# Study on Energy Prices, Costs and Subsidies and their Impact on Industry and Households

## Annexes to the Final report

Trinomics

## Contract details

European Commission – DG Energy

*Study on Energy Prices, Costs and Subsidies and their Impact on Industry and Households*

*DG ENER/Unit A4/Year 2017-Vigie No 2017-359 V2.0*

Service request under framework contract MOVE/ENER/SRD.1/2016-498 Lot 2

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## Acknowledgements

The authors would like to thank the contributions of Emma Smith and all country experts to the data gathering. In addition we would like to thank the cooperation and inputs provided by CEER and the National Regulatory Agencies across the EU Member States.

Finally, we would like to signal our thanks to the Commission Services for an effective and enjoyable cooperation in the preparation of this report and the support provided in data gathering and in the successful iteration and completion of this report.

## Date

Rotterdam, 3 September 2018

## Disclaimer

**Rotterdam, 3 September 2018**

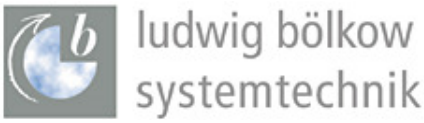
**Client: European Commission – DG Energy**

**Service request under framework contract MOVE/ENER/SRD.1/2016-498**

***Study on Energy Prices, Costs and Subsidies and their Impact on Industry and Households***

**In association with:**





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# Annex A: Country and NACE abbreviations

**Table 0-1: Country abbreviations list (ISO 2-digit codes)**

| EU28 | Code | Non-EU G20 | Code |
|---|---|---|---|
| Austria | AT | Argentina | AR |
| Belgium | BE | Australia | AU |
| Bulgaria | BG | Brazil | BR |
| Croatia | HR | Canada | CA |
| Cyprus | CY | China | CN |
| Czech Republic | CZ | India | IN |
| Denmark | DK | Indonesia | ID |
| Estonia | EE | Japan | JP |
| Finland | FI | Mexico | MX |
| France | FR | Russia | RU |
| Germany | DE | Saudi Arabia | SA |
| Greece | EL | South Africa | ZA |
| Hungary | HU | South Korea | KR |
| Ireland | IE | Turkey | TR |
| Italy | IT | United States | US |
| Latvia | LV | Norway | NO |
| Lithuania | LT | Switzerland | CH |
| Luxembourg | LU | | |
| Malta | MT | | |
| Netherlands | NL | | |
| Poland | PL | | |
| Portugal | PT | | |
| Romania | RO | | |
| Slovakia | SK | | |
| Slovenia | SI | | |
| Spain | ES | | |
| Sweden | SE | | |
| United Kingdom | UK | | |

Table 0-2: NACE code list

| NACE 1 | NACE 2 |
|---|---|
| A Agriculture | A Agriculture |
| | A01 Crop and animal production, hunting and related service activities |
| | A02 Forestry and logging |
| | A03 Fishing and aquaculture |
| B & D Energy industry | B D Cross sector |
| | B D Infrastructure |
| | B Fossil fuels |
| | D CHP and district heating |
| | D Electricity |
| | D Electricity from fossil fuels |
| | D Electricity from nuclear |
| | D Energy storage |
| | D Heat pumps |
| | D RES |
| | D RES for electricity production |
| | D RES for heating and cooling |
| C Manufacturing | C Manufacturing |
| | C Energy intensive manufacturing industry |
| | C10 food products |
| | C11 beverages |
| | C12 tobacco products |
| | C13 textiles |
| | C14 wearing apparel |
| | C15 leather and related products |
| | C16 wood and of products of wood and cork, except furniture; articles of straw and plaiting materials |
| | C17 paper and paper products |
| | C18 Printing and reproduction of recorded media |
| | C19 coke and refined petroleum products |
| | C20 chemicals and chemical products |
| | C21 basic pharmaceutical products and pharmaceutical preparations |
| | C22 rubber and plastic products |
| | C23 other non-metallic mineral products |
| | C24 basic metals |
| | C25 fabricated metal products, except machinery and equipment |
| | C26 computer, electronic and optical products |
| | C27 electrical equipment |
| | C28 machinery and equipment n.e.c. |
| | C29 motor vehicles, trailers and semi-trailers |
| | C30 other transport equipment |
| | C31 furniture |
| | C32 Other manufacturing |
| | C33 Repair and installation of machinery and equipment |

| NACE 1 | NACE 2 |
|---|---|
| H Transport | H49 Rail transport |
| | H49 Road transport |
| | H50 Water transport |
| | H51 Air transport |
| HH Households | HH Households |
| O Public | O Public |
| Z Non-households | Z Non-households |
| Cross sector | Cross sector |

# Annex B: T1 - International energy prices - data source tables

| Electricity Wholesale prices | | | |
|---|---|---|---|
| Country code | Source | Price type | Comment |
| EU28 | Calculated | Consumption (total) weighted average of EU28 MS for which data is available | |
| AT | Platts | EXAA-AT | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| BE | Platts | BPX-BE | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| BG | Platts | IBEX-BG | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| CY | No data | | |
| CZ | Platts | OTE-CZ | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| DE | Platts | EPEXspot-DE | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| DK | Platts | NP - DK | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts. The European Commission calculated a simple mean of NP-DK East and NP-DK West markets to give a final result for NP-DK. |
| EE | Platts | NP-EE | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| EL | Platts | DESMIE-GR | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| ES | Platts | OMEL-ES | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| FI | Platts | NP-FI | Calculated monthly averages Base Load 00:00-24:00. Day ahead contracts. |
| FR | Platts | EPEXspot-FR | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| HR | ERRA | | |
| HU | Platts | HUPX-HU | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| IE | Platts | IE-SEMO | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| IT | Platts | GME-IT | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| LT | Platts | NP-LT | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| LU | Platts | Proxy used: EPEXspot-DE | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| LV | Platts | NP-LV | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| MT | Platts | Proxy used: GME-IT | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| NL | Platts | APX-NL | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| PL | Platts | PolPX-PL | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| PT | Platts | OMEL-PT | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| RO | Platts | OPCOM-RO | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| SE | Platts | NP-SE Disc & NP-SE3 Stockholm | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| SI | Platts | BSP-SI | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| SK | Platts | OTE-SK | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| UK | Platts | Elexon-UK | Calculated monthly averages Base Load: 00.00-24.00. Day ahead contracts |
| AG | No data | | |
| AU | Australian Energy Regulator | | Queensland - used as proxy for AU, as largest power producing state in AU, also similar consumption to NSW and Victoria |
| BR | CEIC | | Unable to source wholesale price, used industrial price as proxy |
| CA | IESO | | The monthly and yearly average Hourly Ontario Energy Price (HOEP) reported in ¢/kWh from May 2002 to 2017. |
| CN | CEIC | | Unable to source wholesale price, used industrial price as proxy |
| IN | No data | | |

| | | | |
|---|---|---|---|
| ID | CEIC | | Unable to source wholesale price, used industrial price as proxy |
| JP | Japan Electric Power Exchange | | |
| ME | IEA Mexico Energy Outlook: Special Report 2016 | | Estimated from figure 1.11 in report |
| RF | ERRA | | |
| SA | No data | | |
| ZA | No data | | |
| KO | No data | | |
| TR | ERRA | | |
| US | EIA ICE Daily Indices. | | Simple average of weighted daily prices across the 9 USA electricity hubs |

| Electricity Retail Household Prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Calculated | Consumption (residential) weighted average of EU28 MS for which data is available | |
| AT | ESTAT- HICP-monthly prices-el_2008_2017 261 | Band DD : 5 000 kWh < Consumption < 15 000 kWhAll | Band DD selected on the basis that this is band with highest market share in ongoing EC data collection. |
| BE | ESTAT- HICP-monthly prices-el_2008_2017 96 | Band DB : 1 000 kWh < Consumption < 2 500 kWhAll | Band DB selected on the basis that this is band with highest market share in ongoing EC data collection. |
| BG | ESTAT- HICP-monthly prices-el_2008_2017 267 | Band DD : 5 000 kWh < Consumption < 15 000 kWhAll | Band DD selected on the basis that this is band with highest market share in ongoing EC data collection. |
| CY | ESTAT- HICP-monthly prices-el_2008_2017 186 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| CZ | ESTAT- HICP-monthly prices-el_2008_2017 189 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| DE | ESTAT- HICP-monthly prices-el_2008_2017 192 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| DK | ESTAT- HICP-monthly prices-el_2008_2017 195 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| EE | ESTAT- HICP-monthly prices-el_2008_2017 282 | Band DD : 5 000 kWh < Consumption < 15 000 kWhAll | Band DD selected on the basis that this is band with highest market share in ongoing EC data collection. |
| EL | ESTAT- HICP-monthly prices-el_2008_2017 213 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| ES | ESTAT- HICP-monthly prices-el_2008_2017 201 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| FI | ESTAT- HICP-monthly prices-el_2008_2017 207 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| FR | ESTAT- HICP-monthly prices-el_2008_2017 294 | Band DD : 5 000 kWh < Consumption < 15 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| HR | Eurostat [nrg_pc_204] | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll taxes and levies included | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| HU | ESTAT- HICP-monthly prices-el_2008_2017 216 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| IE | ESTAT- HICP-monthly prices-el_2008_2017 303 | Band DD : 5 000 kWh < Consumption < 15 000 kWhAll | Band DD selected on the basis that this is band with highest market share in ongoing EC data collection. |
| IT | ESTAT- HICP-monthly prices-el_2008_2017 222 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |

| | | | |
|---|---|---|---|
| LT | ESTAT- HICP-monthly prices-el_2008_2017 141 | Band DB : 1 000 kWh < Consumption < 2 500 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| LU | ESTAT- HICP-monthly prices-el_2008_2017 228 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | No data - assumption of default band DC. |
| LV | ESTAT- HICP-monthly prices-el_2008_2017 231 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| MT | ESTAT- HICP-monthly prices-el_2008_2017 234 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| NL | ESTAT- HICP-monthly prices-el_2008_2017 237 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Band DC selected on the basis that this is band with highest market share in ongoing EC data collection. |
| PL | ESTAT- HICP-monthly prices-el_2008_2017 156 | Band DB : 1 000 kWh < Consumption < 2 500 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| PT | ESTAT- HICP-monthly prices-el_2008_2017 243 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| RO | ESTAT- HICP-monthly prices-el_2008_2017 162 | Band DB : 1 000 kWh < Consumption < 2 500 kWhAll | Band DB selected on the basis that this is band with highest market share in ongoing EC data collection. |
| SE | ESTAT- HICP-monthly prices-el_2008_2017 249 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| SI | ESTAT- HICP-monthly prices-el_2008_2017 336 | Band DD : 5 000 kWh < Consumption < 15 000 kWhAll | Band DD selected on the basis that this is band with highest market share in ongoing EC data collection. |
| SK | ESTAT- HICP-monthly prices-el_2008_2017 255 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| UK | ESTAT- HICP-monthly prices-el_2008_2017 258 | Band DC : 2 500 kWh < Consumption < 5 000 kWhAll | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| AG | No data | | |
| AU | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| BR | CEIC | Average Current Prices: Source: Electricity: Residence (Brazil) | |
| CA | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| CN | CEIC | CN: Service Price: 36 City Avg: Electricity: for Resident: 220v (China) | The retail price data covers the 36 biggest cities. |
| IN | No data | | |
| ID | CEIC | Electricity: Average Price: Household (Indonesia) | |
| JP | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| ME | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| RF | CEIC | Avg Consumer Price: Electricity Supply (Russian Federation) | |
| SA | ERRA | Total, all - excluding taxes | |
| ZA | ESKOM | Total including all taxes | See table 3.5 in http://www.eskom.co.za/Documents/EcoOverviewElectricitySA-2017.pdf |
| KO | CEIC | Retail Price: Electricity: Average (South Korea) | |
| TR | Eurostat [nrg_pc_204] | Band DB : 1 000 kWh < Consumption < 2 500 kWhAll taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Electricity prices: price systems 2014 |
| US | CEIC | Electricity: Average Retail Price: Residential (USA) | |

| Electricity Retail Industrial Prices | | | |
|---|---|---|---|
| Country code | Source | Price type | Comment |
| EU28 | Calculated | Consumption (industrial) weighted average of EU28 MS for which data is available | |
| AT | ESTAT- HICP-monthly prices-el_2008_2017 263 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| BE | ESTAT- HICP-monthly prices-el_2008_2017 266 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| BG | ESTAT- HICP-monthly prices-el_2008_2017 269 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Bulgaria, based on Eurostat (2015) Electricity prices: price systems 2014 |
| CY | ESTAT- HICP-monthly prices-el_2008_2017 356 | Band IE : 20 000 MWh < Consumption < 70 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Cyprus, based on Eurostat (2015) Electricity prices: price systems 2014 |
| CZ | ESTAT- HICP-monthly prices-el_2008_2017 275 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| DE | ESTAT- HICP-monthly prices-el_2008_2017 362 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption - Band selected on the basis of closest match of EU and IEA price data. |
| DK | ESTAT- HICP-monthly prices-el_2008_2017 281 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| EE | ESTAT- HICP-monthly prices-el_2008_2017 284 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Estonia, based on Eurostat (2015) Electricity prices: price systems 2014 |
| EL | ESTAT- HICP-monthly prices-el_2008_2017 299 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| ES | ESTAT- HICP-monthly prices-el_2008_2017 287 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| FI | ESTAT- HICP-monthly prices-el_2008_2017 125 | Band IB : 20 MWh < Consumption < 500 MWh ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Finland, based on Eurostat (2015) Electricity prices: price systems 2014 |
| FR | ESTAT- HICP-monthly prices-el_2008_2017 296 | Band IB : 20 MWh < Consumption < 500 MWh ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in France, based on Eurostat (2015) Electricity prices: price systems 2014 |
| HR | Eurostat [nrg_pc_205] | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| HU | ESTAT- HICP-monthly prices-el_2008_2017 302 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| IE | ESTAT- HICP-monthly prices-el_2008_2017 137 | Band IB : 20 MWh < Consumption < 500 MWh ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Ireland, based on Eurostat (2015) Electricity prices: price systems 2014 |
| IT | ESTAT- HICP-monthly prices-el_2008_2017 140 | Band IB : 20 MWh < Consumption < 500 MWh ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Italy, based on Eurostat (2015) Electricity prices: price systems 2014 |
| LT | ESTAT- HICP-monthly prices-el_2008_2017 143 | Band IB : 20 MWh < Consumption < 500 MWh ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Lithuania, based on Eurostat (2015) Electricity prices: price systems 2014 |
| LU | ESTAT- HICP-monthly prices-el_2008_2017 314 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| LV | ESTAT- HICP-monthly prices-el_2008_2017 317 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |

| | | | |
|---|---|---|---|
| MT | ESTAT- HICP-monthly prices-el_2008_2017 320 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| NL | ESTAT- HICP-monthly prices-el_2008_2017 323 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in the Netherlands, based on Eurostat (2015) Electricity prices: price systems 2014 |
| PL | ESTAT- HICP-monthly prices-el_2008_2017 326 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in the Netherlands, based on Eurostat (2015) Electricity prices: price systems 2014 |
| PT | ESTAT- HICP-monthly prices-el_2008_2017 161 | Band IB : 20 MWh < Consumption < 500 MWh ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Portugal, based on Eurostat (2015) Electricity prices: price systems 2014 |
| RO | ESTAT- HICP-monthly prices-el_2008_2017 332 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| SE | ESTAT- HICP-monthly prices-el_2008_2017 335 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| SI | ESTAT- HICP-monthly prices-el_2008_2017 338 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| SK | ESTAT- HICP-monthly prices-el_2008_2017 341 | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in Slovakia, based on Eurostat (2015) Electricity prices: price systems 2014 |
| UK | ESTAT- HICP-monthly prices-el_2008_2017 557 | Band IG : Consumption > 150 000 MWh; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share in the UK, based on Eurostat (2015) Electricity prices: price systems 2014 |
| AG | No data | | |
| AU | No data | | |
| BR | CEIC | ; Average Current Prices: Source: Electricity: Industry (Brazil) | |
| CA | IEA Energy Prices and Taxes | ; Total price | This total price includes a tax amount (typically less than 10% of the total price), part of which is a (recoverable) General Sales Tax. No data is available on the precise split between the two. The price is also the average of prices in multiple states and territories which each have their own different excise and sales tax regimes. |
| CN | CEIC | ; CN: Usage Price: 36 City Avg: Electricity for Industry: 35 kV & Above (China) | The retail price data covers the 36 biggest cities. |
| IN | No data | | |
| ID | CEIC | ; Electricity: Average Price: Industrial (Indonesia) | |
| JP | IEA Energy Prices and Taxes | ; Total (less taxes) | This price represents the total price less an adjustment to account for the (recoverable) consumption tax part of the price. This was set at 5% until 2014, whereby it increased to 8%. These amounts have been deducted in the price used in the tool. |
| ME | IEA Energy Prices and Taxes | ; Total price | VAT excluded from price. No excise taxes. |
| RF | ERRA | Total; all - excluding taxes | Non-residential |
| SA | ERRA | Total; All taxes and levies included. (No taxes in place) | Non-residential |
| ZA | No data | | |
| KO | IEA Energy Prices and Taxes | ; Total price | VAT excluded from price, excise taxes included. |
| TR | Eurostat [nrg_pc_205] | Band ID : 2 000 MWh < Consumption < 20 000 MWh; Excluding VAT and other recoverable taxes and levies | Assumption of default consumption band, as no data from other sources or suitable proxy to estimate. |
| US | CEIC | ; Electricity: Average Retail Price: Industrial (USA) | Price may include a (recoverable) state sales tax - which varies by state, rates vary from 0-7.25%. |

| Natural gas wholesale prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |

| | | | |
|---|---|---|---|
| AT | Platts | Hub; Simple average of daily prices | |
| BE | Platts | Hub; Simple average of daily prices | |
| BG | Comext | EBP-RF; Simple average of daily prices | |
| CY | No data | | |
| CZ | OTE | Hub; Simple average of daily prices | |
| DE | Platts | Hub; Simple average of daily prices | |
| DK | Platts | Hub; Simple average of daily prices | |
| EE | Comext | EBP-RF; Simple average of daily prices | |
| EL | Comext | EBP-RF; Simple average of daily prices | |
| ES | Comext | EBP-DZ; Simple average of daily prices | |
| FI | Finnish gas exchange | Hub; Simple average of daily prices | |
| FR | Platts | Hub; Simple average of daily prices | |
| HR | Eurostat data provided by the European Commission, value of pipeline gas import - WSP, value in EURs | ; Simple average of daily prices | |
| HU | Comext | EBP-RF; Simple average of daily prices | |
| IE | Comext | EBP-UK; Simple average of daily prices | Outlier values in 2011 removed from adjusted series |
| IT | Platts | Hub; Simple average of daily prices | |
| LT | Comext | EBP-RF; Simple average of daily prices | |
| LU | Enerdata report | | Proxy average of DE and BE Wholesale gas prices (weighted by the share of the gas supplied from BE or DE). We calculated 62.6% (from BE 6.2TWh) and 37.4% (from DE 3.7TWh). Starting from 2007-7. (2003-4 to 2007-6 the LU price is 100% BE price as there is no DE data for this time). https://estore.enerdata.net/energy-market/luxembourg-energy-report-and-data.html |
| LV | Comext | EBP-RF; Simple average of daily prices | |
| MT | No data | | |
| NL | Platts | Hub; Simple average of daily prices | |
| PL | ERRA | | |
| PT | Comext | EBP-ES; Simple average of daily prices | |
| RO | Comext | EBP-RF; Simple average of daily prices | |
| SE | Comext | EBP-DK; Simple average of daily prices | |
| SI | Comext | EBP-RF; Simple average of daily prices | |
| SK | Comext | EBP-RF; Simple average of daily prices | |
| UK | Platts | UK NBP; Simple average of daily prices | |
| AG | Knoema ( World Gas Intelligence; World Bank) | World liquefied natural gas (LNG) landed prices, Monthly Update $/MMBtu (Observation data) | Adjusted global LNG average |
| AU | Australian Energy Regulator | Average daily weighted imbalance price ($ per gigajoule) | |
| BR | Bluegold research | Global LNG Prices | Adjusted global LNG average |
| CA | Bloomberg Terminal | | Calculated from daily prices of 15 Canadian wholesale natural gas benchmarks (including day-ahead, border prices and near curve) |
| CN | CEIC | | Wtd Avg_All Borders |
| IN | Knoema ( World Gas Intelligence; World Bank) | World liquefied natural gas (LNG) landed prices, Monthly Update $/MMBtu (Observation data) | Adjusted global LNG average |

| | | | |
|---|---|---|---|
| ID | Knoema ( World Gas Intelligence; World Bank) | Indonesian Liquified Natural Gas Monthly Price - US Dollars per Million Metric British Thermal Unit | |
| JP | Thomson-Reuters + Waterborne | | LNG average import prices |
| ME | Knoema ( World Gas Intelligence; World Bank) | World liquefied natural gas (LNG) landed prices, Monthly Update $/MMBtu (Observation data) | Adjusted global LNG average |
| RF | ERRA | | |
| SA | No data | | |
| ZA | No data | | |
| KO | Thomson-Reuters + Waterborne | | LNG average import prices |
| TR | ERRA | | |
| US | Thomson-Reuters | | Henry Hub - daily spot prices |

| Natural gas retail household prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Calculated | Consumption (residential) weighted average of EU28 MS for which data is available | |
| AT | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Assumed default, as no data, possible proxies eg. DE, also D2 |
| BE | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| BG | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| CY | No data | | No household natural gas use |
| CZ | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Assumed default, as no data, possible proxies eg. SK, also D2 |
| DE | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| DK | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Assumed default, as no data or good proxy |
| EE | ESTAT - HICP monthly prices NG 2008-2017 | Band D3 : Consumption > 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| EL | Eurostat_gas_HH_nrg_pc_202 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| ES | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| FI | No data | | No household natural gas use |
| FR | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| HR | Eurostat_gas_HH_nrg_pc_202 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| HU | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| IE | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| IT | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| LT | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |

| | | | |
|---|---|---|---|
| LU | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Assumed default, as no data, possible proxies eg. BE, also D2 |
| LV | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| MT | No data | | No household natural gas use |
| NL | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| PL | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| PT | ESTAT - HICP monthly prices NG 2008-2017 | Band D1 : Consumption < 20 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| RO | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| SE | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Assumed default, as no data or good proxy |
| SI | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| SK | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| UK | ESTAT - HICP monthly prices NG 2008-2017 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| AG | No data | | |
| AU | No data | | |
| BR | CEIC | Average Current Prices: Source: Natural Gas (Brazil) | |
| CA | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| CN | CEIC | CN: Service Price: 36 City Avg: Pipe Natural Gas: for Resident (China) | The retail price data covers the 36 biggest cities. |
| IN | No data | | |
| ID | No data | | |
| JP | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| ME | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| RF | ERRA | End-user | |
| SA | ERRA | End-user | |
| ZA | No data | | No household natural gas use |
| KO | IEA Energy Prices and Taxes | End-user | Assumed annual value is for Jan |
| TR | Eurostat_gas_HH_nrg_pc_202 | Band D2 : 20 GJ < Consumption < 200 GJ; All taxes and levies included | Selected as residential consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |

| Natural gas retail industrial prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Calculated | Consumption (residential) weighted average of EU28 MS for which data is available | |
| AT | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| BE | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| BG | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| CY | No data | | |
| CZ | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; | Assumed default band as no data or suitable proxy |

| | | | |
|---|---|---|---|
| | | Excluding VAT and other recoverable taxes and levies | |
| DE | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumption - based on closest match of prices with IEA data |
| DK | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| EE | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| EL | Eurostat [nrg_pc_203] | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| ES | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| FI | Eurostat [nrg_pc_203] | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| FR | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| HR | Eurostat [nrg_pc_203] | Band I3 : 10 000 GJ < Consumption < 100 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| HU | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| IE | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| IT | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| LT | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| LU | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| LV | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| MT | No data | | |
| NL | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with 2nd highest market share, based on Eurostat (2015) Gas prices: price systems 2014 - BandI6 has highest share but no price data. |
| PL | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| PT | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| RO | ESTAT - HICP monthly prices NG 2008-2017 | Band I6 : Consumption > 4 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014. |
| SE | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| SI | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |

| | | | |
|---|---|---|---|
| SK | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014 |
| UK | ESTAT - HICP monthly prices NG 2008-2017 | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Selected as industrial consumption band with highest market share, based on Eurostat (2015) Gas prices: price systems 2014. |
| AG | No data | | |
| AU | No data | | |
| BR | CEIC | Average Reference Price: Natural Gas (Brazil) | |
| CA | IEA Energy Prices and Taxes | No consumption band, average price; Total price | Price excludes GST. No excise taxes. |
| CN | CEIC | CN: Usage Price: 36 City Avg: Natural Gas for Industry (China) | The retail price data covers the 36 biggest cities. |
| IN | No data | | |
| ID | No data | | |
| JP | IEA Energy Prices and Taxes | No consumption band, average price; Total price | Excludes (recoverable) consumption tax. No excise taxes. |
| ME | IEA Energy Prices and Taxes | No consumption band, average price; Total price | No VAT or excise taxes charged. |
| RF | ERRA Natural Gas Non-residental Prices | No consumption band, average price; Pre-tax | |
| SA | No data | | |
| ZA | No data | | |
| KO | IEA Energy Prices and Taxes | No consumption band, average price; Total price | No VAT or excise taxes charged. |
| TR | Eurostat [nrg_pc_203] | Band I4 : 100 000 GJ < Consumption < 1 000 000 GJ; Excluding VAT and other recoverable taxes and levies | Assumed default band as no data or suitable proxy |
| US | IEA Energy Prices and Taxes | No consumption band, average price; Total price | Price includes a (recoverable) state sales tax, rates vary between states from 0-7.25%. |

| Petroleum products - petrol retail prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Oil Bulletin | Euro-super 95(I) | EU28 Consumption weighted average. Monthly average of Oil Bulletin weekly data |
| All individual EU Member States | Oil Bulletin | Euro-super 95(I) | Monthly average of Oil Bulletin weekly data |
| AG | GIZ international fuel prices | | |
| AU | IEA Energy Prices and Taxes | Premium unleaded 95 RON (litre) | Assumed annual value is for Jan |
| BR | GIZ international fuel prices | | |
| CA | IEA Energy Prices and Taxes | Premium unleaded 95 RON (litre) | Assumed annual value is for Jan |
| CN | GIZ international fuel prices | | |
| IN | GIZ international fuel prices | | |
| ID | GIZ international fuel prices | | Subsidised price |
| JP | IEA KWES | Premium unleaded 95 RON (litre) | Assumed annual value is for Jan |
| ME | IEA Energy Prices and Taxes | Premium unleaded 95 RON (litre) | Assumed annual value is for Jan |
| RF | GIZ international fuel prices | | |
| SA | GIZ international fuel prices | | |
| ZA | GIZ international fuel prices | | |
| KO | IEA Energy Prices and Taxes | Premium unleaded 95 RON (litre) | Assumed annual value is for Jan |
| TR | IEA Energy Prices and Taxes | Premium unleaded 95 RON (litre) | Assumed annual value is for Jan |
| US | EIA - Gasoline and diesel fuel update | Regular Gasoline | |

| Petroleum products - diesel retail prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Oil Bulletin | Gas oil automobile / Automotive gas oil /Dieselkraftstoff(I) | EU28 Consumption weighted average |
| All individual EU28 Member States | Oil Bulletin | Gas oil automobile / Automotive gas oil /Dieselkraftstoff(I) | Monthly average of Oil Bulletin weekly data |

| | | | |
|---|---|---|---|
| AG | GIZ international fuel prices | | |
| AU | IEA Energy Prices and Taxes | | Household |
| BR | GIZ international fuel prices | | |
| CA | IEA Energy Prices and Taxes | | Household |
| CN | GIZ international fuel prices | | |
| IN | GIZ international fuel prices | | |
| ID | GIZ international fuel prices | | Subsidised price |
| JP | IEA Energy Prices and Taxes | | Household |
| ME | IEA Energy Prices and Taxes | | Household |
| RF | GIZ international fuel prices | | |
| SA | GIZ international fuel prices | | |
| ZA | GIZ international fuel prices | | |
| KO | IEA Energy Prices and Taxes | | Household |
| TR | IEA Energy Prices and Taxes | | Household |
| US | EIA - Diesel fuel pump price history | | Household |

| Petroleum products - LPG retail prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Oil Bulletin | GPL pour moteurLPG motor fuel | EU28 Consumption weighted average |
| All individual EU28 Member States | Oil Bulletin | GPL pour moteurLPG motor fuel | Monthly average of Oil Bulletin weekly data |
| AG | No data | | |
| AU | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| BR | No data | | |
| CA | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| CN | No data | | |
| IN | No data | | |
| ID | No data | | |
| JP | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| ME | No data | | |
| RF | No data | | |
| SA | No data | | |
| ZA | No data | | |
| KO | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| TR | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| US | US AFDA | | |

| Petroleum products - CNG retail prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | EU28 | No data | |
| Austria | AT | | http://cngeurope.com/ |
| Belgium | BE | | http://cngeurope.com/ |
| Bulgaria | BG | | http://cngeurope.com/ |
| Cyprus | CY | No data | |
| Czech Republic | CZ | | http://cngeurope.com/ |
| Germany | DE | | http://cngeurope.com/ |
| Denmark | DK | | http://cngeurope.com/ |
| Estonia | EE | No data | |
| Greece | EL | | http://cngeurope.com/ |
| Spain | ES | | http://cngeurope.com/ |
| Finland | FI | | http://cngeurope.com/ |
| France | FR | | http://cngeurope.com/ |
| Croatia | HR | | http://cngeurope.com/ |
| Hungary | HU | | http://cngeurope.com/ |
| Ireland | IE | | http://cngeurope.com/ |
| Italy | IT | | http://cngeurope.com/ |
| Lithuania | LT | | http://cngeurope.com/ |
| Luxembourg | LU | | http://cngeurope.com/ |
| Latvia | LV | | http://cngeurope.com/ |
| Malta | MT | No data | |
| Netherlands | NL | | http://cngeurope.com/ |
| Poland | PL | | http://cngeurope.com/ |
| Portugal | PT | | http://cngeurope.com/ |
| Romania | RO | | http://cngeurope.com/ |
| Sweden | SE | | http://cngeurope.com/ |
| Slovenia | SI | | http://cngeurope.com/ |
| Slovakia | SK | | http://cngeurope.com/ |
| United Kingdom | UK | | http://cngeurope.com/ |

| | | | |
|---|---|---|---|
| Argentina | AG | No data | |
| Australia | AU | No data | |
| Brazil | BR | No data | |
| Canada | CA | No data | |
| China | CN | No data | |
| India | IN | No data | |
| Indonesia | ID | No data | |
| Japan | JP | No data | |
| Mexico | ME | No data | |
| Russia | RF | | http://cngeurope.com/ |
| Saudi Arabia | SA | No data | |
| South Africa | ZA | No data | |
| South Korea | KO | No data | |
| Turkey | TR | | http://cngeurope.com/ |
| USA | US | | US AFDA |

| Petroleum products - High sulphur fuel oil prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Oil Bulletin | Fuel oil -Schweres Heizöl(III)Soufre > 1%Sulphur > 1%Schwefel > 1% | EU28 Consumption weighted average |
| All individual EU28 Member States | Oil Bulletin | Fuel oil -Schweres Heizöl(III)Soufre > 1%Sulphur > 1%Schwefel > 1% | Monthly average of Oil Bulletin weekly data |
| AG | No data | | |
| AU | No data | | |
| BR | No data | | |
| CA | IEA Energy Prices and Taxes | | Assumed annual value is for Dec |
| CN | No data | | |
| IN | No data | | |
| ID | No data | | |
| JP | IEA Energy Prices and Taxes | | Assumed annual value is for Dec |
| ME | IEA Energy Prices and Taxes | | Assumed annual value is for Dec |
| RF | No data | | |
| SA | No data | | |
| ZA | No data | | |
| KO | IEA Energy Prices and Taxes | | Assumed annual value is for Dec |
| TR | IEA Energy Prices and Taxes | | Assumed annual value is for Dec |
| US | IEA Energy Prices and Taxes | | Assumed annual value is for Dec |

| Petroleum products - Low sulphur fuel oil prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Oil Bulletin | Fuel oil -Schweres Heizöl(III)Soufre | EU28 Consumption weighted average |
| All individual EU28 Member States | Oil Bulletin | Fuel oil -Schweres Heizöl(III)Soufre | Monthly average of Oil Bulletin weekly data |
| AG | No data | | |
| AU | No data | | |
| BR | No data | | |
| CA | No data | | |
| CN | No data | | |
| IN | No data | | |
| ID | No data | | |
| JP | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| ME | No data | | |
| RF | No data | | |
| SA | No data | | |
| ZA | No data | | |
| KO | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| TR | No data | | |
| US | No data | | |

| Petroleum products - Heating oil prices | | | |
|---|---|---|---|
| **Country code** | **Source** | **Price type** | **Comment** |
| EU28 | Oil Bulletin | Gas oil de chauffageHeating gas oilHeizöl(II) | EU28 Consumption weighted average |
| All individual | Oil Bulletin | Gas oil de chauffageHeating gas oilHeizöl(II) | Monthly average of Oil Bulletin weekly data |

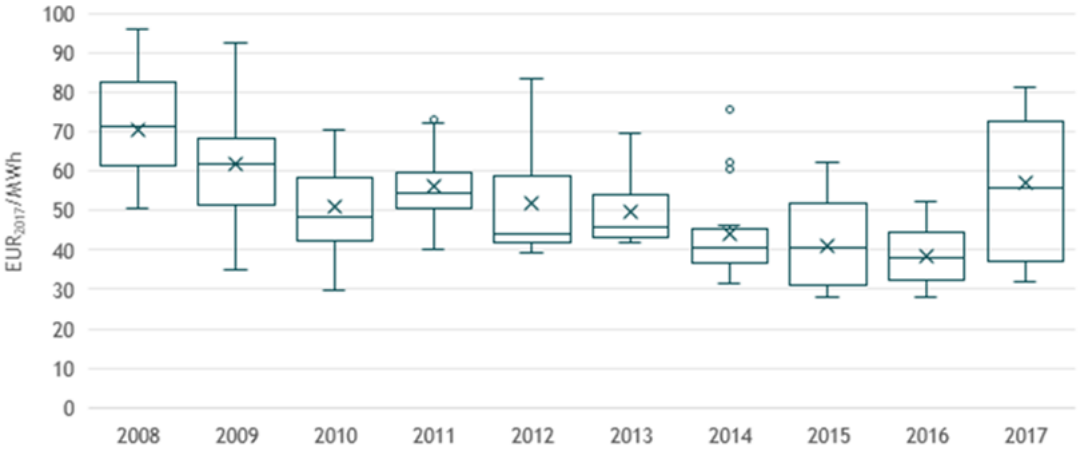
| | | | |
|---|---|---|---|
| EU28 Member States | | | |
| AG | No data | | |
| AU | No data | | |
| BR | No data | | |
| CA | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| CN | No data | | |
| IN | No data | | |
| ID | No data | | |
| JP | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| ME | No data | | |
| RF | No data | | |
| SA | No data | | |
| ZA | No data | | |
| KO | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| TR | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |
| US | IEA Energy Prices and Taxes | | Assumed annual value is for Jan |

| **Petroleum products: crude oil prices** | | | |
|---|---|---|---|
| Country | Source | Relevant info | Comment |
| Average | World Bank - Global Economic Monitor Commodities (Pink Sheet) | | |
| Brent | World Bank - Global Economic Monitor Commodities (Pink Sheet) | | |
| Dubai | World Bank - Global Economic Monitor Commodities (Pink Sheet) | | |
| WTI | World Bank - Global Economic Monitor Commodities (Pink Sheet) | | |

# Annex C: T1 - International energy prices - EU price movements

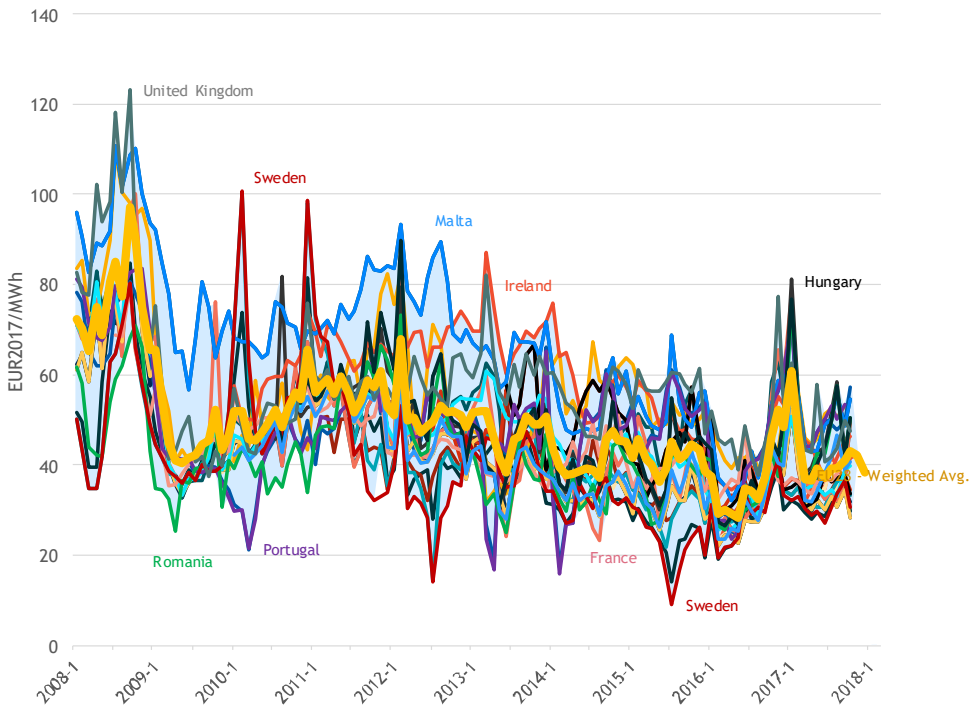
**Note on Box Plots:** The box represents the 25th to 75th percentile of data in the set, the line represents the median (middle) value of the range, whilst the cross represents the mean. The T lines extending from the box representing the full range of values in that period, except in the case of values denoted by o which represent outliers in the data. The mean and median values diverge from the EU averages presented in chapter 3 as the values here are unweighted, whilst in chapter 3 the EU average is calculated from country values weighted by consumption.

**Table 0-1: Box plot of EU28 wholesale electricity prices 2008-2017**



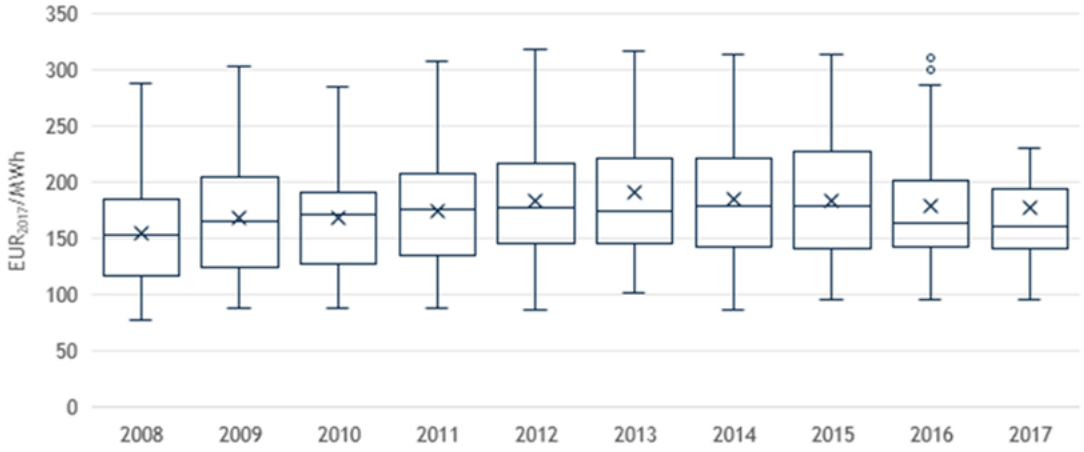

*Source:* Own calculations

**Table 0-2: EU28 wholesale electricity prices 2008-2017, individual Member States lines visible, outliers named**



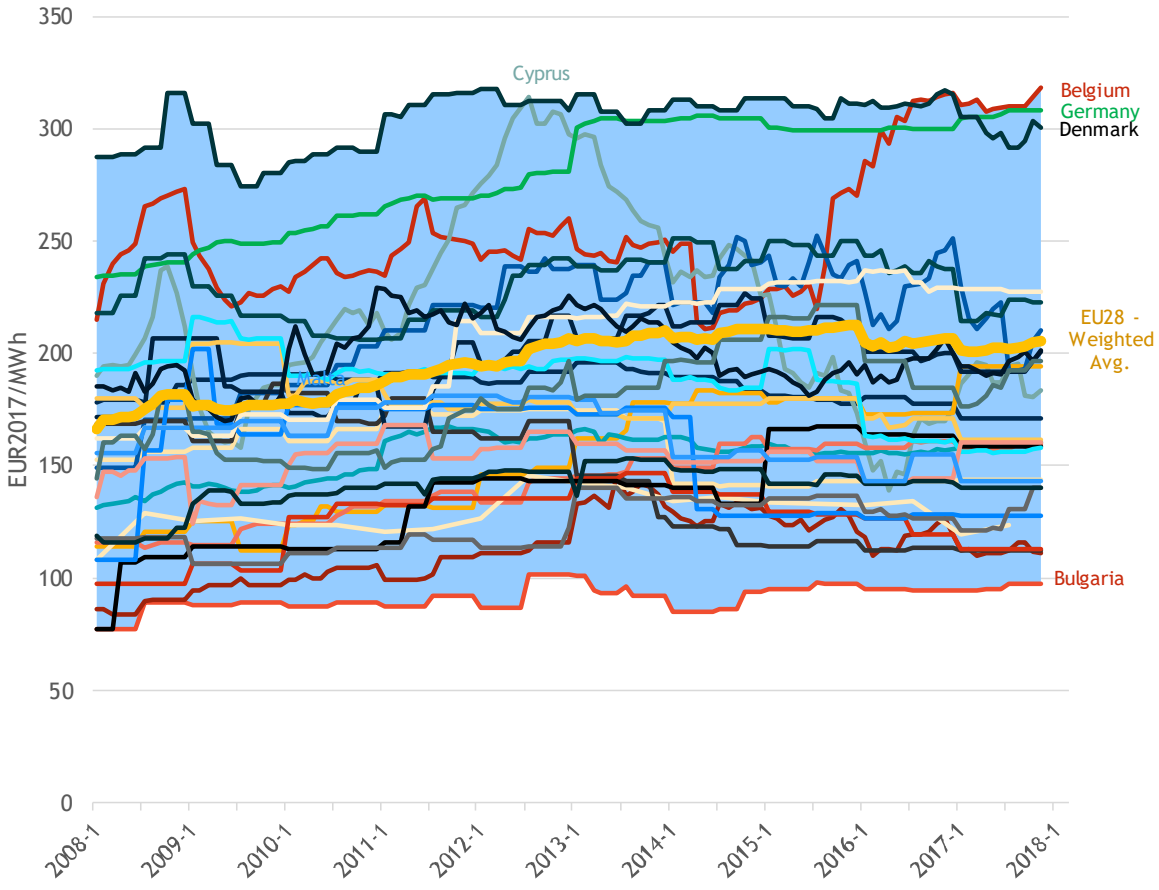

*Source:* Own calculations

**Table 0-3: Box plot of EU28 household retail electricity prices 2008-2017**



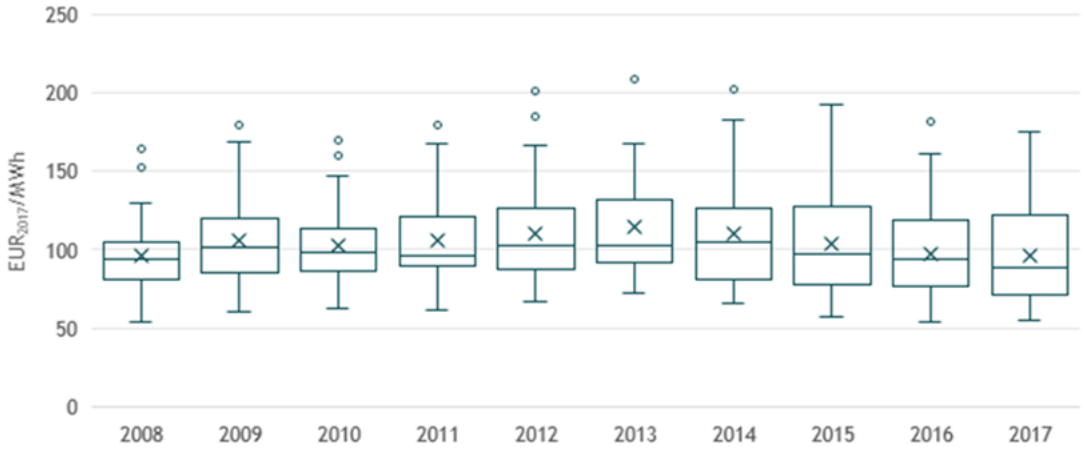

*Source:* Own calculations

**Table 0-4: EU28 household retail electricity prices 2008-2017, individual Member States lines visible, outliers named**



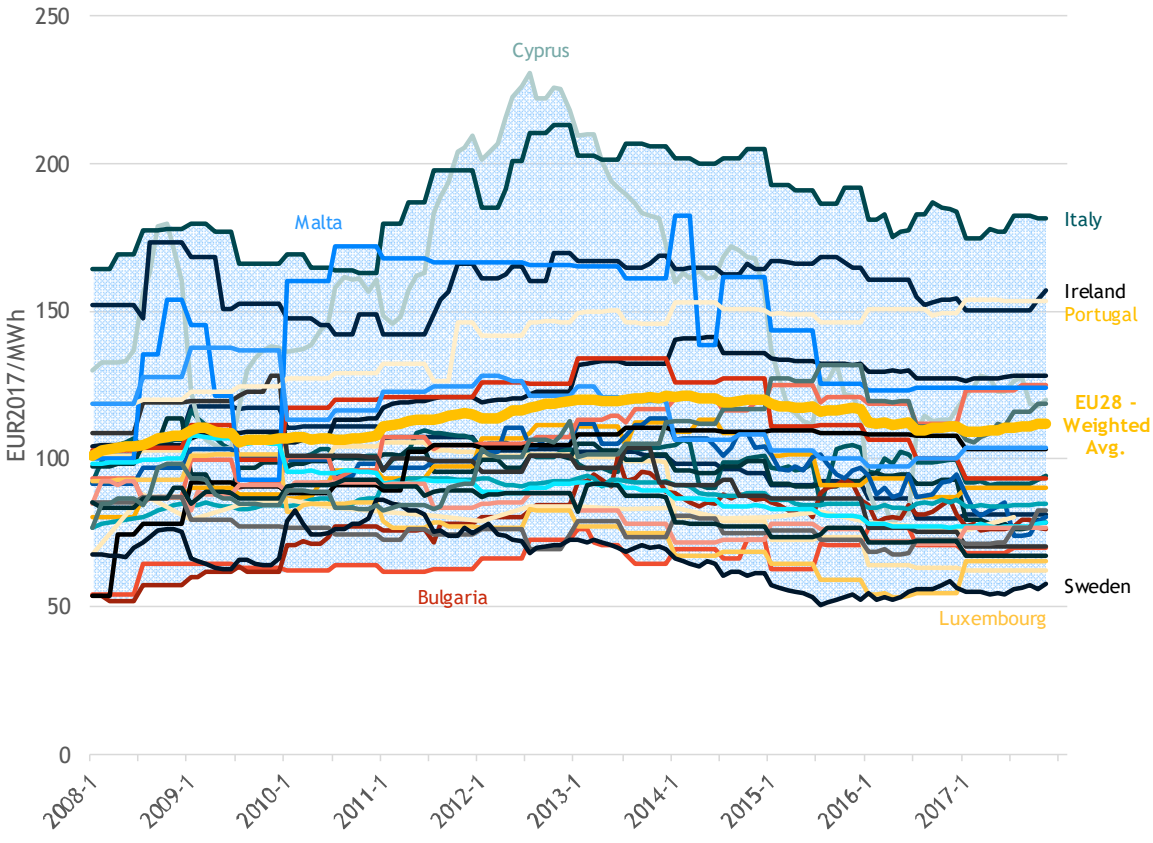

*Source:* Own calculations

**Table 0-5: Box plot of EU28 industrial retail electricity prices 2008-2017**



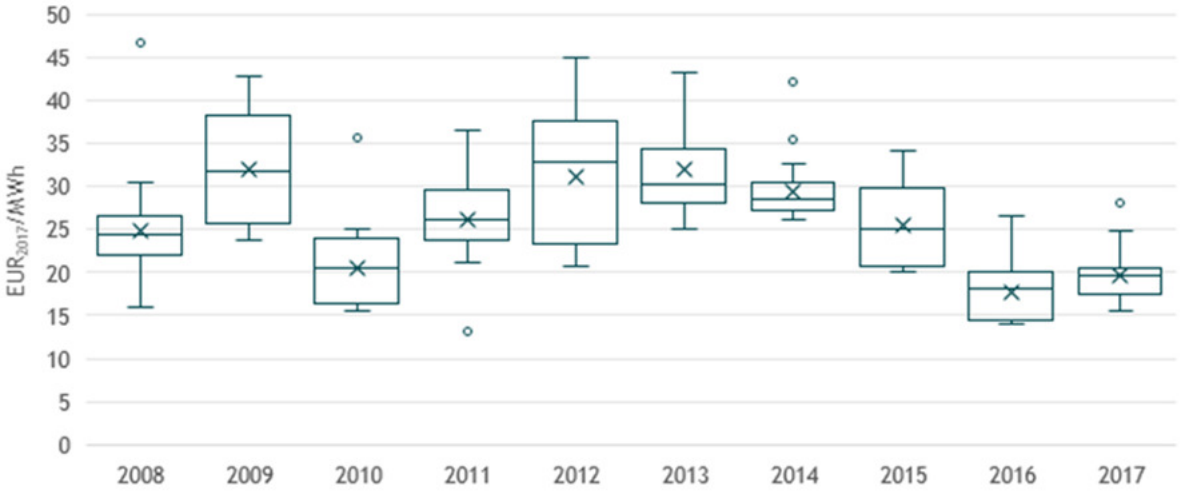

*Source:* Own calculations

**Table 0-6: EU28 industrial retail electricity prices 2008-2017, individual Member States lines visible, outliers named**



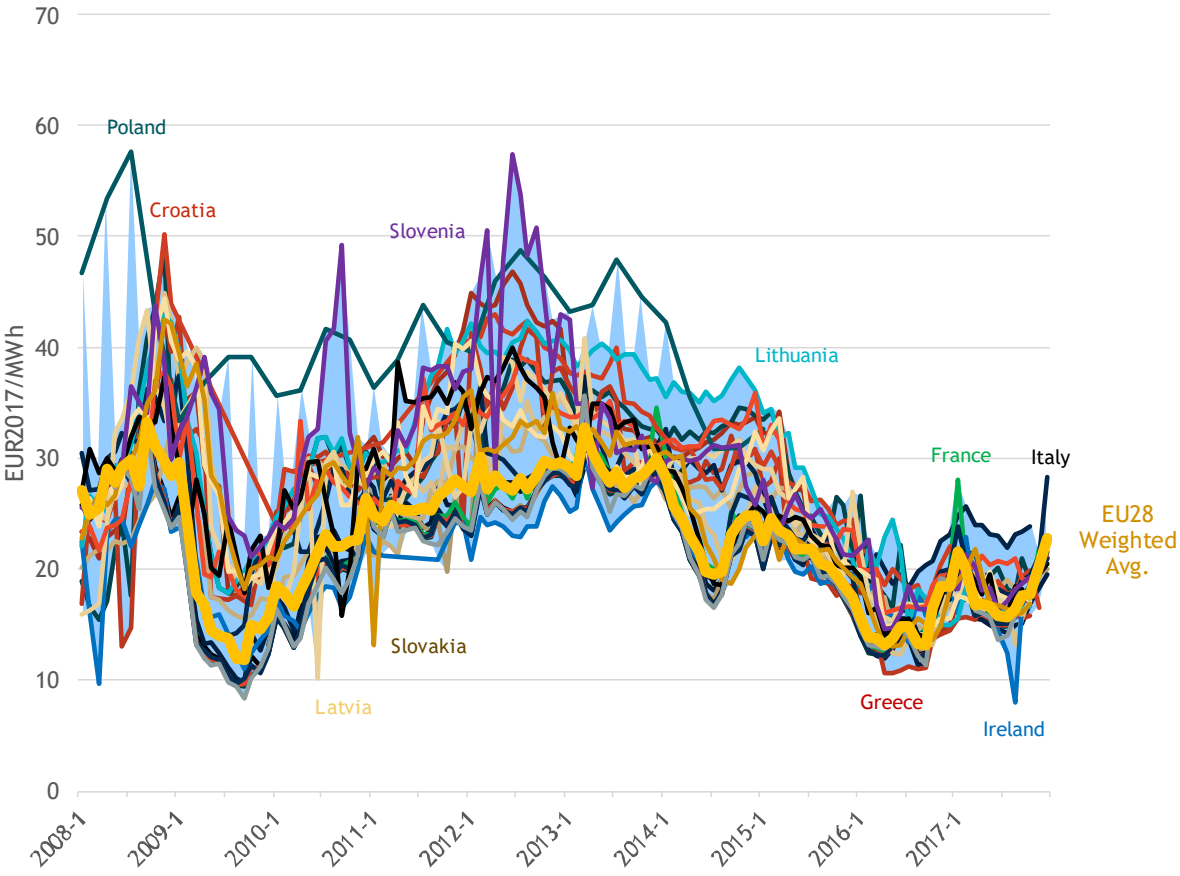

*Source:* Own calculations

**Table 0-7: Box plot of EU28 wholesale natural gas prices 2008-2017**



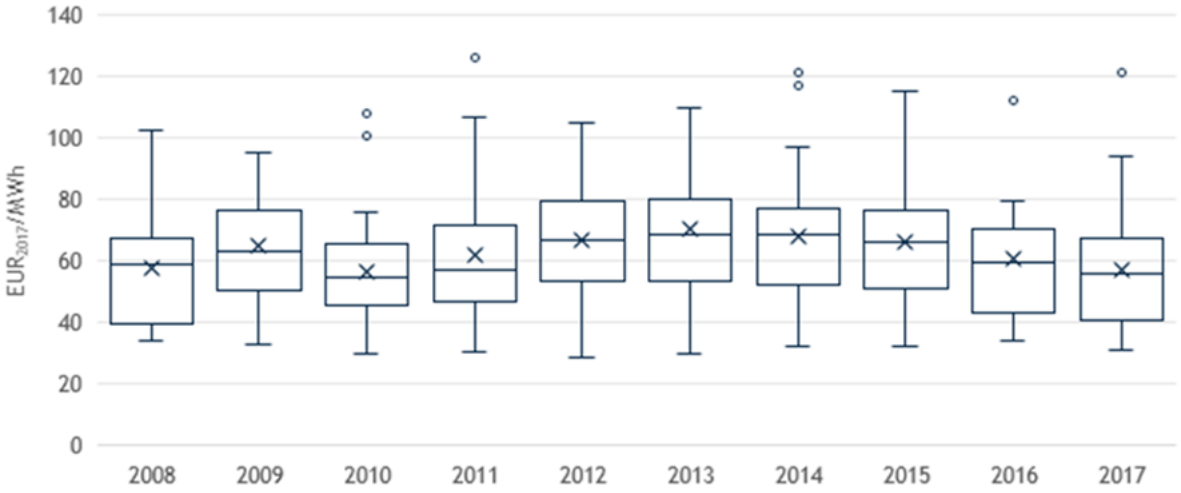

*Source:* Own calculations

**Table 0-8: EU28 wholesale natural gas prices 2008-2017, individual Member States lines visible, outliers named**



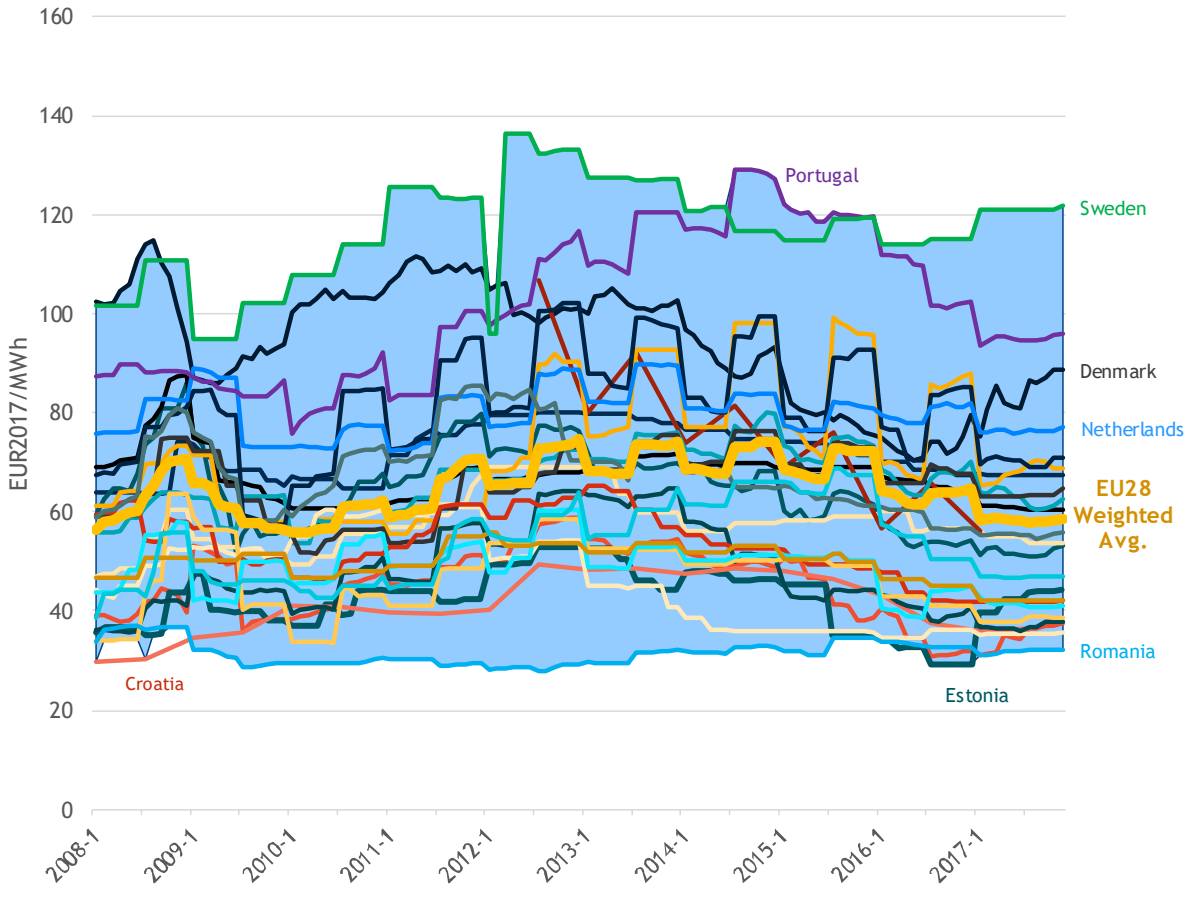

*Source:* Own calculations

**Table 0-9: Box plot of EU28 household retail natural gas prices 2008-2017**



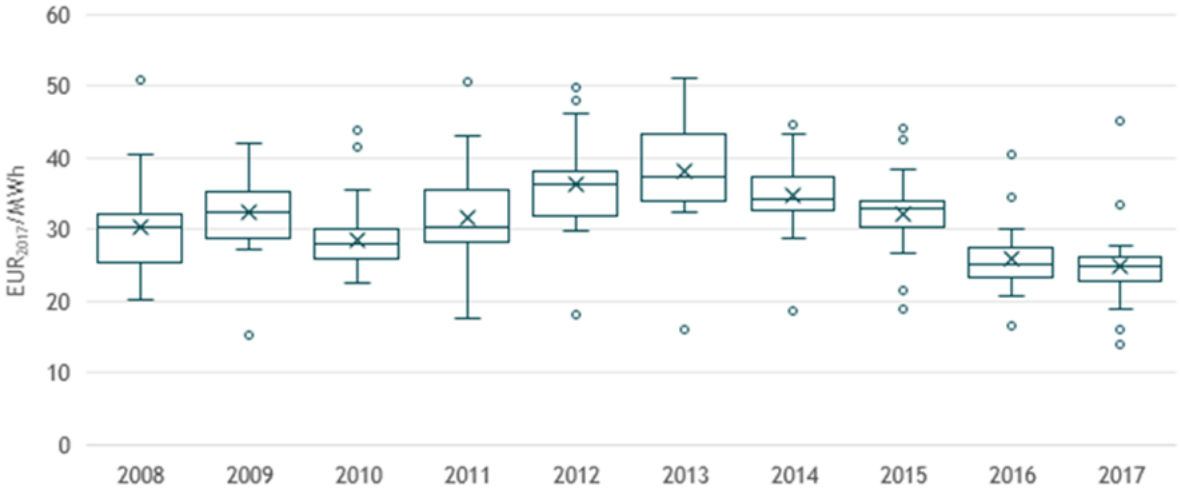

*Source:* Own calculations

**Table 0-10: EU28 household retail natural gas prices 2008-2017, individual Member States lines visible, outliers named**



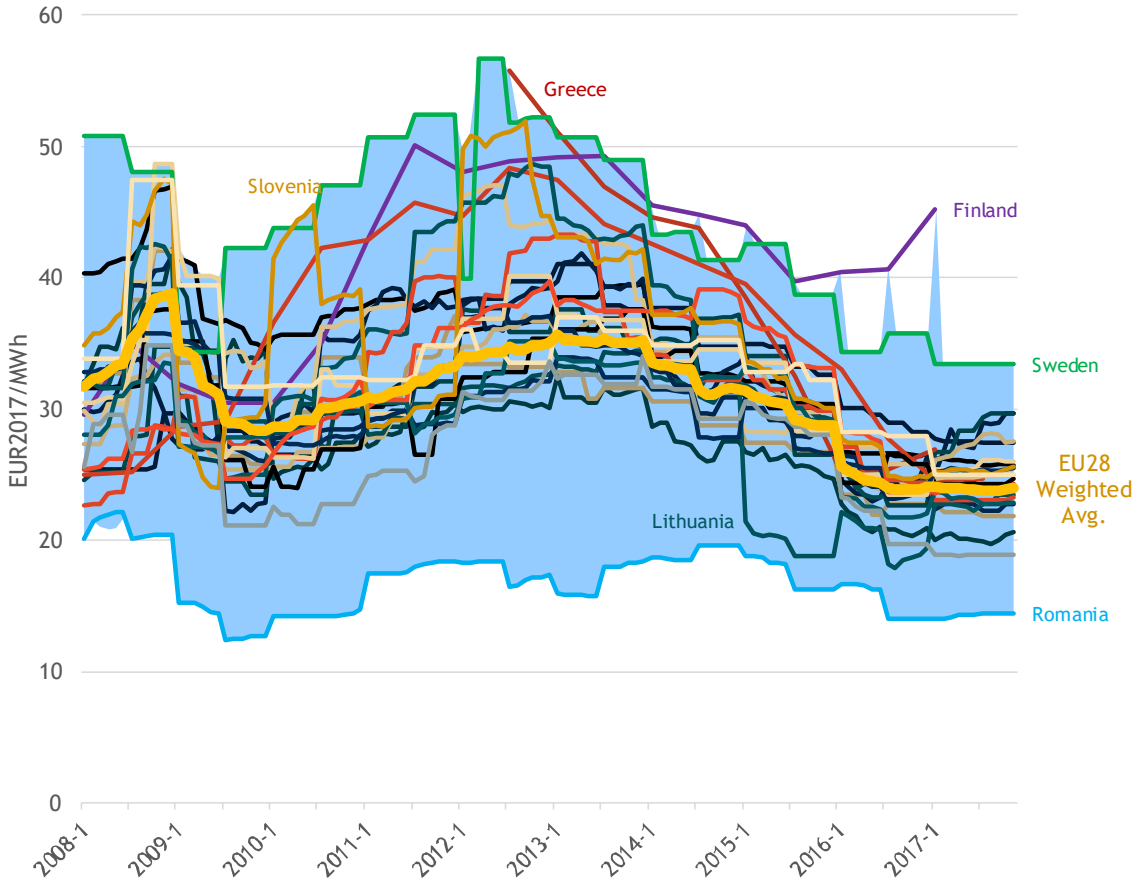

*Source:* Own calculations

**Table 0-11: Box plot of EU28 industrial retail natural gas prices 2008-2017**




*Source:* Own calculations

**Table 0-12: EU28 industrial retail natural gas prices 2008-2017, individual Member States lines visible, outliers named**




*Source:* Own calculations

# Annex D: T2 - List of countries available for calculation of energy cost shares in sector C

| | | |
|---|---|---|
| C103 - Fruit and vegetables | C103 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C106 - Grain products | C106 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C132 - Textiles | C132 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, PL, PT, RO, SE, SI, SK, UK |
| C161 - Sawmills | C161 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C171 - Pulp and paper | C171 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, NL, PL, PT, RO, SE, SI, SK, UK |
| C172 - Articles of paper | C172 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, NL, PL, PT, RO, SE, SI, SK, UK |
| C192 - Refineries | C192 | AT, BE, EE, EL, FR, HR, HU, IT, LU, LV, PL, PT, SI, UK |
| C201 - Basic chemicals | C201 | AT, BE, BG, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C206 - Man-made fibres | C206 | AT, BE, BG, CY, CZ, DE, EE, EL, ES, FI, FR, HR, HU, IT, LT, MT, NL, PL, PT, SE, SK, UK |
| C222 - Plastics products | C222 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C231 - Glass | C231 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C232 - Refractory products | C232 | AT, BE, BG, CY, CZ, DE, EL, ES, FI, FR, HR, HU, IT, LT, LU, LV, MT, PL, PT, RO, SE, SI, SK, UK |
| C233 - Clay building materials | C233 | AT, BE, BG, CY, CZ, DE, DK, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C234 - Porcelain and ceramics | C234 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C235 - Cement, lime and plaster | C235 | AT, BE, BG, CY, CZ, DE, EL, ES, FI, FR, HR, HU, IE, IT, LT, MT, PL, PT, RO, SE, SI, SK, UK |
| C237 - Stone | C237 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C239 - Abrasive products | C239 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C241 - Iron and steel | C241 | AT, BE, BG, CY, CZ, DE, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C244 - Non-ferrous metals | C244 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C245 - Casting of metal | C245 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C11 - Beverages | C11 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C21 - Pharmaceutical products | C21 | AT, BE, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C25 - Fabricated metal products | C25 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C26 - Computer and electronics | C26 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C27 - Electrical equipment | C27 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C28 - Machinery and equipment | C28 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C29 - Motor vehicles | C29 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C30 - Other transport equipment | C30 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |
| C32 - Other manufacturing | C32 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK |
| C33 - Repair of machinery | C33 | AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, UK |

# Annex E: T2 - Evolution of the energy cost shares

This table summarises the energy cost shares per section and branch showing the changes over time, the final level of the cost share in 2015, the average of the cost share over the period and the maximum level reached.

**Table 0-1: Evolution of the energy cost shares over time of all sectors analysed**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Changes 2008-2015 | Changes 2008-2011 | Changes 2011-2015 | Level 2015 | Average | Max. level | Low. level | Diff max-low level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Section C | | | | | | | | | | | | | | | | |
| C103 - Fruit and vegetables | 3.6% | 3.5% | 2.8% | 2.8% | 3.0% | 2.8% | 2.9% | 2.5% | -1.1% | -0.8% | -0.3% | 2.5% | 3.0% | 3.6% | 2.5% | 1.1% |
| C106 - Grain products | 3.8% | 3.8% | 3.3% | 3.1% | 3.3% | 3.1% | 3.3% | 3.0% | -0.8% | -0.6% | -0.1% | 3.0% | 3.3% | 3.8% | 3.0% | 0.8% |
| C132 - Textiles | 4.3% | 6.4% | 3.6% | 2.5% | 2.7% | 2.4% | 2.3% | 2.1% | -2.2% | -1.8% | -0.4% | 2.1% | 3.3% | 6.4% | 2.1% | 4.3% |
| C161 - Sawmills | 3.7% | 4.1% | 3.6% | 4.1% | 3.7% | 3.6% | 3.4% | 3.1% | -0.6% | 0.4% | -1.0% | 3.1% | 3.7% | 4.1% | 3.1% | 1.0% |
| C171 - Pulp and paper | 12.2% | 13.0% | 11.1% | 11.2% | 10.7% | 9.9% | 9.1% | 8.4% | -3.9% | -1.1% | -2.8% | 8.4% | 10.7% | 13.0% | 8.4% | 4.6% |
| C172 - Articles of paper | 3.6% | 3.7% | 3.1% | 2.8% | 3.0% | 3.0% | 2.7% | 2.5% | -1.0% | -0.8% | -0.3% | 2.5% | 3.0% | 3.7% | 2.5% | 1.2% |
| C192 - Refineries | 3.2% | 2.4% | 2.5% | 2.0% | 2.8% | 3.1% | 3.1% | 3.7% | 0.6% | -1.2% | 1.7% | 3.7% | 2.8% | 3.7% | 2.0% | 1.7% |
| C201 - Basic chemicals | 7.1% | 7.7% | 6.8% | 7.0% | 6.7% | 6.7% | 6.1% | 5.7% | -1.4% | -0.1% | -1.3% | 5.7% | 6.7% | 7.7% | 5.7% | 2.0% |
| C206 - Man-made fibres | 8.6% | 12.4% | 7.8% | 7.1% | 6.7% | 8.5% | 6.5% | 6.2% | -2.4% | -1.6% | -0.9% | 6.2% | 8.0% | 12.4% | 6.2% | 6.2% |
| C222 - Plastics products | 3.5% | 3.5% | 2.9% | 2.9% | 2.8% | 2.9% | 2.7% | 2.6% | -0.9% | -0.6% | -0.3% | 2.6% | 3.0% | 3.5% | 2.6% | 0.9% |
| C231 - Glass | 9.8% | 10.1% | 8.9% | 9.1% | 10.3% | 10.1% | 9.3% | 8.2% | -1.7% | -0.7% | -0.9% | 8.2% | 9.5% | 10.3% | 8.2% | 2.1% |
| C232 - Refractory products | 6.9% | 6.5% | 6.2% | 5.9% | 6.5% | 6.6% | 5.8% | 6.1% | -0.8% | -1.0% | 0.1% | 6.1% | 6.3% | 6.9% | 5.8% | 1.1% |
| C233 - Clay building materials | 15.4% | 14.1% | 11.8% | 11.0% | 12.4% | 12.4% | 11.3% | 11.1% | -4.3% | -4.4% | 0.1% | 11.1% | 12.4% | 15.4% | 11.0% | 4.4% |
| C234 - Porcelain and ceramics | 6.0% | 5.7% | 4.8% | 5.0% | 5.3% | 5.4% | 5.0% | 4.3% | -1.7% | -1.0% | -0.8% | 4.3% | 5.2% | 6.0% | 4.3% | 1.7% |
| C235 - Cement, lime and plaster | 22.1% | 22.9% | 22.1% | 23.5% | 21.4% | 21.8% | 20.9% | 16.3% | -5.8% | 1.5% | -7.3% | 16.3% | 21.4% | 23.5% | 16.3% | 7.3% |
| C237 - Stone | 4.8% | 4.4% | 3.3% | 3.4% | 2.6% | 4.3% | 3.1% | 3.2% | -1.5% | -1.4% | -0.1% | 3.2% | 3.6% | 4.8% | 2.6% | 2.1% |
| C239 - Abrasive products | 5.8% | 5.3% | 4.9% | 4.9% | 5.0% | 5.2% | 4.8% | 5.1% | -0.7% | -0.9% | 0.1% | 5.1% | 5.1% | 5.8% | 4.8% | 1.0% |
| C241 - Iron and steel | 9.2% | 11.9% | 9.5% | 7.7% | 8.5% | 8.5% | 7.3% | 7.5% | -1.7% | -1.4% | -0.3% | 7.5% | 8.8% | 11.9% | 7.3% | 4.6% |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C244 - Non-ferrous metals | 4.6% | 6.0% | 4.2% | 4.0% | 3.9% | 4.0% | 3.6% | 3.5% | -1.1% | -0.5% | -0.6% | 3.5% | 4.2% | 6.0% | 3.5% | 2.5% |
| C245 - Casting of metal | 6.4% | 7.1% | 6.0% | 5.2% | 5.4% | 5.5% | 5.3% | 4.9% | -1.4% | -1.1% | -0.3% | 4.9% | 5.7% | 7.1% | 4.9% | 2.2% |
| | | | | | | | | | | | | | | | | |
| | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **Changes 2008-2015** | **Changes 2008-2011** | **Changes 2011-2015** | **Level 2015** | **Average** | **Max. level** | **Low. level** | **Diff max-low level** |
| C11 - Beverages | 2.6% | 2.6% | 2.6% | 2.7% | 2.6% | 2.6% | 2.5% | 2.4% | -0.2% | 0.1% | -0.2% | 2.4% | 2.6% | 2.7% | 2.4% | 0.2% |
| C21 - Pharmaceutical products | 2.8% | 1.7% | 1.2% | 1.2% | 1.3% | 1.3% | 1.2% | 1.1% | -1.7% | -1.6% | -0.1% | 1.1% | 1.5% | 2.8% | 1.1% | 1.7% |
| C25 - Fabricated metal products | 2.2% | 2.4% | 2.3% | 1.9% | 2.0% | 2.1% | 2.1% | 1.9% | -0.2% | -0.3% | 0.0% | 1.9% | 2.1% | 2.4% | 1.9% | 0.5% |
| C26 - Computer and electronics | 0.9% | 0.9% | 0.7% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | -0.2% | -0.2% | 0.0% | 0.8% | 0.8% | 0.9% | 0.7% | 0.2% |
| C27 - Electrical equipment | 1.1% | 1.3% | 1.0% | 1.0% | 1.0% | 1.0% | 1.1% | 0.9% | -0.3% | -0.2% | -0.1% | 0.9% | 1.0% | 1.3% | 0.9% | 0.5% |
| C28 - Machinery and equipment | 1.1% | 1.2% | 1.0% | 0.9% | 0.9% | 1.0% | 0.9% | 0.8% | -0.3% | -0.2% | -0.1% | 0.8% | 1.0% | 1.2% | 0.8% | 0.4% |
| C29 - Motor vehicles | 1.0% | 1.0% | 0.8% | 0.8% | 0.8% | 0.8% | 0.7% | 0.7% | -0.3% | -0.2% | -0.1% | 0.7% | 0.8% | 1.0% | 0.7% | 0.3% |
| C30 - Other transport equipment | 1.1% | 1.0% | 0.9% | 0.8% | 0.8% | 0.9% | 0.7% | 0.8% | -0.3% | -0.3% | -0.1% | 0.8% | 0.9% | 1.1% | 0.7% | 0.4% |
| C32 - Other manufacturing | 1.3% | 1.4% | 1.3% | 1.1% | 1.1% | 1.1% | 1.1% | 1.0% | -0.3% | -0.2% | -0.1% | 1.0% | 1.2% | 1.4% | 1.0% | 0.4% |
| C33 - Repair of machinery | 1.3% | 1.2% | 1.1% | 1.1% | 1.1% | 1.2% | 1.1% | 0.9% | -0.4% | -0.2% | -0.2% | 0.9% | 1.1% | 1.3% | 0.9% | 0.4% |
| Other sections | | | | | | | | | | | | | | | | |
| B - Mining and quarrying | 3.4% | 2.9% | 2.9% | 2.7% | 2.8% | 2.8% | 2.7% | 3.1% | -0.3% | -0.8% | 0.5% | 3.1% | 2.9% | 3.4% | 2.7% | 0.8% |
| B06 - Oil and gas | 1.6% | 0.6% | 0.6% | 0.5% | 0.6% | 0.7% | 0.7% | 0.7% | -0.9% | -1.1% | 0.2% | 0.7% | 0.7% | 1.6% | 0.5% | 1.1% |
| B07 - Mining of metal ores | 15.8% | 16.6% | 19.7% | 20.8% | 19.6% | 19.4% | 17.7% | 18.4% | 2.6% | 5.0% | -2.4% | 18.4% | 18.5% | 20.8% | 15.8% | 5.0% |
| B08 - Other mining | 10.3% | 9.8% | 10.4% | 10.4% | 10.9% | 10.2% | 9.6% | 9.4% | -0.9% | 0.1% | -1.0% | 9.4% | 10.1% | 10.9% | 9.4% | 1.5% |
| D35 - Electricity, gas and steam | 17.0% | 16.8% | 16.9% | 16.4% | 14.3% | 12.3% | 11.4% | 11.5% | -5.5% | -0.6% | -4.9% | 11.5% | 14.6% | 17.0% | 11.4% | 5.6% |
| E38 - Waste management | 4.0% | 3.0% | 3.1% | 3.5% | 4.2% | 4.3% | 4.8% | 4.3% | 0.3% | -0.5% | 0.8% | 4.3% | 3.9% | 4.8% | 3.0% | 1.8% |
| F - Construction | 1.5% | 1.5% | 1.5% | 1.7% | 1.7% | 1.7% | 1.6% | 1.4% | 0.0% | 0.2% | -0.3% | 1.4% | 1.6% | 1.7% | 1.4% | 0.3% |
| G - Wholesale and retail trade | 0.7% | 0.8% | 0.7% | 0.6% | 0.7% | 0.6% | 0.6% | 0.6% | -0.1% | 0.0% | 0.0% | 0.6% | 0.7% | 0.8% | 0.6% | 0.2% |
| H49 - Land transport | 36.3% | 31.0% | 33.2% | 40.6% | 37.0% | 34.4% | 32.1% | 27.0% | -9.3% | 4.3% | -13.6% | 27.0% | 33.9% | 40.6% | 27.0% | 13.6% |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H51 - Air transport | 19.5% | 16.7% | 21.6% | 20.1% | 23.3% | 20.0% | 24.4% | 20.2% | 0.7% | 0.6% | 0.1% | 20.2% | 20.7% | 24.4% | 16.7% | 7.8% |
| I - Accommodation and restaurants | 3.9% | 4.2% | 4.7% | 4.2% | 4.5% | 4.3% | 3.7% | 3.9% | 0.0% | 0.3% | -0.3% | 3.9% | 4.2% | 4.7% | 3.7% | 1.1% |

*Source:* Own calculations

# Annex F: T2 & T4 - Description of E3ME

E3ME is a computer-based model of the world's economic and energy systems and the environment. It was originally developed through the European Commission's research framework programmes and is now widely used in Europe and beyond for policy assessment, for forecasting and for research purposes. The global edition is a new version of E3ME which expands the model's geographical coverage from 33 European countries to 59 global regions.

Recent applications of E3ME include:

- a global assessment of the economic impact of renewables for IRENA;
- contribution to the EU's Impact Assessment of its 2030 climate and energy package;
- evaluations of the economic impact of removing fossil fuel subsidies in India and Indonesia;
- analysis of future energy systems, environmental tax reform and trade deals in East Asia;
- an assessment of the potential for green jobs in Europe;
- an economic evaluation for the EU Impact Assessment of the Energy Efficiency Directive.

This model description provides a short summary of the E3ME model. For further details, the reader is referred to the full model manual available online from www.e3me.com.

### E3ME's basic structure and data

The structure of E3ME is based on the system of national accounts, with further linkages to energy demand and environmental emissions. The labour market is also covered in detail, including both voluntary and involuntary unemployment. In total, there are 33 sets of econometrically estimated equations, also including the components of GDP (consumption, investment, international trade), prices, energy demand and materials demand. Each equation set is disaggregated by country and by sector.

E3ME's historical database covers the period 1970-2015 and the model projects forward annually to 2050. The main data sources for European countries are Eurostat and the IEA, supplemented by the OECD's STAN database and other sources where appropriate. For regions outside Europe, additional sources for data include the UN, OECD, World Bank, IMF, ILO and national statistics. Gaps in the data are estimated using customised software algorithms.

### The main dimensions of the model

The main dimensions of E3ME are:

- 59 countries – all major world economies, the EU28 and candidate countries plus other countries' economies grouped;
- 43 or 69 (Europe) industry sectors, based on standard international classifications;
- 28 or 43 (Europe) categories of household expenditure;
- 22 different users of 12 different fuel types;
- 14 types of air-borne emission (where data are available) including the six greenhouse gases monitored under the Kyoto protocol.

The countries and sectors covered by the model are listed at the end of this document.

### Standard outputs from the model

As a general model of the economy, based on the full structure of the national accounts, E3ME is capable of producing a broad range of economic indicators. In addition, there are range of energy and environment indicators. The following list provides a summary of the most common model outputs:

- GDP and the aggregate components of GDP (household expenditure, investment, government expenditure and international trade);
- sectoral output and GVA, prices, trade and competitiveness effects;
- international trade by sector, origin and destination;
- consumer prices and expenditures;
- sectoral employment, unemployment, sectoral wage rates and labour supply;
- energy demand, by sector and by fuel, energy prices;
- CO2 emissions by sector and by fuel;
- other air-borne emissions;
- material demands.

This list is by no means exhaustive and the delivered outputs often depend on the requirements of the specific application. In addition to the sectoral dimension mentioned in the list, all indicators are produced at the national and regional level and annually over the period up to 2050.

### E3ME as an E3 model

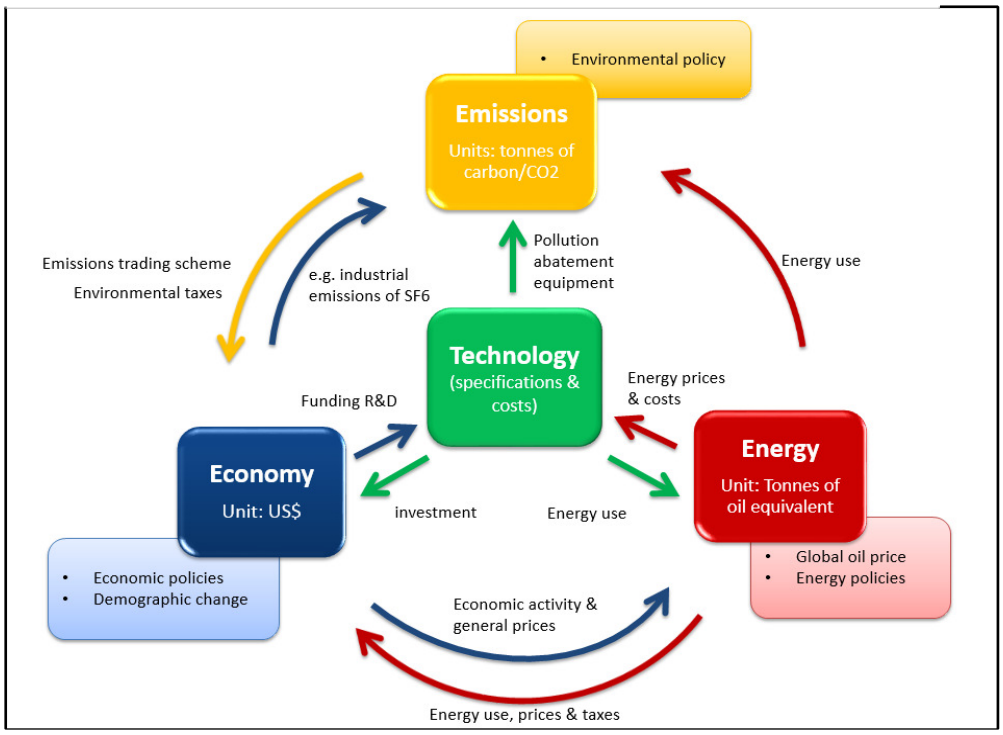
The figure below how the three components (modules) of the model - energy, environment and economy - fit together. Each component is shown in its own box. Each data set has been constructed by statistical offices to conform with accounting conventions. Exogenous factors coming from outside the modelling framework are shown on the outside edge of the chart as inputs into each component. For each region's economy, the exogenous factors are economic policies (including tax rates, growth in government expenditures, interest rates and exchange rates). For the energy system, the outside factors are the world oil prices and energy policy (including regulation of the energy industries). For the environment component, exogenous factors include policies such as reduction in SO2 emissions by means of end-of-pipe filters from large combustion plants. The linkages between the components of the model are shown explicitly by the arrows that indicate which values are transmitted between components.

The economy module provides measures of economic activity and general price levels to the energy module; the energy module provides measures of emissions of the main air pollutants to the environment module, which in turn can give measures of damage to health and buildings. The energy module provides detailed price levels for energy carriers distinguished in the economy module and the overall price of energy as well as energy use in the economy.

Technological progress plays an important role in the E3ME model, affecting all three Es: economy, energy and environment. The model's endogenous technical progress indicators (TPIs), a function of R&D and gross investment, appear in nine of E3ME's econometric equation sets including trade, the labour market and prices. Investment and R&D in new technologies also appears in the E3ME's energy and material demand equations to capture energy/resource savings technologies as well as pollution

abatement equipment. In addition, E3ME also captures low carbon technologies in the power sector through the FTT power sector model.[1]

**E3 linkages in the E3ME model**




*Source:* Cambridge Econometrics

## Treatment of international trade

An important part of the modelling concerns international trade. E3ME solves for detailed bilateral trade between regions (similar to a two-tier Armington model). Trade is modelled in three stages:

- econometric estimation of regions' sectoral import demand;
- econometric estimation of regions' bilateral imports from each partner;
- forming exports from other regions' import demands.

Trade volumes are determined by a combination of economic activity indicators, relative prices and technology.

## The labour market

Treatment of the labour market is an area that distinguishes E3ME from other macroeconomic models. E3ME includes econometric equation sets for employment, average working hours, wage rates and participation rates. The first three of these are disaggregated by economic sector while participation rates are disaggregated by gender and five-year age band.

The labour force is determined by multiplying labour market participation rates by population. Unemployment (including both voluntary and involuntary unemployment) is determined by taking the

[1] See Mercure (2012).

difference between the labour force and employment. This is typically a key variable of interest for policy makers.

### The power sector model

The power sector in E3ME is represented using a novel framework for the dynamic selection and diffusion of innovations, initially developed by J.-F. Mercure (Mercure, 2012), called FTT:Power (Future Technology Transformations for the Power sector). This is the first member of the FTT family of technology diffusion models. It uses a decision-making core for investors wanting to build new electrical capacity, facing several options. The resulting diffusion of competing technologies is constrained by a global database of renewable and non-renewable resources (Mercure & Salas, 2012, 2013). The decision-making core takes place by pairwise levelised cost (LCOE) comparisons, conceptually equivalent to a binary logit model, parameterised by measured technology cost distributions. Costs include reductions originating from learning curves, as well as increasing marginal costs of renewable natural resources (for renewable technologies) using cost-supply curves. The diffusion of technology follows a set of coupled non-linear differential equations, sometimes called 'Lotka-Volterra' or 'replicator dynamics', which represent the better ability of larger or well-established industries to capture the market, and the life expectancy of technologies. Due to learning-by-doing and increasing returns to adoption, it results in path-dependent technology scenarios that arise from electricity sector policies. A survey of renewable resources was carried out by Mercure & Salas (2012) for the purpose of limiting the diffusion of technologies in FTT:Power. This database provides cost-supply curves covering 90 countries and can be re-aggregated to various configurations of regions following the development of E3ME. It also includes a review of non-renewable fossil and nuclear fuels. These however are not used as cost-supply curves, since such curves would need to change as consumption progresses. Instead, a dynamic model of resource consumption was introduced in FTT:Power, which tracks how a cost-distribution of resources is gradually depleted. This is parameterised by the current rate of reserves to resources ratios for these fuels, and determines a dynamic marginal cost (Mercure & Salas, 2013). FTT:Power features 24 types of power technologies, as shown in the table below:

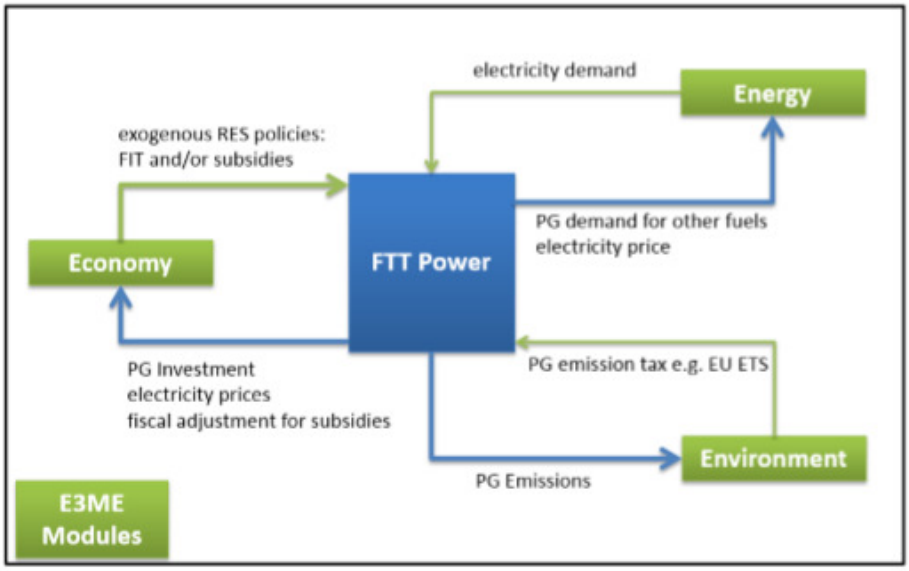
| | | |
|---|---|---|
| Nuclear | Solid Biomass | Wind onshore |
| Oil | Solid Biomass + CCS | Wind offshore |
| Coal PC | Biomass IGCC | Solar Photovoltaic |
| Coal IGCC | Biomass IGCC + CCS | Concentrated Solar Power |
| Coal PC + CCS | Biogas | Geothermal |
| Coal IGCC + CCS | Biogas + CCS | Wave |
| Gas CCGT | Tidal | Fuel Cells |
| Gas CCGT + CCS | Large Hydro | CHP |

These use 13 types of natural resources:

| | | |
|---|---|---|
| Uranium | Biogas | Solar sites |
| Oil | Tidal | Geothermal sources |
| Coal | Hydro | Waves |
| Gas | Onshore wind sites | |
| Sold biofuels | Offshore wind sites | |

Among these, the 4 non-renewable resources, uranium, coal, gas and oil, are treated with the resources consumption model. The demand for these fuels includes that of other sectors in E3ME and can be used to determine the cost of these fuels in scenarios of depletion.

The basic structure of FTT Power




*Source:* Cambridge Econometrics

FTT:Power determines a technology mix by region given a scenario of detailed electricity policy: carbon prices, subsidies, feed-in tariffs and regulations by technology. Changes in the power technology mix result in changes of production costs, reflected in the price of electricity. The model takes electricity demand from E3ME and feeds back a price, fuel use and investment for replacements and new generators.

### Comparison with CGE models and econometric specification

E3ME is often compared to Computable General Equilibrium (CGE) models. In many ways the modelling approaches are similar; they are used to answer similar questions and use similar inputs and outputs. However, underlying this there are important theoretical differences between the modelling approaches.

In a typical CGE framework, optimal behaviour is assumed, output is determined by supply-side constraints and prices adjust fully so that all the available capacity is used. In E3ME the determination of output comes from a post-Keynesian framework and it is possible to have spare capacity. The model is more demand-driven and it is not assumed that prices always adjust to market clearing levels.

The differences have important practical implications, as they mean that in E3ME regulation and other policy may lead to increases in output if they are able to draw upon spare economic capacity. This is described in more detail in the model manual.

The econometric specification of E3ME gives the model a strong empirical grounding. E3ME uses a system of error correction, allowing short-term dynamic (or transition) outcomes, moving towards a

long-term trend. The dynamic specification is important when considering short and medium-term analysis (e.g. up to 2020) and rebound effects2, which are included as standard in the model's results.

### Key strengths of E3ME

In summary the key strengths of E3ME are:

- the close integration of the economy, energy systems and the environment, with two-way linkages between each component;
- the detailed sectoral disaggregation in the model's classifications, allowing for the analysis of similarly detailed scenarios;
- its global coverage, while still allowing for analysis at the national level for large economies;
- the econometric approach, which provides a strong empirical basis for the model and means it is not reliant on some of the restrictive assumptions common to CGE models;
- the econometric specification of the model, making it suitable for short and medium-term assessment, as well as longer-term trends.

### Applications of E3ME

Although E3ME can be used for forecasting, the model is more commonly used for evaluating the impacts of an input shock through a scenario-based analysis. The shock may be either a change in policy, a change in economic assumptions or another change to a model variable. The analysis can be either forward looking (ex-ante) or evaluating previous developments in an ex-post manner. Scenarios may be used either to assess policy, or to assess sensitivities to key inputs (e.g. international energy prices).

Model-based scenario analyses often focus on changes in price because this is easy to quantify and represent in the model structure. Examples include:

- changes in tax rates including direct, indirect, border, energy and environment taxes
- changes in international energy prices
- emission trading schemes

All of the price changes above can be represented in E3ME's framework reasonably well, given the level of disaggregation available. However, it is also possible to assess the effects of regulation, albeit with an assumption about effectiveness and cost. For example, an increase in vehicle fuel-efficiency standards could be assessed in the model with an assumption about how efficient vehicles become, and the cost of these measures. This would be entered into the model as a higher price for cars and a reduction in fuel consumption (all other things being equal). E3ME could then be used to determine:

- secondary effects, for example on fuel suppliers
- rebound effects[3]
- overall macroeconomic impacts

[2] Where an initial increase in efficiency reduces demand, but this is negated in the long run as greater efficiency lowers the relative cost and increases consumption. See Barker et al (2009).
[3] In the example, the higher fuel efficiency effectively reduces the cost of motoring. In the long-run this is likely to lead to an increase in demand, meaning some of the initial savings are lost. Barker et al (2009) demonstrate that this can be as high as 50% of the original reduction.

**Main dimensions of the E3ME model**

| | Regions | Industries (Europe) | Industries (non-Europe) |
|---|---|---|---|
| 1 | Belgium | Crops, animals, etc | Agriculture etc |
| 2 | Denmark | Forestry & logging | Coal |
| 3 | Germany | Fishing | Oil & Gas etc |
| 4 | Greece | Coal | Other Mining |
| 5 | Spain | Oil and Gas | Food, Drink & Tobacco |
| 6 | France | Other mining | Textiles, Clothing & Leather |
| 7 | Ireland | Food, drink & tobacco | Wood & Paper |
| 8 | Italy | Textiles & leather | Printing & Publishing |
| 9 | Luxembourg | Wood & wood prods | Manufactured Fuels |
| 10 | Netherlands | Paper & paper prods | Pharmaceuticals |
| 11 | Austria | Printing & reproduction | Other chemicals |
| 12 | Portugal | Coke & ref petroleum | Rubber & Plastics |
| 13 | Finland | Other chemicals | Non-Metallic Minerals |
| 14 | Sweden | Pharmaceuticals | Basic Metals |
| 15 | UK | Rubber & plastic products | Metal Goods |
| 16 | Czech Rep. | Non-metallic mineral prods | Mechanical Engineering |
| 17 | Estonia | Basic metals | Electronics |
| 18 | Cyprus | Fabricated metal prods | Electrical Engineering |
| 19 | Latvia | Computers etc | Motor Vehicles |
| 20 | Lithuania | Electrical equipment | Other Transport Equipment |
| 21 | Hungary | Other machinery/equipment | Other Manufacturing |
| 22 | Malta | Motor vehicles | Electricity |
| 23 | Poland | Other transport equip | Gas Supply |
| 24 | Slovenia | Furniture; other manufacture | Water Supply |
| 25 | Slovakia | Machinery repair/installation | Construction |
| 26 | Bulgaria | Electricity | Distribution |
| 27 | Romania | Gas, steam & air cond. | Retailing |
| 28 | Norway | Water, treatment & supply | Hotels & Catering |
| 29 | Switzerland | Sewerage & waste | Land Transport etc |
| 30 | Iceland | Construction | Water Transport |
| 31 | Croatia | Wholesale & retail MV | Air Transport |
| 32 | Turkey | Wholesale excl MV | Communications |
| 33 | Macedonia | Retail excl MV | Banking & Finance |
| 34 | USA | Land transport, pipelines | Insurance |
| 35 | Japan | Water transport | Computing Services |
| 36 | Canada | Air transport | Professional Services |
| 37 | Australia | Warehousing | Other Business Services |
| 38 | New Zealand | Postal & courier activities | Public Administration |
| 39 | Russian Fed. | Accommodation & food serv | Education |
| 40 | Rest of Annex I | Publishing activities | Health & Social Work |
| 41 | China | Motion pic, video, television | Miscellaneous Services |
| 42 | India | Telecommunications | Unallocated |
| 43 | Mexico | Computer programming etc. | |
| 44 | Brazil | Financial services | |
| 45 | Argentina | Insurance | |

**Main dimensions of the E3ME model**

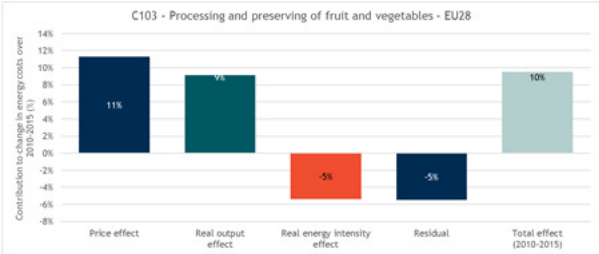
| | Regions | Industries (Europe) | Industries (non-Europe) |
|---|---|---|---|
| 46 | Colombia | Aux to financial services | |
| 47 | Rest Latin Am. | Real estate | |
| 48 | Korea | Imputed rents | |
| 49 | Taiwan | Legal, account, consult | |
| 50 | Indonesia | Architectural & engineering | |
| 51 | Rest of ASEAN | R&D | |
| 52 | Rest of OPEC | Advertising | |
| 53 | Rest of world | Other professional | |
| 54 | Ukraine | Rental & leasing | |
| 55 | Saudi Arabia | Employment activities | |
| 56 | Nigeria | Travel agency | |
| 57 | South Africa | Security & investigation, etc | |
| 58 | Rest of Africa | Public admin & defence | |
| 59 | Africa OPEC | Education | |
| 60 | | Human health activities | |
| 61 | | Residential care | |
| 62 | | Creative, arts, recreational | |
| 63 | | Sports activities | |
| 64 | | Membership orgs | |
| 65 | | Repair comp. & pers. goods | |
| 66 | | Other personal serv. | |
| 67 | | Hholds as employers | |
| 68 | | Extraterritorial orgs | |
| 69 | | Unallocated/Dwellings | |

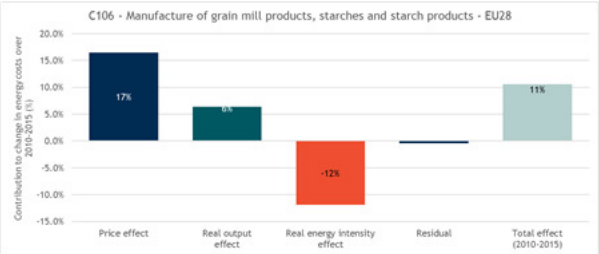
*Source:* Cambridge Econometrics

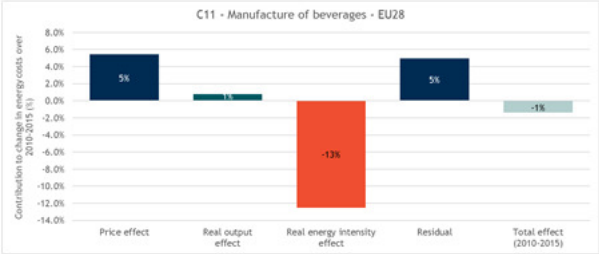
# Annex G: T2 - Results from decomposition of energy costs (EU28)

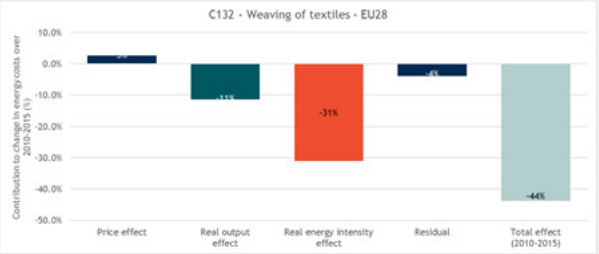
## Results for the EU28 at a sectoral level

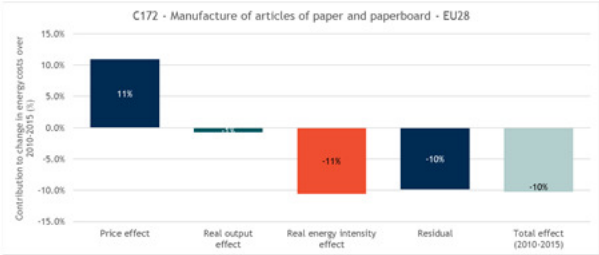
Applicable to all figures that follow: *Source:* Own calculations

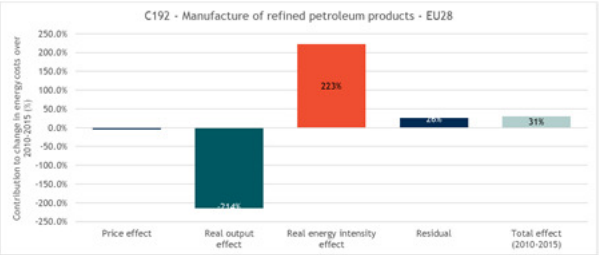


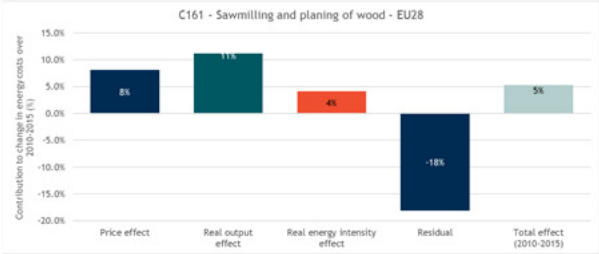



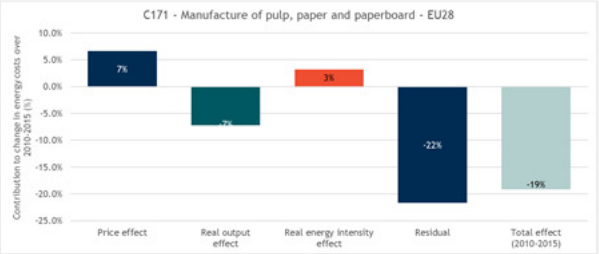



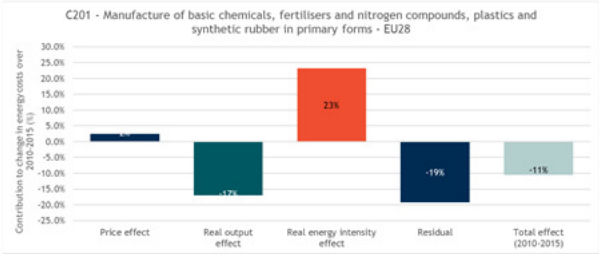



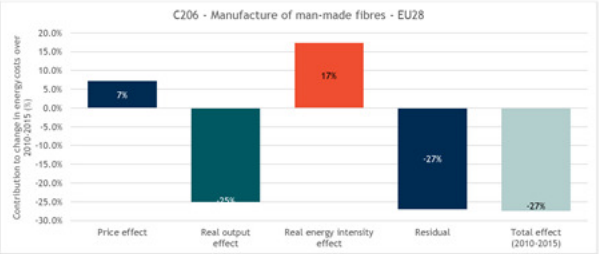



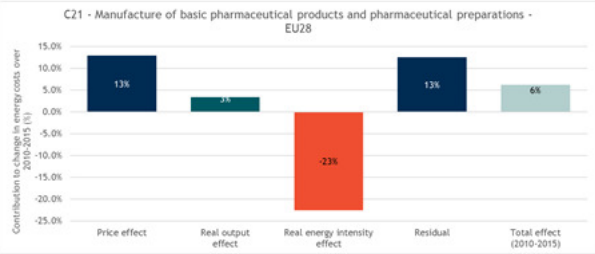



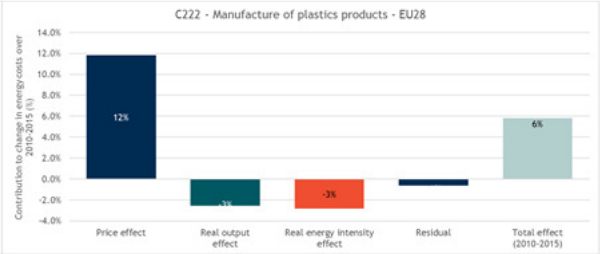



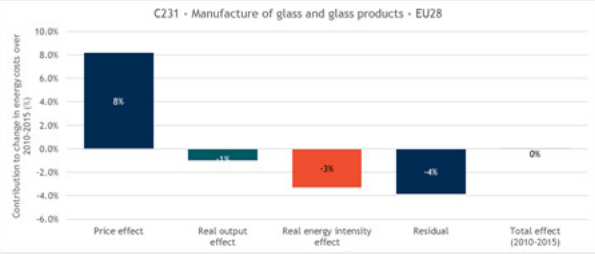



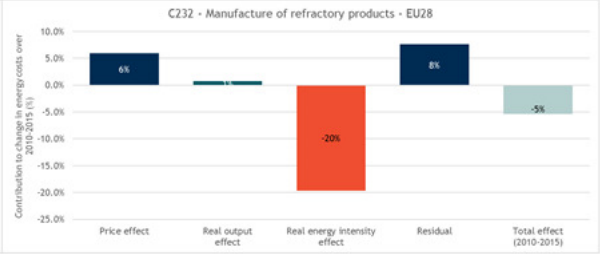



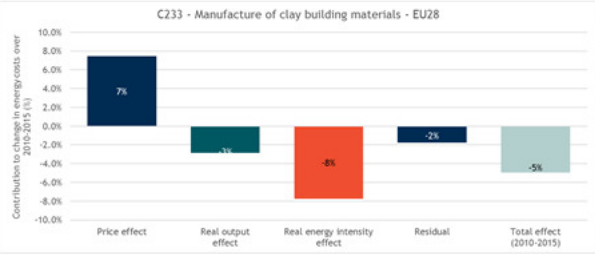



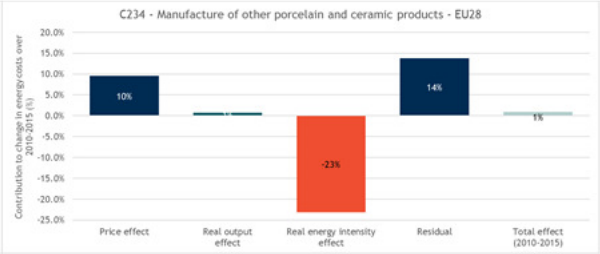

C21 - Manufacture of basic pharmaceutical products and pharmaceutical preparations - EU28
Contribution to change in energy costs over 2010-2015 (%)
13%
-3%
-23%
13%
6%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

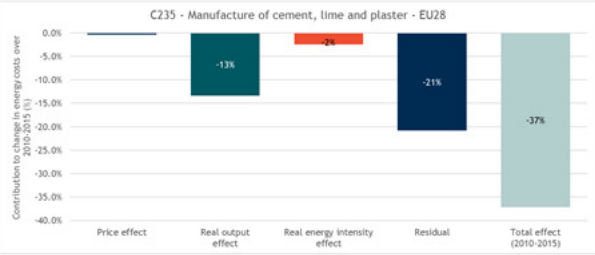

C222 - Manufacture of plastics products - EU28
Contribution to change in energy costs over 2010-2015 (%)
12%
-3%
-3%
6%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

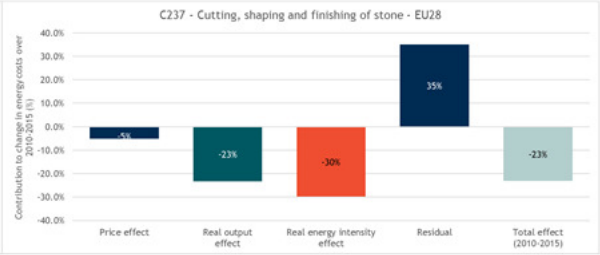

C231 - Manufacture of glass and glass products - EU28
Contribution to change in energy costs over 2010-2015 (%)
8%
-3%
-4%
0%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

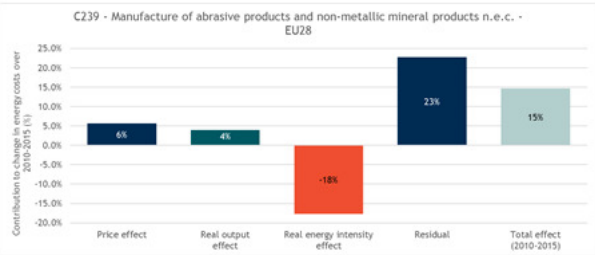

C232 - Manufacture of refractory products - EU28
Contribution to change in energy costs over 2010-2015 (%)
6%
-20%
8%
-5%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

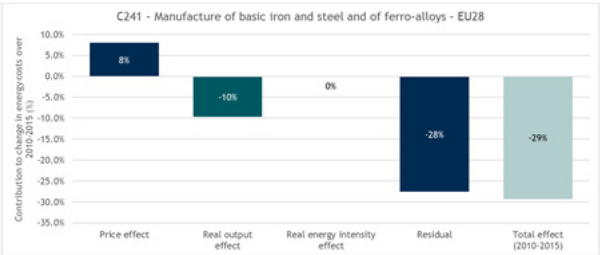

C233 - Manufacture of clay building materials - EU28
Contribution to change in energy costs over 2010-2015 (%)
7%
-3%
-8%
-2%
-5%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

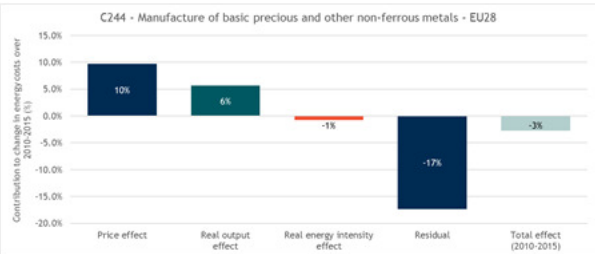

C234 - Manufacture of other porcelain and ceramic products - EU28
Contribution to change in energy costs over 2010-2015 (%)
10%
-23%
14%
1%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

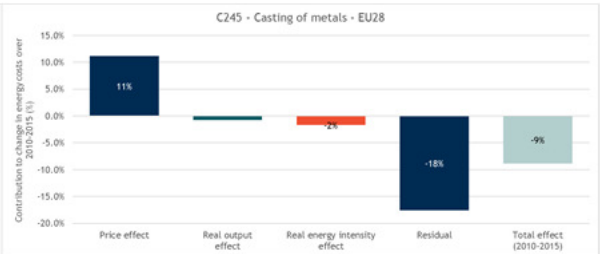

C235 - Manufacture of cement, lime and plaster - EU28
Contribution to change in energy costs over 2010-2015 (%)
-13%
-2%
-21%
-37%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

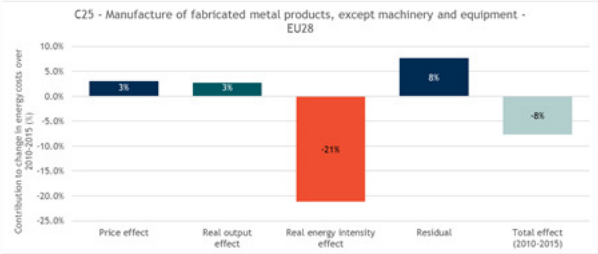

C237 - Cutting, shaping and finishing of stone - EU28
Contribution to change in energy costs over 2010-2015 (%)
-5%
-23%
-30%
35%
-23%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

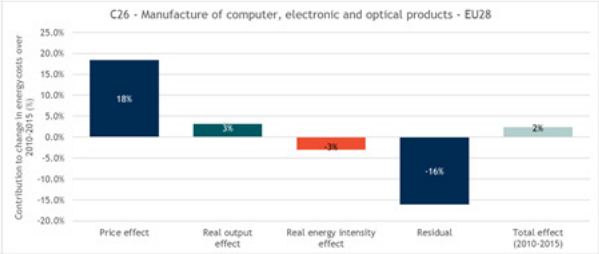

C239 - Manufacture of abrasive products and non-metallic mineral products n.e.c. - EU28
Contribution to change in energy costs over 2010-2015 (%)
6%
4%
-18%
23%
15%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

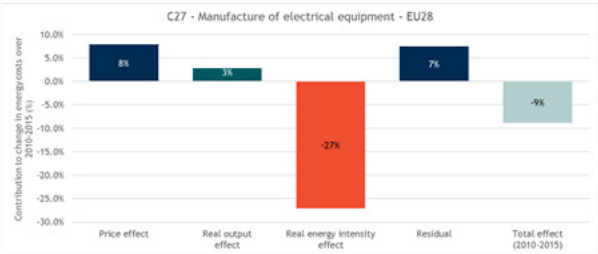

C241 - Manufacture of basic iron and steel and of ferro-alloys - EU28
Contribution to change in energy costs over 2010-2015 (%)
8%
-10%
0%
-28%
-29%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

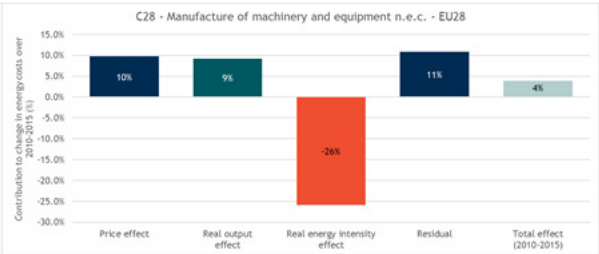

C244 - Manufacture of basic precious and other non-ferrous metals - EU28
Contribution to change in energy costs over 2010-2015 (%)
10%
6%
-1%
-17%
-3%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

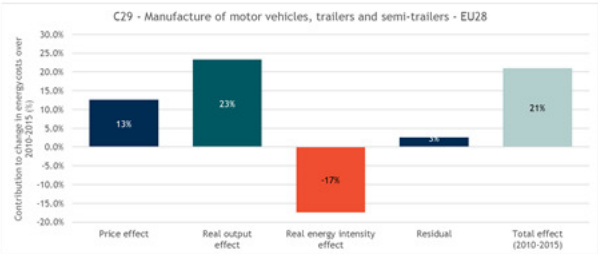

C245 - Casting of metals - EU28
Contribution to change in energy costs over 2010-2015 (%)
11%
-2%
-18%
-9%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

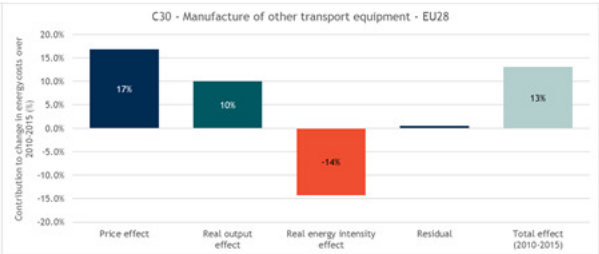

C25 - Manufacture of fabricated metal products, except machinery and equipment - EU28
Contribution to change in energy costs over 2010-2015 (%)
3%
3%
-21%
8%
-8%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

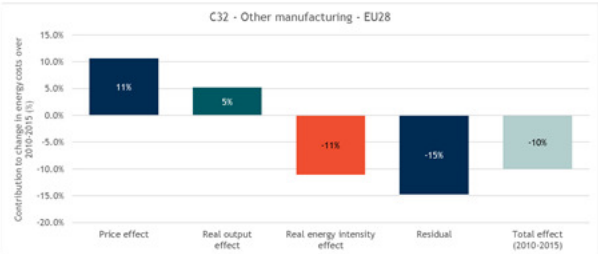

C26 - Manufacture of computer, electronic and optical products - EU28
Contribution to change in energy costs over 2010-2015 (%)
18%
3%
-3%
-16%
2%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

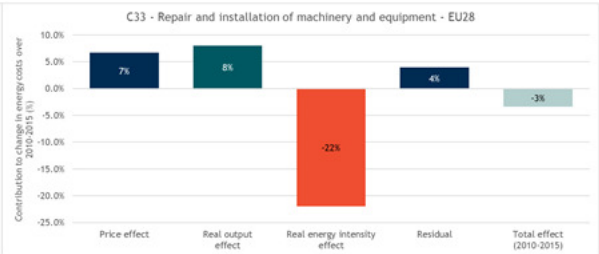

C27 - Manufacture of electrical equipment - EU28
Contribution to change in energy costs over 2010-2015 (%)
8%
3%
-27%
7%
-9%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


C28 - Manufacture of machinery and equipment n.e.c. - EU28
Contribution to change in energy costs over 2010-2015 (%)
10%
9%
-26%
11%
4%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


C29 - Manufacture of motor vehicles, trailers and semi-trailers - EU28
Contribution to change in energy costs over 2010-2015 (%)
13%
23%
-17%
21%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

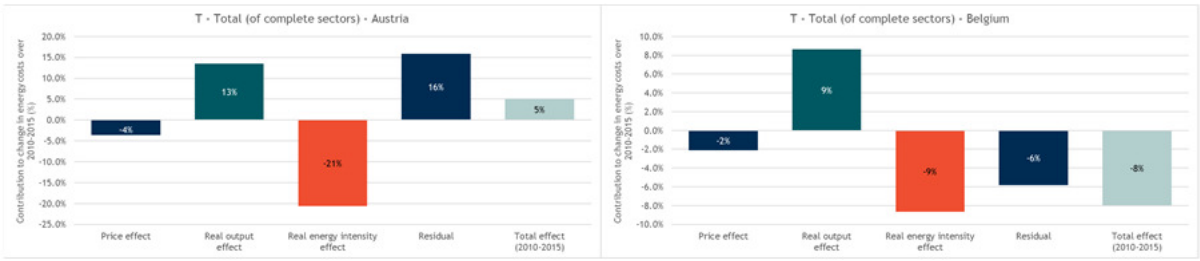

C30 - Manufacture of other transport equipment - EU28
Contribution to change in energy costs over 2010-2015 (%)
17%
10%
-14%
13%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


C32 - Other manufacturing - EU28
Contribution to change in energy costs over 2010-2015 (%)
11%
5%
-11%
-15%
-10%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


C33 - Repair and installation of machinery and equipment - EU28
Contribution to change in energy costs over 2010-2015 (%)
7%
8%
-22%
4%
-3%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

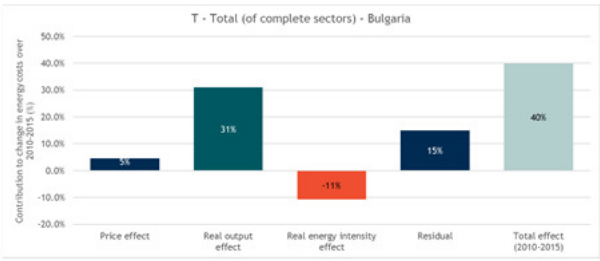
## Results for the weighted-average impact across all sectors considered, at the Member State level

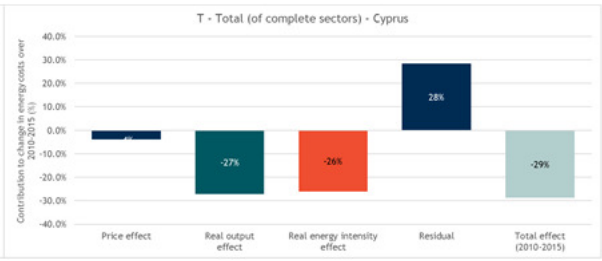
Applicable to all figures that follow: *Source:* Own calculations

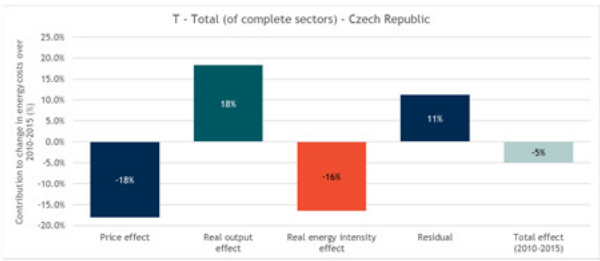


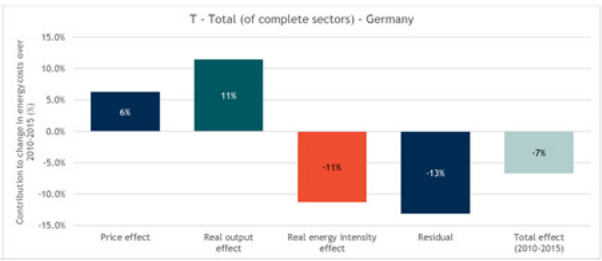


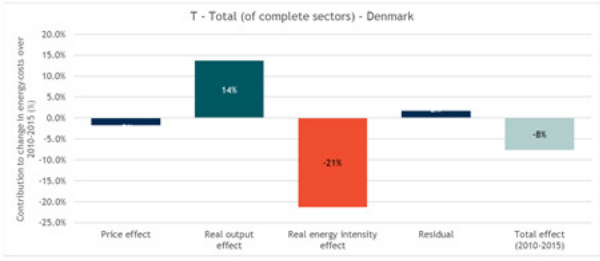


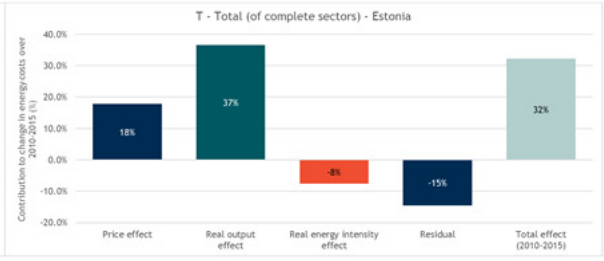


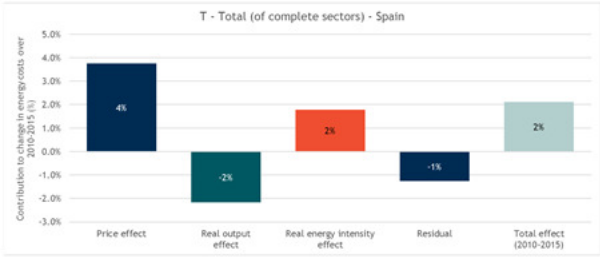



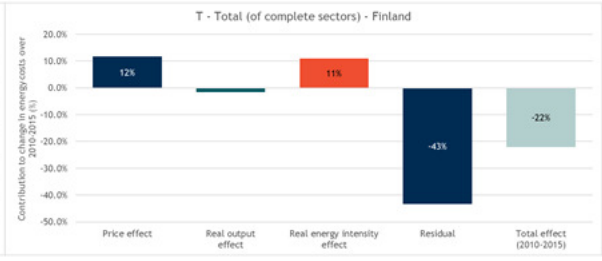



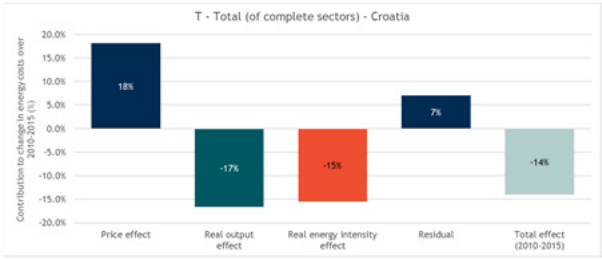



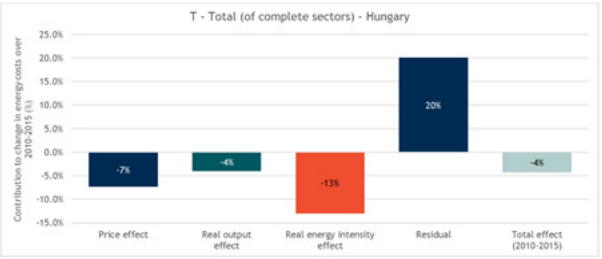



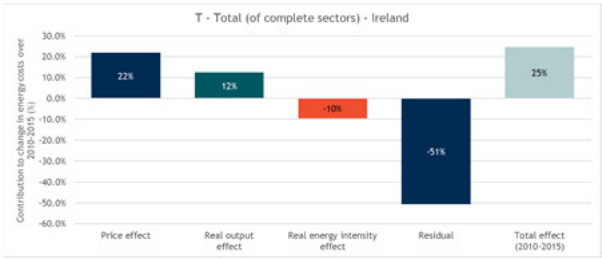



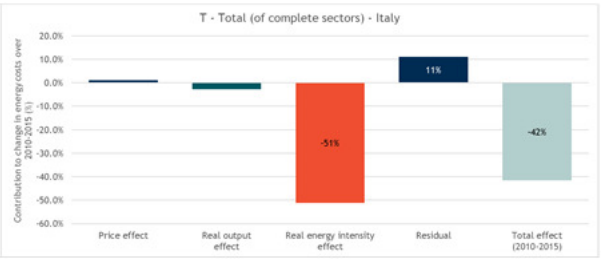



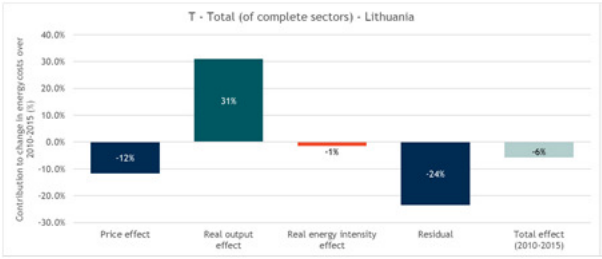



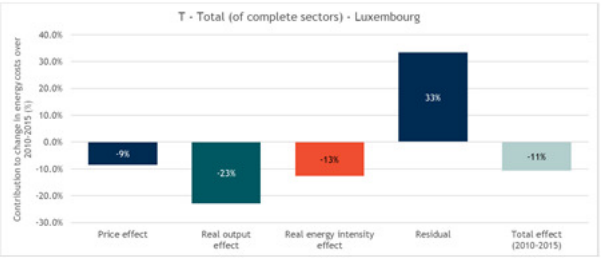

T - Total (of complete sectors) - Croatia
Contribution to change in energy costs over 2010-2015 (%)
18%
-17%
-15%
7%
-14%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

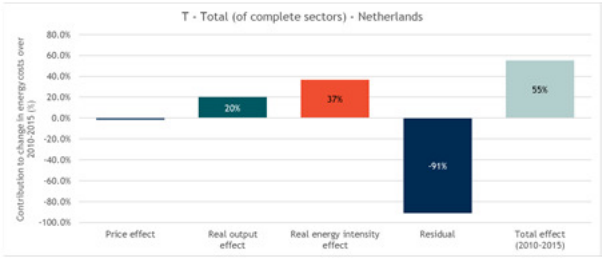

T - Total (of complete sectors) - Hungary
Contribution to change in energy costs over 2010-2015 (%)
-7%
-4%
-13%
20%
-4%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

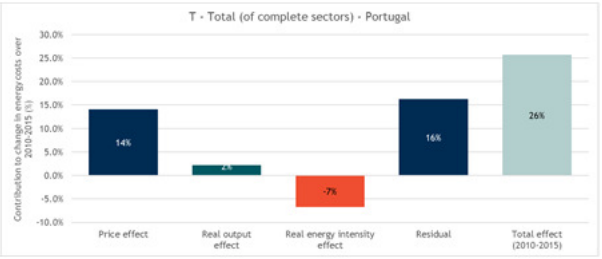

T - Total (of complete sectors) - Ireland
Contribution to change in energy costs over 2010-2015 (%)
22%
12%
-10%
-51%
25%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

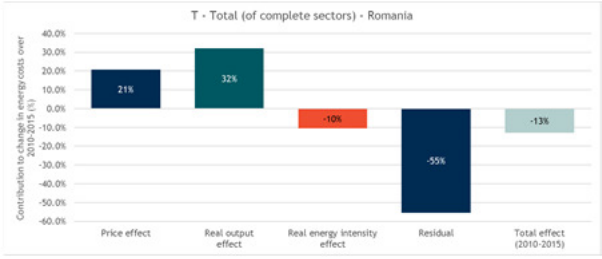

T - Total (of complete sectors) - Italy
Contribution to change in energy costs over 2010-2015 (%)
11%
-51%
-42%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

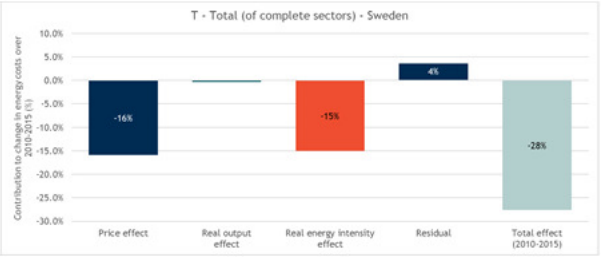

T - Total (of complete sectors) - Lithuania
Contribution to change in energy costs over 2010-2015 (%)
-12%
31%
-1%
-24%
-6%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

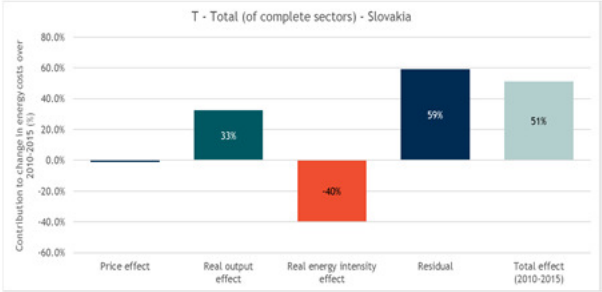

T - Total (of complete sectors) - Luxembourg
Contribution to change in energy costs over 2010-2015 (%)
-9%
-23%
-13%
33%
-11%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

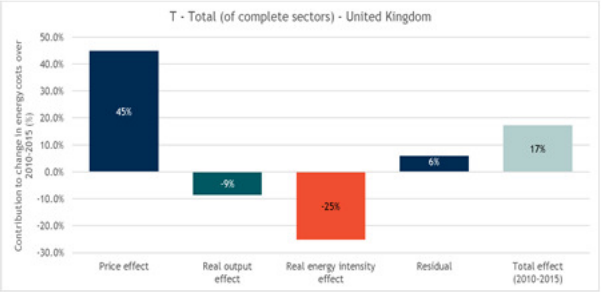

T - Total (of complete sectors) - Netherlands
Contribution to change in energy costs over 2010-2015 (%)
20%
37%
-91%
55%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


T - Total (of complete sectors) - Portugal
Contribution to change in energy costs over 2010-2015 (%)
14%
-7%
16%
26%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


T - Total (of complete sectors) - Romania
Contribution to change in energy costs over 2010-2015 (%)
21%
32%
-10%
-55%
-13%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


T - Total (of complete sectors) - Sweden
Contribution to change in energy costs over 2010-2015 (%)
-16%
-15%
4%
-28%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


T - Total (of complete sectors) - Slovakia
Contribution to change in energy costs over 2010-2015 (%)
33%
-40%
59%
51%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)


T - Total (of complete sectors) - United Kingdom
Contribution to change in energy costs over 2010-2015 (%)
45%
-9%
-25%
6%
17%
Price effect
Real output effect
Real energy intensity effect
Residual
Total effect (2010-2015)

# Annex H: T3 – List of indicators

| Topic | Indicator | Quantification | Sector | Energy vector | MS coverage | Timeframe | Source |
|---|---|---|---|---|---|---|---|
| Consumer choice | Number of electricity only contract available for consumers | Number | HH only | Only electricity | EU28 | 2014 | CEER |
| | Dual-offers available | Yes/no | HH only | Only electricity | EU28 | 2014 | CEER |
| | Certified green offers available | Yes/no | HH only | Only electricity | EU28 | 2015 | CEER |
| | Availability of non-price-financial benefit (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes/no | HH only | Only electricity | Partial | 2014 | CEER |
| | Availability of non-financial benefits (home insurance, free maintenance of water boilers, etc.) | Yes/no | HH only | Only electricity | Partial | 2014 | CEER |
| | Availability of ICT-based offerings (in-house display, energy consumption feedback mobile app, etc.) | Yes/no | HH only | Only electricity | Partial | 2014 | CEER |
| Consumer engagement | Annual switching rates, (by # of eligible meter points for hh and eligible volume for nhh) (0 can be the result of only one supplier) | % | Both | Both | EU28 | 2008-2016 | CEER |
| | Share of consumers who have never switched supplier | % | HH only | Only electricity | Partial | 2015 | CEER |
| Consumer satisfaction | Main reason for trying to switch retailer | Description | HH only | Only electricity | EU28 | 2010 | DG Justice |
| | Main reason for not switching retailer | Description | HH only | Only electricity | EU28 | 2010 | DG Justice |
| | General level of satisfaction with the electricity/gas industry | Market Performance Indicator (0-100) | HH only | Both | Partial | 2010-2013 and 2015 | CMS MPIavg |
| | Ability of consumers to compare products or services | Score 0-10 | HH only | Both | EU 28 | 2010-2013 and 2015 | CMS COMPARABILITYavg |
| | Trust of consumers in suppliers/providers to respect the rules and regulations protecting consumers | Score 0-10 | HH only | Both | EU 28 | 2010-2013 and 2015 | CMS TRUSTavg |
| | Percentage of people who experienced at least one problem | % | HH only | Both | EU 28 | 2010-2013 and 2015 | CMS PROBLEMSperc |
| | Percentage of people who complained after having experienced at least one problem | % of people with problems | HH only | Both | EU 28 | 2010-2013 and 2015 | CMS COMPLAINTS_YESperc |
| | Satisfaction with the number of suppliers/retailers to choose from (0-10) | Score 0-10 | HH only | Both | EU 28 | 2015 | CMS CHOICEavg |

| Topic | Indicator | Quantification | Sector | Energy vector | MS coverage | Timeframe | Source |
|---|---|---|---|---|---|---|---|
| | Perceived ease of switching | Score 0-10 | HH only | Both | EU 28 | 2010-2013 and 2015 | CMS EASE_SWITCHINGav |
| | Electricity industry ranking | Score 1-52 | HH only | Only electricity | Partial | 2013 | CEER |
| | Electricity industry change in ranking | Absolute change in Score (1-52) | HH only | Only electricity | Partial | 2013 | CEER |
| | Main reason for complaints | Description | HH only | Only electricity | EU28 | 2013 | DG Justice / CEER |
| **Investment & Propensity to invest** | New installed capacity - Additions | Total annual new installed capacity (MW) - per technology | Unclear | Only electricity | EU28 | 2008-2016 | Platts- Additions |
| | Investments in renewable energy - CAPEX per type | CAPEX in million € | Not applicable | Only electricity | Partial | 2012-2016 | Eurobserver |
| | Interest rates[4] | Average interest rates per technology | NA | NA | EU28 | 2007-2018 | Eurostat [irt_lt_mcby_m] |
| **Profits and growth** | Electricity retail prices per component | EUR/Kwh or EUR/MWh (also available in PPS) | Both | Both | EU28 | 2007-2016 | Eurostat nrg_pc_204_c & nrg_pc_205_c Eurostat, second semester. For gas, only the energy component is available |
| | Monthly average whole sale prices[5] | EUR/Kwh or EUR/MWh | Not applicable | Only electricity | EU28[6] | 2007-2016 | Task 1 |
| | Mark-up of retail price over wholesale price (Calculated as wholesale - retail price) | €/MWh | Both | Both | EU28 | Up to 2017 | Using WS and PS01. Retail only available for S2 in Eurostat, we only took S2 for wholesale electricity |
| **Competition** | Expenditures on energy as share of disposable income | €/kWh, see method of quantification previously used by Vaasa/HEPI | HH only | Both | EU28 | 2008-2015 | Calculated based on Eurostat data. |
| **Prices and savings** | Savings available to consumers[7] | % of the current energy bill which could be saved by switching supplier | HH only | Both | EU28 | 2015-2016 | VaasaETT_AnnualisedSavings via DG ENER |

[4] Interest rates not available per technology. Using Eurostat (EMU convergence criterion series - monthly data)
[5] Electricity wholesale prices (day ahead, 100% baseload). Previously called PG05
[6] Excluding Cyprus and Croatia
[7] Annualised average savings in percent of the current energy bill available to typical households who switched away from their local by-default contract to the cheapest offer available in April 2015. Temporary discounts and rebates were taken into account for this analysis. Prices in capital cities are used as a proxy to assess prices at the national level.

| Topic | Indicator | Quantification | Sector | Energy vector | MS coverage | Timeframe | Source |
|---|---|---|---|---|---|---|---|
| Retailer choice | Number active of suppliers | Total number | Both | Both | EU28 | 2008-2015 | CEER |
| | Number of offers per supplier | Total number of offers | Unclear | Both | EU28 (capital cities) | 2014-2015 | MMR underlying data |
| | Number of offers per supplier | Share out of total of each type of offer (fixed, variable, green, spot-based) | Unclear | Both | EU28 | 2015 | MMR underlying data |
| | Market shares of three largest firms on market[8] | Consumed volumes | Both | Both | EU28 | 2008-2015 | CEER. |
| | Number of suppliers with more than 5% market share[9] | Number | Both | Both | EU28 | 2013-2016 (hh) / 2015-2016 (nhh) | CEER |
| | Market concentration (Herfindahl-Hirschman Index, HHI) | HHI | Both | Both | Partial | 2015-2016 | CEER |
| | Netto number of new active suppliers | Number of suppliers | Both | Both | EU29 | 2009-2016 | Calculated (change per year) |
| | Change in netto number of active suppliers | % | Both | Both | EU30 | 2009-2017 | Calculated (% change per year) |
| Regulated prices | Existence of price regulaton | Yes/No | Both | Both | EU28 | 2008-2015 | CEER |
| | Existence of price regulation dropped in | Year | Both | Both | EU28 | 2008-2016 | Calculated based on CEER |
| | Year since removal | Number of years since removal | Unclear | Both | EU28 | 2017 | Calculated based on CEER |
| | Type of price regulation I | Description of the type of price regulation | Unclear | Both | Where relevant | 2008-2015 | CEER |
| | Type of price regulation II | Description of the type of price regulation | Unclear | Both | Where relevant | 2008-2015 | CEER |
| | Share of consumers with regulated prices | % of total consumers covered by regulated price[10] | Both | Both | Where relevant | 2008-2015 | Calculated based on CEER |
| | Volume of the consumption of consumers with regulated prices | Volume in TWh | Both | Both | Where relevant | 2008-2015 | CEER |
| | Share of the consumption of regulated consumers out of total consumption | % for share of consumption | Both | Both | Where relevant | 2008-2015 (hh), 2013-2015 (nhh) | CEER |
| Vulnerable consumers | Share of households that receive social tariffs | % | HH only | Both | EU28 | 2008-2015 | CEER |
| | Inability to keep home adequately warm | % | HH only | Merged | EU28 | 2008-2016 | Eurostat - ilc_mdes01 |
| | Arrears on utility bills | % | HH only | Merged | EU28 | 2008-2016 | Eurostat - ilc_mdes07 |

[8] Households by metering points and non-households by volume, combined by volume

[9] Data on the number of suppliers with market shares >5% is only available for the electricity market from 2013 onwards. Data is not available on the number of suppliers with markets shares >5% for the gas market

[10] Including social tariff, transitory measures, universal service, default supplier or other mechanisms with price regulation

| Topic | Indicator | Quantification | Sector | Energy vector | MS coverage | Timeframe | Source |
|---|---|---|---|---|---|---|---|
| | Number of households on social tariffs | Number | HH only | Both | EU28 | 2008-2015 | CEER |
| Tariff deficits | Growth - Gross domestic product at market prices | GDP (Million €, current prices) | Merged | Merged | EU28 | 2008 -2017 | Eurostat - tec00001 |
| | Government debt | (%) of GDP | Merged | Merged | EU28 | 2008 -2017 | Eurostat - teina225 |
| | Electricity generated from renewable sources | % of gross electricity consumption | Merged | Only electricity | EU28 | 2008 -2016 | Eurostat - tsdcc330 |
| | Retail competition | Number of retailers | Merged | Only electricity | EU28 | 2008 -2015 | DB CEER |
| | Retail competition[11] | Index | Merged | Merged | EU28 | 2008 -2016 | WB database: Worldwide Governance Indicators - GE.EST |
| | Regulatory Quality: Estimate[12] | Index | Merged | Merged | EU28 | 2008 -2016 | WB database: Worldwide Governance Indicators - RQ.EST |

[11] Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

[12] Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5.

# Annex I: T3 - Country factsheets

# 1 Factsheet: Austria

This factsheet presents the findings for Austria for the 'Study on energy prices, costs and subsidies'. The indicators presented here are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 1.1 Household Price Regulation in Austria

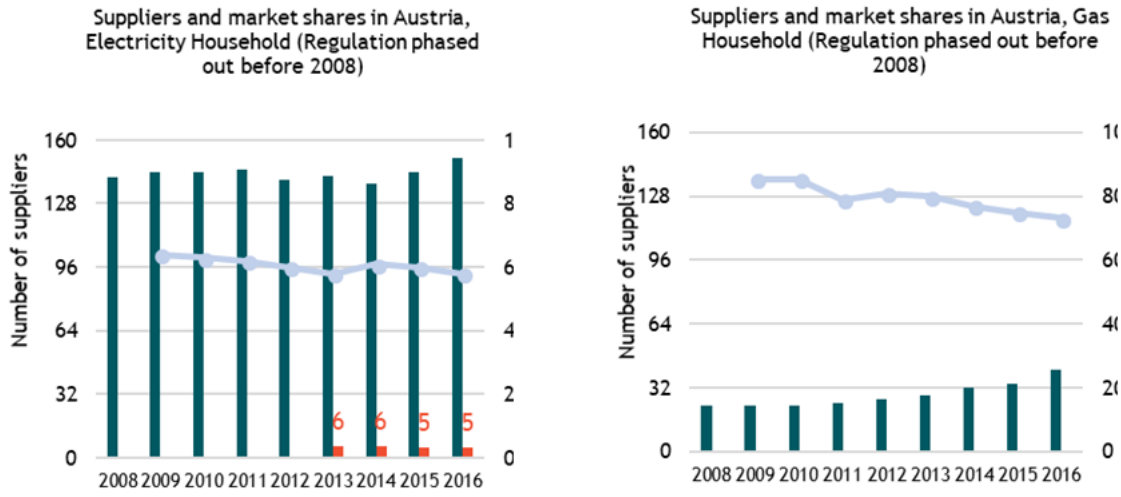
**Austria had no energy price regulation for households in the period assessed.**

Austria liberalized its electricity and gas markets in 2001 and 2002 respectively[13].

### *1.1.1 Selected aspects of competition*

On the electricity market (for household consumers), the three largest suppliers have had over 55% of the market shares over the last years with a sustained slight decrease. The number of active suppliers in the electricity market remained roughly constant, although local suppliers expanded beyond their historical areas.[14] The gas market is more concentrated, with the three largest suppliers covering above 70% of the market in 2016. However, increasingly accurate data[14] indicates a sharp decrease in this share (from 85% in 2009) as the number of active suppliers almost doubled over the investigated time period.

**Figure 1: Number of suppliers and market shares in Austria**




[13] E-Control. Freier Strom- und Gasmarkt. Information available at: https://www.e-control.at/konsumenten/energiemarkt
[14] Private communication with the NRA (2018)

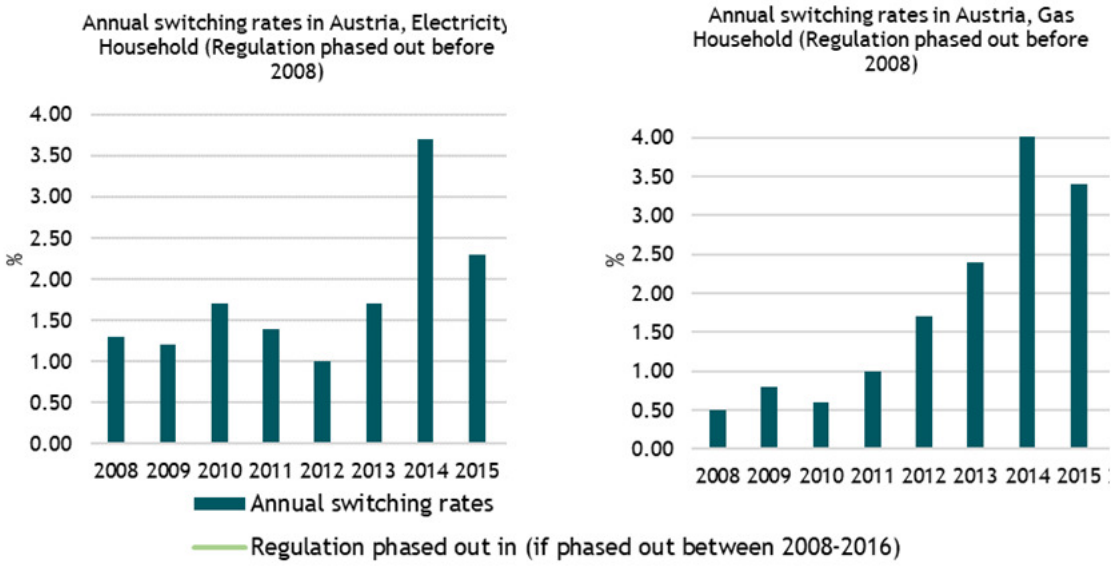

*Note: Data on the number of suppliers with market shares >5% is only available for the electricity market from 2013 onwards. Data is not available on the number of suppliers with markets shares >5% for the gas market*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figures below show the annual switching rates[15] in households for both electricity and gas, which have steadily increased since 2008. In the gas market this seems logical, as the number of suppliers doubled (see Figure 1) over the investigated time period. On the electricity market, increased competition between nationwide suppliers (alternative and local historical incumbents) and collective switching actions explain the high switching rates despite the number of suppliers remaining constant.[14]

**Figure 2 Annual switching rates for households in Austria**




*Source:* CEER data

The consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[16] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[17] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Austria. For both electricity and gas, an increase in the share of the respective expenditures in disposable income can be observed between 2009 and 2013 (with shares reverting to 2008 levels from 2014 onwards). A likely

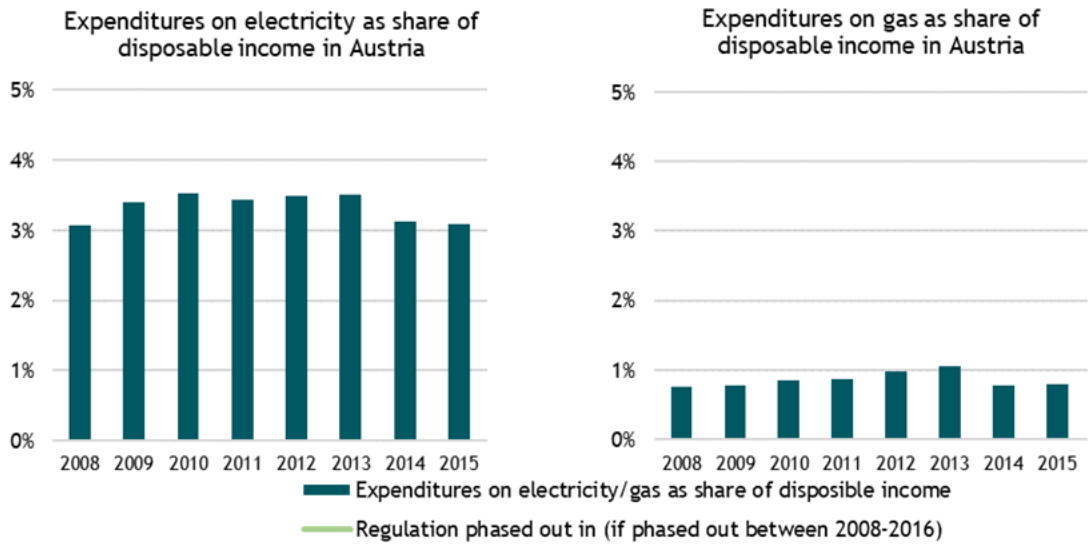
[15] Switching is defined as the voluntary action by which a customer changes his supplier

[16] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[17] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

explanation for this temporary hike is the financial crisis that reached Europe in 2009 and lowered disposable income especially for the households in the middle consumption bands. Electricity and gas consumption tends to be quite income inelastic (i.e. consumption remained constant over the period with decreased disposable income), which makes for a plausible explanation of the share increases observed between 2009 and 2013 in Figure 3.

**Figure 3: Expenditures on gas and electricity as share of disposable income for households in Austria (for middle consumption bands DC and D2) using PPS prices[18]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

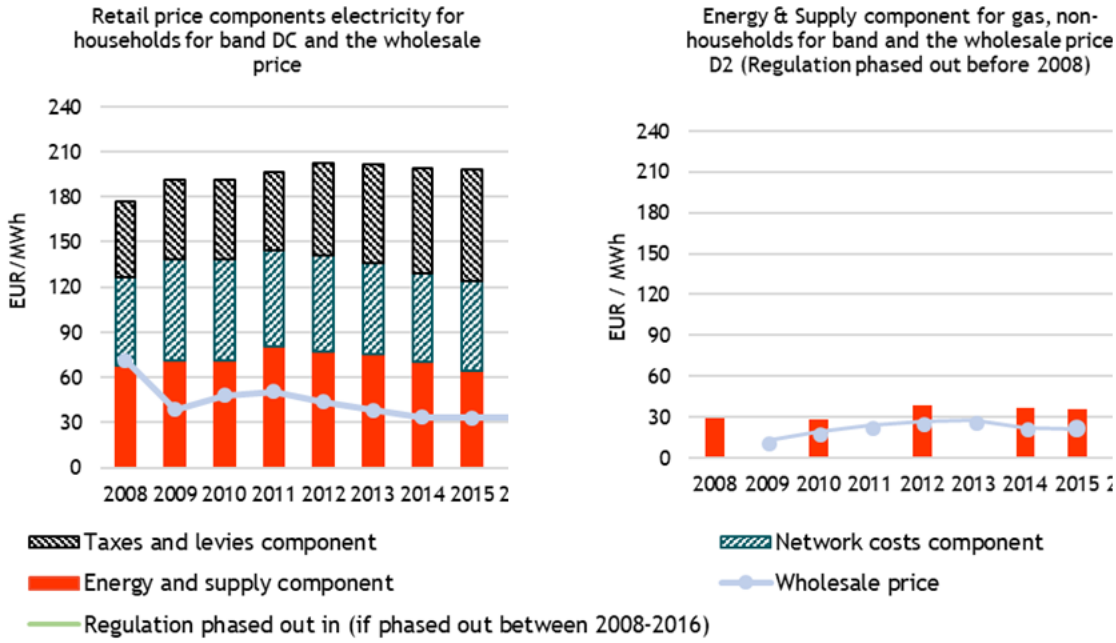
*Source:* Own calculations[19] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. Hereby, the energy and supply component has steadily decreased in price since peaking in 2011 (now between 55-60 EUR/MWh). It is interesting to see that, for Austria, this has compensated increases in the tax and levies component, so that retail electricity prices remained stable since 2012. The same trend of a decreasing energy and supply component price since a peak in 2012 can be observed in the gas retail price, as confirmed by NRA data.[20]

[18] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[19] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.
[20] E-Control (2017). Marktbericht 2017.

**Figure 4 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Austria**



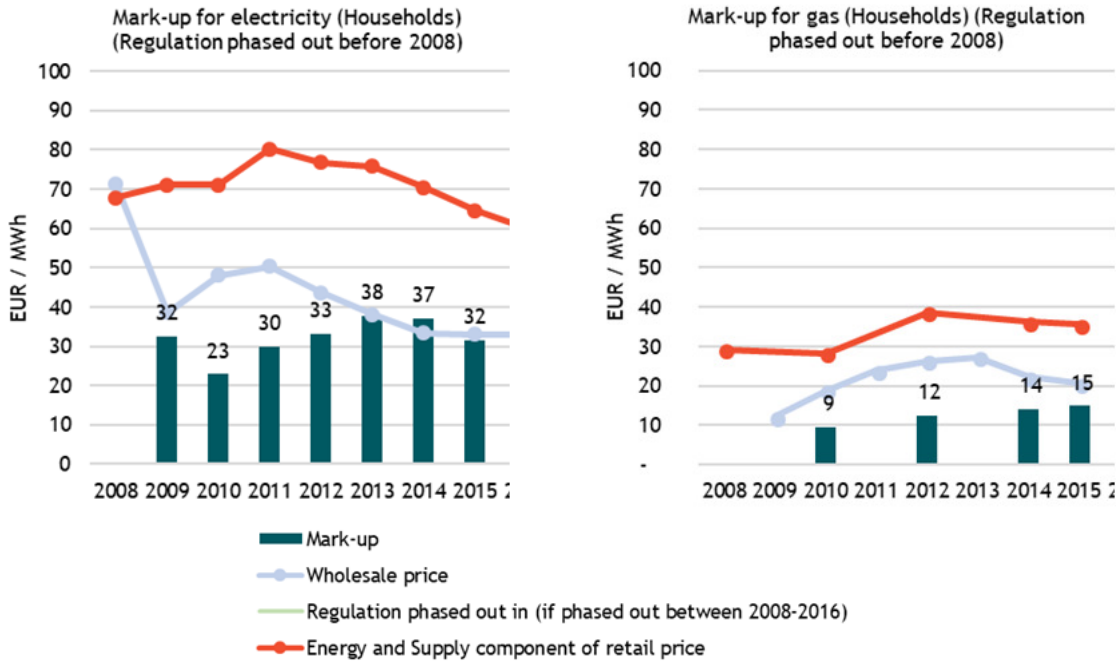

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[21] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[22] The figures below show the mark-ups along with the wholesale price.

[21] Eurostat has data available on gas prices; however not for the energy and supply component.
[22] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 5 Mark-ups for Austria, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price). Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.

After running a deficit in 2008, mark-ups for electricity bounced back to 24 EUR/MWh in 2010 and increased steadily per year until peaking at 38 EUR/MWh in 2013. Ever since, the mark-up has decreased with wholesale prices stabilizing at around 35 EUR/MWh and the energy and supply component of the retail price falling steadily in value. On the gas market, mark-ups exhibit positive growth throughout the years, although the data is limited. Between 2010 and 2012 this was mainly due to the energy and supply component of retail prices increasing marginally more than the wholesale price. Since 2014, however, it is due to wholesale prices decreasing faster relative to the rather stable energy and supply component of retail prices. The regulator indicates that potential savings from switching suppliers have increased correspondingly in the last years to several hundreds of €/year.[23]

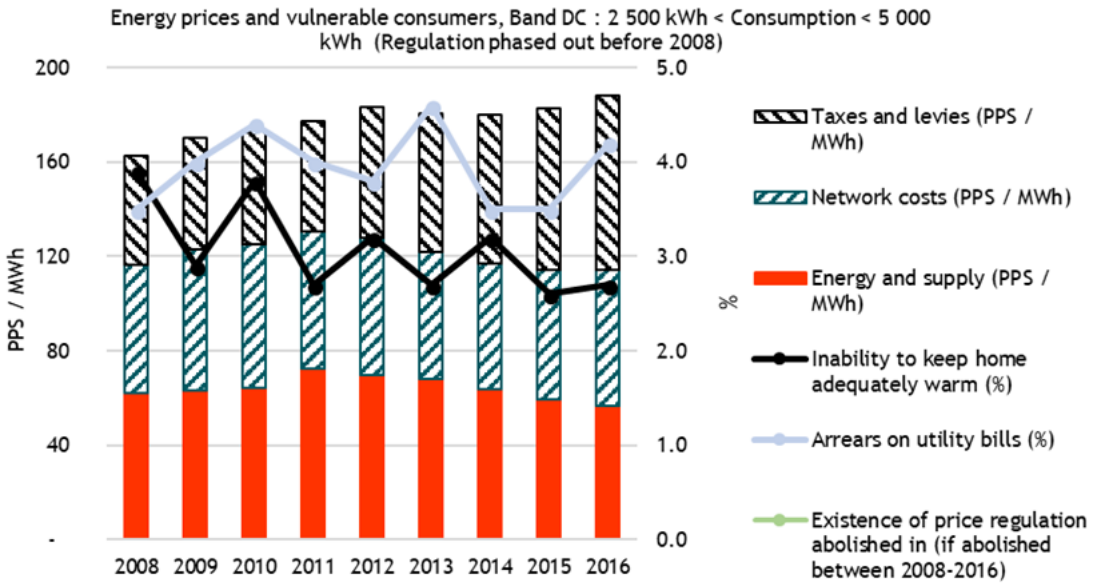
### 1.1.2 Energy poverty

The share of the population unable to keep their home adequality warm in Austria is decreasing over time, as can be seen by the diagram below. However, the most recent year of investigation (2016) shows a slight reverse of this trend. Given that these variables were rather volatile over the investigated time period, it is not unreasonable to assume that future years will deviate again from this direction (and follow the overall decreasing trend). On the other hand, there is no visible trend for the

[23] E-Control (2017). Marktbericht 2017.

share of the population with arrears on their utility bills. The NRA presents a more detailed analysis on energy poverty[24], although only for 2014, when 3.1% of Austrian households were energy-poor (with high energy expenditures and low incomes).

**Figure 6 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Austria**




*Source:* Eurostat

### *1.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

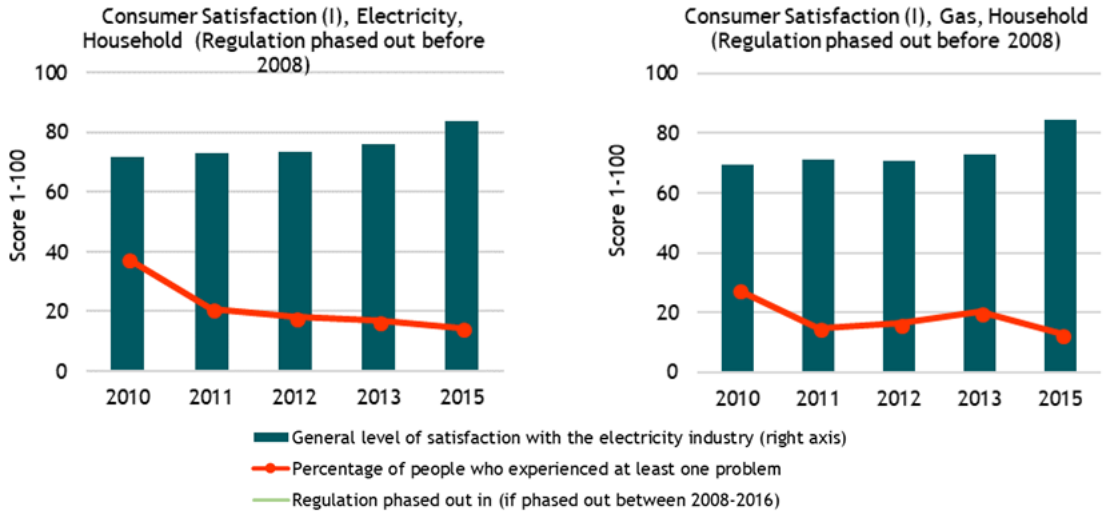
#### Consumer satisfaction

Over the period of investigation, the electricity sector has seen a significant rise in consumer satisfaction, up 12 points (on a 100-point scale) between 2010 and 2015. The percentage of people experiencing a problem with services also steadily decreased to below 5% (down from 11% in 2010).

[24] E-Control (2017). Marktbericht 2017.

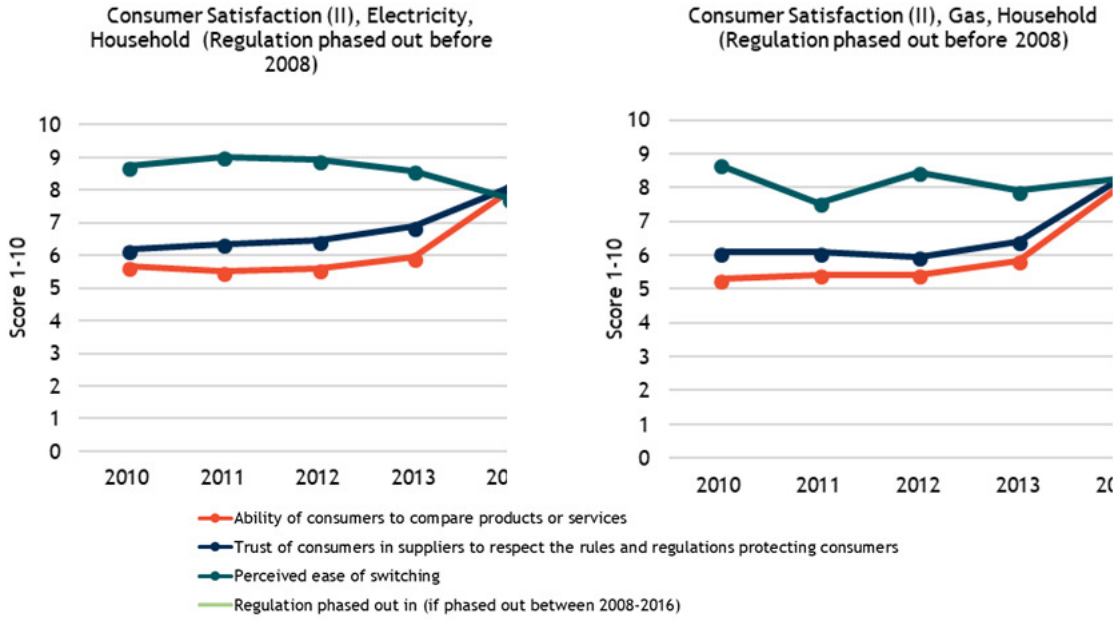
Consumer satisfaction on the gas market followed roughly the same itinerary. The incidence of problems experienced with gas sector services is even lower (under 4%) than with electricity sector services. In total, problem incidence in the gas sector was halved over the investigated period.

**Figure 7 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Austria for households**




*Source:* EC – DG Justice[25]

**Figure 8 Ability of consumers to compare products or services[26], trust of consumers in suppliers[27] and perceived ease of switching[28] in Austria**




*Source:* EC – DG Justice

[25] Note that from 2013 onwards, the survey was carried out every other year.
[26] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[27] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[28] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

As can be seen in Figure 8, ability of consumers to compare products or services has increased in both markets, probably owing to the steadily increasing number of supplier options (and the resulting market opportunity for entrepreneurs to offer comparison tools). Overall trust of consumers in suppliers to respect rules and regulations protecting consumers also increased steadily (and more starkly in recent years). Perceived ease of switching is high and stable in both markets but has seen a slight decrease in the electricity market from 2011-2015.

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. Austria offers a wide range of tools to foster consumer choice, which qualifies it as a highly developed market in that regard (especially since it is also counting with modern ICT-based offerings).

**Table 1-1 Consumer choice in Austria (electricity, households)**

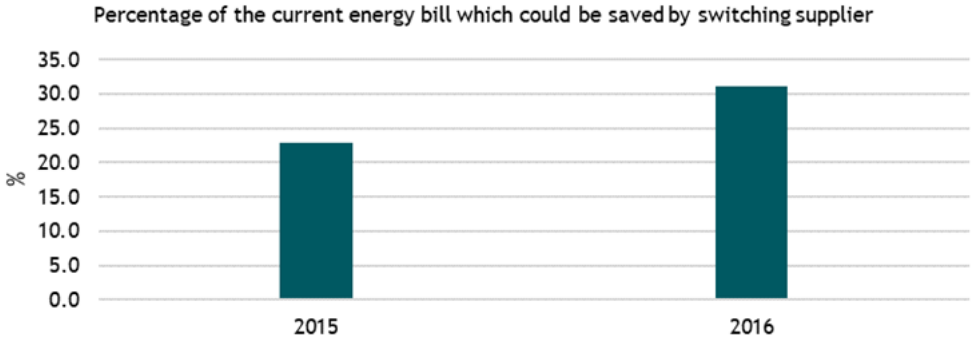
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 | Yes |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | Yes |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The potential savings from switching suppliers in Austria increased from 2015 to 2016 as indicated below. This is corroborated by the NRA, which indicates a rising trend in savings potential for households, both for gas and electricity since 2012.[29]

**Figure 9 Percentage of the current electricity bill which could be saved by switching supplier in Austria**



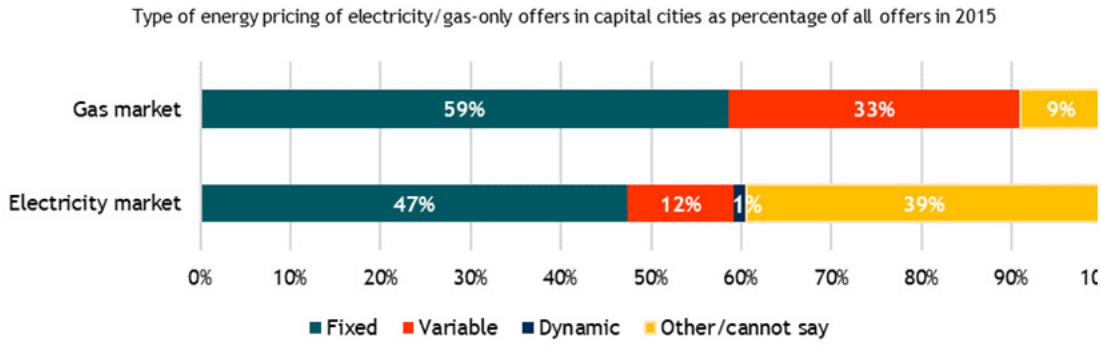

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, most of which are fixed.

[29] E-Control (2017). Marktbericht 2017.

**Figure 10 Type of offers for households in Austria**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 1.2 Non-Household Price Regulation in Austria

**Austria had no energy price regulation for non-households in the period assessed.**

The liberalization of Austrian electricity and gas markets for large consumers was effective already in 1999 and 2000, respectively, before that for small consumers[30].

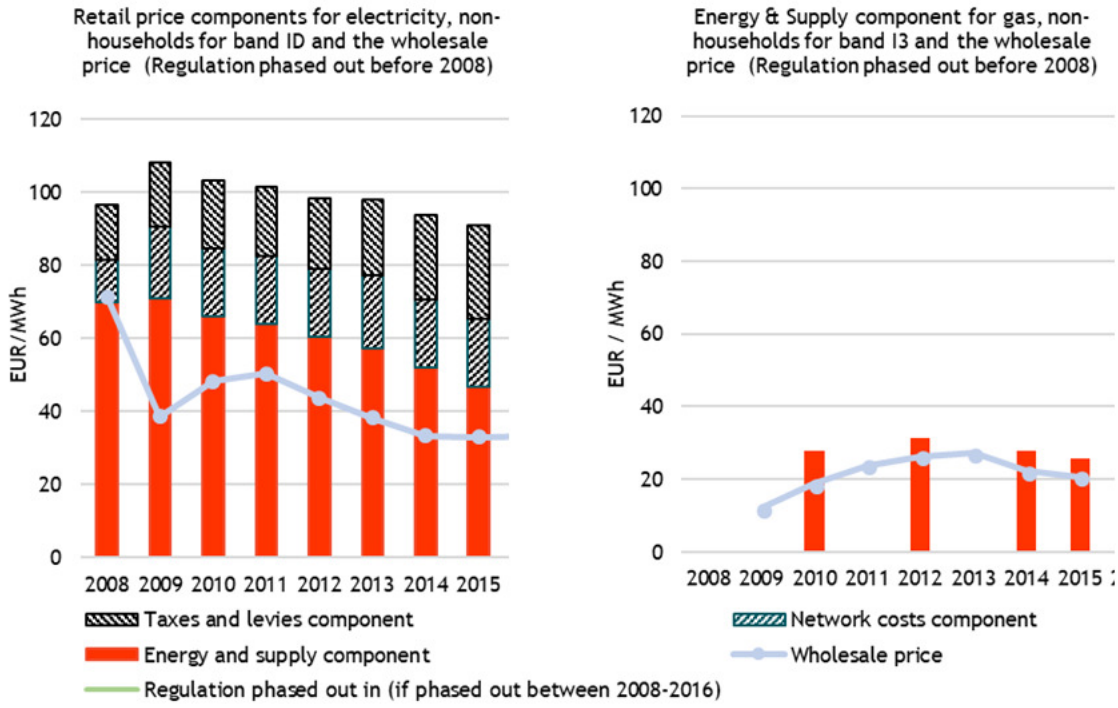
### *1.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Wholesale as well as retail prices (for non-household consumers) on the electricity market fell steadily over the investigated time period, with wholesale prices stabilizing from 2014 onwards. The energy and supply component of the retail price also decreased yearly between 2009-2016. For the gas market, wholesale prices and the energy and supply component roughly followed the same development path (peaking between 2012-2013, decreasing from 2014 onwards[31]).

[30] For electricity, E-Control (2002). Liberalisierung und Strompreisentwicklung - Liberalisierung und Strompreisentwicklung.
For gas, Peter Köberl (2001). Liberalisierung des Erdgasmarktes. Information available at: http://www.diglib.tugraz.at/download.php?id=4e81cf45cbfcc&location=browse

[31] This is corroborated by the NRA from 2013 on. E-Control (2017). Marktbericht 2017.

**Figure 11 Industry retail price components for middle bands (ID and I3) and wholesale prices in Austria**



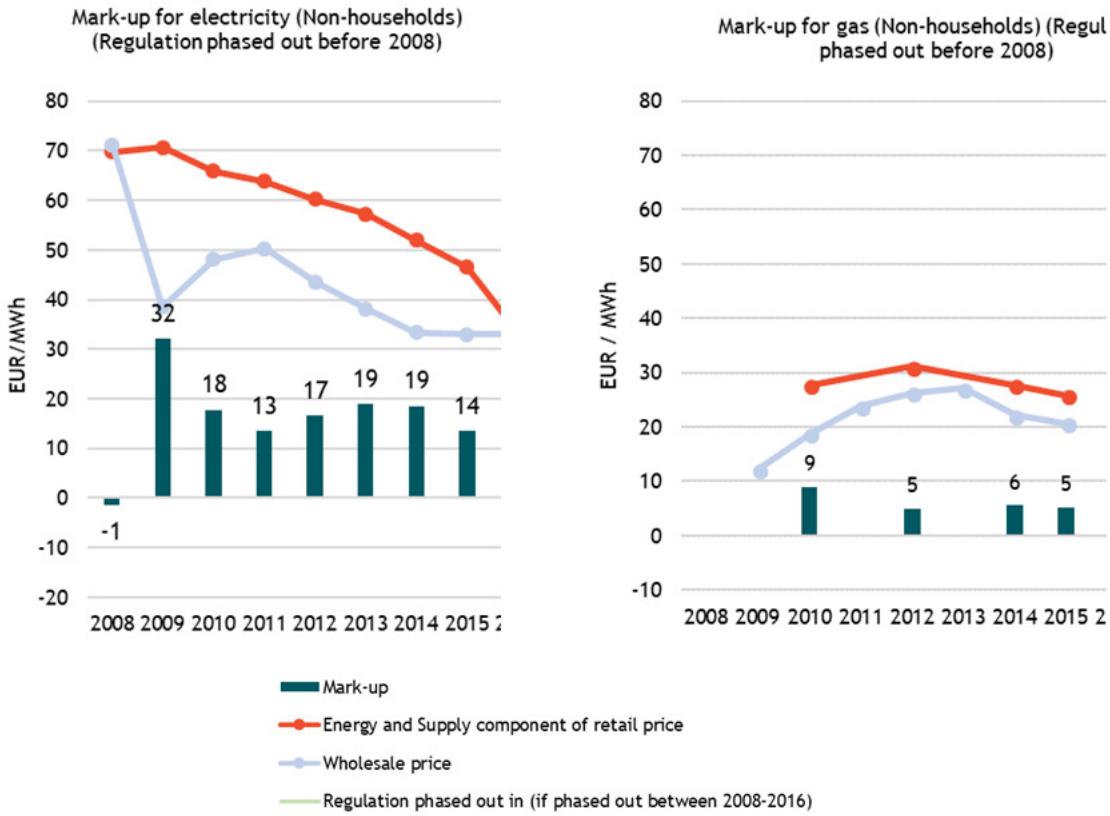

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[32] The figures below show the mark-ups along with the wholesale price. For the electricity market, (industry) retail mark-ups fell to 0 EUR/MWh in 2016 after a period of relative stability around 18 EUR/MWh between 2010 and 2015. Reason for the mark-up to vanish is the stabilization of wholesale prices paired with the continued fall of the energy and supply component of the retail price. In the gas market, mark-ups have remained stable at 5-6 EUR/MWh since 2012, with both the wholesale price and the energy component of the retail price following the same itinerary.

[32] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 12 Mark-ups for Austria, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price). Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.

## 1.3 Tariff deficit in Austria

**Austria had no tariff deficit between 2008 and 2016.**

# 2 Factsheet: Belgium

This factsheet presents the findings for Belgium for the 'Study on energy prices, costs and subsidies'. The indicators presented here are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 2.1 Household Price Regulation in Belgium

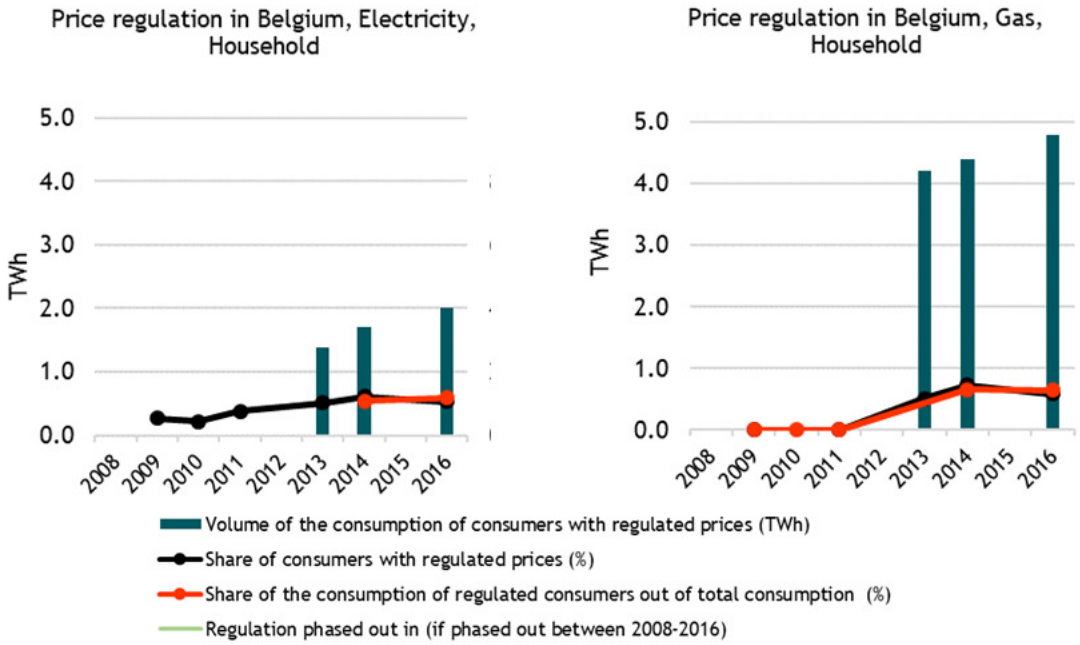
**Belgium still has energy price regulation for households in place due to the share of households with social tariffs (which is above 5%).**

During the considered period 2008-2016, prices for supply of gas and electricity to households were not regulated in Belgium, except for vulnerable consumers (social tariffs) and dropped consumers. The Belgian law of 8 January 2012 (amended by the law of 29 March 2012) introduced an extensive price monitoring for electricity and gas supply prices to households. This monitoring had initially been introduced until end 2014, and was prolonged until end 2017, when it ceased to exist.

From April 2012 until December 2012, electricity and gas retailers were by that law forbidden to increase their prices of contracts for existing products with variable prices. Contracts with fixed prices or for new products were not subject to this legal measure, and retailers could hence continue to adapt their prices for new contracts or products. As of January 2013, retailers were again allowed to adapt their variable electricity and gas prices for supply to households, but only quarterly (while beforehand they could adapt their prices monthly). New price formulas and parameters (e.g. references to specific wholesale market prices) had to be notified to the national energy regulator and had to comply with the provisions of the Royal Decree of 21 December 2012. The national energy regulator was legally empowered to control ex post whether the changes in price formulas were effectively compliant with the legislation, and whether the price increases were justified, amongst others based on a comparison between the actual Belgian retail prices and the average prices in the CWE market (BE, NL, LU, FR and DE). As the wholesale prices are in this integrated supranational market converging to a large extent, the Belgian legislator and regulator assume that the commodity retail prices for electricity and gas should also converge. If the actual retail prices in Belgium were higher than the CWE average, the national energy regulator was legally empowered to enter into “negotiations” with the concerned retailers in view of assessing their justification for higher retail prices in Belgium and, if appropriate, obliging them to reduce their commodity prices to the average CWE level.

Figure 1 shows the share of household consumers and related overall consumption that were in 2008-2016 covered by this extensive price monitoring and the social tariffs. Due to the share of household consumers on social tariffs in Belgium, in the cross-country report on energy prices, costs and subsidies, the country is still classified as having low shares of price regulation for households as of 2016.

**Figure 13 Household price regulation in Belgium from 2008 to 2016**



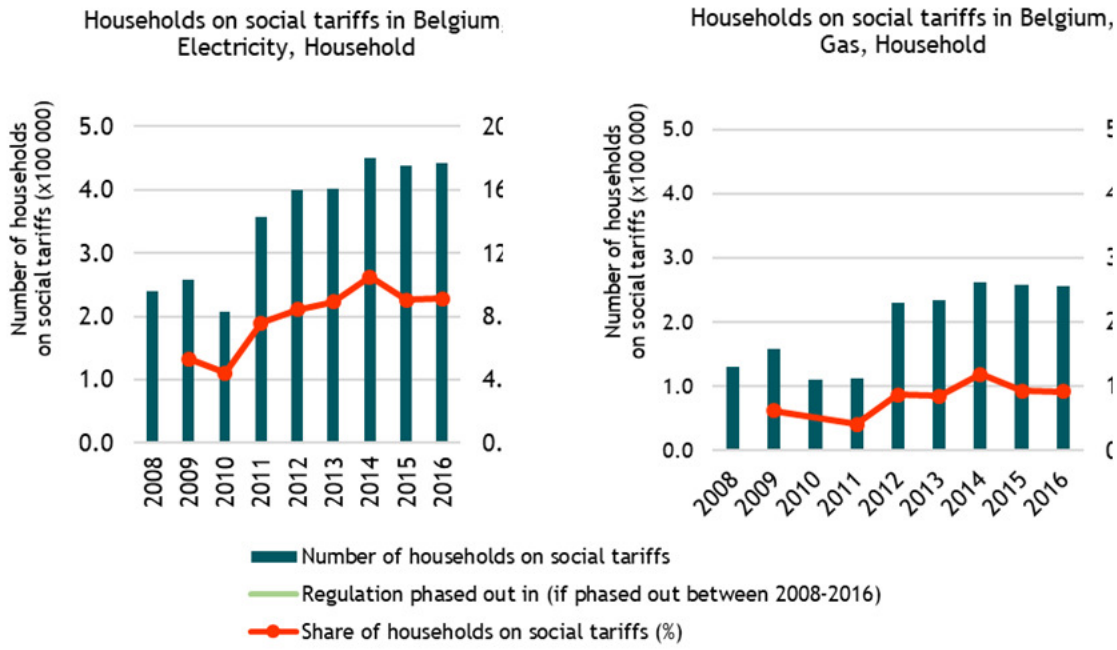

*Source:* CEER data

*No year for the end of price regulation is indicated due to the share of population on social tariffs*

The current social tariff regulation for electricity and gas has been introduced by two Ministerial Decrees of 30 March 2007 (respectively for electricity and gas) and by the Royal Decree of 25 June 2009. Vulnerable low-income households that benefit from a specific financial allowance granted by national or municipal authorities, are eligible for a social gas and electricity tariff. The actual social electricity and gas tariff levels are twice a year determined by the national energy regulator for the next period of 6 months, on the basis of the lowest commodity price which is at that moment offered by the retailers. The social tariff levels are hence lower than the price level of almost all other supply contracts, but the difference is not predetermined and depends on actual market practices. There is also no direct relation between the social tariff and the wholesale price; the effective level depends on the price setting of the most competitive retailer. The overall net impact of the social tariff on the retailers' margins is recovered via a surcharge on the electricity and gas bills determined and collected by the national energy regulator; the retailers can claim from the national energy regulator reimbursement of the net costs (net impact on their revenues) that they incur by granting social tariffs. At present about 9% of the Belgian households are benefiting of social electricity and gas tariffs.

Regulated prices also apply for electricity or gas supply to non-protected households that have been dropped by their commercial supplier due to unpaid bills. In these cases, distribution grid operators act as supplier of last resort and have to apply maximum prices which are twice a year determined by the national energy regulator.

Figure 14 Household social tariffs in Belgium

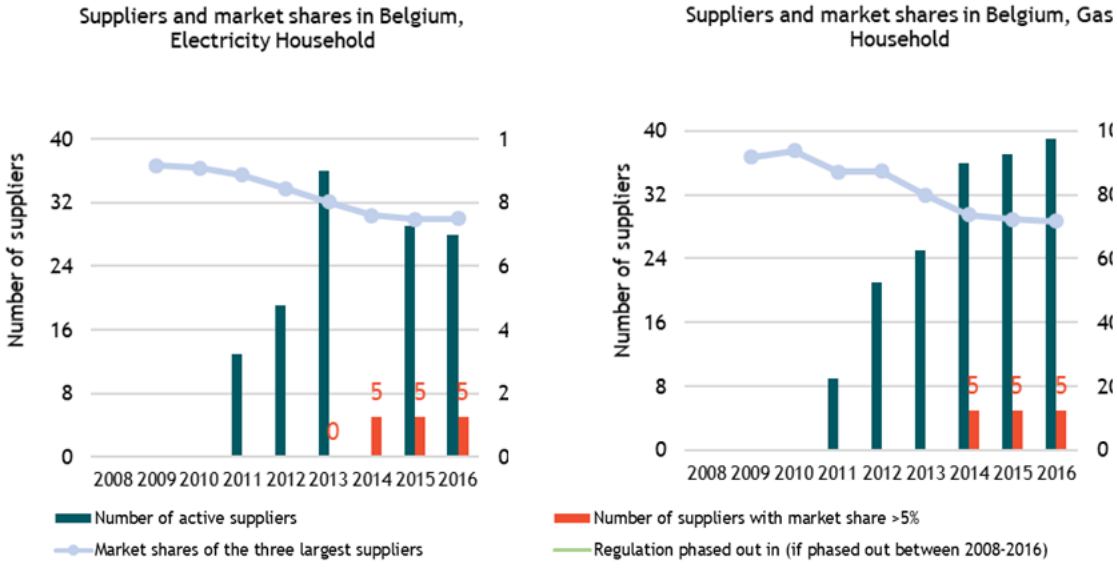



*Source:* CEER data

### 2.1.1 *Selected aspects of competition*

The number of active suppliers on the Belgian electricity and gas retail market has strongly increased since the liberalisation, but due to hard competition and low margins, a consolidation is taking place since a few years (e.g. takeover of Lampiris by TOTAL in June 2016, ENI Gas & Power Belgium by ENECO in July 2017, Direct Energy - Poweo in April 2018 by TOTAL, and others). For both electricity and gas (household market segment), we see that the three largest suppliers have consistently lost market share over the last years. This is mainly due to the heavily decreasing market share of the major incumbent Engie-Electrabel.

Figure 15: Number of suppliers and market shares in Belgium



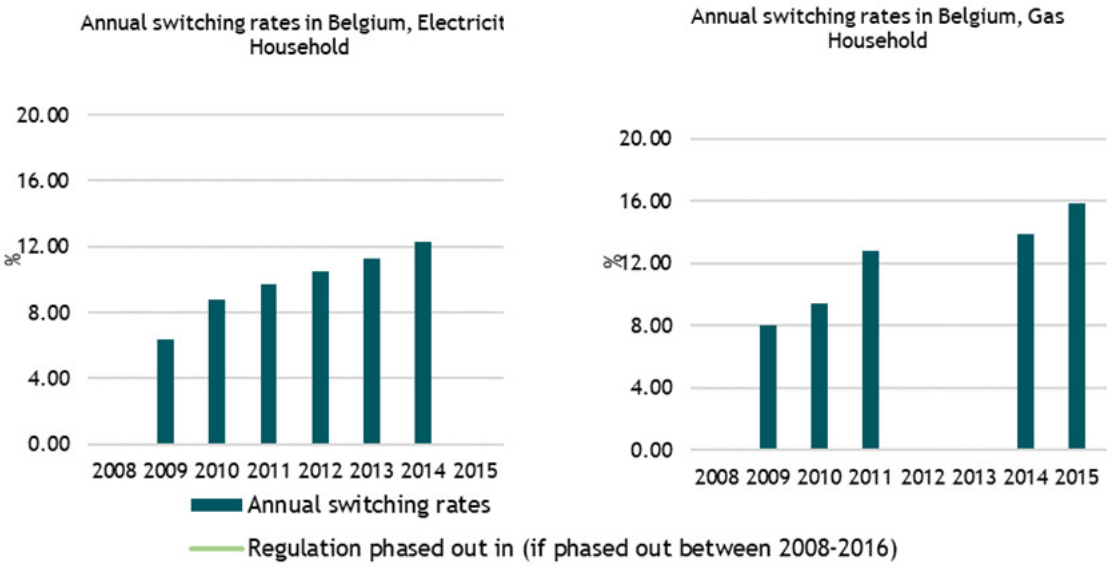

*Note that data on the number of active suppliers is not available prior to 2011*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figures below show the annual switching rates[33] of households for both electricity and gas. The switching rates have in Belgium gradually increased and have reached very high levels compared to most other EU countries. There are several large multinational energy companies and new local operators that entered the Belgian retail market. Customers have a large choice, both in terms of number of suppliers and in terms of contract and product types, and they are becoming increasingly aware of the potential benefits of switching energy supplier. Consumer awareness has been raised by information campaigns launched by energy regulators and consumer associations, as well as by commercial actions of retailers. Group purchases resulting in collective switching schemes have also contributed to enhancing consumers' awareness and price competition on the retail market. The price pressure on retailers resulting from actions from competitors and consumers seems to have had a larger effect than the above mentioned price monitoring. The high switching rates have also led to a gradually decreasing concentration on the Belgian electricity and gas retail markets.

**Figure 16 Annual switching rates for households in Belgium**




*No data available in 2008 and 2015 (electricity) and 2008, 2012 and 2013 (gas)*

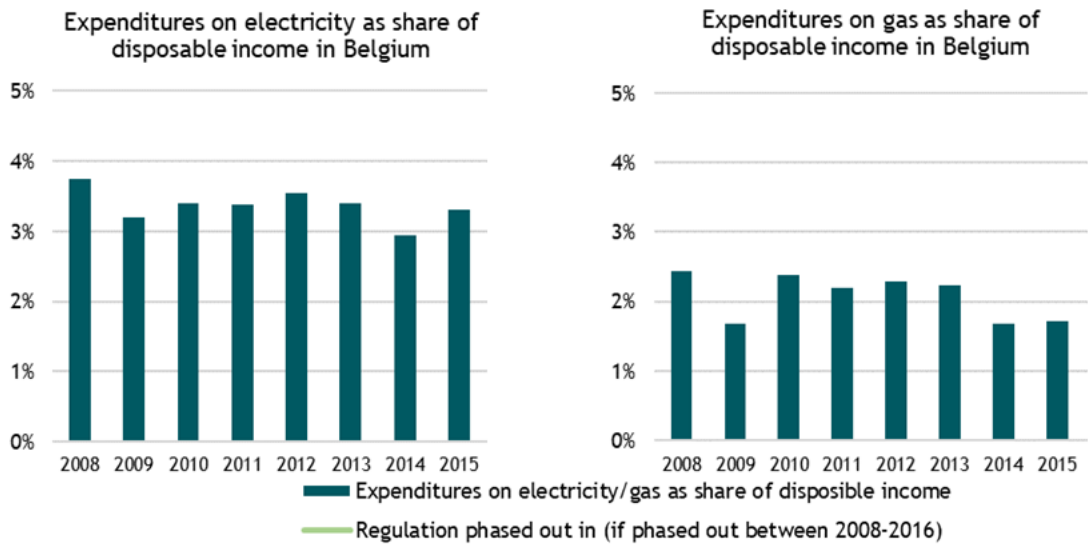
*Source:* CEER data

Regarding the impact of retail electricity and gas prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income of households.[34] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of electricity and gas in Belgium. We notice that notwithstanding increasing grid costs and fees/surcharges (in particular for renewable energy), the share of the overall electricity and gas cost in disposable income has on average not increased (except in 2016 for electricity, which is due to the introduction in the Flemish region of a new levy to recover accumulated debts for renewable energy support). This evolution can be explained by decreasing energy consumption (resulting from energy efficiency

[33] Switching is defined as the voluntary action by which a customer changes his supplier
[34] The expenditures on energy were calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

measures) and in general decreasing wholesale prices during the considered period. The retail margins for both electricity and gas were during that period also under pressure, mainly due to strong competition on the Belgian market (high switching rates) and possibly also due to the price monitoring implemented in 2012. Although the national bank of Belgium (NBB) and the national energy regulator (CREG) have both monitored and evaluated the impact of the monitoring mechanism, its actual effect on the affordability of electricity and gas for households is rather unclear.

**Figure 17: Expenditures on gas and electricity as share of disposable income for households in Belgium (for middle consumption bands DC and D2)**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

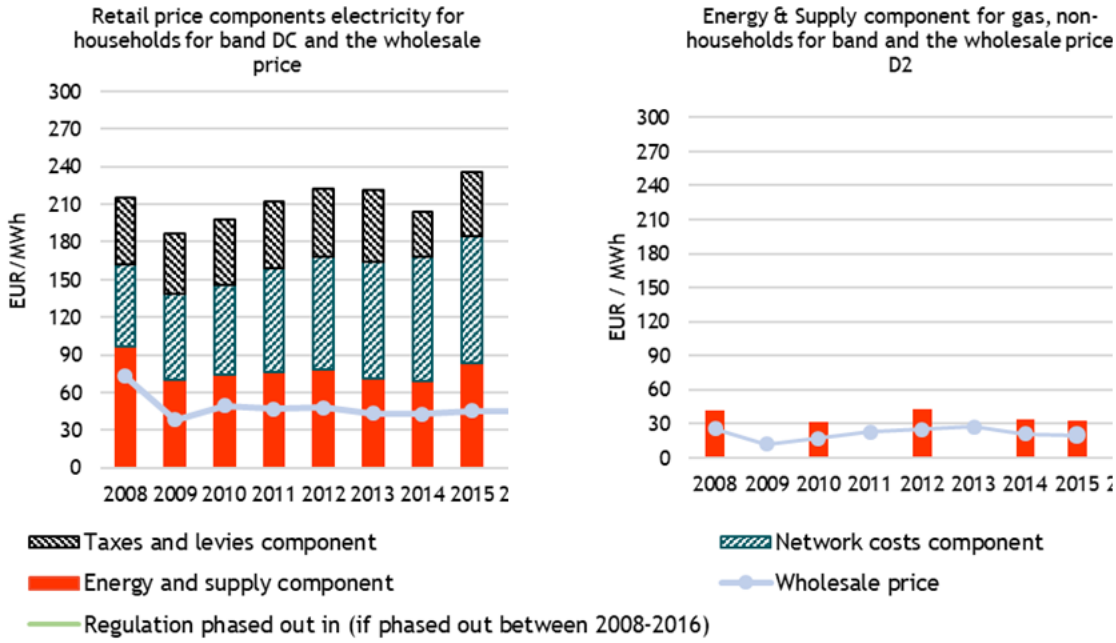
*Source:* Own calculations[35] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. For Belgium, we notice that the electricity commodity price component per MWh has been relatively stable during the considered period, while taxes/fees and grid costs were gradually increasing. In 2014 and 2015, taxes were lower due to a temporary measure to reduce the VAT rate from 21 to 6% (from 1 April 2014 to 31 August 2015). The gas price component has been more volatile, which is linked to the price evolutions on the global gas market. Further analysis might be needed to gain a better understanding of the drivers behind the changes in the retail market prices.

[35] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 18 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Belgium**



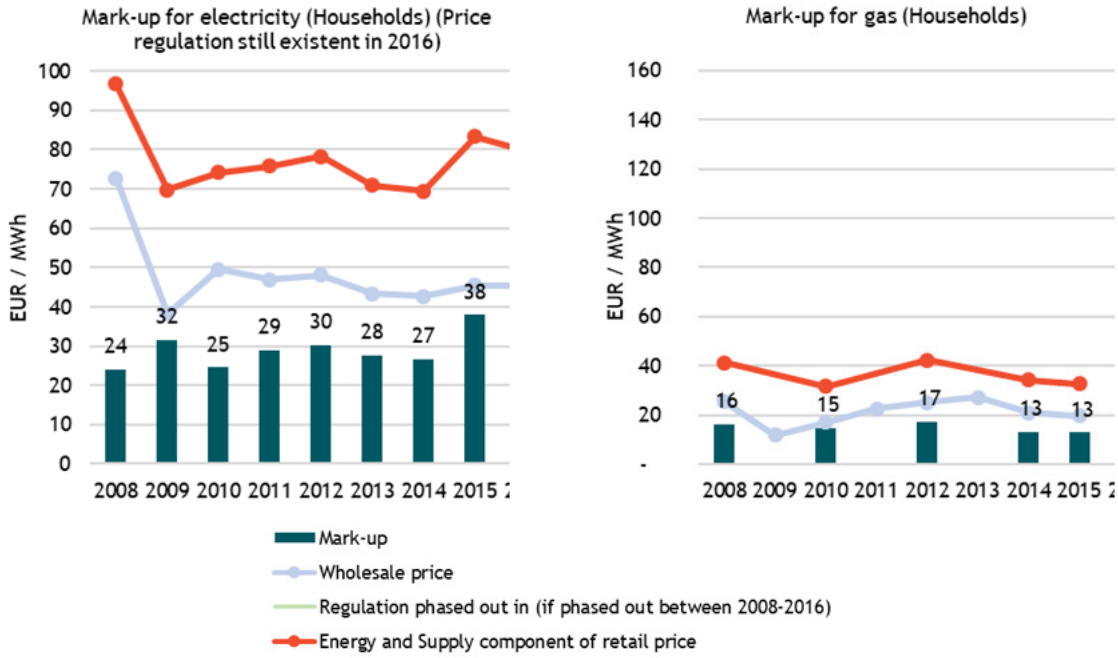

*No data available for the energy and supply component of the gas retail price in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[36] and EMOS (wholesale price)

The competition performance section also assesses the gross margins achieved by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[37] The figures below show the mark-ups along with the wholesale prices. We notice that the retail margins for electricity have more or less remained stable during the considered period; the introduction of price monitoring in 2012 has apparently had no visible impact on the margins. When retail margins are compared at international level, the size of the considered markets should also be taken into account. The Belgian electricity and gas retail market is de facto split up in 3 regional markets, where different legislation and regulation apply. For this reason, the fixed costs are for retailers in Belgium higher than in most other EU retail markets. The sharp price competition and resulting 'low' margins on the Belgian retail markets lead to market consolidation on the one hand (see supra); on the other hand, a few suppliers had to stop their supply activities in June 2018 due to financial difficulties.

[36] Eurostat has data available on gas prices; however not for the energy and supply component.
[37] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 19 Mark-ups for Belgium, band DC (electricity consumption between 2 500 kWh and 5 000 kWh) and band D2 (gas consumption between 20 GJ and 200 GJ)**




*No data available for the energy and supply component of the gas retail price in 2009, 2011, 2013 and 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat, EMOS, EC ad-hoc data

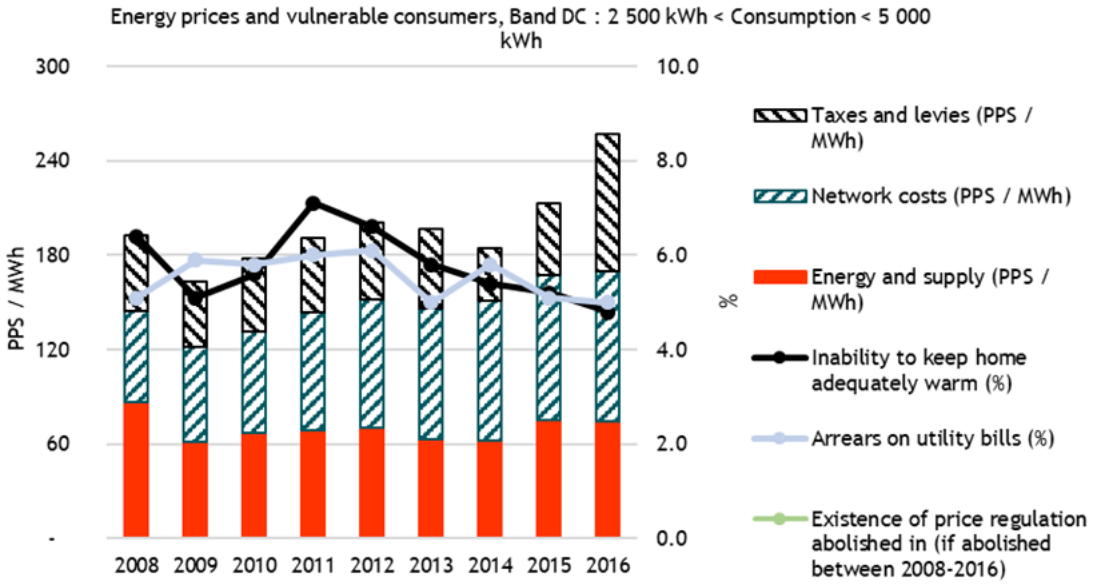
### 2.1.2 *Energy poverty*

The number of consumers in Belgium who are potentially suffering from energy poverty has slightly decreased since 2011, as can be seen on the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. This positive evolution might be linked to the fact that the share of the electricity and gas costs in the overall household expenditures has until 2015 slightly decreased. During the considered period, the number of consumers who benefit from social tariffs has increased; this might also have contributed to reducing the burden of energy bills on the households.

According to the Energy Poverty Barometer (2017),[38] 14.5% of Belgian households devoted in 2015 too high a share of their income to energy expenditure. A further 4% of households restricted their energy consumption. Households with the lowest incomes, tenants, single-person households, especially women living alone and aged 65 or more, and single-parent families were the most affected. As the social tariffs apply to 'only' 9% of the Belgian households, this analysis suggests that not all households in energy poverty benefit from this measure.

**Figure 20: Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Belgium**

[38] The Energy Poverty Barometer (2017), Bart Delbeke and Jill Coene, University Antwerp - Sandrine Meyer, University Brussels




*Source:* Eurostat

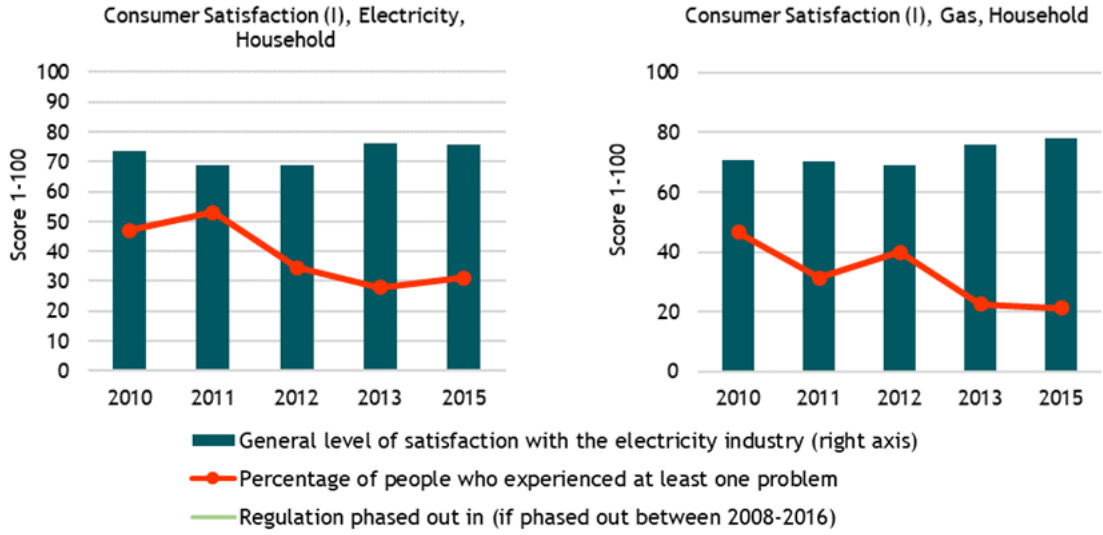
### 2.1.3 *Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

We notice that during the considered period, the number of problems encountered by consumers has decreased and their overall satisfaction level has significantly increased. The dynamic evolution of the Belgian retail market seems hence to have had a positive impact on the consumer satisfaction.

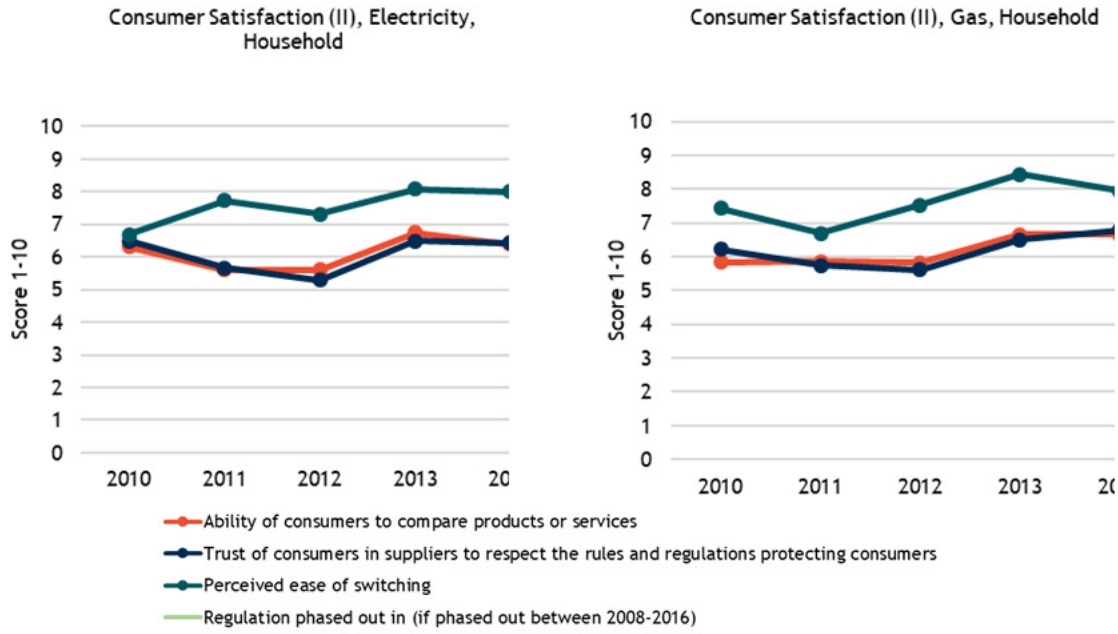
**Figure 21 General level of satisfaction of households with the energy supply industry and the percentage of people who experienced at least one problem in Belgium**




*Source:* EC – DG Justice[39]

[39] Note that from 2013 onwards, the survey was carried out every other year.

**Figure 22 Ability of consumers to compare products or services, trust of consumers in suppliers and perceived ease of switching in Belgium**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. We notice in general that energy retailers have in Belgium become very innovative in their offerings to consumers; most suppliers offer both electricity and gas and have several types of supply contracts (fixed or variable prices, 100% renewable energy or market mix, optional additional services related to energy efficiency, etc.). Other service providers (e.g. aggregators) are also active on the Belgian market, but mainly in the industrial and tertiary sectors; as households are not yet equipped with smart meters, the demand response potential in this market segment cannot yet be fully deployed.

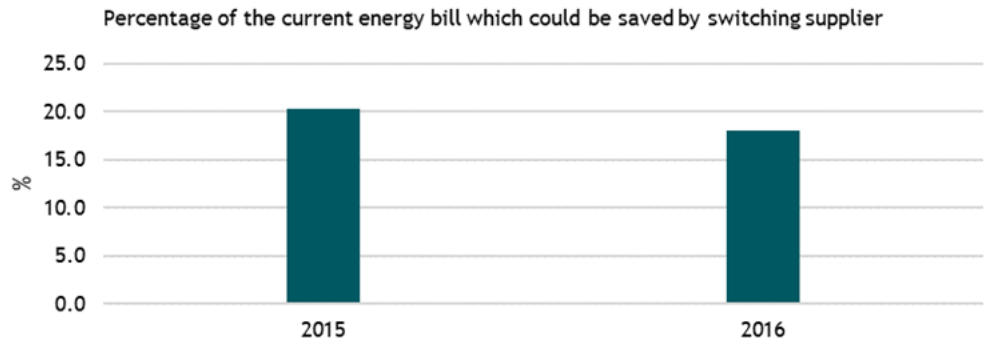
**Table 2-1 Consumer choice in Belgium (electricity, households)**

| | Answer |
|---|---|
| Dual-offers available in 2014 | Yes |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | No |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | Yes |

*Source:* ACER/CEER (2015)

The next figure shows the potential savings by switching energy supplier in Belgium. This is a theoretical estimate based on a comparison between the highest and lowest price offerings at a certain moment. In reality, price comparisons are more complex as prices relate to different contract types (e.g. fixed versus variable prices) and products (e.g. renewable energy-based electricity versus grey electricity).

Figure 23 Percentage of the current electricity bill which could be saved by switching supplier in Belgium

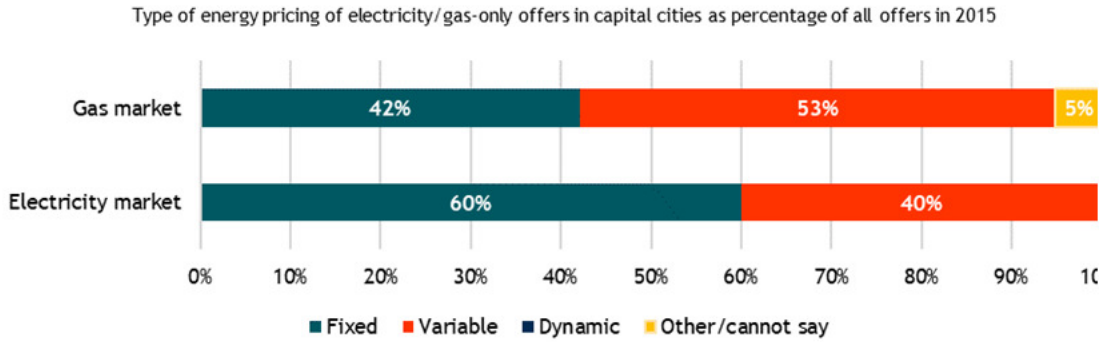



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of supply contracts for electricity and gas, that were applied in 2015. At that moment, most electricity contracts (60%) were based on fixed prices, while the majority of the gas contracts were based on variable prices, linked to average wholesale prices. However, the situation for gas was reversed in 2016.[40] Dynamic pricing in Belgium was already implemented in the household market segment in 2013 but was not representative according to the ACER/CEER data.

Figure 24 Type of offers for households in Belgium




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015). Spot-based offers are a special type of variable offers and are indicated separately.

## 2.2 Non-Household Price Regulation in Belgium

**Belgium had no energy price regulation for non-households in the period assessed. Belgium applied price monitoring to SMEs since 2012 (phased out in 2017), but it is less than 5% of consumers.**

During the considered period 2008-2016, prices for supply of gas and electricity to non-residential consumers in Belgium were not regulated. The extensive price monitoring which was been introduced in April 2012 by the Belgian law of 8 January 2012 (see supra) also applied to professional end-users (SMEs)

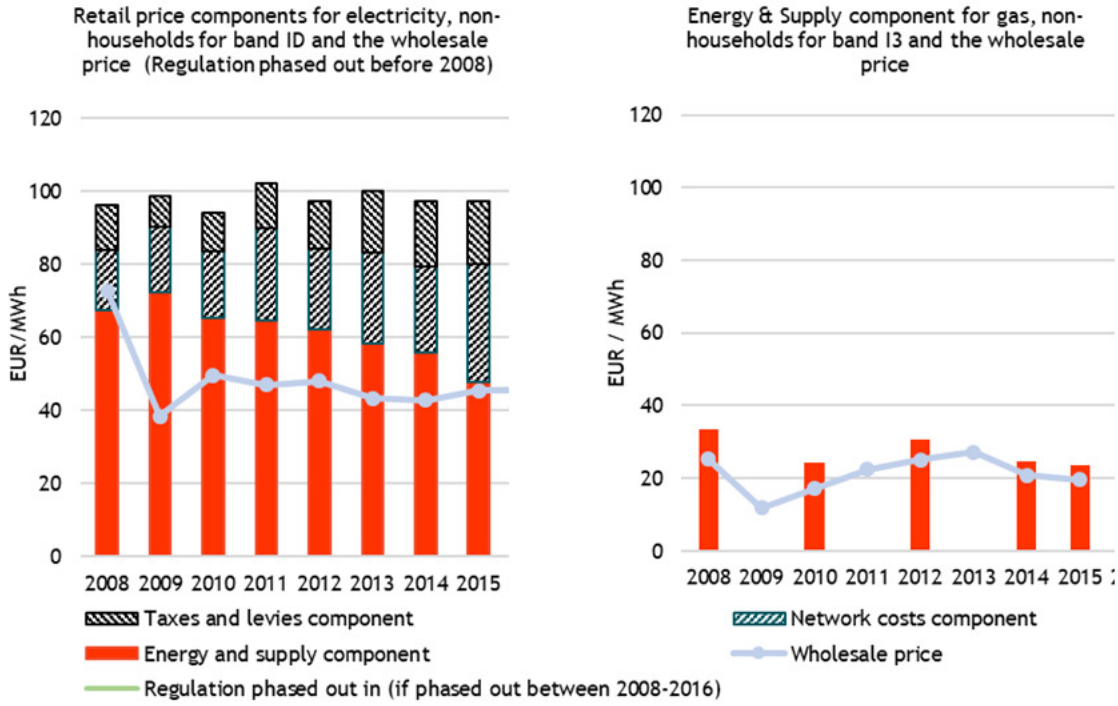
[40] Private communication with the national energy regulator (2018).

with a maximum annual consumption of respectively 50 MWh electricity or 100 MWh gas taken off from the network. This extensive price monitoring has been abolished in December 2017.

### 2.2.1 Selected aspects of competition (mark-ups)

The alignment between the energy component of (non-household) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. We notice that, as a consequence of the hard price competition on the Belgian retail market, the commodity retail price level has gradually decreased from 2009 to 2016, notwithstanding a rather stable wholesale price. For gas, the retail price seems to have more closely followed the wholesale price. There is no visible impact of the implementation of the extensive retail price monitoring as of April 2012.

**Figure 25 Industry retail energy component and wholesale prices in Belgium**



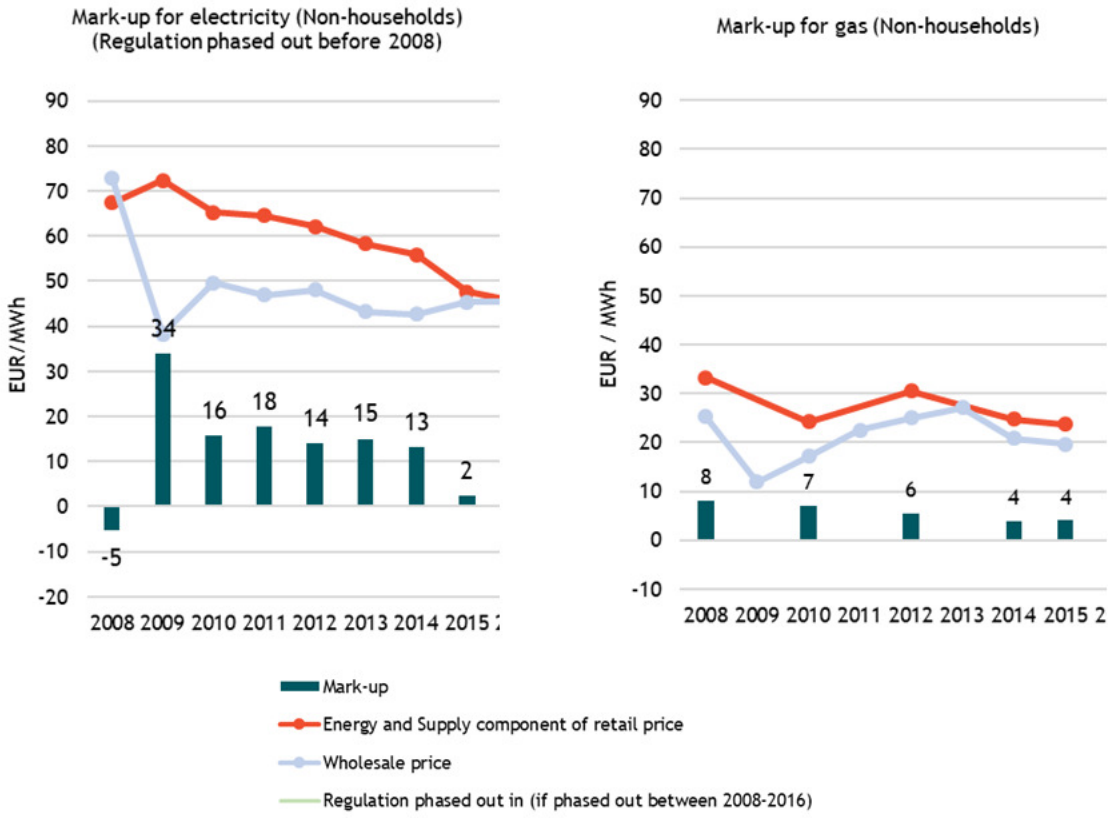

*No data available for the energy and supply component of the gas retail price in 2009, 2011, 2013 and 2016*

*Source:* Eurostat, EMOS, EC ad-hoc data

The competition performance section also assesses the gross margins achieved by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[41] The figures below show the mark-ups along with the wholesale price. We notice that the gross margins have in this market segment gradually decreased since 2009, both for gas and for electricity. The low profitability of some suppliers on the Belgian electricity and gas retail markets is leading to a consolidation (see supra).

[41] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 26 Mark-ups for Belgium, band ID (electricity consumption between 2 000 MWh and 20 000 MWh) and band I3 (gas consumption between 10 000 GJ and 100 000 GJ)**




*No data available for the energy and supply component of the gas retail price in 2009, 2011, 2013 and 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat, EMOS, EC ad-hoc data

## 2.3 Tariff deficit in Belgium

**Belgium had no tariff deficit between 2008 and 2016.**

# 3 Factsheet: Bulgaria

This factsheet presents the findings for Bulgaria for the 'Study on energy prices, costs and subsidies'. The indicators presented here are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 3.1 Household Price Regulation in Bulgaria

**Bulgaria still has energy price regulation for households in place, both for electricity and gas. Electricity prices were liberalised in 2013 except for the low voltage band (which remains regulated and represents most of the household consumers). Gas prices are regulated for 100% of the consumers.**

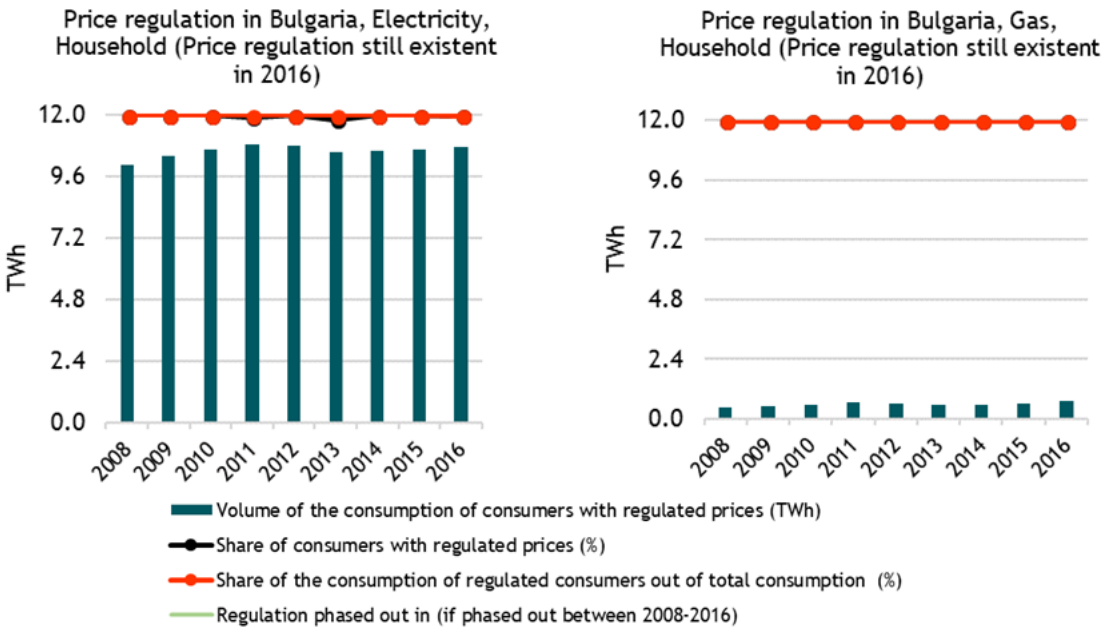
The Bulgarian Energy Act was amended in July 2012 to comply with the Directives 2009/72/EC[42] and 2009/73/EC[43], concerning common rules for the internal market in electricity and gas market respectively.[44] The Renewable Energy Act was amended in 2013 to abolish the "green surcharge for transit", to introduce a levy for solar and wind power production and amend the limitation on the volume of electricity that could be purchased at the feed-in-tariff (production above the defined threshold would be purchased at the regulated retail price).[45]

Retail prices for households are, in nominal terms, by far the lowest in the EU and did not change much between 2008 and 2012.[46] Electricity prices were liberalised in 2013 apart from the low voltage band which remained regulated.[47] The Bulgarian Energy and Water Regulatory Commission (EWRC) set the consumers prices annually, for each of the three main suppliers and the state-owned NEK.[48] EWRC in December 2015 kept the price cap for transactions on the balancing energy market for upward regulation at 202 BGN/ MWh (103.3 €/MWh), while the price cap for transactions in the balancing energy market for downward regulation was set at 0 BGN/MWh.[49] The vast majority of consumers are in the low voltage band, as can be seen by the figure below, since 98% of the consumers had regulated price in 2013. However, since 2016 household and small non-household consumers may switch suppliers and choose between regulated and deregulated prices.[Error! Bookmark not defined.]

Both electricity and gas market prices are regulated for the household consumers as shown in Figure 27. EWRC sets the annual price cap for the sale of natural gas.[50] The consumption of both markets is rather stable, with electricity fluctuating between 10 and 10.9 TWh and for the gas market fluctuating between 0.4 and 0.7 TWh.

**Figure 27: Household price regulation in Bulgaria from 2008 to 2016**

[42] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0072&from=EN
[43] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0094:0136:en:PDF
[44] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[45] Ibid.
[46] http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf
[47] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[48] https://uk.practicallaw.thomsonreuters.com/2-523-7911?bhcp=1&transitionType=Default&contextData=(sc.Default)#co_anchor_a848774
[49] https://www.ceer.eu/documents/104400/5988265/C17_NR_Bulgaria-EN.pdf/6050abe3-d557-c506-d340-35f1af8d9ceb
[50] https://www.ceer.eu/eer_publications/national_reports/national_reporting_2014/-/document_library_display/Jon2qNF040hb/view_file/3737881?_110_INSTANCE_Jon2qNF040hb_redirect=https%3A%2F%2Fwww.ceer.eu%2Feer_publications%2Fnational_reports%2Fnational_reporting_2014%3Fp_p_id%3D110_INSTANCE_Jon2qNF040hb%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-1%26p_p_col_pos%3D6%26p_p_col_count%3D8




*Source:* CEER data

There are no social tariffs for household consumers in Bulgaria.

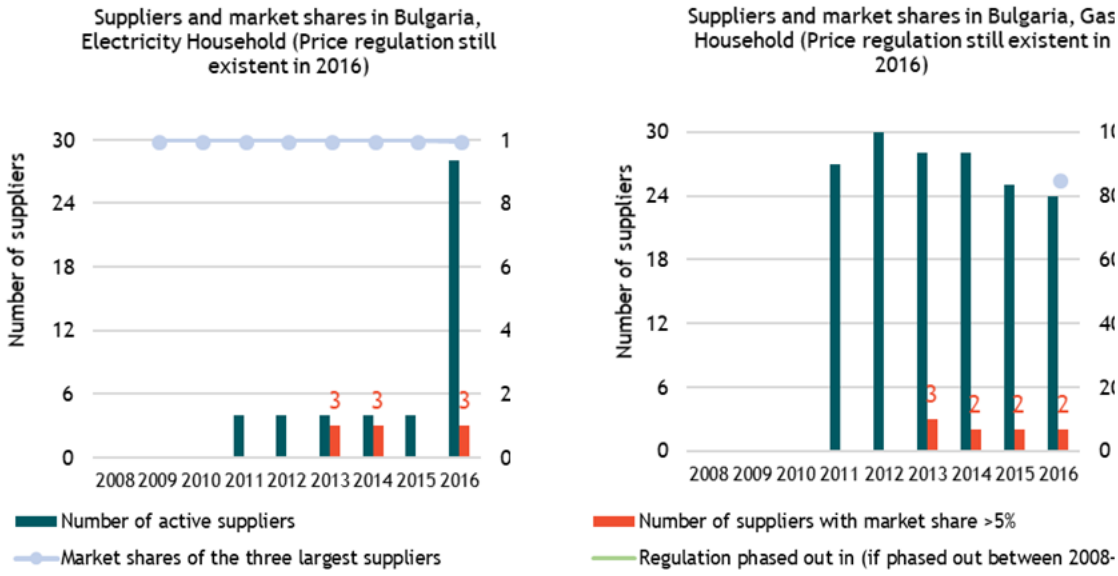
### 3.1.1 *Selected aspects of competition*

The electricity supply for households is dominated by the Bulgarian Energy Holding and its subsidiary Natsionalna Elektricheska Kompania EAD (NEK), and in total three suppliers control almost the whole market. Data from the Bulgarian NRA suggests that the market share of the three largest suppliers has decreased from 95% in 2015 to less than 85% in 2016, but this is due to the non-households segment.[51] From 2016 on households are able to switch suppliers, which led to the significant increase in electricity suppliers in that year. Although this led to only over 900 customers switching in that year, this may increase market competition for the household segment in the future.

Figure 3 indicates that the level of competition on the gas market is slightly higher. However, the number of household customers was very low in 2015, and the segment represented only 2.28% of the national gas consumption.[52]

[51] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[52] https://www.ceer.eu/documents/104400/5988265/C17_NR_Bulgaria-EN.pdf/6050abe3-d557-c506-d340-35f1af8d9ceb

**Figure 28: Number of suppliers and market shares in Bulgaria**




*No data is available on the number of suppliers prior to 2011. No data is available on the number of suppliers with more than 5% market share before 2013. On the gas market, data is only available for the market shares of the three largest suppliers in 2016*

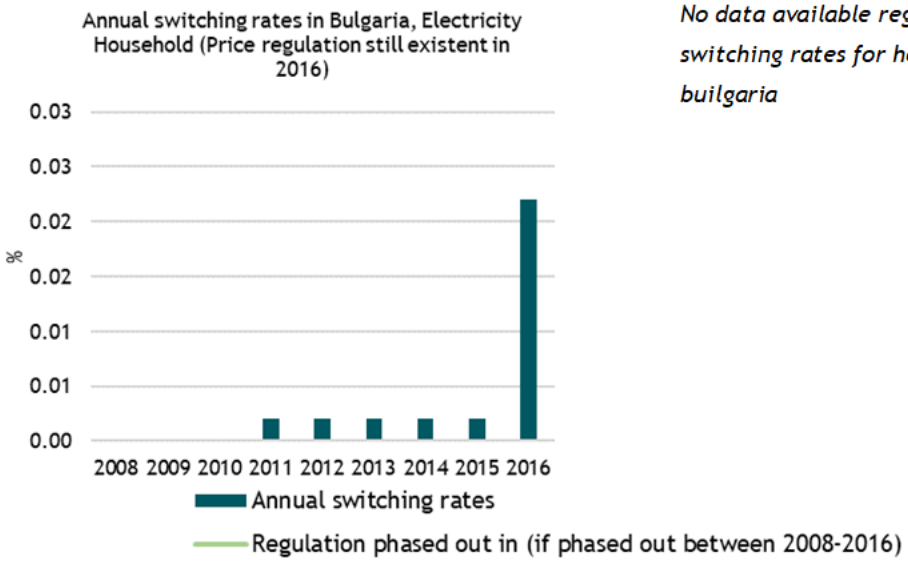
*Source:* CEER data

## Consumer engagement and expenditures on energy

The figure below shows the annual switching rates[53] in households for the electricity market, which is almost zero. Although electricity consumers are eligible to switch supplier, no switching is observed since the prices are regulated and there are no incentives for switching supplier since there is no financial benefit for them if they switch supplier. Regulated prices also discourages investors from entering the Bulgarian energy market.[54]

[53] Switching is defined as the voluntary action by which a customer changes his supplier
[54] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

**Figure 29 Annual switching rates for households in Bulgaria**




*No data available regarding gas switching rates for households in builgaria*

*Note that switching rates equalled zero between 2008 and 2010*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[55] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[56] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Bulgaria. Even though electricity prices are relatively low in Bulgaria, disposable incomes are also significantly lower than the EU-28 average. Due to this, a relative large share of the disposable income is spent on electricity in absolute terms. Over time, the expenditures on electricity as share of disposable income follows the opposite trend of the GDP per capita of the country: when an increase in the GDP per capita is observed, a reduction in the expenditures on electricity as share of disposable income is observed. The only exception is 2015.[57] The expenditures on gas are far less significant than the expenditures on electricity (less than 1% per year), as few households are connected to the gas network.[58] Nevertheless, the share of expenditures on gas increased by 56% from 2008 to 2012, due to a sharp increase in the retail gas price over the same period (driven by a 51% increase in the energy and supply component of the retail price).[59]

[55] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

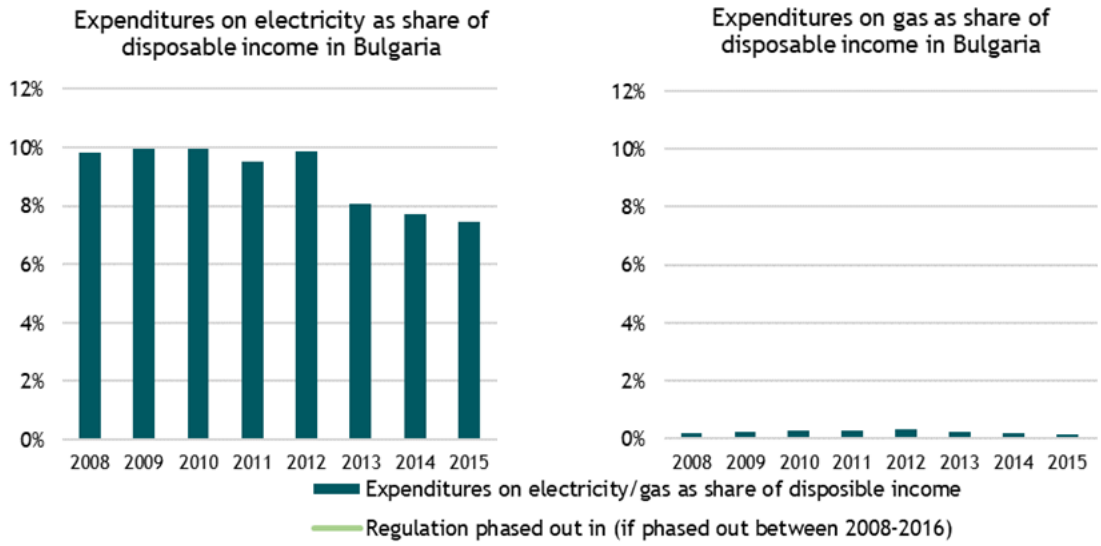
[56] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[57] https://data.worldbank.org/country/bulgaria?view=chart

[58] https://www.ceer.eu/documents/104400/5988265/C17_NR_Bulgaria-EN.pdf/6050abe3-d557-c506-d340-35f1af8d9ceb

[59] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

**Figure 30: Expenditures on gas and electricity as share of disposable income for households in Bulgaria (for middle consumption bands DC and D2) using PPS prices[60]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

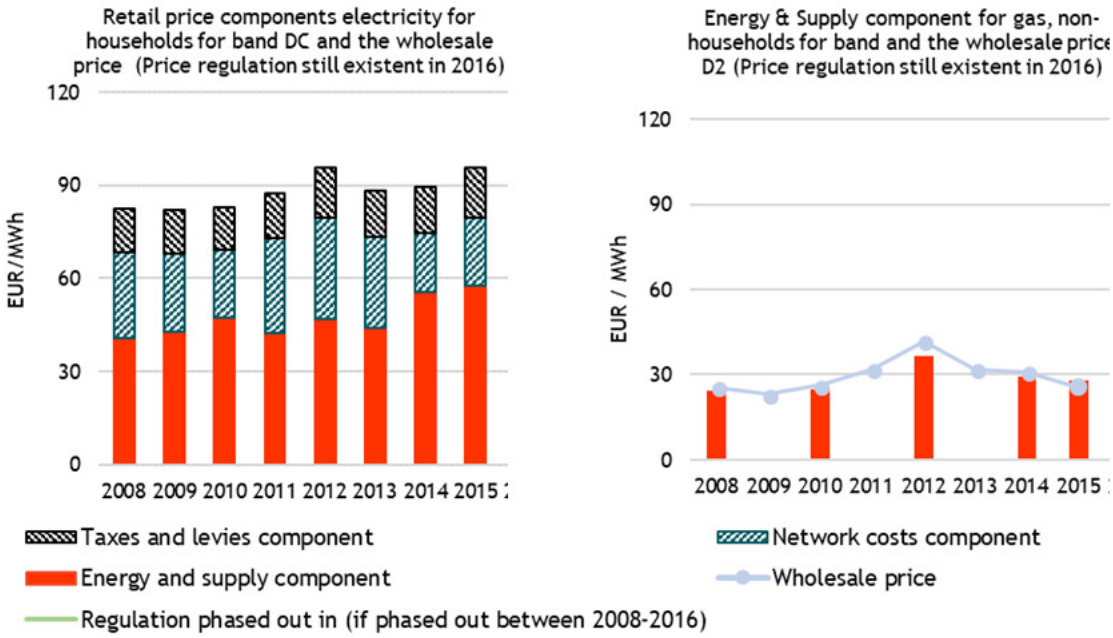
*Source:* Own calculations[61] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. The energy and supply component of the retail electricity price in Bulgaria increased in the time period, with the component fluctuating between 41 €/kWh and 58 €/kWh. Both electricity and gas markets experienced a significant increase in the retail prices in the period 2008 – 2012, by 32% and 51%, respectively. As mentioned earlier, this was due to a similar increase in the energy and supply component of the prices. It is interesting to see that, on the gas market for household consumers, the wholesale price shows a similar pattern as the energy and supply component of the retail price. Due to data limitations, this is not disclosed on the electricity market.

[60] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[61] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 31 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Bulgaria**



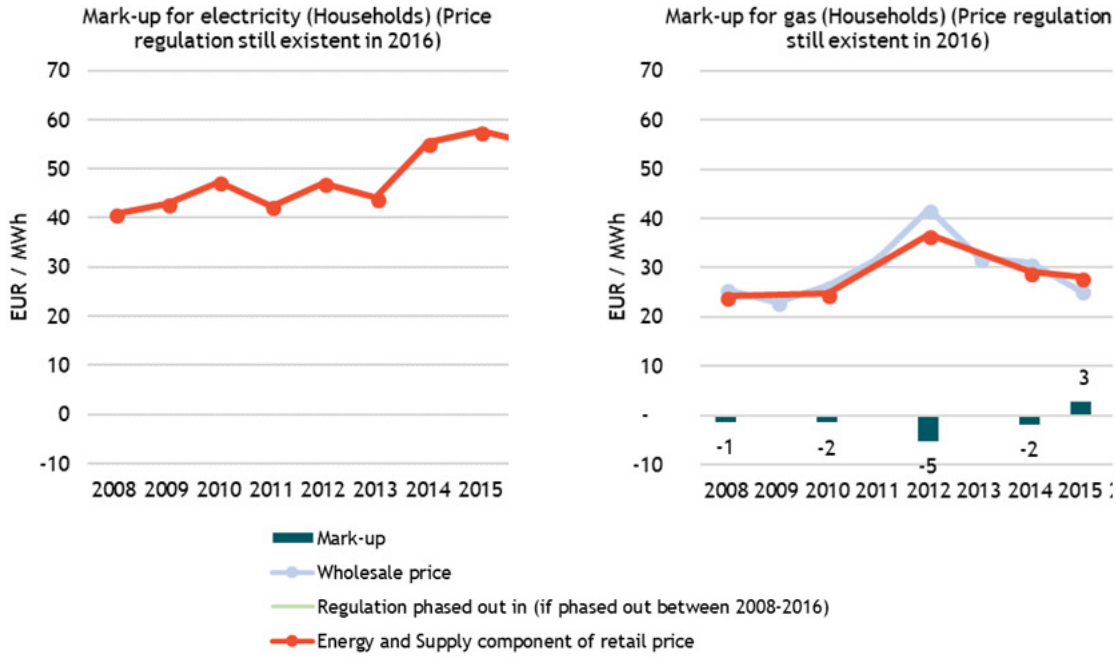

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market. The wholesale electricity price is only available in 2016*

Source: Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[62] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[63] The figures below show the mark-ups along with the wholesale price. For the electricity market there are available data for mark-up only in 2016. The energy and supply component increased between 2015 and 2008 by 37%. In the gas market, from 2008 to 2014 negative mark-ups were observed, which may indicate risk of tariff deficit.

[62] Eurostat has data available on gas prices; however not for the energy and supply component.
[63] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 32 Mark-ups for Bulgaria, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. No data is available on the wholesale electricity price, except in 2016*

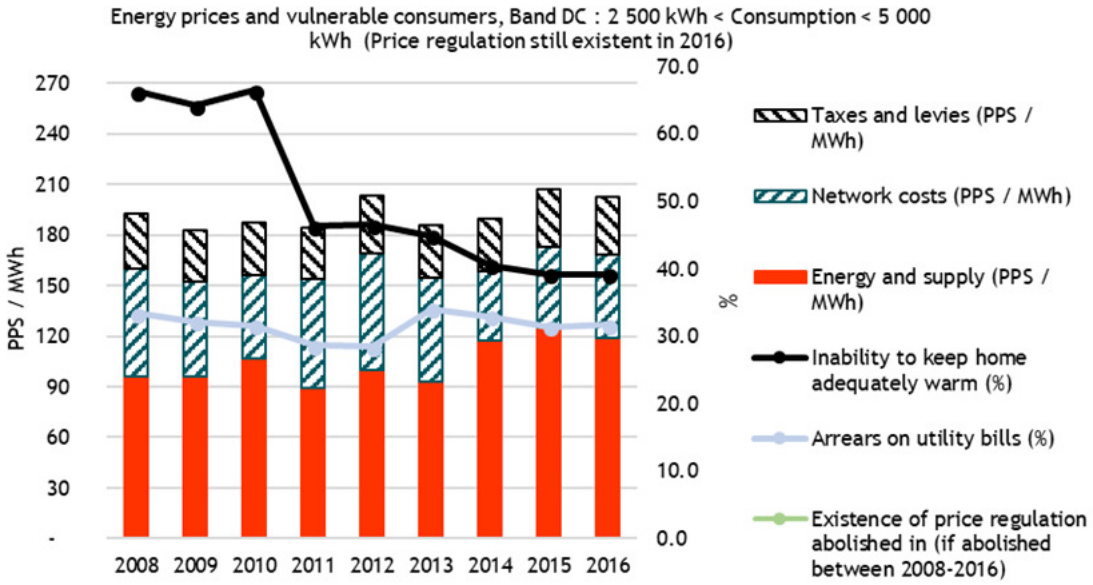
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### *3.1.2 Energy poverty*

One of the indicators which are used to estimate the level of energy poverty hints at a decrease in the number of consumers which are potentially suffering from energy poverty. Figure 8 shows that the share of the population that is unable to keep their home adequately warm decreased from approximately 65% in 2008 to less than 40% in 2016. The percentage of the population with arrears on their utility bills is remaining rather constant, fluctuating between 28% (in 2012) and 34% (in 2013).

**Figure 33: Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Bulgaria**




*Source:* Eurostat

### *3.1.3 Quality of services*

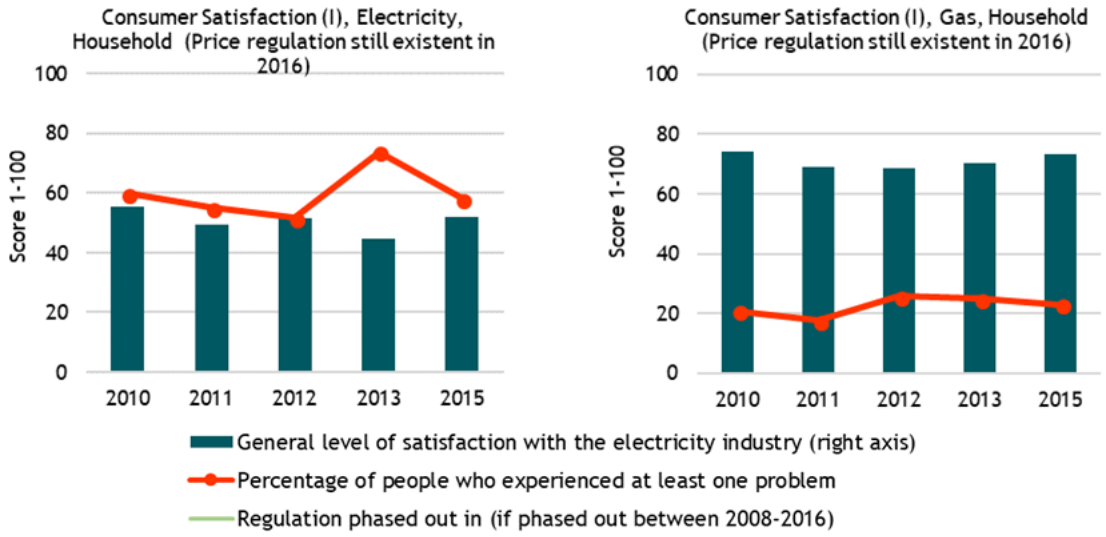
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The satisfaction rate of the electricity market is rather low, fluctuating between 45 and 55, being the lowest in the EU.[64] At the same time, the percentage of costumers who experienced at least one problem fluctuated between 26% in 2012 and 37% in 2013. On the other hand, the gas market received significantly higher score, from 68 to 74 and the highest percentage of costumers who experienced a problem at least once was 13% in 2012. Still, the gas market score is below the average EU score, and the Bulgarian gas market was ranked 18th in 2012.[65]

[64] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[65] Ibid.

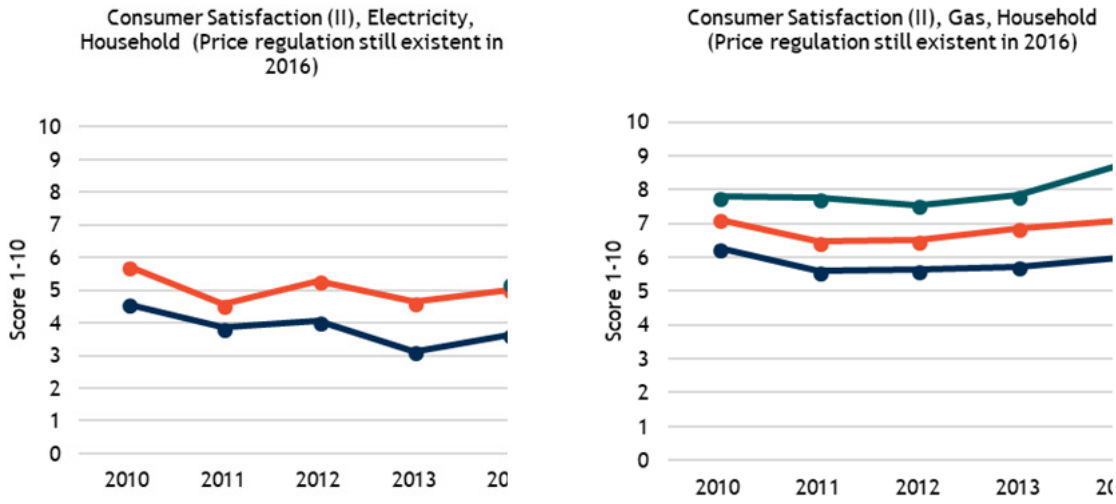
**Figure 34 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Bulgaria for households**



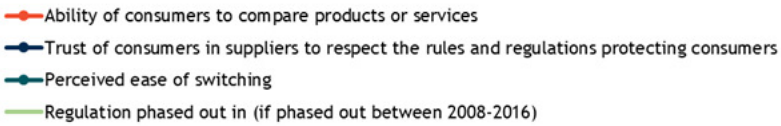

*Source:* EC – DG Justice[66]

Both markets (especially electricity) received low scores in terms of trust of consumers in suppliers to respect the rules and regulations protecting consumers. In general, the Bulgarian electricity market scored the lowest or second lowest on all components surveyed except for the proportion of complaints.[67]

**Figure 35 Ability of consumers to compare products or services[68], trust of consumers in suppliers[69] and perceived ease of switching[70] in Bulgaria**




[66] Note that from 2013 onwards, the survey was carried out every other year.
[67] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[68] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[69] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[70] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)



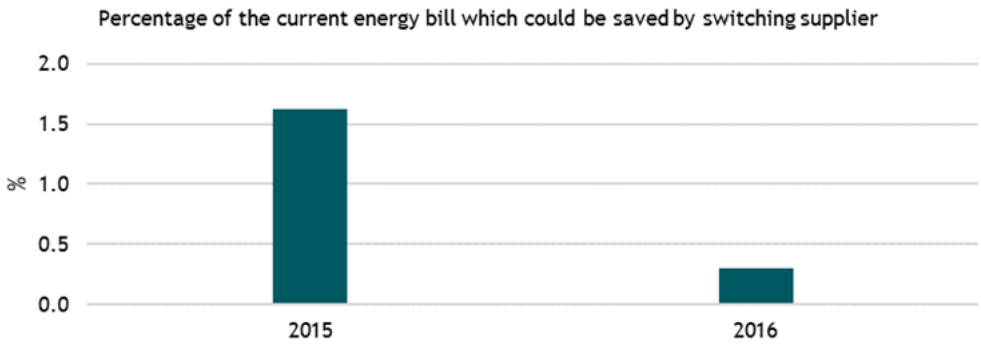

*Data on the perceived ease of switching between electricity suppliers is only available in 2015*

*Source:* EC – DG Justice

## Consumer choice

Since the prices are regulated, the savings from switching provider are minimal, because the customers will have no benefit by doing so.

**Figure 36 Percentage of the current electricity bill which could be saved by switching supplier in Bulgaria**

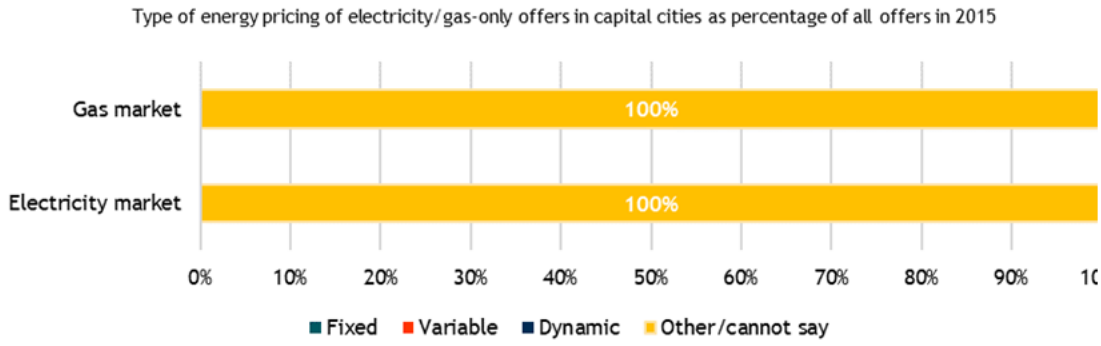



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, the majority of which have variable price for both markets.

**Figure 37 Type of offers for households in Bulgaria**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

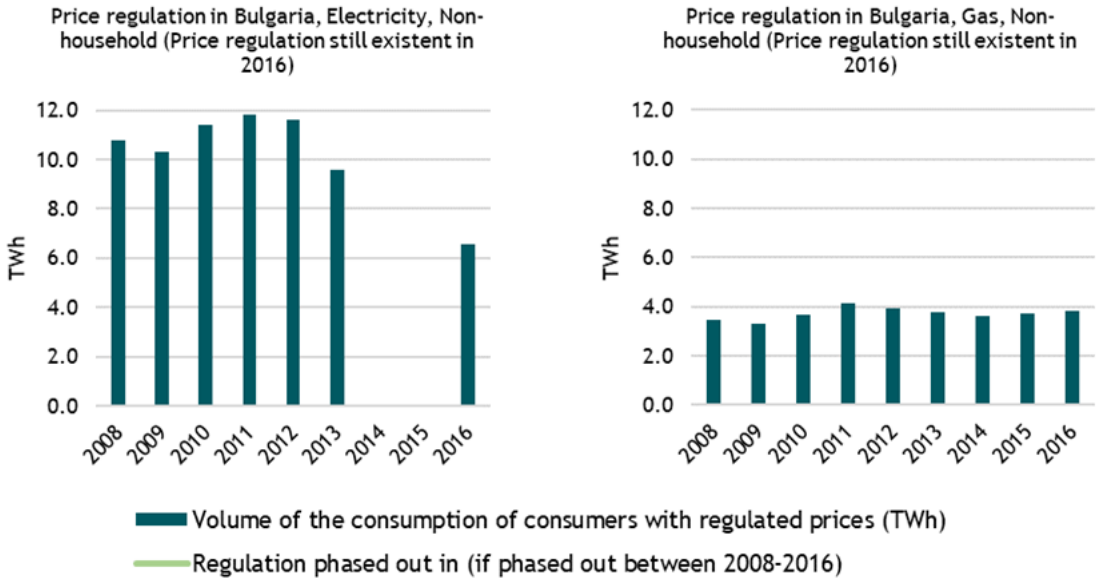
*Source:* ACER/CEER (2015)

## 3.2 Non-Household Price Regulation in Bulgaria

**Bulgaria still has energy price regulation for non-households in place. For electricity, only the low voltage bands are regulated.**

Since the beginning of 2013 the electricity market is regulated only in the low voltage band.[71] However, in 2016 still about half of the non-household electricity consumption volume was price-regulated.[72]

**Figure 38 Non-household price regulation in Bulgaria from 2008 to 2016**




*No data available for the electricity market between 2013 and 2016*

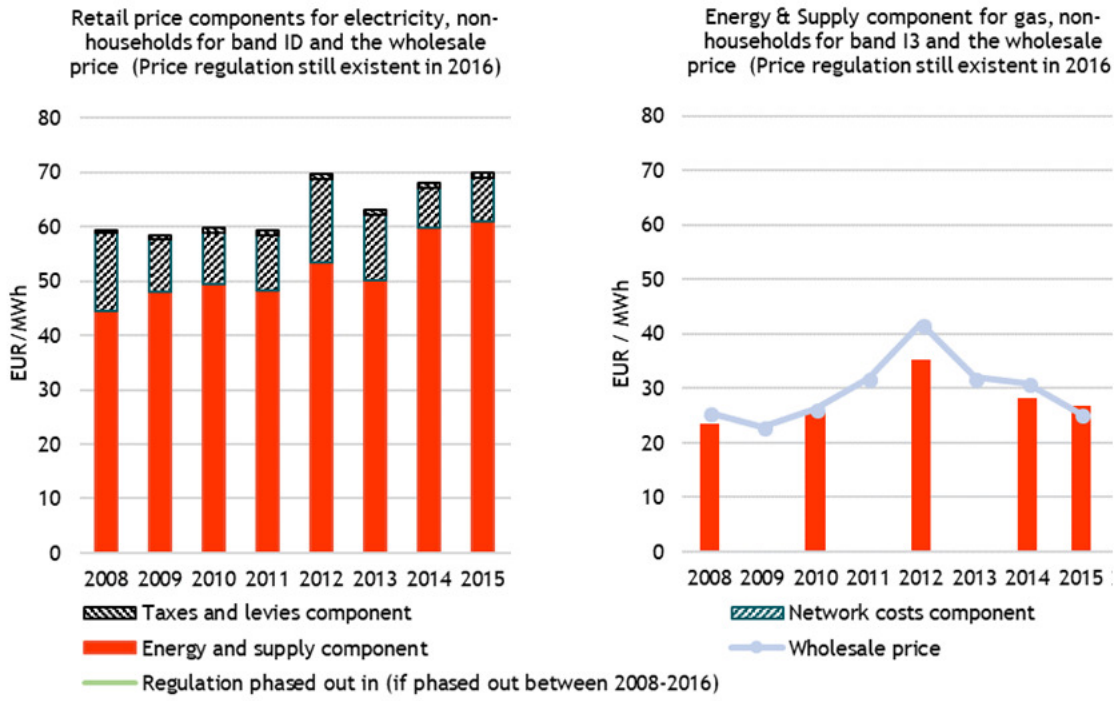
*Source:* CEER data

### 3.2.1 *Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Data for electricity wholesale prices are available only for 2016. Energy and supply component has the highest fluctuation between the three components, fluctuating between 61 and 44.5 €/MWh. For the gas market the wholesale price follows the same trend as the energy and supply component for gas price.

[71] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[72] https://www.ceer.eu/documents/104400/5988265/C17_NR_Bulgaria-EN.pdf/6050abe3-d557-c506-d340-35f1af8d9ceb

**Figure 39 Industry retail price components for middle bands (ID and I3) and wholesale prices in Bulgaria**



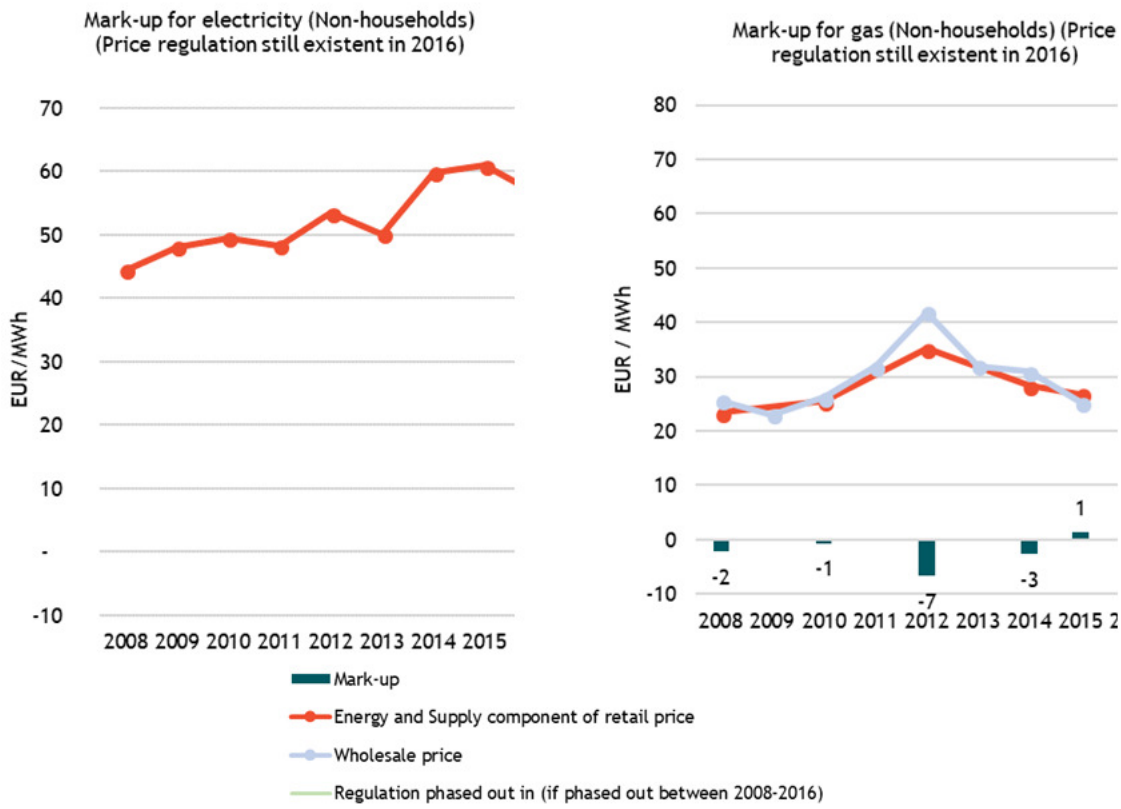

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market. Data on the electricity wholesale price is only available in 2016*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[73] The figures below show the mark-ups along with the wholesale price. For the electricity market there are available data for mark-up only in 2016. The energy and supply component increased between 2015 and 2008 by 37%. Figure 15 shows that there were negative mark-ups for the gas market, which may indicate risk of tariff deficit.

[73] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 40 Mark-ups for Bulgaria, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Data on the electricity wholesale price is only available in 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 3.3 Tariff deficit in Bulgaria

**Bulgaria still has a tariff deficit. To solve that issue, the NRA attempted to increase the electricity prices by 14% as of January 2013 but due to continuous protests the regulator took back the decision of increasing the electricity prices and gradually reduce the prices by 13% in 2013.**

Bulgaria has an integral electricity tariff covering all electricity costs, and retail prices for households are in nominal terms by far the lowest in the EU and hardly changed between 2008 and 2012 (Figure 31). The past five years an upward trend in generation costs was observed due to:[74]

- the expansion of RES incentivised by subsidies for solar power and cogeneration
- The long-term purchase power agreements

[74] http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf

- Delays in market liberalisation.

According to the World Bank, the integral tariff is not sufficient to match the corresponding costs borne by electricity utilities.[75] The deficit is accumulated mainly in the state-owned company NEK which is dominating the market, and the foreign-owned distribution companies.[76] To solve that issue, the Bulgarian energy regulator attempted to increase the electricity prices by 14% as of January 2013. Due to continuous protests the regulator took back the decision of increasing the electricity prices and gradually reduce the prices by 13% in 2013.

# 4 Factsheet: Cyprus

This factsheet presents the findings for Cyprus for the 'Study on energy prices, costs and subsidies'. The indicators presented here are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 4.1 Household Price Regulation in Cyprus

**Cyprus still has energy price regulation for households in place for electricity.**

**Cyprus has no gas market.**

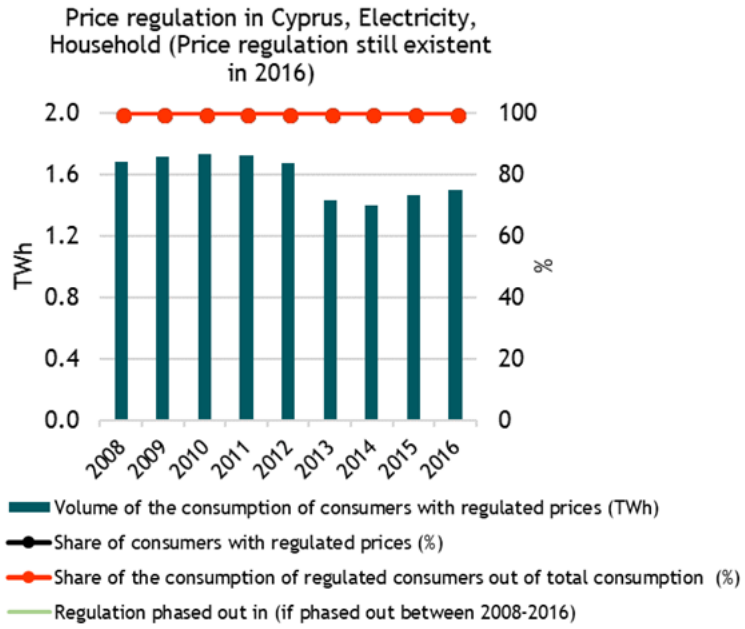
Cyprus' electricity market price for households is still regulated. So far, no gas market exists in Cyprus, due to geographical isolation and the small size of the market. However, several actions were taken towards the termination of isolation of Cyprus, such as the current CERA's decision issued on October 2017 whereby the following have been decided:

- The PCI No. 7.3.2 "Removing internal bottlenecks in Cyprus to end the isolation and allow the transmission of gas from the Eastern Mediterranean region" has reached a sufficient degree of maturity for decision-making purposes,
- the sharing of costs between the two Member States is reasonable and documented and there is a net positive impact of project results on the parties involved, and
- taking into account the investment application request of the Project Implementing Body, the Republic of Cyprus is the only one of the two Member States involved to bear any investment and operating costs related to the implementation of the project while Greece will bear no costs.

Another PCI which is promoted is the "EastMed Pipeline" which is a pipeline from offshore Cyprus to Greece mainland via Crete.[77] Since there is no gas market currently in Cyprus, the rest of the report will focus only on electricity market.

[75] Ibid.
[76] Ibid.
[77] Private communication with the NRA (2018).

**Figure 41 Household price regulation in Cyprus from 2008 to 2016**

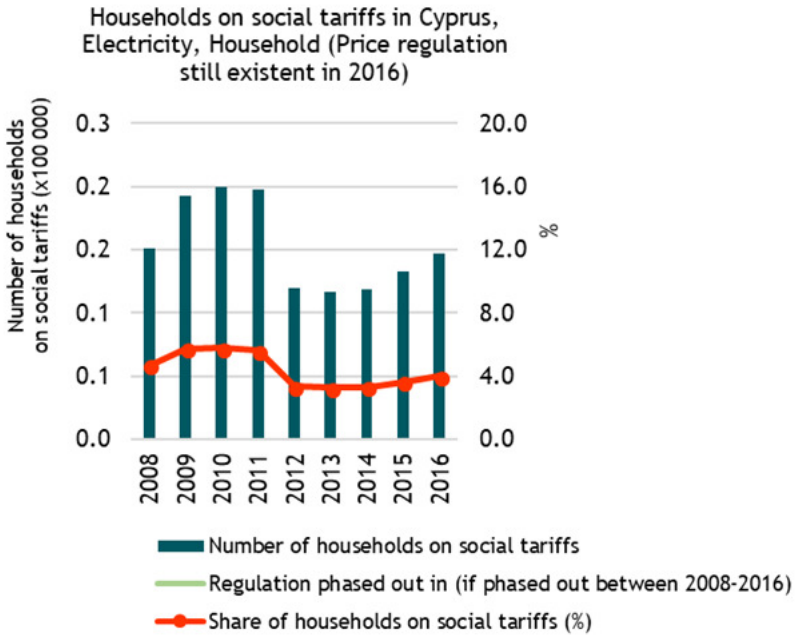



*Source:* CEER data

Cyprus Energy Regulatory Authority (CERA) issued a regulatory decision in August 2013 to enforce electricity providers to reduce electricity tariffs to vulnerable costumers, and then a second one in October 2016.[78] After May 2016, the Public Service Obligations (PSO) tariff was set at 0.00065 €/kWh for all Energy Authority of Cyprus (EAC) customers (EAC is the sole generator of electricity in Cyprus).78 This tariff was then revised in May 2018 to €0.00083 / KWh.[79] Surprisingly, although the financial situation in Cyprus for the examined period was deteriorating (resulting in applying for capital control in March 2013[80]), the percentage of households on social tariffs was reduced from approximately 6% in 2011 to less than 3% in 2012, and remaining below 4.5% the following years.

[78] https://www.ceer.eu/documents/104400/3736793/C16_NR_Cyprus-EN.pdf/801094a0-86cb-9a61-42b4-ac0979379076
https://www.ceer.eu/documents/104400/5988265/C17_NR_Cyprus-EN.pdf/ff6348c4-9372-e9ff-7cb1-ea607ecaa3d2
[79] Private communication with the NRA (2018).
[80] https://www.ft.com/content/9901f6ce-96f2-11e2-a77c-00144feabdc0

Figure 42 Household social tariffs in Cyprus

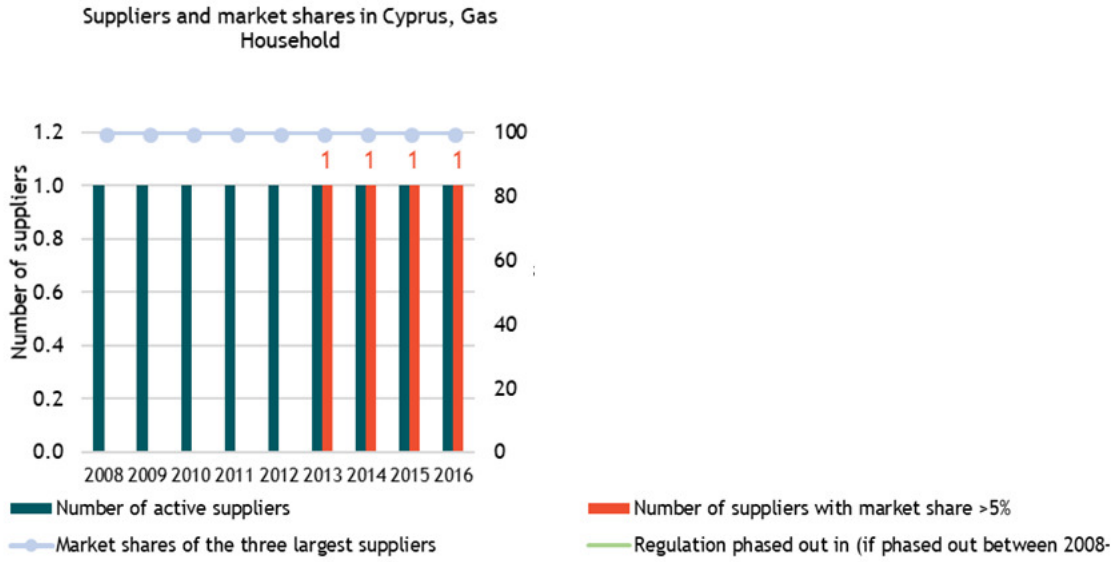



*Source:* CEER data

### 4.1.1 *Selected aspects of competition*

Due to the limitation of the Cypriot market (geographical isolation and the small size of the market) there is only one electricity supplier.

Figure 43: Number of suppliers and market shares in Cyprus



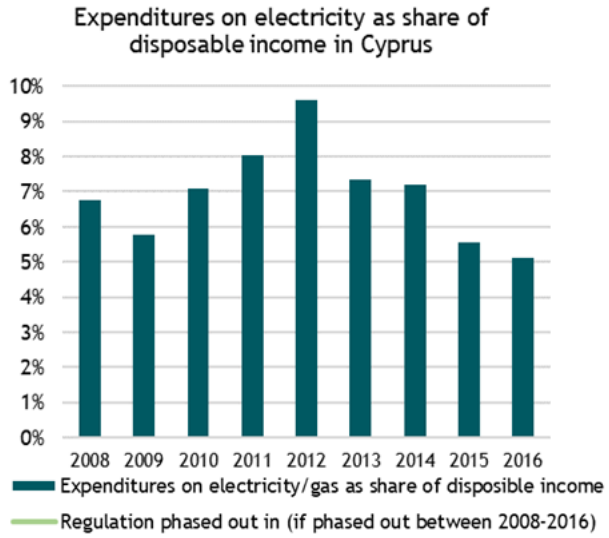

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards.*

*Source:* CEER data

### Consumer engagement[81] and expenditures on energy

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on electricity as a share of disposable income for households in the middle consumption bands[82] (for electricity, those who consume between 2.5 MWh and 5 MWh per year).[83] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Cyprus. In the examined period, a reduction by 34% in the GDP per capita was observed.[84] That resulted in increasing the expenditures on electricity as share of disposable income in Cyprus continuously until 2012. In 2013, CERA implemented social tariffs resulting in a reduction in expenditures on electricity as share of disposable income.[85]

**Figure 44: Expenditures on gas and electricity as share of disposable income for households in Cyprus (for middle consumption bands DC and D2) using PPS prices[86]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

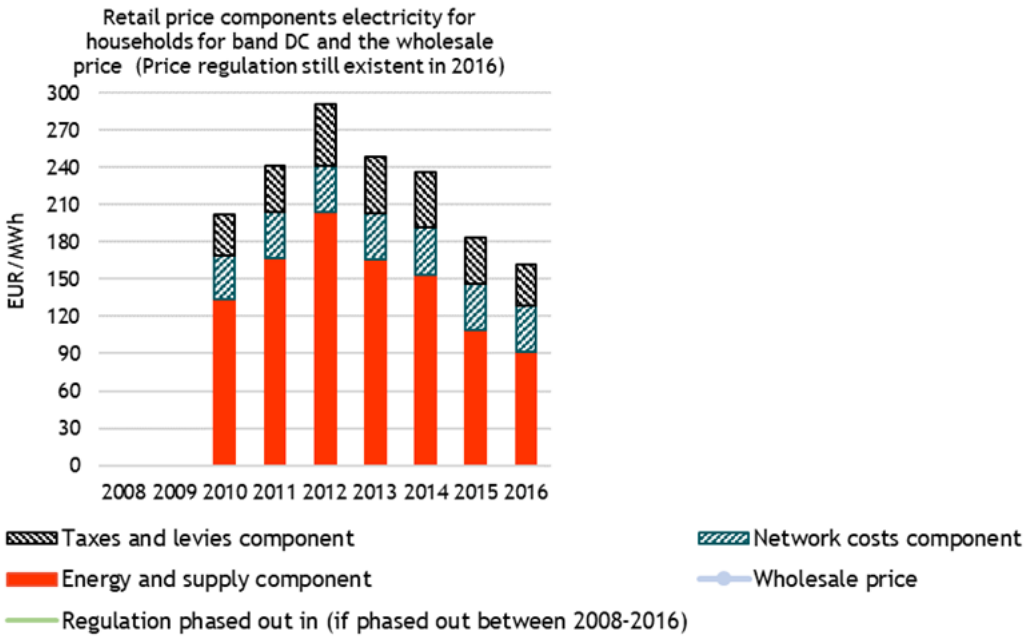
*Source:* Own calculations[87] based on Eurostat

[81] As there is only one supplier of energy in Cyprus, switching rates are not relevant
[82] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)
[83] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.
[84] https://data.worldbank.org/country/cyprus?view=chart
[85] https://www.ceer.eu/documents/104400/3736793/C16_NR_Cyprus-EN.pdf/801094a0-86cb-9a61-42b4-ac0979379076
[86] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[87] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. In 2011 and 2012, there was an increase by 20% and 22% in the energy and supply component, respectively. In the following years, there was a continuous reduction which resulted in a total reduction by 49% in 2016 compared to 2012 values.

**Figure 45 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Cyprus**




*Note that data is not available for the electricity market in 2008 and 2009.*

*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[88]

The reason why there are no mark-up data for Cyprus is due to the fact that there is no real wholesale price in Cyprus but rather a 'wholesale tariff'. The wholesale tariff is the price set by EAC Generation to EAC Supply and to other suppliers at what is called 'the Basic Fuel Price'[89] . The retail prices (thus the tariffs) decreased since 2012 as the regulator urged EAC to lower its profit and thus to decrease the tariffs.

### *4.1.2 Energy poverty*

Energy poverty proxies are decreasing since 2013, as can be seen from the diagram below, despite the deterioration of the economy after 2008. A potential explanation could be that the decrease in the

[88] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

[89] The wholesale tariff is adjusted based on the weighted average fuel price, which is announced by EAC every month, and the fuel adjustment coefficient for customers at high voltage, which is approved by CERA every 6 months adjusted with the loss adjustment factor at high voltage of each month as set by the relevant CERA's decision (No.173/2017) – see also: https://www.eac.com.cy/EN/CustomerService/Tariffs/Pages/ditimisihondrikis.aspx

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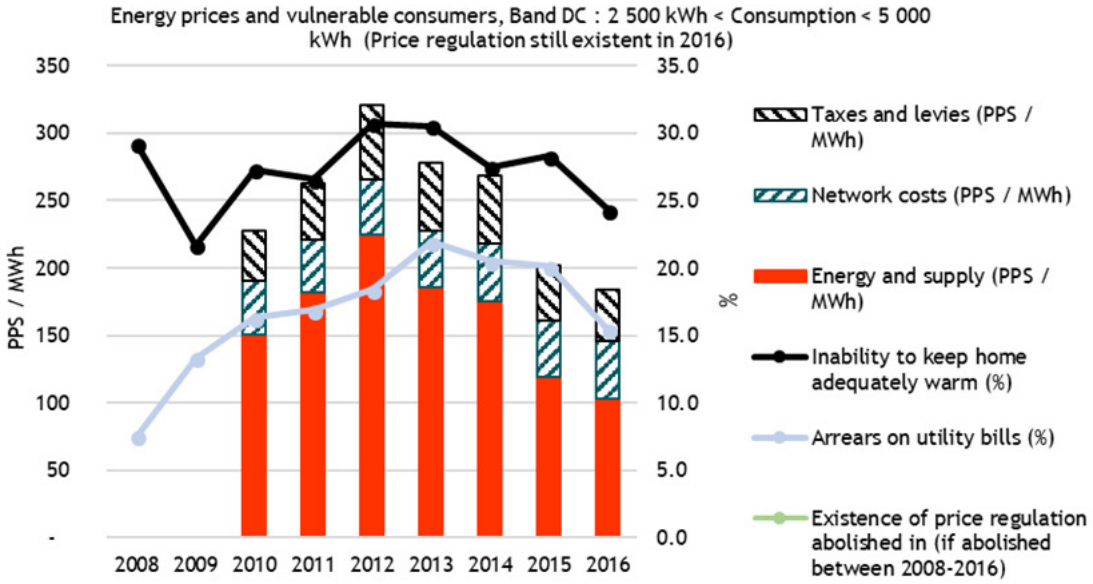
inability to keep the home adequately warm and arrears on utility bills is that it coincides with the implementation of the social tariff.

**Figure 46 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Cyprus**




*Source:* Eurostat

It is important to note that, in Cyprus, vulnerable consumers are defined either as families with more than 3 dependent children with an annual gross family income up to € 51,258 , recipients of different types of assistance provided by the Social Welfare Services of the Ministry of Labour, Welfare and Social Insurance (including assistance provided to those with disabilities and to pensioners with low incomes) as well as Individuals suffering from multiple sclerosis who are registered members of the Cyprus Multiple Sclerosis Association.[90]

### *4.1.3 Quality of services*

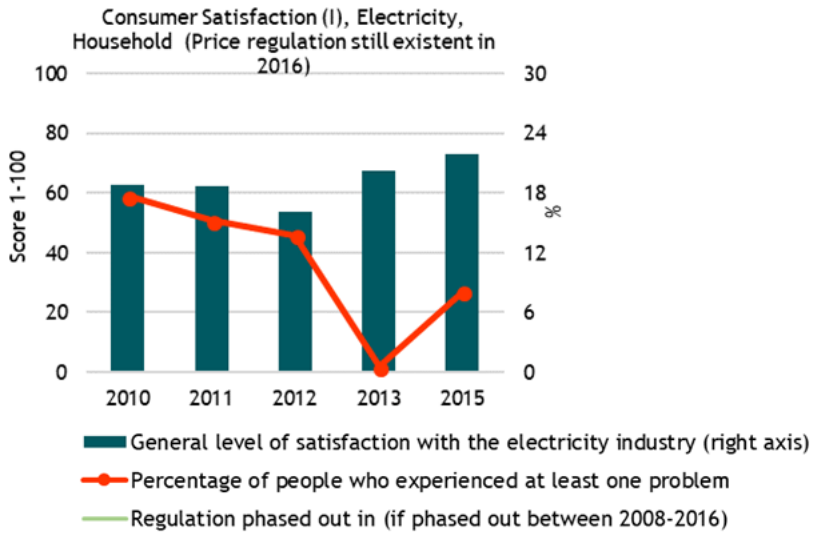
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

General level of satisfaction varies between 55 and 70. In 2013, there were no problems reported at all.

[90] https://www.ceer.eu/documents/104400/3736793/C16_NR_Cyprus-EN.pdf/801094a0-86cb-9a61-42b4-ac0979379076

**Figure 47 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Cyprus for households**

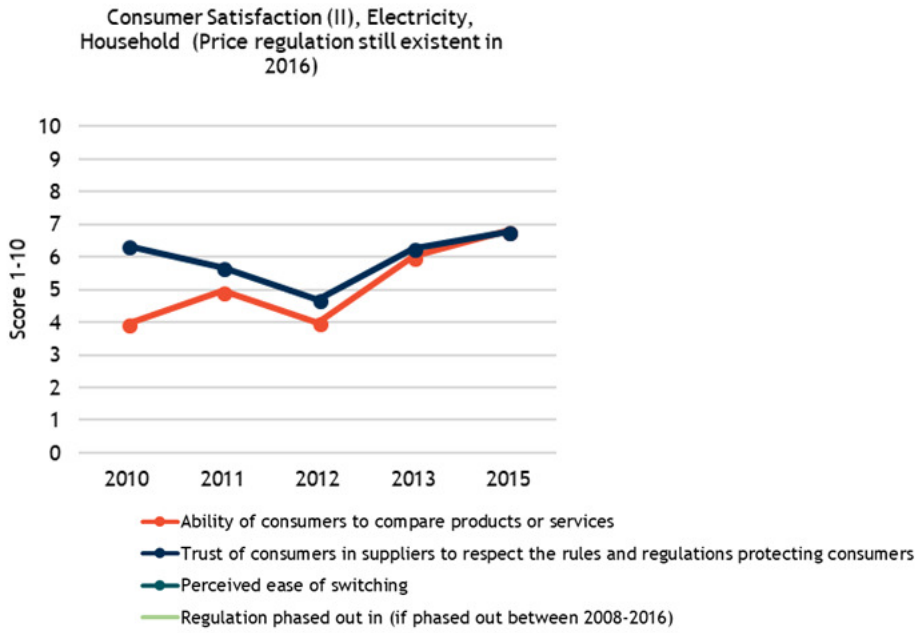



*Source:* EC – DG Justice[91]

The next figure (Fig. 8) shows the consumer satisfaction level, which is rather high in Cyprus. The decrease in the score of 'trust of consumers in electricity suppliers to respect the rules and regulations protecting consumers' can be explained by the explosion at the Naval Base that occurred on the 11th of July 2011 and led to damage at the nearby Vasiliko Power Station (which was responsible for covering approximately 50% of the island's electricity demand).[92] The operation of the Power Station was halted for more than one year and eventually the measure of rolling-blackouts was applied to control the electricity supply. It should be stated though, that the Vasiliko Power Station restarted its operation earlier than expected.[93]

[91] Note that from 2013 onwards, the survey was carried out every other year.
[92] https://energypress.gr/news/kypros-polynekri-ekrixi-se-naytiki-vasi-katastrofi-ilektroparagogikoy-stathmoy
[93] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

**Figure 48 Ability of consumers to compare products or services[94], trust of consumers in suppliers[95] and perceived ease of switching[96] in Cyprus**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. Due to the lack of options for consumers (only one electricity supplier at the moment and no gas market) this table is not applicable to the Cypriot energy market.

**Table 4-1 Consumer choice in Cyprus (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | N/A |
| Certified green offers available in 2015 (CC04) | N/A |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

By Decision 145/2017 issued on July 18, 2017, CERA decided to approve the DSO's proposal on the switching supplier procedure. There is no data for Cyprus on the type of offers available for electricity and gas, as there is only one electricity provider and no existing gas market.

[94] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[95] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[96] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

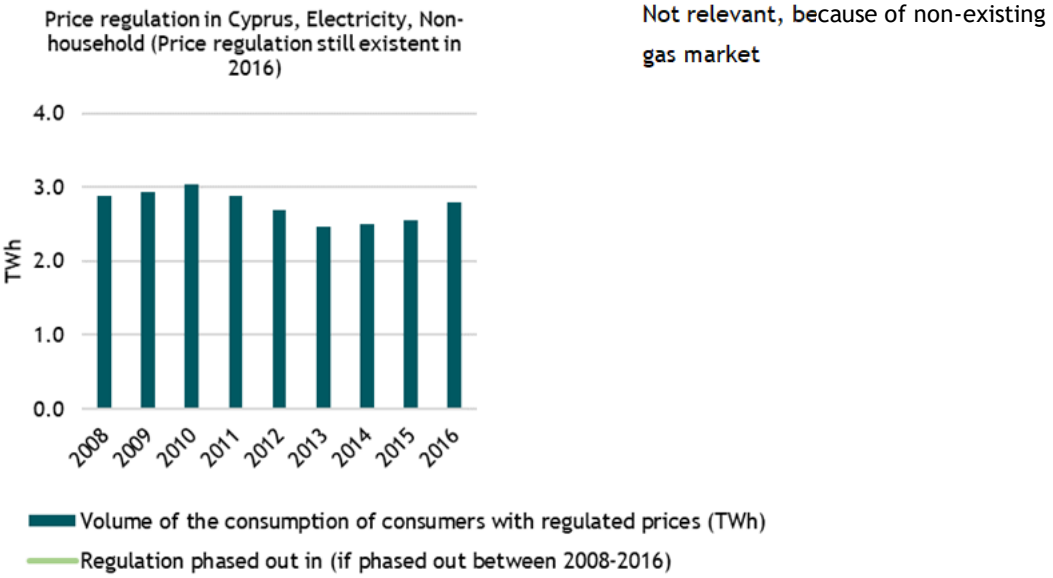
## 4.2 Non-Household Price Regulation in Cyprus

**Cyprus legally phased out energy price regulation for non-households for electricity starting from 2014, though in practice prices remain regulated.**

**Cyprus has no gas market.**

On 1 January 2014, full liberalisation of the electricity market was achieved, but only legally. In practice, nothing changed as there is only one supplier (EAC).[97]

Figure 49 Non-household price regulation in Cyprus from 2008 to 2016



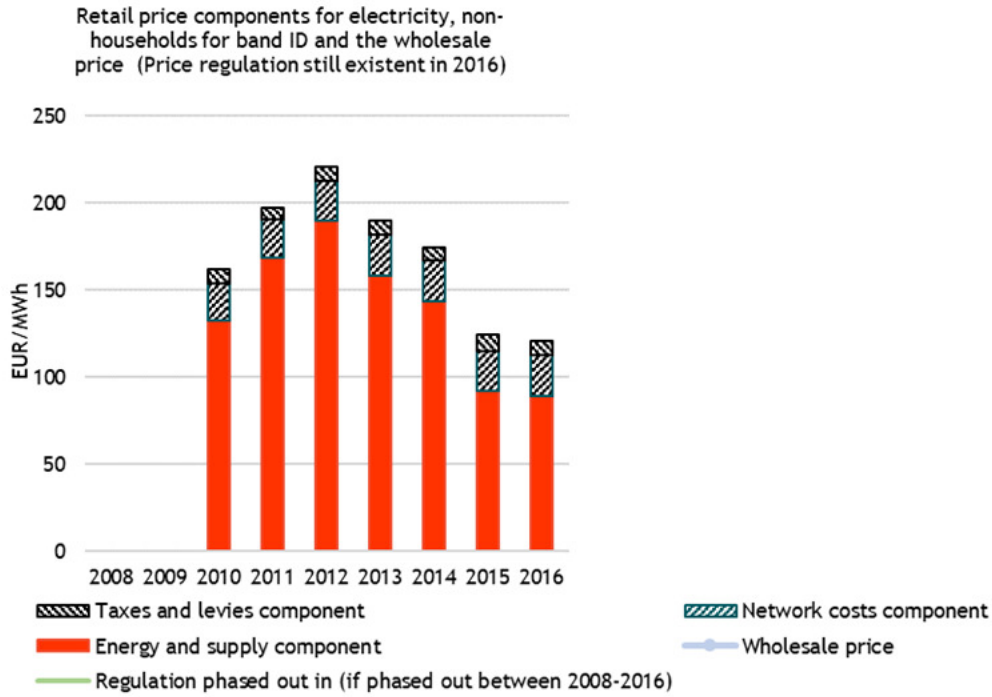

*Source:* CEER data

### *4.2.1 Selected aspects of competition (mark-ups)*

Also here, due to the specific energy system of Cyprus, there are no figures available for the mark-ups. The figures below refer to the energy component of the final electricity price for non-households which has decreased since 2012. EAC is using 'Commercial and Industrial Use Tariffs'. These tariffs decreased for the same reason as for the household tariffs (EAC had to decrease these tariffs by the regulator).

[97] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

Figure 50 Industry retail price components for middle bands (ID and I3) and wholesale prices in Cyprus




*Note that data is not available for the electricity market in 2008 and 2009*

*Source:* Eurostat (components of the electricity retail price)

## 4.3 Tariff deficit in Cyprus

**No tariff deficit was identified for Cyprus between 2008 and 2016.**

# 5 Factsheet: the Czech Republic

This factsheet presents the findings for the Czech Republic for the 'Study on energy prices, costs and subsidies'. The indicators presented here are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 5.1 Household Price Regulation in the Czech Republic

**The Czech Republic had no energy price regulation for households in the period assessed.**

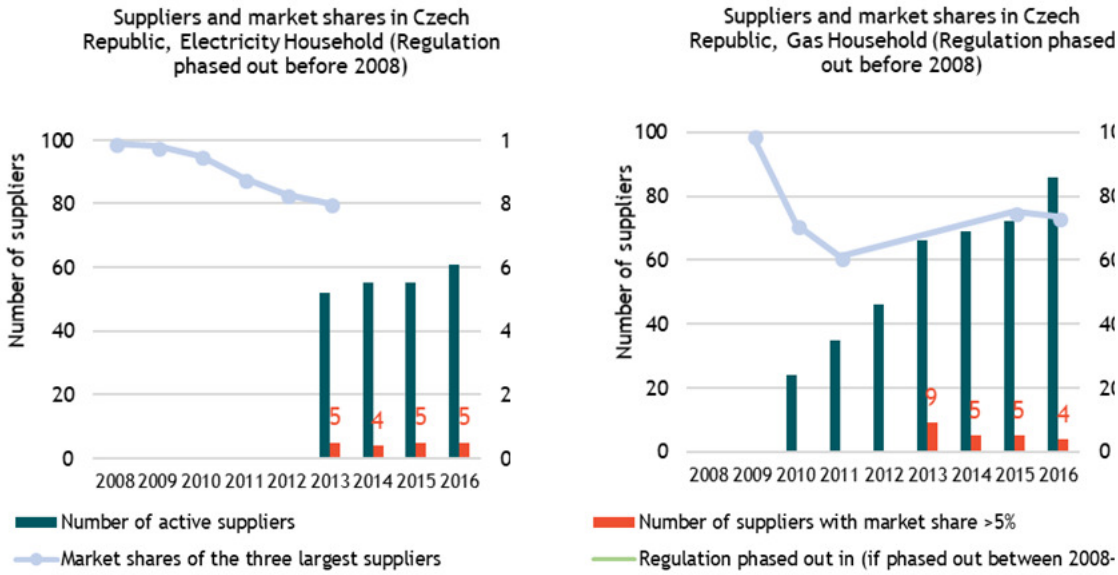
### *5.1.1 Selected aspects of competition*

The total number of active electricity suppliers for both household and non-household customers has been slightly increasing over time, with 52 active suppliers in 2013 increasing to 61 in 2016. The

numbers are the same for household and non-household end users as all suppliers cover both customer segments. Even though data on the number of active suppliers is not available prior to 2013, the market share of the three largest suppliers suggests that the number of suppliers was smaller in the years before 2013. The increase in the number of suppliers is an indication of more competition on the electricity market for household consumers.

In the gas market for households, the total number of active suppliers has been constantly increasing from 24 in 2010 to 86 in 2016. Moreover, the number of suppliers with more than 5% market share has been decreasing. Both developments are an indication of intensified competition on the gas market for household consumers. However, from the figure below, one cannot conclude if the reduced market shares of those suppliers that moved below the 5% market share threshold resulted in higher market shares for small entities or if the four suppliers with more than 5% market share in 2016 absorbed the market power of the companies that moved below the 5% threshold (as no data is available on the market shares of the three largest suppliers in 2012, 2013 and 2014).

**Figure 51: Number of suppliers and market shares in the Czech Republic**




*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards and data on the market shares of the three largest suppliers only until 2013. For the gas market, data on the market shares of the three largest suppliers is only available in 2009, 2010, 2011, 2015, 2016*

*Source:* CEER data

### Consumer engagement and expenditures on energy

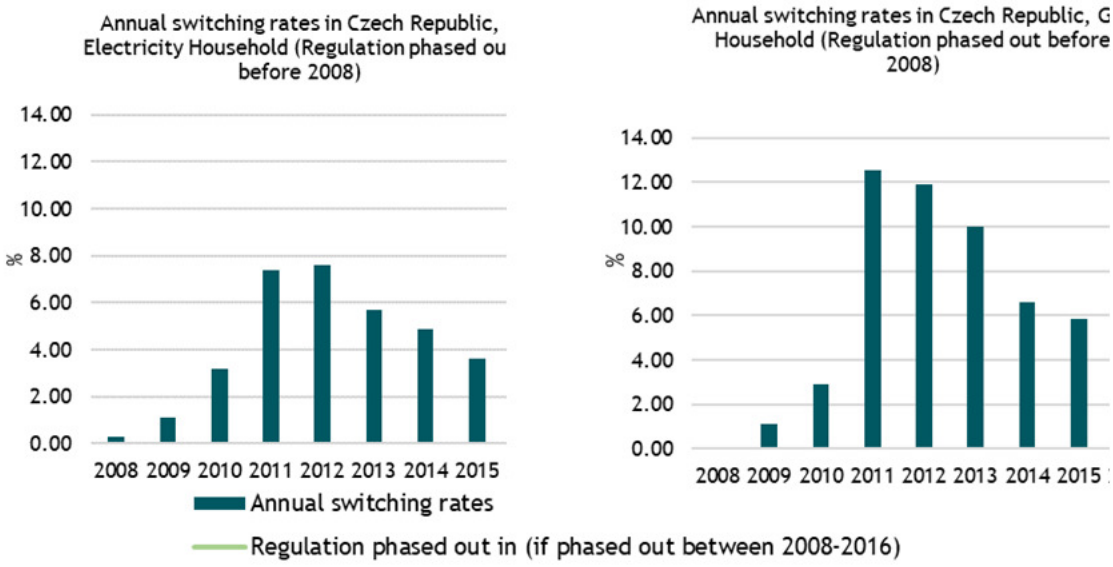
The figures below show the annual switching rates[98] in households for both electricity and gas. They show a similar pattern in both electricity and gas markets, increasing since 2008 to 2011/2012 from almost non-existent in 2008 to above 7% and 12%, respectively. Since 2012 the switching rates have been decreasing but increasing again in 2016, above 5 and 6%, respectively. The overall increase in

[98] Switching is defined as the voluntary action by which a customer changes his supplier

electricity supplier switching in 2016 is mainly attributable to the year-on-year growth of 43.7% in the household segment.[99]

The high relatively high switching rates suggest high levels of competition on the markets.

**Figure 52 Annual switching rates for households in the Czech Republic**




*Source:* CEER data

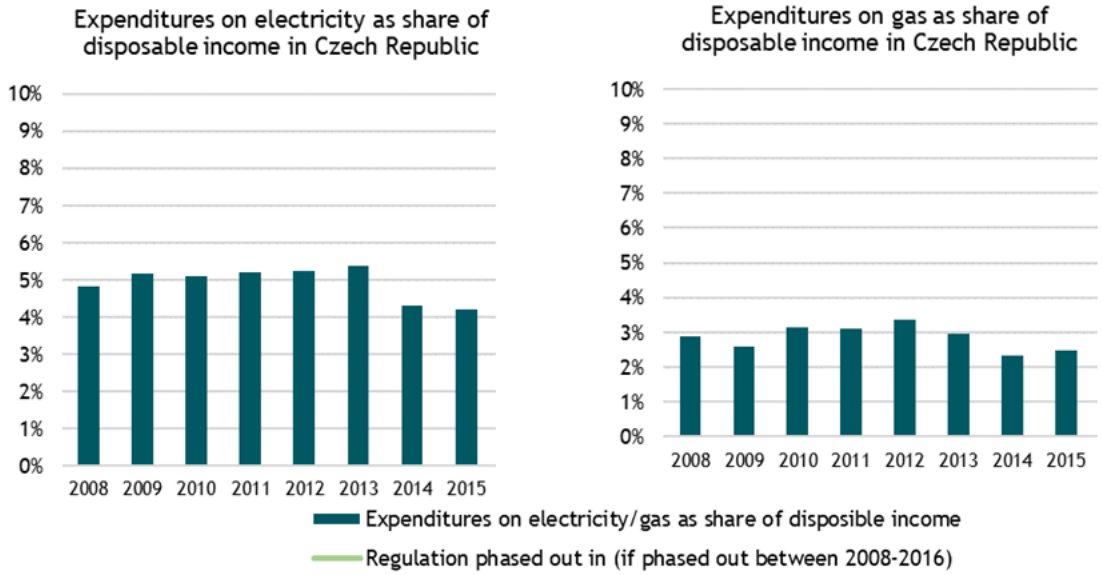
Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[100] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[101] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in the Czech Republic. In the Czech Republic, the share of expenditures on electricity has been around 5% until 2013, and slightly above 4% since then, which is higher than the EU average of around 4%. For gas, it is substantially above the 1 to 2% EU average expenditure.

[99] National Report of the Energy Regulatory Office on the Electricity and Gas Industries in the Czech Republic in 2016 (July 2017), available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_CzechRepublic-EN.pdf/bfe72765-5439-c12f-4b31-167c2d628fad

[100] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 GJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[101] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 53: Expenditures on gas and electricity as share of disposable income for households in the Czech Republic (for middle consumption bands DC and D2) using PPS prices[102]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

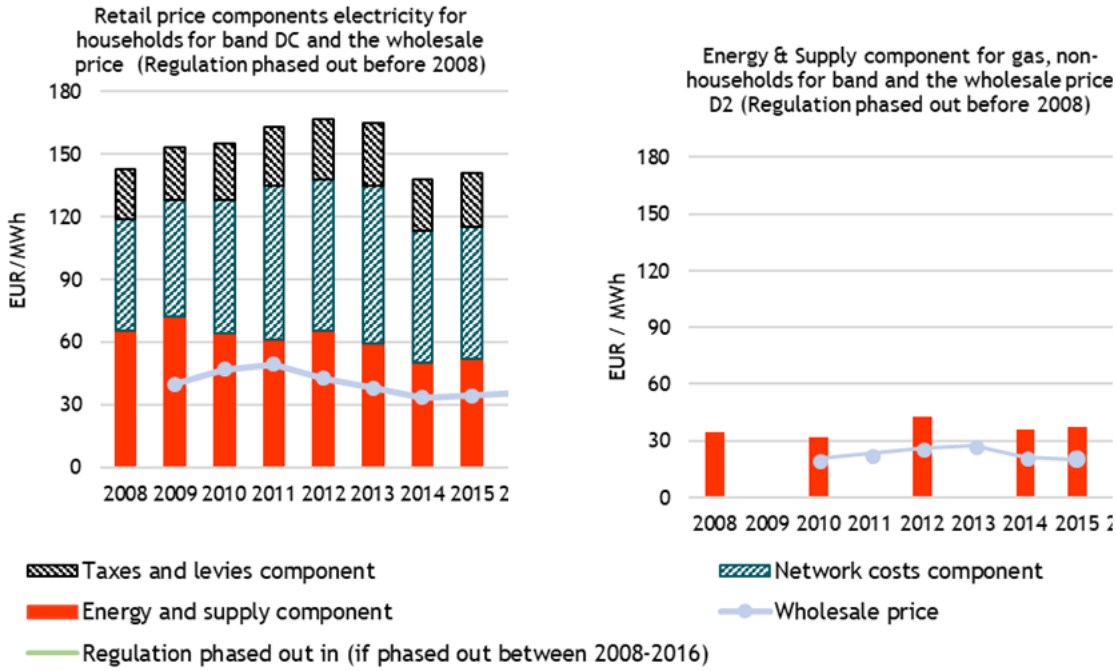
*Source:* Own calculations[103] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for the Czech Republic, from 2012 there is a slight decrease in the energy and supply component of the electricity retail price which is more or less in line with the slight decrease of electricity wholesale prices. This suggest a relatively competitive electricity market for household consumers. In the gas market, the trend of the energy component is also in line with the wholesale price, at least for the years where information is available.

[102] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[103] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 54 Retail household price for middle consumption bands (DC and D2) and wholesale prices in the Czech Republic**



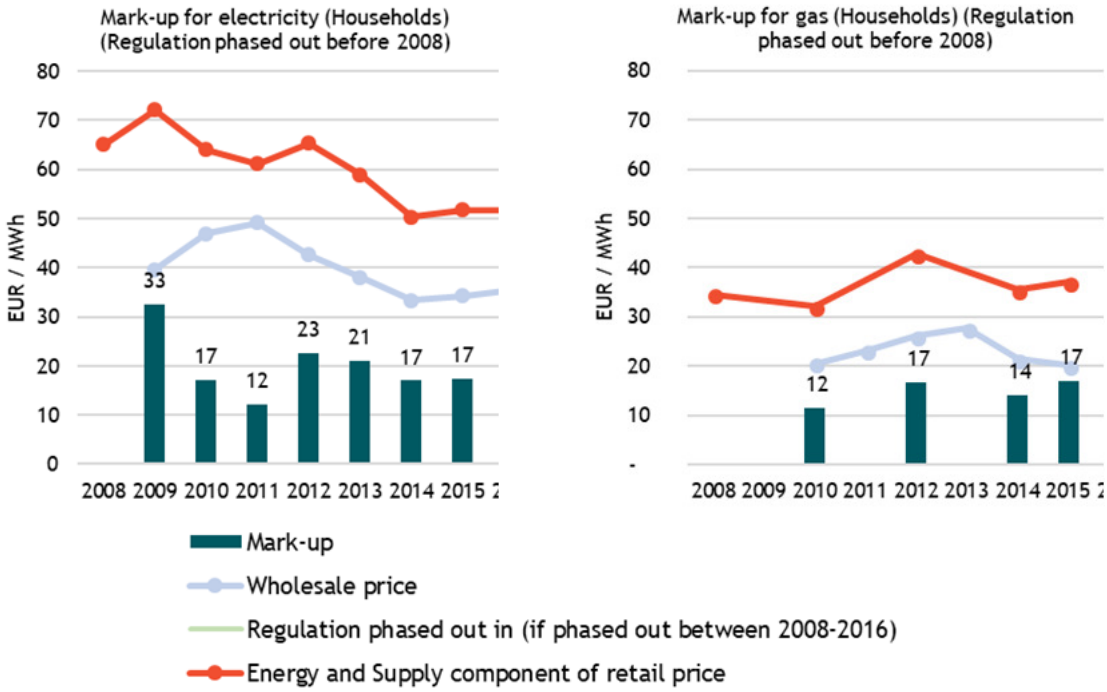

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[104] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[105] The figures below show the mark-ups along with the wholesale price.

[104] Eurostat has data available on gas prices; however not for the energy and supply component.
[105] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 55 Mark-ups for the Czech Republic, middle consumption bands (DC and D2)**



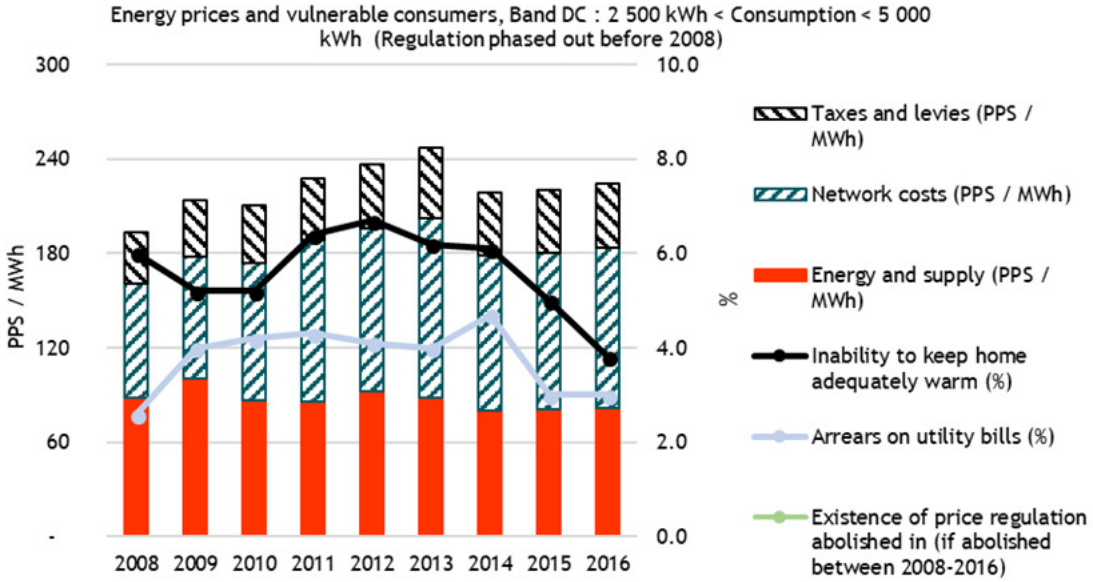

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

The figures above show that in the electricity markets, the mark-up varies from 12 EUR/ MWh in 2011 to 33 EUR/ MWh in 2009, and there has been a continuous decrease since 2012 from 23 EUR/ MWh to 16 EUR / MWh in 2016 as the energy and supply component of the retail price and the wholesale price have been converging. In the gas market, the mark-up has been around 12 EUR/MWh in 2010 to 17 EUR/ MWh in 2015, but that data is patchy.

### 5.1.2 Energy poverty

The consumers in the Czech Republic which are potentially suffering from energy poverty have been constant at around 4% (based on the indicators below), and dropped to just above 3% in recent years, as can be seen by the diagram below showing the share of the population with arrears on their utility bills. The share of consumers unable to keep their home adequately warm has been fluctuating over time between 6-7%, dropping to below 4% in 2016. At the same time, the energy component in retail prices has been very slightly decreasing in the last years.

**Figure 56 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in the Czech Republic**




*Source:* Eurostat

The Energy Act does not define vulnerable customers in the Czech Republic.

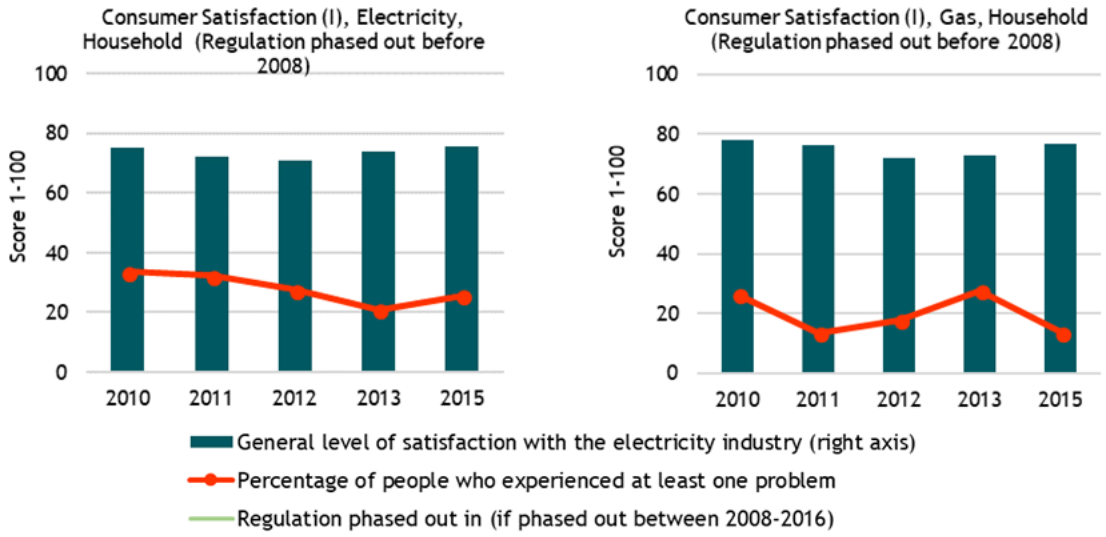
### *5.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

Figure 7 shows the general level of satisfaction with the energy industry and the percentage of people who experienced at least one problem. With respect to the first, no conclusive trends are observed over the time period. On both the electricity and the gas market, the general level of satisfaction decreased until 2012 and increased in 2013 and 2015. On average, the Czechs seem to be slightly more satisfied with the gas sector than with the electricity sector. Concerning the latter, the percentage of people who experienced at least one problem, a positive trend is observed on the electricity market (a decreasing trend). On the gas market, this decreasing trend is not disclosed. However, in most years, the percentage of people with problems was lower on the gas market than on the electricity market.

**Figure 57 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in the Czech Republic for households**

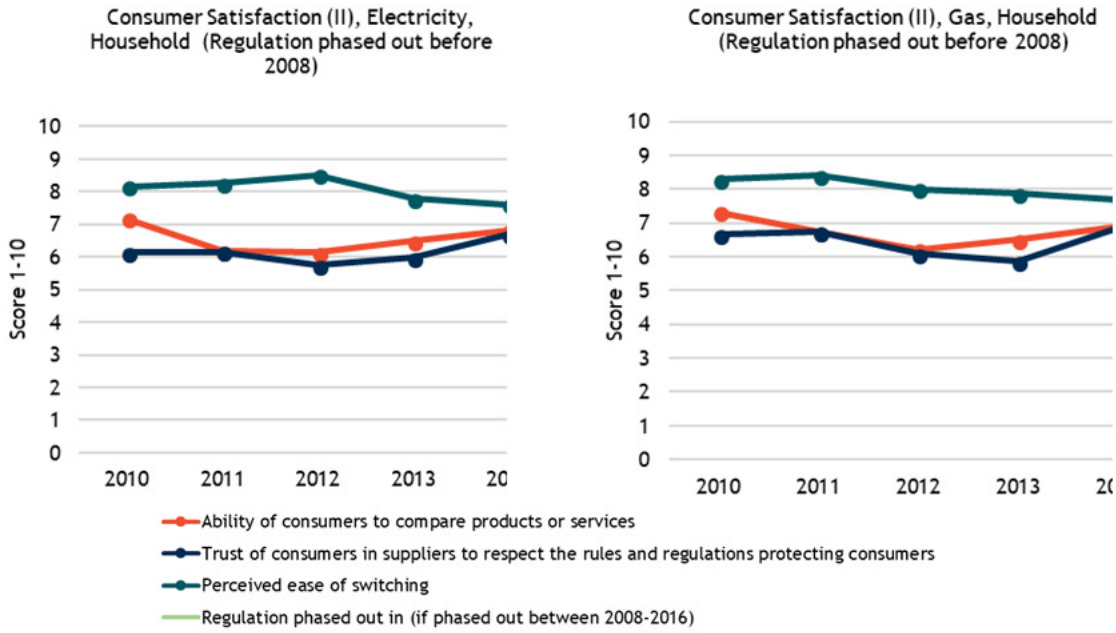



*Source:* EC – DG Justice[106]

Figure 8 shows mixed results with respect to the development of the consumer satisfaction. On the electricity and the gas market, the score for the perceived ease of switching fell from 2012 to 2015, while on the contrary the score for the ability of consumers to compare products or services rose in the same period. This suggests that switching rates still have the potential to increase if switching supplier would be better facilitated.

[106] Note that from 2013 onwards, the survey was carried out every other year.

**Figure 58 Ability of consumers to compare products or services[107], trust of consumers in suppliers[108] and perceived ease of switching[109] in the Czech Republic**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. On the Czech electricity market for households, dual offers and certified green offers are available, which are indications of a fairly developed electricity market in which consumers can choose their supplier and different types of contracts. Data on other indicators is missing for the Czech Republic. Figure 9 shows, again, that despite the relatively efficient and competitive electricity market, consumers could still save more than 10% of their electricity bill by switching supplier.

**Table 5-1 Consumer choice in the Czech Republic (electricity, households)**

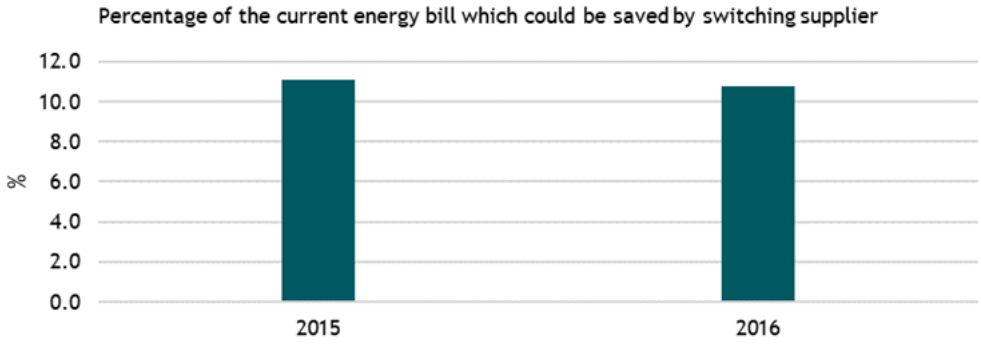
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 | Yes |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

[107] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[108] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[109] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

**Figure 59 Percentage of the current electricity bill which could be saved by switching supplier in the Czech Republic (PS05a)**

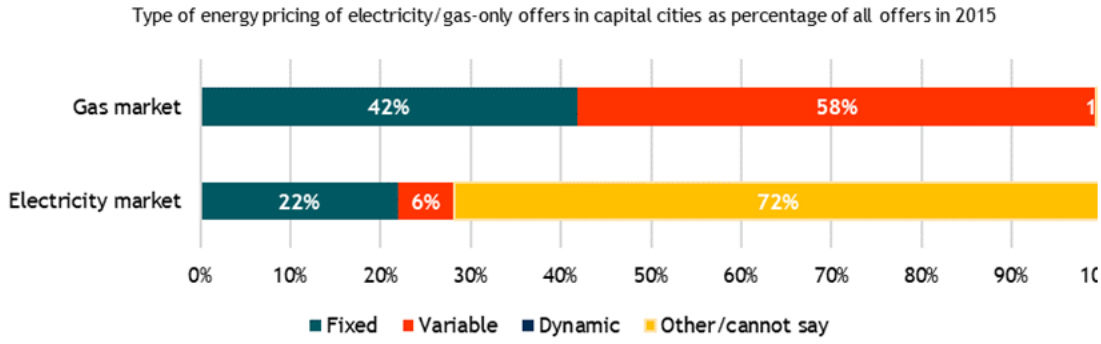



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas.

**Figure 60 Type of offers for households in the Czech Republic**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 5.2 Non-Household Price Regulation in the Czech Republic

**Czech Republic had no energy price regulation for non-households in the period assessed.**

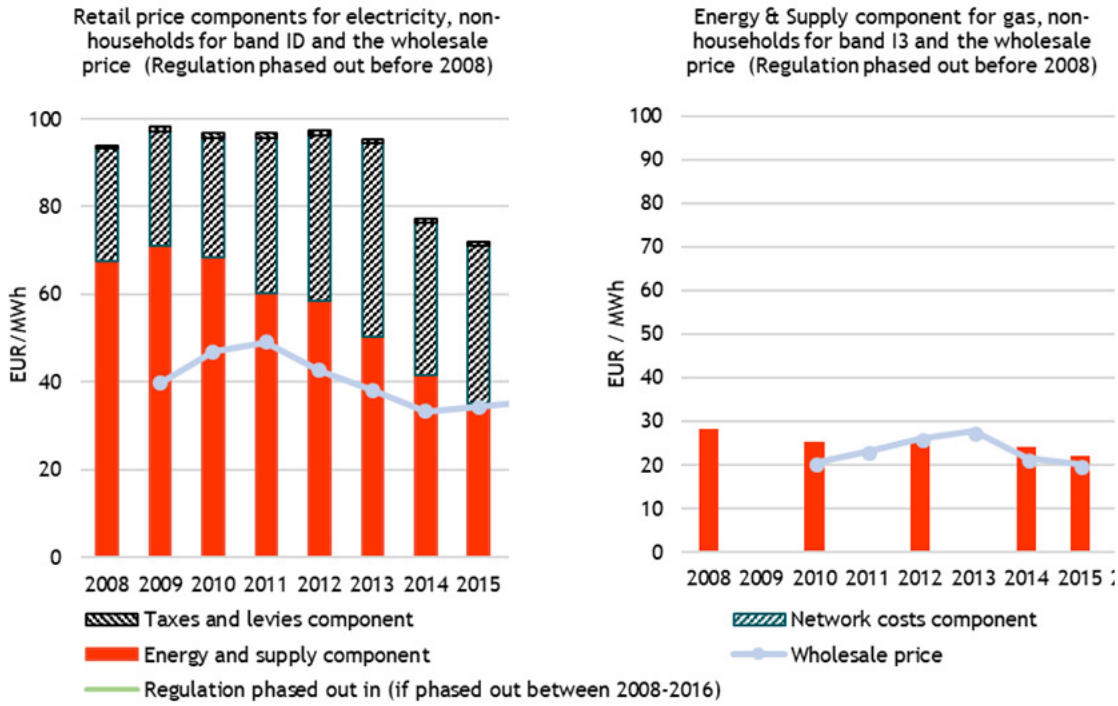
There was no end user price regulation for non-household consumers between 2008 and 2016.

### *5.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Figure 11 shows that ever since 2009, the energy and supply component of the retail electricity price has been declining. The increases in the network costs component of the retail price until 2013 were largely due to a rise in the cost of funding the RES support scheme which is recovered through distribution tariffs. These amounted to over 13 €/MWh in 2016. The overall retail price sharply decreased in 2014. Between 2011 and 2016, the energy and supply component of the retail electricity price seems to be aligned with the wholesale price, which is an indication of an

efficient electricity market for non-household consumers. On the gas market for non-household consumers, the energy and supply component of the retail price decreased between 2008 and 2015. However, the changes are relatively modest compared to the large changes on the electricity market.

**Figure 61 Industry retail price components for middle bands (ID and I3) and wholesale prices in the Czech Republic**



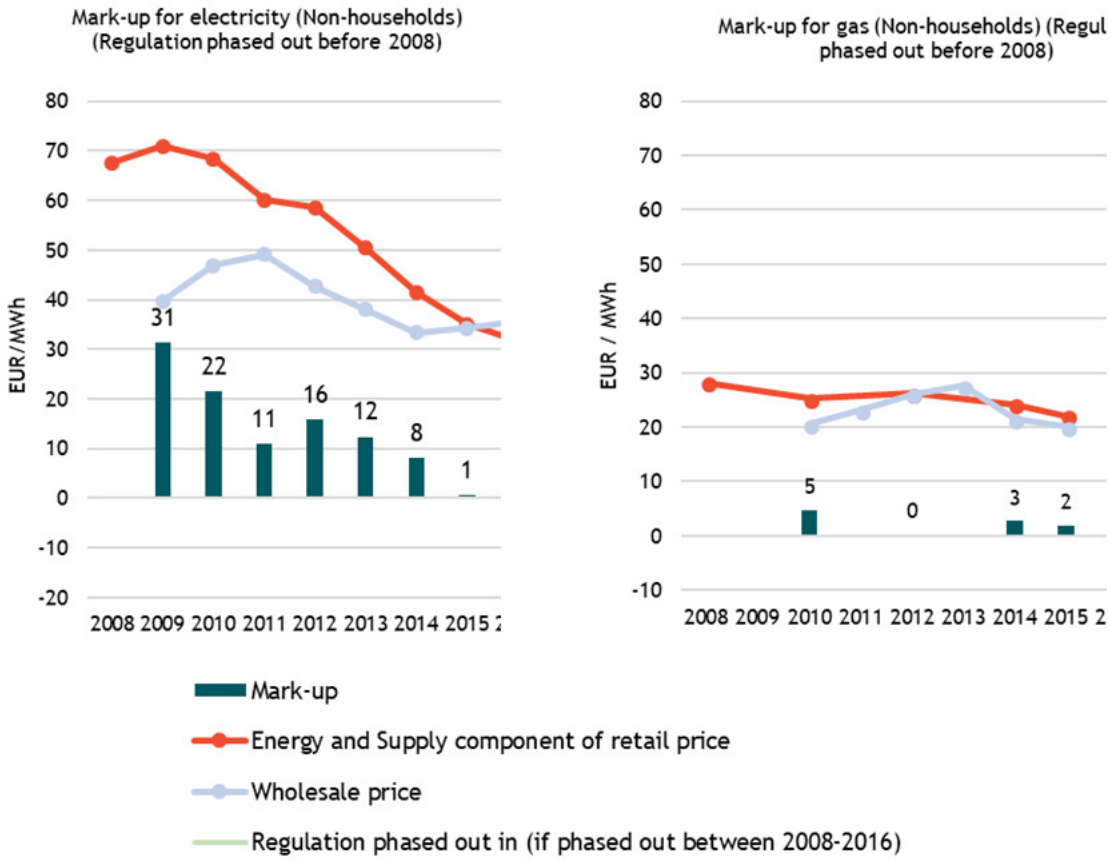

*Note that data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[110] The figures below show the mark-ups along with the wholesale price. On the electricity market for non-household consumers, an almost constant decrease in the mark-ups is disclosed (with 2012 being the exception). In 2016, the wholesale price outweighed the retail price which resulted in a negative mark-up. Although decreasing mark-ups are another indication of a competitive energy market, negative mark-ups can also lead to a tariff deficit. On the gas market for non-household consumers, too little data is available to disclose clear trends. It is, however, observed, that the differential between the energy and supply component of the retail price and the wholesale price has been very small throughout the years.

[110] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 62 Mark-ups for the Czech Republic, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

## 5.3 Tariff deficit in the Czech Republic

**Czech Republic had no tariff deficit between 2008 and 2016.**

# 6 Factsheet: Germany

This factsheet presents the findings for Germany for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 6.1 Household Price Regulation in Germany

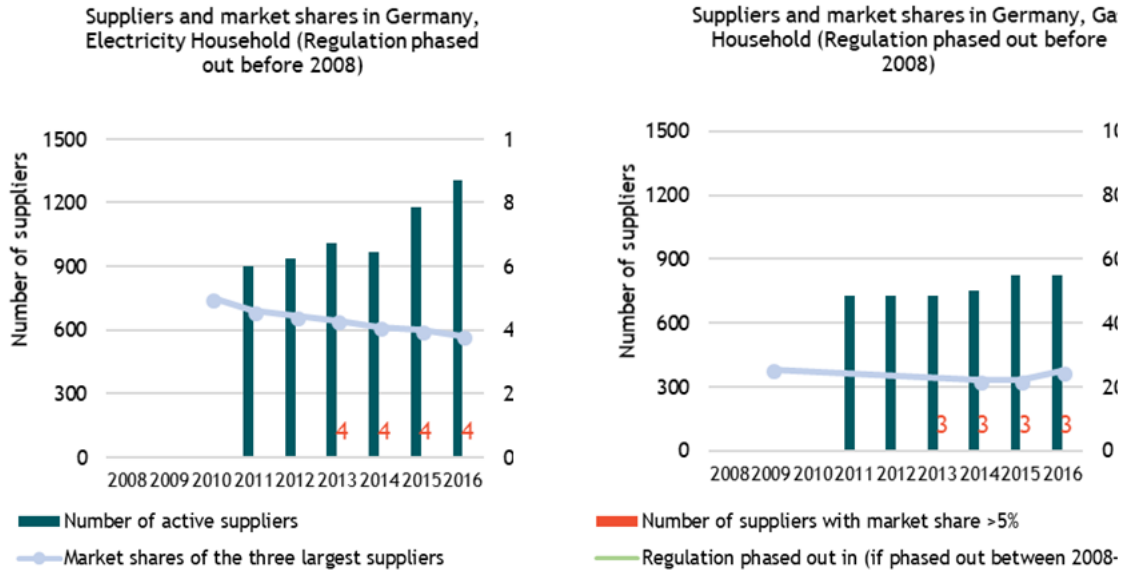
**Germany had no energy price regulation for households in the period assessed.**

Germany has no price regulation on household electricity or gas prices. The gas and electricity markets were liberalized in 1998.[111] Still, prices on the gas market did not develop naturally after 1998, as the wholesale price was coupled to petroleum prices by gas suppliers. For household prices, this coupling was declared unconstitutional in 2010 and prices have developed freely ever since.[112]

### 6.1.1 Selected aspects of competition

For both electricity and gas (in households), there has been a constant increase in the number of active suppliers. This rise is more pronounced in the electricity market, with supplier numbers rising from roughly 900 to roughly 1300 between 2011 and 2016. Entrance in the gas market was more modest, 100 new market actors becoming active between 2011 and 2016.

**Figure 63: Number of suppliers and market shares in Germany**




*Note that data was not available for several years (empty bars do not refer to zeros, but to missing data)*

*Source:* CEER data

#### Consumer engagement and expenditures on energy

The figures below show the annual switching rates[113] in households for both electricity and gas, which have steadily increased since 2008. The NRA provides more detailed data, differentiating between switches due to households moving to an area served by a different supplier or not. Both for electricity and gas, switches where households do not change their residence are the large majority of cases. The NRA attributes the constant increase in switching rates to the new legal basis for supplier switch, the potential savings from such a switch and the increased customer choice available.[114]

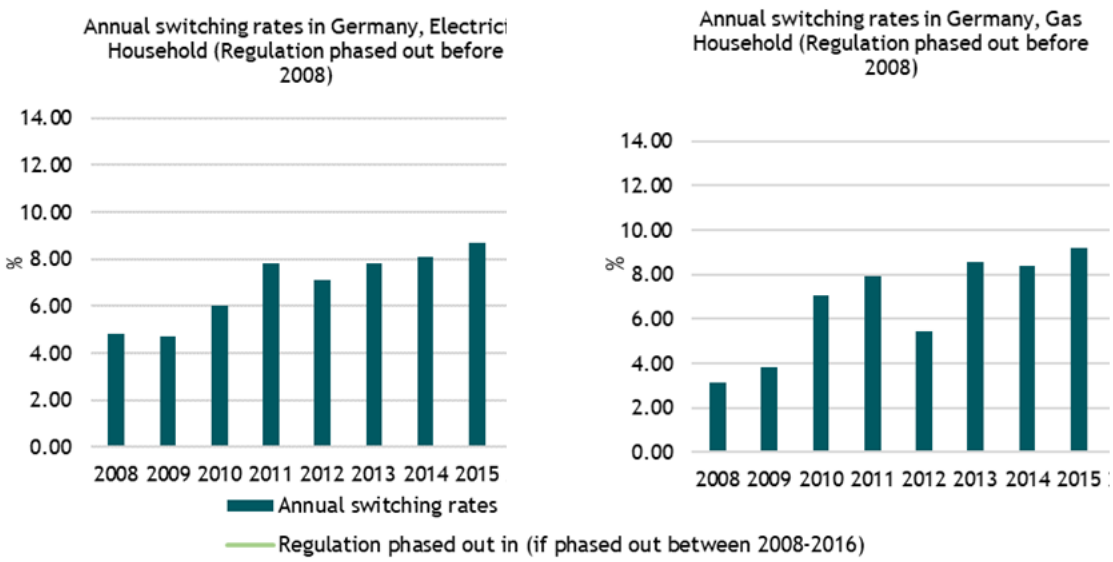
[111] https://www.gesetze-im-internet.de/enwg_2005/

[112] http://juris.bundesgerichtshof.de/cgi-bin/rechtsprechung/document.py?Gericht=bgh&Art=en&sid=989e39411244f8df7c46872aba5ea8de&nr=51829&pos=0&anz=5

[113] Switching is defined as the voluntary action by which a customer changes his supplier

[114] Bundesnetzagentur (2017). Monitoringbericht 2017.

**Figure 64 Annual switching rates for households in Germany**




*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

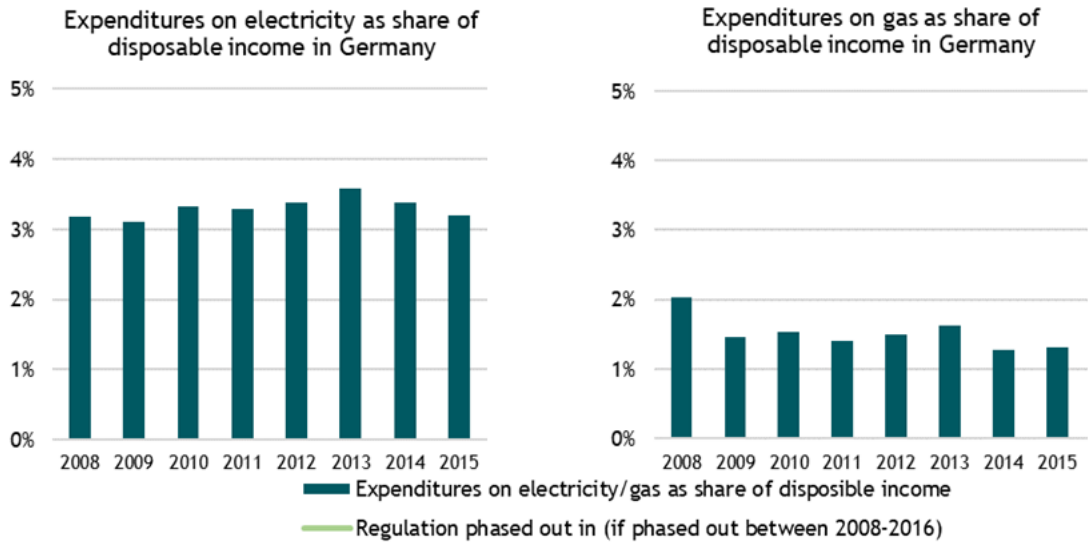
*Source:* CEER data

The consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[115] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[116] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Germany. Over the years, expenditure shares of electricity and gas in the middle consumption bands in Germany have remained rather stable. Electricity oscillates lightly between 3.2%-3.4% (with one outlier of 3.6% in 2013), whereas gas takes up roughly 1.5% of disposable income. No real effect can be observed for household gas prices after the decision in 2010 to uncouple gas prices from petroleum prices.

[115] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[116] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 65: Expenditures on gas and electricity as share of disposable income for households in Germany (for middle consumption bands DC and D2) using PPS prices[117]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

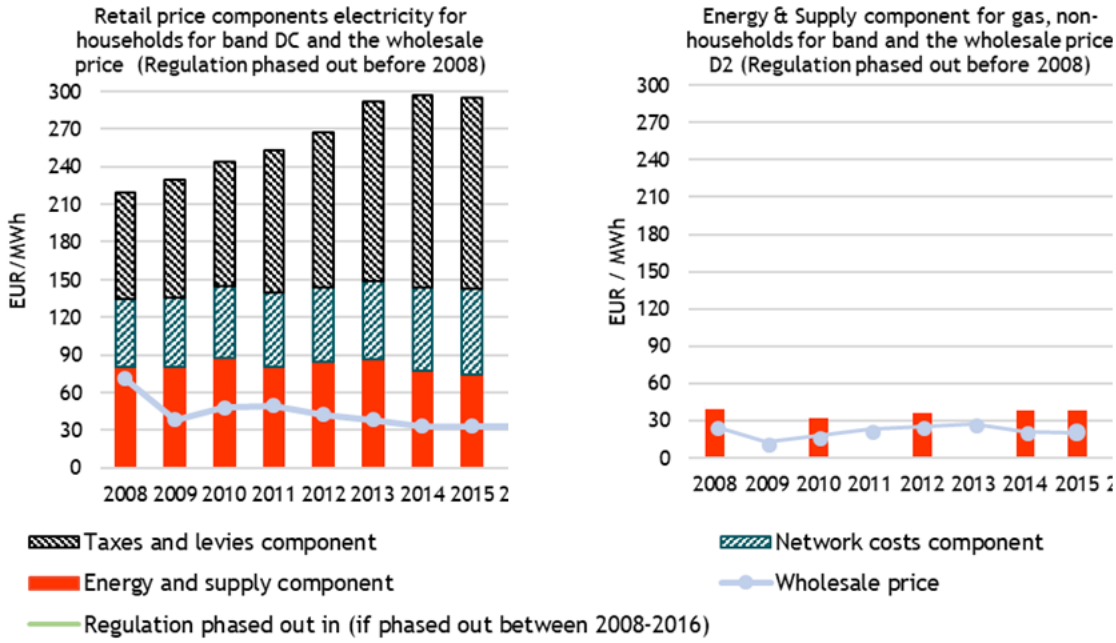
*Source:* Own calculations[118] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that, for Germany, retail electricity prices rose from 2008-2013 and have remained stable ever since. Hereby, the energy component part has not fluctuated majorly and stayed at roughly 70-75 EUR/MWh over the investigated time period. An interesting finding is that the energy and supply component of the retail gas price fell by roughly 10 EUR/MWh between 2008 and 2010. This could have been a direct effect of the decision to uncouple the gas price from the petroleum price. Since then, however, the price of the energy and supply component for gas has reverted back to 2008 levels (around 40 EUR/MWh).

[117] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[118] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 66 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Germany**



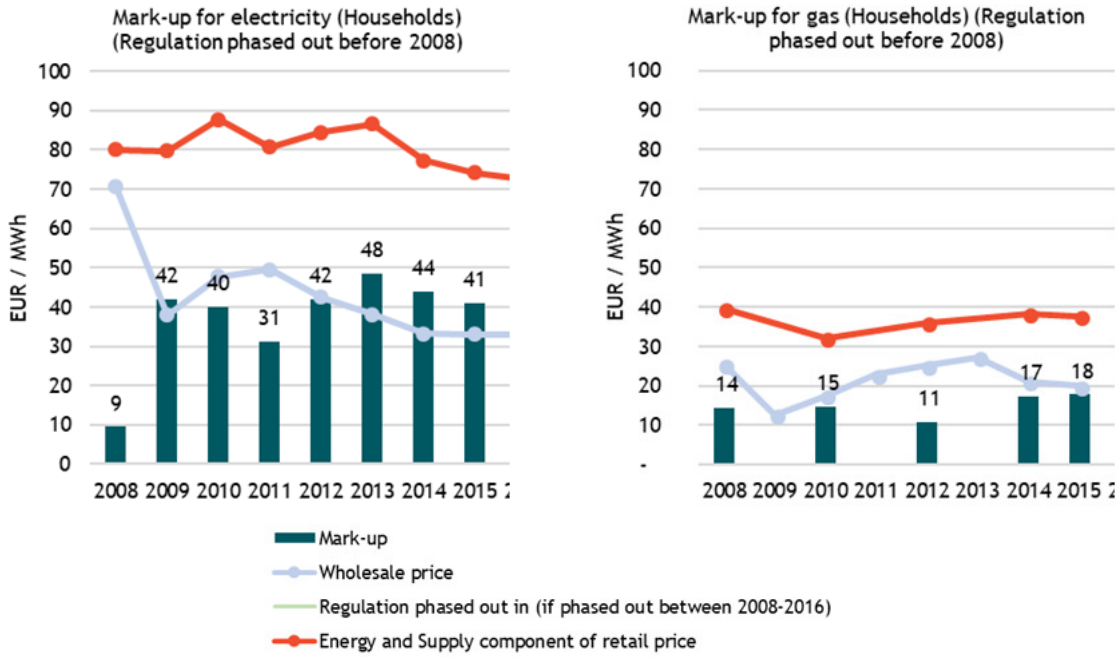

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[119] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[120] The figures below show the mark-ups along with the wholesale price.

[119] Eurostat has data available on gas prices; however not for the energy and supply component.
[120] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 67 Mark-ups for Germany, middle consumption bands (DC and D2)**



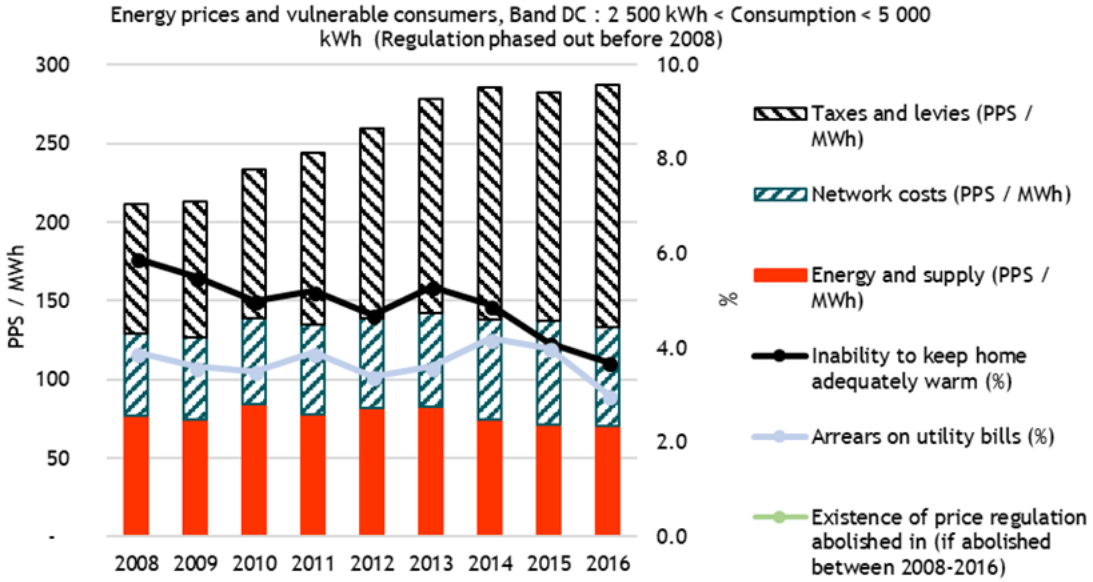

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

Mark-ups in the electricity sector jumped from 9 EUR/MWh to 43 EUR/MWh in just one year from 2008 to 2009. Since then, the mark-up has remained relatively stable, with a low (2011) and a high (2013) outlier. The 2011 drop in mark-up was due to an increase in wholesale prices and a decrease in the price of the energy component of the retail price. The wholesale price seems to have stabilized since 2014, whereas the energy and supply component of the retail price exhibits a negative trend since 2013. In the gas market, mark-ups oscillated between 14-18 EUR/MWh between 2008-2015. In 2011, the mark-up experienced a low at 11 EUR/MWh owing to a proportionally steeper rise in wholesale prices to the energy and supply component of the gas retail price.

### 6.1.2 Energy poverty

The consumers in Germany which are potentially suffering from energy poverty are decreasing over time, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. Just about 3.5% of the population cannot keep their home adequately warm in 2016 (down from 6% in 2008). The percentage of the population with arrears on utility bills decreased only in recent years and is, in 2016, just below the 3% mark (down from 4.2% in 2014).

**Figure 68: Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Germany**




*Source:* Eurostat

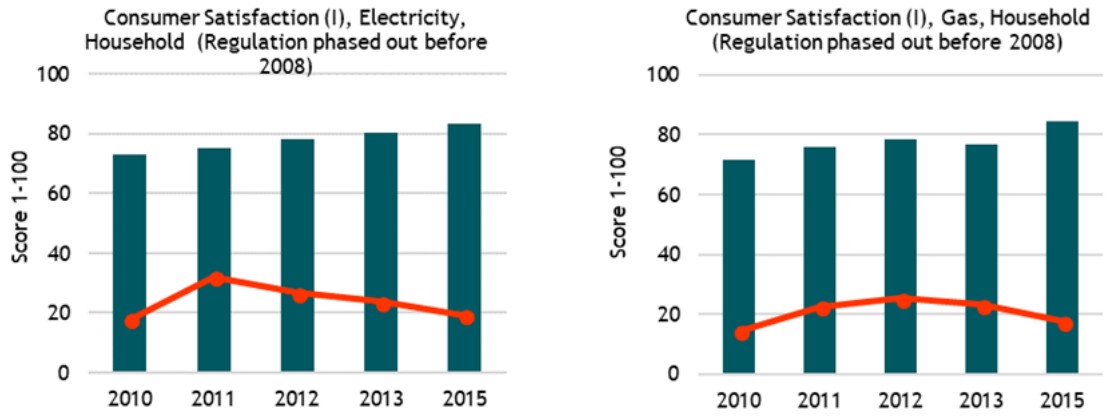
### 6.1.3 *Quality of services*

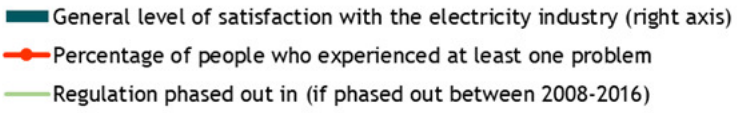
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

Over the period of investigation, the electricity sector has seen a significant rise in consumer satisfaction, up 10 points (on a 100-point scale) between 2010 and 2015. The percentage of people experiencing a problem with services also steadily decreased to below 6% (down from 9% in 2011). Consumer satisfaction in the gas sector followed roughly the same itinerary. The incidence of problems experienced with gas sector services seemed to have peaked in the year 2012 with roughly 7.5% of customers raising complaints. Since then, it seems that the incidence of problems has been put under control again. Just about 5% of customers now report at least one problem (compared to roughly 4.5% in 2010).

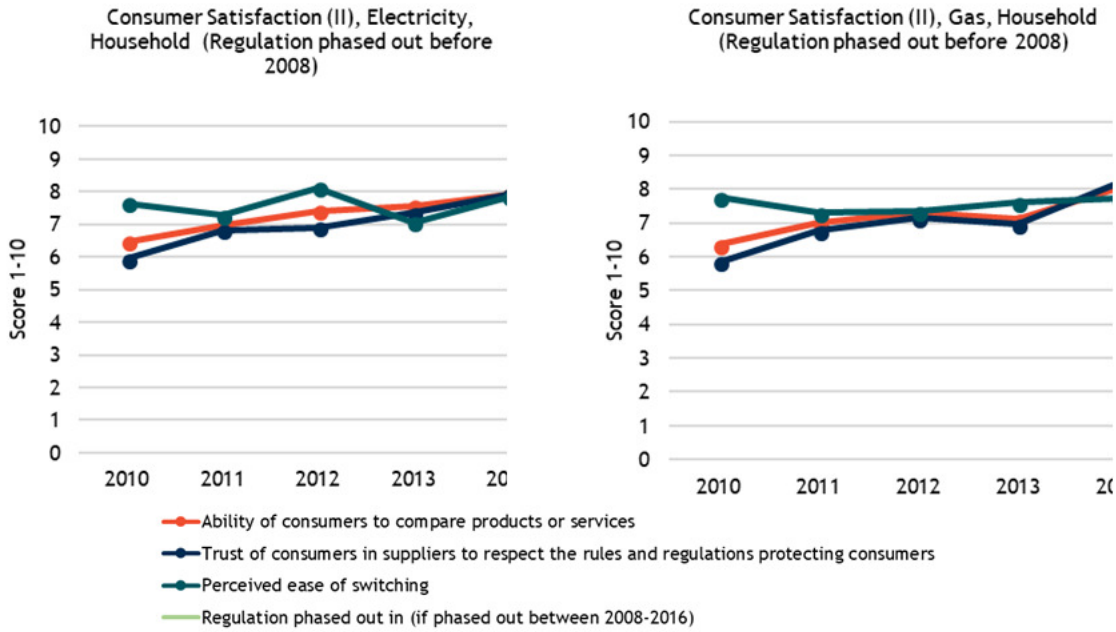
**Figure 69 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Germany for households**






*Source:* EC – DG Justice[121]

**Figure 70 Ability of consumers to compare products or services[122], trust of consumers in suppliers[123] and perceived ease of switching[124] in Germany**




*Source:* EC – DG Justice

As can be seen in Figure 8, ability of consumers to compare products or services has increased in both markets, probably owing to the steadily increasing number of supplier options (and the resulting market opportunity for entrepreneurs to offer comparison tools). Overall trust of consumers in suppliers to respect rules and regulations protecting consumers also increased steadily (and more starkly in recent years). Perceived ease of switching is high and stable in both markets.

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. The German markets do count with benefits and offers that widen consumer choice such as green offers or sign-in discounts. In 2014 no dual-offers were available so that there were still difficulties in integrating electricity, gas and other markets such as insurances, but by 2017 the NRA reported that 18% of the electricity suppliers offered them.[125]

**Table 6-1 Consumer choice in Germany (electricity, households)**

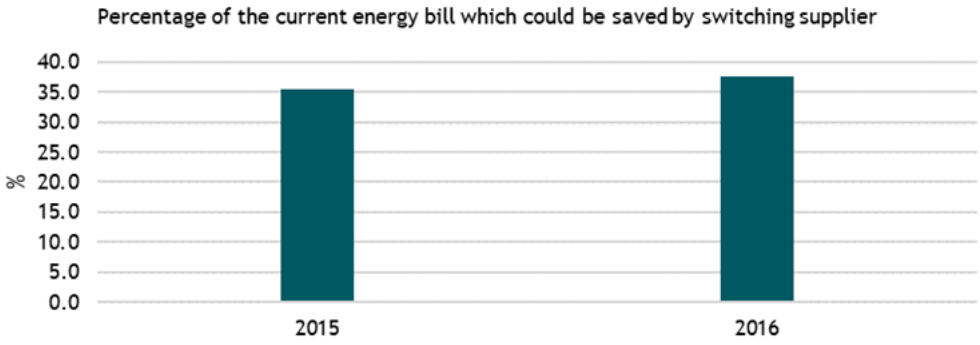
[121] Note that from 2013 onwards, the survey was carried out every other year.
[122] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[123] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[124] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)
[125] Bundesnetzagentur (2017). Monitoringbericht 2017.

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 | No |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | No |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | Yes |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

**Figure 71 Percentage of the current electricity bill which could be saved by switching supplier in Germany**

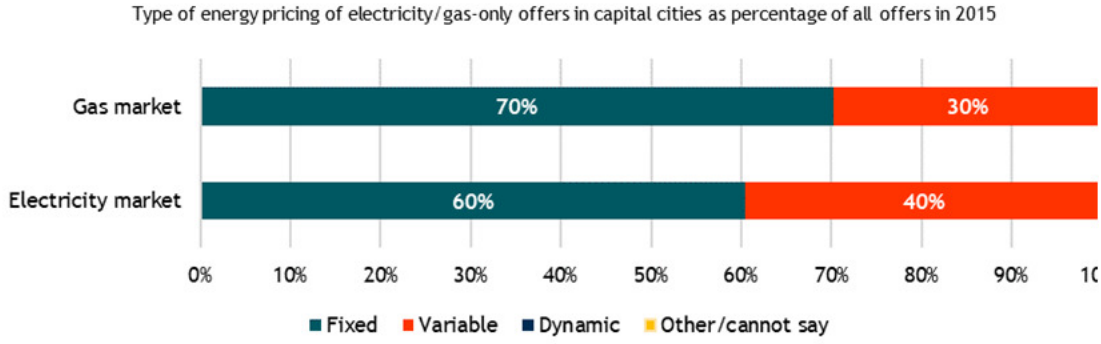



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2015)

The diagrams below show the type of offers available for electricity and gas, most of which are fixed.

**Figure 72 Type of offers for households in Germany**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 6.2 Non-Household Price Regulation in Germany

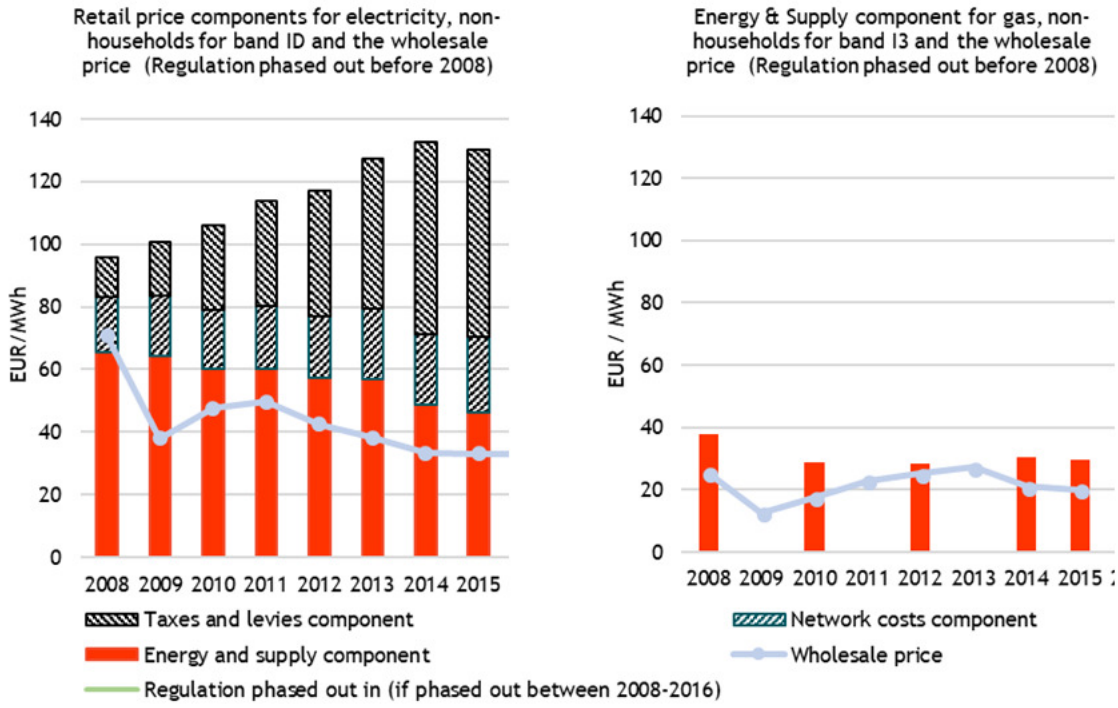
**Germany had no energy price regulation for non-households in the period assessed.**

Germany has no price regulation on non-household electricity or gas prices. As for households, the gas and electricity markets were liberalized in 1998[126], but prices on the gas market did not develop naturally after 1998, as the wholesale price was coupled to petroleum prices by gas suppliers. For household prices, this coupling was declared unconstitutional in 2010 and prices have developed freely ever since.[127] However, the ruling was reverted for non-household customers in 2014 – coupling of prices is therefore still exercised for that segment.[128]

### 6.2.1 Selected aspects of competition (mark-ups)

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. (Industry) wholesale prices in the electricity market fell steadily over the investigated time period, stabilizing from 2014 onwards. Retail prices, on the other hand, increased between 2008-2014 mainly due to a hike in the taxes and levies component of the retail price. This is likely due to Germany's implementation of heavy subsidies for electricity generated by renewable energy sources (EEG law[129]). The energy and supply component of the retail price decreased yearly between 2009-2016. For the gas market, wholesale prices rose steadily between 2009 and 2013, just to drop in 2014 when the gas price for non-households was coupled to petroleum once more. The energy component of the retail price rose from 2010 onwards and has stabilized since 2014.

**Figure 73 Industry retail price components for middle bands (ID and I3) and wholesale prices in Germany**

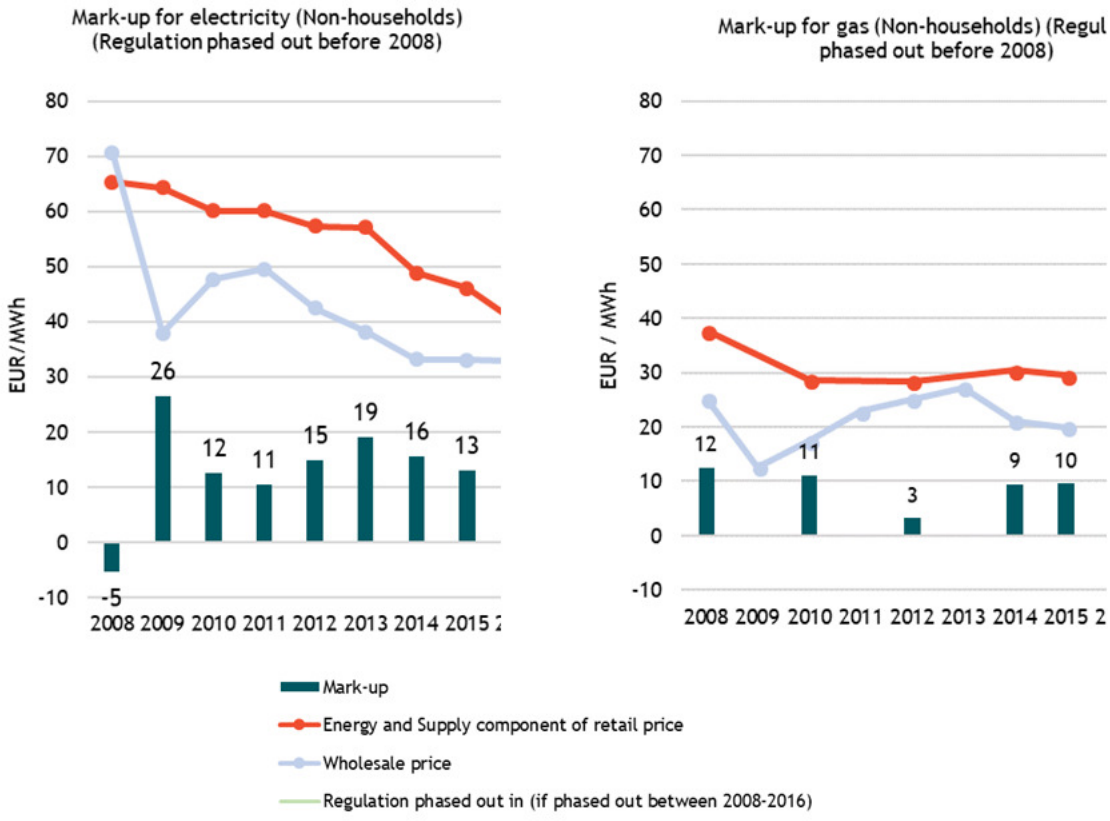



[126] https://www.gesetze-im-internet.de/enwg_2005/
[127] http://juris.bundesgerichtshof.de/cgi-bin/rechtsprechung/document.py?Gericht=bgh&Art=en&sid=989e39411244f8df7c46872aba5ea8de&nr=51829&pos=0&anz=5
[128] http://juris.bundesgerichtshof.de/cgi-bin/rechtsprechung/document.py?Gericht=bgh&Art=pm&Datum=2014&Sort=3&nr=67705&pos=0&anz=82
[129] https://www.gesetze-im-internet.de/eeg_2014/

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[130] The figures below show the mark-ups along with the wholesale price. For the electricity market, (industry) retail mark-ups fell to 7 EUR/MWh in 2016 after a period of fluctuation between 10-19 EUR/MWh from 2010 and 2015. Reason for the mark-up to vanish is the stabilization of wholesale prices paired with the continued fall of the energy and supply component of the retail price. In the gas market, mark-ups have returned to 2010 levels after a period of low margins between 2011 and 2013 (due to a hike in wholesale price; the ruling of 2014 is likely to have reverted the trend and brought mark-ups back to before-2010 levels).

**Figure 74 Mark-ups for Germany, middle consumption bands (ID and I3)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

[130] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

## 6.3 Tariff deficit in Germany

**Germany had a temporary tariff deficit in recent years due to the way that its support of renewable energy is structured. However, the deficit is paid off immediately in the subsequent year (via an increase in the surcharge).**

In recent years, Germany has repeatedly run a temporary tariff deficit due to the way that its support of renewable energy is structured. The EEG surcharge, paid for by end-consumers and defined each year based on forecasted renewable energy production, hereby runs the risk of not matching with actual costs of renewable energy electricity production. This deficit is, however, not cumulated annually but rather paid off immediately in the subsequent year (via an increase in the surcharge). Accounts were hence balanced in 2017, leading to a small reduction of the EEG surcharge in 2018.[131]

# 7 Factsheet: Denmark

This factsheet presents the findings for Denmark for the 'Study on energy prices, costs and subsidies'. The indicators presented here are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 7.1 Price Regulation in Denmark

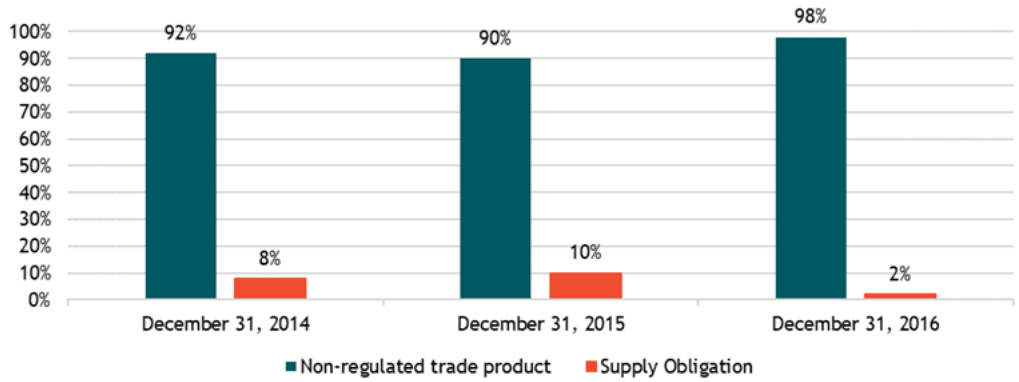
**Denmark phased out energy price regulation for households starting from 2016 for electricity (though 2% of consumers remained under price regulation up to May 2017), but still had energy price regulation in place for gas in 2016 (covering around 6% of consumers).**

Denmark has recently changed its position regarding regulated electricity prices, implementing the supplier centric model (SCM) by amending the Danish Electricity Act (DES). Prior to the entry into force of the SCM in 2016, Denmark licensed default suppliers for specific grid areas. These licensed default suppliers had a universal service obligation to supply any customer who did not actively choose a supplier. After 2013 these default suppliers were chosen through competitive tenders, and with the implementation of the SCM all inactive consumers were moved to a product without any price regulation.[132] Nine license holders (with supply obligation licenses covering 2% of consumers) still operated under the previous regulatory regime, i.e. with prices regulated by DERA. By May 2017 the licenses of these last default suppliers expired, and all households were moved to the liberalized electricity market. In the new model, all suppliers have the obligation to provide electricity to consumers in their active areas.

[131] Bundesnetzagentur (2017). Monitoringbericht 2017.
[132] Danish Energy Regulatory Authority (2017), National report Denmark: Status for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Denmark-EN.pdf/be24eae3-d615-a912-2f04-f043b3f2b165

In 2016, the non-regulated electricity products amounted to around 98% of the consumption and today, all consumers receive market-based products. However, over 60% of the consumption is sold to consumers who have not actively decided to change product and therefore receive a product chosen by the supplier.

**Figure 75 Distribution of customers among different electricity product types, 2014-2016.**




*Source:* DERA (2017)

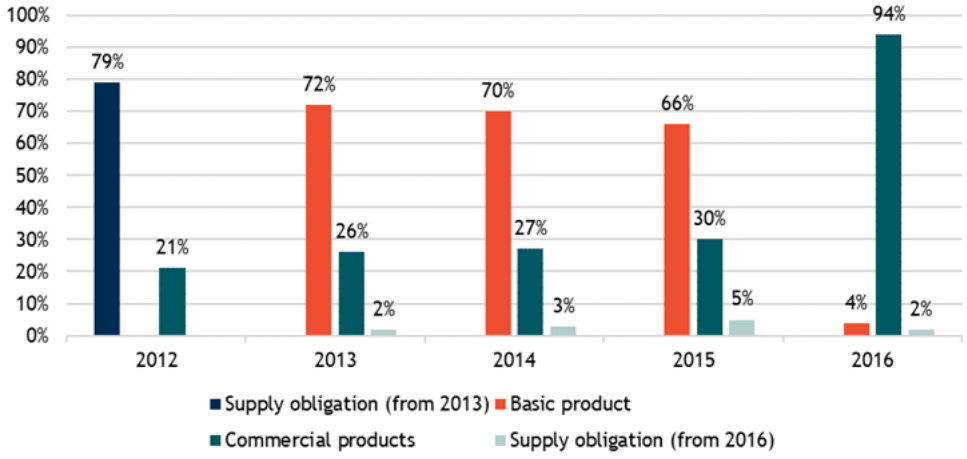
Regarding **gas prices,** in 2011, Denmark amended the Natural Gas Supply Act and changed DERA's supervision of the regulated default prices for gas customers who do not actively choose a gas supplier (i.e. since 2013 DERA supervises the price of supply obligation products). The amendment also introduced a basic product which acts as gradual phase-out of regulated gas products.[133] The supply obligation products are decided through tenders of supply obligation licenses granted by DEA. Until now, two auctions of licenses have been completed; one commenced in 2013 and one 2016. As a license applies for 3 year, licenses granted in 2016 expire in 2019.[134]

- **Gas supply obligation product** – The supply obligation product is a default product which is supplied to gas customers who have not actively chosen a supplier. The price of the supply obligation product must not exceed the wholesale price of natural gas with an additional charge to cover several costs (storage and other flexibility costs, costs of transmission outside Denmark, contribution margin and subscription) plus transmission costs within Denmark. The price is determined on a monthly basis. Suppliers of supply obligation products are found through tenders of supply obligation licenses. The current license period started 1 May 2016 and ends 31 March 2019.
- **Gas basic product**: Customers, who have previously received a supply obligation product customer and have not chosen a new supplier before 1 May 2016, will receive a basic product from their existing supplier. The price and conditions for the basic product must correspond to the price and conditions of the now abolished regulated supply obligation product. The basic product must be available to all gas customers during the following period of supply obligation licenses, however, not more than three years. The price is determined on a monthly basis.

[133] At the end of the supply obligation license period, customers who have a supply obligation product and have not chosen a new supplier are automatically transferred to a basic product (with price and conditions which correspond to those of the supply obligation product). The basic product must be available during the following period of supply obligation licenses, however, not more than three years.
[134] Danish Energy Regulatory Authority (2017), National report Denmark: Status for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Denmark-EN.pdf/be24eae3-d615-a912-2f04-f043b3f2b165

As of May 2016, the majority (around 94%) of Danish gas customers were supplied at unregulated prices which are not supervised by DERA. The supply obligation products and the basic products are currently supplied by two gas suppliers, and DERA is currently supervising the prices of these products. As the share of customers is above 5% Denmark is considered to still apply regulated prices for gas in 2016, although this ended in 2017.

**Figure 76 Distribution of consumers on various types of products.**

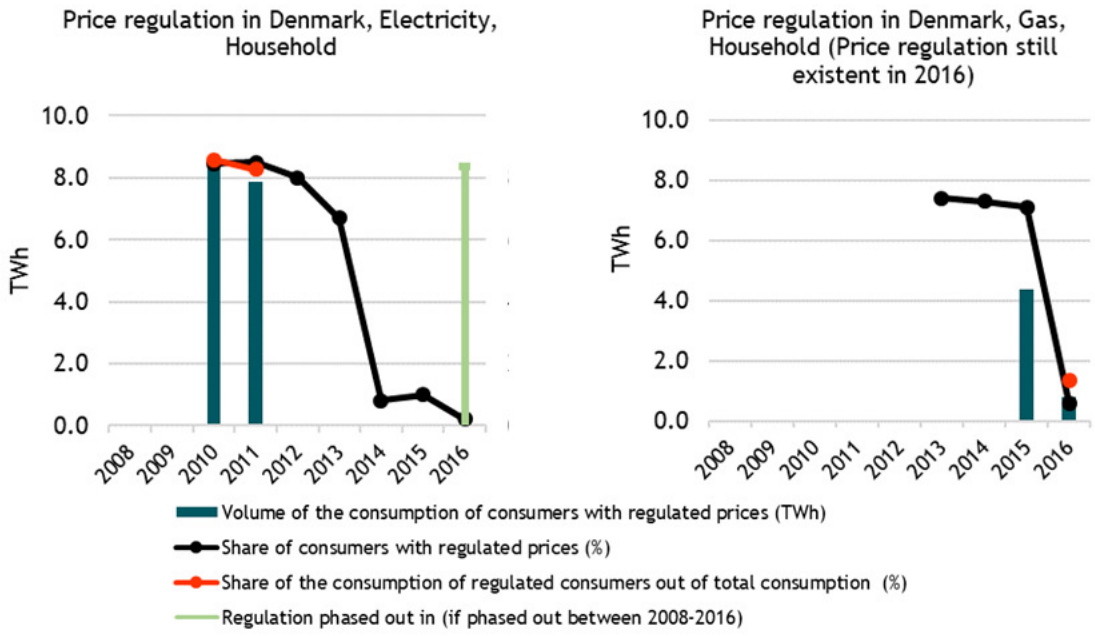



*Source:* DERA (2017)

## 7.2 Household Price Regulation in Denmark

As mentioned above, electricity household prices have been deregulated in 2016 while gas household prices remain regulated. The diagrams below show the limited data available for household consumers, though the images on the introduction above present a more complete overview.

**Figure 77 Household price regulation in Denmark from 2008 to 2016**



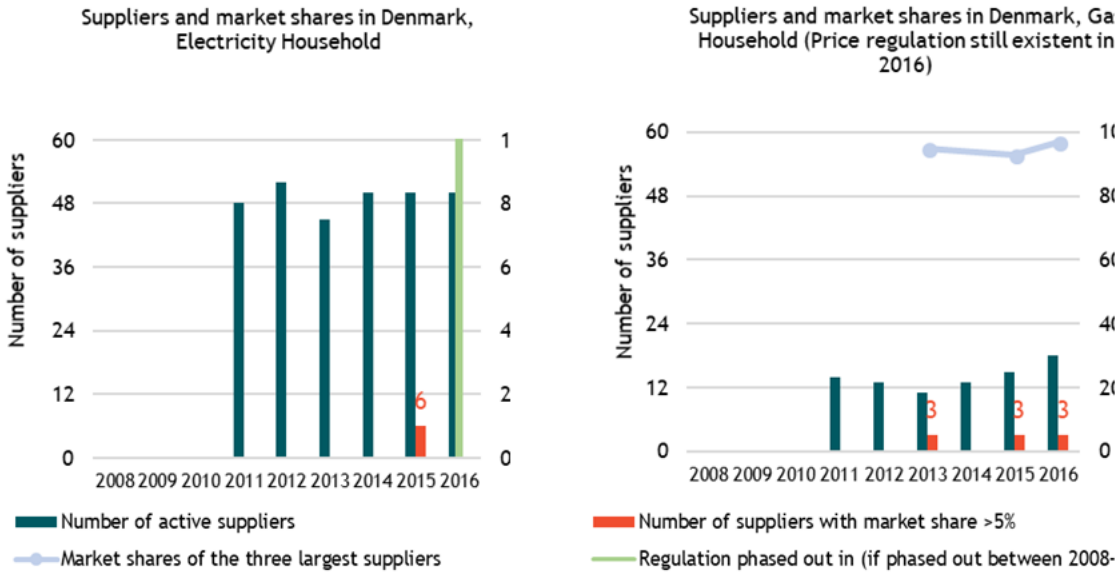

*Source:* CEER data and country experts

There are no social tariffs for households in Denmark (nor have there been any in the past 10 years).[135]

### 7.2.1 *Selected aspects of competition*

There is limited information regarding competition in Denmark in the household sector. It can be seen that both for electricity and gas (in households), there has been a large number of active suppliers in the past years (over 40 for electricity and over 10 for gas). We see also that in both markets there seems to be a few suppliers with more than 5% market share (6 suppliers for electricity in 2015 and 3 for gas).

**Figure 78: Number of suppliers and market shares in Denmark**




*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

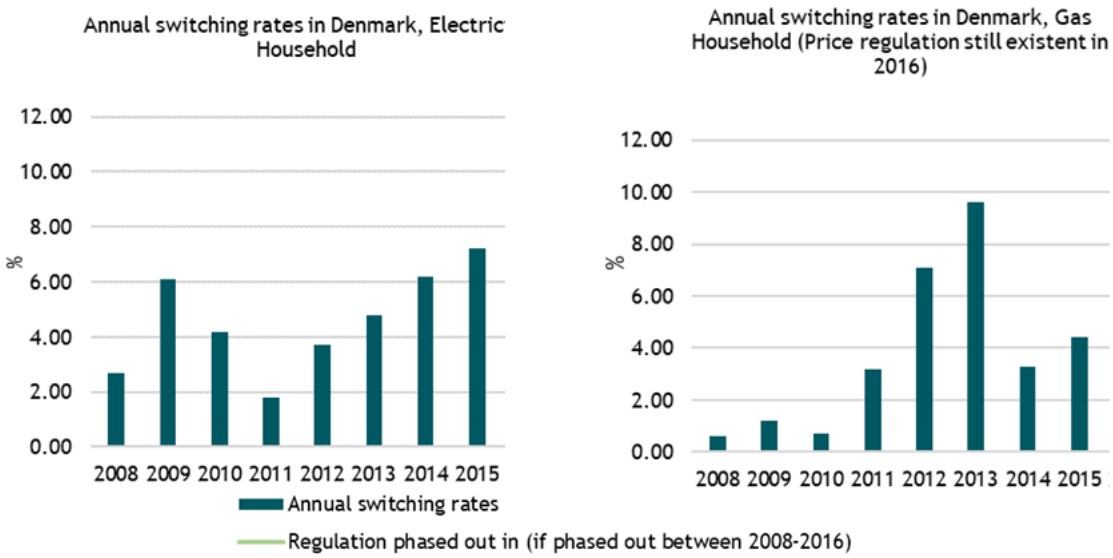
*Source:* CEER data

#### Consumer engagement and expenditures on energy

The figures below show the annual switching rates[136] in households for both electricity and gas, which are overall rather low. Switching rates were at its highest point in 2009 for electricity (6%) and declined slightly in the following years. There is no data available on the switching rates for the electricity market for household consumers. However, the combined switching rates (household and non-household consumers) were 6.3% in 2014, 7.2% in 2015 and 6.4% in 2016.[137] On the other hand, switching rates have been increasing for gas from 1% in 2008 to around 10% in 2015, driving competition. However, there was still high market concentration in 2015 and 2016, with the three largest suppliers having over 90% of the market share (see figure above).

[135] Source: CEER data
[136] Switching is defined as the voluntary action by which a customer changes his supplier
[137] Danish Energy Regulatory Agency (2017) National Report 2017. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Denmark-EN.pdf/be24eae3-d615-a912-2f04-f043b3f2b165

Figure 79 Annual switching rates for households in Denmark




*Note: No information available for electricity from 2013 onwards, and for gas for 2014 or 2016.*

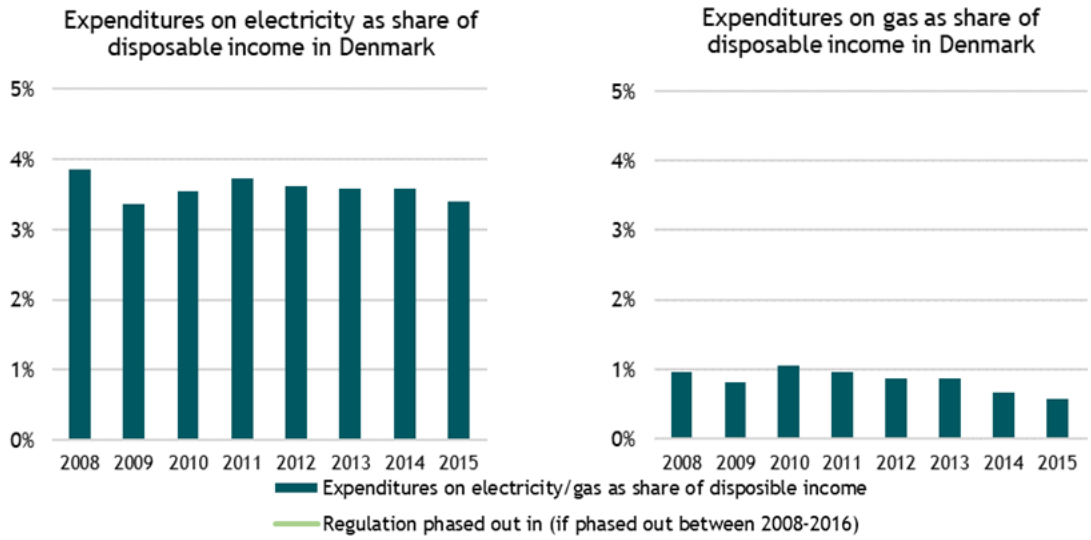
*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[138] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[139] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Denmark. While there is no clear trend in the electricity market, the energy expenditures for gas as part of the disposable income have decreased over time for gas.

[138] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualization: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[139] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 80: Expenditures on gas and electricity as share of disposable income for households in Denmark (for middle consumption bands DC and D2) using PPS prices[140]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

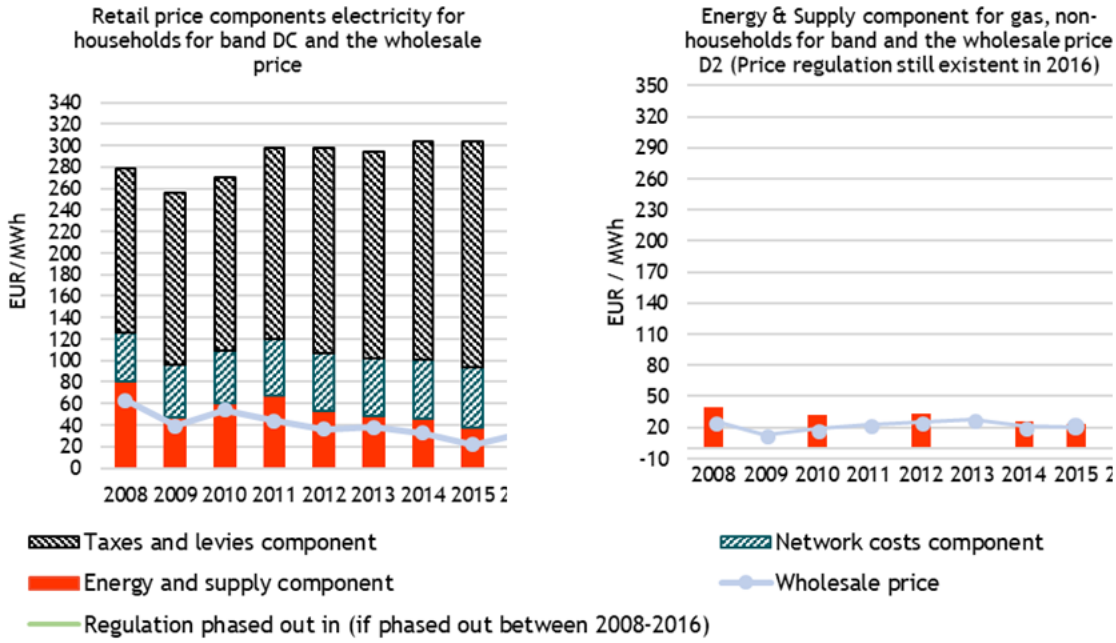
*Source:* Own calculations[141] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Denmark, there is a clear correlation between wholesale price and the energy component of the electricity retail price, with a slight decrease over the past years. This correlation also seems present for gas, though it is more difficult to assess given the limited data available.

[140] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[141] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 81 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Denmark**



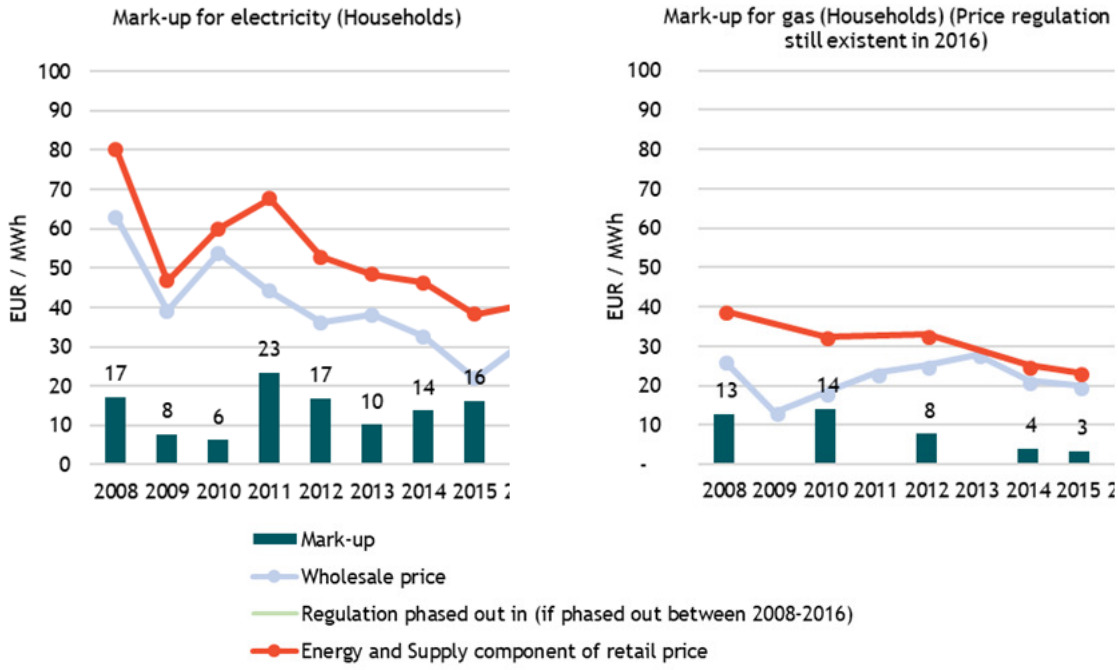

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[142] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[143] The figures below show the mark-ups along with the wholesale price. There has been a significant decrease in the gas mark-ups over time from 14 EUR/MWh in 2011 to 3 EUR/MWh in 2015, while the electricity mark-ups have been more erratic, oscillating between 8 and 22 EUR/MWh.

[142] Eurostat has data available on gas prices; however not for the energy and supply component.
[143] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 82 Mark-ups for Denmark, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

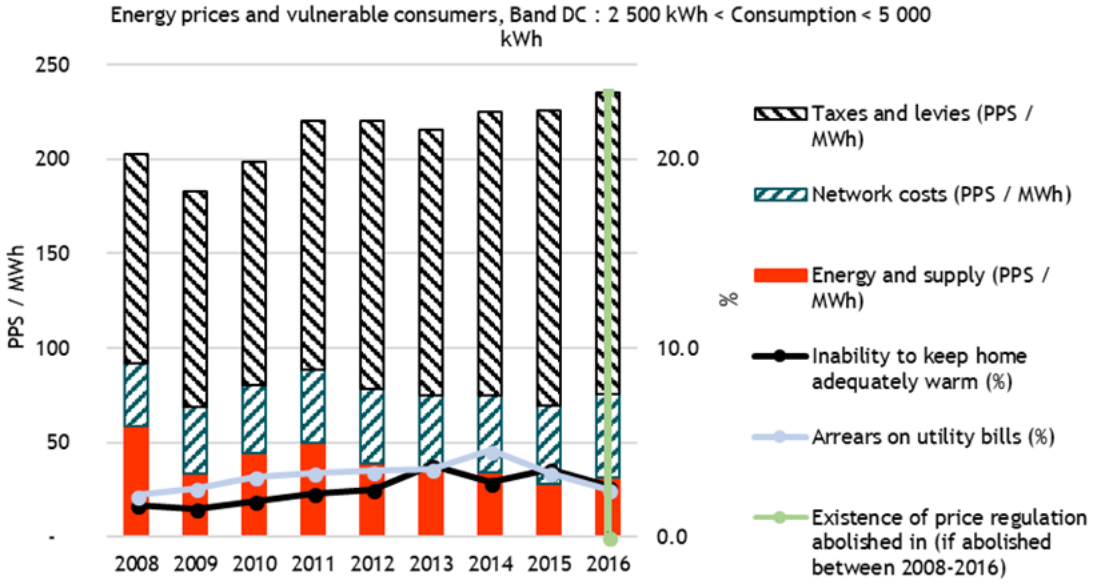
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price). Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.

### 7.2.2 *Energy poverty*

Proxies for energy poverty in Denmark were increasing from 2008 to 2013/2014 and have shown a decreasing trend since then. This can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. These changes do not seem to be correlated to changes in the energy component of household electricity retail prices. It has been noted by other studies, that Denmark has one of the highest energy taxes in the EU.[144]

[144] Insight E (2015), Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures. Available at: https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf

**Figure 83 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Denmark**




*Source:* Eurostat

Denmark is not commonly regarded as a country having issues with energy poverty. Neither the concept of 'energy poverty' nor 'vulnerable consumer' have been defined in (energy) Danish law. The issue is dealt with social legislation (via the social security system). Further, the principle of universality exists, where every citizen has the right to social assistance when affected by a specific event.[145]

### 7.2.3 *Quality of services*

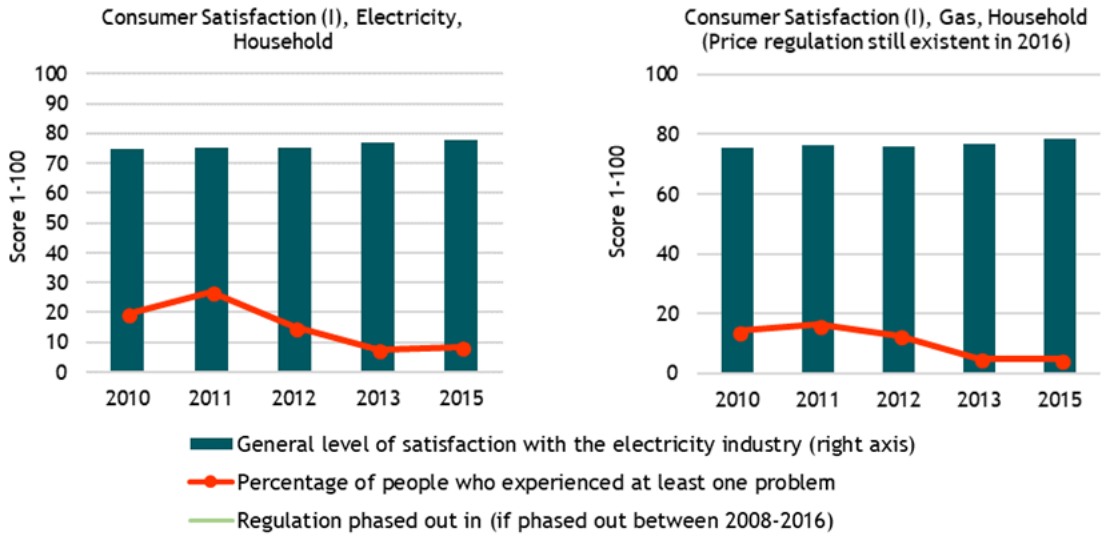
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

Consumers in Denmark seem to be more satisfied with the energy industry over time. Results are very similar and follow the same trends in both the electricity and gas market in this regard. The figures below show that the percentage of people experiencing problems, both with their electricity or gas supplier, has decreased since 2011. At the same time, their general satisfaction with the industry has increased from scores of around 75/100 to around 78/100.

[145] Insight E (2015), Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures. Available at: https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf

**Figure 84 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Denmark for households**

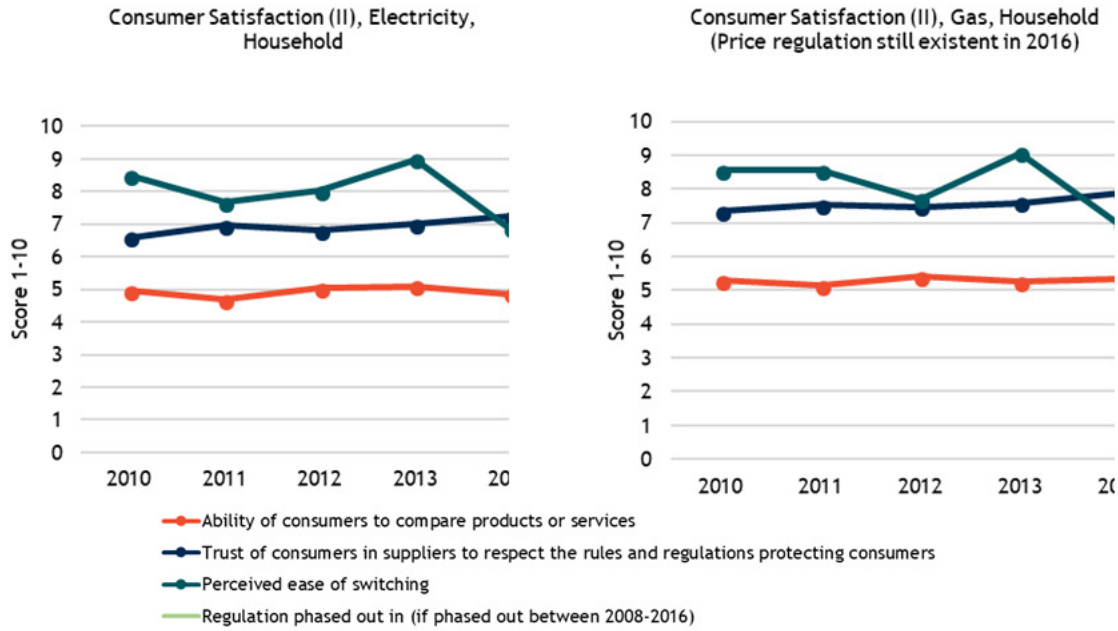



*Source:* EC – DG Justice[146]

Consumers in both markets trust their suppliers to respect rules and regulations protecting consumers. They also perceive switching is easy, though this perception was negatively affected in 2015. The score regarding the ability of consumers to compare products or services however, is only average, and shows a potential area of improvement for gas and electricity suppliers.

[146] Note that from 2013 onwards, the survey was carried out every other year.

**Figure 85 Ability of consumers to compare products or services[147], trust of consumers in suppliers[148] and perceived ease of switching[149] in Denmark**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. It shows that Danish electricity suppliers could still provide consumers additional choice in 2016 by including dual offers and providing non-financial benefits such as home insurance, free maintenance of water boilers, and others. By 2018 dual-offers were also available to Danish households.[150]

**Table 7-1 Consumer choice in Denmark (electricity, households)**

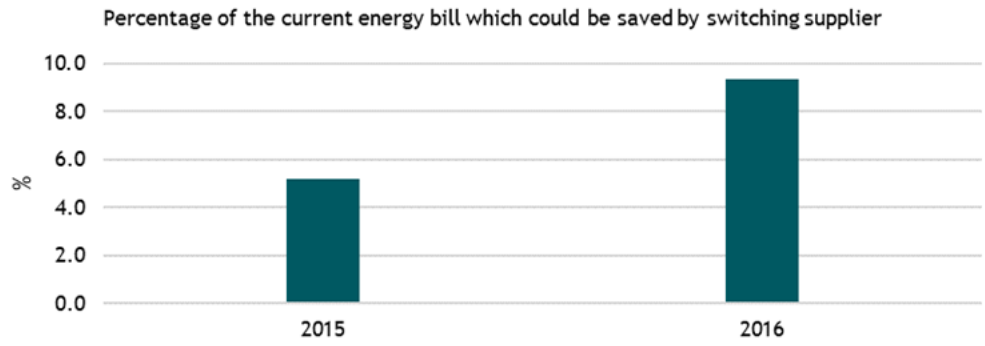
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | No |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | No |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | Yes |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

[147] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[148] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[149] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)
[150] Private communication with the NRA (2018).

Figure 86 Percentage of the current electricity bill which could be saved by switching supplier in Denmark

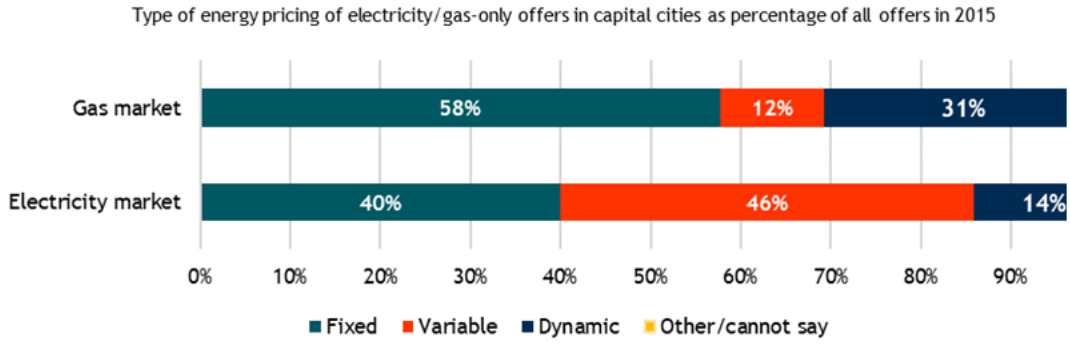



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, most of which are fixed in the gas market and variable in the electricity market. However, DERA indicates that most variable electricity and gas offers available in 2018 are in fact dynamic.[151]

Figure 87 Type of offers for households in Denmark




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

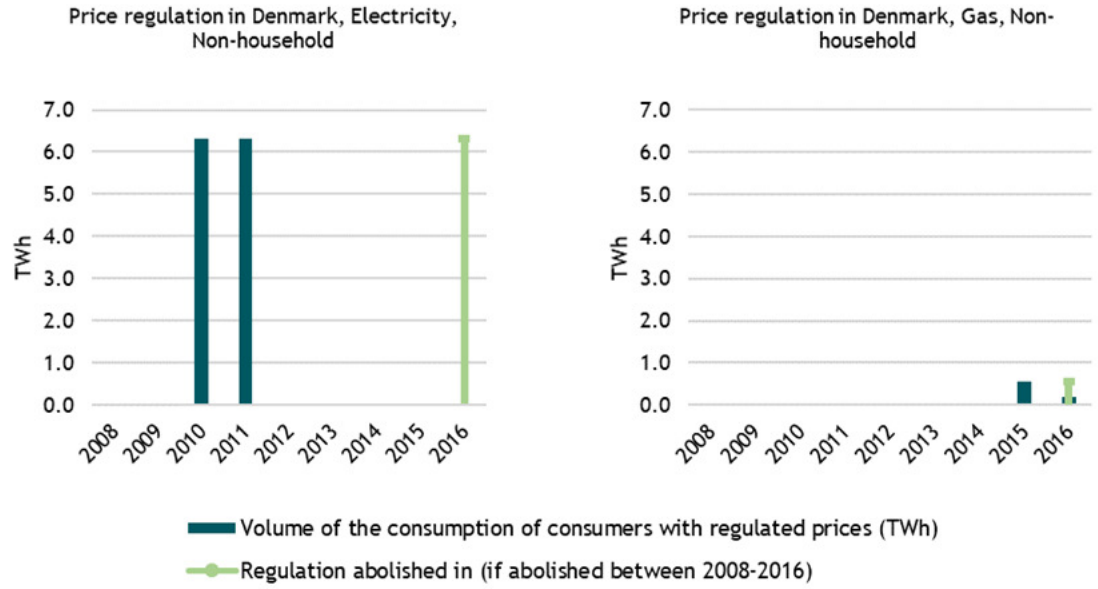
## 7.3 Non-Household Price Regulation in Denmark

**Denmark phased out energy price regulation for non-households starting from 2016.**

As mentioned in the introduction, electricity and gas non-household prices have been deregulated in 2016. The diagrams below show the limited data available for non-household consumers, though the images on the introduction present a more complete overview.

[151] Private communication with the NRA (2018)

Figure 88 Non-household price regulation in Denmark from 2008 to 2016

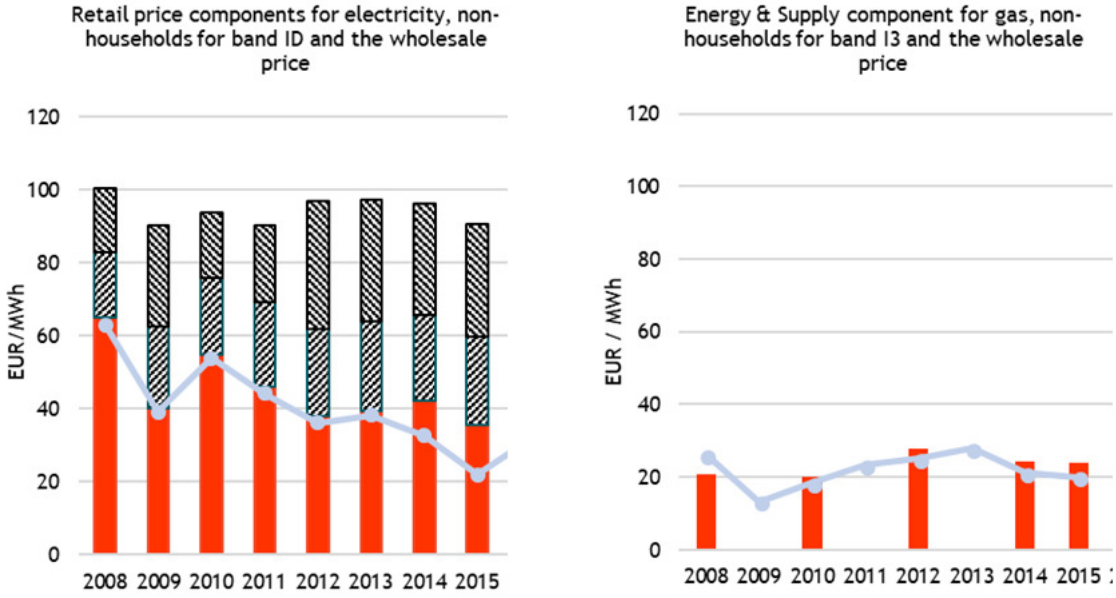


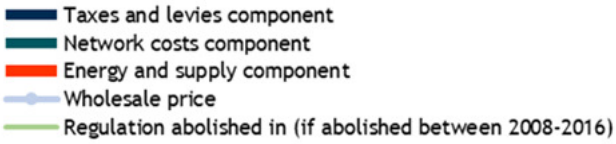

*Source:* CEER data

### 7.3.1 *Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. As in the case for households, we see there is a correlation for electricity between the wholesale electricity price and the energy component of the industry retail price. The correlation seems also present for gas, though the data available is limited.

Figure 89 Industry retail price components for middle bands (ID and I3) and wholesale prices in Denmark






*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[152] The figures below show the mark-ups along with the wholesale price. In both, electricity and gas markets, mark-ups tend to be low in the industry sector compared to households; though there was a considerable increase for electricity in 2014 and 2015. Electricity mark-ups were stable around 1 – 2 EUR MWh between 2008 and 2013 and then increased to 10 EUR/ MWh in 2014, decreasing again to around 5 EUR/MWh in 2016. For gas, they were negative in 2008 but remained between 2 and 4 EUR/MWh from 2010 to 2015.

**Figure 90 Mark-ups for Denmark, middle consumption bands (ID and I3)**


*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

[152] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

## 7.4 Tariff deficit in Denmark

**Denmark had no tariff deficit between 2008 and 2016.**

# 8 Factsheet: Estonia

This factsheet presents the findings for Estonia for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 8.1 Household Price Regulation in Estonia

**Estonia phased out energy price regulation for electricity in households starting from 2013, and phased out price regulation for gas before 2008.**

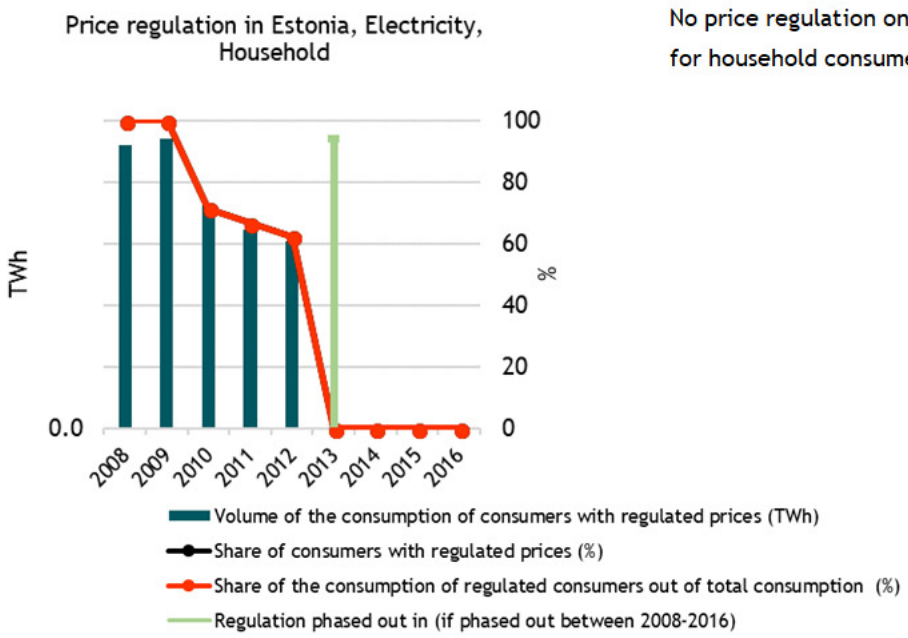
Arising from Directive 2009/72/EC and Regulation (EC) No 714/2009 and by virtue of the Electricity Market Act (EMA), the Estonian Competition Authority (ECA) acts as the National Energy Regulator in the country. Prior to 1998 the end-user tariffs were fixed by governmental decree. The EMA of 1998 abolished the fixed tariffs and introduced price regulation by the ECA instead. From 2003 to 2010 end costumers were obliged to buy electricity from a distribution network operator under the Public Service Obligation (PSO).

In 2010, Estonia introduced amendments to the EMA under which eligible customers (eligibility threshold: 2 GWh/year) were encouraged to buy electricity based on market conditions[153]. By the end of 2012 all earlier electricity contracts were invalidated in Estonia and since January 1st, 2013 Estonia has abolished all price regulation on energy generation and supply. Thus, **currently the country does not regulate end-prices in either the electricity or gas markets.** All customers, including households, purchase electricity on the free market. In practical terms this means that consumers are free to choose a suitable electricity seller irrespective of the network operator with whom the customer has signed a contract[154]. PSO is available for small customers (with connections lower than 63A) however, in reality PSO tariffs are usually more expensive compered to market prices[155]. In the case that a customer does not sign a contract with a supplier, the customer is automatically assigned to PSO.

[153] "Price regulation in Estonian power sector", Märt Ots, Estonian Competition Authority, Budapest, 2017
[154] "EU energy markets in 2014", EC
[155] "Price regulation in Estonian power sector", Märt Ots, Estonian Competition Authority, Budapest, 2017

The Natural Gas Act does not grant the Estonian Competition Authority with powers pursuant to Article 41(4)(b) of Directive 2009/73/EC[156] however, the ECA is able to apply provisions related to the Competition Act. The Estonian gas market is supplied, almost entirely, by one non-EU supplier, which prevent the normal functioning of both wholesale and retail gas markets[157].

**Figure 91 Household price regulation in Estonia from 2008 to 2016**




*Source:* CEER data

Figure 1 shows that in 2008 and 2009 all consumers purchased electricity at a price that was regulated. After introducing amendments to the EMA in 2010, this number decreased to between 70 and 60 percent between 2010 and 2012. In 2013 all price regulation was abolished. The gas retail market in Estonia has not been regulated during the time-period of interest.

Estonia has no social tariffs according to the CEER data.

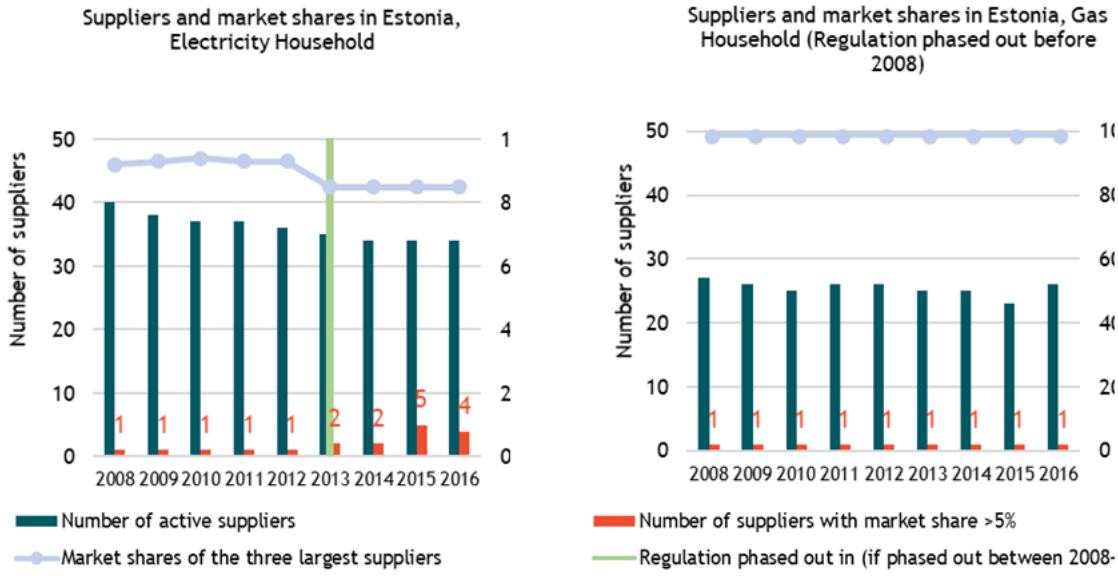
### *8.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers have had between 80 and 90 percent of market shares consistently over the last years. From 2008 to 2012 the sole electricity supplier with a market share larger than 5 percent was Eesti Energia AS. In 2012 the

[156] This Directive states that MS shall grant regulatory authorities the power to carry out investigations into the functioning of the gas market.
[157] "Electricity and Gas Markets in Estonia" report, 2017

company owned 82.9% of electricity sales the company, and the second highest percentage of shares was of Elektrum Eesti AS, with 13% of electricity market sales[158]. In the gas retail market the main enterprise is AS Eesti Gaas, which constitutes the sole company with a market share of over 5 percent[159]. Based on the information in Figure 2, it is possible to observe a small decrease in the number of electricity suppliers (including network undertakings) after abolishing price regulations 2013. In contrast, in the gas retail market the number of suppliers has remained relatively steady between 2008 and 2016.

**Figure 92: Number of suppliers and market shares in Estonia**




*Source:* CEER data and the Estonian Competition Authority

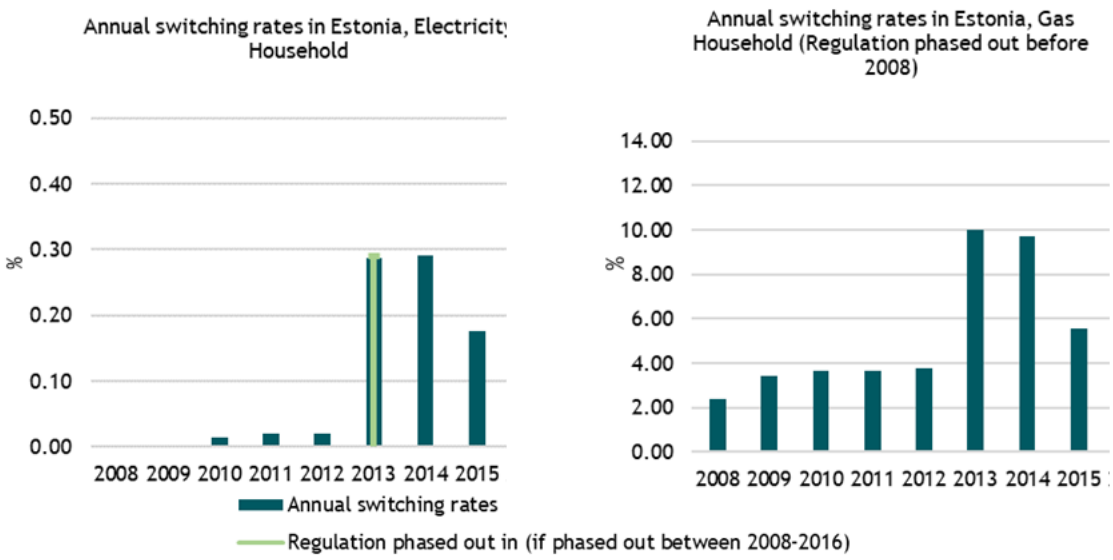
## Consumer engagement and expenditures on energy

Based on the 2014 EU energy markets report, the overall score for the retail gas market in Estonia was the fourth highest in the EU, and the customer satisfaction score the fifth highest. However, switching rates[160] in the Estonian retail gas market are very low. Figure 3 shows that there has been an increase in annual switching rates between 2012 and 2013. This coincides with the final phase out of regulated electricity prices for households. It is likely that the deregulation of prices in the energy retail market brought about an increase in switching rates in both markets.

In contrast to the gas retail market, the performance of the electricity retail market scores below EU average. As discussed above, the switching rates, have substantially increased after the abolishment of price regulation in 2013.

[158] "EU Energy Markets in 2014" EC
[159] "EU Energy Markets in 2014" EC
[160] Switching is defined as the voluntary action by which a customer changes his supplier

**Figure 93 Annual switching rates for households in Estonia**




*Note that the switching rate is per number of eligible meter points and eligible volumes*

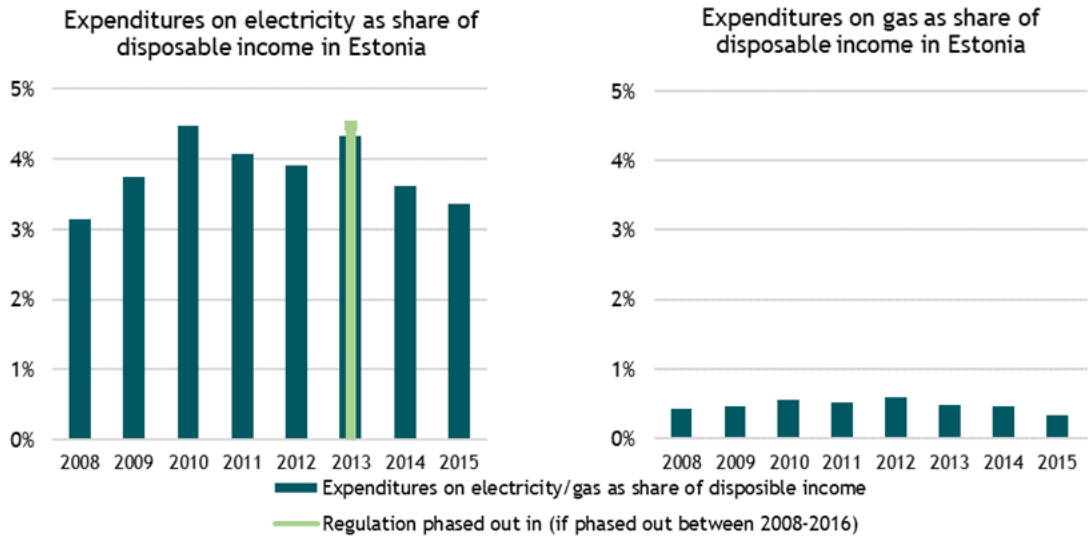
*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[161] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[162] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Estonia. Figure 4 shows that electricity bill constituted between 3 and 4.5 percent of the total disposable income between 2008 and 2016. There is a downward trend in electricity pricing after 2013. The expenditure on gas represents a lower percentage of the disposable income share but follows a similar trend to that of electricity. No significant impact of price deregulation on the affordability of the energy bill can be derived from the figures.

[161] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[162] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 94: Expenditures on gas and electricity as share of disposable income for households in Estonia (for middle consumption bands DC and D2) using PPS prices[163]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

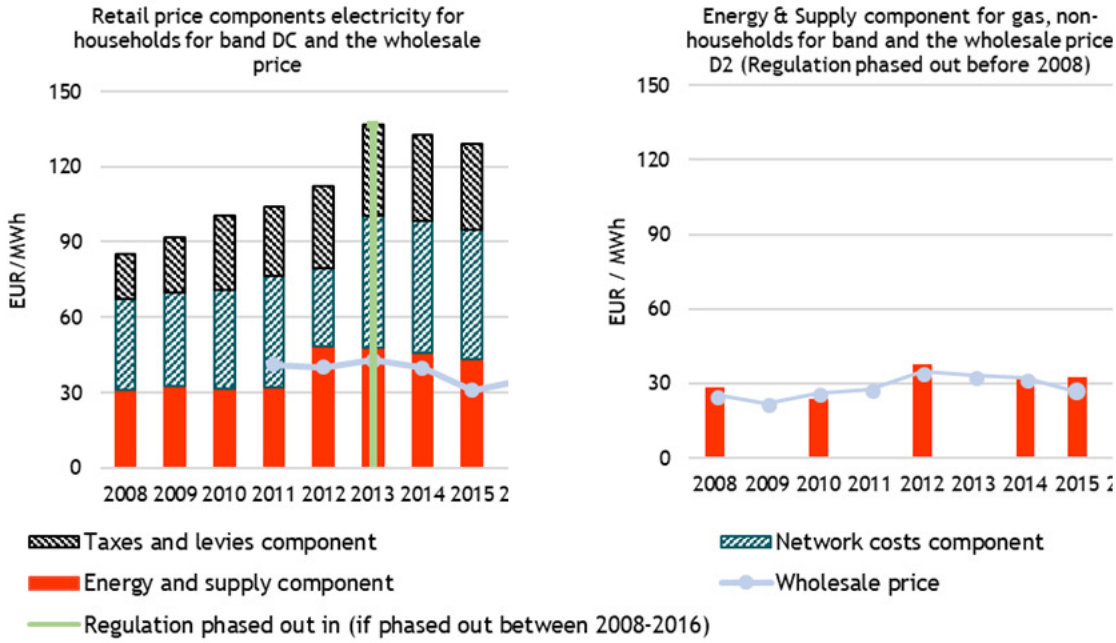
*Source:* Own calculations[164] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. For the electricity market the energy and supply component of the retail price has remained fairly steady from 2008 to 2016 with slight increase between 2011 and 2012. In contrast network costs increased substantially in 2013 after the reforms to the reforms of the Electricity Market Act. From 2013 onwards the energy and supply component represents about one third of the final retail price. The energy and supply component for gas, loosely follows trend of wholesale gas price.

[163] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[164] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 95 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Estonia**



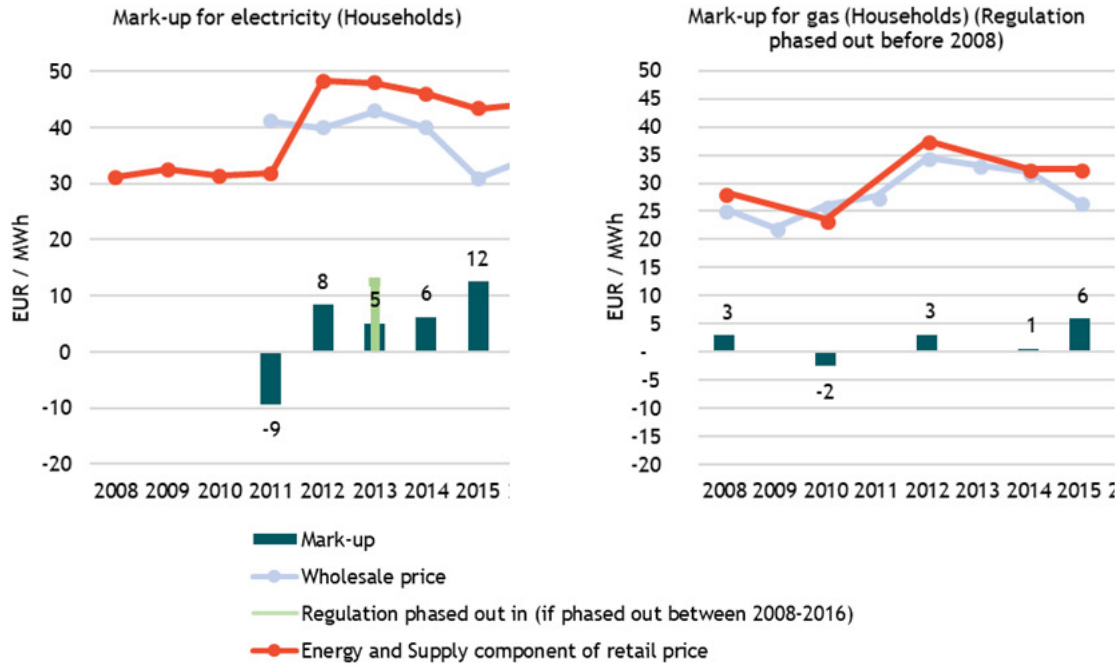

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[165] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[166] The figures below show the mark-ups along with the wholesale price. In 2011, when price regulation was still in place, a negative mark-up of minus 9 was observed for the electricity market. The mark-up doubled between 2014 and 2015, subsequently falling slightly. As wholesale prices decreased in 2015 this mark-up increase did not lead to higher retail prices. Since 2012 the energy and supply component of the retail price has been higher than the wholesale price. As in the electricity market, the highest mark-up for gas was observed in 2015. A slightly negative mark-up was calculated for the year 2010. No clear trends can be discerned in the mark-ups for either the electricity or gas markets between 2008 and 2016, which might also be due to missing data. On the other hand there is a strong co-movement between retail and wholesale prices after the phase out of price regulation, both for electricity and gas.

[165] Eurostat has data available on gas prices; however not for the energy and supply component.
[166] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 96 Mark-ups for Estonia, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

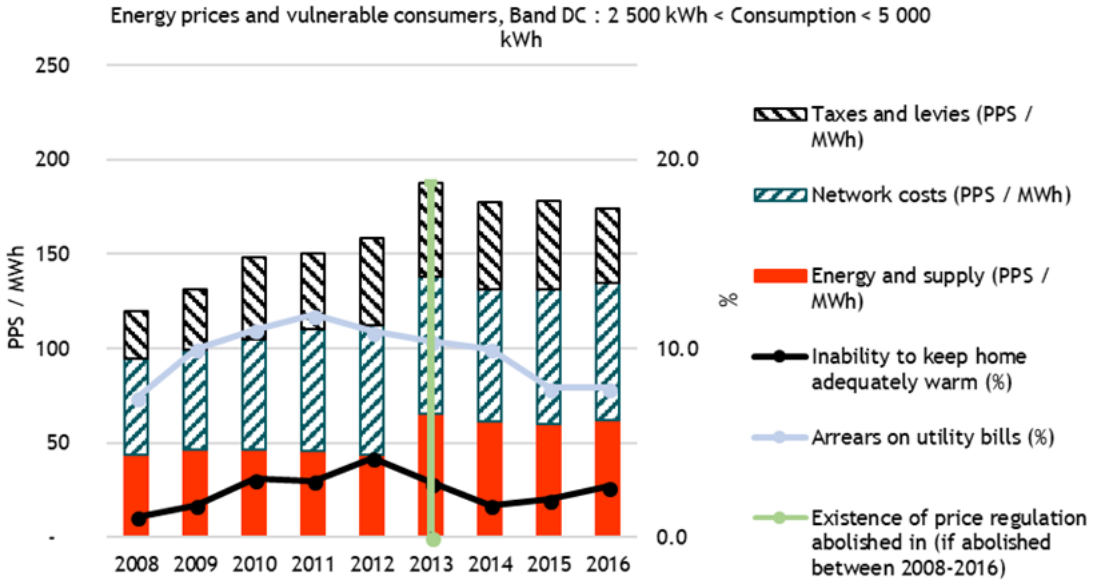
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### *8.1.2 Energy poverty*

Climate conditions in Estonia require household heating during a large part of the year. Energy poverty in Estonia is understood as the ability to keep one's home adequately warm. It has been reported that the 20 percent of the poorest households in Estonia spend 10.7% of their income on domestic energy services (at 2012 level)[167].The consumers in Estonia which are potentially suffering from energy poverty decreased since the phase out of price regulation for electricity in 2012, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm, despite slight increases in these indicators since 2014.

[167] "Energy Union Factsheet Estonia", Commission Staff Working Document, EC, SWD(2017) 391 final

**Figure 97 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Estonia**




*Source:* Eurostat

### *8.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

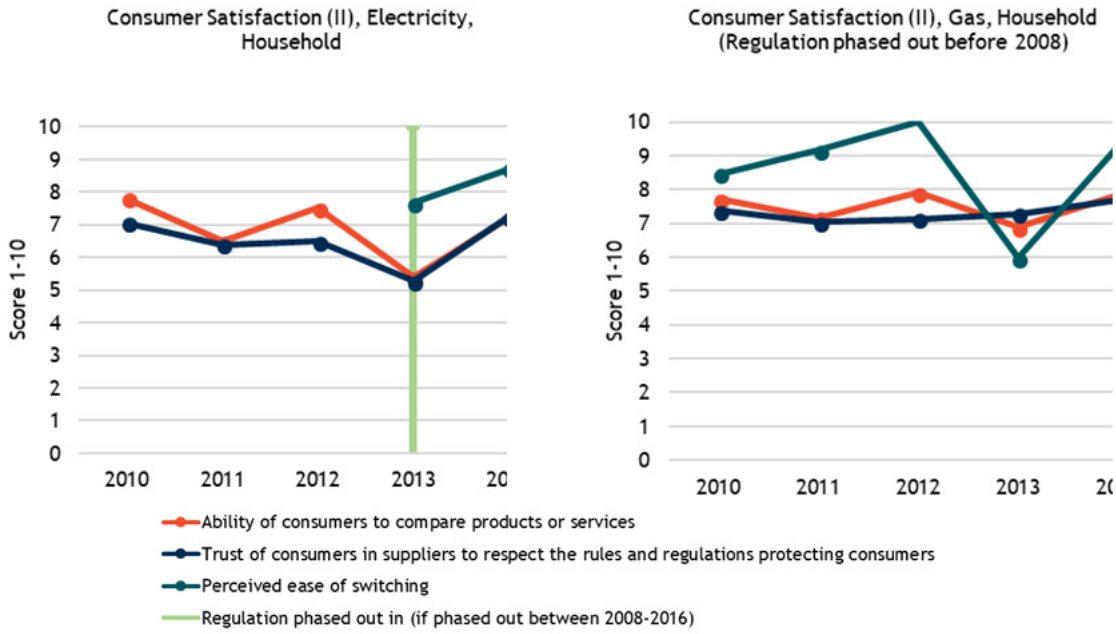
#### Consumer satisfaction

Based on the data from Figure 8, 2015 has been a year in which client satisfaction in both the electricity and gas household retail markets has been highest. In addition, it is possible to observe a steady and sharp decline in the percentage of clients who have experience at least one problem in relation to their electricity and gas provisions. These figures are encouraging as they suggest an overall improvements in the quality of services provided over time. Figure 9, shows that in 2013 there was a drop in customer's ability to compare products or services in the electricity household retail market however, by 2015 there was a complete recovery in the score for this indicator. This information suggests that although the deregulation of electricity retail pricing in 2013 required some new learning, customers were quick to adapt to the changes. This same trend is observed in relation to the trust of consumers in suppliers to respect the rules and regulations protecting them. No data is available for perceived ease of switching in the electricity market before 2013. Between 2013 and 2015 this perception has increased favourably. In the gas retail market there was a large decrease in the perceived ease of switching between 2012 and 2013. By 2015 the perceived ease of switching had increased to almost 2012 levels. No large fluctuations are observed between 2010 and 2015 for neither the customer's ability to compare products nor the trust of consumers in suppliers to respect the rules and regulations protecting them.

**Figure 98 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Estonia for households**


*Source:* EC – DG Justice[168]

**Figure 99 Ability of consumers to compare products or services[169], trust of consumers in suppliers[170] and perceived ease of switching[171] in Estonia**




*Source:* EC – DG Justice

[168] Note that from 2013 onwards, the survey was carried out every other year.
[169] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[170] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[171] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. Table 1 suggests that household customers in Estonia have many options in relation to dual-offers, green offers as well as options providing non-price-financial benefits and non-financial benefits. Thus the electricity retail market is diversified in terms of options. In addition, Figure 11 shows that the types of offers in the electricity market include fixed, variable and spot-based options.

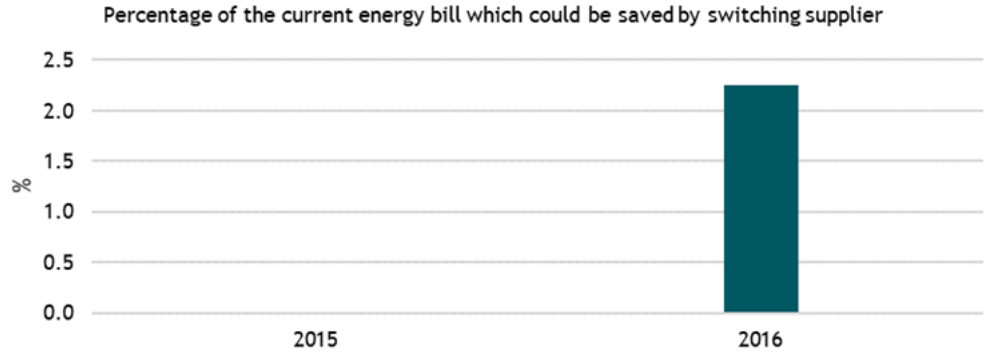
**Table 8-1 Consumer choice in Estonia (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

**Figure 100 Percentage of the current electricity bill which could be saved by switching supplier in Estonia**



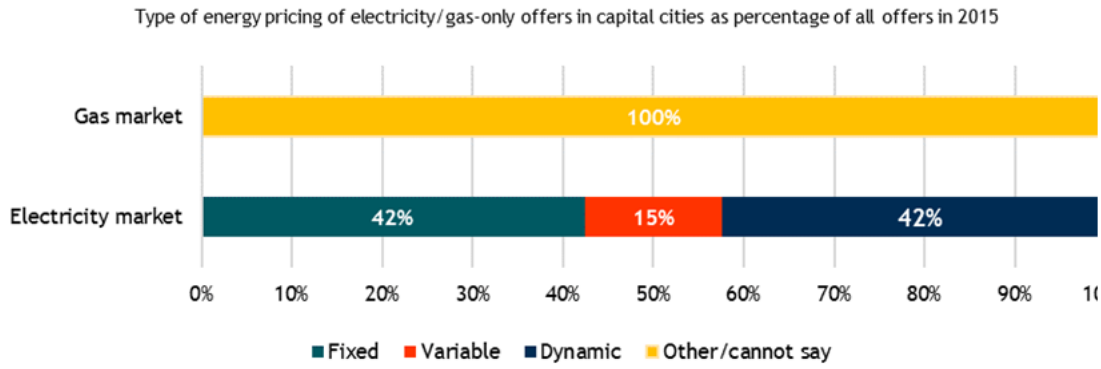

*Note: Savings may include one-time benefits such as sign-in bonuses*

*In 2015, the value was zero (i.e. there is no missing data)*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas.

**Figure 101 Type of offers for households in Estonia**



*Note: Dynamic price contracts are a type of variable contract but presented separately.*
*Source:* ACER/CEER (2015)

## 8.2 Non-Household Price Regulation in Estonia

**Estonia phased out energy price regulation for non-households starting from 2014 for electricity and before 2008 for gas.**

Price deregulation in the electricity retail market was also applicable to non-household consumers. As in the case of household consumers there has been no price regulation for non-household consumers in the years from 2008 to 2016. In agreement with the Natural Gas Act the selling price of electricity to non-household customers is not subject to regulation.

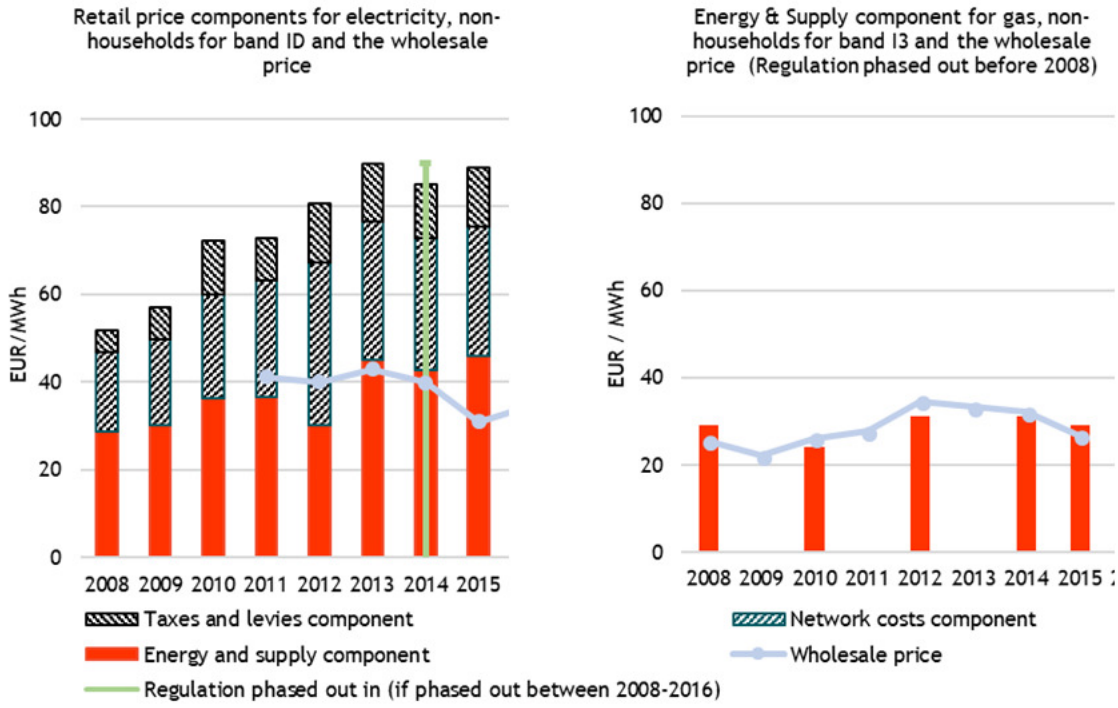
Figure 102 Non-household price regulation in Estonia from 2008 to 2016


*Source:* CEER data

### 8.2.1 *Selected aspects of competition (mark-ups)*

The alignment between the energy component of industry retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Figure 13 shows that from 2013 onwards the energy and supply component of the electricity retail price for middle band users was almost equal (2013) or higher than the wholesale price. The biggest difference between the two prices was observed in 2015. In contrast during 2011 and 2012 the opposite trend was true; wholesale prices were higher than the energy and supply component of the retail electricity price. In the gas market, wholesale price was lower than the energy and supply component of the retail price in 2008 and 2015. No data on the gas retail price for non-household consumers is available for the years 2009, 2011 and 2013.

**Figure 103 Industry retail price components for middle bands (ID and I3) and wholesale prices in Estonia**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

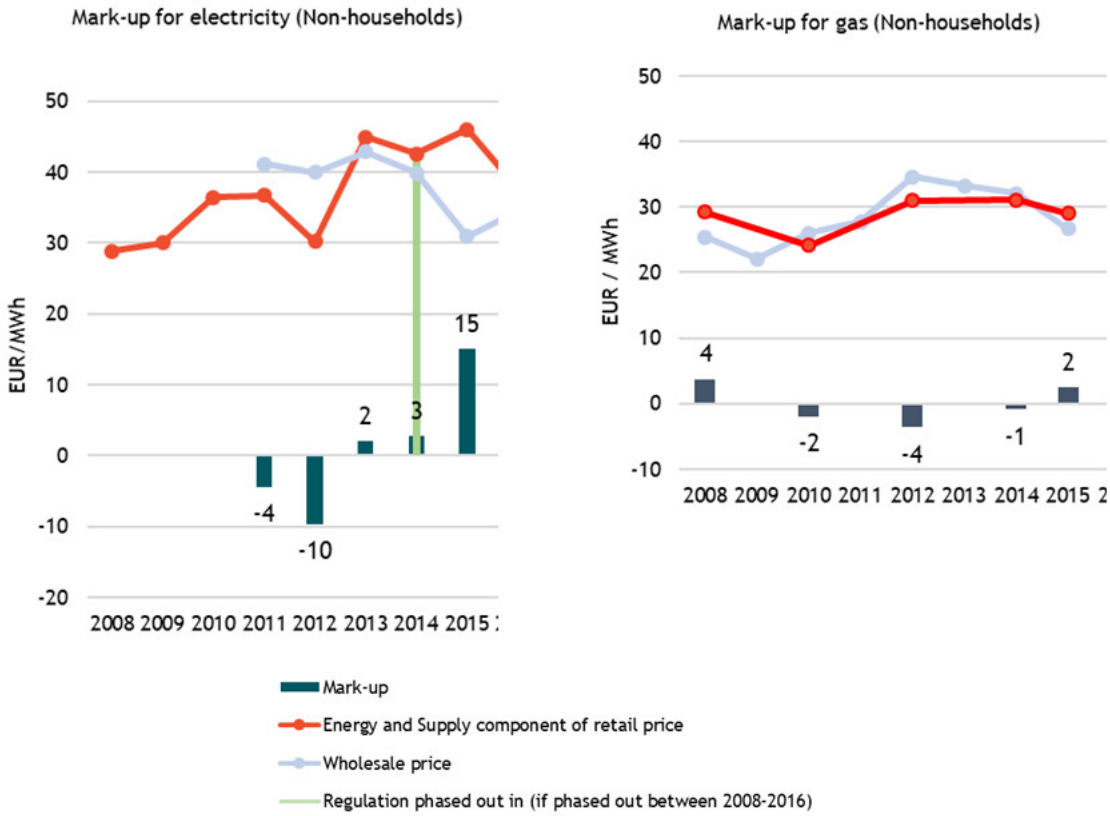
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[172] The figure below show the mark-ups along with the wholesale price.

Figure 14 shows negative mark ups in the electricity retail market for non-household consumers in the years preceding deregulation (2011 and 2012). In 2015 there was a large positive mark up, which decreased subsequently. The gas retail market shows positive mark ups in the years 2008 and 2015 and negative ones in 2010, 2012 and 2014.

[172] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 104 Mark-ups for Estonia, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 8.3 Tariff deficit in Estonia

**Estonia had no tariff deficit between 2008 and 2016.**

# 9 Factsheet: Greece

This factsheet presents the findings for Greece for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

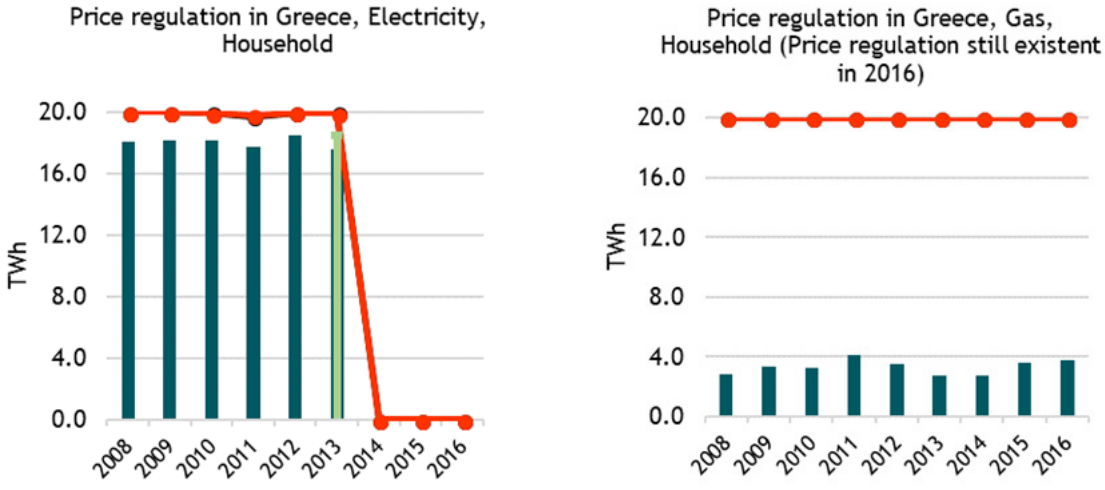
## 9.1 Household Price Regulation in Greece

**Greece phased out household energy price regulation starting from 2013 for electricity but still has price regulation for gas. While around 10% of consumers receive social tariffs, these are not considered as price regulation as there is no maximum price for suppliers (subsidies are provided instead).**

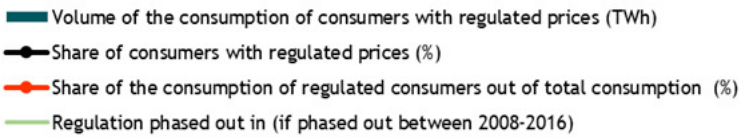
The electricity market in Greece was first regulated in 1999 with the legislation "2773/1999 Liberalisation of the electricity market - Regulation of energy policy issues and other provisions"[173]. The gas market in Greece was already regulated in 1995 with the legislation "2364/1995 Constitution of the energy control and design body. Both pieces of legislation were further updated following the 2nd and 3rd EU energy package with the legislations "3428/2005 Liberalisation of the natural gas market"[174] and "4001/2011 For Electricity and Natural Gas Energy, for Hydrocarbon Research, Production and Networks, and other regulations"[175]. This led to establishment of a new TSO (ADMIE SA), initially a 100% subsidiary of the stated owned Public Power Corporation (PPC) but since 2017 fully separate. In the gas sector, the TSO of the national grid is DESFA SA.
The Greek Regulatory Authority for Energy (RAE) - which was established in July 2000 – introduced in 2013 a decoupled entry-exit tariff model in the gas sector[176]. Unbundling

Greece applied end-user price regulation for electricity in the entire household sector until 1st of July 2013 when prices became fully liberalised. On the other hand, Greece continued applying end-user price regulation for gas in the household sector for the entire period examined.
In 2016 (by Law 4425/2016), the Greek wholesale market was reorganised to "the Target Model" and as such an intra-day and forward electricity market, a balancing market and regional markets were established. For gas, a transition period – from geographically defined areas of operation and of exclusivity supply rights to the free operation of retail suppliers - should finish by the end of 2018.

**Figure 105 Household price regulation in Greece from 2008 to 2016**



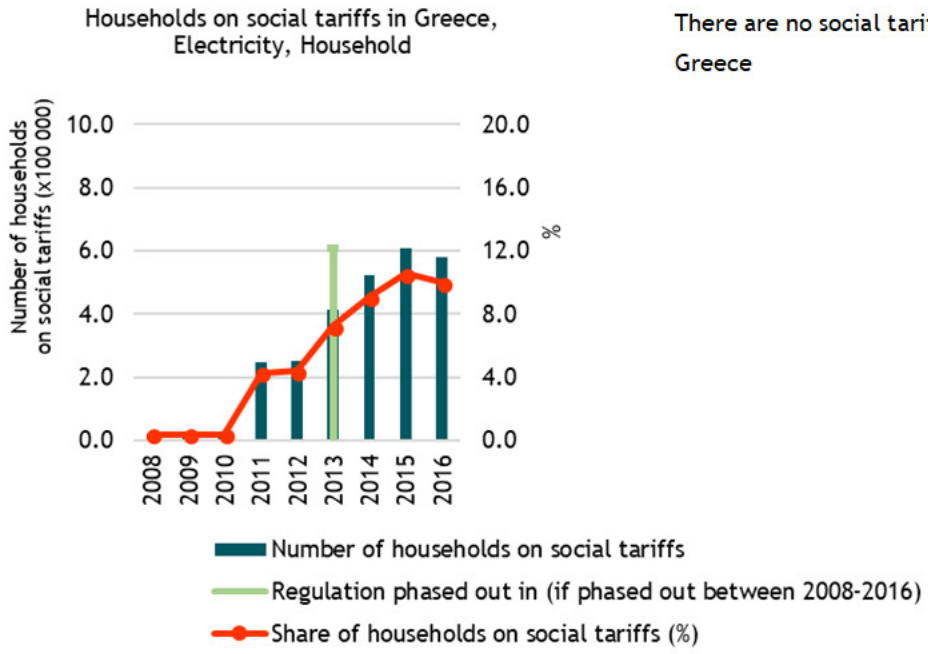

[173] http://www.ypeka.gr/LinkClick.aspx?fileticket=VtweJAT%2FbGU%3D&tabid=278&language=
[174] http://www.depa.gr/uploads/files/laws/N_3428_2005__ΦΕΚ%20A_313.pdf
[175] http://www.depa.gr/uploads/files/laws/N_4001_2011__ΦΕΚ%20A_179.pdf
[176] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf




*Source:* CEER data

The social tariffs remained regulated after the 1st of July 2013. Social residential tariffs were applied to five categories of vulnerable customers (families with low income, families with 3 children, long and short - term unemployed and people living on medical support[177]) since 1st of January 2011. Since first implementation in 2011, the share of households with residential social tariff was continuously increasing until 2016. The reason behind this substantial increase was the deterioration of the financial status of Greeks due to the continuous economic crisis. A total of 10% of all residential customers benefitted from a social tariff in 2016. Further, the database shows no social tariffs for gas. Social charges also cover the difference in the production cost between the mainland of the country and most islands. All Non-Interconnected Islands (NNIs) are supplied by autonomous electrical systems. The measure of social tariffs is financed by the rest of consumers through the Public Utility Charges (Υπηρεσίες Κοινής Ωφέλειας ΥΚΩ).[178]

**Figure 106 Household social tariffs in Greece**




*Source:* CEER data

### 9.1.1 *Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers had almost 100% of the market consistently over the last years. In the electricity market, the Public Power Corporation

[177] https://www.ceer.eu/documents/104400/5988265/C17_NR_Greece-EN.pdf/8d93e7c7-7533-7739-0ff2-0815975c0b20
[178] https://www.dei.gr/el/dimosies-diavouleuseis/nomiko-kathestws-gia-tis-xrewseis-upiresiwn-koinis-wfeleias-ukw

(PPC) is dominating the market with more than a 90% share of the number of clients for the same period. In the beginning, an increase in the number of active suppliers was observed until 2010, which then started decreasing, reaching the lowest value (ten active suppliers) in 2015. Under the third financial adjustment programme signed in August 2015 between Greece and the Troika[179], it was agreed that the share of the PPC in the electricity market should drop to maximum 50% (from more than 90%).[180] That resulted in an increase in the number of electricity suppliers. At the same time, there has been no change in the number of active gas suppliers.

**Figure 107: Number of suppliers and market shares in Greece**


*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards.*

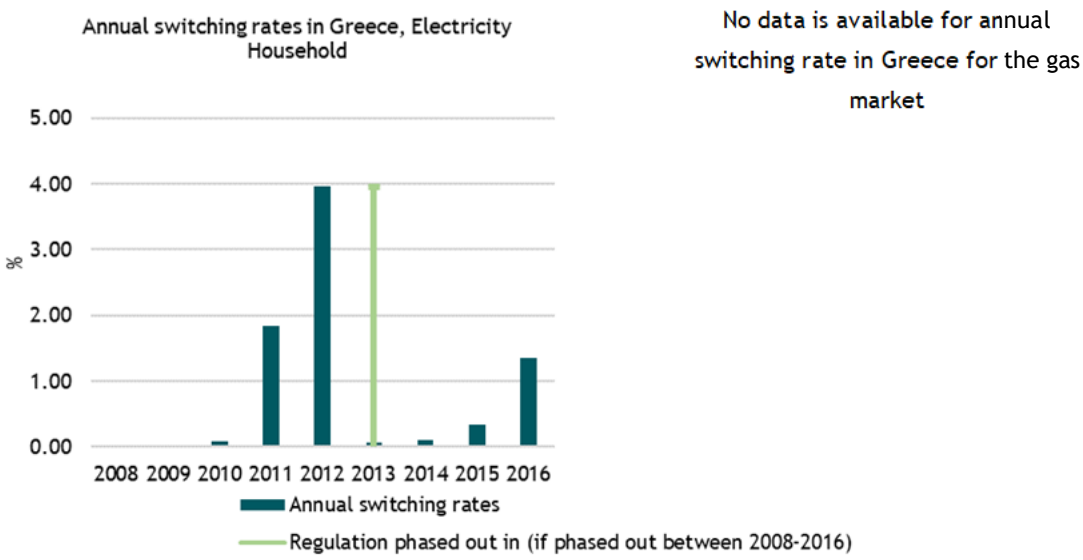
*Source:* CEER data

## Consumer engagement and expenditures on energy

The figure below shows the annual switching[181] rate in households for electricity, while there is no data available for the gas market. The increase observed in 2011 and 2012 was caused by an economical scandal in which two electricity providers were involved which had to cease their operation, forcing all their costumers to change provider.[182] In 2012, in total four suppliers exited the market.[183] That scandal had a negative effect on emerging electricity providers, as costumers were reluctant to risk changing to a new provider. As mentioned earlier, the share of the PPC in the electricity market must drop to maximum 50% (from more than 90%)[184], which resulted in a slight increase of consumer switching electricity supplier in 2015 and 2016.

[179] Troika consists of the European Commission (EC), the European Central Bank (ECB) and the International Monetary Fund (IMF).
[180] https://energypress.gr/news/mahairi-50-sto-meridio-agoras-tis-dei-vazei-neo-mnimonio-diavaste-ta-pliri-keimena-analytika
[181] Switching is defined as the voluntary action by which a customer changes his supplier
[182] https://energypress.gr/news/energa-hellas-power-o-lavyrinthos-ton-offshore-poy-ekryve-256-ekat
[183] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[184] https://energypress.gr/news/mahairi-50-sto-meridio-agoras-tis-dei-vazei-neo-mnimonio-diavaste-ta-pliri-keimena-analytika

**Figure 108 Annual switching rates for households in Greece**




*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[185] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[186] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Greece. Due to the three memoranda signed between Greece and the Troika in 2010, 2012 and 2015, a significant reduction in the income of the citizens of Greece was observed. In that period, the GDP per capita was reduced by 45%.[187] At the same time, electricity prices for both industrial and domestic consumers increased significantly (29% and 37% resp.) in 2012, due to the introduction of nonrecoverable tax rates.[188] Interesting to see is that was an increase in this indicator even before Greece abolished price regulation. The decrease observed on the expenditures on gas as a share of disposable income in Greece in 2014 was a result of the agreement between DEPA and GAZPROM EXPORT to decrease the price of the imported natural gas by 15%.[189]

[185] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

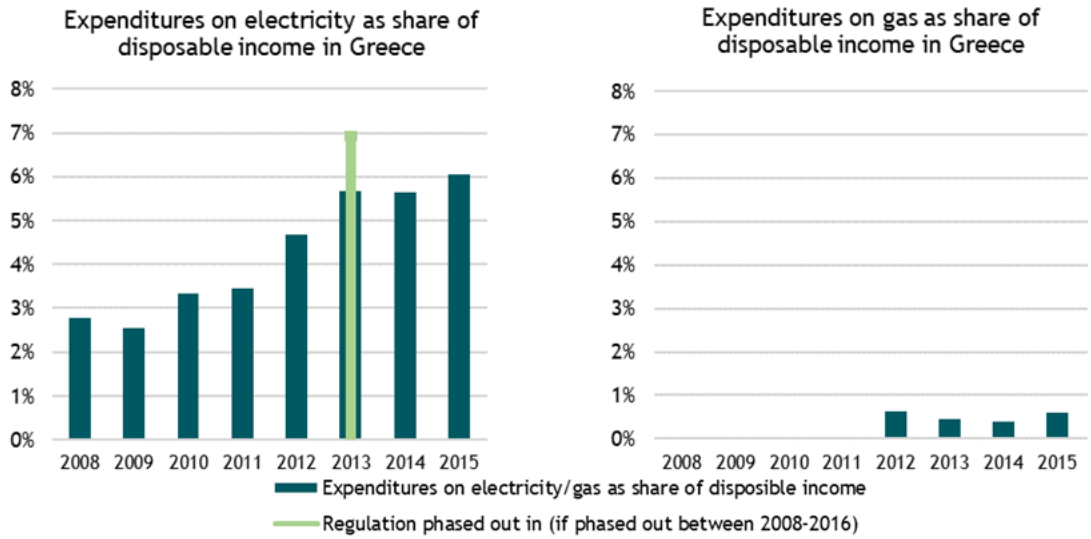
[186] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[187] https://data.worldbank.org/country/greece?view=chart

[188] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

[189] Ibid.

**Figure 109: Expenditures on gas and electricity as share of disposable income for households in Greece (for middle consumption bands DC and D2) using PPS prices[190]**




*No data is available prior to 2012 for the gas market*

*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

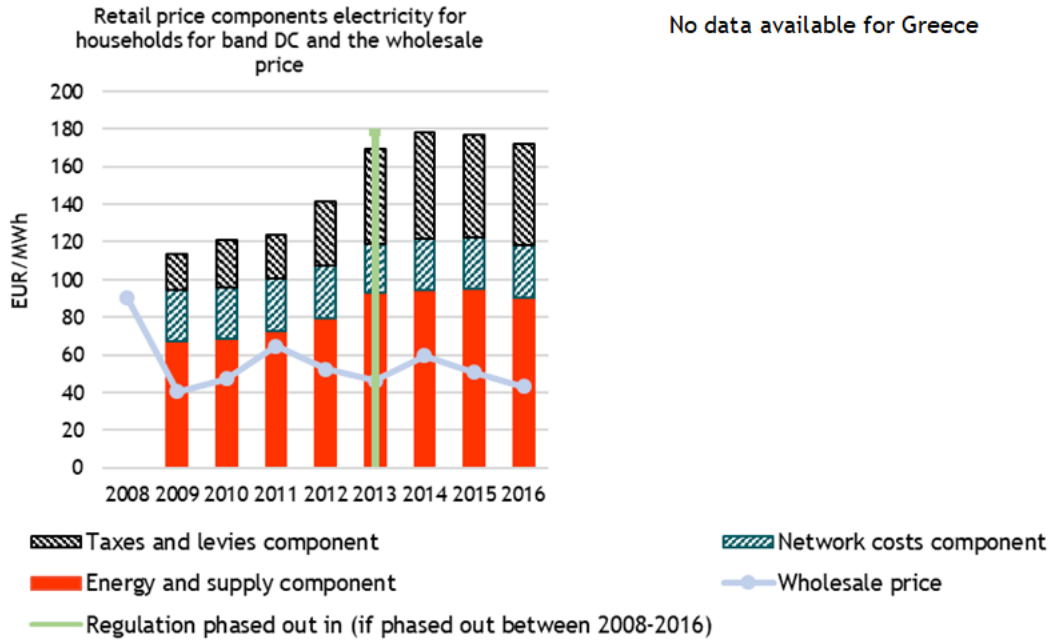
*Source:* Own calculations[191] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. When Greece abolished price regulation, there was an increase by 17% in the energy and supply component, which afterwards remained almost constant. Similarly, there was a 47% increase in the taxes and levies component in 2012, and another increase by 46% in the following year. There were no data available on retail prices for the gas market in Greece.

[190] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[191] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 110 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Greece**



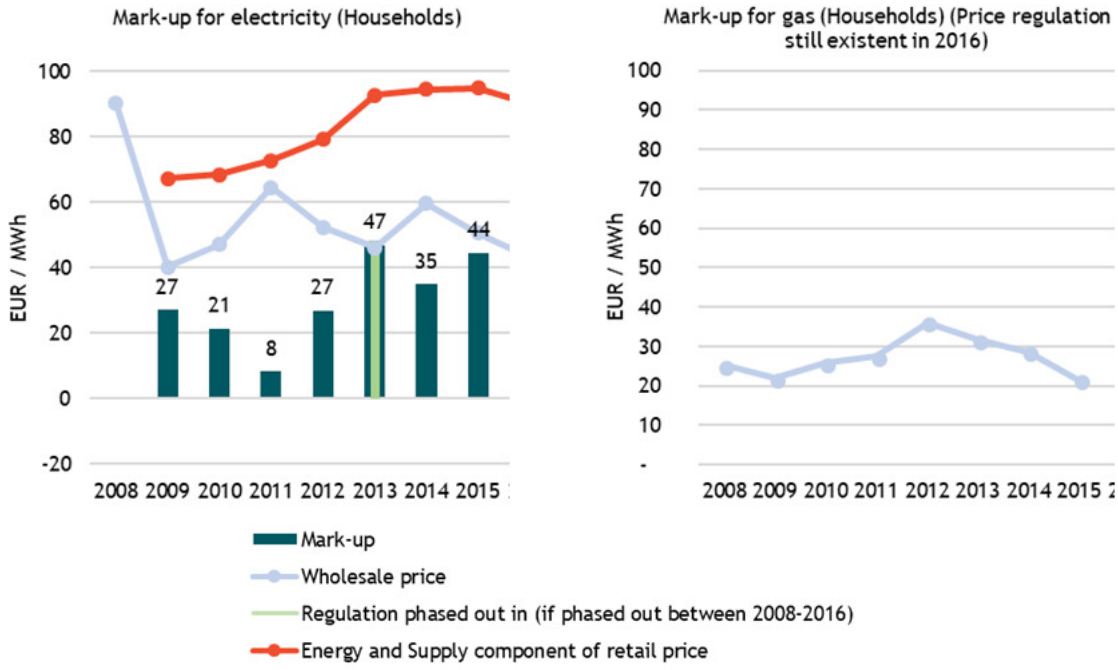

*No data is available on retail prices for the gas market for household consumers*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[192] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[193] The figures below show the mark-ups along with the wholesale price. In the beginning of the examined period (2009 – 2011) the mark-up for the households' electricity market was decreasing, while in the following years it was increased substantially.

[192] Eurostat has data available on gas prices; however not for the energy and supply component.
[193] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 111 Mark-ups for Greece, middle consumption bands (DC and D2)**




*No data is available on retail prices on the gas market for household consumers*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

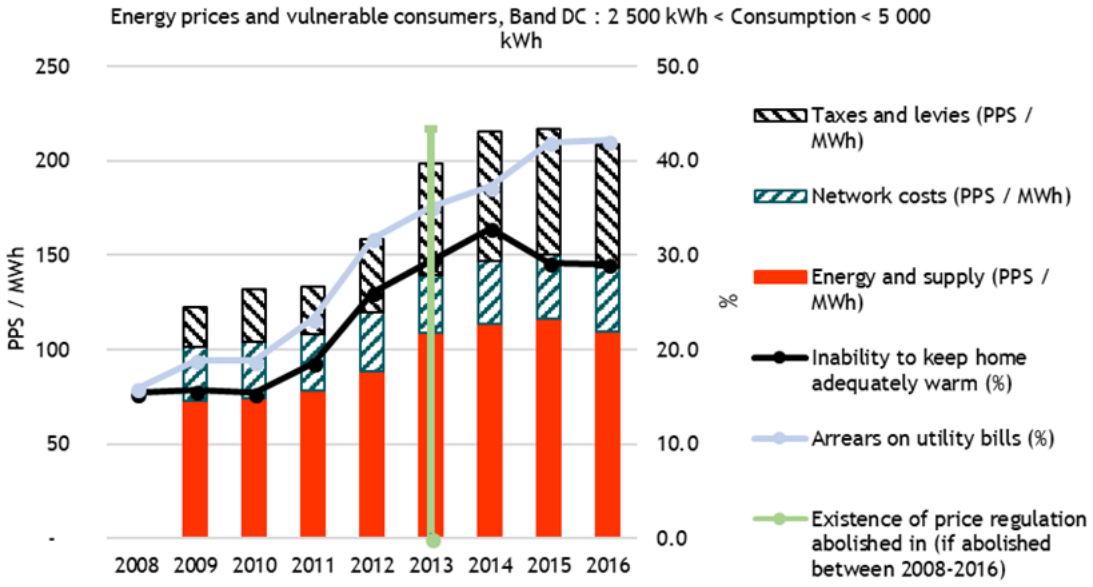
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### 9.1.2 Energy poverty

The consumers in Greece, who are potentially suffering from energy poverty, are increasing over time, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. At the same time, a significant increase in households who are unable to pay their electricity bill is observed. The amount of unpaid bills was estimated at €1.3 billion in 2014.[194] These two reasons have resulted in an increase of the households benefited by social tariffs in the same period, as shown in Figure 8. The high rate of arrears on utility bills was mainly caused by the continuous recession, but also in PPC has implemented a 15% reduction in electricity bills on those who pay on time, to incentivise their customers to pay their bills on time.[195] At the same time, the energy component in retail prices has increased in the last years even for those who have the lowest consumption, (i.e. Band DA) even though social tariffs in theory aim to reduce the burden of energy prices on the households.

**Figure 112 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Greece**

[194] http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf
[195] https://www.dei.gr/el/oikiakoi-pelates/xrisimes-plirofories-gia-to-logariasmo-sas/ekptwsi-15-kai-evnoikis-rythmisis-ton-ofeilon/ekptwsi-15-se-epaggelmaties-epixeiriseis-noikokuri




*Source:* Eurostat

It is important to note, that in Greece vulnerable consumers are considered families with low income, families with 3 children, long and short - term unemployed and people living on medical support.[196]

### 9.1.3 *Quality of services*

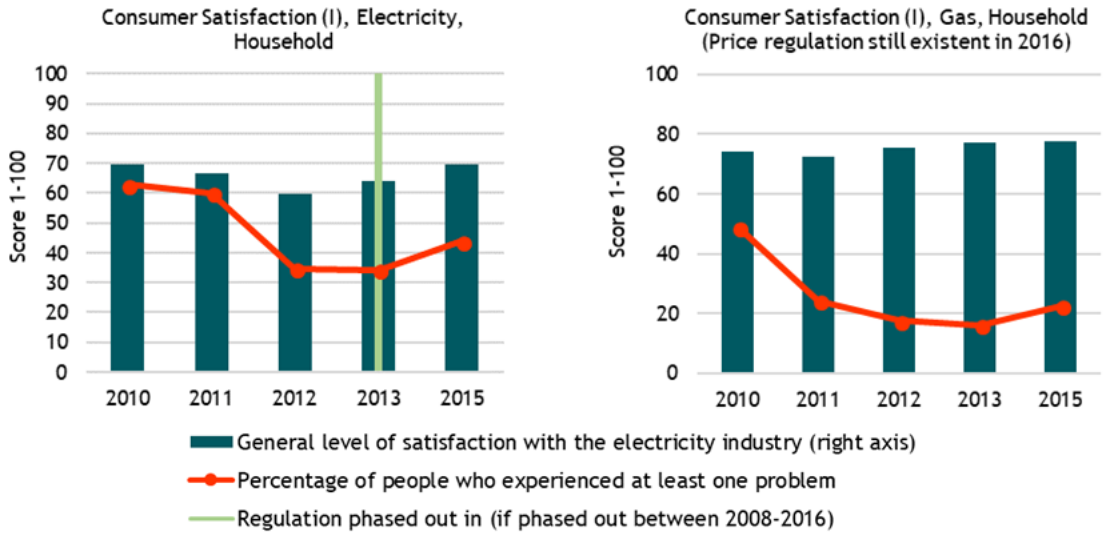
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The overall level of consumer satisfaction seems to be higher for gas than for electricity. It is interesting though, that in years when the number of consumers who experienced at least one solved problem, the percentage of satisfied consumers reduced (though the opposite would be expected). That was observed in both markets (from 2011 to 2012 in electricity market and 2010 to 2011 in gas market).

[196] https://www.ceer.eu/documents/104400/5988265/C17_NR_Greece-EN.pdf/8d93e7c7-7533-7739-0ff2-0815975c0b20

**Figure 113 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Greece for households**

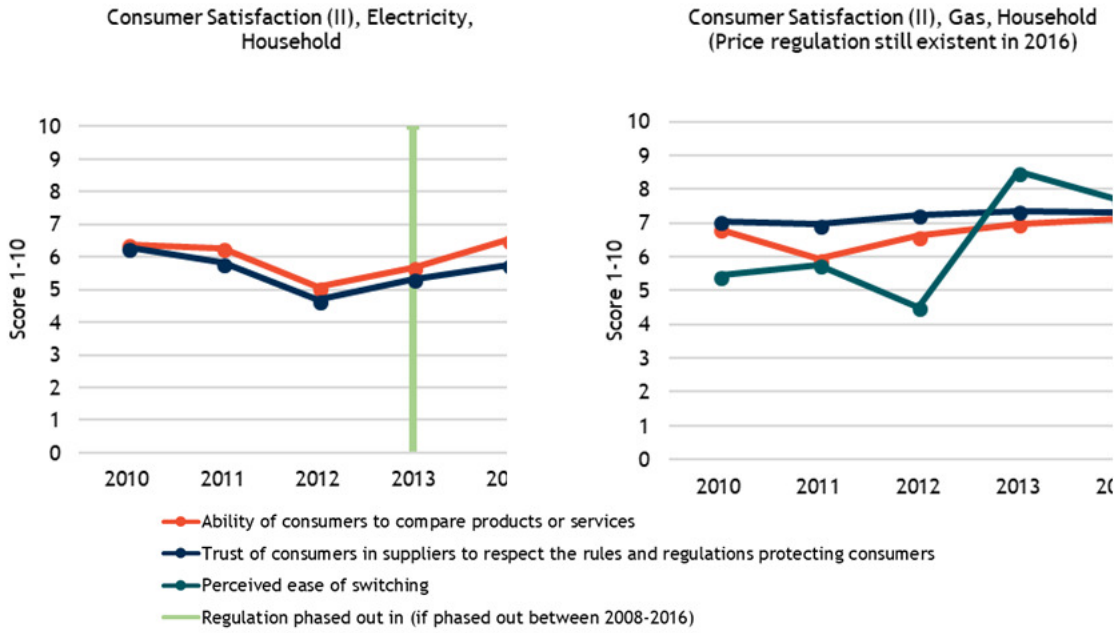



*Source:* EC – DG Justice[197]

The fall in the score of trust of consumers in electricity suppliers to respect the rules and regulations protecting consumers can be attributed to the economic scandal that was revealed in 2011.[198] In 2014, consumers' satisfaction for the electricity market in Greece was the 2nd lowest in the EU.[199] In contrast to that, the gas market in Greece was more than 4 points above the EU average (78.5 vs. 74.1), which corresponded to 6th highest position in EU.[200]

[197] Note that from 2013 onwards, the survey was carried out every other year.
[198] https://energypress.gr/news/energa-hellas-power-o-lavyrinthos-ton-offshore-poy-ekryve-256-ekat
[199] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[200] Ibid.

**Figure 114 Ability of consumers to compare products or services[201], trust of consumers in suppliers[202] and perceived ease of switching[203] in Greece**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice, indicating that Greek households' consumers do not have enough choice in some aspects of the electricity market (which could be an indication of an immature market).

**Table 9-1 Consumer choice in Greece (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | No |
| Certified green offers available in 2015 (CC04) | No |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

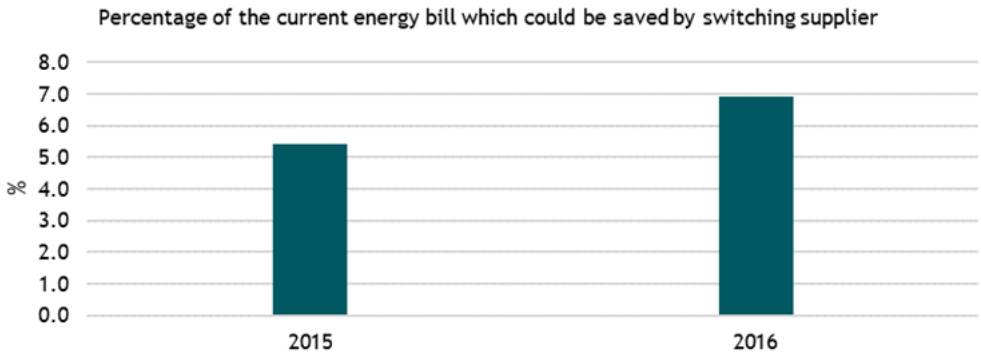
*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

As shown in the figure below, one can also see that switching may lead to savings (which were over 5% of the energy bill in 2015 and were increased to almost 7% in 2016).

[201] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[202] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[203] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

Figure 115 Percentage of the current energy bill which could be saved by switching supplier in Greece

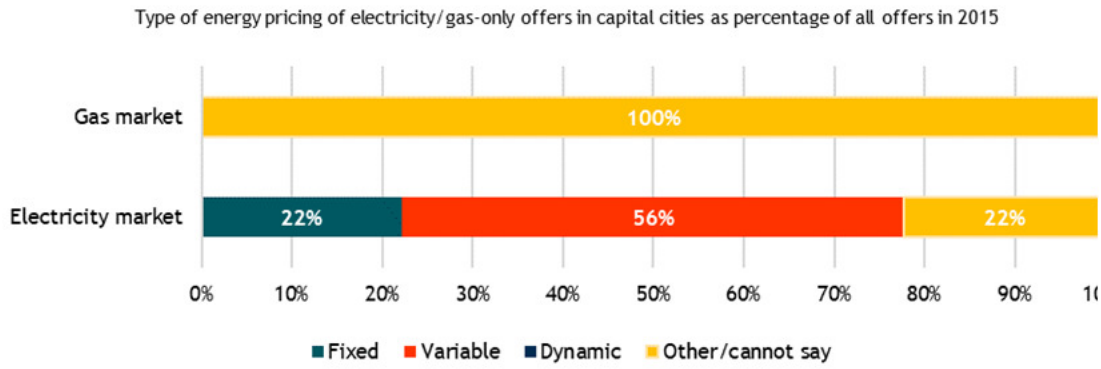



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The figure below shows the type of offers available for electricity, the majority of which have variable prices (56%), while 22% has a fixed price. There is no information available for the gas market.

Figure 116 Type of offers for households in Greece




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

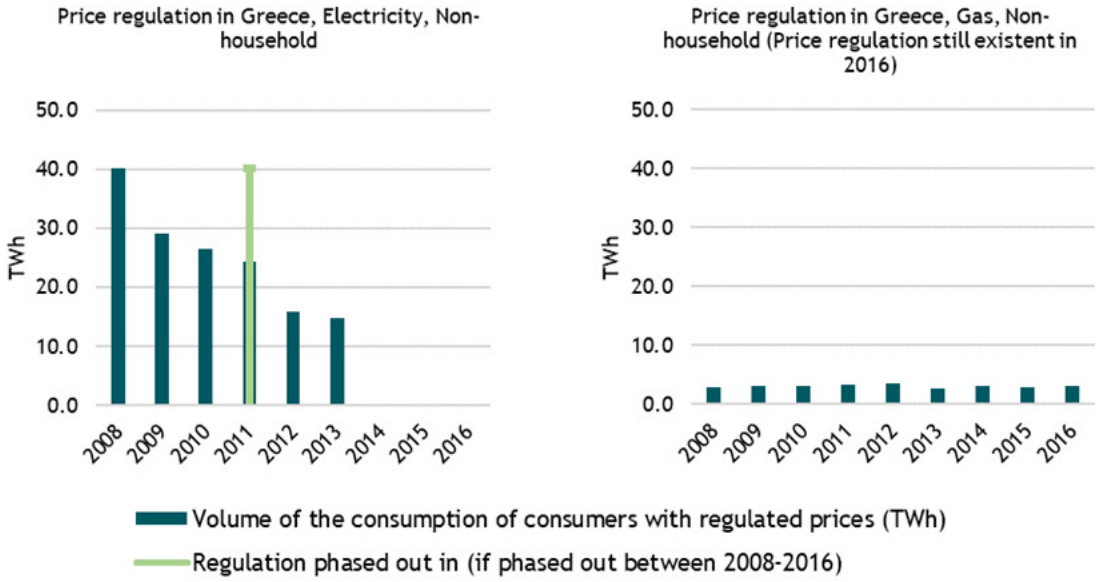
*Source:* ACER/CEER (2015)

## 9.2 Non-Household Price Regulation in Greece

**Greece phased out energy price regulation for non-households starting from 2011 for electricity, but continues to have price regulation for gas.**

Greece applied price regulation for the non-household electricity market until 2011. Until 2013, a continuous reduction of the electricity consumption under regulated prices was observed. On the other hand, in the gas market Greece was using price regulation until 2016 and therefore the gas consumption was almost constant for the examined period.

Figure 117 Non-household price regulation in Greece from 2008 to 2016

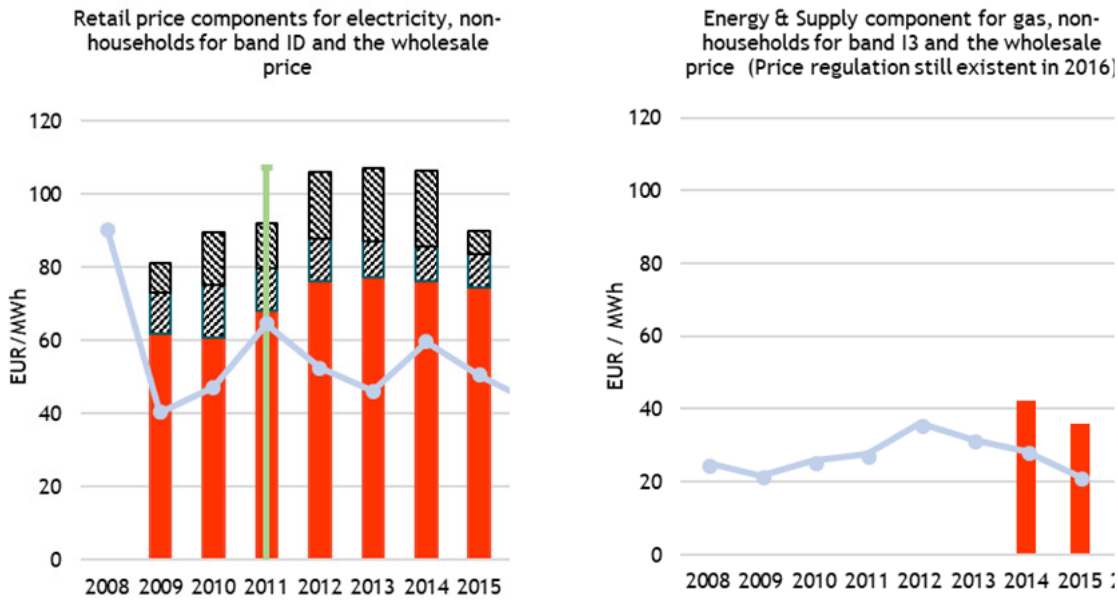



*Source:* CEER data

### 9.2.1 *Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. In the period 2009 to 2011 and 2014 to 2016 the retail and wholesale market followed the same trend. On the other hand, in the period 2011 to 2014 wholesale prices were decreasing until 2013 and then increased, while retail prices first increased in 2012, and then remained almost constant until 2014. No data were available for the Greek gas market.

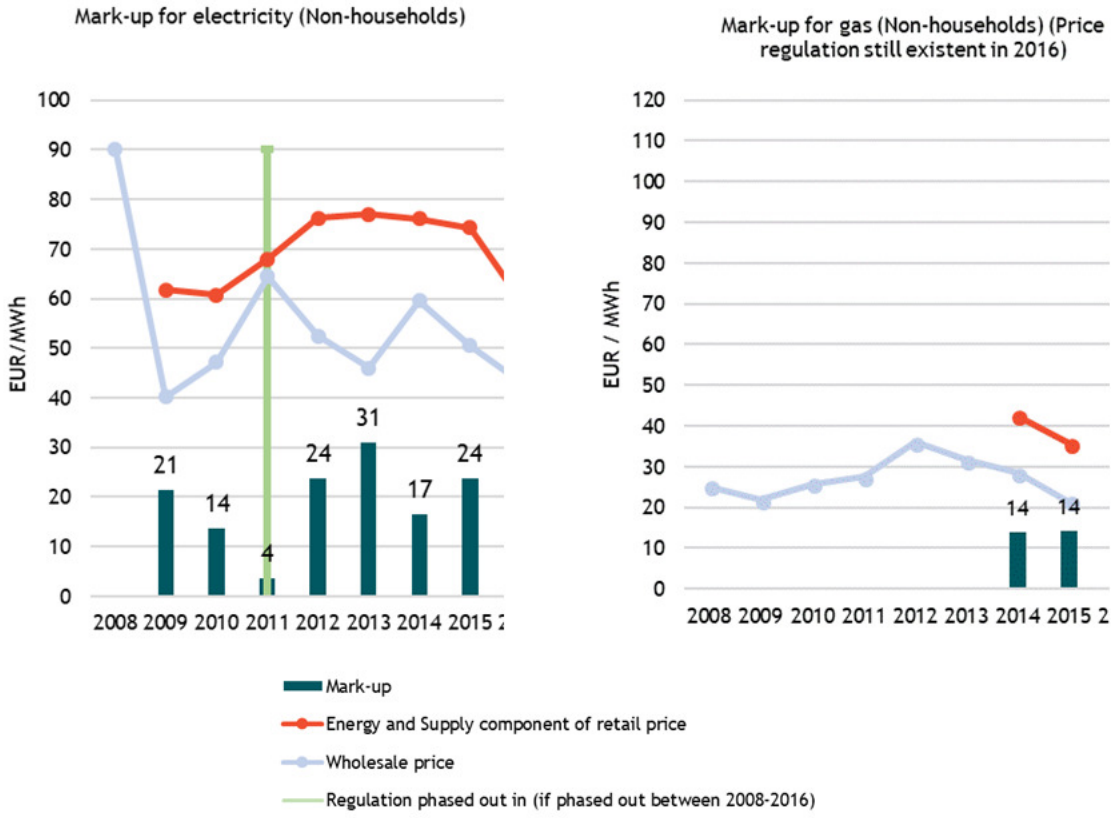
Figure 118 Industry retail price components for middle bands (ID and I3) and wholesale prices in Greece (ES, NC, TL, PG07)




*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[204] The figures below show the mark-ups along with the wholesale price. Current tariffs for low consumption band are below the energy cost. The difference is accumulated by the dominating supplier (PPC) and covered by the tariffs of commercial users and residential users with large consumption.[205]

**Figure 119 Mark-ups for Greece, middle consumption bands (ID and I3)**




*Note that data is not available for the gas market apart from 2014 and 2015.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

[204] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

[205] http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf

## 9.3 Tariff deficit in Greece

**Greece had a tariff deficit in 2014 in their special account for renewable energy. A suppliers' charge was introduced in 2016, resulting in an expected surplus of €256 million by end 2018 in the special account for RES.**

Greece faced a deficit in their special account for renewable energy (RES account), which was estimated at €700 million in early 2014.[206] The deficit was caused by the large investment in RES, especially in PVs which were subsidised in the form of feed-in-tariffs, which did not take into account the reduction of the cost of the technology.[207] Electricity bills include a RES levy, named Specific Fee for the Reduction of Gaseous Pollutant Emissions (Ειδικό Τέλος της Μείωσης των Εκπομπών Αερίων Ρύπων (ETMEAP)). Due to the ongoing economic crisis, it was not possible to increase the RES levy to cover the deficit. Therefore, the authorities allocated other sources to the special account for RES, such as revenues from the sale of unused CO2 allowances or the implementation of a levy from the production of electricity from lignite.[208] A suppliers' charge (Χρέωση προμηθευτή) was introduced in August 2016. It is a contributory charge that suppliers are paying to offset for the cheaper electricity they are buying due to the integration of RES in the network. The result is that the special account for RES is estimated to have a surplus by €256 million by the end of 2018.[209]

# 10 Factsheet: Spain

This factsheet presents the findings for Spain for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 10.1 Household Price Regulation in Spain

**Spain still has energy price regulation for households in place both for electricity and gas, though the share of consumers under price regulation has decreased substantially in the past years.**

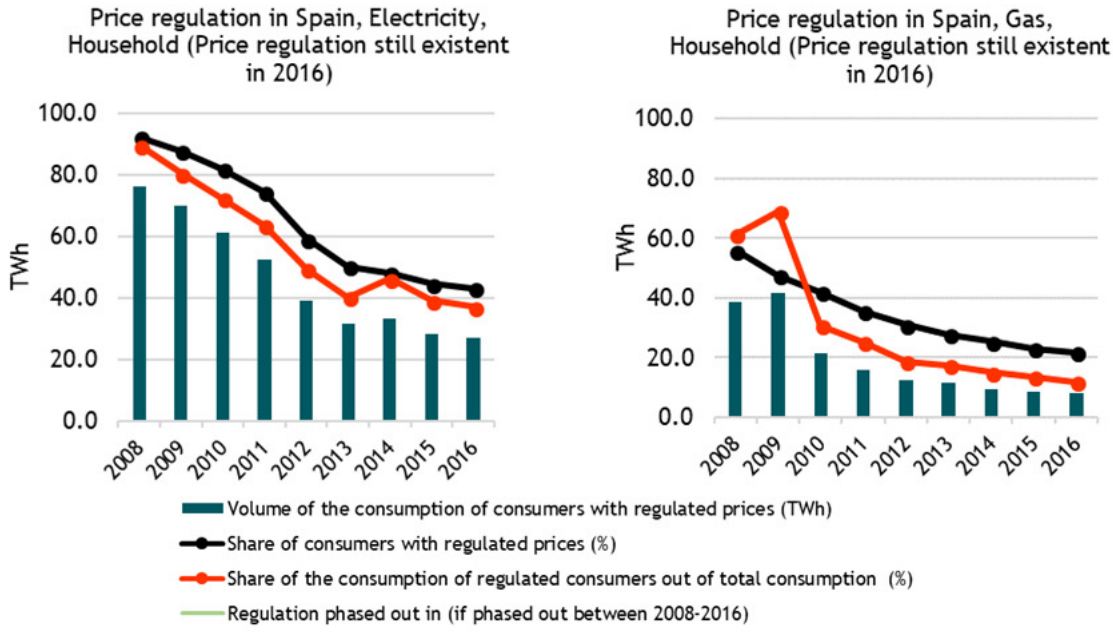
The regulated prices in the **gas sector** are called TUR (last resort supply tariffs). Since July 2009, only residential consumers with up to 50 000 KWh/year and connected to pipelines with a pressure equal to or smaller than 4 bar are supplied voluntarily at last resort tariffs. The number of customers supplied

[206] Ibid.
[207] Ibid.
[208] Ibid.
[209] http://www.lagie.gr/fileadmin/groups/EDSHE/MiniaiaDeltiaEL/JAN_FEB_01_02_2018_DELTIO_ELAPE_v1.1_04.04.2018.pdf

gas at regulated tariff continues the decreasing trend started in 2010. At the end 2017, it represented 21% of consumers.[210]

In the **electricity** sector, TUR tariffs which were available for consumers with up to 10kW for electricity have been replaced by the PVPC (Voluntary prices for the small consumer)[211] which is a spot price pass-through and access tariff with a regulated margin on top (I.e. it's a regulated dynamic price contract). As from 2014, the last resort regulated tariff for small consumers disappeared[212] and instead, small consumers can opt to be supplied at the voluntary price for small consumers (PVPC). At the end 2017, it represented 40% of consumers.[210]

**Figure 120 Household price regulation in Spain from 2008 to 2016**




*Source:* CEER data

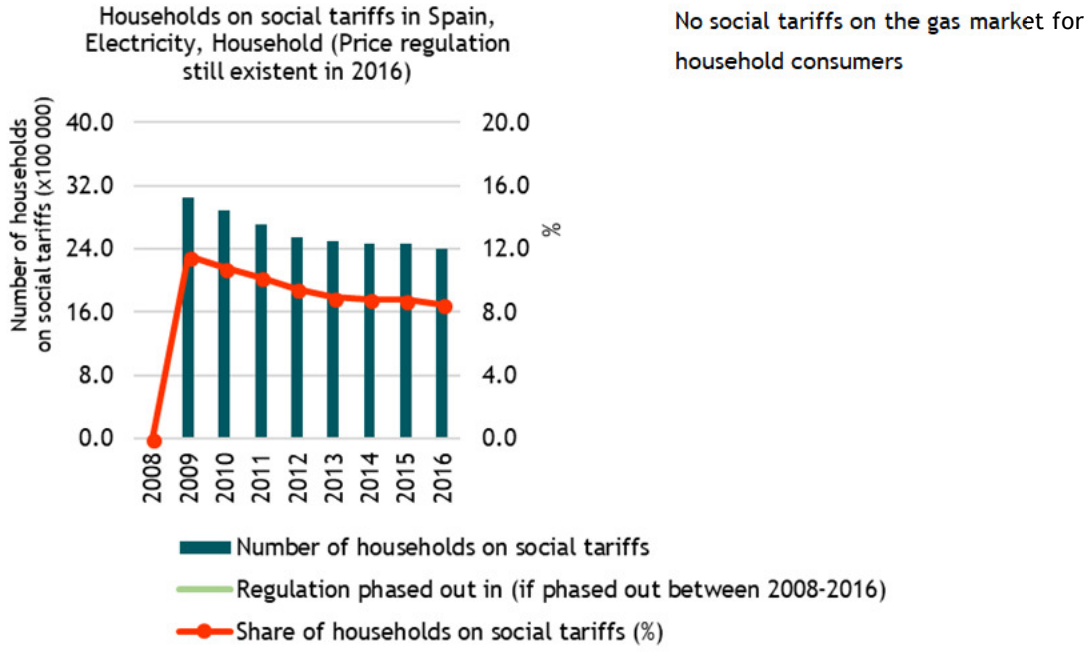
The PVPC model embeds social tariffs (called 'bono social'). It allows small consumers[213] to get various levels of discounts on the electricity prices (-25%, -40%, -50%) which are capped by a monthly consumption. The consumption cap to which the discounts are applicable increases according to the number of children in the households while the share of the discounts depends on the degree of vulnerability of the consumers. The discounts can be applied to any household that qualifies as a 'vulnerable consumer' (-25% discount) or 'severe vulnerable consumer' (-40% discount) depending upon

[210] Private communication with the regulator CNMC (2018).
[211] The Act 24/2013 of the **Power Sector** and the Royal Decree 216/2014 modified the regime of the last resort supply and introduced the "voluntary price for small consumers" (known by the acronym in Spanish: PVPC) for consumers below 10 KW. Source: IDAE (2017), available from: http://www.idae.es/sites/default/files/estudios_informes_y_estadisticas/tarifas_reguladas_julio_2017.pdf and CNMC (2017), Spanish energy regulator's national report to the EC 2017 available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Spain-EN.pdf/08292859-f5b9-02fb-d803-128ac897e7ea
[212] As from 1st April 2014, last resort tariffs are only available to: i) vulnerable consumers and ii) consumers that not having the right to be supplied under the PVPC regime, do not have a free market supply contract in force.
[213] Consumers with a capacity lower than 10kw

the number of children in the household, the average annual income of the household (compared with official income thresholds set by the legislation) and the working status of the head of the household (if retired). Regional/local administration can also grant the category of 'consumers in risk of social exclusion' to specific households which will entitle the household to the maximum discount (-50%). In October 2017 the PVPC model was modified, and now eligibility criteria consider only income and family size, instead of the connection capacity, reducing the number of eligible households.[214]

The database shows that the share of households under social tariffs for electricity is decreasing more slowly in the last years. At the end 2017, the social tariff represent transitorily approximately 8% of consumers. This is significantly lower than the share of households under price regulation for electricity. Due to the changes in eligibility criteria for the social tariff, the share for social tariffs could decrease by a quarter[215], reaching thus approximately 6% by 2018. Further, the database shows no social tariffs for gas.

**Figure 121 Household social tariffs in Spain (VC03a, VC03b)**




*Source:* CEER data

### *10.1.1 Selected aspects of competition*

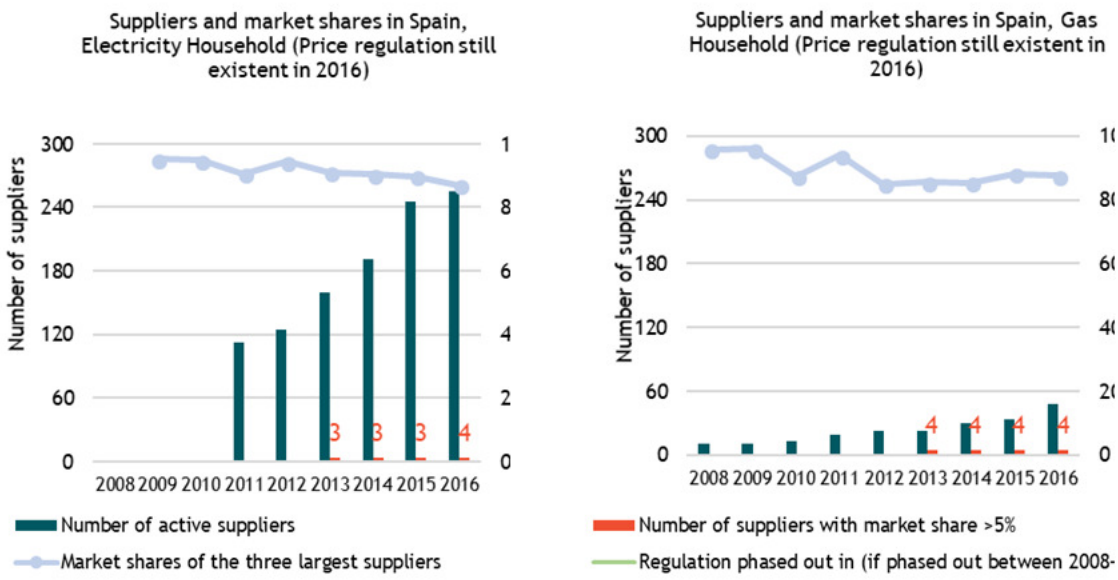
For both electricity and gas (in households), we see that the three largest suppliers have had over 80% of the market consistently over the last years. At the same time, there has been a constant increase in the number of active suppliers[216].

[214] Royal Decree 897/2017, of 6 October, which regulates the figure of the vulnerable consumer, the social bond and other protective measures for domestic consumers of electricity.

[215] Private communication with the regulator CNMC (2018).

[216] Suppliers which report activity to CNMC in 2017 amounted to 290 in electricity sector and 58 in natural gas sector. Private communication with the regulator CNMC (2018).

**Figure 122: Number of suppliers and market shares in Spain**



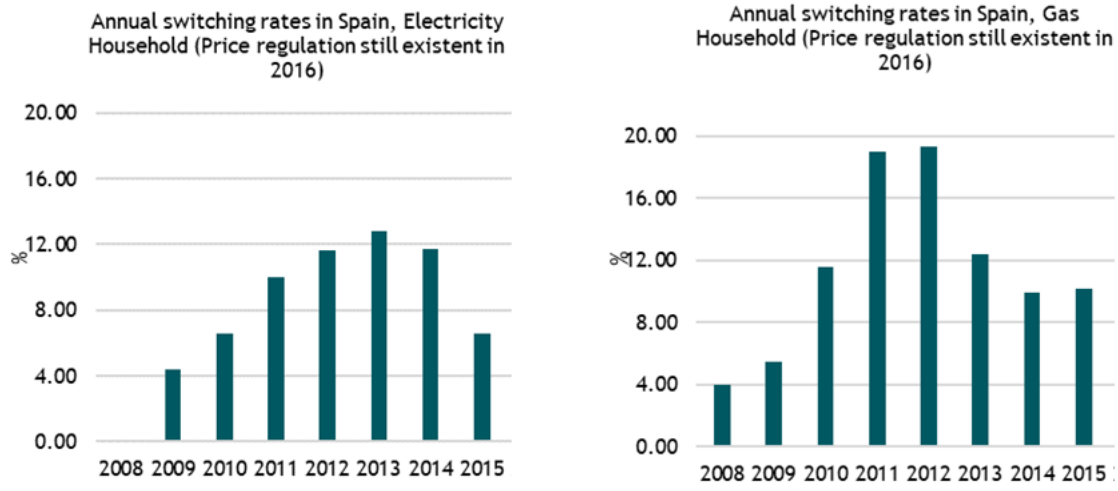

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

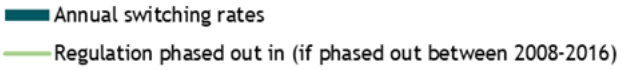
## Consumer engagement and expenditures on energy

The figures below show the annual switching[217] rates in households for both electricity and gas, which in both cases have increased from below 5% to up to almost 13% in 2013 for electricity and 19% in 2012 for gas. This was followed by another decrease, but levels remained above 5%. Increased switching levels may be seen as a driver of competition, enabling changes in market concentration. Moreover, the movement of consumers from regulated retail markets to liberalized ones can explain up to half of the switching rates,[218] explaining thus the continuous decrease of Spanish households with regulated electricity and gas prices

**Figure 123 Annual switching rates for households in Spain**




[217] Switching is defined as the voluntary action by which a customer changes his supplier
[218] CNMC (2017), Spanish energy regulator's national report to the European commission 2017




*Source:* CEER data

According to the CNMC[219], the average switching rate in 2017 (combined for households and industry) was 10.8% for the electricity sector and also 9.8% for the gas sector (higher than the numbers reported above).[220] It further provided the following split for household customers.

**Table 10-1 Switching rates for household customers in 2017.**

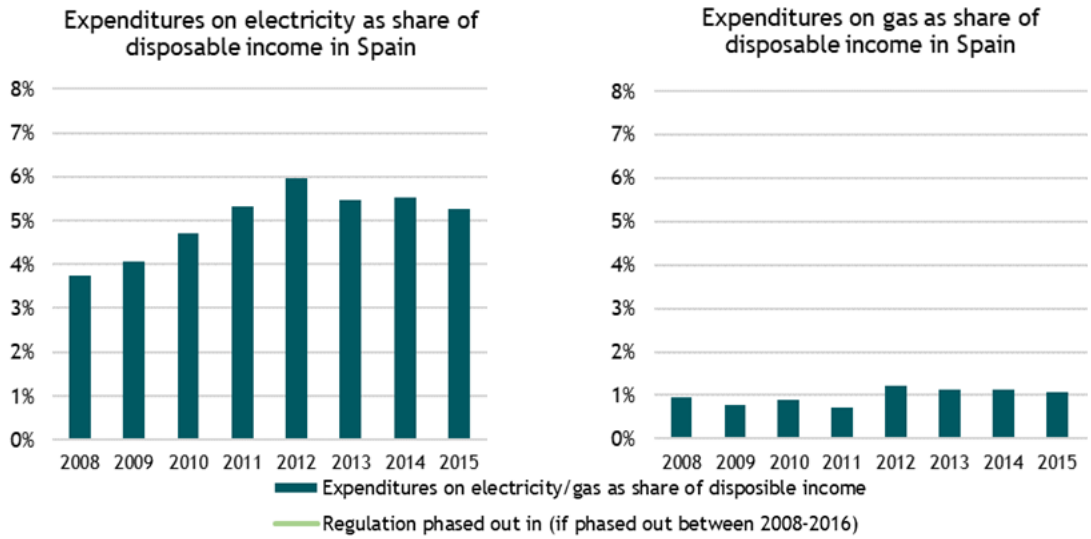
| Segment | Electricity | Gas |
|---|---|---|
| Households | 10.3% | 9.7% |

*Source:* CNMC (2018)

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[221] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[222] This indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Spain. In Spain, the share of expenditures on electricity is slightly higher than the EU average of around 4%, despite its regulated prices; while for gas I is very close to the 1% EU average expenditure..

[219] Spain's National Commission on Markets and Competition (CNMC in Spanish)
[220] CNMC (2018), Informe anual de supervisión de los cambios de comercializador – Año 2017. -Available from: https://www.cnmc.es/sites/default/files/2095743_29.pdf
[221] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)
[222] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 124: Expenditures on gas and electricity as share of disposable income for households in Spain (for middle consumption bands DC and D2) using PPS prices[223]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

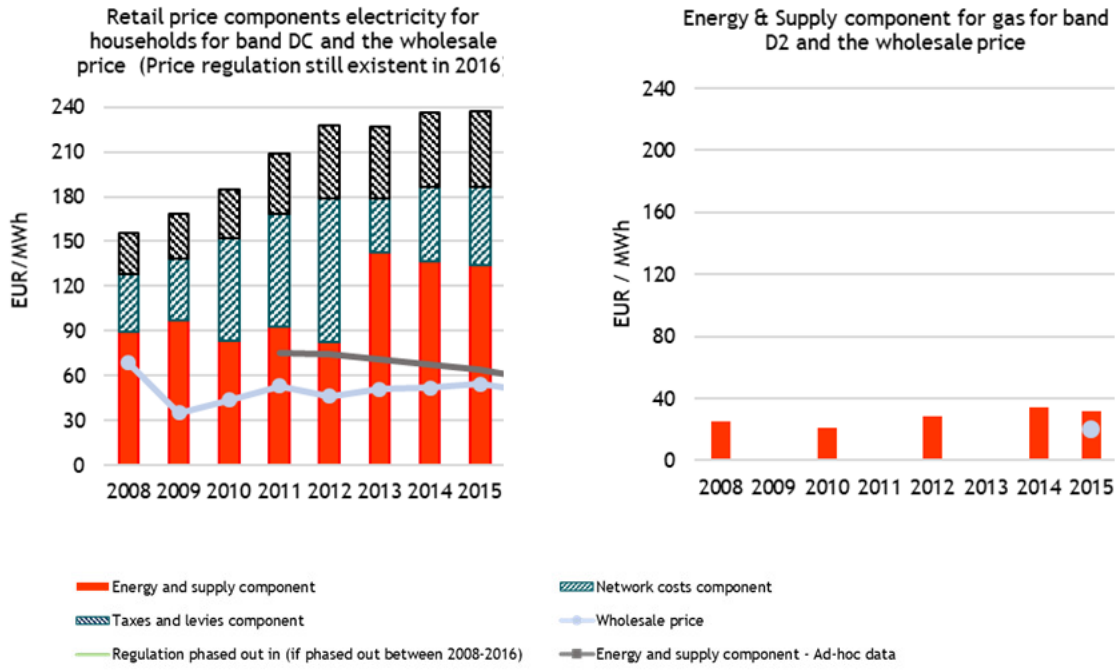
*Source:* Own calculations[224] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Spain, from 2013 onwards, there was a big increase in the (Eurostat) energy component which does not seem in line with the wholesale prices. This is due to the inclusion of policy related costs. For comparison, we include the energy component for electricity as reported in DG ENER's ad-hoc data.

[223] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[224] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 125 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Spain**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas and electricity retail price)[225] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[226] The figures below show the mark-ups along with the wholesale price.

It is important to highlight that there is a lack of cost harmonization in the energy retail component. The energy component reported to Eurostat by Spain includes other cost elements not directly related with energy and supply, namely:

- **Policy Support Costs (since 2013).** Before 2012 Spain reported its Policy Support Costs (e.g. RES support schemes, social policy costs, tariff deficit annuities, etc.) in the network costs. From 2013 onwards, Spain started reporting policy and support costs in the energy and supply component (although they are recovered as part of the third-party access tariffs, they were no longer attributable to the network component)
- **Capacity remuneration mechanisms**, which are recovered through a variable term.
- **Market exchange and system operator costs**, which are recovered through a variable term.[227]

[225] Eurostat has data available on gas prices; however not for the energy and supply component.
[226] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014
[227] Information provided bilaterally by a Spanish stakeholder.

In other countries, policy costs are usually allocated in the tax component, as established in the Eurostat regulation.[228] In order to address this lack of harmonization, an additional data set has been used only for Spain to calculate the mark-ups (ad-hoc data provided by DG ENER).[229]

The additional costs included in the energy component may give a higher mark-up than in reality (both for the household and non-household sectors). The calculation also neglects the energy losses attributable to domestic consumers, even if they must also bear these costs (energy losses are estimated at 19% for electricity households in Spain, 1% for gas). However, the approach introduced above is used in this study across all MSs to allow for consistency. A different methodology, used by the CNMC[230], estimated for 2016 an average mark-up between 25 and 30 €/MWh for electricity in the residential sector (compared to 17 and 20 €/MWh in 2015).[231] For the segment of households under the PVPC regulated prices, the mark-up for electricity was estimated between 26 and 32 €/MWh compared to 16 and 19 €/MWh in 2015.[232] These values are closer to those presented above calculated with the ad-hoc data instead of Eurostat than the regulated prices for households under the PVPC was 6 €/MWh in 2016,

Further, the Spanish government sets a commercial fixed and variable margin for those suppliers delivering energy at regulated prices.[233]

[228] Regulation (EU) 2016/1952 of the European Parliament and of the Council of 26 October 2016 on European statistics on natural gas and electricity prices and repealing Directive 2008/92/EC. Available from: https://publications.europa.eu/en/publication-detail/-/publication/fa2f1139-ac92-11e6-aab7-01aa75ed71a1/language-en

[229] Other studies, such as Energy prices and costs in Europe report [COM(2016) 769 final] and by ACER's Annual Report on the Results of Monitoring the Internal Electricity and Gas Markets in 2015, have also taken different values for Spain's energy and supply component for energy prices.

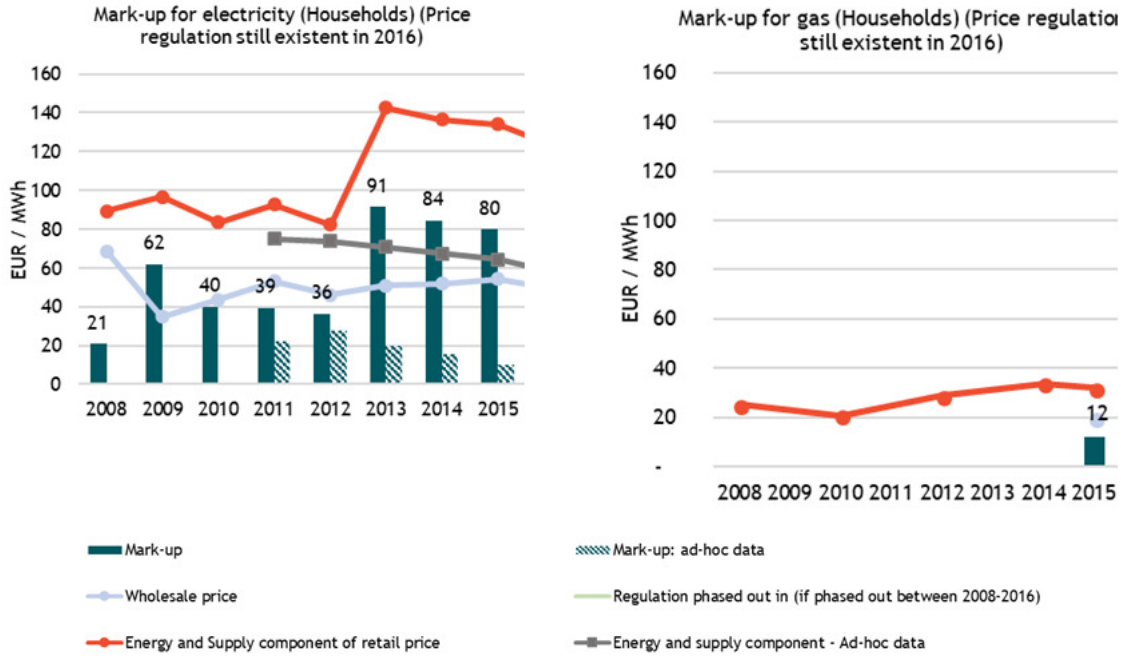
[230] Spain's National Commission on Markets and Competition (CNMC in Spanish)

[231] CNMC (2016), Informe de supervisión del mercado minorista de electricidad. Available from: https://www.cnmc.es/sites/default/files/1928592_2.pdf

[232] CNMC (2016), Informe de supervisión del mercado minorista de electricidad. Available from: https://www.cnmc.es/sites/default/files/1928592_2.pdf

[233] Orden ITC/1660/2009, de 22 de junio, por la que se establece la metodología de cálculo de la tarifa de último recurso de gas natural. Available from: https://www.boe.es/buscar/doc.php?id=BOE-A-2009-10329

**Figure 126 Mark-ups for Spain, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

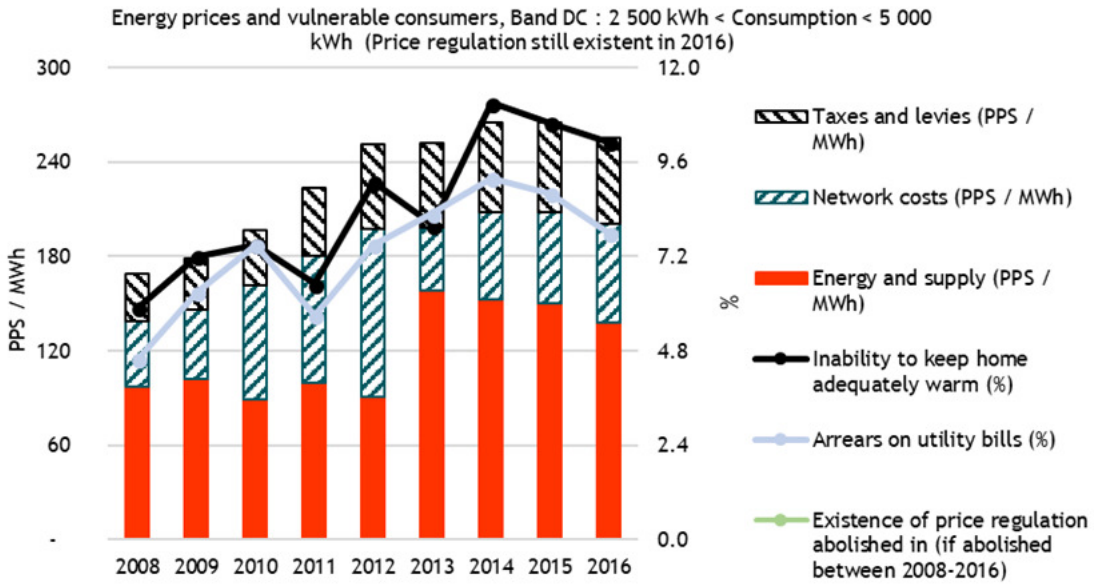
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas and electricity retail price) and EMOS (wholesale price)

### *10.1.2 Energy poverty*

The diagram below shows the share of the population with arrears on their utility bills and unable to keep their home adequality warm. These proxies suggest that the share of consumers in Spain which are potentially suffering from energy poverty is increasing over time, which warrants further studies. At the same time, the energy component in retail prices has increased in the last years (even for those who have the lowest consumption, i.e. Band DA) even though social tariffs in theory aim to reduce the burden of energy prices on the households.

**Figure 127 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Spain**




*Source:* Eurostat

It is important to note, that in Spain the regulation has established the concept vulnerable consumer (as those who fulfil certain social characteristics regarding consumption and purchasing power) only for electricity. These customers have to pay last resort tariff instead of the voluntary price for small customers.

The Act 24/2013 defines the social bonus as the difference between the last resort tariff and the voluntary price for small customers. The Royal Decree 897/2017 regulates the figure of the vulnerable consumer, the social bond and other protective measures for domestic consumers of electricity.

### *10.1.3 Quality of services*

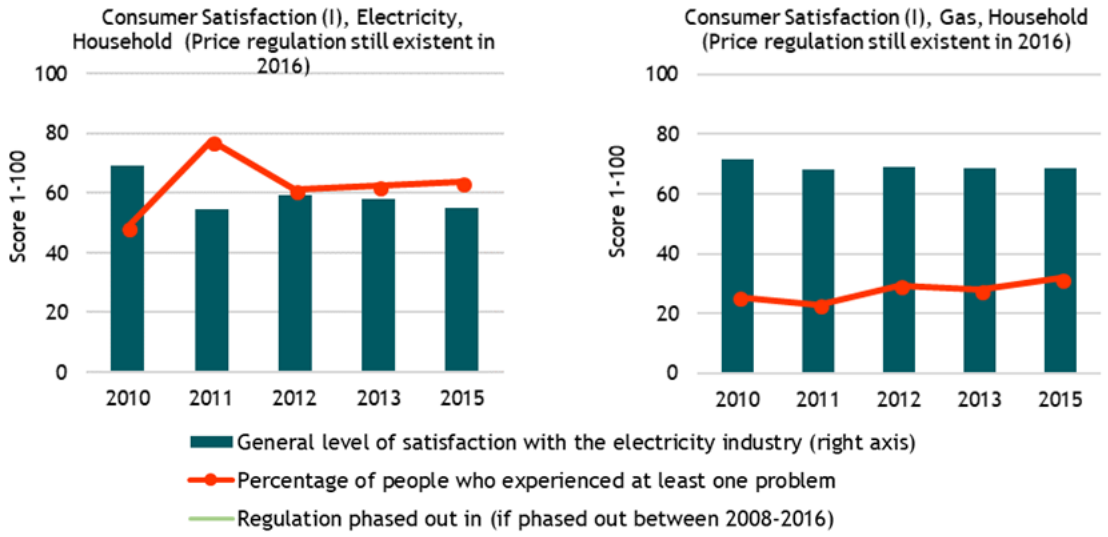
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

In Spain the level of consumer satisfaction is higher with the gas industry than the electricity one, where the share of consumers which experience at least one problem is also higher. This is confirmed by the comparison of Market Performance Indicators (MPIs) for the Spanish gas and electricity sectors in 2015, where the latter even experience a slight decline.[234]

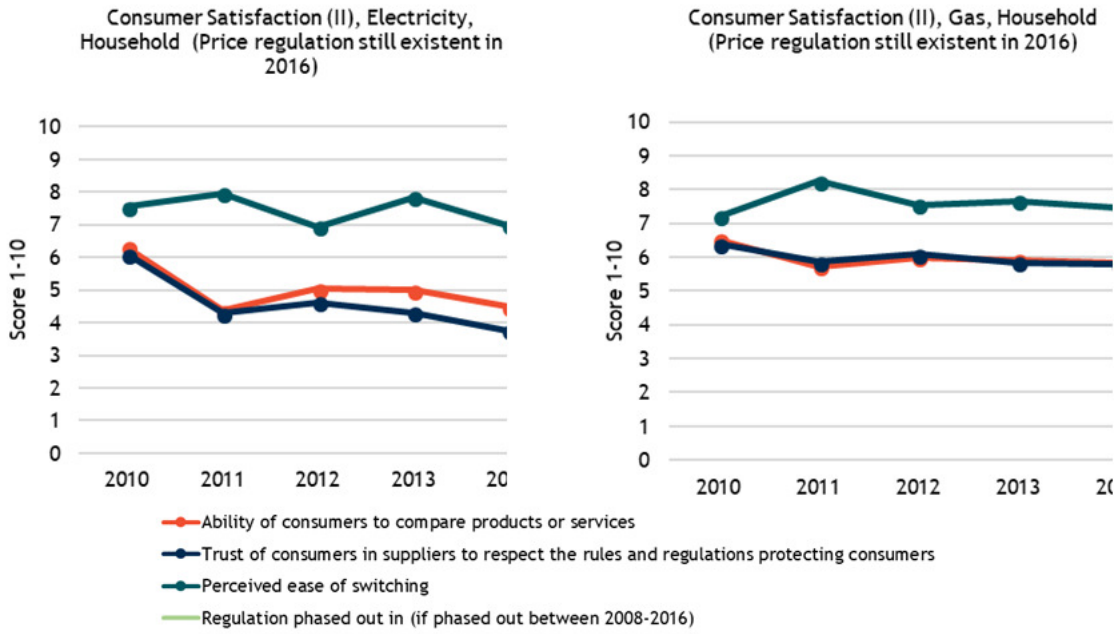
[234] EC (2016). Monitoring consumer markets in the European Union 2015

**Figure 128 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Spain for households**




*Source:* EC – DG Justice[235]

**Figure 129 Ability of consumers to compare products or services[236], trust of consumers in suppliers[237] and perceived ease of switching[238] in Spain**




*Source:* EC – DG Justice

[235] Note that from 2013 onwards, the survey was carried out every other year.
[236] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[237] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[238] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice, showing that Spanish household consumers have choices in several aspects in the electricity market.

**Table 10-2 Consumer choice in Spain (electricity, households)**

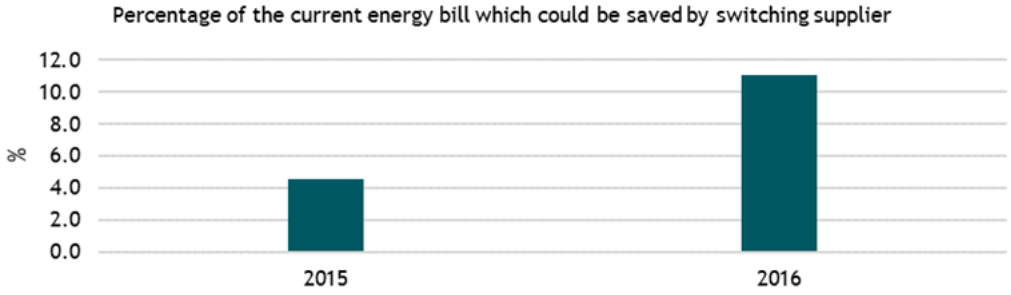
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Source:* ACER/CEER (2015)

*Note that "-" indicates missing data*

As shown in the figure below, once can also see that switching may lead to savings (which were around 4% of the energy bill in 2015, but reached over 10% in 2016).

**Figure 130 Percentage of the current electricity bill which could be saved by switching supplier in Spain**

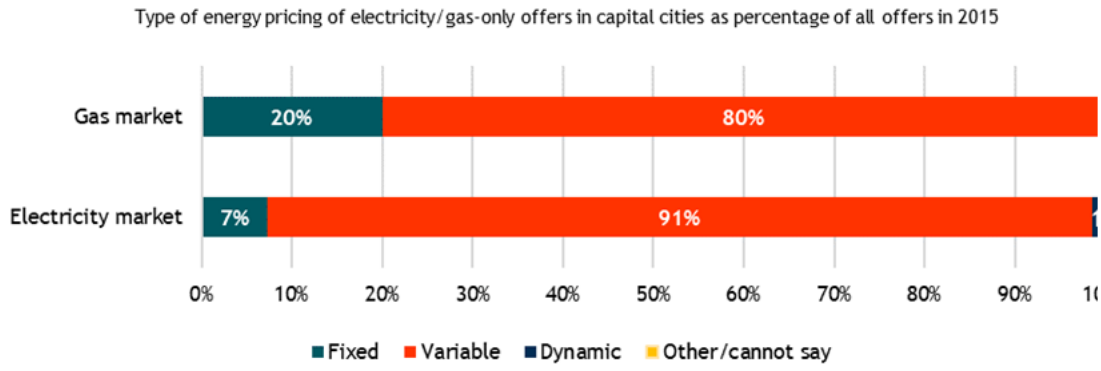



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, most of which are variable.

**Figure 131 Type of offers for households in Spain**



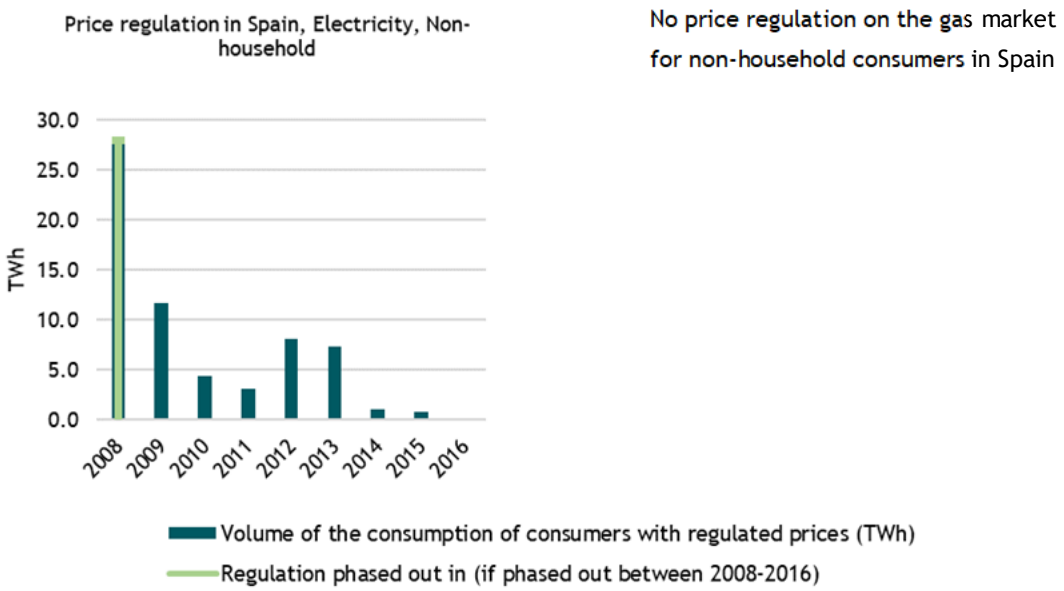

*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

## 10.2 Non-Household Price Regulation in Spain

**Spain had no energy price regulation for non-households in the period assessed for gas and phased out price regulation for electricity in 2008.**

Figure 132 Non-household price regulation in Spain from 2008 to 2016

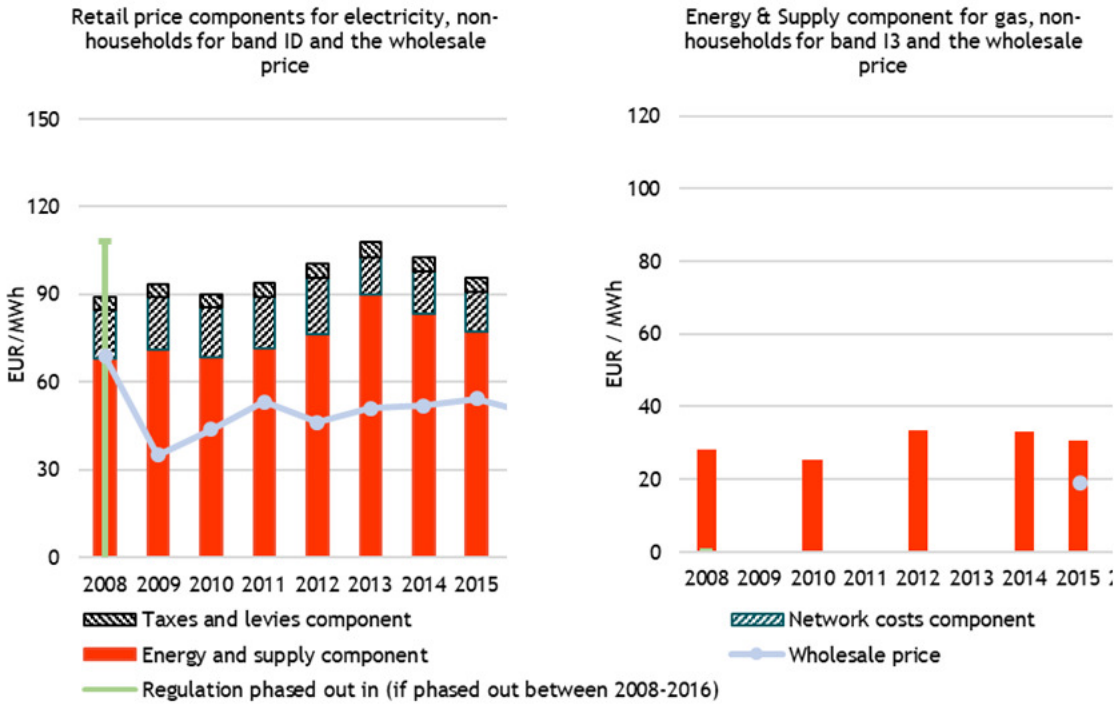



*Source:* CEER data

### *10.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Here the factors leading to an increase in the energy and supply price component due to the inclusion of policy related costs must also be considered, as described in the section on regulated prices for households.

**Figure 133 Industry retail price components for middle bands (ID and I3) and wholesale prices in Spain**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

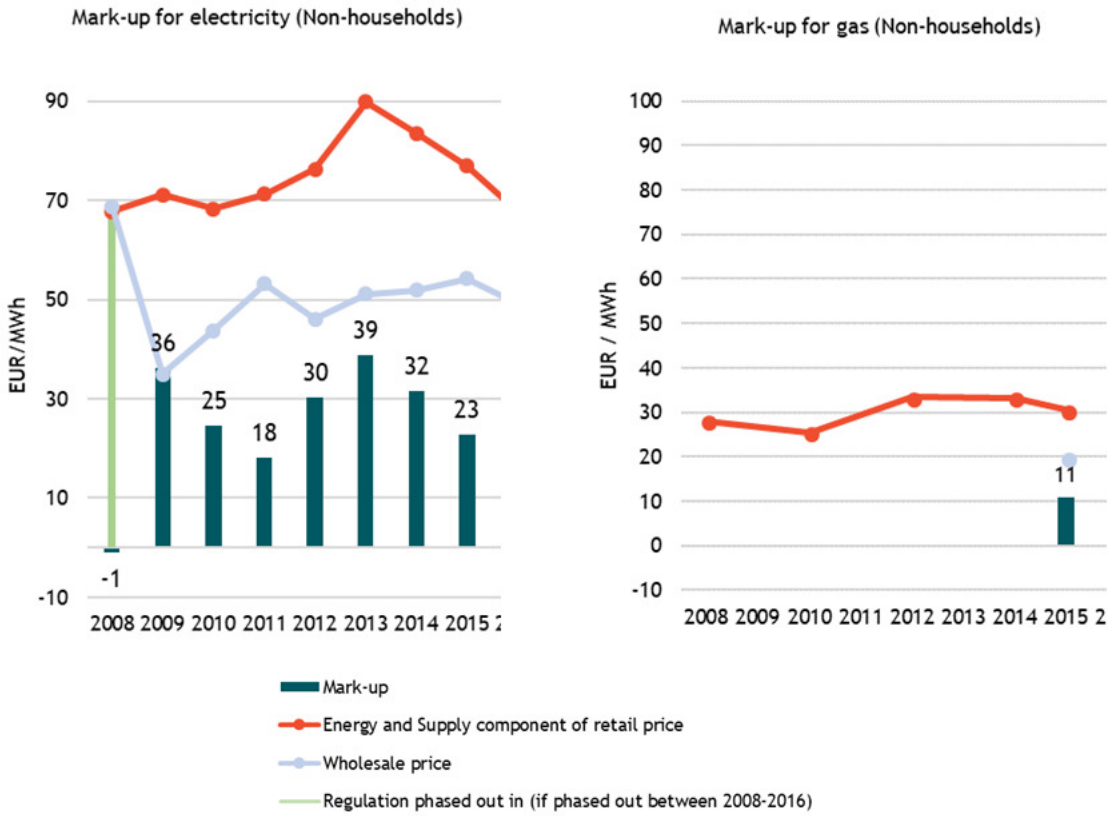
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[239] The figures below show the mark-ups along with the wholesale price.

As mentioned in the household sector section, the energy component reported to Eurostat by Spain includes policy support costs, capacity remuneration mechanisms and market exchange and system operator costs which may give a higher mark-up than in reality (both for the household and non-household sectors).[240] However, the approach introduced above is used in this study across all MSs to allow for consistency. A different methodology, used by the CNMC[241], estimated for 2016 an average gross mark-up in electricity between 0.7 and 6 €/MWh for electricity in the industry sector (compared to -1.2 and 1.4 €/MWh in 2015) and between 13 and 18 €/MWh for electricity in SMEs (compared to 8 and 11 €/MWh in 2015).[242]

[239] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014
[240] Information provided bilaterally by a Spanish stakeholder.
[241] Spain's National Commission on Markets and Competition (CNMC in Spanish)
[242] CNMC (2016), Informe de supervisión del mercado minorista de electricidad. Available from: https://www.cnmc.es/sites/default/files/1928592_2.pdf

Figure 134 Mark-ups for Spain, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

According to the CNMC[243], the average switching rate in 2017 (combined for households and industry) was 10.8% for the electricity sector and also 9.8% for the gas sector. It further provided the following split for non-household customers.[244]

Table 10-3 Switching rates for non-household customers in 2015.

| Segment | Electricity | Gas |
|---|---|---|
| SMEs | 27.1% | 21.2% |
| Industry | 19.8% | 17.3% |

*Source:* CNMC (2016)

## 10.3 Tariff deficit in Spain

[243] Spain's National Commission on Markets and Competition (CNMC in Spanish)
[244] CNMC (2018), Informe anual de supervisión de los cambios de comercializador – Año 2017 -Available from: https://www.cnmc.es/sites/default/files/2095743_29.pdf

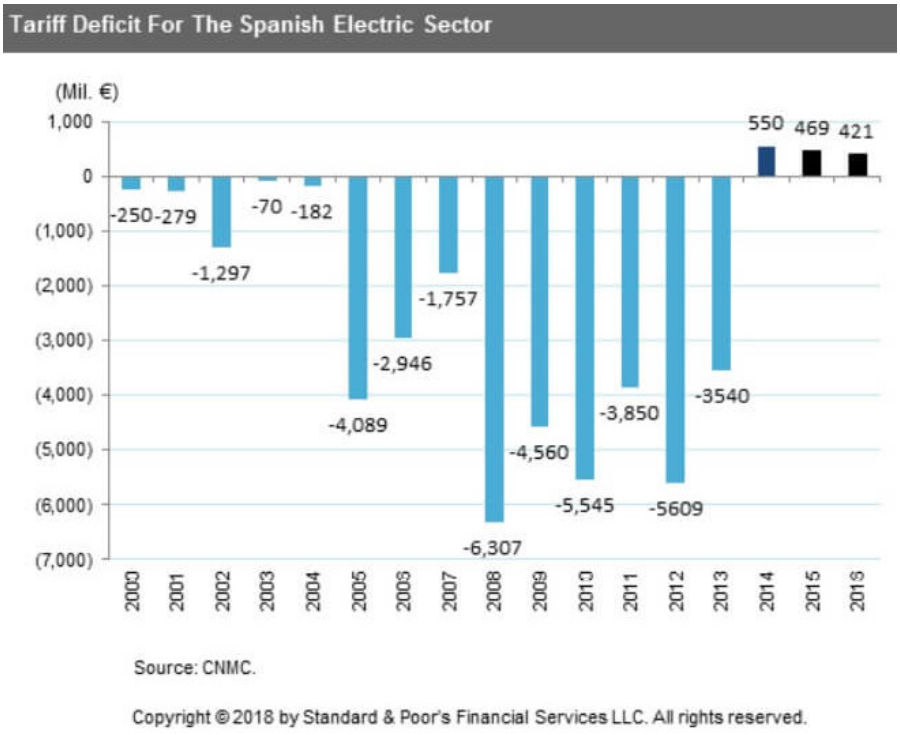
**Spain had a tariff deficit since the 2000s until 2015. An electricity market reform was introduced in 2013. As a result, in 2015, after 14 years of deficit, the power system had a surplus of EUR 550 million.**

Spain used to have the highest tariff deficit among the EU Member States due to a massive imbalance between the regulated costs and revenues of the electricity system. Its outstanding tariff debt gradually built up since 2000 and was estimated at EUR 30 billion at the end of 2013 (or 3% of GDP).[245] The revenues from tariffs associated with regulated costs were lower than the regulated costs (transmission and distribution costs, support for RES, extra-peninsular costs, annuities to cover the deficit, etc.) which had increased rapidly. The biggest share of these regulated costs corresponded to the support for RES under the 'special regime' which since mid-2000s subsidised RES producers. From 2005 to 2013, the costs in the electricity system grew by 221% while revenues increased by only 100%, leading to the large cumulated deficit.[246] Due to the high costs in the electricity system, end-user prices in Spain are among the highest in the EU.

In 2012, stabilising the public-sector finances (including solving the tariff deficit) was an urgent priority. A broad electricity market reform package was introduced in 2013 and implemented by 2015.[247] As a result, the accumulated deficit should gradually disappear over the next 10-15 years. In 2015, after 14 years of deficit, the power system had a surplus of EUR 550 million.[248]

[245] European Commission (2014), Electricity Tariff Deficit: Temporary or Permanent Problem in the EU? European Economy: Economic Papers 534, October 2014.
[246] https://www.iea.org/Textbase/npsum/spain2015sum.pdf
[247] The reform reduced the remuneration and compensation for the activities in the electricity system by several billion euros per year and introduced the principle of "no new cost without a revenue increase". It also introduced a new way of calculating compensation for renewable energy, waste, and co-generation (combined production of heat and power). Source: https://www.iea.org/Textbase/npsum/spain2015sum.pdf
[248] http://thecorner.eu/spain-economy/spain-power-system-posts-surplus-in-2015-after-14-years-of-deficit/52393/

Figure 135 Evolution of electricity tariff deficit in Spain, 2000-2013.




*Source:* S&P Global (2018)[249]

Triggered by the recession, a tariff deficit also emerged in the natural gas system, as falling gas demand reduced revenues from infrastructure use. By the end of 2014, a tariff deficit of EUR 1,025 million had accumulated. In 2014, the government introduced a new mechanism to gradually eliminate the accumulated tariff deficit.[250]

# 11 Factsheet: Finland

This factsheet presents the findings for Finland for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 11.1 Household Price Regulation in Finland

**Finland had no energy price regulation for households in the period assessed.**

[249] S&P Global (2018)[249], The End to Subsidies: The Beginning of a New Era for Spanish Renewables? Available from: https://www.capitaliq.com/CIQDotNet/CreditResearch/RenderArticle.aspx?articleId=1990704&SctArtId=448388&from=CM&nsl_code=LIME&sourceObjectId=10410209&sourceRevId=3&fee_ind=N&exp_date=20280213-22:39:51

[250] The reform requires all new system costs to be matched by cost cuts or revenue increases elsewhere. Access tariffs will be automatically increased if the annual tariff deficit rises over a predetermined threshold. Source: S&P Global (2018)[250], The End to Subsidies: The Beginning of a New Era for Spanish Renewables? Available from: https://www.capitaliq.com/CIQDotNet/CreditResearch/RenderArticle.aspx?articleId=1990704&SctArtId=448388&from=CM&nsl_code=LIME&sourceObjectId=10410209&sourceRevId=3&fee_ind=N&exp_date=20280213-22:39:51

There is no retail price regulation or social tariffs for households in Finland.

**Electricity suppliers** decide prices by themselves without ex-ante approval. However, according to the Electricity Market Act, an electricity retailer with significant market power within its operating area shall deliver electricity to consumers and certain other users at a reasonable price (obligation to deliver). The prices of electricity within the obligation to supply system do not have to be approved by the regulator before the supplier takes them into use. The Energy Authority may investigate either on the basis of a complaint or at its own initiative the pricing of electricity.

All **gas suppliers** have an obligation to supply, setting their prices by themselves without any ex-ante approval. However, supply tariffs under obligation to supply should be reasonable. The Finnish gas market will open to competition only in 2020, and there is only one importer/wholesaler. Thus, the obligation to supply applies to all gas suppliers.[251]

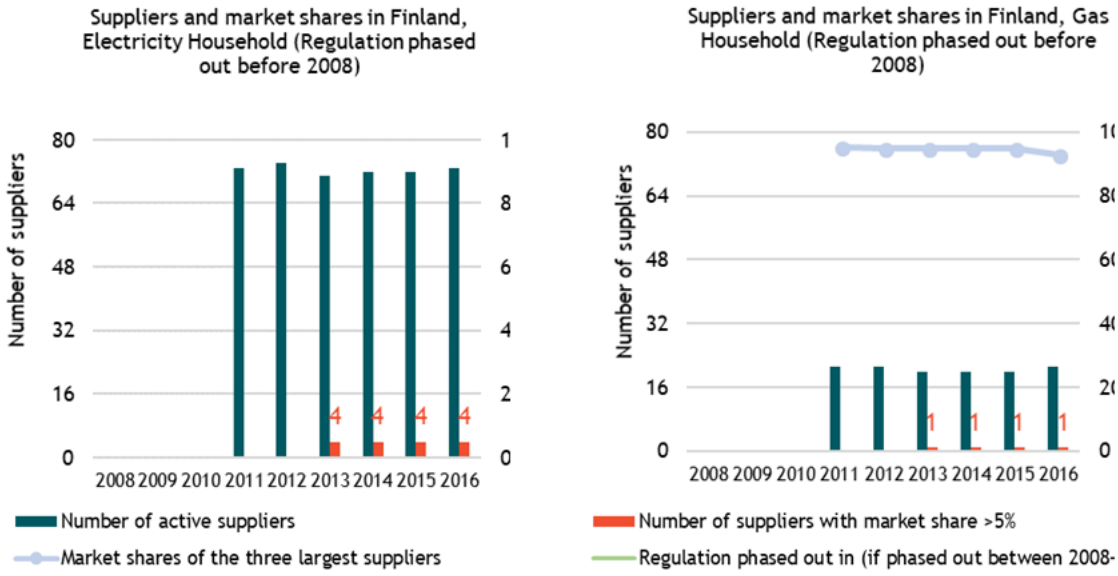
It is important to mention that there is neither legal nor operational unbundling of natural gas transmission network operation in Finland. This is due to an exemption allowed by the Natural Gas Market Directives because Member States are free to decide that unbundling provisions are not applied to DSOs with fewer than 100,000 customers (All Finnish gas DSOs fall below the limit). Gasum Oy is vertically integrated (the only importer and wholesale supplier as well as operator of the transmission network) and is downward vertically integrated into retail supply.[252]

### *11.1.1 Selected aspects of competition*

The number of active suppliers has remained rather stable for both electricity and gas over the past years. For gas (in households), we see that the three largest suppliers have had over 90% of the market consistently over the last years. No information in this regard is available for electricity in the database, though literature shows that in 2014 it was around 35-40%.[253] For electricity, there are four suppliers in the past years which have more than 5% of the market showing moderate market concentration; for gas, only one supplier has a significant market share. However, the household gas retail market in Finland is very small (0.02% of gas consumption), mostly for cooking and not open, so households do not have the possibility to switch anyway.[251]

[251] Energy Authority Finland (2017), National Report 2017 to the Agency for the Cooperation of Energy Regulators and to the European Commission. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Finland-EN.pdf/b1048901-ce81-7586-4a9f-5f9fdb4ce5b8
[252] Energy Authority Finland (2017), National Report 2017 to the Agency for the Cooperation of Energy Regulators and to the European Commission. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Finland-EN.pdf/b1048901-ce81-7586-4a9f-5f9fdb4ce5b8
[253] https://ec.europa.eu/energy/sites/ener/files/documents/2014_countryreports_finland.pdf

Figure 136: Number of suppliers and market shares in Finland




*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards, and there is no data on the market share of the three largest suppliers.*

*Source:* CEER data

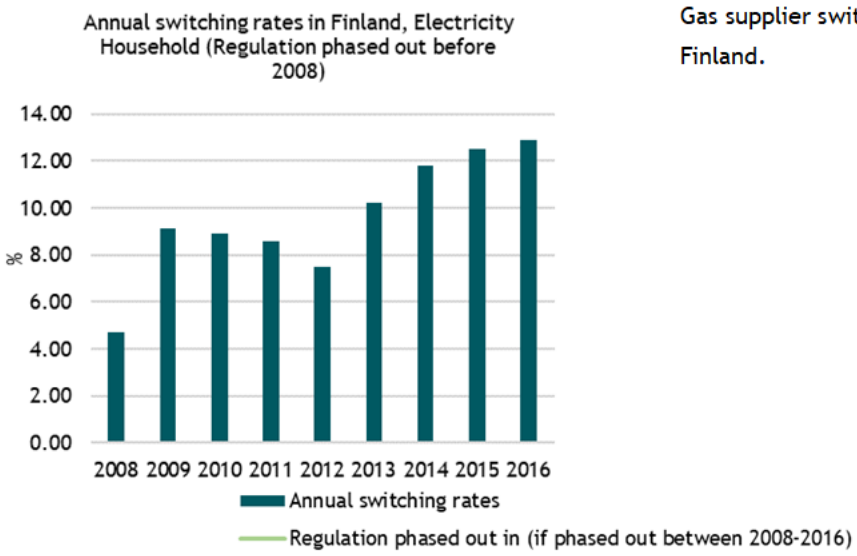
## Consumer engagement and expenditures on energy

The figures below show the annual switching[254] rates in households for both electricity and gas. There has been increasing switching of suppliers in the electricity market (which has remained over 10% in the last few years). On the other hand, as indicated gas markets are not open yet in Finland.

Over 70% of the ~30 000 customers in the Finnish natural gas market are households who buy natural gas for cooking. However, their consumption amounts to only 1 mcm (0.02% of total consumption).[255] At the end of 2015 there were 22 natural gas DSOs, all of which were also active in retail supply. Further, many of the natural gas retailers are relatively small having only dozens of customers.[256] As supplier switching is not possible, all gas suppliers are in a monopoly situation within their network area.[257]

[254] Switching is defined as the voluntary action by which a customer changes his supplier
[255] Energy Authority Finland (2017), National Report 2017 to the Agency for the Cooperation of Energy Regulators and to the European Commission. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Finland-EN.pdf/b1048901-ce81-7586-4a9f-5f9fdb4ce5b8
[256] Energy Authority Finland (2017), National Report 2017 to the Agency for the Cooperation of Energy Regulators and to the European Commission. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Finland-EN.pdf/b1048901-ce81-7586-4a9f-5f9fdb4ce5b8
[257] Energy Authority Finland (2016), National Report 2016 to the Agency for the Cooperation of Energy Regulators and to the European Commission. Available at: https://www.energiavirasto.fi/documents/10191/0/National+Report+2016+Finland+1518-601-2016.pdf/061a4522-d540-4870-a72c-80ce72a84b15

**Figure 137 Annual switching rates for households in Finland**




*Source:* CEER data

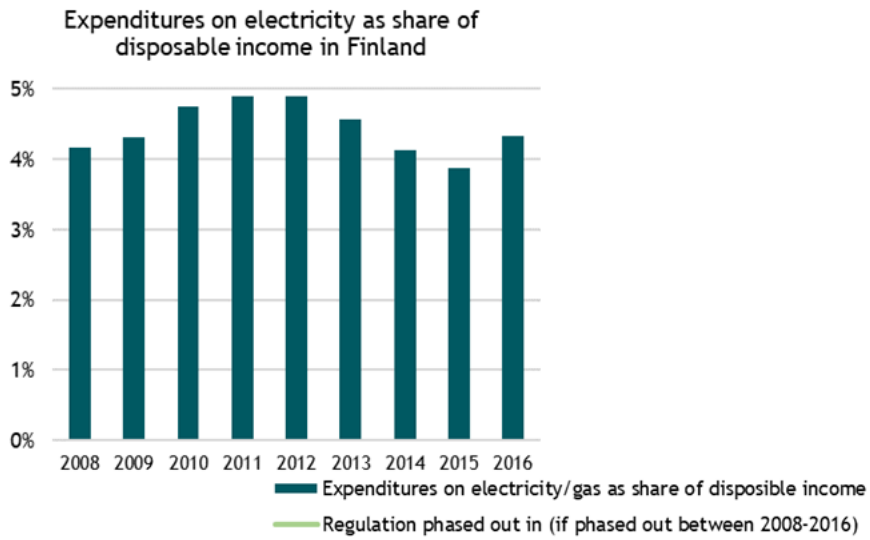
Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[258] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[259] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Finland. Expenditures on electricity have been around 4-5% of disposable income for households in the past years.

**Figure 138: Expenditures on gas and electricity as share of disposable income for households in Finland (for middle consumption bands DC and D2) using PPS prices[260]**

[258] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[259] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[260] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).




*Note: No data available for gas*

*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[261] based on Eurostat

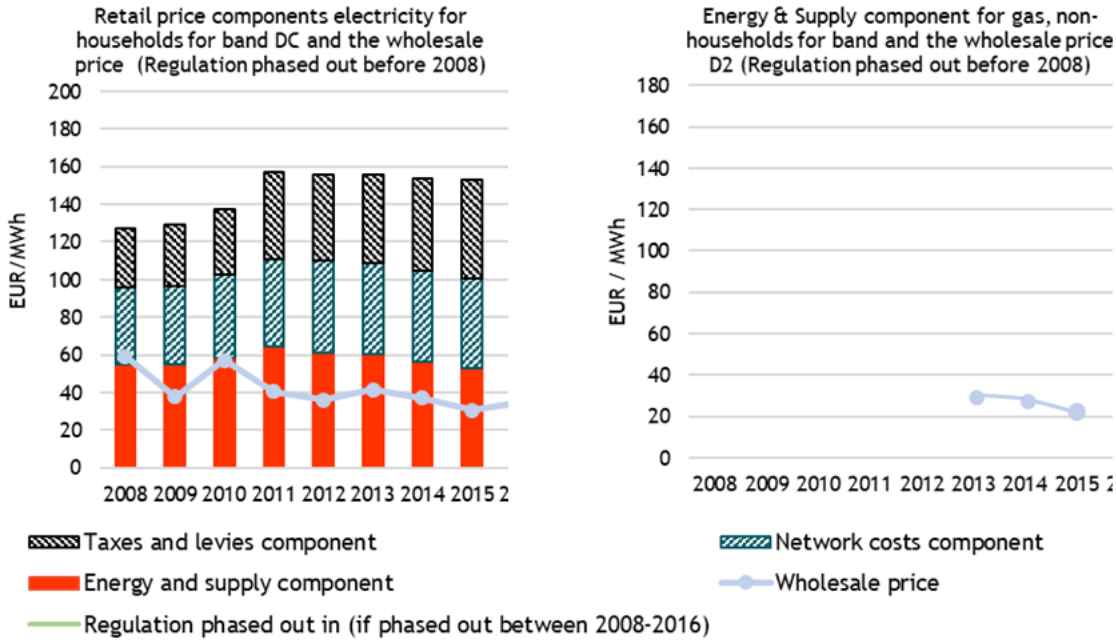
### Competition performance and mark-ups

Given the limited price data for Finland it is not possible to assess the alignment between the energy component of retail prices and wholesale prices over time and give an indication regarding competition performance. Similarly, due to lack of data, it is not possible to calculate the mark-ups (differences between the wholesale price and retail energy price component[262]).

[261] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

[262] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 139 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Finland**




*Note that there is no data available on the energy and supply component for the gas market.*

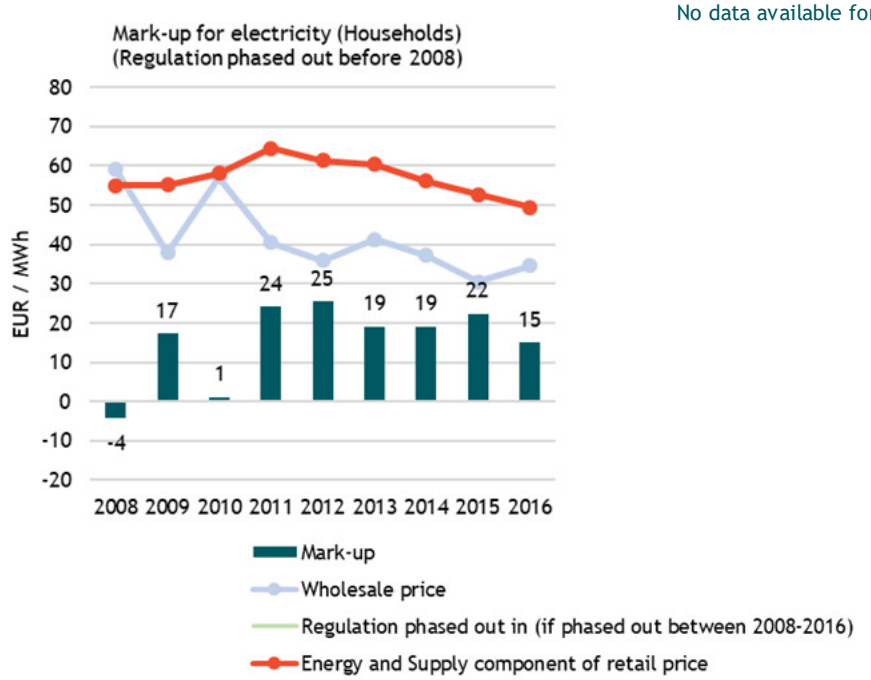
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[263] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price (as a proxy for the procurement cost) and the retail energy price component.[264] The figures below show the mark-ups along with the wholesale price.

[263] Eurostat has data available on gas prices; however not for the energy and supply component.
[264] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 140 Mark-ups for Finland, middle consumption bands (DC)**

No data available for gas

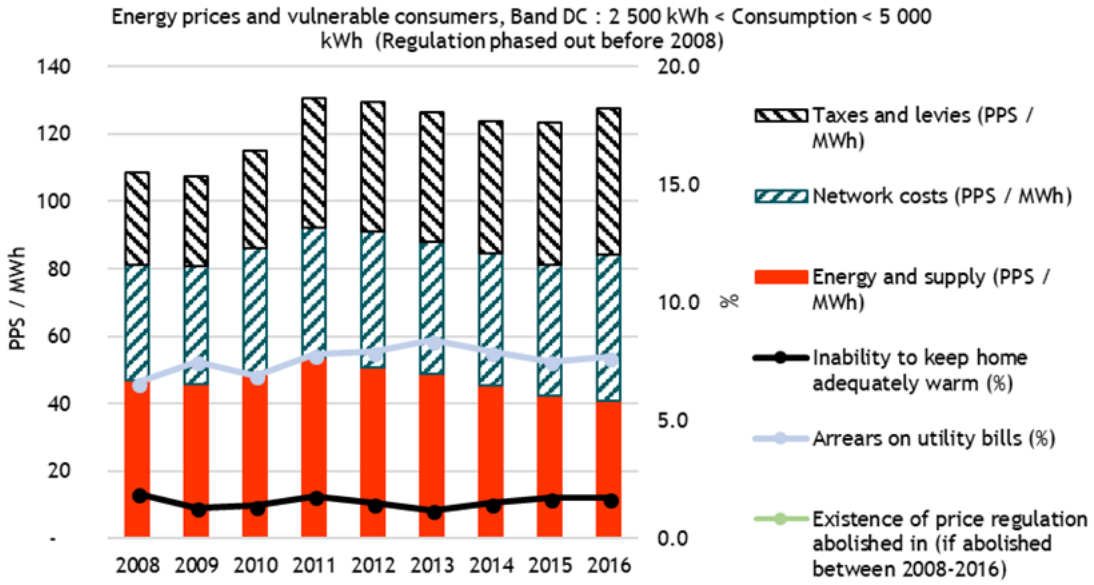



*Note that data is missing for the gas market.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### 11.1.2 Energy poverty

The consumers in Finland which are potentially suffering from energy poverty seem to be increasing over time, as can be seen by the diagram below showing the share of the population with arrears on their utility bills. However, the share of households unable to keep their home adequality warm seems to have remained at a more stable level between 1 and 2%. There seems to be no correlation with the energy component in retail prices for electricity which increased up to 2011 and then had a constant decrease in the last years.

**Figure 141 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Finland**




*Source:* Eurostat

Finland does not use the terminology of vulnerable consumers or energy poverty but does recognise concerns around vulnerability to access to or affordability of household energy.[265] In Finland, social assistance is a last-resort form of income security based on essential expenses, which include electricity and heating bills.[266]

### *11.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

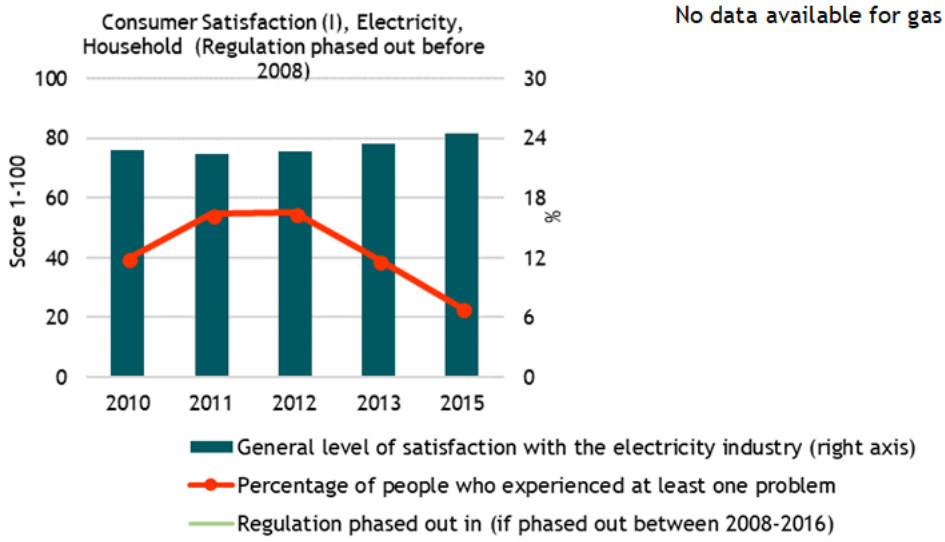
The general level of satisfaction with the Finnish electricity industry has been steadily increasing; while the percentage of people who experienced problems has decreased over time. Electricity consumers have an increasingly positive perception regarding the ease of switching providers and regarding trust in suppliers to respect the rules and regulations protecting consumers. They also have a relatively positive perception regarding their ability to compare products and services.

No information is available regarding the gas industry.

[265] Insight E (2015), Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures. Available from: https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf

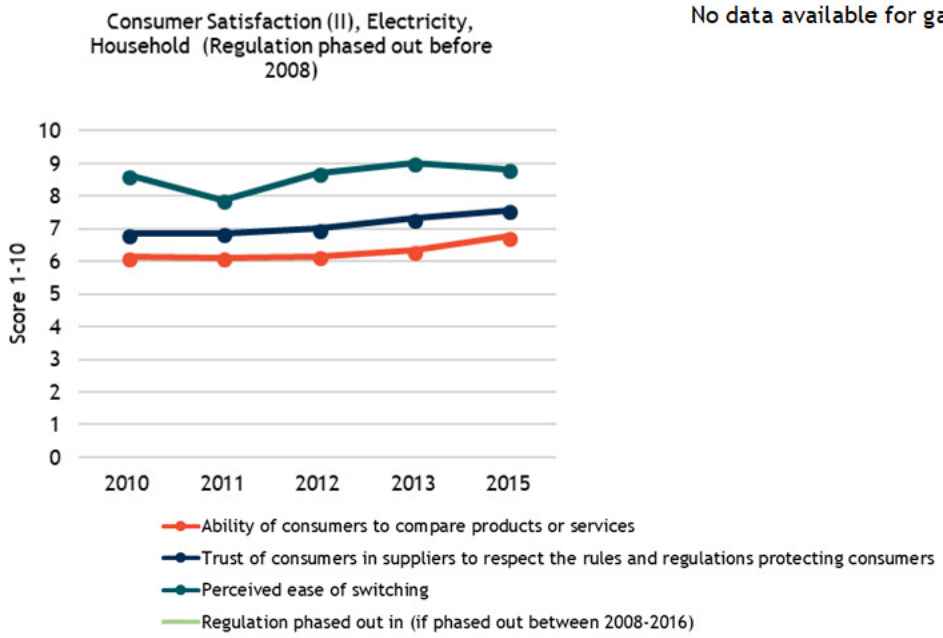
[266] https://ec.europa.eu/energy/sites/ener/files/documents/2014_countryreports_finland.pdf

**Figure 142 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Finland for households**




*Source:* EC – DG Justice[267]

**Figure 143 Ability of consumers to compare products or services[268], trust of consumers in suppliers[269] and perceived ease of switching[270] in in Finland**




*Source:* EC – DG Justice

[267] Note that from 2013 onwards, the survey was carried out every other year.
[268] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[269] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[270] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. Overall, Finnish consumers have choice in the electricity market, except with regards to dual offers.

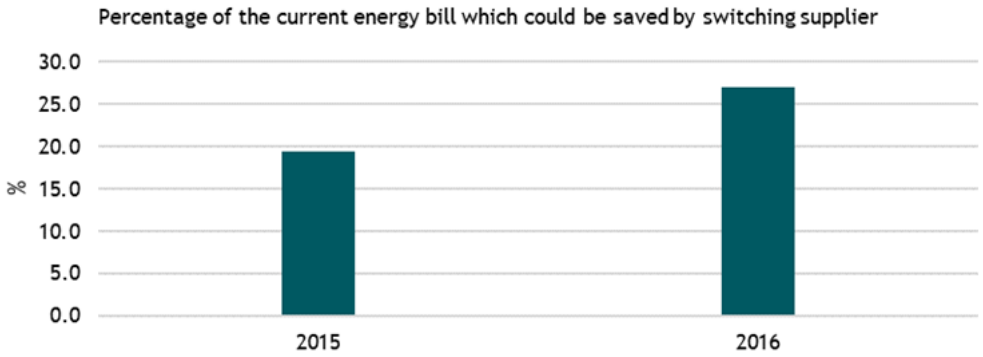
**Table 11-1 Consumer choice in Finland (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 | No |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | Yes |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

**Figure 144 Percentage of the current electricity bill which could be saved by switching supplier in Finland**

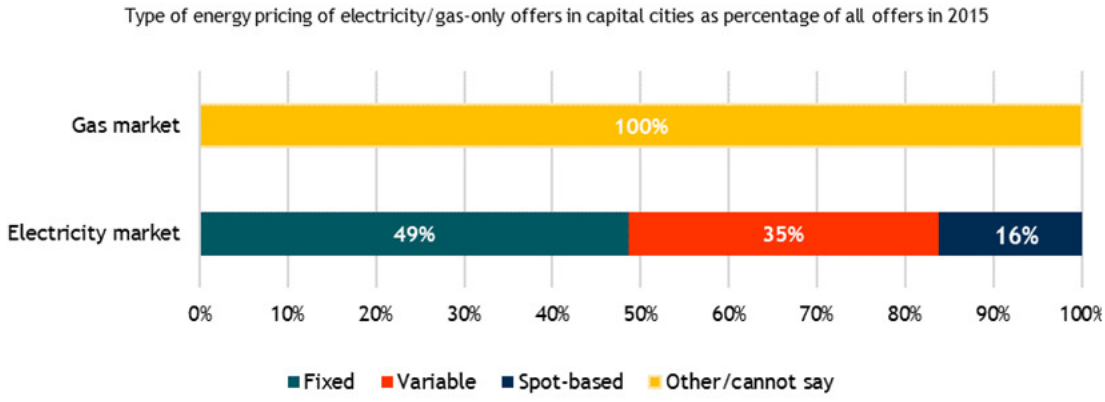



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, most of which are fixed for electricity. There is limited information regarding the gas offers for households.

**Figure 145 Type of offers for households in Finland**




*Note: Spot-based contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015).

## 11.2 Non-Household Price Regulation in Finland

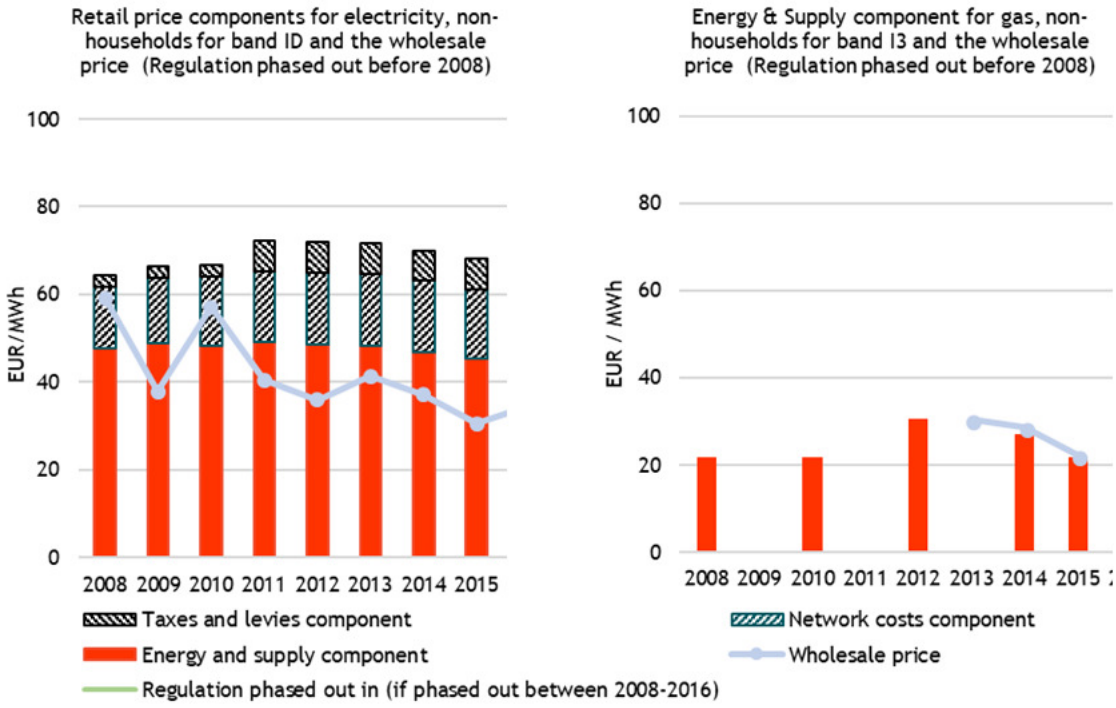
**Finalnd had no energy price regulation for non-households in the period assessed.**

Similarly as for households, there is no retail price regulation for non-household consumers in Finland.

### *11.2.1 Selected aspects of competition (mark-ups)*

Given the limited price data for Finland it is not possible to assess the alignment between the energy component of retail prices and wholesale prices over time and give an indication regarding competition performance. Similarly, due to lack of data, it is not possible to calculate the mark-ups (differences between the wholesale price and retail energy price component[271]).

**Figure 146 Industry retail price components for middle bands (ID and I3) and wholesale prices in Finland**

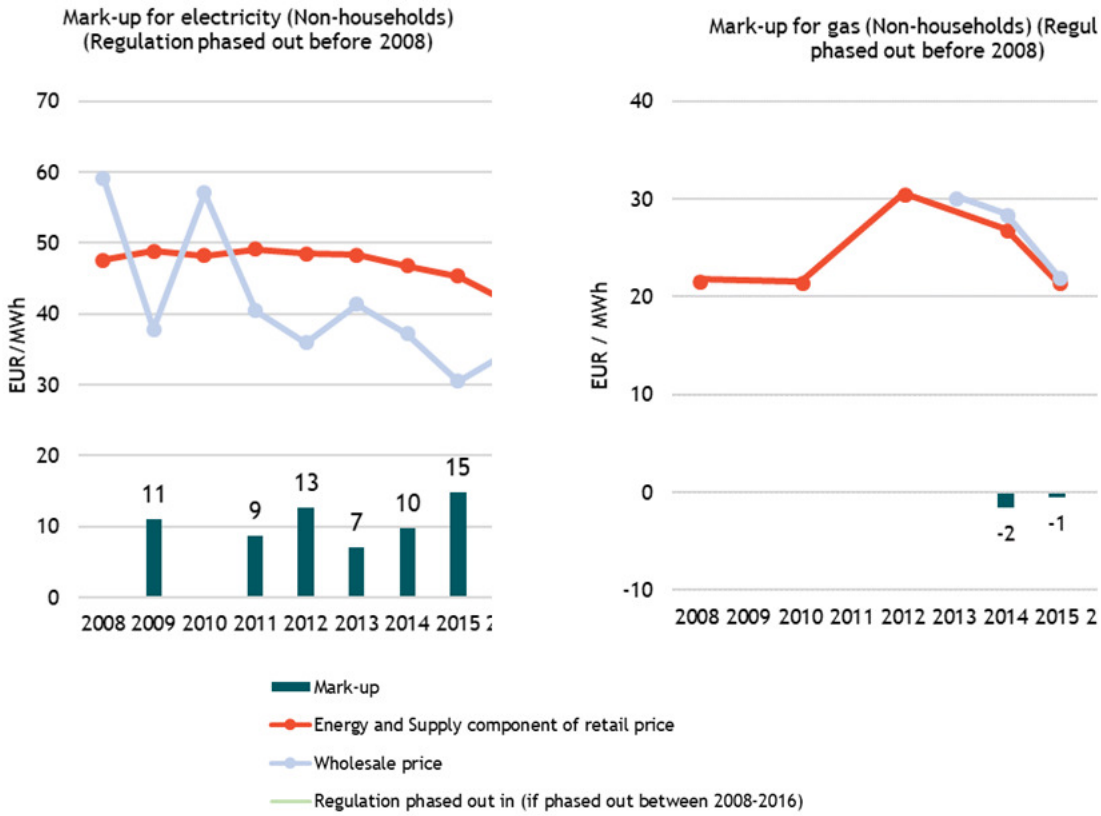



*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

[271] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 147 Mark-ups for Finland, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 11.3 Tariff deficit in Finland

**Finland had no tariff deficit between 2008 and 2016.**

# 12 Factsheet: France

This factsheet presents the findings for France for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 12.1 Household Price Regulation in France

**France still has energy price regulation for households in place, both for electricity and gas. Since 2007consumers can opt for regulated or market prices.**

**End user price regulation is still existent on the electricity and the gas markets for household consumers.** Since 2007, French household consumers do have the choice between opting for free market prices and regulated tariffs. Regulated prices (yearly set by the French public authorities) can only be offered by the incumbents (EDF, Engie and local suppliers (ELD).

Regulated electricity tariffs are established, in accordance with Article L.337-6 of the Energy Code, by adding (besides infrastructure, transport and distribution costs), the price of regulated access to historical nuclear electricity (ARENH)[272], the additional energy supply at market price, the costs related to the capacity guarantee, the routing and marketing costs and the normal remuneration of the incumbent.[273] With the above-mentioned measures (like ARENH), efforts are being made to reduce market concentration. The regulated electricity tariffs increased slowly between 2008 and 2015[274] partly due to the financing needs of the incumbent, the increase in operating costs and the modernisation of the (nuclear) power plants. By the end of 2017, 82% of the residential customers (for electricity) are still on regulated tariffs (= the blue tariff).[275]

Regulated gas tariffs, in accordance with Decree 2013-400 and Articles L. 445-1 to L. 445-4 French Energy Code, are calculated based on the price of the gas molecule purchased (99% of gas is imported in France), infrastructure, transport, distribution and commercialization costs plus the normal remuneration of the incumbent. In July 2017, however, the highest administrative court of France (le Conseil d'Etat) repealed the law on regulated gas prices (saying it hurts competition and was against European Union regulations). By a decision of 18 May 2018, the Conseil d'Etat accepted, in its principle, the existence of regulated tariffs for the supply of electricity but annuls the contested decision in so far as it is applicable to all final consumers, domestic and non-domestic, for their sites subscribing to a power of less than or equal to 36 kVA.

Figure 1 shows the slowly declining share of the electricity consumption of regulated consumers (households) but still with more than 80% of the residential sector staying with the incumbent (the total electricity consumption of the residential customers is about 150 TWh). In 2016 the wholesale market price (presented Figure 153) was lower than the price of ARENH (and as such alternative suppliers could propose cheaper tariffs based on ordinary wholesale prices). For the gas market, the trend is more aggressive: the share of regulated customers decreased from more than 90% (in 2008) to just over 50% in 2016/17.

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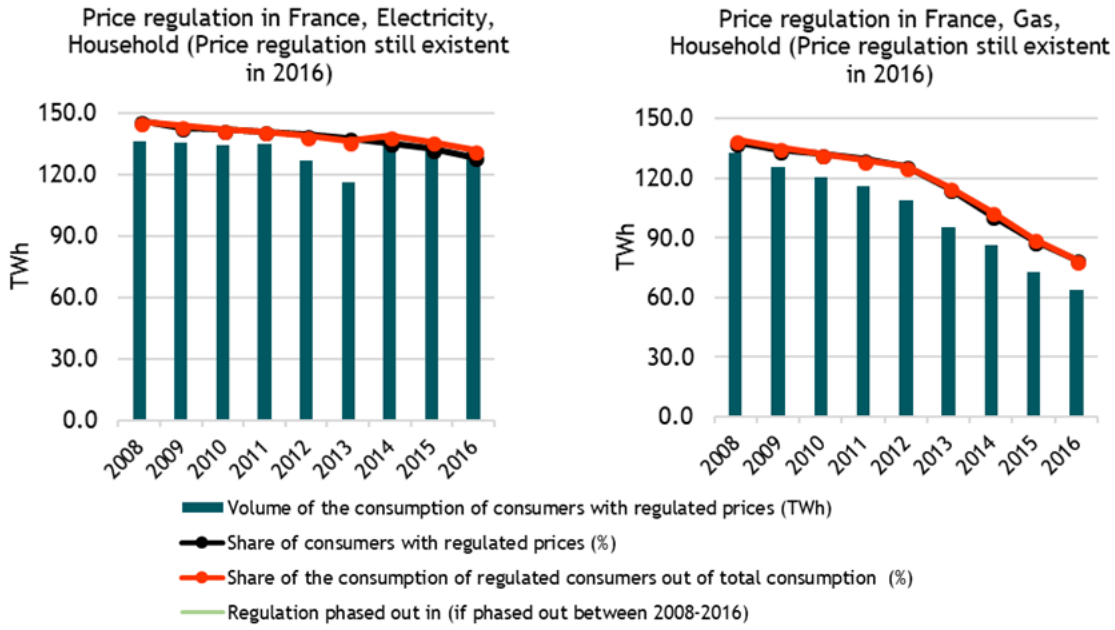
272 ARENH secures access to a limited volume of nuclear generation (maximum of 100 TWh/year) under regulated tariffs for alternative suppliers; the ARENH price has been set by the French government at 42 eur/MWh since the 1st January 2012. In 2016 and 2017, wholesale market prices were lower in average than ARENH price. Suppliers did not use their right for ARENH except occasionally for pure financial optimisation (market prices went higher at the end of the year enabling such optimization).

273 CRE, 7/2017, RAPPORT ANNUEL A LA COMMISSION EUROPEENNE, Principaux développements des marchés français de l'électricité et du gaz naturel en 2016 et au premier semestre 2017

274 Regulated electricity tariffs for households – excl. taxes – decreased from nearly 130 eur/MWh in 1996 to just above 100 eur/Mwh in 2008.

275 CRE, 7/2017, RAPPORT ANNUEL A LA COMMISSION EUROPEENNE, Principaux développements des marchés français de l'électricité et du gaz naturel en 2016 et au premier semestre 2017. "Blue tariffs" is the generic name given to regulated tariffs offered to sites subscribing to a power of less than or equal to 36 kVA. There are "Blue tariffs" for household sites and "Blue tariffs" for non-household sites. Besides, each site chooses one option of "Blue tariffs" mostly between the following: base (one price along the year), peak/off-peak (a lower price during the night and higher price otherwise) or "Tempo" (for household: this option distinguishes three different kinds of days (blue, white and red) related to how the system is solicited; the colour of the day is chosen by TSO; there are two prices for each colour (Peak or Off-peak)). See also: https://www.cre.fr/Documents/Deliberations/Proposition/Tarifs-reglementes-de-vente-d-electricite4

**Figure 148 Household price regulation in France from 2008 to 2016**




*Source:* CEER data

Special tariffs for the protection of vulnerable consumers (exclusively households) were adopted under the law of 10 February 2000 for electricity and the law of 7 December 2006 for gas, included in the Energy Code respectively in Articles L. 121-5, L. 337-7 and L. 445-5. From the end of 2013, these tariffs were further extended to cover all households with an annual reference fiscal income per unit lower than EUR 2175[276]. Consequently, the number of households benefitting from the social tariff increase further.

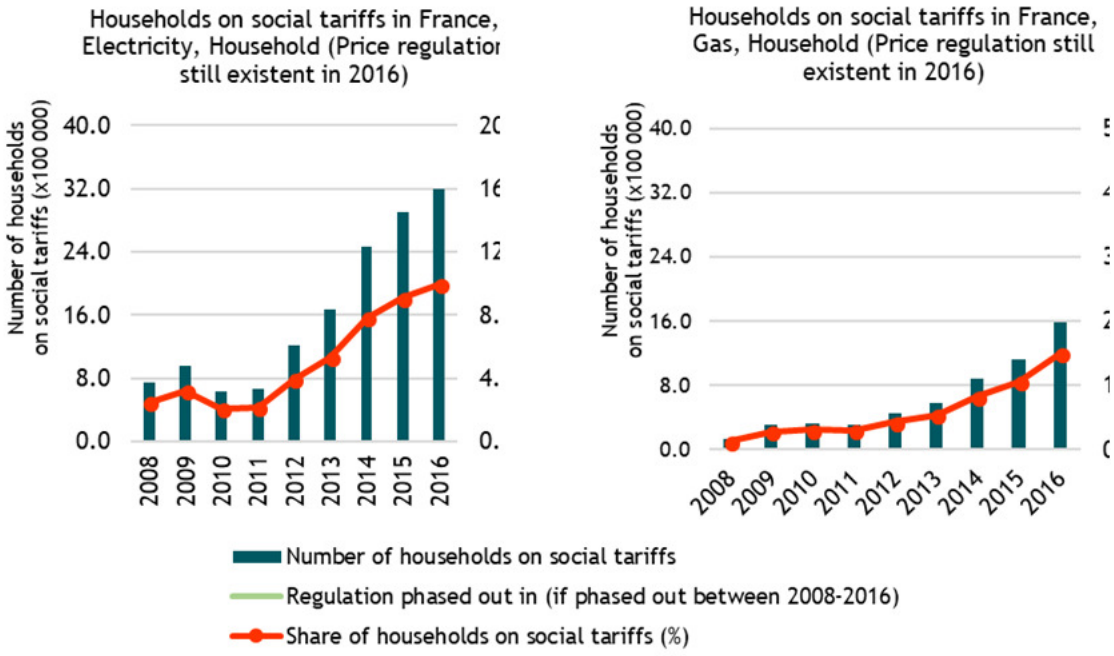
For electricity277, by the end of 2017, around 3 million households benefited from the TPN (primer necessity tariff). Compared to 2011, the number of households benefitting from a social tariff increased with a factor 6. The costs borne by the suppliers applying the TPN are compensated for these public energy service charges. The estimated cost of the system, including management costs, is €273.9 million for 2017. In addition to the TPN, the most disadvantaged consumers can benefit from assistance with the payment of their social services bills via the Solidarity Fund for Housing (FSL).For gas[278], also by the end of 2017, around 1.5 million households benefited from the Special Tariff of Solidarity (TSS). As for the TPN, consumers in difficulty can benefit from a service of maintenance of the energy and with assistance with the payment of their invoices (through FSL). Suppliers who apply the TSS are compensated for public service charges on energy. The expenses for 2017, including management costs, totaled €92.8 million.

Important to note is that the social tariffs in gas and electricity disappeared at the end of 2017 in favour of the energy cheque. The energy cheque ("chèque énergie") is set up gradually, starting with a

[276] or if the resources made it possible to benefit from the "CMU-C" (Complementary Universal Health Cover) or the "ACS" (Assistance for a complementary Health insurance)
[277] Ibid
[278] Ibid

two-year experimental phase. In May 2017, 170,000 energy cheques were distributed to the first beneficiaries in four departments. The beneficiaries of the energy cheque benefit from the same reductions regarding the services related to the supply as the customers benefiting from the social tariffs, namely the free commissioning and an 80% reduction on the travel expenses in case of unpaid invoice. Costs borne by suppliers as such are included in the scope of energy public service charges.

**Figure 149 Household social tariffs in France**

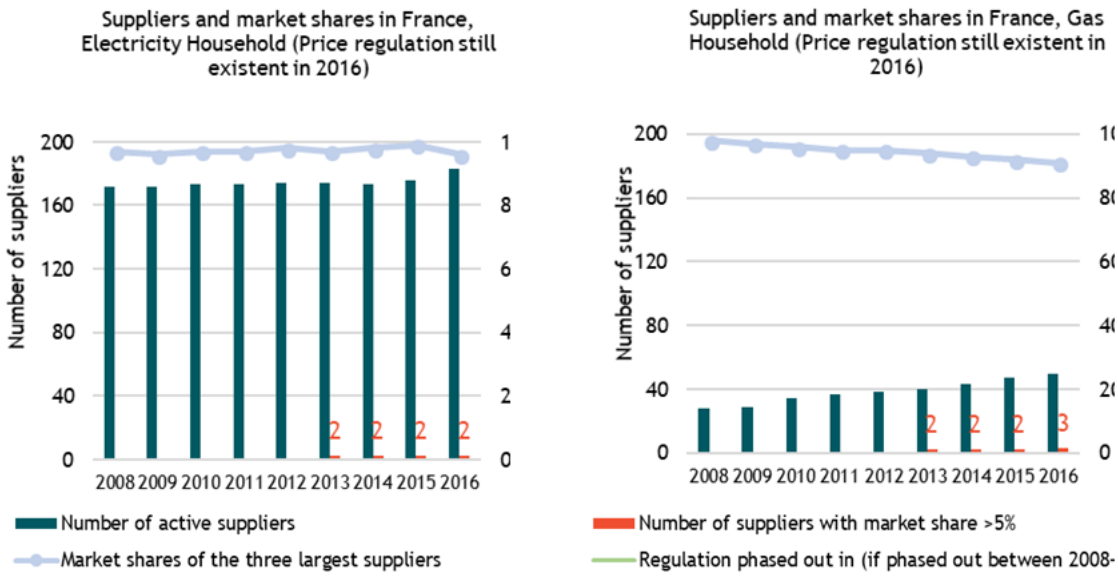



*Source:* CEER data

### *12.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the market share of three largest suppliers is over 90% over the last years. For electricity, the market has remained static for most of the period of analysis with the exception of 2016, which could be explained by the fact that the general wholesale price went below the ARENH price as mentioned above. For gas, there has been an increase in the number of active suppliers and a continuous decreasing market share of the incumbents that has accompanied the reduction in the share of households under regulated prices in the gas market.

**Figure 150: Number of suppliers and market shares in France**

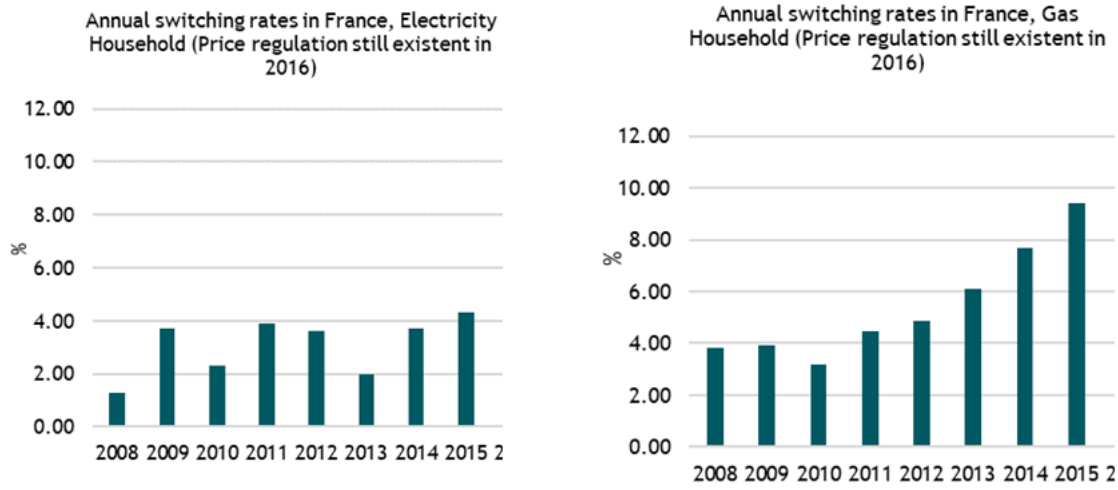



*Note: Data on the number of suppliers with market shares >5% is only available form 2013 onwards. For electricity: Active suppliers offering contracts in at least one part of the country (eg. one region) and having at least one customer + 160 ELD which are local distribution companies; For Gas: Active suppliers offering contracts in at least one part of the country (eg. one region) and having at least one customer + 22 ELD which are local distribution companies*
*Source:* CEER data

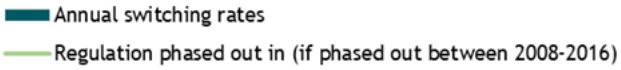
## Consumer engagement and expenditures on energy

The figures below show the annual switching[279] rates in households for both electricity and gas. The switch rate for gas grew steadily as the share of households under regulated prices was reduced. Similar to what was observed above, the electricity market remained static and was range-bound at a low range of switching (between 2% and 4%), with valleys in 2013 and 2010 (partly related to special campaigns and the changing legislation) until a more sustained increased occurred from 2014 on. In 2016, the annual switch rate was 5.4% for electricity and 10.4% for gas.

**Figure 151 Annual switching rates for households in France**



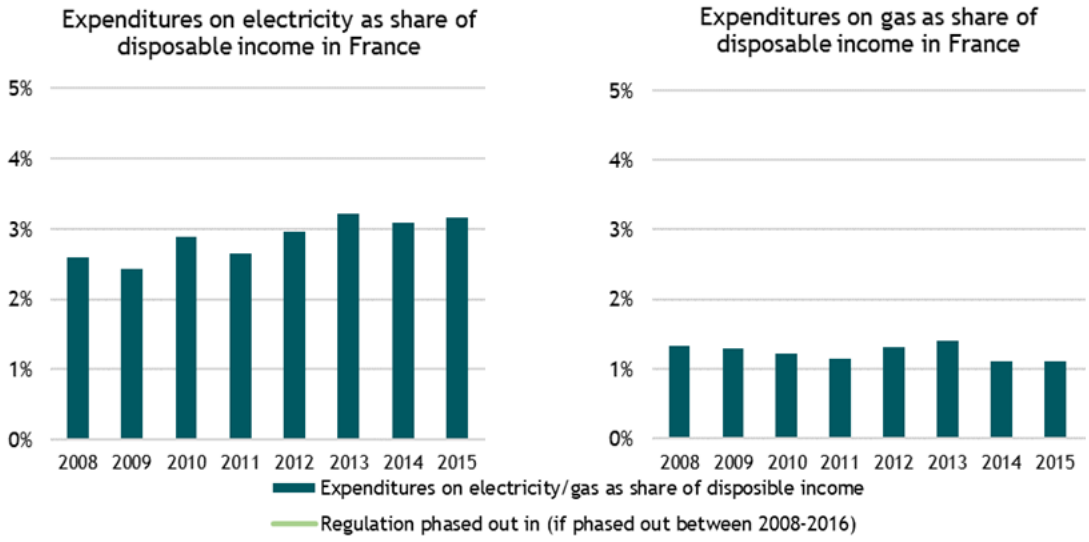

[279] Switching is defined as the voluntary action by which a customer changes his supplier




*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands 280 (those who consume between 2,500 kWh and 5,000 kWh electricity per year and between 20GJ and 200 GJ per year).[281] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in France. Expenditure as a share of disposable in France was 3% for electricity and 1% for gas.

**Figure 152: Expenditures on gas and electricity (incl. VAT) as share of disposable income for households in France (for middle consumption bands DC and D2) using PPS[282]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*
*Source:* Own calculations[283] based on Eurostat

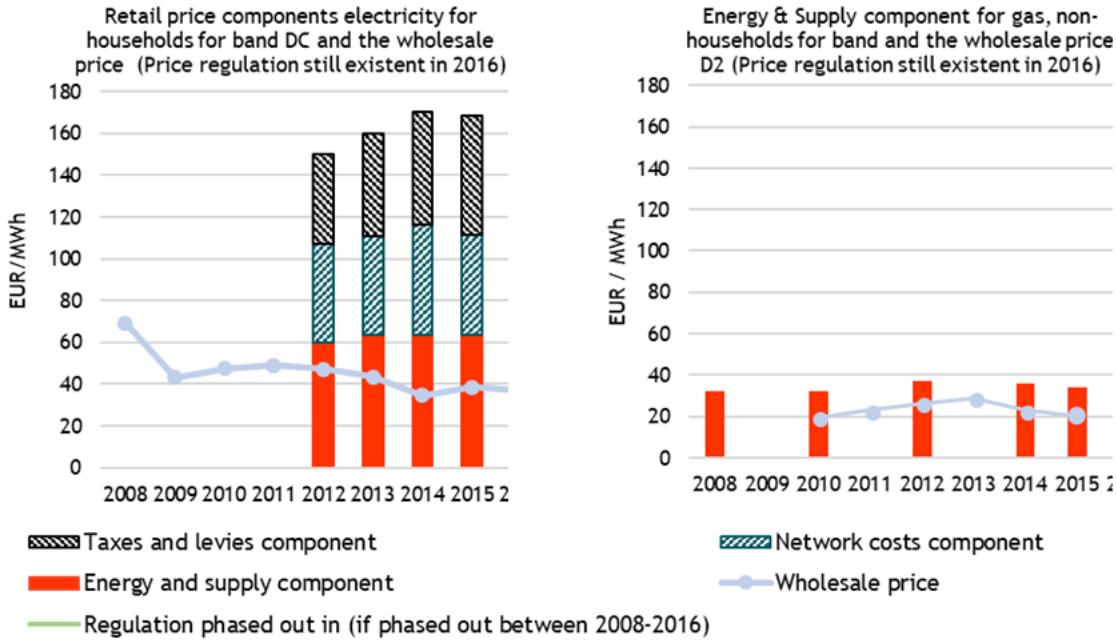
## Competition performance and mark-ups (proxy)

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. An indication to assess the competition performance can be done by comparing the evolution of the energy component of retail prices to those observed in the

[280] The data on gas and electricity prices separates different consumption bands. This report always shows the middle consumption bands being DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)
[281] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.
[282] Purchasing Power Parity (PPS) is an artificial currency. In theory, one can buy the same amount of goods or services in each country with 1 PPS. It can therefore be used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[283] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

wholesale prices. Figure 6 shows the retail component for electricity and gas. The overall retail price for electricity increased slightly due to higher taxes and levies. Wholesale prices remained more or less stable.

**Figure 153 Retail household price for middle consumption bands (DC and D2) and wholesale prices in France**

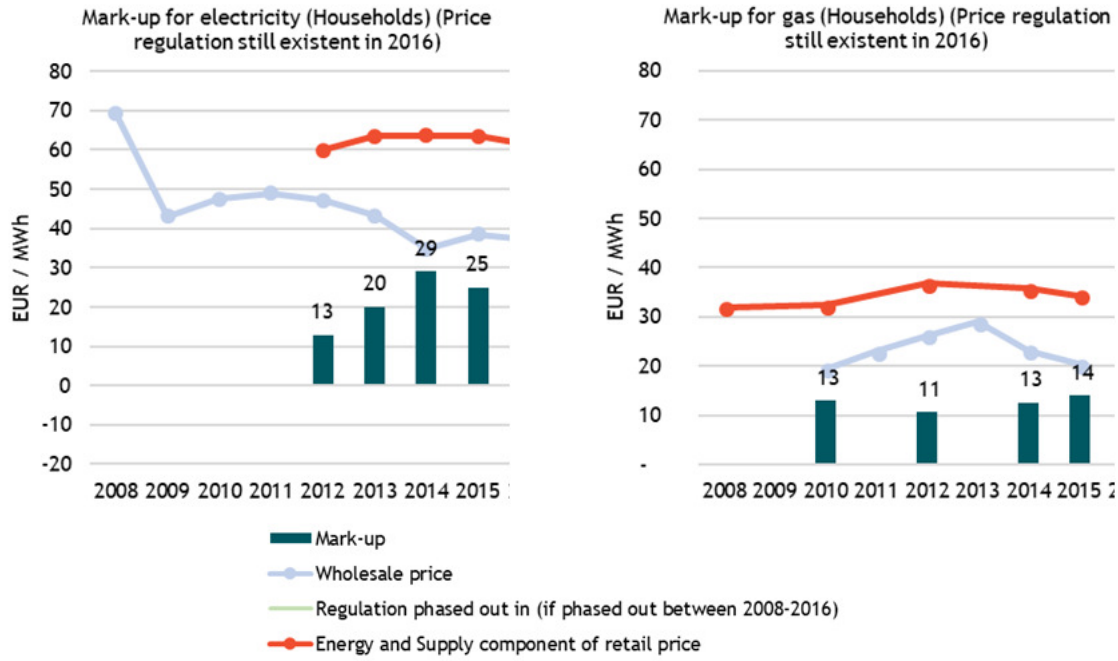



*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market. For the electricity market, no data is available on retail prices between 2008 and 2011*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[284] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price (as a proxy for the procurement cost) and the retail energy price component.[285] The figures below show the mark-ups along with the wholesale price. For electricity, the mark-up is rather stable (around 20 eur/MWh), the mark-up for gas is lower, around 10 eur/MWh. Despite decreasing wholesale electricity prices from 2012 onwards, there was low responsiveness of the retail energy prices to these decreases. When working with data from ACER, the situation is different as ACER publishes higher electricity wholesale prices for 2012 and 2013 (around 45-56 eur/MWh) and slightly lower retail prices. Consequently, the mark-ups are lower and even just negative for 2012 (-1.1 eur/MWh).

[284] Eurostat has data available on gas prices; however not for the energy and supply component.
[285] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 154 Mark-ups for France, middle consumption bands (DC and D2)**

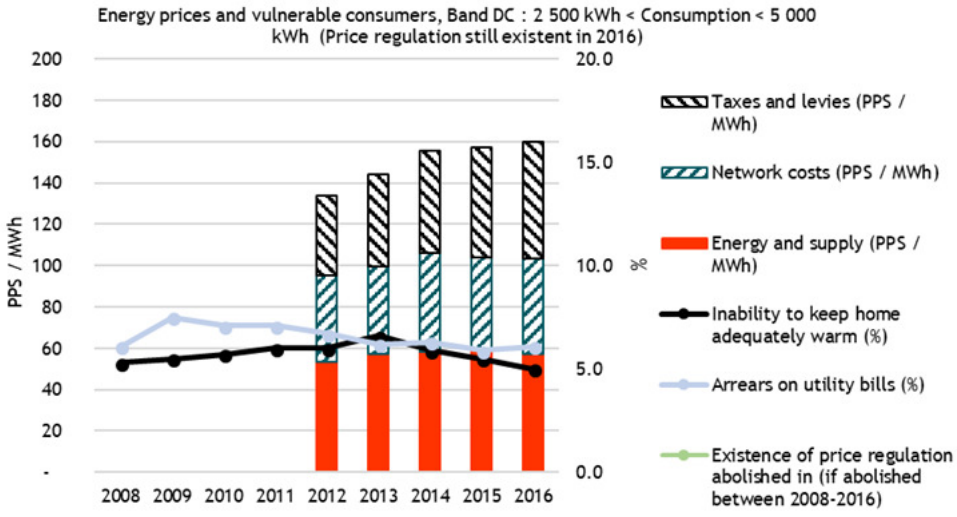



*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. For the electricity market, no data is available on retail prices between 2008 and 2011*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### 12.1.2 Energy poverty

Figure 8 shows the share of the population with arrears on their utility bills and who are unable to keep their homes adequality warm. Consumers in France which are potentially suffering from energy poverty (looking at the number of people who couldn't adequately keep their houses warm), where increasing until 2013. From then onwards, there has been a decreasing trend, while the number of people receiving social tariffs increased in the same period, warranting further analysis of the correlation.

**Figure 155 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in France**




*For the electricity market, no data is available on retail prices between 2008 and 2011.*
*Source:* Eurostat

### 12.1.3 Quality of services

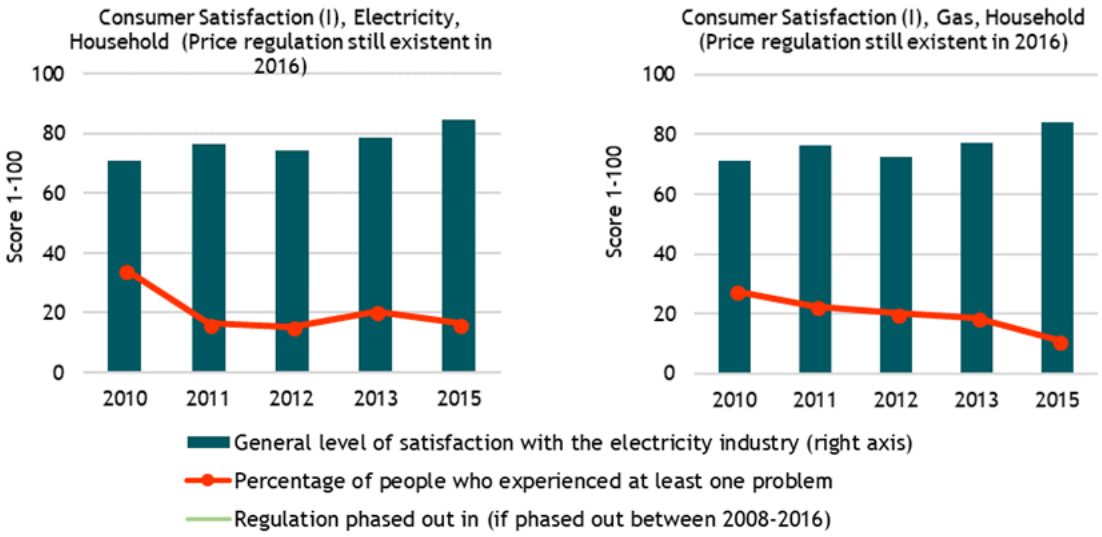
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

Figure 9 shows that consumer satisfaction increased gradually both for electricity and gas. Also, the people who experienced at least one problem declined to a level of 5%.

The CRE mentions in its annual report to the EC[286] that received complaints mainly concern disputes relating to invoicing and the estimate of consumptions by suppliers, unsolicited terminations, essentially resulting technical errors on the part of suppliers, unfair commercial practices, suspensions supply following a billing dispute or payment difficulties and litigation relating to the connection to electricity or natural gas distribution networks.

**Figure 156 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in France for households**



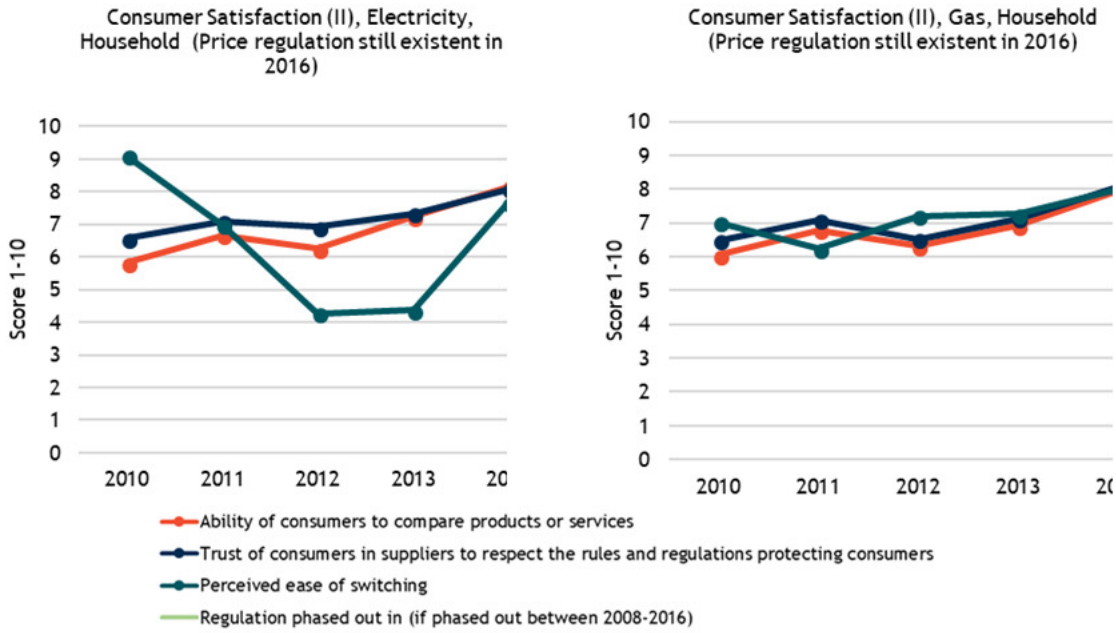

*Source:* EC – DG Justice[287]

Figure 10 gives an overview of the ability of consumers to compare products and services (in red), the trust of consumers in the energy suppliers (in blue) and the perceived ease of switching (in green). The indicators show a rising trend from 2012 on for both electricity and gas. The exception is for the perceived ease of switching in electricity, which decreased sharply from 2010 to 2012 before partially recovering only from 2013 on.

[286] CRE, 7/2017, RAPPORT ANNUEL A LA COMMISSION EUROPEENNE, Principaux développements des marchés français de l'électricité et du gaz naturel en 2016 et au premier semestre 2017

[287] Note that from 2013 onwards, the survey was carried out every other year.

**Figure 157 Ability of consumers to compare products or services[288], trust of consumers in suppliers[289] and perceived ease of switching[290] in France**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. While French household consumers had available to them more complex offer types such as dual- or green offers in 2016, there is no information for 2014 on the availability of additional benefits (financial or not) or ICT based offerings to these consumers.

**Table 12-1 Consumer choice in France (electricity, households)**

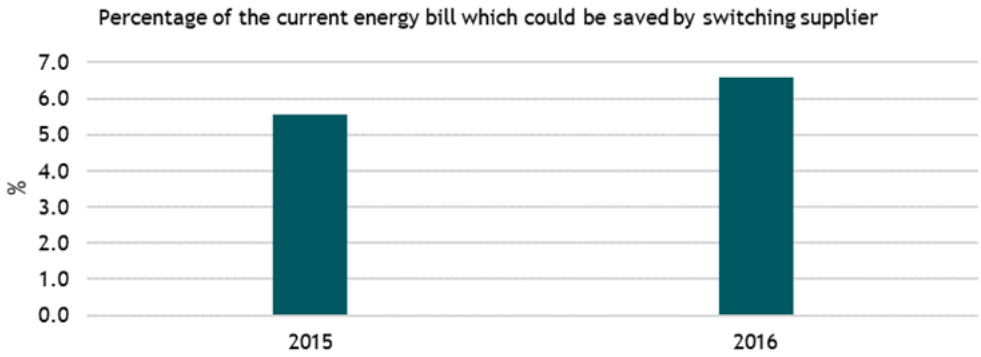
| | Answer |
|---|---|
| Dual-offers available in 2016 (CC03) | Yes |
| Certified green offers available in 2016 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Note that "-" indicate missing data*
*Source:* ACER/CEER (2015)

Figure 11 gives an indication of the potential savings (in percentage of the current bill) in the case of a switch to another electricity supplier. Between 2015 and 2016, the potential savings which could have been realised on the energy bill by switching between suppliers increased by 1 percentage point.

[288] Survey question: "I can choose from a sufficient number of electricity providers?"
[289] Survey question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[290] Survey question: "Which of the following best reflects your experience of switching?"

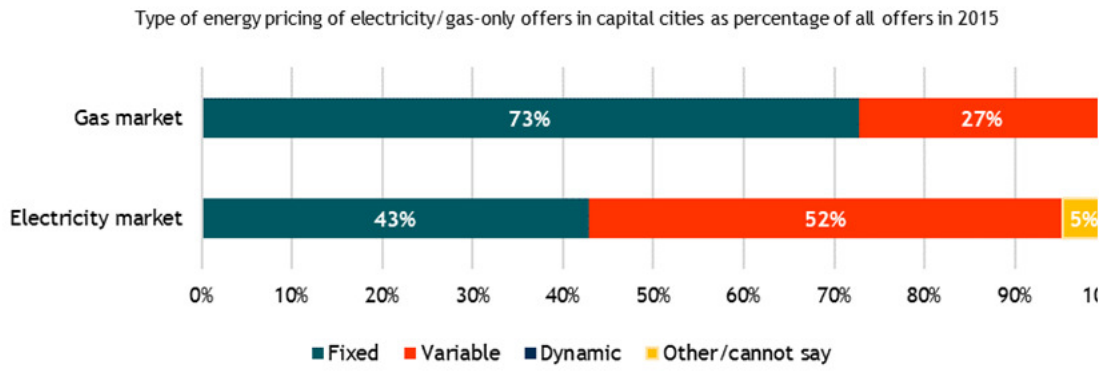
Figure 158 Percentage of the current electricity bill which could be saved by switching supplier in France




*Note: Savings may include one-time benefits such as sign-in bonuses*
*Source:* VaasaETT (2016)

The diagram below shows the type of offers available for electricity and gas. For gas, a majority of the offers is still fixed. For electricity, the fixed offers became less than half of the total amount of offers.

Figure 159 Type of offers for households in France




*Note: Dynamic price contracts are a type of variable contract but presented separately.*
*Source:* ACER/CEER (2015)

## 12.2 Non-Household Price Regulation in France

**France phased out energy price regulation for non-households starting from 2014 for gas, but still has price regulation in place for electricity. For electricity, since 2016 price regulation is only available for consumers under 36kVA though.**

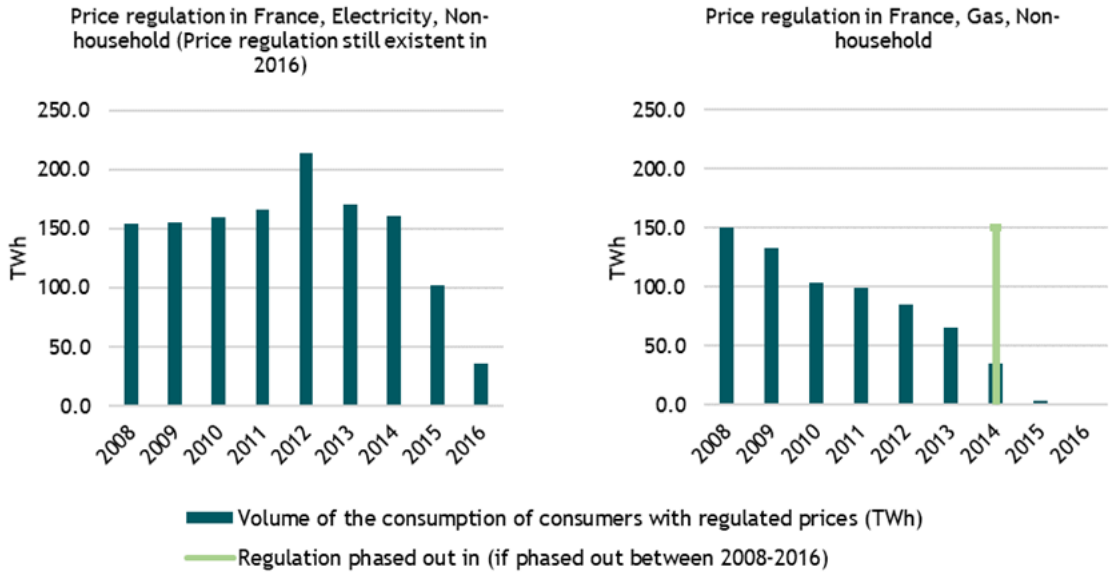
For the non-residential market, for the electricity sector, the system changed from 1/1/2016 onwards: companies that subscribed a contract power higher than 36kVA are, overall, not eligible anymore (to apply for regulated prices) and thus have to source themselves in the free market (cf. art L 337-9 of the Energy code). However, as most SMEs are not subscribed at more than 36kVA, most non-residential consumers (66% at 31/12/2017) are still sourcing themselves via regulated tariffs (representing 12% of annual consumption). The abolishment of regulated electricity tariffs was carried out in one single step. The number of sites concerned was significant: more than 400,000 sites had to subscribe to a market offer before January 1, 2016, nearly three times more than for natural gas. As such, the number of non-residential sites in market supply increased by 58.6% in 2016, compared to only 39.8% in 2015. By

1/1/2017, 1,548,000 sites out of a total of 5.0 million were in electricity supply, of which about 56% was from an alternative supplier.

For gas, the gradual abolition of regulated sales tariffs for professionals began in 2014. The provisions of Article L. 445-4 of the Energy Code stemming from the law of 17 March 2014 foresee in the gradual elimination of regulated sales tariffs: by June 19, 2014 for very large natural gas users connected to the transmission grid; by 31 December 2014 at the latest, for non-domestic consumers whose annual consumption exceeds 200 000 kWh of gas per year and by 31 December 2015 at the latest, for non-domestic consumers whose annual consumption exceeds 30 000 kWh of gas per year and for main-use residential buildings consuming more than 150 000 kWh per year.

The CEER data confirms the gradual declines in the electricity and gas consumption under regulated prices for non-household consumers. Figure 13 shows that the volume of electricity consumption under regulated for non-household consumers increased between 2012. From 2013 onwards, the volume decreased consistently and reached 36 TWh in 2016. For gas, the decline in the consumption under regulated prices started earlier (in 2008) and reached 1.1 TWh in 2016.

**Figure 160 Non-household price regulation in France from 2008 to 2016**



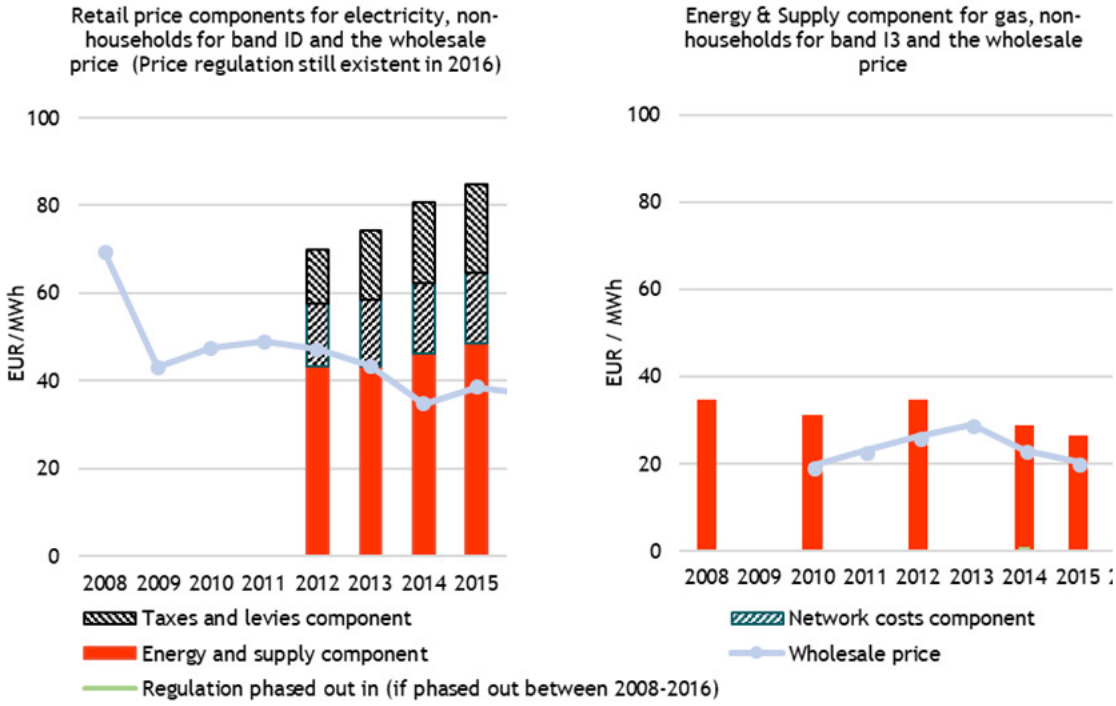

*Source:* CEER data

### *12.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Figure 14 discloses that the energy and supply component of the retail electricity price increased between 2013 and 2015 and decreased in 2016 to 43 eur/MWh. In the same periods, the other retail price components did not change significantly. The figure shows similar trends for the electricity wholesale price and the and the energy and supply component for the electricity market between 2014 and 2016. Even though this short time period does not allow for robust conclusions, it is an indication of a relatively efficient electricity market for non-household consumers. This conclusion

holds for gas as well as the figure shows rather similar developments of the wholesale price and the energy and supply component of the retail price between 2010 and 2015.

**Figure 161 Industry retail price components for middle consumption bands (ID and I3) and wholesale prices in France**




*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market. For the electricity market, no data is available on retail prices between 2008 and 2011*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[291] The figures below show the mark-ups along with the wholesale price. The mark-ups for gas vary between -4 eur/MWh and 11 eur/MWh. This suggests that, the difference between the electricity wholesale price and the energy and supply component of the retail price is rather small in France between 2012 and 2016. For gas, negative mark-ups are not disclosed and the variation in the mark-ups is smaller (varying between 6 eur/MWh and 12 eur/MWh). Whereas no clear trend is observed for electricity, the energy and supply component of the gas retail price and the wholesale price converged between 2010 and 2015 which resulted in a decreasing trend for mark-ups. For both electricity and gas, mark-ups are lower on the market for non-household consumers than on the market for household consumers, with energy & supply price components following more closely the wholesale prices.

[291] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 162 Mark-ups for France, middle consumption bands (ID and I3)


*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. For the electricity market, no data is available on retail prices between 2008 and 2011.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 12.3 Tariff deficit in France

**France does not have a tariff deficit per se, as the applied regulated tariffs do cover the costs. However, the CSPE (Contribution to the Public Service of Electricity) is sometimes considered tariff deficit.**

France doesn't have a tariff deficit, as the applied regulated tariffs do cover the costs (and as such, the mark-ups are positive). However, the CSPE (Contribution to the Public Electricity Service) which was instituted by the law 2003-8, could be considered a kind of tariff deficit. The CSPE is a contribution which covers the costs of support to renewables, co-generation, tariff equalization in non-interconnected French territories, as well as the social tariff for vulnerable consumer.
Initially, in 2002, the CSPE was set at 3 €/MWh but over the years, it increased continuously and since 2016 it is at a level of 22.5 €/MWh. Since France has an annual consumption of about 480 TWh, the total amount potentially recoverable by the CSPE can be estimated at more than 10 billion euros per year.
The legislative modification, enforced in 2016, regarding the financing of public energy service charges, scheduled (for the period 2016-20) the reimbursement of this deficit. Since 2016, these public charges are directly financed by the public state budget (by general budget or dedicated purpose fund depending on the nature of the expense).

# 13 Factsheet: Croatia

This factsheet presents the findings for Croatia for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 13.1 Household Price Regulation in Croatia

**Croatia phased out energy price regulation for households for electricity starting from 2016 but still has price regulation for gas.**

Croatia has recently changed its position with respect to the regulation of electricity prices for household consumers. In Croatia, household consumers are either supplied by the market or with *universal service* (public supply which consumers automatically get if they are not supplied by the market[292]). In December 2016, 89% of all electricity sold to household consumers was under universal services (as opposed to 99% in 2013 [293]). On 1 January 2016, the Electricity Market Act was amended, and price regulation was abolished for universal services. This change **fully deregulated the electricity prices for households' consumers.**[292]

While the gas market is in the ongoing process of deregulation, **price regulation is still existent on the gas market for household consumers supplied under public service**. In Croatia, consumers are supplied by the market or with *public service* (gas supply for households' consumers under regulated prices and gas supply for energy entities which use gas for generating thermal energy). In 2016, 24% of the total natural gas consumption was supplied using public service, a category which excludes gas for generating thermal energy following the 2018 Gas Market Act.[294] Thus, about a quarter of the total natural gas consumption was under regulated prices. For the suppliers who supplied the consumers under regulated prices, the Croatian Energy Regulatory Agency (HERA) set a price cap.[292]

The first panel in figure 1 confirms the situation on price regulation on the electricity market for household consumers in Croatia. In 2011, 100% of the electricity consumers were under regulated prices. The shares of regulation started to fall in 2014 and reached zero in 2016. Effective liberalization of the household gas market started in 2016, although consumers had the right to switch suppliers since 2008,[295] and thus the second panel indicates all these households were still regulated in 2016.

Croatia does not have social tariffs for either the electricity market or the gas market for household consumers.

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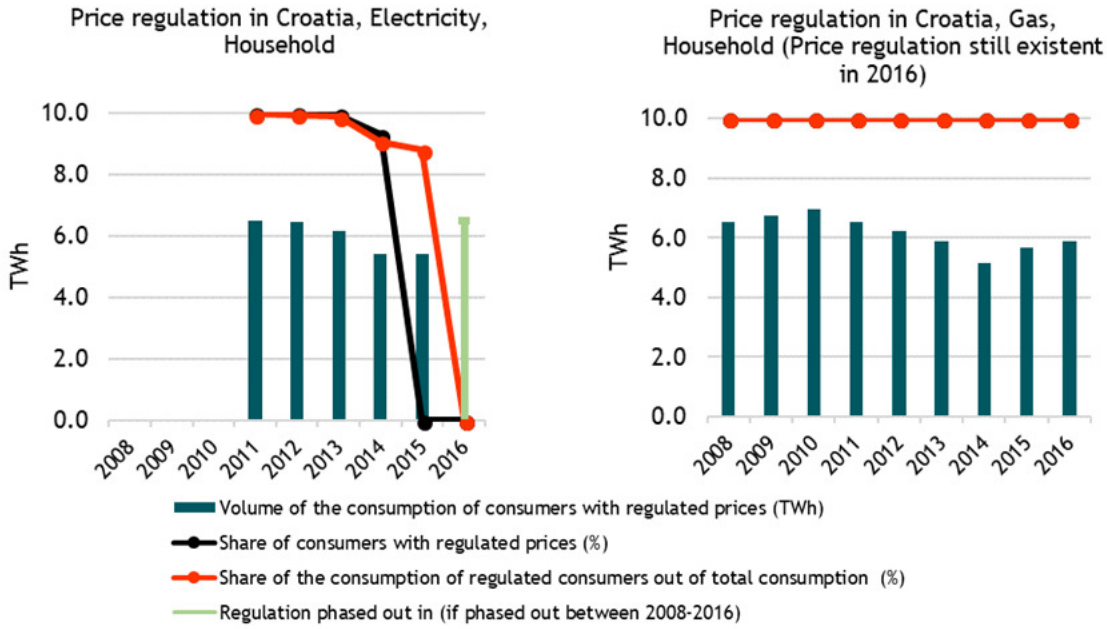
[292] Croatian Energy Regulatory Agency (2016) Annual Report. Available at: https://www.ceer.eu/documents/104400/3736793/C16_NR_Croatia-EN/79221bc5-9c36-9351-5d47-ff678a330743
[293] Croatian Energy Regulatory Agency (2013) Annual Report. Available at: https://www.hera.hr/english/docs/HERA_Annual_Report_2013.pdf
[294] Gas Market Act (OG No. 18/18)
[295] Private communication with the NRA

Figure 163 Household price regulation in Croatia from 2008 to 2016



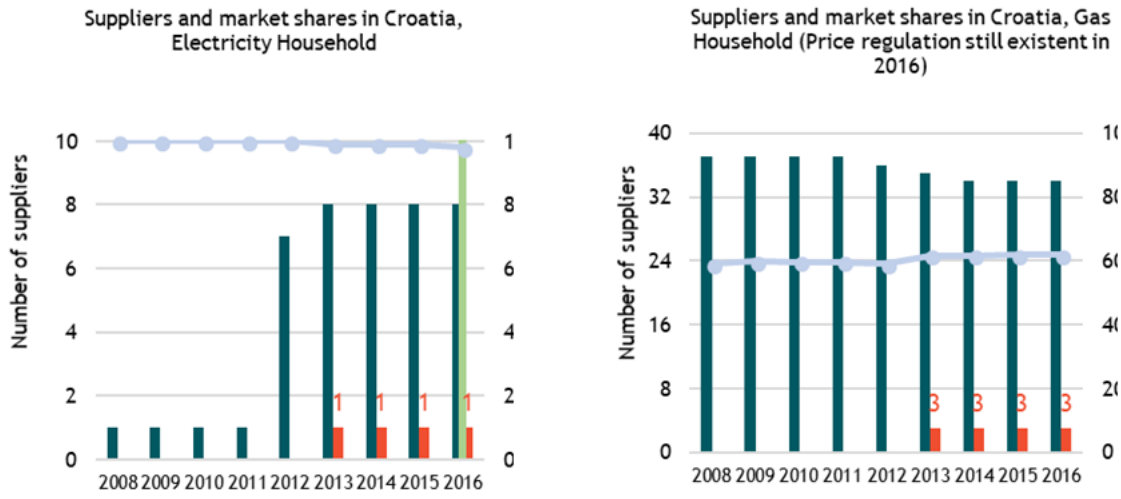

*Note that data is not available for the electricity market between 2008 and 2010*

*Source:* CEER data

### *13.1.1 Selected aspects of competition*

Between 2008 and 2011, there was a single supplier of electricity to household consumers. This increased to seven suppliers in 2012 and another new entrant appeared one year later. It should be noted that the new suppliers are all fairly small as the market share of the incumbent supplier remains above 91% (as can be seen in the figure below). These numbers suggest that there is relatively few competition on the Croatian market and one supplier has much market power. With respect to the gas market for household consumers, the number of suppliers is significantly higher, but decreasing (from 38 in 2008 to 34 in 2016). Meanwhile, the market share of the three largest suppliers is increasing. In contrast to the electricity market, there are three relatively large suppliers of gas for household consumers (with more than 5% market share).

Figure 164: Number of suppliers and market shares in Croatia



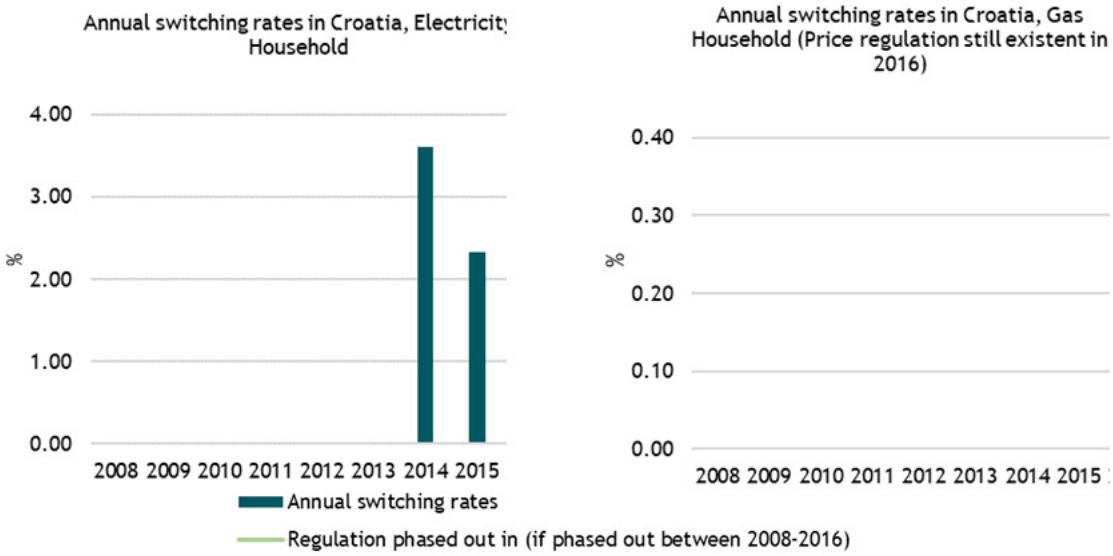

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards.*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figures below show the annual switching[296] rates in households for both electricity and gas, which show that switching rates vary between 2.4% and 3.6% on the electricity market. This implies that, despite the entrance of the new electricity suppliers, most consumers have not switched between supplier. The tendency not to switch between suppliers is even stronger on the gas market. Although there were 34 suppliers of gas in 2016, the switching rate was only 0.34% in that same year. These low percentages show that household consumers on both markets do not switch often between suppliers which could be another indication of relatively little competition on the electricity and gas markets for household consumers in Croatia.

**Figure 165 Annual switching rates for households in Croatia**




*Note that no data was available for the electricity market before 2014 and for the gas market before 2016*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[297] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[298] The indicator shows the

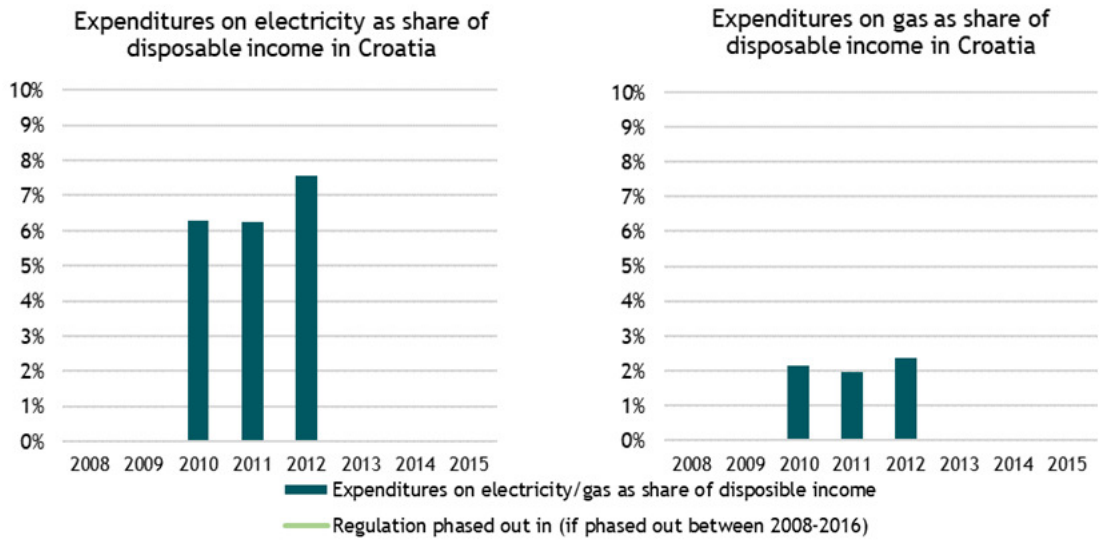
[296] Switching is defined as the voluntary action by which a customer changes his supplier

[297] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[298] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Croatia. The expenditures of Croatian household consumers on energy as a share of their disposable income is rather large. In fact, almost 10% of the disposable income was spend on either electricity or gas consumption in 2012. Although data is only available for the years 2010, 2011 and 2012, it is noteworthy that the expenditures on energy have increased in this short period (as a total, but also individually for electricity and gas). This increase could be driven by the increased energy and supply component of the retail prices for electricity and gas (see figure 6). Unfortunately, the data does not allow one to disclose a possible effect of price deregulation on the expenditures on energy.

**Figure 166: Expenditures on gas and electricity as share of disposable income for households in Croatia (for middle consumption bands DC and D2) using PPS prices[299]**




*No data is available for 2008, 2009 and 2013-2016*

*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[300] based on Eurostat

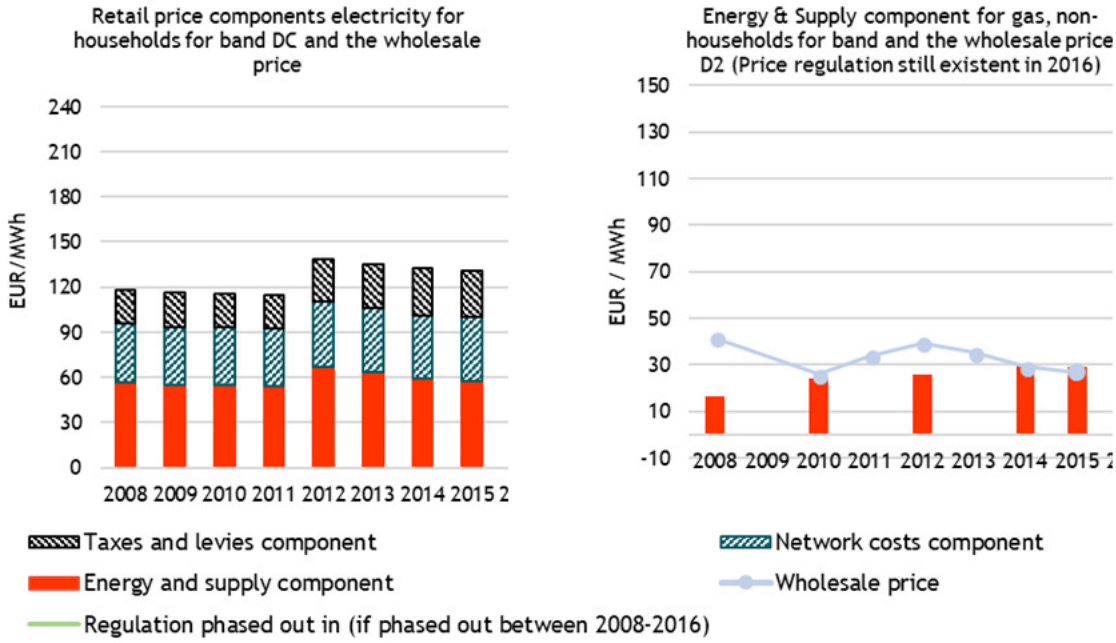
### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Croatia, the energy and supply component of the retail electricity price increased significantly in 2012 (by 21.8%) compared to 2011. In the subsequent years, this component gradually decreased and almost reached the pre-2012 level in 2016. Also, the taxes and levies component and the network costs component experienced a significant increase in 2012. In contrast to the energy and supply component, these price increases have not yet been reversed causing

[299] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[300] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

an increase in the total retail electricity price of 16.1% between 2011 and 2016. The energy and supply component of the retail gas price has increased gradually over time (except in 2016). The total increase between 2008 and 2015 was 81.2%. At the same time, the wholesale prices for gas decreased steadily after 2012.

**Figure 167 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Croatia**




*Wholesale price data is not available for the electricity market. Also, data is not available for the energy and supply component on the gas market in 2009, 2011, 2013 and 2016. Besides, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[301] and EMOS (wholesale price)

*The NRA provided different data which indicate lower values for the energy and supply component prices than Eurostat data. However, a similar increase and decrease pattern is observable, albeit with a later peak.*[302]

**Figure 168 Wholesale and Energy and Supply prices for household consumers**

| HOUSEHOLD CONSUMERS | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|
| Wholesale (EUR/MWh) | 15,28 | 18,90 | 24,08 | 23,92 | 27,63 | 31,37 | 24,14 | 23,00 | 20,17 |
| Energy and Supply (EUR/MWh) | 16,42 | 20,04 | 25,35 | 25,18 | 28,88 | 32,61 | 25,85 | 24,93 | 22,36 |
| *Mark up EUR/MWh* | *1,14* | *1,15* | *1,27* | *1,27* | *1,25* | *1,24* | *1,70* | *1,94* | *2,19* |

*Source:* National Regulatory Agency - Croatia

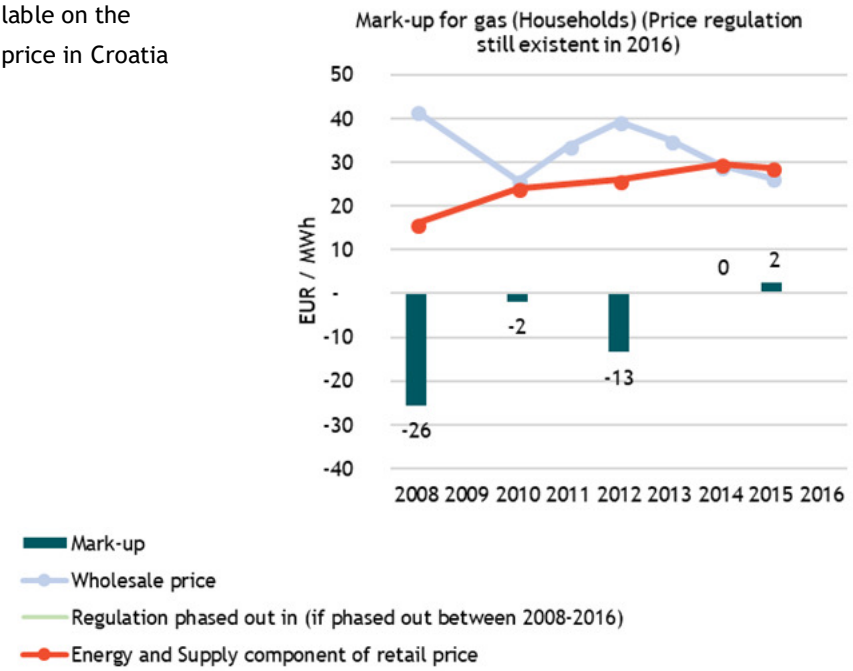
The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale

[301] Eurostat has data available on gas prices; however not for the energy and supply component.
[302] Private communication with the NRA.

price and retail energy price component.[303] The figure below shows the mark-ups on the gas market for household consumers along with the wholesale price, using Eurostat and EMOS data. It is interesting to observe that the mark-ups on the gas market for household consumers have been very low in Croatia compared to other countries. In fact, in 2008, 2010 and 2012, mark-ups were negative. Only for 2015, a positive mark-up is disclosed. For electricity, as the figure above indicates mark-ups are positive but low, in the range of 1 to 2.2 EUR/MWh.

**Figure 169 Mark-ups for Croatia, middle consumption bands (DC and D2)**

No Eurostat data available on the wholesale electricity price in Croatia




*Note that data is not available for the energy and supply component of the retail price for the gas market in 2009, 2011, 2013 and 2016.*

*For consistency of country factsheets, the ad hoc data on electricity is presented in* Figure 169.

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

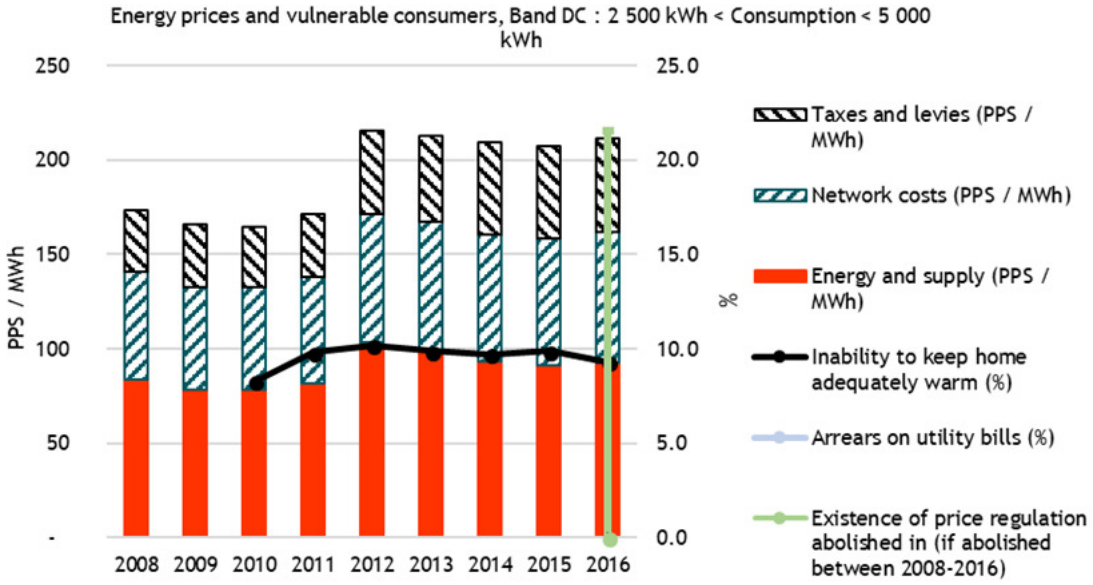
### *13.1.2 Energy poverty*

The share of consumers in Croatia which are potentially suffering from energy poverty was relatively stable over time according to proxy indicators, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. The share of the population which had arrears on their utility bills has decreased between 2010 and 2016. However, with still about 25% of the population having arrears on their utility bill in 2016, this proxy suggests that energy poverty remains an important issue in Croatia compared to other countries where this percentage is generally lower. The number of households with forced inability to keep their homes adequately warm has experienced a modest increase over time. This proxy for energy poverty is,

[303] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

however, much smaller in magnitude. It should also be noted that the share of the population with arrears on the utility bills was closely correlated with the retail electricity price between 2011 and 2015. Yet, where the retail electricity price increased in 2016, the share of the population with arrears on the utility bills decreased by 4% points in the same year. However, whether or not this deviation can be explained by the abolishment of price regulation cannot be concluded based on the limited data period. Croatia defines vulnerable and protected consumers in the Energy Act, Gas Market Act and the Regulation on Criteria for Acquiring the Status of an Endangered Purchaser of Electricity from Networked Systems.[304]

**Figure 170 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Croatia**




*Note that data was not available prior to 2010 the two energy poverty proxies*

*Source:* Eurostat

### *13.1.3 Quality of services*

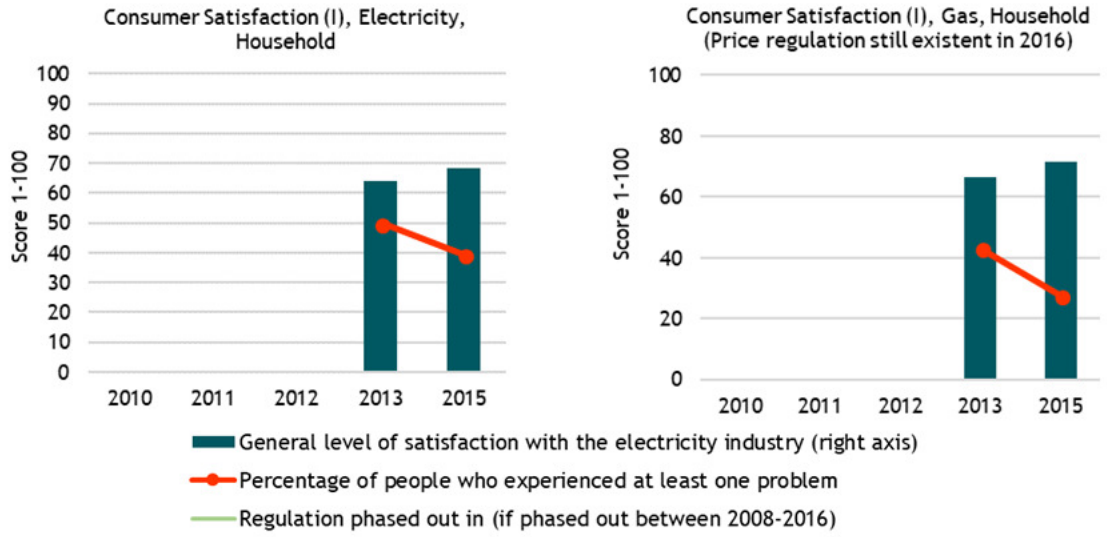
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

Figure 9 shows the general level of satisfaction with the energy sector and the percentage of people who experienced at least one problem. Both indicators are used to estimate the consumers satisfaction in Croatia. Although data is very limited available, the differences between 2013 and 2015 suggest a positive development of consumer satisfaction on both the electricity and the gas market for household consumers. On both markets, the level of satisfaction with the industry increased and the percentage of complaints decreased.

[304] Private communication with the NRA (2018).

**Figure 171 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Croatia for households**

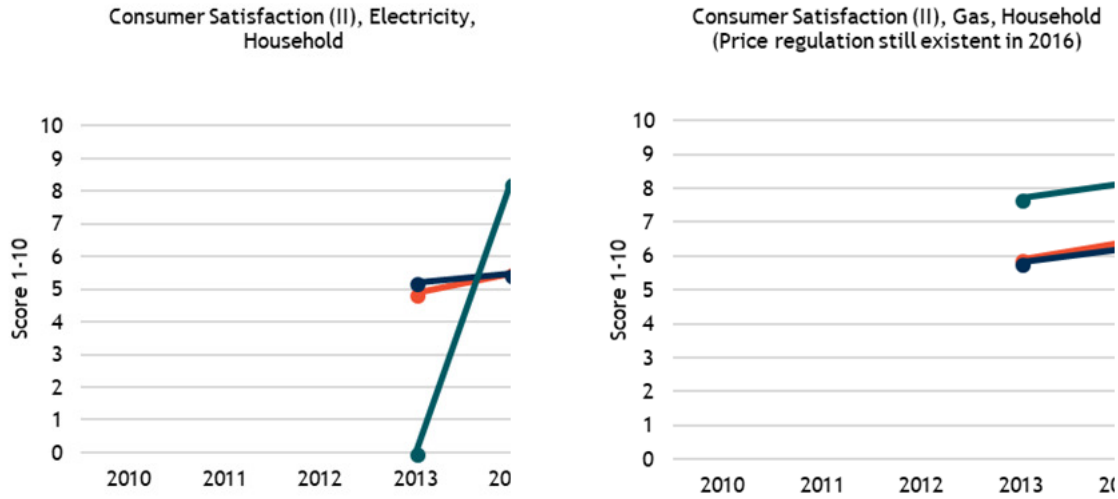



*Data is only available for 2013 and 2015*

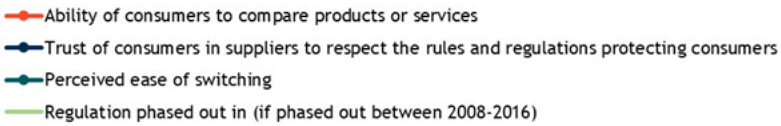
*Source:* EC – DG Justice[305]

Figure 10 is also related to consumer satisfaction as it shows the ability of consumers to compare products and services, the trust of consumers in suppliers and the perceived ease of switching. Also for these indicators, data is only available in 2013 and 2015. As in figure 9, all scores have increased in 2015 compared to 2013.

**Figure 172 Ability of consumers to compare products or services[306], trust of consumers in suppliers[307] and perceived ease of switching[308] in Croatia**




[305] Note that from 2013 onwards, the survey was carried out every other year.
[306] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[307] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[308] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)




*Data is only available for 2013 and 2015*

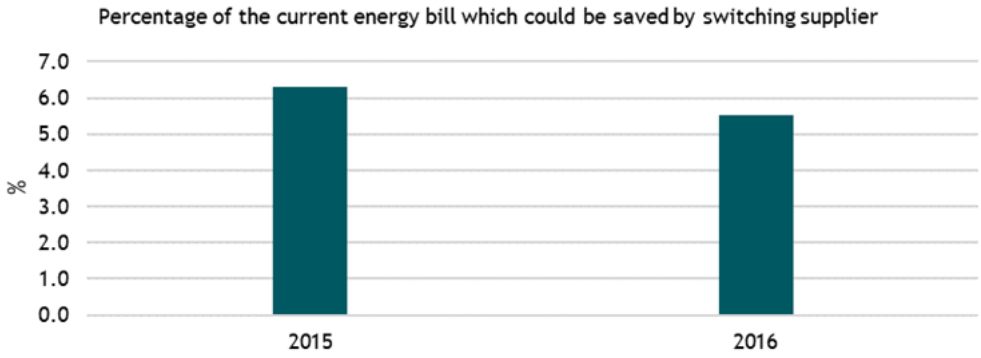
*Source:* EC – DG Justice

### Consumer choice

No data is available on the availability of different energy contracts for Croatia.

Figure 11 shows the percentage of the energy bill which could have been saved if consumers would have switched between electricity suppliers. In 2015, consumers could have saved 6.3% of the electricity bill and in 2016, 5.5%.

**Figure 173 Percentage of the current energy bill which could be saved by switching supplier in Croatia**



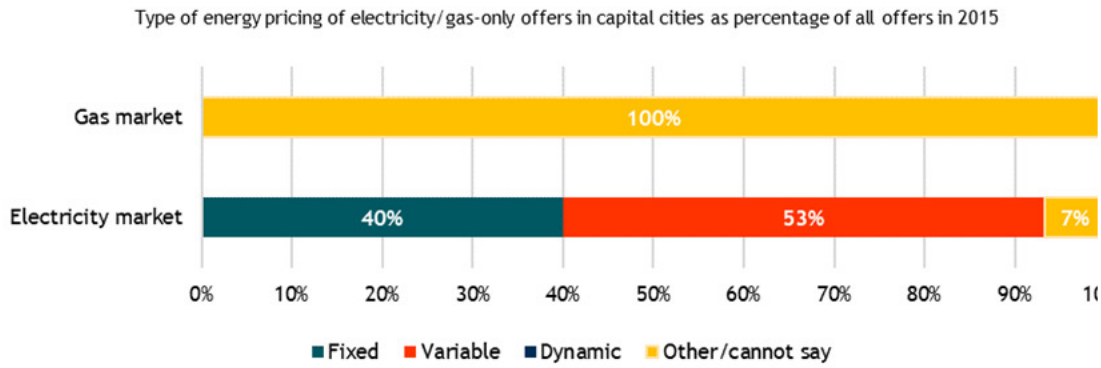

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas. Most of the offers on the electricity market for household consumers in Croatia consider variable prices (53%). These are offers in which electricity prices are, for instance, different at night than during peak hours in the daytime. Besides, 40% of the offers have a fixed price. Another 7% of the offers on the electricity market for household consumers uses other pricing mechanisms (or information is not disclosed). The NRA indicates however that two-tariff meters by 2018 reached 73% of households.[309] On the gas market, 100% of the offers uses different pricing mechanism or the mechanism is not disclosed.

[309] Private communication with the NRA (2018).

**Figure 174 Type of offers for households in Croatia**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

## 13.2 Non-Household Price Regulation in Croatia

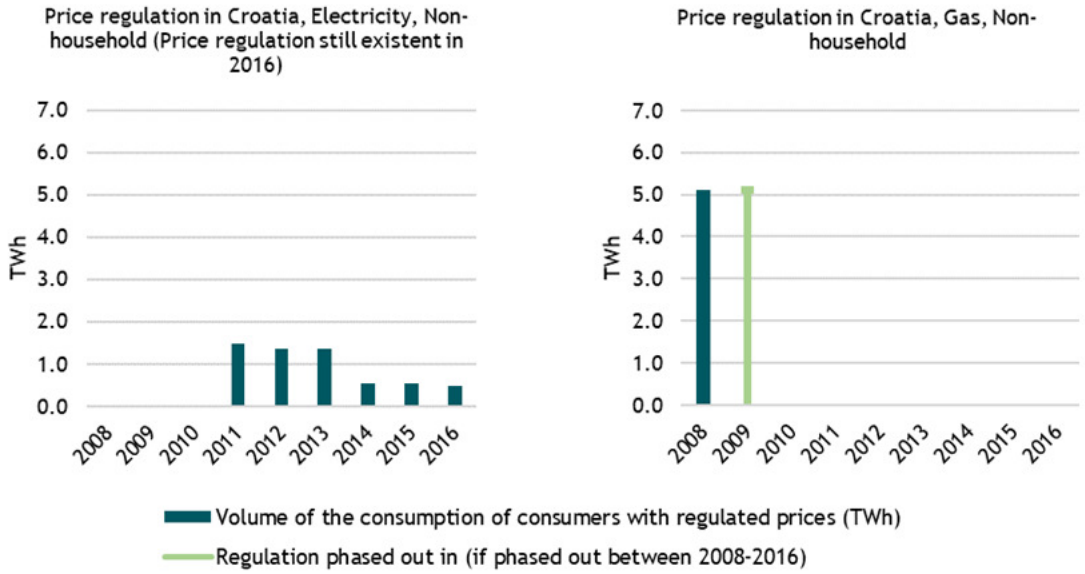
**Croatia phased out energy price regulation for non-households starting from 2009 for gas. However, Croatia still has energy price regulation for non-households in place for electricity.**

Non-household consumers are either supplied by the market or with *guaranteed supply* (non-household customers get in this group in case they are left without supplier driven by conditions beyond their control). Prices under guaranteed supply are higher than market prices in order to incentivise consumers to select a market supplier. In 2016, 10% of the total electricity consumption was under guaranteed supply. Price regulation for guaranteed supply was still in place in 2016.[310] Thus, **around 5% of the *total* electricity consumption in Croatia was still under regulated prices in 2016**. In practice, prices were regulated by a price cap set by HERA.

While the household gas market is in the ongoing process of deregulation, **gas price regulation was phased out in Croatia from 2009 on.** The figure below confirms the situation on the electricity market for non-household consumers in so far that still a small volume of the electricity supplied to non-household consumers is still under regulated prices. With respect to the gas market for non-household consumers, the data from CEER indicates that prices were deregulated in 2009. As a consequence, the volumes of consumption under regulated prices equalled zero from 2009 onwards.

[310] Croatian Energy Regulatory Agency (2016) Annual Report. Available at: https://www.ceer.eu/documents/104400/3736793/C16_NR_Croatia-EN/79221bc5-9c36-9351-5d47-ff678a330743

**Figure 175 Non-household price regulation in Croatia from 2008 to 2016**




*No data available for the electricity market prior to 2011*

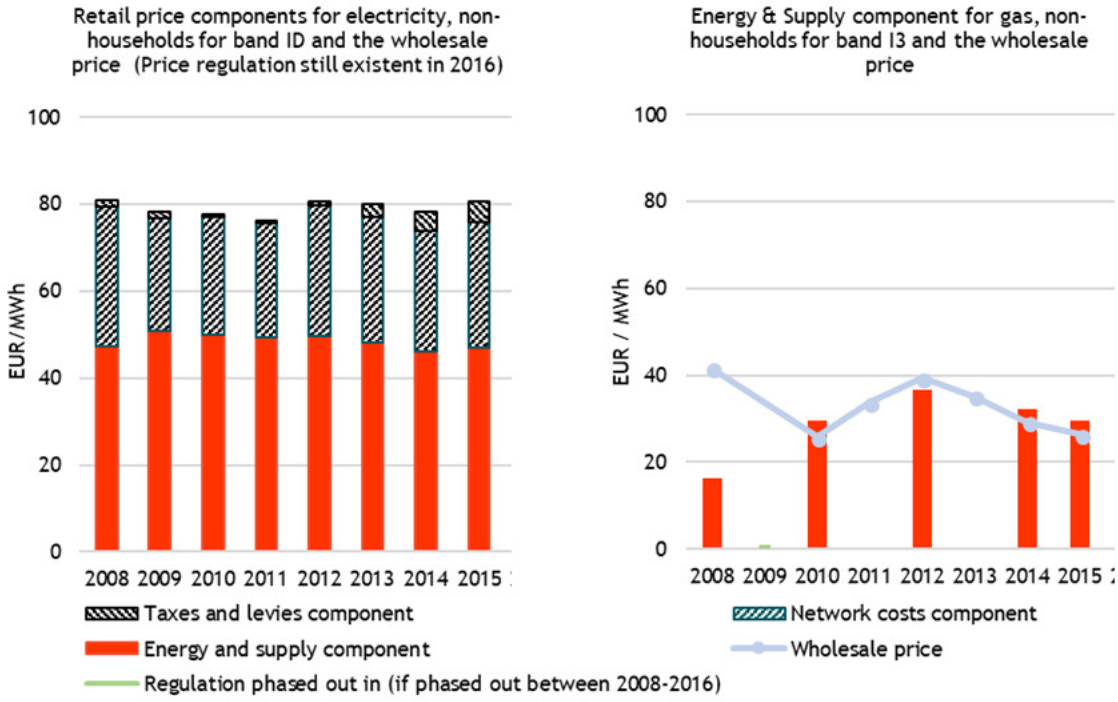
*Source:* CEER data

### *13.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. However, care is necessary as the Croatian NRA started collecting data only in 2014, not verifying thus data from the period of this report.[311] The figure below shows that the retail electricity prices for non-households consumers have been rather stable between 2008 and 2016. The energy and supply component peaked in 2009 when it reached €51 per MWh. After 2009, the energy and supply component of the retail price decreased almost continuously (except in 2012) reaching €44 per MWh in 2016. It should also be noted that the taxes and levies component was very low between 2008 and 2012 (€1 per MWh) after which it was increased to €5 per MWh. The energy and supply component of the retail price for non-household consumers has developed differently on the gas market than on the electricity market. The gas price peaked in 2012, after which it declined again. The energy and supply component of the gas retail price shows a similar pattern as the wholesale price for gas (except in 2008).

[311] Private communication with the NRA (2018).

**Figure 176 Industry retail price components for middle bands (ID and I3) and wholesale prices in Croatia**




*Wholesale price data is not available for the electricity market. Data is also not available for the gas market in 2009, 2011, 2013 and 2016. Besides, there is no data available for the taxes and levies component and the network component for the gas market.*

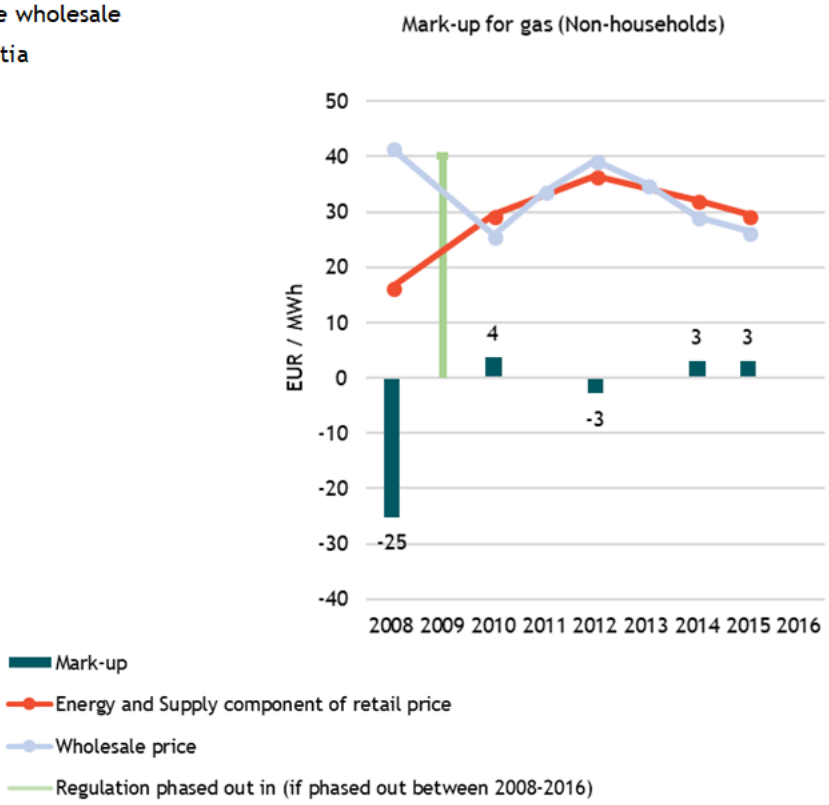
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[312] The figures below show the mark-ups along with the wholesale price. As the wholesale price for electricity is not available for Croatia, no mark-ups were calculated for the electricity market. Figure 15 discloses an interesting pattern on the gas market for non-household consumers in Croatia. In two out of the five years for which data is available, mark-ups were negative. In particular the large negative mark-up (minus €25 per MWh) in 2008 catches the eye. Driven by the decrease in the wholesale price, mark-ups were positive in 2014 and 2015.

[312] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 177 Mark-ups for Croatia, middle consumption bands (ID and I3)

No data available on the wholesale electricity price in Croatia




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 13.3 Tariff deficit in Croatia

**Croatia had no tariff deficit between 2008 and 2016.**

# 14 Factsheet: Hungary

This factsheet presents the findings for Hungary for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 14.1 Price Regulation in Hungary

End user price regulation is still existent on the electricity and the gas retail markets in Hungary. Since the opening of the **electricity market** in 2003, the retail electricity market has been characterised by a dual structure: the regulated price segment (*universal service*) and the competitive market segment, separated from each other. In 2008, the public utility service subject to regulated pricing (which was available to all consumers) was replaced by universal service (which is available to a significantly smaller scope of consumers).[313] The consumers entitled to universal service are household consumers and public institutions.

The **gas market**, similarly to the electricity one, has a dual structure since its opening in 2004. It has a segment with regulated prices and another with competitive market prices, with a constant shift towards the competitive market. In 2009, the public utility service (which was available to all consumers at a regulated price) was replaced by universal service (available to a significantly more limited scope of consumers). The consumers entitled to universal service are household consumers, other consumers with purchased capacity below 20 m3/h, and local governments up to the capacity to supply the service locations of consumers living in
apartments rented from the municipality.[314]

With the termination of public utility service, and later with the reduction of eligibility for universal service, consumers with medium and low consumption also selected their natural gas supplier from the natural gas traders. Upon the introduction of the universal service, the regulated price segment represents only a share of less than 40% of the total natural gas consumption (36% in 2015).[315]

**Natural gas source offering system**

The part of the specific natural gas price taken into account in the price of universal service fees other than the natural gas domestically produced and sold at a regulated price is specified on the basis of the natural gas price formula[316] which takes into account several factors.

Keeping natural gas prices low in 2015 required that universal service providers have access to natural gas at a price lower than the price resulting from the formula. This was facilitated by the price set by the Authority for gas produced domestically from gas fields set into production before

[313] Hungarian energy and public utility regulatory authority (2016), Annual report 2015. Available at: https://www.ceer.eu/documents/104400/3736793/C16_NR_Hungary-EN.pdf/f4ac301e-ae84-c619-39f2-0e31ce47aeb0
[314] Ibid.
[315] Ibid.
[316] Resolution 29/2009 (VI. 29.) of the Ministry of Transport, Communications and Energy on pricing in respect of universal service provided on the natural gas market

1998, which is significantly lower than the market prices. The majority of this resource contracts was terminated in 2015. Therefore, it became necessary develop a legislative framework for the new resource contracts. The Natural Gas Act amendments was completed and approved by the Parliament, and the involved industry players concluded the contracts in May 2015.

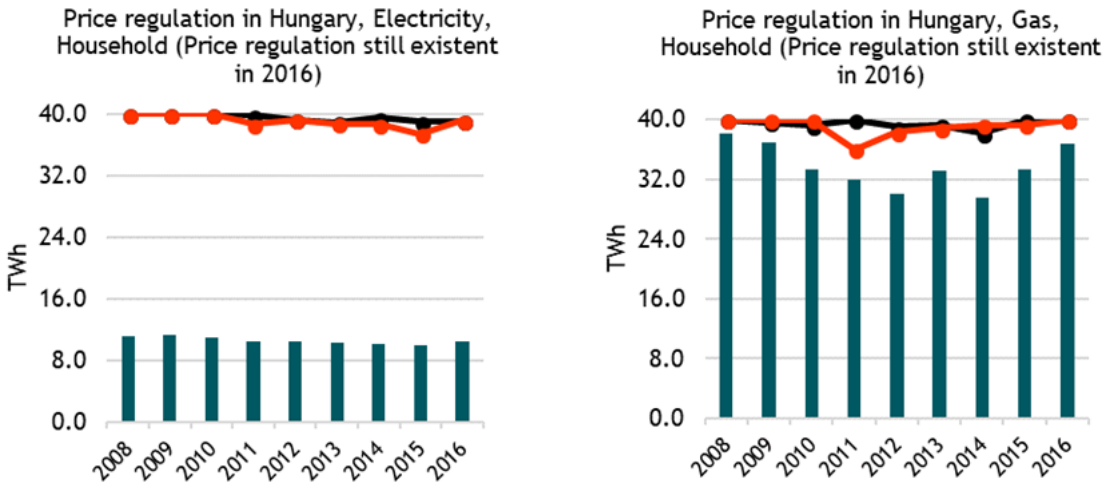
## 14.2 Household Price Regulation in Hungary

**Hungary still has energy price regulation for households in place, both for gas and electricity. Both regulated and market prices are available to consumers in parallel.**

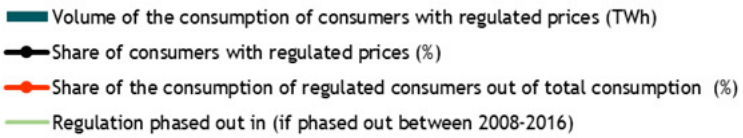
In December 2012, it was decided to reduce the electricity prices for household consumers and to implement a price adjustment at the beginning of 2012.[317] Energy prices were subject to three types of taxes; an electricity tax, a differentiated profit tax and a crisis tax which was set on energy companies' taxable revenue and was supposed to expire in 2013.[318]

The consumption of the regulated electricity market is rather stable, fluctuating between 10 and 11.3 TWh. On the other hand, in the gas market there was a continuous decline in regulated gas consumption between 2008 (38.2 TWh) and 2012 (30 TWh), while there was an increase in the period 2014 to 2016, from 29.5 TWh to 36.7 TWh. It should also be noted that the data on the share of consumption and consumers with regulated electricity and gas prices in Hungary is not perfect (for instance, in 2011, 90% of the consumption was reported under regulated gas prices, while 100% consumers were reported under regulated gas prices). Regardless of these imperfections, the CEER data suggests that between roughly 90% to 100% of the gas market for household consumers was under regulated prices over the time period.

**Figure 178 Household price regulation in Hungary from 2008 to 2016**




[317] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[318] Ibid.

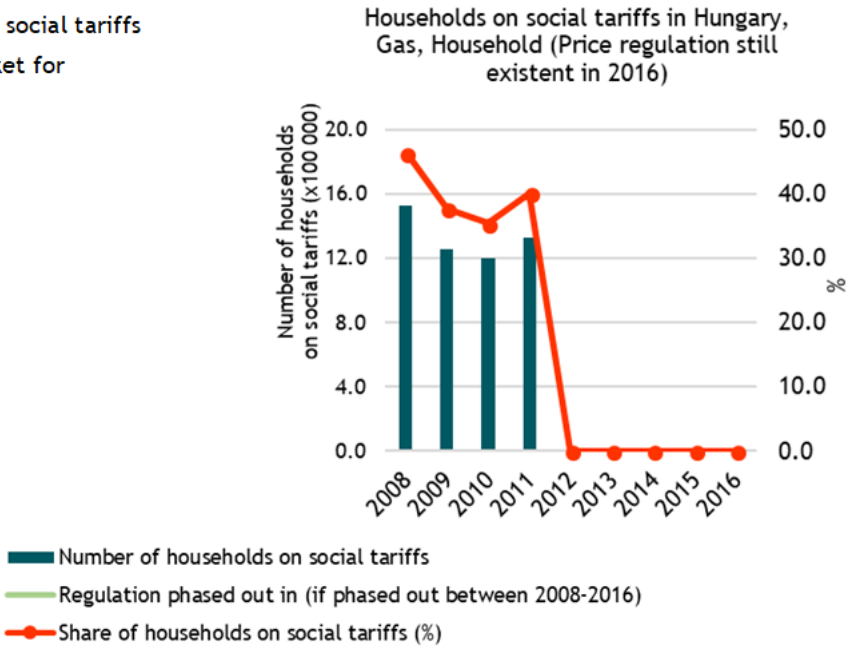



*Source:* CEER data

Hungary does not have social tariffs on the electricity market for household consumers according to the CEER data. However, vulnerable consumers are recognised on a social and health-related basis since 2008.[319] Vulnerable costumers are those who require special attention due to their social disposition defined in legal regulation in terms of supplying them with electricity.[320] They are supported in different ways, depending on the category in which they are registered.[321] As for gas, a significant share of households received subsidies for their gas expenditures until 2011, leading to social tariffs being indicated in the CEER database. This subsidy was phased out in August 2011.[322]

**Figure 179 Household social tariffs in Hungary**

Hungary does not have social tariffs on the electricity market for household consumers




*Source:* CEER data

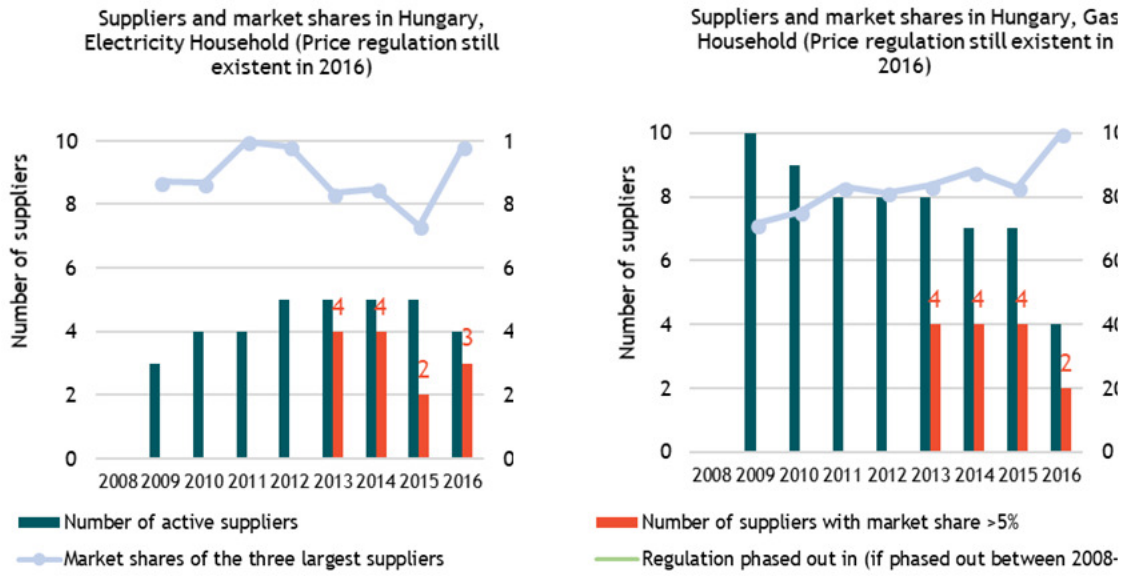
### *14.2.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers have had over 73% and 71% of the market consistently over the last years, respectively. In the case of gas, the share has increased over time, while for electricity there was a decreasing trend which was reversed in 2016. At the same time, there has been a significant decrease in the number of active suppliers in the gas market, while for the electricity market it has oscillated in the 3 – 5 range. The increased market share of the three largest suppliers and the decrease in the number suppliers suggest that both the electricity

[319] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[320] https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf
[321] Ibid.
[322] Private communication with the NRA (2008).

as well as the gas market for household consumers has not become more competitive between 2013 and 2016.

**Figure 180: Number of suppliers and market shares in Hungary**




*Note: For both the electricity and gas markets, data on the number of active suppliers is only available from 2011 onwards.*

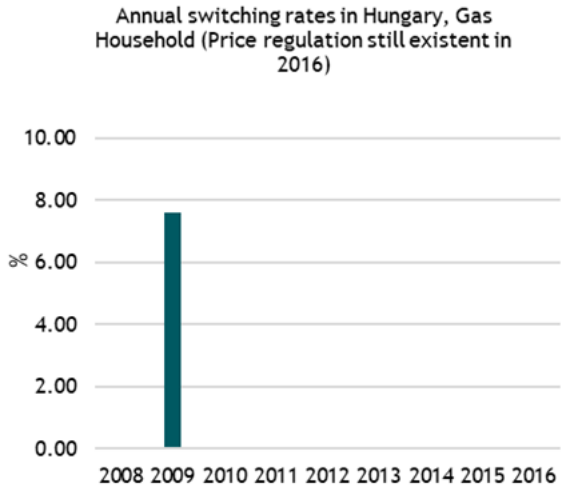
*Source:* CEER data

## Consumer engagement and expenditures on energy

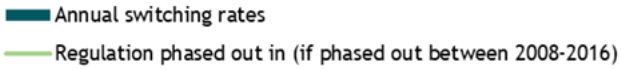
The figures below show the annual switching[323] rates in households for both electricity and gas. There is no data available for annual switching in the electricity market for household consumers, while in the gas market data is only available for the years 2008 – 2009. In 2008, for the gas market, there were hardly any switches (0.04%), which was increased substantially in the following year, to almost 8%.

**Figure 181 Annual switching rates for households in Hungary**

No data available for the electricity market for household consumers




[323] Switching is defined as the voluntary action by which a customer changes his supplier

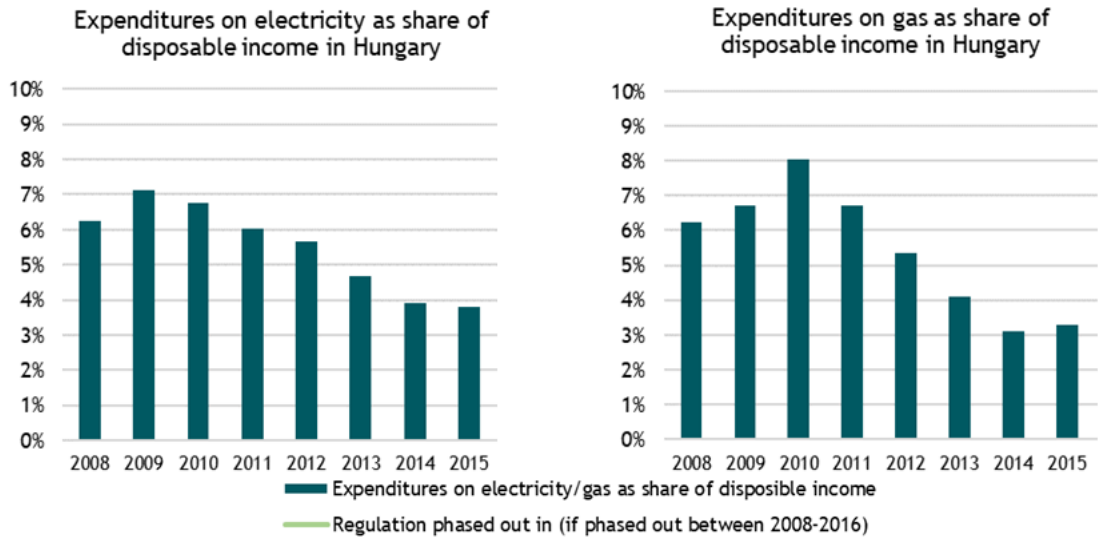



*Data is only available in 2008 and 2009*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[324] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[325] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Hungary. For both markets, initially an increase was observed in the expenditure on electricity and gas as share of disposable income for households in Hungary, in the period 2008-2009 and 2008-2010, for electricity and gas markets, respectively. Afterwards, a continuous reduction was observed in both markets. Since in the same period there was only a slight reduction in the GDP per capita[326], that reduction in the expenditures on gas and electricity as share of disposable income for households in Hungary can be attributed to the reduction in the electricity prices.[327]

**Figure 182: Expenditures on gas and electricity as share of disposable income for households in Hungary (for middle consumption bands DC and D2) using PPS prices[328]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

[324] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[325] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[326] https://data.worldbank.org/country/hungary?view=chart

[327] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

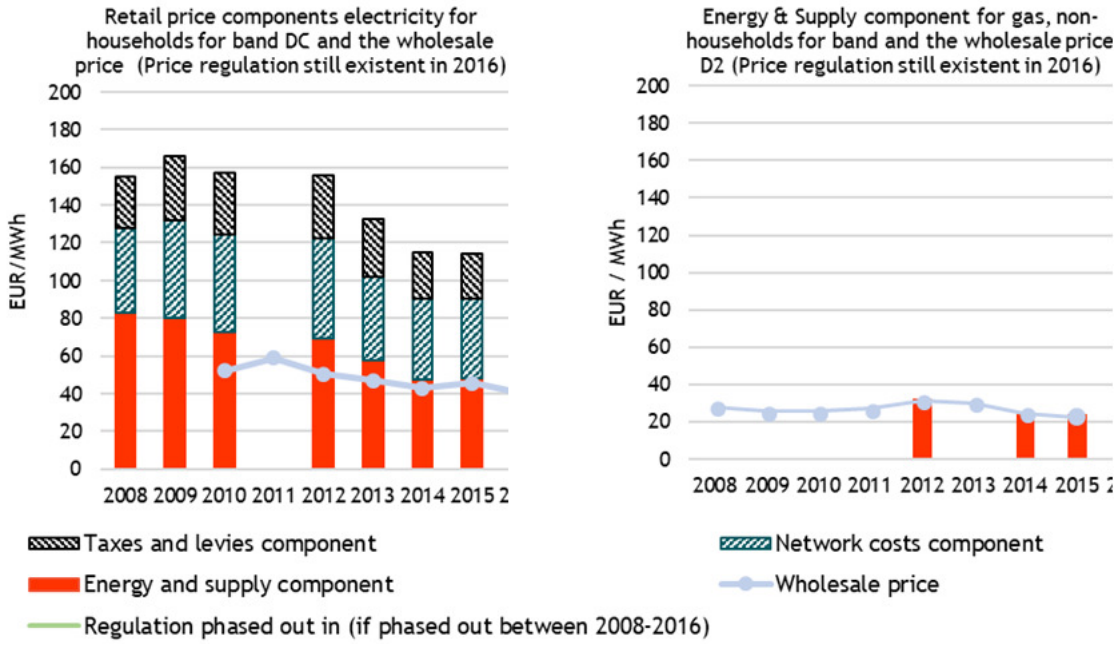
[328] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

*Source:* Own calculations[329] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Hungary, a continuous reduction was observed in the energy and supply component of the household electricity prices from 2008 to 2014. This led to a reduction in the total price especially in the period 2012 to 2014, when the network costs component remained almost constant. Similarly, the wholesale prices for electricity and gas markets were reduced in the period 2011 – 2016 by approximately 30% and 29%, respectively.

**Figure 183 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Hungary**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

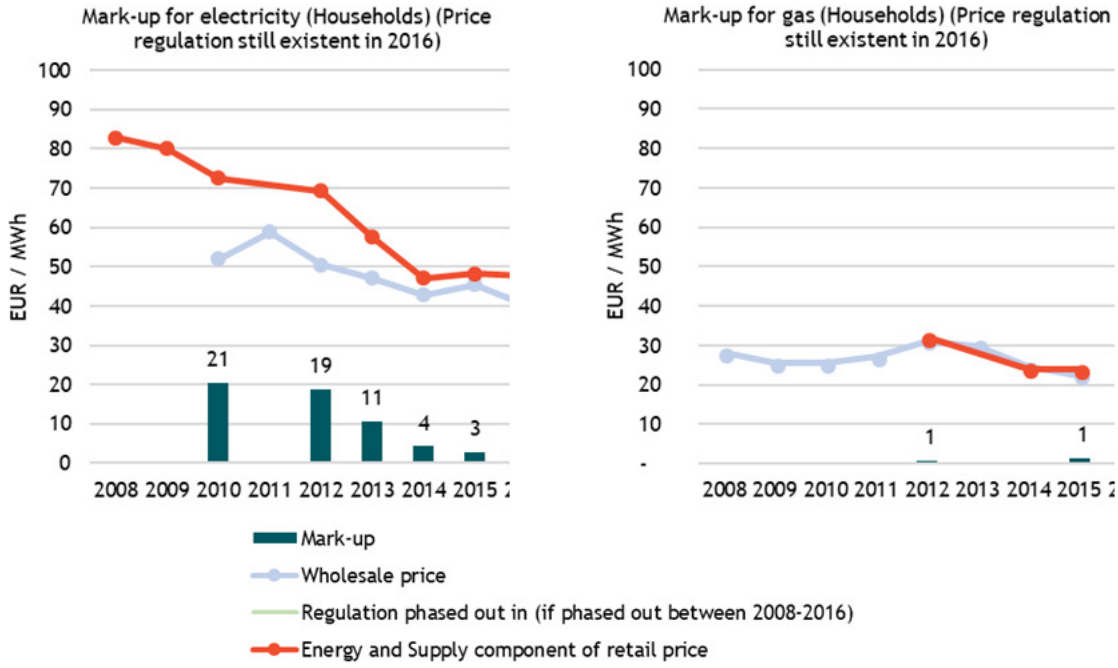
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[330] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[331] The figures below show the mark-ups along with the wholesale price. For the electricity market, the energy and supply component was reduced by 42% in the period 2008 to 2016. The wholesale price had a steeper decrease in the period 2011 – 2014, which

[329] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.
[330] Eurostat has data available on gas prices; however not for the energy and supply component.
[331] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

resulted in almost eliminating the high mark-ups observed in 2010 and 2012. In the gas market, the mark-ups are minimal, since the retail and the wholesale prices are almost identical.

**Figure 184 Mark-ups for Hungary, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

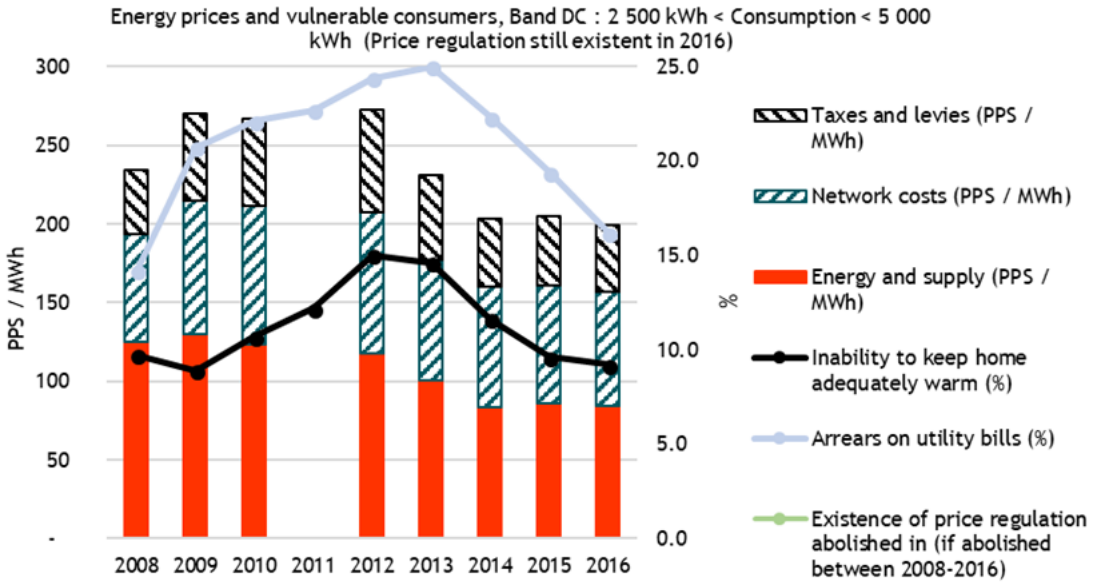
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### *14.2.2 Energy poverty*

The consumers in Hungary which are potentially suffering from energy poverty were increasing over time in the period 2009 to 2012, since there was an increase by 64% in the percentage of consumers unable to keep their home warm, as can be seen by the figure below. Similarly there was an increase in the percentage of arrears on the utility bills by 52% in the period between 2008 and 2013.

**Figure 185 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Hungary**




*Source:* Eurostat

As mentioned earlier, vulnerable costumers are those who require special attention due to their social disposition defined in legal regulation in terms of supplying them with electricity.[332]

### *14.2.3 Quality of services*

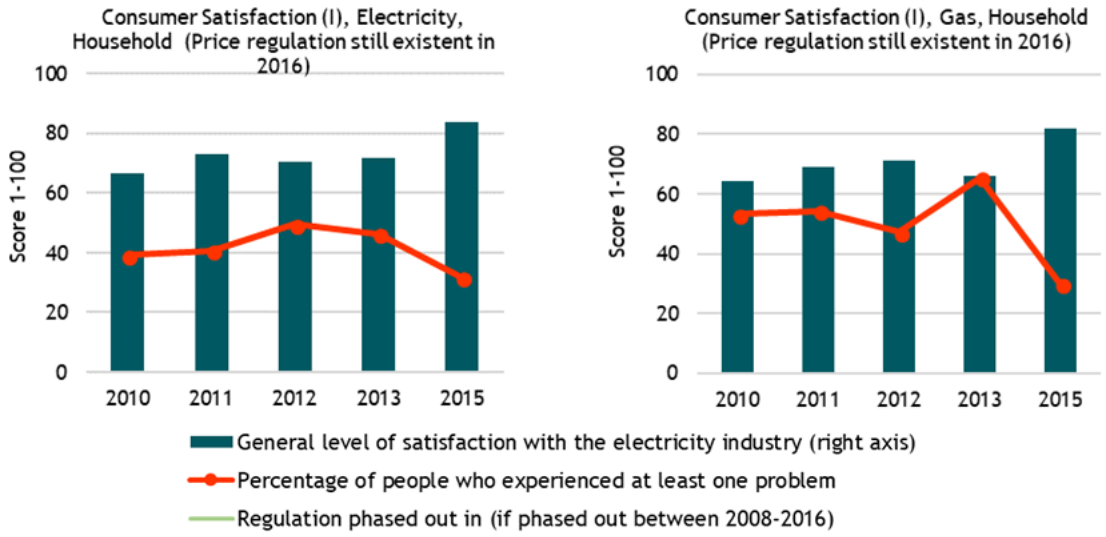
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The consumer satisfaction for both electricity and gas markets gradually increased between 2010 and 2015, from 67 to 84 and from 64 to 82 for the electricity and gas markets, respectively. The satisfaction performance of both gas and electricity markets is slightly below the average European satisfaction score.[333] For both markets the percentage of customers that experienced a problem, was constantly below 20%.

[332] https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf
[333] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

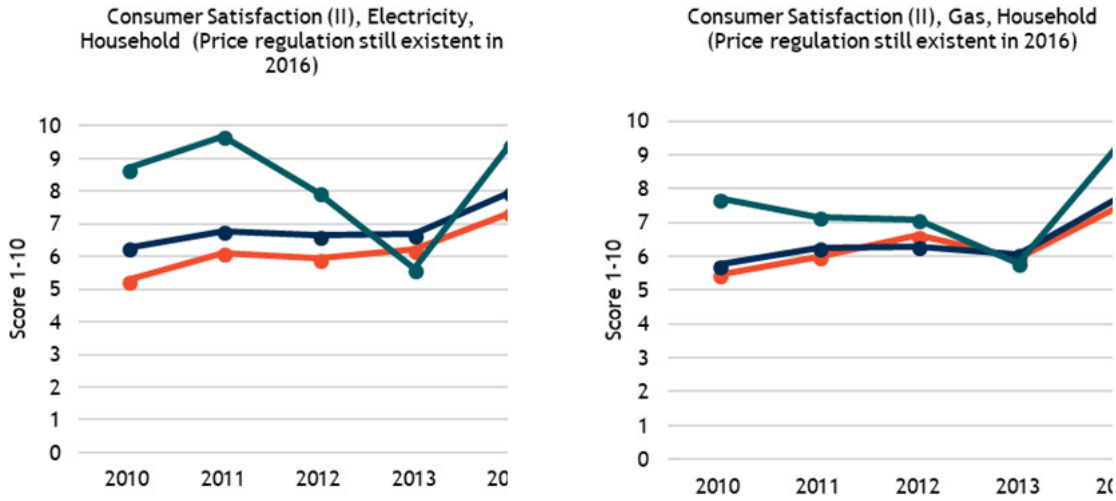
**Figure 186 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Hungary for households**



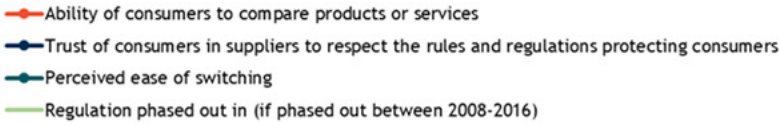

*Source:* EC – DG Justice[334]

As shown in the figure below, the score of the Hungarian electricity and gas markets in the ability of consumers to compare products or service and their trust on suppliers to respect the rules and regulations protecting consumers are both gradually increasing for the period 2010 to 2015. On the other hand, a decline was observed in the perceived ease of switching between 2011 and 2013 and from 2010 to 2013 for the electricity and gas markets, respectively.

**Figure 187 Ability of consumers to compare products or services[335], trust of consumers in suppliers[336] and perceived ease of switching[337] in Hungary**




[334] Note that from 2013 onwards, the survey was carried out every other year.
[335] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[336] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[337] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)




*Source:* EC – DG Justice

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. The table below shows that the costumers have neither the option of duals-offers or certified green offer. This suggests that consumers have limited options which is an indication of an immature market. However, one should take the data limitations into account.

**Table 14-1 Consumer choice in Hungary (electricity, households)**

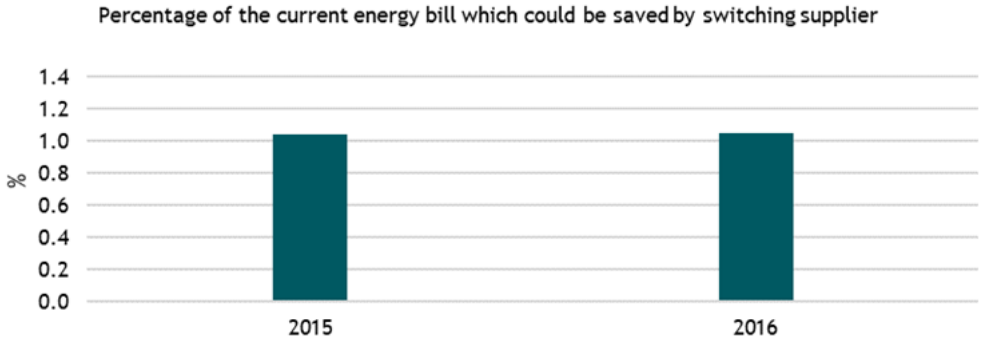
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | No |
| Certified green offers available in 2015 (CC04) | No |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The percentage of the current electricity bill which could be saved by switching supplier in Hungary is below 1% as shown in the figure below, which means that customers have no financial incentives to switch supplier.

**Figure 188 Percentage of the current electricity bill which could be saved by switching supplier in Hungary**




*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

There is no information regarding the type of offers available for electricity and gas. [338]

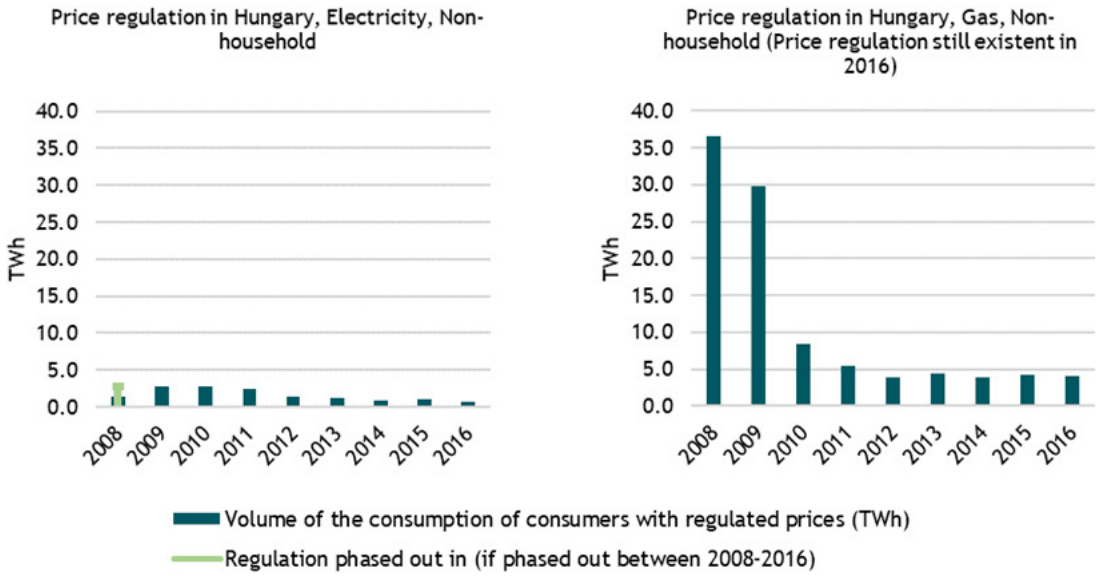
## 14.3 Non-Household Price Regulation in Hungary

[338] ACER/CEER (2015)

**Hungary phased out price regulation for electricity for non-household consumers in 2008, but still has regulated prices for gas.**

The energy price regulation for the non-household sector is similar to the one for households, and is described above in the introduction. As can be seen in the diagram below, the termination of the public utility scheme and introduction of the universal service for gas in 2009 had a significant impact on the consumption of regulated consumers. This switch was carried out earlier for the electricity market (2008). The electricity market furthermore exhibited since 2008 a much lower share than gas of non-household consumers under the regulated prices (the universal service scheme).

**Figure 189 Non-household price regulation in Hungary from 2008 to 2016**

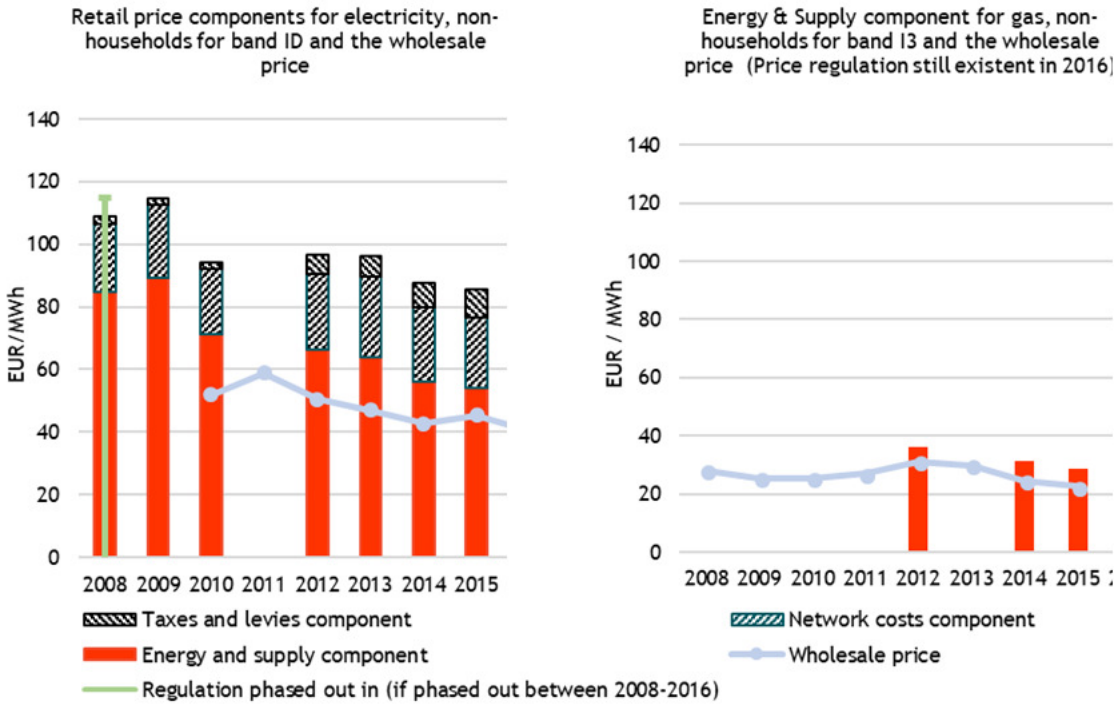



*Source:* CEER data

### *14.3.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

**Figure 190 Industry retail price components for middle bands (ID and I3) and wholesale prices in Hungary**



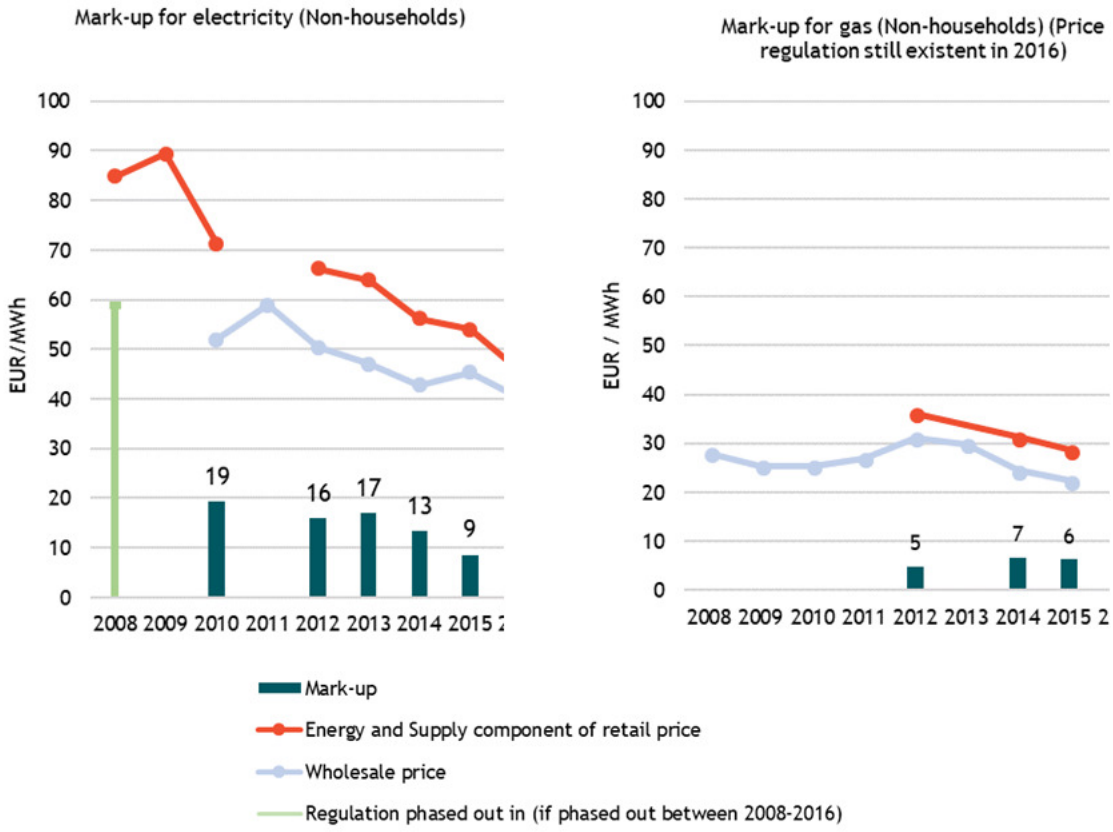

*Note that data is not available for the gas market in 2008, 2009, 2010, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[339] The figures below show the mark-ups along with the wholesale price. On the electricity market, both the energy and supply component of retail price and the wholesale price are declining. However, as the decline of the energy and supply component is steeper, the two prices are gradually converging, which results in lower mark-ups. On the gas market, both prices have the same rate of reduction between 2012 and 2015, therefore the marks-ups remain almost constant.

[339] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 191 Mark-ups for Hungary, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 14.4 Tariff deficit in Hungary

**Hungary had financial losses in energy distribution companies in 2011 and 2012.**

In 2013, electricity, gas and district heating tariffs for household customers were reduced by 20%, which were partially compensated by increasing the prices for industrial consumers. The reduced prices were possibly below the cost, which resulted in losses mainly for the foreign-owned distribution companies and for the state-owned MVM, which was dominating the market. The reported financial losses were €71 million in 2011 and €45 million in 2012.[340]

[340] http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf

# 15 Factsheet: Ireland

This factsheet presents the findings for Ireland for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 15.1 Household Price Regulation in Ireland

**Ireland phased out energy price regulation for households starting from 2011 for electricity and 2014 for gas.**

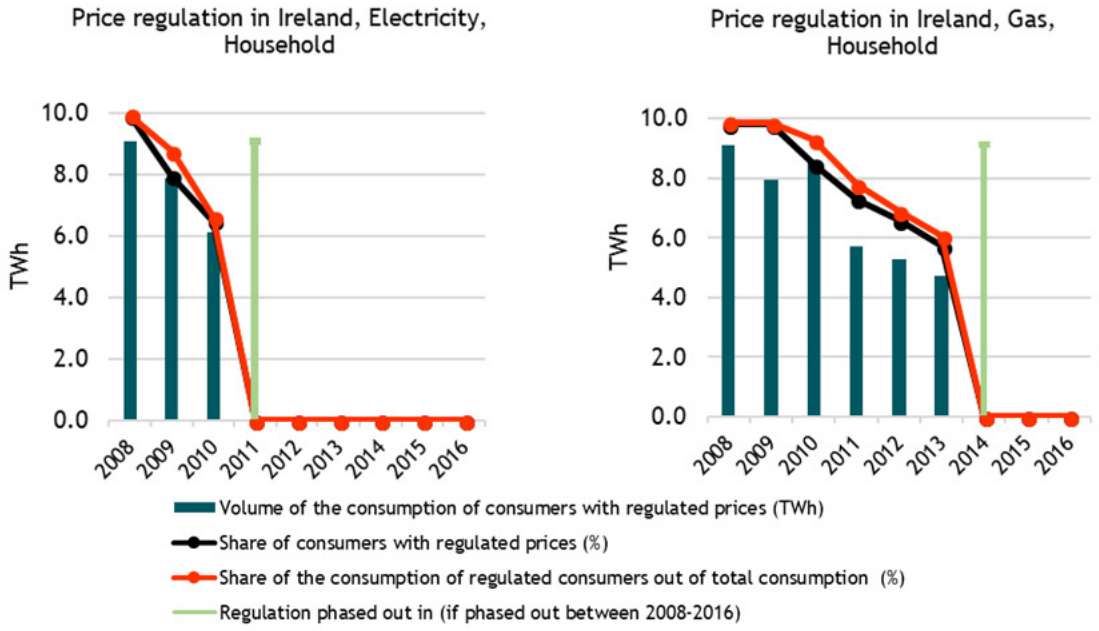
Liberalisation of the Irish electricity (and natural gas) markets began in 1999 with the Electricity Regulation Act, this enabled other suppliers to enter the market and compete with the Electricity Supply Board (ESB) which was the sole supplier. Restrictions on pricing for ESB for household consumers were in place until April 2011, when it was deemed there was adequate consumer switching by the Commission for Regulation of Utilities[341] (CRU) for these restrictions to be lifted. In its last assessment of tariffs, the CRU's conducted a formal ex-ante review and public consultation to approve a maximum allowable revenue request by the ESB, calculated by a formula which included an allowed margin[342]. In previous reviews the CRU approved the ESB tariffs, accounting for over-or under recovery of costs.

Price regulation for natural gas was abolished in July 2014 for household consumers. This ended the role of the CRU in regulating the prices that Bord Gais Energy, the largest, former monopoly supplier, could charge. Previously the regulation operated in the same way as for electricity, giving CRU the role of approving a maximum revenue ex-ante with an allowed margin[343].

Transmission and distribution tariff components of electricity and natural gas prices result from the maximum revenue approved by the CRU for 5-year periods that can be collected from customers[344]. There are annual adjustments to the transmission and distribution tariffs to ensure they remain in line with the five-year price controls.

[341] The Commission for Regulation of Utilities (CRU) is Ireland's independent energy and water regulator. The CRU was originally established as the Commission for Energy Regulation (CER) in 1999. The CER changed its name to the CRU in 2017 to better reflect the expanded powers and functions of the organisation.
[342] https://www.cru.ie/wp-content/uploads/2011/07/cer11026.pdf
[343] https://www.cru.ie/wp-content/uploads/2009/07/cer09147-gas-annual-tarrif-review-2009-2010-decision-paper.pdf
[344] https://gettingthedealthrough.com/area/12/jurisdiction/14/electricity-regulation-ireland/

Figure 192 Household price regulation in Ireland from 2008 to 2016

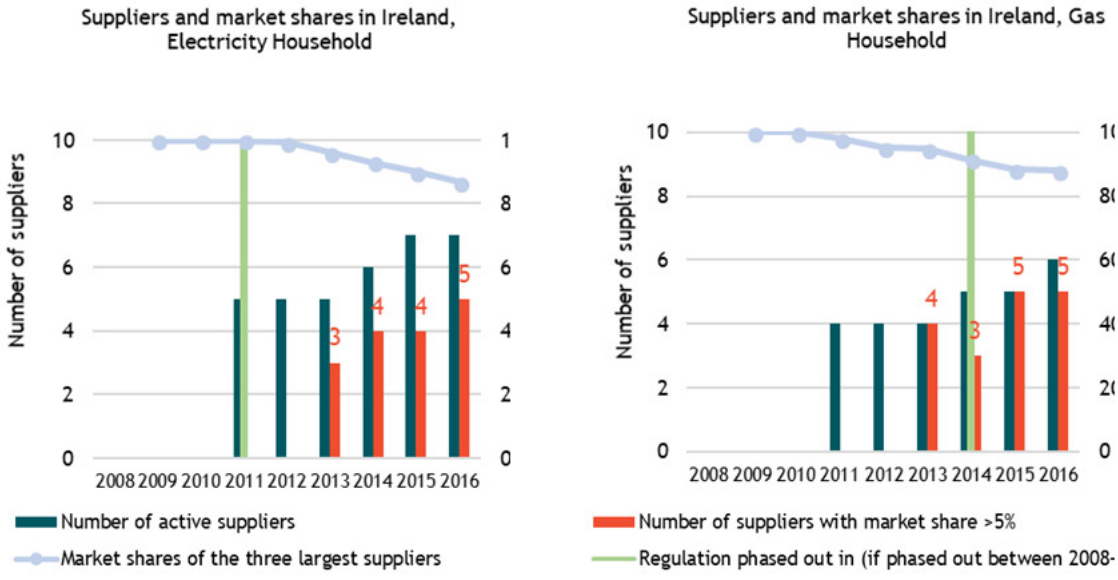



*Source:* CEER data

### *15.1.1 Selected aspects of competition*

For electricity, we see that the three largest suppliers have seen their market share decline from 100% at the time of deregulation (in 2011) to around than 85% in 2016. For gas, a similar decline is observed, but this began already before price regulation was removed in 2014. At the same time, for both electricity and gas there has been an increase (albeit small) in the number of active suppliers, and in those with a market share of more than 5%. Latest data (July 2018) from the national regulatory authority (NRA) in Ireland, the Commission for Regulation of Utilities (CRU), lists 12 active licensed electricity suppliers (9 for households only) and 9 active licensed gas suppliers (8 for households only).

Figure 193: Number of suppliers and market shares in Ireland



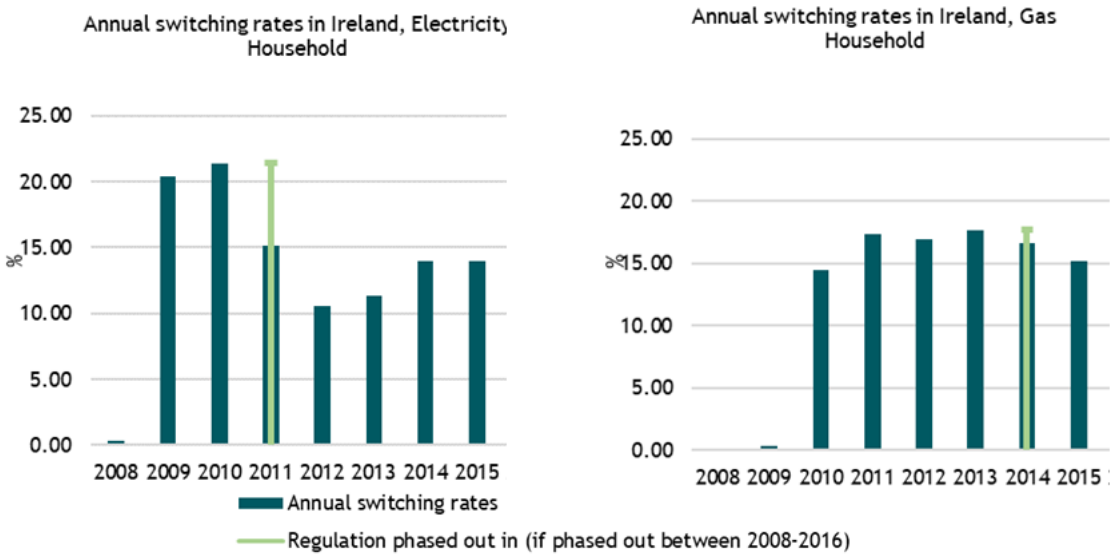
*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards and data on the number of active suppliers is only available from 2011 onwards. No data is available on the number of suppliers prior to 2011*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figures below show the annual switching[345] rates in households for both electricity and gas, which show rates of 10-20% in most years for both electricity and gas. For electricity switching rates were high prior to deregulation in 2009 and 2010, before declining to 2012, since then rates have increased each year since. For natural gas, switching rates peaked in the year before prices were deregulated but have been observed to decline since 2014. In both cases around 1 in 6 customers switch supplier each year. The process of price deregulation for both electricity and gas in Ireland was tied to switching rates, with the threshold for considering the removal of price regulation linked to the share of the market of the former monopoly provider.

**Figure 194 Annual switching rates for households in Ireland**




*No data is available for the gas market in 2008*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[346] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[347] The indicator shows the significance of the total energy bill compared to disposable income and is therefore a proxy to

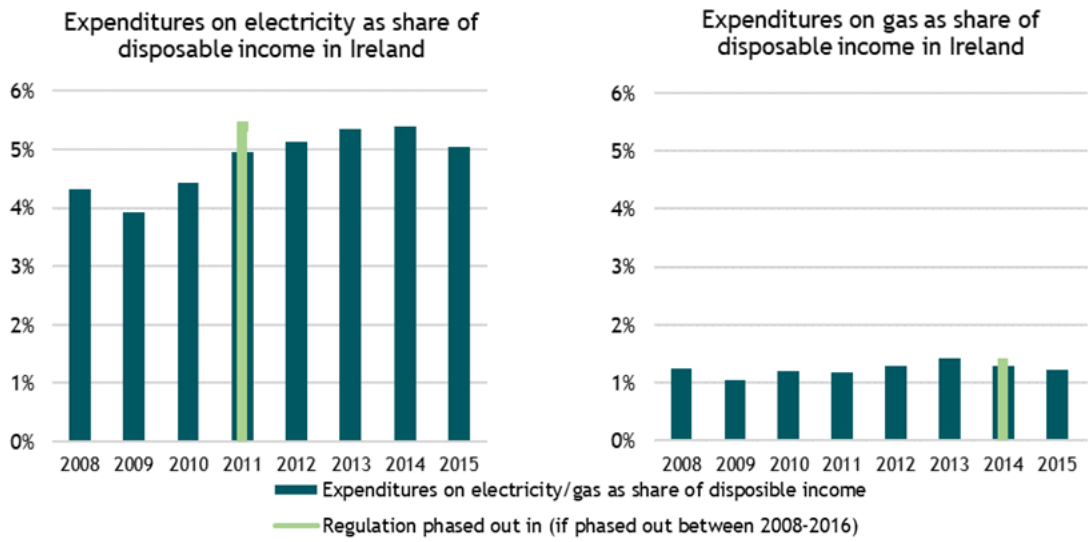
[345] Switching is defined as the voluntary action by which a customer changes his supplier

[346] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[347] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

understand the level and evolution of the affordability of energy in Ireland. This shows that expenditure shares for both electricity and gas increased in the years up to 2013-14, this is unsurprising as this period coincides with the worst of the financial crisis and squeeze on disposable incomes that was particularly acute in Ireland. Since then the share has declined for both electricity and gas, it is unclear if this is driven by falling prices (driven by deregulation and increased competition) or from increasing incomes.

**Figure 195: Expenditures on gas and electricity as share of disposable income for households in Ireland (for middle consumption bands DC and D2) using PPS prices[348]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

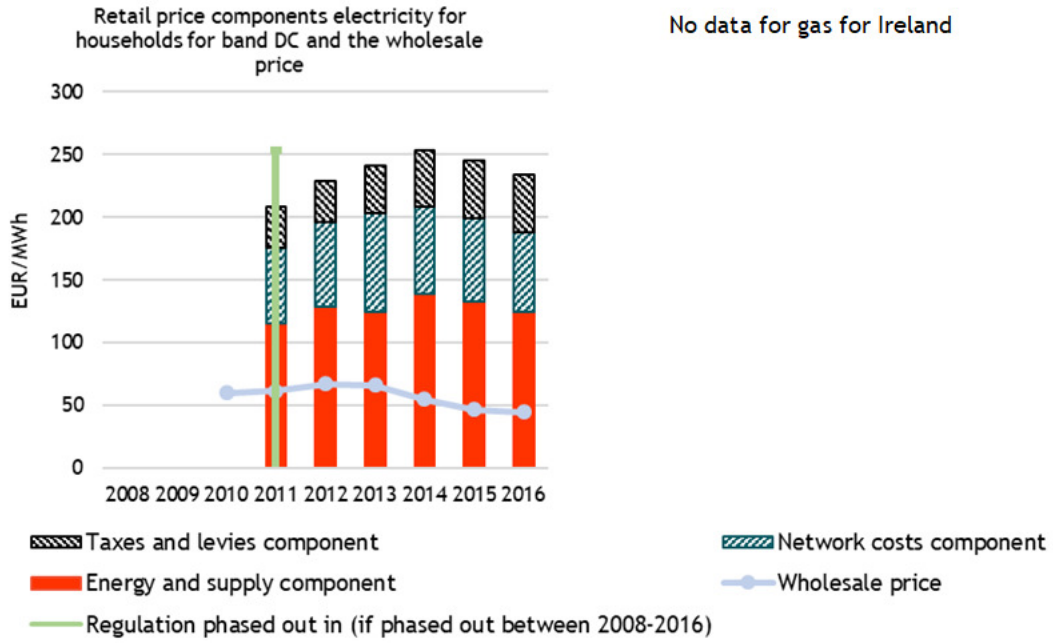
*Source:* Own calculations[349] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for electricity, wholesale prices have declined by 28% since 2011, the year of price deregulation, but that over the same period the energy and supply component has increased by 8%, a significant divergence. Although since 2014 the energy and supply component has been in decline.

[348] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[349] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 196 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Ireland**



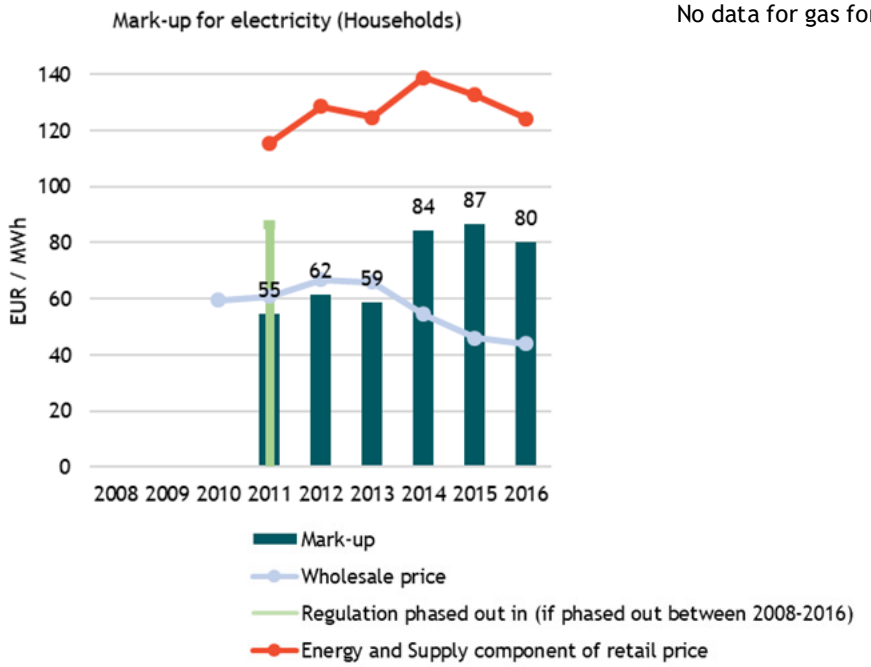

*Note that data is not available for the gas market. No data is available prior to 2010 on retail electricity prices*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[350] and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[351] The figures below show the mark-ups along with the wholesale price for electricity. For electricity we see more clearly the trends highlighted in the previous figure, namely that the gap between these two prices widened considerably between 2013-2014. The reasons for this are unclear, although market reports herald a 2% retail price cut by the largest supplier in response to falling wholesale prices[352], which were down 17% between 2013-2014, this suggests that the benefits of falling prices were not quickly or entirely passed onto consumers, indeed energy and supply costs increased.

[350] Eurostat has data available on gas prices; however not for the energy and supply component.
[351] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014
[352] https://www.cru.ie/wp-content/uploads/2015/07/CER15112-The-Electricity-and-Gas-Retail-Market-Report-2014-1.pdf

**Figure 197 Mark-ups for Ireland, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market. Also, no data is available for the electricity market prior to 2011*

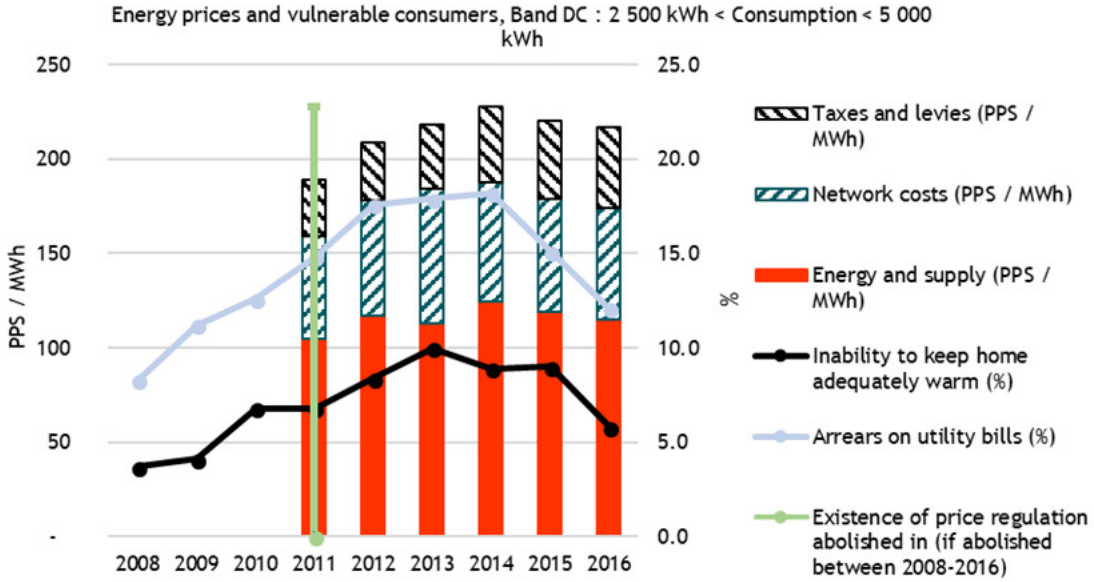
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

### *15.1.2 Energy poverty*

The consumers in Ireland which are potentially suffering from energy poverty increased significantly since 2008 and the financial crisis, as can be seen by Figure 198 below showing the shares of the population with arrears on their utility bills and unable to keep their home adequality warm. Since 2014 as the economy has recovered these shares have begun to decline, this is also consistent with rising incomes and decreasing prices as shown in previous figures.

**Figure 198 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Ireland**




*Source:* Eurostat

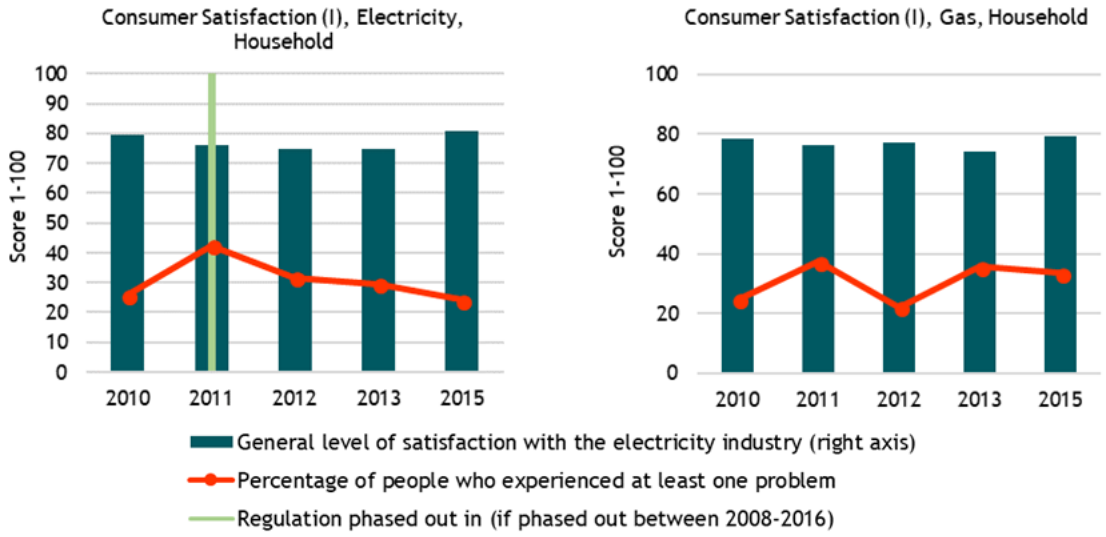
### *15.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

For electricity we observe (see Figure 199) that general satisfaction with the industry has increased since deregulation (in 2011) from 76 to 81. At the same time the percentage of people experiencing a problem has also declined from 13% to 7% over the period 2011-2015. Both trends illustrate improvements in the consumers experience and satisfaction. For gas, the trend was for a decline in satisfaction up to 2013. In 2015, the only year post-full deregulation the satisfaction level increased. The trend on percentage of people experiencing problem is volatile but has increased from 2010-2015.

**Figure 199 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Ireland for households**

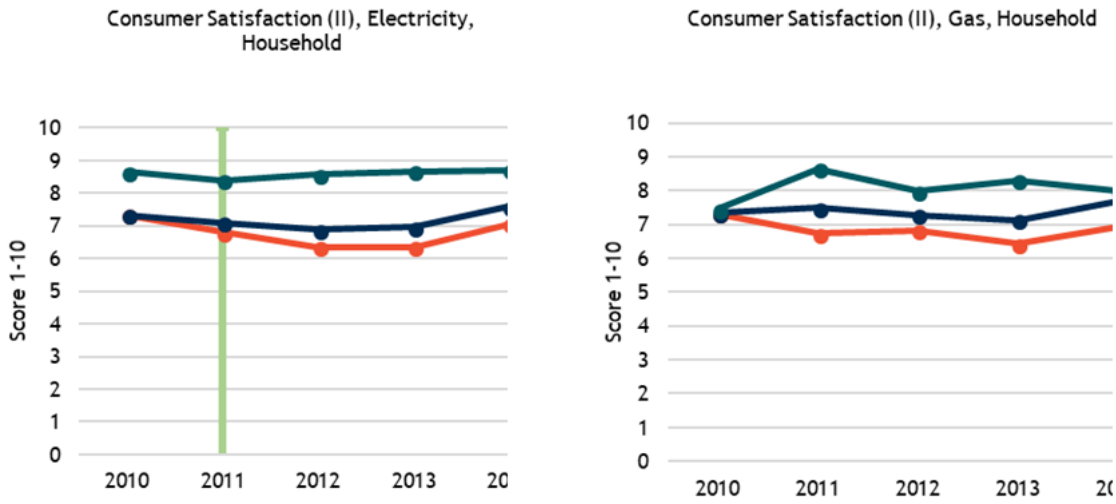



*Note: Ireland phased out gas regulated prices in 2014, not show in graph.*

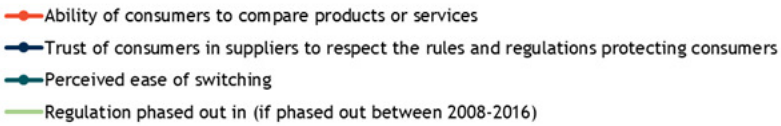
*Source:* EC – DG Justice[353]

Figure 200 shows three other indicators concerning consumer satisfaction. The scores on the ability to compare products remain around the same level in 2015 as they were in 2010 for both the gas as well as the electricity market, with little apparent impact from deregulation. The scores for trust in suppliers and the ability to compare offers has increased a little over time, as have scored on the perceived ease of switching.

**Figure 200 Ability of consumers to compare products or services[354], trust of consumers in suppliers[355] and perceived ease of switching[356] in Ireland**




[353] Note that from 2013 onwards, the survey was carried out every other year.
[354] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[355] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[356] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)




*Note: Ireland phased out gas regulated prices in 2014, not show in graph.*

*Source:* EC – DG Justice

### Consumer choice

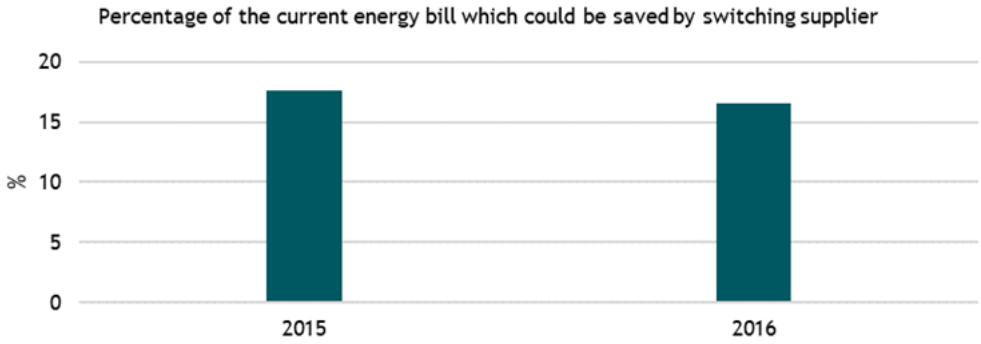
The table below provides an overview of key indicators regarding consumer choice. These show that despite full price de-regulation begin quite recent in electricity markets that there is already a well-developed range of offers and choices for consumers. Nevertheless there remain significant potential consumer savings still possible by switching supplier (see Figure 201), although this declined a little between the two years for which data was available.

**Table 15-1 Consumer choice in Ireland (electricity, households)**

| | Answer |
|---|---|
| Dual- offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | Yes |

*Source:* ACER/CEER (2015)

**Figure 201 Percentage of the current electricity bill which could be saved by switching supplier in Ireland**

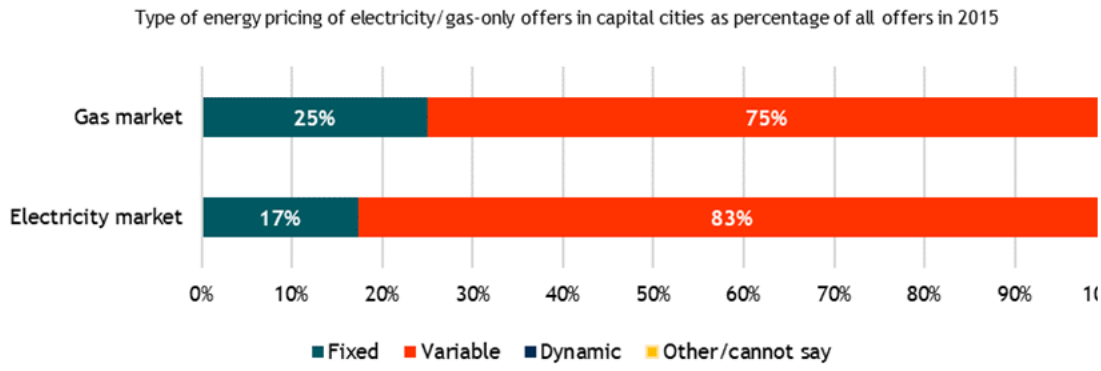



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

Figure 202 below shows the type of offers available for electricity and gas, most of which are variable. No dynamic price tariffs are available.

Figure 202 Type of offers for households in Ireland




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015).

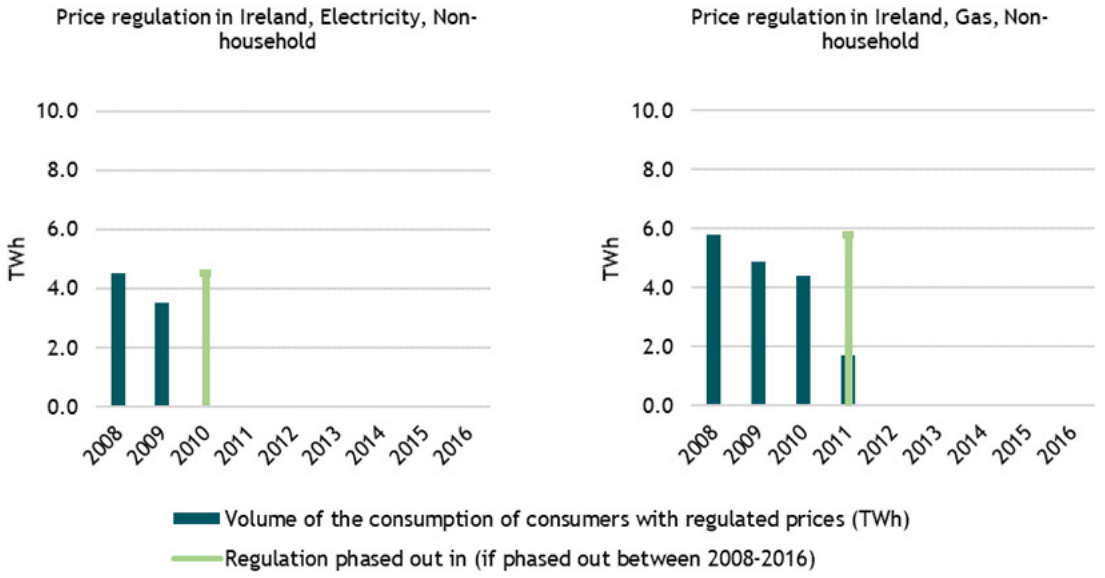
## 15.2 Non-Household Price Regulation in Ireland

**Ireland phased out energy price regulation for non-households starting from 2010 for electricity and 2011 for gas.**

The approach to regulation for non-household prices is the same as for household prices. Only the dates of full liberalisation of markets are different, namely:

- For electricity business consumers price regulation was lifted in October 2010
- For natural gas business consumers price regulation was lifted in October 2011, around 3 years earlier than for household consumers.

Figure 203 Non-household price regulation in Ireland from 2008 to 2016




*Source:* CEER data, country experts assessment

### *15.2.1 Selected aspects of competition (mark-ups)*

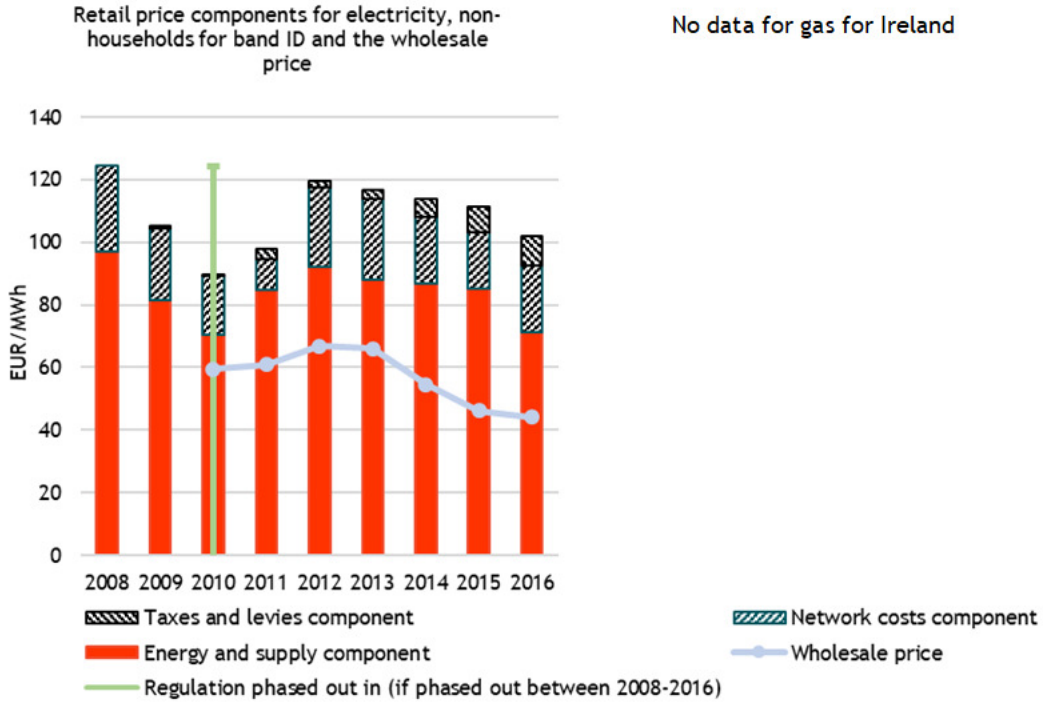
The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was

assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

The first panel of Figure 204 shows that the retail and the wholesale electricity price show similar trends over the period 2010-2016, with prices increasing 2010-2012 and decreasing since. The energy and supply component was barely unchanged between 2010-2016, whilst at the same time wholesale prices declined from 59 EUR/MWh to 44 EUR/MWh (-25%). Looking at the period 2011-2016 a more positive trend in the relation between the two prices can be seen with the energy and supply component decreasing by 14 EUR/MWh, with a comparable 17 EUR/MWh decline in wholesale prices Since deregulation, the contribution of both the network component (+116%) and taxes and levies component (+197%) to the price has increased significantly, although the energy and supply is still by far the largest price component (>70% of the total price).

No component level data is available for natural gas.

**Figure 204 Industry retail price components for middle bands (ID and I3) and wholesale prices in Ireland**




*Note that data is not available for the gas market.*

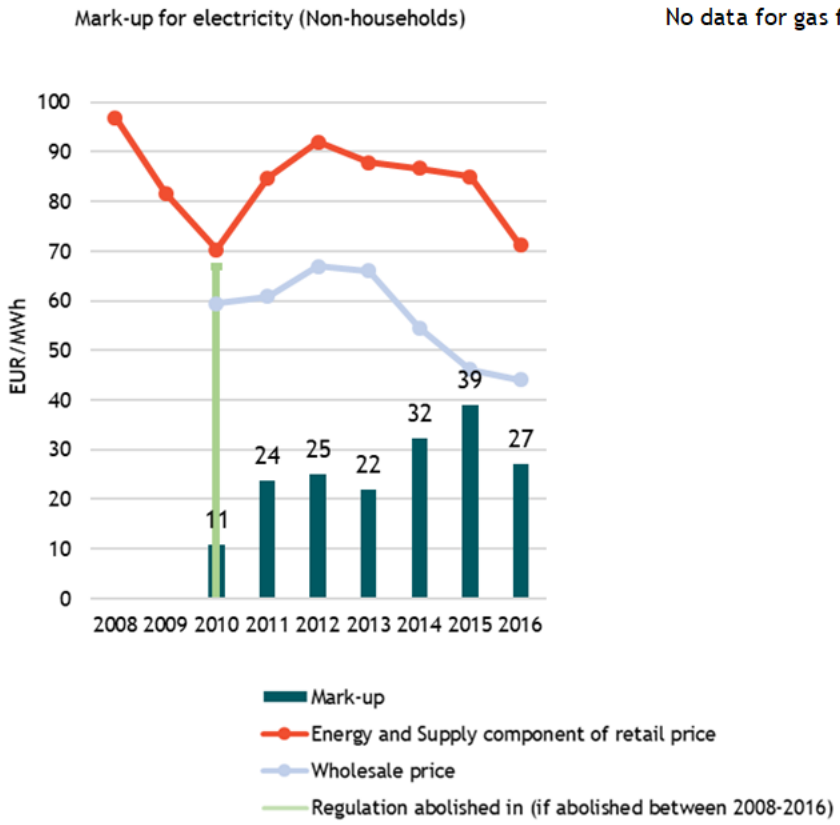
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[357] Figure 205 below shows the mark-ups along with the wholesale price,

[357] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

this shows a generally increasing trends in mark-ups over time and since deregulation as the energy and supply component does not fully or quickly follow the observed wholesale price trends.

**Figure 205 Mark-ups for Ireland, middle consumption bands (ID and I3)**




*Note that data is not available for the gas market and no retail prices prior to 2010 for the electricity market*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

## 15.3 Tariff deficit in Ireland

**Ireland had no tariff deficit between 2008 and 2016.**

# 16 Factsheet: Italy

This factsheet presents the findings for Italy for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 16.1 Household Price Regulation in Italy

**Italy had no energy price regulation for households in the period assessed, given that the share of consumers under social tariffs is considered too low to categorise Italy as MS with price regulation.**

The Italian Regulatory Authority for Electricity, Gas and Water (ARERA[358]) is an independent body in place in Italy for the purposes of protecting consumer interest in electricity, gas and water competition, efficiency, distribution and quality. ARERA is responsible for setting tariffs for electricity and gas for both households and non-households. The Ministry of Economic Development (MISE) defines strategic principles of operation for the country's electricity and gas markets and in 2013 and 2017 published the transformative National Energy Strategy (SEN)[359].

The liberalization of the Italian electricity retail market for households started in 2000 with Decree 164, with the different liberalization stages culminating in the law 125/2007 which opened the market to all household customers. The law simultaneously established a standard protected regime for eligible households and small businesses who were then unable to choose a supplier. Although this regime still existed by 2016, eligibility criteria have at moments been reformed, especially with the Legislative Decree 28/11, which also reshaped incentives for renewables, such as feed-in tariffs. The protected regime will end in 2019 following law 164/2017. After discussions between the NRA and the European Commission it was established the protected regime is not considered as price regulation.[360]

Although energy prices have historically been higher than the EU average, they are coming closer to converging with the EU average. Competition in the electricity market in recent years was enhanced by the improved utilization of the electricity network and excess supply based largely on renewables growth. With regard to gas, successful unbundling of the TSO and new capacity allocation rules have helped incentivise competition[361].

To finalise the implementation of the EC's Third Energy Package, Law no. 122 was published in 2016 illustrating *provisions for the fulfilment of obligations deriving from Italy's belonging to the European*

[358] https://www.autorita.energia.it/it/inglese/
[359] 2013 SEN: http://www.sviluppoeconomico.gov.it/images/stories/normativa/20130314_Strategia_Energetica_Nazionale.pdf
2017 SEN: http://www.sviluppoeconomico.gov.it/index.php/it/194-comunicati-stampa/2037349-ecco-la-strategia-energetica-nazionale-2017
[360] Private communication with the NRA
[361] https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf

*Union*. Additional laws are also in place defining electricity and gas market characteristics, for example legislative decree no. 102 transposing the Energy Efficiency Directive into national law, and Legislative Decree 257 regarding the deployment of alternative fuels infrastructure[362].

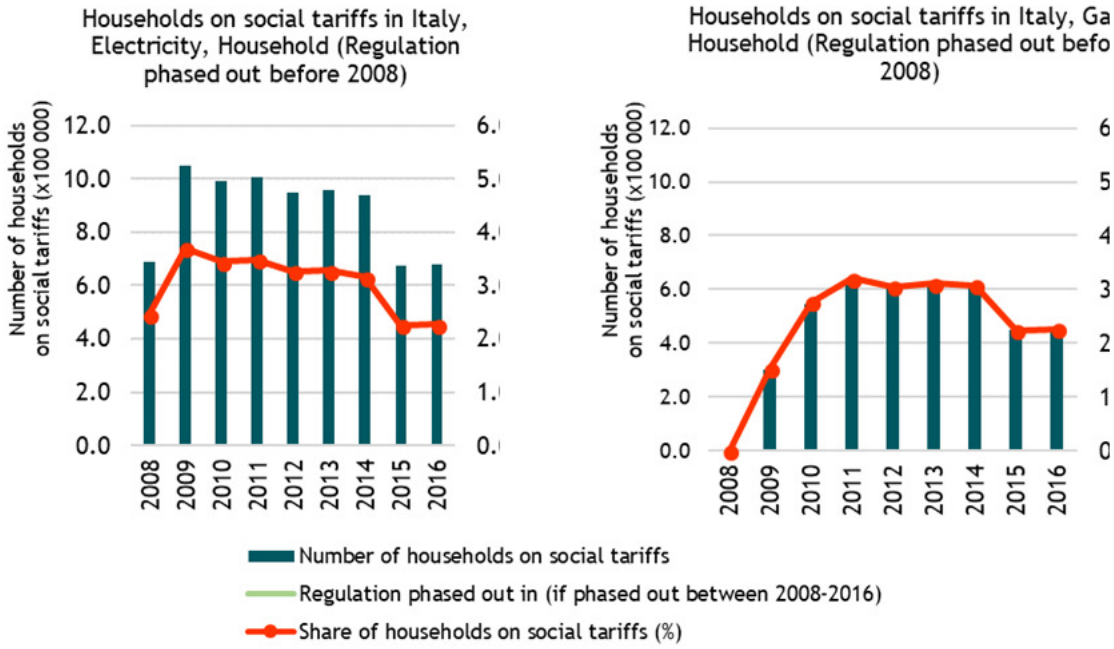
Italy faces a challenging energy market, partially limited by interconnection capacities with neighbouring power and gas markets, but also challenged by positive developments in renewable energy (which has enhanced supply and compounded price decreases). Overall, in 2016 household and non-household consumers faced lower energy prices than in the past. Furthermore, it was discussed in the past whether Italy had a tariff deficit in the electricity sector (primarily related to issues with the arrival of significant quantities of renewable energy on the market in recent years). However, the NRA revealed that this is not the case as the cost of support to renewables is recovered through general system charges.[360]

With regard to social tariffs for energy in Italy these are referred to as a "bonus sociale" divided into the "bonus electricity" and the "bonus gas." The number of households receiving social tariffs for electricity has declined steadily since 2009, from around 1,000,000 households in 2009 (just over 3.5% of the population) to around 600,000 households in 2016 (just over 2% of the population). On the other hand, the number of households receiving social tariffs for gas increased from 300,000 in 2009 to just over 600,000 in 2011 (just over 3% of the population) and has since declined to current levels at around 450,000 in 2016 (around 2.25% of the population). It is therefore evident that social tariffs are lower for gas than for electricity.

There is a specific protection policy with regard to social tariffs in place for consumers in remote areas[363]. Furthermore, in terms of protecting consumers, disconnections in cases related to small debts are not permitted and vulnerable consumers are permitted to pay unexpectedly high bills by instalment. There are also certain methods in place to protect vulnerable consumers while also contributing to meeting EU targets – tax reductions are available for investments in energy efficiency and smart meters additionally help consumers to receive/monitor/manage bills based on actual consumption[364]. Incentives for RES, as for other energy policy measures such as "bonus" for vulnerable customers, are financed by general system charges that are not part of the network tariffs.

**Figure 206 Household social tariffs in Italy**

[362] https://www.ceer.eu/documents/104400/5988265/C17_NR_Italy-EN/34ae6d3c-d928-eef7-6841-7a0b3acbd44c
[363] http://www.cerre.eu/sites/cerre/files/Affordability_ResearchPaper_3.pdf
[364] http://www.cerre.eu/sites/cerre/files/Affordability_ResearchPaper_3.pdf

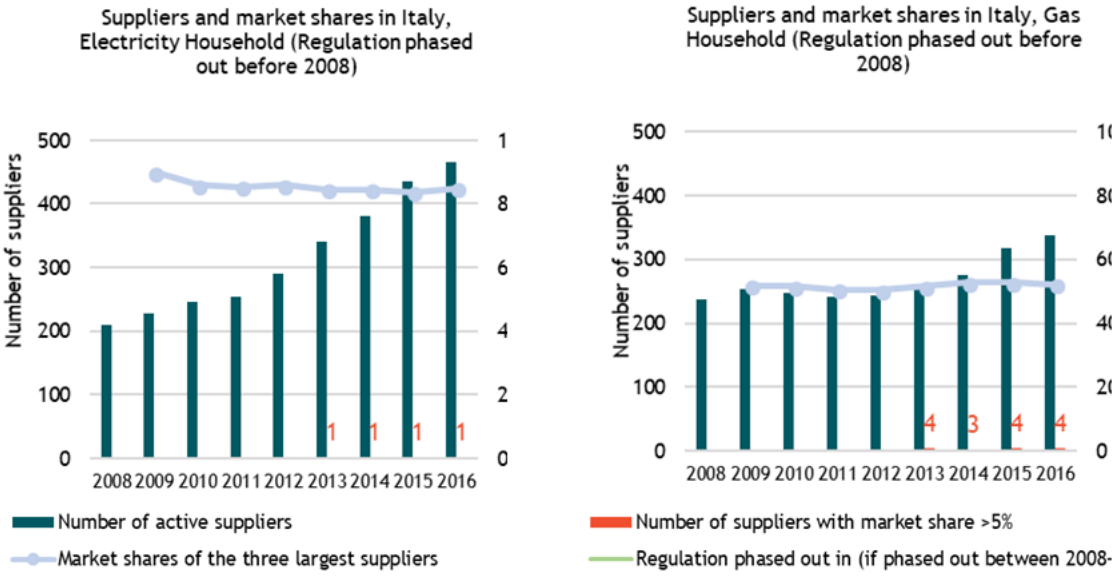



*Source:* CEER data

### *16.1.1 Selected aspects of competition*

The dominant operator for both electricity and gas is Enel, with Edison and Eni in second and third place. For electricity (for household consumers), we see that the three largest suppliers have held over 80% of the market consistently over the past 9 years. At the same time, there has been a constant increase in the number of active suppliers from around 225 in 2009 to over 450 in 2016. For gas, the three largest suppliers had had over 50% of the market consistently over the past 9 years, while also facing a growing number of suppliers from around 250 in 2009 to almost 350 in 2016. This suggests that, based on the number of energy suppliers, competition has increased in Italy. On the gas market, the increase in the number of suppliers has intensified in recent years.

**Figure 207: Number of suppliers and market shares in Italy**



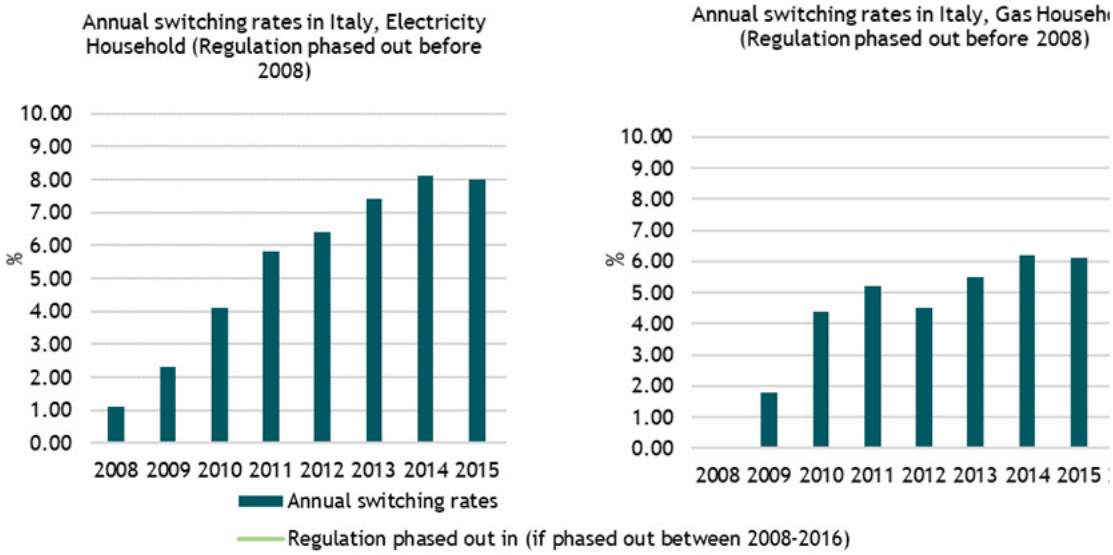
*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figures below show the annual switching[365] rates in households for both electricity and gas. On both the electricity and the gas market for household consumers, switching has maintained consistently high rates since regulations were abolished (in 2013 for both electricity and gas). Switching ultimately drives competition, enabling changes in market concentration, so it does not come as a surprise that relatively high switching rates (almost 9% for electricity and just over 6% for gas) are in line with high levels of competition in both sectors. The *Trova Offerte* (Offer Finder) search system allows domestic users to easily search for electricity and gas commercial offers based on post code. *Portale Offerte* will substitute *Trova Offerte* in September 2018.[366]

**Figure 208 Annual switching rates for households in Italy**




*No data available for the gas market in 2008*

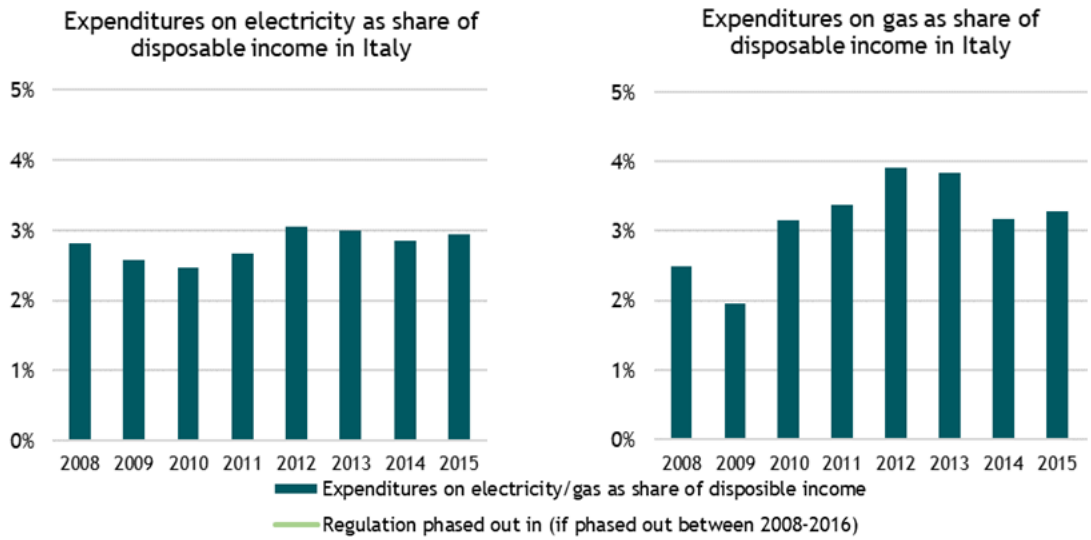
*Source:* CEER data

The project consortium has calculated expenditures on gas and electricity as a share of disposable income for households in the middle consumption bands[367] (for electricity, these households are those consuming between 2.5 MWh and 5 MWh per year and for gas, these households are those consuming between 20GJ and 200 GJ per year).[368] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Italy. Changes in expenditure have been less than 1 percentage point in

[365] Switching is defined as the voluntary action by which a customer changes his supplier
[366] Private communication with the NRA (2018).
[367] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)
[368] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

each case. General economic conditions are a major factor affecting electricity expenditures as a share of disposable income, and might be combined with improved efficiency monitoring through smart metering (Italy was an early adopter and, since full roll-out, has already moved to 2nd generation smart meters).

**Figure 209: Expenditures on gas and electricity as share of disposable income for households in Italy (for middle consumption bands DC and D2) using PPS prices[369]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

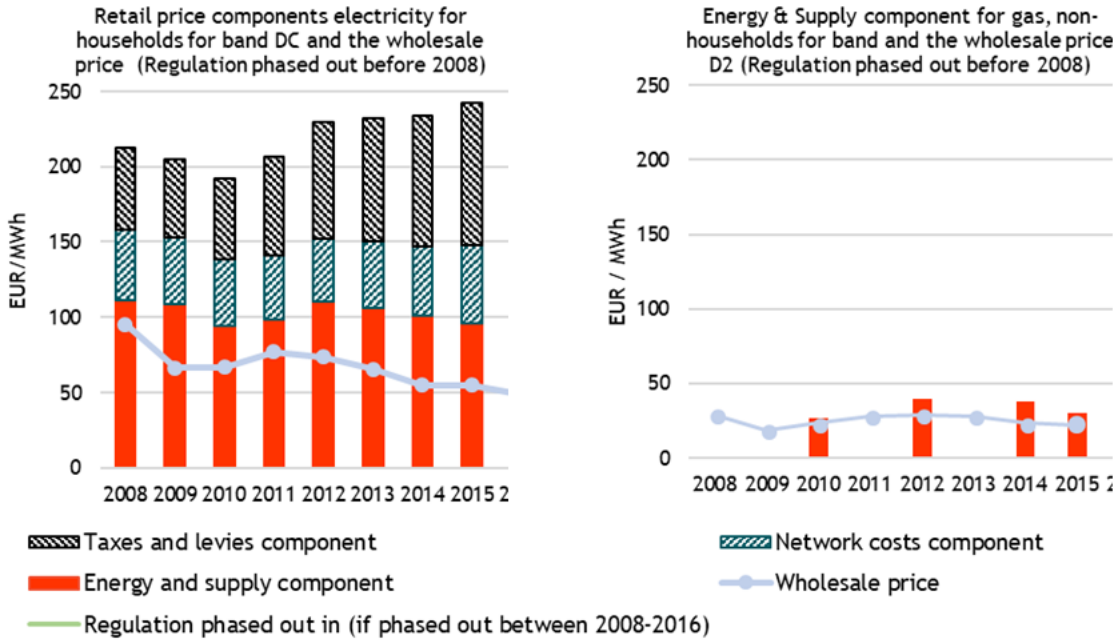
*Source:* Own calculations[370] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in wholesale prices. For electricity in Italy, the energy and supply component only decreased slightly since its peak in 2012, to slightly under €100 per MWh in 2016 – meanwhile, wholesale electricity prices have declined since 2012 to just under €50 per MWh in 2016. For gas in Italy, data availability is worse but overall it can be concluded that both wholesale gas prices and the energy and supply component have decreased since 2012. In 2015, the wholesale gas price was just above €20 per MWh and the energy and supply component was at just under €30 per MWh. It can be concluded that changes in the electricity price market have not been significant since 2013 but given the lack of data for gas market prices reaching firm conclusions is challenging.

[369] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[370] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 210 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Italy**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[371] and EMOS (wholesale price)

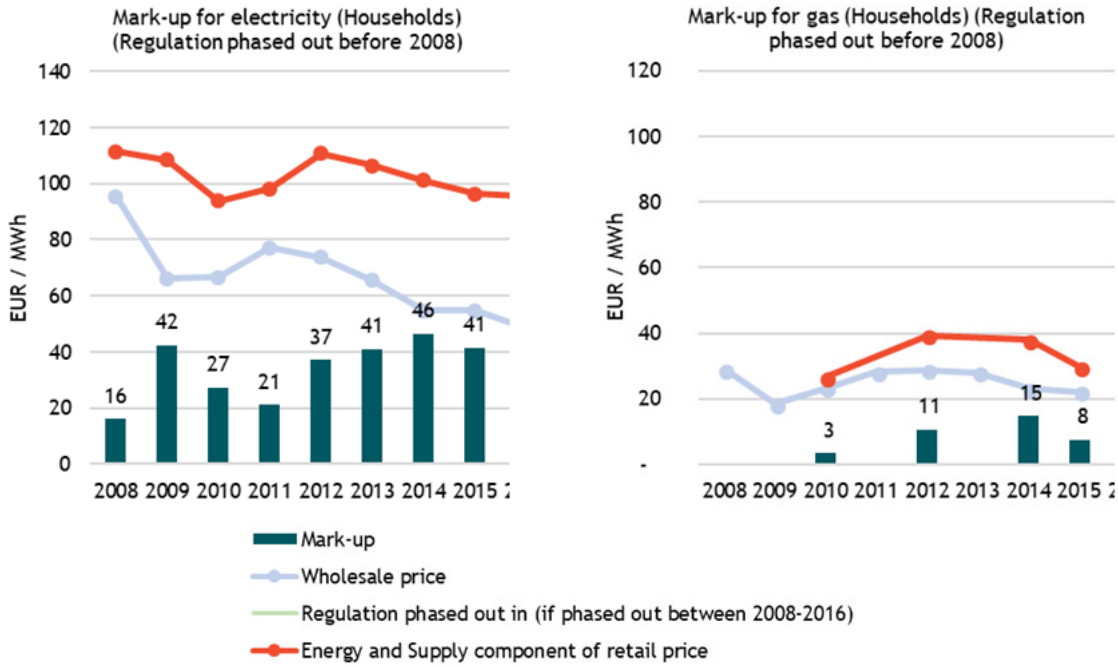
This **competition performance** section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[372] The figures below show the mark-ups along with the wholesale price.

From a low of €16 per MWh in 2008, the mark-up on **electricity** prices increased to €47 per MWh in 2016. This compares to a declining trend in both the wholesale price and the energy and supply component of retail prices. Wholesale electricity prices declined from €100 per MWh in 2008 to just under €60 per MWh in 2016. The energy and supply component of electricity prices declined from a peak of around €110 per MWh in 2012 to almost €100 per MWh in 2016.

Data remains patchy for **gas** prices and it remains difficult to reach conclusions relating to price regulation. However, the mark-up for gas was €3 per MWh in 2010 and in 2015 (latest data available) the mark-up measured €8 per MWh.

[371] Eurostat has data available on gas prices; however not for the energy and supply component.
[372] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 211 Mark-ups for Italy, middle consumption bands (DC and D2)**



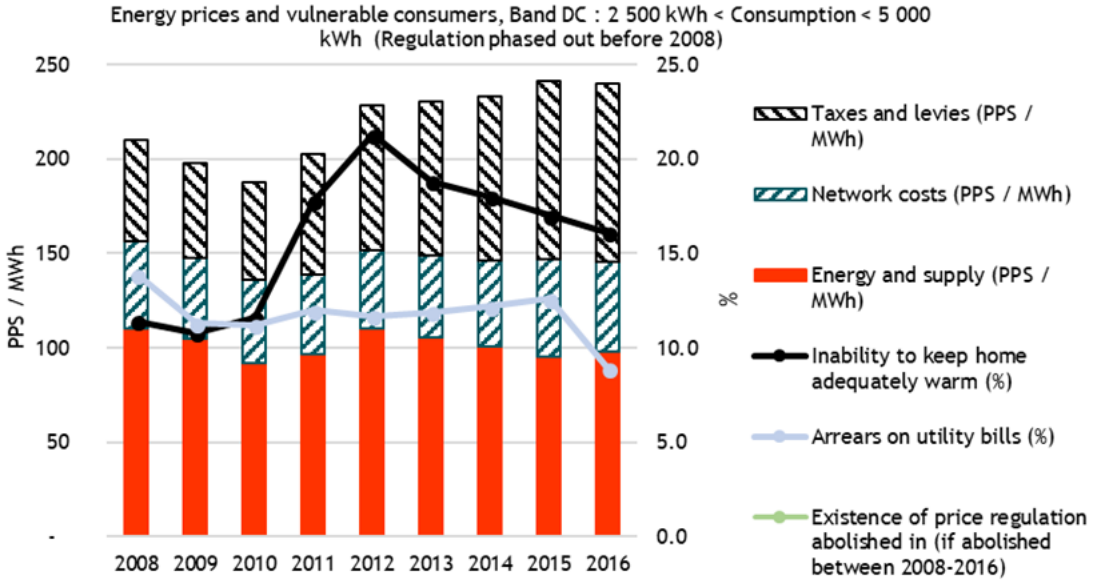

*Note that data is not available for retail prices on the gas market in 2008, 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### *16.1.2 Energy poverty*

The number of consumers in Italy potentially suffering from energy poverty has been decreasing in recent years, reversing a trend of increases prior to 2013. These trends can be seen in the diagram below, which shows the share of the population with arrears on their utility bills and unable to keep their home adequality warm. At the same time, the energy and supply component in retail prices has remained relatively stable in recent years, even though social tariffs (specifically, the "bonus sociale") in theory aim to reduce the burden of energy prices on the households. In 2014 the number of Italians with low economic capacity receiving access to the electricity-related bonus were 933,000 and those accessing the gas-related bonus were 625,000. Estimates suggest that up to 3 million people could in theory gain access to the electricity-related bonus and 2.5 million could potentially access the gas-related bonus. Various recommendations have been made to increase the reach of these bonuses to further protect consumers particularly in the realm of big data and smart monitoring[373]. Vulnerable consumers in Italy include elderly, disabled, families with small children, chronically ill individuals using electro-medical equipment and individuals/groups inhabiting old, poorly maintained and energy inefficient dwellings - this last point is relevant for around ¼ of the population[374].

[373] http://www.aicarr.org/Documents/Convegni/Relazione%20Fuel%20Poverty_def.pdf
[374] http://www.anre.ro/download.php?f=fq59gw%3D%3D&t=wOutwdHbn8%2BcmLPfvrrV5ps%3D

**Figure 212 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Italy**




*Source:* Eurostat

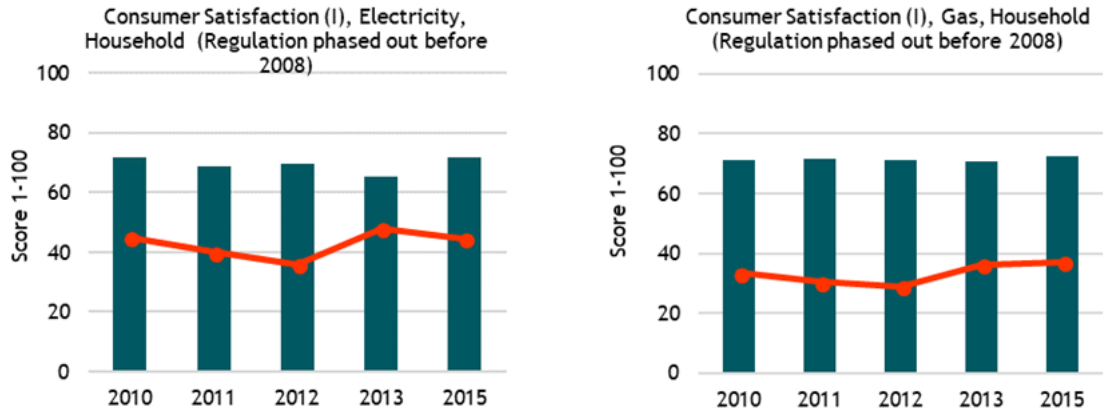
### *16.1.3 Quality of services*

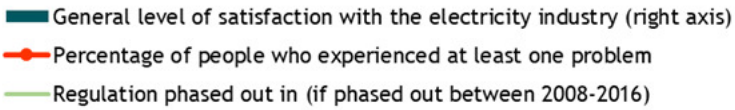
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The percentage of households experiencing problems has increased for both gas and electricity since 2012, although for electricity there was a minor decline in problems experienced between 2013 and 2015. Overall in 2015, around 13% of households experienced problems in the electricity sector and just under 11% of households experienced problems in the gas sector. Furthermore, in 2015 levels of consumer satisfaction in the electricity sector were around 70/100, with a similar score for the gas sector.

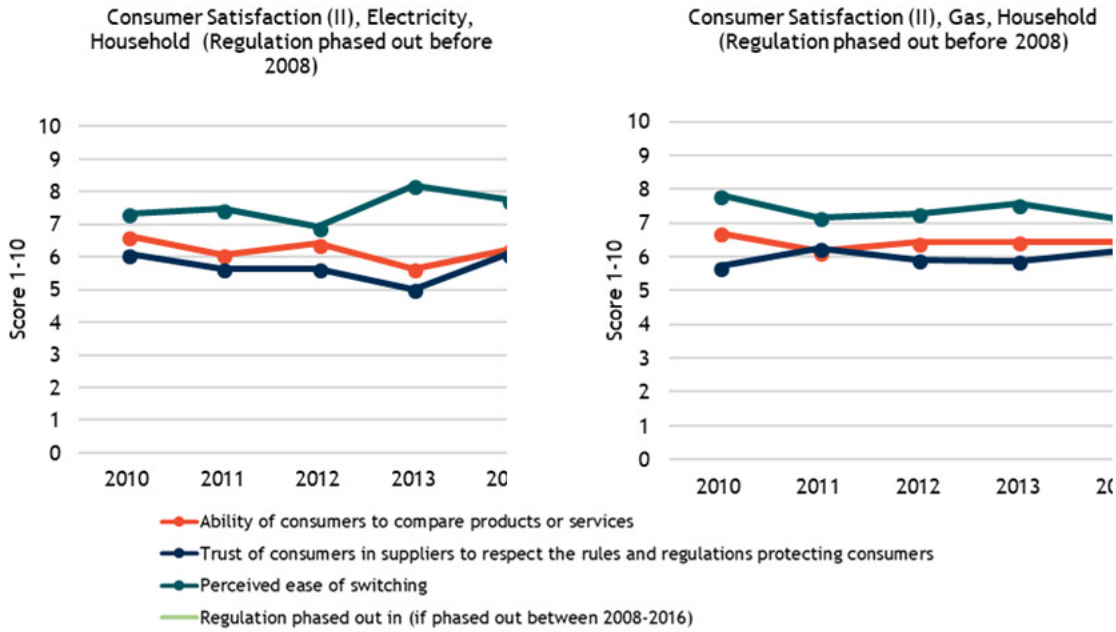
**Figure 213 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Italy for households**






*Source:* EC – DG Justice[375]

**Figure 214 Ability of consumers to compare products or services[376], trust of consumers in suppliers[377] and perceived ease of switching[378] in Italy**




*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. Italy demonstrates a degree of consumer choice in all cases shown in the table below. Furthermore, Figure 10 shows the financial incentives associated with switching energy provider. These points are illustrative of a relatively open and well-developed market.

**Table 16-1 Consumer choice in Italy (electricity, households)**

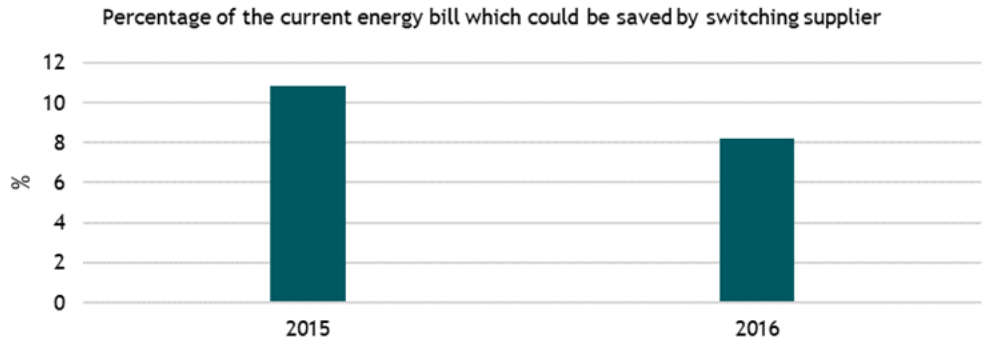
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | Yes |

[375] Note that from 2013 onwards, the survey was carried out every other year.
[376] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[377] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[378] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

*Note that "-"indicates missing data*

*Source:* ACER/CEER (2015)

**Figure 215 Percentage of the current electricity bill which could be saved by switching supplier in Italy**

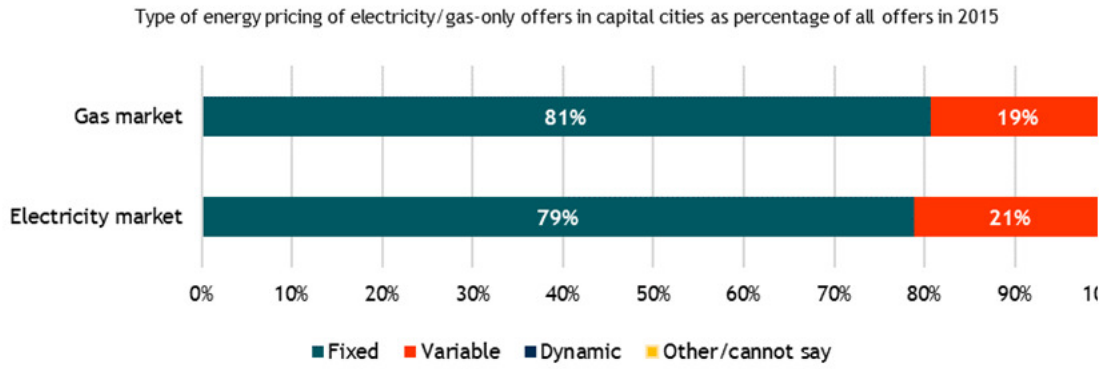



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

Figure 11 below show the type of offers available for electricity and gas, most of which are variable.

**Figure 216 Type of offers for households in Italy**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

## 16.2 Non-Household Price Regulation in Italy

**Italy had no energy price regulation for non-households in the period assessed.**

In 2016, Italian Law no. 122 was published introducing further provisions for the implementation of the EU Third Energy Package[379]. Italy's Regulatory Authority for Electricity, Gas and Water (ARERA[380]) is responsible for protecting consumer interest, as well as setting electricity and gas tariffs for both households and non-households. The protection regime for electricity and gas retail is available to households and small businesses, but is not considered price regulation by the European Commission.

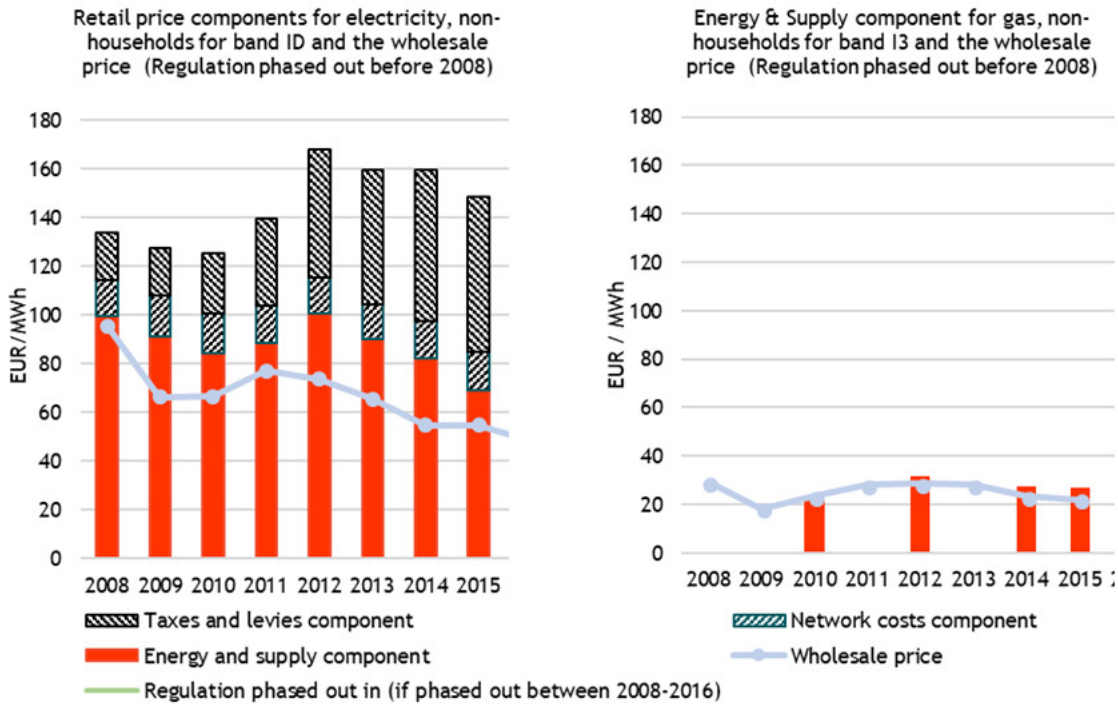
[379] https://www.ceer.eu/documents/104400/5988265/C17_NR_Italy-EN/34ae6d3c-d928-eef7-6841-7a0b3acbd44c
[380] https://www.autorita.energia.it/it/inglese/

Italy adheres strictly to energy requirements set out by the European Commission and operates under the National Energy Strategy set out in 2013 and in 2017.

### 16.2.1 Selected aspects of competition (mark-ups)

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

**Figure 217 Industry retail price components for middle bands (ID and I3) and wholesale prices in Italy**



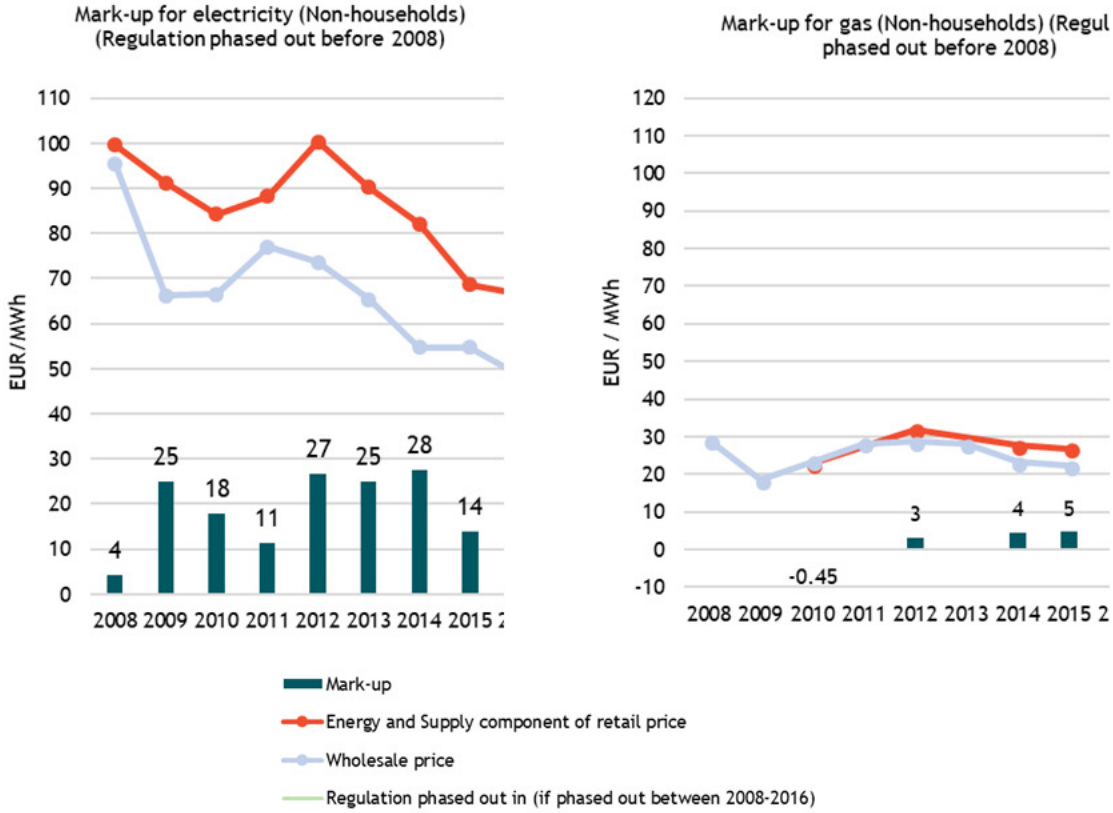

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[381] The figures below show the mark-ups along with the wholesale price. Although data for gas is patchy, in 2015 the mark-up was €5 per MWh, marking a slight increase from €3 per MWh before 2013. For electricity, the mark-up was €18 per MWh in 2016, lower than the €27 per MWh prior to 2013. Overall for electricity, the wholesale price and the energy and supply component relating to non-households have been declining since 2012. Although less distinct, a similar declining trend is also notable regarding gas.

[381] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 218 Mark-ups for Italy, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 16.3 Tariff deficit in Italy

**Italy had no tariff deficit between 2008 and 2016.**

Based on communication with the NRA, there is no tariff deficit in Italy.

# 17 Factsheet: Lithuania

This factsheet presents the findings for Lithuania for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 17.1 Household Price Regulation in Lithuania

**Lithuania still has energy price regulation for households in place.**

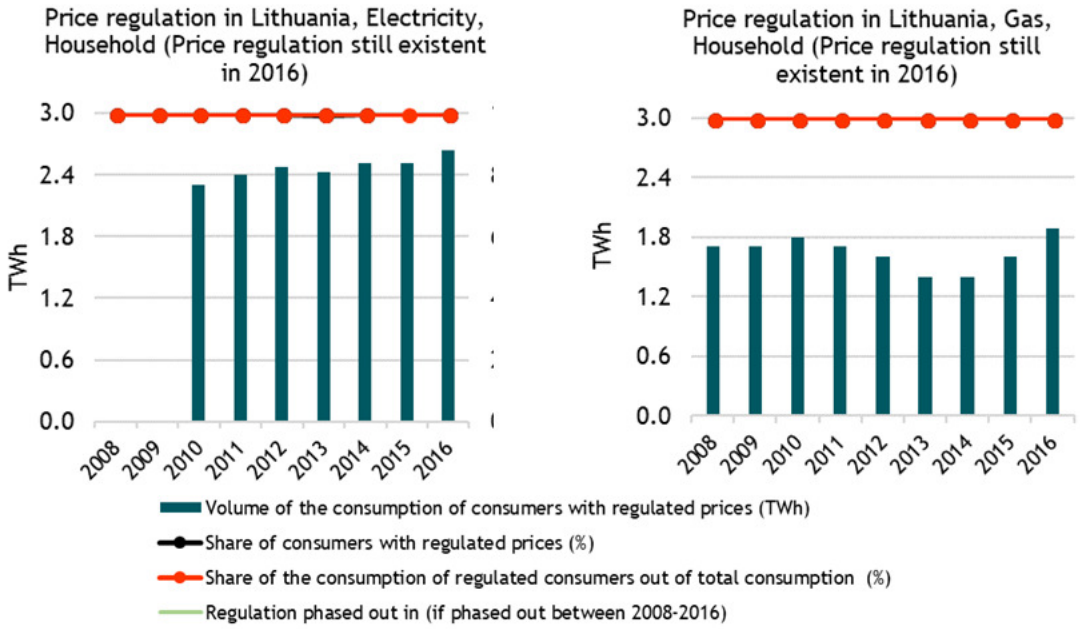
**End user price regulation is still existent in Lithuania on the electricity and gas market for household consumers**. Household customers have the right to choose an independent electricity supplier, but there is a price cap for the electricity contracts. Apart from buying electricity in the market or by concluding bilateral agreements, a guaranteed electricity supply exists. This form of guaranteed electricity supply is available to all customers who did not choose an independent electricity supplier or in those cases where the supplier fails to fulfil its obligations.[382],[383] Public electricity prices and tariffs are set by the National Commission on Price and Energy Control (NCC) every year, with extraordinary adjustments mid-year if justified (and are thus also regulated).

Like in the case of the electricity retail market, all household consumers in the gas retail market were subject to price regulation. Also they have the right to choose alternative supplier but for this moment there is one large supplier and household do no switch. Based on Article 9 (17) of the Law on Natural Gas, the NCC approves tariffs for household customers every six months.[384] In order to allow for the possibility of revising natural gas tariffs for household consumers in extraordinary circumstances the NCC amended its Methodology for Setting the State-Regulated Prices in the Natural Gas Sector in 2014.

Figure 1 shows that the share of consumers with regulated prices in the electricity household retail market has been 100 percent from 2008 to 2016. The volumes of electricity consumption for electricity with regulated prices has been fairly steady in the period analysed. Interestingly, there was a sharp decrease in the share of the consumption of regulated consumers out of the total consumption between 2009 and 2010, but the share of this consumption showed a recovery, albeit not a full one, in the subsequent years. In the Lithuanian gas retail market the share of consumption of regulated consumers out of the total consumption was 100 percent from 2008 to 2018. This translates to a volume of between 1.5 and 1.9 TWh.

382 "Retail Markets Monitoring Report", CEER, 2017, Ref:C17-MMr-83-02
383 https://enmin.lrv.lt/en/sectoral-policy/electricity-sector-1
384 "Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission", 2015, National Commission for Energy

Figure 219 Household price regulation in Lithuania from 2008 to 2016




*Source:* CEER data

Lithuania does not have social tariffs on the market for electricity or gas for household consumers

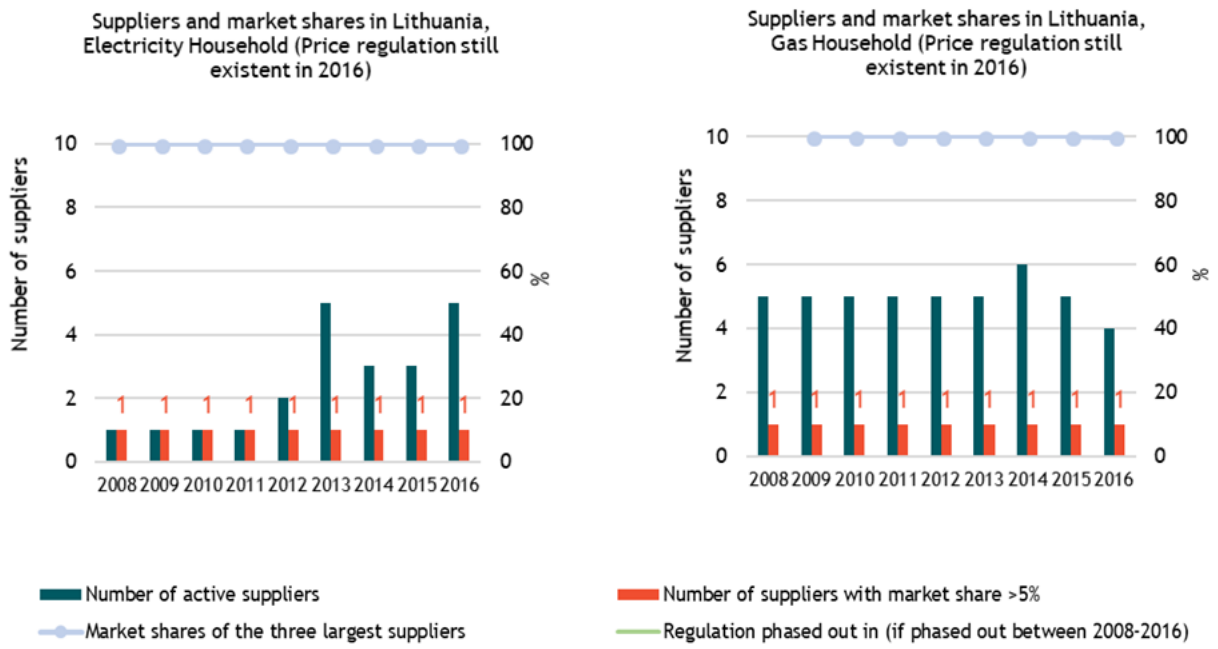
### *17.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers had almost 100 percent of market shares in the period analysed (data for 2008 in the gas market not available). Between the years of 2008 and 2011 only one active supplier participated in the electricity retail market in Lithuania. A second supplier entered the market in 2012 and in 2013 there were five active suppliers. In 2013 and 2014 this number decreased to three active suppliers but increased back to five in 2016. In 2016 the public supplier Energijos skirstymo operatorius, AB held the entirety of the retail market share including guaranteed supply.[385]

The number of active suppliers in the gas retail market was constant between 2008 and 2013, with five active players in the market. An additional player entered the market in 2014 but in 2015 the number decreased back to five and in 2016 there were only four active suppliers in the market. In addition from 2013 onwards only one of the active suppliers had a market share greater than 5 percent. The relatively low amount of suppliers on both the electricity and the gas market is an indication of little competition on the Lithuanian market.

[385] Private communication with the regulator and "Annual Report on Electricity and Natural Gas Markets of the Republic of Lithuania to the European Commission", 2017, National Commission for Energy Control and Prices

**Figure 220: Number of suppliers and market shares in Lithuania**



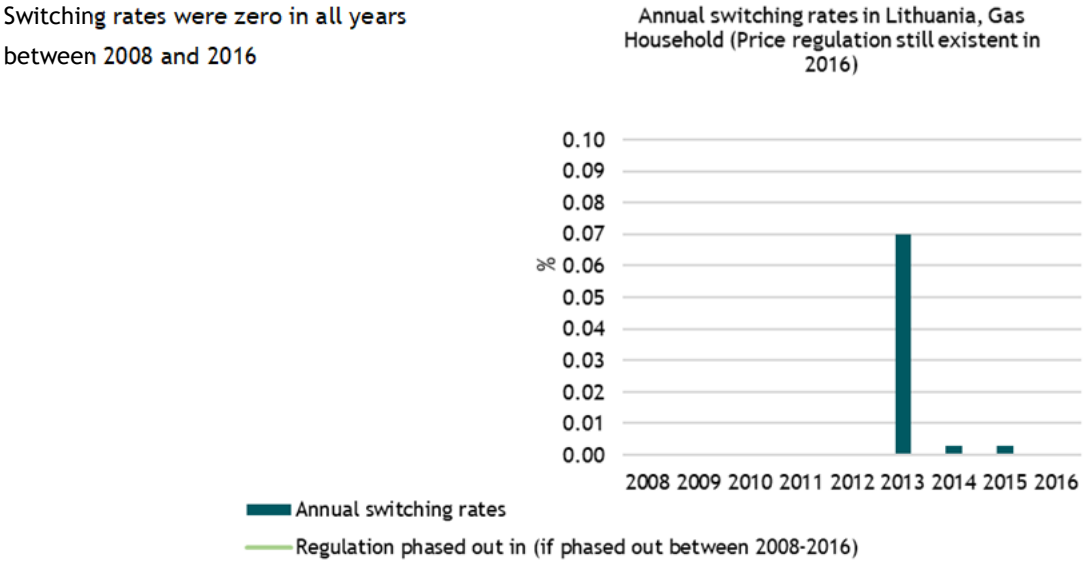

*Note: Data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

## Consumer engagement and expenditures on energy

Figure 3 shows the annual switching[386] rates in households for both electricity and gas. Between 2008 and 2016 household customers in Lithuania did not switch suppliers in the electricity retail market despite being able to do so. In the gas retail market switching are negligible low (with a maximum switching rate of 0.07 percent in 2013). This behaviour is detrimental to competition as it tends to promote market concentration.

**Figure 221 Annual switching rates for households in Lithuania**



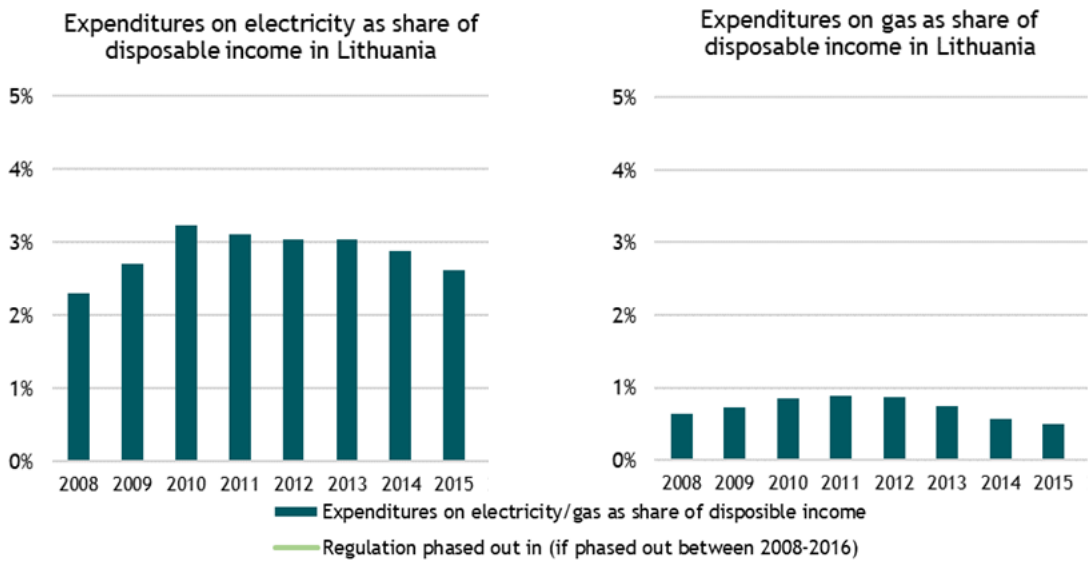

[386] Switching is defined as the voluntary action by which a customer changes his supplier

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[387] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[388] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Lithuania.

Between the years 2008 and 2010, household electricity consumers spent an increasingly larger share of their disposable income on electricity. This share surpassed 3 percent of the disposable income in 2010. Between the years 2011 and 2013 the share remained more or less constant at 3 percent of the income. From 2013 to 2016 the share has been decreasing (which coincides with a decrease in the retail electricity price in the same years as shown in figure 5). In the years from 2008 to 2016 gas constituted less than one percent of the disposable income in households. Thus, households tend to spend more on electricity than on gas in Lithuania. Compared to other EU Member States, the share of disposable income spent on energy is relatively low.

**Figure 222: Expenditures on gas and electricity as share of disposable income for households in Lithuania (for middle consumption bands DC and D2) using PPS prices[389]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

[387] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[388] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[389] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

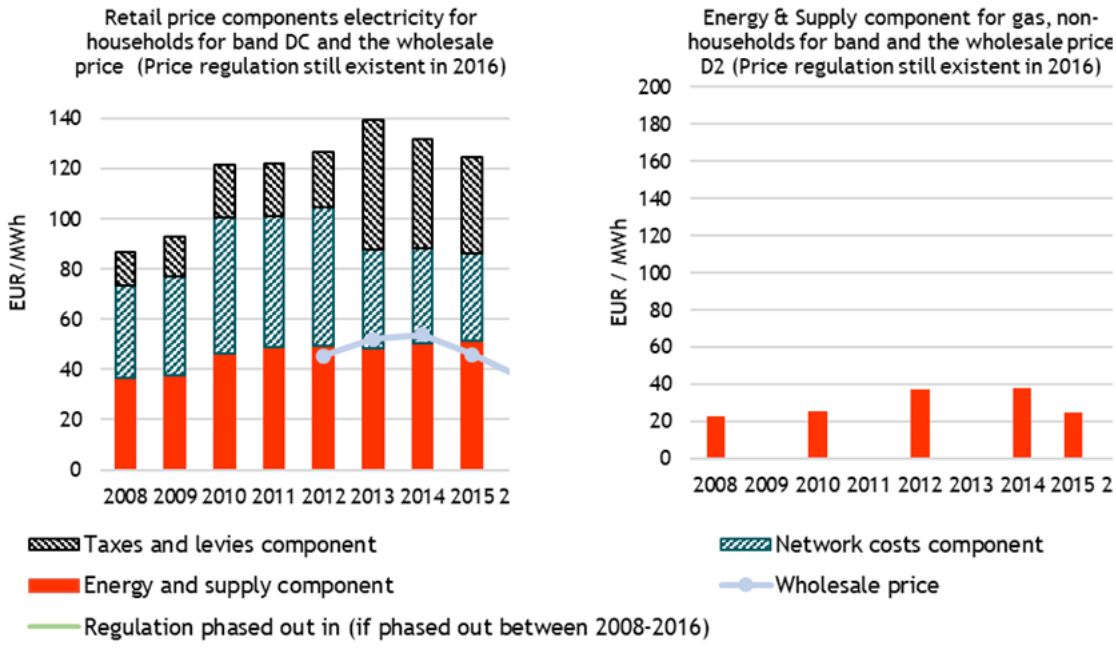
*Source:* Own calculations[390] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Lithuania. Figure 5 shows that between 2012 and 2016 wholesale electricity prices were similar to the energy and supply component of the retail electricity price. The wholesale price was slightly higher in the years 2013 and 2014. The opposite is true for 2012, 2015 and 2016. It should also be noted that the taxes and levies component of the retail price increased significantly in 2013.

The energy and supply component of the retail gas price appears to be rather volatile over the considered time period. Data on the price of wholesale gas is not available and thus, no conclusions can be drawn regarding competition performance or mark-ups in the gas sector based on this indicator.

**Figure 223 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Lithuania**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market. There is also no data available on the wholesale price of gas in Lithuania nor on the wholesale price of household electricity in the years 2008 to 2011.*

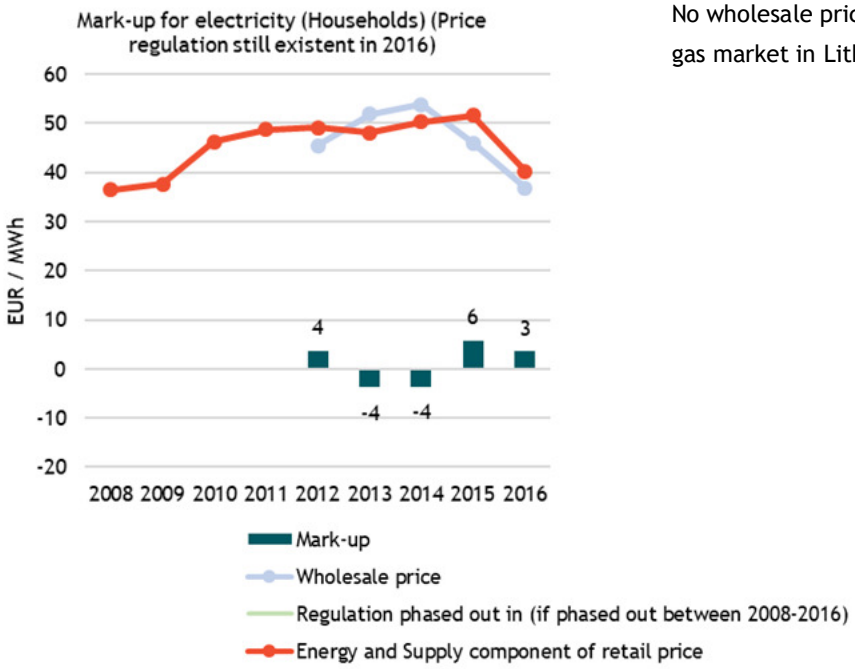
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[391] and EMOS (wholesale price)

[390] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

[391] Eurostat has data available on gas prices; however not for the energy and supply component.

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[392] The figures below show the mark-ups along with the wholesale price. Slightly negative mark ups were calculated in 2013 and 2014 for the electricity retail market. In the years 2012, 2015 and 2016 the mark ups were small but positive. Due to lack of information available an analysis on the mark ups in the gas retail sector is not possible.

**Figure 224 Mark-ups for Lithuania , middle consumption bands (DC and D2)**




No wholesale prices available for the gas market in Lithuania

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

### *17.1.2 Energy poverty*

According the Collaboratory for Urban Resilience and Energy, Lithuania might be one of the EU countries most afflicted by energy poverty.[393] Lithuania currently does not have a national definition of energy poverty, however the term is generally applied to those individuals or households who are unable to adequately heat or provide other required energy services in their homes at affordable costs.[394] According to the EU Survey on Income and Living Conditions[395] in 2015, 31.1 percent of inhabitants were not able to afford keeping their houses adequately warm and 17 percent indicated

[392] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

[393] https://urban-energy.org/2017/06/07/an-update-on-energy-poverty-situation-in-lithuania/

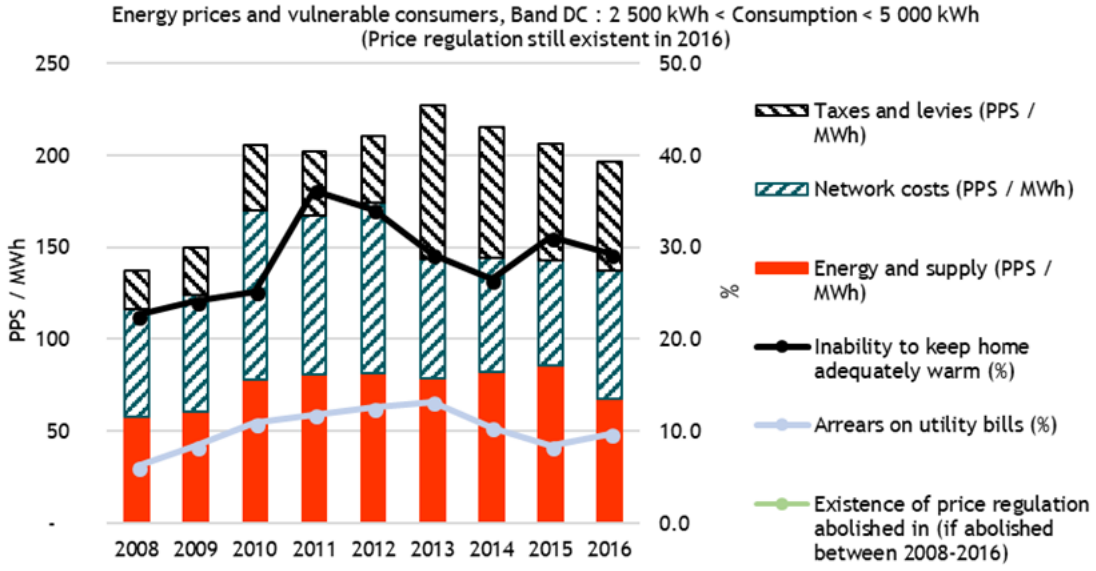
[394] "Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures", Insight_E, Policy Report, May 2015

[395] http://ec.europa.eu/eurostat/web/microdata/european-union-statistics-on-income-and-living-conditions

that they were dampness, draughts and leaks. According to Eurostat, single person households suffer most from energy poverty (43.8%).[396]

The black line in Figure 7 represents the percentage of consumers who are unable to keep their households sufficiently warm. A sharp increase in the percentage of such consumers was seen from 2010 to 2011 in spite of the fact that in 2011 the final retail electricity price slightly lower than in the previous year. From 2011 to 2014 there was a decrease in the percentage of consumers who were unable to keep their households sufficiently warm in spite of the fact that in those years the final retail price of electricity increased. Thus, energy poverty might not be exactly correlated with electricity prices but other, external factors might also affect the ability of customers to keep their households warm. From 2014 to 2015, there was again an increase in the share of people unable to keep their households warm. This percentage decreased from 2015 to 2016. There is no clear correlation between the percentage of arrears on utility bills and the percentage of electricity consumers unable to keep their households warm. For example, between 2015 and 2016 the percentage of arrears on utility bills increased but the number of people unable to keep their homes adequately warm decreased.

**Figure 225 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Lithuania**




*Source:* Eurostat

### *17.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

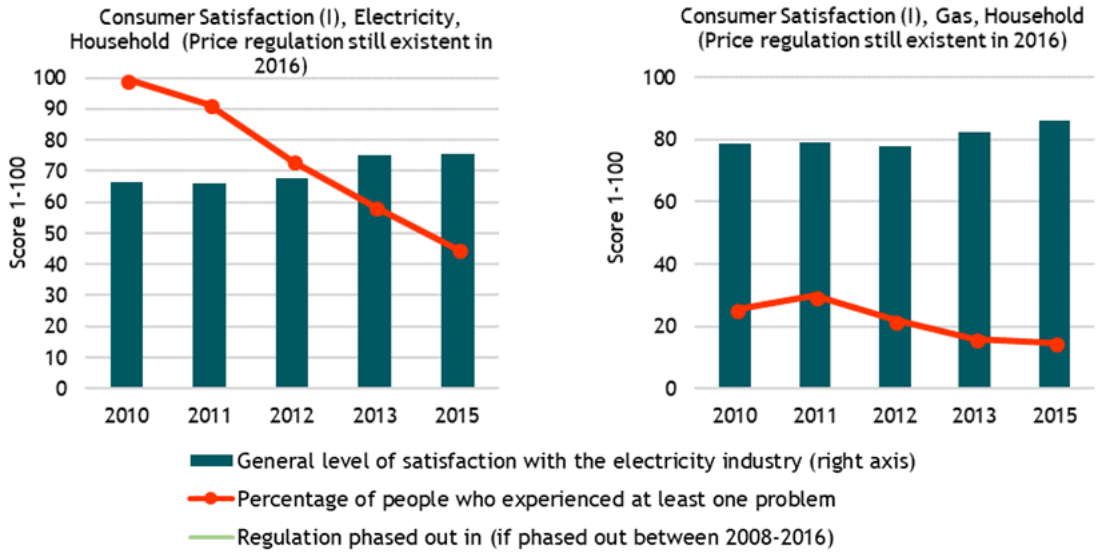
#### Consumer satisfaction

Figure 8 shows that general customer satisfaction in the electricity retail market for households has increased over time. The overall score for general customer satisfaction in this market was 75 out of 100. At the same time the percentage of people who experience at least one problem decreased by

[396] Eurostat, 2017 cited in "Changes in taxation could increase the risk of energy poverty in Lithuania", ESPN Flash Report 2017/51

more than half between 2010 and 2015. The gas retail market for households scores higher than the electricity marker across the period analysed. The highest score of above 85 was attained in 2015. In addition, the percentage of people who experience at least one problem was also on decline between 2011 and 2014. Based on the 2014 "EU Energy Markets" report by the European Commission, the scores on satisfaction are well above the EU average for both the electricity and the gas market.[397]

**Figure 226 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Lithuania for households**




*Source:* EC – DG Justice[398]

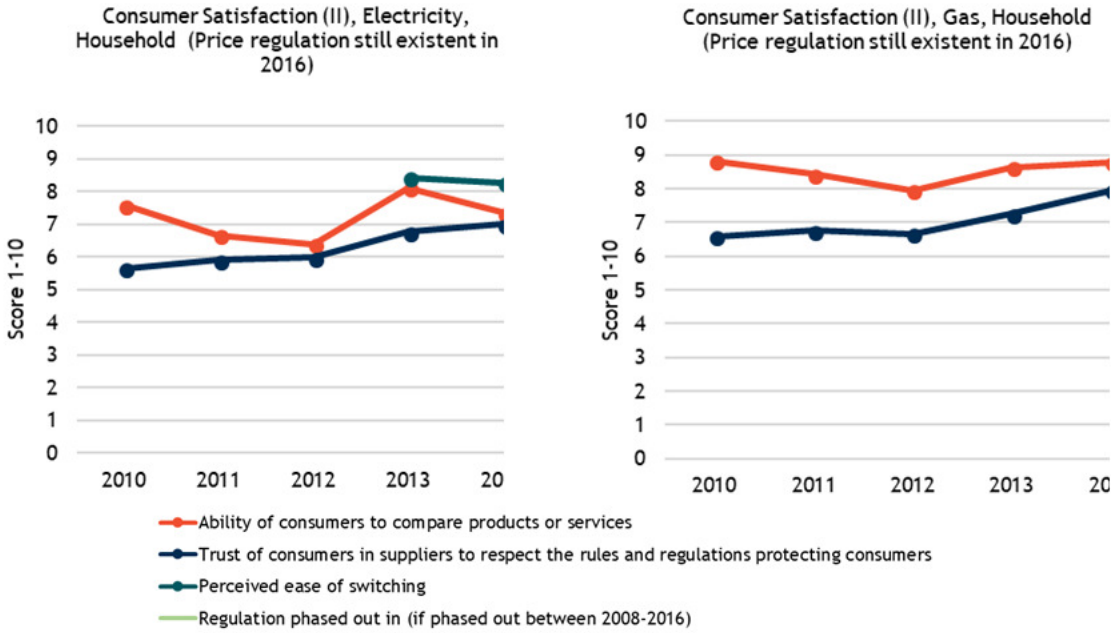
The trust of consumers in suppliers to respect the rules and regulations protecting consumers is increasing in Lithuania, both for electricity and gas. The scores in 2010 were lower than 7 and in 2015 it was 7 and 8, respectively. The ability of consumers to compare products or services has consistently ranked lower than the trust of consumers in suppliers. From 2012 to 2013 the score decreed from close to 6 to 8 but decreased to 7 in 2015. Only two data points are available in relation to the perceived ease of switching. This indicator received a score of about 8/10 on both 2013 and 2015. The scores are surprisingly high if contrasted with the fact that there has been zero switching in the electricity retail market between 2008 and 2016.

In the gas retail market, between 2010 and 2012, the ability of consumers to compare products or services was ranked higher than their trust in suppliers. From 2012 to 2015 the two indicators have received similar scores which have been increasingly more positive. Data on the perceived ease of switching is not available.

[397] "EU Energy Markets in 2014", EC

[398] Note that from 2013 onwards, the survey was carried out every other year.

**Figure 227 Ability of consumers to compare products or services[399], trust of consumers in suppliers[400] and perceived ease of switching[401] in Lithuania**



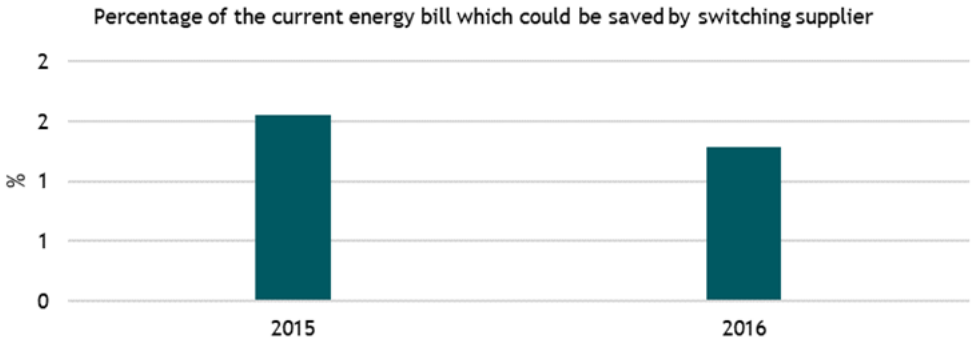

*Source:* EC – DG Justice

## Consumer choice

No data is available of specific choices on available energy contracts (such as green offers) for Lithuania.

Percentage of the current electricity bill which could be saved by switching supplier in Lithuania was equal to 1.5 percent in 2015 and decreased slightly in 2016. This implies that Lithuanian consumers could have saved a relatively small share of their electricity bill by switching suppliers (compared to the EU average). Based on Figure 11, 80 percent of all offers in the electricity retail market are fixed, the remaining offers pertain to options different from variable or spot-based offers.

**Figure 228 Percentage of the current electricity bill which could be saved by switching supplier in Lithuania**



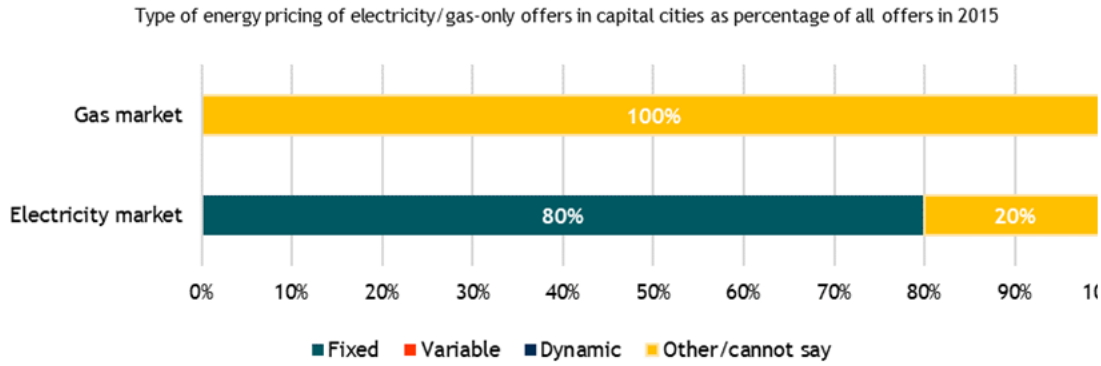

[399] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[400] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[401] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas.

**Figure 229 Type of offers for households in Lithuania (RC03b)**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*

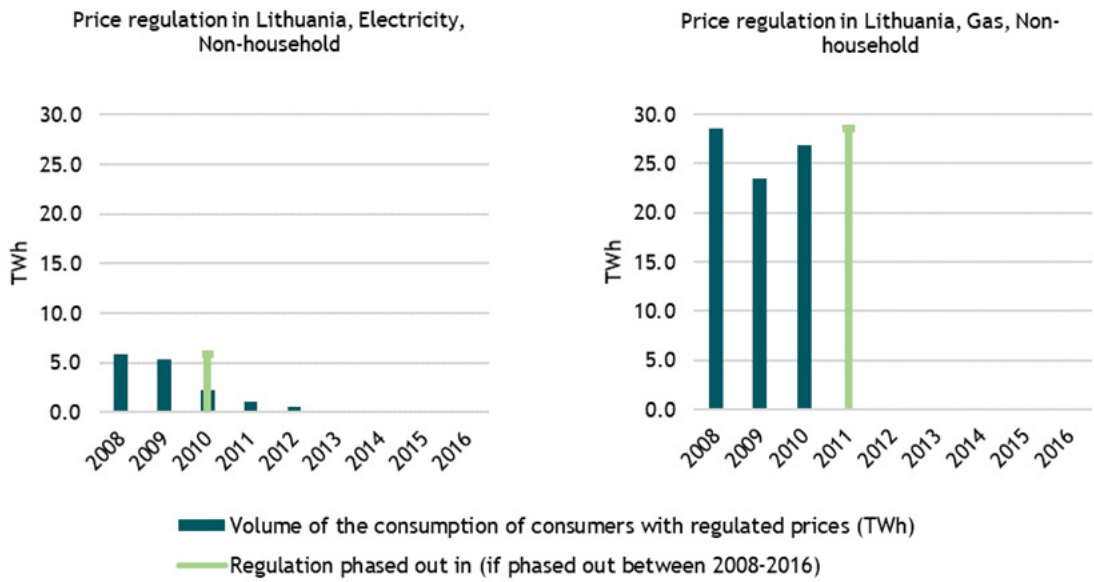
*Source:* ACER/CEER (2015)

## 17.2 Non-Household Price Regulation in Lithuania

**Lithuania phased out energy price regulation for non-households starting from 2010 for electricity and 2011 for gas. However, Lithuania still had a very small share of consumption under regulated electricity prices (under 5%).**

According to CEER, **price regulation was abolished on the electricity and gas markets for non-household consumers in 2010 and 2011 respectively**. Figure 12 confirms this for the gas market, but not for the electricity market. Yet, the volume of consumption under regulated electricity prices for non-household consumers has decreased drastically since 2010. In fact, the low volume of consumption under regulated prices between 2013 and 2016 suggests that price regulation has had a neglectable effect from 2013 onwards.

**Figure 230 Non-household price regulation in Lithuania from 2008 to 2016**

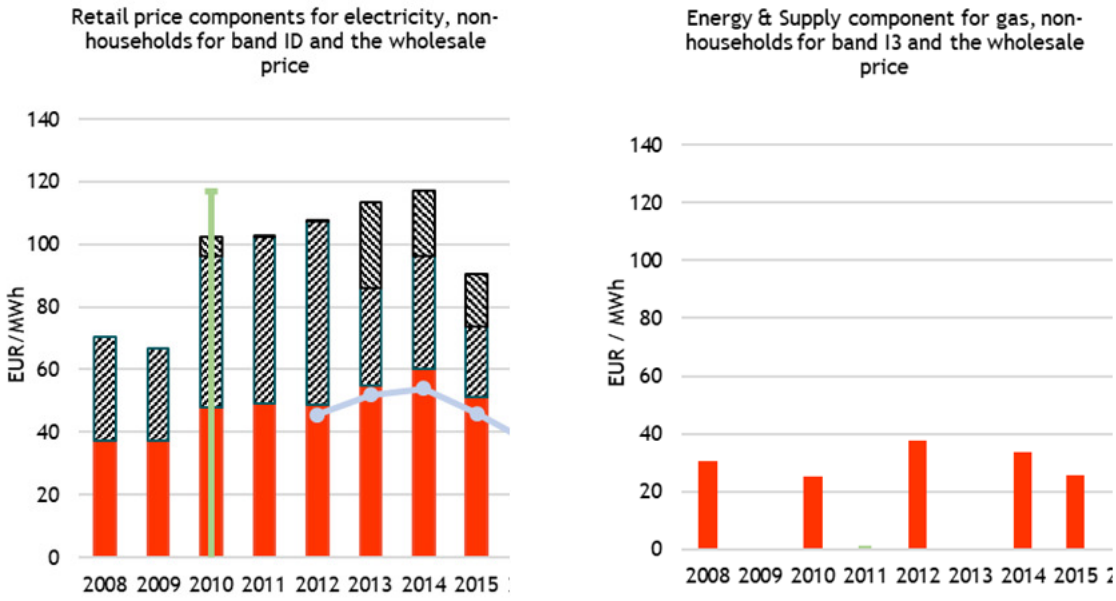



*Source:* CEER data

### *17.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. The retail electricity price for non-household consumers shows much variation over the considered time period. The energy and supply component of the retail electricity price increased until 2014 followed by a decrease in 2015 and 2016. It should also be noted that it is very closely correlated with the wholesale electricity price which is an indication of an efficient electricity market. In 2013, the taxes and levies component of the retail electricity price increased after being equal to zero in 2011 and 2012. The energy and supply component of the retail gas price also shows a lot of variation between 2008 and 2015, but decreased steadily after peaking in 2012.

**Figure 231 Industry retail price components for middle bands (ID and I3) and wholesale prices in Lithuania**

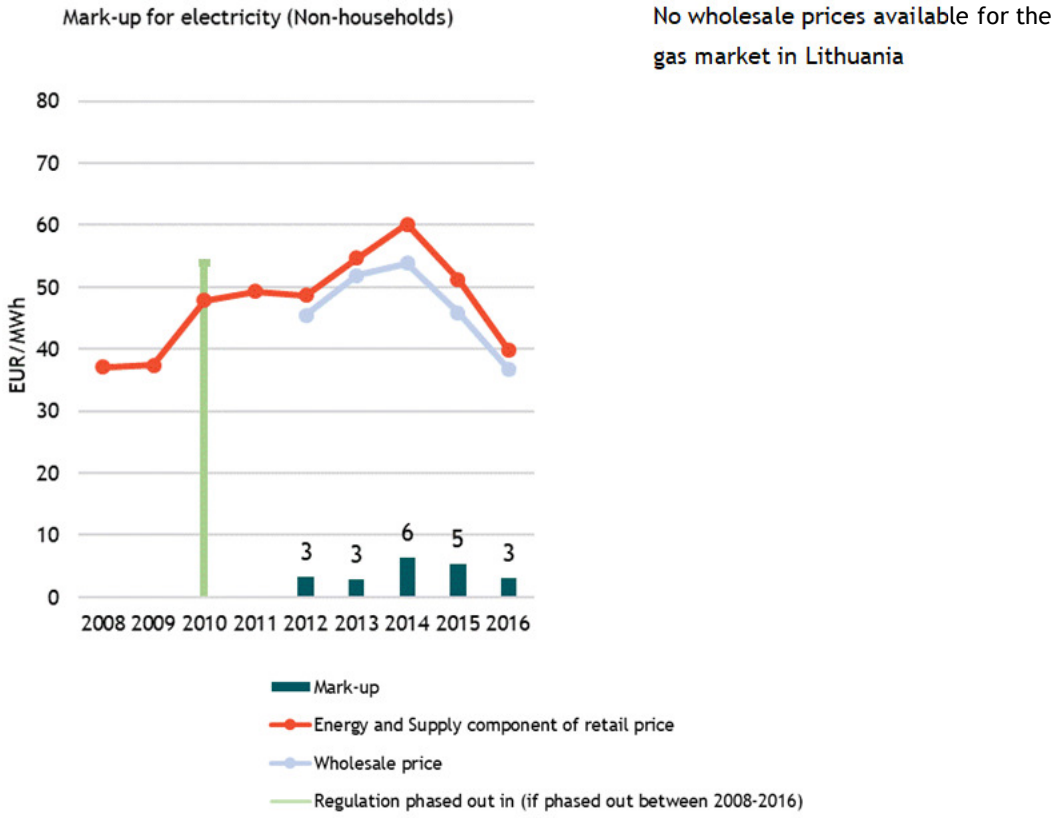



*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. There is no data available for the taxes and levies component (also for the electricity market in 2009 and 2010) and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[402] The figures below show the mark-ups along with the wholesale price for the electricity market for non-household consumers (the wholesale gas price is not available). The differential between the energy and supply component of the retail electricity price for non-household consumers and the wholesale electricity price is relatively small, but consistently positive. This is could be an indication of a competitive electricity market for non-household consumers.

**Figure 232 Mark-ups for Lithuania , middle consumption bands (ID and I3)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

[402] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

## 17.3 Tariff deficit in Lithuania

**Lithuania had no tariff deficit between 2008 and 2016.**

# 18 Factsheet: Luxembourg

This factsheet presents the findings for Luxembourg for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 18.1 Household Price Regulation in Luxembourg

**Luxembourg had no energy price regulation for households in the period assessed.**

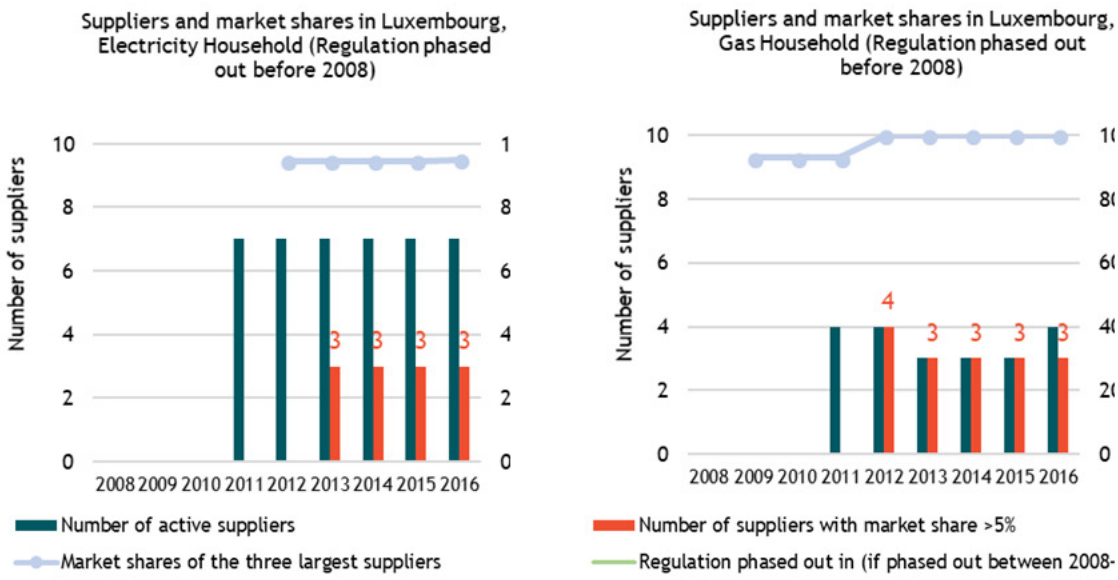
In Luxembourg there are no regulated retail prices for electricity or gas and the retail market is fully open to competition since 1 July 2007. There are also no social tariffs for electricity or gas.
According to article 54 (3 bis) of the law of 1 August 2007 concerning the organisation of the electricity market and article 51 (6 bis) of the law of 1 August 2007 concerning the organisation of the natural gas market, the NRA must, at least once a year, evaluate whether the supply prices for electricity and gas are compliant with the public service obligations for electricity and gas, and specifically for electricity, with the required quality of the universal service. The NRA must in particular evaluate whether the electricity and gas suppliers apply reasonable terms and prices, which are easily and clearly comparable, transparent, non-discriminatory and published.[403]

### *18.1.1 Selected aspects of competition*

For both electricity and gas, we see that the retail market concentration in Luxembourg is still very high and has even increased in 2012. In the considered time period, the three largest suppliers had consistently a market share over 95% in the household segment. At the same time, the number of active suppliers has been relatively stable, except for gas. In 2016, the Ministry of Economy, which is in charge of authorising suppliers for Luxembourg, had granted an electricity supply licence to 27 companies, out of which 14 were effectively active on the Luxembourg market. Despite the "high" number of active market players at wholesale level the retail market competition remains rather low, with 7 suppliers active in the household electricity market segment and 4 suppliers active in the household gas market segment in 2016. There were only 3 electricity suppliers with a market share in volume higher than 5% (respectively 74%, 14% and 7% in 2016). For gas, the market concentration is even higher.

[403] Sources: CEER data – Reports Institut Luxembourgeois de Régulation (NRA)

Figure 233: Number of suppliers and market shares in Luxembourg



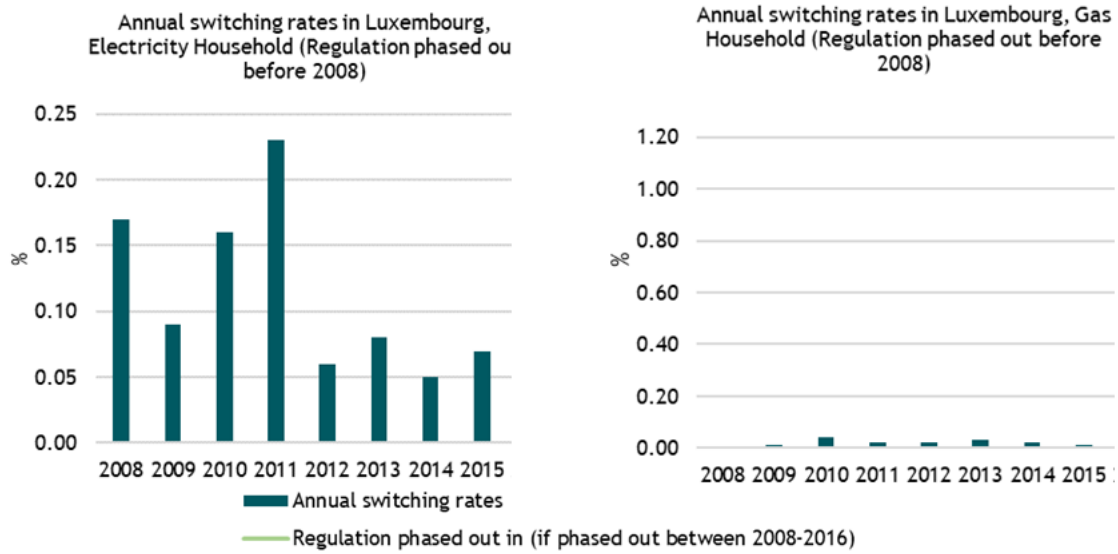

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. Data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

## Consumer engagement and energy expenditures

The figures below show the annual switching[404] rates of households for both electricity and gas. We notice that the switching rate in the household retail segment has remained at a very low level, with less than 0.2% of households switching supplier. The supplier switching rate is in the industrial market segment much higher than in the households market segment.

Figure 234 Annual switching rates for households in Luxembourg

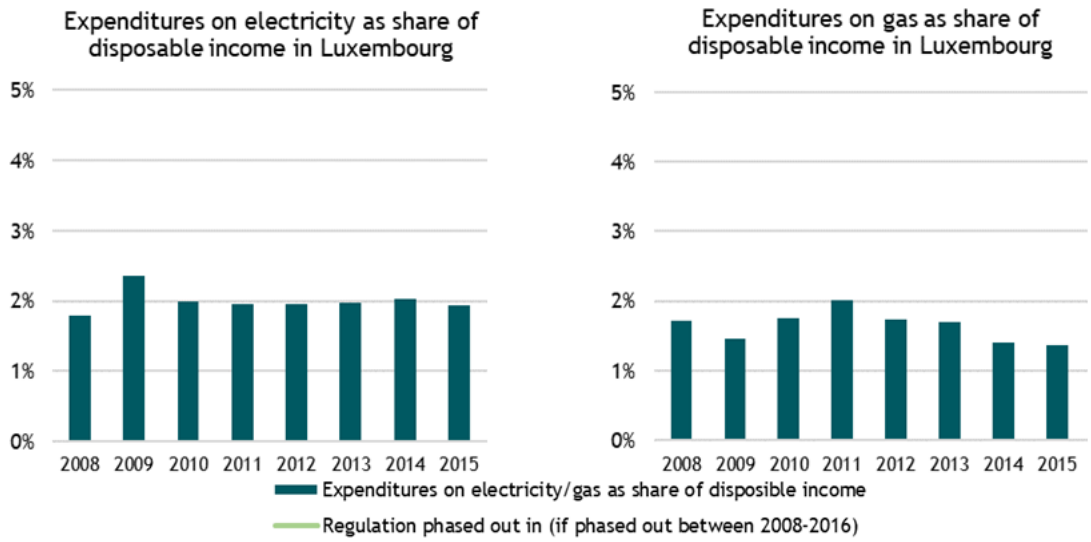



[404] Switching is defined as the voluntary action by which a customer changes his supplier

*Source:* CEER data

The consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[405] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[406] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Luxembourg. The share of the electricity bill in the household expenditures has been rather stable during the considered period, while the share of the gas bill has decreased.

**Figure 235: Expenditures on gas and electricity as share of disposable income for households in Luxembourg (for middle consumption bands DC and D2) using PPS prices[407]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[408] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. The wholesale decomposed retail household prices using data from the NRA is also presented.

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[405] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

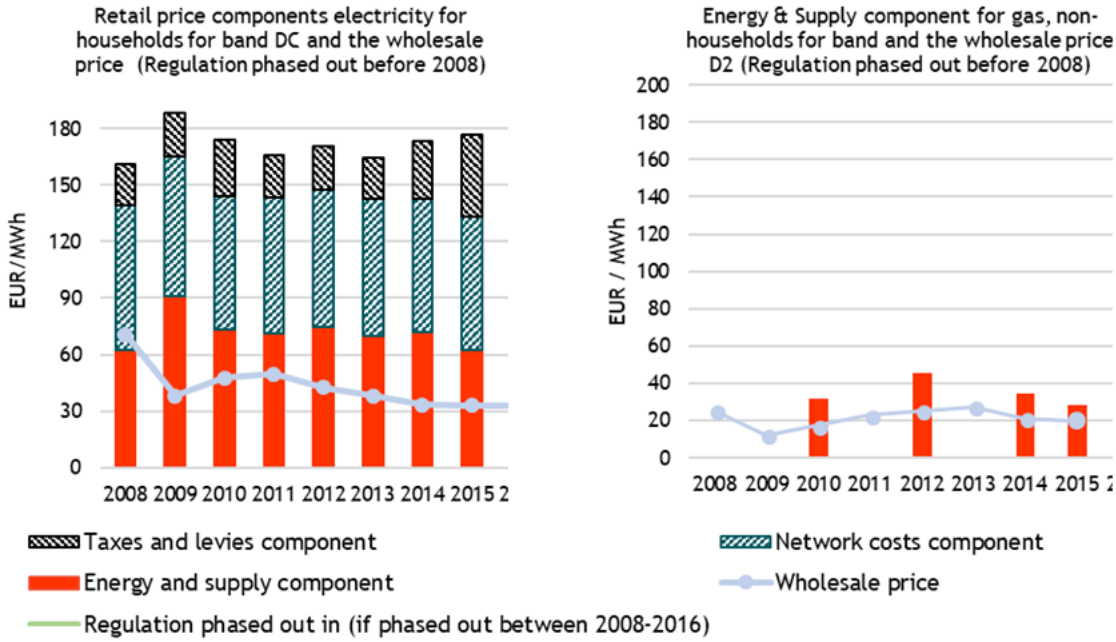
[406] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[407] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

[408] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

It is interesting to see that for Luxembourg, the price of the energy component has decreased over time for electricity and gas (in line with the evolution of the wholesale prices). On the other hand, taxes and network costs have slightly increased for both energy carriers. The commodity share in the overall energy bill has hence decreased. Further analysis might be needed to gain a better understanding of the drivers behind the changes in the retail market.

**Figure 236 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Luxembourg**

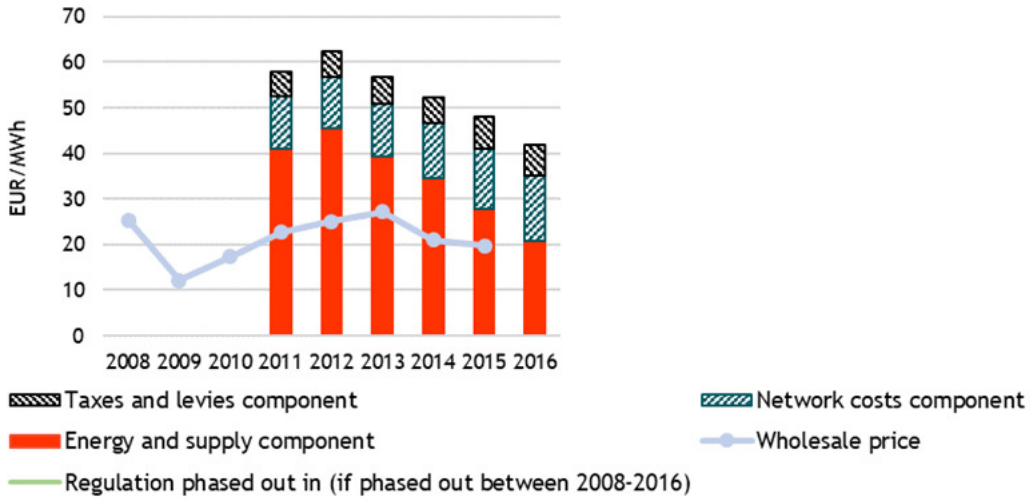



*Note that ad hoc data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*[409]

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[410] and EMOS (wholesale price)

[409] The NRA has further specific data for the country in their website.
[410] Eurostat has data available on gas prices; however not for the energy and supply component.

**Figure 237 Gas retail household price for middle consumption bands (D2) and wholesale prices in Luxembourg with NRA data**

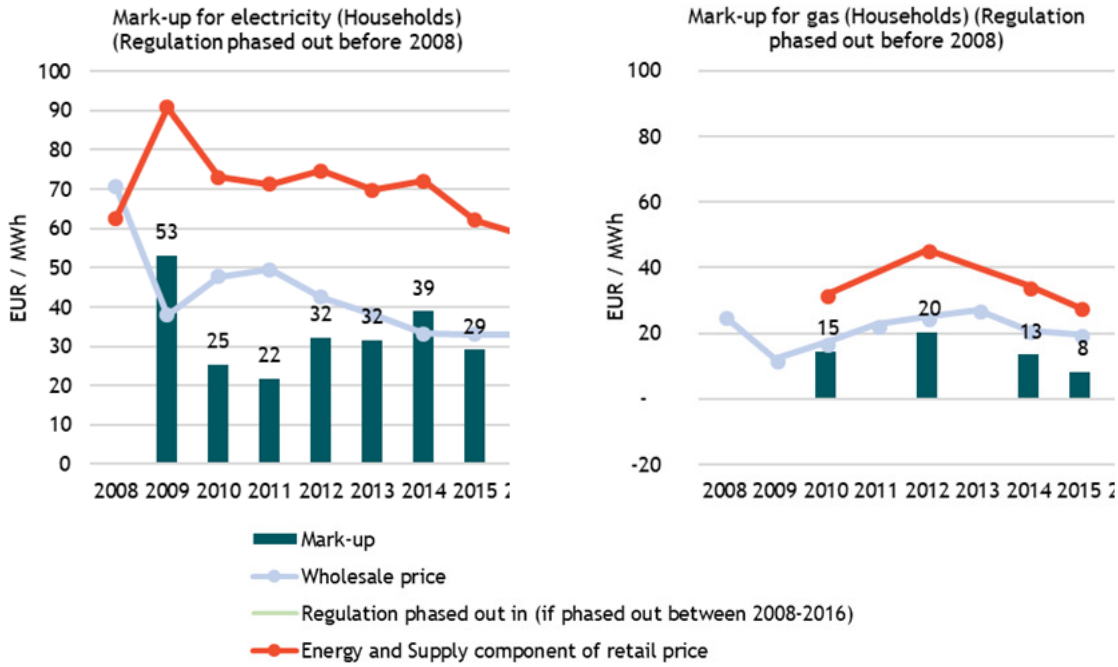



*Source:* ILR (2017), Rapport de l'institut luxembourgeois de régulation sur ses activités et sur l'exécution de ses missions dans les secteurs de l'électricité et du gaz naturel (components of the gas retail price), and EMOS (wholesale price)

The competition performance section also assesses gross margins achieved by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[411] The figures below show the mark-ups along with the wholesale price, including using data from the NRA, for gas. The commodity price evolution on the household market segment seems in general in line with the wholesale prices. According to a similar analysis performed by the NRA, gross margins for electricity amounted in 2011-2015 between 14.2 €/MWh (2011) and 25.3 €/MWh (2014) (Source : report ILR December 2016). Gross margins for gas also decreased according to the NRA, to 14 €/MWh in 2016. The NRA has at that moment also compared the price levels applied in Luxembourg with those in neighbouring countries. On the basis of both analyses, the NRA did not make critical comments with regard to the retail price levels applied in Luxembourg. There is hence in Luxembourg no visible impact of the high market concentration and low supplier switching level on the gross margins of suppliers.

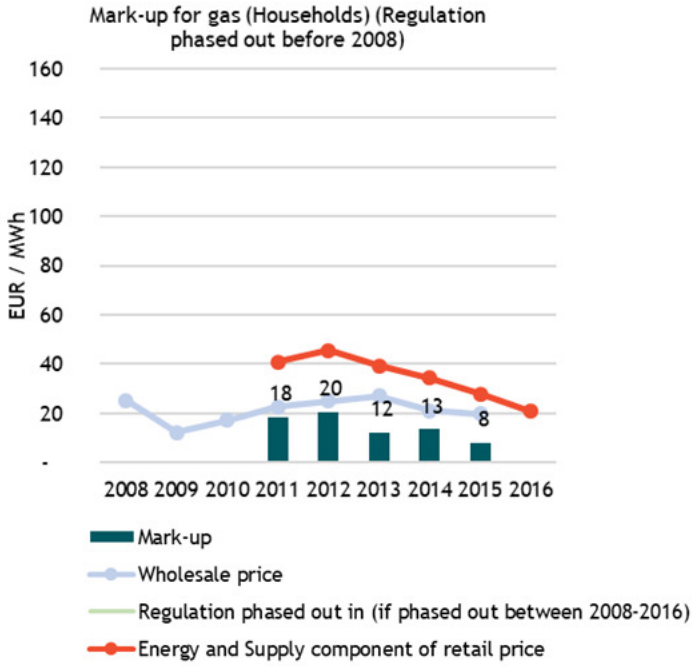
[411] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 238 Mark-ups for Luxembourg, middle consumption bands (DC and D2)**




*Note that ad hoc data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

**Figure 239 Mark-ups for Luxembourg, D2 gas consumption band with regulator data**



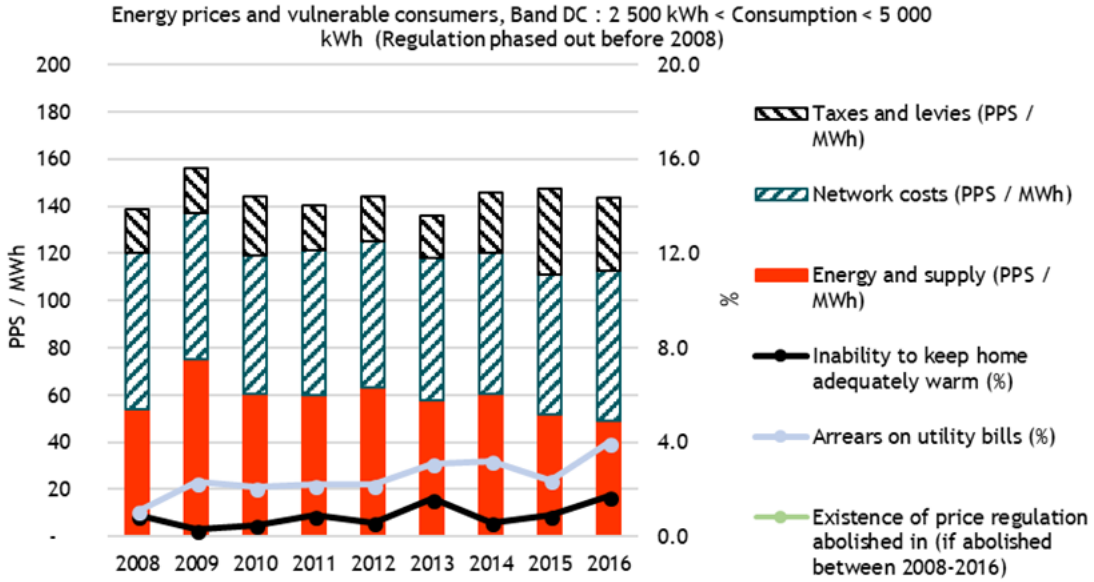

*Source:* ILR (2017), Rapport de l'institut luxembourgeois de régulation sur ses activités et sur l'exécution de ses missions dans les secteurs de l'électricité et du gaz naturel (components of the gas retail price), and EMOS

(wholesale price). Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.

### 18.1.2 Energy poverty

The number of consumers in Luxembourg which are potentially suffering from energy poverty is slightly increasing over time, as can be seen in the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. However, in general the levels of energy poverty in Luxembourg are lower than those in most other EU Member States. As mentioned in the first section, there are in no social tariffs for electricity or gas. Yet, energy poverty is addressed by generic social security and energy efficiency policy measures.

**Figure 240 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Luxembourg**




*Source:* Eurostat

### 18.1.3 Quality of services

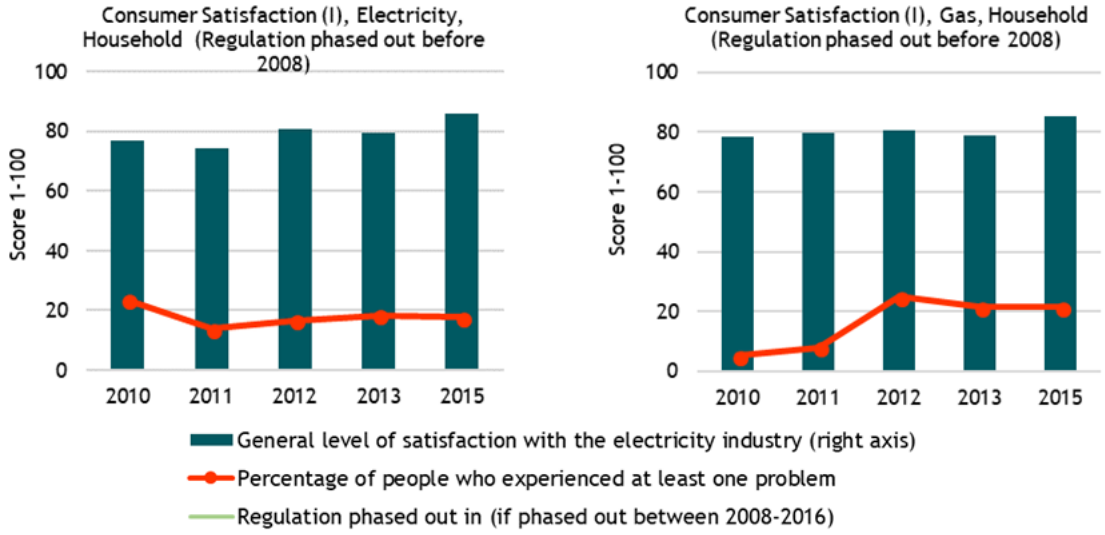
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The consumers' satisfaction with regard to supply of electricity and gas has in Luxembourg increased over time and has reached a high level, notwithstanding the fact that the number of consumers facing at least one problem has increased for gas.

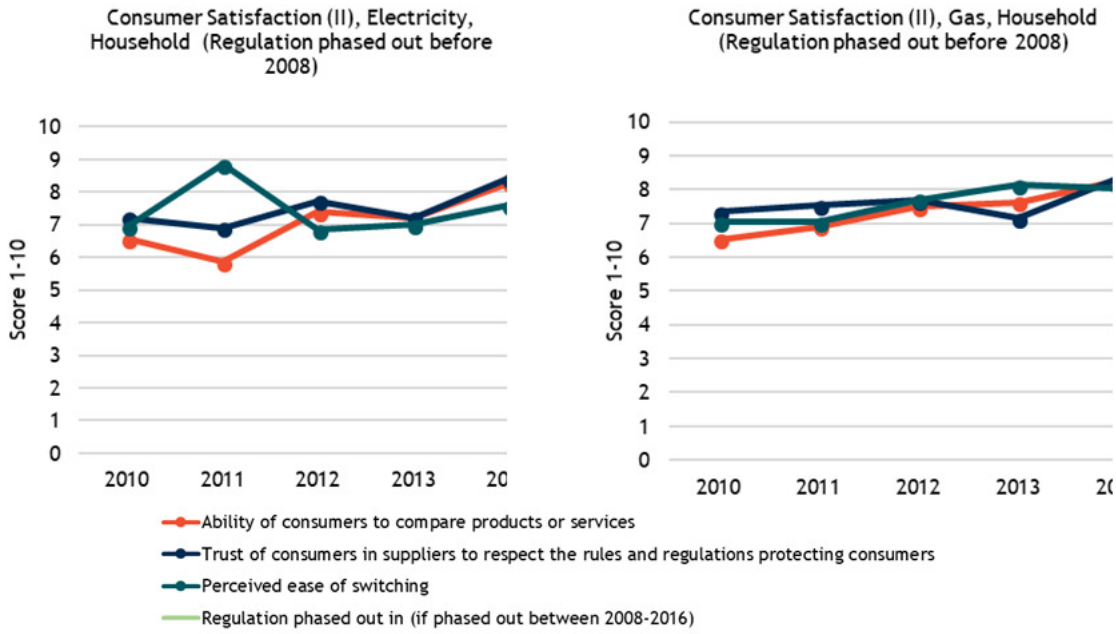
The perceived ease of switching is very low, and can explain the low switching rates in Luxembourg, despite the fact that suppliers are legally not allowed to charge any specific switching costs.

**Figure 241 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Luxembourg for households**




*Source:* EC – DG Justice[412]

**Figure 242 Ability of consumers to compare products or services[413], trust of consumers in suppliers[414] and perceived ease of switching[415] in Luxembourg**




*Source:* EC – DG Justice

[412] Note that from 2013 onwards, the survey was carried out every other year.
[413] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[414] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[415] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. Households can in Luxembourg effectively opt for green products, but not dual supply contracts from national suppliers. The offerings of additional energy related services to households is still rather limited in Luxembourg; the ongoing installation of smart meters will however enhance the opportunities for offering new services. Since 1 July 2016, new connections are equipped with smart meters, while the existing meters are currently being replaced systematically. In principle their replacement will be finalised by end 2019 for electricity and by end 2020 for gas. At that moment aggregators can also become more active on the Luxembourg household market.

**Table 18-1 Consumer choice in Luxembourg (electricity, households)**

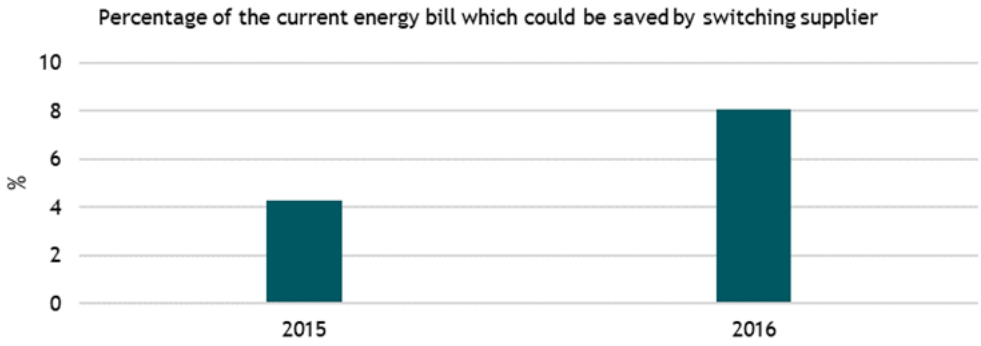
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 | No |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The potential benefits of switching electricity supplier seem rather limited in Luxembourg, which can explain, along with the low perceived ease of switching, the low effective switching rates.

**Figure 243 Percentage of the current electricity bill which could be saved by switching supplier in Luxembourg (PS05a)**



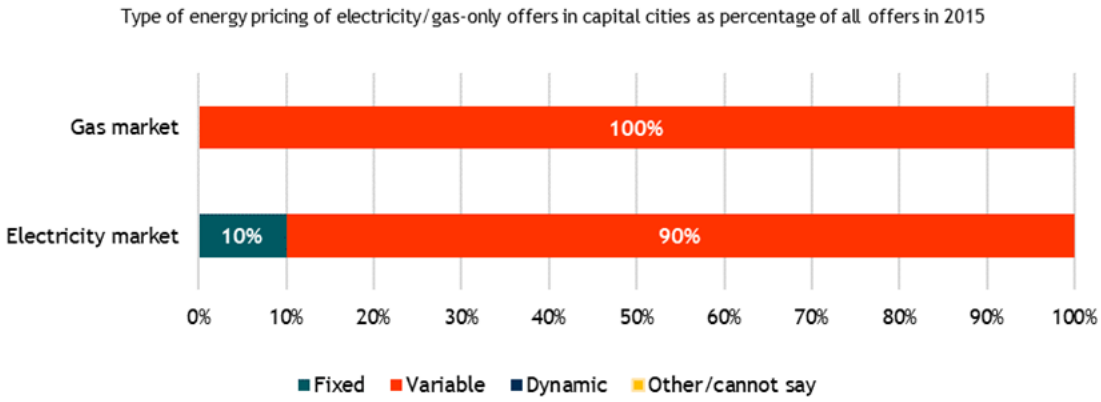

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available in 2015 for electricity and gas, most of which are variable. In 2016 these figures had changed to 21% and 79% of fixed and variable offer in gas, and 33% and 67% for fixed and variable electricity offers.[416]

[416] From exchange with the regulator (2018).

Figure 244 Type of offers for households in Luxembourg




*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 18.2 Non-Household Price Regulation in Luxembourg

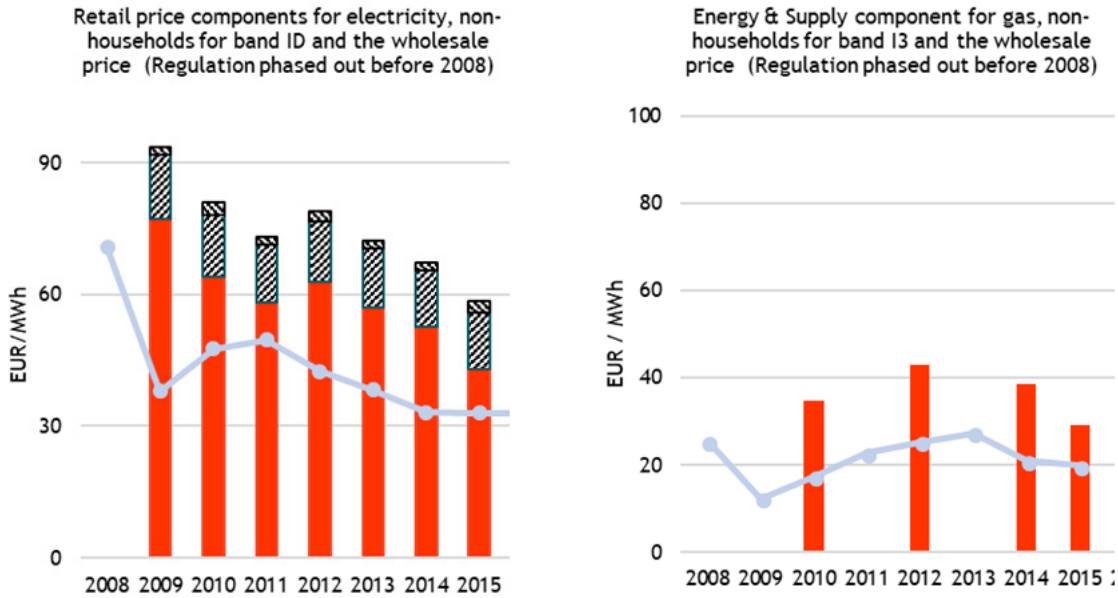
**Luxembourg had no energy price regulation for non-households in the period assessed.**

There is in Luxembourg no price regulation for supply of gas or electricity; there is only a legal monitoring obligation for the NRA to annually evaluate the price evolution (see supra).

### *18.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (non-household) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

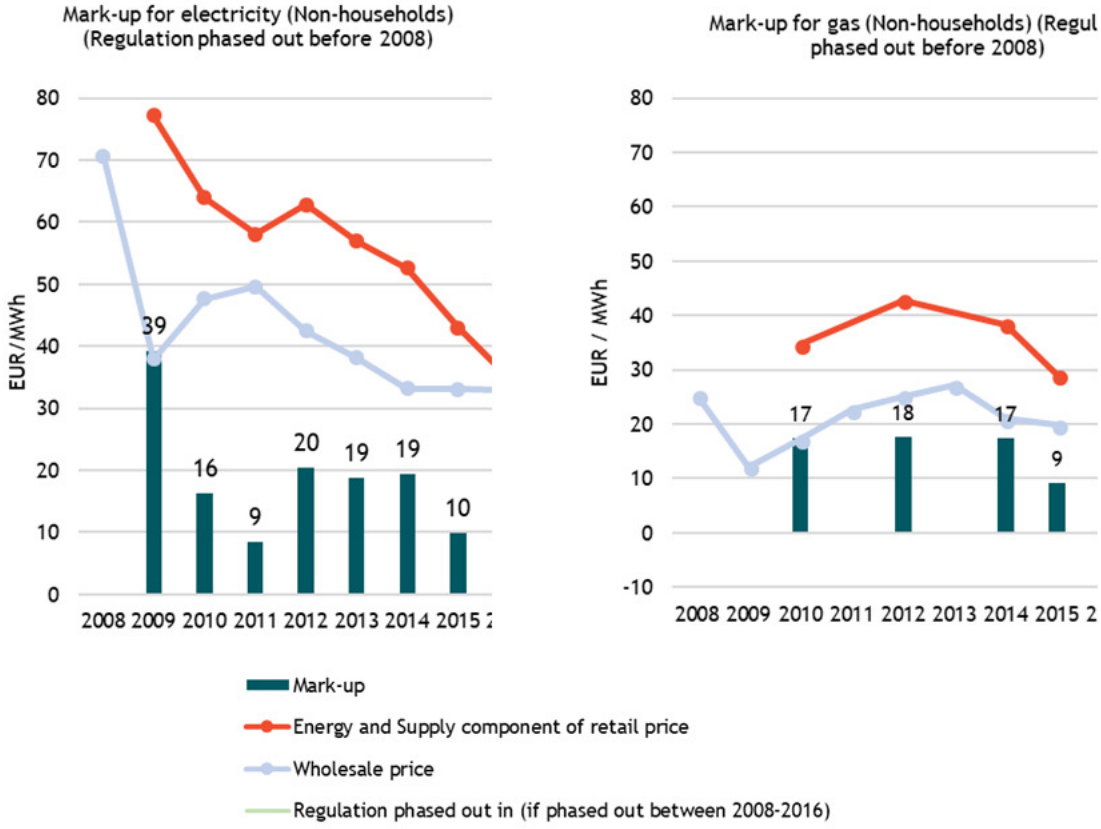
Figure 245 Industry retail price components for middle bands (ID and I3) and wholesale prices in Luxembourg




*Note that data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*[417]
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses gross margins achieved by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[418] The figures below show the mark-ups along with the wholesale prices. The gas price components and mark-up using data from the NRA is also indicated. We notice that the gross margins in the wholesale market segment are for electricity on average lower than in the household market segment, while for gas they are more or less at the same level. The price evolution on the retail market is in general in line with the evolution at wholesale level – thus for the gas market mark-ups remain stable.

**Figure 246 Mark-ups for Luxembourg, middle consumption bands (ID and I3)**




*Note that data is not available for the gas market in 2008, 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

[417] The NRA has further specific data for the country in their website.
[418] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

**Figure 247 Industry gas retail price components, wholesale prices and mark-ups for Luxembourg, middle consumption bands (ID and I3) with NRA data**


*Source:* ILR (2017), Rapport de l'institut luxembourgeois de régulation sur ses activités et sur l'exécution de ses missions dans les secteurs de l'électricité et du gaz naturel (components of the gas retail price), and EMOS (wholesale price)

## 18.3 Tariff deficit in Luxembourg

**Luxembourg had no tariff deficit between 2008 and 2016.**

# 19 Factsheet: Latvia

This factsheet presents the findings for Latvia for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 19.1 Household Price Regulation in Latvia

**Latvia still has energy price regulation for households in place on the electricity and gas market. While the government phased out price regulation for electricity starting from 2015, the number of consumers under social tariffs increased drastically (and is also considered price regulation). Phase out of gas price regulation started from 2017.**

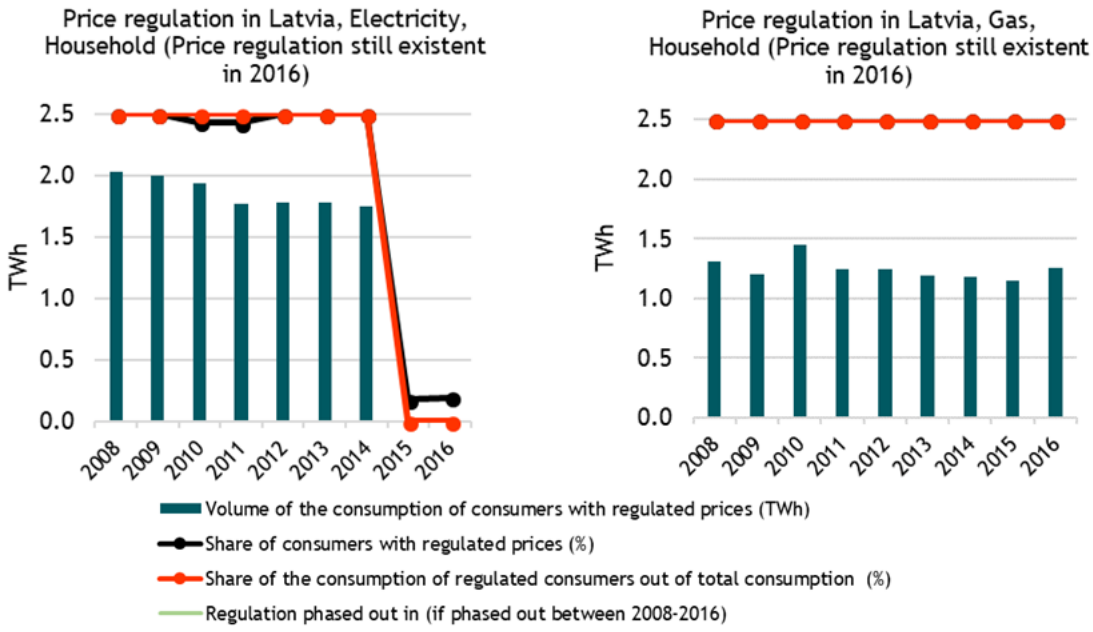
In the **electricity** sector, price regulation was phased out on January 1, 2015 for the large majority of consumers. However, at the same time, the number of households with social tariffs for electricity increased drastically. Since social tariffs are considered as end-user price regulation (as prices are still regulated for vulnerable consumers), price regulation was not completely phased out in Latvia by 2015.[419] Besides social tariffs, the Regulator sets network tariffs; supply prices are set by bilateral agreements and the price can be fixed or variable (tied to spot price).[420] Before 2015, the Regulator approved tariffs for electricity trade to *captive customers* - if the trader was not authorized to set tariffs. Tariffs for captive customers covered costs of generated and imported electricity, including electricity generated from renewable energy resources, and costs of transmission and distribution system services, as well as the costs of electricity trading service. According to the Electricity Market Law, the Regulator authorized former incumbent JSC "Latvenergo" to set the tariffs for captive customers from January 1, 2009.

According to the legal framework, the Regulator set tariffs for all end-users in the **natural gas** supply sector until April 2nd, 2017. The designated supplier was fully compensated for the obligation to supply natural gas under regulated tariffs.[421] In order to fully implement the requirements of the Gas Directive, amendments to the Energy Law were adopted in 2016. These amendments stipulated that the Latvian natural gas market would open on April 3rd, 2017. Starting April 3rd, 2017 all natural gas users have the right to freely choose a natural gas trader; while households have a right to choose to become a market player or receive gas at a regulated price.[422] The supply of natural gas to households (*captive consumers*) is ensured by the public trader for the natural gas price set by the Regulator. The natural gas price for captive consumers is the charge laid down in conformity with costs which are comprised of the charge for trade service and natural gas trade price, and in accordance with which a captive

[419] 2014 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector, Prepared for the European Commission. Available at: https://www.sprk.gov.lv/uploads/doc/ReportEC2014.pdf
[420] Sabiedrisko Pakalpojumu Regulesanas Komisija (2017), 2016 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector, Prepared for the European Commission. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Latvia-EN.pdf/619a89d2-acb3-cf9a-c3b4-9ddae9be1854
[421] 2014 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector, Prepared for the European Commission. Available at: https://www.sprk.gov.lv/uploads/doc/ReportEC2014.pdf
[422] Sabiedrisko Pakalpojumu Regulesanas Komisija (2017), 2016 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector, Prepared for the European Commission. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Latvia-EN.pdf/619a89d2-acb3-cf9a-c3b4-9ddae9be1854

consumer settles accounts with a public trader. The natural gas trader, who provides the natural gas trading services to the largest number of household users, is required to fulfil the obligations of the public trader and is fully compensated for the obligation to supply natural gas under regulated price.

**Figure 248 Household price regulation in Latvia from 2008 to 2016**




*Source:* CEER data

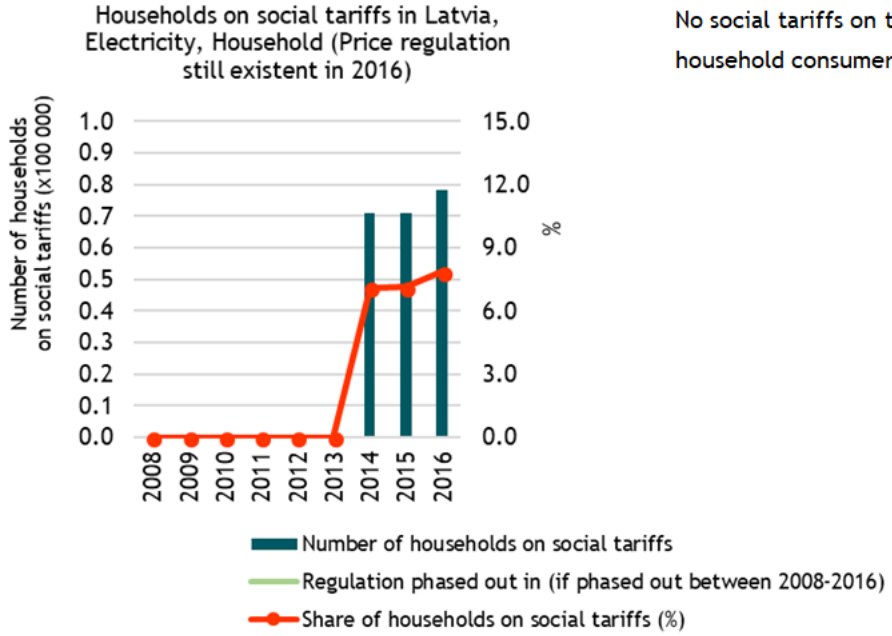
*No year for the end of price regulation is indicated due to the share of population on social tariffs*

Figure 1 shows that, consistent with the deregulation of the electricity retail market in 2015, there was a sharp drop in the volume of consumption of price-regulated electricity and consequently the share of the regulated consumption out of the total consumption. Before 2015, all end-user consumption of household electricity was regulated and the volume of the price-regulated electricity ranged between 1.5 and 2.0 TWh.

In the gas retail market all household prices were regulated from 2008 and 2016. The volume of gas consumed was in the range between 1.0 and 1.5 TWh in the period analysed.

With the deregulation of prices in electricity retail market, there was also a large increase in the share of households on social tariffs in Latvia (see figure 2). The share of households on social tariffs increased from zero to 7 percent from 2014 to 2015. The regulator indicates however that in contrast to the available data, social tariffs were introduced in 2015 only. In relation to the gas retail market there are currently no social tariffs in place.

Figure 249 Household social tariffs in Latvia




*Source:* CEER data

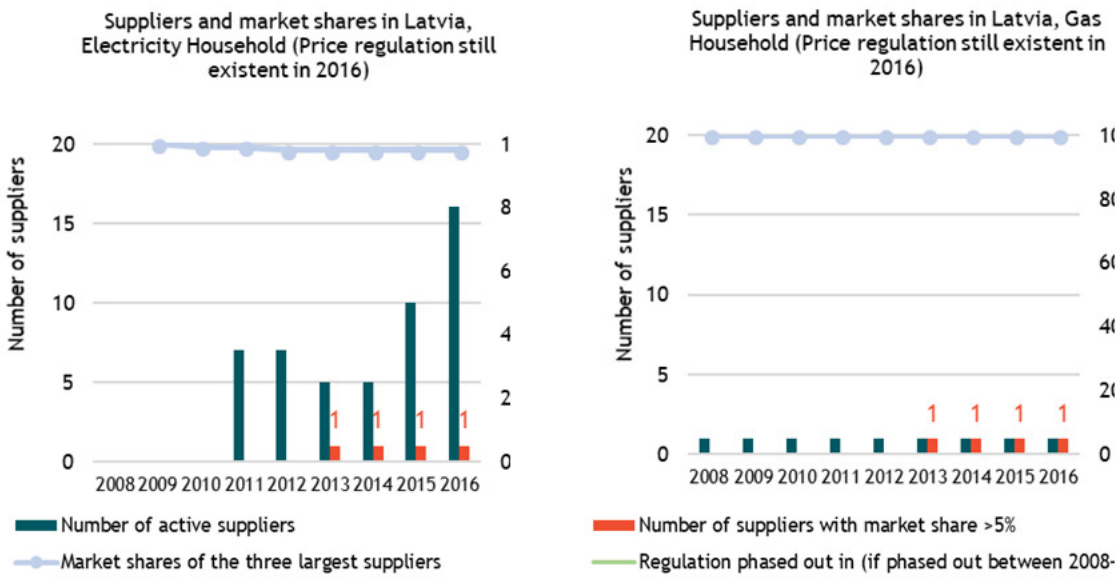
### *19.1.1 Selected aspects of competition*

The number of active suppliers in the electricity retail marker increased after the deregulation of the prices in 2015. In the year prior to the deregulation (2014), there were five active suppliers. In 2015, this number increased to 10 and in 2016 to 16. Nonetheless, the share of the three largest market suppliers is more than 95 percent, which suggests that the newcomers are still relatively small. Prior and after price deregulation in 2015 only one supplier on the market had more than 5 percent of the overall market shares.

In the case of gas, given that the Latvian gas market has only been open since 2017, the diagram shows only one supplier in the past 8 years. This has been changed given the new conditions. Three months after gas market opening there were 6 active traders, and in 2018 10 active traders [423].

[423] https://www.sprk.gov.lv/uploads/doc/Gazestirgotajuregistrs.pdf

**Figure 250: Number of suppliers and market shares in Latvia**



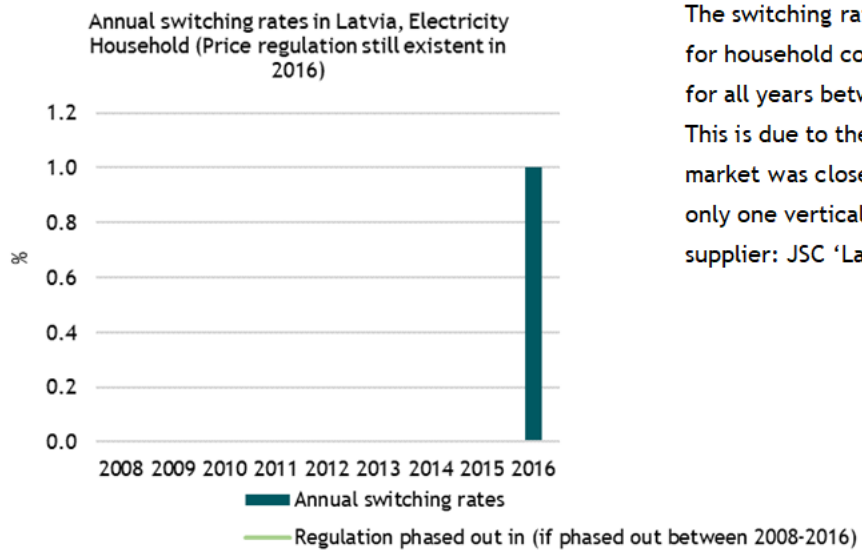

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

## Consumer engagement and expenditures on energy

Following the reforms in the retail electricity market the switching[424] rates in Latvia increased from zero to one percent. Since the gas market underwent reforms only in 2017, the switching rates in the period analysed (2008 to 2016) are equal to zero as during this time there was only one vertically integrated supplier

**Figure 251 Annual switching rates for households in Latvia**




The switching rates on the gas market for household consumers equaled zero for all years between 2008 and 2016. This is due to the fact that the market was closed, and there was only one vertically integrated supplier: JSC 'Latvijas Gaze'.[425]

[424] Switching is defined as the voluntary action by which a customer changes his supplier
[425] 2013 Annual Report of the Public Utilities Commission of the Republic of Latvia on the National Energy Sector, Prepared for the European Commission. Available at: https://www.sprk.gov.lv/uploads/doc/ReportEC2013.pdf

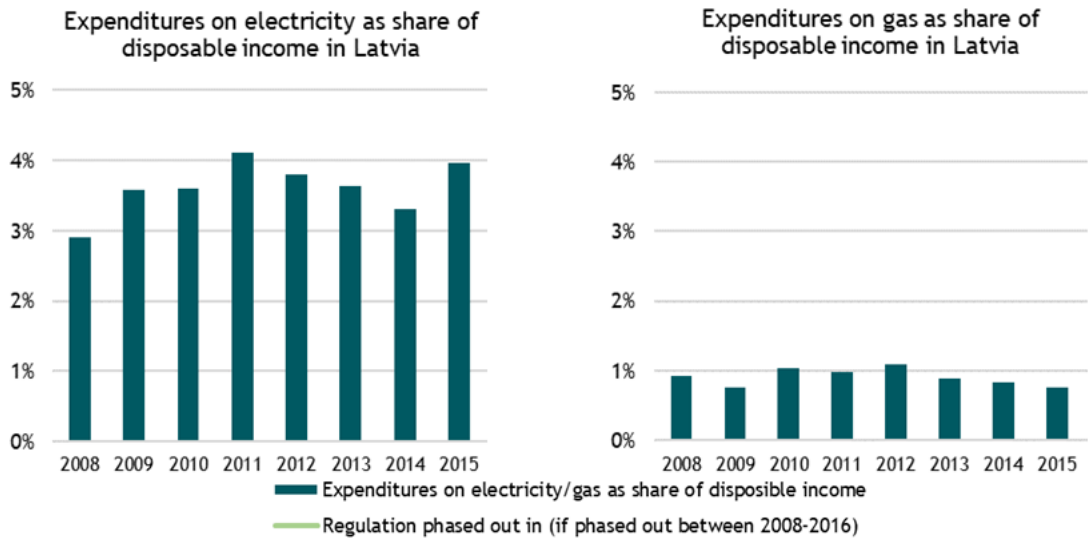
*Note that data is available for all years for the electricity market (switching rates equalled zero between 2008 and 2015)*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[426] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[427] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Latvia.

Household consumers in Latvia spent the least on electricity bills in 2008. During that year, they payed less than 3 percent of their disposable income on electricity. Between 2009 and 2014, this number fluctuated between 3 and 4 percent (slightly above 4 percent in 2011). In 2015 and 2016, the years in which prices were unregulated, an increase of expenditures as a share of disposable income was observed. Customers spent around 4 percent of their disposable incomes on electricity bills since market reforms took place. Household gas customers spent 1 or less than 1 percent of their disposable income on gas bills in the period of interest (2008 to 2016). Thus, household spend less on gas than on electricity in Latvia.

**Figure 252: Expenditures on gas and electricity as share of disposable income for households in Latvia (for middle consumption bands DC and D2) using PPS prices[428]**




[426] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[427] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[428] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

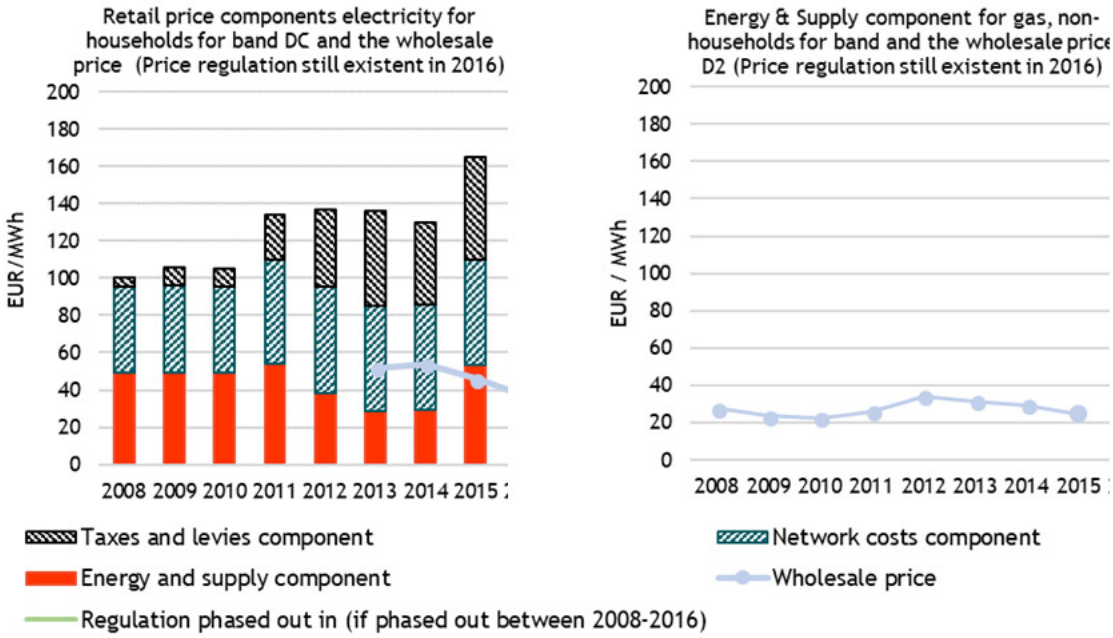
*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[429] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. Wholesale prices for the electricity market are available only for the years 2013 to 2016. In 2013 and 2014, the energy and supply component of the final retail price was lower than the wholesale price. This trend was reversed in 2015 and 2016. In both years the energy and supply part of the retail price was higher than the wholesale electricity price. A similar analysis for the gas market is not possible due to missing data.

**Figure 253 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Latvia**




*Note that data is not available for the retail gas market for the years 2008 to 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market. Electricity wholesale prices are only available between 2013 and 2016*

*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

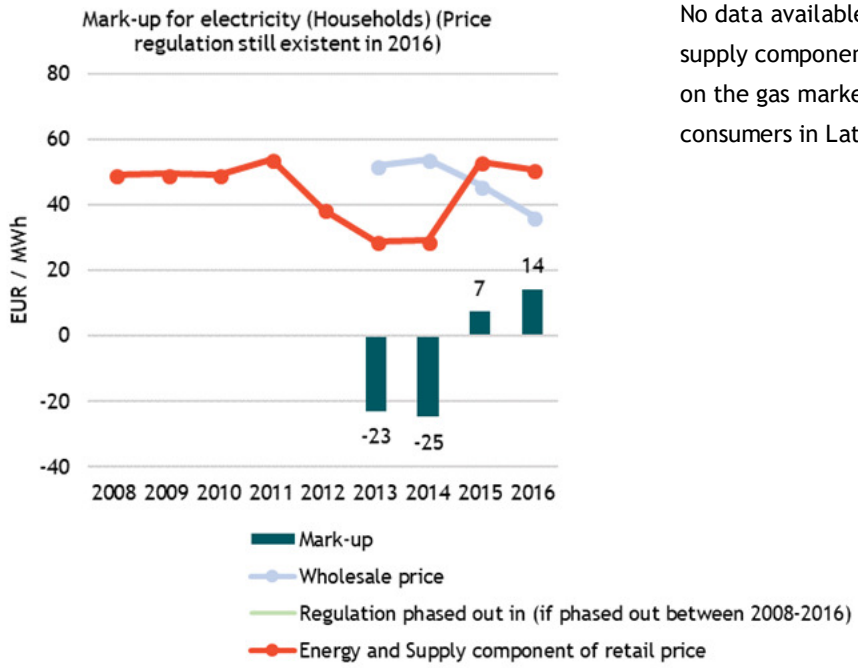
The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[430] The figures below show the mark-ups along with the wholesale price. Consistent with the analysis above, negative mark-ups are observed for the years 2013

[429] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

[430] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

and 2014. The mark-ups became positive in 2015 and 2016, coinciding with the phase out of electricity price regulation for households. The mark-up doubled between 2015 and 2016. Due to lack of data availability, no conclusions can be drawn on the mark-ups in the gas retail market.

**Figure 254 Mark-ups for Latvia, middle consumption bands (DC and D2)**




No data available on the energy and supply component of the retail price on the gas market for household consumers in Latvia

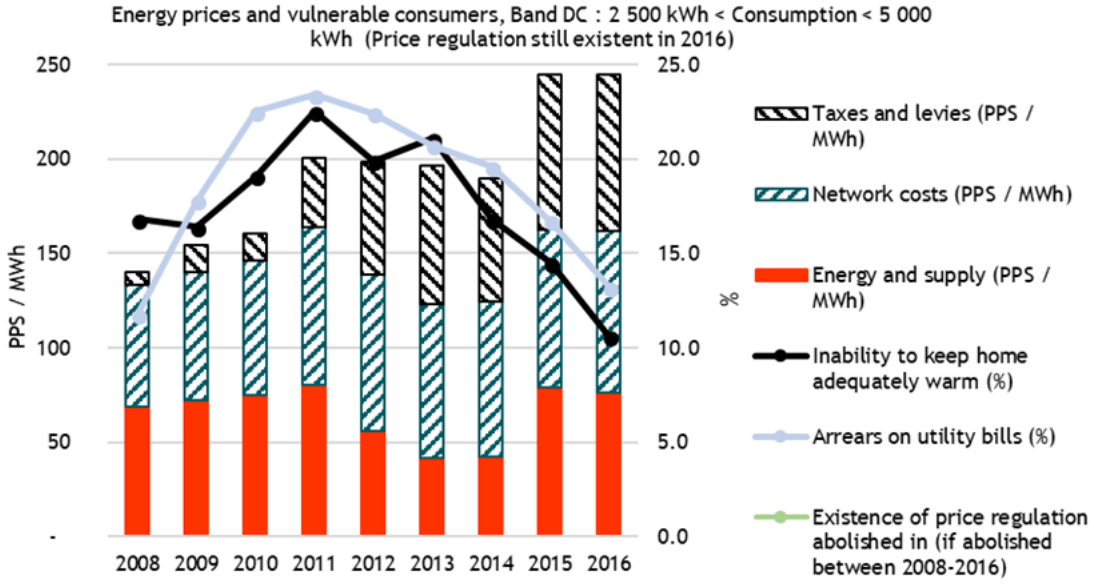
*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

### *19.1.2 Energy poverty*

Latvia does not have an official definition for energy poverty. However, the "inability to keep homes adequately warm" can provide an indication for this[431]. As shown in Figure 8, the percentage of customers unable to keep their homes adequately has decreased from 20% to 10% between 2013 and 2016. This trend is also true for the percentage of arrears on utility bills between the years 2013 and 2016. Between 2009 and 2011, both the share of people unable to keep their homes adequately warm and the percentage of arrears on utilities were on a rise and peaked in 2011.

[431] https://ec.europa.eu/energy/en/content/inability-keep-home-adequately-warm-18

**Figure 255 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Latvia**




*Source:* Eurostat

Latvia had no definition for vulnerable consumers in 2014.[432] The definition of protected customers was introduced in Electricity Market Law and has been applied from January 1st, 2015. There is no such definition in legal acts regarding natural gas users.

### *19.1.3 Quality of services*

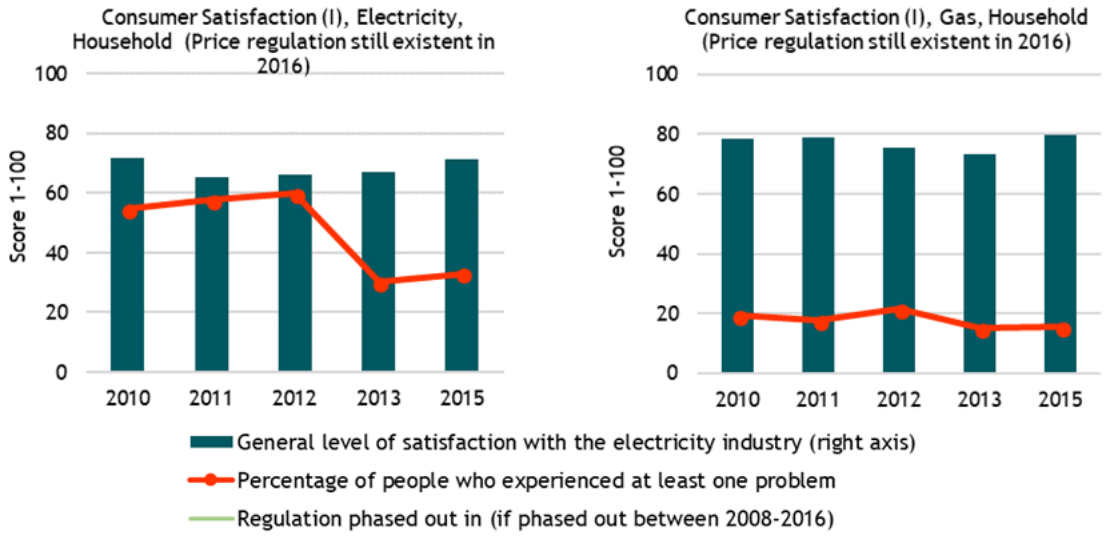
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The general level of consumer satisfaction increased from 2013 to 2015. The largest change in percentage of people who experienced at least one problem with their electricity suppliers happened between 2012 and 2013. During this time, the share of people reporting problems with their electricity suppliers decreased by more than half. The general level of satisfaction with the gas industry and percentage of people experiencing problems with their gas supplier has remained relatively stable between 2010 and 2015. The highest level of satisfaction was observed in 2015 with a score of almost 80 percent. Figure 10 shows that the other consumer satisfaction indicators did not improve over time.

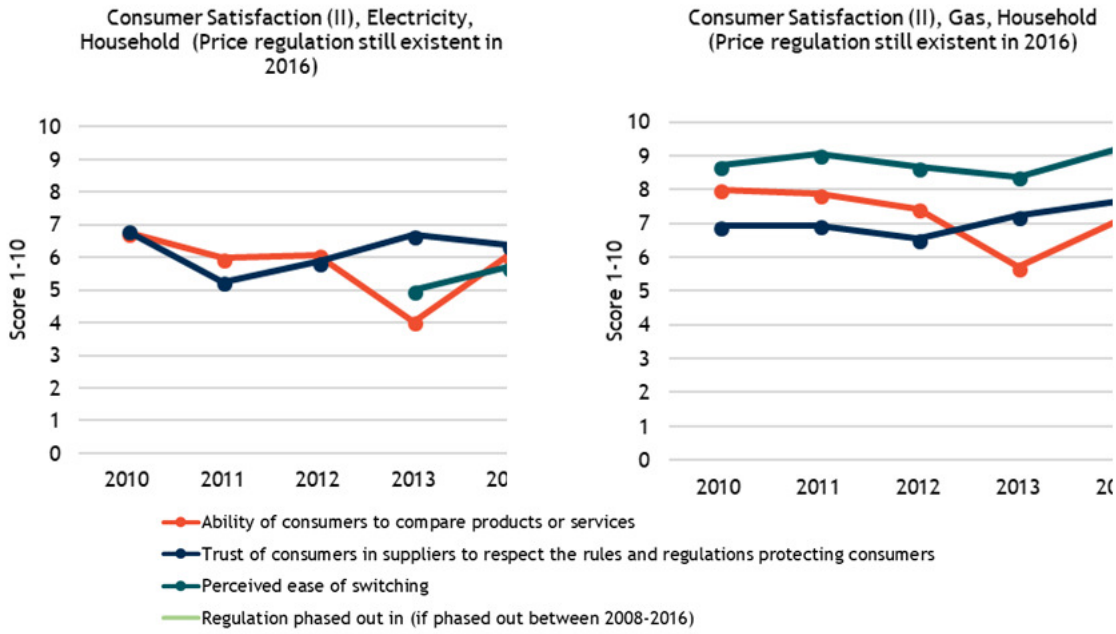
[432] Insight E (2015), Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures. Available at: https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty-Main%20Report.pdf

**Figure 256 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Latvia for households**




*Source:* EC – DG Justice[433]

**Figure 257 Ability of consumers to compare products or services[434], trust of consumers in suppliers[435] and perceived ease of switching[436] in Latvia**




*Source:* EC – DG Justice

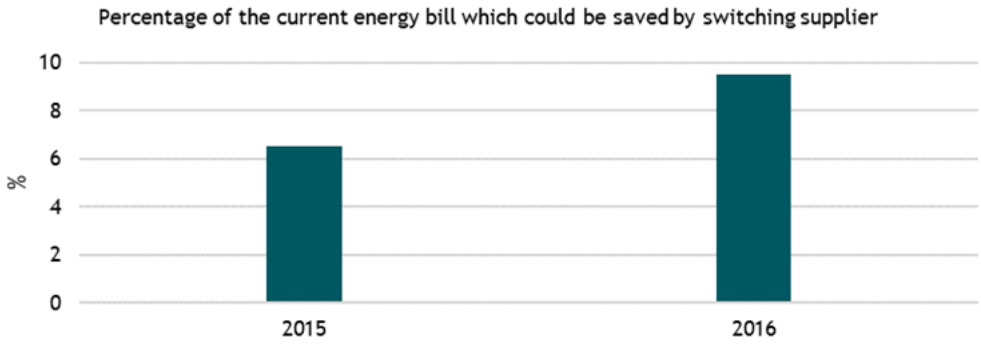
## Consumer choice

Information on different offers from which the consumers could chose is not available for Latvia.

[433] Note that from 2013 onwards, the survey was carried out every other year.
[434] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[435] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[436] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

Figure 11 shows the percentage of the currently electricity bill which could be saved by switching suppliers. In 2015 this figure was at 6 percent and in 2016 it increased to almost 10 percent.

**Figure 258 Percentage of the current electricity bill which could be saved by switching supplier in Latvia**

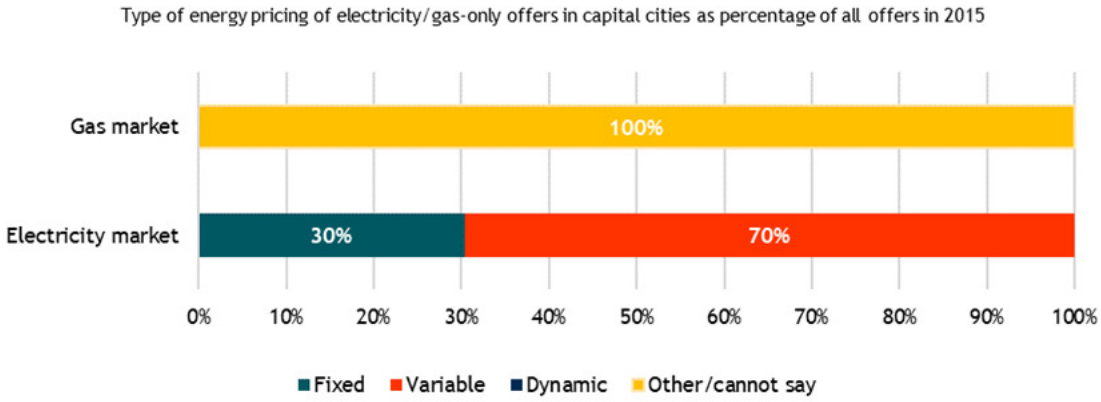



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas. In the gas market, all offers are other than fixed, variable or dynamic pricing mechanisms. In the electricity market only 30 percent of the offers are fixed and the rest are variable. The regulator indicates that most of these variable offers are tied to the spot price. Some follow exactly that price, and others apply restrictions as price ceilings.

**Figure 259 Type of offers for households in Latvia (RC03b)**




*Note: Spot-based contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

## 19.2 Non-Household Price Regulation in Latvia

**Latvia phased out electricity price regulation for non-households starting from 2008; while it only phased out price regulation for gas in 2017.**

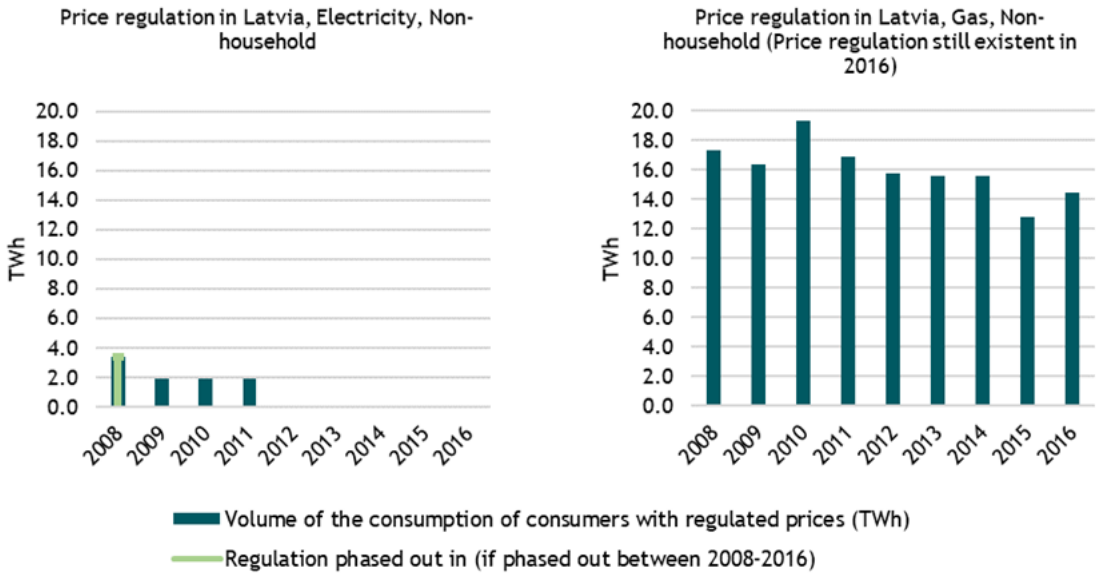
According to CEER, **end user price regulation was gradually abolished starting in 2008 on the electricity market for non-household consumers.** In contrast, **price regulation was abolished in 2017**

**on the gas market for non-household consumers.** The price regulation was identical to the price regulation for household consumers. The regulator indicates that "by April 1, 2012, the right to receive electricity for regulated tariffs was for households and merchants whose annual turnover or balance sheet total did not exceed 7 million LVL and the number of employees employed was less than 50 employees. Under these conditions, around 1700 electricity users - energy-intensive and large enterprises, which took up ~ 35% of Latvia's annual electricity consumption, were involved in the electricity market.

From April 1st 2012, users with a connection voltage greater than 400 V and an input protection device with a nominal current greater than 100 A, namely, average electricity consumers, were involved in the market. The share of open market participation was approximately 66%. From November 1st, 2012, electricity for regulated tariffs was only for those users who use electricity for household needs. Thus the open electricity market share reached 75% of the total consumption. On January 1, 2015, the opening of the electricity market in Latvia was completed.

Figure 13 indicates this gradual opening of the Latvian, with a phase out of regulated prices for eligible non-household consumers in 2012. Concerning the gas market for non-household consumers, a decreasing trend is observed in the volume under regulation since 2010 (except in 2016).

**Figure 260 Non-household price regulation in Latvia from 2008 to 2016**




*Note that the consumption under regulated electricity prices was zero from November 2012 onwards*

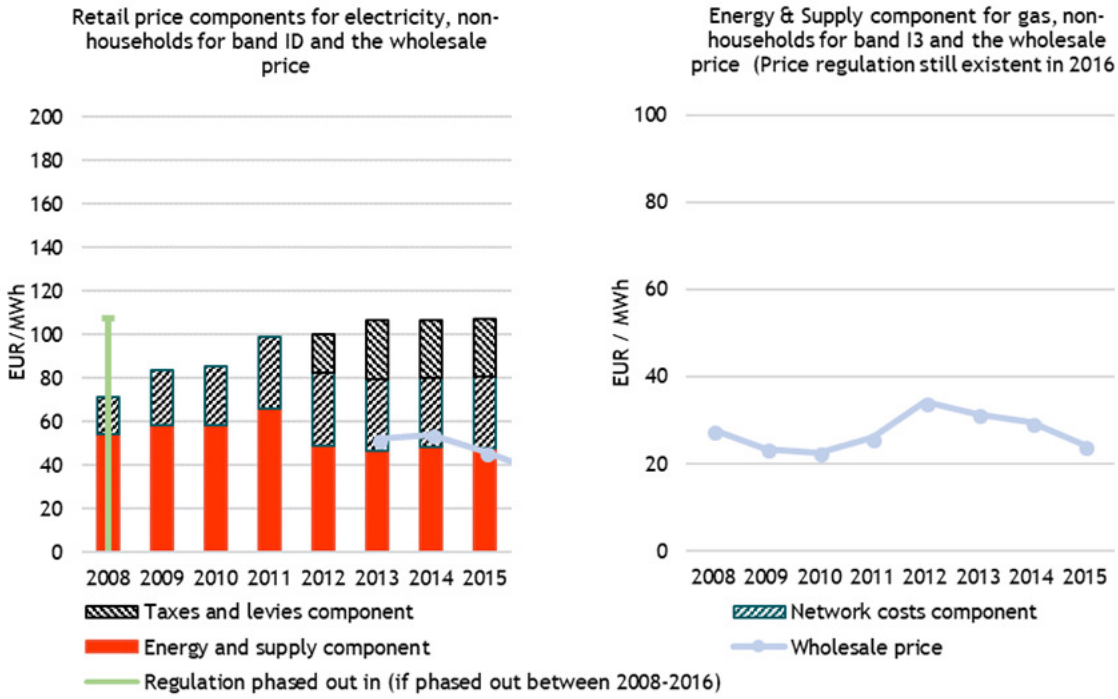
*Source:* CEER data

### *19.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Figure 14 shows that the energy and retail component of the retail electricity price for non-household consumers increased until 2011. In 2012, it decreased sharply. However, the final electricity retail price did not decrease as the taxes and levies component of the retail price increased from 0 (2008-2011) to €18 per MWh in 2012. The wholesale electricity price (which is only

available for 2013 to 2016) decreased between 2013 and 2013. No data is available for the electricity and supply component of gas for non-household consumers, which was a regulated monopoly until 2017.

**Figure 261 Industry retail price components for middle bands (ID and I3) and wholesale prices in Latvia**



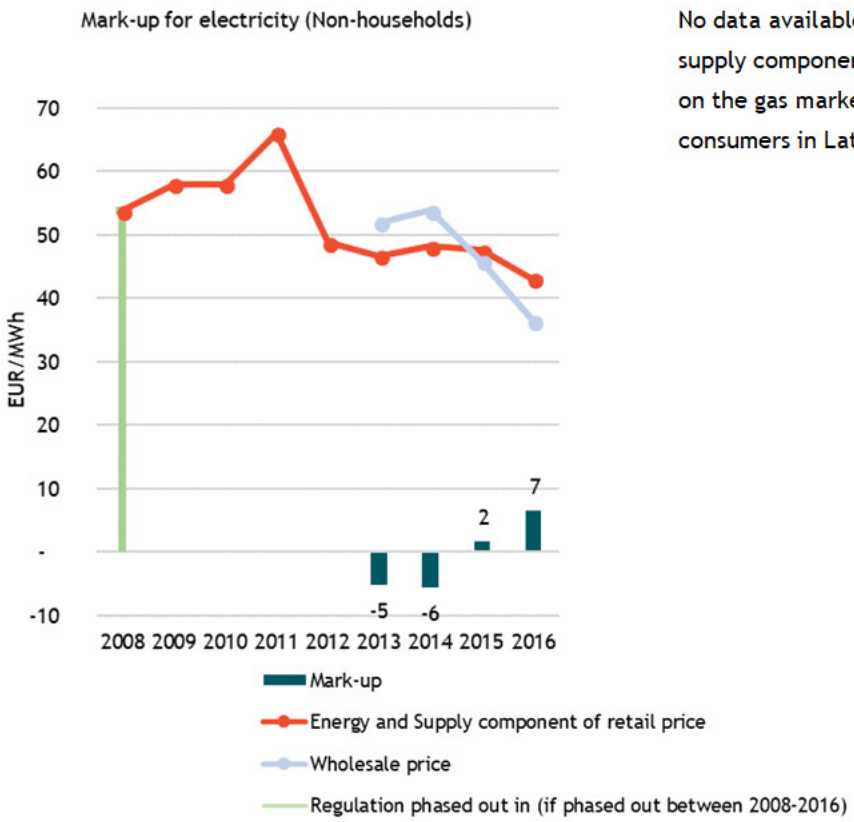

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[437] The figures below show the mark-ups along with the wholesale price for the electricity market for non-household consumers. In 2013 and 2014, negative mark-ups were realised as the wholesale price outweighed the energy and supply component of the retail electricity price. In contrast, in 2015 and 2016, the mark-ups turned positive. Even though strong conclusion cannot be drawn as data is only limited available, the figure suggests that mark-ups are increasing driven by the declining wholesale prices.

[437] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 262 Mark-ups for Latvia, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 19.3 Tariff deficit in Latvia

**Latvia showed indications of a tariff deficit until 2011.**

Tariff deficit refers to instances where there is a shortfall of revenues in the electricity market due to tariffs in the retail electricity component of the market being set lower (in a price-regulated markets) than the wholesale electricity price. Based on figure 7 on mark-ups, it is possible to observe that in 2013 and 2014 there were large negative mark ups indicative of tariff deficits. In Latvia indications of a tariff deficit were observed by the national transmission system operator until 2010 and by the main electricity distribution company between the years 2009 and 2011. Some of the losses in the transmission and distribution activities could be due to delays in approvals of regulated tariffs by the Latvian public utilities regulator.[438] The regulator indicates that the new tariffs for transmission were effective in 2011 following an agreement with the TSO, and that delays in setting distribution tariffs were cause by the DSO not submitting complete information.[439] However, since 2009 the vertically

[438] "Electricity Tariff Deficit: Temporary or Permanent Problem in the EU?" EC ISSN 1725-3187
[439] Private communication with the NRA (2018)

integrated state-owned company Latvenergo Group has been making profit which indicates that the tariff deficits did not accumulate and there was no need to external financing.

# 20 Factsheet: Malta

This factsheet presents the findings for Malta for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 20.1 Household Price Regulation in Malta

**Malta still has electricity price regulation for households in place.**

**There is no gas market in Malta.**

Malta's Regulator for Energy and Water Services (REWS) took over from the Malta Resources Authority (established in 2001) since 2015 the responsibility for the regulation of electricity and natural gas in Malta[440] (additional regulatory functions stretch to the water and petroleum sectors). Electricity prices are regulated for both household as well as non-household consumers.

EU Directives 2009/72/EC and 2005/89/EC were transposed into national law in Malta through the Electricity Market Regulations (S.L.545.13). Derogations are granted to Malta through Article 44 of Directive 2009/72/EC from the requirements of Article 9 (Unbundling of transmission systems and transmission system operators) and Article 26 of Directive 2009/72/EC (Unbundling of distribution system operators). As a result, these articles do not apply to Malta. Furthermore, there are no transmission systems or transmission system operators in Malta. Electricity system balancing is aligned with Italy's Terna and independent power producers connected to the distribution system are not responsible for balancing.

Although the electricity generation market is open to competition (e.g. from household renewable energy generators), the retail of electricity in Malta is not open to competition and Enemalta is the sole operator in this regard, performing tasks such as meter reading, billing, customer relations through a subsidiary called ARMS Ltd. All customers of electricity are under the regulated electricity retail tariffs. There is no natural gas market in Malta. However, Electro Gas Malta Ltd commissioned a LNG facility in 2017 (involving Floating LNG storage and an onshore re-gasification plant)[440].

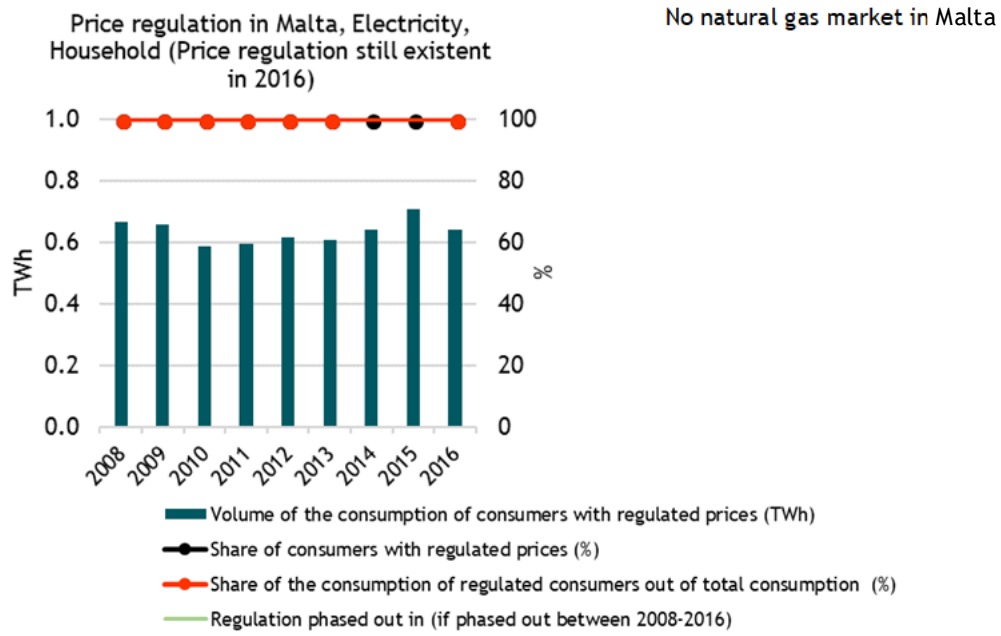
Any independent power producers connected to the distribution network are required to sell all electricity produced and not yet consumed on site to Enemalta.

[440]Council of European Energy Regulators (2017) Malta's Report to the European Commission on the implementation of Directive 2009/72/EC, Directive 2009/73/EC and Directive 2005/89/EC. Available on: https://www.ceer.eu/documents/104400/5988265/C17_NR_Malta-EN.pdf/e76e7c95-6822-7c2d-7ed8-a4f25fa9810b

With regard to the retail tariff paid by household consumers, this is an "all-inclusive tariff" which covers costs of operation, transmission and distribution. The retail electricity tariffs are approved by the Regulator. A tariff review process is initiated by the submission of a request for a tariff review by the distribution system operator/supplier to the Regulator. Tariffs are brought into force through amendments to the Electricity Supply Regulations[441]. Overall, the tariff is based on fixed annual service charge and a kWh consumption tiered tariff structure. The tariff structure, which involves the meter charge and certain additional components, for both household and non-household consumers is based on a selection of tariffs that feature in a regulated agreement with Enemalta (the Electricity Supply Amendment Regulations)[442].

In addition to social support, an eco-reduction represents a discount on electricity consumption bill for households based on energy consumption.

**Figure 263Household price regulation in Maltafrom 2008 to 2016**



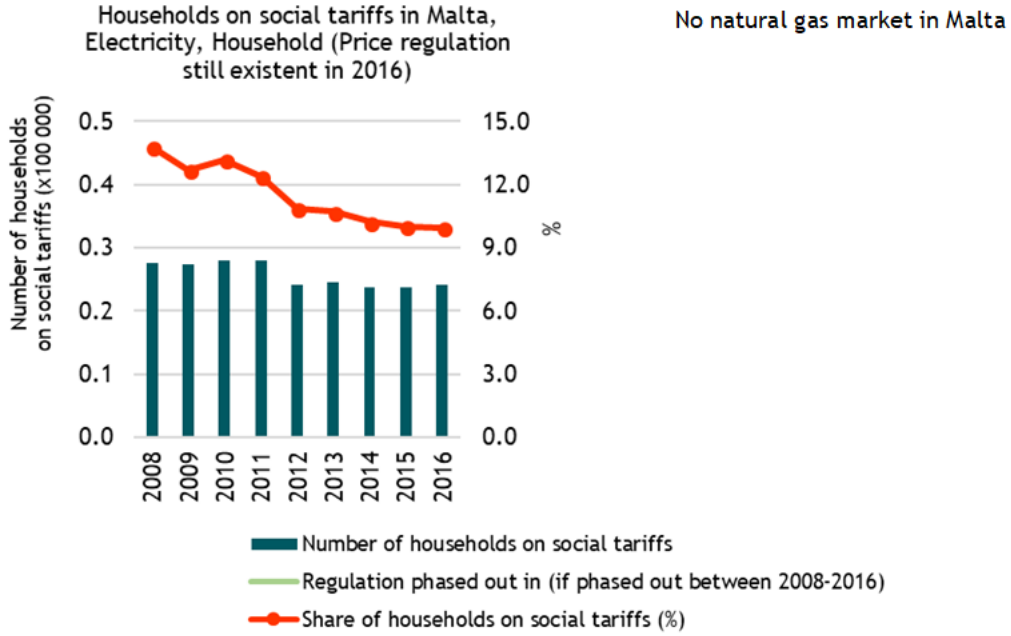

*Note that 100% of the consumption was under regulated prices*

*Source:* CEER data

In Malta, an Energy Benefit is in place for the following persons: those in receipt of social assistance, those in receipt of special unemployment benefit, those in receipt of an age pension and those in receipt of a carer's pension. Others also receive an Energy Benefit, e.g. recipients of children's allowance, supplementary allowance, disability pension (where total income is less than €8886) or on humanitarian grounds[443]. The number of households receiving Energy Benefits for gas and electricity has declined from around 14% in 2008 to 10% in 2016.

[441] http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=12349&l=1
[442] http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=17214&l=1
[443] Government of Malta. Energy benefit. Available on : https://socialsecurity.gov.mt/en/Short-Term-Benefits/Pages/Energy-Benefit.aspx

Figure 264 Household social tariffs in Malta

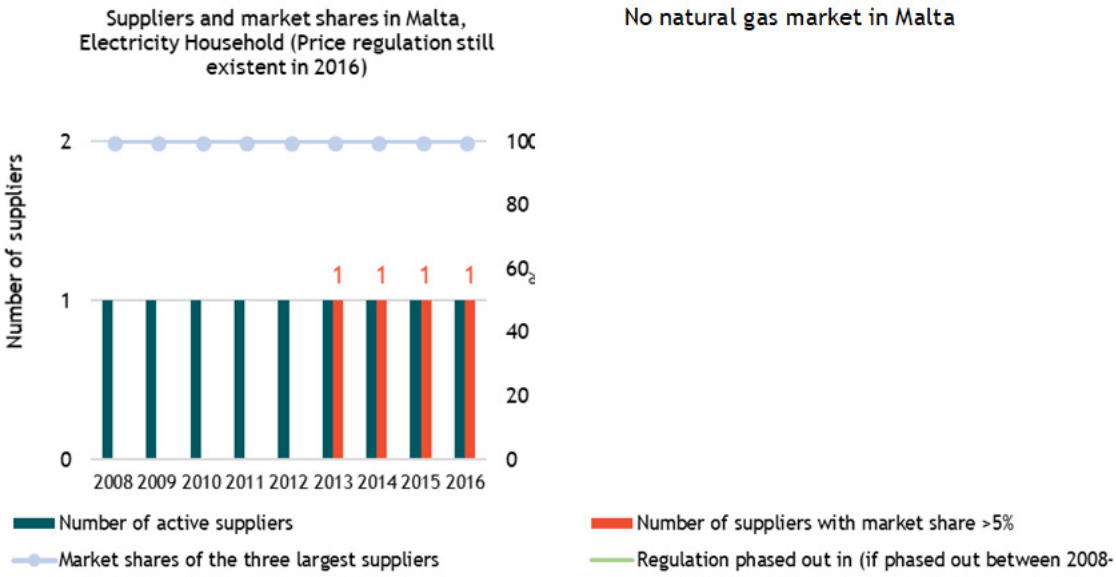



*Source:* CEER data

### 20.1.1 Selected aspects of competition

Established in 1977, Enemalta holds an effective monopoly over Malta's electricity retail market. Gas is distributed to households in the form of liquid petroleum gas bottles, and consequently there is no natural gas market in Malta

Figure 265: Number of suppliers and market shares in Malta




*Data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

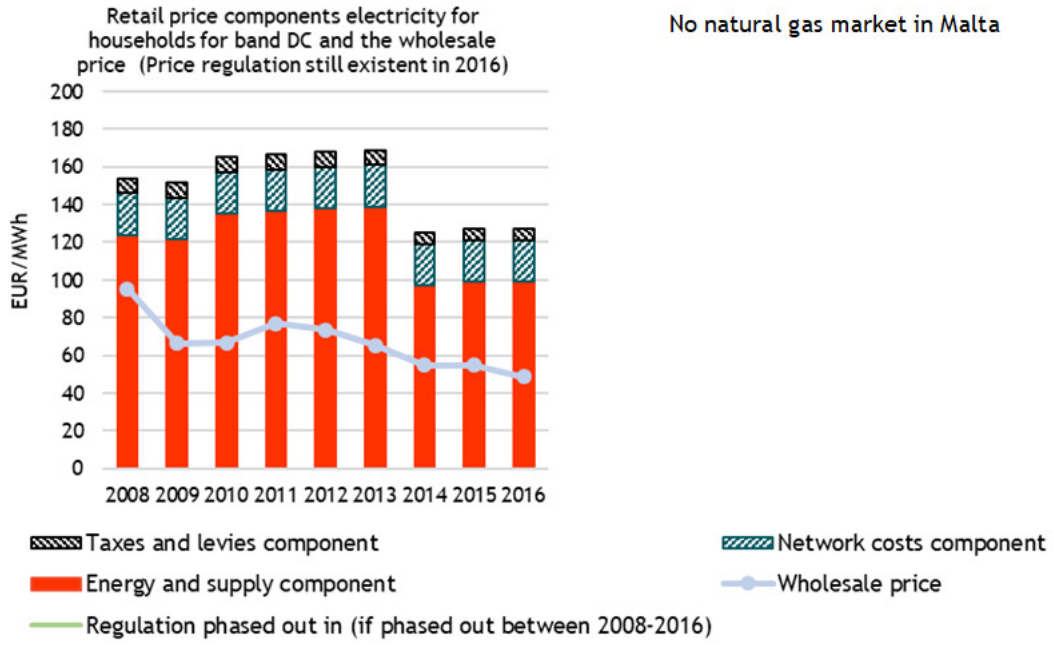
### Consumer engagement and expenditures on energy

With only a single supplier of electricity, switching[444] rates are not relevant for Malta. Data on household gas and electricity expenditures as a share of the disposable income are not available.

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to observe that in Malta, the energy and supply component was €120 per MWh in 2008 but decreased to €100 per MWh in 2016. Taxes and levies and network costs components have remained relatively stable over time. On the other hand, the wholesale price decreased from just under €100 per MWh in 2008 to just over €40 per MWh in 2016 according to the CEER data. However, in the absence of a liquid wholesale market in Malta, that price is calculated by the Regulator, which affects this analysis. The developments of the energy and supply component of the retail price and the wholesale price show similarities. Both increased in 2010 and 2011 and decreased between 2014 and 2016.

**Figure 266 Retail household price for middle consumption bands (DC and D2) and wholesale prices inMalta**

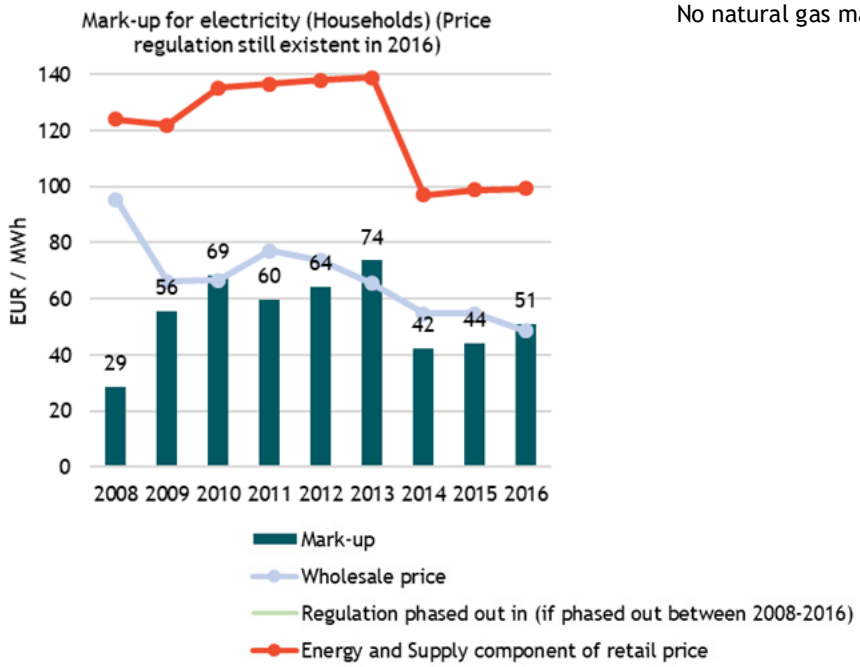



*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[445]The figures below show the mark-ups along with the wholesale price.In 2008, the mark-up was €29 per MWh. This mark-up has faced both increasesand decreasesover time, with a maximum of €74 per MWh in 2013 and settling at a value of €51 per MWh in 2016.

[444] Switching is defined as the voluntary action by which a customer changes his supplier
[445] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 267 Mark-ups for Malta, middle consumption bands (DC and D2)**




No natural gas market in Malta

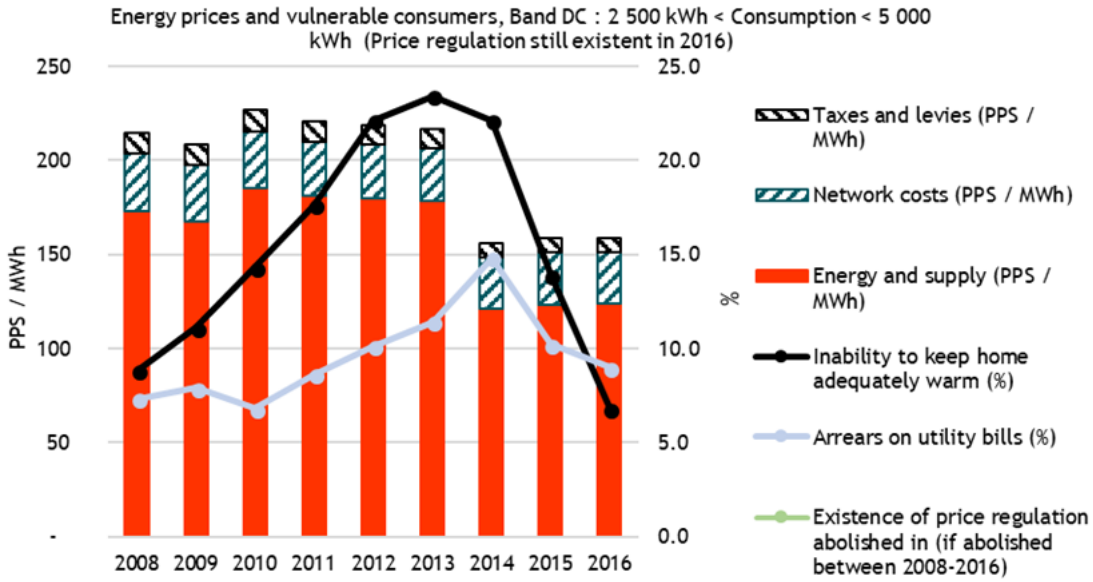
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price) and EMOS (wholesale price)

### *20.1.2 Energy poverty*

The proportion of consumers in Malta potentially suffering from energy poverty over time is shown in the diagram below, i.e. the share of the population with arrears on their utility bills and those unable to keep their home adequately warm. Since 2013 the proportion of consumers unable to keep the home adequately warm began to decrease and in 2014, the proportion of consumers with arrears on utility bills also began to decline (both measured less than 10% in 2016). This was possibly supported by decrease in the energy component of retail prices.

**Figure 268 Electricity price components for Band DC, the inability to keep home adequately warm andarrears on utility bills in Malta**




*Source:* Eurostat

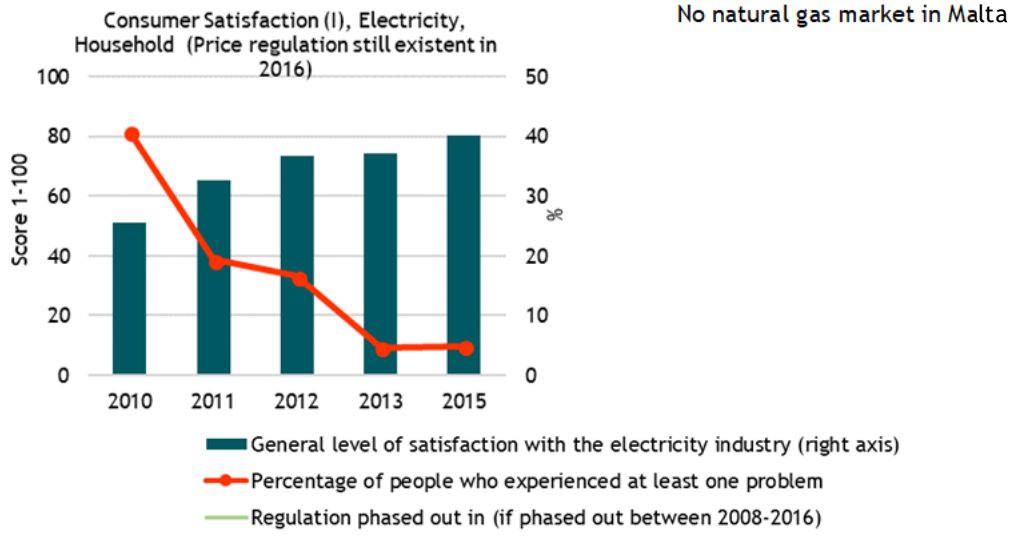
### *20.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The percentage of people experiencing problems with the supply of electricity to households in Malta has been declining between 2010-2015, from 40% to 5%. Furthermore, the general level of satisfaction with the electricity/gas industry has increased from 50 to 80 out of 100 points. Both indicators illustrate a substantial increase in the level of satisfaction.

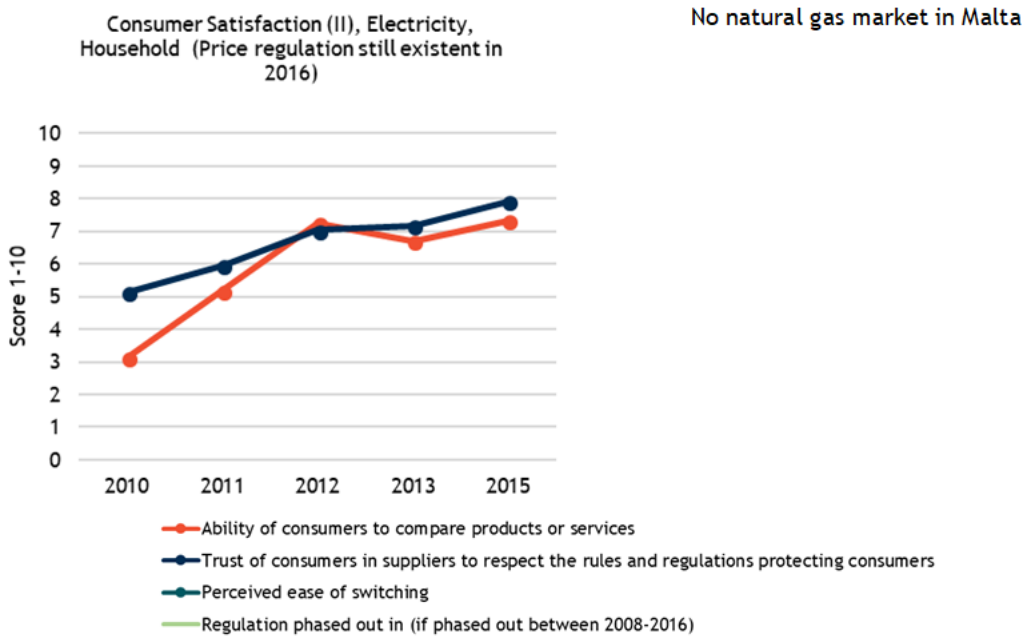
**Figure 269 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Malta for households**




*Source:* EC – DG Justice[446]

[446] Note that from 2013 onwards, the survey was carried out every other year.

**Figure 270 Ability of consumers to compare products or services[447], trust of consumers in suppliers[448] and perceived ease of switching[449] in Malta**

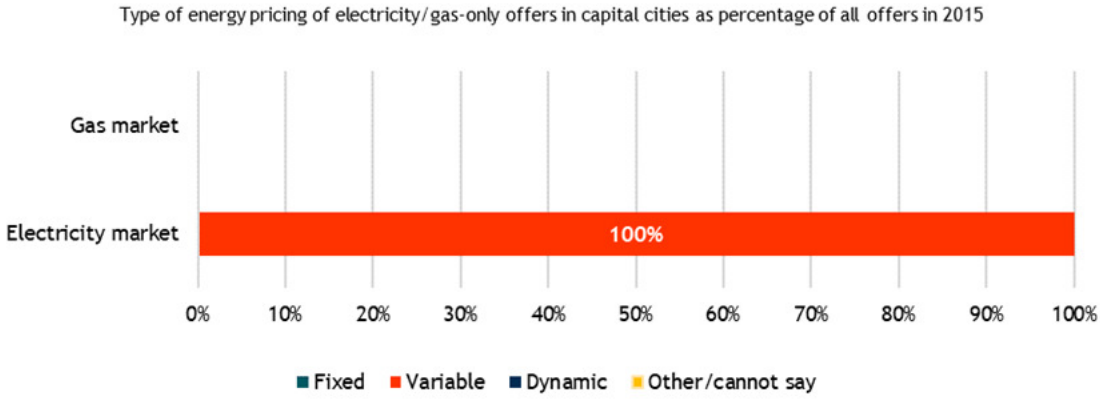



*Source:* EC – DG Justice

## Consumer choice

Little information is available on the consumer choice in Malta in terms of different types of contracts. Tariffs for households vary according to whether the premises are the primary residence, and households benefit from tariff discounts for keeping annual consumptions below a threshold.[450] The diagrams below show the type of offers available for electricity and gas, which are all variable.

**Figure 271 Type of offers for households in Malta**




[447] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[448] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[449] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)
[450] REWS (2018). Malta's Report to the European Commission on the Implementation of Directive 2009/72/EC, Directive 2009/73/EC and Directive 2005/89/EC

*Note: Spot-based contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

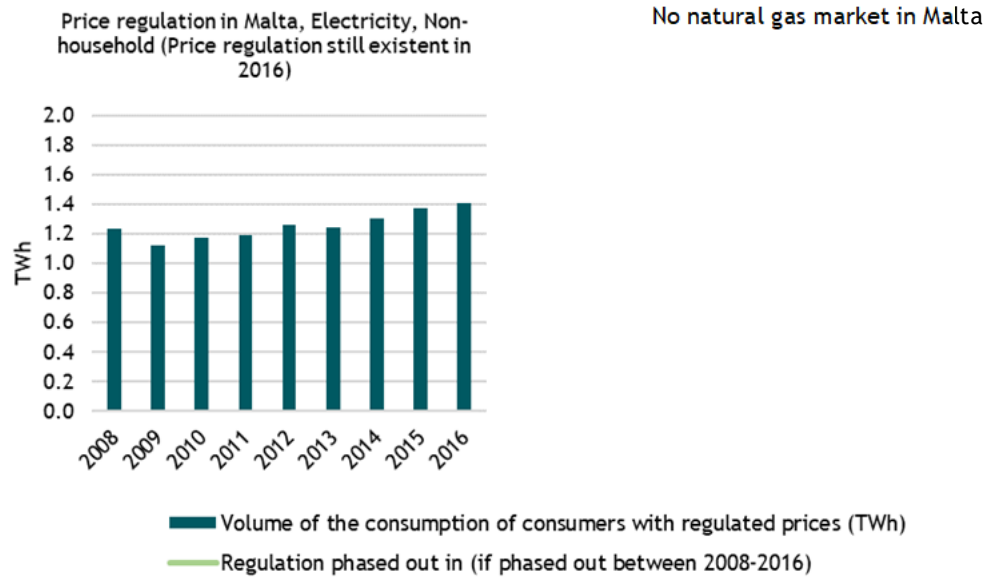
## 20.2 Non-Household Price Regulation in Malta

**Malta still has energy price regulation for non-households in place for electricity.**

**There is no gas market in Malta.**

As mentioned in the introduction, Malta's Regulator for Energy and Water Services (REWS) is since 2015 responsible for the regulation of electricity and natural gas in Malta for both household and non-household consumers[451] (additional regulatory functions also stretch to the water and petroleum sectors). Despite recent developments in the sector, there is no natural gas market in Malta. Energy price regulation in Malta is based on transposed EU Directives.

**Figure 272Non-household price regulation in Malta from 2008 to 2016**



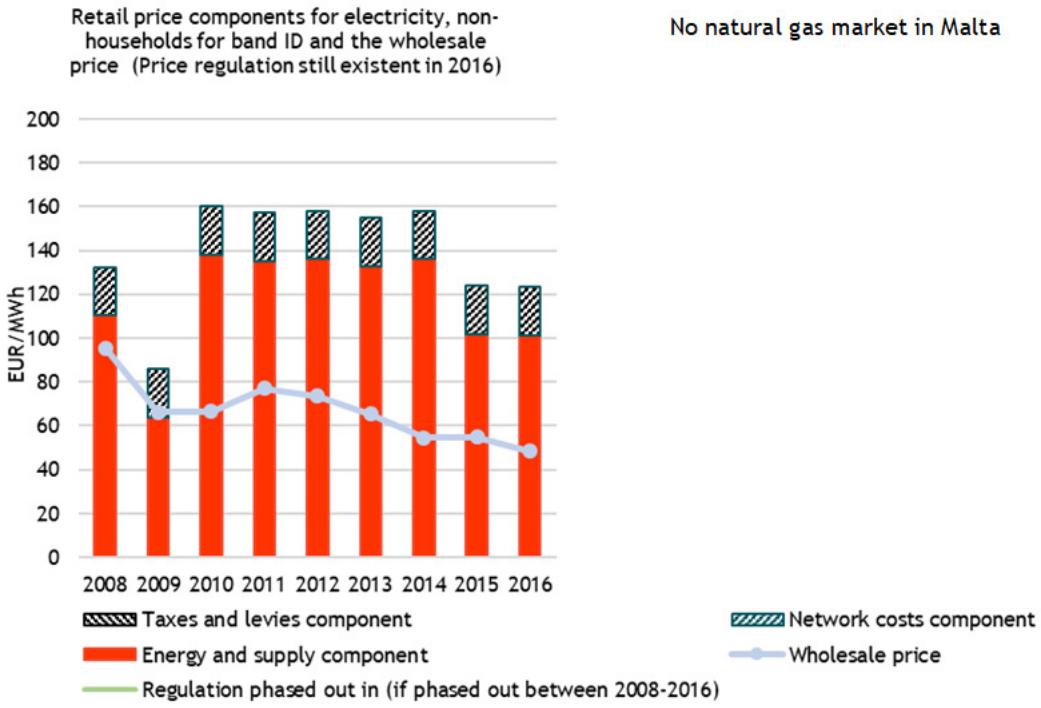

*Source:* CEER data

### *20.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. As on the market for household consumers, the energy and supply component of the retail price decreased in 2015 and 2016 and the wholesale price decreased after 2011.

[451] https://www.ceer.eu/documents/104400/5988265/C17_NR_Malta-EN.pdf/e76e7c95-6822-7c2d-7ed8-a4f25fa9810b

**Figure 273Industry retail price components for middle bands (ID and I3) and wholesale prices inMalta**

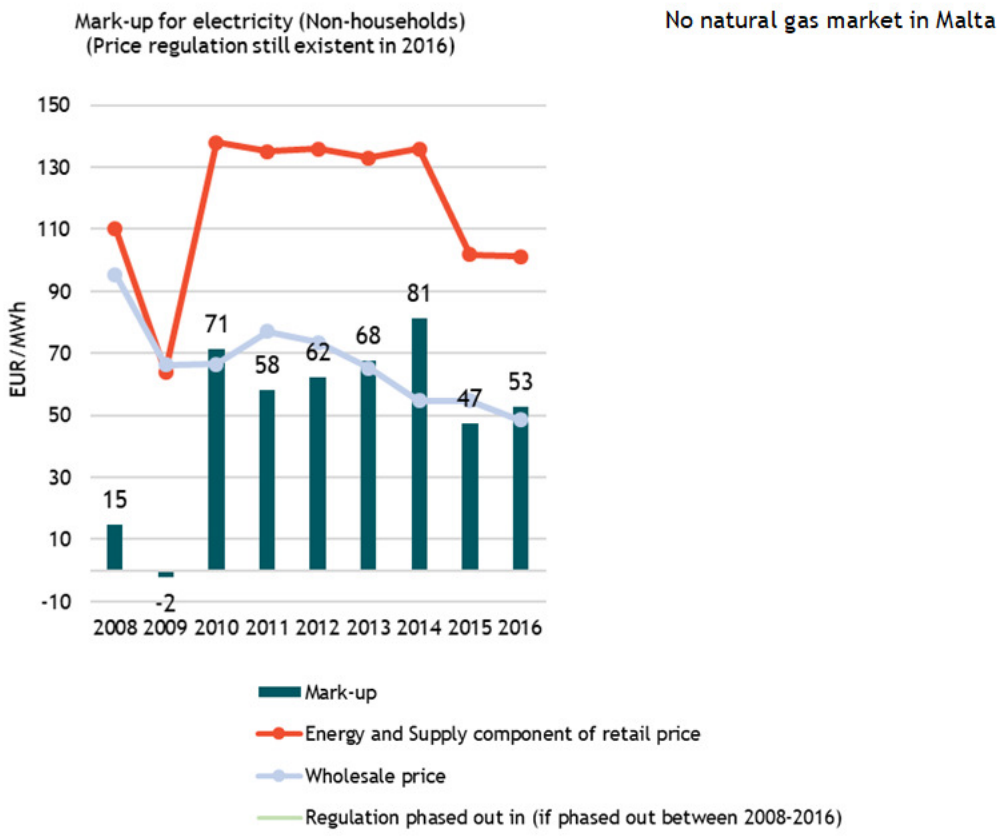



*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[452] The figure below shows the mark-ups along with the wholesale price. The mark-up was €15 per MWh in 2008 and has since increased to €53 per MWh in 2016 (reaching a maximum of €81 per MWh in 2014). At the same time, the energy and supply component has decreased since 2014 to a level of about €100 per MWh in 2016 and the wholesale price has decreased since 2011 to 2016 levels of just under €50 MWh.

[452] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 274Mark-ups for Malta, middleconsumption bands (ID and I3)




*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 20.3 Tariff deficit in Malta

**Malta had a tariff deficit in 2014, but none since 2015 after the sector restructuring.**

The identification of the existence of electricity tariff deficits in EU Member States is complex. In Malta, there is evidence of possible tariff deficits driven by the financial performance of the regulated energy provider. Malta has been identified as having shortfalls of revenues in its electricity system due to regulated electricity tariffs being too low to cover costs otherwise borne by the utilities. This is particularly the case for households. Another piece of evidence that contributes to the suggestion of a tariff deficit in Malta is that the national integrated electricity company (Enemalta) has exhibited continued losses. Furthermore, Enemalta actually accumulated €0.87 billion of debts (equivalent to 12% of GDP). This can be partly explained by high costs due to oil-based generation facilities and an inability therefore to pass on all costs to consumers. This situation was complicated by the decision in

2014 to reduce energy tariffs by 25%[453], taken in the context of a new electricity interconnection and a switch of generation to natural gas. However, the Regulator indicates there was no more tariff deficit from 2015 after the sector restructuring.[454]

# 21 Factsheet: the Netherlands

This factsheet presents the findings for the Netherlands for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 21.1 Household Price Regulation in the Netherlands

**The Netherlands had no energy price regulation for households in the period assessed.**

The Dutch legislation on the electricity and gas market is formalised in the Electricity Act 1998 and in the Gas Act 2000.[455] Both acts authorise the Authority for Consumers and Markets (ACM) to regulate the Dutch electricity and gas market. The Council of European Energy Regulators (CEER) characterised the Netherlands as a MS which does not have price regulation in place for the electricity or gas market for household consumers. Yet, following the national documents [456], prices are not entirely deregulated in the Netherlands. In fact, all price changes in electricity or gas contracts need to be notified to the ACM.[455] In case ACM considers a price 'unreasonable', it has the power to reduce the price retroactively. According to ACM, prices are reasonable if "*energy suppliers sufficiently use the effects of efficient operations towards reducing consumer tariffs*".[457] In practise, this means that ACM assesses the revenues, costs and margins of all contract types. If ACM finds that the tariff as a whole is excessive, it may intervene. It remains unclear when exactly margins are considered excessive. Despite ACM's regulatory power, interventions on the pricing decisions are rare. In 2017, ACM determined that Nuon charged an unreasonable price for two electricity products involving approximately 130,000 customers.[457] According to ACM, these customers paid €2.90 (including VAT) too much for electricity over the first six months of 2017. Although a final decision has not yet been made by the court, Nuon could have to compensate the customers in case the court decision is in line with ACM's assessment.

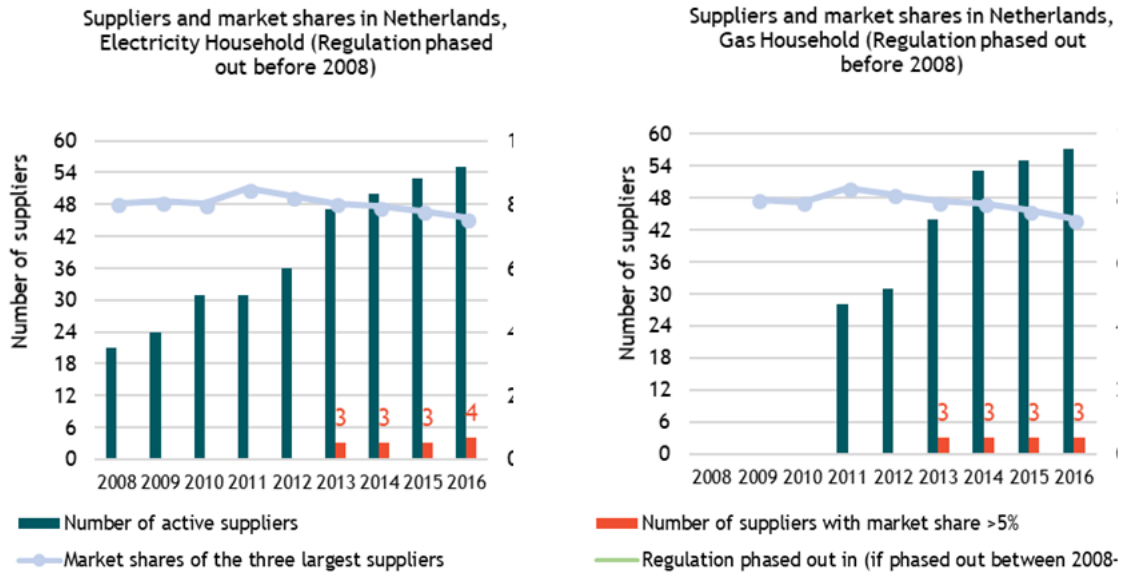
[453] European Commission (2014) Electricity tariff deficit: Temporary or permanent problem in the EU. Available on: http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf
[454] Private communication (2018).
[455] Both acts are available (in Dutch) at: http://wetten.overheid.nl/BWBR0009755/2016-07-01 and http://wetten.overheid.nl/BWBR0011440/2016-07-01
[456] For instance, the acts in the previous footnote or in their annual reports: Authority for Consumers & Markets (2017) Jaarverslag ACM (2017). Available at: https://jaarverslag.acm.nl/sites/default/files/acm-jaarverslag-2017.pdf or Authority for Consumers & Markets (2017) Annual report ACM (2016). Available at: https://jaarverslag.acm.nl/sites/default/files/2016%20ACM%20Annual%20Report.pdf
[457] Authority for Consumers & Markets (2017) Maximum tariffs set for electricity products of Nuon. Available at https://www.acm.nl/en/publications/maximum-tariffs-set-electricity-products-nuon

Despite the tariff notification obligation and the revision powers of ACM for electricity or gas, the effect of price regulation on consumers is considered very small. This is because interventions on pricing decisions are rare and only affect a very small share of the customers. To illustrate this, in 2017 there were only two interventions on the market for electricity and gas supply.[458] Besides, the previously mentioned intervention only affects less than 2% of all household consumers of electricity. Other common types of price regulation are fully absent in the Netherlands (i.e. social tariffs, revenue caps or maximum rate of returns).

### *21.1.1 Selected aspects of competition*

For both the electricity and gas market for household consumers, we see that the three largest suppliers have had over 50% of the market over the last years. At the same time, there has been a constant increase in the number of active suppliers. On the electricity market for household consumers, the market share of the three largest suppliers has fallen between 2011 and 2016 which is an indication of decreasing market power of the largest suppliers. Besides, the number of suppliers more than doubled between 2008 and 2016. On the gas market for household consumers, similar trends are observed.

**Figure 275: Number of suppliers and market shares in the Netherlands**




*Note: Data on the number of suppliers with market shares >5% is only available form 2013 onwards. For the gas market, data on the number of active suppliers are only available from 2011 onwards.*

*Source:* CEER

[458] Authority for Consumers & Markets (2017) Jaarverslag ACM (2017). Available at: https://jaarverslag.acm.nl/sites/default/files/acm-jaarverslag-2017.pdf

### Consumer engagement and expenditures on energy

For the Netherlands, data on the switching[459] rates for household consumers are not available in the database. The ACM does indicate that switching rates for small consumers (households and small businesses) has increased from under 10% in 2010 to 16% in 2017.[460]

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households for the middle consumption bands [461] (those who consume between 2.5 MWh and 5 MWh electricity per year and between 20GJ and 200 GJ per year).[462] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in the Netherlands. On the electricity market, it is shown that the expenditures as a share of the disposable income have decreased on average between 2008 and 2016 and in particular after 2013. This change is most likely driven by decreases in the electricity prices as the patterns in figure 5 panel I are in line with the patterns in figure 6 panel I (electricity prices). Moreover, the household disposable income has not changed substantially over the same period. The trends are less conclusive on the gas market. Even though a relatively sharp decrease of more than 1% point is observed between 2013 and 2014 (driven by decreasing wholesale gas prices which induced lower retail prices), the years prior to 2013 do not disclose a clear pattern. Overall, the expenditures of Dutch households on gas and electricity as a share of their disposable income have decreased from 6.3% in 2008 to 5.2% in 2016. This suggests that energy has become more affordable.

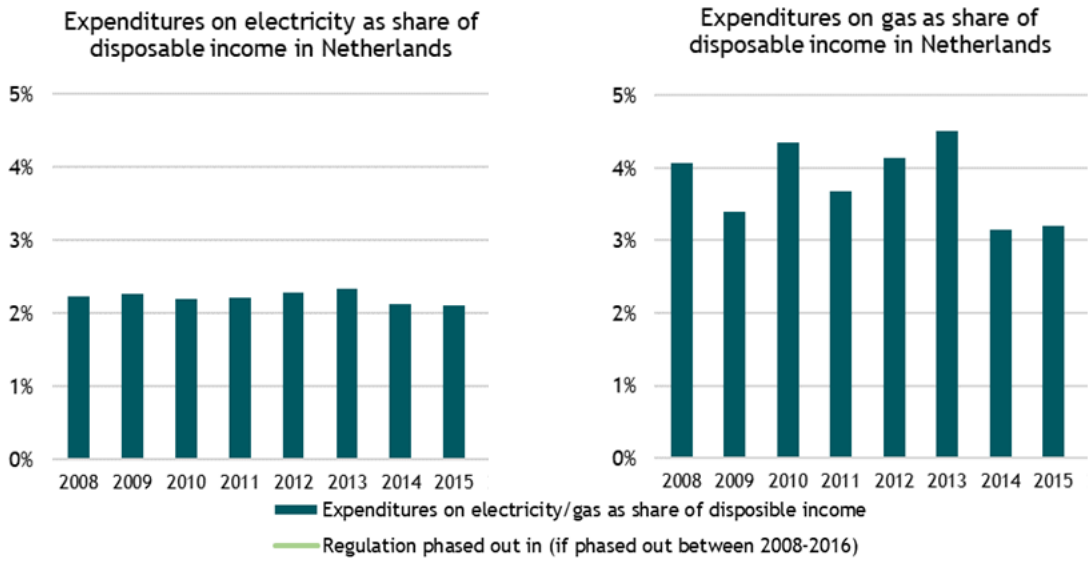
[459] Switching is defined as the voluntary action by which a customer changes his supplier

[460] Authority for Consumers & Markets (2018) Energie Monitor 2018.

[461] The data on gas and electricity prices separates different consumption bands. This report always shows the middle consumption bands being DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[462] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 276: Expenditures on gas and electricity as share of disposable income for households in the Netherlands (for middle consumption bands DC and D2) using PPS[463]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

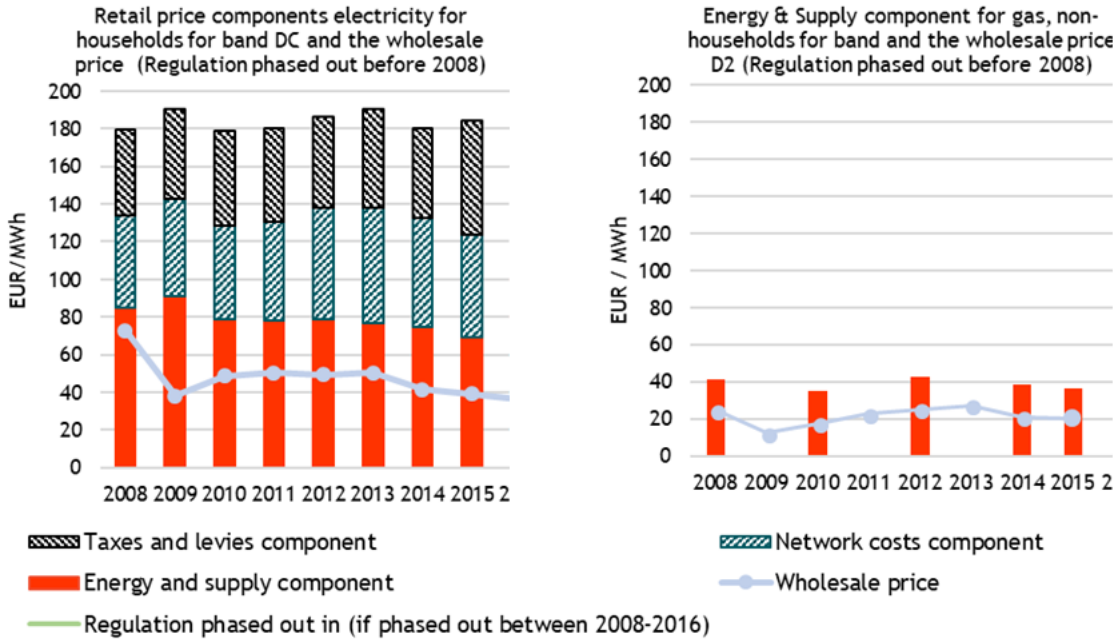
*Source:* Own calculations[464] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for the Netherlands, the energy and supply component of the retail price has decreased from €85 to €65 per MWh between 2008 and 2016. Further analysis might be needed to gain a better understanding of the drivers behind the changes in the retail market.

[463] Purchasing Power Parity (PPS) is an artificial currency. In theory, one can buy the same amount of goods or services in each country with 1 PPS. It can therefore be used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[464] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 277 Retail household price for middle consumption bands (DC and D2) and wholesale prices in the Netherlands**



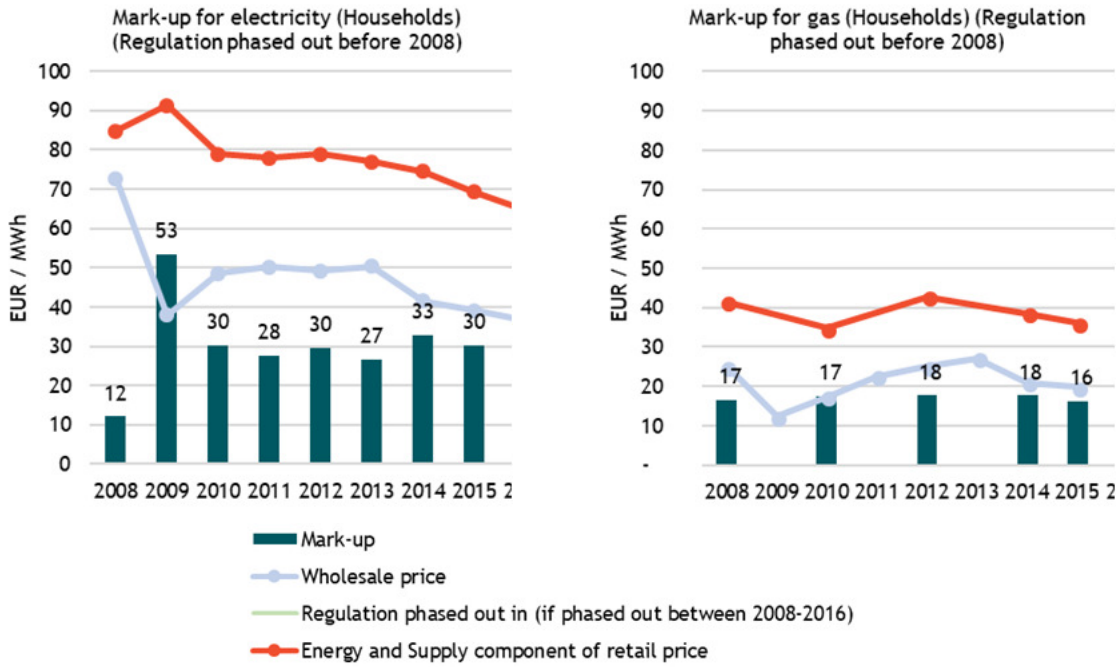

*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[465] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[466] The figures below show the mark-ups along with the wholesale price. With respect to the wholesale electricity price, it is observed that it followed a similar trend as the energy and supply component of the retail price (a decrease between 2008 and 2016 from €49 to €36 per MWh). Unlike the energy and supply component of the retail price, the wholesale price increased between 2009 and 2013. The mark-ups are relatively stable (except for the first two years of the period) and vary between €27 and €33 per MWh from 2010 onwards. Prices and mark-ups are lower on the gas market. Moreover, mark-ups are even more stable on the gas market and vary between €16 and €18 per MWh.

[465] Eurostat has data available on gas prices; however not for the energy and supply component.
[466] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 278 Mark-ups for the Netherlands, middle consumption bands (DC and D2)**




*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016*

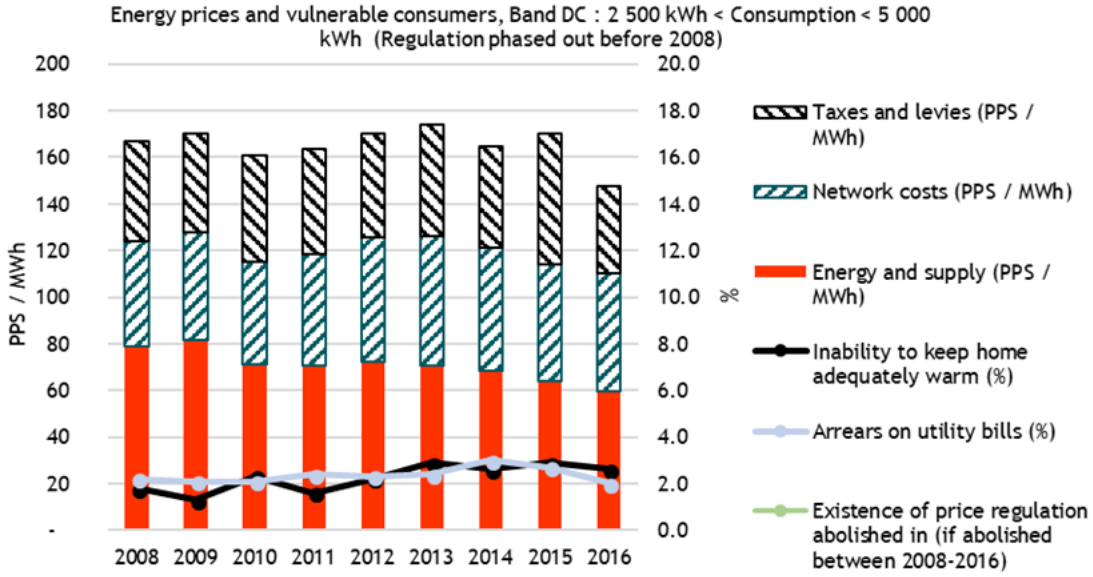
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

### *21.1.2 Energy poverty*

The trends on consumers in the Netherlands which are potentially suffering from energy poverty are mixed, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and the share of the population unable to keep their home adequality warm. The share of the population who was unable to keep their homes adequately warm increased from 1.8% to 2.6% over time. In contrast, the share of customers with arrears on their utility bills has decreased slightly considering the complete data period. However, prior to 2015, this proxy for energy poverty also increased over time. This increase could partially be explained by the retail energy price, combined with other factors; despite the decrease in the energy supply component of the retail price, the overall retail price did not decrease. Besides, the Netherlands does not have social tariffs to support vulnerable consumers.

**Figure 279 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in the Netherlands**




*Source:* Eurostat

In the Netherlands, there are no specific energy policies which target vulnerable consumers. Yet, over the last years, several articles were published according to which consumers with low incomes will have to incur relatively high costs to implement the measures to facilitate the energy transition.[467] Therefore, some political parties are in favour of implementing energy related policies to support consumers with low incomes.[468]

### *21.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

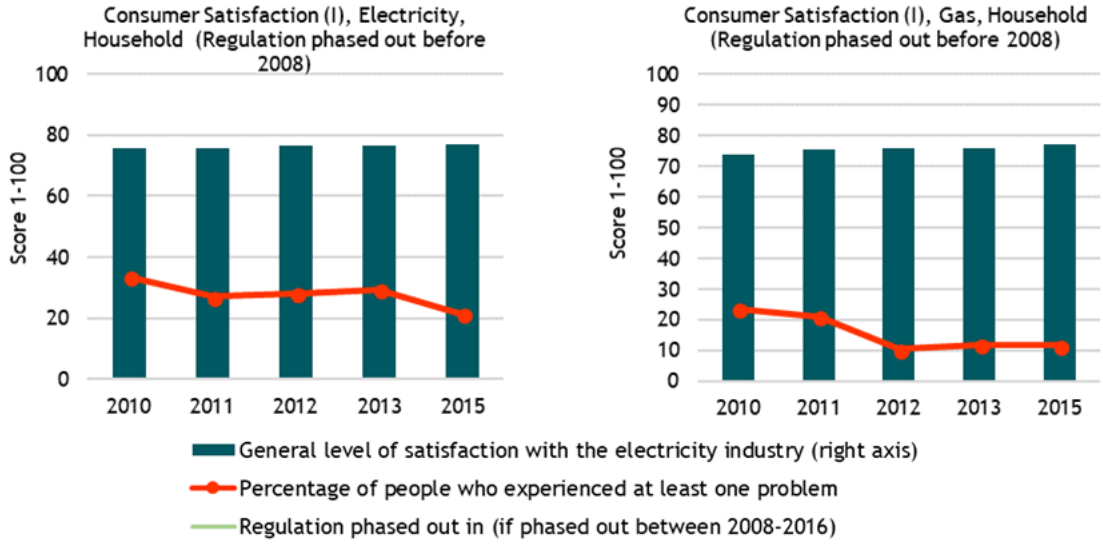
#### Consumer satisfaction

Figure 6 suggests that consumers have become more satisfied with both the electricity as well as the gas sector in the Netherlands. Between 2010 and 2015, the satisfaction with the electricity increased year by year. Moreover, the percentage of people who experienced problems has decreased. The same holds for the gas industry. Moreover, the increase in satisfaction with the gas industry is more substantial (from 73.8 to 77.0) than the increase in satisfaction with the electricity industry (from 75.5 to 77.0).

[467] For instance: CE Delft (2016) Voor wie zijn de kosten en baten van het klimaatbeleid? Available at: https://www.cedelft.eu/en/publications/download/2309

[468] House of representatives (2017) Klimaatbeleid treft lage inkomens. Available at: https://www.tweedekamer.nl/kamerstukken/plenaire_verslagen/kamer_in_het_kort/klimaatbeleid-treft-lage-inkomens

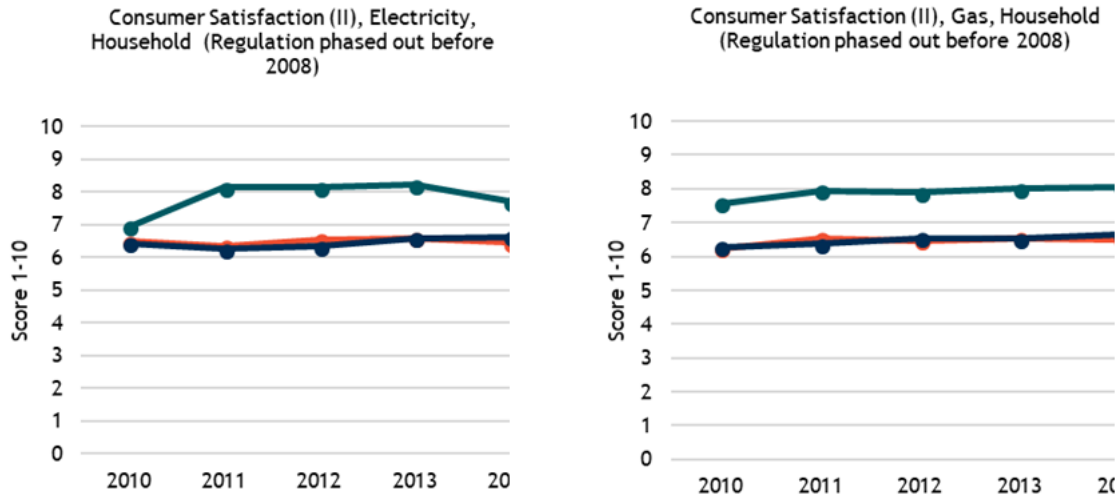
**Figure 280 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in the Netherlands for households**



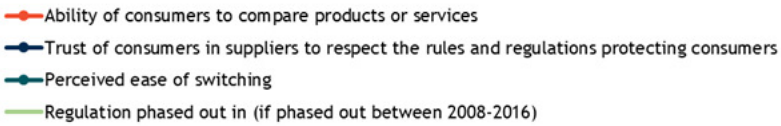

*Source:* EC – DG Justice[469]

Figure 7 shows three other indicators concerning consumer satisfaction. The scores on the ability to compare products are rather stable for both the gas as well as the electricity market. On the electricity market for household consumers, the scores for trust in suppliers and the ability to compare offers have increased over time. Moreover, it is noteworthy that all scores on the gas market show slight increases over the time period.

**Figure 281 Ability of consumers to compare products or services470, trust of consumers in suppliers471 and perceived ease of switching[472] in the Netherlands**




[469] Note that from 2013 onwards, the survey was carried out every other year.
[470] Survey question: "I can chose from a sufficient number of electricity providers?"
[471] Survey question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[472] Survey question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)




*Source:* EC – DG Justice

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. It shows that consumers in the Netherlands have relatively much choice when it comes to energy contracts. Dual-offers (gas and electricity combined), certified green offers, non-price-financial benefits and ICT-based offers are available on the market.

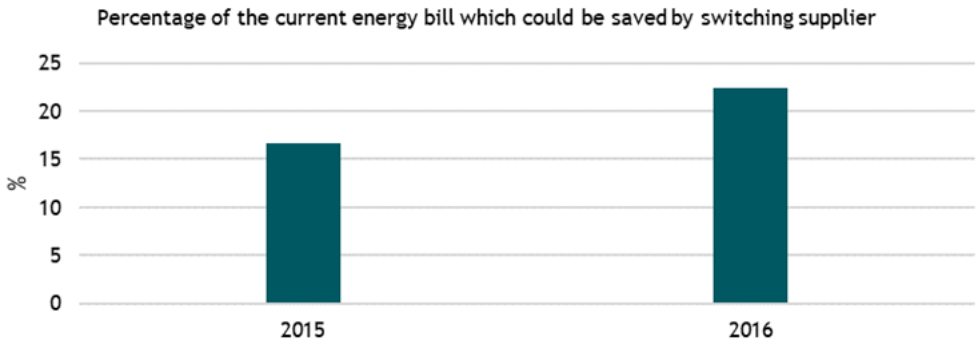
**Table 21-1 Consumer choice in the Netherlands (electricity, households)**

| | Answer |
|---|---|
| Dual-offers available in 2014 | Yes |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | No |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | Yes |

*Source:* ACER/CEER (2015)

Figure 8 shows that Dutch consumers could still lower their energy bill if they would switch between suppliers. It is also noteworthy that the potential savings have increased in 2016 (compared to 2015).

**Figure 282 Percentage of the current electricity bill which could be saved by switching supplier in the Netherlands**



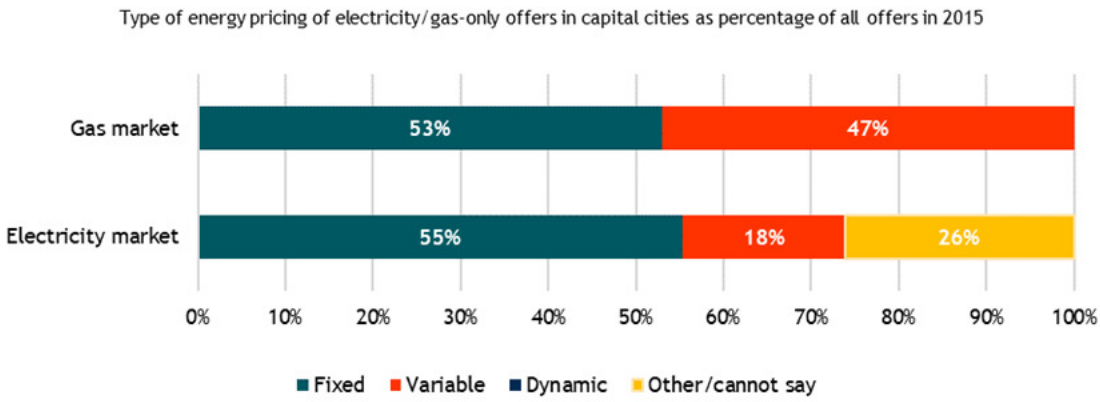

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The majority of the Dutch consumers has fixed energy prices (both on the electricity as well as on the gas market). On the gas market, 47% of the consumers has contract with variable prices (for instance different prices on different moments of the day). This share is much lower on the electricity market. However, by 2015 the share of variable electricity and/or gas contracts had risen to 58%.[473]

[473] Authority for Consumers & Markets (2017) Trendrapportage energiemarkt voor consumenten - tweede helft 2015.

**Figure 283 Type of offers for households in the Netherlands**




*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 21.2 Non-Household Price Regulation in the Netherlands

**The Netherlands had no energy price regulation for non-households in the period assessed.**

On the markets for non-household consumers, no price regulation is in place in the Netherlands. Moreover, no permits are required to supply energy to large-scale consumers (i.e. non-household consumers). Large-scale consumers are consumers with an electricity capacity greater than 3*80 A and gas capacity greater than 40 $m^3$ (n) per hour) as defined by the Dutch legislators.[474]

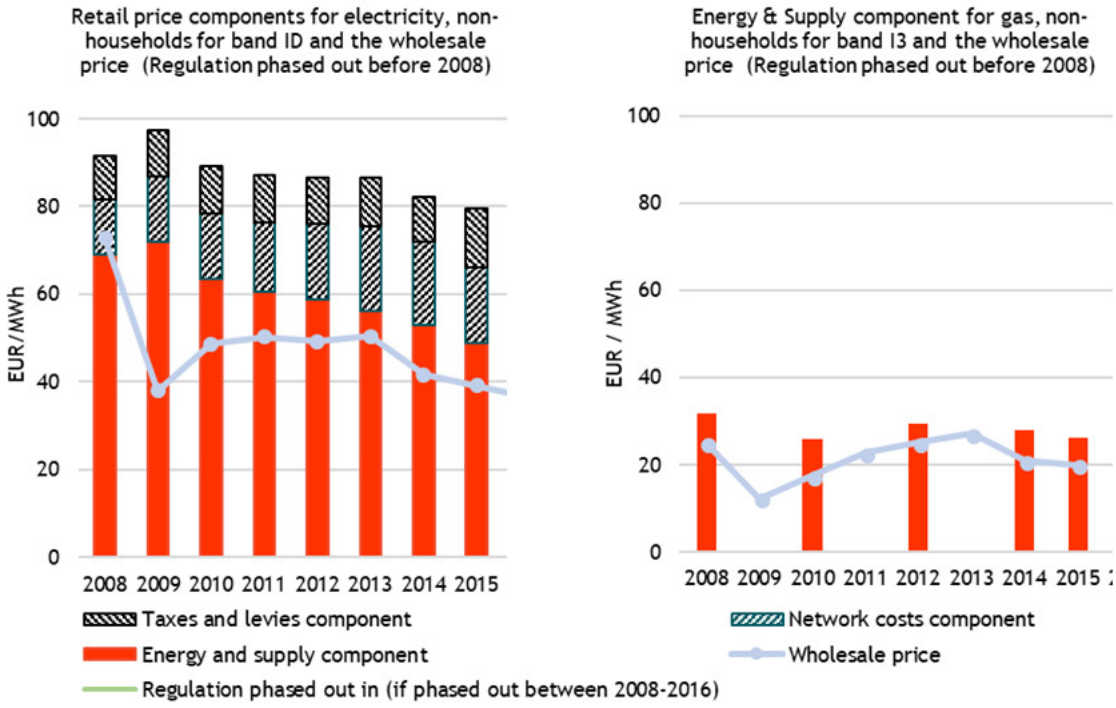
### *21.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

The first panel of figure 10 shows that the retail and the wholesale electricity price show similar developments apart from the year 2009. Furthermore, it should be noted that the decrease in the overall retail electricity price is driven by the decrease in the energy and supply component rather than by changes in taxes or network and supply costs. Results are less conclusive on the gas market for non-household consumers (although the wholesale price and the energy and supply component of the retail price show similar patterns).

[474] Electricity Act (1998). Available at: http://wetten.overheid.nl/BWBR0009755/2016-07-01 and Gas Act (2000). Available at: http://wetten.overheid.nl/BWBR0011440/2016-07-01

**Figure 284 Industry retail price components for middle consumption bands (ID and I3) and wholesale prices in the Netherlands**



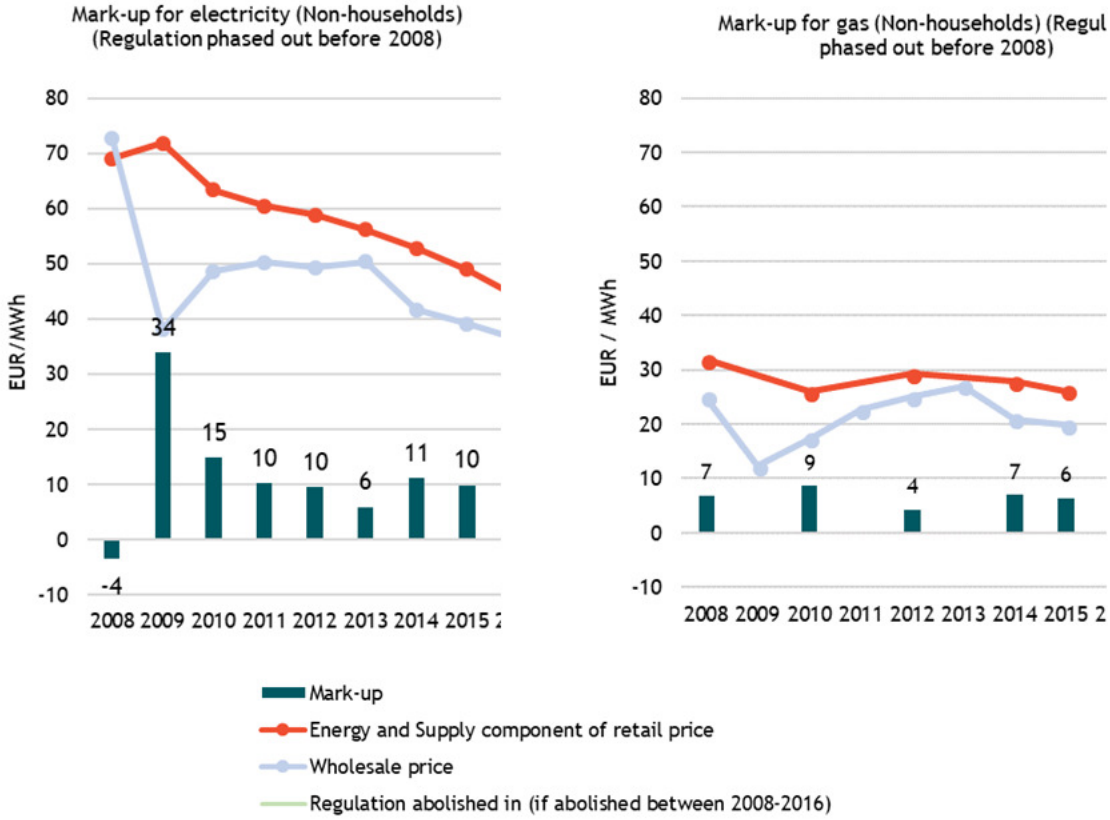

*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[475] The figures below show the mark-ups along with the wholesale price. The mark-ups on the electricity market for non-household consumers are lower than the mark-ups on the market for household consumers. Between 2010 and 2016, the mark-ups were relatively stable and varied between €6 and €15 per MWh. In 2008, the mark-up was negative (-€4 per MWh) as a result of the high wholesale price (€73 per MWh). The mark-ups on the gas market for non-household consumers show less variation and were between €4 and €9 per MWh in all the available years.

[475] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 285 Mark-ups for the Netherlands, middle consumption bands (ID and I3)




*Note that data is missing for the gas market in 2009, 2011, 2013 and 2016. Note that data is missing for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

## 21.3 Tariff deficit in the Netherlands

**The Netherlands had no tariff deficit between 2008 and 2016.**

# 22 Factsheet: Poland

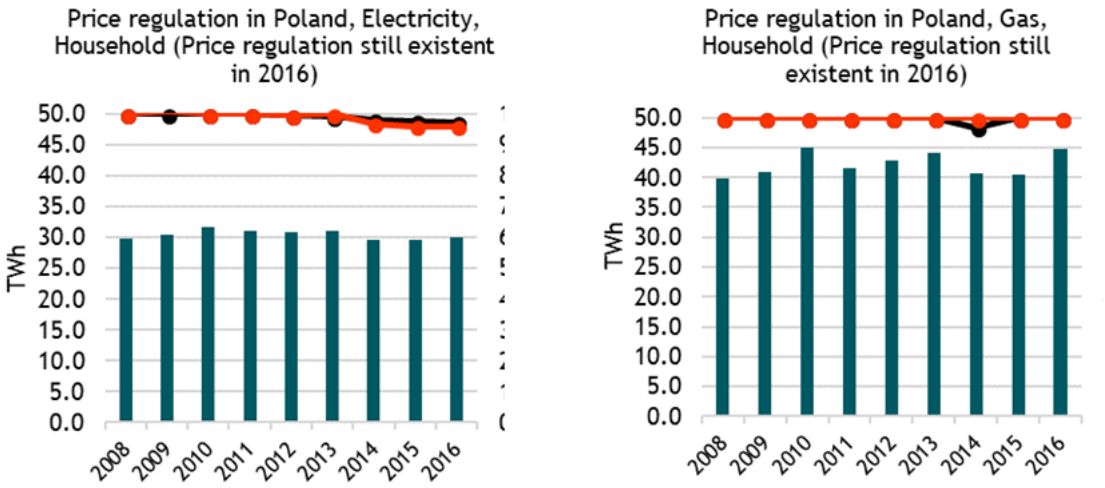
This factsheet presents the findings for Poland for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 22.1 Household Price Regulation in Poland

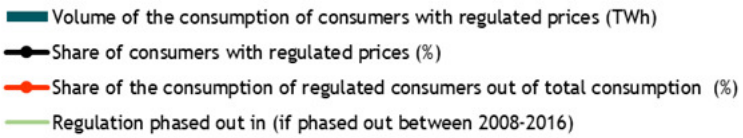
**Poland still has energy price regulation for households in place both for gas and electricity.**

Poland regulates electricity and gas prices for households. The President of Energy Regulatory Office (ERO) is the central body responsible for the regulation of energy retail prices. Electricity tariffs (G tariff group) have to be approved by the President of the ERO. The President can exempt a supplier from this obligation if he considers that such supplier operates in a competitive environment. Currently, the majority of electricity sellers to households are required to submit their tariffs for approval.[476] However, only the default and vertically integrated suppliers are obliged to apply for tariff approval. Non-default suppliers can use price lists that are not approved by the President of the ERO. Tariff calculations are based on rules that take into account, among other factors, the external costs of energy companies, including the costs of supporting renewable energy sources.[477]
Liberalisation of gas prices is underway as per the ruling of the European Court of Justice (36/14 Commission v. Poland).[478] Based on this ruling on October 1st 2017 regulated natural gas tariffs was abolished to all consumers other than households, while gas suppliers to household may offer tariffs only under the regulated cap. The deregulation of natural gas price for households is expected to take place by January 2024.

**Figure 286 Household price regulation in Poland from 2008 to 2016**




[476] https://gettingthedealthrough.com/area/12/jurisdiction/39/electricity-regulation-2018-poland/
[477] "National Report", The President of the Energy Regulatory Office in Poland, 2017
[478] "Energy Union Factsheet Poland", Commission Staff Working Document, EC, SWD (2017) 407 final




*Source:* CEER data

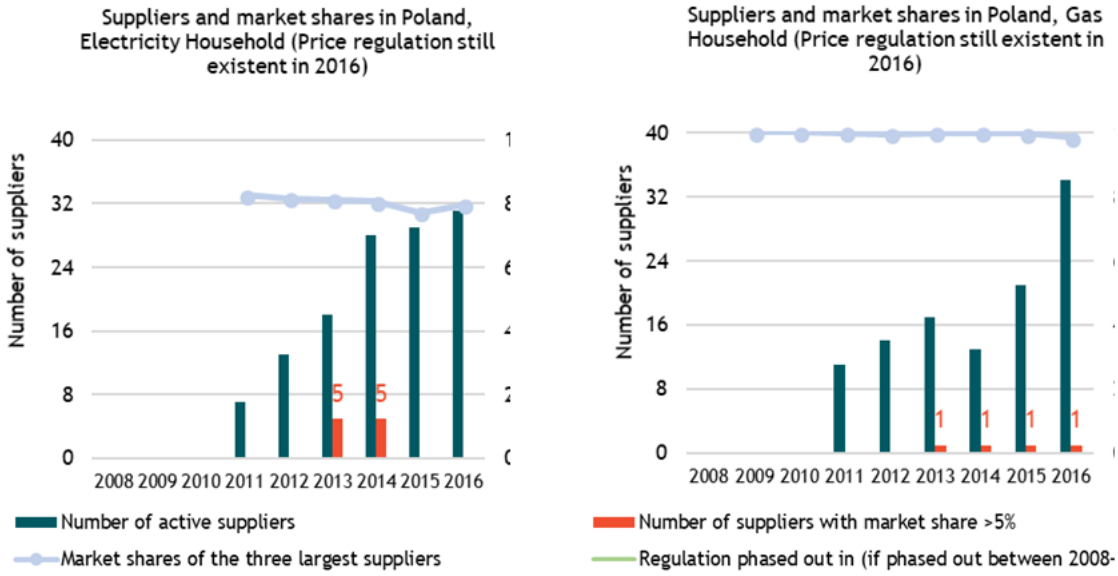
Figure 1 shows the volume and share of consumers and consumption for both electricity and gas retail markets in Poland. The volume of electricity consumption at regulated prices was fairly constant between 2008 and 2016. From 2011 to 2016 it remained relatively constant at around 30 TWh. The share of electricity consumption for regulated consumers decreased from 100% in 2013 to 96.5% in 2014. The percentage of consumers with regulated prices has also been in steady decline from 2011 onwards. In the case of gas consumption by households, the volume of consumed gas at regulated prices remained steady between 2008 and 2016 at around 40 TWh. The share of consumption of regulated consumers in relation to the total consumption is equal to 100 percent. In short, even though the share of consumption and consumers has decreased slightly in the last years, figure 1 confirms that prices are regulated for the vast majority of the electricity and gas household consumers.

Currently Poland has social tariffs set in place neither for electricity, nor for gas, but the energy poverty section describes the Polish financial support scheme.

### *22.1.1 Selected aspects of competition*

Figure 2 shows that the number of active suppliers in the Polish electricity household market has been continuously increasing from 2011 onwards. In 2013 and 2014 there were five suppliers with market share larger than 5 percent. No data is available in the years preceding or after. The market share of the three largest suppliers in the energy household market decreased slightly below 80 percent in 2015 but increased again in 2016. In the gas retail market the only supplier with a market share above 5 percent has an almost complete monopoly of the market (there was a slight decrease in 2016). In terms of number of suppliers, figure 2 suggests that there is more competition on the electricity market than on the gas market for household consumers.

**Figure 287: Number of suppliers and market shares in Poland**



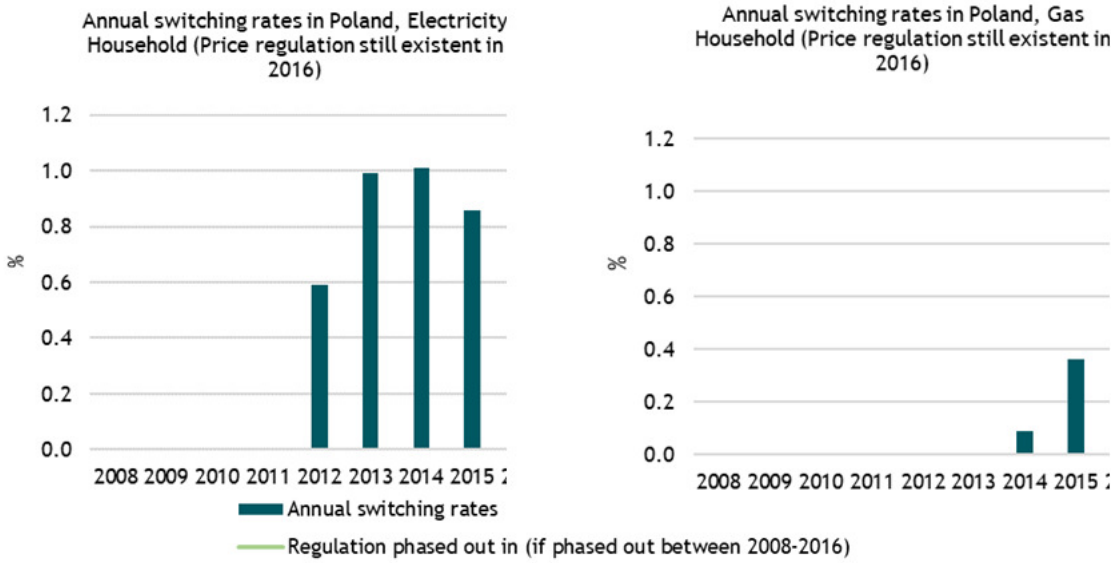
*Note: Data on the number of suppliers with market shares >5% is only available from in 2013 and 2014 for the electricity market and for 2013-2014 for the gas market. Data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figures below show the annual switching[479] rates in households for both electricity and gas. Switching rates in the electricity household market increased from 2012 to 2013 from 0.6 percent to 1 percent and declined to around 0.7 percent in 2016. Annual switching rates in the Polish gas household market have been on an increase since 2014. They jumped from 0.1 percent in 2014 to almost 0.9 percent in 2016.

**Figure 288 Annual switching rates for households in Poland**




*Data on switching rates for the electricity market was not available prior to 2012. In contrast, switching rates on the gas market between 2008 and 2013 equalled zero.*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[480] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[481] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Poland. An average household (in the middle consumption bands DC and D2) spent between 3 and 4 percent of its disposable income on

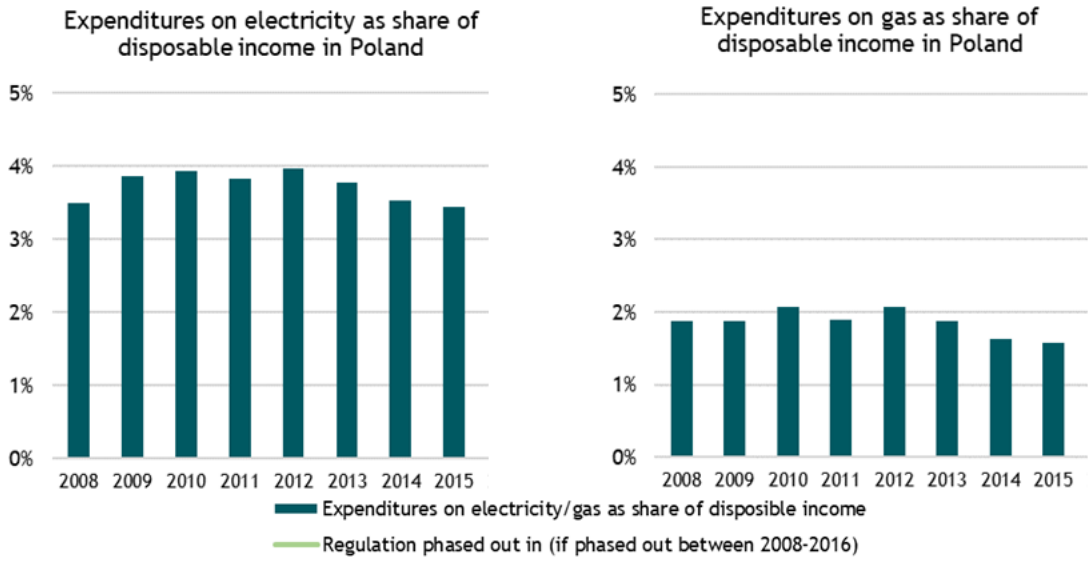
[479] Switching is defined as the voluntary action by which a customer changes his supplier

[480] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[481] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

electricity. The numbers have been on a decrease since 2012 going from more than 3.9 percent to slightly more than 3.4 percent. It should be noted that this decrease coincides with a decrease in the (energy and supply component) of the retail electricity price as shown in figure 5. The share of expenditure of the disposable income on gas for an average household in Poland has fluctuated between 1.5 percent and 2 percent between 2008 and 2016, but not all Polish households use natural gas. In contrast to the electricity market, the trend on the expenditures on gas does not show the same pattern as the development of the energy and supply component of the retail gas price (see figure 5).

**Figure 289: Expenditures on gas and electricity as share of disposable income for households in Poland (for middle consumption bands DC and D2) using PPS prices[482]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

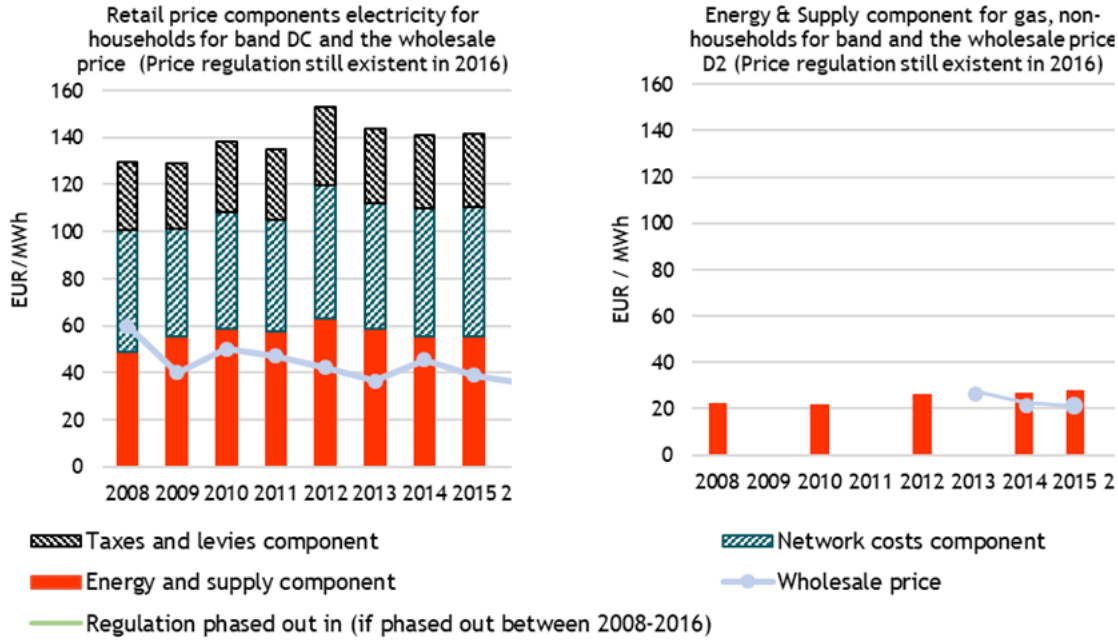
*Source:* Own calculations[483] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. On the electricity market for household consumers, the energy and supply component of the retail price has consistently been higher than the wholesale price, with the exception of 2008. Even though the differential between the energy and supply component of the retail price and the wholesale price is rather constant, it is interesting to observe that there seems to be little correlation between the two. Only between 2014 and 2016, both prices show a similar (decreasing) trend. Due to incomplete data it is difficult to say much about the efficiency of retail competition in the gas household market. In 2015 and 2016 the energy and supply component of the retail gas price was higher than the wholesale price.

[482] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[483] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 290 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Poland**



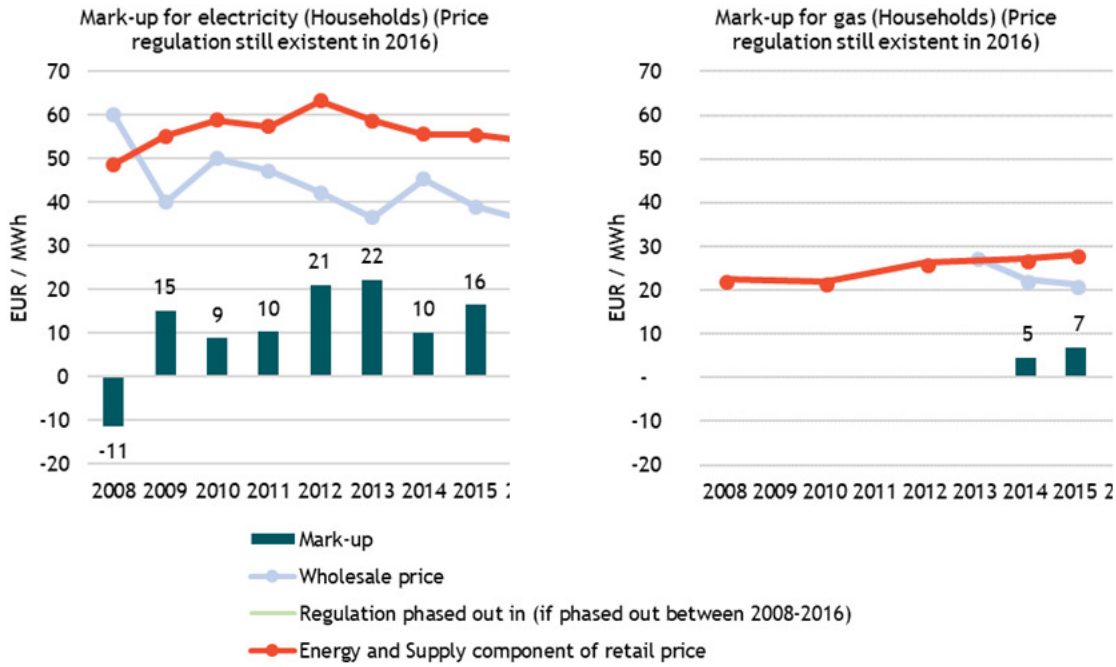

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[484] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[485] The figures below show the mark-ups along with the wholesale price. The mark-ups in both the energy and gas household markets have been positive, with the exception of 2008 for the electricity market (mark-ups for the gas market are only available for the last two years). The mark-ups in the electricity were highest for the years 2012 and 2013.

[484] Eurostat has data available on gas prices; however not for the energy and supply component.
[485] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 291 Mark-ups for Poland, middle consumption bands (DC and D2)**



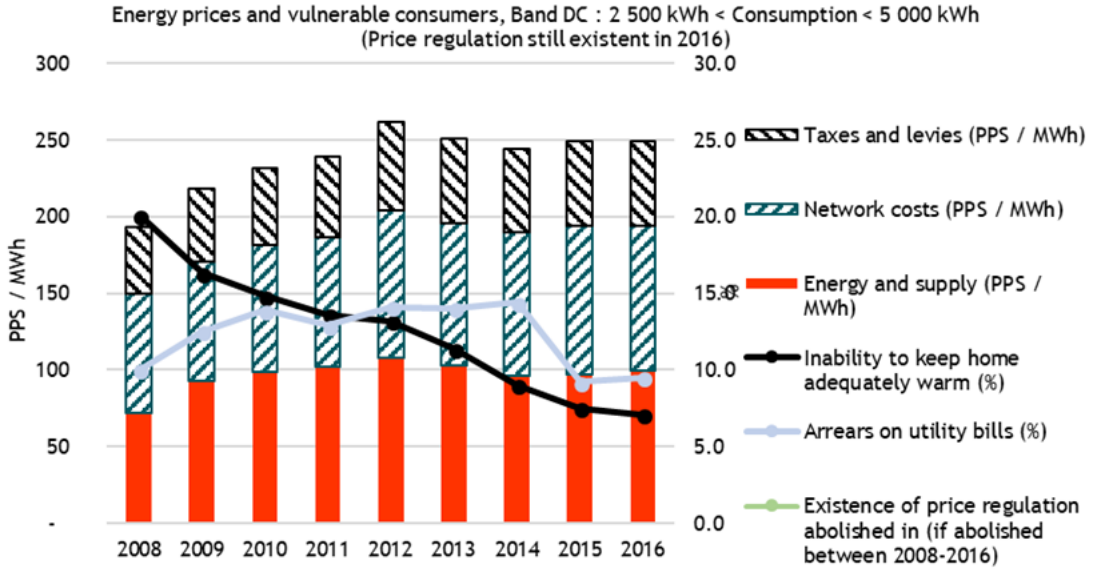

*Note that data is not available for the energy and supply component of the retail price on the gas market in 2009, 2011, 2013 and 2016. The gas wholesale price is only available between 2013 and 2015*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### 22.1.2 Energy poverty

Studies on energy poverty in Poland have found that around 12 percent of the population (~ 4.6 million people) is vulnerable towards energy poverty.[486,487] Although this number is higher than the approximate 7 percent of people who were incapable of adequately heating their home in 2016 (Figure 7), this is likely due to differences in the scope of the definitions. Figure 7 shows that the percentage of people who are not able to keep their home adequately warm in Poland has been on decline from 2008 to 2016. As mentioned above, Poland does not currently have social tariffs in the electricity or gas household sector. In 2013 a system of financial support for vulnerable consumers were established, but it is outside the tariff system. The financial support system provides for payment of energy allowances by municipalities to vulnerable consumers who were granted housing allowance (electricity consumers) or a lump sum for the purchase of fuel (gaseous fuels consumers). They must also be, respectively, a party to the common service agreement or supply agreement of electricity or gas, and reside in the place of supplying this energy or fuels.

[486] "Energy poverty in Poland 2012-2016. Description and changes over time"; Sałach K., Lewandowski P., IBS 2018; http://ibs.org.pl/en/publications/energy-poverty-in-poland-2012-2016-description-and-changes-over-time/
[487] According to the following definition of energy poverty: "Energy poverty is a phenomenon consisting in experiencing difficulties in satisfying basic energy needs at a place of residence for a reasonable price, such as maintaining an adequate heating standard and in other types of energy supply used adequately for satisfying basic biological and social needs for household members."

**Figure 292 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Poland**




*Source:* Eurostat

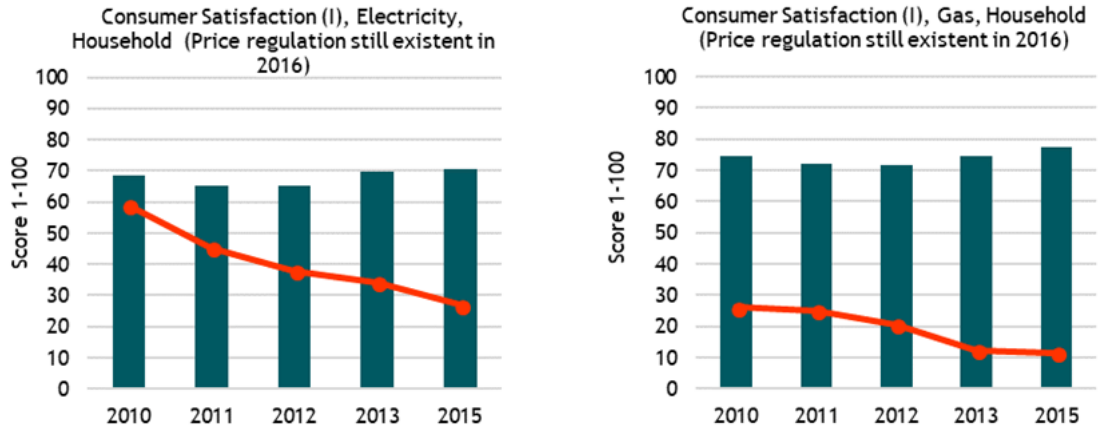
### *22.1.3 Quality of services*

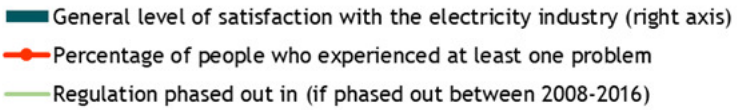
Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

Based on Figure 8 is it possible to attest that, in general, customers both in the electricity and gas household retail markers are increasingly more satisfied with the respective industries, at least in the most recent years. Consistent with this, the percentage of people who experienced at least one problem in either sector has decreased over time. The decrease in the electricity retail sector has gone down from 18 percent in 2010 to around 8 percent in 2015. In the case of the gas retail market the percentage of customers dissatisfied with the industry has fallen to around 4 percent in 2015 from almost 8 percent in 2010.

**Figure 293 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Poland for households**

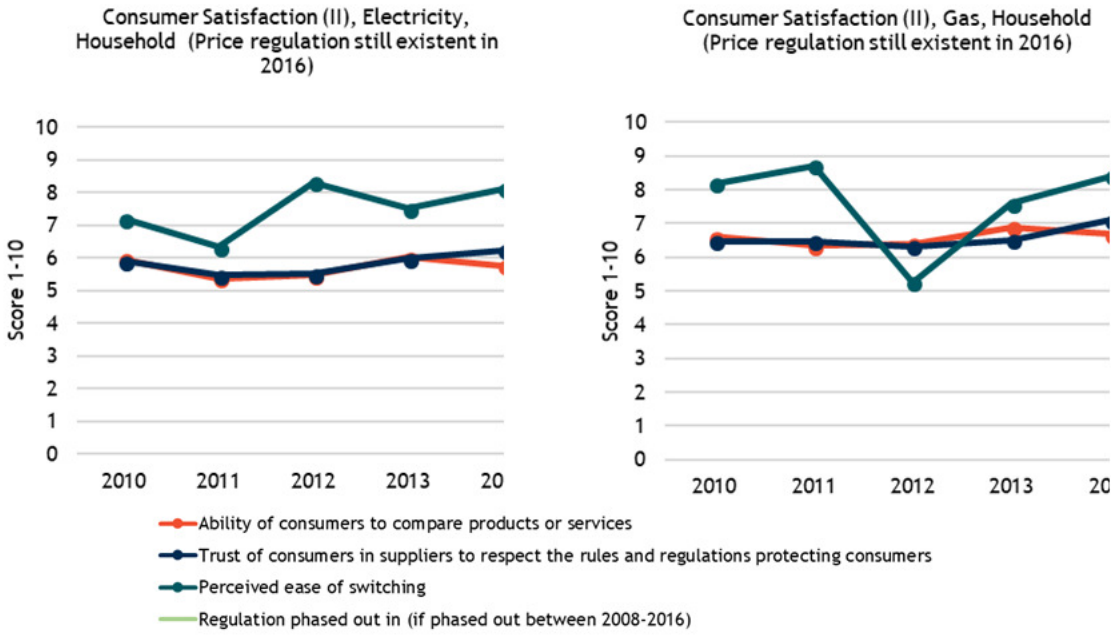





*Source:* EC – DG Justice[488]

In the electricity retail market the ability of consumers to compare products or services is consistently ranked substantially higher than the trust of consumers in suppliers to respect the rules and regulations protecting consumers. This second indicator, has had consistently low scores from 2010 to 2015. According to the National Report of the President of the ERO for 2017, in 2016, there was a large increase in complaints against practices of energy undertakings. Based on this the President of the ERO made available a special complaint form on ERO's website. This helped to improve performance monitoring. The perceived ease of switching in the Polish electricity retail market has the highest scores from all three indicators. Whereas the perceived ease of switching received the highest score in 2012 in the electricity retail market the opposite is true for the same indicator in the gas retail market. With the exception of the sharp drop in perceived ease of switching in 2012, the other indicators of consumer satisfaction in the gas retail market parallel those in the electricity market.

**Figure 294 Ability of consumers to compare products or services[489], trust of consumers in suppliers[490] and perceived ease of switching[491] in Poland**




*Source:* EC – DG Justice

[488] Note that from 2013 onwards, the survey was carried out every other year.
[489] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[490] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[491] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. In 2014 there were no dual-offers, combining both electricity and gas, available for customers on the Polish energy market, however by 2018 such offers were available to consumers.[492] Certified green offers have been introduced to the market in 2015. In addition, from Figure 11, it is possible to observe that Polish customers have the option to choose from fixed, variable or other offer options in the household retail electricity market. The spot option is currently not available in Poland. In the case of the gas market only one type of offer is available. No information is available on options such as non-price-financial benefits, non-financial benefits and ICE-based offerings.

**Table 22-1 Consumer choice in Poland (electricity, households)**

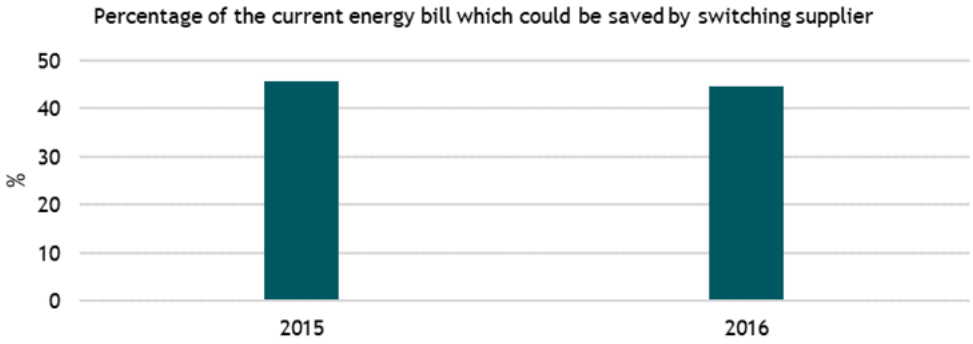
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | No |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The percentage of energy bills that could be saved by switching suppliers is high, almost 46 percent in 2015 and more than 44 percent in 2016. Combined with the fact that the perceived ease of switching is the highest scoring indicator in Figure 9 on customer satisfaction, more analysis is needed on the low switching rates indicated in Figure 288.

**Figure 295 Percentage of the current electricity bill which could be saved by switching supplier in Poland**



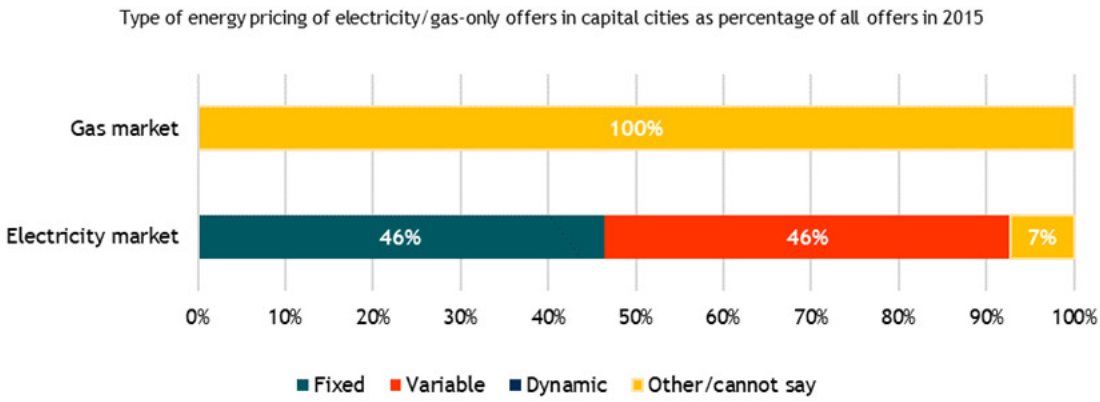

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas.

[492] Private communication with the NRA (2018)

**Figure 296 Type of offers for households in Poland**




*Note: Spot-based contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

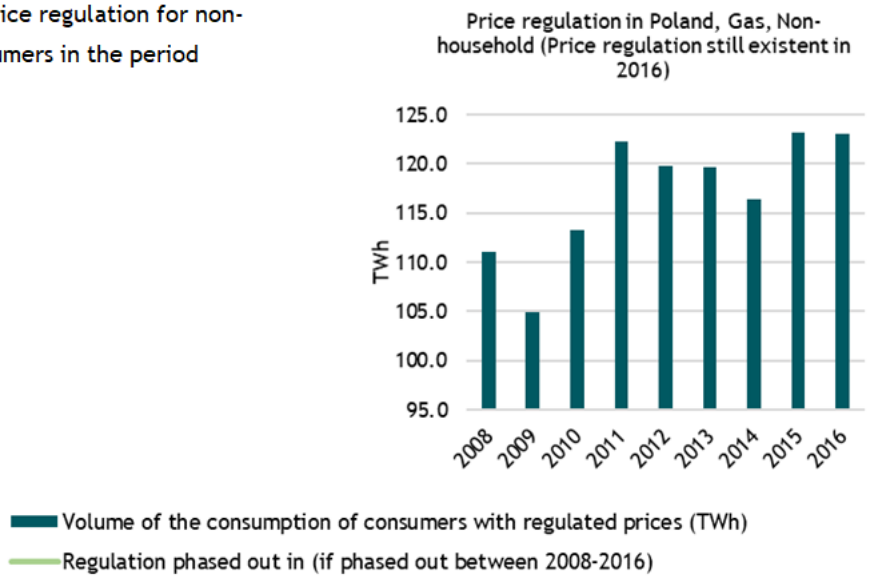
## 22.2 Non-Household Price Regulation in Poland

**Poland had no energy price regulation for non-households in the period assessed for electricity, and only phased out price regulation for gas in 2017.**

Whereas vendors in the household electricity retail market are required to submit tariffs for approval to the President of the ERO, this is not the case for industrial and commercial consumers.[493] As mentioned previously, based on the ruling by the European Court of Justice, on October 1st 2017 the obligation to apply tariffs to suppliers delivering natural gas to all consumers other than households was abolished.

**Figure 297 Non-household price regulation in Poland from 2008 to 2016**

No electricity price regulation for non-household consumers in the period




*Source:* CEER data

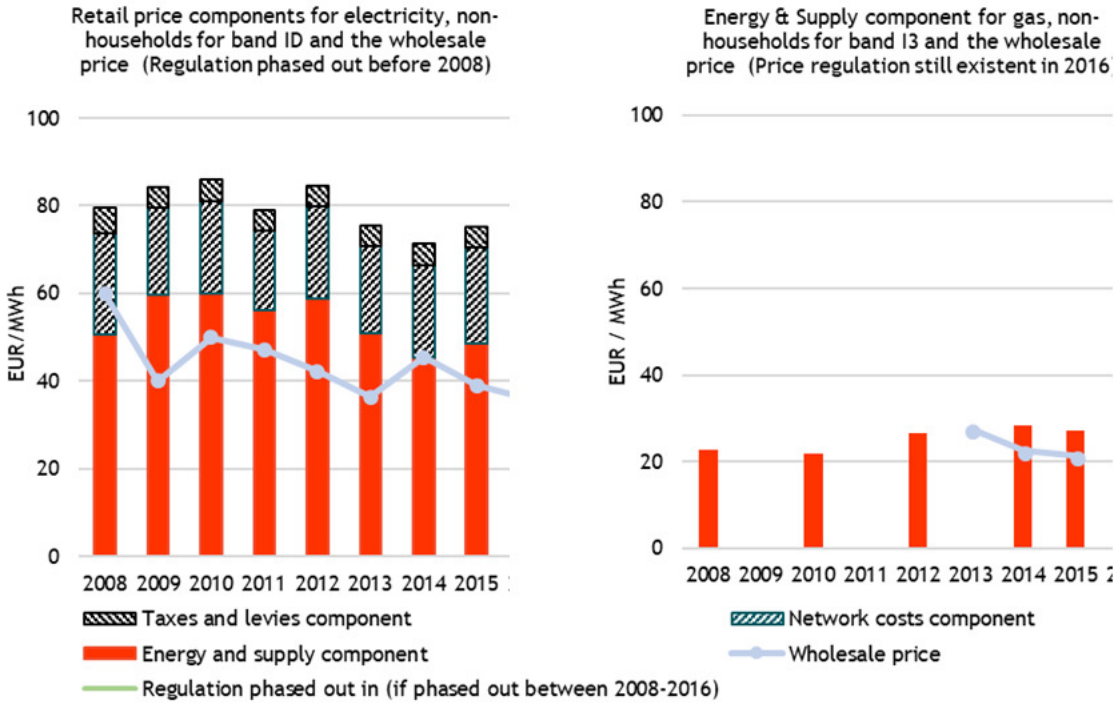
[493] https://gettingthedealthrough.com/area/12/jurisdiction/39/electricity-regulation-poland/

Figure 12 shows the volume of the electricity and gas consumption by consumers with regulated prices in the non-household sector. In the case of the electricity retail market, there was no consumption under regulated electricity prices for non-household consumers as market-based prices are offered to this consumer group. In the gas retail sector the volume has remained fairly constant between 2008 and 2016.

### *22.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

**Figure 298 Industry retail price components for middle bands (ID and I3) and wholesale prices in Poland**



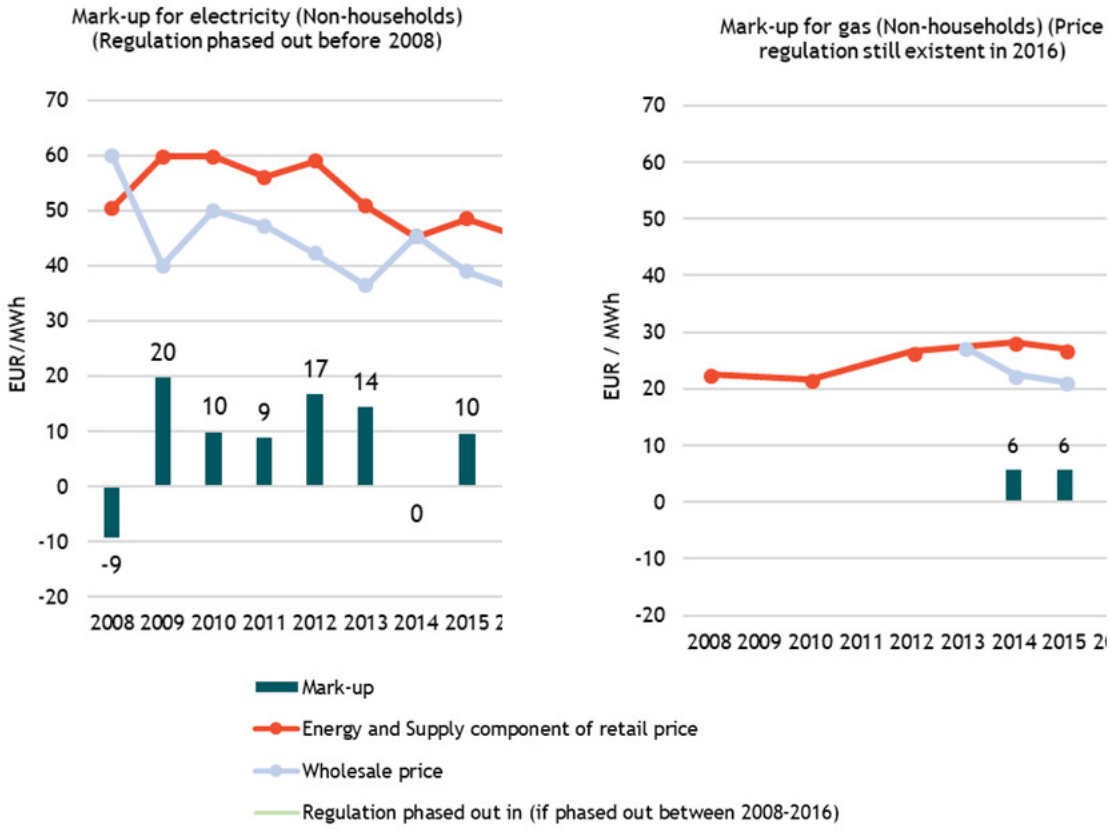

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

Except for 2008, the energy and supply comportment of the non-household electricity retail price has been higher than the wholesale price. In 2014, the energy and supply component of the price and the wholesale price were exactly equal. In contrast to the electricity market for household consumers, the trend of the energy and supply component of the retail electricity price is similar to that of the wholesale price (except for 2008 and 2014), suggesting a more efficient electricity market for non-household consumers than for household consumers. There is no information on the wholesale price of gas before 2013, thus the analysis is limited to the years 2014 and 2015. In both years, the retail gas price was higher than the wholesale price.

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[494] The figures below show the mark-ups along with the wholesale price. The analysis made in the paragraph above is directly related to the observed mark-ups. The only year in which the mark-up for the non-household electricity retail market was negative is 2009. In 2014, the mark-up was zero. 2009 was the year with the highest mark up.

**Figure 299 Mark-ups for Poland, middle consumption bands (ID and I3)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 22.3 Tariff deficit in Poland

**Poland had no tariff deficit between 2008 and 2016.**

[494] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

# 23 Factsheet: Portugal

This factsheet presents the findings for Portugal for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 23.1 Household Price Regulation in Portugal

**Portugal phased out energy price regulation for households for gas starting in 2013, but price regulation remains in place for both gas and electricity for more than 20% of the consumers.**

For electricity, Portugal eliminated end-user price regulation in the household sector for all consumers from 2013 onwards, with a phase-out period. This is reflected in a continued reduction of the share of regulated household consumers, reaching 23% by the end of 2016, with an even lower share of 19% when measured in terms of market consumption[495].

End-user price regulation for households will be completely phased-out by the end of 2020[496]. However, Portugal introduced in 2017 the possibility of household electricity consumers to return to regulated prices until then[497]. EDP Serviço Universal is the universal supplier, but retailers have the option of offering consumers regulated tariffs. If they do not, consumers have the opportunity to cancel contracts free of any penalties and move to EDP Serviço Universal[498]. The regulated end-user price is determined by the regulator and is set to the average market price[1]. By 2016 the energy component of tariffs was still below cost due to tariff increase caps, with this deficit being recovered through the global use of the system (GUoS) tariff component[499].

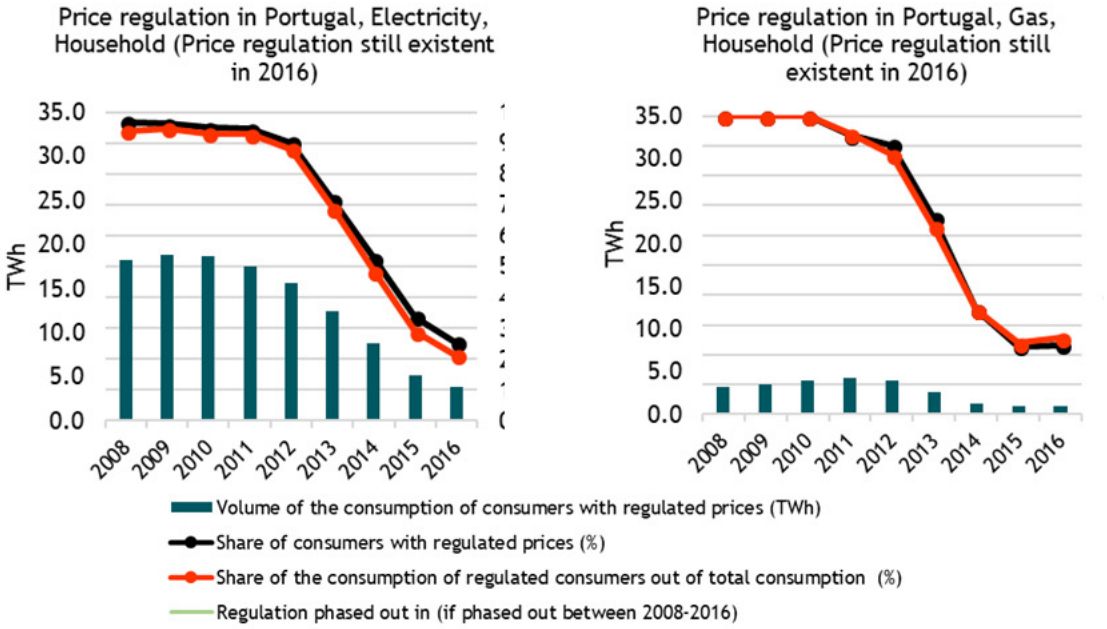
Portugal possesses an electricity social tariff discount since 2010, determined by the regulator and available by all eligible households[500]. The social tariff amounts to a discount of 33.8% on the regulated tariffs, automatically applied to eligible households.

[495] ERSE, Monthly Report of the liberalised Market – Electricity (December 2016):
[496] The law 42/2016 extends with the article 171 the deadline for the extinction of electricity regulated tariffs to the end of 2020 (originally being the end of 2017). Available from https://dre.pt/home/-/dre/105637672/details/maximized
[497] Law 105/2017. Available at https://dre.pt/application/file/a/108074492
[498] Ordinance 348/2017 which furthermore regulates the offering of regulated tariffs by suppliers and their reporting obligations, and transparency and information to customers. Available from https://dre.pt/web/guest/pesquisa/-/search/114200700/details/normal?l=1
[499] ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016. Available from http://www.erse.pt/eng/international/euromarkets/Documents/Relat%C3%B3rio%20CE%202016_EN.pdf
[500] Created by law 138-A/2010. The eligible groups are determined by the Portuguese Directorate General for Energy and Geology and comprise recipients of welfare allowances or to families with annual incomes below the set threshold starting at € 5.808 (varying per household composition). The social tariff is limited to households with a connection capacity below 6.9 kVA. ERSE (2017), Tarifa Social de energia elétrica em 2018. Available from http://www.erse.pt/pt/electricidade/tarifaseprecos/2018/Paginas/TarifasSociaisAcessoTVF2018.aspx

Like electricity, Portugal eliminated gas end-user price regulation for the household sector from 2013 onwards, with a phase-out until the end of 2020[501]. Likewise, this led to a sustained decrease in the share of consumers with regulated prices, reaching 26% in 2016. The regulated gas end-user price is determined by the regulator and is set according to energy, transmission, distribution and retailing components, with an additional factor to incentivize the migration to unregulated prices.

As for electricity, Portugal has a social tariff discount for gas since 2010[502]. It applies automatically to eligible households and amounts to a discount of 31.2% (since 2016 to today) over the regulated tariffs[503].

**Figure 300 Household price regulation in Portugal from 2008 to 2016**




*Source: CEER data*

*No year for the end of price regulation is indicated as the transition period goes to 2020*

The database shows that the share of households under social tariff discounts has increased since its introduction in 2010 both for electricity and gas. The sharp increase observed for electricity is due to the automatic attribution of the social tariff to eligible customers from 2016 on. Despite the recent increase of households with social tariffs for gas, these are comparatively much lower than for electricity. Even before the introduction of automatic attribution, households on electricity social tariffs were 10 times more numerous than for gas.

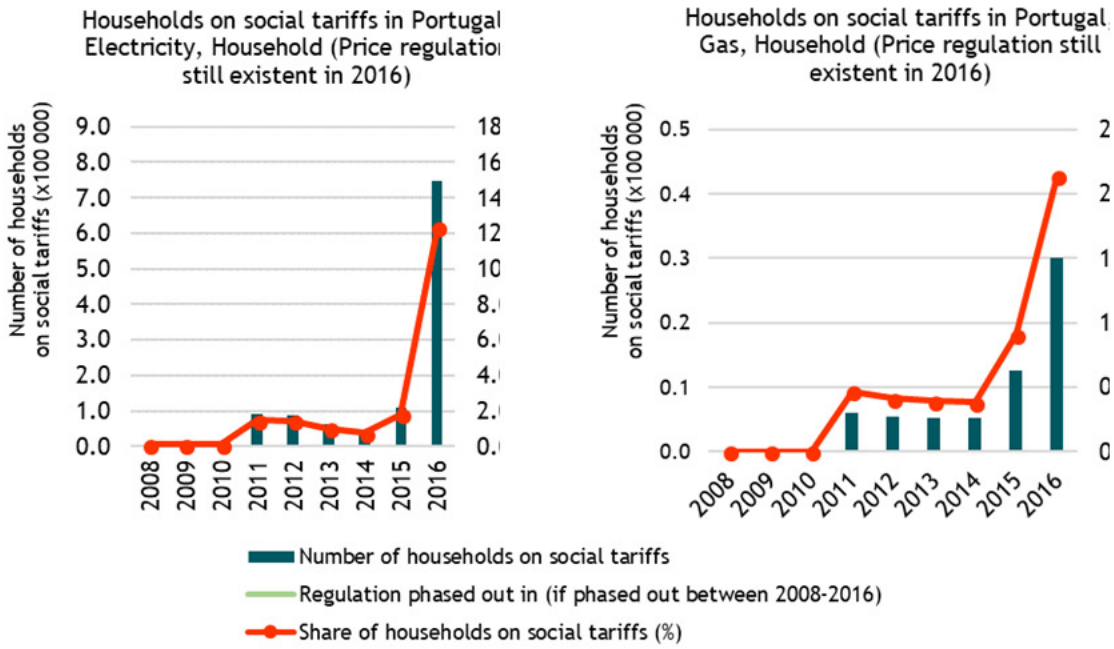
[501] The ordinance 144/2017 extends the deadline for extinction of gas regulated tariffs from the end of 2017 to the end of 2020, in order to equate the electricity and gas regulate tariffs deadline. However, the ordinance does not allow consumers to return to regulated tariffs as for electricity. Available from https://dre.pt/home/-/dre/106923197/details/maximized

[502] Created by the law 101/2011. Available from https://dre.pt/pesquisa/-/search/671202/details/normal

[503] Similar rules for eligible gas consumers apply as for electricity, although annual income is not taken into account for gas consumers. Only the connection capacity threshold of 6.9 kVA is changed to 500 $m^3$. ERSE (2017), Tarifa social no Gás Natural. Aspetos principais 2017-2018. Available from http://www.erse.pt/pt/gasnatural/tarifaseprecos/20172018/Documents/Tarifa%20social%20no%20g%C3%A1s%20natural%202017-2018.pdf

While the transmission system operator is responsible for the charges financing the social tariffs, the imputation of these charges differs for electricity and gas. For electricity, they are imputed to producers[504], while for gas they are imputed to transmission and distribution operators and suppliers[505].

**Figure 301 Household social tariffs in Portugal**



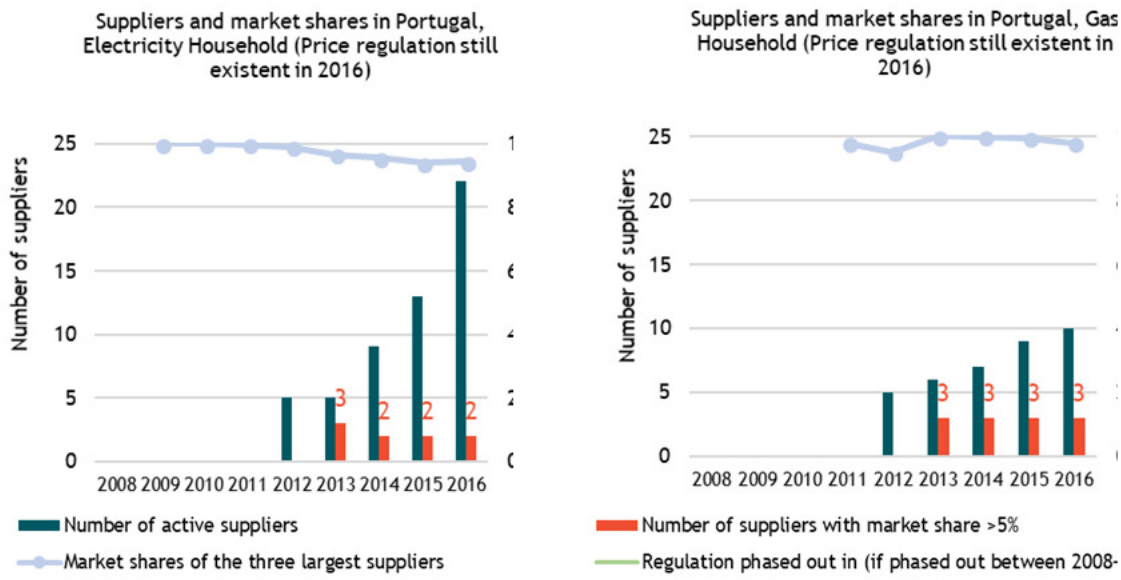

*Source: CEER data and the Portuguese NRA*

### *23.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers have had over 90% market consistently over the last years, albeit with a continued modest decrease in concentration in electricity since 2012. Thus, by 2016 the largest electricity supplier, EDP Comercial, possessed a constant 45% share of the market. On the other hand, the share of the largest gas supplier, Galp, decreased from 70% in 2013 to 55% in 2016[506]. At the same time, there has been a sustained increase in the number of active suppliers from 2012 to 2016. The regulator ERSE indicates several structural factors contributing to these trends, such as the end of regulated tariffs, the entrance of Spanish suppliers and increase offer transparency[506].

[504] Law 138-A/2010. Available from https://dre.pt/pesquisa/-/search/666880/details/maximized
[505] Law 114/2017. Available from https://dre.pt/application/file/a/114426182
[506] ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016.

**Figure 302: Number of suppliers and market shares in Portugal**



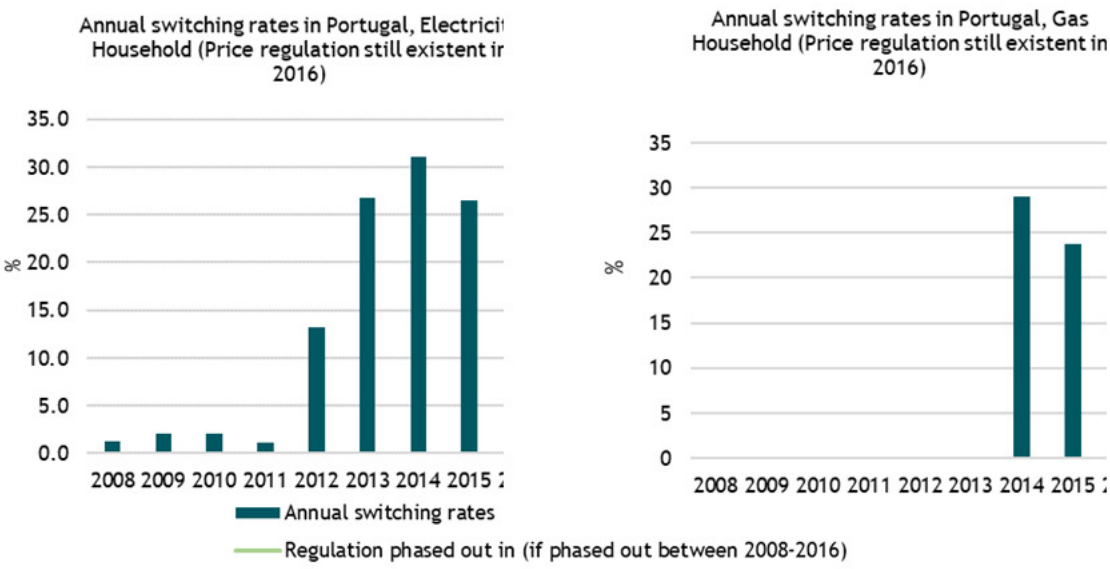

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*
*Source: CEER data and the Portuguese NRA*

### Consumer engagement and expenditures on energy

The figures below show the annual switching[507] rates in households for both electricity and gas, which increased significantly since the abolishment of end-user regulated prices from 2013 on[508]. Despite fluctuations, household switching rates remain above 20% for both electricity and gas due to the phase-out of regulated tariffs, increase transparency in supplier offers, and 'adoption of regulated risk coverage mechanisms by the suppliers'[509]. Nonetheless, there is a relation between the observed consolidation of the market which led to sharp reductions in the number of electricity and gas suppliers from 2015 on and the fall in switching rates in Portugal.

[507] Switching is defined as the voluntary action by which a customer changes his supplier
[508] For gas, law 66/2010. Available from https://dre.pt/pesquisa/-/search/335465/details/normal?l=1/en/en/en/en
For electricity, law 75/2012. Available from https://dre.pt/web/guest/pesquisa/-/search/553927/details/normal?l=1
[509] ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016. Available from http://www.erse.pt/eng/international/euromarkets/Documents/Relat%C3%B3rio%20CE%202016_EN.pdf

Figure 303 Annual switching rates for households in Portugal



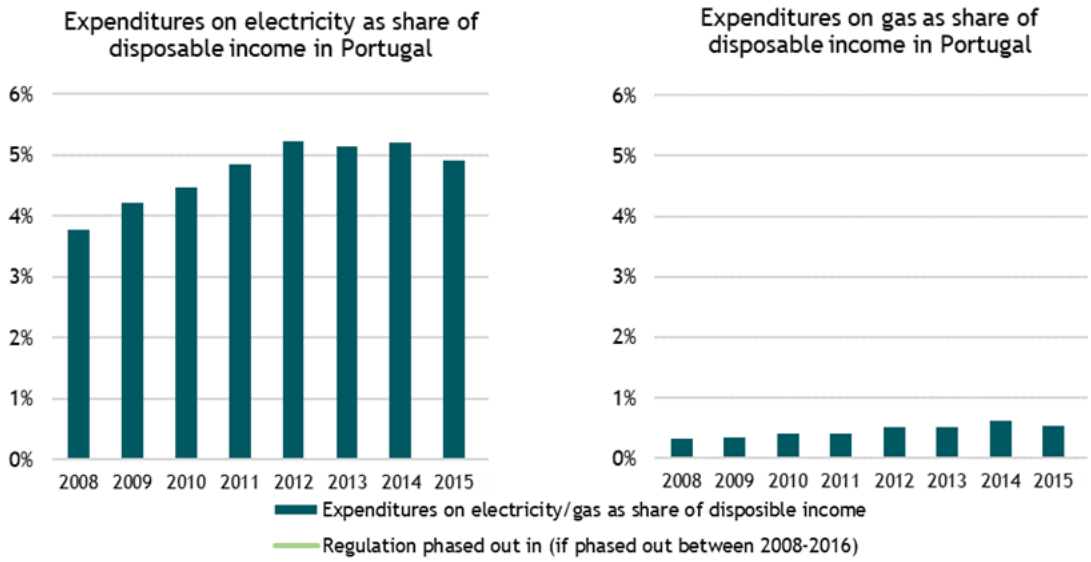

*Source: CEER data*

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[510] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[511] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Portugal. Since the introduction of social tariffs, the indicator remained stable for electricity and gas, except for a drop in 2016 for gas. This may be caused by the automatic attribution of social tariffs from that year on. Moreover, expenditures relative to income are an order of magnitude higher for electricity than gas.

[510] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[511] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

**Figure 304: Expenditures on gas and electricity as share of disposable income for households in Portugal (for middle consumption bands DC and D2) using PPS prices[512]**



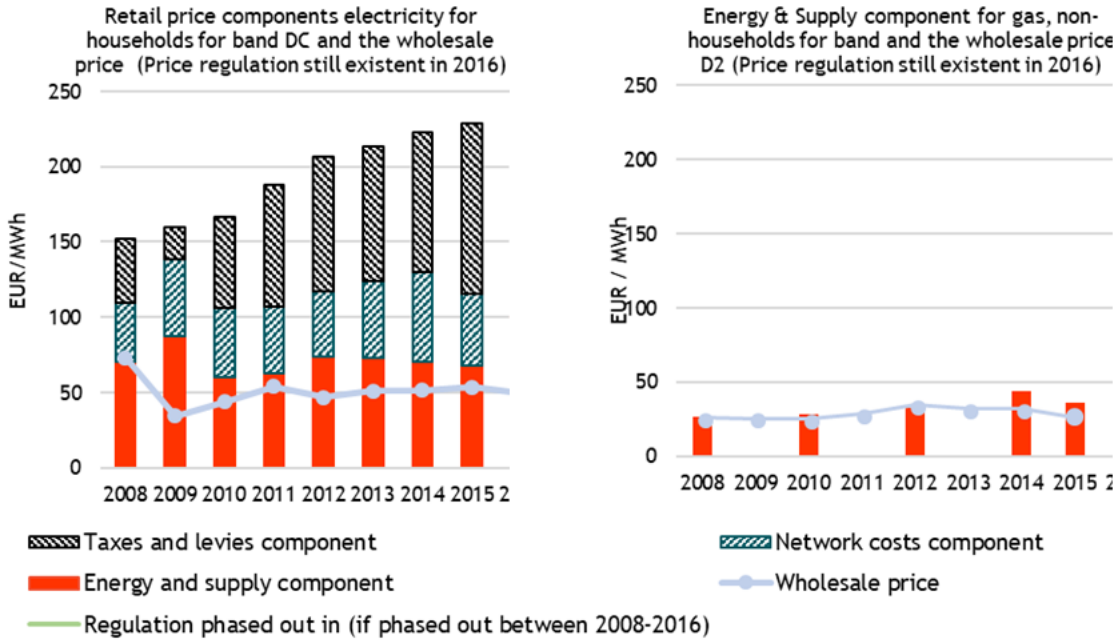

*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*
*Source: Own calculations[513] based on Eurostat*

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. For Portugal both wholesale and energy component prices have stayed constant since the end of regulated tariffs in 2013 (albeit there are transition tariffs until 2020).

[512] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[513] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

**Figure 305 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Portugal**

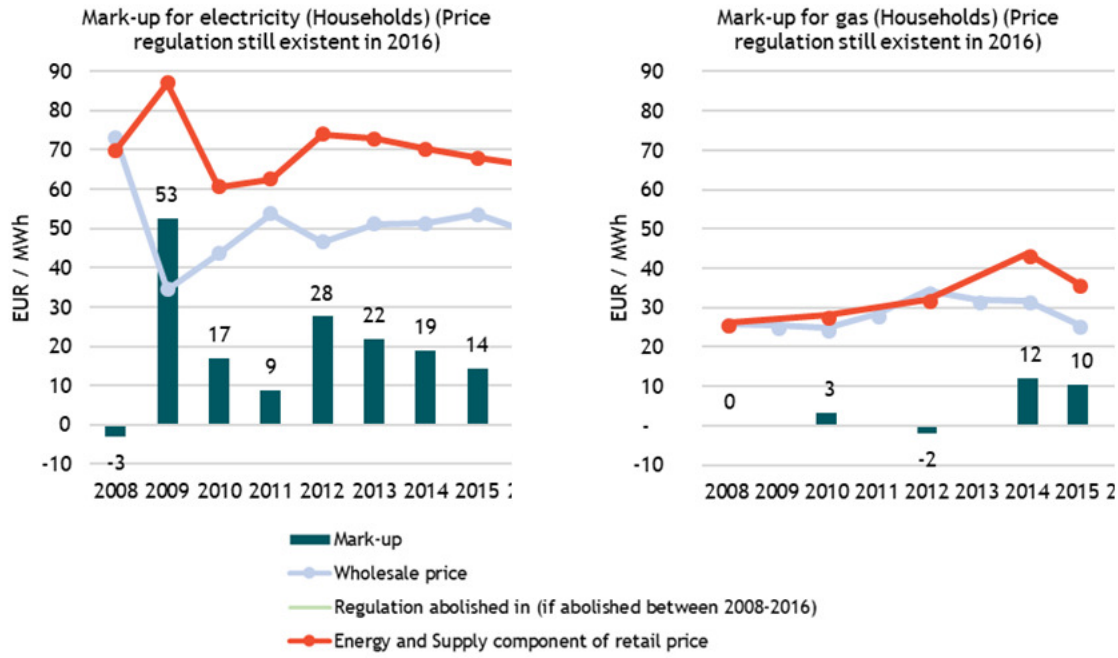



*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*
*Source: Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[514] and EMOS (wholesale price)*

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[515] The figures below show the mark-ups along with the wholesale price. The electricity mark-up for households has decreased since the abolition of regulated tariffs in 2013 and the gradual entrance of more households into the liberalized market. The gas mark-ups are slightly lower than for electricity, but have increased from 2012 to above 10 €/MWh, in accordance with data from the NRA.

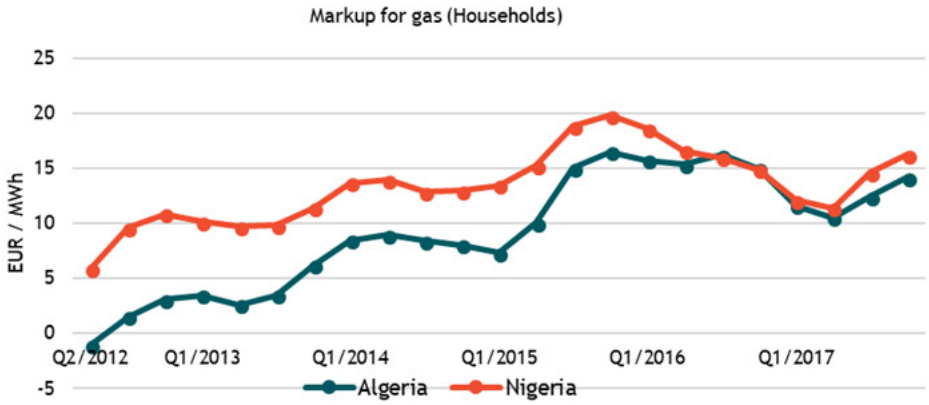
[514] Eurostat has data available on gas prices; however not for the energy and supply component.
[515] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 306 Mark-ups for Portugal, middle consumption bands (DC and D2)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source: Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)*

Figure 307 Mark-ups from two gas origins to households for Portugal, with NRA data



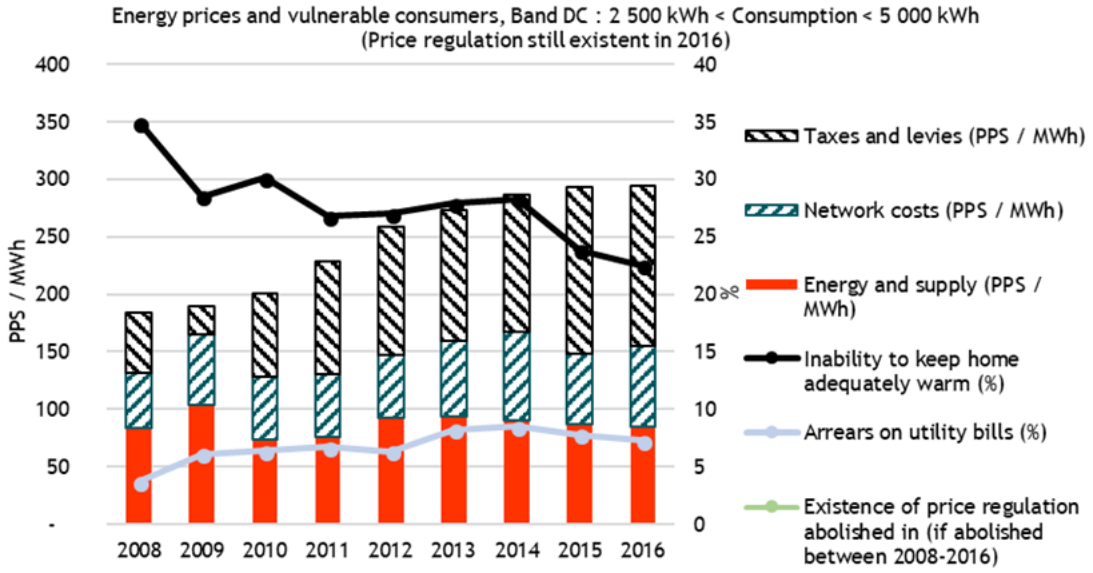

*Source:* Private communication with ERSE (2018)

### 23.1.2 Energy poverty

The diagram below shows a conflicting trend. While the share of the population with arrears on their utility bills grew slightly since 2012, the share which is unable to keep their home adequality warm decreased from over 30% to 23%. As indicated, the number of households on social tariffs increased significantly since the introduction of automatic attribution in 2016, which partly explains the trend.

In 2016, Portuguese household consumers paid the highest electricity and gas prices of the EU[516]. Increases in energy prices arise from the taxes and levies component, since the energy, supply and retail cost components remained stable throughout the period of analysis. The European Commission indicates that part of the taxes and levies increases until 2014 at least was due to subsidies to producers. These subsidies arose from the renewable energy and combined heat-and-power support mechanisms, and compensation for stranded costs from the liberalization process[517]. Indeed, in 2016 support to renewable energy represented 21% of incumbent's standard offers for households in the Portuguese capital[516].

**Figure 308 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Portugal**




*Source: Eurostat*

Portugal does not have mechanisms addressing energy poverty other than the social tariffs, but these do include also the right to further favourable tax treatments[518]. It is important to note, that in Portugal vulnerable consumers are not officially defined. The eligibility conditions are defined for the social tariff instead[519].

### *23.1.3 Quality of services*

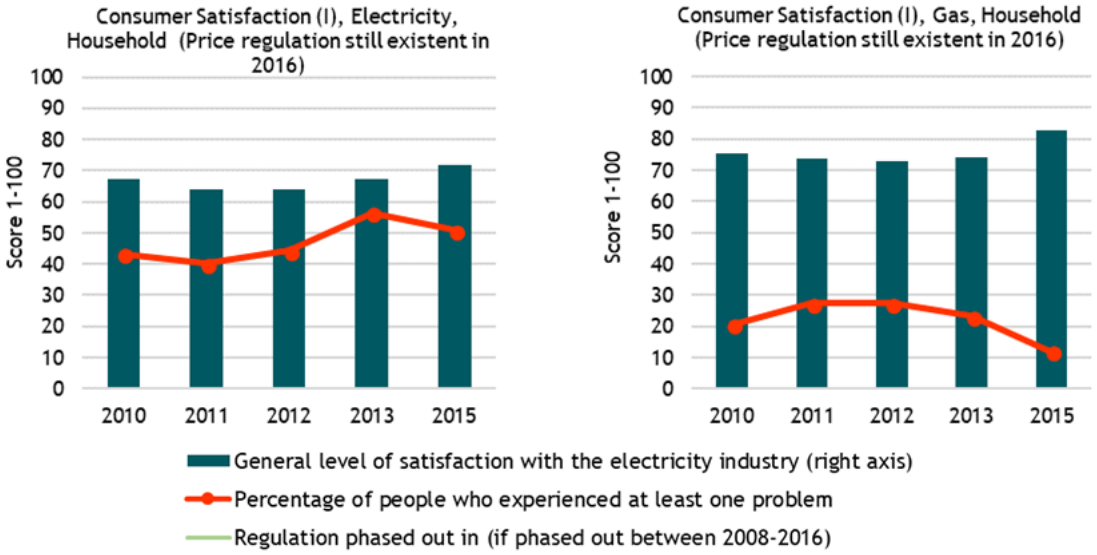
[516] ACER/CEER (2017), Annual Report on the Results of Monitoring the Internal Electricity and Gas Markets in 2016.
[517] European Commission (2014), EU Energy Markets in 2014. Available from https://ec.europa.eu/energy/sites/ener/files/documents/2014_energy_market_en_0.pdf
[518] Namely the exemption from the Electricity Consumption Special Tax (IEC) and discounts in the Audiovisual Contribution (CAV). ERSE (2017), Tarifa Social de energia elétrica em 2018. Available from http://www.erse.pt/pt/electricidade/tarifaseprecos/2018/Paginas/TarifasSociaisAcessoTVF2018.aspx
[519] Recipients of welfare allowances or families with annual incomes below the set threshold starting at € 5.808 (varying per household composition). The social tariff is limited to households with a connection capacity below 6.9 kVA for electricity and 500 $m^3$ for gas.
ERSE (2018), Tarifa Social de energia elétrica em 2018. Available from http://www.erse.pt/pt/electricidade/tarifaseprecos/2018/Paginas/TarifasSociaisAcessoTVF2018.aspx
ERSE (2017), Tarifa social no Gás Natural. Aspetos principais 2016-2017. Available from https://www.tagusgas.pt/wp-content/uploads/2017/10/tarifa_social_ERSE-2016_17.pdf

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

### Consumer satisfaction

ERSE become responsible both for technical and commercial service quality for electricity and gas effectively from 2014[520]. Compared to previous years consumer satisfaction increased sharply from 2013 to 2015 for both electricity and gas, and was accompanied with a decrease in the percentage of people who experienced at least one problem. In 2016 the main cause for customer complaints in the electricity sector were related to invoicing, followed by contracting and metering. In the gas sector invoicing was also the main cause for complaints, followed by interruptions of supply[521].

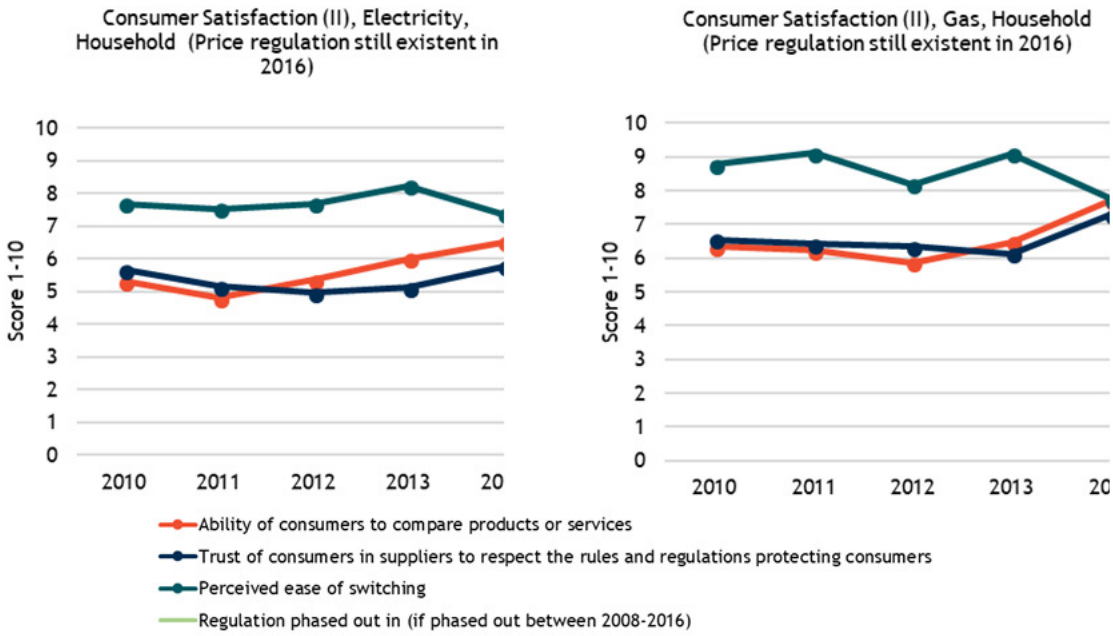
**Figure 309 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Portugal for households**




*Source: EC – DG Justice*[522]

**Figure 310 Ability of consumers to compare products or services[523], trust of consumers in suppliers[524] and perceived ease of switching[525] in Portugal**

[520] ERSE (2013). Regulamento da Qualidade de Serviço do Setor do Gás Natural.
[521] ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016. Available from http://www.erse.pt/eng/international/euromarkets/Documents/Relat%C3%B3rio%20CE%202016_EN.pdf
[522] Note that from 2013 onwards, the survey was carried out every other year.
[523] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[524] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[525] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)




*Source: EC – DG Justice*

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. In 2017, households recovered the option to return to regulated tariffs for electricity, although these will be phase out nonetheless[526]. According to the regulator[527], the increased transparency in the supply offers available to consumers was one of the factors contributing to the increase of the liberalized electricity retail market size and robustness. Indeed, the regulator implemented several measures on offer transparency and standardization in recent years both for electricity and gas, and offers on its website simulators for supplier comparison and estimation of the power to be contracted. The regulator also monitors the availability of dual offers, which in 2016 followed price decreases for the regulated (transitional) tariff and gas prices.

**Table 2 Consumer choice in Portugal (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

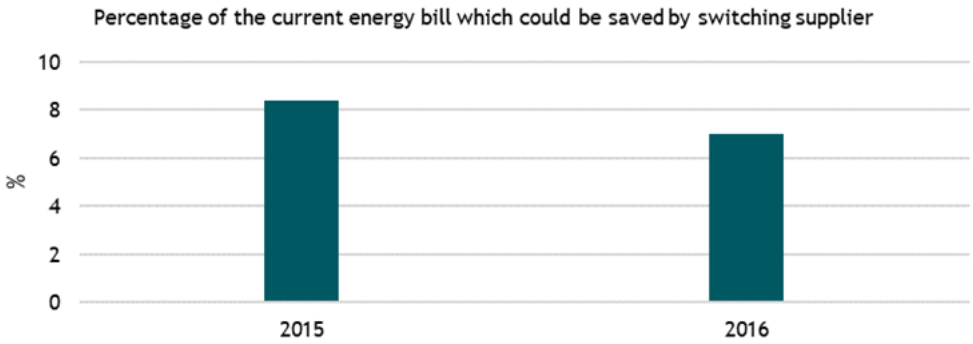
*Note that "-" indicates missing data*

*Source: ACER/CEER (2015)*

[526] Law 42/2016. Available from https://dre.pt/home/-/dre/105637672/details/maximized

[527] The measures cover publishing reference price information on its website, standardization of (pre-)contractual rules, public disclosure of commercial offers by large suppliers, tariff disaggregation in bills, metering data access, and monitoring of suppliers. ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016. Available from http://www.erse.pt/eng/international/euromarkets/Documents/Relat%C3%B3rio%20CE%202016_EN.pdf

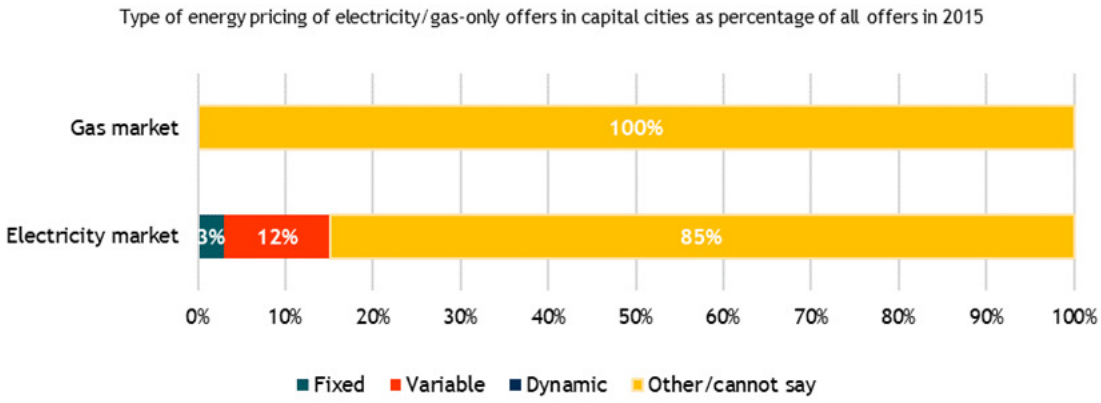
Figure 311 Percentage of the current electricity bill which could be saved by switching supplier in Portugal




*Note: Savings may include one-time benefits such as sign-in bonuses*
*Source: VaasaETT (2016)*

The diagrams below show the type of offers available for electricity and gas, most of which are variable.

Figure 312 Type of offers for households in Portugal




*Note: Spot-based contracts are a type of variable contract but presented separately.*
*Source: ACER/CEER (2015)*

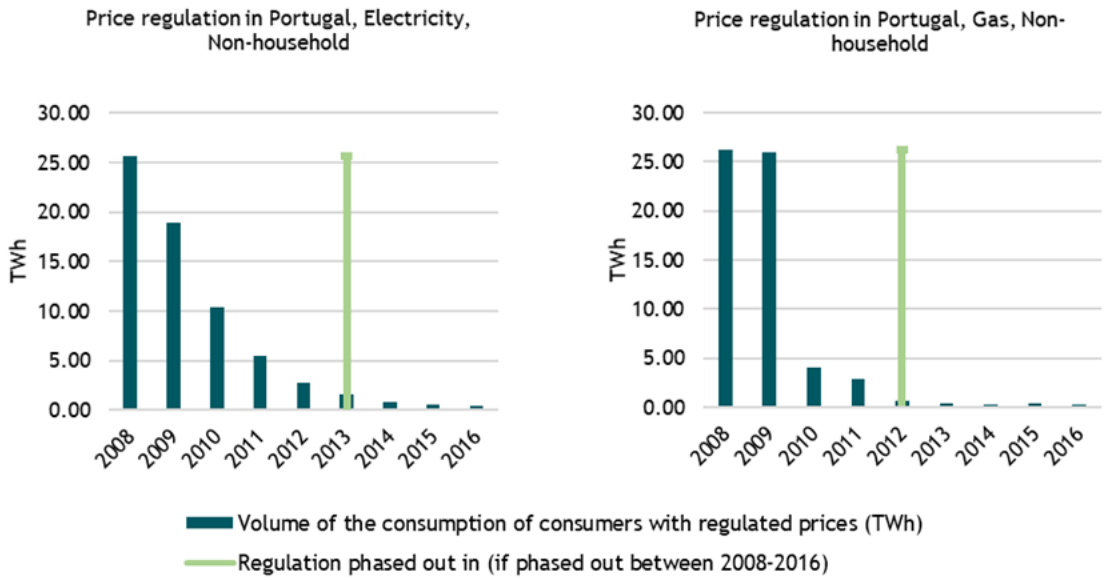
## 23.2 Non-Household Price Regulation in Portugal

**Portugal phased out energy price regulation for non-households starting from 2013 for electricity and 2012 for gas. However, Portugal still has a (small) share (0-5%) of non-household consumption under price regulation.**

The market for non-household consumers in Portugal is in transition towards a fully liberalized market without end-use price regulation which should be reached by the end of 2020. Consumers with gas consumption below 10000 $m^3$ or contracted electricity capacity below 10.35 kVA are eligible for the regulated (transitional) tariff described in the 'household price regulation in Portugal' section.

The penetration of the liberalized electricity market for non-households has increased continuously since 2012. Currently practically all large customers and industries do not have regulated prices, while the penetration for small businesses has reached 94.9% in 2016[528].
A similar trend can be observed for the gas market for large customers which have non-regulated prices since 2012. Since 2014, the liberalized gas market penetration for industries has been stable at around 91%.

**Figure 313 Non-household price regulation in Portugal from 2008 to 2016**



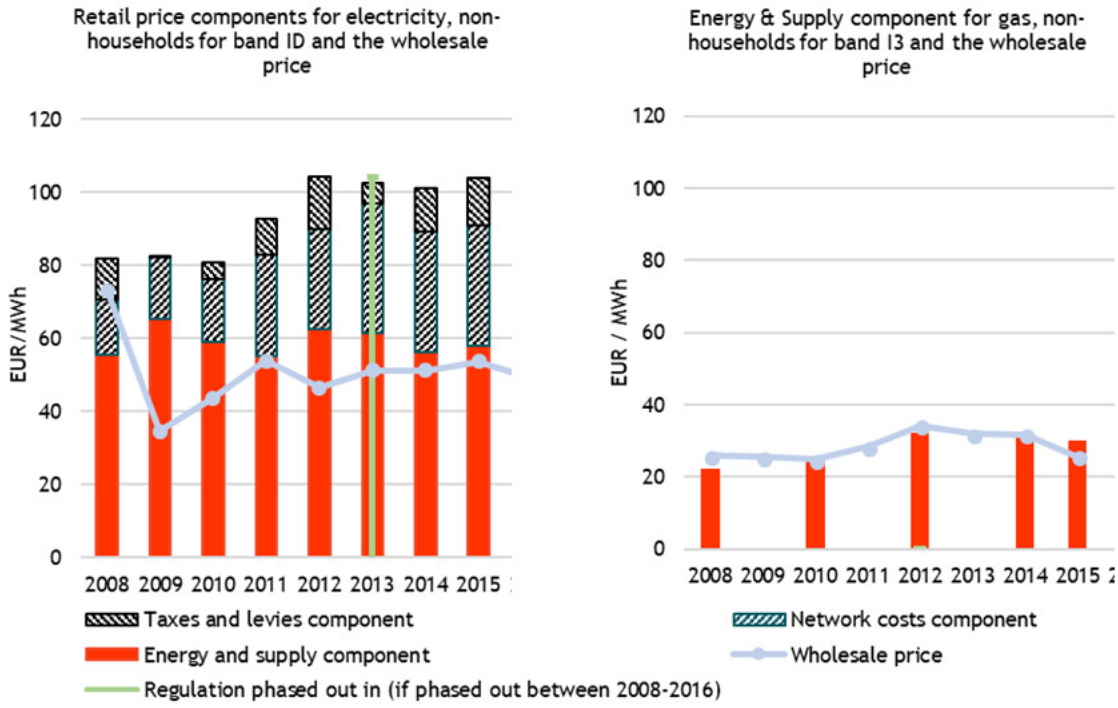

*Source: CEER data*

### *23.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

[528] ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016. Available from http://www.erse.pt/eng/international/euromarkets/Documents/Relat%C3%B3rio%20CE%202016_EN.pdf

**Figure 314 Industry retail price components for middle bands (ID and I3) and wholesale prices in Portugal**

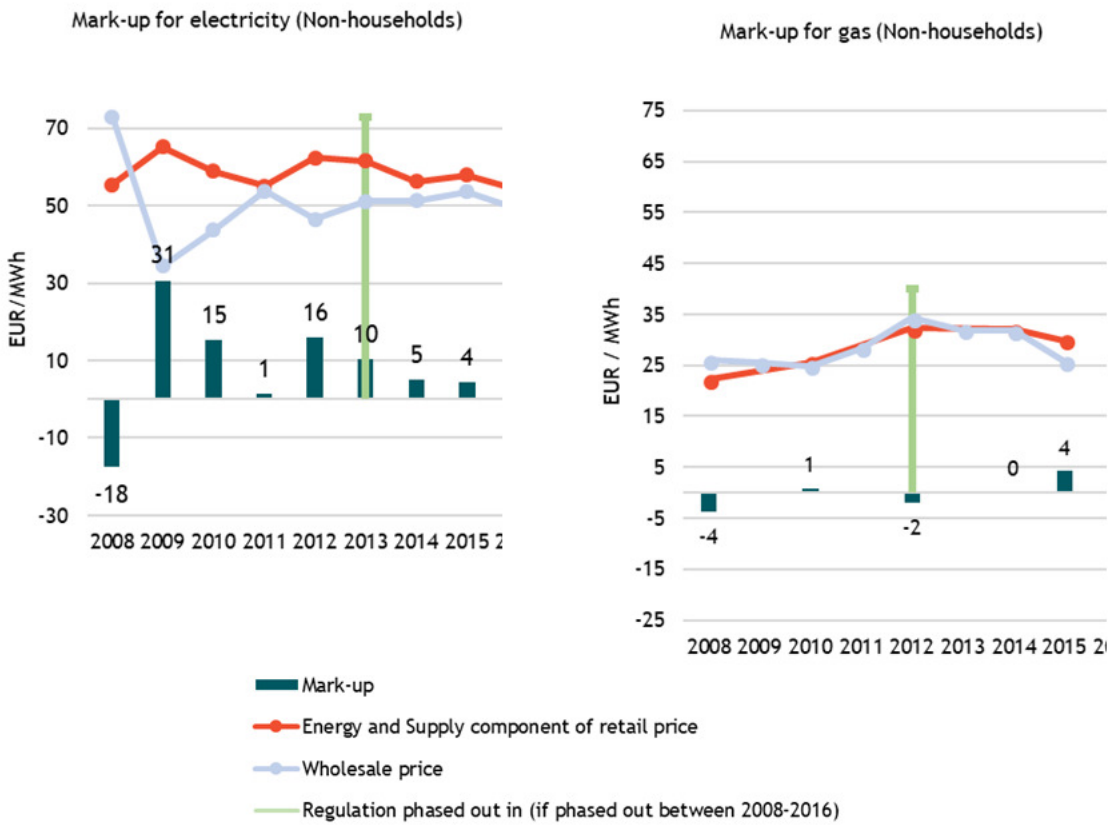



*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*
*Source: Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)*

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[529] The figures below show the mark-ups along with the wholesale price, also using data from the NRA. This indicates that mark-ups in Portugal were very low in comparison to other European Member States. Thus, mark-ups were consistently below 5% both for electricity and gas, and even negative at some moments. This could indicate a deficit on energy price components as discussed below for electricity.

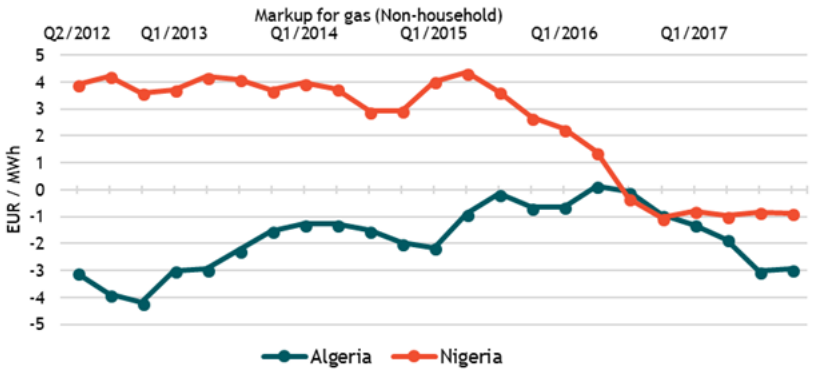
[529] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 315 Mark-ups for Portugal, middle consumption bands (ID and I3)**




*Note that ad hoc data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source: Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)*

**Figure 316 Mark-ups from two gas origins to non-households for Portugal, with NRA data**




*Source:* Private communication with ERSE (2018)

## 23.3 Tariff deficit in Portugal

**Portugal had a significant tariff deficit accumulated by 2017.**

In 2017, Portugal had a significant tariff deficit and had already accumulated a debt due to past deficits. All deficits incurred until 2020 can be recovered through the GUoS (Global Use of the System) tariff[530]. The continuation of the tariff deficit is explained by a cap on retail tariff increases, and the authorization to recover costs related to renewable electricity support and supplier of last resort obligations. Most of the tariff deficit debt is borne by the main Portuguese supplier, EDP, which unloads these from its balance sheet through securitization of the debt in the financial market[531]. While the analysis of mark-ups for the gas sector in Portugal does indicate negative mark-ups in the past, there is no indication of a tariff deficit for gas.

[530] ERSE (2017), Annual Report on the Electricity and Natural Gas Markets in 2016. Available from http://www.erse.pt/eng/international/euromarkets/Documents/Relat%C3%B3rio%20CE%202016_EN.pdf
The decree 78/2011 established the cost recovery mechanism. Available from https://dre.pt/pesquisa/-/search/670026/details/maximized

[531] EDP (2018), Results Presentation 2017. Available from https://www.edp.com/sites/default/files/portal.com/ye17_results_presentation_vf_1.pdf

# 24 Factsheet: Romania

This factsheet presents the findings for Romania for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 24.1 Household Price Regulation in Romania

**Romania still has energy price regulation for households in place for more than 5% of the consumers both for gas and electricity. However, Romania liberalised the gas and electricity markets in 2007 and implemented a roadmap for phasing out regulated prices in 2012. Although virtually all Romanian households are considered still regulated, an increasing share of their consumption was sourced from the liberalized market.**

The electricity and gas markets were liberalised for both household and non-household consumers on 1 July 2007, in accordance with Government Decision no. 638/2007.[532] With respect to end-user price regulation, Romania signed a Memorandum of Understanding with the European Commission on 13 March 2012 which commits Romania to gradually phase out price regulation on the electricity and gas market for non-household and household consumers.[533] For electricity household consumers, the roadmap provided for the elimination of the regulated tariffs by 31 December 2017.[534] For natural gas household consumers, in accordance with Law no. 123/2012 on electricity and natural gas, as amended and supplemented, the process of phasing out regulated prices ends in 2021. However, within the considered time period (between 2008 and 2016), **price regulation was still in place on both the electricity and gas markets for household consumers.**

Price regulation is under the responsibility of the Romanian Energy Regulatory Authority (ANRE). Regulated electricity prices are set and approved at the end of each year by ANRE. For 2016 this is defined by the provisions of the Methodology for establishing prices and tariffs applied by the suppliers of last resort to final consumers, approved by ANRE Order no. 92/2015.[535] ANRE sets regulated tariffs for the final consumers who did not exercise their eligibility right (i.e. choosing a market supplier). According to the electricity roadmap for phasing out regulated prices, the percentage of electricity purchased from the competitive market for final consumers who have not choose to change supplier increased from 0% to 100% in the period from September 2012 to 2014 for non-households and in the period from September 2013 to 2017 for households.[536] Starting from September 2012 (non-households)

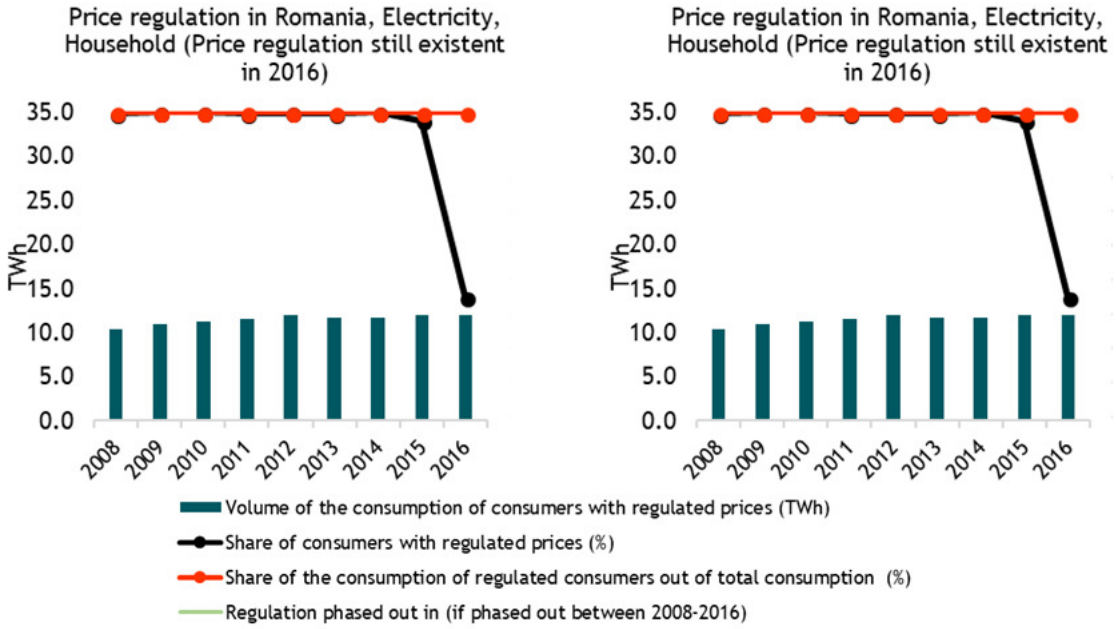
[532] ANRE (2014) Newsletter Fourth Quarter 2014. Available at: https://www.scribd.com/document/334465953/Romania-ANRE-Newsletter-Fourth-Quarter-2014-1
[533] Romanian Energy Regulatory Authority (2017) National report 2016. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Romania-EN.pdf/f91e100d-0e28-fd97-2c18-719d1993c1e1
[534] ANRE (2014) Newsletter Fourth Quarter 2014. Available at: https://www.scribd.com/document/334465953/Romania-ANRE-Newsletter-Fourth-Quarter-2014-1
[535] Romanian Energy Regulatory Authority (2017) National report 2016. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Romania-EN.pdf/f91e100d-0e28-fd97-2c18-719d1993c1e1
ANRE (2014) Newsletter Fourth Quarter 2014. Available at: https://www.scribd.com/document/334465953/Romania-ANRE-Newsletter-Fourth-Quarter-2014-1

and July 2013 (households), there are two tariffs on the electricity bill of the end-customers who did not exercise their eligibility right: a regulated tariff and a new tariff, referred to as the 'competitive market component' (CMC). The CMC differs from one area to another and is determined by the price paid by the supplier for purchasing electricity on the competitive market.

According to Law no. 123/2012 on electricity and natural gas, the natural gas sector in Romania consists of two segments: the competitive market (trading at wholesale level or retail level); and the regulated market (containing natural monopoly activities, related activities and supply at regulated tariffs and according to framework contracts). In the regulated market, final prices and tariffs systems are established by ANRE.[537]

Figure 1 confirms the situation on price regulation for household consumers in Romania. Even though price regulation was still existent in 2016, the share of consumers under regulated prices has decreased marginally since 2014, with the share of consumers under regulated prices decreasing to 97% in the electricity market and around 98% in the gas market. This is explained by the fact that following the Romanian roadmap to phase out regulated prices the electricity supplied to households had a dual structure combining regulated and deregulated prices, so that practically all consumers are still considered regulated. By the end of 2017, 100% of the electricity supplied to households should be without price regulation.[538] Figure 2 presents the regulated shares for electricity considering this combination of regulated and unregulated prices, using data from the NRA.

**Figure 317 Household price regulation in Romania from 2008 to 2016**

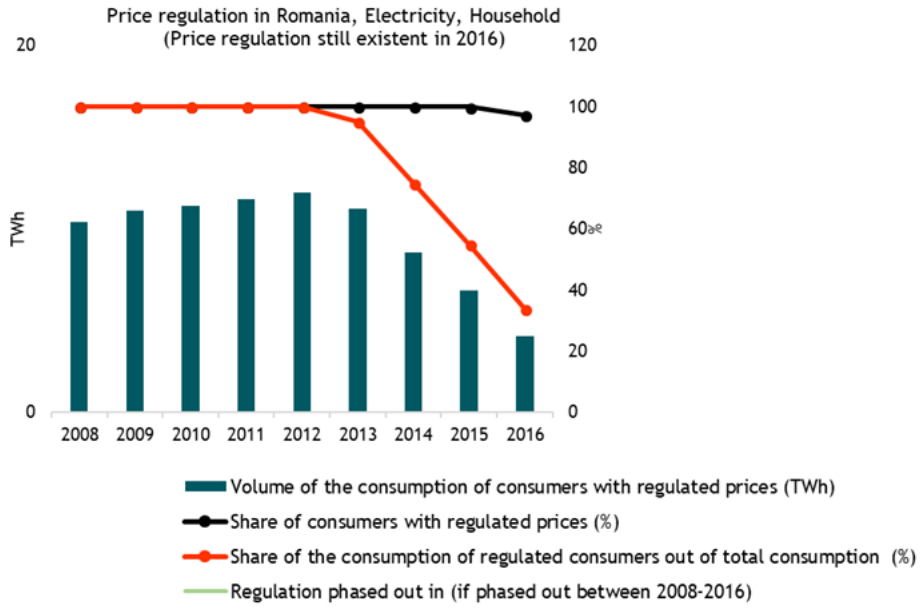



*Source:* CEER data

[537] Romanian Energy Regulatory Authority (2015) National report 2014. Available at: https://www.ceer.eu/eer_publications/national_reports/national_reporting_2015/-/document_library_display/35oiTkPsE0q7/view_file/3737549

[538] Private communication with the NRA (2018) and roadmap for phasing out regulated prices. Available at http://www.anre.ro/ro/cauta?s=foaie+de+parcurs

**Figure 318 Household price regulation in Romania from 2008 to 2016**




*Source:* CEER and NRA data

### *24.1.1 Social tariffs*

Social tariffs exist only for the electricity market. In accordance with the "Procedure regarding terms and conditions for granting the social tariff to electricity household consumers", approved by ANRE Order no. 38/2005 as amended and supplemented, vulnerable consumers[539] with average monthly income per family member less than or equal to the minimum wage set by Government Decision have the right to apply for the social tariff.[540] However, social tariffs were abolished as of July 2018.[541]

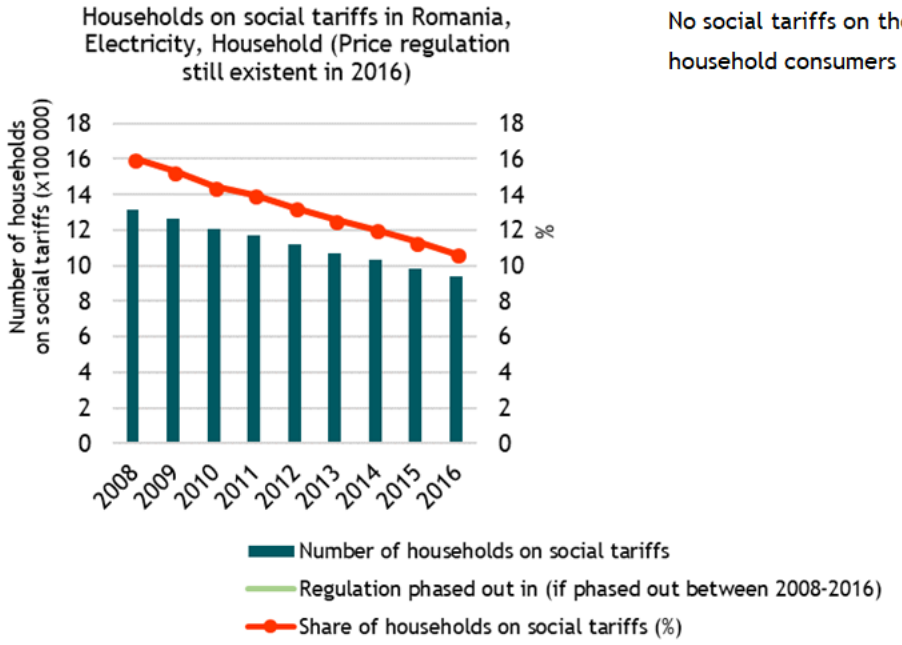
Figure 3 shows that the share of households on social tariffs has decreased from 16% in 2008 to 10% in 2016.

**Figure 319 Household social tariffs in Romania**

[539] Defined by Law no. 123/2012 on electricity and natural gas as final consumers being part of a household group that, for reasons of age, health or low income, are at risk of social exclusion, and in order to prevent this risk, benefit from social protection measures, including financial ones.

[540] Romanian Energy Regulatory Authority (2017) National report 2017. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Romania-EN.pdf/f91e100d-0e28-fd97-2c18-719d1993c1e1

[541] Private communication with the regulator ANRE (2018).

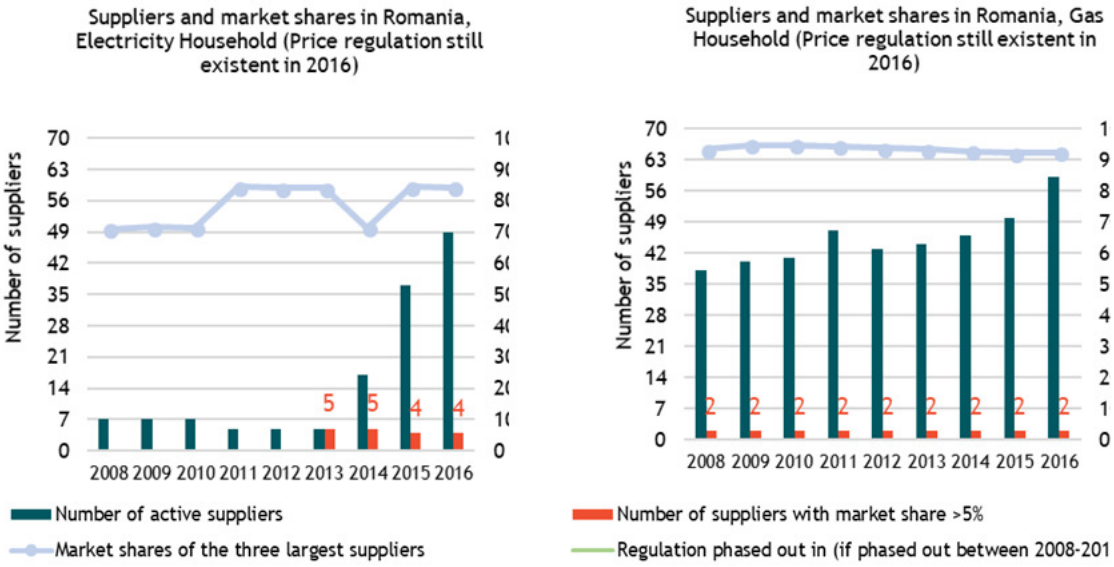



*Source:* CEER data

### *24.1.2 Selected aspects of competition*

For electricity and gas (in households), we see that the three largest suppliers have had over 70%, respectively 90% of the market consistently over the last years. The number of suppliers on the electricity market increased between 2008 and 2010, decreased in 2011, and increased between 2012 and 2014. The drop in 2015 is explained because before then the total number of suppliers (licensed, active or not) was reported. On the gas market, the number of active suppliers shows an increasing trend from 2008 to 2016. However, the market power of the three largest suppliers remains relatively high.

**Figure 320: Number of suppliers and market shares in Romania**



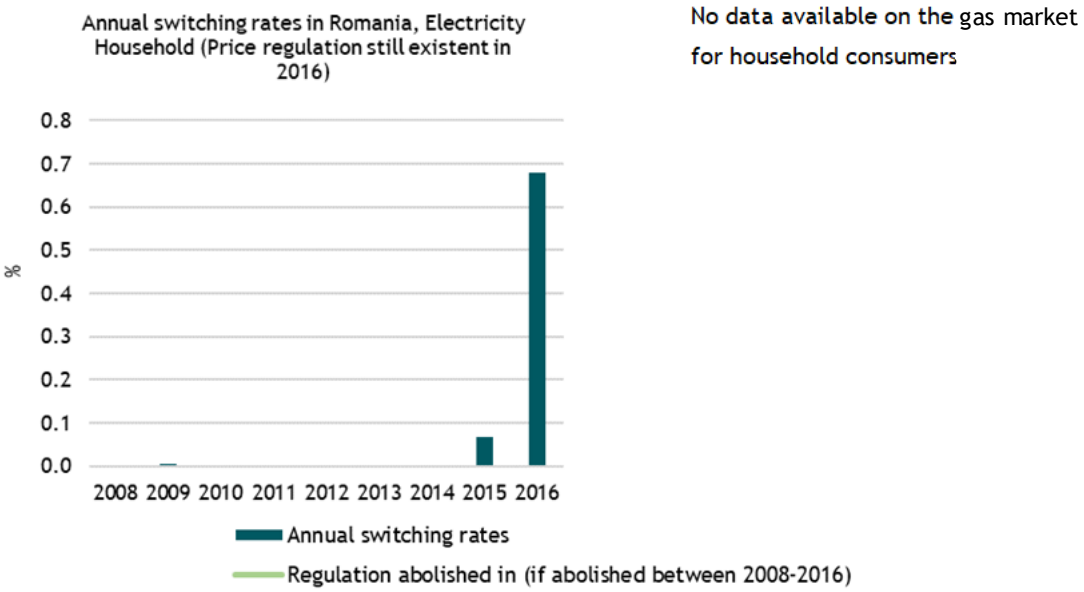

*Note: Data on the number of electricity suppliers with market shares >5% is only available from 2013 onwards.*

*Source:* CEER data

### Consumer engagement and expenditures on energy

The figure below shows the annual switching[542] rates in households for electricity, which increased only slightly after 2014, reaching 0.7% in 2016. Prior to those years, switching rates were practically zero. ANRE, reports on switching rates for household and non-household electricity consumers, showing a clear increase trend in the past 8 years.[543] The difference is explained by differences in the potential base for switching (eligible meter points for CEER and consumption sites for the NRA).[543,544]

**Figure 321 Annual switching rates for households in Romania**



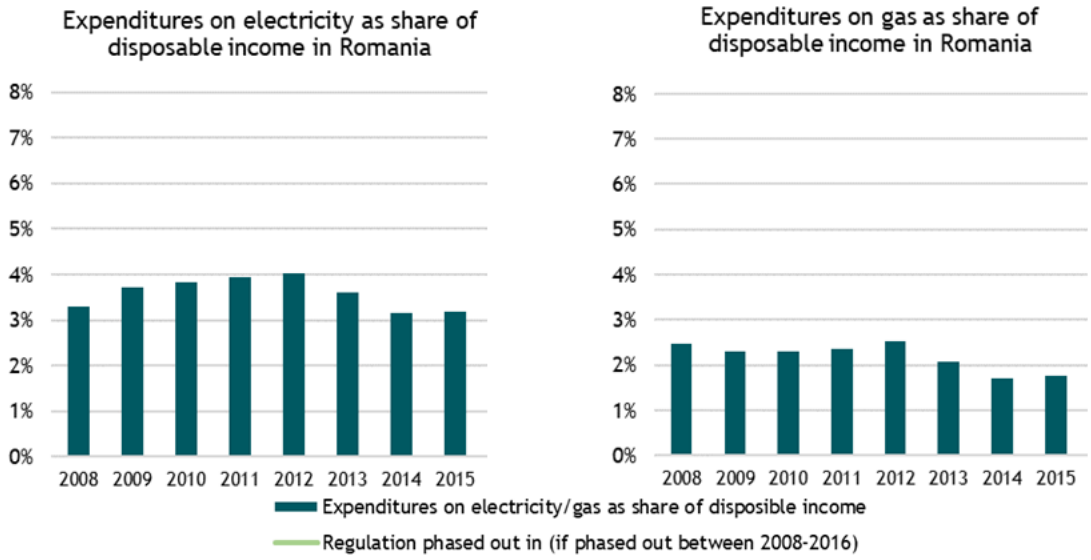

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures (figure 6), the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[545] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20 GJ and 200 GJ per year).[546] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Romania. After an increase from 2008 to 2012, the share of disposable income spent on electricity decreased between 2012 and 2015. Similarly, from 2012 to 2015 there has been a decrease in the expenditure on gas as a share of disposable income. Even though disposable incomes are generally lower in Romania than the EU average, the share of disposable income spent on energy is relatively close to the EU average. It should also be noted that the relative energy expenditures decreased from 2013 onwards, while the energy

[542] Switching is defined as the voluntary action by which a customer changes his supplier
[543] Romanian Energy Regulatory Authority (2017), National report 2016. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Romania-EN.pdf/f91e100d-0e28-fd97-2c18-719d1993c1e1
[544] Private communication with the regulator ANRE (2018).
[545] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)
[546] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

and supply component of the retail electricity and gas price increased. The decrease in the relative energy expenditures was driven by a sharp increase in the disposable income (which outweighed the increase in retail energy prices).

**Figure 322: Expenditures on gas and electricity as share of disposable income for households in Romania (for middle consumption bands DC and D2) using PPS prices[547]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

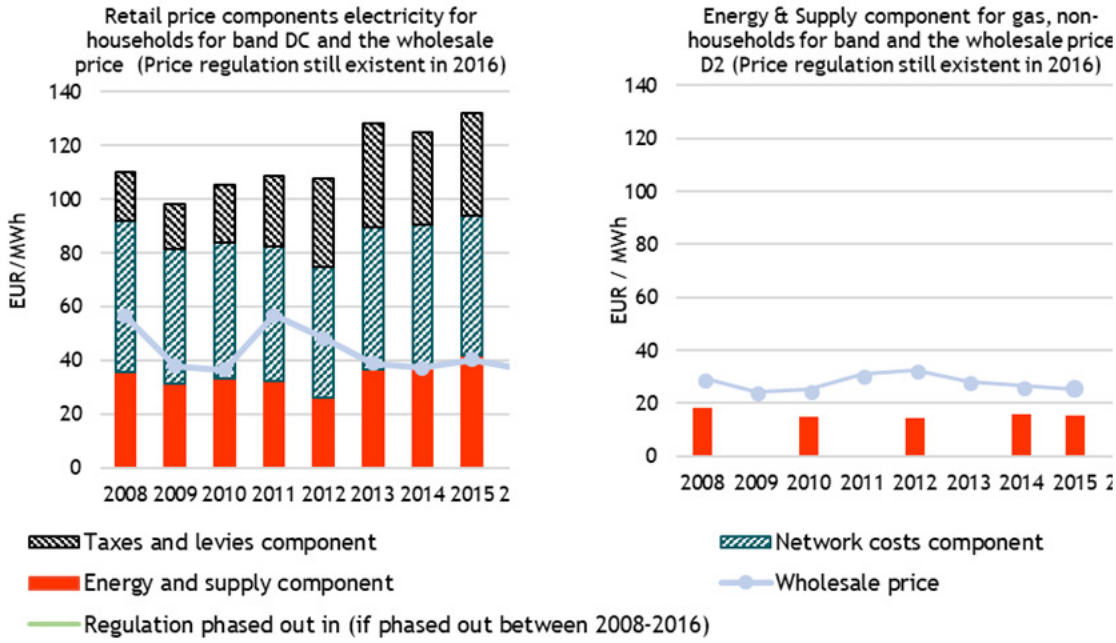
*Source:* Own calculations[548] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. For Romania, the energy component of electricity retail prices varied close to the wholesale price in 2013-2015, but often in opposite directions and ended slightly higher than the wholesale price in 2016. For gas, the energy component has been consistently lower than the wholesale price since 2008, possibly due to the fact that wholesale prices for natural gas from domestic production are significantly lower, under 20 €/MWh. [549] It should also be noted that there appears to be little correlation between the energy and supply component of the retail prices and the wholesale prices in Romania.

[547] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).
[548] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.
[549] Private communication and Romanian Energy Regulatory Authority (2017), National report 2016. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Romania-EN.pdf/f91e100d-0e28-fd97-2c18-719d1993c1e1

**Figure 323 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Romania**



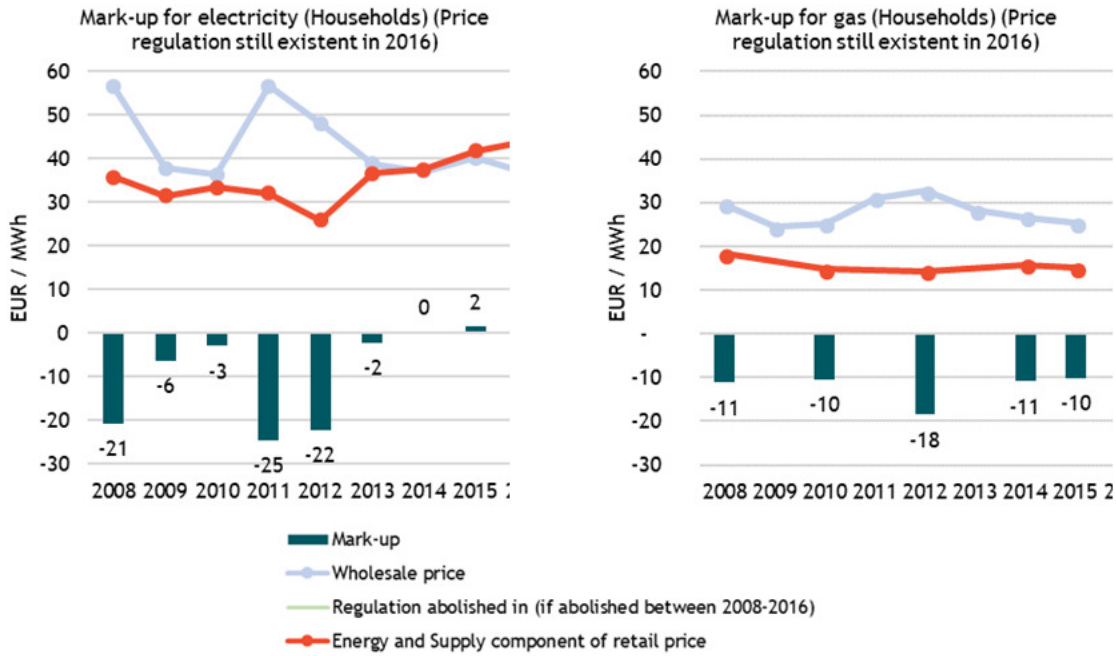

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[550] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[551] The figures below show the mark-ups along with the wholesale price. For electricity, mark-ups were negative until 2013, then increased to 7 EUR/MWh in 2016. For gas, data is missing for 2016. In all other years however, negative mark-ups are disclosed. Compared to other EU Member States, Romania shows many years with large negative mark-ups.

[550] Eurostat has data available on gas prices; however not for the energy and supply component.
[551] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 324 Mark-ups for Romania, middle consumption bands (DC and D2)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

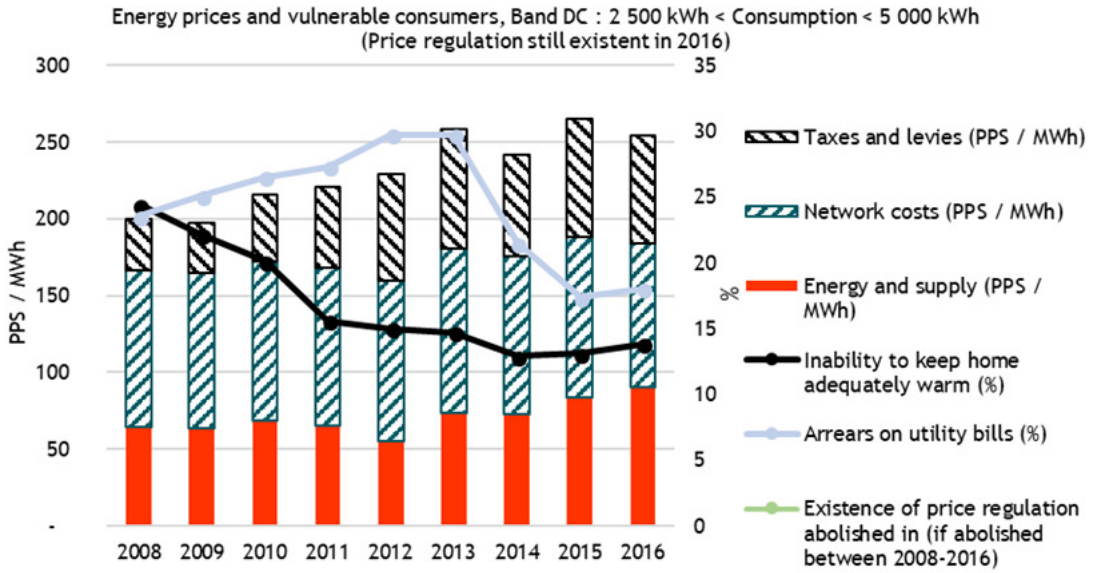
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### *24.1.3 Energy poverty*

Figure 9 shows that the share of the population in Romania with arrears on their utility bills has decreased significantly since 2014. The share of consumers unable to keep their home adequately warm shows a decreasing overall trend since 2008. Both indicators suggest that the share of vulnerable consumers has decreased over the considered period.

Figure 325 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Romania




*Source:* Eurostat

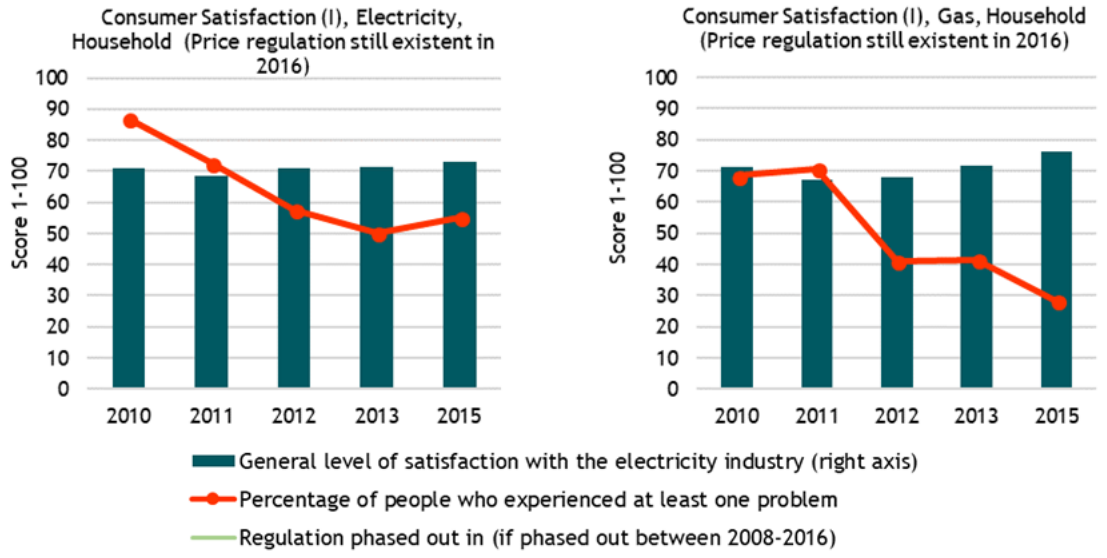
### *24.1.4 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The general level of consumer satisfaction with the electricity and gas markets has increased over time, after a decrease from 2010 to 2011. Also, less consumers experienced at least one problem. Both indicators suggest that the level of consumer satisfaction has increased on both the electricity as well as the gas market. However, compared to other EU Member States, the level of satisfaction remains relatively low.

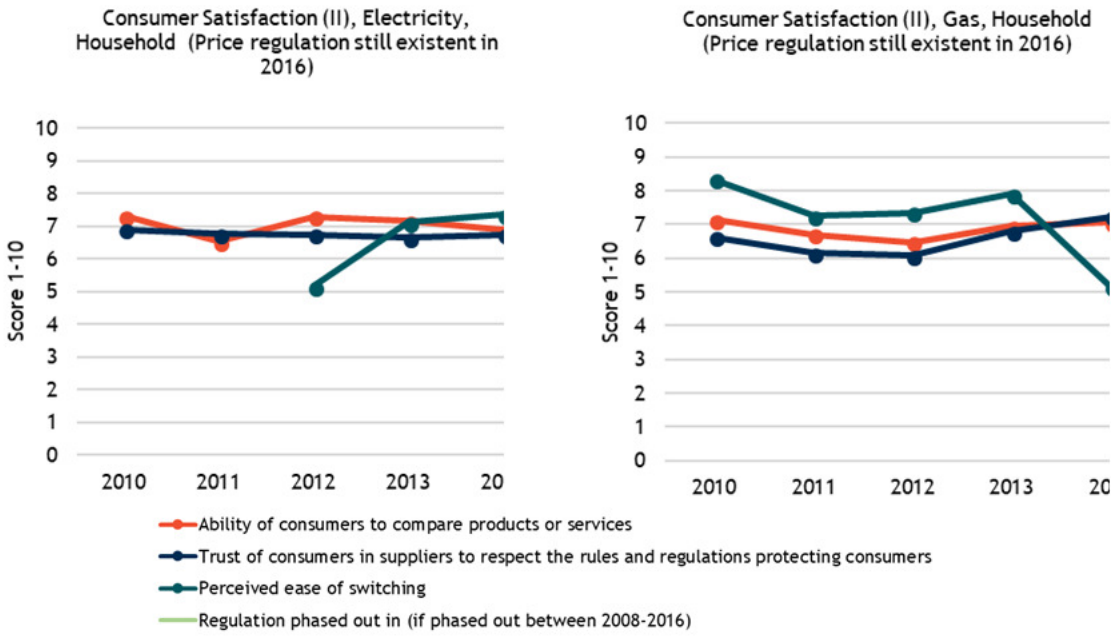
**Figure 326 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Romania for households**



*Source:* EC – DG Justice[552]

The graphs below show that, for both electricity and gas, the ability of consumers to compare products or services has been stable over time (with a score of around 7 on a scale from 1 to 10). For electricity, the perceived ease of switching increased from 2011 to 2015 (after a sharp decrease in 2011 compared to 2010). For gas, the perceived ease of switching declined between 2013 and 2015.

**Figure 327 Ability of consumers to compare products or services[553], trust of consumers in suppliers[554] and perceived ease of switching[555] in Romania**




*Data on the perceived ease of switching between electricity suppliers is only available after 2011*

*Source:* EC – DG Justice

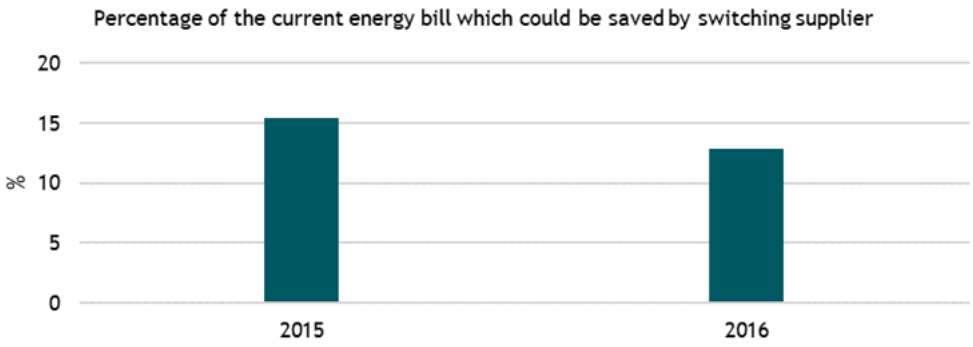
## Consumer choice

No data is available on the specific type of contracts and consumer choice for Romania.

As shown in figure 12, consumers could have saved up to 15% of their electricity bill by switching between suppliers.

[552] Note that from 2013 onwards, the survey was carried out every other year.
[553] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[554] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[555] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

Figure 328 Percentage of the current electricity bill which could be saved by switching supplier in Romania

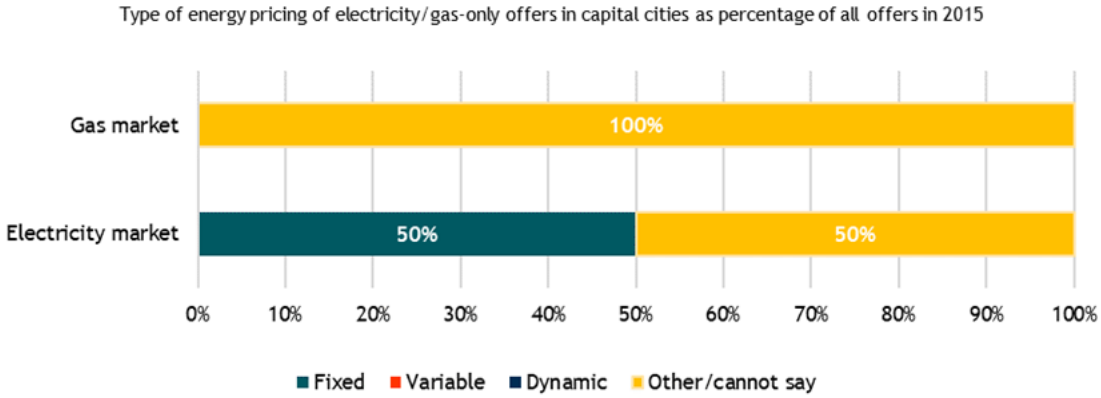



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas.

Figure 329 Type of offers for households in Romania




*Note: Spot-based contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

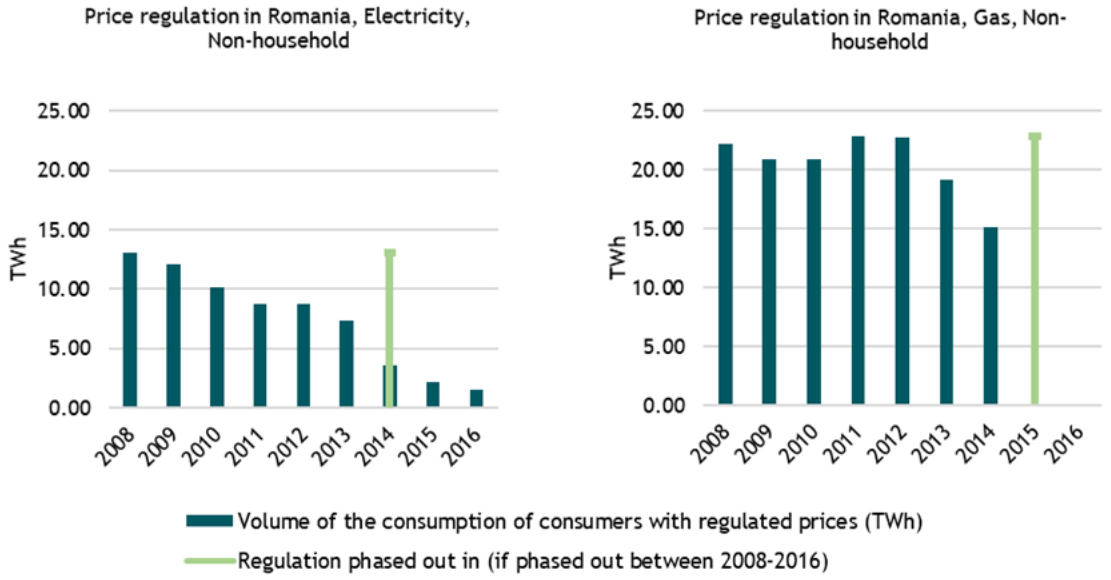
## 24.2 Non-Household Price Regulation in Romania

**Romania phased out energy price regulation for non-households starting from 2014 for electricity and 2015 for gas. However, a small portion of consumers still had regulated prices for electricity after this.**

End user price regulation for non-household consumers of electricity ended in 2014, although in the 2014-2016 period there was a small share of non-household consumption which was sourced by the supplier of last resort and universal regime. This share reached 4.2% in 2016. From 2015 onwards, end-user gas price regulation for non-household consumers was abolished.[556]

[556] Romanian Energy Regulatory Authority (2017) National report 2016. Available at: https://www.ceer.eu/documents/104400/5988265/C17_NR_Romania-EN.pdf/f91e100d-0e28-fd97-2c18-719d1993c1e1

Figure 330 Non-household price regulation in Romania from 2008 to 2016



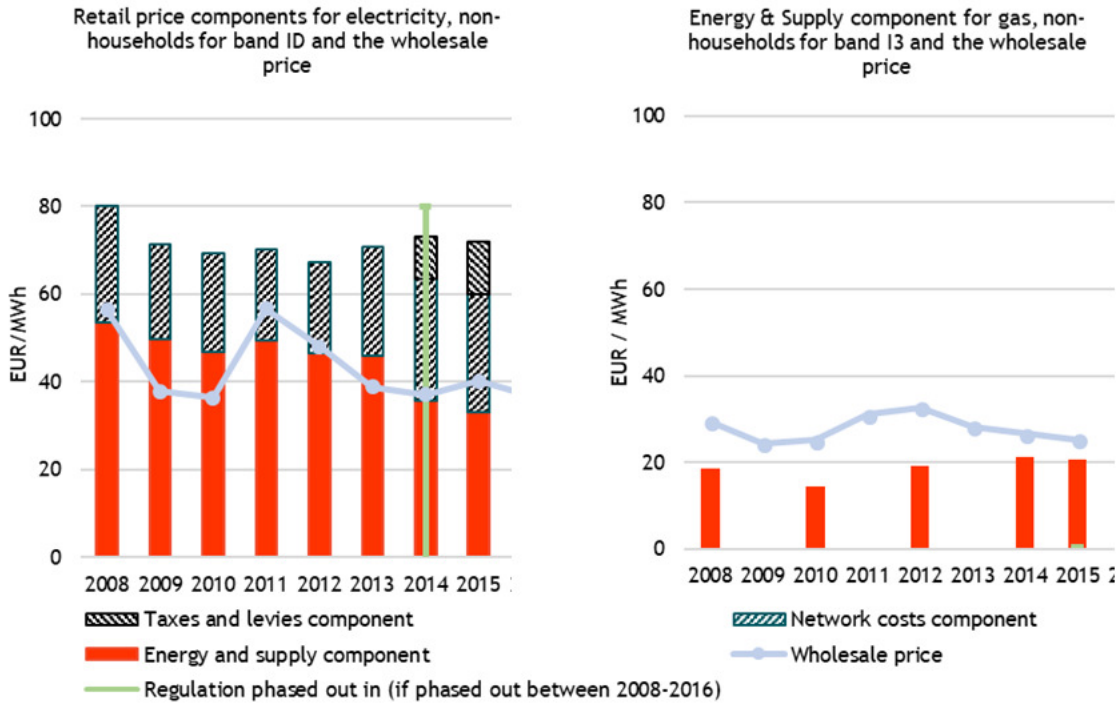

*Note that from 2015 onwards, consumption under regulated prices equalled zero*

*Source:* CEER data

### 24.2.1 Selected aspects of competition (mark-ups)

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. In the first panel of figure 15, one can see that after price deregulation, the tax and levies component was separated from the network one for non-household electricity consumption.

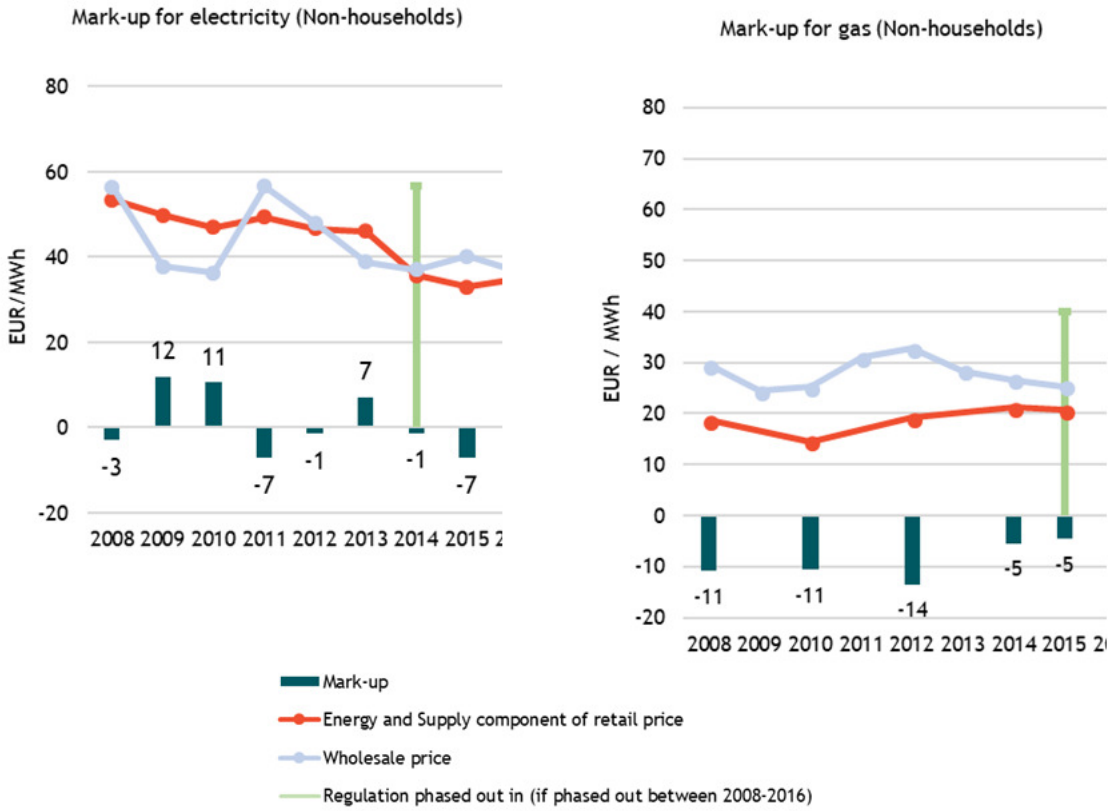
Figure 331 Industry retail price components for middle bands (ID and I3) and wholesale prices in Romania



*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[557] The figures below show the mark-ups along with the wholesale price. For electricity, mark-ups were positive only in 2009, 2010 and 2013. For gas, negative mark-ups are observed in all years, but the difference between the wholesale price and retail energy price component decreased in 2014 and 2015 compared to previous years.

**Figure 332 Mark-ups for Romania, middle consumption bands (ID and I3)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

[557] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

## 24.3 Tariff deficit in Romania

**Romania had a potential tariff deficit during the assessed period.**

The negative mark-ups which were realised on the gas and electricity market for household and non-household consumers hint at possible tariff deficits. Tariff deficits are shortfalls of incomes of energy systems as the energy prices (which can be regulated) are not high enough to cover the costs[558]. In 2014, the European Commission categorised Romania as a Member State which could have faced tariff deficits as a result of the financial performance of the regulated companies[559]. In the same report, the European Commission argues that the regulated prices were set too low in Romania. On the electricity market for household consumers, the retail prices have increased lately. This resulted in positive mark-ups which suggest that tariff deficits are turning less problematic in Romania on the electricity market for household consumers. It can, however, not be concluded that price deregulation has completely solved the problem of tariff deficit. Even though price regulation was abolished on the gas and electricity market for non-household consumers, negative mark-ups are still present if wholesale prices for imported natural gas are considered.

[558] http://ec.europa.eu/economy_finance/publications/economic_paper/2014/ecp534_en.htm

[559] European Commission (2014) Electricity Tariff Deficit: Temporary or Permanent Problem in the EU? Available at: http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp534_en.pdf

# 25 Factsheet: Sweden

This factsheet presents the findings for Sweden for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 25.1 Household Price Regulation in Sweden

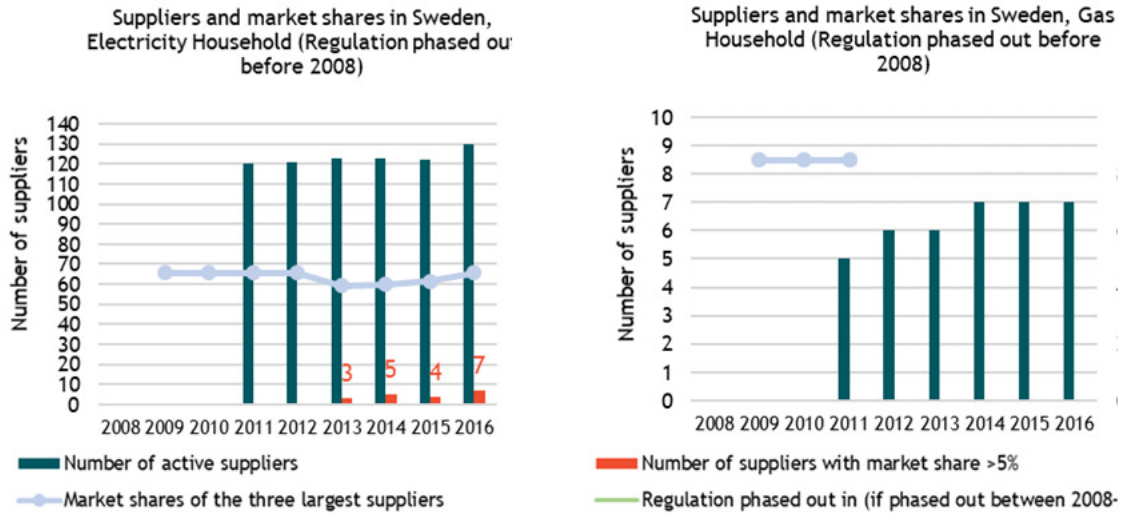
**Sweden had no energy price regulation for households in the period assessed.**

Household price regulation is not a concern for the Swedish electricity or gas markets. In fact, the Swedish electricity market went through a process of deregulation in 1996,[560] and the gas market was deregulated in 2005 as a result of the EU's Second Energy Package.

### *25.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest gas suppliers have had over 80% of the market consistently between 2009 and 2011. Data on the three largest suppliers is not available for the rest of the timeframe for gas. For electricity, it has remained around 40%. At the same time, there has been a constant increase in the number of active suppliers in both markets.

**Figure 333: Number of suppliers and market shares in Sweden**




*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards for the electricity market and not available for the gas market. The market shares of the three largest suppliers on the gas market is only available between 2009 and 2011. Data on the number of active suppliers is only available from 2011 onwards.*

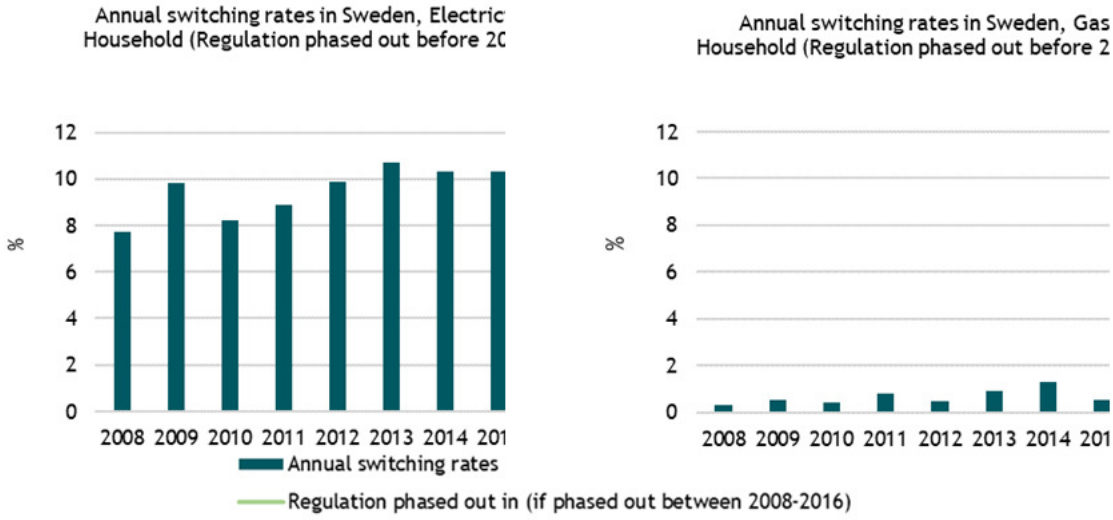
*Source:* CEER data

[560] https://www.sns.se/wp-content/uploads/2005/09/sos_elmarknad_2005_eng.pdf

### Consumer engagement and expenditures on energy

The figures below show the annual switching[561] rates in households for both electricity and gas. For the electricity market, other than the 2009 spike, there has been a gradual increase leading up to 2013, followed by a subsequent gradual decrease. The apex of this increase was in 2013, where the annual switching rate in Sweden was just over 10%. For the gas market the switching rate has been more sporadic. However in general there has been a consistent increase one year and decrease the next. The only exception for this was in 2014 which continued a two-year trend of increased prices and led to the peak of the annual switching rate for household gas at around 1.3%. It is therefore important to note that the switching rate for the gas market at its peak in 2014 was exceptionally less than the electricity market at its trough in 2008. This might be explainable from the relative longevity of the liberalised electricity market compared to the gas market in Sweden.

**Figure 334 Annual switching rates for households in Sweden**




*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[562] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[563] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Sweden. As shown in Figure 3, there was a small increase from 2008-2010 in the percentage of the disposable income required for electricity and gas (although gas expenditures are marginal). However this led to a decline from 2010-2014, a

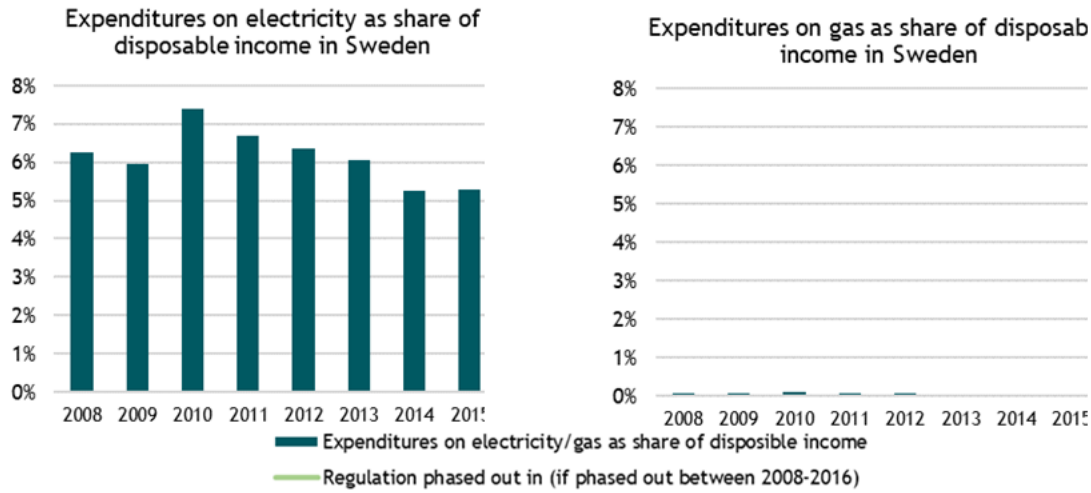
[561] Switching is defined as the voluntary action by which a customer changes his supplier

[562] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[563] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

levelling out in 2015, and a small increase in 2016. On the basis that both markets show similar fluctuations, it seems that they were influenced by the economic conditions of Sweden. This trend doesn't seem to directly align with the overall disposable income fluctuations in Sweden during the same time period, as reported by OECD.[564]

**Figure 335: Expenditures on gas and electricity as share of disposable income for households in Sweden (for middle consumption bands DC and D2) using PPS prices[565]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[566] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Sweden, the efficiency of retail competition for the electricity market is much lower than in the gas market. There was high point of this inefficiency was in 2015, with an almost 90% difference between the wholesale price and the retail price of components. This is a drastic change compared to the roughly 65% difference in 2008. For gas the differences are considerably lower ranging between c.15-40%, the largest taking place in 2010 and 2014, with the lowest being in 2012. The steady consumer costs for gas have been that way since 2007 and the deregulation of natural gas.[567]

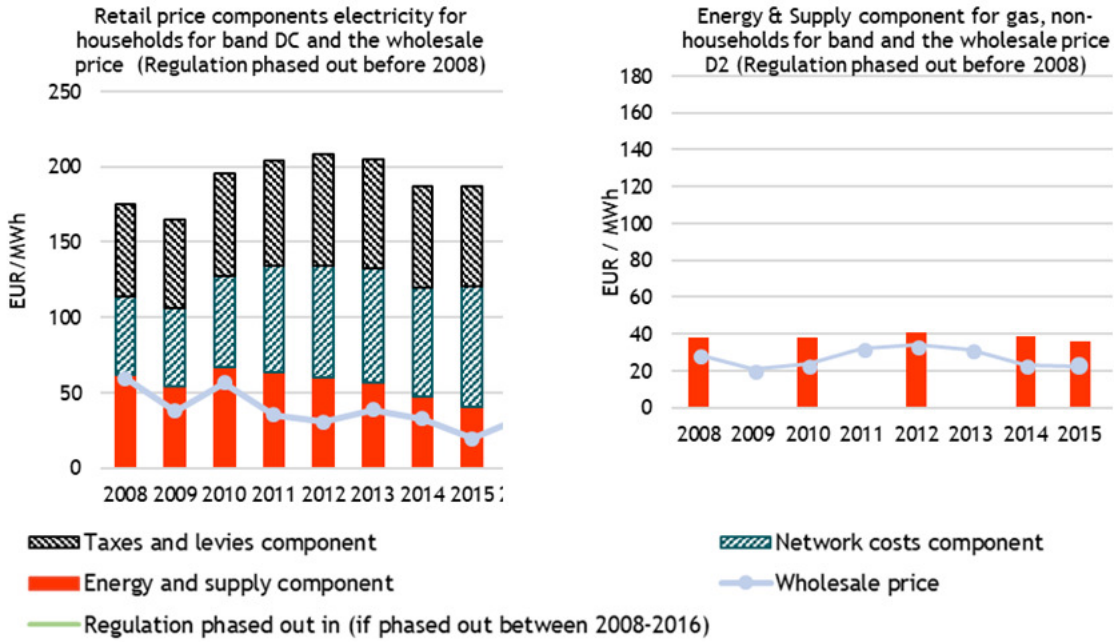
[564] https://data.oecd.org/hha/household-disposable-income.htm

[565] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

[566] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

[567] CEER (2017), The Swedish Electricity and Natural Gas Market 2016

**Figure 336 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Sweden**



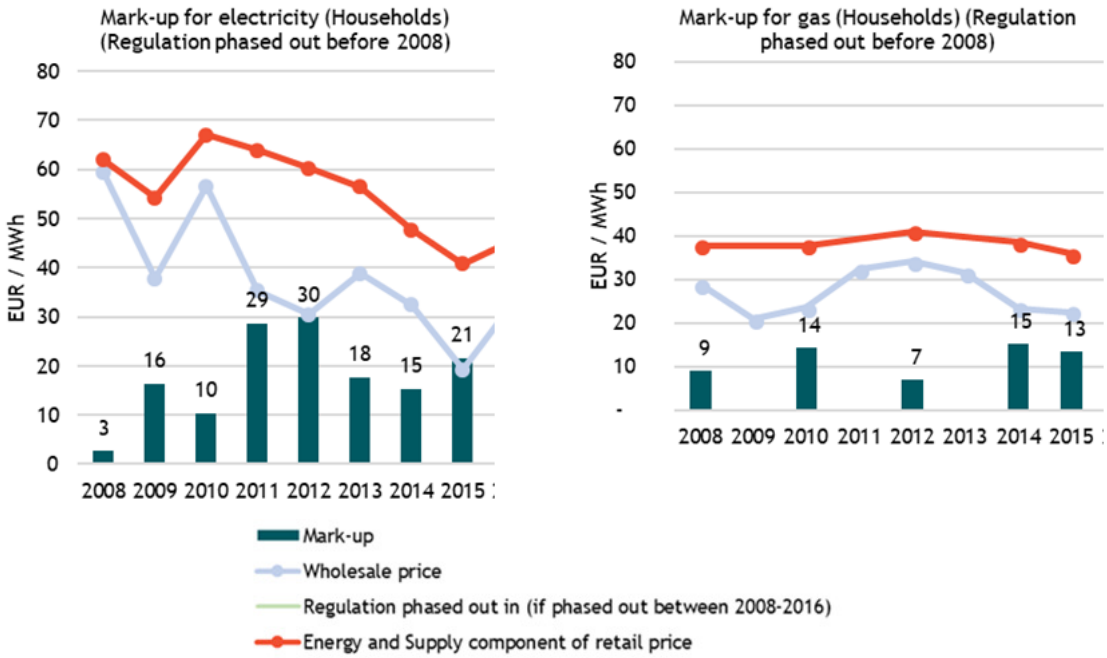

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[568] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[569] The figures below show the mark-ups along with the wholesale price. For the electricity market there has been a broad decrease in both the retail energy price component and the wholesale price, other than the sharp spike in 2010 and the smaller increase in 2016. However up to 2012, the mark-up between the two grew to 30% with wholesale prices falling more rapidly than the retail energy price component. This levelled out more in 2013 and 2014 at a mark-up of 18% and 15% respectively. 2015 saw another steep decline in the wholesale price increasing the mark-up slightly to 21%, but this was again reduced to 12% the next year. For gas the retail price component remained relatively consistent, other than a slight increase in 2012 and then a minimal dip in 2015. The wholesale value, however, had two large dips in 2009 and 2015, and an apex in 2012. The lowest mark-up was therefore in 2012 at 7%, whereas the highest was in 2014 at 15%.

[568] Eurostat has data available on gas prices; however not for the energy and supply component.
[569] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 337 Mark-ups for Sweden, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

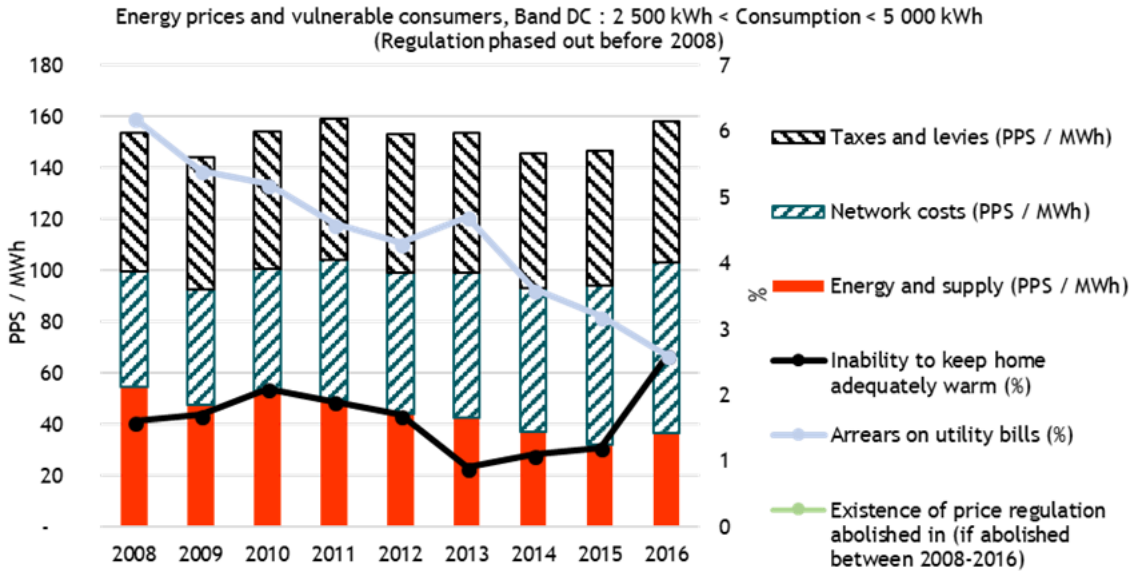
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

### *25.1.2Energy poverty*

The number of consumers in Sweden who are potentially suffering from energy poverty has been decreasing over time, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm. However the inability to adequately warm the home statistic had an increase in 2016 from around 1.5% (in 2015) to 2.2%. The reduced percentage of consumers with arrears on their utility bill may be indicative of the steady decline in the energy retail price component.

**Figure 338 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Sweden**




*Source:* Eurostat

In Sweden there are no social tariffs to support the consumption of energy to vulnerable consumers. However there are provisions in both the Electricity Act and the Natural Gas Act that protect consumers who are at risk of being disconnected from the electricity or natural gas networks as a result of unpaid bills or other significant breaches of contract. Furthermore "vulnerable customers", defined by EI as "persons who lack the ability to pay for the electricity or natural gas which is transmitted or delivered to them for purposes which fall outside of the scope of business activities", are eligible to receive financial assistance to cover their electricity and natural gas needs. [570] The Swedish regulator estimated that there are around 20,000 vulnerable consumers in Sweden. EI has previously estimated that around 20,000 consumers are included in the Swedish definition of the term.

### *25.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

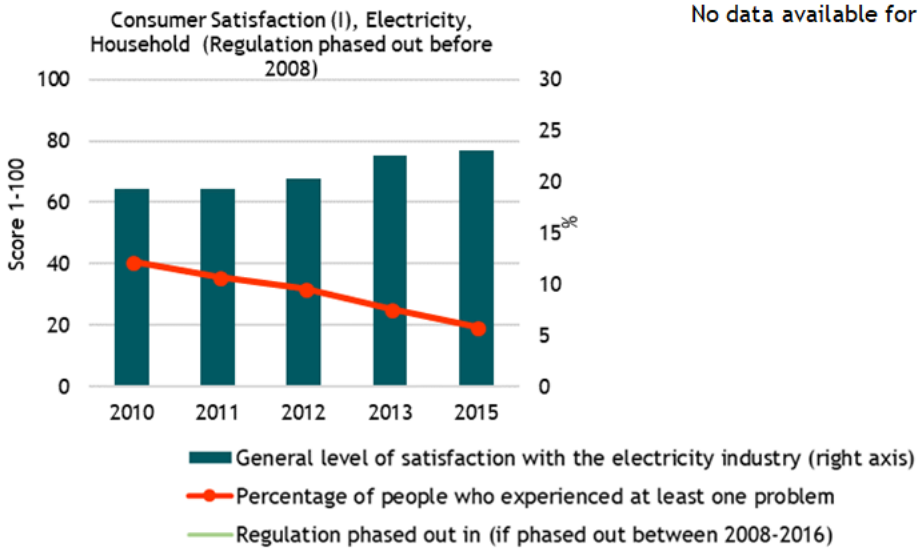
#### Consumer satisfaction

In Figure 7 the level of consumer satisfaction is illustrated with the energy industry for electricity. In Sweden it is clear that customers are largely satisfied with the industry with the satisfaction score being around 75 and 76 in 2013 and 2015 respectively. Furthermore the percentage of people that experience problems with the electricity industry has decreased between 2010 and 2015, from around 12% to under 6% of consumers. These two trends highlight that Swedish consumer satisfaction within the electricity industry is only increasing. Figure 8 supports this insight, highlighting the high levels of consumer trust in suppliers respecting consumer protection law and regulation. Furthermore, consumers perceive that it is easy to switch between providers, with scores for this statistic remaining high through 2010 to 2015 period. Lastly Swedish consumers have had a relatively moderate ability to compare products and services for the electricity market. These factors further justify the high consumer satisfaction presented in Figure 7.

[570] CEER (2017), The Swedish Electricity and Natural Gas Market 2016; Insight_E (2015), Energy poverty and vulnerable consumers in the energy sector across the EU: analysis of policies and measures

**Figure 339 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Sweden for households**

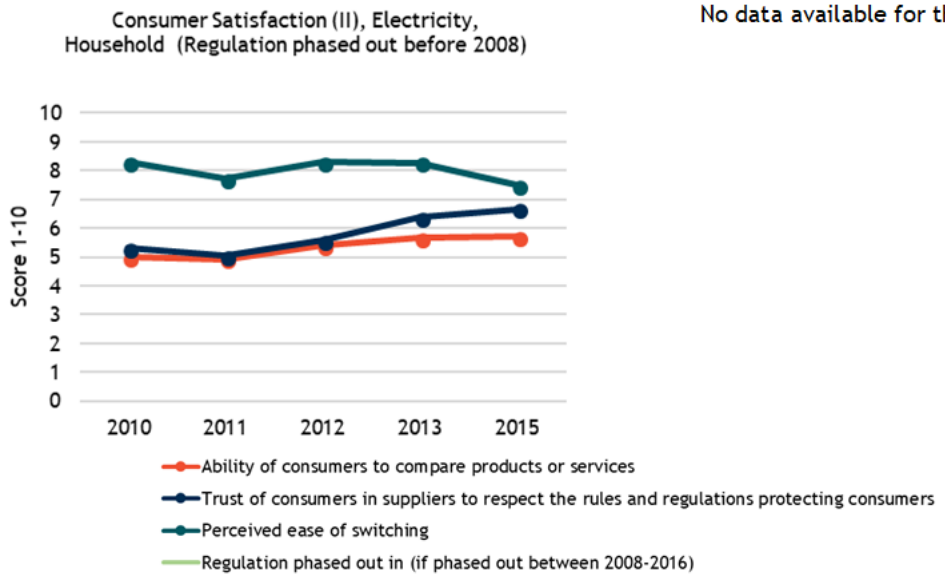
No data available for the gas market




*Source:* EC – DG Justice[571]

**Figure 340 Ability of consumers to compare products or services[572], trust of consumers in suppliers[573] and perceived ease of switching[574] in Sweden**

No data available for the gas market




*Source:* EC – DG Justice

[571] Note that from 2013 onwards, the survey was carried out every other year.
[572] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[573] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[574] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

### Consumer choice

The table below provides an overview of key indicators regarding consumer choice. The table highlights the mature level of development in the Swedish electricity market for households. It meets 4 out of the 5 criteria presented below, while dual offers are not available because the gas market is very limited, most households using exclusively electricity. This has been demonstrated with EI's 2008 launch of an online electricity price comparison site, to enable consumers the compare all Swedish supplier options. Furthermore in 2009 DSOs were obliged to carry out monthly meter readings, which led to a full distribution of smart meters to be installed across Sweden.[575]

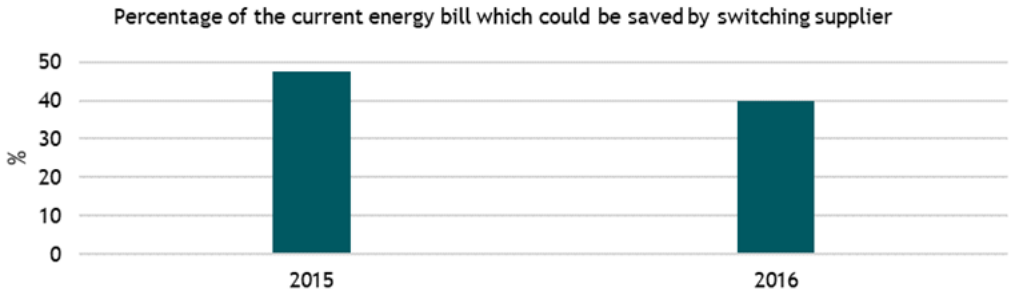
**Table 25-1 Consumer choice in Sweden (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 | No |
| Certified green offers available in 2015 | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) | Yes |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

**Figure 341 Percentage of the current electricity bill which could be saved by switching supplier in Sweden**



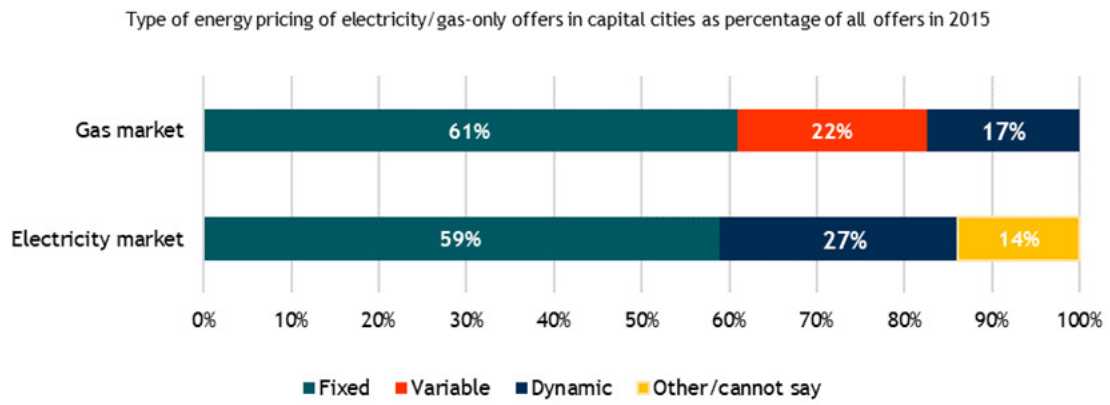

*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, most of which are Fixed.

[575] European Commission (2014), EU Energy Markets in 2014

Figure 342 Type of offers for households in Sweden




*Note: Spot-based contracts are a type of variable contract but presented separately.*

*Source:* ACER/CEER (2015)

## 25.2 Non-Household Price Regulation in Sweden

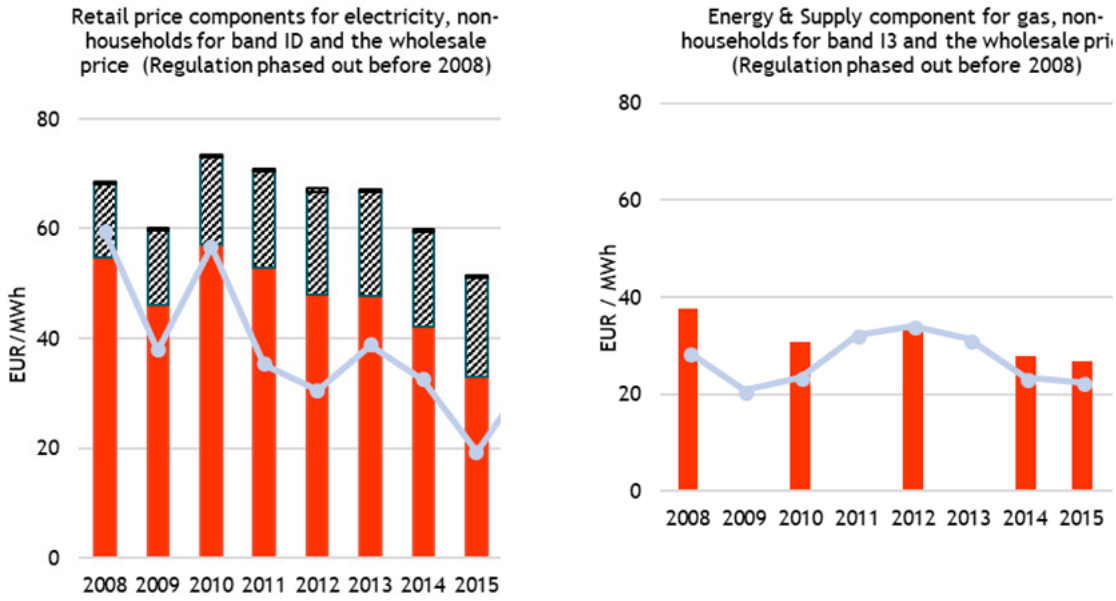
**Sweden had no energy price regulation for non-households in the period assessed.**

Once again, as mentioned for household price regulation the Swedish energy market was deregulated in 1996 for electricity, and in 2005 for gas. Therefore there are no non-household price regulations in Sweden.

### *25.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices.

Figure 343 Industry retail price components for middle bands (ID and I3) and wholesale prices in Sweden

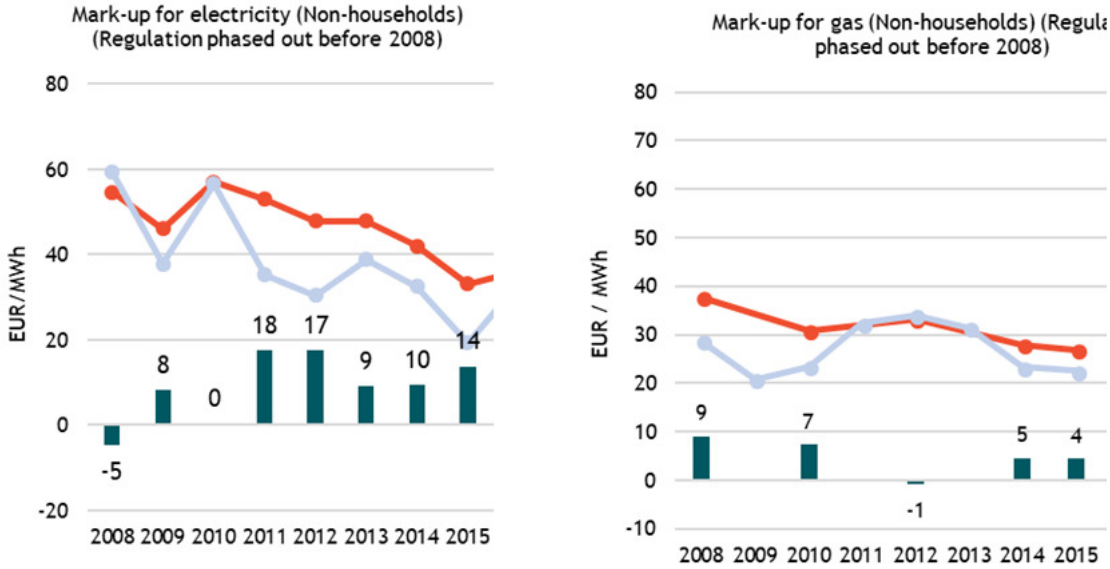



*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

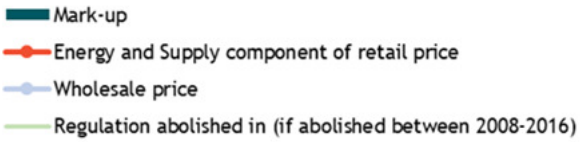
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[576] The figures below show the mark-ups along with the wholesale price. The mark-ups have been much lower for both electricity and gas in the non-household sector. For electricity, other than the 2010 spike, there was a steady decline in the retail price component. Similarly to the household sector, the mark-up for electricity had the largest increases due to rapid decreases in the wholesale price comparative to the steady decrease of the retail price component. This is particularly notable for 2011, 2012, and 2015 where the mark-ups were 15%, 17%, and 14% respectively. Furthermore, 2008 saw a negative mark-up of -5%, however this does not seem to be indicative of a tariff deficit. For gas, the wholesale price fluctuated differently the electricity market, with a peak in 2012 and two troughs in 2009 and 2015. The retail energy price component was relatively more stable, though it declined steadily from 2008 to 2015. There was a slight increase in 2012, but it was not enough to make the 2012 figure a positive mark-up. This was therefore the smallest mark-up, with the largest observable mark-up taking place in 2008.

**Figure 344 Mark-ups for Sweden, middle consumption bands (ID and I3)**




[576] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

## 25.3 Tariff deficit in Sweden

**Sweden had no tariff deficit between 2008 and 2016.**

# 26 Factsheet: Slovenia

This factsheet presents the findings for Slovenia for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 26.1 Household Price Regulation in Slovenia

**Slovenia had no energy price regulation for households in the period assessed.**

There is no household price regulation for gas or electricity in Slovenia. However, while this is not in the scope of this study, there is regulation of the price of heat for district heating.[577]

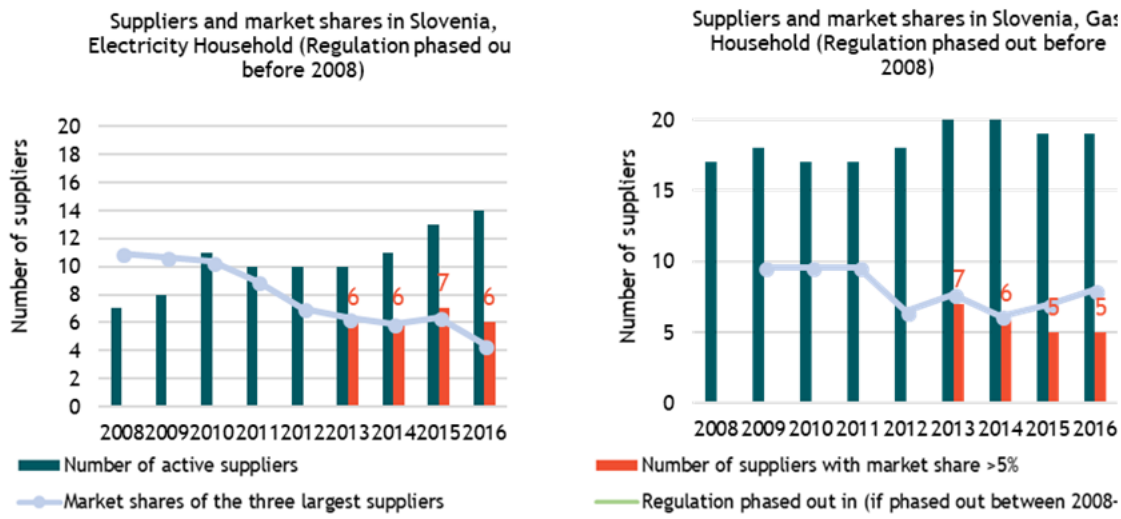
The Energy Agency (Agencija za energijo) is the national regulatory authority for electricity and gas in Slovenia, and monitors the prices in the retail household and business markets. It receives information on prices changes or supply offers monthly. On the basis of the monitoring, the Energy Agency determines
the retail price indexes (RPI) which are based on the lowest offer on the retail market, accessible to all households and not restricted to the possibility of switching supplier.[578]

### *26.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers have had over 60% of the market consistently over the last years. However, there has been a constant decrease in this share for the electricity market (from around 75% in 2008 to 60% in 2016). At the same time, there has been a steady increase in the number of active electricity suppliers. On the other hand, these trends are not as straightforward in the gas market. Market concentration is moderate, with between 5 and 7 active suppliers in the past years both for gas and electricity.

[577] Agencija za energijo (2016), Report on the energy sector in Slovenia for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Slovenia-EN.pdf/a5d23292-942e-d220-3582-103760438571
[578] Agencija za energijo (2016), Report on the energy sector in Slovenia for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Slovenia-EN.pdf/a5d23292-942e-d220-3582-103760438571

**Figure 345: Number of suppliers and market shares in Slovenia**



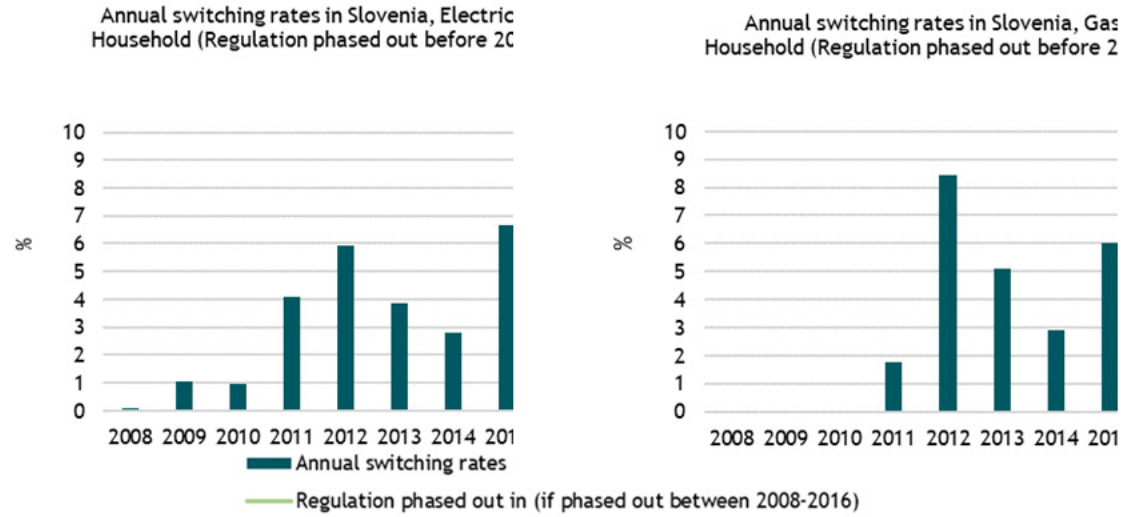

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

*Source:* CEER data

## Consumer engagement and expenditures on energy

The figures below show the annual switching[579] rates in households for both electricity and gas. There is a high fluctuation in the switching rates for both electricity and gas reaching 7% for electricity and only 4% for gas in 2016.

**Figure 346 Annual switching rates for households in Slovenia**



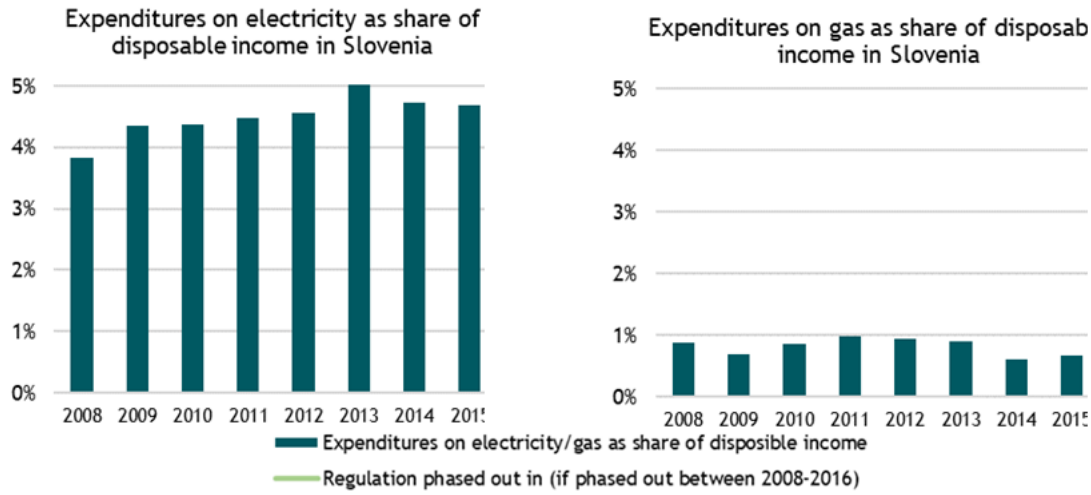

*According to the CEER data, switching rates in the gas market were zero between 2008 and 2010*

*Source:* CEER data

[579] Switching is defined as the voluntary action by which a customer changes his supplier

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[580] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[581] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Slovenia. There has been a slight increase over time on the electricity expenditures though they remain around 4-5% of the total disposable income. On the other hand, gas expenditures have decreased slightly since 2011, though they remain between 0.6% and 1% of the disposable income.

**Figure 347: Expenditures on gas and electricity as share of disposable income for households in Slovenia (for middle consumption bands DC and D2) using PPS prices[582]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

Source: Own calculations[583] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Slovenia, there has been a slight decrease in the energy and supply component of the retail electricity price (since 2012), reflecting the decrease in wholesale electricity prices which started in 2011. As for gas, there has been a strong decrease in the energy and

[580] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for household consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

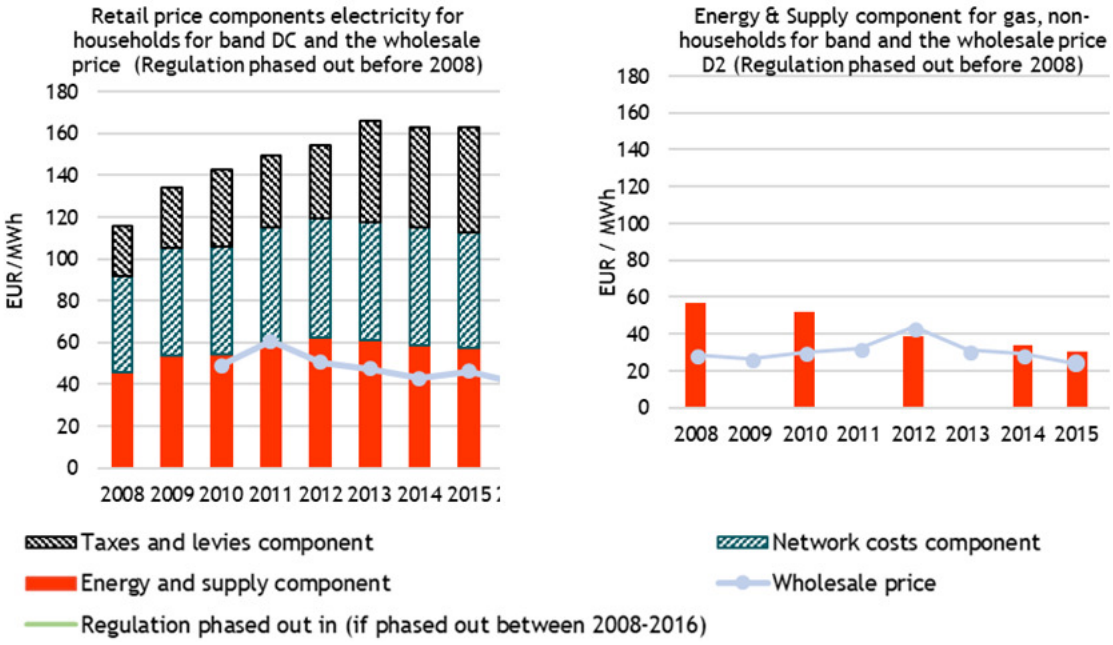
[581] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

[582] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

[583] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

supply component of the retail price (from around 55EUR/MWh in 2008 to around 30EUR/MWh in 2015) in contrast with the evolution for gas wholesale prices which peaked in 2012 at over 40EUR/MWh (higher than the retail energy and supply component for the middle consumption band that year).

**Figure 348 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Slovenia**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

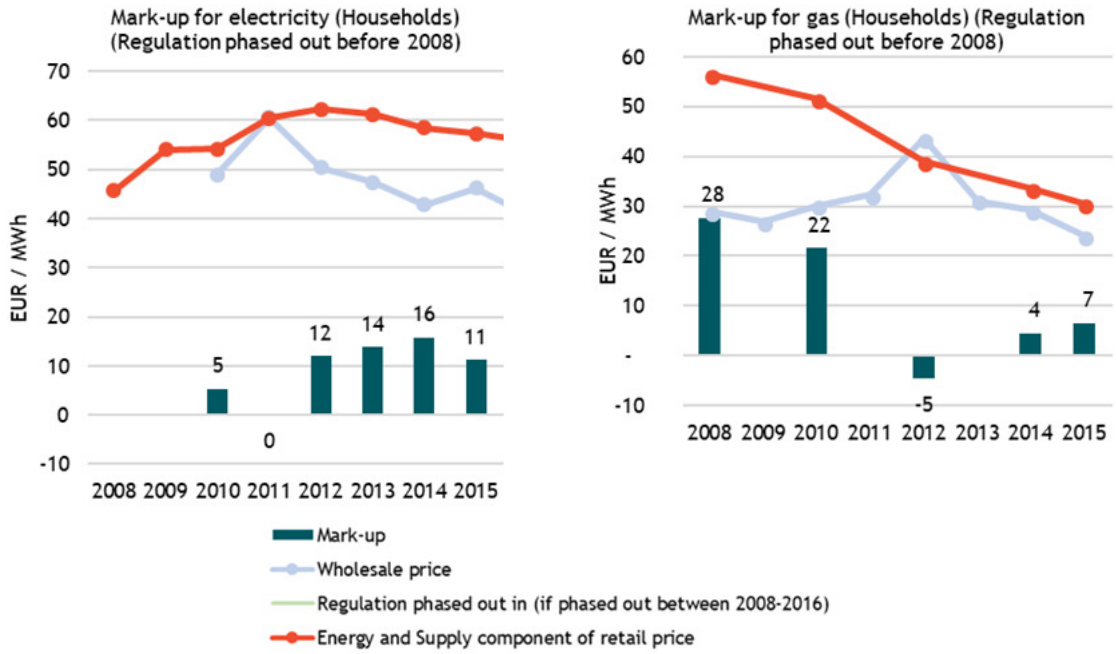
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[584] and EMOS (wholesale price)

Information from Slovenia's energy agency for retail gas prices for households confirms the decrease in the energy component described above.

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[585] The figures below show that, for the household sector, electricity mark-ups have increased since 2010 – with a dip in 2015; while for gas there is no clear trend, with mark-ups at 28 EUR/MWh in 2008, -5 EUR/MWh in 2012 and 7 EUR/MWh in 2015.

[584] Eurostat has data available on gas prices; however not for the energy and supply component.
[585] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 349 Mark-ups for Slovenia, middle consumption bands (DC and D2)**




*Note that data is not available for retail gas prices in 2009, 2011, 2013 and 2016 and not for the electricity wholesale price in 2008 and 2009*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

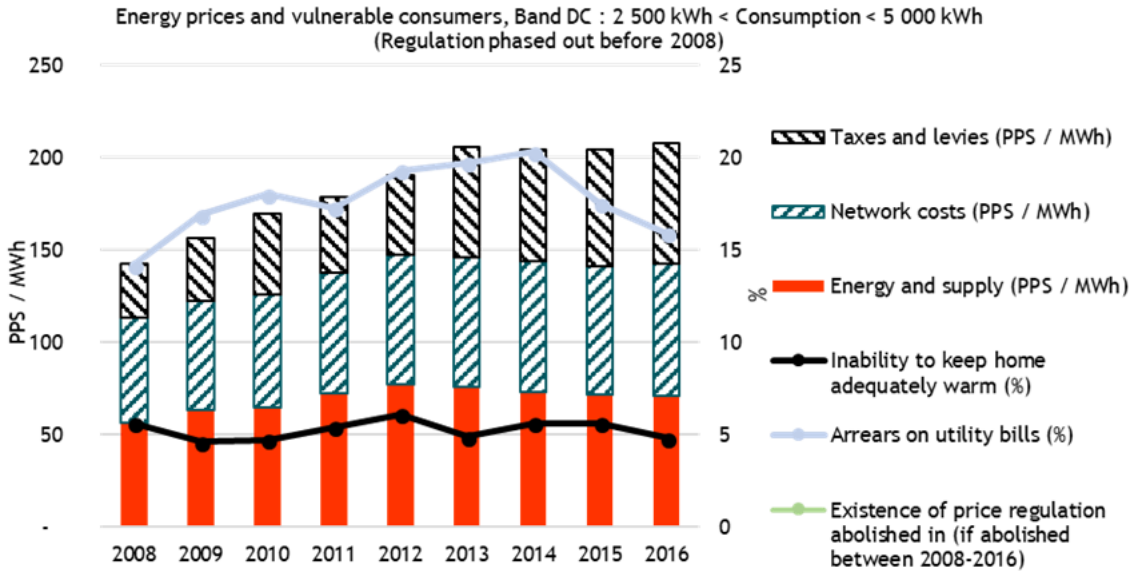
Source: Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

### *26.1.2 Energy poverty*

The consumers in Slovenia which are potentially suffering from energy poverty were increasing up to 2014 and then decreasing, as can be seen by the diagram below showing the share of the population with arrears on their utility bills. There seems to be a correlation between increasing (overall) retail prices up to 2014 and the share of households with arrears, but this is no longer the case for 2015 and 2016.

When looking at the households unable to keep their home adequality warm, these percentage has remained mostly stable throughout time.

**Figure 350 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Slovenia**




*Source:* Eurostat

In Slovenia, a vulnerable consumer is a household consumer who, due to its financial circumstances (i.e. income, other social circumstances, living conditions, etc.) is "unable to obtain an alternative source of energy for household use that would incur the same or smaller costs for essential household use". A DSO may not disconnect a vulnerable consumer from supply or restrict his consumption before it reaches a quantity that is absolutely necessary in order not to jeopardise life and health of the persons living in the household (emergency supply).

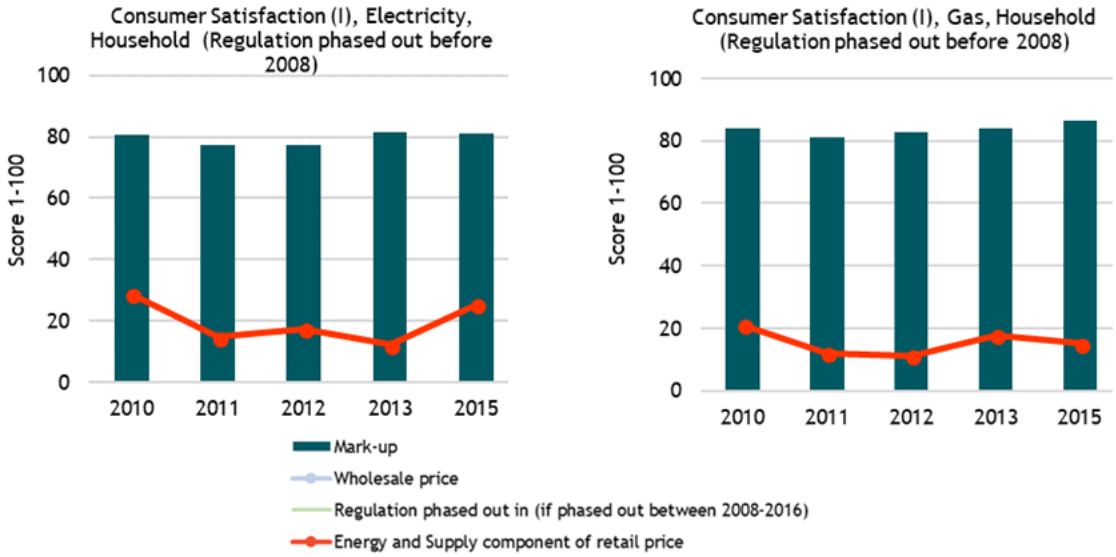
### *26.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

The general level of satisfaction of consumers has increased both for electricity and gas industries. Though the trend shows a steadier increase for gas (going from 81 points in 2010 to 86 in 2015). In the electricity industry there was a dip in the scores in 2011 and 2011 (with a score of around 77) and then an increase to around 81 points which remained the same in 2013 and 2015.

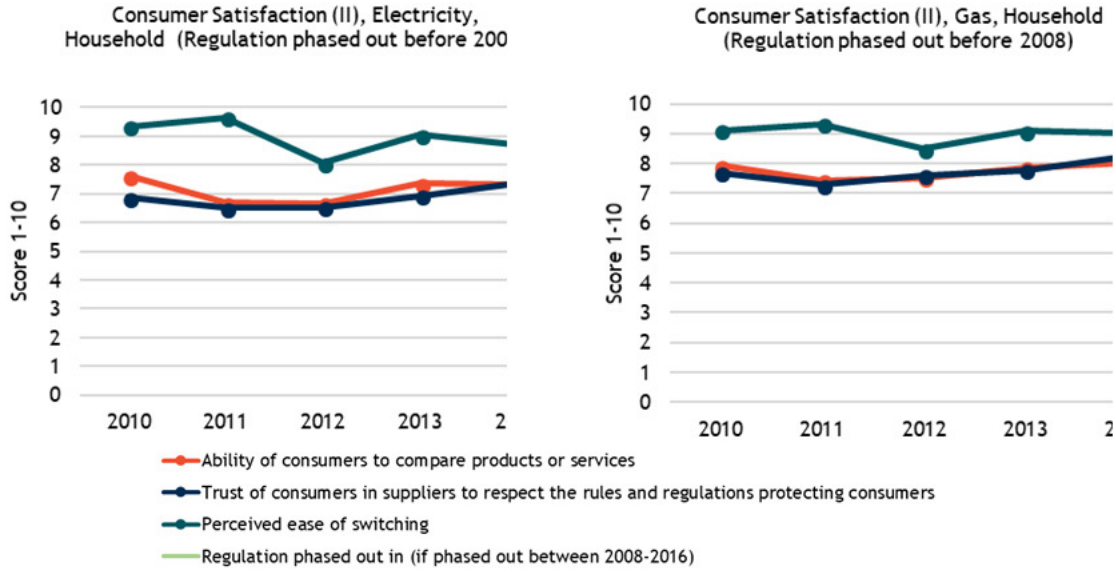
**Figure 351 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Slovenia for households**




*Source:* EC – DG Justice[586]

There has also been a slight increase in consumer trust and ability to compare products and services, both for electricity and gas. The perceived ease of switching is high in both electricity and gas.

**Figure 352 Ability of consumers to compare products or services[587], trust of consumers in suppliers[588] and perceived ease of switching[589] in Slovenia**




*Source:* EC – DG Justice

[586] Note that from 2013 onwards, the survey was carried out every other year.
[587] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can choose from a sufficient number of electricity providers?"
[588] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[589] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. While dual and green offers are available, there was limited information regarding other choices (i.e. availability of non-price financial benefits or ICT-based offerings.

**Table 26-1 Consumer choice in Slovenia (electricity, households)**

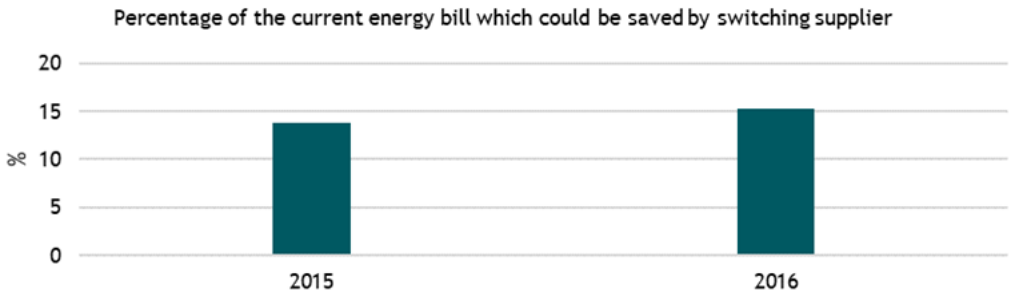
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The diagram below provides an overview of the savings that can be achieved by switching electricity supplier as a share of the current electricity bill.

**Figure 353 Percentage of the current electricity bill which could be saved by switching supplier in Slovenia**




*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

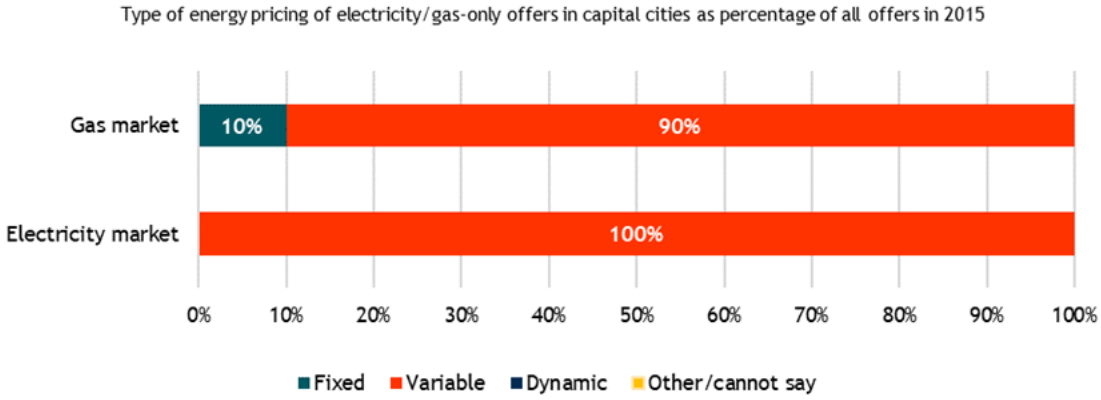
The Slovenian energy agency has also performed a quantitative assessment of the savings by which a consumer can potentially reduce annual electricity costs when switching supplier or supply product. In 2016 the potential savings increased. For example, when switching from the most expensive to the cheapest offer on the market, savings reached between EUR 69 and 91. The potential saving by switching supplier within regular offers went from EUR 55 to almost EUR 60 in December 2016. The increase in potential savings resulted from a reduction in electricity prices: the minimum electricity supply cost was lower at the end of 2016 than at the beginning of the year, while the maximum cost remained the same.[590]

[590] Agencija za energijo (2016), Report on the energy sector in Slovenia for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Slovenia-EN.pdf/a5d23292-942e-d220-3582-103760438571

A similar analysis has been carried out for gas showing that the difference between the highest and the lowest price was increasing, and thus, potential savings were higher as well. In 2016, switching from the supplier with the highest price to the one with the lowest price, could lead to savings between EUR 300 and EUR 370 (for a consumer with annual consumption of 2000 $m^3$). Savings from switching based on the average price were between EUR 65 and EUR 90, while savings on the basis of the lowest regular price would be insignificant.[591]

The diagrams below show the type of offers available for electricity and gas, most of which are variable. In the case of electricity, consumers pay for the supplied electricity according to actual consumption metered.[592]

**Figure 354 Type of offers for households in Slovenia**




*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 26.2 Non-Household Price Regulation in Slovenia

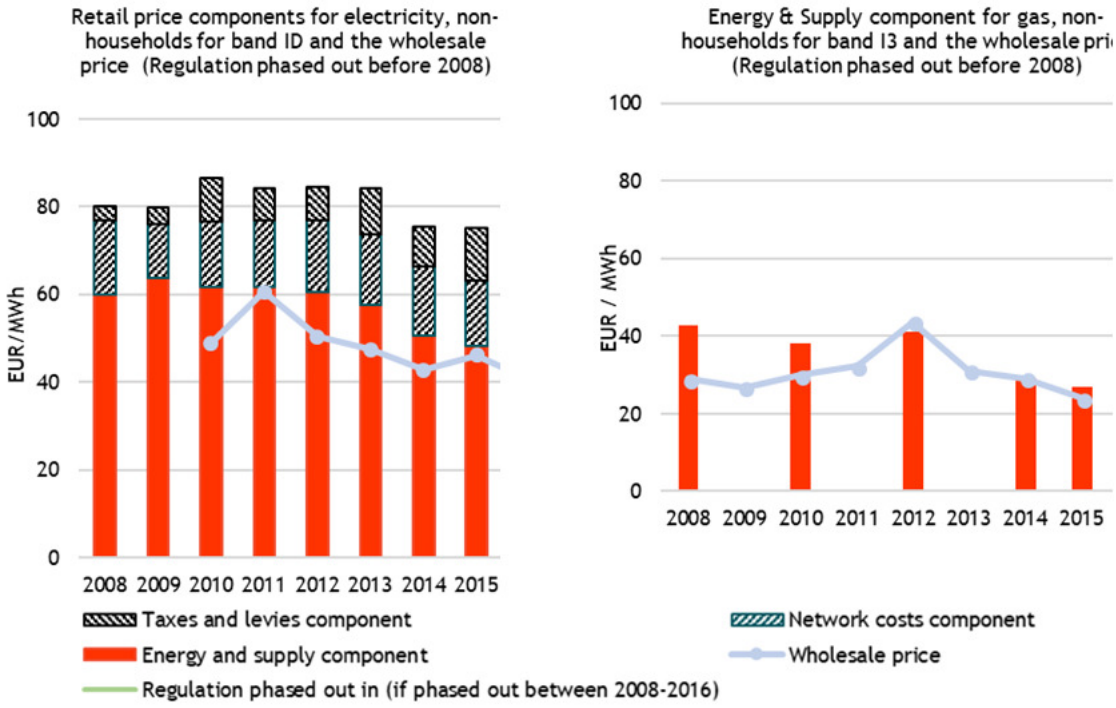
**Slovenia had no energy price regulation for non-households in the period assessed.**

### *26.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. For electricity, there seems to be a correlation between the wholesale prices and the retail energy and supply component for non-households with both showing a decrease for the past five years. However, this is not the case for gas.

[591] Agencija za energijo (2016), Report on the energy sector in Slovenia for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Slovenia-EN.pdf/a5d23292-942e-d220-3582-103760438571
[592] Agencija za energijo (2016), Report on the energy sector in Slovenia for 2016. Available from: https://www.ceer.eu/documents/104400/5988265/C17_NR_Slovenia-EN.pdf/a5d23292-942e-d220-3582-103760438571

**Figure 355 Industry retail price components for middle bands (ID and I3) and wholesale prices in Slovenia**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

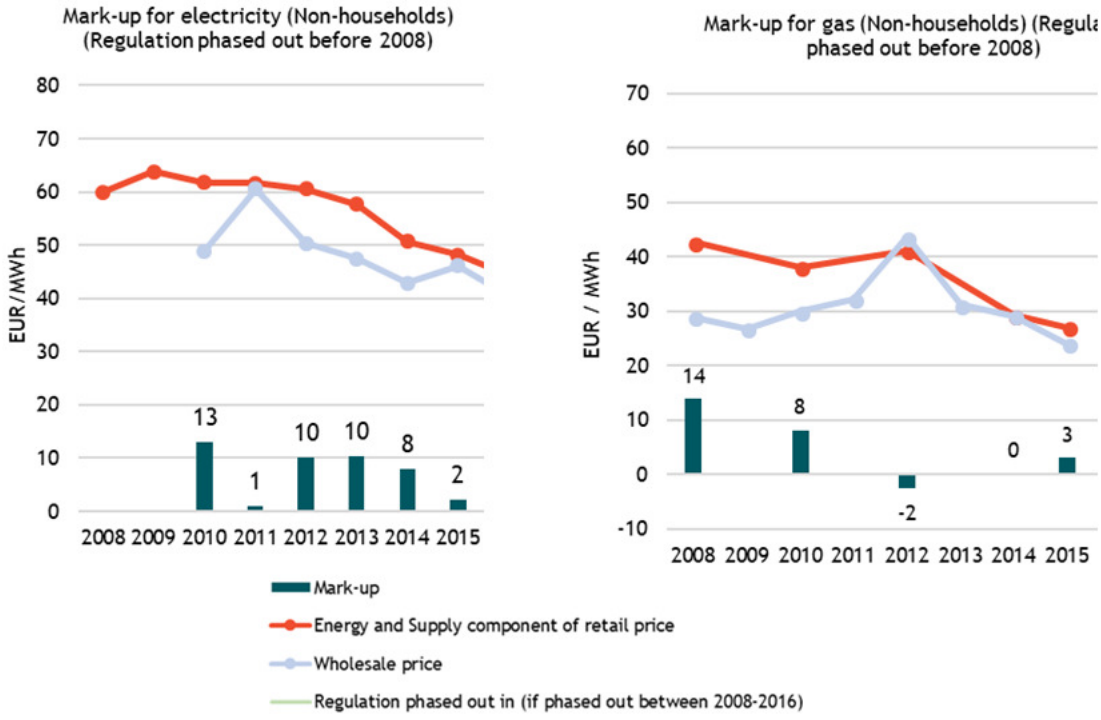
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

Information from Slovenia's energy agency on retail gas prices for business consumers confirms the decrease in the energy component described above.

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[593] The figures below show the mark-ups along with the wholesale price. There is an overall decrease in mark-ups both for electricity and gas going from 14 EUR/MWh in 2008 (gas) and 2010 (electricity) to 3 and 2 EUR/MWh in 2015 respectively.

[593] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 356 Mark-ups for Slovenia, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

## 26.3 Tariff deficit in Slovenia

**Slovenia had no tariff deficit between 2008 and 2016.**

# 27 Factsheet: Slovakia

This factsheet presents the findings for Slovakia for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level. The factsheet has been reviewed by an NRA representative and data has been adjusted accordingly.

## 27.1 Household Price Regulation in Slovakia

**Slovakia still has energy price regulation for households in place both for electricity and gas.**

Slovakia has end user price regulation both for electricity and gas for household consumers. Household consumers are considered as vulnerable customers. Therefore, price regulation for electricity applies to all household end users. Price regulation for gas applies to household end users who use a maximum of 100 MWh per year[594], however, almost all households fall under this category. Act No. 250/2012 Coll.[595] regulates price regulation for both electricity and gas markets. This Act has gone through several amendments, the latest being Amendment No. 164/2017.[596]

Regulated prices are set for a regulatory period for every provider (supplying electricity to regulated customers) on the electricity market by the Regulatory Office for Network Industries (RONI) (Úrad pre reguláciu sieťových odvetví – URSO, in Slovak). Prices set by RONI reflect consumption of previous period, balancing fee and maximum allowed profit which an electricity provider is able to gain. URSO sets a maximum price, but the supplier may offer a lower price if it wishes so. The maximum prices for household electricity suppliers are made of two components – a monthly payment per an off-take point and the electricity consumed in the low or high price band. Household electricity supply is divided into eight rates.[597] The maximum prices for gas supply to household consist of the maximum amount of a fixed monthly rate and the maximum amount of a rate for the gas consumed. The structure of the tariffs is based on six tariff groups based on the volume of the annual gas consumption.[598]

The measures aim to maintain acceptable price level for end users, while allowing providers to operate with certain profit. Each operator on the market supplying gas to households is officially regulated via set prices based on previous years of operation.

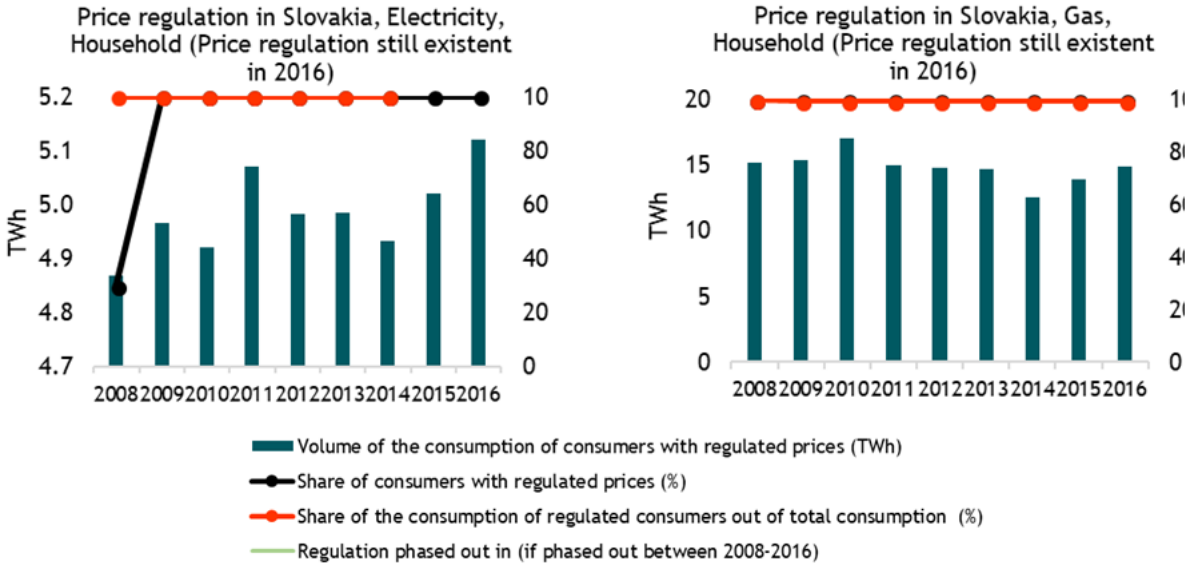
According to URSO[599], there are still weaknesses in the Slovak energy market, with the largest suppliers on the market abusing their dominant position with respect to the end users. For example, in 2012,

[594] Annual report RONI for the year 2017. Available at: http://www.urso.gov.sk/sites/default/files/dokumenty/RONI_AR_2017.pdf
[595] Act No. 250/2012 Coll. on regulation of network industries, available at http://www.zakonypreludi.sk/zz/2012-250
[596] Amendment 164/2017 amending Act No. 250/2012 Coll. on regulation of network industries, available at http://www.zakonypreludi.sk/zz/2017-164
[597] National report for the year 2016 submitted as of 31 July 2017 by the Regulatory Office for Network Industries Slovakia. http://www.urso.gov.sk/sites/default/files/NarodnaSprava_za2016_EN.pdf
[598] Annual report RONI for the year 2017. Available at: http://www.urso.gov.sk/sites/default/files/dokumenty/RONI_AR_2017.pdf
[599] Direct communication with URSO

when price regulation for SMEs' end users was abolished, the energy prices increased immediately by 10 to 20%.

Another example is, when in 2016, gas suppliers for households in Slovakia did not manage to react promptly to the development of European gas markets and did not offer lower prices to Slovak households, even though the price of gas as a commodity on exchanges had been significantly declining over a longer period of time. This showed the need for end user price regulation in Slovakia. URSO needed to intervene in May 2016 to decrease the maximum gas price for households, and the gas prices for household end users fell by 4.87%.[600]

**Figure 357 Household price regulation in Slovakia from 2008 to 2016**




*Note that the share of consumers with regulated electricity prices was 100% between 2009 and 2014. No data was available for this indicator (and the share of consumption of regulated consumers out of total electricity consumption) in 2015 and 2016*

*Source:* CEER data and NRA representative

During 2008 – 2016, all household electricity consumption fell under regulated prices, while almost all household gas consumption (almost 99.4%) fell under regulated prices. In the electricity sector, all household consumers have regulated price of electricity, while in the gas sector, almost all household consumers (close to 100%) have regulated gas prices. The consumption of electricity of households varied between around 4.9 to 5.15 TWh, while the consumption of gas was around 12.5 to 16 TWh during this time period.

There are no social tariffs in Slovakia.

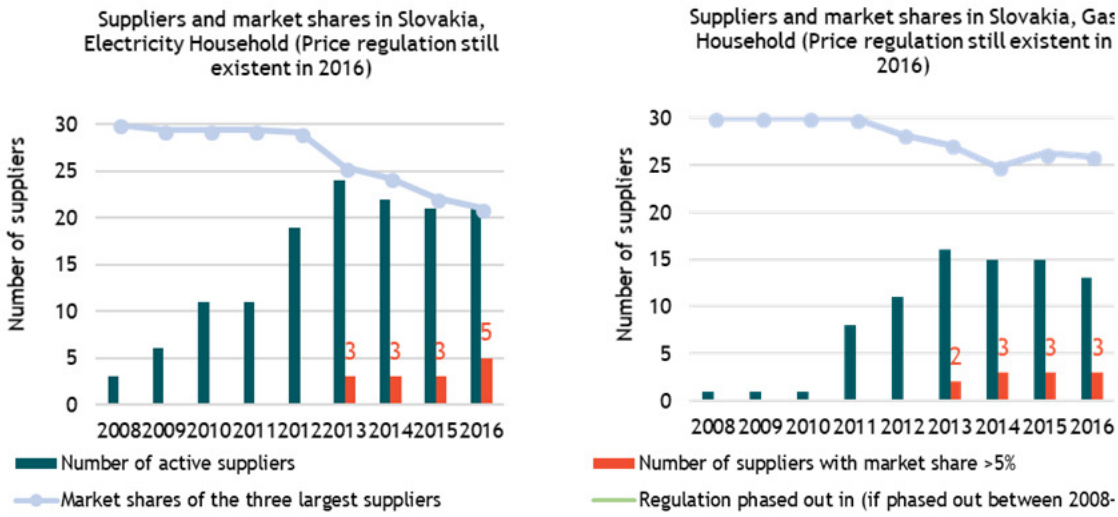
### 27.1.1 Selected aspects of competition

For both electricity and gas (in households), we see that the three largest suppliers have had over 85% of the market consistently over the last years. Between 2008 and 2012, this has been (close to) 100%. In

[600] Direct communication with URSO

the gas household market, the three largest suppliers have had even over 90% of the market in the last three years. At the same time, there has been a constant increase in the number of active suppliers until 2013, then a slight decrease.

**Figure 358: Number of suppliers and market shares in Slovakia**



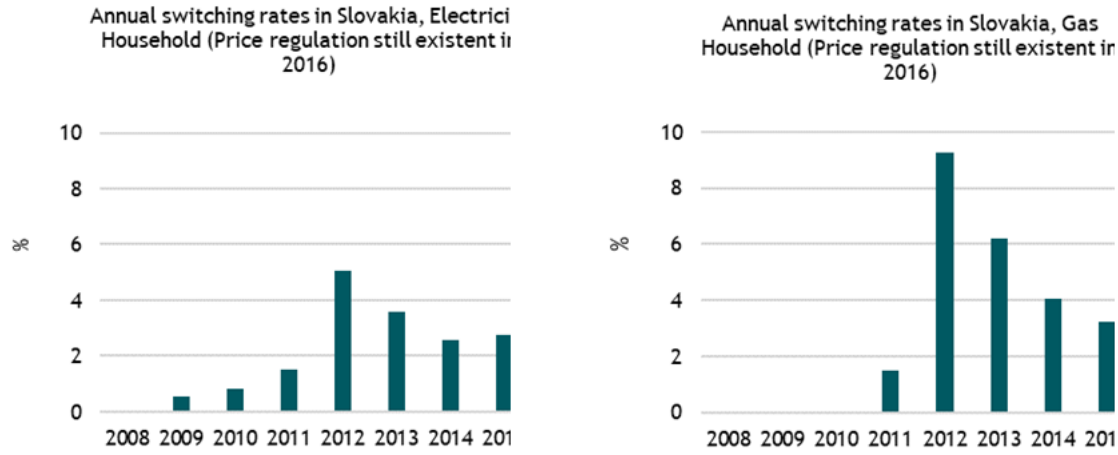

*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards.*

*Source:* CEER data

## Consumer engagement and expenditures on energy

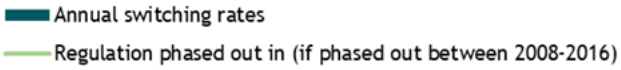
The figures below show the annual switching[601] rates in households for both electricity and gas, which in both cases have increased from below 1-2% to above 5-9% in 2012 for electricity and gas markets respectively. Since then they have decreased but remain close to 3%. Increased switching rates suggest increased competition on the markets. Overall, switching rates remain relatively low. For gas markets, according to URSO this is due to the maturity of the gas market and the very low difference between prices of different gas suppliers.[602]

**Figure 359 Annual switching rates for households in Slovakia**




[601] Switching is defined as the voluntary action by which a customer changes his supplier

[602] Energie Portal, Ktori dodavatelia plynu na Slovensku su najvacsi ? Rebricek vedu SPP a innogy, available at : https://www.energie-portal.sk/Dokument/ktori-dodavatelia-plynu-na-slovensku-su-najvacsi-rebricek-vedu-spp-a-innogy-103750.aspx

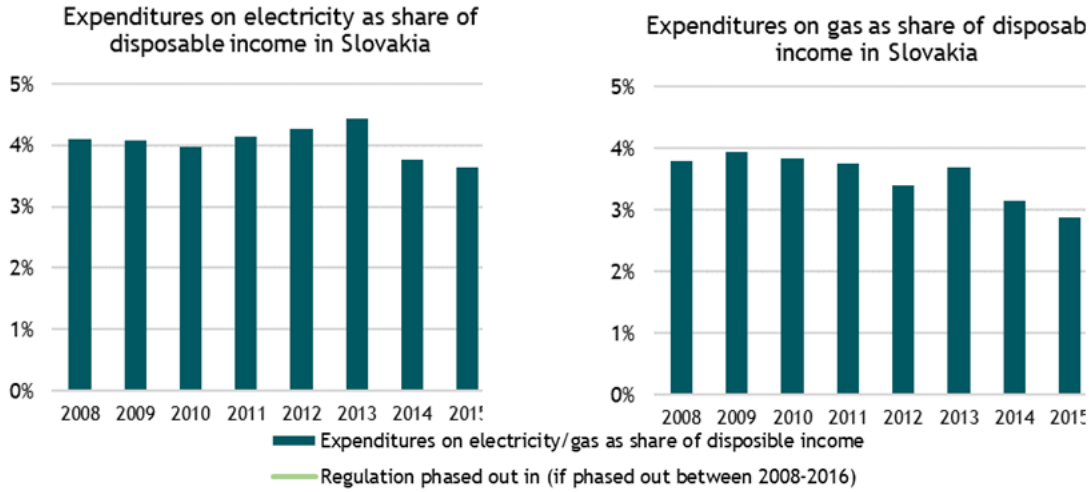



*Note that switching rates equalled zero on the electricity market in 2008 and on the gas market between 2008 and 2010*

*Source:* CEER data

Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the middle consumption bands[603] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[604] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in Slovakia. In Slovakia, the share of expenditures on electricity is close to the EU average of around 4% and since 2014 below the EU average; while for gas it is way above the 1 to 2% EU average expenditure despite the price regulation. As mentioned at the beginning of this factsheet, the gas suppliers do not yet adequately respond to gas price market developments and end consumers end up with higher gas prices. Moreover, the number of active gas suppliers has slightly decreased in the past years. Slovakia also depends heavily on gas imports.

**Figure 360: Expenditures on gas and electricity as share of disposable income for households in Slovakia (for middle consumption bands DC and D2) using PPS prices[605]**




*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[606] based on Eurostat

[603] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh - 5 MWh per year), D2 for the gas market for households consumers (20 GJ - 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh - 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ - 100 TJ per year)

[604] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

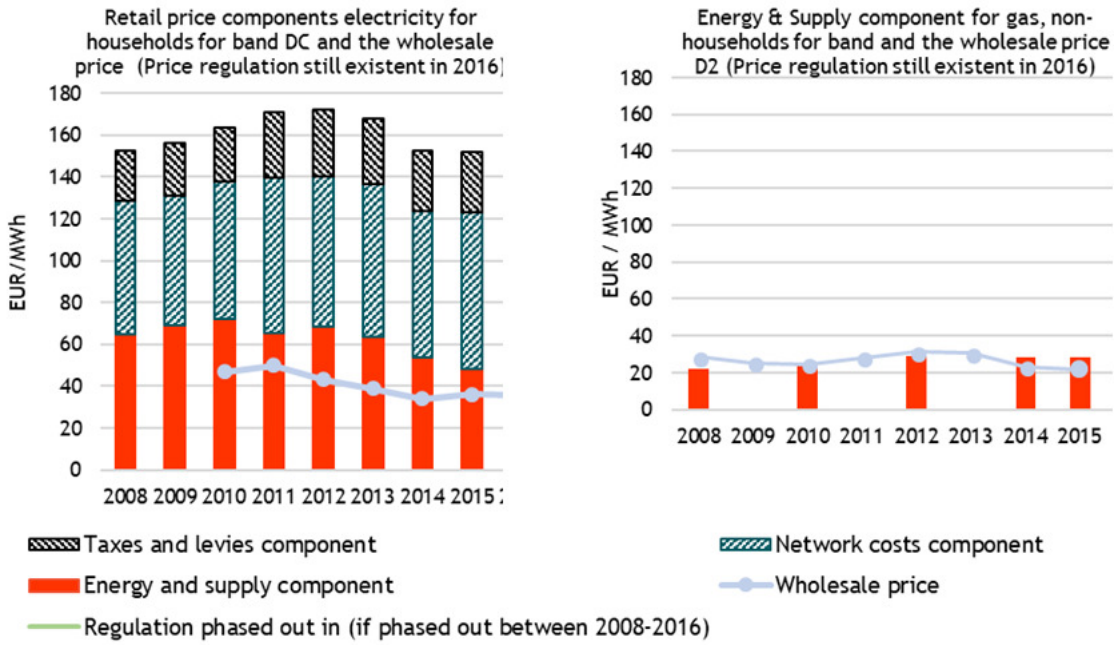
[605] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

[606] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for Slovakia, from 2012 there is a slight decrease in the energy and supply component of the electricity retail price which is more or less in line with the slight decrease of electricity wholesale prices. In the gas markets, the energy component is not in line with the wholesale price.

**Figure 361 Retail household price for middle consumption bands (DC and D2) and wholesale prices in Slovakia**



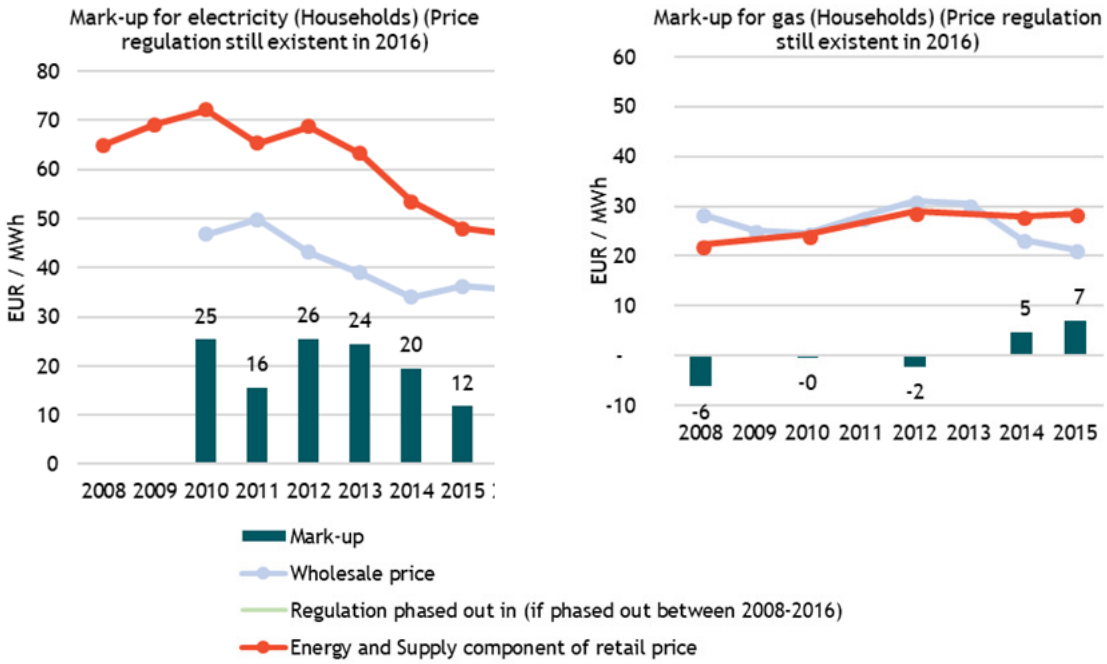

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[607] and EMOS (wholesale price)

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[608] The figures below show the mark-ups along with the wholesale price.

[607] Eurostat has data available on gas prices; however not for the energy and supply component.
[608] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

**Figure 362 Mark-ups for Slovakia, middle consumption bands (DC and D2)**



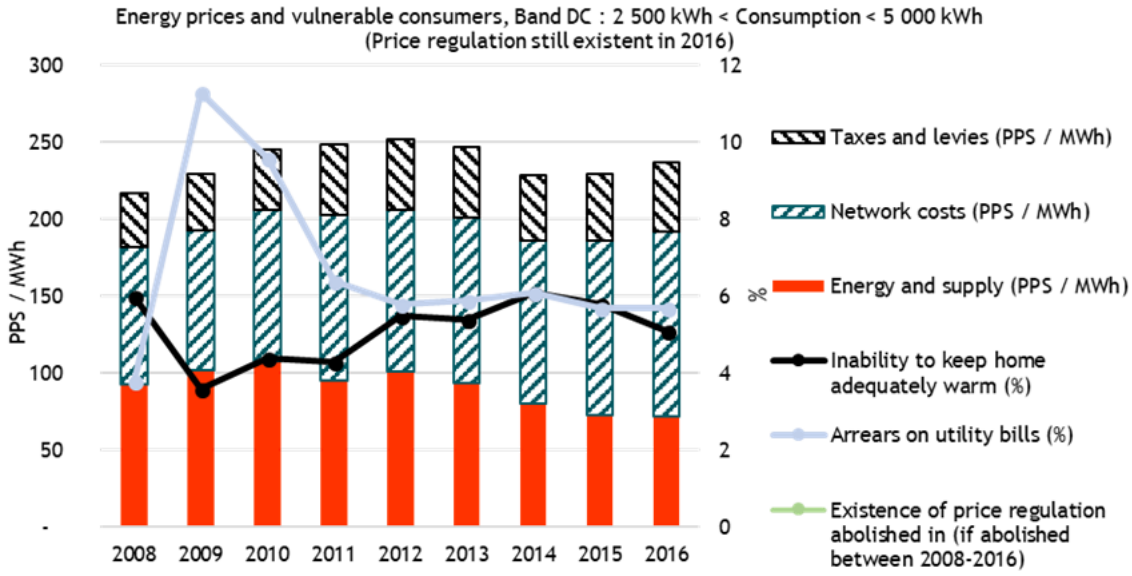

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price).

The figures above show that in the electricity markets, the mark-ups vary from 26 EUR/ MWh to 11 EUR/MWh in 2016. The mark-up has been constantly decreasing since 2012. On the gas market, negative and positive mark-ups are displayed.

### *27.1.2 Energy poverty*

The consumers in Slovakia which are potentially suffering from energy poverty have been constant at around 6% in recent years, as can be seen by the diagram below showing the share of the population with arrears on their utility bills. There has been a large drop of such consumers from close to 12% in 2009 suffering from arrears on utility to close to 6% in 2011. The share of consumers unable to keep home adequately warm has slightly increased and then decreased over time, ranging between 4-6%. At the same time, the energy component in retail prices has been slightly decreasing in the last years.

**Figure 363 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in Slovakia**




*Source:* Eurostat

It is important to note, that in Slovakia vulnerable consumers are defined as households and SMEs.

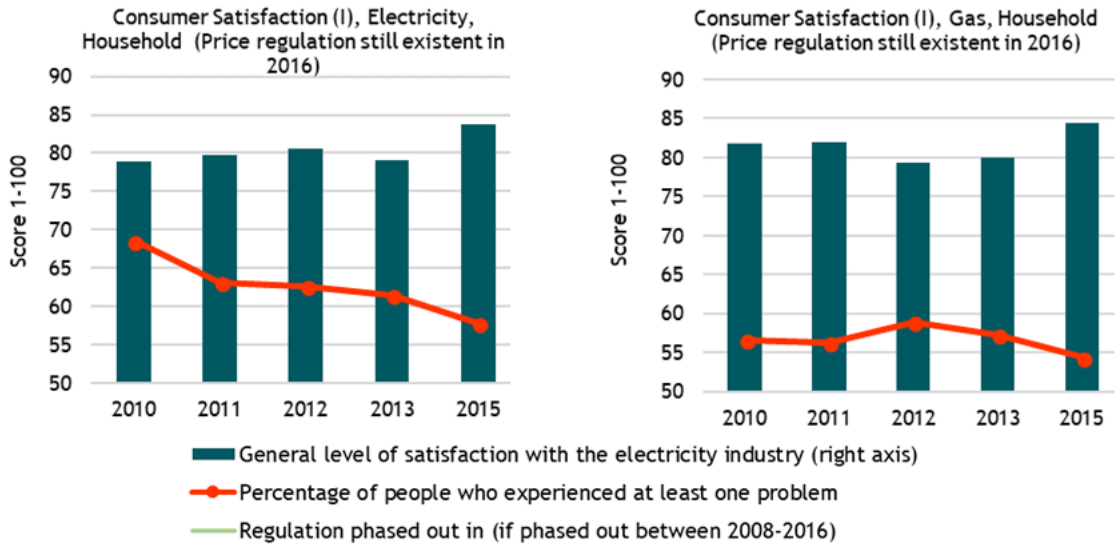
### *27.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

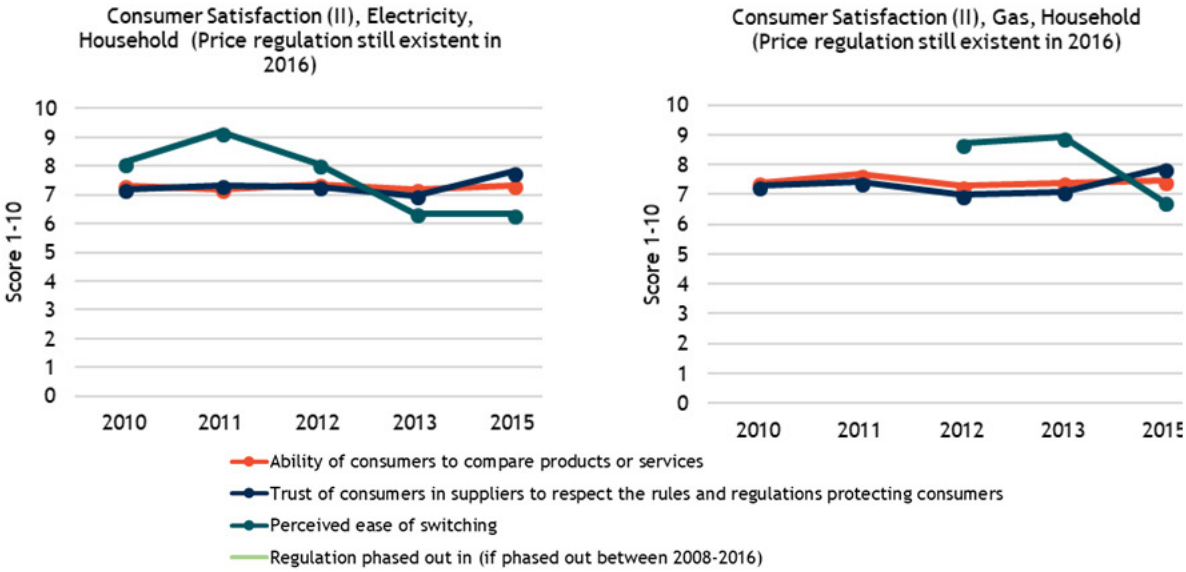
The general level of satisfaction with the electricity and gas industry was more or less similar for both industries and has been relatively constant over time. In the electricity sector, in past years, consumers seemed to be slightly less satisfied than in the gas markets (as the percentage of people who experienced at least one problem was higher). The percentage of people who experienced at least one problem has declined for both markets over time.

**Figure 364 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in Slovakia for households**



*Source:* EC – DG Justice[609]

**Figure 365 Ability of consumers to compare products or services[610], trust of consumers in suppliers[611] and perceived ease of switching[612] in Slovakia**




*No data is available for the perceived ease of switching in 2010 and 2011*

*Source:* EC – DG Justice

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice, showing that Slovak households do not have choices in several aspects in the electricity market.

**Table 27-1 Consumer choice in Slovakia (electricity, households)**

| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | No |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | - |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | - |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | - |

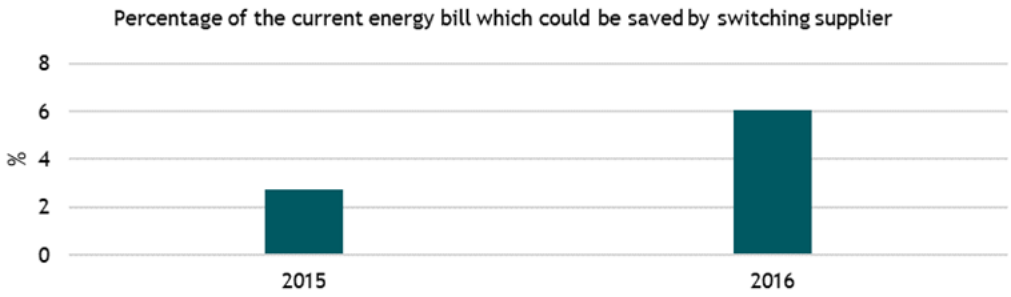
*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The figure below shows that switching electricity supplier can lead to some cost savings, which were close to 3% in 2015 but reached 6% in 2016.

[609] Note that from 2013 onwards, the survey was carried out every other year.
[610] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[611] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[612] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

Figure 366 Percentage of the current electricity bill which could be saved by switching supplier in Slovakia

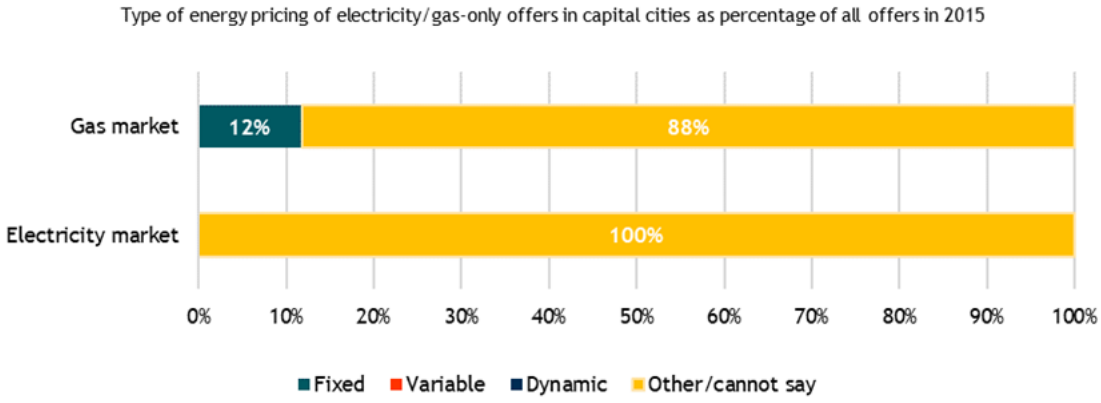



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagram below shows that the type of offers available for electricity and gas are other or not known. Around 12% of offers in the gas market are fixed.

Figure 367 Type of offers for households in Slovakia




*Source:* ACER/CEER (2015). Spot-based contracts are a type of variable contract but presented separately.

## 27.2 Non-Household Price Regulation in Slovakia

**Slovakia phased out energy price regulation for non-households starting from 2012 both for gas and electricity. Slovakia still applies gas and electricity price regulation for SMEs, which represent less than 5% of non-household consumption.[613]**

Slovakia applies price regulation for end users in the non-household sector for both electricity and gas sectors. However, it applies only to SMEs. Similar regulation of prices applies as for households. According to Act No. 250/2012 Coll. an SME is an end user with a maximum annual consumption of electricity of 30 000 kWh for the past year, or an end user with a maximum annual consumption of gas of 100 000 kWh for the past year.

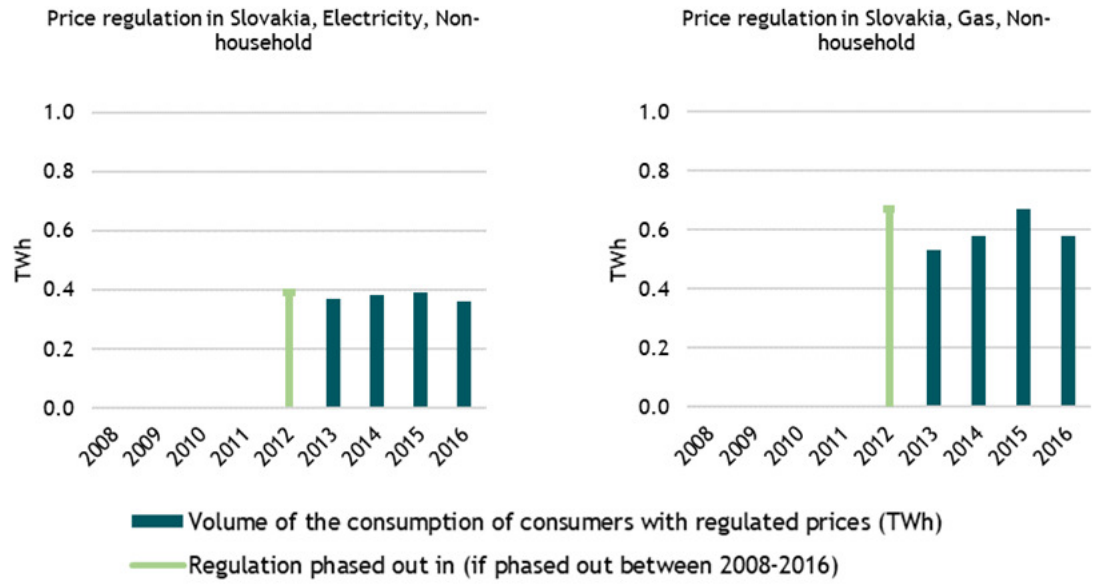
[613] Price regulation for SMEs was initially phased out in 2012 and reintroduced in the same year due to large increases in the electricity prices

The need to regulate the supply of electricity to SMEs stemmed from the recent opening of the electricity market. The price deregulation did not lower the prices and costs of electricity to customers, but the opposite. Regulation of final prices to SMEs customers has stabilized the energy prices.[614] As mentioned above, in 2012, the price regulation for electricity for SMEs was abolished but reintroduced as the prices rose significantly.

Regarding gas supply to SMEs, the tariffs are divided into six tariff groups based on the annual volume of the natural gas consumption.[615]

Figures below show that around 0.36 to 0.39 TWh consumption of electricity is regulated, while it is around 0.53 to 0.67 TWh of gas consumption between 2013-2016.

**Figure 368 Non-household price regulation in Slovakia from 2008 to 2016**




*Note that no data is available between 2009 and 2011 for the electricity market, other empty bars refer to zeros*

*Source:* CEER data

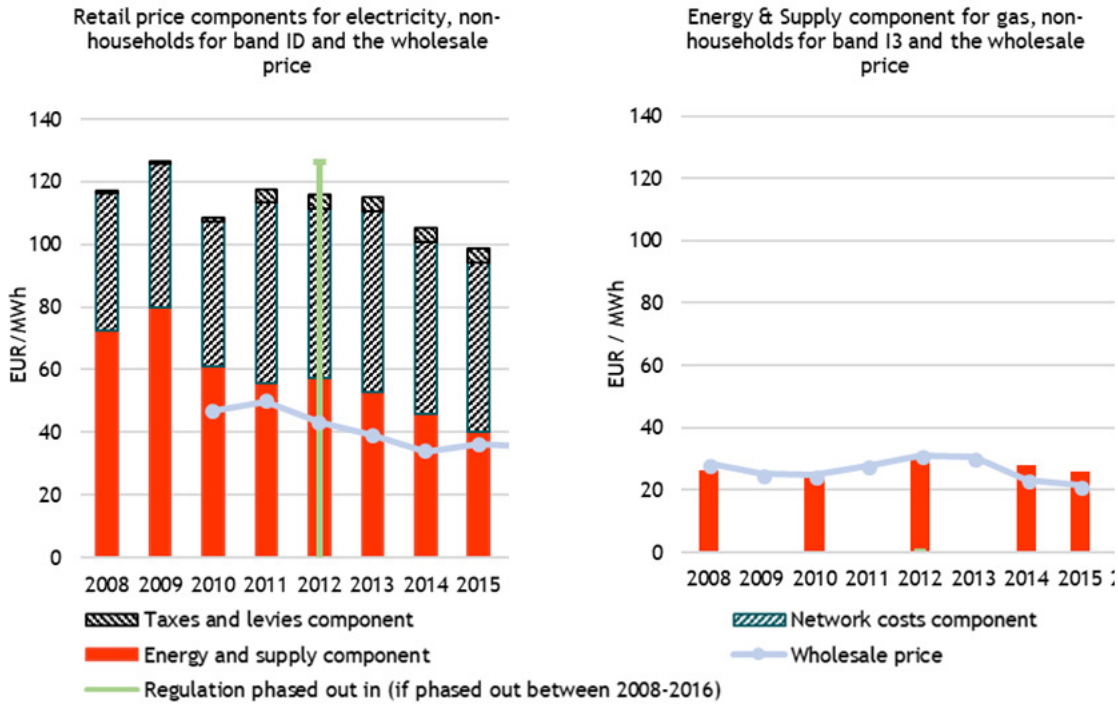
### *27.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Similar patterns can be seen as for the household sector.

[614] National report for the year 2016 submitted as of 31 July 2017 by the Regulatory Office for Network Industries Slovakia. http://www.urso.gov.sk/sites/default/files/NarodnaSprava_za2016_EN.pdf

[615] Annual report RONI for the year 2017. Available at: http://www.urso.gov.sk/sites/default/files/dokumenty/RONI_AR_2017.pdf

**Figure 369 Industry retail price components for middle bands (ID and I3) and wholesale prices in Slovakia**



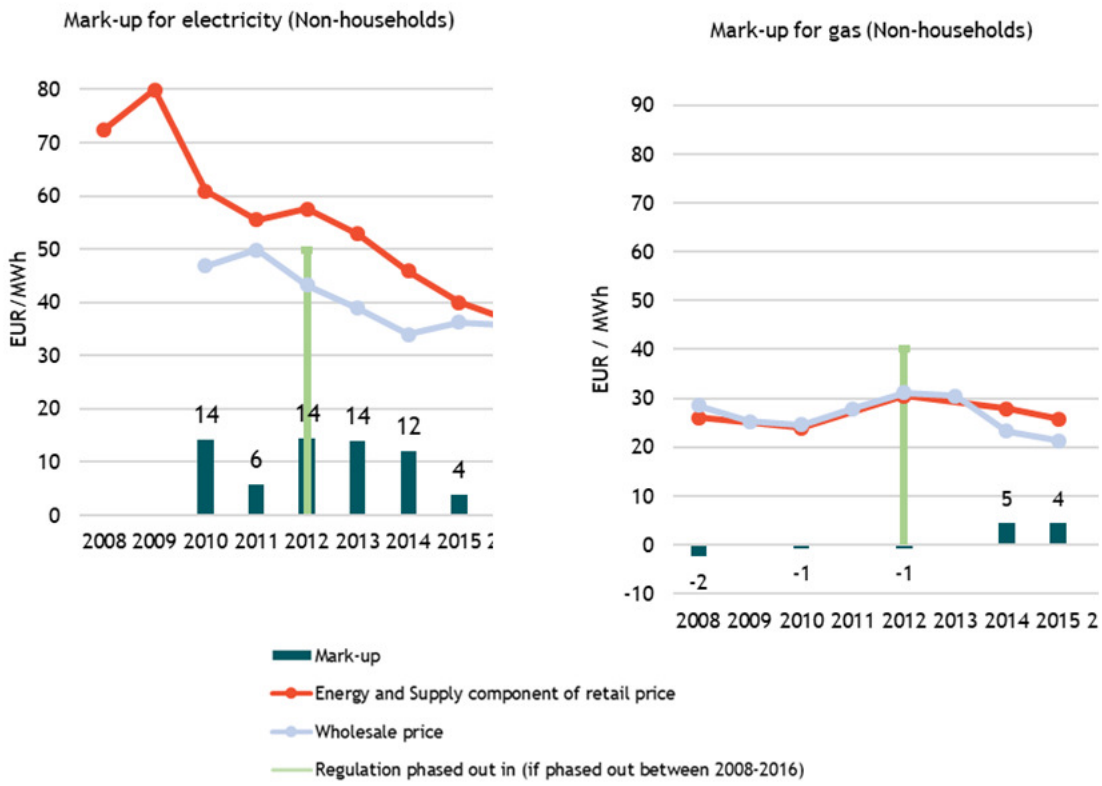

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price). Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[616] The figures below show the mark-ups along with the wholesale price. The figures below show that the mark-ups for non-household consumers with price regulation (SMEs) are much lower in the electricity sector than for households, ranging from around 14 EUR/ MWh in 2012 and 2013 to around 1 EUR/ MWh in 2016.

[616] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 370 Mark-ups for Slovakia, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

## 27.3 Tariff deficit in Slovakia

**Slovakia had no tariff deficit between 2008 and 2016.**

# 28 Factsheet: the United Kingdom

This factsheet presents the findings for the UK for the 'Study on energy prices, costs and subsidies'. The indicators presented are based on the database compiled for the study and includes data up to 2016. The text, on the other hand, presents current developments at national level.

## 28.1 Household Price Regulation in the UK

**The UK had no energy price regulation for households in the period assessed. However, a price cap has been set since 2017 for both gas and electricity.**

Prior to 2017 there was no price regulation or social tariffs for gas or electricity to households in the UK. However, it is an issue that has caused some concern and has been investigated. In June 2016, the Competition and Markets Authority (CMA) published its final report[617] into the GB energy market. The summary document of this extensive report gives the following explanation as to why it was carried out:
"Ofgem referred the energy markets to us {the CMA} in 2014, a decision that can be seen as the culmination of concerns regarding the energy sector that had been growing for a number of years. Perhaps most importantly, there was a rapid increase in retail energy prices between 2004 and 2014: average annual domestic gas prices rose by around 125% in real terms over the period, and domestic electricity prices by around 75%. There was no consensus on the extent to which these price rises reflected increases in costs, which led to a concern that current price levels may be generating excessive levels of profitability for energy generators and suppliers. "

This report has led to a cap on the gas and electricity tariffs paid by customers on prepaid meters (which was around 16% of all domestic customers in 2016). On 1 April 2017, the amount of money suppliers can charge a domestic prepayment meter (PPM) customer per unit of energy became subject to a safeguard tariff (or 'price cap'). On the 2 February 2018, Ofgem extended this price protection to a further one million vulnerable customers receiving the Warm Home Discount[618]. The warm home discount is a £140 per year discount to the electricity bill that is available to those that receive pension credits (i.e. pensioners with incomes below a certain level) or those on a low income (i.e. that receive certain income-dependant social payments). The customers need to apply to their supplier for this discount and the number of discounts each supplier can give is limited.

Under the PPM price cap suppliers can charge less than the set level of the safeguard tariff, but not more. It does not cap the total cost of a bill. That is because the amount customers pay also depends on how much gas or electricity they have used. Ofgem is responsible for administering the safeguard tariff. The level of the cap is updated on 1 April and 1 October each year. Ofgem publishes separate levels of the cap for each region and meter type, calculated using a methodology designed by the CMA. This methodology sets the level of the cap based on calculations of: wholesale costs, network costs,

617 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/531204/overview-modernising-the-energy-market.pdf
618 https://www.gov.uk/the-warm-home-discount-scheme

policy costs, operating costs, and costs specifically associated with prepayment meters. It also includes a degree of 'headroom', which is designed to allow suppliers to offer competitive deals underneath the cap.

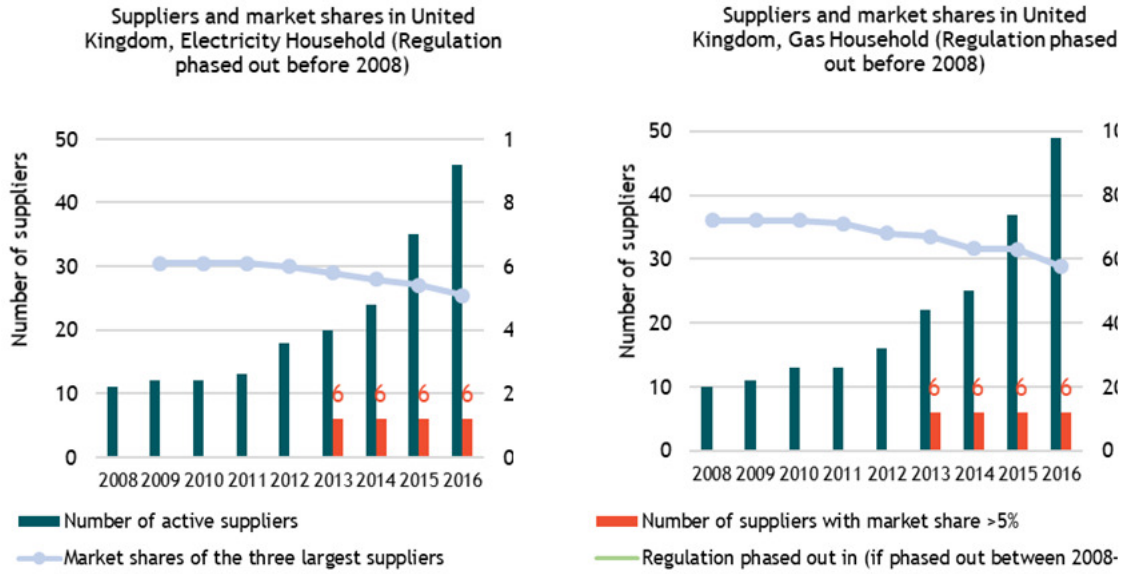
The report has also led to a current (2018) proposal for the introduction of temporary price caps for all standard variable tariffs (SVT) and fixed-term default tariffs. The UK energy regulator (Ofgem) has consulted on the proposal[619] and anticipate that Parliament will approve the Domestic Gas and Electricity (Tariff Cap) Bill in the summer of 2018, and the cap will come into force at the end of 2018. The level of the price cap on SVTs has not yet been confirmed.

The SVT and default tariff cap extends protection to all consumers who do not engage in the market frequently. This reflects the finding of the CMA report that consumers on prepayment meters as well as those who have not changed from their default supplier (and are typically on SVT of other default tariffs) are being charged more than those customers who change suppliers and/or pay for their gas and electricity by direct debit. Ofgem market review[620] indicates that the majority of customers are still on poor value SVTs with their energy supplier. As of September 2017, around 57% of people with the 10 largest suppliers – around 13 million customers – are on non-price-protected SVTs.

### *28.1.1 Selected aspects of competition*

For both electricity and gas (in households), we see that the three largest suppliers have had over 50% of the market consistently over the last years. At the same time, there has been a significant increase in the number of active suppliers.

**Figure 371: Number of suppliers and market shares in UK**




*Note: Data on the number of suppliers with market shares >5% is only available from 2013 onwards. For the electricity market, data on the number of active suppliers is only available from 2011 onwards.*

[619] https://www.ofgem.gov.uk/publications-and-updates/default-tariff-cap-policy-consultation-overview
[620] https://www.ofgem.gov.uk/publications-and-updates/standard-variable-tariffs-latest-trends-september-2017

*Source:* CEER data

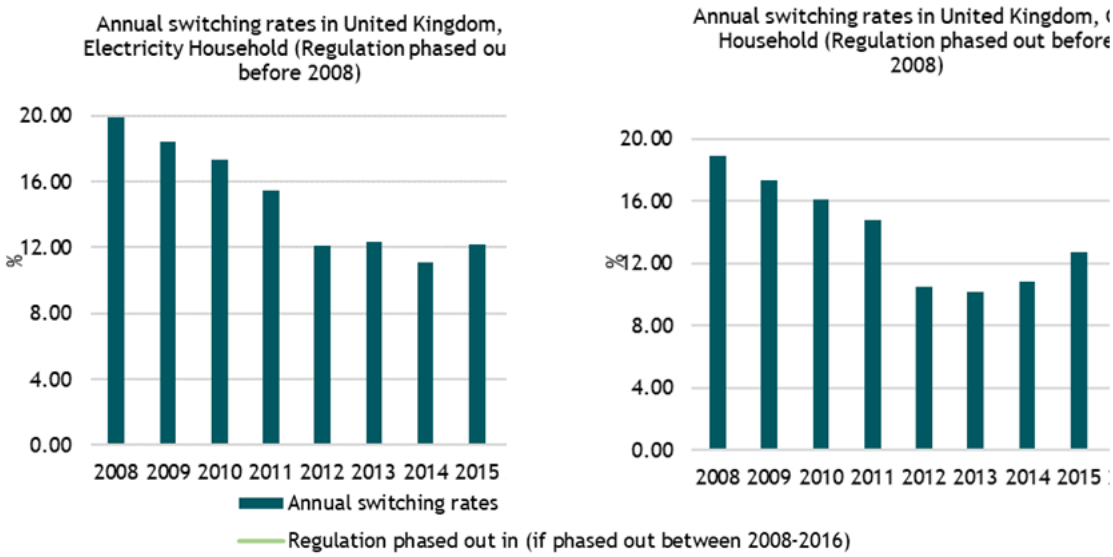
### Consumer engagement and expenditures on energy

The figures below show the annual switching[621] rates in households for both electricity and gas, which shows that the vast majority of customers do not frequently change their supplier, although this trend has improved over the last three years, with the most recent data from the Energy UK trade association (May 2018[622]) confirming that this growth in switching is continuing. The CMA report quoted earlier in this note gave the following summary analysis of the main reasons behind many customers lack of switching.

"Some categories of customer – for example, those who do not have access to the internet, those who are on particular types of restricted meter, and prepayment customers – experience specific, material difficulties in shopping around and switching. However, for the majority of domestic customers, shopping around and switching is relatively easy - yet many of these customers have never considered engaging, either because it has not occurred to them or because they think it will be too much hassle. There are a number of possible explanations for this, including the role of traditional meters and bills, which create barriers to understanding,

the lack of quality differentiation of gas and electricity and the absence of a trigger point for engagement, arising from the fact that energy is continuously supplied whether or not a customer has signed a contract."

**Figure 372 Annual switching rates for households in UK**




*Source:* CEER data

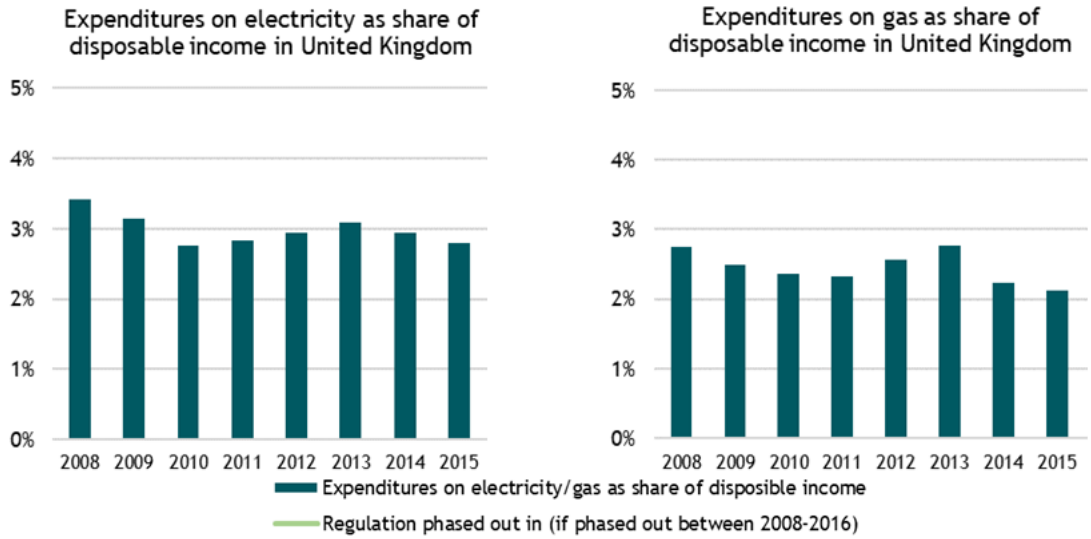
Regarding the impact of regulated prices on household energy expenditures, the consortium has calculated expenditures on gas and electricity as share of disposable income for households in the

[621] Switching is defined as the voluntary action by which a customer changes his supplier

[622] https://www.energy-uk.org.uk/publication.html?task=file.download&id=6677

middle consumption bands[623] (for electricity, those who consume between 2.5 MWh and 5 MWh per year and for gas those who consume between 20GJ and 200 GJ per year).[624] The indicator shows the significance of the total energy bill compared to the disposable income and is therefore a proxy to understand the level and evolution of the affordability of energy in UK. It is interesting to note that the peak in the relative expense of gas and electricity coincided with an increase in the rate of switching suppliers. This could indicate that the higher prices encouraged more people to seek a lower cost supplier.

**Figure 373: Expenditures on gas and electricity as share of disposable income for households in UK (for middle consumption bands DC and D2) using PPS prices[625]**




*No data is available for 2016*

*Note: Average yearly household expenditures may deviate with other sources due to factors such as differences between numbers of households and actual connection points*

*Source:* Own calculations[626] based on Eurostat

### Competition performance and mark-ups

The alignment between the energy component of retail prices and wholesale prices over time is a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of retail prices to those observed in the wholesale prices. It is interesting to see that for UK, despite prices (and the energy price component) rising for

[623] The data available on gas and electricity prices is provided per consumption band. This report shows the middle consumption bands for easier visualisation: DC for the electricity market for household consumers (2.5 MWh – 5 MWh per year), D2 for the gas market for households consumers (20 GJ – 200 DJ per year), ID for the electricity market for non-household consumers (2 GWh – 20 GWh per year) and I3 for the gas market for non-household consumers (10 TJ – 100 TJ per year)

[624] The expenditures on energy where calculated by multiplying the energy consumption per household by its price and divide this by the disposable income per household.

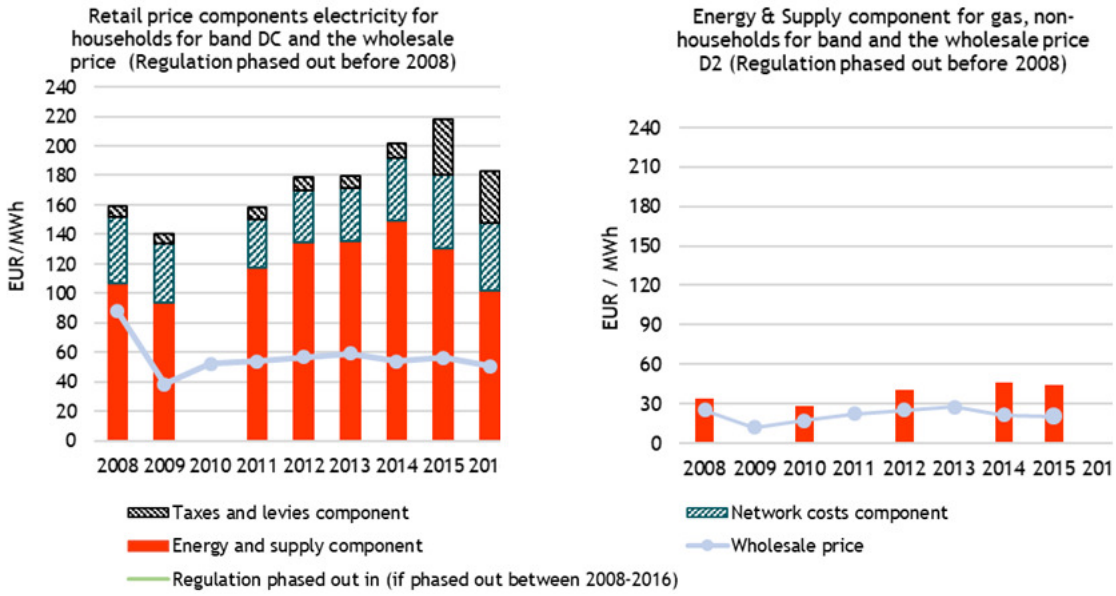
[625] Purchasing Power Parity (PPS) is an artificial currency used to compare prices across countries, taking into account the differences in purchasing power between countries (Eurostat statistics explained, 2014).

[626] Energy expenditures as share of disposable income have been calculated using the electricity and gas retail prices and the average energy consumptions per household (calculated using the number of households per country and the country energy consumption for the household sector). This was further compared to the household disposable income as reported by Eurostat.

electricity the wholesale price remained relatively flat (as shown in figure 4). For gas the whole price tracked the energy component more closely. The CMA report[627] considered the level of profits made by energy suppliers and produced the following conclusions:

"After a sustained period of real terms reductions in the years following privatisation, domestic gas and electricity prices have increased significantly over the last ten years. Average domestic electricity prices rose by around 75% in real terms between 2004 and 2014, and average domestic gas prices rose by around 125% in real terms over the same period. In 2015, the upwards trend halted, with electricity prices roughly flat and gas prices falling nearly 5% in real terms.
We have reviewed financial data submitted by the Six Large Energy Firms, for the period 2009 to 2014. This suggests that, for electricity, the main drivers of domestic price increases from 2009 to 2014 were the costs of social and environmental obligations and network costs. Reported wholesale costs remained flat while profit (EBIT[628]) margins fell sharply in 2010 and rose steadily year on year thereafter. For gas, there was a broadly even percentage increase in wholesale costs, network costs, obligation costs and indirect costs, with EBIT increasing significantly after 2009. Average EBIT margins earned on sales to domestic customers were 3.5% over the period. Average EBIT margins on sales of gas (4.5%) were higher than those on sales of electricity (2.5%)."

**Figure 374 Retail household price for middle consumption bands (DC and D2) and wholesale prices in UK**



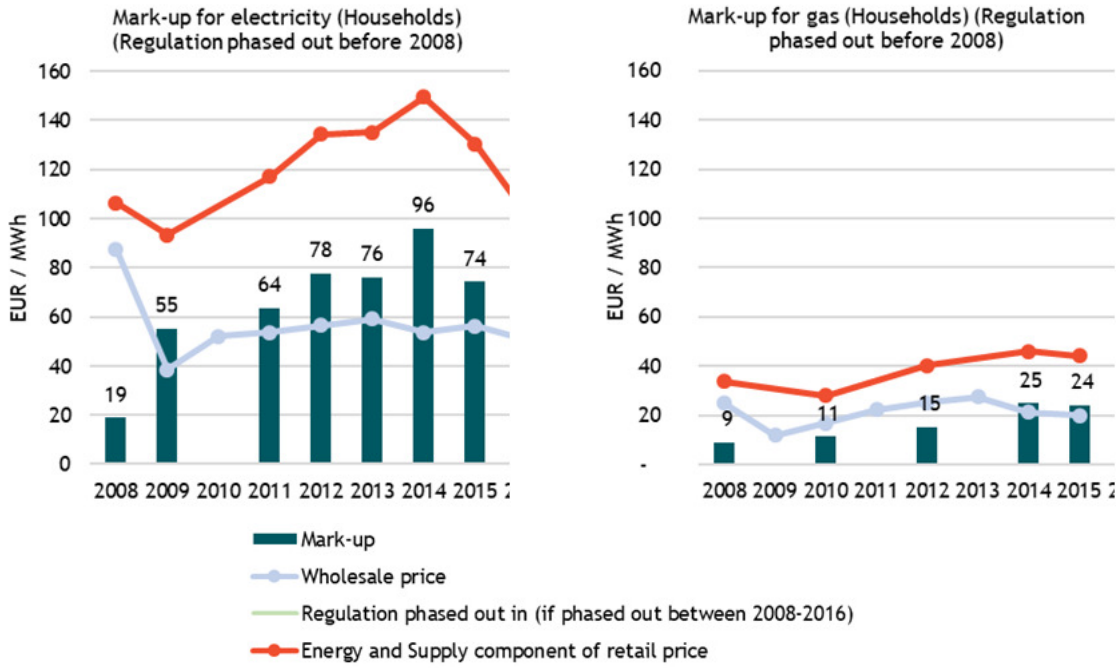

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016 and not for the electricity market in 2010. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price)[629] and EMOS (wholesale price)

627
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/531157/Energy-final-report-summary.pdf
628 Earnings before interest and tax, or gross profit less indirect costs
629 Eurostat has data available on gas prices; however not for the energy and supply component.

The competition performance section also assesses gross margins made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[630] The figures below show the mark-ups along with the wholesale price.

**Figure 375 Mark-ups for UK, middle consumption bands (DC and D2)**




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016*

*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*

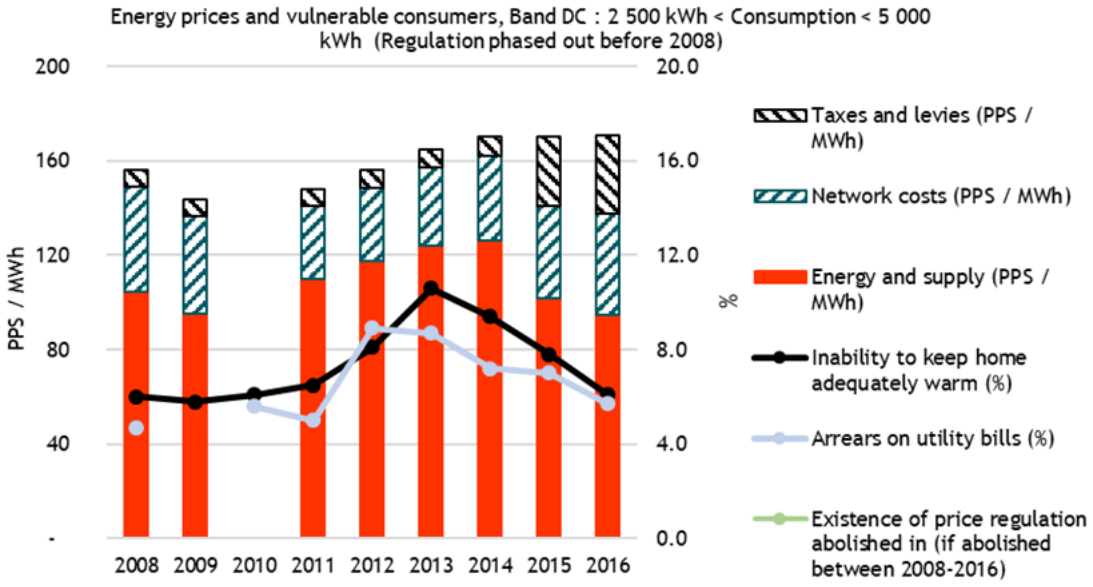
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

### *28.1.2 Energy poverty*

The consumers in UK which are potentially suffering from energy poverty are decreasing over time, as can be seen by the diagram below showing the share of the population with arrears on their utility bills and unable to keep their home adequality warm.

**Figure 376 Electricity price components for Band DC, the inability to keep home adequately warm and arrears on utility bills in UK**

[630] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014




*No data is available on the retail price in 2010 and the arrears on the utility bill in 2009*

*Source:* Eurostat

UK energy suppliers operate a scheme known as the Warm Home Discount[631]. The warm home discount is a £140 per year discount to the electricity bill that is available to those that receive pension credits (i.e. pensioners with incomes below a certain level) or those on a low income (i.e. that receive certain income dependant social payments). The customers need to apply to their supplier for this discount and the number of discounts each supplier can give is limited.

The UK social care system also provides a winter fuel benefit[632] of between £100 and £300 to eligible pensioners. The government also provides additional cold weather payments[633] of £25 per person for each 7 day period of very cold weather on an area by area basis when average temperatures fall below zero degrees Celsius for seven consecutive days between 1 November and 31 March.

### *28.1.3 Quality of services*

Consumer satisfaction and consumer choice are areas identified for the assessment of the evolution of the quality of service.

#### Consumer satisfaction

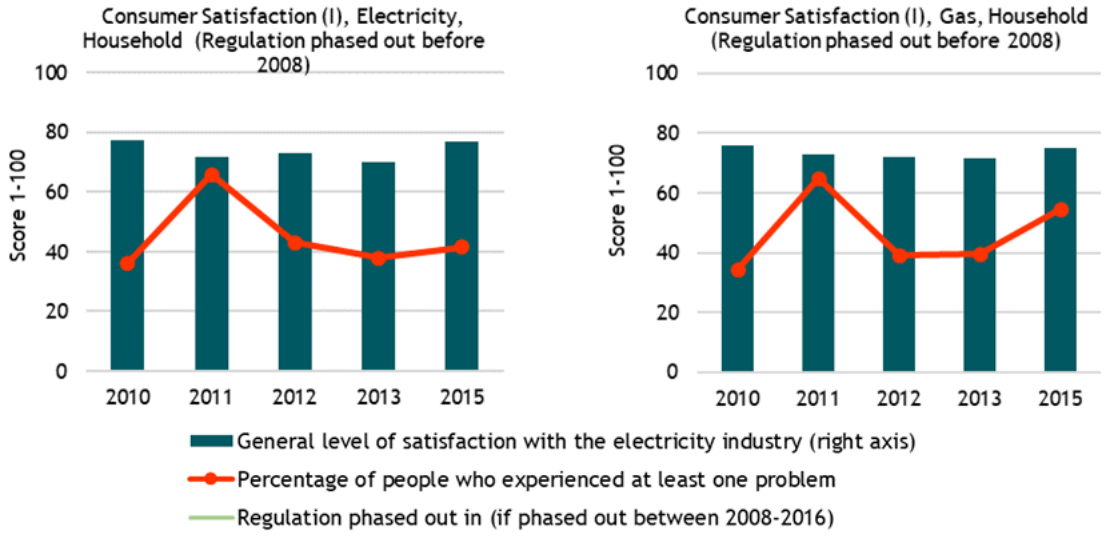
Over the period of investigation, the level of consumer satisfaction has remained rather stable between 2010 and 2015 both for electricity and gas. The percentage of people experiencing a problem with electricity services however has decreased since it peaked in 2011. For gas the incidence of problems also peaked in 2011, after which there was a significant decrease and another peak in 2015.

The CMA report considered consumer satisfaction in its report, noting considerable concerns about the quality of service offered by the Six Large Energy Firms. ... According to the CMA report, the number

631 https://www.gov.uk/the-warm-home-discount-scheme
632 https://www.gov.uk/winter-fuel-payment
633 https://www.gov.uk/cold-weather-payment

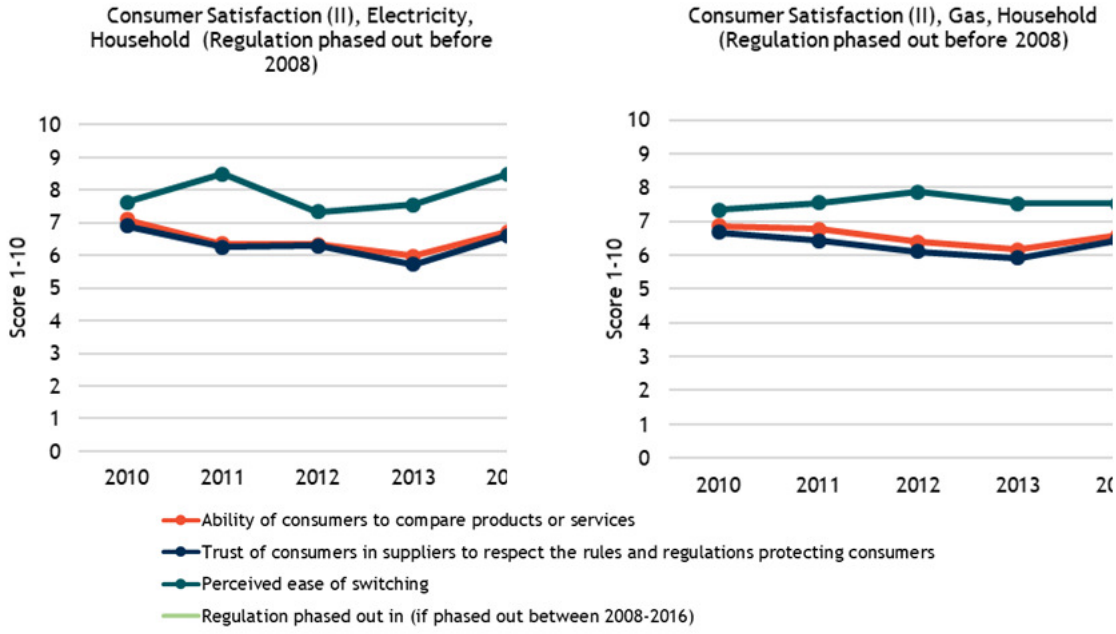
of recorded complaints increased six-fold between 2008 and 2014 before falling by 20% in 2015. Complaints usually were related to billing, customer services and payments.

**Figure 377 General level of satisfaction with the industry and the percentage of people who experienced at least one problem in UK for households**




*Source:* EC – DG Justice[634]

**Figure 378 Ability of consumers to compare products or services[635], trust of consumers in suppliers[636] and perceived ease of switching[637] in UK**




*Source:* EC – DG Justice

[634] Note that from 2013 onwards, the survey was carried out every other year.
[635] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "I can chose from a sufficient number of electricity providers?"
[636] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "In your opinion, do consumers trust electricity suppliers with respect to the rules and regulations protecting consumers?"
[637] DG Justice survey: The functioning of retail electricity markets for consumers in the EU. Question: "Which of the following best reflects your experience of switching?" Average of three answers (easy, average, difficult)

## Consumer choice

The table below provides an overview of key indicators regarding consumer choice. The UK offers a wide range of tools to foster consumer choice, which qualifies it as a highly developed market in that regard (especially since it is also counting with modern ICT-based offerings).

**Table 28-1 Consumer choice in UK (electricity, households)**

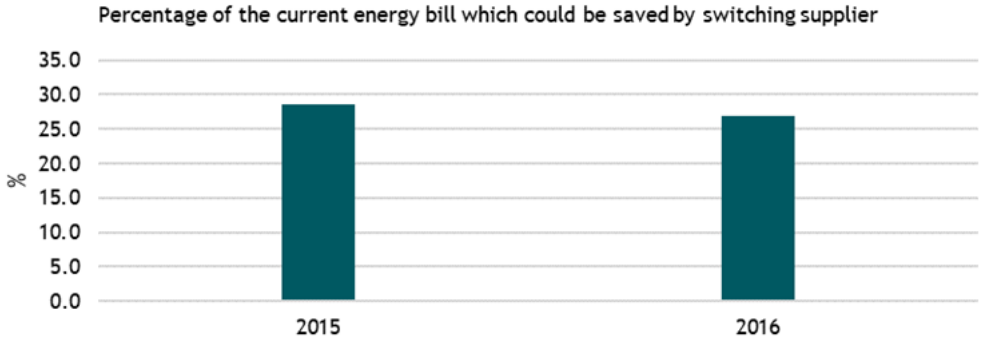
| | Answer |
|---|---|
| Dual-offers (electricity and gas combined) available in 2014 (CC03) | Yes |
| Certified green offers available in 2015 (CC04) | Yes |
| Availability of non-price-financial benefit in 2014 (sign-in discounts, bonus for renewing contract, loyalty programs, etc.) (CC16) | Yes |
| Availability of non-financial benefits in 2014 (home insurance, free maintenance of water boilers, etc.) (CC17) | Yes |
| Availability of ICT-based offerings in 2014 (in-house display, energy consumption feedback mobile app, etc.) (CC18) | Yes |

*Note that "-" indicates missing data*

*Source:* ACER/CEER (2015)

The potential savings from switching suppliers in the UK slightly decreased from 2015 to 2016 as indicated below.

**Figure 379 Percentage of the current electricity bill which could be saved by switching supplier in UK**

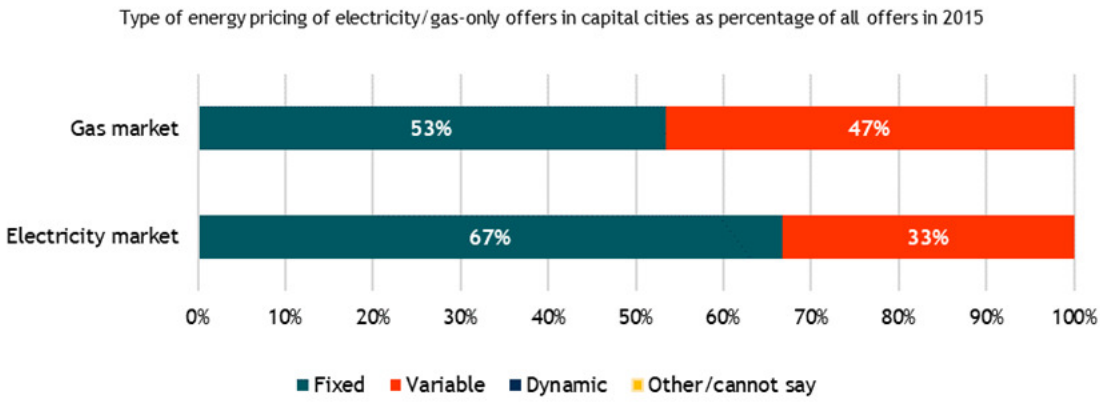



*Note: Savings may include one-time benefits such as sign-in bonuses*

*Source:* VaasaETT (2016)

The diagrams below show the type of offers available for electricity and gas, most of which are variable.

**Figure 380 Type of offers for households in UK**




*Note: Dynamic price contracts are a type of variable contract but presented separately.*
*Source:* ACER/CEER (2015)

The CMA report acknowledges a wide variation in the energy prices paid by domestic customers. According to this report, customers could have made considerable savings (equivalent to more than 20% of their bill) from switching a combination of suppliers, tariffs and payment methods.

## 28.2 Non-Household Price Regulation in UK

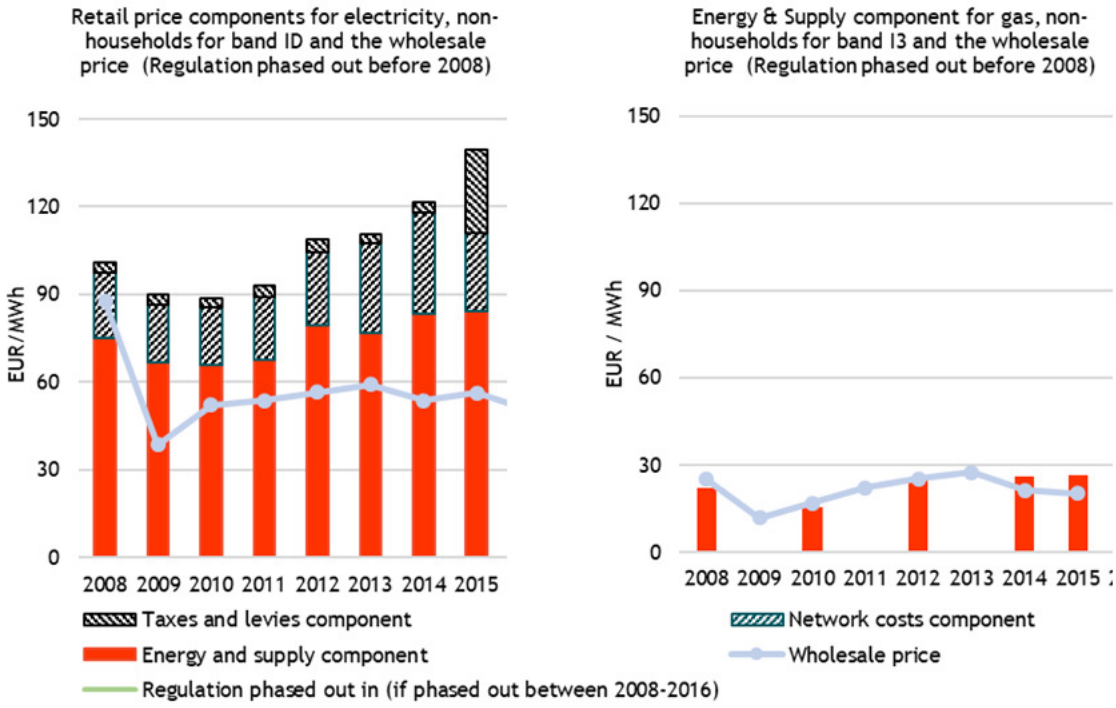
**The UK had no energy price regulation for non-households in the period assessed.**

There is no price regulation of energy prices for non-households in the UK.

### *28.2.1 Selected aspects of competition (mark-ups)*

The alignment between the energy component of (industry) retail prices and wholesale prices over time is also a proxy for the efficiency of retail competition. Therefore, competition performance was assessed by comparing the evolution of the energy component of the retail prices to those observed in the wholesale prices. Wholesale prices (for non-household consumers) on the electricity market were high in 2008 and decrease drastically in 2009 after which have remained stable over the investigated time period. Retail prices, on the other hand, have increased since 2010 until 2015 in part due to increasing energy and supply component. For the gas market, wholesale prices seem to correlate with the energy and supply component, with an increasing trend.

**Figure 381 Industry retail price components for middle bands (ID and I3) and wholesale prices in UK**



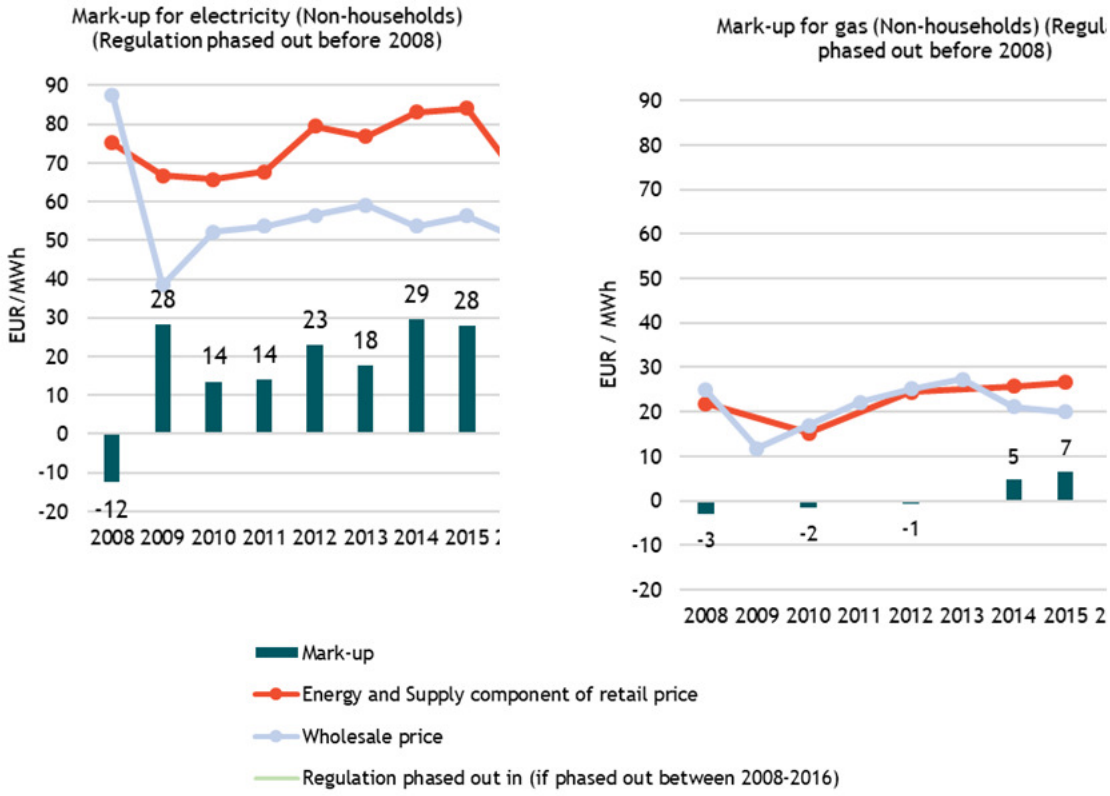

*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016. Also, there is no data available for the taxes and levies component and the network component for the gas market.*

*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

The competition performance section also assesses profits made by suppliers by calculating mark-ups. Mark-ups for the retail markets are calculated as the differences between the wholesale price and retail energy price component.[638] The figures below show the mark-ups along with the wholesale price. For the electricity market, (industry) retail mark-ups increased from -12 EUR/MWh in 2008 to between 14-29 EUR/MWh between 2009 and 2016. In the gas market, mark-ups have shown a steady increase from -3 EUR/MWh in 2008 to 7 EUR/MWh in 2016.

[638] ACER/CEER (2015), Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

Figure 382 Mark-ups for UK, middle consumption bands (ID and I3)




*Note that data is not available for the gas market in 2009, 2011, 2013 and 2016.*
*Note: Differences in mark-ups to other sources may arise due to differences such as the consideration of supplier procurement strategies, forward prices, and the energy price data used.*
*Source:* Eurostat (components of the electricity retail price), EC ad-hoc data (energy and supply component of the gas retail price) and EMOS (wholesale price)

As with domestic tariffs the mark up and total cost are much closer for gas than they are for electricity.

The CMA report also considered the energy prices paid by SMEs and micro-businesses. It concluded that: "EBIT margins from retail sales to SMEs (including microbusinesses) were on average 8% over the period – significantly higher than those on sales to domestic customers or industrial and commercial (I&C) customers. Margins on sales of gas to SMEs (10%) were higher than those on sales of electricity (7%)."

## 28.3 Tariff deficit in UK

**The UK had no tariff deficit between 2008 and 2016.**

Tariff deficits are shortfalls of revenues in the electricity system, which arise when the tariffs for the regulated components of the retail electricity price are set below the corresponding costs borne by the energy companies. This does not appear to be an issue in the UK.

# Annex J: T4 - Classification and definition of interventions

| Intervention category | Intervention type |
|---|---|
| Tax expenditures | Accelerated depreciation |
| | EUA ETS |
| | Exemption & reduction -Energy tax |
| | Exemption & reduction -Fuel excise tax |
| | Exemption & reduction -Taxes and levies |
| | Exemption & reduction -VAT (related to energy use) |
| | Tax allowance |
| | Tax credits |
| Direct transfer | Grants |
| | Soft loans |
| | Others |
| Indirect transfer | Biofuels blending mandate |
| | Capacity payment |
| | Differentiated grid connection charges |
| | Energy efficiency obligations |
| | Feed-in premiums |
| | Feed-in tariffs |
| | Interruptible load schemes |
| | Others |
| | Power purchase agreement (PPA) |
| | Price guarantees (cost support) |
| | Price guarantees (price regulation) |
| | RES quotas with tradable certificates |
| RD&D budgets | RD&D budgets |
| Others | Others |

*Accelerated depreciation*

Accelerated depreciation is a measure that can be used to provide a tax advantage to firms, resulting in foregone income to the Government. It works by changing the rate at which capital assets can be written off in firm accounts, allowing firms to write off more than would otherwise be allowed in the early years of the asset-life.

Accelerated depreciation can act as an important investment incentive, being advantageous in increasing a firm's book costs and therefore reducing the profits on which tax is payable in the short term. Within an individual investment the nominal total tax liability should be unchanged over the asset life, but there are benefits to the firm of using accelerated depreciation due to time preference, i.e. it

is preferable to have money now than in the future, as this can be used to generate interest or other returns in the meantime. It is also advantageous within a wider company portfolio to help reduce taxes paid on other incomes, and can be used to attract investors to a project where accounting rules allow for an investor to 'buy' the tax advantage of accelerated depreciation.

*Biofuels blending mandate*

Any market price support mechanisms for biofuel in the transport sector.

*Capacity payment*

Electricity capacity mechanisms have be deployed by MS in order to prevent energy shortages that could affect consumers. Capacity mechanisms are measures that allow energy providers to be paid for maintaining their existing power plants or even for investing in new ones. This is in addition to the normal payment they receive for providing electricity to the market.

*Differentiated grid connection charges*

New power plants have to pay costs associated with connecting to grid. "Shallow" costs describe the connection to the next grid connection point. "Deep" costs include the reinforcement of existing grid infrastructure to cope with additional generation capacity. In some cases, Governments intervene to reduce or waive these costs for certain technologies.

*Energy efficiency obligations*

In an energy efficiency obligation, an energy supplier (or other entity) is given an obligation by the Government to achieve a certain level of savings (either in energy or in carbon). Often, these obligations include a social element requiring a certain proportion of the savings to be delivered in poorer households.

*Exemption and reduction - Energy tax*

Certain customer groups can be exempted from taxes for social reasons. Some industrial customers might be exempted because of other energy efficiency measures, e.g. sector specific demand reduction targets. There are countries where all customers get some form of compensation to lift the financial burden.

*Exemption and reduction - Fuel excise tax*

Fuels are taxed for a number of reasons, including providing an incentive for energy saving. If the fuels are converted to other energy carriers (e.g. electricity, petrol) which in turn are taxed, any exemption or reduction is not be calculated at the level of the primary but at the level of the secondary energy carrier. In other words, they are not be considered as an exemption/reduction for coal/crude oil. As heat is not taxed by additional energy taxes, exemptions from fuel taxes for CHP are also covered.

*Exemption and reduction - Taxes and levies*

There are several MS specific taxes and levies to finance other electricity related costs and to support generation from renewable energy sources. Specific customers are exempted from these payments. These exemptions most often apply to large consumers such as the energy intensive industry or low-income customers. Some MS also put a limit on the grid fee and concession fee payments for specific customers. These reductions are mainly granted to energy intensive industries and industrial customers with specific characteristics.

*Exemption and reduction - VAT (related to energy use)*

Electricity is an input factor for production. For industrial customers, VAT payments are refundable. In households, electricity is required to serve the basic needs. Therefore, in some countries, a reduced rate is applied to the electricity consumption of households. There is some discussion in literature whether this should be classified as a subsidy. We assume it is if there is a difference between the general level of VAT and that on energy.

### *Feed-in tariffs*

In a feed-in tariff (FIT) system, power plant operators receive a fixed payment for each unit of electricity, heat and/or biogas generated, independent of the market price of these energy products. In other words, in tariff systems, generators do not sell the produced electricity on the power market, but a single buyer fulfils this role. Most countries use a differentiation according to technology, which facilitates the development of a range of technologies due to the different level of tariffs they receive. The specific design of the feed-in scheme may differ as well: some countries have a fixed tariff over the complete support term, others have decreasing tariffs.

### *Feed-in premiums*

In a feed - in premium scheme, plant operators have to sell their renewable energy on the market and receive an additional payment on top of the market price - either as a fixed payment or adapted to changing market prices (e.g. with cap and floor prices, sliding premium/Contract for Difference) to limit the price risk for plant operators.

Premium schemes provide a secure additional return for producers, while exposing them to the electricity price risk. The level of premiums is based on future expectations regarding the generation costs of renewable electricity and the average electricity market revenues.

### *Free allocation of emission allowances in the EU ETS*

In the context of the EU ETS, the allowances are allocated either by auctioning or by free allocation. Installations in the manufacturing and power sector received free allocation of emission allowances during Phase II (2008 - 2012). The allowances were grandfathered on the basis of historic emissions. Since 2013, the power producers are subject to 100% auctioning. The only exception is modernisation of the power sector in certain Member States. Auctioning is the default method, however in sectors other than power generation, the continuation of free allocation allows the EU to pursue ambitious emission reduction targets while protecting internationally competing industry from the risk of carbon leakage.

### *Grants*

Grants are non-repayable funds or products disbursed or gifted by a public entity such as European Union, governments, ministries, national agencies, etc.

### *Interruptible load schemes*

In several countries, there are interruptible load schemes that provide payment to electricity consumers that agree to be switched off remotely where there is a danger of system black outs. These schemes are implemented additional to balancing markets. Participants have to meet high standards to take part.

These prequalification standards only apply to energy intensive industries. The payments for capacity are tendered in an auction, but because of the low number of eligible participants, the result of the auction often hits the maximum price limit.

### *Price guarantees (cost support)*

Price guarantees refer to measures that protect producers or consumers of energy by setting the price of fuels or electricity below or higher than a reference price. Examples of the first variant include social tariffs for electricity that protect certain target groups against too high burdens of energy costs in total household expenditures or the provision of fossil fuels as input to electricity generation below actual cost. The last example protects producers.

### *Price guarantees (price regulation)*

Price guarantees refer to measures where an institution (Government, regulator…) sets the price of fuels or electricity to a certain level, which doesn't fully cover the total cost of the energy provided. This type of measure applies to all final customers (may be split between residential, commercial, industry…), not only to a specific group of customers (see definition of "Price guarantees (cost support)").

### *RD&D budget*

Energy research, development and demonstration (RD&D) budgets cover various types of interventions such as fiscal instruments (e.g. taxes), financial instruments (e.g. loans, grants), market-based mechanisms, direct investment (e.g. public procurement), education and information campaigns, or technology replacement programmes.[639]

### *RES quotas with tradable certificates*

In case of quota obligation schemes, Governments impose minimum shares of a particular energy source on suppliers (or consumers and producers). Quota obligations are frequently combined with tradable green certificates. Plant operators receive certificates for their electricity, heat and biogas, which they may sell to the actors obliged to fulfil their quota obligation. Hence, green certificates provide support in addition to the market price and are used as proof of compliance. A green certificate represents the value of the energy and facilitates trade in that value.

Some countries apply what is called technology banding: distributing different amounts of certificates according to the cost of a particular technology. This is to avoid that only the cheaper energy options are deployed. There are also examples of Governments that apply minimum/'floor' prices and sometimes prices are capped by the Government.

### *Soft loans*

A loan or debt is the amount of money that is provided to a project by a third party under the condition that this will be (entirely or partially) repaid during or at the end of the agreed debt term. Loan facilities can be very helpful in case the availability of capital is a problem. Loans can cover up to 100% of the financeable cost and are used for both renewable energy and energy saving projects. Interest rates and repayment periods of loans have a major impact on the overall cost of projects. Especially new technologies, smaller projects or project developers without a proven track record often experience difficulties in obtaining commercial loans at reasonable conditions. Governments can increase commercial viability of projects significantly by offering low interest loans or loan guarantees. Governments can offer low interest loans for specific technologies directly through state-owned banks or through subsidies to commercial banks. These loans can be characterised by lower interest rates and/or longer repayment periods. Low interest loans have been applied successfully in for example

[639] For more detail, see http://www.iea.org/statistics/rdd/

Spain and Germany. Governments can also offer just loan guarantees for certain projects. In that case the Government guarantees debt repayment to the lending bank, thus reducing risk and hence interest rate (e.g. 1 to 2%), debt term and debt service conditions of the loan.

### *Tax credits*

Tax credits are applied to the actual amount of tax owed/payable. It is typically based on a percentage of eligible R&D expenditures.

### *Tax allowances*

Tax allowances (which can also be described as deductions, reliefs and exemptions) reduce the amount of income that is taxable. It refers to the amount of money which a taxpayer is allowed to earn and not pay tax on (taxable income), as a result of carrying out activities (in particular R&D). These are typically expressed in the form of a, for example, 150% allowance, which allows for a firm to deduct an additional 50% on top of the actual expenditure.

### *Others*

Interventions in this category do not fit with any other pre-existing categories, but do relate to investments. Examples of public interventions that fall in this category are loan guarantees, planning exemptions, exemptions from stamp duties etc.

# Annex K: T4 – Country and sector subsidies factsheets

## Country factsheets

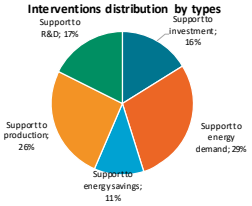
For all following sheets: *Source:* Own calculations

# European Union (constant prices 2017)

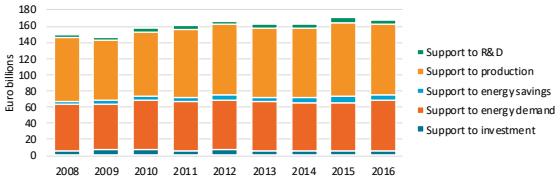
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 242 | *16%* | 5 | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 7 | 59 | 1 | +27% | +3% |
| Support to energy demand | 433 | *29%* | 57 | 56 | 61 | 59 | 62 | 61 | 59 | 59 | 61 | 536 | 4 | +6% | +1% |
| Support to energy savings | 168 | *11%* | 3 | 4 | 5 | 5 | 5 | 6 | 8 | 9 | 7 | 51 | 3 | +105% | +9% |
| Support to production | 388 | *26%* | 80 | 75 | 81 | 84 | 87 | 84 | 86 | 92 | 89 | 758 | 8 | +10% | +1% |
| Support to R&D | 261 | *17%* | 3 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 40 | 1 | +48% | +5% |
| **Total** | **1 492** | ***100%*** | **150** | **146** | **158** | **160** | **167** | **161** | **163** | **170** | **168** | **1 444** | **18** | **+12%** | **+1%** |

Interventions distribution by types



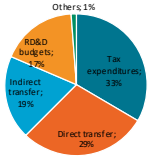

Financial support by types (billion euros)



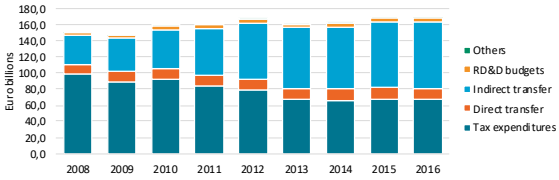

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 497 | *33%* | 99 | 88 | 91 | 84 | 79 | 67 | 66 | 68 | 68 | 711 | -31 | -32% | -5% |
| Direct transfer | 434 | *29%* | 11 | 14 | 14 | 13 | 13 | 13 | 14 | 14 | 14 | 119 | 3 | +26% | +3% |
| Indirect transfer | 285 | *19%* | 37 | 40 | 48 | 58 | 71 | 76 | 77 | 82 | 82 | 569 | 45 | +123% | +11% |
| RD&D budgets | 261 | *17%* | 3 | 4 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 40 | 1 | +48% | +5% |
| Others | 15 | *1%* | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 5 | 0 | -32% | -5% |
| **Total** | **1 492** | ***100%*** | **150** | **146** | **158** | **160** | **167** | **161** | **163** | **170** | **168** | **1 444** | **18** | **+12%** | **+1%** |

Interventions distribution by sub-types



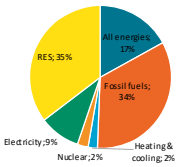

Financial support by sub-types (billion euros)



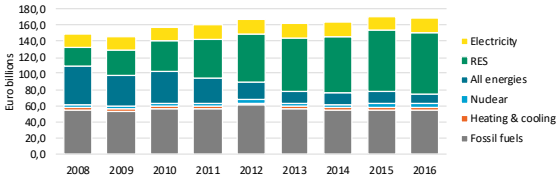

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 252 | *17%* | 47 | 38 | 38 | 31 | 21 | 14 | 14 | 15 | 11 | 230 | -36 | -76% | -16% |
| Fossil fuels | 505 | *34%* | 54 | 53 | 56 | 56 | 60 | 56 | 55 | 55 | 55 | 502 | 1 | +3% | +0% |
| Heating & cooling | 33 | *2%* | 3 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 29 | 0 | +1% | +0% |
| Nuclear | 35 | *2%* | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 39 | 1 | +28% | +3% |
| Electricity | 141 | *9%* | 16 | 17 | 18 | 18 | 18 | 17 | 18 | 17 | 18 | 157 | 1 | +8% | +1% |
| RES | 526 | *35%* | 25 | 31 | 38 | 48 | 59 | 67 | 70 | 75 | 75 | 488 | 50 | +203% | +15% |
| **Total** | **1 492** | ***100%*** | **150** | **146** | **158** | **160** | **167** | **161** | **163** | **170** | **168** | **1 444** | **18** | **+12%** | **+1%** |

Interventions distribution by energy/technology



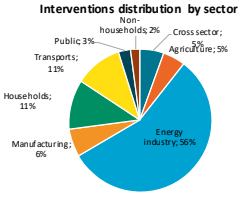

Financial support by energy/technology (billion euros)



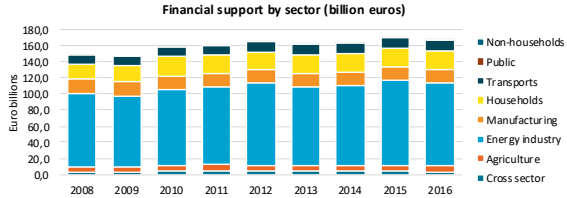

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 81 | *5%* | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 31 | 0 | +18% | +2% |
| Agriculture | 76 | *5%* | 7 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 71 | 1 | +10% | +1% |
| Energy industry | 839 | *56%* | 91 | 87 | 93 | 97 | 101 | 97 | 99 | 105 | 102 | 871 | 11 | +12% | +1% |
| Manufacturing | 93 | *6%* | 18 | 18 | 18 | 16 | 17 | 17 | 17 | 17 | 17 | 153 | -1 | -4% | -1% |
| Households | 167 | *11%* | 19 | 20 | 24 | 23 | 23 | 23 | 24 | 23 | 24 | 203 | 5 | +25% | +3% |
| Transports | 162 | *11%* | 12 | 11 | 11 | 11 | 13 | 12 | 12 | 13 | 13 | 108 | 2 | +13% | +2% |
| Public | 42 | *3%* | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 4 | 0 | +64% | +6% |
| Non-households | 32 | *2%* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | +117% | +10% |
| **Total** | **1 492** | ***100%*** | **150** | **146** | **158** | **160** | **167** | **161** | **163** | **170** | **168** | **1 444** | **18** | **+12%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

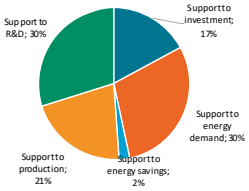


# Austria

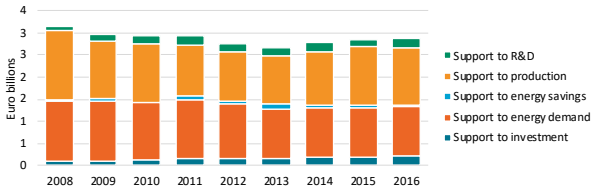
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 8 | *17%* | 0,10 | 0,11 | 0,12 | 0,14 | 0,15 | 0,16 | 0,17 | 0,17 | 0,21 | 1,32 | +109% | +10% |
| Support to energy demand | 14 | *30%* | 1,35 | 1,35 | 1,33 | 1,35 | 1,26 | 1,13 | 1,14 | 1,14 | 1,12 | 11,17 | -17% | -2% |
| Support to energy savings | 1 | *2%* | 0,06 | 0,06 | | 0,06 | 0,05 | 0,10 | 0,06 | 0,06 | 0,03 | 0,48 | -41% | -6% |
| Support to production | 10 | *21%* | 1,54 | 1,30 | 1,31 | 1,19 | 1,10 | 1,10 | 1,21 | 1,32 | 1,31 | 11,38 | -15% | -2% |
| Support to R&D | 14 | *30%* | 0,10 | 0,14 | 0,19 | 0,20 | 0,18 | 0,18 | 0,20 | 0,17 | 0,20 | 1,57 | +93% | +9% |
| **Total** | **47** | ***100%*** | **3,15** | **2,96** | **2,95** | **2,94** | **2,75** | **2,66** | **2,77** | **2,86** | **2,88** | **25,92** | **-9%** | **-1%** |

Interventions distribution by types



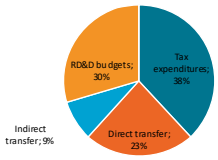

Financial support by types (billion euros)



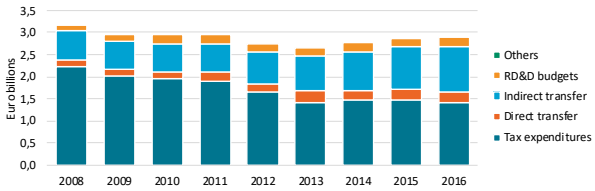

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 18 | *38%* | 2,22 | 2,00 | 1,97 | 1,88 | 1,64 | 1,42 | 1,46 | 1,48 | 1,41 | 15,48 | -37% | -6% |
| Direct transfer | 11 | *23%* | 0,16 | 0,17 | 0,12 | 0,21 | 0,20 | 0,26 | 0,23 | 0,23 | 0,24 | 1,84 | +50% | +5% |
| Indirect transfer | 4 | *9%* | 0,67 | 0,64 | 0,67 | 0,65 | 0,72 | 0,80 | 0,89 | 0,98 | 1,03 | 7,04 | +53% | +5% |
| RD&D budgets | 14 | *30%* | 0,10 | 0,14 | 0,19 | 0,20 | 0,18 | 0,18 | 0,20 | 0,17 | 0,20 | 1,57 | +93% | +9% |
| Others | | | | | | | | | | | | | | |
| **Total** | **47** | ***100%*** | **3,15** | **2,96** | **2,95** | **2,94** | **2,75** | **2,66** | **2,77** | **2,86** | **2,88** | **25,92** | **-9%** | **-1%** |

Interventions distribution by sub-types



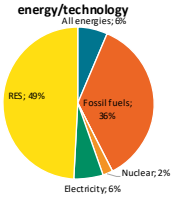

Financial support by sub-types (billion euros)



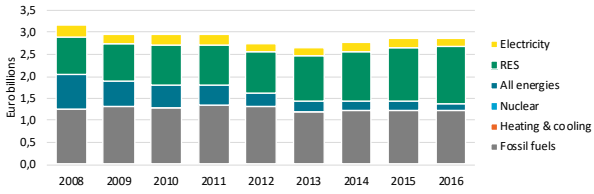

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 3 | *6%* | 0,76 | 0,56 | 0,48 | 0,44 | 0,28 | 0,24 | 0,20 | 0,23 | 0,15 | 3,36 | -80% | -18% |
| Fossil fuels | 17 | *36%* | 1,27 | 1,32 | 1,30 | 1,36 | 1,32 | 1,21 | 1,24 | 1,22 | 1,23 | 11,47 | -3% | -0% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 1 | *2%* | 0,01 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | -70% | -14% |
| Electricity | 3 | *6%* | 0,25 | 0,23 | 0,24 | 0,24 | 0,20 | 0,19 | 0,21 | 0,20 | 0,19 | 1,95 | -21% | -3% |
| RES | 23 | *49%* | 0,87 | 0,85 | 0,91 | 0,90 | 0,94 | 1,02 | 1,13 | 1,21 | 1,30 | 9,12 | +49% | +5% |
| **Total** | **47** | ***100%*** | **3,15** | **2,96** | **2,95** | **2,94** | **2,75** | **2,66** | **2,77** | **2,86** | **2,88** | **25,92** | **-9%** | **-1%** |

Interventions distribution by energy/technology



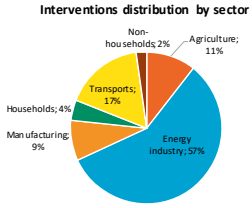

Financial support by energy/technology (billion euros)



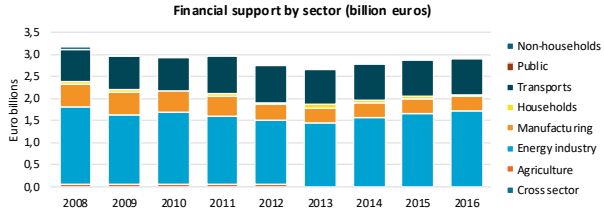

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | | | | | | | | | | | | | | |
| Agriculture | 5 | *11%* | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,00 | 0,00 | 0,00 | 0,00 | 0,31 | -100% | -60% |
| Energy industry | 27 | *57%* | 1,74 | 1,55 | 1,62 | 1,52 | 1,43 | 1,43 | 1,57 | 1,66 | 1,72 | 14,24 | -1% | -0% |
| Manufacturing | 4 | *9%* | 0,53 | 0,52 | 0,49 | 0,47 | 0,37 | 0,34 | 0,32 | 0,32 | 0,32 | 3,70 | -39% | -6% |
| Households | 2 | *4%* | 0,06 | 0,06 | | 0,06 | 0,05 | 0,10 | 0,06 | 0,06 | 0,03 | 0,48 | -41% | -6% |
| Transports | 8 | *17%* | 0,73 | 0,75 | 0,76 | 0,82 | 0,83 | 0,78 | 0,82 | 0,82 | 0,80 | 7,12 | +9% | +1% |
| Public | | | | | | | | | | | | | | |
| Non-households | 1 | *2%* | 0,04 | 0,02 | 0,02 | | | | | | | 0,08 | -100% | -100% |
| **Total** | **47** | ***100%*** | **3,15** | **2,96** | **2,95** | **2,94** | **2,75** | **2,66** | **2,77** | **2,86** | **2,88** | **25,92** | **-9%** | **-1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

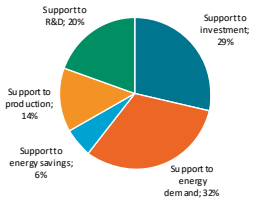


# Belgium

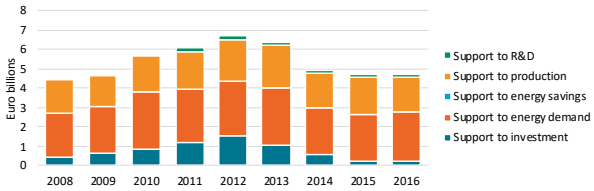
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 19 | *29%* | 0,38 | 0,64 | 0,83 | 1,15 | 1,56 | 1,01 | 0,58 | 0,19 | 0,19 | 6,54 | -49% | -8% |
| Support to energy demand | 21 | *32%* | 2,30 | 2,39 | 2,98 | 2,77 | 2,77 | 3,01 | 2,40 | 2,45 | 2,56 | 23,64 | +11% | +1% |
| Support to energy savings | 4 | *6%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,05 | +133% | +11% |
| Support to production | 9 | *14%* | 1,74 | 1,60 | 1,84 | 1,99 | 2,18 | 2,18 | 1,76 | 1,91 | 1,78 | 16,98 | +2% | +0% |
| Support to R&D | 13 | *20%* | | | 0,06 | 0,16 | 0,22 | 0,20 | 0,16 | 0,16 | 0,17 | 1,14 | | |
| **Total** | **66** | ***100%*** | **4,43** | **4,63** | **5,71** | **6,08** | **6,74** | **6,41** | **4,92** | **4,72** | **4,71** | **48,35** | **+6%** | **+1%** |

Interventions distribution by types



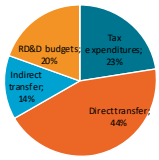

Financial support by types (billion euros)



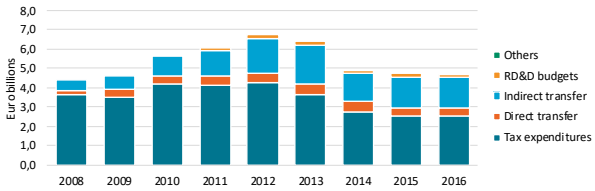

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 15 | *23%* | 3,63 | 3,49 | 4,16 | 4,10 | 4,24 | 3,67 | 2,76 | 2,55 | 2,56 | 31,16 | -29% | -4% |
| Direct transfer | 29 | *44%* | 0,23 | 0,44 | 0,45 | 0,51 | 0,53 | 0,51 | 0,50 | 0,38 | 0,40 | 3,94 | +72% | +7% |
| Indirect transfer | 9 | *14%* | 0,57 | 0,70 | 1,05 | 1,31 | 1,75 | 2,03 | 1,50 | 1,62 | 1,59 | 12,12 | +179% | +14% |
| RD&D budgets | 13 | *20%* | | | 0,06 | 0,16 | 0,22 | 0,20 | 0,16 | 0,16 | 0,17 | 1,14 | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **66** | ***100%*** | **4,43** | **4,63** | **5,71** | **6,08** | **6,74** | **6,41** | **4,92** | **4,72** | **4,71** | **48,35** | **+6%** | **+1%** |

Interventions distribution by sub-types



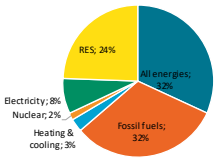

Financial support by sub-types (billion euros)



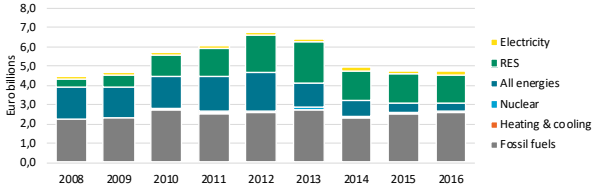

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 21 | *32%* | 1,61 | 1,55 | 1,68 | 1,82 | 1,99 | 1,25 | 0,83 | 0,47 | 0,39 | 11,59 | -76% | -16% |
| Fossil fuels | 21 | *32%* | 2,29 | 2,32 | 2,73 | 2,57 | 2,61 | 2,77 | 2,33 | 2,54 | 2,59 | 22,75 | +13% | +2% |
| Heating & cooling | 2 | *3%* | | | 0,01 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | | |
| Nuclear | 1 | *2%* | | | 0,06 | 0,08 | 0,09 | 0,11 | 0,07 | 0,08 | 0,09 | 0,57 | | |
| Electricity | 5 | *8%* | 0,11 | 0,10 | 0,16 | 0,15 | 0,12 | 0,15 | 0,15 | 0,11 | 0,18 | 1,24 | +57% | +6% |
| RES | 16 | *24%* | 0,42 | 0,66 | 1,07 | 1,45 | 1,93 | 2,13 | 1,53 | 1,51 | 1,46 | 12,18 | +246% | +17% |
| **Total** | **66** | ***100%*** | **4,43** | **4,63** | **5,71** | **6,08** | **6,74** | **6,41** | **4,92** | **4,72** | **4,71** | **48,35** | **+6%** | **+1%** |

Interventions distribution by energy/technology



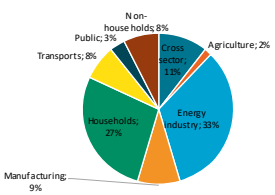

Financial support by energy/technology (billion euros)



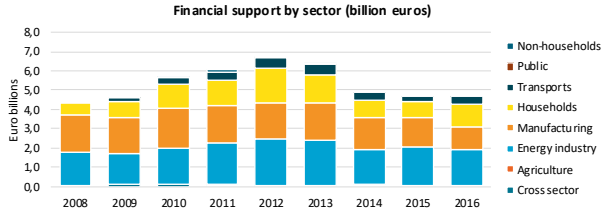

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 7 | *11%* | 0,01 | 0,12 | 0,09 | 0,08 | 0,05 | 0,06 | 0,07 | 0,01 | 0,02 | 0,52 | +20% | +2% |
| Agriculture | 1 | *2%* | 0,03 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,01 | 0,01 | 0,17 | -64% | -12% |
| Energy industry | 22 | *33%* | 1,74 | 1,60 | 1,90 | 2,15 | 2,41 | 2,37 | 1,87 | 2,04 | 1,91 | 17,99 | +9% | +1% |
| Manufacturing | 6 | *9%* | 1,91 | 1,84 | 2,04 | 1,92 | 1,89 | 1,88 | 1,60 | 1,53 | 1,13 | 15,75 | -41% | -6% |
| Households | 18 | *27%* | 0,65 | 0,80 | 1,24 | 1,36 | 1,81 | 1,46 | 0,91 | 0,78 | 1,22 | 10,24 | +88% | +8% |
| Transports | 5 | *8%* | 0,07 | 0,22 | 0,39 | 0,42 | 0,48 | 0,55 | 0,39 | 0,30 | 0,37 | 3,17 | +432% | +23% |
| Public | 2 | *3%* | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,05 | +105% | +9% |
| Non-households | 5 | *8%* | 0,02 | 0,03 | 0,02 | 0,12 | 0,09 | 0,06 | 0,04 | 0,04 | 0,05 | 0,45 | +231% | +16% |
| **Total** | **66** | ***100%*** | **4,43** | **4,63** | **5,71** | **6,08** | **6,74** | **6,41** | **4,92** | **4,72** | **4,71** | **48,35** | **+6%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

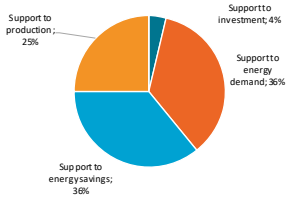


# Bulgaria

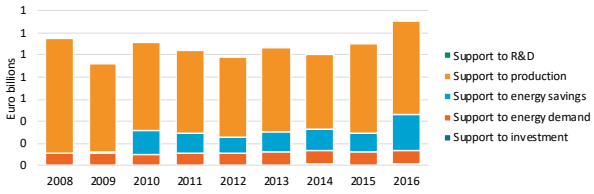
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 1 | *4%* | | | | | | 0,00 | 0,01 | 0,00 | 0,01 | 0,02 | | |
| Support to energy demand | 10 | *36%* | 0,10 | 0,11 | 0,09 | 0,10 | 0,10 | 0,12 | 0,12 | 0,12 | 0,13 | 1,02 | +24% | +3% |
| Support to energy savings | 10 | *36%* | 0,01 | 0,01 | 0,22 | 0,19 | 0,15 | 0,18 | 0,20 | 0,17 | 0,32 | 1,45 | +3862% | +58% |
| Support to production | 7 | *25%* | 1,04 | 0,79 | 0,80 | 0,75 | 0,72 | 0,75 | 0,67 | 0,81 | 0,84 | 7,18 | -19% | -3% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **28** | ***100%*** | **1,15** | **0,92** | **1,12** | **1,04** | **0,98** | **1,06** | **1,00** | **1,10** | **1,30** | **9,67** | **+14%** | **+2%** |

**Interventions distribution by types**



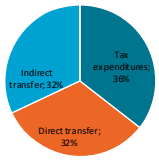

**Financial support by types (billion euros)**



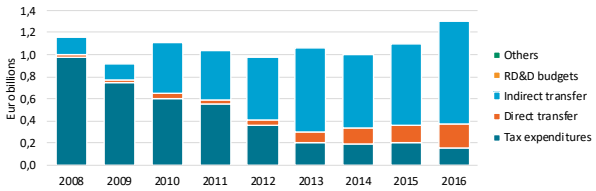

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 10 | *36%* | 0,97 | 0,75 | 0,60 | 0,55 | 0,36 | 0,20 | 0,19 | 0,20 | 0,15 | 3,97 | -85% | -21% |
| Direct transfer | 9 | *32%* | 0,03 | 0,03 | 0,05 | 0,05 | 0,05 | 0,10 | 0,15 | 0,15 | 0,23 | 0,83 | +785% | +31% |
| Indirect transfer | 9 | *32%* | 0,15 | 0,14 | 0,47 | 0,45 | 0,56 | 0,76 | 0,66 | 0,75 | 0,92 | 4,87 | +522% | +26% |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **28** | ***100%*** | **1,15** | **0,92** | **1,12** | **1,04** | **0,98** | **1,06** | **1,00** | **1,10** | **1,30** | **9,67** | **+14%** | **+2%** |

**Interventions distribution by sub-types**



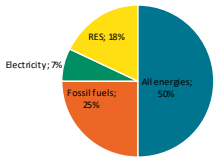

**Financial support by sub-types (billion euros)**



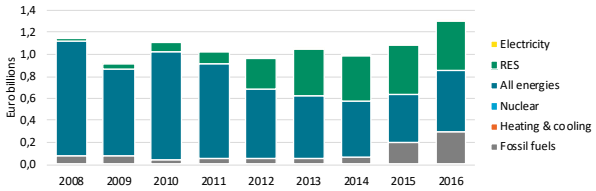

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 14 | *50%* | 1,04 | 0,79 | 0,98 | 0,86 | 0,63 | 0,56 | 0,52 | 0,44 | 0,55 | 6,36 | -47% | -8% |
| Fossil fuels | 7 | *25%* | 0,08 | 0,08 | 0,04 | 0,05 | 0,05 | 0,06 | 0,07 | 0,20 | 0,30 | 0,93 | +289% | +19% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | 2 | *7%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,10 | +53% | +5% |
| RES | 5 | *18%* | 0,02 | 0,04 | 0,08 | 0,12 | 0,29 | 0,43 | 0,41 | 0,45 | 0,45 | 2,28 | +1918% | +46% |
| **Total** | **28** | ***100%*** | **1,15** | **0,92** | **1,12** | **1,04** | **0,98** | **1,06** | **1,00** | **1,10** | **1,30** | **9,67** | **+14%** | **+2%** |

**Interventions distribution by energy/technology**



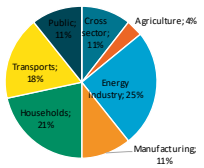

**Financial support by energy/technology (billion euros)**



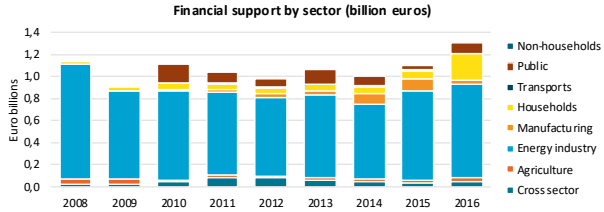

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 3 | *11%* | 0,02 | 0,02 | 0,05 | 0,08 | 0,08 | 0,06 | 0,05 | 0,03 | 0,05 | 0,45 | +99% | +9% |
| Agriculture | 1 | *4%* | 0,05 | 0,05 | 0,01 | 0,02 | 0,01 | 0,02 | 0,02 | 0,02 | 0,04 | 0,24 | -25% | -3% |
| Energy industry | 7 | *25%* | 1,04 | 0,79 | 0,80 | 0,75 | 0,72 | 0,75 | 0,67 | 0,81 | 0,84 | 7,18 | -19% | -3% |
| Manufacturing | 3 | *11%* | 0,00 | 0,00 | 0,02 | 0,03 | 0,03 | 0,03 | 0,09 | 0,11 | 0,04 | 0,37 | +1140% | +37% |
| Households | 6 | *21%* | 0,03 | 0,03 | 0,06 | 0,05 | 0,05 | 0,06 | 0,07 | 0,07 | 0,23 | 0,66 | +695% | +30% |
| Transports | 5 | *18%* | 0,01 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,09 | +8% | +1% |
| Public | 3 | *11%* | | | 0,17 | 0,09 | 0,07 | 0,13 | 0,09 | 0,04 | 0,10 | 0,69 | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **28** | ***100%*** | **1,15** | **0,92** | **1,12** | **1,04** | **0,98** | **1,06** | **1,00** | **1,10** | **1,30** | **9,67** | **+14%** | **+2%** |

**Interventions distribution by sector**




**Financial support by sector (billion euros)**

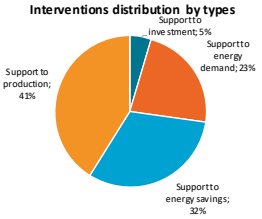


# Croatia

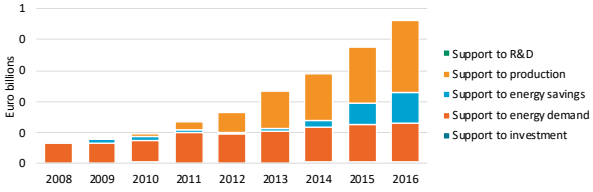
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 1 | 5% | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,02 | +614% | +28% |
| Support to energy demand | 5 | 23% | 0,06 | 0,06 | 0,07 | 0,10 | 0,09 | 0,10 | 0,11 | 0,12 | 0,12 | 0,85 | +92% | +9% |
| Support to energy savings | 7 | 32% | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,02 | 0,07 | 0,10 | 0,24 | +1974% | +46% |
| Support to production | 9 | 41% | | 0,01 | 0,01 | 0,03 | 0,06 | 0,12 | 0,15 | 0,18 | 0,23 | 0,78 | | |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **22** | ***100%*** | **0,07** | **0,08** | **0,10** | **0,13** | **0,16** | **0,23** | **0,29** | **0,38** | **0,46** | **1,90** | **+558%** | **+27%** |

**Interventions distribution by types**



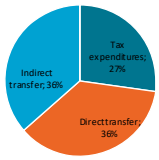

**Financial support by types (billion euros)**



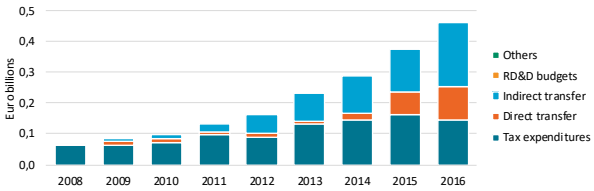

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 6 | 27% | 0,06 | 0,06 | 0,07 | 0,10 | 0,09 | 0,13 | 0,15 | 0,16 | 0,15 | 0,98 | +131% | +11% |
| Direct transfer | 8 | 36% | 0,01 | 0,01 | 0,02 | 0,01 | 0,01 | 0,01 | 0,02 | 0,07 | 0,10 | 0,26 | +1766% | +44% |
| Indirect transfer | 8 | 36% | | 0,01 | 0,01 | 0,03 | 0,06 | 0,09 | 0,12 | 0,14 | 0,21 | 0,66 | | |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **22** | ***100%*** | **0,07** | **0,08** | **0,10** | **0,13** | **0,16** | **0,23** | **0,29** | **0,38** | **0,46** | **1,90** | **+558%** | **+27%** |

**Interventions distribution by sub-types**



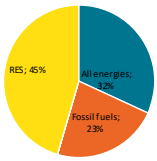

**Financial support by sub-types (billion euros)**



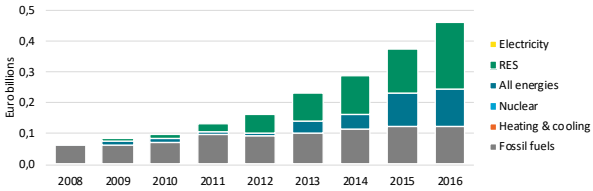

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 7 | 32% | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,04 | 0,05 | 0,11 | 0,12 | 0,36 | +2963% | +53% |
| Fossil fuels | 5 | 23% | 0,06 | 0,06 | 0,07 | 0,10 | 0,09 | 0,10 | 0,11 | 0,12 | 0,12 | 0,85 | +92% | +9% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | | | | | | | | | | | | | | |
| RES | 10 | 45% | 0,00 | 0,01 | 0,01 | 0,03 | 0,06 | 0,09 | 0,12 | 0,14 | 0,22 | 0,69 | +12941% | +84% |
| **Total** | **22** | ***100%*** | **0,07** | **0,08** | **0,10** | **0,13** | **0,16** | **0,23** | **0,29** | **0,38** | **0,46** | **1,90** | **+558%** | **+27%** |

**Interventions distribution by energy/technology**



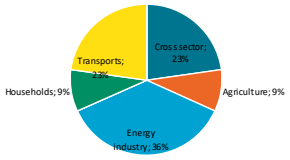

**Financial support by energy/technology (billion euros)**



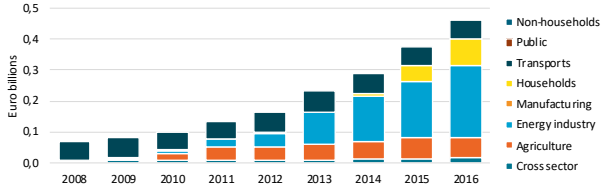

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 5 | 23% | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,08 | +179% | +14% |
| Agriculture | 2 | 9% | | | 0,02 | 0,05 | 0,04 | 0,05 | 0,06 | 0,07 | 0,07 | 0,36 | | |
| Energy industry | 8 | 36% | | 0,01 | 0,01 | 0,02 | 0,05 | 0,10 | 0,14 | 0,18 | 0,23 | 0,75 | | |
| Manufacturing | | | | | | | | | | | | | | |
| Households | 2 | 9% | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,06 | 0,09 | 0,16 | +22301% | +97% |
| Transports | 5 | 23% | 0,06 | 0,07 | 0,06 | 0,05 | 0,07 | 0,07 | 0,07 | 0,06 | 0,06 | 0,56 | -9% | -1% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **22** | ***100%*** | **0,07** | **0,08** | **0,10** | **0,13** | **0,16** | **0,23** | **0,29** | **0,38** | **0,46** | **1,90** | **+558%** | **+27%** |

**Interventions distribution by sector**




**Financial support by sector (billion euros)**

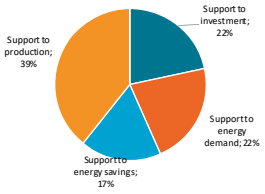


# Cyprus

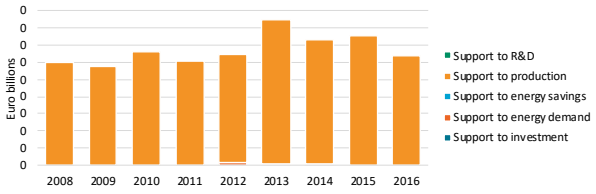
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 5 | *22%* | | | | | | | | | | | | |
| Support to energy demand | 5 | *22%* | | | | | 0,00 | 0,00 | 0,00 | | | 0,01 | | |
| Support to energy savings | 4 | *17%* | | | | | | | | | | | | |
| Support to production | 9 | *39%* | 0,12 | 0,12 | 0,13 | 0,12 | 0,13 | 0,17 | 0,15 | 0,15 | 0,13 | 1,21 | +7% | +1% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **23** | ***100%*** | **0,12** | **0,12** | **0,13** | **0,12** | **0,13** | **0,17** | **0,15** | **0,15** | **0,13** | **1,21** | **+7%** | **+1%** |

Interventions distribution by types



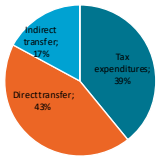

Financial support by types (billion euros)



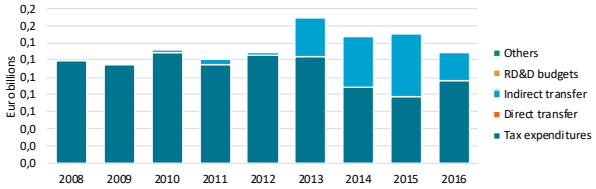

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 9 | *39%* | 0,12 | 0,11 | 0,13 | 0,11 | 0,12 | 0,12 | 0,09 | 0,08 | 0,10 | 0,99 | -19% | -3% |
| Direct transfer | 10 | *43%* | | | | | | | | | | | | |
| Indirect transfer | 4 | *17%* | 0,00 | 0,00 | 0,00 | 0,01 | 0,00 | 0,05 | 0,06 | 0,07 | 0,03 | 0,22 | +6395% | +68% |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **23** | ***100%*** | **0,12** | **0,12** | **0,13** | **0,12** | **0,13** | **0,17** | **0,15** | **0,15** | **0,13** | **1,21** | **+7%** | **+1%** |

Interventions distribution by sub-types



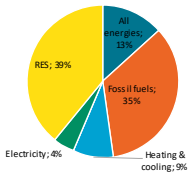

Financial support by sub-types (billion euros)



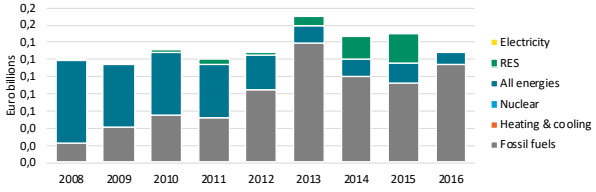

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 3 | *13%* | 0,10 | 0,07 | 0,07 | 0,06 | 0,04 | 0,02 | 0,02 | 0,02 | 0,01 | 0,42 | -85% | -21% |
| Fossil fuels | 8 | *35%* | 0,02 | 0,04 | 0,06 | 0,05 | 0,08 | 0,14 | 0,10 | 0,09 | 0,11 | 0,70 | +393% | +22% |
| Heating & cooling | 2 | *9%* | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | 1 | *4%* | | | | | | | | | | | | |
| RES | 9 | *39%* | 0,00 | 0,00 | 0,00 | 0,01 | 0,00 | 0,01 | 0,03 | 0,04 | | 0,09 | -100% | -100% |
| **Total** | **23** | ***100%*** | **0,12** | **0,12** | **0,13** | **0,12** | **0,13** | **0,17** | **0,15** | **0,15** | **0,13** | **1,21** | **+7%** | **+1%** |

Interventions distribution by energy/technology



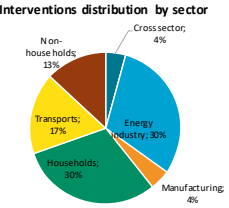

Financial support by energy/technology (billion euros)



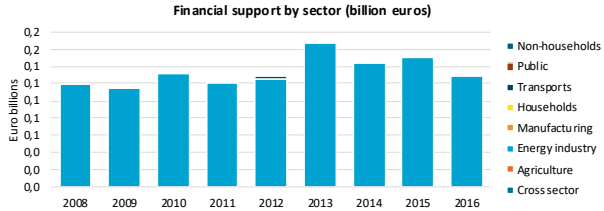

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 1 | *4%* | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | | | |
| Energy industry | 7 | *30%* | 0,12 | 0,12 | 0,13 | 0,12 | 0,13 | 0,17 | 0,15 | 0,15 | 0,13 | 1,21 | +7% | +1% |
| Manufacturing | 1 | *4%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | | 0,00 | -100% | -100% |
| Households | 7 | *30%* | | | | | | | | | | | | |
| Transports | 4 | *17%* | | | | | 0,00 | 0,00 | 0,00 | | | 0,01 | | |
| Public | | | | | | | | | | | | | | |
| Non-households | 3 | *13%* | | | | | | | | | | | | |
| **Total** | **23** | ***100%*** | **0,12** | **0,12** | **0,13** | **0,12** | **0,13** | **0,17** | **0,15** | **0,15** | **0,13** | **1,21** | **+7%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

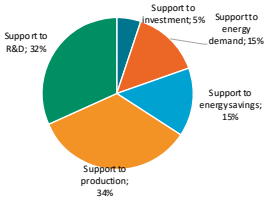


# Czech Republic

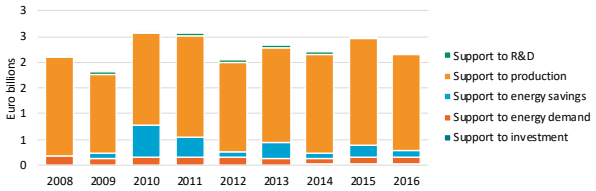
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 2 | *5%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,02 | 0,03 | 0,11 | +199% | +15% |
| Support to energy demand | 6 | *15%* | 0,16 | 0,13 | 0,14 | 0,14 | 0,14 | 0,13 | 0,13 | 0,13 | 0,13 | 1,24 | -20% | -3% |
| Support to energy savings | 6 | *15%* | 0,00 | 0,09 | 0,62 | 0,40 | 0,11 | 0,31 | 0,10 | 0,24 | 0,13 | 2,01 | +5140% | +64% |
| Support to production | 14 | *34%* | 1,93 | 1,54 | 1,80 | 1,96 | 1,74 | 1,85 | 1,92 | 2,06 | 1,88 | 16,68 | -2% | -0% |
| Support to R&D | 13 | *32%* | 0,04 | 0,04 | 0,03 | 0,05 | 0,05 | 0,04 | 0,04 | 0,04 | 0,02 | 0,34 | -46% | -7% |
| **Total** | **41** | ***100%*** | **2,14** | **1,81** | **2,61** | **2,57** | **2,04** | **2,34** | **2,20** | **2,49** | **2,19** | **20,38** | **+2%** | **+0%** |

Interventions distribution by types



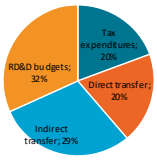

Financial support by types (billion euros)



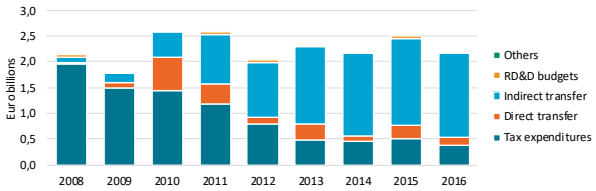

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 8 | *20%* | 1,97 | 1,51 | 1,45 | 1,17 | 0,80 | 0,48 | 0,46 | 0,52 | 0,38 | 8,75 | -81% | -19% |
| Direct transfer | 8 | *20%* | 0,01 | 0,09 | 0,63 | 0,41 | 0,12 | 0,32 | 0,12 | 0,26 | 0,16 | 2,12 | +1330% | +39% |
| Indirect transfer | 12 | *29%* | 0,12 | 0,17 | 0,49 | 0,94 | 1,07 | 1,49 | 1,59 | 1,68 | 1,63 | 9,17 | +1284% | +39% |
| RD&D budgets | 13 | *32%* | 0,04 | 0,04 | 0,03 | 0,05 | 0,05 | 0,04 | 0,04 | 0,04 | 0,02 | 0,34 | -46% | -7% |
| Others | | | | | | | | | | | | | | |
| **Total** | **41** | ***100%*** | **2,14** | **1,81** | **2,61** | **2,57** | **2,04** | **2,34** | **2,20** | **2,49** | **2,19** | **20,38** | **+2%** | **+0%** |

Interventions distribution by sub-types



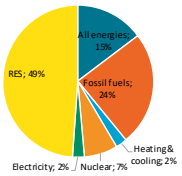

Financial support by sub-types (billion euros)



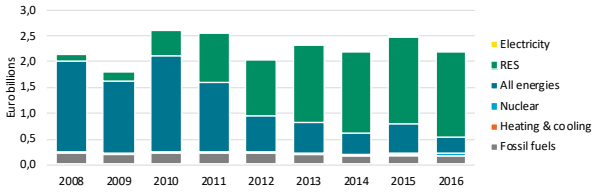

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 6 | *15%* | 1,75 | 1,40 | 1,86 | 1,36 | 0,70 | 0,61 | 0,40 | 0,58 | 0,33 | 8,99 | -81% | -19% |
| Fossil fuels | 10 | *24%* | 0,23 | 0,20 | 0,22 | 0,22 | 0,22 | 0,18 | 0,16 | 0,18 | 0,18 | 1,79 | -21% | -3% |
| Heating & cooling | 1 | *2%* | | | | | 0,00 | 0,00 | 0,01 | 0,00 | 0,00 | 0,01 | | |
| Nuclear | 3 | *7%* | 0,02 | 0,02 | 0,02 | 0,02 | 0,03 | 0,03 | 0,04 | 0,04 | 0,03 | 0,26 | +42% | +5% |
| Electricity | 1 | *2%* | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,00 | 0,05 | +38% | +4% |
| RES | 20 | *49%* | 0,13 | 0,19 | 0,50 | 0,95 | 1,08 | 1,50 | 1,59 | 1,68 | 1,64 | 9,28 | +1115% | +37% |
| **Total** | **41** | ***100%*** | **2,14** | **1,81** | **2,61** | **2,57** | **2,04** | **2,34** | **2,20** | **2,49** | **2,19** | **20,38** | **+2%** | **+0%** |

Interventions distribution by energy/technology



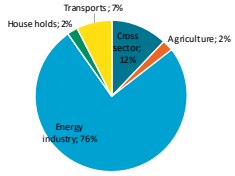

Financial support by energy/technology (billion euros)



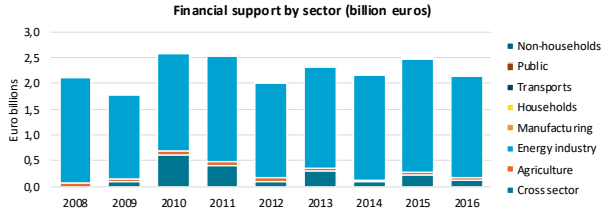

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 5 | *12%* | 0,00 | 0,09 | 0,62 | 0,40 | 0,11 | 0,31 | 0,10 | 0,24 | 0,13 | 1,99 | +5139% | +64% |
| Agriculture | 1 | *2%* | 0,06 | 0,06 | 0,07 | 0,07 | 0,07 | 0,05 | 0,04 | 0,05 | 0,05 | 0,53 | -26% | -4% |
| Energy industry | 31 | *76%* | 2,05 | 1,64 | 1,89 | 2,06 | 1,84 | 1,97 | 2,05 | 2,18 | 1,98 | 17,66 | -3% | -0% |
| Manufacturing | | | | | | | | | | | | | | |
| Households | 1 | *2%* | | | | | 0,00 | 0,00 | 0,01 | 0,00 | 0,00 | 0,01 | | |
| Transports | 3 | *7%* | 0,03 | 0,02 | 0,02 | 0,03 | 0,02 | 0,01 | 0,01 | 0,02 | 0,03 | 0,19 | -1% | -0% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **41** | ***100%*** | **2,14** | **1,81** | **2,61** | **2,57** | **2,04** | **2,34** | **2,20** | **2,49** | **2,19** | **20,38** | **+2%** | **+0%** |

Interventions distribution by sector




Financial support by sector (billion euros)

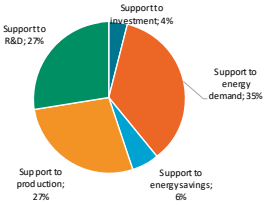


# Denmark

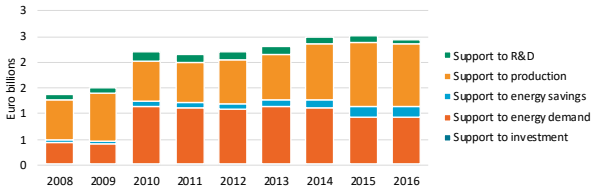
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 2 | *4%* | 0,03 | 0,03 | 0,04 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,30 | -6% | -1% |
| Support to energy demand | 18 | *35%* | 0,42 | 0,40 | 1,12 | 1,10 | 1,06 | 1,12 | 1,10 | 0,91 | 0,92 | 8,12 | +120% | +10% |
| Support to energy savings | 3 | *6%* | 0,05 | 0,05 | 0,10 | 0,10 | 0,11 | 0,13 | 0,15 | 0,21 | 0,20 | 1,09 | +300% | +19% |
| Support to production | 14 | *27%* | 0,79 | 0,92 | 0,77 | 0,76 | 0,85 | 0,88 | 1,09 | 1,23 | 1,21 | 8,50 | +54% | +6% |
| Support to R&D | 14 | *27%* | 0,09 | 0,11 | 0,19 | 0,17 | 0,15 | 0,16 | 0,14 | 0,14 | 0,09 | 1,25 | -2% | -0% |
| **Total** | **51** | ***100%*** | **1,38** | **1,51** | **2,21** | **2,17** | **2,20** | **2,32** | **2,51** | **2,52** | **2,45** | **19,26** | **+77%** | **+7%** |

Interventions distribution by types



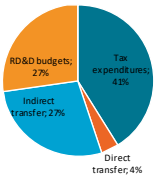

Financial support by types (billion euros)



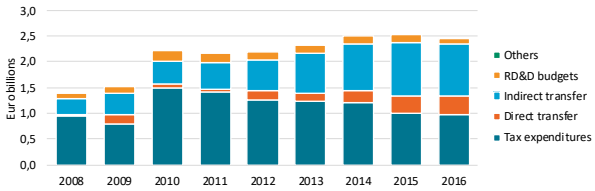

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 21 | *41%* | 0,97 | 0,80 | 1,50 | 1,40 | 1,26 | 1,22 | 1,19 | 1,01 | 0,99 | 10,35 | +3% | +0% |
| Direct transfer | 2 | *4%* | 0,02 | 0,19 | 0,09 | 0,07 | 0,19 | 0,17 | 0,25 | 0,32 | 0,34 | 1,65 | +1579% | +42% |
| Indirect transfer | 14 | *27%* | 0,30 | 0,41 | 0,44 | 0,52 | 0,61 | 0,77 | 0,91 | 1,05 | 1,02 | 6,01 | +243% | +17% |
| RD&D budgets | 14 | *27%* | 0,09 | 0,11 | 0,19 | 0,17 | 0,15 | 0,16 | 0,14 | 0,14 | 0,09 | 1,25 | -2% | -0% |
| Others | | | | | | | | | | | | | | |
| **Total** | **51** | ***100%*** | **1,38** | **1,51** | **2,21** | **2,17** | **2,20** | **2,32** | **2,51** | **2,52** | **2,45** | **19,26** | **+77%** | **+7%** |

Interventions distribution by sub-types



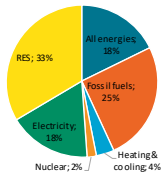

Financial support by sub-types (billion euros)



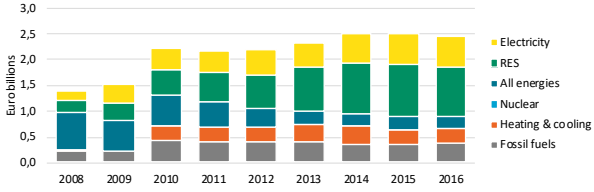

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 9 | *18%* | 0,75 | 0,58 | 0,59 | 0,50 | 0,37 | 0,26 | 0,25 | 0,25 | 0,22 | 3,78 | -71% | -14% |
| Fossil fuels | 13 | *25%* | 0,22 | 0,22 | 0,42 | 0,40 | 0,39 | 0,40 | 0,36 | 0,34 | 0,38 | 3,15 | +68% | +7% |
| Heating & cooling | 2 | *4%* | 0,01 | 0,01 | 0,30 | 0,29 | 0,29 | 0,33 | 0,34 | 0,29 | 0,29 | 2,17 | +2143% | +48% |
| Nuclear | 1 | *2%* | | | 0,00 | 0,00 | 0,01 | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | | |
| Electricity | 9 | *18%* | 0,17 | 0,36 | 0,40 | 0,41 | 0,49 | 0,48 | 0,57 | 0,61 | 0,60 | 4,10 | +254% | +17% |
| RES | 17 | *33%* | 0,22 | 0,33 | 0,50 | 0,55 | 0,64 | 0,85 | 0,97 | 1,02 | 0,96 | 6,04 | +330% | +20% |
| **Total** | **51** | ***100%*** | **1,38** | **1,51** | **2,21** | **2,17** | **2,20** | **2,32** | **2,51** | **2,52** | **2,45** | **19,26** | **+77%** | **+7%** |

Interventions distribution by energy/technology



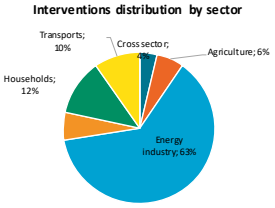

Financial support by energy/technology (billion euros)



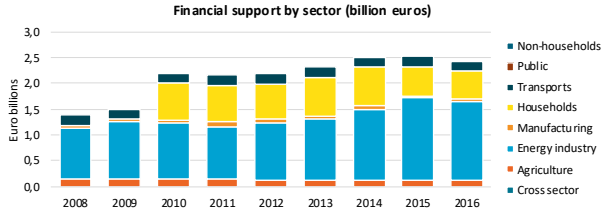

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 2 | *4%* | | | | | | | | | | | | |
| Agriculture | 3 | *6%* | 0,16 | 0,14 | 0,14 | 0,14 | 0,13 | 0,12 | 0,12 | 0,12 | 0,12 | 1,20 | -25% | -4% |
| Energy industry | 32 | *63%* | 0,96 | 1,11 | 1,08 | 1,01 | 1,11 | 1,18 | 1,39 | 1,61 | 1,53 | 10,99 | +59% | +6% |
| Manufacturing | 3 | *6%* | 0,05 | 0,05 | 0,06 | 0,10 | 0,07 | 0,06 | 0,06 | 0,04 | 0,04 | 0,54 | -19% | -3% |
| Households | 6 | *12%* | | | 0,73 | 0,73 | 0,69 | 0,77 | 0,76 | 0,57 | 0,57 | 4,83 | | |
| Transports | 5 | *10%* | 0,20 | 0,20 | 0,19 | 0,19 | 0,20 | 0,19 | 0,17 | 0,17 | 0,18 | 1,70 | -11% | -1% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **51** | ***100%*** | **1,38** | **1,51** | **2,21** | **2,17** | **2,20** | **2,32** | **2,51** | **2,52** | **2,45** | **19,26** | **+77%** | **+7%** |

Interventions distribution by sector




Financial support by sector (billion euros)

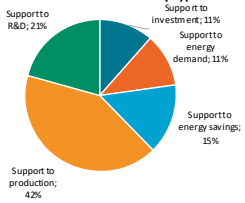


# Estonia

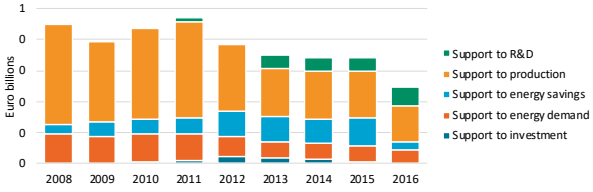
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 6 | *11%* | | 0,00 | 0,00 | 0,01 | 0,02 | 0,02 | 0,01 | 0,01 | 0,00 | 0,07 | | |
| Support to energy demand | 6 | *11%* | 0,10 | 0,09 | 0,09 | 0,09 | 0,06 | 0,05 | 0,05 | 0,05 | 0,04 | 0,63 | -55% | -10% |
| Support to energy savings | 8 | *15%* | 0,03 | 0,05 | 0,05 | 0,05 | 0,08 | 0,08 | 0,08 | 0,09 | 0,03 | 0,54 | -15% | -2% |
| Support to production | 22 | *42%* | 0,32 | 0,26 | 0,29 | 0,31 | 0,22 | 0,15 | 0,15 | 0,15 | 0,12 | 1,97 | -64% | -12% |
| Support to R&D | 11 | *21%* | | | | 0,01 | 0,00 | 0,04 | 0,05 | 0,04 | 0,06 | 0,20 | | |
| **Total** | **53** | ***100%*** | **0,45** | **0,39** | **0,44** | **0,47** | **0,39** | **0,35** | **0,34** | **0,34** | **0,25** | **3,41** | **-45%** | **-7%** |

Interventions distribution by types



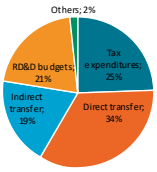

Financial support by types (billion euros)



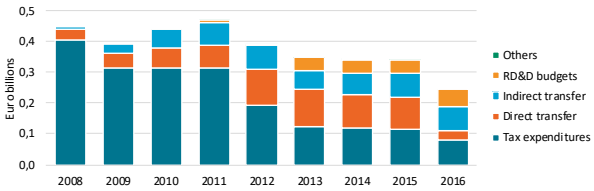

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 13 | *25%* | 0,40 | 0,31 | 0,31 | 0,31 | 0,19 | 0,13 | 0,12 | 0,12 | 0,08 | 1,98 | -80% | -18% |
| Direct transfer | 18 | *34%* | 0,03 | 0,05 | 0,07 | 0,07 | 0,12 | 0,12 | 0,10 | 0,10 | 0,03 | 0,69 | -4% | -1% |
| Indirect transfer | 10 | *19%* | 0,01 | 0,03 | 0,06 | 0,07 | 0,08 | 0,06 | 0,07 | 0,08 | 0,07 | 0,53 | +513% | +25% |
| RD&D budgets | 11 | *21%* | | | | 0,01 | 0,00 | 0,04 | 0,05 | 0,04 | 0,06 | 0,20 | | |
| Others | 1 | *2%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0,00 | -100% | -100% |
| **Total** | **53** | ***100%*** | **0,45** | **0,39** | **0,44** | **0,47** | **0,39** | **0,35** | **0,34** | **0,34** | **0,25** | **3,41** | **-45%** | **-7%** |

Interventions distribution by sub-types



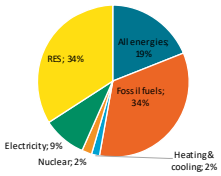

Financial support by sub-types (billion euros)



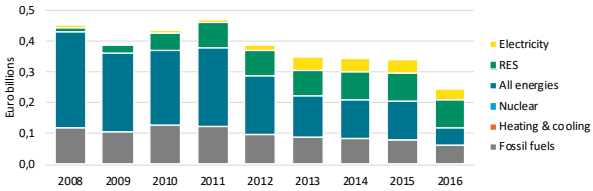

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 10 | *19%* | 0,31 | 0,25 | 0,24 | 0,25 | 0,19 | 0,13 | 0,13 | 0,13 | 0,05 | 1,70 | -82% | -20% |
| Fossil fuels | 18 | *34%* | 0,12 | 0,11 | 0,13 | 0,12 | 0,10 | 0,09 | 0,08 | 0,08 | 0,06 | 0,89 | -48% | -8% |
| Heating & cooling | 1 | *2%* | | | | | | | | | 0,00 | 0,00 | | |
| Nuclear | 1 | *2%* | | | | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | |
| Electricity | 5 | *9%* | 0,00 | 0,00 | 0,01 | 0,01 | 0,02 | 0,04 | 0,04 | 0,05 | 0,03 | 0,21 | +727% | +30% |
| RES | 18 | *34%* | 0,01 | 0,03 | 0,06 | 0,08 | 0,08 | 0,08 | 0,09 | 0,09 | 0,09 | 0,62 | +673% | +29% |
| **Total** | **53** | ***100%*** | **0,45** | **0,39** | **0,44** | **0,47** | **0,39** | **0,35** | **0,34** | **0,34** | **0,25** | **3,41** | **-45%** | **-7%** |

Interventions distribution by energy/technology



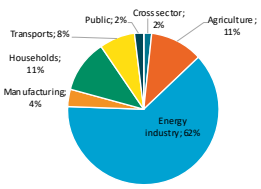

Financial support by energy/technology (billion euros)



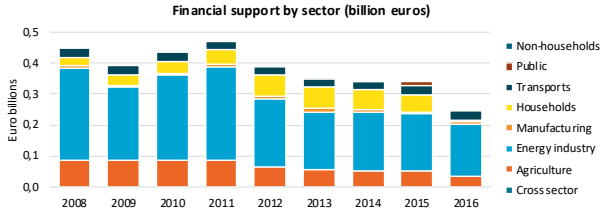

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 1 | *2%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | 0,00 | -100% | -100% |
| Agriculture | 6 | *11%* | 0,09 | 0,08 | 0,09 | 0,09 | 0,06 | 0,05 | 0,05 | 0,05 | 0,03 | 0,60 | -62% | -11% |
| Energy industry | 33 | *62%* | 0,30 | 0,24 | 0,27 | 0,30 | 0,22 | 0,19 | 0,19 | 0,18 | 0,17 | 2,06 | -44% | -7% |
| Manufacturing | 2 | *4%* | 0,01 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,07 | +15% | +2% |
| Households | 6 | *11%* | 0,02 | 0,04 | 0,04 | 0,05 | 0,07 | 0,07 | 0,07 | 0,06 | 0,00 | 0,41 | -87% | -23% |
| Transports | 4 | *8%* | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,26 | +3% | +0% |
| Public | 1 | *2%* | | | | | | 0,00 | 0,00 | 0,01 | | 0,02 | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **53** | ***100%*** | **0,45** | **0,39** | **0,44** | **0,47** | **0,39** | **0,35** | **0,34** | **0,34** | **0,25** | **3,41** | **-45%** | **-7%** |

Interventions distribution by sector




Financial support by sector (billion euros)

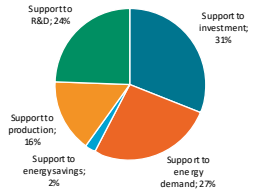


# Finland

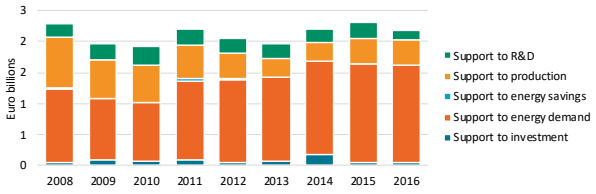
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 14 | *31%* | 0,04 | 0,09 | 0,05 | 0,08 | 0,05 | 0,06 | 0,17 | 0,05 | 0,05 | 0,64 | +27% | +3% |
| Support to energy demand | 12 | *27%* | 1,19 | 0,99 | 0,97 | 1,28 | 1,34 | 1,36 | 1,51 | 1,60 | 1,56 | 11,79 | +32% | +3% |
| Support to energy savings | 1 | *2%* | 0,02 | 0,01 | 0,00 | 0,05 | 0,02 | 0,01 | 0,00 | 0,00 | 0,00 | 0,11 | -93% | -28% |
| Support to production | 7 | *16%* | 0,84 | 0,61 | 0,61 | 0,54 | 0,41 | 0,30 | 0,30 | 0,42 | 0,41 | 4,43 | -51% | -8% |
| Support to R&D | 11 | *24%* | 0,19 | 0,26 | 0,30 | 0,28 | 0,25 | 0,24 | 0,22 | 0,24 | 0,16 | 2,17 | -17% | -2% |
| **Total** | **45** | ***100%*** | **2,28** | **1,97** | **1,93** | **2,22** | **2,07** | **1,97** | **2,21** | **2,30** | **2,19** | **19,14** | **-4%** | **-0%** |

Interventions distribution by types



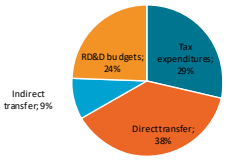

Financial support by types (billion euros)



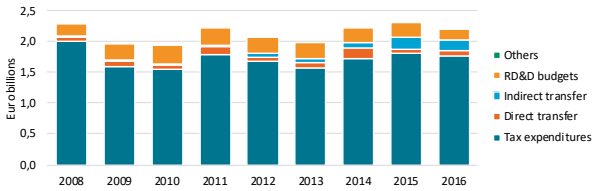

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 13 | *29%* | 2,01 | 1,59 | 1,56 | 1,79 | 1,68 | 1,57 | 1,72 | 1,80 | 1,76 | 15,49 | -13% | -2% |
| Direct transfer | 17 | *38%* | 0,06 | 0,10 | 0,06 | 0,12 | 0,07 | 0,08 | 0,17 | 0,08 | 0,10 | 0,82 | +69% | +7% |
| Indirect transfer | 4 | *9%* | 0,01 | 0,02 | 0,01 | 0,02 | 0,07 | 0,08 | 0,09 | 0,18 | 0,17 | 0,66 | +1365% | +40% |
| RD&D budgets | 11 | *24%* | 0,19 | 0,26 | 0,30 | 0,28 | 0,25 | 0,24 | 0,22 | 0,24 | 0,16 | 2,17 | -17% | -2% |
| Others | | | | | | | | | | | | | | |
| **Total** | **45** | ***100%*** | **2,28** | **1,97** | **1,93** | **2,22** | **2,07** | **1,97** | **2,21** | **2,30** | **2,19** | **19,14** | **-4%** | **-0%** |

Interventions distribution by sub-types



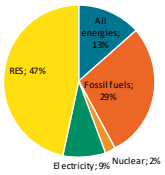

Financial support by sub-types (billion euros)



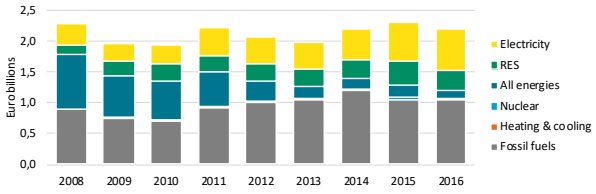

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 6 | *13%* | 0,87 | 0,67 | 0,63 | 0,54 | 0,31 | 0,18 | 0,17 | 0,20 | 0,13 | 3,71 | -85% | -21% |
| Fossil fuels | 13 | *29%* | 0,90 | 0,75 | 0,71 | 0,93 | 1,02 | 1,05 | 1,20 | 1,06 | 1,06 | 8,66 | +18% | +2% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 1 | *2%* | 0,01 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,01 | 0,15 | +14% | +2% |
| Electricity | 4 | *9%* | 0,34 | 0,28 | 0,30 | 0,45 | 0,44 | 0,43 | 0,50 | 0,62 | 0,67 | 4,03 | +100% | +9% |
| RES | 21 | *47%* | 0,16 | 0,24 | 0,28 | 0,28 | 0,29 | 0,29 | 0,32 | 0,41 | 0,31 | 2,59 | +88% | +8% |
| **Total** | **45** | ***100%*** | **2,28** | **1,97** | **1,93** | **2,22** | **2,07** | **1,97** | **2,21** | **2,30** | **2,19** | **19,14** | **-4%** | **-0%** |

Interventions distribution by energy/technology



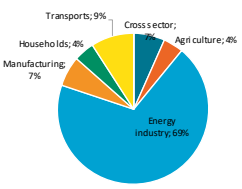

Financial support by energy/technology (billion euros)



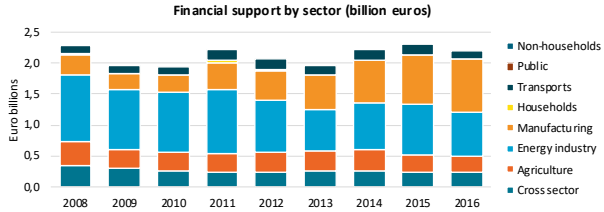

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 3 | *7%* | 0,34 | 0,29 | 0,26 | 0,24 | 0,23 | 0,26 | 0,27 | 0,24 | 0,23 | 2,35 | -32% | -5% |
| Agriculture | 2 | *4%* | 0,41 | 0,32 | 0,30 | 0,29 | 0,33 | 0,33 | 0,33 | 0,28 | 0,27 | 2,86 | -33% | -5% |
| Energy industry | 31 | *69%* | 1,07 | 0,96 | 0,96 | 1,05 | 0,83 | 0,67 | 0,75 | 0,82 | 0,70 | 7,82 | -35% | -5% |
| Manufacturing | 3 | *7%* | 0,31 | 0,26 | 0,28 | 0,42 | 0,48 | 0,55 | 0,70 | 0,80 | 0,86 | 4,66 | +174% | +13% |
| Households | 2 | *4%* | 0,02 | 0,01 | 0,00 | 0,05 | 0,02 | 0,01 | 0,00 | 0,00 | 0,00 | 0,11 | -93% | -28% |
| Transports | 4 | *9%* | 0,13 | 0,12 | 0,13 | 0,17 | 0,18 | 0,16 | 0,16 | 0,17 | 0,13 | 1,34 | -2% | -0% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **45** | ***100%*** | **2,28** | **1,97** | **1,93** | **2,22** | **2,07** | **1,97** | **2,21** | **2,30** | **2,19** | **19,14** | **-4%** | **-0%** |

Interventions distribution by sector




Financial support by sector (billion euros)

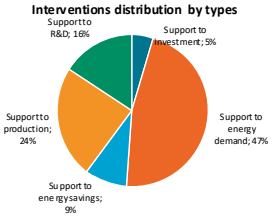


# France

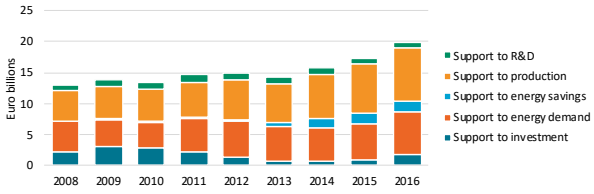
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 4 | *5%* | 2,25 | 2,97 | 2,88 | 2,26 | 1,27 | 0,70 | 0,64 | 0,88 | 1,68 | 15,53 | -25% | -4% |
| Support to energy demand | 41 | *47%* | 4,94 | 4,48 | 4,09 | 5,25 | 5,87 | 5,66 | 5,42 | 5,79 | 7,08 | 48,58 | +43% | +5% |
| Support to energy savings | 8 | *9%* | 0,03 | 0,07 | 0,12 | 0,27 | 0,33 | 0,57 | 1,58 | 1,84 | 1,67 | 6,47 | +6253% | +68% |
| Support to production | 21 | *24%* | 4,84 | 5,15 | 5,20 | 5,69 | 6,32 | 6,34 | 7,10 | 7,87 | 8,62 | 57,12 | +78% | +7% |
| Support to R&D | 14 | *16%* | 0,96 | 1,07 | 1,02 | 1,15 | 1,12 | 1,10 | 1,06 | 1,02 | 0,93 | 9,42 | -3% | -0% |
| **Total** | **88** | ***100%*** | **13,01** | **13,73** | **13,31** | **14,61** | **14,91** | **14,36** | **15,81** | **17,41** | **19,98** | **137,12** | **+54%** | **+6%** |

Interventions distribution by types



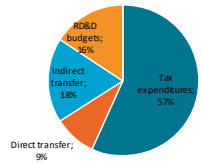

Financial support by types (billion euros)



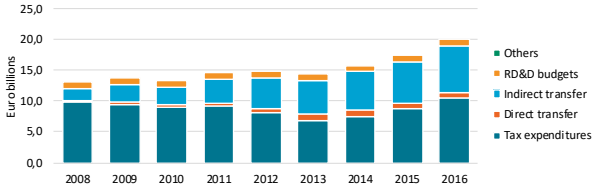

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 50 | *57%* | 9,87 | 9,31 | 8,96 | 9,09 | 8,14 | 6,99 | 7,48 | 8,64 | 10,58 | 79,05 | +7% | +1% |
| Direct transfer | 8 | *9%* | 0,21 | 0,49 | 0,49 | 0,61 | 0,61 | 0,81 | 1,02 | 0,98 | 0,86 | 6,08 | +308% | +19% |
| Indirect transfer | 16 | *18%* | 1,97 | 2,87 | 2,83 | 3,76 | 5,03 | 5,46 | 6,25 | 6,78 | 7,61 | 42,56 | +286% | +18% |
| RD&D budgets | 14 | *16%* | 0,96 | 1,07 | 1,02 | 1,15 | 1,12 | 1,10 | 1,06 | 1,02 | 0,93 | 9,42 | -3% | -0% |
| Others | | | | | | | | | | | | | | |
| **Total** | **88** | ***100%*** | **13,01** | **13,73** | **13,31** | **14,61** | **14,91** | **14,36** | **15,81** | **17,41** | **19,98** | **137,12** | **+54%** | **+6%** |

Interventions distribution by sub-types



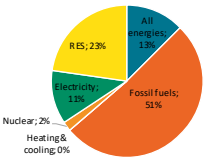

Financial support by sub-types (billion euros)



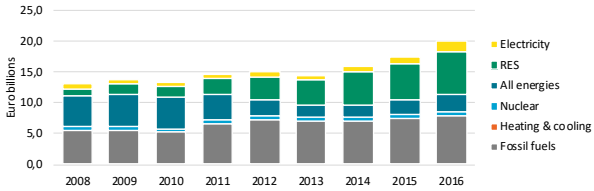

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 11 | *13%* | 5,02 | 5,01 | 5,01 | 4,12 | 2,57 | 1,78 | 2,00 | 2,27 | 2,71 | 30,49 | -46% | -7% |
| Fossil fuels | 45 | *51%* | 5,53 | 5,65 | 5,29 | 6,74 | 7,32 | 7,01 | 6,98 | 7,49 | 8,05 | 60,06 | +45% | +5% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 2 | *2%* | 0,58 | 0,55 | 0,51 | 0,56 | 0,63 | 0,68 | 0,65 | 0,61 | 0,56 | 5,34 | -2% | -0% |
| Electricity | 10 | *11%* | 0,72 | 0,73 | 0,67 | 0,63 | 0,67 | 0,76 | 0,89 | 0,98 | 1,76 | 7,82 | +143% | +12% |
| RES | 20 | *23%* | 1,16 | 1,79 | 1,83 | 2,55 | 3,72 | 4,12 | 5,28 | 6,06 | 6,89 | 33,41 | +492% | +25% |
| **Total** | **88** | ***100%*** | **13,01** | **13,73** | **13,31** | **14,61** | **14,91** | **14,36** | **15,81** | **17,41** | **19,98** | **137,12** | **+54%** | **+6%** |

Interventions distribution by energy/technology



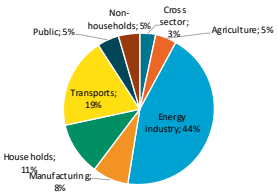

Financial support by energy/technology (billion euros)



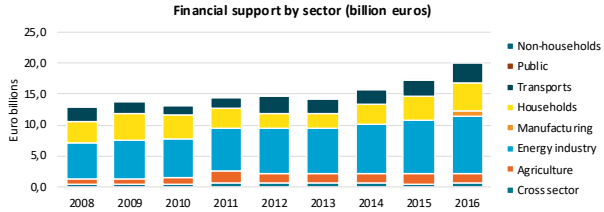

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 3 | *3%* | 0,32 | 0,28 | 0,35 | 0,55 | 0,52 | 0,55 | 0,51 | 0,48 | 0,49 | 4,06 | +53% | +5% |
| Agriculture | 4 | *5%* | 1,02 | 1,03 | 1,06 | 2,01 | 1,60 | 1,62 | 1,61 | 1,63 | 1,72 | 13,30 | +68% | +7% |
| Energy industry | 39 | *44%* | 5,77 | 6,15 | 6,16 | 6,77 | 7,34 | 7,26 | 7,87 | 8,51 | 9,14 | 64,97 | +58% | +6% |
| Manufacturing | 7 | *8%* | | | | 0,01 | 0,01 | 0,01 | 0,02 | 0,19 | 0,97 | 1,19 | | |
| Households | 10 | *11%* | 3,43 | 4,30 | 3,91 | 3,31 | 2,45 | 2,35 | 3,24 | 3,82 | 4,53 | 31,35 | +32% | +4% |
| Transports | 17 | *19%* | 2,38 | 1,95 | 1,70 | 1,76 | 2,69 | 2,40 | 2,37 | 2,62 | 3,03 | 20,91 | +27% | +3% |
| Public | 4 | *5%* | 0,07 | 0,01 | 0,02 | 0,07 | 0,08 | 0,07 | 0,07 | 0,06 | | 0,46 | -100% | -100% |
| Non-households | 4 | *5%* | 0,01 | 0,01 | 0,09 | 0,12 | 0,23 | 0,11 | 0,11 | 0,10 | 0,10 | 0,88 | +979% | +35% |
| **Total** | **88** | ***100%*** | **13,01** | **13,73** | **13,31** | **14,61** | **14,91** | **14,36** | **15,81** | **17,41** | **19,98** | **137,12** | **+54%** | **+6%** |

Interventions distribution by sector




Financial support by sector (billion euros)

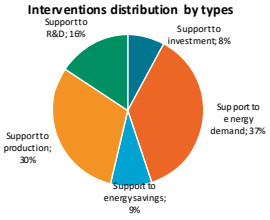


# Germany

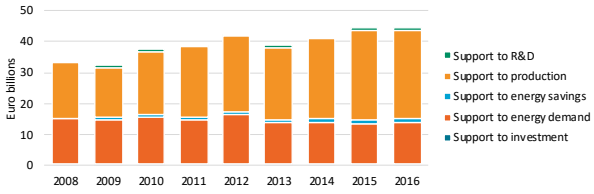
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 7 | *8%* | 0,30 | 0,60 | 0,46 | 0,32 | 0,40 | 0,34 | 0,27 | 0,21 | 0,28 | 3,20 | -7% | -1% |
| Support to energy demand | 33 | *37%* | 14,75 | 14,40 | 15,23 | 14,50 | 16,13 | 13,69 | 13,82 | 13,41 | 13,54 | 129,47 | -8% | -1% |
| Support to energy savings | 8 | *9%* | 0,29 | 0,51 | 0,77 | 0,86 | 0,95 | 0,79 | 1,18 | 1,26 | 1,46 | 8,07 | +402% | +22% |
| Support to production | 27 | *30%* | 18,06 | 16,12 | 20,50 | 22,71 | 24,42 | 23,14 | 25,65 | 28,90 | 28,28 | 207,78 | +57% | +6% |
| Support to R&D | 14 | *16%* | 0,54 | 0,66 | 0,67 | 0,78 | 0,75 | 0,83 | 0,82 | 0,85 | 0,85 | 6,76 | +55% | +6% |
| **Total** | **89** | ***100%*** | **33,94** | **32,30** | **37,64** | **39,18** | **42,65** | **38,79** | **41,75** | **44,63** | **44,41** | **355,28** | **+31%** | **+3%** |

Interventions distribution by types



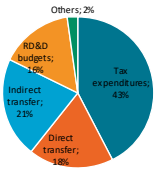

Financial support by types (billion euros)



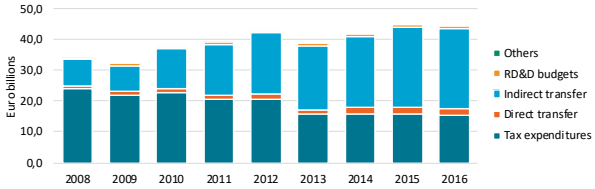

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 38 | *43%* | 24,12 | 21,96 | 22,77 | 20,66 | 20,75 | 15,96 | 16,07 | 16,00 | 15,40 | 173,69 | -36% | -5% |
| Direct transfer | 16 | *18%* | 0,72 | 1,20 | 1,33 | 1,28 | 1,45 | 1,24 | 1,89 | 1,77 | 2,07 | 12,96 | +187% | +14% |
| Indirect transfer | 19 | *21%* | 8,55 | 8,44 | 12,85 | 16,44 | 19,69 | 20,74 | 22,95 | 26,00 | 26,06 | 161,72 | +205% | +15% |
| RD&D budgets | 14 | *16%* | 0,54 | 0,66 | 0,67 | 0,78 | 0,75 | 0,83 | 0,82 | 0,85 | 0,85 | 6,76 | +55% | +6% |
| Others | 2 | *2%* | 0,01 | 0,03 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,03 | 0,16 | +125% | +11% |
| **Total** | **89** | ***100%*** | **33,94** | **32,30** | **37,64** | **39,18** | **42,65** | **38,79** | **41,75** | **44,63** | **44,41** | **355,28** | **+31%** | **+3%** |

Interventions distribution by sub-types



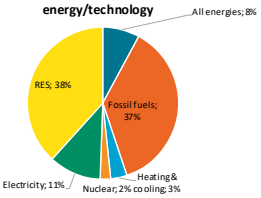

Financial support by sub-types (billion euros)



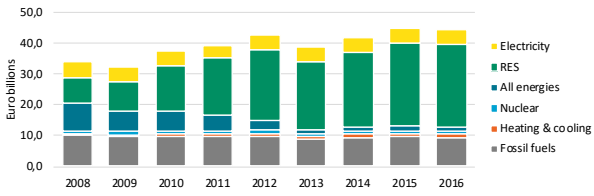

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 7 | *8%* | 9,15 | 6,55 | 6,46 | 5,10 | 3,41 | 1,32 | 1,38 | 1,58 | 1,17 | 36,13 | -87% | -23% |
| Fossil fuels | 33 | *37%* | 10,36 | 9,97 | 9,78 | 9,83 | 9,96 | 8,96 | 9,53 | 9,69 | 9,47 | 87,55 | -9% | -1% |
| Heating & cooling | 3 | *3%* | 0,16 | 0,40 | 0,71 | 0,82 | 0,91 | 0,75 | 1,12 | 1,16 | 1,32 | 7,33 | +729% | +30% |
| Nuclear | 2 | *2%* | 1,11 | 1,13 | 1,10 | 0,95 | 0,90 | 0,87 | 0,86 | 0,80 | 0,73 | 8,44 | -34% | -5% |
| Electricity | 10 | *11%* | 5,07 | 5,04 | 5,20 | 3,72 | 4,64 | 4,63 | 4,75 | 4,65 | 4,68 | 42,39 | -8% | -1% |
| RES | 34 | *38%* | 8,09 | 9,20 | 14,39 | 18,76 | 22,83 | 22,27 | 24,11 | 26,76 | 27,04 | 173,44 | +234% | +16% |
| **Total** | **89** | ***100%*** | **33,94** | **32,30** | **37,64** | **39,18** | **42,65** | **38,79** | **41,75** | **44,63** | **44,41** | **355,28** | **+31%** | **+3%** |

Interventions distribution by energy/technology



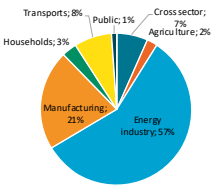

Financial support by energy/technology (billion euros)



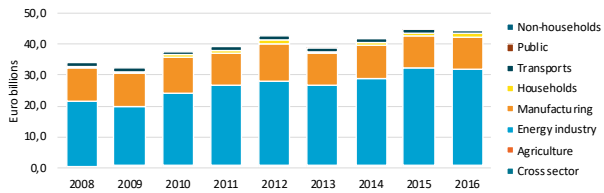

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 6 | *7%* | 0,15 | 0,21 | 0,23 | 0,25 | 0,26 | 0,25 | 0,23 | 0,22 | 0,25 | 2,05 | +64% | +6% |
| Agriculture | 2 | *2%* | 0,15 | 0,36 | 0,44 | 0,51 | 0,47 | 0,46 | 0,42 | 0,45 | 0,47 | 3,74 | +205% | +15% |
| Energy industry | 51 | *57%* | 21,13 | 19,07 | 23,45 | 25,78 | 27,32 | 26,12 | 28,37 | 31,67 | 31,38 | 234,30 | +49% | +5% |
| Manufacturing | 19 | *21%* | 11,00 | 11,01 | 11,67 | 10,74 | 12,32 | 10,18 | 10,53 | 10,04 | 9,92 | 97,41 | -10% | -1% |
| Households | 3 | *3%* | 0,28 | 0,48 | 0,75 | 0,84 | 0,93 | 0,76 | 1,13 | 1,16 | 1,32 | 7,64 | +375% | +22% |
| Transports | 7 | *8%* | 1,24 | 1,16 | 1,10 | 1,06 | 1,35 | 1,01 | 1,05 | 1,07 | 1,05 | 10,11 | -15% | -2% |
| Public | 1 | *1%* | | | | | | 0,00 | 0,01 | 0,01 | 0,01 | 0,03 | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **89** | ***100%*** | **33,94** | **32,30** | **37,64** | **39,18** | **42,65** | **38,79** | **41,75** | **44,63** | **44,41** | **355,28** | **+31%** | **+3%** |

Interventions distribution by sector




Financial support by sector (billion euros)

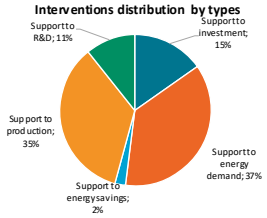


# Greece

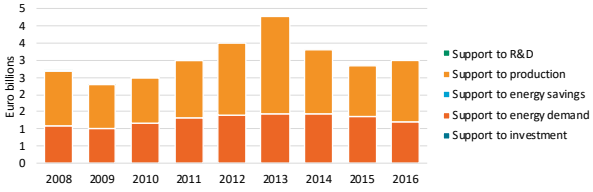
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 7 | *15%* | | | | | | | | | | | | |
| Support to energy demand | 17 | *37%* | 1,09 | 1,01 | 1,19 | 1,35 | 1,42 | 1,46 | 1,44 | 1,37 | 1,23 | 11,55 | +13% | +2% |
| Support to energy savings | 1 | *2%* | | | | | | | | | | | | |
| Support to production | 16 | *35%* | 1,61 | 1,27 | 1,31 | 1,64 | 2,08 | 2,80 | 1,86 | 1,49 | 1,75 | 15,83 | +9% | +1% |
| Support to R&D | 5 | *11%* | 0,02 | 0,02 | 0,01 | 0,01 | | | | | | 0,04 | -100% | -100% |
| **Total** | **46** | ***100%*** | **2,72** | **2,30** | **2,50** | **3,00** | **3,50** | **4,26** | **3,30** | **2,86** | **2,98** | **27,42** | **+10%** | **+1%** |

Interventions distribution by types



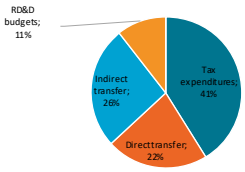

Financial support by types (billion euros)



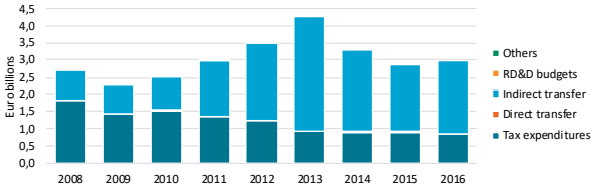

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 19 | *41%* | 1,81 | 1,43 | 1,53 | 1,37 | 1,23 | 0,91 | 0,89 | 0,91 | 0,86 | 10,94 | -52% | -9% |
| Direct transfer | 10 | *22%* | 0,01 | 0,01 | 0,01 | 0,00 | 0,00 | 0,01 | 0,02 | 0,02 | 0,00 | 0,09 | -32% | -5% |
| Indirect transfer | 12 | *26%* | 0,89 | 0,85 | 0,96 | 1,62 | 2,27 | 3,34 | 2,39 | 1,93 | 2,12 | 16,35 | +138% | +11% |
| RD&D budgets | 5 | *11%* | 0,02 | 0,02 | 0,01 | 0,01 | | | | | | 0,04 | -100% | -100% |
| Others | | | | | | | | | | | | | | |
| **Total** | **46** | ***100%*** | **2,72** | **2,30** | **2,50** | **3,00** | **3,50** | **4,26** | **3,30** | **2,86** | **2,98** | **27,42** | **+10%** | **+1%** |

Interventions distribution by sub-types



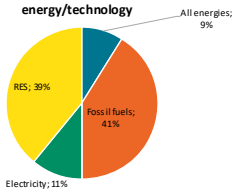

Financial support by sub-types (billion euros)



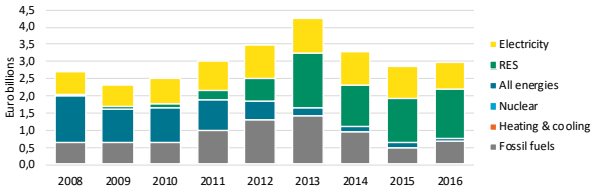

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 4 | *9%* | 1,34 | 0,98 | 0,99 | 0,88 | 0,56 | 0,23 | 0,14 | 0,13 | 0,10 | 5,36 | -93% | -28% |
| Fossil fuels | 19 | *41%* | 0,66 | 0,63 | 0,66 | 1,00 | 1,31 | 1,44 | 0,96 | 0,51 | 0,67 | 7,86 | +1% | +0% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | 5 | *11%* | 0,68 | 0,61 | 0,72 | 0,84 | 0,98 | 1,02 | 0,97 | 0,93 | 0,81 | 7,57 | +18% | +2% |
| RES | 18 | *39%* | 0,03 | 0,07 | 0,12 | 0,28 | 0,64 | 1,56 | 1,22 | 1,29 | 1,41 | 6,64 | +4580% | +62% |
| **Total** | **46** | ***100%*** | **2,72** | **2,30** | **2,50** | **3,00** | **3,50** | **4,26** | **3,30** | **2,86** | **2,98** | **27,42** | **+10%** | **+1%** |

Interventions distribution by energy/technology



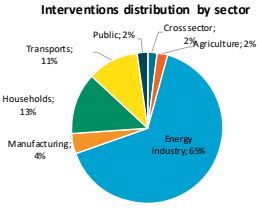

Financial support by energy/technology (billion euros)



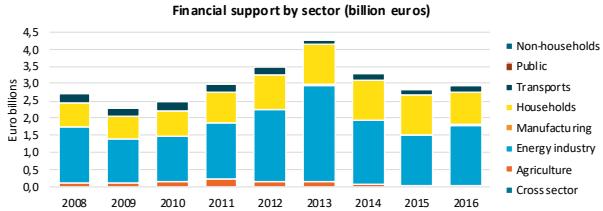

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 1 | *2%* | 0,01 | 0,01 | 0,01 | 0,00 | 0,00 | 0,00 | 0,01 | 0,00 | | 0,04 | -100% | -100% |
| Agriculture | 1 | *2%* | 0,11 | 0,11 | 0,15 | 0,21 | 0,15 | 0,15 | 0,05 | 0,02 | 0,02 | 0,99 | -82% | -19% |
| Energy industry | 30 | *65%* | 1,63 | 1,29 | 1,32 | 1,65 | 2,09 | 2,81 | 1,86 | 1,49 | 1,75 | 15,89 | +8% | +1% |
| Manufacturing | 2 | *4%* | | | | | | 0,00 | 0,01 | 0,02 | 0,04 | 0,08 | | |
| Households | 6 | *13%* | 0,70 | 0,63 | 0,75 | 0,87 | 1,03 | 1,18 | 1,19 | 1,14 | 0,95 | 8,42 | +36% | +4% |
| Transports | 5 | *11%* | 0,25 | 0,24 | 0,27 | 0,25 | 0,22 | 0,09 | 0,17 | 0,18 | 0,20 | 1,85 | -23% | -3% |
| Public | 1 | *2%* | 0,02 | 0,01 | 0,02 | 0,02 | 0,02 | 0,02 | 0,01 | 0,01 | 0,02 | 0,15 | +37% | +4% |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **46** | ***100%*** | **2,72** | **2,30** | **2,50** | **3,00** | **3,50** | **4,26** | **3,30** | **2,86** | **2,98** | **27,42** | **+10%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

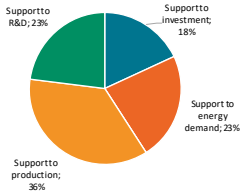


# Hungary

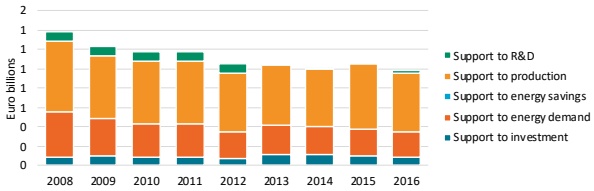
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 7 | *18%* | 0,09 | 0,09 | 0,09 | 0,09 | 0,07 | 0,12 | 0,11 | 0,09 | 0,08 | 0,83 | -3% | -0% |
| Support to energy demand | 9 | *23%* | 0,46 | 0,40 | 0,34 | 0,34 | 0,28 | 0,30 | 0,29 | 0,28 | 0,27 | 2,96 | -42% | -7% |
| Support to energy savings | | | | | | | | | | | | | | |
| Support to production | 14 | *36%* | 0,74 | 0,65 | 0,66 | 0,65 | 0,61 | 0,62 | 0,60 | 0,68 | 0,60 | 5,81 | -19% | -3% |
| Support to R&D | 9 | *23%* | 0,10 | 0,09 | 0,09 | 0,10 | 0,09 | 0,01 | 0,01 | 0,01 | 0,03 | 0,53 | -71% | -14% |
| **Total** | **39** | ***100%*** | **1,39** | **1,23** | **1,18** | **1,17** | **1,05** | **1,04** | **1,01** | **1,07** | **0,98** | **10,12** | **-29%** | **-4%** |

Interventions distribution by types



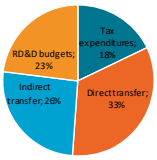

Financial support by types (billion euros)



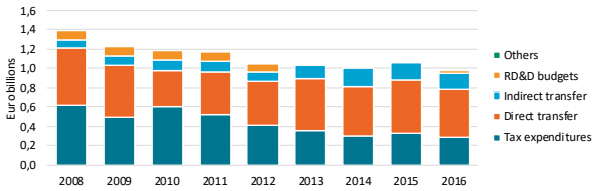

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 7 | *18%* | 0,61 | 0,50 | 0,60 | 0,52 | 0,41 | 0,36 | 0,30 | 0,32 | 0,29 | 3,92 | -53% | -9% |
| Direct transfer | 13 | *33%* | 0,61 | 0,54 | 0,38 | 0,45 | 0,45 | 0,53 | 0,51 | 0,55 | 0,49 | 4,51 | -19% | -3% |
| Indirect transfer | 10 | *26%* | 0,07 | 0,10 | 0,11 | 0,11 | 0,10 | 0,14 | 0,19 | 0,18 | 0,18 | 1,17 | +136% | +11% |
| RD&D budgets | 9 | *23%* | 0,10 | 0,09 | 0,09 | 0,10 | 0,09 | 0,01 | 0,01 | 0,01 | 0,03 | 0,53 | -71% | -14% |
| Others | | | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **1,39** | **1,23** | **1,18** | **1,17** | **1,05** | **1,04** | **1,01** | **1,07** | **0,98** | **10,12** | **-29%** | **-4%** |

Interventions distribution by sub-types



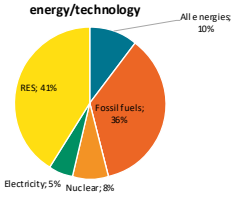

Financial support by sub-types (billion euros)



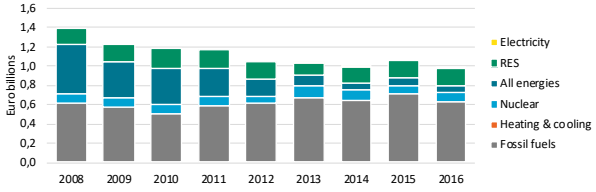

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 4 | *10%* | 0,51 | 0,37 | 0,38 | 0,29 | 0,17 | 0,11 | 0,07 | 0,09 | 0,07 | 2,05 | -86% | -22% |
| Fossil fuels | 14 | *36%* | 0,63 | 0,58 | 0,51 | 0,60 | 0,61 | 0,67 | 0,65 | 0,70 | 0,64 | 5,59 | +2% | +0% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 3 | *8%* | 0,09 | 0,09 | 0,09 | 0,09 | 0,07 | 0,12 | 0,11 | 0,09 | 0,09 | 0,83 | -3% | -0% |
| Electricity | 2 | *5%* | | | | | | 0,01 | 0,02 | 0,01 | 0,01 | 0,05 | | |
| RES | 16 | *41%* | 0,17 | 0,19 | 0,20 | 0,20 | 0,19 | 0,13 | 0,17 | 0,17 | 0,18 | 1,61 | +4% | +1% |
| **Total** | **39** | ***100%*** | **1,39** | **1,23** | **1,18** | **1,17** | **1,05** | **1,04** | **1,01** | **1,07** | **0,98** | **10,12** | **-29%** | **-4%** |

Interventions distribution by energy/technology



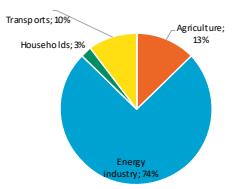

Financial support by energy/technology (billion euros)



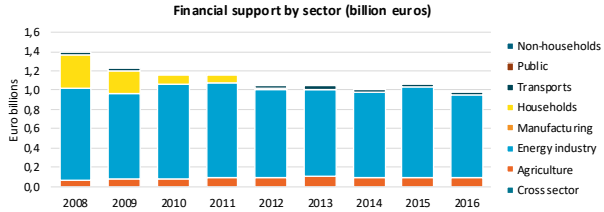

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | | | | | | | | | | | | | | |
| Agriculture | 5 | *13%* | 0,07 | 0,08 | 0,09 | 0,09 | 0,09 | 0,10 | 0,10 | 0,10 | 0,09 | 0,81 | +29% | +3% |
| Energy industry | 29 | *74%* | 0,95 | 0,88 | 0,98 | 0,99 | 0,92 | 0,91 | 0,88 | 0,94 | 0,86 | 8,31 | -9% | -1% |
| Manufacturing | | | | | | | | | | | | | | |
| Households | 1 | *3%* | 0,33 | 0,24 | 0,10 | 0,08 | 0,01 | 0,00 | 0,00 | | | 0,76 | -100% | -100% |
| Transports | 4 | *10%* | 0,03 | 0,03 | 0,02 | 0,02 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,24 | -15% | -2% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **1,39** | **1,23** | **1,18** | **1,17** | **1,05** | **1,04** | **1,01** | **1,07** | **0,98** | **10,12** | **-29%** | **-4%** |

Interventions distribution by sector




Financial support by sector (billion euros)

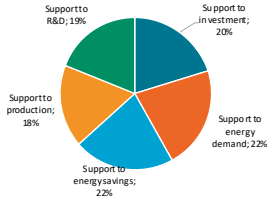


# Ireland

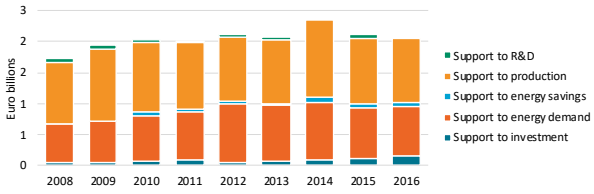
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 15 | *20%* | 0,04 | 0,05 | 0,07 | 0,08 | 0,05 | 0,07 | 0,09 | 0,12 | 0,15 | 0,72 | +277% | +18% |
| Support to energy demand | 16 | *22%* | 0,63 | 0,66 | 0,74 | 0,79 | 0,95 | 0,91 | 0,94 | 0,82 | 0,81 | 7,24 | +29% | +3% |
| Support to energy savings | 16 | *22%* | 0,01 | 0,01 | 0,05 | 0,05 | 0,04 | 0,04 | 0,08 | 0,07 | 0,07 | 0,42 | +561% | +27% |
| Support to production | 13 | *18%* | 0,99 | 1,17 | 1,13 | 1,08 | 1,05 | 1,03 | 1,24 | 1,05 | 1,03 | 9,77 | +4% | +1% |
| Support to R&D | 14 | *19%* | 0,06 | 0,06 | 0,04 | 0,02 | 0,04 | 0,03 | 0,03 | 0,06 | | 0,34 | -100% | -100% |
| **Total** | **74** | ***100%*** | **1,73** | **1,95** | **2,04** | **2,01** | **2,12** | **2,07** | **2,38** | **2,12** | **2,06** | **18,49** | **+19%** | **+2%** |

Interventions distribution by types



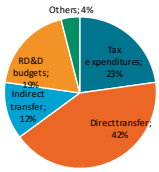

Financial support by types (billion euros)



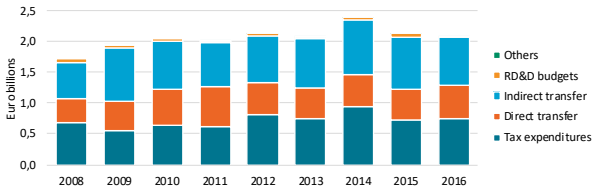

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 17 | *23%* | 0,69 | 0,56 | 0,64 | 0,63 | 0,81 | 0,76 | 0,94 | 0,73 | 0,76 | 6,51 | +9% | +1% |
| Direct transfer | 31 | *42%* | 0,38 | 0,46 | 0,58 | 0,64 | 0,52 | 0,49 | 0,52 | 0,50 | 0,52 | 4,61 | +39% | +4% |
| Indirect transfer | 9 | *12%* | 0,60 | 0,88 | 0,77 | 0,71 | 0,75 | 0,79 | 0,89 | 0,83 | 0,78 | 7,02 | +31% | +3% |
| RD&D budgets | 14 | *19%* | 0,06 | 0,06 | 0,04 | 0,02 | 0,04 | 0,03 | 0,03 | 0,06 | | 0,34 | -100% | -100% |
| Others | 3 | *4%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | -72% | -15% |
| **Total** | **74** | ***100%*** | **1,73** | **1,95** | **2,04** | **2,01** | **2,12** | **2,07** | **2,38** | **2,12** | **2,06** | **18,49** | **+19%** | **+2%** |

Interventions distribution by sub-types



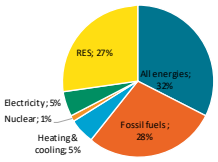

Financial support by sub-types (billion euros)



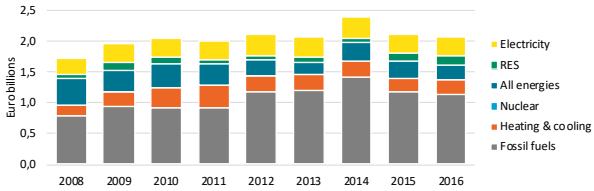

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 24 | *32%* | 0,42 | 0,34 | 0,40 | 0,35 | 0,27 | 0,20 | 0,31 | 0,28 | 0,23 | 2,79 | -45% | -7% |
| Fossil fuels | 21 | *28%* | 0,79 | 0,94 | 0,93 | 0,93 | 1,17 | 1,20 | 1,42 | 1,16 | 1,12 | 9,67 | +41% | +4% |
| Heating & cooling | 4 | *5%* | 0,18 | 0,24 | 0,30 | 0,36 | 0,26 | 0,26 | 0,24 | 0,23 | 0,25 | 2,31 | +39% | +4% |
| Nuclear | 1 | *1%* | 0,00 | 0,00 | | 0,00 | 0,00 | 0,00 | | | | 0,00 | -100% | -100% |
| Electricity | 4 | *5%* | 0,27 | 0,30 | 0,30 | 0,32 | 0,36 | 0,34 | 0,34 | 0,32 | 0,30 | 2,85 | +13% | +2% |
| RES | 20 | *27%* | 0,07 | 0,13 | 0,11 | 0,07 | 0,07 | 0,08 | 0,07 | 0,12 | 0,16 | 0,88 | +131% | +11% |
| **Total** | **74** | ***100%*** | **1,73** | **1,95** | **2,04** | **2,01** | **2,12** | **2,07** | **2,38** | **2,12** | **2,06** | **18,49** | **+19%** | **+2%** |

Interventions distribution by energy/technology



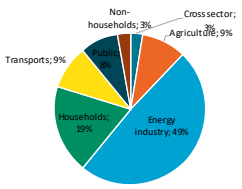

Financial support by energy/technology (billion euros)



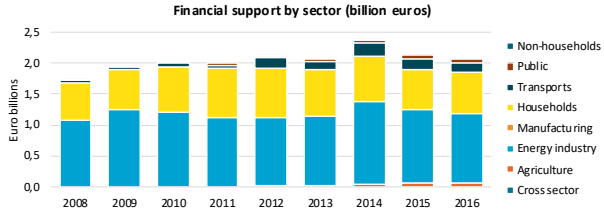

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 2 | *3%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | +506% | +25% |
| Agriculture | 7 | *9%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,03 | 0,03 | 0,03 | 0,05 | 0,05 | 0,18 | +4064% | +59% |
| Energy industry | 36 | *49%* | 1,08 | 1,25 | 1,19 | 1,10 | 1,10 | 1,11 | 1,34 | 1,19 | 1,14 | 10,50 | +5% | +1% |
| Manufacturing | | | | | | | | | | | | | | |
| Households | 14 | *19%* | 0,59 | 0,64 | 0,75 | 0,82 | 0,80 | 0,76 | 0,75 | 0,66 | 0,66 | 6,43 | +11% | +1% |
| Transports | 7 | *9%* | 0,05 | 0,05 | 0,05 | 0,04 | 0,17 | 0,14 | 0,20 | 0,17 | 0,16 | 1,03 | +223% | +16% |
| Public | 6 | *8%* | 0,00 | 0,01 | 0,04 | 0,04 | 0,02 | 0,03 | 0,06 | 0,06 | 0,05 | 0,31 | +4598% | +62% |
| Non-households | 2 | *3%* | 0,00 | 0,01 | 0,00 | 0,01 | 0,01 | 0,00 | 0,00 | 0,00 | 0,00 | 0,04 | -65% | -12% |
| **Total** | **74** | ***100%*** | **1,73** | **1,95** | **2,04** | **2,01** | **2,12** | **2,07** | **2,38** | **2,12** | **2,06** | **18,49** | **+19%** | **+2%** |

Interventions distribution by sector




Financial support by sector (billion euros)

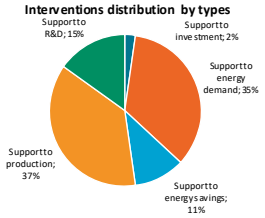


# Italy

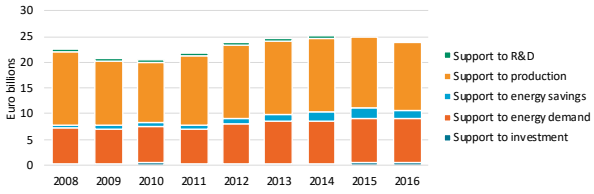
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 2 | *2%* | 0,29 | 0,30 | 0,44 | 0,27 | 0,16 | 0,18 | 0,33 | 0,63 | 0,57 | 3,17 | +94% | +9% |
| Support to energy demand | 32 | *35%* | 6,95 | 6,74 | 7,01 | 6,78 | 7,85 | 8,54 | 8,28 | 8,45 | 8,51 | 69,11 | +23% | +3% |
| Support to energy savings | 10 | *11%* | 0,63 | 0,77 | 0,78 | 0,89 | 1,15 | 1,32 | 1,79 | 2,17 | 1,73 | 11,22 | +176% | +14% |
| Support to production | 34 | *37%* | 14,21 | 12,49 | 11,79 | 13,37 | 14,25 | 14,04 | 14,18 | 13,77 | 13,18 | 121,28 | -7% | -1% |
| Support to R&D | 14 | *15%* | 0,41 | 0,37 | 0,50 | 0,57 | 0,59 | 0,54 | 0,53 | | | 3,51 | -100% | -100% |
| **Total** | **92** | ***100%*** | **22,48** | **20,67** | **20,52** | **21,88** | **23,99** | **24,62** | **25,10** | **25,02** | **23,99** | **208,28** | **+7%** | **+1%** |

Interventions distribution by types



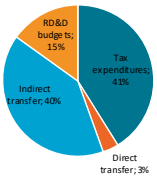

Financial support by types (billion euros)



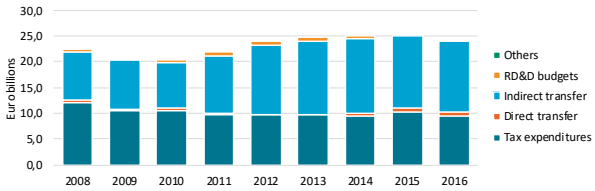

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 38 | *41%* | 12,17 | 10,45 | 10,38 | 9,75 | 9,76 | 9,71 | 9,64 | 10,31 | 9,68 | 91,84 | -20% | -3% |
| Direct transfer | 3 | *3%* | 0,29 | 0,30 | 0,61 | 0,33 | 0,18 | 0,19 | 0,37 | 0,68 | 0,62 | 3,57 | +113% | +10% |
| Indirect transfer | 37 | *40%* | 9,62 | 9,55 | 9,02 | 11,24 | 13,47 | 14,18 | 14,56 | 14,03 | 13,69 | 109,36 | +42% | +5% |
| RD&D budgets | 14 | *15%* | 0,41 | 0,37 | 0,50 | 0,57 | 0,59 | 0,54 | 0,53 | | | 3,51 | -100% | -100% |
| Others | | | | | | | | | | | | | | |
| **Total** | **92** | ***100%*** | **22,48** | **20,67** | **20,52** | **21,88** | **23,99** | **24,62** | **25,10** | **25,02** | **23,99** | **208,28** | **+7%** | **+1%** |

Interventions distribution by sub-types



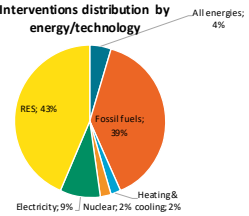

Financial support by sub-types (billion euros)



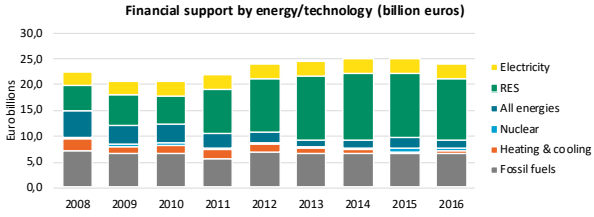

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 4 | *4%* | 5,13 | 3,75 | 3,58 | 2,83 | 2,03 | 1,35 | 1,60 | 2,15 | 1,55 | 23,98 | -70% | -14% |
| Fossil fuels | 36 | *39%* | 7,07 | 6,54 | 6,61 | 5,73 | 6,98 | 6,55 | 6,69 | 6,56 | 6,66 | 59,40 | -6% | -1% |
| Heating & cooling | 2 | *2%* | 2,34 | 1,53 | 1,62 | 1,70 | 1,60 | 1,13 | 0,68 | 0,46 | 0,39 | 11,45 | -83% | -20% |
| Nuclear | 2 | *2%* | 0,37 | 0,39 | 0,53 | 0,35 | 0,26 | 0,28 | 0,41 | 0,63 | 0,57 | 3,79 | +51% | +5% |
| Electricity | 8 | *9%* | 2,69 | 2,59 | 2,88 | 2,93 | 2,73 | 3,07 | 2,99 | 2,86 | 2,87 | 25,60 | +7% | +1% |
| RES | 40 | *43%* | 4,88 | 5,87 | 5,29 | 8,34 | 10,40 | 12,26 | 12,73 | 12,35 | 11,95 | 84,07 | +145% | +12% |
| **Total** | **92** | ***100%*** | **22,48** | **20,67** | **20,52** | **21,88** | **23,99** | **24,62** | **25,10** | **25,02** | **23,99** | **208,28** | **+7%** | **+1%** |

Interventions distribution by energy/technology



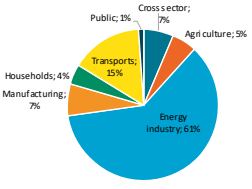

Financial support by energy/technology (billion euros)



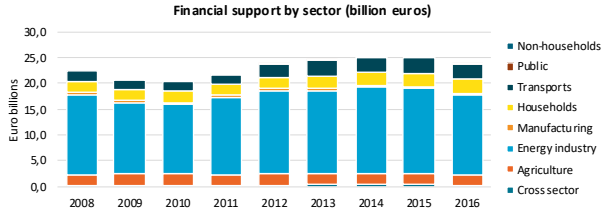

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 6 | *7%* | 0,07 | 0,25 | 0,25 | 0,08 | 0,30 | 0,33 | 0,36 | 0,35 | 0,25 | 2,25 | +273% | +18% |
| Agriculture | 5 | *5%* | 2,26 | 2,22 | 2,26 | 2,24 | 2,32 | 2,34 | 2,26 | 2,22 | 2,15 | 20,28 | -5% | -1% |
| Energy industry | 56 | *61%* | 15,47 | 13,87 | 13,45 | 15,03 | 16,06 | 15,99 | 16,74 | 16,47 | 15,40 | 138,48 | -0% | -0% |
| Manufacturing | 6 | *7%* | 0,50 | 0,41 | 0,41 | 0,41 | 0,40 | 0,42 | 0,39 | 0,39 | 0,38 | 3,71 | -23% | -3% |
| Households | 4 | *4%* | 2,08 | 2,05 | 2,23 | 2,22 | 2,15 | 2,50 | 2,45 | 2,57 | 2,67 | 20,94 | +28% | +3% |
| Transports | 14 | *15%* | 2,11 | 1,87 | 1,91 | 1,86 | 2,72 | 2,99 | 2,87 | 2,99 | 3,11 | 22,43 | +48% | +5% |
| Public | 1 | *1%* | | | | 0,04 | 0,05 | 0,04 | 0,03 | 0,03 | 0,03 | 0,20 | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **92** | ***100%*** | **22,48** | **20,67** | **20,52** | **21,88** | **23,99** | **24,62** | **25,10** | **25,02** | **23,99** | **208,28** | **+7%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

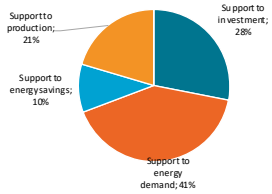


# Latvia

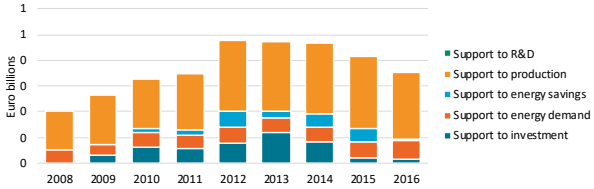
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 11 | *28%* | 0,00 | 0,03 | 0,06 | 0,06 | 0,08 | 0,12 | 0,09 | 0,02 | 0,02 | 0,47 | +1368% | +40% |
| Support to energy demand | 16 | *41%* | 0,05 | 0,04 | 0,06 | 0,05 | 0,06 | 0,06 | 0,06 | 0,06 | 0,07 | 0,52 | +39% | +4% |
| Support to energy savings | 4 | *10%* | | 0,00 | 0,02 | 0,02 | 0,06 | 0,02 | 0,05 | 0,05 | 0,01 | 0,24 | | |
| Support to production | 8 | *21%* | 0,15 | 0,19 | 0,19 | 0,22 | 0,27 | 0,27 | 0,27 | 0,28 | 0,26 | 2,11 | +72% | +7% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **0,20** | **0,27** | **0,33** | **0,35** | **0,48** | **0,47** | **0,47** | **0,42** | **0,35** | **3,33** | **+75%** | **+7%** |

**Interventions distribution by types**



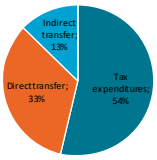

**Financial support by types (billion euros)**



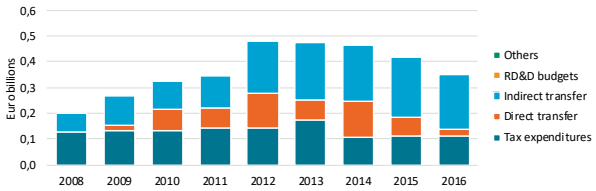

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 21 | *54%* | 0,13 | 0,14 | 0,14 | 0,15 | 0,15 | 0,18 | 0,11 | 0,11 | 0,11 | 1,20 | -12% | -2% |
| Direct transfer | 13 | *33%* | | 0,02 | 0,08 | 0,07 | 0,13 | 0,08 | 0,14 | 0,07 | 0,03 | 0,62 | | |
| Indirect transfer | 5 | *13%* | 0,07 | 0,11 | 0,11 | 0,13 | 0,20 | 0,22 | 0,22 | 0,23 | 0,21 | 1,51 | +190% | +14% |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **0,20** | **0,27** | **0,33** | **0,35** | **0,48** | **0,47** | **0,47** | **0,42** | **0,35** | **3,33** | **+75%** | **+7%** |

**Interventions distribution by sub-types**



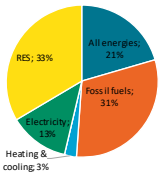

**Financial support by sub-types (billion euros)**



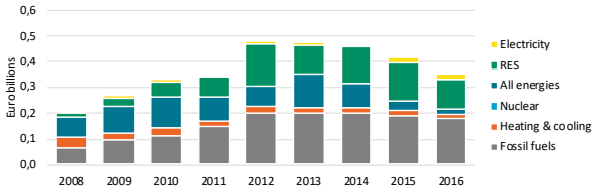

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 8 | *21%* | 0,08 | 0,10 | 0,12 | 0,09 | 0,07 | 0,13 | 0,09 | 0,04 | 0,02 | 0,74 | -75% | -16% |
| Fossil fuels | 12 | *31%* | 0,07 | 0,10 | 0,11 | 0,15 | 0,20 | 0,20 | 0,20 | 0,19 | 0,18 | 1,40 | +174% | +13% |
| Heating & cooling | 1 | *3%* | 0,04 | 0,03 | 0,03 | 0,02 | 0,03 | 0,02 | 0,02 | 0,02 | 0,02 | 0,22 | -60% | -11% |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | 5 | *13%* | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,02 | 0,02 | 0,09 | +927% | +34% |
| RES | 13 | *33%* | 0,02 | 0,03 | 0,06 | 0,08 | 0,17 | 0,12 | 0,15 | 0,15 | 0,11 | 0,88 | +618% | +28% |
| **Total** | **39** | ***100%*** | **0,20** | **0,27** | **0,33** | **0,35** | **0,48** | **0,47** | **0,47** | **0,42** | **0,35** | **3,33** | **+75%** | **+7%** |

**Interventions distribution by energy/technology**



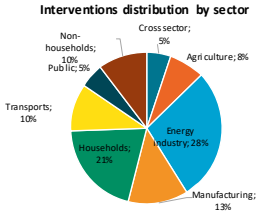

**Financial support by energy/technology (billion euros)**



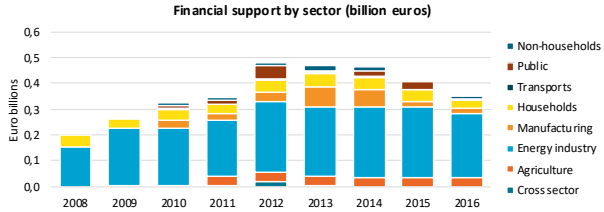

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 2 | *5%* | | 0,00 | 0,00 | 0,00 | 0,02 | 0,00 | 0,00 | | | 0,04 | | |
| Agriculture | 3 | *8%* | | | | 0,03 | 0,04 | 0,04 | 0,04 | 0,03 | 0,03 | 0,21 | | |
| Energy industry | 11 | *28%* | 0,16 | 0,22 | 0,22 | 0,22 | 0,28 | 0,27 | 0,27 | 0,27 | 0,25 | 2,16 | +58% | +6% |
| Manufacturing | 5 | *13%* | | | 0,03 | 0,03 | 0,03 | 0,08 | 0,07 | 0,02 | 0,02 | 0,29 | | |
| Households | 8 | *21%* | 0,04 | 0,04 | 0,04 | 0,04 | 0,05 | 0,05 | 0,05 | 0,04 | 0,04 | 0,39 | -18% | -2% |
| Transports | 4 | *10%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,03 | +173% | +13% |
| Public | 2 | *5%* | | | 0,01 | 0,02 | 0,05 | 0,00 | 0,02 | 0,03 | | 0,13 | | |
| Non-households | 4 | *10%* | | | 0,01 | 0,01 | 0,01 | 0,02 | 0,01 | 0,01 | 0,01 | 0,09 | | |
| **Total** | **39** | ***100%*** | **0,20** | **0,27** | **0,33** | **0,35** | **0,48** | **0,47** | **0,47** | **0,42** | **0,35** | **3,33** | **+75%** | **+7%** |

**Interventions distribution by sector**




**Financial support by sector (billion euros)**

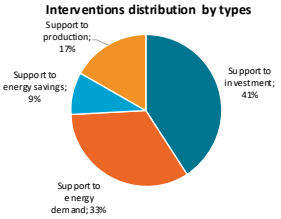


# Lithuania

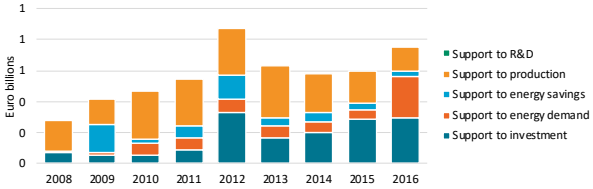
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 27 | *41%* | 0,07 | 0,05 | 0,05 | 0,08 | 0,33 | 0,17 | 0,20 | 0,29 | 0,30 | 1,53 | +353% | +21% |
| Support to energy demand | 22 | *33%* | 0,01 | 0,02 | 0,08 | 0,08 | 0,09 | 0,08 | 0,07 | 0,06 | 0,26 | 0,77 | +1878% | +45% |
| Support to energy savings | 6 | *9%* | | 0,18 | 0,03 | 0,08 | 0,16 | 0,05 | 0,06 | 0,04 | 0,03 | 0,63 | | |
| Support to production | 11 | *17%* | 0,20 | 0,17 | 0,31 | 0,30 | 0,30 | 0,34 | 0,25 | 0,20 | 0,16 | 2,22 | -20% | -3% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **66** | ***100%*** | **0,28** | **0,42** | **0,47** | **0,54** | **0,87** | **0,63** | **0,58** | **0,60** | **0,75** | **5,14** | **+172%** | **+13%** |

Interventions distribution by types



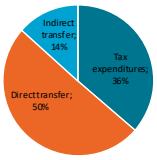

Financial support by types (billion euros)



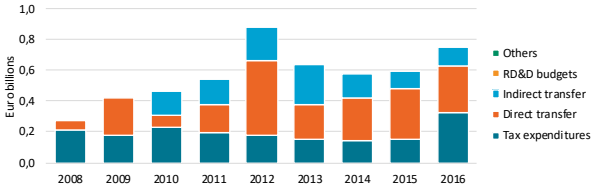

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 24 | *36%* | 0,21 | 0,18 | 0,23 | 0,20 | 0,18 | 0,15 | 0,15 | 0,15 | 0,33 | 1,78 | +54% | +6% |
| Direct transfer | 33 | *50%* | 0,07 | 0,24 | 0,08 | 0,17 | 0,48 | 0,22 | 0,28 | 0,33 | 0,30 | 2,17 | +362% | +21% |
| Indirect transfer | 9 | *14%* | | | 0,15 | 0,17 | 0,21 | 0,26 | 0,16 | 0,11 | 0,12 | 1,19 | | |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **66** | ***100%*** | **0,28** | **0,42** | **0,47** | **0,54** | **0,87** | **0,63** | **0,58** | **0,60** | **0,75** | **5,14** | **+172%** | **+13%** |

Interventions distribution by sub-types



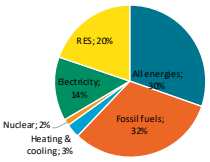

Financial support by sub-types (billion euros)



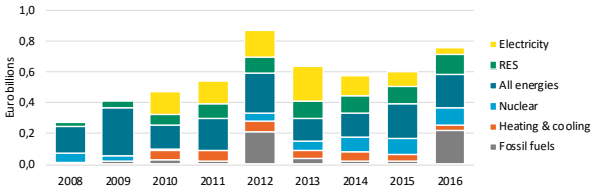

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 20 | *30%* | 0,17 | 0,31 | 0,16 | 0,21 | 0,26 | 0,16 | 0,15 | 0,23 | 0,21 | 1,86 | +26% | +3% |
| Fossil fuels | 21 | *32%* | 0,01 | 0,02 | 0,03 | 0,03 | 0,21 | 0,04 | 0,02 | 0,02 | 0,22 | 0,61 | +1571% | +42% |
| Heating & cooling | 2 | *3%* | | 0,00 | 0,06 | 0,07 | 0,07 | 0,05 | 0,05 | 0,04 | 0,04 | 0,39 | | |
| Nuclear | 1 | *2%* | 0,06 | 0,03 | 0,01 | 0,00 | 0,05 | 0,06 | 0,10 | 0,11 | 0,11 | 0,54 | +75% | +7% |
| Electricity | 9 | *14%* | | | 0,14 | 0,15 | 0,17 | 0,22 | 0,13 | 0,09 | 0,04 | 0,95 | | |
| RES | 13 | *20%* | 0,03 | 0,05 | 0,06 | 0,09 | 0,11 | 0,11 | 0,12 | 0,11 | 0,13 | 0,80 | +333% | +20% |
| **Total** | **66** | ***100%*** | **0,28** | **0,42** | **0,47** | **0,54** | **0,87** | **0,63** | **0,58** | **0,60** | **0,75** | **5,14** | **+172%** | **+13%** |

Interventions distribution by energy/technology



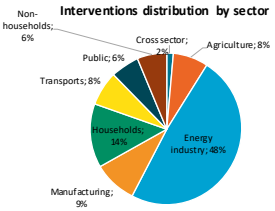

Financial support by energy/technology (billion euros)



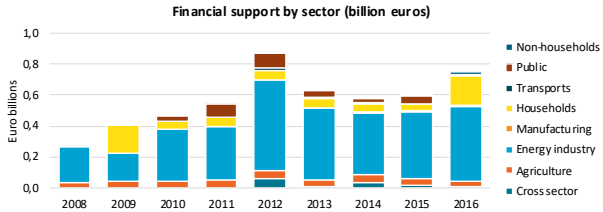

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 1 | *2%* | | | | | 0,06 | 0,01 | 0,03 | 0,01 | 0,01 | 0,12 | | |
| Agriculture | 5 | *8%* | 0,03 | 0,05 | 0,04 | 0,05 | 0,05 | 0,04 | 0,05 | 0,05 | 0,03 | 0,38 | -2% | -0% |
| Energy industry | 32 | *48%* | 0,24 | 0,18 | 0,33 | 0,35 | 0,59 | 0,47 | 0,40 | 0,43 | 0,49 | 3,48 | +105% | +9% |
| Manufacturing | 6 | *9%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,03 | +791% | +31% |
| Households | 9 | *14%* | 0,00 | 0,18 | 0,05 | 0,06 | 0,06 | 0,06 | 0,05 | 0,04 | 0,20 | 0,71 | +16329% | +89% |
| Transports | 5 | *8%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,00 | 0,00 | 0,05 | -15% | -2% |
| Public | 4 | *6%* | 0,00 | 0,01 | 0,03 | 0,08 | 0,10 | 0,04 | 0,03 | 0,05 | 0,00 | 0,34 | -50% | -8% |
| Non-households | 4 | *6%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | 0,04 | +2438% | +50% |
| **Total** | **66** | ***100%*** | **0,28** | **0,42** | **0,47** | **0,54** | **0,87** | **0,63** | **0,58** | **0,60** | **0,75** | **5,14** | **+172%** | **+13%** |

Interventions distribution by sector




Financial support by sector (billion euros)

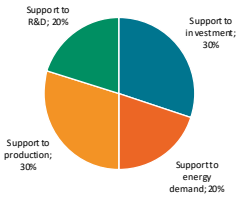


# Luxembourg

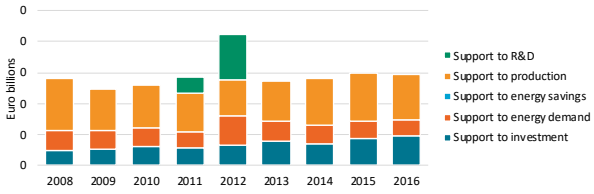
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 9 | *30%* | 0,02 | 0,03 | 0,03 | 0,03 | 0,03 | 0,04 | 0,04 | 0,04 | 0,05 | 0,31 | +94% | +9% |
| Support to energy demand | 6 | *20%* | 0,03 | 0,03 | 0,03 | 0,03 | 0,05 | 0,03 | 0,03 | 0,03 | 0,03 | 0,28 | -14% | -2% |
| Support to energy savings | | | | | | | | | | | | | | |
| Support to production | 9 | *30%* | 0,08 | 0,07 | 0,07 | 0,06 | 0,06 | 0,06 | 0,08 | 0,08 | 0,07 | 0,63 | -12% | -2% |
| Support to R&D | 6 | *20%* | | | | 0,03 | 0,08 | | | | | 0,10 | | |
| **Total** | **30** | ***100%*** | **0,14** | **0,12** | **0,13** | **0,14** | **0,21** | **0,14** | **0,14** | **0,15** | **0,15** | **1,32** | **+6%** | **+1%** |

Interventions distribution by types



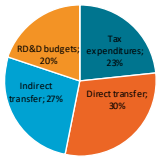

Financial support by types (billion euros)



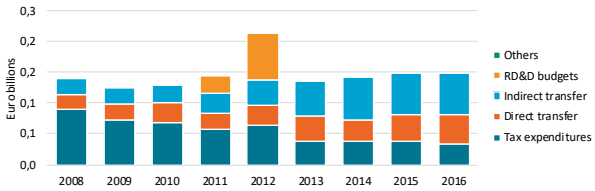

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 7 | *23%* | 0,09 | 0,07 | 0,07 | 0,06 | 0,06 | 0,04 | 0,04 | 0,04 | 0,03 | 0,50 | -62% | -11% |
| Direct transfer | 9 | *30%* | 0,02 | 0,03 | 0,03 | 0,03 | 0,03 | 0,04 | 0,04 | 0,04 | 0,05 | 0,31 | +94% | +9% |
| Indirect transfer | 8 | *27%* | 0,03 | 0,03 | 0,03 | 0,03 | 0,04 | 0,06 | 0,07 | 0,07 | 0,07 | 0,41 | +153% | +12% |
| RD&D budgets | 6 | *20%* | | | | 0,03 | 0,08 | | | | | 0,10 | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **30** | ***100%*** | **0,14** | **0,12** | **0,13** | **0,14** | **0,21** | **0,14** | **0,14** | **0,15** | **0,15** | **1,32** | **+6%** | **+1%** |

Interventions distribution by sub-types



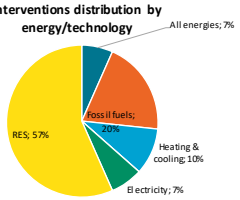

Financial support by sub-types (billion euros)



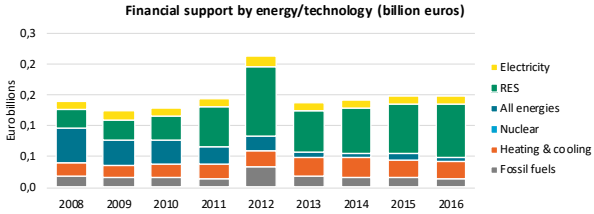

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 2 | *7%* | 0,06 | 0,04 | 0,04 | 0,03 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,22 | -88% | -23% |
| Fossil fuels | 6 | *20%* | 0,02 | 0,02 | 0,02 | 0,01 | 0,03 | 0,02 | 0,02 | 0,02 | 0,01 | 0,16 | -21% | -3% |
| Heating & cooling | 3 | *10%* | 0,02 | 0,02 | 0,02 | 0,02 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,23 | +33% | +4% |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | 2 | *7%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,12 | -3% | -0% |
| RES | 17 | *57%* | 0,03 | 0,03 | 0,04 | 0,06 | 0,11 | 0,07 | 0,07 | 0,08 | 0,09 | 0,58 | +193% | +14% |
| **Total** | **30** | ***100%*** | **0,14** | **0,12** | **0,13** | **0,14** | **0,21** | **0,14** | **0,14** | **0,15** | **0,15** | **1,32** | **+6%** | **+1%** |

Interventions distribution by energy/technology



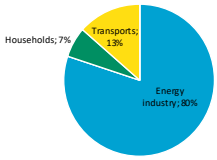

Financial support by energy/technology (billion euros)



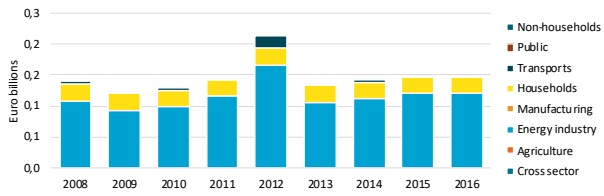

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | | | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | | | |
| Energy industry | 24 | *80%* | 0,11 | 0,09 | 0,10 | 0,12 | 0,17 | 0,10 | 0,11 | 0,12 | 0,12 | 1,04 | +12% | +1% |
| Manufacturing | | | | | | | | | | | | | | |
| Households | 2 | *7%* | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,02 | 0,24 | -10% | -1% |
| Transports | 4 | *13%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | 0,00 | 0,00 | 0,00 | 0,00 | 0,04 | -36% | -5% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **30** | ***100%*** | **0,14** | **0,12** | **0,13** | **0,14** | **0,21** | **0,14** | **0,14** | **0,15** | **0,15** | **1,32** | **+6%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

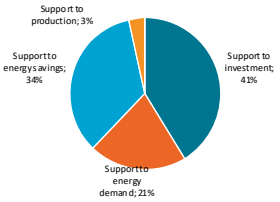


# Malta

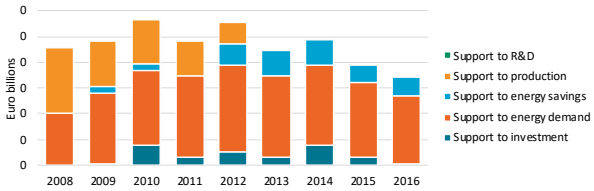
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 12 | *41%* | | 0,00 | 0,02 | 0,01 | 0,01 | 0,01 | 0,02 | 0,01 | 0,00 | 0,06 | | |
| Support to energy demand | 6 | *21%* | 0,04 | 0,06 | 0,06 | 0,06 | 0,07 | 0,06 | 0,06 | 0,06 | 0,05 | 0,52 | +31% | +3% |
| Support to energy savings | 10 | *34%* | | 0,00 | 0,01 | | 0,02 | 0,02 | 0,02 | 0,01 | 0,01 | 0,09 | | |
| Support to production | 1 | *3%* | 0,05 | 0,04 | 0,03 | 0,03 | 0,02 | | | | | 0,16 | -100% | -100% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **29** | ***100%*** | **0,09** | **0,10** | **0,11** | **0,10** | **0,11** | **0,09** | **0,10** | **0,08** | **0,07** | **0,84** | **-25%** | **-4%** |

Interventions distribution by types



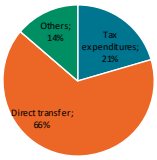

Financial support by types (billion euros)



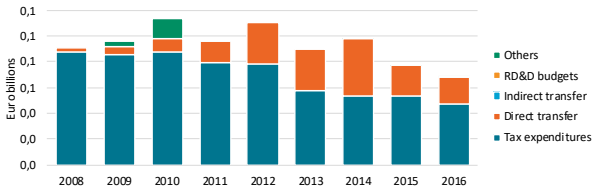

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 6 | *21%* | 0,09 | 0,09 | 0,09 | 0,08 | 0,08 | 0,06 | 0,05 | 0,05 | 0,05 | 0,63 | -46% | -7% |
| Direct transfer | 19 | *66%* | 0,00 | 0,01 | 0,01 | 0,02 | 0,03 | 0,03 | 0,04 | 0,02 | 0,02 | 0,19 | +514% | +25% |
| Indirect transfer | | | | | | | | | | | | | | |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | 4 | *14%* | | 0,00 | 0,01 | 0,00 | | | 0,00 | 0,00 | 0,00 | 0,02 | | |
| **Total** | **29** | ***100%*** | **0,09** | **0,10** | **0,11** | **0,10** | **0,11** | **0,09** | **0,10** | **0,08** | **0,07** | **0,84** | **-25%** | **-4%** |

Interventions distribution by sub-types



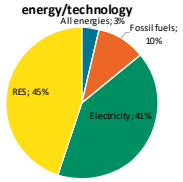

Financial support by sub-types (billion euros)



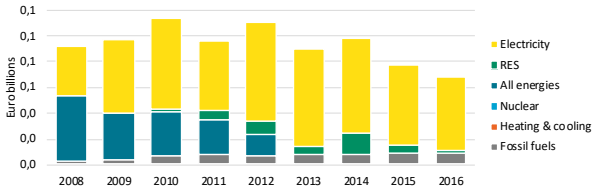

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 1 | *3%* | 0,05 | 0,04 | 0,03 | 0,03 | 0,02 | | | | | 0,16 | -100% | -100% |
| Fossil fuels | 3 | *10%* | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,06 | +268% | +18% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | 12 | *41%* | 0,04 | 0,06 | 0,07 | 0,05 | 0,08 | 0,08 | 0,07 | 0,06 | 0,06 | 0,56 | +51% | +5% |
| RES | 13 | *45%* | | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,02 | 0,01 | 0,00 | 0,05 | | |
| **Total** | **29** | ***100%*** | **0,09** | **0,10** | **0,11** | **0,10** | **0,11** | **0,09** | **0,10** | **0,08** | **0,07** | **0,84** | **-25%** | **-4%** |

Interventions distribution by energy/technology



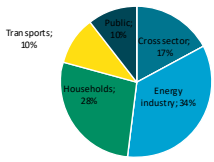

Financial support by energy/technology (billion euros)



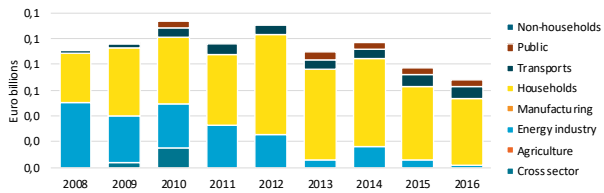

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 5 | *17%* | | 0,00 | 0,01 | 0,00 | | | 0,00 | 0,00 | 0,00 | 0,02 | | |
| Agriculture | | | | | | | | | | | | | | |
| Energy industry | 10 | *34%* | 0,05 | 0,04 | 0,03 | 0,03 | 0,03 | 0,01 | 0,02 | 0,01 | 0,00 | 0,21 | -97% | -35% |
| Manufacturing | | | | | | | | | | | | | | |
| Households | 8 | *28%* | 0,04 | 0,05 | 0,05 | 0,05 | 0,08 | 0,07 | 0,07 | 0,06 | 0,05 | 0,52 | +36% | +4% |
| Transports | 3 | *10%* | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,06 | +268% | +18% |
| Public | 3 | *10%* | | 0,00 | 0,00 | | | 0,01 | 0,01 | 0,01 | 0,01 | 0,03 | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **29** | ***100%*** | **0,09** | **0,10** | **0,11** | **0,10** | **0,11** | **0,09** | **0,10** | **0,08** | **0,07** | **0,84** | **-25%** | **-4%** |

Interventions distribution by sector




Financial support by sector (billion euros)

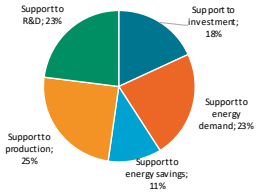


# Netherlands

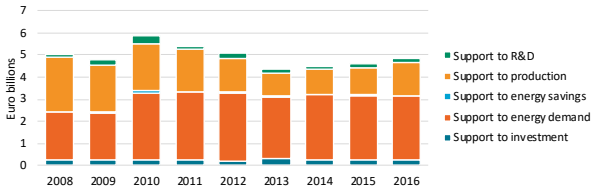
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 11 | *18%* | 0,26 | 0,22 | 0,23 | 0,23 | 0,17 | 0,30 | 0,26 | 0,22 | 0,24 | 2,13 | -7% | -1% |
| Support to energy demand | 14 | *23%* | 2,16 | 2,17 | 3,06 | 3,06 | 3,12 | 2,80 | 2,91 | 2,94 | 2,92 | 25,14 | +35% | +4% |
| Support to energy savings | 7 | *11%* | 0,02 | 0,02 | 0,08 | 0,03 | 0,02 | 0,01 | 0,01 | 0,00 | 0,00 | 0,20 | -84% | -20% |
| Support to production | 15 | *25%* | 2,45 | 2,14 | 2,13 | 1,94 | 1,55 | 1,06 | 1,15 | 1,23 | 1,53 | 15,17 | -38% | -6% |
| Support to R&D | 14 | *23%* | 0,16 | 0,22 | 0,37 | 0,16 | 0,20 | 0,19 | 0,15 | 0,19 | 0,15 | 1,79 | -6% | -1% |
| **Total** | **61** | ***100%*** | **5,04** | **4,77** | **5,86** | **5,42** | **5,06** | **4,37** | **4,49** | **4,59** | **4,83** | **44,43** | **-4%** | **-1%** |

**Interventions distribution by types**



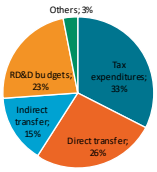

**Financial support by types (billion euros)**



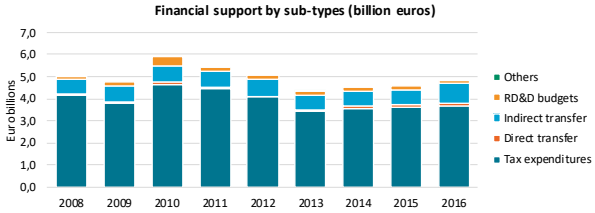

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 20 | *33%* | 4,15 | 3,79 | 4,65 | 4,47 | 4,06 | 3,43 | 3,52 | 3,63 | 3,64 | 35,35 | -12% | -2% |
| Direct transfer | 16 | *26%* | 0,04 | 0,05 | 0,11 | 0,03 | 0,05 | 0,04 | 0,12 | 0,07 | 0,13 | 0,65 | +201% | +15% |
| Indirect transfer | 9 | *15%* | 0,69 | 0,71 | 0,73 | 0,75 | 0,75 | 0,70 | 0,69 | 0,70 | 0,92 | 6,64 | +34% | +4% |
| RD&D budgets | 14 | *23%* | 0,16 | 0,22 | 0,37 | 0,16 | 0,20 | 0,19 | 0,15 | 0,19 | 0,15 | 1,79 | -6% | -1% |
| Others | 2 | *3%* | | | | 0,00 | | 0,00 | | | | 0,00 | | |
| **Total** | **61** | ***100%*** | **5,04** | **4,77** | **5,86** | **5,42** | **5,06** | **4,37** | **4,49** | **4,59** | **4,83** | **44,43** | **-4%** | **-1%** |

**Interventions distribution by sub-types**



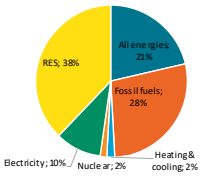

**Financial support by sub-types (billion euros)**



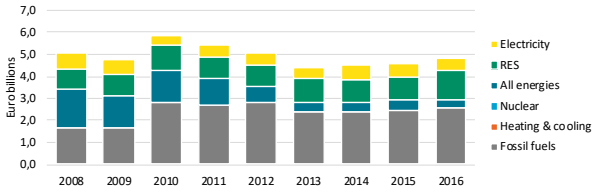

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 13 | *21%* | 1,75 | 1,41 | 1,41 | 1,16 | 0,69 | 0,43 | 0,46 | 0,50 | 0,33 | 8,14 | -81% | -19% |
| Fossil fuels | 17 | *28%* | 1,66 | 1,68 | 2,83 | 2,70 | 2,81 | 2,39 | 2,38 | 2,44 | 2,60 | 21,50 | +57% | +6% |
| Heating & cooling | 1 | *2%* | | | 0,01 | | | | | | | 0,01 | | |
| Nuclear | 1 | *2%* | 0,02 | 0,01 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,11 | -65% | -12% |
| Electricity | 6 | *10%* | 0,68 | 0,69 | 0,43 | 0,55 | 0,52 | 0,49 | 0,67 | 0,60 | 0,60 | 5,23 | -13% | -2% |
| RES | 23 | *38%* | 0,93 | 0,98 | 1,16 | 0,99 | 1,03 | 1,05 | 0,97 | 1,03 | 1,30 | 9,44 | +40% | +4% |
| **Total** | **61** | ***100%*** | **5,04** | **4,77** | **5,86** | **5,42** | **5,06** | **4,37** | **4,49** | **4,59** | **4,83** | **44,43** | **-4%** | **-1%** |

**Interventions distribution by energy/technology**



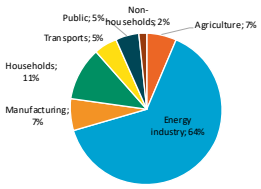

**Financial support by energy/technology (billion euros)**



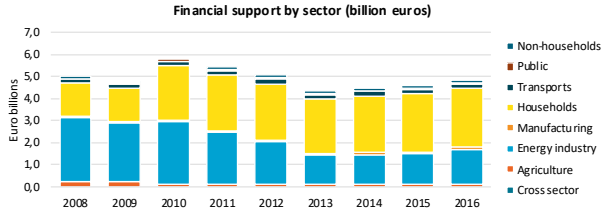

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | | | | | | | | | | | | | | |
| Agriculture | 4 | *7%* | 0,20 | 0,21 | 0,10 | 0,11 | 0,09 | 0,11 | 0,11 | 0,11 | 0,11 | 1,13 | -45% | -7% |
| Energy industry | 39 | *64%* | 2,92 | 2,67 | 2,85 | 2,37 | 1,98 | 1,31 | 1,32 | 1,38 | 1,59 | 18,40 | -46% | -7% |
| Manufacturing | 4 | *7%* | 0,06 | 0,06 | 0,07 | 0,07 | 0,07 | 0,07 | 0,12 | 0,10 | 0,12 | 0,74 | +78% | +7% |
| Households | 7 | *11%* | 1,55 | 1,56 | 2,49 | 2,51 | 2,51 | 2,48 | 2,57 | 2,61 | 2,64 | 20,92 | +71% | +7% |
| Transports | 3 | *5%* | 0,16 | 0,18 | 0,20 | 0,20 | 0,27 | 0,21 | 0,19 | 0,24 | 0,19 | 1,83 | +16% | +2% |
| Public | 3 | *5%* | 0,02 | 0,03 | 0,05 | 0,04 | 0,04 | 0,04 | 0,04 | 0,04 | 0,05 | 0,36 | +122% | +10% |
| Non-households | 1 | *2%* | 0,12 | 0,08 | 0,10 | 0,12 | 0,10 | 0,14 | 0,13 | 0,11 | 0,15 | 1,05 | +21% | +2% |
| **Total** | **61** | ***100%*** | **5,04** | **4,77** | **5,86** | **5,42** | **5,06** | **4,37** | **4,49** | **4,59** | **4,83** | **44,43** | **-4%** | **-1%** |

**Interventions distribution by sector**




**Financial support by sector (billion euros)**

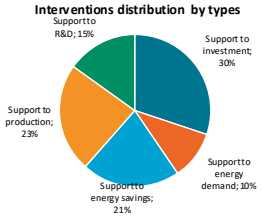


# Poland

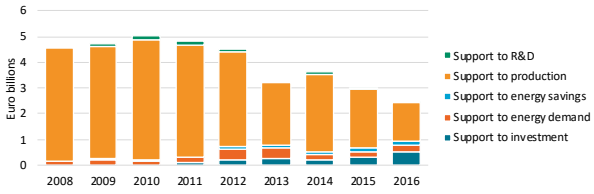
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 26 | *30%* | 0,00 | 0,02 | 0,01 | 0,13 | 0,22 | 0,26 | 0,20 | 0,29 | 0,55 | 1,67 | +30196% | +104% |
| Support to energy demand | 9 | *10%* | 0,14 | 0,16 | 0,16 | 0,16 | 0,42 | 0,43 | 0,24 | 0,24 | 0,26 | 2,19 | +84% | +8% |
| Support to energy savings | 18 | *21%* | 0,01 | 0,09 | 0,05 | 0,05 | 0,11 | 0,11 | 0,09 | 0,13 | 0,14 | 0,78 | +1280% | +39% |
| Support to production | 20 | *23%* | 4,44 | 4,36 | 4,66 | 4,35 | 3,66 | 2,39 | 3,01 | 2,27 | 1,53 | 30,67 | -66% | -12% |
| Support to R&D | 13 | *15%* | 0,00 | 0,09 | 0,13 | 0,15 | 0,10 | 0,10 | 0,08 | 0,09 | 0,03 | 0,78 | +727% | +30% |
| **Total** | **86** | ***100%*** | **4,59** | **4,72** | **5,02** | **4,83** | **4,50** | **3,29** | **3,62** | **3,02** | **2,50** | **36,10** | **-46%** | **-7%** |

Interventions distribution by types



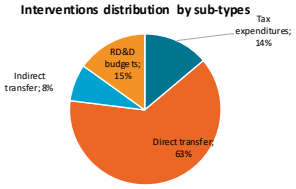

Financial support by types (billion euros)



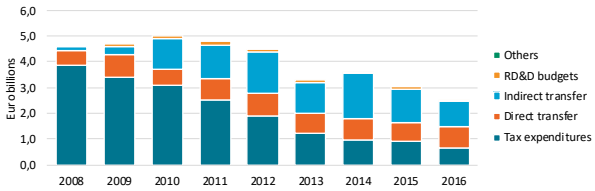

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 12 | *14%* | 3,86 | 3,41 | 3,11 | 2,51 | 1,92 | 1,24 | 1,00 | 0,92 | 0,66 | 18,63 | -83% | -20% |
| Direct transfer | 54 | *63%* | 0,58 | 0,87 | 0,59 | 0,83 | 0,85 | 0,77 | 0,83 | 0,73 | 0,83 | 6,87 | +42% | +4% |
| Indirect transfer | 7 | *8%* | 0,14 | 0,34 | 1,20 | 1,35 | 1,63 | 1,17 | 1,71 | 1,28 | 0,98 | 9,81 | +589% | +27% |
| RD&D budgets | 13 | *15%* | 0,00 | 0,09 | 0,13 | 0,15 | 0,10 | 0,10 | 0,08 | 0,09 | 0,03 | 0,78 | +727% | +30% |
| Others | | | | | | | | | | | | | | |
| **Total** | **86** | ***100%*** | **4,59** | **4,72** | **5,02** | **4,83** | **4,50** | **3,29** | **3,62** | **3,02** | **2,50** | **36,10** | **-46%** | **-7%** |

Interventions distribution by sub-types



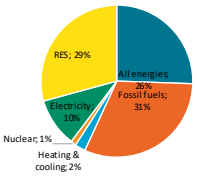

Financial support by sub-types (billion euros)



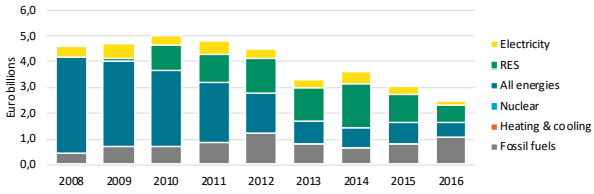

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 22 | *26%* | 3,74 | 3,33 | 2,96 | 2,35 | 1,56 | 0,88 | 0,82 | 0,85 | 0,59 | 17,07 | -84% | -21% |
| Fossil fuels | 27 | *31%* | 0,43 | 0,69 | 0,71 | 0,85 | 1,21 | 0,79 | 0,63 | 0,81 | 1,04 | 7,16 | +143% | +12% |
| Heating & cooling | 2 | *2%* | | | | | | | | | 0,00 | 0,00 | | |
| Nuclear | 1 | *1%* | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,00 | 0,00 | 0,00 | 0,03 | -74% | -15% |
| Electricity | 9 | *10%* | 0,42 | 0,61 | 0,35 | 0,53 | 0,40 | 0,32 | 0,48 | 0,30 | 0,19 | 3,59 | -55% | -10% |
| RES | 25 | *29%* | 0,00 | 0,09 | 1,00 | 1,09 | 1,33 | 1,30 | 1,68 | 1,06 | 0,68 | 8,25 | +77804% | +130% |
| **Total** | **86** | ***100%*** | **4,59** | **4,72** | **5,02** | **4,83** | **4,50** | **3,29** | **3,62** | **3,02** | **2,50** | **36,10** | **-46%** | **-7%** |

Interventions distribution by energy/technology



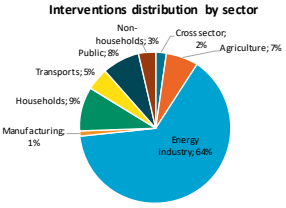

Financial support by energy/technology (billion euros)



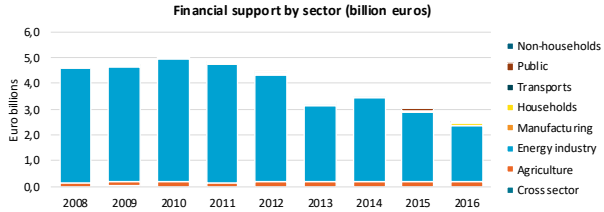

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 2 | *2%* | 0,01 | 0,04 | 0,01 | 0,01 | 0,00 | | | | | 0,07 | -100% | -100% |
| Agriculture | 6 | *7%* | 0,14 | 0,16 | 0,16 | 0,16 | 0,18 | 0,19 | 0,20 | 0,21 | 0,21 | 1,60 | +56% | +6% |
| Energy industry | 55 | *64%* | 4,44 | 4,47 | 4,80 | 4,60 | 4,17 | 2,94 | 3,27 | 2,66 | 2,17 | 33,53 | -51% | -9% |
| Manufacturing | 1 | *1%* | | | | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | |
| Households | 8 | *9%* | | 0,05 | 0,04 | 0,05 | 0,07 | 0,09 | 0,07 | 0,07 | 0,08 | 0,52 | | |
| Transports | 4 | *5%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,02 | 0,01 | 0,02 | 0,02 | 0,02 | 0,10 | +479% | +25% |
| Public | 7 | *8%* | | | | 0,00 | 0,07 | 0,05 | 0,07 | 0,06 | 0,02 | 0,28 | | |
| Non-households | 3 | *3%* | | | | | | | 0,00 | 0,00 | 0,00 | 0,00 | | |
| **Total** | **86** | ***100%*** | **4,59** | **4,72** | **5,02** | **4,83** | **4,50** | **3,29** | **3,62** | **3,02** | **2,50** | **36,10** | **-46%** | **-7%** |

Interventions distribution by sector




Financial support by sector (billion euros)

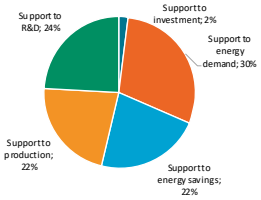


# Portugal

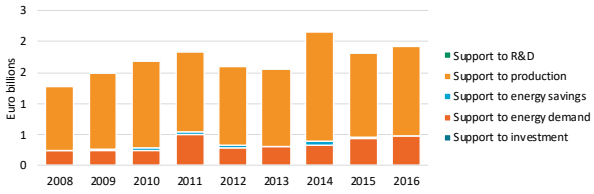
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 1 | *2%* | | | | | | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | | |
| Support to energy demand | 16 | *30%* | 0,24 | 0,25 | 0,23 | 0,50 | 0,28 | 0,30 | 0,32 | 0,44 | 0,48 | 3,03 | +102% | +9% |
| Support to energy savings | 12 | *22%* | 0,00 | 0,02 | 0,04 | 0,05 | 0,04 | 0,00 | 0,06 | 0,01 | 0,00 | 0,24 | +4% | +0% |
| Support to production | 12 | *22%* | 1,03 | 1,21 | 1,42 | 1,28 | 1,27 | 1,25 | 1,78 | 1,36 | 1,43 | 12,04 | +39% | +4% |
| Support to R&D | 13 | *24%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | | 0,04 | -100% | -100% |
| **Total** | **54** | ***100%*** | **1,27** | **1,49** | **1,70** | **1,83** | **1,60** | **1,56** | **2,18** | **1,82** | **1,92** | **15,36** | **+51%** | **+5%** |

Interventions distribution by types



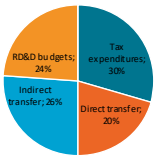

Financial support by types (billion euros)



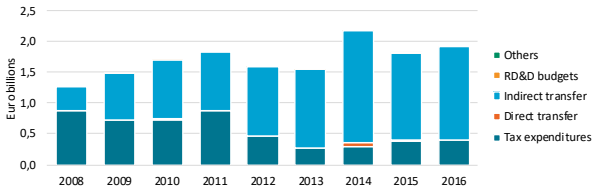

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 16 | *30%* | 0,88 | 0,73 | 0,74 | 0,87 | 0,46 | 0,27 | 0,29 | 0,39 | 0,41 | 5,04 | -54% | -9% |
| Direct transfer | 11 | *20%* | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,00 | 0,06 | 0,01 | 0,00 | 0,12 | +4% | +0% |
| Indirect transfer | 14 | *26%* | 0,39 | 0,75 | 0,95 | 0,96 | 1,12 | 1,27 | 1,81 | 1,41 | 1,51 | 10,16 | +289% | +19% |
| RD&D budgets | 13 | *24%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | | 0,04 | -100% | -100% |
| Others | | | | | | | | | | | | | | |
| **Total** | **54** | ***100%*** | **1,27** | **1,49** | **1,70** | **1,83** | **1,60** | **1,56** | **2,18** | **1,82** | **1,92** | **15,36** | **+51%** | **+5%** |

Interventions distribution by sub-types



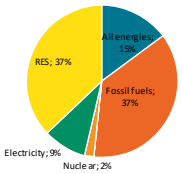

Financial support by sub-types (billion euros)



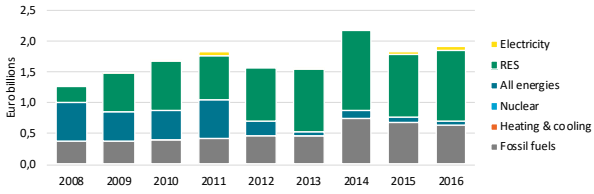

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 8 | *15%* | 0,65 | 0,47 | 0,48 | 0,63 | 0,24 | 0,07 | 0,13 | 0,09 | 0,06 | 2,80 | -91% | -26% |
| Fossil fuels | 20 | *37%* | 0,37 | 0,39 | 0,40 | 0,42 | 0,47 | 0,47 | 0,75 | 0,69 | 0,65 | 4,61 | +73% | +7% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 1 | *2%* | 0,00 | 0,00 | 0,00 | | | 0,00 | | | | 0,00 | -100% | -100% |
| Electricity | 5 | *9%* | 0,00 | 0,01 | 0,01 | 0,07 | 0,04 | 0,01 | 0,01 | 0,04 | 0,06 | 0,24 | +1342% | +40% |
| RES | 20 | *37%* | 0,25 | 0,62 | 0,82 | 0,72 | 0,85 | 1,01 | 1,29 | 1,00 | 1,15 | 7,71 | +364% | +21% |
| **Total** | **54** | ***100%*** | **1,27** | **1,49** | **1,70** | **1,83** | **1,60** | **1,56** | **2,18** | **1,82** | **1,92** | **15,36** | **+51%** | **+5%** |

Interventions distribution by energy/technology



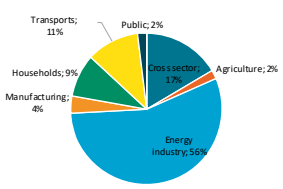

Financial support by energy/technology (billion euros)



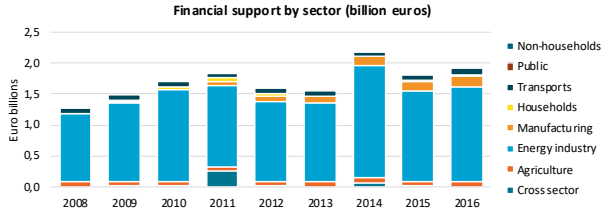

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 9 | *17%* | 0,00 | 0,01 | 0,01 | 0,25 | 0,01 | 0,00 | 0,06 | 0,01 | 0,00 | 0,36 | +3% | +0% |
| Agriculture | 1 | *2%* | 0,08 | 0,07 | 0,07 | 0,07 | 0,07 | 0,08 | 0,08 | 0,08 | 0,09 | 0,69 | +14% | +2% |
| Energy industry | 30 | *56%* | 1,10 | 1,28 | 1,49 | 1,32 | 1,30 | 1,27 | 1,82 | 1,46 | 1,53 | 12,58 | +39% | +4% |
| Manufacturing | 2 | *4%* | 0,01 | 0,01 | 0,01 | 0,06 | 0,09 | 0,11 | 0,14 | 0,15 | 0,17 | 0,74 | +1722% | +44% |
| Households | 5 | *9%* | | 0,01 | 0,03 | 0,05 | 0,03 | 0,00 | 0,00 | 0,03 | 0,03 | 0,20 | | |
| Transports | 6 | *11%* | 0,09 | 0,10 | 0,09 | 0,07 | 0,09 | 0,10 | 0,08 | 0,09 | 0,10 | 0,80 | +11% | +1% |
| Public | 1 | *2%* | | | | | | | | 0,00 | | 0,00 | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **54** | ***100%*** | **1,27** | **1,49** | **1,70** | **1,83** | **1,60** | **1,56** | **2,18** | **1,82** | **1,92** | **15,36** | **+51%** | **+5%** |

Interventions distribution by sector




Financial support by sector (billion euros)

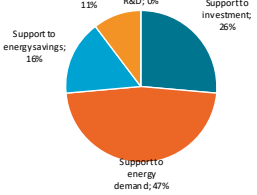


# Romania

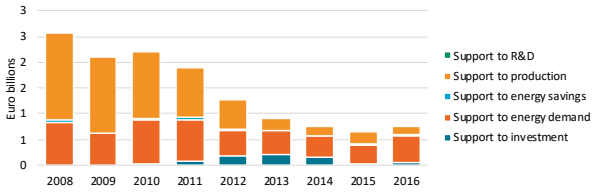
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 5 | *26%* | | 0,00 | 0,03 | 0,08 | 0,18 | 0,20 | 0,16 | 0,02 | 0,06 | 0,72 | | |
| Support to energy demand | 9 | *47%* | 0,83 | 0,62 | 0,85 | 0,81 | 0,51 | 0,47 | 0,40 | 0,38 | 0,52 | 5,39 | -37% | -6% |
| Support to energy savings | 3 | *16%* | 0,07 | 0,01 | 0,03 | 0,04 | 0,02 | 0,01 | 0,01 | 0,02 | 0,01 | 0,23 | -78% | -17% |
| Support to production | 2 | *11%* | 1,68 | 1,47 | 1,29 | 0,96 | 0,57 | 0,24 | 0,19 | 0,24 | 0,16 | 6,80 | -91% | -26% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **19** | ***100%*** | **2,58** | **2,11** | **2,20** | **1,90** | **1,28** | **0,92** | **0,76** | **0,65** | **0,75** | **13,14** | **-71%** | **-14%** |

**Interventions distribution by types**



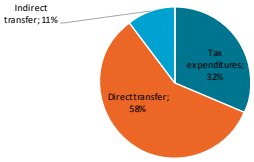

**Financial support by types (billion euros)**



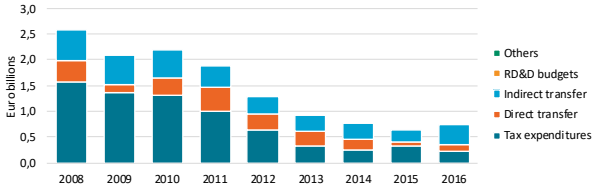

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 6 | *32%* | 1,58 | 1,36 | 1,32 | 1,01 | 0,65 | 0,32 | 0,26 | 0,32 | 0,24 | 7,07 | -85% | -21% |
| Direct transfer | 11 | *58%* | 0,42 | 0,16 | 0,32 | 0,45 | 0,29 | 0,30 | 0,20 | 0,08 | 0,11 | 2,32 | -74% | -16% |
| Indirect transfer | 2 | *11%* | 0,58 | 0,59 | 0,55 | 0,44 | 0,33 | 0,30 | 0,30 | 0,25 | 0,41 | 3,76 | -29% | -4% |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **19** | ***100%*** | **2,58** | **2,11** | **2,20** | **1,90** | **1,28** | **0,92** | **0,76** | **0,65** | **0,75** | **13,14** | **-71%** | **-14%** |

**Interventions distribution by sub-types**



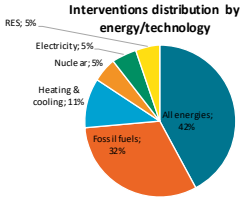

**Financial support by sub-types (billion euros)**



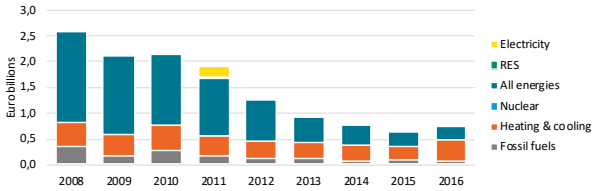

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 8 | *42%* | 1,75 | 1,52 | 1,37 | 1,10 | 0,79 | 0,48 | 0,40 | 0,30 | 0,27 | 7,97 | -85% | -21% |
| Fossil fuels | 6 | *32%* | 0,35 | 0,16 | 0,28 | 0,16 | 0,11 | 0,11 | 0,05 | 0,08 | 0,07 | 1,38 | -82% | -19% |
| Heating & cooling | 2 | *11%* | 0,48 | 0,42 | 0,49 | 0,40 | 0,36 | 0,32 | 0,31 | 0,26 | 0,41 | 3,46 | -13% | -2% |
| Nuclear | 1 | *5%* | | 0,00 | 0,00 | 0,00 | | | | | | 0,01 | | |
| Electricity | 1 | *5%* | | | 0,03 | 0,20 | | | | | | 0,23 | | |
| RES | 1 | *5%* | | 0,00 | 0,01 | 0,04 | 0,02 | 0,00 | 0,00 | 0,01 | 0,01 | 0,09 | | |
| **Total** | **19** | ***100%*** | **2,58** | **2,11** | **2,20** | **1,90** | **1,28** | **0,92** | **0,76** | **0,65** | **0,75** | **13,14** | **-71%** | **-14%** |

**Interventions distribution by energy/technology**



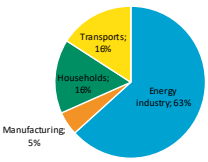

**Financial support by energy/technology (billion euros)**



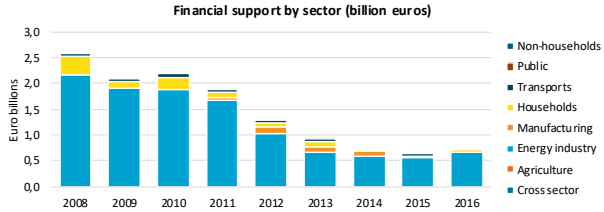

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | | | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | | | |
| Energy industry | 12 | *63%* | 2,17 | 1,90 | 1,87 | 1,68 | 1,03 | 0,68 | 0,59 | 0,56 | 0,68 | 11,18 | -69% | -13% |
| Manufacturing | 1 | *5%* | | | | 0,04 | 0,11 | 0,11 | 0,11 | | | 0,36 | | |
| Households | 3 | *16%* | 0,35 | 0,14 | 0,24 | 0,12 | 0,09 | 0,09 | 0,03 | 0,05 | 0,03 | 1,14 | -91% | -26% |
| Transports | 3 | *16%* | 0,06 | 0,06 | 0,08 | 0,06 | 0,04 | 0,04 | 0,03 | 0,04 | 0,04 | 0,46 | -35% | -5% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **19** | ***100%*** | **2,58** | **2,11** | **2,20** | **1,90** | **1,28** | **0,92** | **0,76** | **0,65** | **0,75** | **13,14** | **-71%** | **-14%** |

**Interventions distribution by sector**




**Financial support by sector (billion euros)**

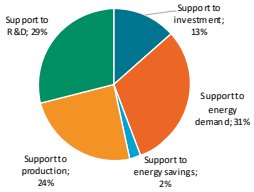


# Slovakia

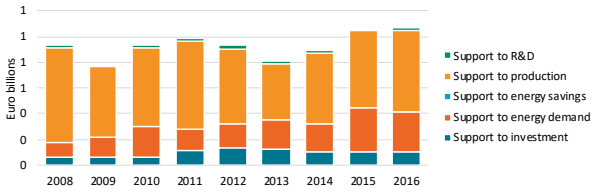
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 6 | *13%* | 0,07 | 0,06 | 0,06 | 0,11 | 0,13 | 0,12 | 0,10 | 0,10 | 0,10 | 0,87 | +59% | +6% |
| Support to energy demand | 14 | *31%* | 0,11 | 0,16 | 0,24 | 0,17 | 0,19 | 0,23 | 0,22 | 0,35 | 0,32 | 2,00 | +181% | +14% |
| Support to energy savings | 1 | *2%* | | | | | | | | | 0,00 | 0,00 | | |
| Support to production | 11 | *24%* | 0,74 | 0,54 | 0,61 | 0,68 | 0,59 | 0,43 | 0,54 | 0,60 | 0,63 | 5,35 | -15% | -2% |
| Support to R&D | 13 | *29%* | 0,02 | 0,02 | 0,02 | 0,03 | 0,02 | 0,02 | 0,02 | 0,00 | 0,02 | 0,17 | +3% | +0% |
| **Total** | **45** | ***100%*** | **0,93** | **0,78** | **0,93** | **0,99** | **0,93** | **0,81** | **0,89** | **1,05** | **1,07** | **8,40** | **+15%** | **+2%** |

Interventions distribution by types



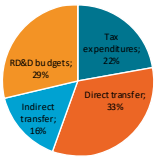

Financial support by types (billion euros)



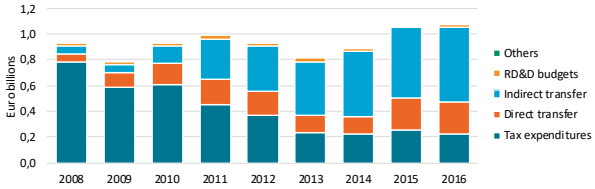

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 10 | *22%* | 0,78 | 0,59 | 0,61 | 0,45 | 0,37 | 0,24 | 0,23 | 0,26 | 0,22 | 3,74 | -71% | -14% |
| Direct transfer | 15 | *33%* | 0,07 | 0,11 | 0,17 | 0,20 | 0,18 | 0,14 | 0,13 | 0,25 | 0,25 | 1,50 | +260% | +17% |
| Indirect transfer | 7 | *16%* | 0,06 | 0,07 | 0,14 | 0,31 | 0,35 | 0,41 | 0,51 | 0,55 | 0,58 | 2,98 | +808% | +32% |
| RD&D budgets | 13 | *29%* | 0,02 | 0,02 | 0,02 | 0,03 | 0,02 | 0,02 | 0,02 | 0,00 | 0,02 | 0,17 | +3% | +0% |
| Others | | | | | | | | | | | | | | |
| **Total** | **45** | ***100%*** | **0,93** | **0,78** | **0,93** | **0,99** | **0,93** | **0,81** | **0,89** | **1,05** | **1,07** | **8,40** | **+15%** | **+2%** |

Interventions distribution by sub-types



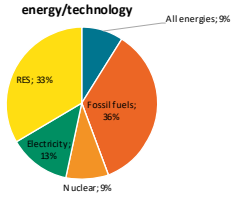

Financial support by sub-types (billion euros)



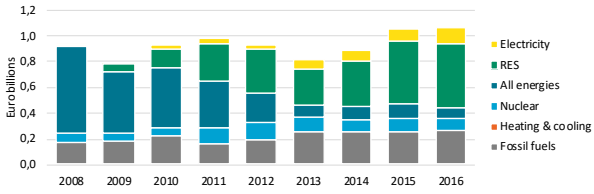

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 4 | *9%* | 0,67 | 0,48 | 0,47 | 0,36 | 0,23 | 0,09 | 0,10 | 0,12 | 0,08 | 2,59 | -88% | -23% |
| Fossil fuels | 16 | *36%* | 0,17 | 0,18 | 0,22 | 0,17 | 0,19 | 0,25 | 0,25 | 0,26 | 0,26 | 1,96 | +52% | +5% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 4 | *9%* | 0,07 | 0,07 | 0,07 | 0,12 | 0,14 | 0,12 | 0,10 | 0,10 | 0,10 | 0,89 | +42% | +4% |
| Electricity | 6 | *13%* | 0,00 | 0,00 | 0,03 | 0,05 | 0,04 | 0,08 | 0,08 | 0,09 | 0,13 | 0,50 | +170508% | +154% |
| RES | 15 | *33%* | 0,01 | 0,06 | 0,15 | 0,29 | 0,34 | 0,27 | 0,35 | 0,49 | 0,49 | 2,46 | +3817% | +58% |
| **Total** | **45** | ***100%*** | **0,93** | **0,78** | **0,93** | **0,99** | **0,93** | **0,81** | **0,89** | **1,05** | **1,07** | **8,40** | **+15%** | **+2%** |

Interventions distribution by energy/technology



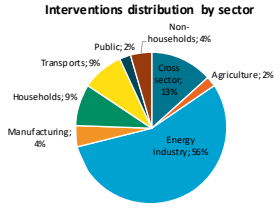

Financial support by energy/technology (billion euros)



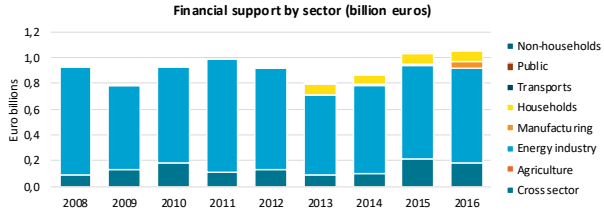

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 6 | *13%* | 0,09 | 0,13 | 0,19 | 0,12 | 0,13 | 0,10 | 0,10 | 0,22 | 0,18 | 1,25 | +113% | +10% |
| Agriculture | 1 | *2%* | | | | | | | | | | | | |
| Energy industry | 25 | *56%* | 0,85 | 0,65 | 0,75 | 0,87 | 0,79 | 0,61 | 0,69 | 0,73 | 0,74 | 6,67 | -13% | -2% |
| Manufacturing | 2 | *4%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,05 | 0,07 | +63382% | +124% |
| Households | 4 | *9%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,08 | 0,07 | 0,08 | 0,08 | 0,31 | +16111% | +89% |
| Transports | 4 | *9%* | | | | | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,05 | | |
| Public | 1 | *2%* | | | | 0,00 | 0,00 | 0,00 | 0,00 | 0,01 | 0,00 | 0,02 | | |
| Non-households | 2 | *4%* | | | | | | 0,01 | 0,01 | 0,01 | 0,01 | 0,02 | | |
| **Total** | **45** | ***100%*** | **0,93** | **0,78** | **0,93** | **0,99** | **0,93** | **0,81** | **0,89** | **1,05** | **1,07** | **8,40** | **+15%** | **+2%** |

Interventions distribution by sector




Financial support by sector (billion euros)

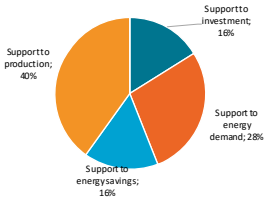


# Slovenia

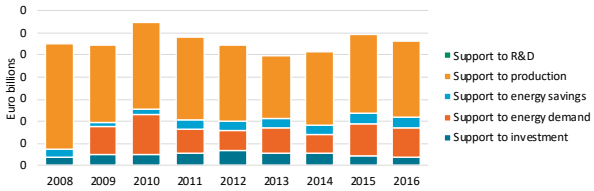
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 4 | *16%* | 0,02 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,02 | 0,02 | 0,22 | -5% | -1% |
| Support to energy demand | 7 | *28%* | | 0,06 | 0,09 | 0,06 | 0,05 | 0,06 | 0,04 | 0,07 | 0,07 | 0,50 | | |
| Support to energy savings | 4 | *16%* | 0,02 | 0,01 | 0,01 | 0,02 | 0,02 | 0,02 | 0,02 | 0,03 | 0,02 | 0,17 | +34% | +4% |
| Support to production | 10 | *40%* | 0,24 | 0,17 | 0,19 | 0,19 | 0,17 | 0,14 | 0,17 | 0,18 | 0,17 | 1,63 | -28% | -4% |
| Support to R&D | | | | | | | | | | | | | | |
| **Total** | **25** | ***100%*** | **0,28** | **0,27** | **0,32** | **0,29** | **0,27** | **0,25** | **0,26** | **0,30** | **0,28** | **2,52** | **+2%** | **+0%** |

Interventions distribution by types



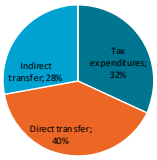

Financial support by types (billion euros)



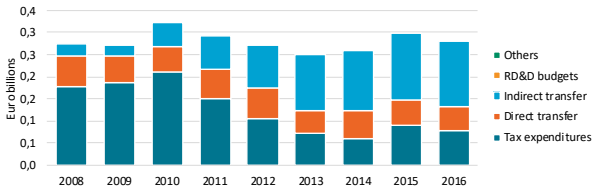

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 8 | *32%* | 0,18 | 0,19 | 0,21 | 0,15 | 0,11 | 0,07 | 0,06 | 0,09 | 0,08 | 1,13 | -56% | -10% |
| Direct transfer | 10 | *40%* | 0,07 | 0,06 | 0,06 | 0,07 | 0,07 | 0,05 | 0,06 | 0,05 | 0,05 | 0,55 | -25% | -3% |
| Indirect transfer | 7 | *28%* | 0,03 | 0,02 | 0,05 | 0,07 | 0,10 | 0,13 | 0,14 | 0,15 | 0,15 | 0,84 | +433% | +23% |
| RD&D budgets | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **25** | ***100%*** | **0,28** | **0,27** | **0,32** | **0,29** | **0,27** | **0,25** | **0,26** | **0,30** | **0,28** | **2,52** | **+2%** | **+0%** |

Interventions distribution by sub-types



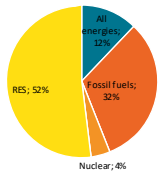

Financial support by sub-types (billion euros)



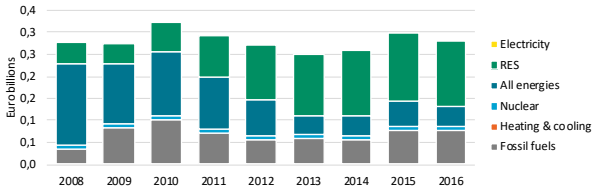

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 3 | *12%* | 0,18 | 0,13 | 0,14 | 0,12 | 0,08 | 0,04 | 0,05 | 0,06 | 0,05 | 0,86 | -75% | -16% |
| Fossil fuels | 8 | *32%* | 0,04 | 0,08 | 0,10 | 0,07 | 0,06 | 0,06 | 0,06 | 0,08 | 0,08 | 0,62 | +119% | +10% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 1 | *4%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,08 | -16% | -2% |
| Electricity | | | | | | | | | | | | | | |
| RES | 13 | *52%* | 0,05 | 0,05 | 0,07 | 0,09 | 0,12 | 0,14 | 0,15 | 0,15 | 0,15 | 0,97 | +221% | +16% |
| **Total** | **25** | ***100%*** | **0,28** | **0,27** | **0,32** | **0,29** | **0,27** | **0,25** | **0,26** | **0,30** | **0,28** | **2,52** | **+2%** | **+0%** |

Interventions distribution by energy/technology



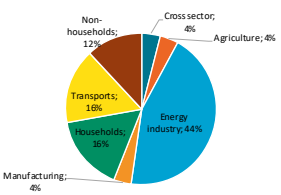

Financial support by energy/technology (billion euros)



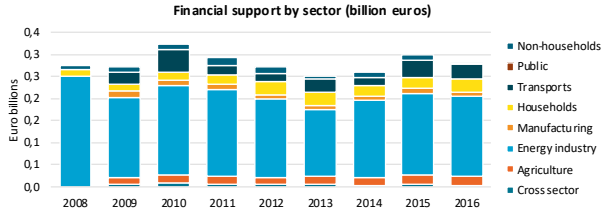

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 1 | *4%* | | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,00 | 0,00 | 0,00 | 0,04 | | |
| Agriculture | 1 | *4%* | | 0,01 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,14 | | |
| Energy industry | 11 | *44%* | 0,25 | 0,18 | 0,20 | 0,20 | 0,18 | 0,15 | 0,18 | 0,19 | 0,18 | 1,71 | -28% | -4% |
| Manufacturing | 1 | *4%* | | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,08 | | |
| Households | 4 | *16%* | 0,02 | 0,01 | 0,02 | 0,02 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,22 | +77% | +7% |
| Transports | 4 | *16%* | | 0,03 | 0,05 | 0,02 | 0,02 | 0,03 | 0,02 | 0,04 | 0,04 | 0,24 | | |
| Public | | | | | | | | | | | | | | |
| Non-households | 3 | *12%* | 0,01 | 0,01 | 0,01 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,00 | 0,10 | -71% | -14% |
| **Total** | **25** | ***100%*** | **0,28** | **0,27** | **0,32** | **0,29** | **0,27** | **0,25** | **0,26** | **0,30** | **0,28** | **2,52** | **+2%** | **+0%** |

Interventions distribution by sector




Financial support by sector (billion euros)

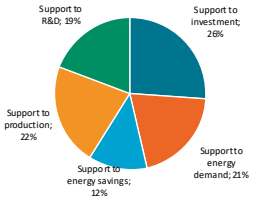


# Spain

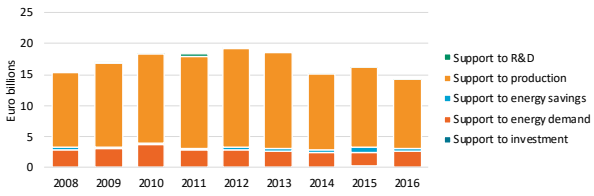
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 19 | *26%* | 0,10 | 0,07 | 0,03 | 0,04 | 0,05 | 0,07 | 0,08 | 0,10 | 0,09 | 0,65 | -7% | -1% |
| Support to energy demand | 15 | *21%* | 2,75 | 2,97 | 3,65 | 2,79 | 2,81 | 2,42 | 2,22 | 2,38 | 2,47 | 24,46 | -10% | -1% |
| Support to energy savings | 9 | *12%* | 0,31 | 0,27 | 0,27 | 0,27 | 0,29 | 0,56 | 0,56 | 0,77 | 0,49 | 3,79 | +59% | +6% |
| Support to production | 16 | *22%* | 12,22 | 13,63 | 14,39 | 14,91 | 16,13 | 15,64 | 12,26 | 12,91 | 11,20 | 123,30 | -8% | -1% |
| Support to R&D | 14 | *19%* | 0,09 | 0,14 | 0,15 | 0,27 | 0,16 | 0,07 | 0,10 | 0,11 | 0,08 | 1,18 | -7% | -1% |
| **Total** | **73** | ***100%*** | **15,46** | **17,10** | **18,49** | **18,29** | **19,45** | **18,78** | **15,22** | **16,28** | **14,32** | **153,39** | **-7%** | **-1%** |

Interventions distribution by types



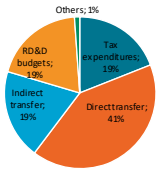

Financial support by types (billion euros)



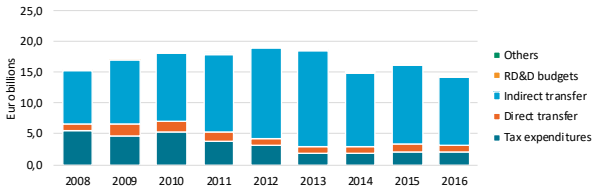

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 14 | *19%* | 5,58 | 4,76 | 5,33 | 3,87 | 3,22 | 1,98 | 1,90 | 2,12 | 2,07 | 30,84 | -63% | -12% |
| Direct transfer | 30 | *41%* | 1,04 | 1,81 | 1,86 | 1,57 | 1,14 | 1,04 | 1,07 | 1,33 | 1,03 | 11,90 | -1% | -0% |
| Indirect transfer | 14 | *19%* | 8,75 | 10,39 | 11,00 | 12,37 | 14,68 | 15,43 | 11,90 | 12,71 | 11,13 | 108,37 | +27% | +3% |
| RD&D budgets | 14 | *19%* | 0,09 | 0,14 | 0,15 | 0,27 | 0,16 | 0,07 | 0,10 | 0,11 | 0,08 | 1,18 | -7% | -1% |
| Others | 1 | *1%* | | | 0,15 | 0,21 | 0,24 | 0,24 | 0,25 | | | 1,09 | | |
| **Total** | **73** | ***100%*** | **15,46** | **17,10** | **18,49** | **18,29** | **19,45** | **18,78** | **15,22** | **16,28** | **14,32** | **153,39** | **-7%** | **-1%** |

Interventions distribution by sub-types



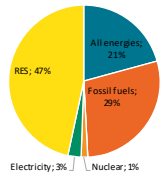

Financial support by sub-types (billion euros)



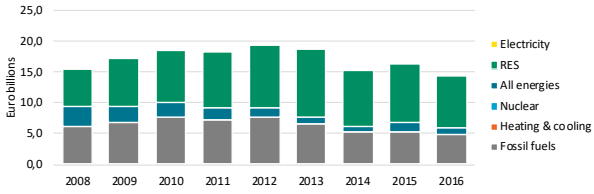

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 15 | *21%* | 3,38 | 2,45 | 2,39 | 2,04 | 1,51 | 1,00 | 0,98 | 1,39 | 1,00 | 16,14 | -70% | -14% |
| Fossil fuels | 21 | *29%* | 6,12 | 6,93 | 7,75 | 7,22 | 7,64 | 6,59 | 5,29 | 5,42 | 4,98 | 57,95 | -19% | -3% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | 1 | *1%* | 0,02 | 0,03 | | 0,00 | 0,03 | 0,02 | 0,00 | 0,00 | 0,01 | 0,12 | -61% | -11% |
| Electricity | 2 | *3%* | 0,00 | 0,01 | 0,01 | 0,06 | 0,01 | 0,00 | 0,01 | 0,03 | 0,02 | 0,16 | +308% | +19% |
| RES | 34 | *47%* | 5,93 | 7,68 | 8,33 | 8,98 | 10,27 | 11,16 | 8,93 | 9,44 | 8,31 | 79,02 | +40% | +4% |
| **Total** | **73** | ***100%*** | **15,46** | **17,10** | **18,49** | **18,29** | **19,45** | **18,78** | **15,22** | **16,28** | **14,32** | **153,39** | **-7%** | **-1%** |

Interventions distribution by energy/technology



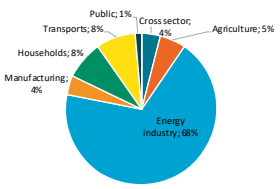

Financial support by energy/technology (billion euros)



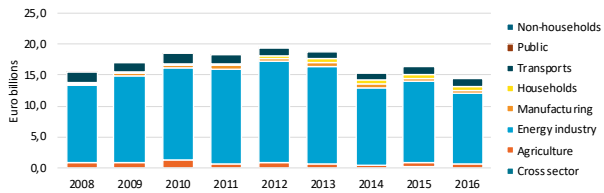

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 3 | *4%* | | | | | | 0,01 | 0,01 | 0,24 | | 0,25 | | |
| Agriculture | 4 | *5%* | 0,72 | 0,87 | 1,16 | 0,68 | 0,74 | 0,52 | 0,46 | 0,50 | 0,50 | 6,15 | -30% | -4% |
| Energy industry | 50 | *68%* | 12,52 | 14,02 | 14,97 | 15,38 | 16,50 | 15,87 | 12,52 | 13,15 | 11,42 | 126,35 | -9% | -1% |
| Manufacturing | 3 | *4%* | 0,30 | 0,45 | 0,46 | 0,56 | 0,54 | 0,69 | 0,56 | 0,52 | 0,51 | 4,59 | +71% | +7% |
| Households | 6 | *8%* | 0,23 | 0,19 | 0,19 | 0,27 | 0,37 | 0,69 | 0,68 | 0,77 | 0,68 | 4,05 | +202% | +15% |
| Transports | 6 | *8%* | 1,69 | 1,56 | 1,69 | 1,40 | 1,29 | 1,00 | 1,00 | 1,10 | 1,20 | 11,92 | -29% | -4% |
| Public | 1 | *1%* | 0,01 | 0,01 | 0,02 | 0,01 | 0,01 | | | | | 0,07 | -100% | -100% |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **73** | ***100%*** | **15,46** | **17,10** | **18,49** | **18,29** | **19,45** | **18,78** | **15,22** | **16,28** | **14,32** | **153,39** | **-7%** | **-1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

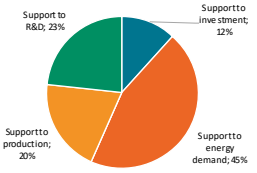


# Sweden

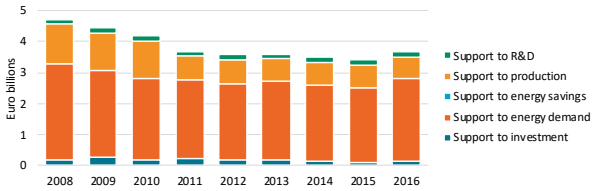
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 7 | *12%* | 0,18 | 0,27 | 0,19 | 0,21 | 0,16 | 0,16 | 0,14 | 0,10 | 0,14 | 1,55 | -19% | -3% |
| Support to energy demand | 27 | *45%* | 3,09 | 2,81 | 2,63 | 2,56 | 2,48 | 2,54 | 2,46 | 2,41 | 2,68 | 23,65 | -13% | -2% |
| Support to energy savings | | | | | | | | | | | | | | |
| Support to production | 12 | *20%* | 1,30 | 1,22 | 1,20 | 0,78 | 0,79 | 0,75 | 0,73 | 0,75 | 0,68 | 8,20 | -48% | -8% |
| Support to R&D | 14 | *23%* | 0,11 | 0,17 | 0,17 | 0,14 | 0,14 | 0,15 | 0,17 | 0,17 | 0,17 | 1,39 | +52% | +5% |
| **Total** | **60** | ***100%*** | **4,68** | **4,46** | **4,18** | **3,69** | **3,57** | **3,61** | **3,50** | **3,44** | **3,67** | **34,80** | **-22%** | **-3%** |

Interventions distribution by types



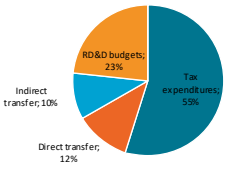

Financial support by types (billion euros)



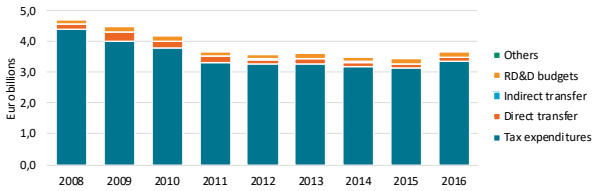

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 33 | *55%* | 4,38 | 4,02 | 3,81 | 3,32 | 3,25 | 3,28 | 3,18 | 3,15 | 3,35 | 31,75 | -23% | -3% |
| Direct transfer | 7 | *12%* | 0,18 | 0,27 | 0,19 | 0,21 | 0,16 | 0,16 | 0,14 | 0,10 | 0,14 | 1,55 | -19% | -3% |
| Indirect transfer | 6 | *10%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,02 | 0,02 | 0,01 | 0,01 | 0,01 | 0,11 | -43% | -7% |
| RD&D budgets | 14 | *23%* | 0,11 | 0,17 | 0,17 | 0,14 | 0,14 | 0,15 | 0,17 | 0,17 | 0,17 | 1,39 | +52% | +5% |
| Others | | | | | | | | | | | | | | |
| **Total** | **60** | ***100%*** | **4,68** | **4,46** | **4,18** | **3,69** | **3,57** | **3,61** | **3,50** | **3,44** | **3,67** | **34,80** | **-22%** | **-3%** |

Interventions distribution by sub-types



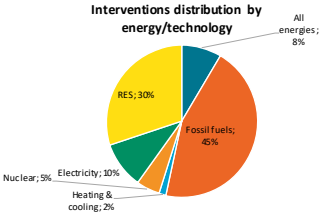

Financial support by sub-types (billion euros)



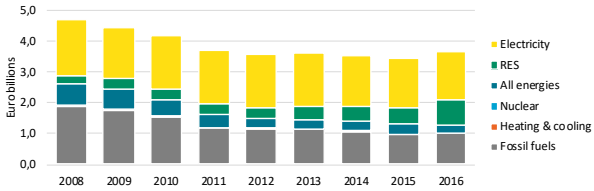

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 5 | *8%* | 0,68 | 0,64 | 0,51 | 0,43 | 0,29 | 0,28 | 0,29 | 0,34 | 0,26 | 3,71 | -62% | -11% |
| Fossil fuels | 27 | *45%* | 1,89 | 1,76 | 1,54 | 1,18 | 1,17 | 1,13 | 1,08 | 0,97 | 1,02 | 11,75 | -46% | -7% |
| Heating & cooling | 1 | *2%* | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | | | 0,01 | -100% | -100% |
| Nuclear | 3 | *5%* | 0,04 | 0,04 | 0,04 | 0,03 | 0,03 | 0,03 | 0,03 | 0,02 | 0,02 | 0,28 | -47% | -8% |
| Electricity | 6 | *10%* | 1,80 | 1,68 | 1,73 | 1,69 | 1,74 | 1,71 | 1,60 | 1,58 | 1,57 | 15,09 | -13% | -2% |
| RES | 18 | *30%* | 0,26 | 0,33 | 0,36 | 0,36 | 0,34 | 0,46 | 0,51 | 0,52 | 0,81 | 3,95 | +207% | +15% |
| **Total** | **60** | ***100%*** | **4,68** | **4,46** | **4,18** | **3,69** | **3,57** | **3,61** | **3,50** | **3,44** | **3,67** | **34,80** | **-22%** | **-3%** |

Interventions distribution by energy/technology



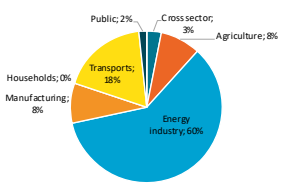

Financial support by energy/technology (billion euros)



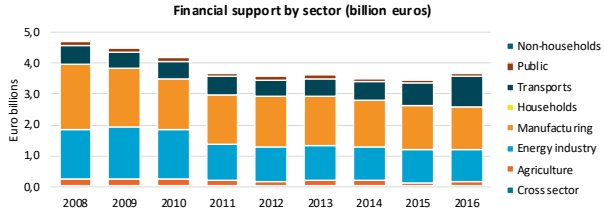

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 2 | *3%* | 0,01 | 0,02 | 0,02 | 0,02 | 0,03 | 0,02 | 0,03 | 0,02 | 0,02 | 0,19 | +44% | +5% |
| Agriculture | 5 | *8%* | 0,22 | 0,22 | 0,22 | 0,19 | 0,15 | 0,18 | 0,17 | 0,11 | 0,15 | 1,63 | -33% | -5% |
| Energy industry | 36 | *60%* | 1,62 | 1,68 | 1,62 | 1,18 | 1,13 | 1,11 | 1,09 | 1,07 | 1,04 | 11,56 | -36% | -5% |
| Manufacturing | 5 | *8%* | 2,13 | 1,91 | 1,64 | 1,59 | 1,61 | 1,61 | 1,48 | 1,44 | 1,38 | 14,78 | -35% | -5% |
| Households | | | | | | | | | | | | | | |
| Transports | 11 | *18%* | 0,59 | 0,52 | 0,59 | 0,60 | 0,54 | 0,58 | 0,63 | 0,71 | 1,00 | 5,75 | +68% | +7% |
| Public | 1 | *2%* | 0,10 | 0,10 | 0,11 | 0,10 | 0,10 | 0,11 | 0,10 | 0,09 | 0,08 | 0,89 | -18% | -2% |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **60** | ***100%*** | **4,68** | **4,46** | **4,18** | **3,69** | **3,57** | **3,61** | **3,50** | **3,44** | **3,67** | **34,80** | **-22%** | **-3%** |

Interventions distribution by sector




Financial support by sector (billion euros)

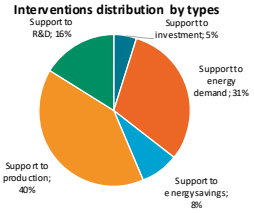


# United Kingdom

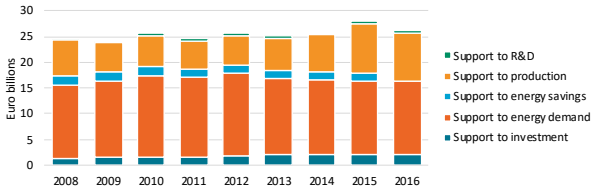
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 4 | *5%* | 1,25 | 1,58 | 1,52 | 1,51 | 1,94 | 2,11 | 2,13 | 2,14 | 2,13 | 16,30 | +71% | +7% |
| Support to energy demand | 27 | *31%* | 14,40 | 14,63 | 15,86 | 15,72 | 15,97 | 14,85 | 14,54 | 14,24 | 14,14 | 134,36 | -2% | -0% |
| Support to energy savings | 7 | *8%* | 1,70 | 1,87 | 1,83 | 1,44 | 1,44 | 1,47 | 1,47 | 1,46 | 0,17 | 12,84 | -90% | -25% |
| Support to production | 35 | *40%* | 7,00 | 5,81 | 5,88 | 5,51 | 5,95 | 6,26 | 7,24 | 9,59 | 9,40 | 62,62 | +34% | +4% |
| Support to R&D | 14 | *16%* | 0,21 | 0,35 | 0,65 | 0,43 | 0,39 | 0,48 | 0,39 | 0,43 | 0,45 | 3,77 | +116% | +10% |
| **Total** | **87** | ***100%*** | **24,55** | **24,23** | **25,73** | **24,62** | **25,68** | **25,16** | **25,77** | **27,86** | **26,30** | **229,89** | **+7%** | **+1%** |

Interventions distribution by types



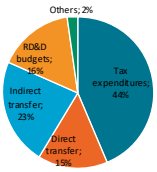

Financial support by types (billion euros)



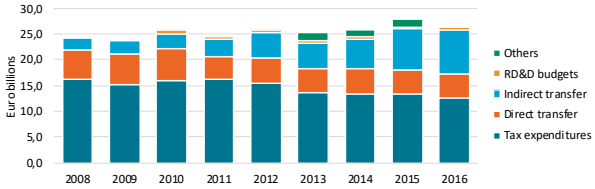

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 38 | *44%* | 16,34 | 15,14 | 16,05 | 16,33 | 15,58 | 13,59 | 13,49 | 13,39 | 12,70 | 132,62 | -22% | -3% |
| Direct transfer | 13 | *15%* | 5,62 | 6,02 | 6,08 | 4,47 | 4,83 | 4,83 | 4,80 | 4,74 | 4,63 | 46,02 | -18% | -2% |
| Indirect transfer | 20 | *23%* | 2,33 | 2,68 | 2,92 | 3,35 | 4,85 | 5,01 | 5,85 | 7,84 | 8,51 | 43,34 | +266% | +18% |
| RD&D budgets | 14 | *16%* | 0,21 | 0,35 | 0,65 | 0,43 | 0,39 | 0,48 | 0,39 | 0,43 | 0,45 | 3,77 | +116% | +10% |
| Others | 2 | *2%* | 0,04 | 0,04 | 0,03 | 0,03 | 0,03 | 1,26 | 1,23 | 1,46 | 0,01 | 4,14 | -77% | -17% |
| **Total** | **87** | ***100%*** | **24,55** | **24,23** | **25,73** | **24,62** | **25,68** | **25,16** | **25,77** | **27,86** | **26,30** | **229,89** | **+7%** | **+1%** |

Interventions distribution by sub-types



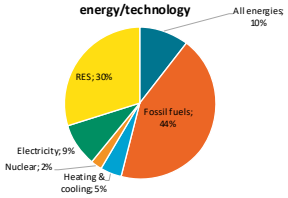

Financial support by sub-types (billion euros)



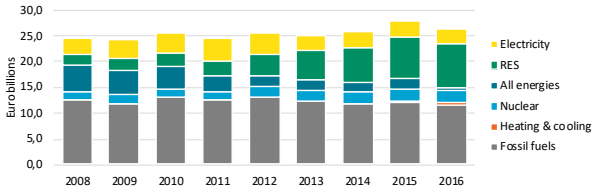

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 9 | *10%* | 5,41 | 4,61 | 4,58 | 3,16 | 2,09 | 1,95 | 1,92 | 1,92 | 0,56 | 26,20 | -90% | -25% |
| Fossil fuels | 38 | *44%* | 12,68 | 12,00 | 12,96 | 12,55 | 13,06 | 12,32 | 11,85 | 12,14 | 11,62 | 111,17 | -8% | -1% |
| Heating & cooling | 4 | *5%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,07 | 0,15 | 0,37 | 0,52 | 1,14 | +7379% | +71% |
| Nuclear | 2 | *2%* | 1,29 | 1,63 | 1,61 | 1,57 | 2,01 | 2,11 | 2,12 | 2,25 | 2,27 | 16,87 | +76% | +7% |
| Electricity | 8 | *9%* | 3,17 | 3,66 | 4,03 | 4,42 | 4,25 | 2,99 | 3,14 | 2,93 | 2,89 | 31,48 | -9% | -1% |
| RES | 26 | *30%* | 1,99 | 2,33 | 2,54 | 2,92 | 4,26 | 5,73 | 6,58 | 8,26 | 8,43 | 43,04 | +324% | +20% |
| **Total** | **87** | ***100%*** | **24,55** | **24,23** | **25,73** | **24,62** | **25,68** | **25,16** | **25,77** | **27,86** | **26,30** | **229,89** | **+7%** | **+1%** |

Interventions distribution by energy/technology



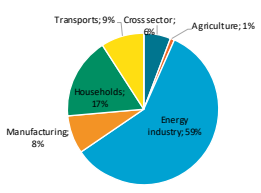

Financial support by energy/technology (billion euros)



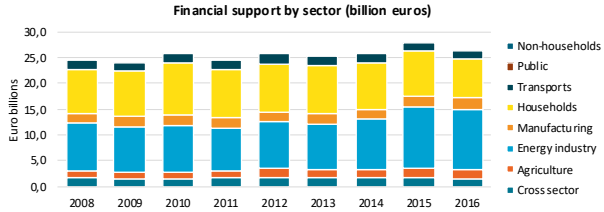

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 5 | *6%* | 1,68 | 1,48 | 1,47 | 1,69 | 1,80 | 1,75 | 1,86 | 1,76 | 1,56 | 15,04 | -7% | -1% |
| Agriculture | 1 | *1%* | 1,28 | 1,34 | 1,30 | 1,31 | 1,75 | 1,71 | 1,59 | 1,70 | 1,66 | 13,65 | +29% | +3% |
| Energy industry | 51 | *59%* | 9,41 | 8,68 | 8,97 | 8,34 | 9,17 | 8,73 | 9,61 | 11,96 | 11,78 | 86,65 | +25% | +3% |
| Manufacturing | 7 | *8%* | 1,84 | 2,04 | 2,23 | 2,13 | 1,79 | 1,98 | 1,83 | 2,15 | 2,27 | 18,26 | +23% | +3% |
| Households | 15 | *17%* | 8,46 | 8,88 | 10,20 | 9,42 | 9,23 | 9,34 | 9,24 | 8,65 | 7,47 | 80,89 | -12% | -2% |
| Transports | 8 | *9%* | 1,87 | 1,81 | 1,55 | 1,72 | 1,95 | 1,66 | 1,64 | 1,64 | 1,57 | 15,41 | -16% | -2% |
| Public | | | | | | | | | | | | | | |
| Non-households | | | | | | | | | | | | | | |
| **Total** | **87** | ***100%*** | **24,55** | **24,23** | **25,73** | **24,62** | **25,68** | **25,16** | **25,77** | **27,86** | **26,30** | **229,89** | **+7%** | **+1%** |

Interventions distribution by sector




Financial support by sector (billion euros)

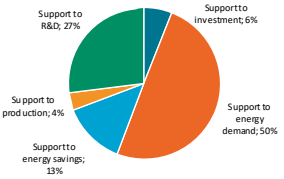


# Norway

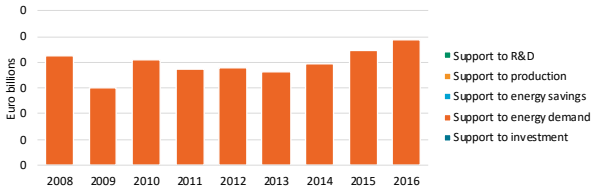
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 3 | *6%* | | | | | | | | | | | | |
| Support to energy demand | 26 | *50%* | 0,21 | 0,15 | 0,20 | 0,19 | 0,19 | 0,18 | 0,20 | 0,22 | 0,24 | 1,79 | +15% | +2% |
| Support to energy savings | 7 | *13%* | | | | | | | | | | | | |
| Support to production | 2 | *4%* | | | | | | | | | | | | |
| Support to R&D | 14 | *27%* | | | | | | | | | | | | |
| **Total** | **52** | ***100%*** | **0,21** | **0,15** | **0,20** | **0,19** | **0,19** | **0,18** | **0,20** | **0,22** | **0,24** | **1,79** | **+15%** | **+2%** |

Interventions distribution by types



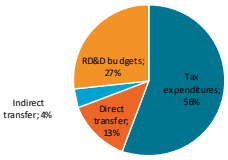

Financial support by types (billion euros)



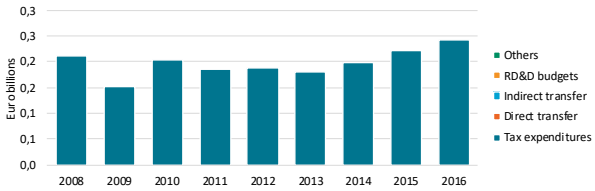

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 29 | *56%* | 0,21 | 0,15 | 0,20 | 0,19 | 0,19 | 0,18 | 0,20 | 0,22 | 0,24 | 1,79 | +15% | +2% |
| Direct transfer | 7 | *13%* | | | | | | | | | | | | |
| Indirect transfer | 2 | *4%* | | | | | | | | | | | | |
| RD&D budgets | 14 | *27%* | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **52** | ***100%*** | **0,21** | **0,15** | **0,20** | **0,19** | **0,19** | **0,18** | **0,20** | **0,22** | **0,24** | **1,79** | **+15%** | **+2%** |

Interventions distribution by sub-types



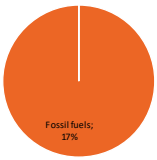

Financial support by sub-types (billion euros)



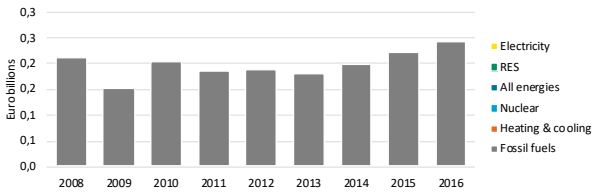

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | | | | | | | | | | | | | | |
| Fossil fuels | 9 | *17%* | 0,21 | 0,15 | 0,20 | 0,19 | 0,19 | 0,18 | 0,20 | 0,22 | 0,24 | 1,79 | +15% | +2% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | | | | | | | | | | | | | | |
| RES | | | | | | | | | | | | | | |
| **Total** | **9** | ***17%*** | **0,21** | **0,15** | **0,20** | **0,19** | **0,19** | **0,18** | **0,20** | **0,22** | **0,24** | **1,79** | **+15%** | **+2%** |

Interventions distribution by energy/technology



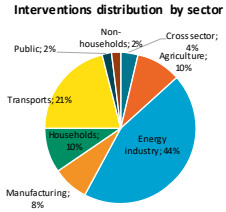

Financial support by energy/technology (billion euros)



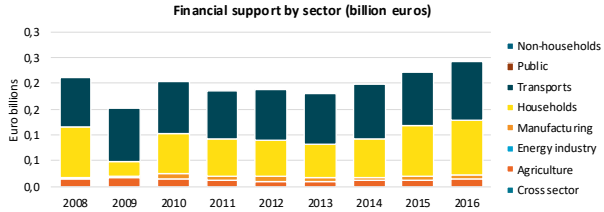

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 2 | *4%* | | | | | | | | | | | | |
| Agriculture | 5 | *10%* | 0,02 | 0,02 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,12 | -6% | -1% |
| Energy industry | 23 | *44%* | | | | | | | | | | | | |
| Manufacturing | 4 | *8%* | 0,00 | 0,00 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,06 | +190% | +14% |
| Households | 5 | *10%* | 0,10 | 0,03 | 0,08 | 0,07 | 0,07 | 0,06 | 0,08 | 0,10 | 0,11 | 0,69 | +10% | +1% |
| Transports | 11 | *21%* | 0,10 | 0,10 | 0,10 | 0,09 | 0,10 | 0,10 | 0,10 | 0,11 | 0,11 | 0,91 | +17% | +2% |
| Public | 1 | *2%* | | | | | | | | | | | | |
| Non-households | 1 | *2%* | | | | | | | | | | | | |
| **Total** | **52** | ***100%*** | **0,21** | **0,15** | **0,20** | **0,19** | **0,19** | **0,18** | **0,20** | **0,22** | **0,24** | **1,79** | **+15%** | **+2%** |

Interventions distribution by sector




Financial support by sector (billion euros)

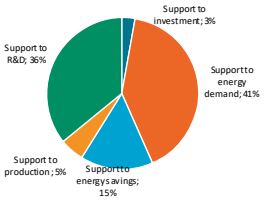


# Switzerland

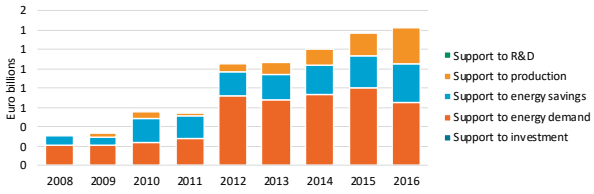
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 1 | *3%* | | | | | | | | | | | | |
| Support to energy demand | 16 | *41%* | 0,21 | 0,21 | 0,23 | 0,28 | 0,72 | 0,68 | 0,74 | 0,81 | 0,66 | 4,54 | +207% | +15% |
| Support to energy savings | 6 | *15%* | 0,09 | 0,09 | 0,26 | 0,23 | 0,25 | 0,27 | 0,30 | 0,33 | 0,39 | 2,21 | +344% | +20% |
| Support to production | 2 | *5%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| Support to R&D | 14 | *36%* | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by types



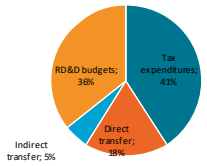

Financial support by types (billion euros)



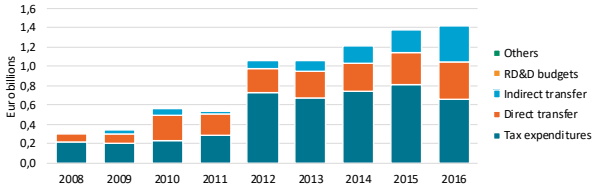

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 16 | *41%* | 0,21 | 0,21 | 0,23 | 0,28 | 0,72 | 0,68 | 0,74 | 0,81 | 0,66 | 4,54 | +207% | +15% |
| Direct transfer | 7 | *18%* | 0,09 | 0,09 | 0,26 | 0,23 | 0,25 | 0,27 | 0,30 | 0,33 | 0,39 | 2,21 | +344% | +20% |
| Indirect transfer | 2 | *5%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| RD&D budgets | 14 | *36%* | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by sub-types



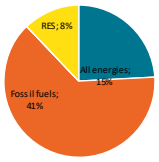

Financial support by sub-types (billion euros)



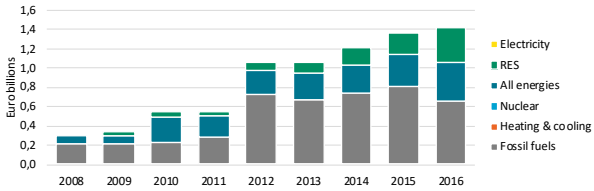

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 6 | *15%* | 0,09 | 0,09 | 0,26 | 0,23 | 0,25 | 0,27 | 0,30 | 0,33 | 0,39 | 2,21 | +344% | +20% |
| Fossil fuels | 16 | *41%* | 0,21 | 0,21 | 0,23 | 0,28 | 0,72 | 0,68 | 0,74 | 0,81 | 0,66 | 4,54 | +207% | +15% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | | | | | | | | | | | | | | |
| RES | 3 | *8%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| **Total** | **25** | ***64%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by energy/technology



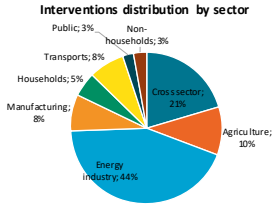

Financial support by energy/technology (billion euros)



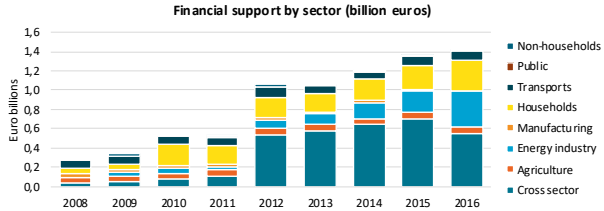

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 8 | *21%* | 0,03 | 0,05 | 0,07 | 0,11 | 0,54 | 0,58 | 0,64 | 0,70 | 0,55 | 3,28 | +1584% | +42% |
| Agriculture | 4 | *10%* | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,55 | +4% | +0% |
| Energy industry | 17 | *44%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| Manufacturing | 3 | *8%* | 0,05 | 0,03 | 0,02 | 0,03 | 0,03 | 0,01 | 0,02 | 0,01 | 0,01 | 0,21 | -81% | -19% |
| Households | 2 | *5%* | 0,05 | 0,05 | 0,22 | 0,19 | 0,21 | 0,19 | 0,22 | 0,25 | 0,32 | 1,72 | +503% | +25% |
| Transports | 3 | *8%* | 0,08 | 0,08 | 0,09 | 0,09 | 0,10 | 0,09 | 0,08 | 0,09 | 0,09 | 0,79 | +14% | +2% |
| Public | 1 | *3%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,00 | 0,01 | 0,01 | 0,06 | -38% | -6% |
| Non-households | 1 | *3%* | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,15 | -35% | -5% |
| **Total** | **39** | ***100%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by sector




Financial support by sector (billion euros)



## Sector factsheets

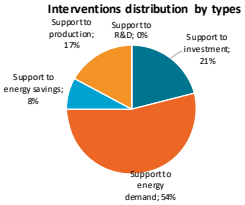
For all following sheets: *Source:* Own calculations

# Agriculture - European Union (constant prices 2017)

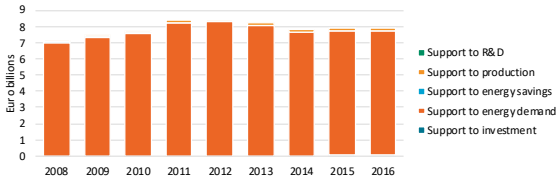
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 16 | *21%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +675% | +29% |
| Support to energy demand | 41 | *54%* | 7.0 | 7.3 | 7.6 | 8.2 | 8.3 | 8.1 | 7.7 | 7.7 | 7.7 | 69.6 | 0.7 | +10% | +1% |
| Support to energy savings | 6 | *8%* | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | -19% | -3% |
| Support to production | 13 | *17%* | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 1.1 | 0.0 | +12% | +1% |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **76** | ***100%*** | **7.2** | **7.5** | **7.8** | **8.4** | **8.5** | **8.2** | **7.8** | **7.9** | **7.9** | **71.2** | **0.7** | **+10%** | **+1%** |

Interventions distribution by types



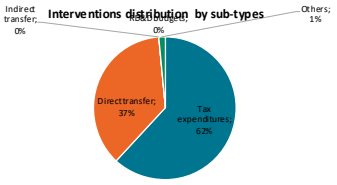

Financial support by types (billion euros)



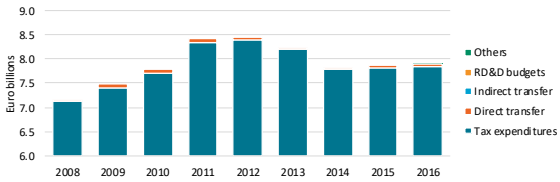

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 47 | *62%* | 7.1 | 7.4 | 7.7 | 8.3 | 8.4 | 8.2 | 7.8 | 7.8 | 7.8 | 70.7 | 0.7 | +10% | +1% |
| Direct transfer | 28 | *37%* | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.5 | 0.0 | +37% | +4% |
| Indirect transfer | | | | | | | | | | | | | | | |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | 1 | *1%* | | | | | | | | | 0.0 | 0.0 | 0.0 | | |
| **Total** | **76** | ***100%*** | **7.2** | **7.5** | **7.8** | **8.4** | **8.5** | **8.2** | **7.8** | **7.9** | **7.9** | **71.2** | **0.7** | **+10%** | **+1%** |

Interventions distribution by sub-types



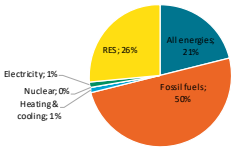

Financial support by sub-types (billion euros)



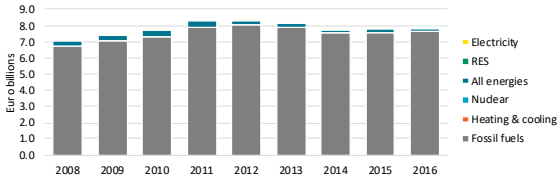

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 16 | *21%* | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 2.5 | -0.1 | -35% | -5% |
| Fossil fuels | 38 | *50%* | 6.8 | 7.1 | 7.3 | 7.9 | 8.0 | 7.8 | 7.5 | 7.6 | 7.6 | 67.7 | 0.9 | +13% | +1% |
| Heating & cooling | 1 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | -100% | -100% |
| Nuclear | | | | | | | | | | | | | | | |
| Electricity | 1 | *1%* | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 | 0.0 | +7% | +1% |
| RES | 20 | *26%* | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.4 | 0.0 | -9% | -1% |
| **Total** | **76** | ***100%*** | **7.2** | **7.5** | **7.8** | **8.4** | **8.5** | **8.2** | **7.8** | **7.9** | **7.9** | **71.2** | **0.7** | **+10%** | **+1%** |

Interventions distribution by energy/technology




Financial support by energy/technology (billion euros)




## Support by sector

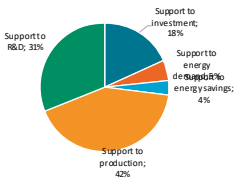
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 5 | *7%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | -0.1 | -100% | -60% |
| Belgium | 1 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | -64% | -12% |
| Bulgaria | 1 | *1%* | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | -25% | -3% |
| Croatia | 2 | *3%* | | | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 | 0.1 | | |
| Cyprus | | | | | | | | | | | | | | | |
| Czech Republic | 1 | *1%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | -26% | -4% |
| Denmark | 3 | *4%* | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.2 | 0.0 | -25% | -4% |
| Estonia | 6 | *8%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.6 | -0.1 | -62% | -11% |
| Finland | 2 | *3%* | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 2.9 | -0.1 | -33% | -5% |
| France | 4 | *5%* | 1.0 | 1.0 | 1.1 | 2.0 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 13.3 | 0.7 | +68% | +7% |
| Germany | 2 | *3%* | 0.2 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 3.7 | 0.3 | +205% | +15% |
| Greece | 1 | *1%* | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 1.0 | -0.1 | -82% | -19% |
| Hungary | 5 | *7%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.0 | +29% | +3% |
| Ireland | 7 | *9%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.0 | +4064% | +59% |
| Italy | 5 | *7%* | 2.3 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 20.3 | -0.1 | -5% | -1% |
| Latvia | 3 | *4%* | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | | |
| Lithuania | 5 | *7%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 | -2% | -0% |
| Luxembourg | | | | | | | | | | | | | | | |
| Malta | | | | | | | | | | | | | | | |
| Netherlands | 4 | *5%* | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.1 | -0.1 | -45% | -7% |
| Poland | 6 | *8%* | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.6 | 0.1 | +56% | +6% |
| Portugal | 1 | *1%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.7 | 0.0 | +14% | +2% |
| Romania | | | | | | | | | | | | | | | |
| Slovakia | 1 | *1%* | | | | | | | | | | | | | |
| Slovenia | 1 | *1%* | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Spain | 4 | *5%* | 0.7 | 0.9 | 1.2 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 6.2 | -0.2 | -30% | -4% |
| Sweden | 5 | *7%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 1.6 | -0.1 | -33% | -5% |
| United Kingdom | 1 | *1%* | 1.3 | 1.3 | 1.3 | 1.3 | 1.7 | 1.7 | 1.6 | 1.7 | 1.7 | 13.6 | 0.4 | +29% | +3% |
| **Total** | **76** | ***13%*** | **7.2** | **7.5** | **7.8** | **8.4** | **8.5** | **8.2** | **7.8** | **7.9** | **7.9** | **71.2** | **0.7** | **+10%** | **+1%** |

# Energy industry - European Union (constant prices 2017)

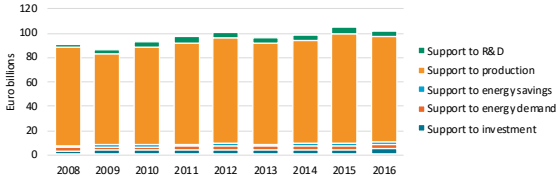
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 152 | *18%* | 2.7 | 3.5 | 3.3 | 3.2 | 3.9 | 4.1 | 4.2 | 4.4 | 4.8 | 34.2 | 2.0 | +75% | +7% |
| Support to energy demand | 45 | *5%* | 3.3 | 2.8 | 3.4 | 3.6 | 3.3 | 3.0 | 2.9 | 2.9 | 3.5 | 28.7 | 0.2 | +6% | +1% |
| Support to energy savings | 30 | *4%* | 1.7 | 1.8 | 1.9 | 2.0 | 2.2 | 1.4 | 1.9 | 2.4 | 2.0 | 17.4 | 0.3 | +16% | +2% |
| Support to production | 351 | *42%* | 80.0 | 74.7 | 80.2 | 83.5 | 87.0 | 83.6 | 84.4 | 90.5 | 87.2 | 751.0 | 7.2 | +9% | +1% |
| Support to R&D | 261 | *31%* | 3.1 | 3.8 | 4.6 | 4.7 | 4.5 | 4.4 | 5.2 | 5.0 | 4.6 | 40.0 | 1.5 | +48% | +5% |
| **Total** | **839** | ***100%*** | **90.9** | **86.6** | **93.4** | **97.0** | **100.9** | **96.6** | **98.8** | **105.1** | **102.1** | **871.3** | **11.2** | **+12%** | **+1%** |

Interventions distribution by types



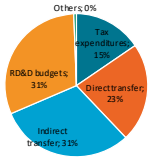

Financial support by types (billion euros)



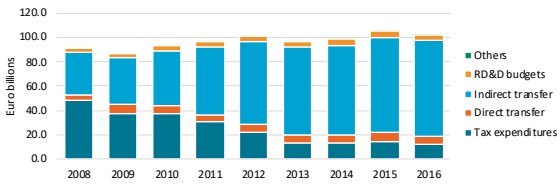

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 129 | *15%* | 48.2 | 37.6 | 37.0 | 30.4 | 22.0 | 13.1 | 13.3 | 14.7 | 12.0 | 228.2 | -36.2 | -75% | -16% |
| Direct transfer | 189 | *23%* | 4.4 | 6.5 | 6.3 | 6.3 | 6.3 | 6.0 | 6.3 | 6.4 | 6.6 | 55.2 | 2.2 | +50% | +5% |
| Indirect transfer | 256 | *31%* | 35.2 | 38.6 | 45.3 | 55.4 | 67.7 | 72.8 | 73.7 | 78.8 | 78.9 | 546.4 | 43.7 | +124% | +11% |
| RD&D budgets | 261 | *31%* | 3.1 | 3.8 | 4.6 | 4.7 | 4.5 | 4.4 | 5.2 | 5.0 | 4.6 | 40.0 | 1.5 | +48% | +5% |
| Others | 4 | *0%* | 0.0 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.0 | 1.6 | 0.0 | -77% | -17% |
| **Total** | **839** | ***100%*** | **90.9** | **86.6** | **93.4** | **97.0** | **100.9** | **96.6** | **98.8** | **105.1** | **102.1** | **871.3** | **11.2** | **+12%** | **+1%** |

Interventions distribution by sub-types



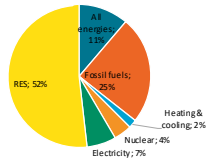

Financial support by sub-types (billion euros)



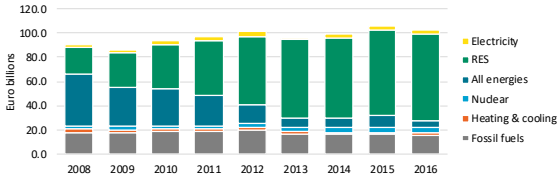

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 93 | *11%* | 42.5 | 32.2 | 30.9 | 24.6 | 15.8 | 7.7 | 8.0 | 9.4 | 6.5 | 177.6 | -36.0 | -85% | -21% |
| Fossil fuels | 208 | *25%* | 17.8 | 18.0 | 18.3 | 18.3 | 19.7 | 16.9 | 16.3 | 16.5 | 16.0 | 157.8 | -1.8 | -10% | -1% |
| Heating & cooling | 15 | *2%* | 2.8 | 2.0 | 2.1 | 2.2 | 2.0 | 1.6 | 1.2 | 1.2 | 1.4 | 16.4 | -1.4 | -50% | -8% |
| Nuclear | 34 | *4%* | 2.8 | 3.1 | 3.2 | 3.1 | 3.6 | 3.8 | 4.0 | 4.3 | 4.2 | 32.3 | 1.5 | +52% | +5% |
| Electricity | 55 | *7%* | 2.5 | 2.8 | 2.9 | 3.6 | 3.2 | 2.4 | 2.7 | 2.5 | 2.6 | 25.1 | 0.1 | +6% | +1% |
| RES | 434 | *52%* | 22.5 | 28.5 | 35.9 | 45.2 | 56.6 | 64.2 | 66.5 | 71.2 | 71.3 | 462.0 | 48.8 | +216% | +15% |
| **Total** | **839** | ***100%*** | **90.9** | **86.6** | **93.4** | **97.0** | **100.9** | **96.6** | **98.8** | **105.1** | **102.1** | **871.3** | **11.2** | **+12%** | **+1%** |

Interventions distribution by energy/technology




Financial support by energy/technology (billion euros)



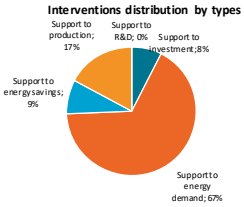

## Support by sector

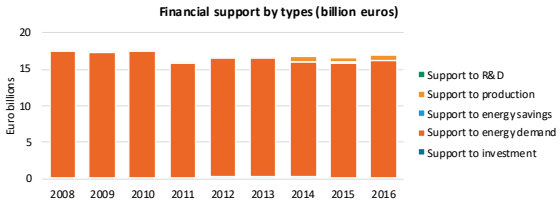
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 27 | *3%* | 1.7 | 1.5 | 1.6 | 1.5 | 1.4 | 1.4 | 1.6 | 1.7 | 1.7 | 14.2 | 0.0 | -1% | -0% |
| Belgium | 22 | *3%* | 1.7 | 1.6 | 1.9 | 2.1 | 2.4 | 2.4 | 1.9 | 2.0 | 1.9 | 18.0 | 0.2 | +9% | +1% |
| Bulgaria | 7 | *1%* | 1.0 | 0.8 | 0.8 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.8 | 7.2 | -0.2 | -19% | -3% |
| Croatia | 8 | *1%* | | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.7 | 0.2 | | |
| Cyprus | 7 | *1%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 1.2 | 0.0 | +7% | +1% |
| Czech Republic | 31 | *4%* | 2.0 | 1.6 | 1.9 | 2.1 | 1.8 | 2.0 | 2.1 | 2.2 | 2.0 | 17.7 | -0.1 | -3% | -0% |
| Denmark | 32 | *4%* | 1.0 | 1.1 | 1.1 | 1.0 | 1.1 | 1.2 | 1.4 | 1.6 | 1.5 | 11.0 | 0.6 | +59% | +6% |
| Estonia | 33 | *4%* | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 2.1 | -0.1 | -44% | -7% |
| Finland | 31 | *4%* | 1.1 | 1.0 | 1.0 | 1.0 | 0.8 | 0.7 | 0.7 | 0.8 | 0.7 | 7.8 | -0.4 | -35% | -5% |
| France | 39 | *5%* | 5.8 | 6.2 | 6.2 | 6.8 | 7.3 | 7.3 | 7.9 | 8.5 | 9.1 | 65.0 | 3.4 | +58% | +6% |
| Germany | 51 | *6%* | 21.1 | 19.1 | 23.4 | 25.8 | 27.3 | 26.1 | 28.4 | 31.7 | 31.4 | 234.3 | 10.3 | +49% | +5% |
| Greece | 30 | *4%* | 1.6 | 1.3 | 1.3 | 1.7 | 2.1 | 2.8 | 1.9 | 1.5 | 1.8 | 15.9 | 0.1 | +8% | +1% |
| Hungary | 29 | *3%* | 1.0 | 0.9 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 8.3 | -0.1 | -9% | -1% |
| Ireland | 36 | *4%* | 1.1 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.3 | 1.2 | 1.1 | 10.5 | 0.1 | +5% | +1% |
| Italy | 56 | *7%* | 15.5 | 13.9 | 13.5 | 15.0 | 16.1 | 16.0 | 16.7 | 16.5 | 15.4 | 138.5 | -0.1 | -0% | -0% |
| Latvia | 11 | *1%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 2.2 | 0.1 | +58% | +6% |
| Lithuania | 32 | *4%* | 0.2 | 0.2 | 0.3 | 0.4 | 0.6 | 0.5 | 0.4 | 0.4 | 0.5 | 3.5 | 0.3 | +105% | +9% |
| Luxembourg | 24 | *3%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.0 | +12% | +1% |
| Malta | 10 | *1%* | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | -97% | -35% |
| Netherlands | 39 | *5%* | 2.9 | 2.7 | 2.9 | 2.4 | 2.0 | 1.3 | 1.3 | 1.4 | 1.6 | 18.4 | -1.3 | -46% | -7% |
| Poland | 55 | *7%* | 4.4 | 4.5 | 4.8 | 4.6 | 4.2 | 2.9 | 3.3 | 2.7 | 2.2 | 33.5 | -2.3 | -51% | -9% |
| Portugal | 30 | *4%* | 1.1 | 1.3 | 1.5 | 1.3 | 1.3 | 1.3 | 1.8 | 1.5 | 1.5 | 12.6 | 0.4 | +39% | +4% |
| Romania | 12 | *1%* | 2.2 | 1.9 | 1.9 | 1.7 | 1.0 | 0.7 | 0.6 | 0.6 | 0.7 | 11.2 | -1.5 | -69% | -13% |
| Slovakia | 25 | *3%* | 0.8 | 0.7 | 0.7 | 0.9 | 0.8 | 0.6 | 0.7 | 0.7 | 0.7 | 6.7 | -0.1 | -13% | -2% |
| Slovenia | 11 | *1%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.7 | -0.1 | -28% | -4% |
| Spain | 50 | *6%* | 12.5 | 14.0 | 15.0 | 15.4 | 16.5 | 15.9 | 12.5 | 13.2 | 11.4 | 126.3 | -1.1 | -9% | -1% |
| Sweden | 36 | *4%* | 1.6 | 1.7 | 1.6 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.0 | 11.6 | -0.6 | -36% | -5% |
| United Kingdom | 51 | *6%* | 9.4 | 8.7 | 9.0 | 8.3 | 9.2 | 8.7 | 9.6 | 12.0 | 11.8 | 86.6 | 2.4 | +25% | +3% |
| **Total** | **825** | ***16%*** | **90.9** | **86.6** | **93.4** | **97.0** | **100.9** | **96.6** | **97.7** | **103.9** | **100.9** | **867.8** | **10.0** | **+11%** | **+1%** |

# Manufacturing - European Union (constant prices 2017)

## Support by types

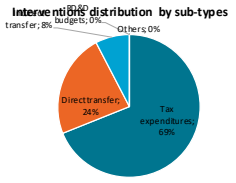
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 7 | 8% | | | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.0 | 0.0 | 0.9 | 0.0 | | |
| Support to energy demand | 62 | 67% | 17.6 | 17.4 | 17.5 | 15.7 | 16.4 | 16.3 | 15.7 | 15.9 | 16.2 | 148.7 | -1.4 | -8% | -1% |
| Support to energy savings | 8 | 9% | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.7 | 0.0 | -37% | -6% |
| Support to production | 16 | 17% | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.7 | 0.6 | 0.8 | 3.1 | 0.6 | +489% | +25% |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **93** | **100%** | **17.8** | **17.6** | **17.8** | **16.1** | **16.9** | **16.9** | **16.8** | **16.6** | **17.0** | **153.4** | **-0.8** | **-4%** | **-1%** |

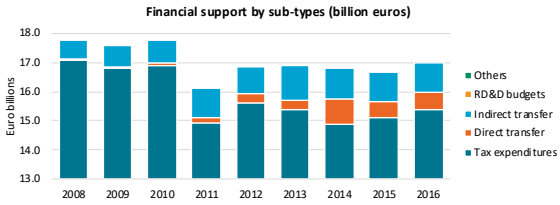



## Support by category

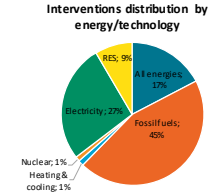
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 64 | 69% | 17.0 | 16.8 | 16.9 | 14.9 | 15.6 | 15.4 | 14.9 | 15.1 | 15.4 | 142.0 | -1.7 | -10% | -1% |
| Direct transfer | 22 | 24% | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.9 | 0.5 | 0.6 | 3.0 | 0.5 | +752% | +31% |
| Indirect transfer | 7 | 8% | 0.7 | 0.7 | 0.8 | 1.0 | 0.9 | 1.2 | 1.1 | 1.0 | 1.0 | 8.4 | 0.4 | +54% | +6% |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | | |
| **Total** | **93** | **100%** | **17.8** | **17.6** | **17.8** | **16.1** | **16.9** | **16.9** | **16.8** | **16.6** | **17.0** | **153.4** | **-0.8** | **-4%** | **-1%** |

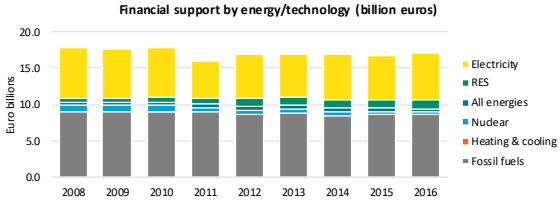



## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 16 | 17% | 0.3 | 0.3 | 0.4 | 0.4 | 0.6 | 0.5 | 0.6 | 0.4 | 0.3 | 3.6 | 0.0 | -10% | -1% |
| Fossil fuels | 42 | 45% | 9.0 | 9.1 | 9.1 | 8.9 | 8.5 | 8.8 | 8.4 | 8.6 | 8.6 | 79.0 | -0.5 | -5% | -1% |
| Heating & cooling | 1 | 1% | | | 0.0 | | | | | | | 0.0 | | | |
| Nuclear | 1 | 1% | 0.9 | 0.9 | 0.9 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 6.4 | -0.4 | -44% | -7% |
| Electricity | 25 | 27% | 6.9 | 6.7 | 6.7 | 5.2 | 6.0 | 5.9 | 6.0 | 5.9 | 6.4 | 55.6 | -0.5 | -7% | -1% |
| RES | 8 | 9% | 0.7 | 0.7 | 0.7 | 0.9 | 1.1 | 1.1 | 1.2 | 1.3 | 1.2 | 8.7 | 0.6 | +89% | +8% |
| **Total** | **93** | **100%** | **17.8** | **17.6** | **17.8** | **16.1** | **16.9** | **16.9** | **16.8** | **16.6** | **17.0** | **153.4** | **-0.8** | **-4%** | **-1%** |




## Support by sector

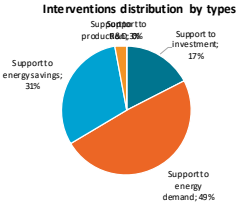
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 4 | 4% | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 3.7 | -0.2 | -39% | -6% |
| Belgium | 6 | 6% | 1.9 | 1.8 | 2.0 | 1.9 | 1.9 | 1.9 | 1.6 | 1.5 | 1.1 | 15.7 | -0.8 | -41% | -6% |
| Bulgaria | 3 | 3% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.4 | 0.0 | +1140% | +37% |
| Croatia | | | | | | | | | | | | | | | |
| Cyprus | 1 | 1% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | -100% | -100% |
| Czech Republic | | | | | | | | | | | | | | | |
| Denmark | 3 | 3% | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.5 | 0.0 | -18% | -2% |
| Estonia | 2 | 2% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +15% | +2% |
| Finland | 3 | 3% | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 4.7 | 0.5 | +174% | +13% |
| France | 7 | 8% | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.0 | 1.2 | 1.0 | | |
| Germany | 19 | 20% | 10.1 | 10.0 | 10.0 | 8.2 | 9.4 | 8.9 | 9.3 | 8.8 | 8.7 | 83.4 | -1.5 | -14% | -2% |
| Greece | 2 | 2% | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Hungary | | | | | | | | | | | | | | | |
| Ireland | | | | | | | | | | | | | | | |
| Italy | 6 | 6% | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 3.7 | -0.1 | -23% | -3% |
| Latvia | 5 | 5% | | | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.3 | 0.0 | | |
| Lithuania | 6 | 6% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +791% | +31% |
| Luxembourg | | | | | | | | | | | | | | | |
| Malta | | | | | | | | | | | | | | | |
| Netherlands | 4 | 4% | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.7 | 0.1 | +78% | +7% |
| Poland | 1 | 1% | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Portugal | 2 | 2% | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.7 | 0.2 | +1722% | +44% |
| Romania | 1 | 1% | | | | 0.0 | 0.1 | 0.1 | 0.1 | | | 0.4 | | | |
| Slovakia | 2 | 2% | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +63382% | +124% |
| Slovenia | 1 | 1% | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Spain | 3 | 3% | 0.3 | 0.4 | 0.5 | 0.6 | 0.5 | 0.7 | 0.6 | 0.5 | 0.5 | 4.6 | 0.2 | +71% | +7% |
| Sweden | 5 | 5% | 2.1 | 1.9 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 14.8 | -0.7 | -35% | -5% |
| United Kingdom | 7 | 8% | 1.8 | 2.0 | 2.2 | 2.1 | 1.8 | 2.0 | 1.8 | 2.1 | 2.3 | 18.3 | 0.4 | +23% | +3% |
| **Total** | **93** | **16%** | **17.8** | **17.6** | **17.8** | **16.1** | **16.9** | **16.9** | **16.8** | **16.6** | **17.0** | **153.4** | **-0.8** | **-4%** | **-1%** |

# Households - European Union (constant prices 2017)

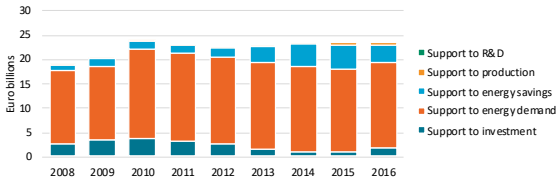
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 29 | *17%* | 2.6 | 3.5 | 3.6 | 3.1 | 2.6 | 1.6 | 1.1 | 1.0 | 1.9 | 21.1 | -0.7 | -26% | -4% |
| Support to energy demand | 82 | *49%* | 15.1 | 15.1 | 18.5 | 18.0 | 18.0 | 17.9 | 17.5 | 17.0 | 17.4 | 154.5 | 2.3 | +15% | +2% |
| Support to energy savings | 51 | *31%* | 1.1 | 1.7 | 1.8 | 1.8 | 1.8 | 3.3 | 4.6 | 4.9 | 3.8 | 24.8 | 2.7 | +235% | +16% |
| Support to production | 5 | *3%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.5 | 0.5 | 2.2 | 0.4 | +487% | +25% |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **167** | ***100%*** | **18.9** | **20.4** | **23.9** | **23.1** | **22.6** | **23.1** | **23.5** | **23.4** | **23.6** | **202.5** | **4.7** | **+25%** | **+3%** |

Interventions distribution by types



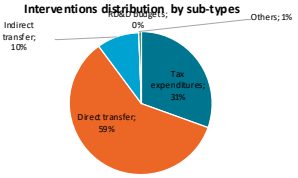

Financial support by types (billion euros)



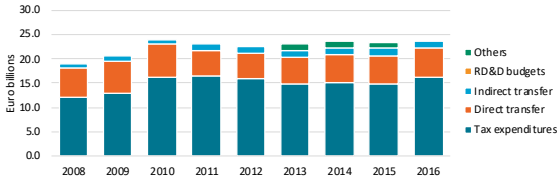

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 51 | *31%* | 11.9 | 12.9 | 16.1 | 16.5 | 15.8 | 14.8 | 15.0 | 14.8 | 16.2 | 134.1 | 4.3 | +36% | +4% |
| Direct transfer | 99 | *59%* | 6.3 | 6.6 | 6.8 | 5.4 | 5.3 | 5.6 | 5.9 | 5.8 | 5.9 | 53.6 | -0.3 | -5% | -1% |
| Indirect transfer | 16 | *10%* | 0.7 | 0.9 | 1.0 | 1.2 | 1.5 | 1.4 | 1.4 | 1.6 | 1.5 | 11.2 | 0.8 | +108% | +10% |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | 1 | *1%* | | | | | | 1.2 | 1.2 | 1.2 | | 3.6 | | | |
| **Total** | **167** | ***100%*** | **18.9** | **20.4** | **23.9** | **23.1** | **22.6** | **23.1** | **23.5** | **23.4** | **23.6** | **202.5** | **4.7** | **+25%** | **+3%** |

Interventions distribution by sub-types



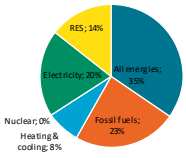

Financial support by sub-types (billion euros)



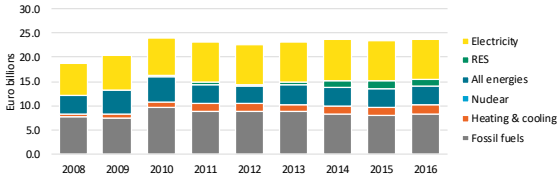

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 58 | *35%* | 3.9 | 5.0 | 4.9 | 4.0 | 3.5 | 4.2 | 3.9 | 4.0 | 3.7 | 37.0 | -0.2 | -4% | -1% |
| Fossil fuels | 39 | *23%* | 7.8 | 7.5 | 9.6 | 8.9 | 9.0 | 8.8 | 8.3 | 8.0 | 8.5 | 76.2 | 0.7 | +9% | +1% |
| Heating & cooling | 13 | *8%* | 0.4 | 0.7 | 1.4 | 1.5 | 1.5 | 1.4 | 1.7 | 1.7 | 1.8 | 12.2 | 1.4 | +341% | +20% |
| Nuclear | | | | | | | | | | | | | | | |
| Electricity | 33 | *20%* | 6.7 | 7.1 | 7.7 | 8.3 | 8.2 | 8.2 | 8.5 | 8.2 | 8.1 | 71.0 | 1.4 | +21% | +2% |
| RES | 24 | *14%* | 0.1 | 0.1 | 0.3 | 0.4 | 0.4 | 0.4 | 1.2 | 1.5 | 1.5 | 6.0 | 1.4 | +1076% | +36% |
| **Total** | **167** | ***100%*** | **18.9** | **20.4** | **23.9** | **23.1** | **22.6** | **23.1** | **23.5** | **23.4** | **23.6** | **202.5** | **4.7** | **+25%** | **+3%** |

Interventions distribution by energy/technology




Financial support by energy/technology (billion euros)



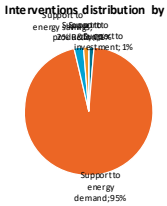

## Support by sector

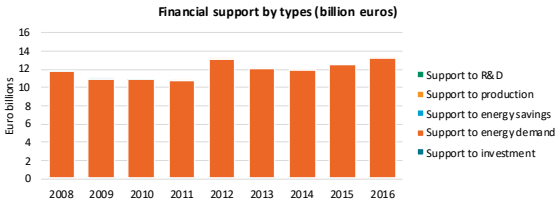
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 2 | *1%* | 0.1 | 0.1 | | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.5 | 0.0 | -41% | -6% |
| Belgium | 18 | *11%* | 0.6 | 0.8 | 1.2 | 1.4 | 1.8 | 1.5 | 0.9 | 0.8 | 1.2 | 10.2 | 0.6 | +88% | +8% |
| Bulgaria | 6 | *4%* | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.7 | 0.2 | +695% | +30% |
| Croatia | 2 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | +22301% | +97% |
| Cyprus | 7 | *4%* | | | | | | | | | | | | | |
| Czech Republic | 1 | *1%* | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Denmark | 6 | *4%* | | | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.6 | 0.6 | 4.8 | 0.6 | | |
| Estonia | 6 | *4%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.4 | 0.0 | -87% | -23% |
| Finland | 2 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -93% | -28% |
| France | 10 | *6%* | 3.4 | 4.3 | 3.9 | 3.3 | 2.5 | 2.3 | 3.2 | 3.8 | 4.5 | 31.3 | 1.1 | +32% | +4% |
| Germany | 3 | *2%* | 0.3 | 0.5 | 0.7 | 0.8 | 0.9 | 0.8 | 1.1 | 1.2 | 1.3 | 7.6 | 1.0 | +375% | +22% |
| Greece | 6 | *4%* | 0.7 | 0.6 | 0.7 | 0.9 | 1.0 | 1.2 | 1.2 | 1.1 | 0.9 | 8.4 | 0.2 | +36% | +4% |
| Hungary | 1 | *1%* | 0.3 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | | | 0.8 | -0.3 | -100% | -100% |
| Ireland | 14 | *8%* | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 6.4 | 0.1 | +11% | +1% |
| Italy | 4 | *2%* | 2.1 | 2.1 | 2.2 | 2.2 | 2.1 | 2.5 | 2.5 | 2.6 | 2.7 | 20.9 | 0.6 | +28% | +3% |
| Latvia | 8 | *5%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | -18% | -2% |
| Lithuania | 9 | *5%* | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.2 | 0.7 | 0.2 | +163291% | +89% |
| Luxembourg | 2 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | -10% | -1% |
| Malta | 8 | *5%* | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 | 0.0 | +36% | +4% |
| Netherlands | 7 | *4%* | 1.5 | 1.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.6 | 2.6 | 20.9 | 1.1 | +71% | +7% |
| Poland | 8 | *5%* | | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 | 0.1 | | |
| Portugal | 5 | *3%* | | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | | |
| Romania | 3 | *2%* | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 1.1 | -0.3 | -91% | -26% |
| Slovakia | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 | +161111% | +89% |
| Slovenia | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | +77% | +7% |
| Spain | 6 | *4%* | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.7 | 0.7 | 0.8 | 0.7 | 4.1 | 0.5 | +202% | +15% |
| Sweden | | | | | | | | | | | | | | | |
| United Kingdom | 15 | *9%* | 8.5 | 8.9 | 10.2 | 9.4 | 9.2 | 9.3 | 9.2 | 8.6 | 7.5 | 80.9 | -1.0 | -12% | -2% |
| **Total** | **167** | ***13%*** | **18.9** | **20.4** | **23.9** | **23.1** | **22.6** | **23.1** | **23.5** | **23.4** | **23.6** | **202.5** | **4.7** | **+25%** | **+3%** |

# Transports - European Union (constant prices 2017)

## Support by types

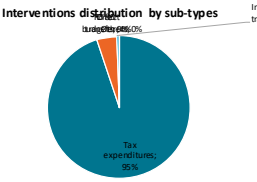
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 2 | *1%* | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Support to energy demand | 154 | *95%* | 11.8 | 11.0 | 10.9 | 10.8 | 13.2 | 12.1 | 11.9 | 12.5 | 13.3 | 107.4 | 1.5 | +13% | +2% |
| Support to energy savings | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | +47% | +5% |
| Support to production | 2 | *1%* | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **162** | ***100%*** | **11.8** | **11.0** | **10.9** | **10.8** | **13.3** | **12.1** | **12.0** | **12.5** | **13.4** | **107.7** | **1.6** | **+13%** | **+2%** |

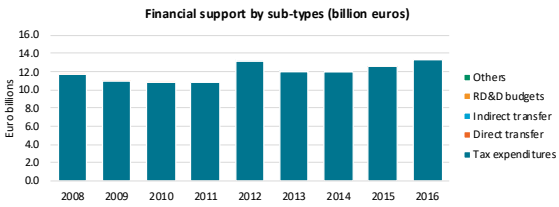



## Support by category

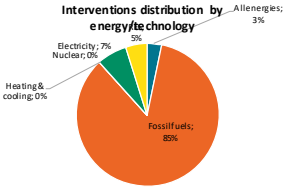
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 154 | *95%* | 11.8 | 11.0 | 10.9 | 10.8 | 13.2 | 12.1 | 11.9 | 12.5 | 13.3 | 107.4 | 1.5 | +13% | +2% |
| Direct transfer | 7 | *4%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | +83% | +8% |
| Indirect transfer | 1 | *1%* | | | | 0.0 | 0.0 | 0.0 | 0.0 | | | 0.0 | | | |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | | |
| **Total** | **162** | ***100%*** | **11.8** | **11.0** | **10.9** | **10.8** | **13.3** | **12.1** | **12.0** | **12.5** | **13.4** | **107.7** | **1.6** | **+13%** | **+2%** |

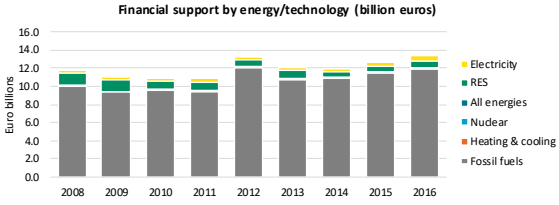



## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 5 | *3%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.9 | 0.0 | -0% | -0% |
| Fossil fuels | 138 | *85%* | 10.1 | 9.3 | 9.6 | 9.4 | 12.0 | 10.8 | 10.8 | 11.5 | 12.0 | 95.5 | 1.9 | +19% | +2% |
| Heating & cooling | | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | | |
| Electricity | 11 | *7%* | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.6 | 3.2 | 0.3 | +101% | +9% |
| RES | 8 | *5%* | 1.3 | 1.3 | 1.0 | 1.0 | 0.8 | 0.9 | 0.6 | 0.6 | 0.7 | 8.1 | -0.6 | -48% | -8% |
| **Total** | **162** | ***100%*** | **11.8** | **11.0** | **10.9** | **10.8** | **13.3** | **12.1** | **12.0** | **12.5** | **13.4** | **107.7** | **1.6** | **+13%** | **+2%** |




## Support by sector

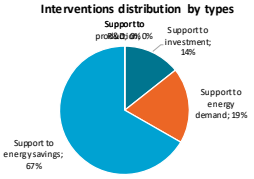
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 8 | *5%* | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 7.1 | 0.1 | +9% | +1% |
| Belgium | 5 | *3%* | 0.1 | 0.2 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.3 | 0.4 | 3.2 | 0.3 | +432% | +23% |
| Bulgaria | 5 | *3%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +8% | +1% |
| Croatia | 5 | *3%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.6 | 0.0 | -9% | -1% |
| Cyprus | 4 | *2%* | | | | | 0.0 | 0.0 | 0.0 | | | 0.0 | | | |
| Czech Republic | 3 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | -1% | -0% |
| Denmark | 5 | *3%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.7 | 0.0 | -11% | -1% |
| Estonia | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | +3% | +0% |
| Finland | 4 | *2%* | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 1.3 | 0.0 | -2% | -0% |
| France | 17 | *10%* | 2.4 | 2.0 | 1.7 | 1.8 | 2.7 | 2.4 | 2.4 | 2.6 | 3.0 | 20.9 | 0.6 | +27% | +3% |
| Germany | 7 | *4%* | 1.2 | 1.2 | 1.1 | 1.1 | 1.4 | 1.0 | 1.1 | 1.1 | 1.1 | 10.1 | -0.2 | -15% | -2% |
| Greece | 5 | *3%* | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 1.9 | -0.1 | -23% | -3% |
| Hungary | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | -15% | -2% |
| Ireland | 7 | *4%* | 0.1 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 1.0 | 0.1 | +223% | +16% |
| Italy | 14 | *9%* | 2.1 | 1.9 | 1.9 | 1.9 | 2.7 | 3.0 | 2.9 | 3.0 | 3.1 | 22.4 | 1.0 | +48% | +5% |
| Latvia | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +173% | +13% |
| Lithuania | 5 | *3%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -15% | -2% |
| Luxembourg | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -36% | -5% |
| Malta | 3 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +268% | +18% |
| Netherlands | 3 | *2%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 1.8 | 0.0 | +16% | +2% |
| Poland | 4 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +479% | +25% |
| Portugal | 6 | *4%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.0 | +11% | +1% |
| Romania | 3 | *2%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 0.0 | -35% | -5% |
| Slovakia | 4 | *2%* | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Slovenia | 4 | *2%* | | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | | |
| Spain | 6 | *4%* | 1.7 | 1.6 | 1.7 | 1.4 | 1.3 | 1.0 | 1.0 | 1.1 | 1.2 | 11.9 | -0.5 | -29% | -4% |
| Sweden | 11 | *7%* | 0.6 | 0.5 | 0.6 | 0.6 | 0.5 | 0.6 | 0.6 | 0.7 | 1.0 | 5.7 | 0.4 | +68% | +7% |
| United Kingdom | 8 | *5%* | 1.9 | 1.8 | 1.6 | 1.7 | 1.9 | 1.7 | 1.6 | 1.6 | 1.6 | 15.4 | -0.3 | -16% | -2% |
| **Total** | **162** | ***15%*** | **11.8** | **11.0** | **10.9** | **10.8** | **13.3** | **12.1** | **12.0** | **12.5** | **13.4** | **107.7** | **1.6** | **+13%** | **+2%** |

# Public - European Union (constant prices 2017)

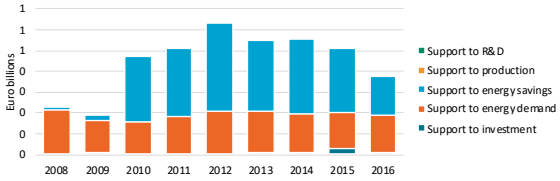
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 6 | *14%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +587% | +27% |
| Support to energy demand | 8 | *19%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 1.7 | 0.0 | -16% | -2% |
| Support to energy savings | 28 | *67%* | 0.0 | 0.0 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 | 0.3 | 0.2 | 2.3 | 0.2 | +1347% | +40% |
| Support to production | | | | | | | | | | | | | | | |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **42** | ***100%*** | **0.2** | **0.2** | **0.5** | **0.5** | **0.6** | **0.5** | **0.6** | **0.5** | **0.4** | **4.0** | **0.1** | **+64%** | **+6%** |

Interventions distribution by types



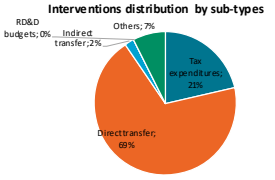

Financial support by types (billion euros)



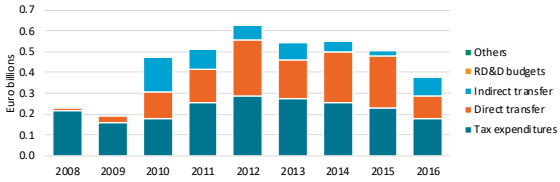

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 9 | *21%* | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 2.0 | 0.0 | -16% | -2% |
| Direct transfer | 29 | *69%* | 0.0 | 0.0 | 0.1 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 1.4 | 0.1 | +706% | +30% |
| Indirect transfer | 1 | *2%* | | | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.6 | 0.1 | | |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | 3 | *7%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -72% | -15% |
| **Total** | **42** | ***100%*** | **0.2** | **0.2** | **0.5** | **0.5** | **0.6** | **0.5** | **0.6** | **0.5** | **0.4** | **4.0** | **0.1** | **+64%** | **+6%** |

Interventions distribution by sub-types



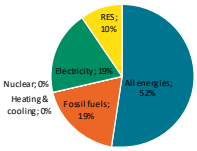

Financial support by sub-types (billion euros)



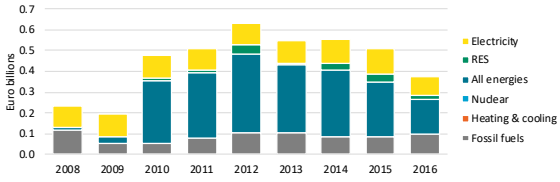

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 22 | *52%* | 0.0 | 0.0 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 2.1 | 0.2 | +1096% | +36% |
| Fossil fuels | 8 | *19%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 0.0 | -14% | -2% |
| Heating & cooling | | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | | |
| Electricity | 8 | *19%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.0 | -9% | -1% |
| RES | 4 | *10%* | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | +9937% | +78% |
| **Total** | **42** | ***100%*** | **0.2** | **0.2** | **0.5** | **0.5** | **0.6** | **0.5** | **0.6** | **0.5** | **0.4** | **4.0** | **0.1** | **+64%** | **+6%** |

Interventions distribution by energy/technology




Financial support by energy/technology (billion euros)



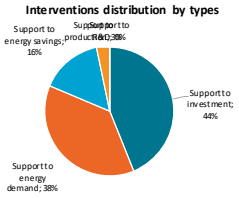

## Support by sector

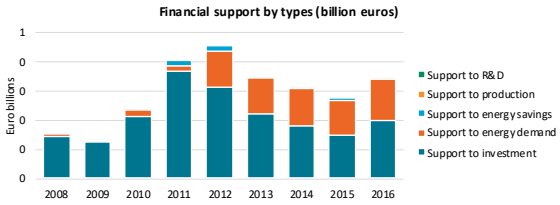
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | | | | | | | | | | | | | | | |
| Belgium | 2 | *5%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +105% | +9% |
| Bulgaria | 3 | *7%* | | | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.7 | 0.1 | | |
| Croatia | | | | | | | | | | | | | | | |
| Cyprus | | | | | | | | | | | | | | | |
| Czech Republic | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | |
| Estonia | 1 | *2%* | | | | | | 0.0 | 0.0 | 0.0 | | 0.0 | | | |
| Finland | | | | | | | | | | | | | | | |
| France | 4 | *10%* | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | 0.5 | -0.1 | -100% | -100% |
| Germany | 1 | *2%* | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Greece | 1 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +37% | +4% |
| Hungary | | | | | | | | | | | | | | | |
| Ireland | 6 | *14%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.3 | 0.1 | +4598% | +62% |
| Italy | 1 | *2%* | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | | |
| Latvia | 2 | *5%* | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.1 | | | |
| Lithuania | 4 | *10%* | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | -50% | -8% |
| Luxembourg | | | | | | | | | | | | | | | |
| Malta | 3 | *7%* | | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Netherlands | 3 | *7%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | +122% | +10% |
| Poland | 7 | *17%* | | | | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.3 | 0.0 | | |
| Portugal | 1 | *2%* | | | | | | | | 0.0 | | 0.0 | | | |
| Romania | | | | | | | | | | | | | | | |
| Slovakia | 1 | *2%* | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Slovenia | | | | | | | | | | | | | | | |
| Spain | 1 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.1 | 0.0 | -100% | -100% |
| Sweden | 1 | *2%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.9 | 0.0 | -18% | -2% |
| United Kingdom | | | | | | | | | | | | | | | |
| **Total** | **42** | ***5%*** | **0.2** | **0.2** | **0.5** | **0.5** | **0.6** | **0.5** | **0.6** | **0.5** | **0.4** | **4.0** | **0.1** | **+64%** | **+6%** |

# Non-households - European Union (constant prices 2017)

## Support by types

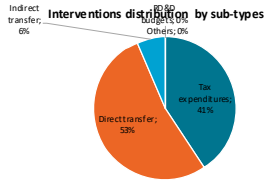
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 14 | *44%* | 0.1 | 0.1 | 0.2 | 0.4 | 0.3 | 0.2 | 0.2 | 0.1 | 0.2 | 1.9 | 0.1 | +41% | +4% |
| Support to energy demand | 12 | *38%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.7 | 0.1 | +1253% | +38% |
| Support to energy savings | 5 | *16%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -77% | -17% |
| Support to production | 1 | *3%* | | | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **32** | ***100%*** | **0.2** | **0.1** | **0.2** | **0.4** | **0.5** | **0.3** | **0.3** | **0.3** | **0.3** | **2.7** | **0.2** | **+117%** | **+10%** |

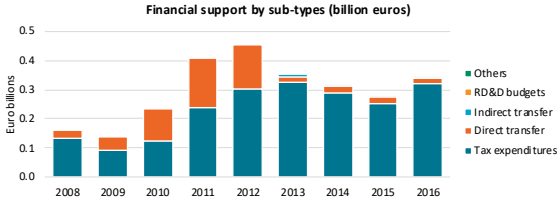



## Support by category

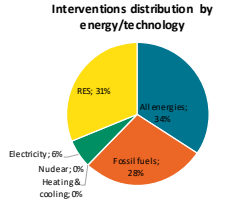
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 13 | *41%* | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 2.1 | 0.2 | +143% | +12% |
| Direct transfer | 17 | *53%* | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | -21% | -3% |
| Indirect transfer | 2 | *6%* | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | | |
| **Total** | **32** | ***100%*** | **0.2** | **0.1** | **0.2** | **0.4** | **0.5** | **0.3** | **0.3** | **0.3** | **0.3** | **2.7** | **0.2** | **+117%** | **+10%** |

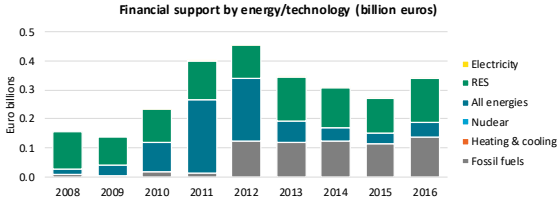



## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 11 | *34%* | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.1 | 0.8 | 0.0 | +183% | +14% |
| Fossil fuels | 9 | *28%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.7 | 0.1 | +1202% | +38% |
| Heating & cooling | | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | | |
| Electricity | 2 | *6%* | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| RES | 10 | *31%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.1 | 0.0 | +16% | +2% |
| **Total** | **32** | ***100%*** | **0.2** | **0.1** | **0.2** | **0.4** | **0.5** | **0.3** | **0.3** | **0.3** | **0.3** | **2.7** | **0.2** | **+117%** | **+10%** |




## Support by sector

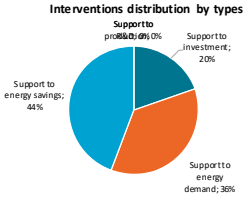
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 1 | *3%* | | | | | | | | | | | | | |
| Belgium | 5 | *16%* | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.5 | 0.0 | +231% | +16% |
| Bulgaria | | | | | | | | | | | | | | | |
| Croatia | | | | | | | | | | | | | | | |
| Cyprus | 3 | *9%* | | | | | | | | | | | | | |
| Czech Republic | | | | | | | | | | | | | | | |
| Denmark | | | | | | | | | | | | | | | |
| Estonia | | | | | | | | | | | | | | | |
| Finland | | | | | | | | | | | | | | | |
| France | 4 | *13%* | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.9 | 0.1 | +979% | +35% |
| Germany | | | | | | | | | | | | | | | |
| Greece | | | | | | | | | | | | | | | |
| Hungary | | | | | | | | | | | | | | | |
| Ireland | 2 | *6%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -65% | -12% |
| Italy | | | | | | | | | | | | | | | |
| Latvia | 4 | *13%* | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Lithuania | 4 | *13%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +2438% | +50% |
| Luxembourg | | | | | | | | | | | | | | | |
| Malta | | | | | | | | | | | | | | | |
| Netherlands | 1 | *3%* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1.1 | 0.0 | +21% | +2% |
| Poland | 3 | *9%* | | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Portugal | | | | | | | | | | | | | | | |
| Romania | | | | | | | | | | | | | | | |
| Slovakia | 2 | *6%* | | | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Slovenia | 3 | *9%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -71% | -14% |
| Spain | | | | | | | | | | | | | | | |
| Sweden | | | | | | | | | | | | | | | |
| United Kingdom | | | | | | | | | | | | | | | |
| **Total** | **32** | ***0%*** | **0.2** | **0.1** | **0.2** | **0.4** | **0.5** | **0.3** | **0.3** | **0.3** | **0.3** | **2.7** | **0.2** | **+117%** | **+10%** |

# Cross sectors - European Union (constant prices 2017)

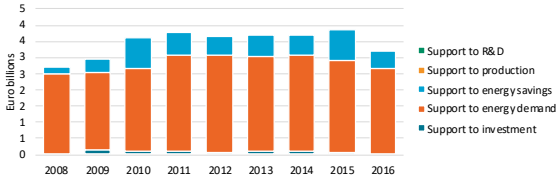
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 16 | *20%* | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.7 | 0.0 | +209% | +15% |
| Support to energy demand | 29 | *36%* | 2.5 | 2.4 | 2.6 | 3.0 | 3.0 | 3.0 | 3.0 | 2.9 | 2.6 | 24.9 | 0.2 | +7% | +1% |
| Support to energy savings | 36 | *44%* | 0.2 | 0.4 | 0.9 | 0.7 | 0.6 | 0.7 | 0.6 | 0.9 | 0.6 | 5.6 | 0.3 | +124% | +11% |
| Support to production | | | | | | | | | | | | | | | |
| Support to R&D | | | | | | | | | | | | | | | |
| **Total** | **81** | ***100%*** | **2.7** | **3.0** | **3.6** | **3.8** | **3.6** | **3.7** | **3.7** | **3.9** | **3.2** | **31.2** | **0.5** | **+18%** | **+2%** |

Interventions distribution by types



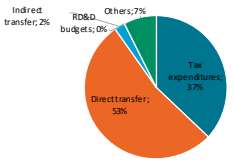

Financial support by types (billion euros)



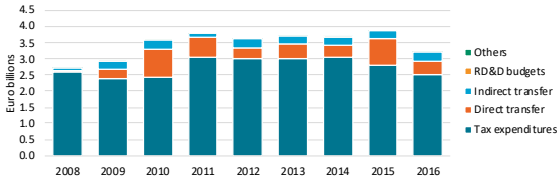

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 30 | *37%* | 2.6 | 2.4 | 2.4 | 3.1 | 3.0 | 3.0 | 3.0 | 2.8 | 2.5 | 24.8 | -0.1 | -3% | -0% |
| Direct transfer | 43 | *53%* | 0.0 | 0.3 | 0.9 | 0.6 | 0.3 | 0.4 | 0.4 | 0.8 | 0.4 | 4.2 | 0.4 | +870% | +33% |
| Indirect transfer | 2 | *2%* | 0.1 | 0.3 | 0.3 | 0.1 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 2.0 | 0.2 | +279% | +18% |
| RD&D budgets | | | | | | | | | | | | | | | |
| Others | 6 | *7%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | +9% | +1% |
| **Total** | **81** | ***100%*** | **2.7** | **3.0** | **3.6** | **3.8** | **3.6** | **3.7** | **3.7** | **3.9** | **3.2** | **31.2** | **0.5** | **+18%** | **+2%** |

Interventions distribution by sub-types



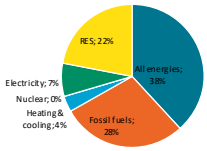

Financial support by sub-types (billion euros)



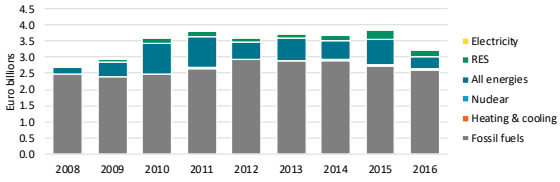

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 31 | *38%* | 0.2 | 0.5 | 1.0 | 1.0 | 0.5 | 0.7 | 0.6 | 0.8 | 0.4 | 5.6 | 0.2 | +71% | +7% |
| Fossil fuels | 23 | *28%* | 2.5 | 2.4 | 2.5 | 2.7 | 2.9 | 2.9 | 2.9 | 2.7 | 2.6 | 24.1 | 0.1 | +6% | +1% |
| Heating & cooling | 3 | *4%* | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Nuclear | | | | | | | | | | | | | | | |
| Electricity | 6 | *7%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +21% | +2% |
| RES | 18 | *22%* | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.2 | 1.3 | 0.2 | +1094% | +36% |
| **Total** | **81** | ***100%*** | **2.7** | **3.0** | **3.6** | **3.8** | **3.6** | **3.7** | **3.7** | **3.9** | **3.2** | **31.2** | **0.5** | **+18%** | **+2%** |

Interventions distribution by energy/technology




Financial support by energy/technology (billion euros)




## Support by sector

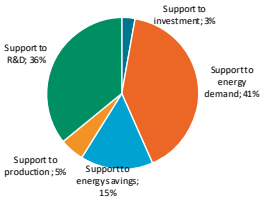
| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | Varitions 2016 - 2008 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | | | | | | | | | | | | | | | |
| Belgium | 7 | *9%* | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.5 | 0.0 | +20% | +2% |
| Bulgaria | 3 | *4%* | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 | +99% | +9% |
| Croatia | 5 | *6%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | +179% | +14% |
| Cyprus | 1 | *1%* | | | | | | | | | | | | | |
| Czech Republic | 5 | *6%* | 0.0 | 0.1 | 0.6 | 0.4 | 0.1 | 0.3 | 0.1 | 0.2 | 0.1 | 2.0 | 0.1 | +5139% | +64% |
| Denmark | 2 | *2%* | | | | | | | | | | | | | |
| Estonia | 1 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | -100% | -100% |
| Finland | 3 | *4%* | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 2.3 | -0.1 | -32% | -5% |
| France | 3 | *4%* | 0.3 | 0.3 | 0.4 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 4.1 | 0.2 | +53% | +5% |
| Germany | 6 | *7%* | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 2.1 | 0.1 | +64% | +6% |
| Greece | 1 | *1%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | -100% | -100% |
| Hungary | | | | | | | | | | | | | | | |
| Ireland | 2 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +506% | +25% |
| Italy | 6 | *7%* | 0.1 | 0.3 | 0.2 | 0.1 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 2.3 | 0.2 | +273% | +18% |
| Latvia | 2 | *2%* | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | 0.0 | | | |
| Lithuania | 1 | *1%* | | | | | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | | |
| Luxembourg | | | | | | | | | | | | | | | |
| Malta | 5 | *6%* | | 0.0 | 0.0 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Netherlands | | | | | | | | | | | | | | | |
| Poland | 2 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | 0.1 | 0.0 | -100% | -100% |
| Portugal | 9 | *11%* | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 | +3% | +0% |
| Romania | | | | | | | | | | | | | | | |
| Slovakia | 6 | *7%* | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 1.3 | 0.1 | +113% | +10% |
| Slovenia | 1 | *1%* | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Spain | 3 | *4%* | | | | | | 0.0 | 0.0 | 0.2 | | 0.3 | | | |
| Sweden | 2 | *2%* | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | +44% | +5% |
| United Kingdom | 5 | *6%* | 1.7 | 1.5 | 1.5 | 1.7 | 1.8 | 1.7 | 1.9 | 1.8 | 1.6 | 15.0 | -0.1 | -7% | -1% |
| **Total** | **81** | ***12%*** | **2.7** | **3.0** | **3.6** | **3.8** | **3.6** | **3.7** | **3.7** | **3.9** | **3.2** | **31.2** | **0.5** | **+18%** | **+2%** |

# Switzerland

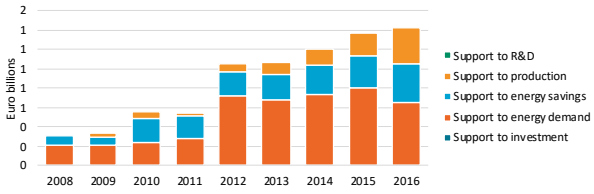
## Support by types

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Support to investment | 1 | *3%* | | | | | | | | | | | | |
| Support to energy demand | 16 | *41%* | 0,21 | 0,21 | 0,23 | 0,28 | 0,72 | 0,68 | 0,74 | 0,81 | 0,66 | 4,54 | +207% | +15% |
| Support to energy savings | 6 | *15%* | 0,09 | 0,09 | 0,26 | 0,23 | 0,25 | 0,27 | 0,30 | 0,33 | 0,39 | 2,21 | +344% | +20% |
| Support to production | 2 | *5%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| Support to R&D | 14 | *36%* | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by types



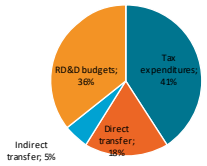

Financial support by types (billion euros)



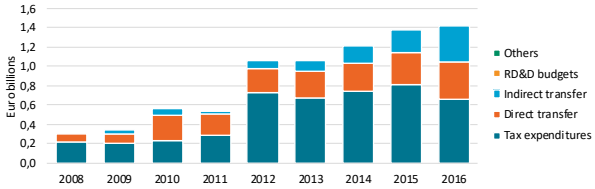

## Support by category

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tax expenditures | 16 | *41%* | 0,21 | 0,21 | 0,23 | 0,28 | 0,72 | 0,68 | 0,74 | 0,81 | 0,66 | 4,54 | +207% | +15% |
| Direct transfer | 7 | *18%* | 0,09 | 0,09 | 0,26 | 0,23 | 0,25 | 0,27 | 0,30 | 0,33 | 0,39 | 2,21 | +344% | +20% |
| Indirect transfer | 2 | *5%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| RD&D budgets | 14 | *36%* | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | |
| **Total** | **39** | ***100%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by sub-types



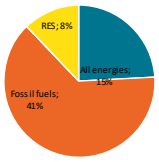

Financial support by sub-types (billion euros)



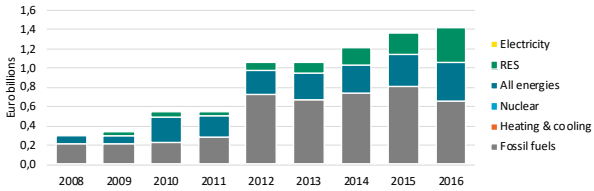

## Support by energy/technology

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| All energies | 6 | *15%* | 0,09 | 0,09 | 0,26 | 0,23 | 0,25 | 0,27 | 0,30 | 0,33 | 0,39 | 2,21 | +344% | +20% |
| Fossil fuels | 16 | *41%* | 0,21 | 0,21 | 0,23 | 0,28 | 0,72 | 0,68 | 0,74 | 0,81 | 0,66 | 4,54 | +207% | +15% |
| Heating & cooling | | | | | | | | | | | | | | |
| Nuclear | | | | | | | | | | | | | | |
| Electricity | | | | | | | | | | | | | | |
| RES | 3 | *8%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| **Total** | **25** | ***64%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by energy/technology



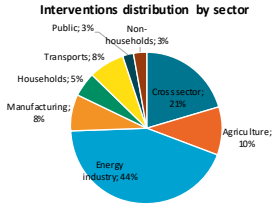

Financial support by energy/technology (billion euros)



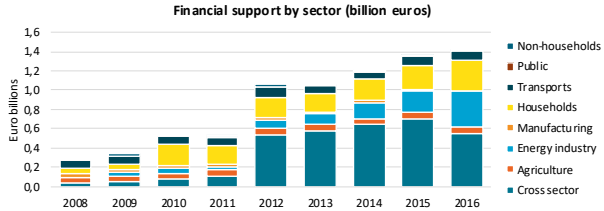

## Support by sector

| | Number of interventions | Distribution | Financial support (billion euros) 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total 2008/16 | 2008/16 (%) | 2008/16 CAGR (%/y) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cross sector | 8 | *21%* | 0,03 | 0,05 | 0,07 | 0,11 | 0,54 | 0,58 | 0,64 | 0,70 | 0,55 | 3,28 | +1584% | +42% |
| Agriculture | 4 | *10%* | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,55 | +4% | +0% |
| Energy industry | 17 | *44%* | | 0,04 | 0,06 | 0,03 | 0,08 | 0,12 | 0,17 | 0,23 | 0,37 | 1,11 | | |
| Manufacturing | 3 | *8%* | 0,05 | 0,03 | 0,02 | 0,03 | 0,03 | 0,01 | 0,02 | 0,01 | 0,01 | 0,21 | -81% | -19% |
| Households | 2 | *5%* | 0,05 | 0,05 | 0,22 | 0,19 | 0,21 | 0,19 | 0,22 | 0,25 | 0,32 | 1,72 | +503% | +25% |
| Transports | 3 | *8%* | 0,08 | 0,08 | 0,09 | 0,09 | 0,10 | 0,09 | 0,08 | 0,09 | 0,09 | 0,79 | +14% | +2% |
| Public | 1 | *3%* | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,01 | 0,00 | 0,01 | 0,01 | 0,06 | -38% | -6% |
| Non-households | 1 | *3%* | 0,02 | 0,02 | 0,02 | 0,02 | 0,02 | 0,01 | 0,01 | 0,01 | 0,01 | 0,15 | -35% | -5% |
| **Total** | **39** | ***100%*** | **0,30** | **0,34** | **0,55** | **0,54** | **1,06** | **1,06** | **1,21** | **1,37** | **1,42** | **7,87** | **+369%** | **+21%** |

Interventions distribution by sector




Financial support by sector (billion euros)



# Annex L: T4 - Results from the econometric analysis

## Impact of renewables on wholesale electricity prices

$$Wholesale\_Price_t = \beta_0 + \beta_1 RES\_Share_t + \ + \beta_2 RES\_Share_t + \ \beta_3 Electricity\ Demand_t + \ Other\_Factors_t + \ \varepsilon_t$$

$t=1,2,\ldots.,T$

*Where,*

- *Wholesale_Price = the wholesale price of electricity (€/MWh)*
- *RES_Share = the share of intermittent renewables in total installed capacity (%)*
- *Nuc_Share= the share of nuclear in total installed capacity (%)*
- *Electricity Demand = electricity demand (MWh)*
- *Other_Factors = other control variables, including heating degree days and cooling degree days*

**Table H.0-1 Regression results showing the estimated impact of renewables on the wholesale electricity price**

| | Estimated coefficient | Z statistic |
|---|---|---|
| Renewable share | -0.55** | -19.65 |
| Nuclear Share | -0.32** | -7.38 |
| Electricity Demand | 0.00** | 3.00 |
| Heating Degree Days | 0.01** | 3.62 |
| Cooling Degree Days | 0.03* | 2.03 |
| Imports | 0.00* | 2.29 |

*indicates significant at 5% level; ** indicates significant at 1% level

*Source:* Own calculations

## Impact of loans and grants on fuel demand

$$Fuel\ Demand_{it} = \beta_0 + \beta_1 Price\ of\ fuel_{it} + \ \beta_2 Economic\ activity_{it} + \ \beta_3 Support\ for\ energy\ demand_{it} + \ \beta_4 Support\ for\ energy\ savings_{it} + \ \beta_5 Support\ for\ energy\ investment_{it} + \ Other\_Factors_{it} + \ \varepsilon_{it}$$

$t=1,2,\ldots.,T$ *(years)*
$i=1,2,\ldots.,N$ *(countries)*

*Where,*

- *Fuel demand = total gas or electricity demand by households or industry (GWh)*
- *Price of fuel= index of average retail prices of gas or electricity for households or industry*
- *Economic activity = Gross output (for industry equations); real income (for household equations)*
- *Support for energy demand= value of cumulative energy demand loans and grants since 2008 (€millions)*
- *Support for energy savings= value of cumulative energy savings loans and grants since 2008 (€millions)*
- *Support for energy investment= value of cumulative energy investment loans and grants since 2008 (€millions)*
- *Other_Factors = other exogenous variables, such temperature indicators*

**Table H-0-2 Fixed effects regression results showing the estimated impact of household and commercial grants and loans on electricity demand**

| | Estimated coefficient | Standard error | P value |
|---|---|---|---|
| Support for investment | 26.06 | 18.00 | 0.149 |
| Support for energy demand | 17.67 | 12.45 | 0.157 |
| Support for energy savings | -5.42 | 1.34 | 0.000 |
| Fuel Price | -0.04 | 1.15 | 0.969 |
| Activity indicator | -0.01 | 0.00 | 0.148 |
| Heating Degree Days | 3.23 | 0.87 | 0.000 |
| Cooling Degree Days | 7.13 | 5.49 | 0.196 |
| constant | 53903.84 | 4885.54 | 0.000 |

*Source:* Own calculations

**Table H-0-3 Fixed effects regression results showing the estimated impact of industry electricity grants and loans on electricity demand**

| | Estimated coefficient | Standard error | P value |
|---|---|---|---|
| Support for investment | -3.92 | 5.11 | 0.444 |
| Support for energy demand | -18.40 | 19.24 | 0.340 |
| Support for energy savings | -7.70 | 1.06 | 0.000 |
| Fuel Price | -9.07 | 1.67 | 0.000 |
| Activity indicator | 0.11 | 0.01 | 0.000 |
| constant | 27212.76 | 2022.95 | 0.000 |

*Source:* Own calculations

**Table H-0-4 Fixed effects regression results showing the estimated impact of household and commercial grants and loans on household gas demand**

| | Estimated coefficient | Standard error | P value |
|---|---|---|---|
| Support for investment | 7.04 | 50.53 | 0.889 |
| Support for energy demand | 63.14 | 10.33 | 0.000 |
| Support for energy savings | -2.14 | 13.54 | 0.875 |
| Fuel Price | -7.96 | 6.07 | 0.192 |
| Activity indicator | -0.04 | 0.01 | 0.001 |
| Heating Degree Days | 13.68 | 2.44 | 0.000 |
| Cooling Degree Days | 6.56 | 15.30 | 0.669 |
| constant | 59316.33 | 14366.09 | 0.000 |

*Source:* Own calculations

**Table H -0-5 Fixed effects regression results showing the estimated impact of industry electricity grants and loans on industry gas demand**

| | Estimated coefficient | Standard error | P value |
|---|---|---|---|
| Support for investment | -30.19 | 11.79 | 0.011 |
| Support for energy demand | -16.40 | 2.60 | - |
| Support for energy savings | 2.67 | 4.60 | 0.000 |
| Fuel Price | 0.11 | 0.01 | 0.563 |
| Activity indicator | 15132.70 | 2729.51 | 0.000 |
| constant | -30.19 | 11.79 | 0.000 |

*Source:* Own calculations

# Annex M: T4 - Financial supports to the nuclear industry

Financial support measure to nuclear industry have been collected by MS experts and then gathered into the database. For consistency reasons, R&D supports have been taken from the dedicated IEA/OECD database[640].

## Financial supports for nuclear R&D

Nuclear industry is directly supported at both European and national levels through subsidies of nuclear R&D Programmes.

At the EU level, the Framework Programme 7 (FP7) running from 2007 to 2013 allocated more than €2.3 billion to nuclear research activities over this period[641]. The EU currently plans to spend €1.6 billion for the nuclear research program Euratom under the Horizon 2020 program over 2014- 2018[642]. Table 1 provides details about the amounts invested in R&D at the national level.

**Table 0-1: Nuclear R&D financial supports (million euros, 2017 prices) (Source IEA)**

| MS | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|
| **Austria** | 4.5 | 3.0 | 3.1 | 2.6 | 2.5 | 2.5 | 1.5 | 1.3 | 1.5 |
| **Belgium** | 0.0 | 0.0 | 56.1 | 69.7 | 81.5 | 103.6 | 67.0 | 76.4 | 88.2 |
| **Czech Rep.** | 13.2 | 12.8 | 12.4 | 14.9 | 18.6 | 20.7 | 20.1 | 18.4 | 6.2 |
| **Denmark** | 0.0 | 0.0 | 2.9 | 1.3 | 5.3 | 2.6 | 2.6 | 2.6 | 2.7 |
| **Estonia** | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 |
| **Finland** | 11.2 | 13.9 | 15.6 | 19.2 | 15.5 | 15.0 | 15.1 | 21.6 | 14.8 |
| **France** | 477 | 456 | 419 | 474 | 543 | 514 | 482 | 455 | 407 |
| **Germany** | 157 | 213 | 203 | 221 | 208 | 217 | 215 | 222 | 211 |
| **Hungary** | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.1 | 0.0 | 0.1 | 0.7 |
| **Ireland** | 0.6 | 0.7 | 0.0 | 0.4 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 |
| **Italy** | 75.0 | 85.0 | 81.1 | 76.1 | 95.3 | 96.5 | 78.4 | 0.0 | 0.0 |
| **Netherlands** | 16.8 | 12.4 | 17.9 | 13.6 | 10.4 | 8.1 | 8.1 | 7.1 | 6.3 |
| **Poland** | 1.2 | 2.4 | 4.7 | 5.5 | 6.6 | 6.3 | 3.2 | 1.1 | 0.3 |
| **Portugal** | 1.0 | 2.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Slovakia** | 5.5 | 5.6 | 5.6 | 4.9 | 6.0 | 3.6 | 2.2 | 0.3 | 0.9 |
| **Spain** | 24.2 | 26.8 | 0.0 | 1.0 | 25.3 | 22.0 | 1.9 | 2.6 | 9.6 |
| **Sweden** | 6.1 | 7.1 | 6.8 | 3.6 | 3.4 | 2.8 | 2.8 | 0.6 | 1.2 |
| **UK** | 48 | 39 | 82 | 51 | 77 | 68 | 68 | 171 | 150 |
| **EU28** | 0 | 0 | 0 | 0 | 0 | 0 | 132 | 128 | 143 |
| **Total** | **842** | **880** | **910** | **960** | **1 099** | **1 083** | **1 101** | **1 108** | **1 044** |

*Source:* IEA

[640] IEA Energy Technology RD&D Budget Database, http://www.iea.org/statistics/rdd/
[641] CE, 2015, Ex-post Evaluation of indirect actions of the Euratom FP7 and Euratom 2012-2013 FP, https://ec.europa.eu/research/evaluations/pdf/archive/fp7-ex-post_evaluation/ki0115936enn.pdf#view=fit&pagemode=none.
[642] EC, 2017, Interim evaluation of the Euratom Research and Training Programme 2014-2018, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52017SC0427

## Non-R&D financial support measures to nuclear industry

Table 0-2 provides details about non-R&D measures that have been reported by MS experts.

**Table 0-2: Non-R&D financial support measures for nuclear industry (million euros, 2017 prices)**

| MS | Name of policy | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|
| CZ | Management of all the radioactive waste repositories | 4.0 | 3.9 | 4.7 | 4.5 | 4.3 | 5.3 | 6.3 | 9.6 | 12.1 |
| HU | Support to NPP decommissioning and waste disposal | 84.4 | 82.2 | 82.1 | 81.3 | 66.8 | 110.4 | 100.2 | 86.7 | 80.8 |
| IT | Nuclear decommissioning incentive | 264.9 | 277.7 | 410.0 | 255.0 | 151.0 | 170.0 | 323.0 | 622.0 | 563.0 |
| LT | Ignalina NPP decommissioning | 55.5 | 23.7 | 8.5 | 1.9 | 48.7 | 53.3 | 95.9 | 103.4 | 107.7 |
| SK | EU nuclear decommissioning assistance programme | 60.4 | 60.4 | 60.4 | 60.4 | 60.4 | 60.4 | 30.3 | 30.9 | 32.8 |
| | Payment to the nuclear fund from electricity tariffs | 0.0 | 0.0 | 0.0 | 51.4 | 70.7 | 58.4 | 70.2 | 67.3 | 65.2 |
| | Subsidy to the national nuclear fund | 0.1 | 0.2 | 0.1 | 0.1 | 0.3 | 0.3 | 0.2 | 0.1 | 0.3 |
| SI | Financial fund for decommissioning of the Krško NPP | 9.0 | 8.2 | 8.0 | 8.9 | 7.9 | 7.6 | 9.1 | 8.1 | 8.1 |
| UK | Nuclear Decommissioning Authority[643] | 1,184 | 1,365 | 1,385 | 1,389 | 1,934 | 1,981 | 2,143 | 2,443 | 2,235 |
| **Total Decommissioning and waste disposal** | | **1,663** | **1,821** | **1,959** | **1,852** | **2,344** | **2,447** | **2,778** | **3,372** | **3,105** |
| SE | Compensation for the closure of Barsebäck NPP | 25.2 | 19.6 | 19.5 | 20.7 | 21.7 | 21.3 | 20.1 | 15.0 | 10.5 |
| **Total Stranded assets** | | **25.2** | **19.6** | **19.5** | **20.7** | **21.7** | **21.3** | **20.1** | **15.0** | **10.5** |
| FR | Expenditure financed by public funds for Nuclear R&D, safety and security purposes | 64.0 | 64.0 | 64.0 | 64.0 | 64.0 | 153.0 | 153.0 | 153.0 | 153.0 |
| RO | Corporate tax exemption to finance investment in Cernavoda NPP2 | 0.0 | 4.1 | 1.9 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SE | Support for nuclear safety | 6.4 | 6.5 | 7.9 | 6.4 | 7.5 | 7.4 | 5.3 | 0.7 | 11.1 |
| **Total Others** | | **70.4** | **74.6** | **73.8** | **71.0** | **71.5** | **160.4** | **158.3** | **153.7** | **164.1** |
| **Total** | | **1,758** | **1,916** | **2,052** | **1,944** | **2,438** | **2,628** | **2,957** | **3,540** | **3,279** |

*Source*: own calculations

[643] Amounts inventoried for the United Kingdom are those linked to civil nuclear industry only, i.e. amounts related to military purpose have been excluded from the inventory.

## Nuclear funds for waste management and plant decommissioning

Within the EU, there are currently 129 operational nuclear reactors with an average age of 30 years and 89 units which were shut down. In the long-term, the decommissioning of these reactors as well as the management of nuclear wastes will require substantial financing: in its 2016 Nuclear Illustrative Programme (PINC), the EC estimates that, by 2050, about €123 billion will be necessary for nuclear decommissioning and €130 billion for managing radioactive waste and spent fuel[644]. This is nearly 50% higher than the costs estimated in the previous PINC in 2008. More generally, the estimated costs of decommissioning a single-unit nuclear power plant in Europe range between €0.5 and 1.6 billion (NEA, 2016)[645].

The following table summarises the different origins of the nuclear decommissioning funds in Europe. According to our data collection, we can distinguish 3 types of financing:

- **companies (operators/owners):** operating entities or owners are often required to build up reserves in their balance sheets to cover decommissioning and waste management costs;
- **public funds:** funding comes either from the EU level or from national States and can be internal or external from the state budget;
- **energy prices:** costs are paid by final customers through levies on energy prices.

At the **European level**, dedicated funds have been set through the implementation of nuclear decommissioning assistance programmes (NDAP) to specifically support Bulgaria, Lithuania, and Slovakia to close and dismantle their early Soviet-designed reactors as required to access to the European Union. The programmes are based on a co-financing principle, i.e. EU funds complement national contributions. In total, these three countries should therefore benefit from an estimated €3.8 billion from the EU budget over 1999-2020[646], and from €4.8 billion over 2020-2027[647]. Currently, the EC estimates that about €1.6 billion have already been spent[648].

In most of the Member States, operators are required to set fund to cover future decommissioning costs either with reserves in their balance sheets, or by contributing to a fund managed by an external entity. There are two main exceptions; in Italy, funds for decommissioning costs arise from a levy on the sales of electricity held by the Italian Regulatory Authority for Electricity and Gas. In the United Kingdom, decommissioning costs of old nuclear plants under the supervision of the Nuclear Decommissioning Authority (NDA) are covered by government funds. Decommissioning costs for the newer reactors are covered by the Nuclear Liabilities Fund (NLF), which is based on contributions from nuclear power plant operators.

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[644] CE, COM(2016) 177 final - Communication from the Commission, Nuclear Illustrative Programme, presented under Article 40 of the Euratom Treaty for the opinion of the European Economic and Social Committee, http://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-177-EN-F1-1.PDF

[645] NEA, 2016, Financing the Decommissioning of Nuclear facilities, https://www.oecd-nea.org/rwm/pubs/2016/7326-fin-decom-nf.pdf

[646] European Parliamentary Research Service Blog, https://epthinktank.eu/2017/04/20/how-the-eu-budget-is-spent-nuclear-decommissioning-assistance/

[647] http://enrsi.rtvs.sk/articles/news/167082/55-million-euros-for-nuclear-plant

[648] EC, COM(2018) 468 final, Report from the Commission to the European Parliament and the Council on the evaluation and implementation of the EU nuclear decommissioning assistance programmes in Bulgaria, Slovakia and Lithuania, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0468&from=EN

Table 3 provides a detailed description of the funding sources for decommissioning and waste disposal in different Member States. In line with the 2011/70/EURATOM Spent Fuel and Radioactive Waste Directive, waste disposal and decommissioning costs have to be paid by entities they arise from ("polluter pays principle"), i.e. nuclear operators. The corresponding amounts are either put aside internally by nuclear plant operators or paid on a public fund managed by the States or a state-owned entity.

However, it is sometimes not clear how some Member States have transposed the Euratom Directive into their national programmes. This is for example the case for Austria, Croatia and Italy[649].

**"The polluter pays principle"**

This principle is enshrined in Euratom Secondary Legislation - notably in the Radioactive Waste Directive[650] - which requires Member States to set up national financing schemes taking into account that the costs for the management of spent fuel and radioactive waste shall be borne by those who generated those materials:

*"The ultimate responsibility of Member States for the safety of spent fuel and radioactive waste management is a fundamental principle reaffirmed by the Joint Convention. That principle of national responsibility, as well as the principle of prime responsibility of the licence holder for the safety of spent fuel and radioactive waste management under the supervision of its competent regulatory authority, should be enhanced and the role and independence of the competent regulatory authority should be reinforced by this Directive."*

*"Member States should establish national programmes to ensure the transposition of political decisions into clear provisions for the timely implementation of all steps of spent fuel and radioactive waste management from generation to disposal."*

**Current infringement for Austria, Croatia and Italy**

At the time of writing, three countries have been referred by the EC in May 2018[9] for failure to notify their final national programmes for the management of the spent fuel and radioactive waste. By the time being, the three Member States had only notified draft versions of their programmes. The current existing funding schemes for waste disposal and decommissioning are described in the Table below.

[649] These three countries have been referred by the EC in May 2018 for failure to notify their final national programmes for the management of the spent fuel and radioactive waste.
[650] Council Directive 2011/70/EURATOM, available under: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0070&from=FR

**Table 0-3: Origin of the financing of nuclear decommissioning/waste management funds.**

| Countries | Funding sources | Comments |
|---|---|---|
| Austria | Companies through National public fund and National funds | As a nuclear-free country, Austria has only three research reactors, two of them being already shut down. The Vienna University of Technology has to provide the financial provisions for the future decommissioning of its reactor; however, the reactor being state-owned, final decommissioning costs will be carried by the State.<br><br>Since 2003, the contributions of waste producers go into a special separated fund which is administered by national authorities and is not part of the state budget. This fund is exclusively dedicated for financing the future final waste disposal in an appropriate repository. |
| Belgium | Companies | There are dedicated segregated funds for decommissioning and spent fuel: provisions are made on a fund managed by SYNATOM (100% daughter company of Electrabel-ENGIE) and are based on quarterly payments by the power plants owners (Engie Electrabel and EDF Luminous) pro rata of their ownership share. |
| Bulgaria | Final consumer and EU funds | The "Radioactive Waste Fund" and the "Nuclear Installations Decommissioning Fund" are the two nuclear funds under the "Safe Use of Nuclear Energy Act" adopted in 2002. The funds are independent from the nuclear industry and managed by the government. The main contribution to the two funds comes from an electricity price levy specified by the Bulgarian Council of Ministers. The Kozloduy nuclear plant pays 3% of the price of its power into the waste management fund and a further 7.5% into the decommissioning fund.<br>The European Union provided more than 95% of the contributions to the International Kozloduy Decommissioning Support Fund (KIDSF) to finance decommissioning activities of Kozloduy 1-4 as well as support energy projects in the country. |
| Croatia | Companies through National public fund | The Fund for Financing Decommissioning and Management of Radioactive Waste and Spent Nuclear Fuel of the Krško NPP (jointly owned with Slovenia) was established in 2007. Contributions to the Fund should be paid every three months until the Krško NPP has ceased operation. |
| Czech Republic | Companies through National public fund | Radioactive Waste Repository Authority (RWRA) is funded through levies imposed on the producers of radioactive waste (CEZ and UJV Rez). The Ministry of Industry and Trade provides funds available to RWRA through the so-called Nuclear Account, which is included among the accounts of State financial assets and liabilities; the amounts on the Nuclear Account are paid by contributions from radioactive waste generators. Regarding decommissioning, under the Atomic Energy Act 2002, CEZ as nuclear plant operator is required to put aside funds for waste disposal, lodging these with the Czech National Bank. The rate is CZK 0.05 / kWh (€0.002/kWh). Nuclear plant operators with decommissioning cost estimates exceeding 300.000 CZK are compelled to make annual payments kept on a blocked account. The management of blocked accounts stands by the operator, these funds may however only be used for decommissioning, and any drawing must be approved by RAWRA. |

| Countries | Funding sources | Comments |
|---|---|---|
| Finland | Companies through National public fund | At the end of 2017, almost € 3 billion had been accumulated in the Finnish State Nuclear Waste Management Fund VYR from the utilities, which account for about 10% of nuclear electricity production costs. The charges are set annually by the government according to the assessed liabilities for each company, and also cover decommissioning. |
| France | Companies | France does not have a dedicated funding agency. There are dedicated segregated funds for decommissioning by the operator, (EDF, CEA). EDF puts aside a provision which amount is related to the total estimated cost, the actualisation cost and the expected lifetime of the nuclear plants for decommissioning and waste disposal. Provisions for dismantling and decontamination have to be fully collected already with the start of operations since the new legislation of June 2006.<br><br>The operator, EDF, is responsible for any underperformance of its fund and is therefore required to implement corrective measures under the supervision of the administrative authority. |
| Germany | Companies and National public fund | Up until 2017, the four operators of nuclear reactors in Germany (E.ON, EnBW, RWE, Vattenfall) managed their own decommissioning reserves. Decommissioning for state-owned nuclear plants are however paid by the State.<br>The total amount of operator reserves was estimated to be EUR 38.3bn. After the deduction of the shares paid into the waste disposal fund, this amount decreased to EUR 14.74bn available for reactor decommissioning and packaging of nuclear waste. With the accelerated shut down of nuclear plants, a part of the income for funding decommissioning and waste disposal has however stopped. To cope with this issue, the German parliament voted a law in December 2016 to transfer radioactive waste management liabilities from nuclear power plant operators to a public fund managed by the German State -thus advocating state aid-. In exchange, nuclear power operators had to make a cash payment to the new fund of about €24.1 billion (roughly corresponding to the provisions already set aside. This transfer was approved by the EC (State Aid SA.45296 (2017/N) )[651]. |

[651] State Aid available under : http://ec.europa.eu/competition/state_aid/cases/269593/269593_1912030_141_2.pdf

| Countries | Funding sources | Comments |
|---|---|---|
| Hungary | Companies through National public fund | Since 1998, a levy on nuclear power production is paid into the Central Nuclear Financial Fund to pay for storage and disposal of radioactive wastes, including used fuel, and decommissioning. At the end of 2017 this fund totalled HUF 283.5 billion.<br>The operation of the Fund is ensured from the following sources:<br>• Payments of the Paks Nuclear Power Plant<br>• Payments for the disposal of radioactive waste from annual budget of the relevant institution by the central budget |
| Italy | Companies, National Fund and Final Consumer | Until 1999, decommissioning funds were accumulated internally by the nuclear plant operator ENEL. In 1999, the state-owned company SOGIN was created; the company is in charge of setting up decommissioning programmes. Since 2000, decommissioning is funded by a levy on electricity sales which is set annually by the National Authority for the Electricity and Gas according to SOGIN's programmes; this levy is allocated by the distribution companies, and transferred twice a month to the national fund 'Cassa per i Servizi Elettrici e Ambientali' (CSEA) |
| Lithuania | EU funds and Companies through National public fund | Most of the funding for decommissioning of Lithuanian NPP come from the EU through the Ignalina International Decommissioning Support Fund (IIDSF) to which the European Union is the largest contributor (~95%). In addition, a National Fund called SE Ignalina NPP National Decommissioning Fund created in 1995 provides further funds. Payments made to the National Fund by the Ignalina NPP come in deduction from sold electricity revenue. These deduced amounts shall be annually approved by the Government. |
| Norway | Companies and National public funds | Norway has no nuclear plants but has built four research reactors. Two of them, which were state-owned, have already been decommissioned, the corresponding decommissioning costs were supported by the State. The two remaining reactors belong to the Institute for Energy Technology (IFE); the issue of decommissioning and waste disposal funding has been discussed by IFE and the State but without any clear legal framework. The Government announced that a separate Government agency will be established in 2018 to manage the processes related to decommissioning of nuclear installations and safe nuclear waste management. |
| Romania | Companies through National public fund | The Nuclear Agency and Radioactive Waste ("NADR") is responsible with collecting the contributions paid by SNN for the remaining useful life of Units 1 and 2 and assumed the responsibility for the management of the entire decommissioning process at the end of useful lives of the units, and also for the final disposal of the resulting waste.<br>SNN annually paid the following contributions towards NADR:<br>• Contributions for decommissioning of each nuclear reactor in amount of EUR0.6/MWh of net electricity produced;<br>Contributions for permanent disposal of the radioactive waste in amount of EUR1.4/MWh of net electricity produced.<br>Nuclearelectrica doesn't get subsidies from the state authorities.<br>The National Uranium Company received subsidies from 2008 to 2011. Since 2012, it has not received any subsidy. |

| Countries | Funding sources | Comments |
|---|---|---|
| Slovakia | Final consumer, EU funds, National public fund and Companies | The Fund "National Nuclear Fund" (NNF) for decommissioning of nuclear facilities and for management of spent fuel and radioactive waste is managed by the Ministry of Economy and financed from:<br>• Contributions from the holders of the operating license for nuclear installations producing electricity.<br>• Transfer from the budget account of the Ministry of Economy of the Slovak Republic as a levy collected by the transmission system operator and the regional distribution system operators from final customers. This nuclear levy was approved in 2013 by the EC under EU State aid rules (SA.31860)[652]<br>• Subsidies and contributions from the EU funds and other international financial institutions<br>• Government subsidies intended to cover the costs incurred for the handling of nuclear material or radioactive waste whose source is unknown, and state subsidies for other reasons (historical deficit, …)<br>• Proceeds from financial operations. |
| Slovenia | Companies through National public Fund | The funds of the Krško NPP Fund created in 1995 shall be provided from the levy for every kWh of the Slovenian share of electricity produced and sold in Slovenia by the Krško NPP.<br>Based on Decommissioning Program of Krško NPP and the disposal of low and intermediate level radioactive waste and spent nuclear fuel, the amount of the levy contribution paid to the Slovenian Fund is regularly paid by GEN energija d.o.o. The amount of levy is EUR3/MWh of electricity produced in NPP Krško and sold in Slovenia; and is monthly paid to the Fund.<br>The total obligations and the payment of Krško NEK and GEN energy in NPP Fund for the period 1995-2014 is EUR 185.59 million. |

[652] State Aid available under : http://ec.europa.eu/competition/state_aid/cases/238200/238200_1431108_203_3.pdf

| Countries | Funding sources | Comments |
|---|---|---|
| Spain | Companies through National public Fund | The "Fund for the financing of activities included in the General Radioactive Waste Plan" (PGRR) is managed by the state-owned company Empresa Nacional de Residuos Radiactivos SA (ENRESA). The fund is fed by several mechanisms:<br>• To be paid by the operators of the nuclear power plants by way of a fee calculated as a percentage on the electricity sale price and the tolls for access to the electricity grid<br>• To be paid by the operators of the nuclear power plants by way of a fee calculated on the basis of gross nuclear electricity generation by each of the plants.<br>• To be paid by fuel assembly manufacturing for the rendering of services for the management of waste deriving from the manufacturing of fuel assemblies at these facilities.<br>• To be paid by other facilities not included in the previous cases for services for the management of waste generated by them by means of a fee calculated on the basis of the quantity or units of waste delivered for management and depending on the nature of the waste.<br>The fund was initially expected to be financed via charges to the electric tariff , from inputs from the nuclear power plants in operation and from nuclear fuel industry in Juzbado (Law 54/1997 6th additional disposition). In 2012, two new taxes are introduced (Law 15/2012) to finance this plan. In addition, the fund includes also the profitability of its investments. |
| Sweden | Companies through National public Fund | The nuclear power companies pay a surcharge of SEK 0.05 for every kilowatt hour produced to a Government fund, the Nuclear Waste Fund. This money is used to deal with spent nuclear fuel and to pay for decommissioning the Swedish nuclear power plants. |
| Switzerland | Companies through National public Funds | Two separate funds for decommissioning and for waste disposal have been established and are managed by the Administrative Commission of the Decommissioning Waste Disposal Fund (STENFO). Nuclear plant operators pay annual contributions into the two funds; their contributions are based on estimated costs reviewed every five years. The latest cost estimates (2016) for decommissioning and waste disposal amount to about CHF 23.5 Mrd. |

| Countries | Funding sources | Comments |
|---|---|---|
| The Netherlands | Companies | In principle, the operator is responsible for all aspects of decommissioning. According to legislation in force since April 2011, a nuclear facility shall be decommissioned directly after final shutdown and deferred dismantling will not be allowed. During the operational phase, the licence holder is required to develop a decommissioning plan describing all the necessary measures to safely reach the end state of decommissioning, including the management of radioactive waste, record keeping, etc. The decommissioning plan serves as the safety basis for all the activities carried during the decommissioning phase, and it provides the basis for the financial provisions for the decommissioning costs. The Nuclear Power Act requires the licence holder to have a financial provision to cover the costs of decommissioning, which will have to be updated and approved by the authorities. The licence holder is in principle free to choose the form of the financial provision. Upon approval, the authorities will assess whether the financial provision offers sufficient security that the decommissioning costs are covered at the moment of decommissioning.<br><br>Regarding waste management, the price paid by waste generators to the Central Organisation for Radioactive Waste (COVRA), a state-owned company, includes the estimated cost for disposal. |
| United Kingdom | National public funds and Companies | The Nuclear Decommissioning Authority (NDA) is a non-departmental public body created through the Energy Act 2004. Amongst other things, it is responsible for decommissioning and cleaning up 17 historical nuclear facilities, and ensuring that all waste products, both radioactive and non-radioactive, are safely managed. The Department for Business, Energy and Industrial Strategy and HM Treasury set its annual operational budget, which is a combination of Government funding and income from its commercial assets. In addition, the decommissioning of second generation nuclear power plants based on Advanced Gas-Cooled Reactor are funded by their operator (EDF Energy). Decommissioning funds for these entities will be gathered via the Nuclear Liabilities Fund, which was created in 1996. The operator makes quarterly payments to the Fund, and a review is undertaken every 10 years (next in 2025). The fund currently gathers approximately £ 9 billion (€ 10.5 billion). |

*Source:* own research