

# Germany

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## Key issues

High volumes of renewables have changed the way the electricity market in Germany operates. In 2012 direct marketing increased, in particular in onshore wind, due to a change of the Renewable Energy Sources Act (EEG). A major review of the EEG is now underway and a revised law entered into force on 1 August 2014. It is expected to have strong impact on the future costs, expansion and market integration of renewables in Germany. It is of central importance that the revised law ensures that as of certain thresholds all new beneficiaries of the RES support scheme will have to sell their electricity directly in the market and will be subject to balancing obligations.

In general, the coordination of the energy policy with neighbouring countries should further improve, also in order to keep the overall costs of transforming the energy system to a minimum, in particular by reviewing the cost-effectiveness of energy policy instruments designed to achieve the renewable energy targets and by continuing efforts to accelerate the expansion of the national and cross-border electricity and gas networks. Recent efforts of the German administration to coordinate reflections on future policy developments with neighbouring countries are very welcome.

Network development is slower than planned. Further efforts on both intra-German infrastructure and cross-border interconnections are needed to better synchronise intermittent renewables expansion with grid development and avoid congestion and unscheduled flows towards the networks of neighbouring countries.

## 1. General overview

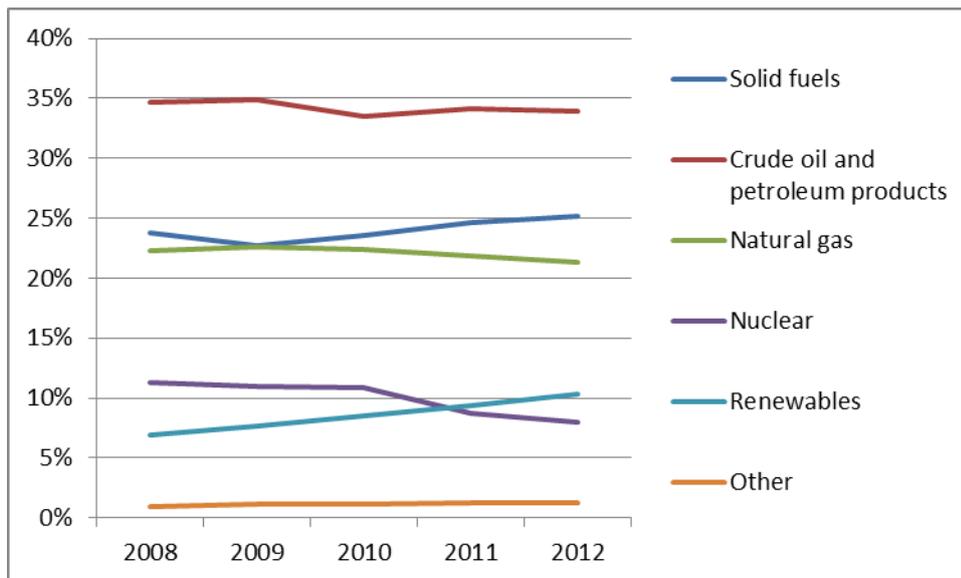
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Gross energy consumption in 2012 (319.5 Mtoe) was based largely on crude oil and petroleum products (33.9%), solid fuels (25.2%), and natural gas (21.3%). The share of renewable energy sources (RES) in overall energy consumption (10.3%) has constantly increased over the last years and surpassed the share of nuclear energy in 2011 which decreased over the same period to 8.0%.<sup>216</sup>

*Figure 1: Gross inland consumption mix 2008 – 2012 (source: Eurostat)*

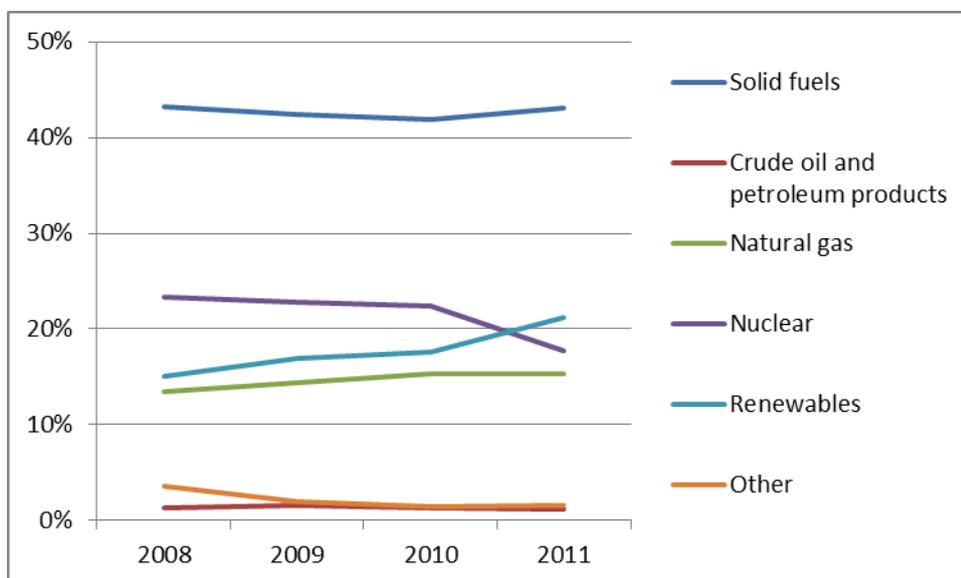
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<sup>216</sup> Eurostat.



The gross electricity generation in 2011 was 608.9 TWh. The biggest share in the generation mix came from solid fuels (43.1%). RES became the second most important production technology (21.2%) followed by nuclear (17.7%) and natural gas (15.3%).<sup>217</sup> In 2011 the German Parliament decided to phase-out nuclear power generation by 2022. Eight of the 17 nuclear power generation units have already been shut down, while the remaining power stations will close by 2022 in a defined order from 2015 onwards.

Figure 2: Gross electricity generation 2008 – 2011 (source: EU Energy in Figures – Pocketbook 2012 and 2013)



The German RES target under the Renewable Energy Directive 2009/28/EC, defined as the percentage of energy from renewable sources in total gross final consumption of energy, stands at

<sup>217</sup> Eurostat.

18% by 2020 which is 5.7 percentage points above the level of 2012. The National Renewable Energy Action Plan expects a share of 19.6% by 2020.

## **2. Regulatory framework**

### **General**

The German energy law was amended following the nuclear moratorium in 2011 and the associated substantial changes of location of generation. Power plants must now announce their shutdown one year in advance and electricity TSOs can intervene to this shutdown in case there is a technical necessity of the particular plant in terms of network stability. TSOs are now obliged to analyse reliable available generation capacity, its development with a view to the next winter period as well as the five following years, and the potentially necessary reserve capacity.

The support schemes for renewable energies (notably solar PV, onshore and offshore wind) have been reviewed by recent legislation. One major element of the amended EEG is the gradual introduction of an obligation for all new RES producers covered by the support scheme to sell their electricity directly on the market. From 1 August 2014, this applies as of 500 kW generation capacity, which will be lowered to 100 kW on 1 January 2016. Further, the new legislation foresees planning corridors for the development of different technologies for renewable generation capacities. A further important element is the gradual introduction until 2017 of competitive tenders for renewable support, a part of which will also be open for operators established in other EU Member States.

On 18 December 2013 the Commission adopted an opening decision on the EEG to examine whether the German RES support scheme and in particular the surcharge reduction granted to energy-intensive industries is compatible with EU state aid rules. On 23 July 2014 the Commission declared the aid to be compatible, taking into account the recent amendments.

### **National Energy Regulator**

The German Federal Network Agency for Electricity, Gas Telecommunications, Posts and Railways (Bundesnetzagentur) was set up in 1998. Bundesnetzagentur is a separate higher federal authority within the Federal Ministry of Economics and Energy. In 2012 BNetzA employed 2,324 employees (FTEs) and had a budget of EUR 181.2 million (ca. EUR 24 million thereof for energy regulation). Since 2011, the BNetzA has taken on additional duties relating to network development so as to accelerate the expansion of the extra-high voltage electricity networks, via efficient planning and approval procedures.

### **Unbundling**

There are four onshore electricity transmission system operators (TSO) and 15 gas TSOs which have filed certification requests. Three of the four onshore electricity TSOs have received the certification while one application was rejected for the time being, due to insufficient financial resources, against the opinion of the Commission. For an offshore electricity TSO (the Baltic Cable), BNetzA opened *ex officio* certification procedures and, in accordance with the Commission Opinion, refused certification as no information had been provided by the TSO.

Local networks are largely still integrated on the basis of an exemption from the statutory provisions on legal and operational separation of network and retail businesses that applies to distribution system operators (DSO) with less than 100,000 connected customers. About 90% of the electricity and 95% of the gas DSOs fall under this “*de minimis rule*”.

### 3. Wholesale markets

#### Electricity

In the generation market (electricity not eligible for payments under the Renewable Energy Sources Act) the four main power generation companies (E.ON, RWE, EnBW and Vattenfall) had a market share of 76% of installed capacity (81.4 GW) in 2012. The aggregated net generation volume of the four biggest companies (332.8 TWh) in relation to the net generation volume (426.2 TWh) that was fed into the grids of public supply resulted in a market share of 78%. In this calculation only generation capacities were taken into account that fed into the grids of public supply and that were not remunerated according to the Renewable Energy Sources Act.<sup>218</sup>

There are two power exchanges in Germany: EPEX SPOT for day-ahead and intraday markets and EEX for any forward products. The volume traded (245.3 TWh) at day ahead market increased by 10% in 2012. Prices decreased for peak load by 15% (EUR 48.51/MWh) and for base load by 17% (EUR 42.6/MWh) at spot markets.

Energy directly sold from renewable sources, particularly onshore wind, increased by more than 400% (51.163 GWh) in 2012 following an amendment of the EEG allowing RES operators to choose among three forms of direct marketing: Direct marketing for the purpose of claiming a market premium, direct marketing for the purpose of an electricity supplier reducing the EEG surcharge, or other direct marketing.

The number of traders active on the different markets further increased to a total of 363 (EPEX Spot 194, and EEX 169).

As of February 2014 Germany coupled its day-ahead market with other North West European markets. Germany is also part of the market coupling project for intraday market of these markets plus Austria and Switzerland. In the market-coupled area, prices started to realign in the second quarter of 2013, after significant price divergences observed in earlier periods.

#### Gas

Gas production in Germany further declined in 2012 by 9.7% to 10.7 bcm and imports increased by 8.78% to 1.535 TWh in 2012. The imported volumes primarily came from Russia (about 45%), the Netherlands (26.5%), and Norway (25.9%). Exports (667.3 TWh) increased by 29.12% and were mainly directed to Czech Republic, France, the Netherlands and Switzerland.

While the German gas market was initially fragmented into more than 20 market areas, there now remain only two market areas: Net Connect Germany (NCG) and GasPool. There is one German gas

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<sup>218</sup> BNetzA, Monitoring Report, 2013.

exchange EGEX (European Gas Exchange GmbH). Trading activities strengthened on both OTC and exchange markets, with OTC (trading volume 2012 was 2.460 TWh) remaining the preferred market. The daily average reference price over both market areas rose by almost 10% (NCG: EUR 25.19/MWh and GasPool EUR 25.11/MWh). This increase was caused partly by temporary bottlenecks in the gas supply in February 2012, when prices increased up to EUR 40/MWh. The daily average cross border price was EUR 29/MWh (+12.6%) and the gas forward price was EUR 24.66/MWh (+4.8%) at the EEX in 2012.

While the three largest importers increased their market share by 11.4 percentage points (to 67.2%), the total share of the five largest companies fell by 11.1 percentage points (to 80.3% in 2012).

Germany has suffered from contractual congestion in the past, but booking levels have recently decreased due to the cancellation of contracts. According to ACER's Annual Report on Congestion<sup>219</sup> contractual congestion remains high, mainly at Germany's border connections with the Netherlands. It therefore remains important that Germany cooperates with neighbouring countries to ensure effective implementation of congestion management regimes on its interconnection points in accordance with EU law<sup>220</sup>.

#### 4. Retail markets

##### Electricity

With an HHI of 2,021 the German electricity market is reasonably competitive even though the four largest supply companies increased their market share by 3.3 percentage points to about 45.5% (228.1 TWh).

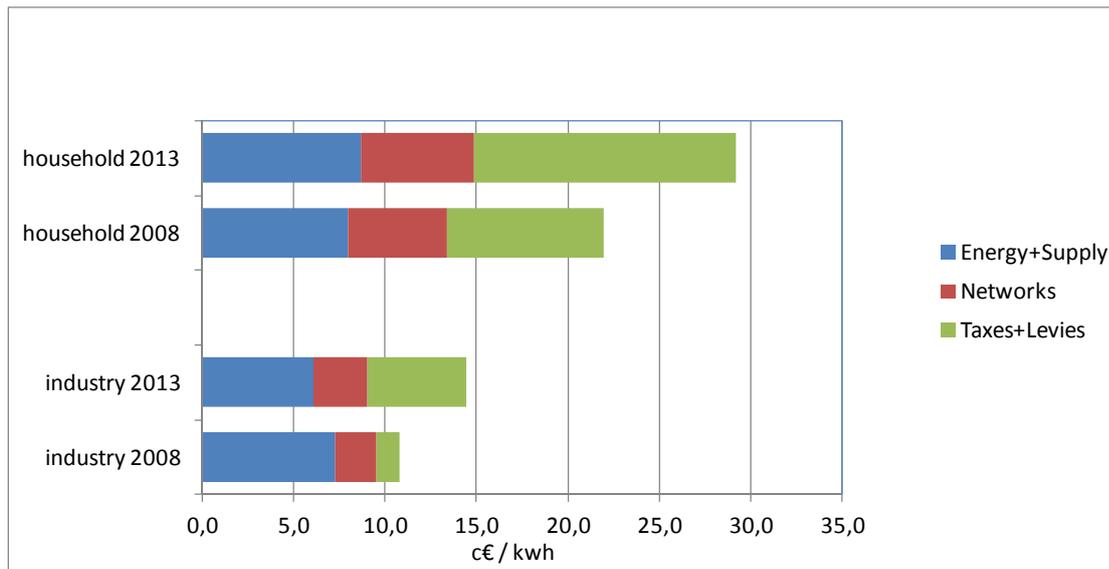
Despite a clear downward drift of wholesale prices on the spot and forward markets, the retail prices for households significantly increased on average (+12.3%) in 2013. Electricity retail prices in Germany rank among the highest in Europe. On the one hand, this can be attributed to the fact that the cost of expanding the share of renewable energy is borne by final consumers. On the other hand, the legislator put in place taxes and fees on energy consumption to incentivise rational use of energy and internalise externalities. Taxes (electricity and VAT) have been stable for a long time and add up to a share of 22.9% and total levies to around 26.1%.

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<sup>219</sup>[http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20Gas%20Contractual%20Congestion%20Report%202014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Gas%20Contractual%20Congestion%20Report%202014.pdf).

<sup>220</sup>Commission Decision 2012/490/EU of 24 August 2012 regarding congestion management guidelines on amending Annex I to Regulation (EC) No 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission networks, OJ (2012) L 231.

Figure 3: Electricity price change by component 2008 – 2013 (source: Eurostat, energy statistics)



Despite some measures taken to limit the increase of the EEG-surcharge, the financing costs amounted in total to EUR 19.4 billion in 2013.

In 2012, electricity customers were able to choose among a large number of suppliers. Household customers were able to choose between 72 suppliers on average (2011: 65). In 2012, 7.8% of household customers and 11.3% of industrial customers switched supplier in terms of consumption volumes. In the entire retail market over 2.8 million customers switched their supplier, leading to a switching rate of 10.4% of the total volume.

In response to the Commission's procedure challenging the exemption by law of industrial users from network charges<sup>221</sup>, Germany has adopted legislative changes to reduce the number of beneficiaries. A revised law on feed-in tariffs intends to help keeping energy prices for consumers stable in the next years.

## Gas

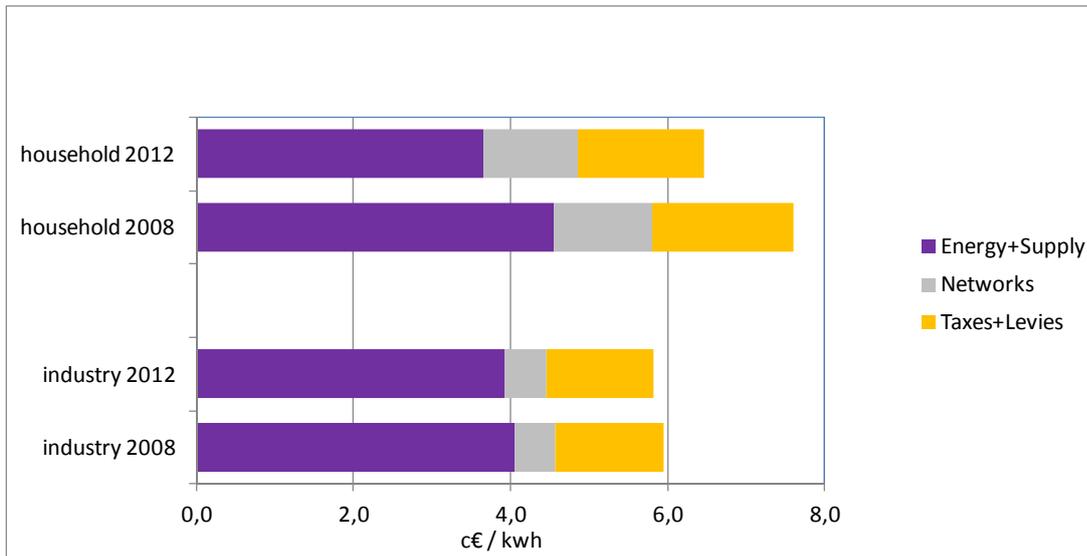
The emitted gas volume to final consumers (including gas-fired power plants) increased by 5% in 2012 (815.4 TWh) driven by an increase in household consumption (+10%) during the very long and cold winter 2012/13. The three largest companies have a market share of only 28.5%. Diversification improved further such that in almost 86% of the network areas consumers can choose among at least 31 different gas suppliers.

However, the number of customers who switched their supplier declined, especially for small consumers. In 2012, 7.92% of household customers and 13.38% of industrial customers switched

<sup>221</sup> A formal investigation procedure under state aid provisions was initiated on 6 March 2013. In parallel, contacts with national authorities have been established to analyse the compliance of the exemption provisions with internal energy market legislation.

supplier in terms of consumption volumes. In terms of all final consumers, the consumption volumes-based supplier change rate was 10.68%. This is a decrease of 18% compared to 2011<sup>222</sup>.

Figure 4: Natural gas price change by component 2008 – 2012 (source: EC, EPCR metadata)



## 5. Consumers

German consumers consider their electricity and gas retail markets as above the EU average (81.4 and 77.4 points compared to 72.0 and 74.1, respectively), ranking 1<sup>st</sup> and 8<sup>th</sup> among EU countries. However, while the electricity market has seen a consistent increase in score since 2010, the gas market has slightly decreased its performance between 2012 and 2013, reversing the positive trend observed since 2010<sup>223</sup>. Both markets score better than the EU average on all the components with the exception of actual switching. Electricity market scores highest among EU countries on trust in providers and ease of switching, 2<sup>nd</sup> highest on comparability and 4<sup>th</sup> highest on choice while the incidence of complaints is second lowest in the EU. For gas services, Germany scores among the best EU countries for comparability and choice (5<sup>th</sup> place). At the same time, only around 6% of electricity and gas consumers have switched their provider or tariff with the existing provider in the past 12 months, which is in both cases around half of the EU average.<sup>224</sup>

In line with the provisions of the Third Energy Package, consumer protection rights have been strengthened by the shortening of the supplier exchange process and by establishing new standards for contracts, information and financial reporting by suppliers. BNetzA has been assigned the role of central information centre for energy consumers. Energy consumers now have the right to file complaints against their supplier. In 2012 the consumer service of the BNetzA recorded a total of 22,112 incidents (electricity 19,771 and gas 2,341) of which a significant portion focused on inconsistencies in the energy bill. Furthermore a new arbitration body, the “Schlichtungsstelle

<sup>222</sup> BNetzA, Monitoring Report, 2013.

<sup>223</sup> The electricity market increased its performance by 2.2 points while gas has seen a 1.6 decrease between 2012 and 2013.

<sup>224</sup> 10th Consumer Markets Scoreboard,

[http://ec.europa.eu/consumers/consumer\\_evidence/consumer\\_scoreboards/10\\_edition/index\\_en.htm](http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/10_edition/index_en.htm)

Energie e.V.”, was founded to provide consumers with additional cost-free extrajudicial resolution with regard to their electricity and natural gas suppliers as well as distribution system operators.

## 6. Infrastructure

BNetzA was designated as the “one stop shop” for permitting procedures for electricity Projects of Common Interest (PCI), while for gas the designation has not yet been communicated.

### Electricity

In 2012 the four TSOs spent EUR 1.15 billion on network infrastructure which is an increase of investment volume of 36% mostly due to the energy transition. The expansion of the electricity transmission network has been advancing slower than planned. By July 2014, about 416 of 1877 kilometres (22 %) of the projects listed since 2009 in the Electricity Grid Expansion Act (EnLAG) were realised. TSOs now expect to finish 40% of the projects by 2016, 10 % less than what had been expected still in early 2014.<sup>225</sup> Network development is clearly behind schedule and subject to increasing resistance, including on the level of regional governments. In 2012, BNetzA approved about 2,800 km new lines and 2,900 km of network enhancements beyond the EnLAG.

With the adoption of the Federal Requirements Plan Act (Bundesbedarfsplangesetz) in 2013, further efforts have been made to commonly agree upon and realise the most crucial and urgently needed transmission infrastructure projects. It however remains to be seen, and becomes increasingly doubtful in view of delays, whether the actual speed of network infrastructure construction is sufficient. Some projects included in the Bundesbedarfsplan are also labelled as projects of common interest as they are particularly important from the European perspective. In total 20 electricity PCIs are located in Germany. Most urgently, lines from the North to the South of Germany are needed to eliminate internal bottlenecks and help avoid unscheduled “loop flows” which are currently congesting the borders with Germany’s neighbours. Also, cross-border lines with neighbouring countries will increase interconnection capacity and ensure that electricity flows where it is most valued.

### Gas

The German Energy Act requires the gas TSOs to jointly prepare a National Development Plan (NDP) Gas on an annual basis. The current NDP will lead to new pipelines with a total length of 522 km and new or extended compressors with a total capacity of 344 MW. Most of these measures are important for the transport of gas from North to South. They are also important to help to relieve critical situations in the supply of gas down to the distribution systems, especially in southern Germany. Furthermore, capacities at cross-border points will be enhanced. For the first time, the NDP Gas also focuses on decreasing L gas volumes, in particular in the Netherlands, and identifies specific grid areas for conversion to H gas.

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<sup>225</sup> [http://www.netzausbau.de/cIn\\_1422/DE/Vorhaben/EnLAG-Vorhaben/EnLAGVorhaben-node.html](http://www.netzausbau.de/cIn_1422/DE/Vorhaben/EnLAG-Vorhaben/EnLAGVorhaben-node.html).

## 7. Security of supply

### Electricity

Bundesnetzagentur has prepared a series of reports<sup>226</sup> assessing security of electricity supply in order to establish the need for reserve capacity during the winter period. The aim of maintaining reserve capacity is to provide relief when critical situations arise in the transmission network as a result of the increase in energy from renewable sources and conventional plant shutdowns. Network operators contracted 2.6 MW of reserve capacities for the winter of 2012/2013. In addition to this, TSOs can use generation units nominated for decommissioning if they define these units as systemically relevant entities. The owner of such reserve capacities is then compensated for costs of keeping the unit available and generating the required power. Until now five of such nominated generation units with a total net capacity of 668 MW were defined as systemically relevant. Finally, TSOs may intervene into generation dispatch plans in order to stabilize the system. System interruption is still at a low level of 15.91 minutes in 2012.

In respect of the national balance between demand and supply, ENTSO-E calculated a negative reserve margin of -0.6% for Germany for the winter of 2012/2013 which indicates that national demand of electricity could be higher than available generation capacities. Germany may therefore need to rely on imports in certain situations.

In 2012, total electricity demand remained almost constant whilst the total volume of traded electricity across the border increased by 7.7% (79.7 TWh). The net export increased significantly, by 700% to 21.7 TWh (2011 imports: 35.5 TWh and exports 38.4 TWh), so that Germany became a net exporter of power. The cross-border trading volume of electricity increased from 74 TWh in 2011 to 79.7 TWh in 2012, of which 50.7 TWh were exported and 29 TWh imported. The biggest change occurred in the export between Germany and the Netherlands which more than doubled and the imports from France which dropped by almost one third.

### Gas

The average interruption duration in gas was constantly on a low level in 2012 (1.91 minutes). During gas year 2011/2012 capacities have been shifted from entry to exit in parallel to significant sign offs of booked capacities after price increases. Given the total volume of 2.69 billion kWh transported, only 0.05% of the nominated quantities of gas were interrupted in the gas year 2011/2012.

## 8. Key indicators

Electricity		Gas	
Number of companies representing at least 95% of net power generation	>450	Number of entities bringing natural gas into country	38
Number of main power-generation companies	4	Number of main gas entities	3
Market share of the largest power-	N/A	Market share of the largest	30.1%

<sup>226</sup>[http://www.bundesnetzagentur.de/cln\\_1912/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen\\_Institutio nen/Versorgungssicherheit/Berichte\\_Fallanalysen/berichte\\_fallanalysen-node.html#doc266870bodyText3](http://www.bundesnetzagentur.de/cln_1912/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutio nen/Versorgungssicherheit/Berichte_Fallanalysen/berichte_fallanalysen-node.html#doc266870bodyText3).

generation company		entity bringing natural gas into country	
Number of electricity retailers	>1,000	Number of retailers selling natural gas to final customers	851
Number of main electricity retailers	4	Number of main natural gas retailers	3
Switching rates (entire electricity retail market)	10.4% <sup>227</sup>	Switching rates for gas (entire retail market)	10.68% <sup>228</sup>
Regulated prices for households – electricity	No	Regulated prices for households – gas	No
Regulated prices for non-households – electricity	No	Regulated prices for non-households – gas	No
HHI in power-generation market	2,021	HHI in gas supply market	1,886
HHI in electricity retail market	n/a	HHI in gas retail market	300
Electricity market value <sup>229</sup> (bn€)	74.906	Gas market value (bn€)	27.511
Installed generation capacity (MW)	171,681		
National instantaneous peak load (MW) (2012)	81,858		
Number of smart meters installed	N/A		

<sup>227</sup> In terms of volume of the entire electricity retail market 2012. The switching rate in terms of metering points was at 5.8%.

<sup>228</sup> In terms of volume of the entire gas retail market 2012. The switching rate in terms of metering points stood at 7.59%.

<sup>229</sup> Market value is an estimation of the size of the retail electricity and gas markets. It is calculated using data on electricity and gas consumption in the household and non-household sectors (average bands) and annual average retail prices.