

Annual Report

on the progress made towards achieving the national energy efficiency targets under Article 24(1), in accordance with Part 1 of Annex XIV to Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC

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Introduction

When it joined the European Union on 1 July 2013, the Republic of Croatia, like all the other Member States, undertook in accordance with Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, to increase energy efficiency in the EU in order to achieve the objective of saving 20% of the Union's primary energy consumption by 2020, compared to projections (with regard to the business-as-usual or baseline energy consumption scenario).

The Conclusions of the European Council of 17 June 2010 confirmed the energy efficiency target as one of the headline targets of the Union's new strategy for jobs and smart, sustainable and inclusive growth ('Europe 2020 Strategy'). As part of this process and in order to implement the said objective at national level, Member States are required to set national targets in close dialogue with the Commission and to indicate, in their National Reform Programmes, how they intend to achieve them.

To achieve this fundamental objective, each Member State is required to draw up National Energy Efficiency Action Plans laying down national energy savings targets in accordance with a set methodology, as well as sector-specific measures and objectives. Each Action Plan analyses the effects and, where necessary, revises current measures while also setting new sector-specific measures in order to ensure compliance with the target by 2020.

The significance of energy efficiency in the Republic of Croatia is reflected in the country's laws and strategies. The Energy Act outlines energy efficiency as a matter of national interest. The Energy Efficiency Act, adopted in October 2014, encourages energy efficiency and the development of an energy services market.

A National Energy Efficiency Programme for the 2008-2016 period has been produced in accordance with the European Directive 2006/32/EC on energy end-use efficiency and energy services (ESD). The Croatian Government adopted the Third National Action Plan for Energy Efficiency in Croatia for 2014-2016. The Action Plans have been submitted to the European Commission, which reviews the action plans of all Member States and looks at target compliance across the EU.

A. Estimate of indicators for the year before last (2015)

I. PRIMARY ENERGY CONSUMPTION

Table 1 provides a breakdown of total energy consumption¹ during 2010-2015. Figure 1 shows the development of total energy consumption since 1988. Total energy consumption in Croatia in 2015 fell by 0.9% compared to 2014. The consumption of coal and coke fell by 5.5%, while the share of hydro energy plummeted by 30.7% due to low water levels. All other forms of energy consumption were on the rise, most notably electricity, where imports surged by 71.7%. The consumption of heat from heat pumps increased by 20.3%, from firewood and biomass by 14.2% and from other renewables by 7.4%. The consumption of petroleum products and natural gas increased by 4.1% and 3%, respectively.

Between 2010 and 2015 total energy consumption decreased at an average annual rate of 2.5%. While the consumption of other renewables, imported electricity and heat from heat pumps, firewood and biomass increased, other forms of energy saw a downward trend in consumption. Furthermore, while the consumption of renewables surged at an average annual rate of 38.6%, the rise in the consumption of electricity imports was a more moderate 11.3%. The increase in the consumption of heat from heat pumps as well as the consumption of firewood and biomass was much slower, amounting to 0.4% and 0.2%, respectively. The average annual rates of consumption fell by 4.8% for natural gas, 3% for liquid fuels and 0.7% for coal and coke. The consumption of hydro energy was also in decline, on average by 6.7% per year, with fluctuations in particular years, depending on watercourse levels.

Tablica 1. Ukupna potrošnja energije								
Table 1. Total Primary Energy Supply								
	2010.	2011.	2012.	2013.	2014.	2015.	2015./14.	2010.-15.
	PJ						%	
Ugljen i koks								
Coal and coke	30,92	31,66	28,37	32,18	31,59	29,86	-5,5	-0,7
Drvo i biomasa								
Biomass	52,29	51,5	52,1	51,67	45,82	52,69	14,2	0,2
Tekuća goriva								
Liquid Fuels	152,54	149,3	134,17	128,37	125,8	130,92	4,1	-3,0
Prirodni plin								
Natural Gas	111,37	108,6	101,78	95,54	84,62	87,16	3,0	-4,8
Vodne snage								
Hydro Power	87,24	47,58	47,32	84,92	88,99	61,63	-30,7	-6,7
Električna energija								
Electricity	14,28	25,76	26,75	13,93	14,23	24,44	71,7	11,3
Toplinska energija								
Heat	0,63	0,61	0,62	0,63	0,53	0,64	20,3	0,4
Obnovljivi izvori								
Renewables	2,24	2,83	5,72	7,8	10,64	11,44	7,4	38,6
UKUPNO	451,5	417,84	396,84	415,04	402,22	398,77	-0,9	-2,5
TOTAL								

Source: Energy in Croatia 2015

¹ Translator's note: Table 1 and Figure 1, with the EN translations, are taken from Energy in Croatia 2015. The term Total primary energy supply (TPES) is used to refer to 'total energy consumption'.

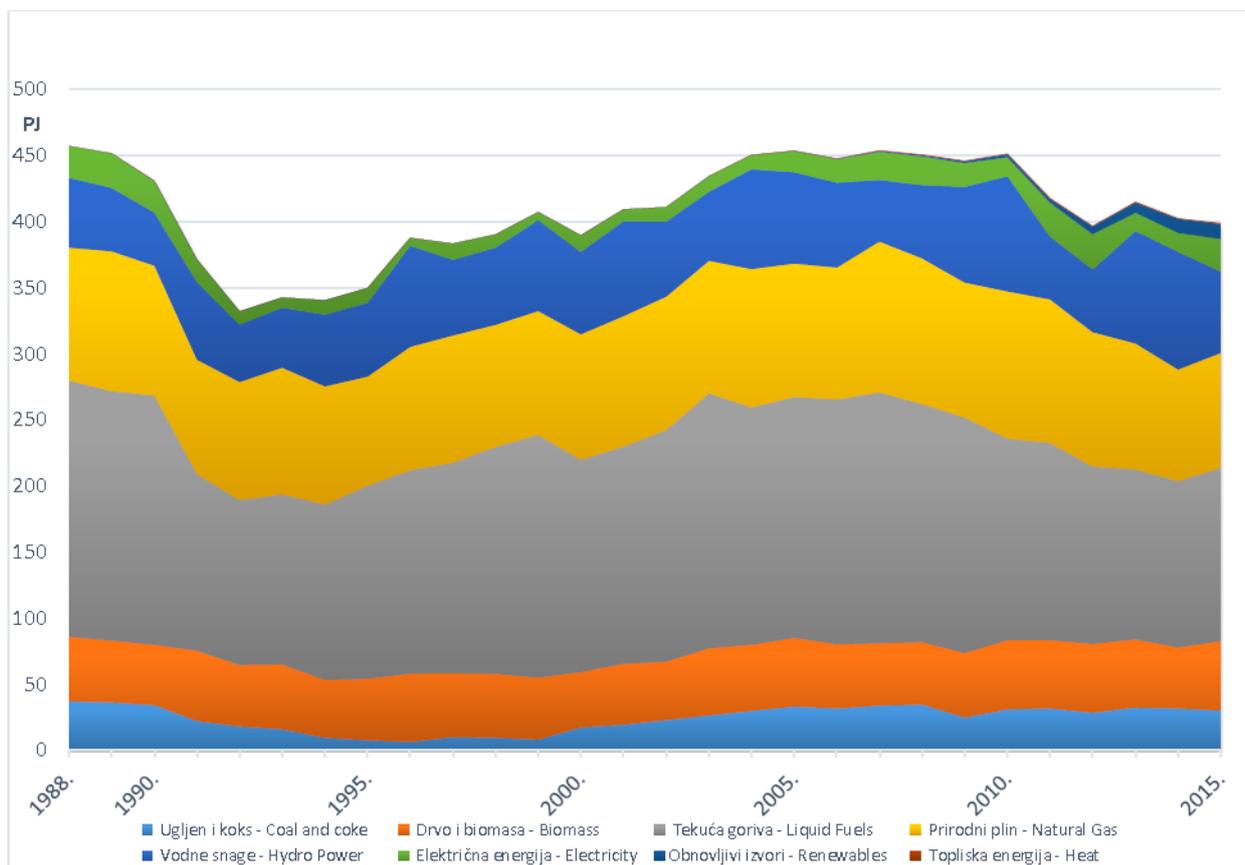


Figure 1: Total energy consumption in Croatia (source: Energy in Croatia 2015)

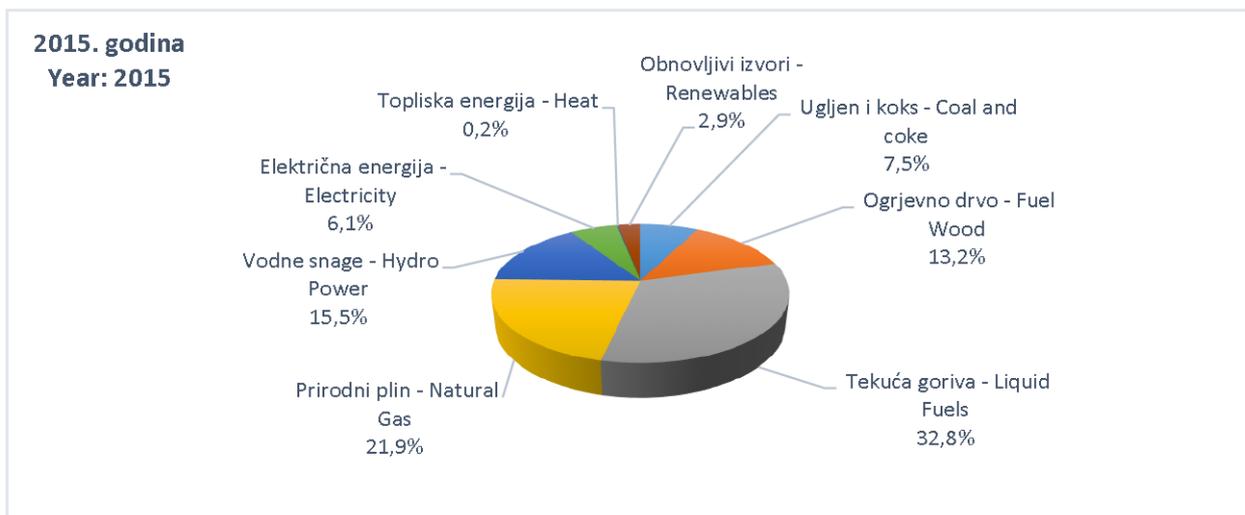


Figure 2: Breakdown of total energy consumption (source: Energy in Croatia 2015)

Figure 2 provides a breakdown of total energy consumption in 2015 by energy source. Liquid fuels account for the largest share of total energy consumption in Croatia, albeit falling from 33.8% in 2010 to 32.8% by 2015. Besides liquid fuels, the shares of natural gas and hydro energy also fell in 2015, by 2.8% and 3.8%, respectively, to 21.9% (natural gas) and 15.5% (hydro energy) in 2015. The consumption of other forms of energy increased. The share of electricity imports was 6.1% in 2015, compared with 3.2% in 2010. The share of other renewables (wind, solar, geothermal, biodiesel and biogas) rose from 0.5% to 2.9%, while the share of firewood and solid biomass increased from

11.6% to 13.2%. The total energy consumption share of heat from heat pumps increased by a mere 0.1%, to 0.2% in 2015, while the share of coal and coke increased from 6.8% to 7.5%.

II. TOTAL FINAL ENERGY CONSUMPTION (END USE)

Table 2 provides a breakdown of all energy consumed in Croatia between 2010 and 2015². Figure 3 provides a breakdown of total energy requirements between 1988 and 2015. Total energy consumption in 2015 was 398.77 PJ, down 0.9% compared to 2014. End-use energy consumption in 2015 was 275.17 PJ, up 5.5% against 2014.

Between 2010 and 2015, end-use energy consumption fell on average by 1.8% per year.

Tablica 2. Struktura ukupno utrošene energije								
Table 2. Total Primary Energy Supply by Sectors								
	2010.	2011.	2012.	2013.	2014.	2015.	2015./14.	2010.-15.
	PJ						%	
Ukupna potrošnja energije								
Total Primary Energy Supply	451,5	417,84	396,84	415,04	402,22	398,77	-0,9	-2,5
Gubici transformacija								
Conversion Losses	84,5	60,39	60,3	84,07	83,49	67,23	-19,5	-4,5
Pogonska potrošnja								
Energy Sector Own Use	30,24	32,03	26,57	24,33	26,72	24,99	-6,5	-3,7
Gubici transporta i distribucije								
Transmission Losses	10,88	10,14	10	9,76	8,87	9,21	3,8	-3,3
Neenergetska potrošnja								
Non Energy Use	24,97	24,94	22,31	22,52	22,6	22,17	-1,9	-2,3
Neposredna potrošnja energije								
Final Energy Consumption	300,9	290,34	277,66	274,36	260,54	275,17	5,5	-1,8
- Industrija								
- Industry	50,3	46,96	41,56	40,92	40,63	40,42	-0,5	-4,3
- Promet								
- Transport	86,8	85,39	84,02	85,49	84,53	88,37	4,5	0,4
- Opća potrošnja								
- Other Sectors	163,81	157,99	152,08	147,95	135,38	146,38	7,9	-2,2

Source: Energy in Croatia 2015

² Translator's note: Table 1, with the EN translations, is taken from Energy in Croatia 2015. The term Total primary energy supply by sectors is used to refer to 'total final energy consumption'.

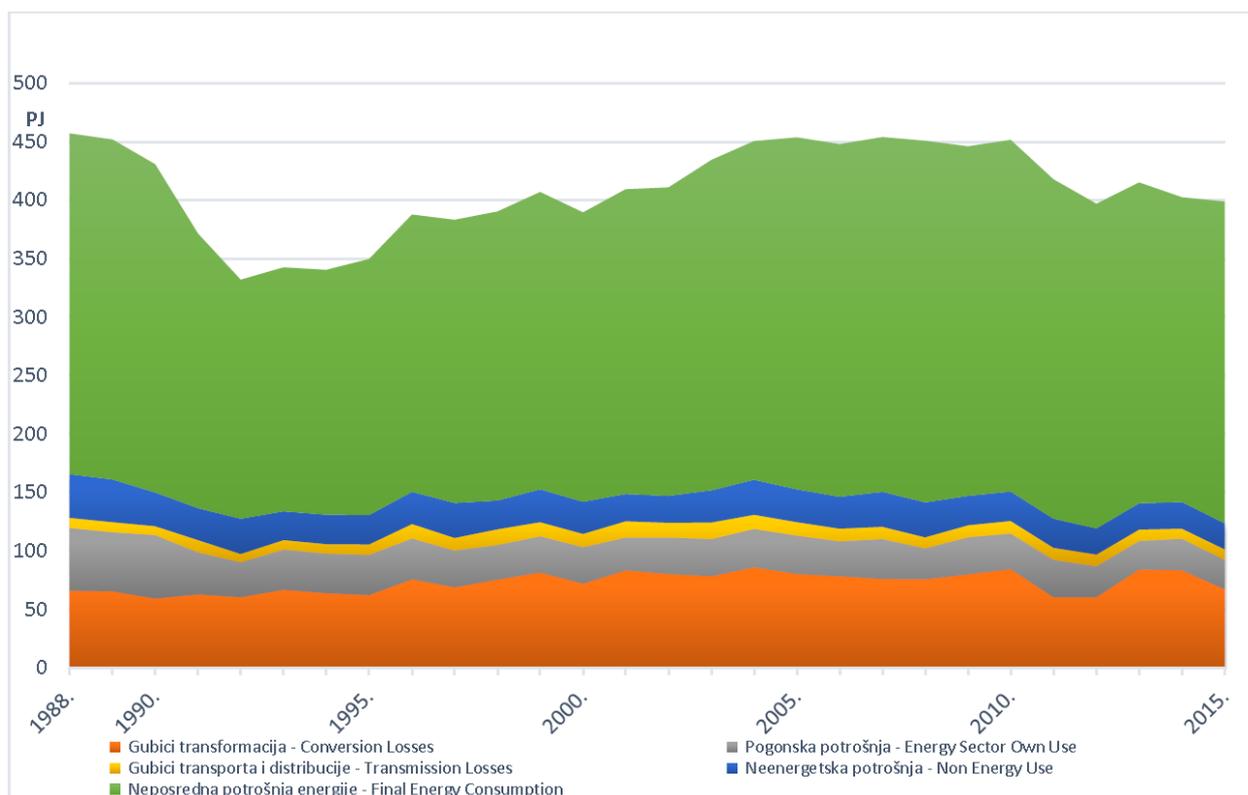


Figure 3 Breakdown of total energy consumption (source: Energy in Croatia 2015)

At 69%, end-use consumption accounted for most of the energy used in 2015. Between 2010 and 2015, the share of end-use energy consumption increased by 2.4%, while the share of non-energy consumption increased by a mere 1%, to 5.6% in 2015. The shares of total energy consumption in the other sectors decreased. Energy losses in transport and distribution were down slightly (from 2.4% to 2.3%), while the share of the energy sector's own use fell from 6.7% to 6.3%. The share of transformation losses fell by 1.8%, to 16.9% in 2015.

III. END-USE ENERGY CONSUMPTION BY SECTOR: INDUSTRY, TRANSPORT AND GENERAL CONSUMPTION (HOUSEHOLDS, SERVICES, AGRICULTURE AND CONSTRUCTION)

Table 2 provides a breakdown of energy consumption by three characteristic end-use sectors: industry, transport and general consumption. The general energy consumption sector comprises households, the services sector, agriculture and construction. Figure 2 shows the development of energy consumption in the three sectors since 1988. Compared to energy consumption in 2014, energy consumption in industry fell by 0.5% in 2015. Consumption increased by 7.9% in the general consumption sector and by 4.5% in the transport sector. Between 2010 and 2015, energy consumption in industry declined annually by 4.3% on average. The transport sector saw energy consumption increase at an average rate of 0.4% per year, while the general consumption sector recorded an average drop of 2.2% per year.

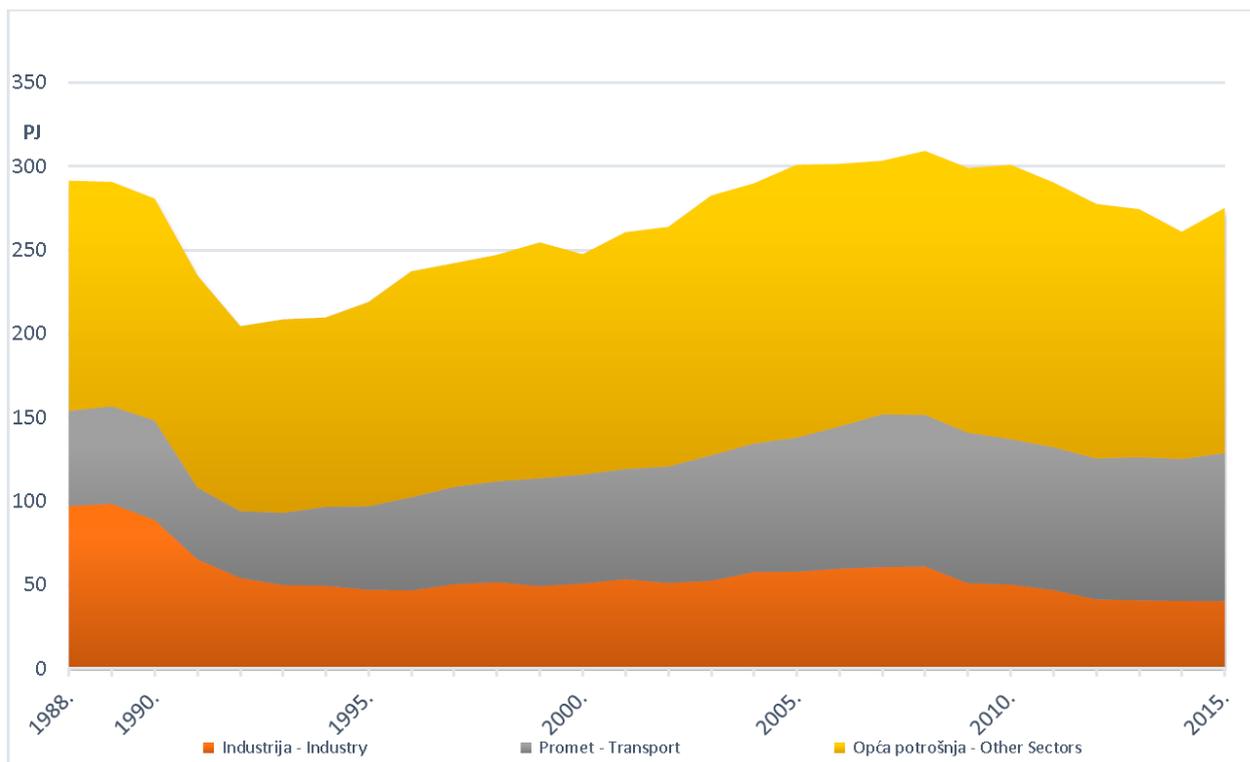


Figure 4 End-use energy consumption by sector (source: Energy in Croatia 2015)

Figure 5 shows the shares of individual end-use energy consumption sectors in 2015. The general consumption sector accounted for most of the energy used (53.2%), followed by transport (32.1%) and industry (14.7%).

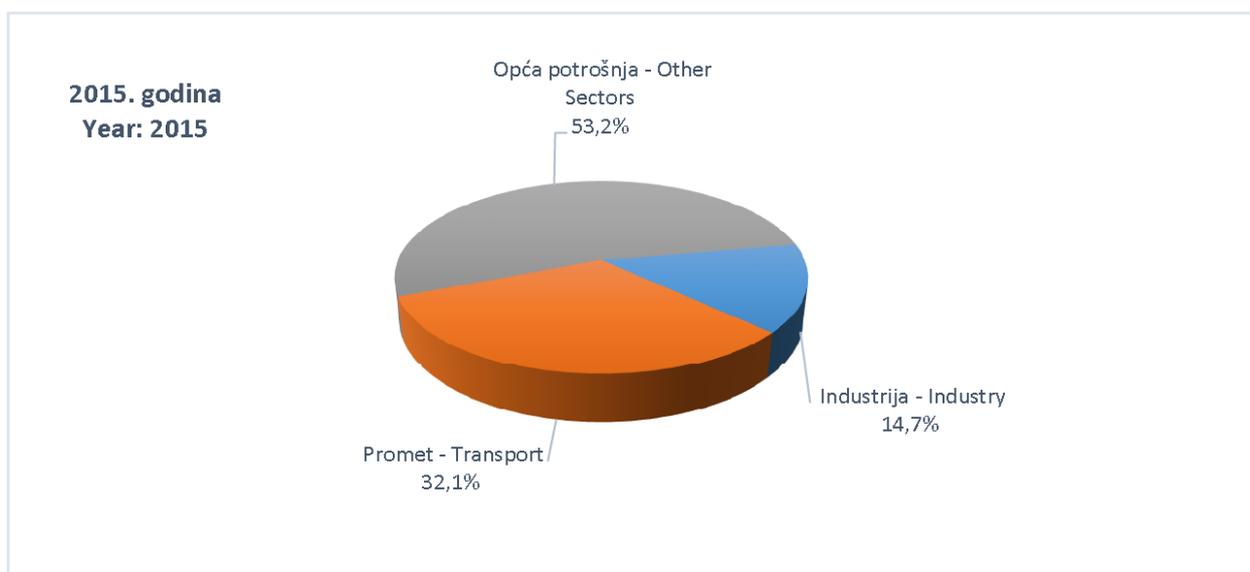


Figure 5 Energy end-use broken down by sector (source: Energy in Croatia 2015)

INDUSTRY

Table 3 provides a breakdown of energy consumption in industry between 2010 and 2015. Energy consumption in industry declined by another 0.5% in 2015 compared to 2014. This was due to a decline in the consumption of liquid fuels, coal and coke, and steam and hot water. In the same

period, the consumption of firewood, other biomass, natural gas and electricity increased. The highest percentage fall – 8.7% – was in the use of liquid fuels. The consumption of coal and coke, and steam and hot water fell by 5.8% and 3.5%, respectively. The consumption of firewood and other biomass increased by 26.7%, while electricity consumption increased by 4.3% and natural gas consumption by 1.3%.

Between 2010 and 2015, energy consumption in industry declined at an average annual rate of 4.3%. There was a fall in consumption of most forms of energy during this period, except firewood and other biomass, which saw an average increase in consumption of 6.2% per year. With average annual rates of 10.1% and 8%, respectively, the most rapid decline was recorded by gas and liquid fuels. The consumption of steam and hot water fell by an average rate of 4.7% per year, while the consumption of coal and coke declined by 2.8% on average. Electricity consumption recorded only a slight drop, with an average annual rate of 0.1%.

Tablica 3. Neposredna potrošnja energije u industriji									
Table 3. Final Energy Consumption in Industry by Fuels									
	2010.	2011.	2012.	2013.	2014.	2015.	2015./14.	2010.-15.	
	PJ							%	
Ugljen i koks									
Coal and coke	9,28	8,19	7,63	8,74	8,54	8,05	-5,8	-2,8	
Ogrjevno drvo i biomasa									
Fuel Wood and biomass	0,86	0,63	1,18	0,96	0,92	1,17	26,7	6,2	
Tekuća goriva									
Liquid Fuels	3,32	3,13	2,76	2,53	2,4	2,19	-8,7	-8,0	
Plinovita goriva									
Gaseous Fuels	12,42	11,33	8,14	7,31	7,21	7,30	1,3	-10,1	
Električna energija									
Electricity	12,18	11,76	10,65	11,05	11,59	12,09	4,3	-0,1	
Para i vrela voda									
Steam and Hot Water	12,22	11,93	11,2	10,34	9,98	9,62	-3,5	-4,7	
UKUPNO									
TOTAL	50,3	46,96	41,56	40,92	40,63	40,42	-0,5	-4,3	

Source: Energy in Croatia 2015

TRANSPORT

Table 4 provides a breakdown of energy consumption in transport between 2010 and 2015. Energy consumption in transport increased by 4.5% in 2015 in comparison with 2014. More diesel fuel, liquefied gas, electricity and natural gas were used, while the consumption of other energy sources declined. There was a decline in the consumption of motor spirit (0.2%), jet fuel (2.9%) and liquid biofuels (18.4%). The consumption of diesel fuel, liquefied gas and electricity increased by 7.8%, 10.9% and 5.7%, respectively. Though still accounting for a meagre share of total energy consumption in transport, natural gas recorded an increase of 2.6%. Between 2010 and 2015, energy consumption in transport increased by 0.4% per year on average.

Tablica 4. Neposredna potrošnja energije u prometu									
Table 4. Final Energy Consumption in Transport by Fuels									
	2010.	2011.	2012.	2013.	2014.	2015.	2015./14.	2010.-15.	
	PJ							%	
Tekuća biogoriva									
Liquid biofuels	0,11	0,14	1,51	1,33	1,25	1,02	-18,4	54,9	
Ukapljeni plin									
LPG	2,75	2,62	2,57	2,64	2,83	3,14	10,9	2,7	
Prirodni plin									
Natural gas	0,09	0,03	0,03	0,06	0,13	0,14	2,6	9,4	
Motorni benzin									
Motor gasoline	28,41	27,76	25,8	25,2	23,26	23,20	-0,2	-4,0	
Mlazno gorivo									
Jet fuel	4,54	4,81	4,98	5,44	5,46	5,30	-2,9	3,1	
Dizelsko gorivo									
Diesel oil	49,68	48,87	48	49,72	50,59	54,52	7,8	1,9	
Loživa ulja									
Fuel oils	0,08	0,07	0,08	0,08	0,02	0,00	-100,0		
Električna energija									
Electricity	1,12	1,09	1,04	1,01	0,99	1,05	5,7	-1,4	
UKUPNO									
TOTAL	86,8	85,39	84,02	85,49	84,53	88,37	—	4,5	0,4

Source: Energy in Croatia 2015

Table 5 shows energy use broken down by mode of transport between 2010 and 2015. In 2015 less energy was used for railway, maritime, river and air transport. Energy consumption increased in all other modes of transport.

Tablica 5. Potrošnja energije pojedinih vrsta prometa									
Table 5. Final Energy Consumption by Means of Transport									
	2010.	2011.	2012.	2013.	2014.	2015.	2015./14.	2010.-15.	
	PJ							%	
Željeznički promet									
Rail Transport	1,84	1,75	1,65	1,54	1,43	1,30	-9,1	-6,8	
Cestovni promet									
Road Transport	77,13	75,59	74,3	75,17	74,17	78,37	5,7	0,3	
Zračni promet									
Air Transport	4,65	4,92	5,07	5,55	5,56	5,40	-2,8	3,1	
Pomorski i riječni promet									
Sea and River Transport	1,65	1,65	1,58	1,79	1,93	1,84	-5,0	2,2	
Javni gradski promet									
Public City Transport	1,45	1,41	1,35	1,36	1,35	1,35	0,0	-1,3	
Ostali promet									
Non Specified	0,08	0,07	0,07	0,09	0,09	0,11	21,6	6,1	
UKUPNO PROMET									
TOTAL TRANSPORT	86,8	85,39	84,02	85,49	84,53	88,37	—	4,5	0,4

Source: Energy in Croatia 2015

GENERAL CONSUMPTION (HOUSEHOLDS, SERVICES, AGRICULTURE AND CONSTRUCTION)

The general energy consumption sector comprises households, the services sector, agriculture and construction. Table 6 provides a breakdown of energy consumption in the general consumption sector between 2010 and 2015. In 2015 energy consumption in the general consumption sector increased by 7.9% against 2014. With the exception of a 16.9% decline in the consumption of coal, consumption of all other energy resources increased.

Tablica 6. Neposredna potrošnja energije u općoj potrošnji								
Table 6.. Final Energy Consumption in Other Sectors by Fuels								
	2010.	2011.	2012.	2013.	2014.	2015.	2015./14.	2010.-15.
	PJ						%	
Ugljen								
<i>Coal</i>	0,26	0,23	0,22	0,18	0,11	0,09	-16,9	-18,2
Ogrjevno drvo i biomasa								
<i>Fuel Wood and Biomass</i>	49,82	48,64	48,57	48,27	42,57	48,84	13,9	-0,4
Tekuća goriva								
<i>Liquid Fuels</i>	28,06	26,62	23,36	21,66	19,8	20,82	5,2	-5,8
Plinovita goriva								
<i>Gaseous Fuels</i>	32,29	29,55	27,73	26,87	24,45	26,52	8,5	-3,9
Električna energija								
<i>Electricity</i>	43,74	43,73	43,5	42,11	40,76	42,01	3,1	-0,8
Toplinska energija								
<i>Heat</i>	9,13	8,68	8,1	8,23	6,86	7,21	5,1	-4,6
Obnovljivi izvori								
<i>Renewables</i>	0,51	0,55	0,59	0,63	0,83	0,88	5,7	11,6
UKUPNO	163,81	157,99	152,08	147,95	135,38	146,38	7,9	-2,2
TOTAL								

Source: Energy in Croatia 2015

Table 7 shows energy consumption in the general consumption sector, broken down by subsector between 2010 and 2015, while Figure 6 provides the same breakdown for the 1988-2015 period. Despite a decline in energy consumption in agriculture and construction, total energy consumption in the general consumption sector increased by 7.9% in 2015 on account of households and the services sector, where it recorded growth rates of 8.6% and 9.5%, respectively. In comparison with 2014, energy consumption in agriculture and construction decreased by 0.6% and 0.1%, respectively.

Tablica 7. Potrošnja energije u podsektorima opće potrošnje								
Table 7. Final Energy Consumption in Other Sectors by Subsectors								
	2010.	2011.	2012.	2013.	2014.	2015	2015./14.	2010.-15.
	PJ						%	
Kućanstva								
<i>Households</i>	116,02	110,73	107,32	104,38	93,76	101,83	8,6	-2,6
Uslužni sektor								
<i>Services</i>	32,13	31,60	30,36	29,49	28,07	30,75	9,5	-0,9
Poljoprivreda								
<i>Agriculture</i>	10,27	10,49	9,61	9,47	9,70	9,64	-0,6	-1,2
Građevinarstvo								
<i>Construction</i>	5,39	5,16	4,79	4,60	4,16	4,16	-0,1	-5,1
UKUPNO OPĆA POTROŠNJA	163,81	157,99	152,08	147,95	135,38	146,38	7,9	-2,2
TOTAL OTHER SECTORS								

Source: Energy in Croatia 2015

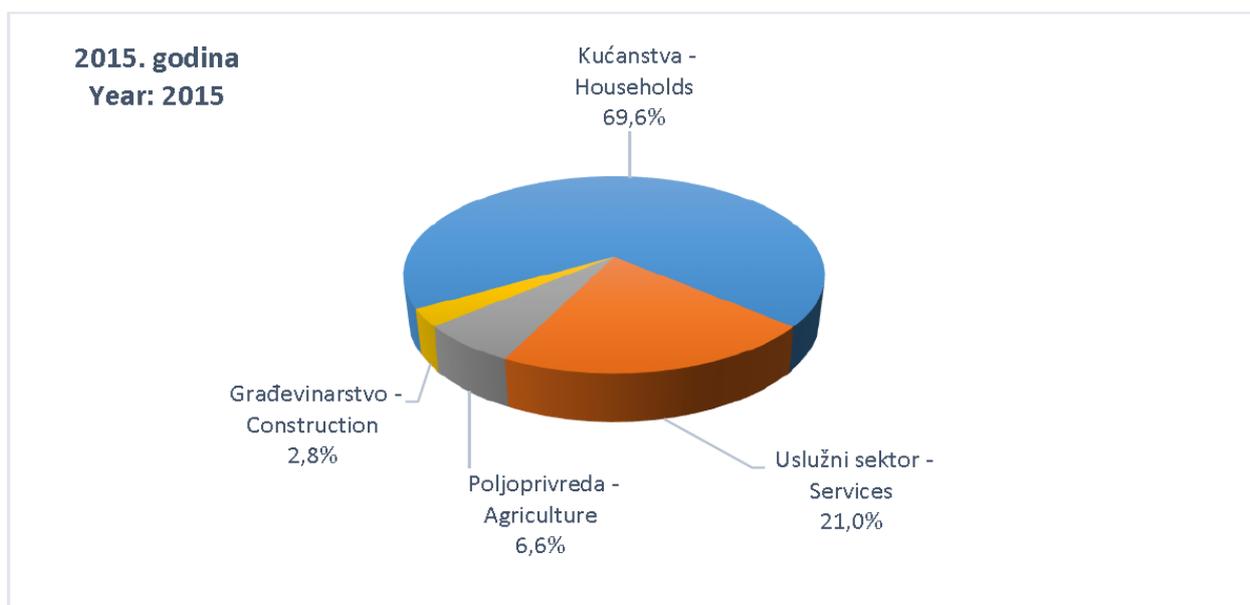


Figure 6 Energy consumption in the general consumption sector, broken down by subsector (source: Energy in Croatia 2015)

IV. GROSS VALUE ADDED BY SECTOR

Table 8 Gross Value Added			
Gross Value Added - GVA	2012	2013	2014
Industry	HRK 40 574 316 000	HRK 39 239 510 000	HRK 40 619 701 000
Services*	HRK 202 017 046 000	HRK 203 274 527 000	HRK 204 318 279 000

Source: Croatian Bureau of Statistics, 2016 Statistical Yearbook

GVA1 - Gross value added for agriculture, forestry and fisheries

GVA2 - Gross value added for mining and quarrying

GVA3 - Gross value added for processing industry

GVA4 - Gross value added for construction

* **GVA services = GVA total - (GVA1 + GVA2 + GVA3 + GVA4)**

Data on GVA in 2015 are not available in the 2016 Statistical Yearbook.

V. DISPOSABLE HOUSEHOLD INCOME

Table 9 Disposable household income		
	2010	2011
Disposable annual household income	HRK 86 975	HRK 81 215

Source: Croatian Bureau of Statistics, 2011 and 2012 Statistical Yearbooks

No data are available on disposable household income in 2012-2015. Statistical Yearbooks for 2012-2016 do not contain these data.

According to the 2016 Statistical Yearbook, the average monthly net salary was **HRK 5 711** and the average monthly gross salary was **HRK 8 055** in 2015.

2016 Statistical Yearbook - Household spending in 2014 averaged at HRK 81 315 annually, 16.2% of which was spent on housing and energy costs.

VI. GROSS DOMESTIC PRODUCT

Table 10 Gross Domestic Product - GDP	
2015	
Gross Domestic Product - GDP	HRK 333.837 000 000
	EUR 10 426 per capita

Source: Croatian Bureau of Statistics, 2016 Statistical Yearbook

VII. ELECTRICITY GENERATION IN THERMAL POWER PLANTS

Table 11 Electricity generation in thermal power plants				
GWh		2014	2015	2014/2015 [%]
Proizvodnja	Production			
-termoelektrane	<i>- thermal power plants</i>	2 374.3	2 595.9	9.3

Source: Energy in Croatia 2015

VIII. ELECTRICITY GENERATION IN CHP PLANTS, INCLUDING INDUSTRIAL WASTE HEAT

Table 12 Electricity generation in CHP plants, including industrial waste heat				
GWh		2014	2015	2014/2015 [%]
Proizvodnja	Production			
-javne toplane	<i>- public cogeneration plants</i>	951.8	1 087.6	14.3
-industrijske toplane	<i>- industrial cogeneration plants</i>	338.2	309.5	-8.5
Ukupno	<i>Total</i>	1 290	1 397.1	

Source: Energy in Croatia 2015

IX. HEAT GENERATION IN THERMAL POWER PLANTS

Thermal power plants in Croatia do not produce just heat; rather, heat is generated together with electricity in these installations in a combined production process.

The heat thus generated is therefore addressed in chapter X: Heat generation in CHP plants, including industrial waste heat.

The production of heat in thermal power plants, as per the title of this chapter, equals zero.

X. HEAT GENERATION IN CHP PLANTS, INCLUDING INDUSTRIAL WASTE HEAT

Table 13 Heat generation in CHP plants, including industrial waste heat				
PJ		2014	2015	2014/2015 [%]
Javne toplane	<i>- public cogeneration plants</i>	8 014	8 833	10.2

Source: Energy in Croatia 2015

XI. FUEL INPUT IN THERMAL POWER PLANTS

Table 14 shows the fuel input in all energy transformations, broken down by raw material.

Table 14 Fuel input for thermal power plants				
		Ugljen 1 000 ten	Derivati nafte 1 000 ten	Plinovita goriva 1 000 ten
		Coal 1 000 toe	Petroleum Products 1 000 toe	Gas 1 000 toe
Javne elektrane	Public Electricity Plants	521.2	12.3	43.4
Javne toplane	Public CHP Plants	-	34.4	284

Source: Energy in Croatia 2015

XII. PASSENGER KILOMETRES (PKM)

The transport sector is currently one of the largest energy consumers in Croatia; moreover, the consumption figures are set to grow faster than in the other sectors. The sector's share of final energy consumption increased from 21.7% in 1991 to 32.1% in 2015, which shows that there is enormous scope for energy efficiency measures to be implemented.

Efficiency could be increased principally by optimising the transport structure, making maximum use of capacities (increasing the load factor), introducing high-efficiency engines and vehicles and adapting the driving regimes.

Table 15 Passenger kilometres							
		2010	2011	2012	2013	2014	2015
Cars - petrol	[10 ⁹ pkm]	15.919	15.608	14.669	14.347	13.322	13.616
Cars - diesel	[10 ⁹ pkm]	18.197	18.240	17.873	18.474	18.710	21.087
Cars - electric	[10 ⁹ pkm]	0.000	0.000	0.002	0.003	0.004	0.012
Cars - CNG	[10 ⁹ pkm]	0.002	0.002	0.003	0.002	0.003	0.002
Cars - LPG	[10 ⁹ pkm]	1.692	1.622	1.596	1.647	1.730	1.968
Aircraft	[10 ⁹ pkm]	0.140	0.161	0.158	0.150	0.154	0.153
Motorcycles	[10 ⁹ pkm]	0.279	0.270	0.234	0.232	0.220	0.227
Buses (diesel)	[10 ⁹ pkm]	7.163	6.607	6.389	6.899	6.607	8.002
Buses - CNG	[10 ⁹ pkm]	0.088	0.026	0.032	0.068	0.122	0.128
Trains	[10 ⁹ pkm]	1.742	1.486	1.104	0.858	0.927	0.951
Trams - electric	[10 ⁹ pkm]	1.189	1.176	1.128	1.094	0.059	1.227
Total		46 410	45 200	43 187	43 775	41 857	47 373

Source: Hrvoje Požar Energy Institute

The official statistics (courtesy of the Croatian Bureau of Statistics) comprise only public transport figures; passenger cars, which have by far the largest share, are not included. These figures were obtained by the Hrvoje Požar Energy Institute through modelling based on past results. The table above shows total pkm from 2010 to 2015. The figures are based on modelling and give a realistic picture of relations among individual modes of transport.

As expected, passenger car transport has the largest share in the passenger kilometre structure. The estimate is based on the number of registered cars, the average annual distance travelled and the average car occupancy.

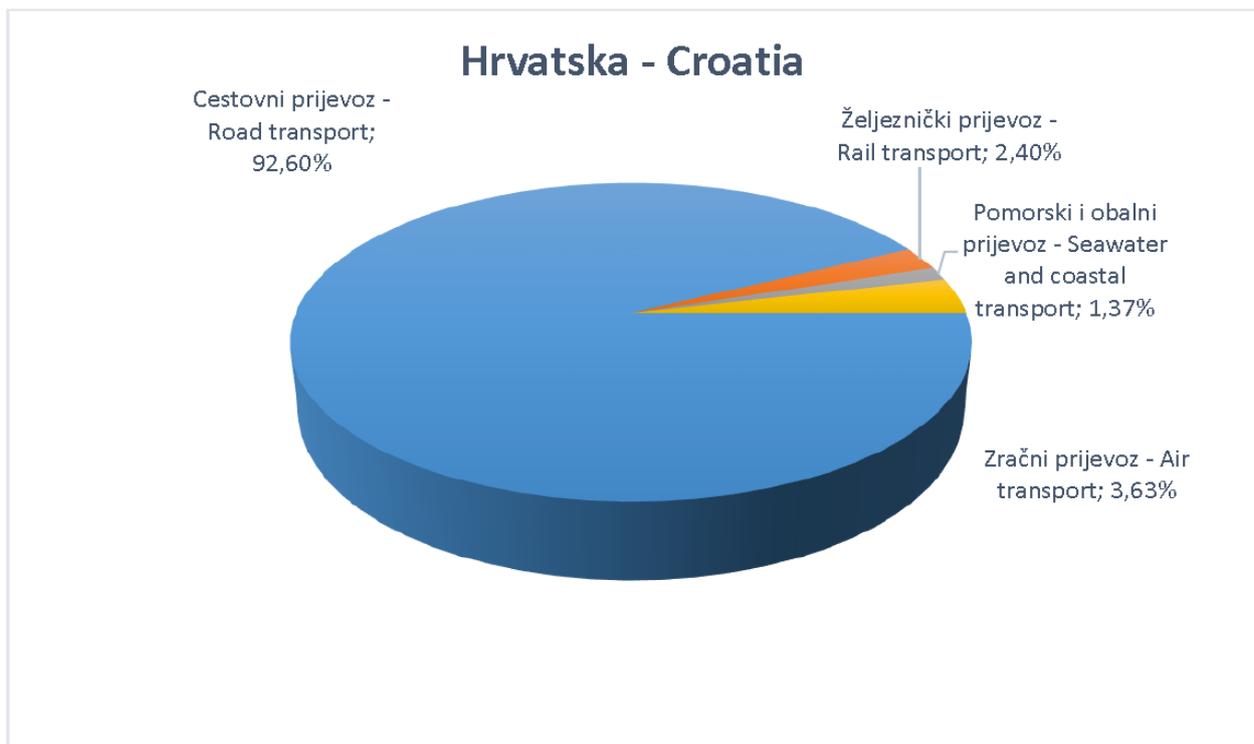


Figure 7 Pkm shares in passenger transport in Croatia in 2015 (source: Energy in Croatia 2015)

Between 1995 and 2008, the number of passenger cars in Croatia grew steadily, at a rate of 4.9% per year on average. The number of registered passenger cars increased from 817 229 in 1995 to 1 537 981 by the end of 2008. The number of registered passenger cars declined for the first time in 2009. The downward trend continued in 2010, when there was a total of 1 517 079 registered cars (meaning that there were some 343 cars per 1 000 inhabitants, or in other words, one in three people in Croatia owned a car). There was a total of 1 516 698 registered cars in Croatia in 2015 (approx. 359 cars per 1 000 inhabitants).

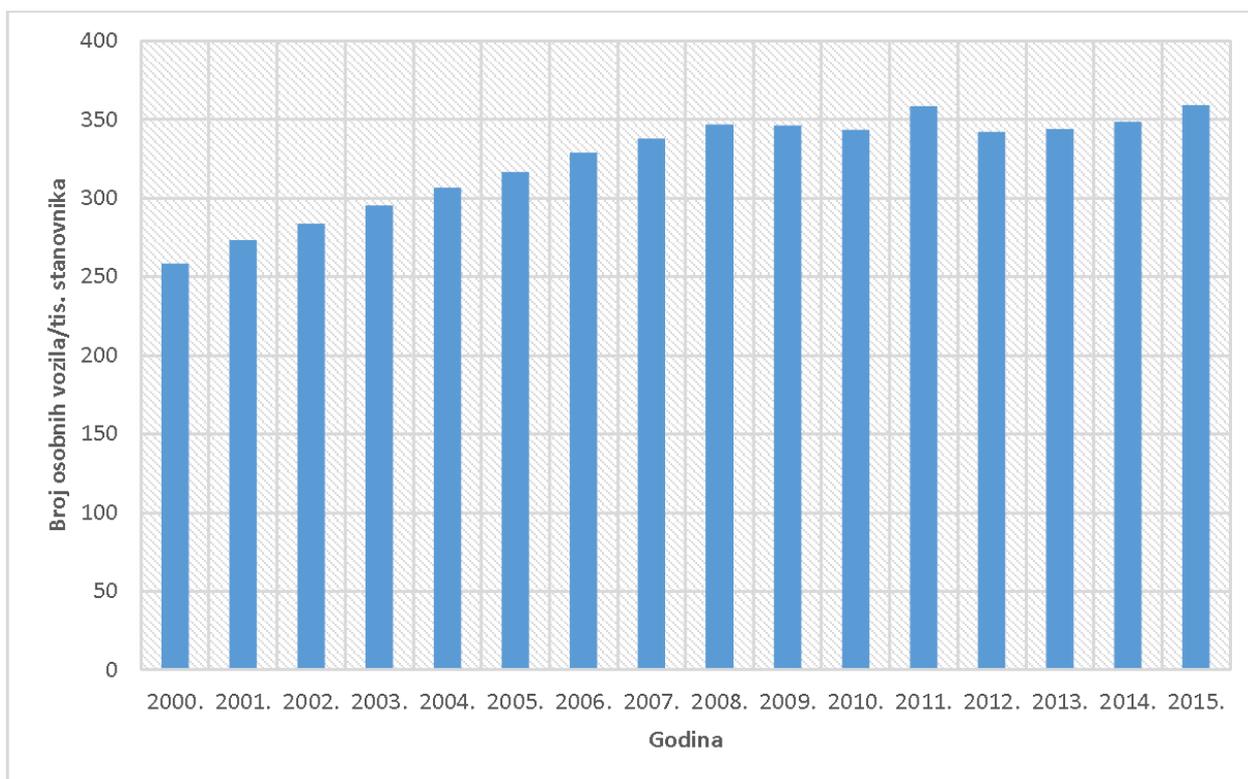


Figure 8 Number of passenger cars per 1 000 inhabitants in Croatia (source: Energy in Croatia 2015)

Between 1995 and 2015 there was a significant increase (350%) in the share of diesel passenger cars in Croatia, and this trend continues to grow. The share of petrol cars declined from 80.5% in 1995 to 53.6% in 2015, while the share of diesel cars grew from 17.5% to 43.3% in the same period. The share of liquefied petroleum gas (LPG) cars increased from 2.0% in 1995 to 2.9% in 2015.



Figure 9 Passenger cars in Croatia by fuel type (1995-2015) (source: Energy in Croatia 2015)

The figures reflect an obvious shift in consumer habits in terms of their demand for bigger, more powerful cars. At the same time, relatively good conditions are in place for buying smaller, more energy efficient diesel cars. This positive structural shift is based solely on market principles, i.e. the affordability of diesel fuel during the reference period, rather than on any specific incentives.

XIII. TONNE KILOMETRES (TKM)

The key indicator of energy efficiency in transport is the share of the various modes of transport. In freight transport, for example, a larger share of rail transport is an indicator of better energy efficiency.

The tkm breakdown shows that in Croatia freight is transported primarily by road.

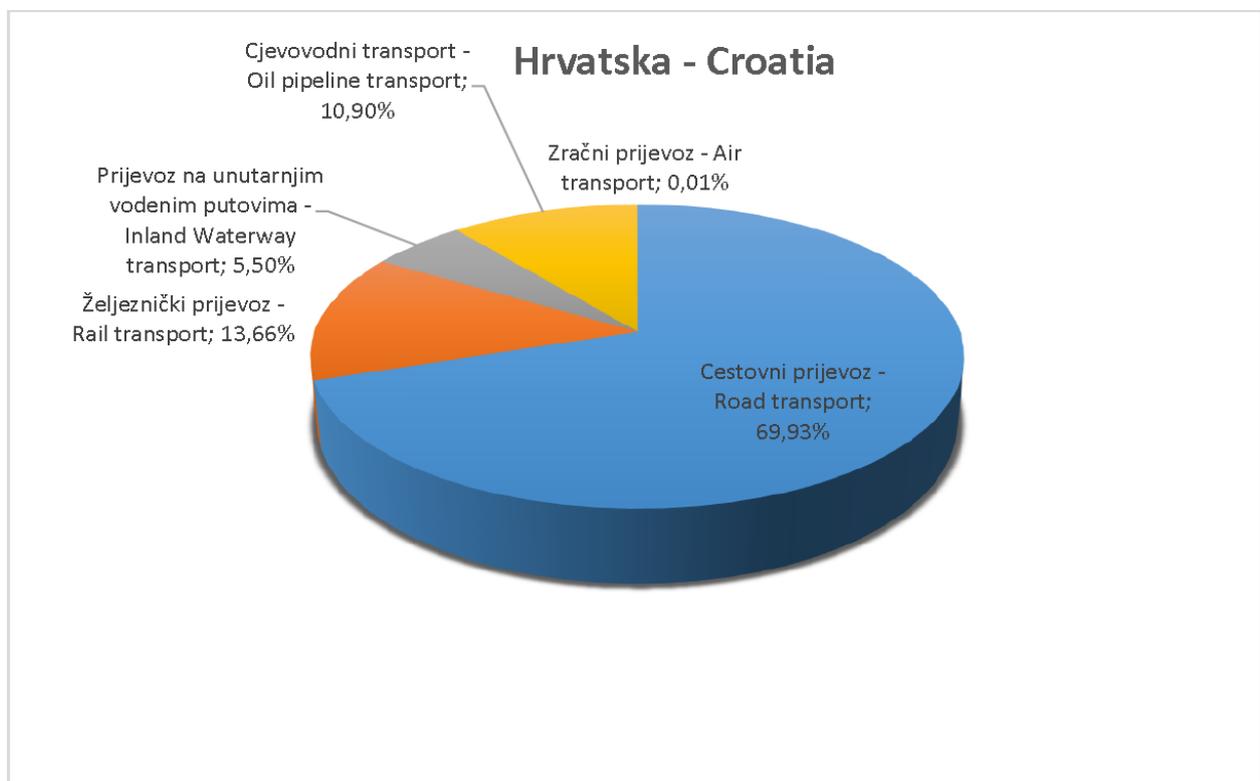


Figure 10 Tkm breakdown in freight transport in Croatia in 2015 (source: Energy in Croatia 2015)

It should be noted that the breakdown does not include maritime and coastal transport, as they somewhat distort the picture due to the fact that the large distances covered in international shipping result in an increased share of tkm in the EU 28.

Data from 2014 and 2015, taken from the 2016 Statistical Yearbook, show a significant increase in the number of tkm in maritime and coastal transport (107 709 million tkm in 2014; 122 223 million tkm in 2015). Table 16 provides a breakdown of tonne kilometres.

Table 16 Tonne kilometres		
Tonne kilometres (tkm)	2014	2015
Road transport	9 381 000 000 km	10 439 000 000 km
Rail transport	2 119 000 000 km	2 183 000 000 km
Pipeline transport	1 447 000 000 km	1 740 000 000 km
Air transport	2 000 000 km	2 000 000 km
Inland waterway transport	716 000 000 km	879 000 000 km
TOTAL	13 665 000 000 km	15 243 000 000 km

Source: Croatian Bureau of Statistics, 2016 Statistical Yearbook

XIV. TRANSPORT KILOMETRES COMBINED – WHERE NO DATA IS AVAILABLE FOR XII AND XIII

The two previous chapters provide data for passenger and tonne kilometres separately.

XV. POPULATION

Size: 4 284 889 (source: Croatian Bureau of Statistics, 2016 Statistical Yearbook; the most recent census was in 2011)

Number of households: 1 519 038 (average No of household members: 2.80)

(source: Croatian Bureau of Statistics, 2016 Statistical Yearbook)

Population density per km²: 75.7

Capital city: Zagreb (790 017 inhabitants)

Language: Croatian

Script: Latin

Currency: Kuna (HRK)

B. Updates on major legislative and non-legislative measures implemented in the preceding year which contribute towards the overall national energy efficiency targets for 2020

MAJOR LEGISLATIVE AND NON-LEGISLATIVE MEASURES IN 2016

There were no major changes to legislative or non-legislative measures in 2016.

C. Total floor area of buildings owned and occupied by the Member State's central government, with a total useful floor area exceeding 500 m² (250 m² as of 9 July 2015), that did not comply with the energy requirements laid down in Article 5(1) by 1 January of the reporting year.

Does not apply to Croatia, which has opted for an alternative approach to calculating energy savings in eligible buildings owned and occupied by the central government.

D. Total floor area of heated and/or cooled buildings owned and occupied by the Member State's central government, renovated in the preceding year as provided for by Article 5(1) or the amount of energy savings in eligible buildings owned and occupied by the central government in accordance with Article 5(6).

Directive 2012/27/EU requires Member States to achieve energy savings in public buildings owned or occupied by the central authorities by renovating at least 3% per year of the floor area in those buildings so as to at least equal the investment in the renovation of public and private residential and non-residential buildings, which must take into account an overview of the national building stock, cost-effective approaches to renovation relevant to the building type and climatic zone, policies and measures to encourage in-depth reconstruction, including the refurbishment of buildings, an overview of future market trends to guide investment decisions of individuals, the construction industry and financial institutions, and an estimate of expected energy savings and wider benefits. The single register of central government buildings indicating the energy performance of individual buildings is not yet fully functional. Instead, the project *Dovesti svoju kuću u red* ('House in order'), under which an active energy consumption database was set up for non-residential buildings of the central government and local authorities, is being used as a data source.

The ISGE (Energy Management Information System) database pools data on actual measured consumption of all energy products and water in a month on the basis of invoices issued by distributors. Of a total of 3 700 buildings included in the ISGE project, 774 are being used by the central government.

The monitoring of energy savings through the energy delivered to end-users will result in the energy renovation of 17 public buildings per year (14 in Continental Croatia and 3 in Adriatic Croatia) with a combined heated floor area of 33 267 m² in a standard range of buildings or, according to specific energy savings (which differ greatly from office buildings to hospitals), an area of 10 941-51 309 m². The resulting savings will correspond to those achieved through the energy renovation of 3% of the buildings annually, or 0.00489 PJ per annum.

The target achieved in 2016 was 0.02942 PJ, exceeding the planned 3% renovation savings target. The target has been achieved for the most part by completely renovating Karlovac General Hospital.

Table 18 3% rate of renovation of central government buildings		
	Planned target	Savings achieved
3% rate of renovation of central government buildings	0.00489 PJ	0.02942 PJ

Source: National Energy Efficiency Authority (CEI)

E. Energy savings achieved through the national energy efficiency obligation schemes referred to in Article 7(1) or the alternative measures adopted under Article 7(9)

Title of measure	Savings [PJ]	Savings [tCO ₂]	Total investment amount [HRK]	Total funds disbursed by the Fund [HRK]
RESIDENTIAL BUILDINGS				
Energy renovation programme for family homes (2014-2016)	0.36357	8 918.28	423 331 679.52	288 340 683.90
Energy renovation programme for multi-residential buildings	0.06332	4 481.07	77 433 196.05	32 935 261.93
Introduction of individual heat metering	0.11918	8 978.36	40 232 189.01	16 092 886.29
PUBLIC SECTOR BUILDINGS				
Energy renovation programme for public sector buildings (2014-2015)	0.05297	3 995.55	97 246 108.45	45 510 392.52
Energy renovation programme for public sector buildings (2016-2020)				
COMMERCIAL NON-RESIDENTIAL BUILDINGS				
Energy renovation programme for commercial non-residential buildings	0.01637	1 340.11	16 968 228.97	7 830 783.48
PUBLIC LIGHTING				
Energy-efficient public lighting programme	0.01382	1 267.06	37 288 674.53	19 698 946.15
TRANSPORT				
Financial incentives for energy-efficient vehicles	0.003466	230.5404	32 694 460.98	7 879 604.95
Incentives for eco-driving	0.00068	51.09	69 880.00	22 361.60
Introduction of CO ₂ emission-based taxation of motor vehicles				
TOTAL	0.63338	29 262.06	725 264 417.51	418 310 920.82

Source: System for monitoring, measuring and verifying energy savings, CEI

Table 19 shows alternative policy measures that have taken off as a result of public calls by the Environmental Protection and Energy Efficiency Fund. The data on all implemented measures are available in the System for monitoring, measuring and verifying energy savings, which calculates energy savings using a bottom-up methodology.

Title of measure	Savings [PJ]	Savings [tCO ₂]	Total investment amount [HRK]	Total funds disbursed by the Fund [HRK]
RESIDENTIAL BUILDINGS				
Energy renovation programme for family homes (2014-2016)	1.10438	53 709.00	778 492 028.45	487 329 822.20
Energy renovation programme for multi-residential buildings	0.25131	19 825.03	154 535 990.29	61 997 642.77
Introduction of individual heat metering	0.51337	42 331.63	116 930 071.23	46 313 643.72
PUBLIC SECTOR BUILDINGS				
Energy renovation programme for public sector buildings (2014-2015)	0.30125	22 388.49	344 258 164.79	155 309 742.45
Energy renovation programme for public sector buildings (2016-2020)	0	0.00	0.00	0
COMMERCIAL NON-RESIDENTIAL BUILDINGS				
Energy renovation programme for commercial non-residential buildings	0.07073	5 388.05	49 781 776.24	20 279 641.08
PUBLIC LIGHTING				
Energy-efficient public lighting programme	0.19776	19 783.05	160 986 313.89	84 028 721.96
TRANSPORT				
Financial incentives for energy-efficient vehicles	0.083556	7 706.02	207 250 726.57	39 996 341.06
Incentives for eco-driving	0.09159	6 784.91	2 986 214.63	977 649.24
Introduction of CO ₂ emission-based taxation of motor vehicles	0	0.00	0.00	0
TOTAL	2.61395	177 916.18	1 815 221 286.09	896 233 204.48

Source: System for monitoring, measuring and verifying energy savings, CEI

Table 20 shows cumulative savings achieved through alternative policy measures in 2014-2016 as a result of public calls by the Environmental Protection and Energy Efficiency Fund. The data on all implemented measures are available in the System for monitoring, measuring and verifying energy savings, which calculates energy savings using a bottom-up methodology.