



REPUBLIC OF CROATIA
MINISTRY OF THE ECONOMY AND
SUSTAINABLE DEVELOPMENT

Report

on progress towards achieving the national energy efficiency targets for 2020 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
(Text with EEA relevance) (OJ L 315/1, 25.10.2012)

Zagreb, September 2021

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Introduction

By acceding to full membership of the European Union on 1 July 2013, Croatia, like all other Member States, assumed the obligation under 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 (Text with EEA relevance) (OJ L 315/1, 25.10.2012) to increase energy efficiency in the EU in order to achieve the objective of saving 20% of the European Union's primary energy consumption by 2020, compared to projections (with regard to a 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 Croatia is reflected in the country's laws and strategies. The Energy Act highlights energy efficiency as a matter of national interest, while the Energy Efficiency Act (*Narodne novine* (NN; Official Gazette of the Republic of Croatia) Nos 127/14, 116/18, 25/20 and 41/21) encourages energy efficiency and the development of an energy services market.

For that reason, Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council, was adopted on 11 December 2018. The Regulation requires integrated national energy and climate plans covering ten-year periods to be drawn up. The first Integrated Energy and Climate Plan was issued in December 2019 and amended in 2020 and covers the period from 2021 to 2030.

A. Estimate of indicators in the year before last (2019)

I. PRIMARY ENERGY CONSUMPTION

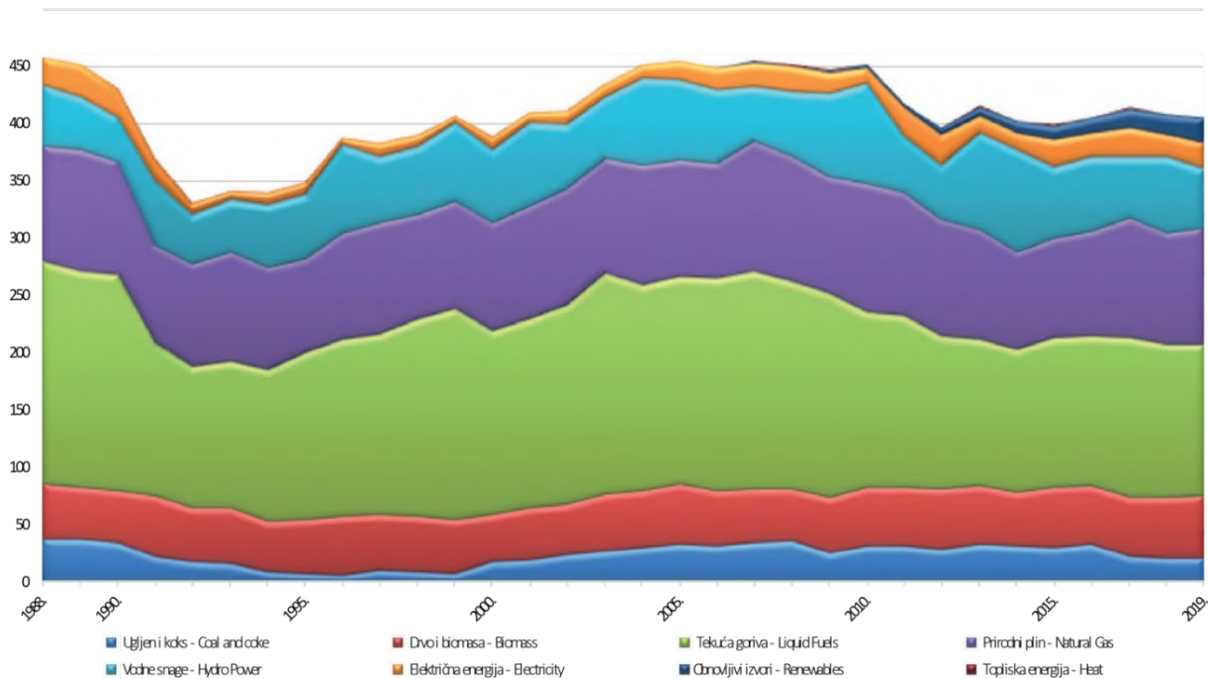
Table 1 gives a breakdown of total energy consumption by form of energy during the 2014–2019 period. Total energy consumption in Croatia fell by 0.8% in 2019 compared to the previous year. At the same time, there was an increase in the consumption of coal and coke (+2.0%), fuel wood and biomass (+1.8%), natural gas (+5.0%), electricity (+13.8%) and renewable energy sources (+27.7%). There was a fall in the consumption of liquid fuels (-1.0%), hydro power (-23.1%) and heat energy (-4.0%). The consumption of heat energy from heat pumps fell by 5.4%, while imported electricity consumption saw the sharpest fall: 22.5%.

Between 2014 and 2019, total energy consumption increased at an average annual rate of 0.2%. During this period, there was a fall in the consumption of coal and coke and of hydro power, while all other forms of energy saw an increase in consumption. The consumption of coal and coke fell at an average annual rate of 8.1%, hydro power at an average annual rate of 10.3%. The consumption of other renewables and imported electricity grew at average annual rates of 16% and 9.2%, respectively. The consumption of liquid fuels and natural gas grew at average annual rates of 1.2% and 3.6%, respectively. The consumption of heat from heat pumps rose at an average annual rate of just 3.1%, while the consumption of fuel wood and biomass rose at an average annual rate of 3.3%.

Table 1 Total energy consumption									
Table 1 Total energy consumption									
	2014	2015	2016	2017	2018	2019		2019/18	2014–19
	PJ							%	
Coal and coke	31.59	29.86	32.14	21.65	20.36	20.77		2.0	-8.1
Biomass	46.12	52.69	52.47	52.09	53.20	54.18		1.8	3.3
Liquid fuels	125.80	130.92	130.78	139.83	134.52	133.21		-1.0	1.2
Natural gas	84.62	87.16	91.08	104.67	96.43	101.22		5.0	3.6
Hydro power	88.99	61.63	65.63	53.81	66.98	51.54		-23.1	-10.3
Electricity	14.23	24.44	19.91	25.03	19.40	22.08		13.8	9.2
Heat	0.52	0.62	0.66	0.67	0.63	0.61		-4.0	3.1
Renewables	10.52	11.36	12.90	16.11	17.32	22.12		27.7	16.0
TOTAL	402.40	398.68	405.56	413.86	408.85	405.72		-0.8	0.2

Source: Energy in Croatia 2019

Figure 1 shows the trend in total energy consumption since 1988.



Source: Energy in Croatia 2019

Figure 1 Total energy consumption in Croatia (source: Energy in Croatia 2019)

Figure 2 gives a breakdown of total energy consumption by energy source in 2019.

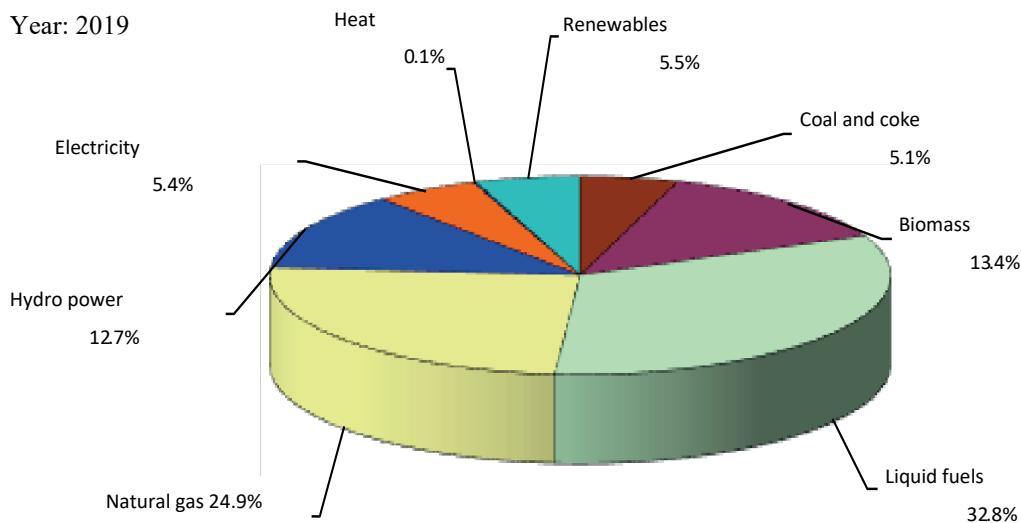


Figure 2 Breakdown of total energy consumption (source: Energy in Croatia 2019)

Liquid fuels accounted for the largest share of total energy consumption in Croatia. Their share stood at 31.3% in 2014, rising to 32.8% by 2019. The shares of other renewables (wind energy, solar energy, geothermal energy, biodiesel and biogas), of fuel wood and biomass, natural gas and imported electricity also increased. The share of other renewables increased from 2.6% to 5.5%, that of fuel wood and biomass from 11.5% to 13.4%. The share of natural gas stood at 21% in 2014, rising to 24.9% in 2019, while the share of imported electricity increased from 3.5% to 5.4%. The share of heat from heat pumps remained unchanged, at a mere 0.1%. There was a fall in the share of other forms of energy out of total energy consumption. The share of coal and coke fell from 7.9% to 5.1%, while hydrological conditions led to a fall in the share of hydro power, from 22.1% in 2014 to 12.7% in 2019.

II. TOTAL FINAL (END-USE) ENERGY CONSUMPTION

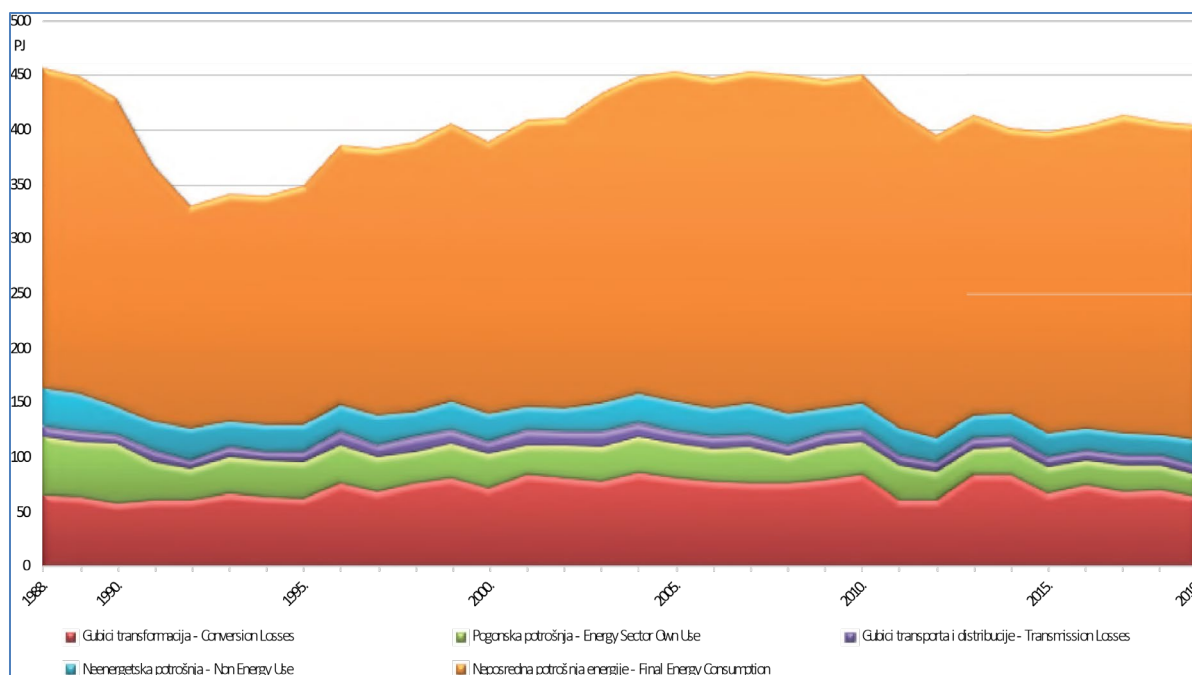
Table 2 gives a breakdown by sector of total energy consumption (referred to in section 1) in Croatia between 2014 and 2019. Total energy consumption rose by 0.9% in 2019 against the previous year. At the same time, conversion losses fell by 7.5%, transmission losses by 5.7%. Final energy consumption rose by 0.9%, non-energy use by 16.7%. Energy consumption for energy sector own use fell by 14.0%.

Between 2014 and 2019, total energy consumption increased at an average annual rate of 0.2%. At the same time, final energy consumption and non-energy use rose at average annual rates of 2.1% and 0.9%, respectively. There was a fall in the share of other sectors out of total energy consumption. Conversion losses, transmission losses and energy consumption for energy sector own use fell at average annual rates of 5.1%, 0.2% and 5.3%, respectively.

Table 2 Breakdown of total energy consumption									
Table 2 Total primary energy supply by sector									
	2014	2015	2016	2017	2018	2019	2019/18	2014-19	
	<i>PJ</i>								
Total primary energy supply	402.40	398.68	405.56	413.86	408.85	405.72	-0.8	0.2	
Conversion losses	83.49	67.23	74.56	68.55	69.34	64.11	-7.5	-5.1	
Energy sector own use	26.72	24.99	22.88	24.41	23.68	20.36	-14.0	-5.3	
Transmission losses	8.87	9.21	9.20	9.01	9.29	8.76	-5.7	-0.2	
Non-energy use	22.60	22.17	21.58	22.34	20.25	23.63	16.7	0.9	
Final energy consumption	260.72	275.07	277.34	289.55	286.28	288.85	0.9	2.1	
- Industry	40.63	40.42	40.30	44.48	44.62	44.75	0.3	1.9	
- Transport	84.53	88.37	90.71	98.04	97.54	101.84	4.4	3.8	
- Other sectors	135.56	146.29	146.33	147.02	144.12	142.26	-1.3	1.0	

Source: Energy in Croatia 2019

Figure 3 gives a breakdown of total energy requirements between 1988 and 2019.



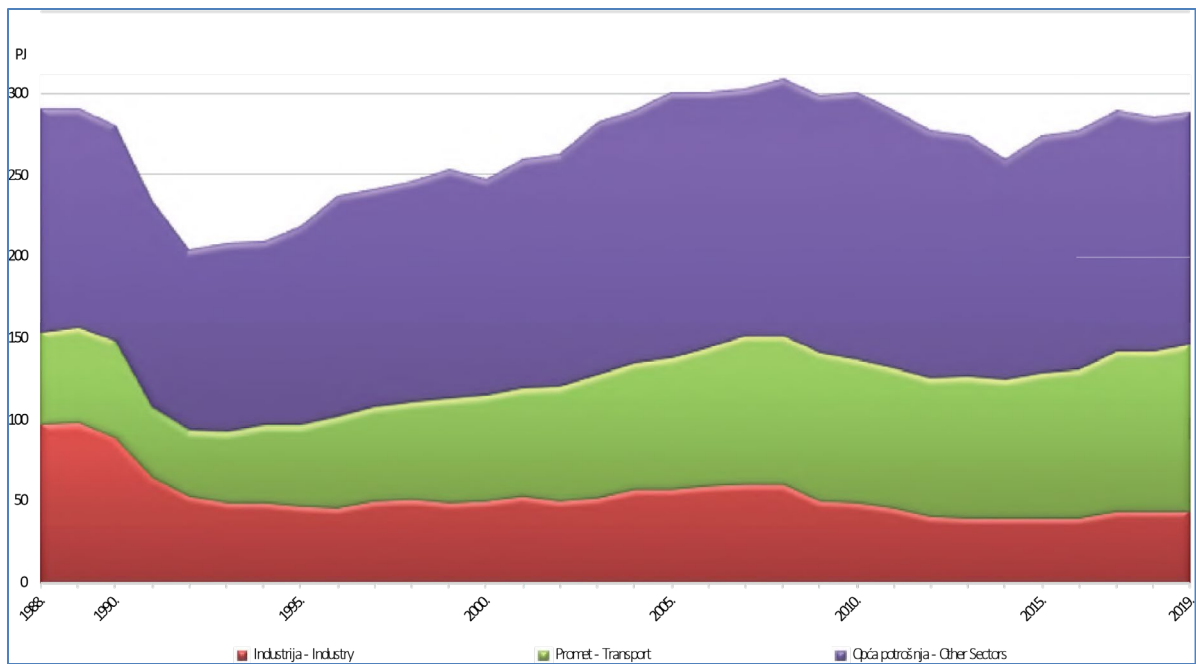
Source: Energy in Croatia 2019

Figure 3 Breakdown of total energy consumption in Croatia

Final energy consumption accounted for the largest share of total energy consumption, rising from 64.8% to 71.2% during the period under review. There was also a rise in the share of non-energy use, from 5.6% to 5.8%, whereas the share of transmission and distribution losses remained unchanged, at 2.2%. There was a decrease in the share of total energy consumption accounted for by other sectors. The share of conversion losses fell from 20.7% to 15.8%, the share of energy sector own use from 6.5% to 5%.

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

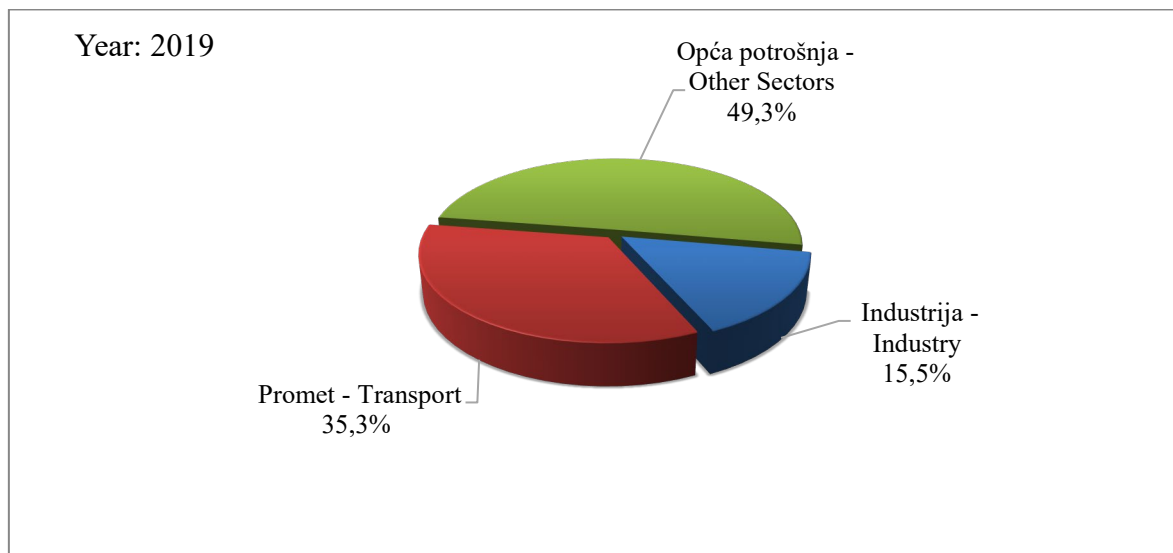
Table 2 provides a breakdown of energy consumption by the three typical end-use sectors: industry, transport and general consumption. Similarly, Figure 4 shows the trend in energy consumption in those three sectors from 1988 to 2019. In comparison with 2018, energy consumption in 2019 increased by 0.3% in industry, falling by 1.3% in the general consumption sector and increasing by 4.4% in the transport sector. The 2014–2019 period saw a trend of increasing energy consumption in industry, at an average annual rate of 1.9%. The transport sector saw energy consumption increase at an average annual rate of 3.8%, while the general consumption sector recorded an average annual increase of 1%.



Source: Energy in Croatia 2019

Figure 4 Final energy consumption by sector

Figure 5 gives a breakdown by sector of final energy consumption in 2019. The general consumption sector accounted for most of the energy used (49.3%), followed by transport (35.3%) and industry (15.5%).



Source: Energy in Croatia 2019

Figure 5 Share of final energy consumption by sector

INDUSTRY

Table 3 gives a breakdown of energy consumption in industry by fuel type between 2014 and 2019. The share of energy consumption accounted for by industry increased by 0.3% in 2019 compared with the previous year. This overall increase was the result of a rise in the consumption of biomass, natural gas, and steam and hot water, and a fall in the consumption of other forms of energy. The highest percentage increase (12.9%) was in the fuel wood and biomass sector. The consumption of natural gas and steam and hot water rose by 2.2% and 7.9%, respectively. The consumption of electricity fell by 2%, coal and coke by 10% and liquid fuels by 3.6%.

During the 2014–2019 period, energy consumption in industry grew at an average annual rate of 1.9%. During that period, there was an increase in the consumption of most forms of energy, except liquid fuels and coal and coke, which fell at average annual rates of 3.9% and 2.2%, respectively. The fastest growth in consumption was recorded by fuel wood and biomass, which grew at an average annual rate of 19.5%. The consumption of electricity, natural gas, and steam and hot water, grew at average annual rates of 1.9%, 3.3% and 3.2%, respectively.

Table 3 Final energy consumption in industry									
Table 3 Final energy consumption in industry, by fuel type									
	2014	2015	2016	2017	2018	2019		2019/18	2014–19
	<i>PJ</i>							%	
Coal and coke	8.54	8.05	7.61	8.81	8.48	7.64		-10.0	-2.2
Fuel wood and biomass	0.92	1.17	0.98	1.25	1.99	2.24		12.9	19.5
Liquid fuels	2.40	2.19	2.02	2.06	2.04	1.96		-3.6	-3.9
Gaseous fuels	7.21	7.30	6.85	7.88	8.29	8.48		2.2	3.3
Electricity	11.59	12.09	12.08	12.74	13.00	12.74		-2.0	1.9
Steam and hot water	9.98	9.62	10.77	11.74	10.83	11.68		7.9	3.2
TOTAL	40.63	40.42	40.30	44.48	44.62	44.75		0.3	1.9

Source: Energy in Croatia 2019

TRANSPORT

Table 4 gives a breakdown of energy consumption in transport by fuel type between 2014 and 2019. In 2019, energy consumption in the transport sector increased by 4.4% compared to consumption in 2018. There was an increase in the consumption of liquid biofuels, jet fuel and diesel fuel, and a decrease in the consumption of other energy products. There was a very high percentage increase in biofuel consumption, which rose by 132.1%. Consumption of jet fuel increased by 7.9%, diesel fuel by 5.5%. Consumption of motor spirit and electricity fell by 5.9% and 2.4%, respectively. Consumption of liquefied and natural gas was down by 6.3% and 5.9%, respectively.

Between 2014 and 2019, energy consumption in the transport sector increased at an average annual rate of 3.8%. There was a downward trend only in the consumption of motor spirit; all other forms of energy

saw an increase in consumption. The consumption of motor spirit fell at an average annual rate of 2.2%. The consumption of diesel fuel posted an increase of 5.2%, compared to 10% for jet fuel. The average annual rate of increase in consumption of liquefied gases was 1.8%, electricity 3.9%. The consumption of natural gas grew at a rate of 4.3%, while liquid biofuels saw the fastest increase in consumption, at an average annual rate of 16%.

Table 4 Final energy consumption in transport									
<i>Table 4 Final energy consumption in transport, by fuel type</i>									
	<i>2014</i>	<i>2015</i>	<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2019/18</i>	<i>2014–19</i>	
	<i>PJ</i>							<i>%</i>	
Liquid biofuels	1.25	1.02	0.04	0.02	1.13	2.62	132.1	16.0	
LPG	2.83	3.14	3.32	3.32	3.30	3.09	-6.3	1.8	
Natural gas	0.13	0.14	0.15	0.18	0.18	0.17	-5.9	4.3	
Motor spirit	23.26	23.20	23.29	22.41	21.78	20.77	-4.6	-2.2	
Jet fuel	5.46	5.30	5.60	6.61	8.14	8.78	7.9	10.0	
Diesel oil	50.59	54.52	57.22	64.35	61.79	65.21	5.5	5.2	
Fuel oils	0.02								
Electricity	0.99	1.05	1.09	1.16	1.23	1.20	-2.4	3.9	
TOTAL	84.53	88.37	90.71	98.04	97.54	101.84	4.4	3.8	

Source: Energy in Croatia 2019

Table 5 shows energy use broken down by form of transport between 2014 and 2019. Energy consumption increased in air, road, and maritime and river transport in 2019. Energy consumption remained unchanged in rail transport and fell among other forms of transport. Energy consumption rose by 7.8% in air transport, 4.3% in road transport, and 3.8% in maritime and river transport. Energy consumption fell by 1.7% in public urban transport and by 27.3% in other forms of transport.

During the 2014–2019 period, energy consumption increased among most forms of transport, rail transport being the only sector that saw a fall in energy consumption, at an average annual rate of 2.5%. The average annual rate of increase in energy consumption in air transport was 10%, compared with 3.5% for road transport. There was an increase in energy consumption in maritime and river transport on the one hand, and public urban transport on the other, at average annual rates of 2.4% and 1.1%, respectively. Other forms of transport saw an increase in consumption, at an average annual rate of 4.7%.

Table 5 Energy consumption by form of transport								
<i>Table 5 Final energy consumption by form of transport</i>								
	2014	2015	2016	2017	2018	2019	2019/18	2014–19
	<i>PJ</i>						<i>%</i>	
Rail transport	1.43	1.30	1.34	1.34	1.26	1.26	0.0	-2.5
Road transport	74.17	78.37	80.26	86.37	84.29	87.93	4.3	3.5
Air transport	5.56	5.40	5.71	6.75	8.29	8.94	7.8	10.0
Maritime and river transport	1.93 1.35	1.84 1.35	1.87 1.41	1.98 1.46	2.10 1.45	2.18 1.42	3.8 -1.7	2.4 1.1
Urban public transport	0.09	0.11	0.12	0.14	0.16	0.11	-27.3	4.7
Non-specified	84.53	88.37	90.71	98.04	97.54	101.84	4.4	3.8
TOTAL TRANSPORT	1.43	1.30	1.34	1.34	1.26	1.26	0.0	-2.5

Source: Energy in Croatia 2019

GENERAL CONSUMPTION (HOUSEHOLDS, SERVICES, AGRICULTURE AND CONSTRUCTION)

The general consumption sector comprises the household, service, agriculture and construction sectors. Table 6 gives a breakdown of energy consumption in the general consumption sector by fuel type between 2014 and 2019. The share of energy consumption accounted for by general consumption fell by 2% in 2019 compared with the previous year. Consumption was down 1.3% against the previous year. There was a fall in the consumption of fuel wood and biomass, as well as liquid fuels, while all other forms of energy saw an increase in consumption. Consumption of fuel wood fell by 2.8%, liquid fuels by 5.1%. Consumption of natural gas rose by a mere 0.1%, electricity by 0.5%, and heat by 1.3%. Consumption of other renewables rose by 4.9%, while consumption of coal rose by 8.9%.

Between 2014 and 2019, energy consumption in the general consumption sector increased at an average annual rate of 1%. Most forms of energy saw an increase in consumption during this period, with fuel wood and biomass, liquid fuels and coal seeing a fall in consumption. Consumption of fuel wood and biomass fell at an average annual rate of just 0.1%, liquid fuels at an annual rate of 1.3%, and coal 4.1%. Consumption of other renewables and natural gas rose sharply compared with other energy products, at average annual rates of 5.8% and 3.4%, respectively. Consumption of electricity and heat increased at average annual rates of 1.6% and 0.5%, respectively.

Table 6 Final energy consumption in the general consumption sector								
Table 6 Final energy consumption in the general consumption sector, by fuel type								
	2014	2015	2016	2017	2018	2019	2019/18	2014-18
	PJ						%	
Coal	0.11	0.09	0.10	0.12	0.09	0.09	8.9	-4.1
Fuel wood and biomass	42.88	48.84	47.50	46.02	43.97	42.72	-2.8	-0.1
Liquid fuels	19.80	20.82	20.51	20.19	19.58	18.58	-5.1	-1.3
Gaseous fuels	24.45	26.52	28.06	28.92	28.84	28.87	0.1	3.4
Electricity	40.76	42.01	41.87	43.55	43.81	44.02	0.5	1.6
Heat	6.85	7.20	7.43	7.34	6.94	7.03	1.3	0.5
Renewables	0.71	0.81	0.86	0.88	0.90	0.95	4.9	5.8
TOTAL	135.56	146.29	146.33	147.02	144.12	142.26	-1.3	1.0

Source: Energy in Croatia 2019

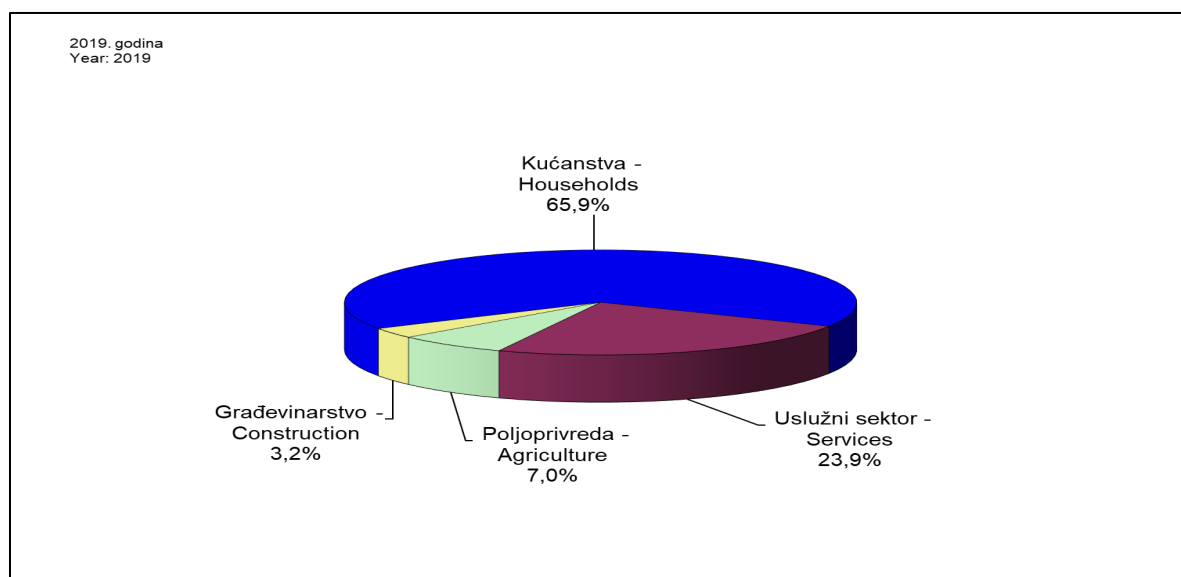
Table 7 gives a breakdown of energy consumption in the general consumption sector, by sub-sector, between 2014 and 2019. Total energy consumption in the general consumption sector fell by 1.3% in 2019 compared with the previous year, with consumption increasing in services, agriculture and construction, but falling in the household sector, by 2.6%. Compared with the previous year, energy consumption in services rose by 0.9%, in agriculture by 1.1% and in construction by 5.6%.

During the 2014–2019 period, energy consumption grew at an average annual rate of 1%. All sectors saw an increase in energy consumption, although growth was negligible in the household sector. In the services sector, energy consumption increased at an average annual rate of 3.9%, compared with 1.8% in the construction sector. In agriculture, energy consumption rose at an average annual rate of 0.5%.

Table 7 Final energy consumption in the general consumption sector								
Table 7 Final energy consumption in the general consumption sector, by sub-sector								
	2014	2015	2016	2017	2018	2019	2019/18	2014-19
	PJ						%	
Households	93.63	101.68	100.85	100.15	96.23	93.71	-2.6	0.02
Services	28.06	30.80	31.65	33.22	33.73	34.05	0.9	3.9
Agriculture	9.70	9.64	9.78	9.65	9.84	9.94	1.1	0.5
Construction	4.16	4.16	4.05	4.00	4.32	4.56	5.6	1.8
TOTAL GENERAL CONSUMPTION	135.56	146.29	146.33	147.02	144.12	142.26	-1.3	1.0

Source: Energy in Croatia 2019

Figure 6 gives a breakdown by sector of total energy consumption in the general consumption sector in 2019. During that period, the services and construction sectors saw an increase in their share, the household and agriculture sectors a fall in their share, of consumption. Most energy was consumed by households, whose share fell from 69.1% to 65.9%. The share of the services sector rose by 3.2 percentage points, to 23.9% in 2019, while the share of the construction sector increased by just 0.1 percentage points, to 3.2% in 2019. The share accounted for by agriculture fell from 7.2% to 7% in 2019.



Source: Energy in Croatia 2019

Figure 6 Energy consumption in the general consumption sector

IV. GROSS VALUE ADDED BY SECTOR

Table 8 Gross value added			
Gross value added – GVA	2017	2018	2019
Industry	HRK 303 700 000 000	HRK 316 681 000 000	HRK 329 674 000 000
Services*	HRK 208 693 000 000	HRK 238 672 000 000	HRK 249 745 000 000

Source: Croatian Bureau of Statistics (https://www.dzs.hr/Hrv_Eng/Pokazatelji/Bruto_domaci_proizvod_Godisnji.xls)

* **BDV usluge** = **BDV** ukupno – (**BDV1** + **BDV2** + **BDV3** + **BDV4**)

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*

V. DISPOSABLE HOUSEHOLD INCOME

Table 9 Disposable household income

	2018	2019
Disposable annual household income	HRK 97 870	HRK 105 932

Source: Croatian Bureau of Statistics (https://www.dzs.hr/Hrv_Eng/publication/2019/14-01-01_01_2019.htm, Indicators of poverty and social exclusion, 2019)

In 2019, average monthly gross earnings stood at HRK 8 766, average monthly net earnings at HRK 6.457.

Source: Croatia Bureau of Statistics, [Average monthly net and gross earnings of persons in paid employment in 2019](#)

VI. GROSS DOMESTIC PRODUCT

Table 10 Gross domestic product – GDP

	2019
Gross domestic product – GDP	HRK 402 332 000 000
Gross domestic product per capita – GDP per capita	EUR 13 349 per capita

Source: Croatian Bureau of Statistics, Croatian Central Bank (<https://www.hnb.hr/en/statistics/main-macroeconomic-indicators>)

VII. ELECTRICITY GENERATION FROM THERMAL POWER GENERATION

Table 11 Electricity generation from thermal power generation

<i>GWh</i>	2018	2019	2018/19 %
Generation			
<i>- thermal power plants</i>	1472.30	1666.60	13.2

Source: Energy in Croatia 2019

VIII. ELECTRICITY GENERATION FROM COMBINED HEAT AND POWER, INCLUDING INDUSTRIAL WASTE HEAT

Table 12 Electricity generation from combined heat and power, including industrial waste heat

<i>GWh</i>	2018	2019	2018/19 %
Generation			
<i>- public cogeneration plants</i>	2595.5	3149.3	21.3
<i>- industrial cogeneration plants</i>	366.7	369.5	0.8

Total	2962.2	3518.8	
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Source: Energy in Croatia 2019

IX. HEAT GENERATION FROM THERMAL POWER GENERATION

Thermal power plants in Croatia do not produce heat alone; they produce heat alongside electricity in a co-generation process. The figures for heat energy obtained from these processes are shown in section X 'Heat generation from combined heat and power plants, including industrial waste heat'.

Heat generation in thermal power plants under this heading is therefore equal to zero.

X. HEAT GENERATION FROM COMBINED HEAT AND POWER PLANTS, INCLUDING INDUSTRIAL WASTE HEAT

Table 13 Heat generation from combined heat and power plants, including industrial waste heat			
<i>GWh</i>	2018	2019	2019/18 %
Generation			
- public cogeneration plants	3046.67	3201.94	5.1
- industrial cogeneration plants	2468.89	2531.67	2.5
Total	5515.56	5733.61	

Source: Energy in Croatia 2019

XI. FUEL INPUT FOR THERMAL POWER GENERATION

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

Table 14 Fuel input for thermal power generation						
	Coal	Petroleum products	Gas	Biogas	Biomass	
	1000 toe	1000 toe	1000 toe	1000 toe	1000 toe	1000 toe
2019						
Public electricity plants	336.2	0.8	0.4	8.3	0.0	
Public CHP plants	0.0	0.2	526.3	70.1	214.6	

(Source: Hrvoje Požar Energy Institute)

XII. PASSENGER-KILOMETRES (PKM)

The transport sector is currently one of the largest energy consumers in Croatia. The sector's share of final energy consumption increased from 21.7% in 1991 to 34.1% in 2018, which shows that there is enormous scope for energy efficiency measures to be implemented. The potential for increasing efficiency lies mostly in optimising the mix of forms of transport, maximising the exploitation of capacities of means of transport and deploying more efficient motor vehicles and appropriate driving regimes.

The official statistics provided (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 2012 to 2018. The figures are based on modelling and give a realistic picture of relations among individual modes of transport.

Table 15 Passenger-kilometres		2012	2013	2014	2015	2016	2017	2018	2019
Motor cars – petrol	[10 ⁹ pkm]	14.669	14.347	13.322	13.616	13.798	13.465	13.283	12.843
Motor cars – diesel	[10 ⁹ pkm]	17.873	18.474	18.71	21.087	22.235	25.068	24.633	27.137
Motor cars – electric	[10 ⁹ pkm]	0.002	0.003	0.003	0.008	0.01	0.01	0.011	0.013
Motor cars – CNG	[10 ⁹ pkm]	0.003	0.002	0.003	0.002	0.002	0.003	0.003	0.003
Motor cars – LPG	[10 ⁹ pkm]	1.596	1.647	1.73	1.968	2.076	2.092	2.095	1.978
Aircraft	[10 ⁹ pkm]	0.158	0.15	0.154	0.153	0.164	0.172	0.175	0.166
Motorcycles	[10 ⁹ pkm]	0.234	0.232	0.22	0.227	0.22	0.224	0.226	0.230
Buses (diesel)	[10 ⁹ pkm]	6.389	6.899	6.607	8.002	8.218	8.431	8.735	8.155
Buses – CNG	[10 ⁹ pkm]	0.032	0.068	0.122	0.128	0.145	0.169	0.166	0.148
Trains	[10 ⁹ pkm]	1.104	0.858	0.927	0.951	0.836	0.745	0.756	0.734
Trams – electric	[10 ⁹ pkm]	1.128	1.094	1.06	1.227	1.271	1.233	1.139	1.080
Total	[10 ⁹ pkm]	43.187	43.775	42.857	47.369	48.976	51.613	51.221	52.488

Source: Hrvoje Požar Energy Institute

As can be seen in Figure 7, passenger cars account for by far the largest share of passenger-kilometres travelled. The number of passenger-kilometres travelled by passenger car is determined by the number of registered passenger cars, the average annual distance travelled, and average car occupancy. The share of passenger transport by road in Croatia is higher than the share at EU level. The figures do not include urban public transport by tram.

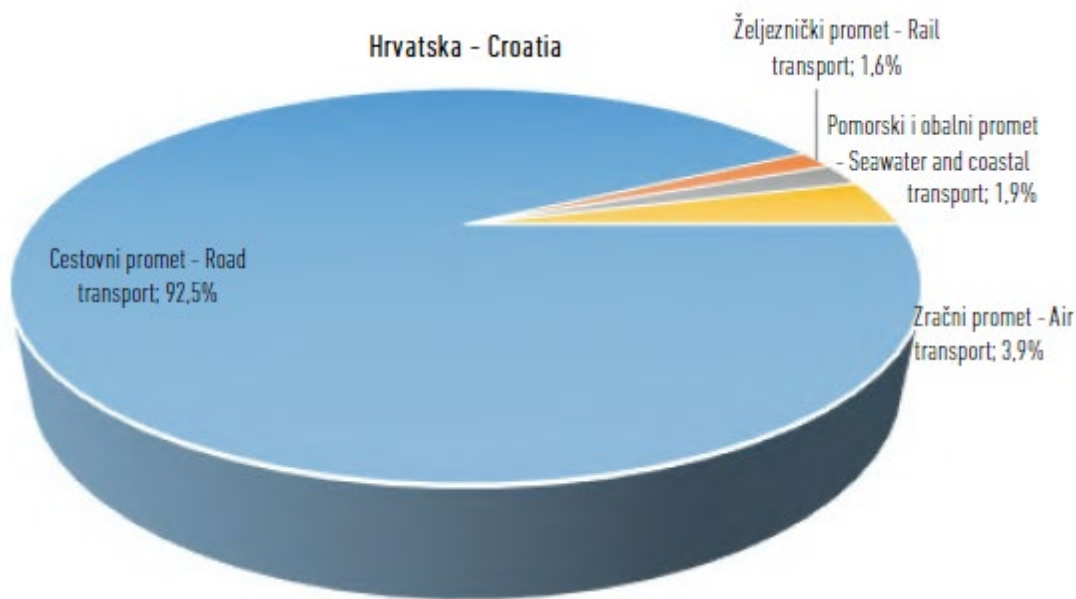


Figure 7 Breakdown of passenger-kilometres by form of passenger transport in Croatia in 2019
Source: Energy in Croatia 2019

The increase in the number of vehicles seen over recent years continued in 2019, with the number of registered passenger cars in Croatia reaching 1 727 694 (approx. 425 cars per 1 000 inhabitants).

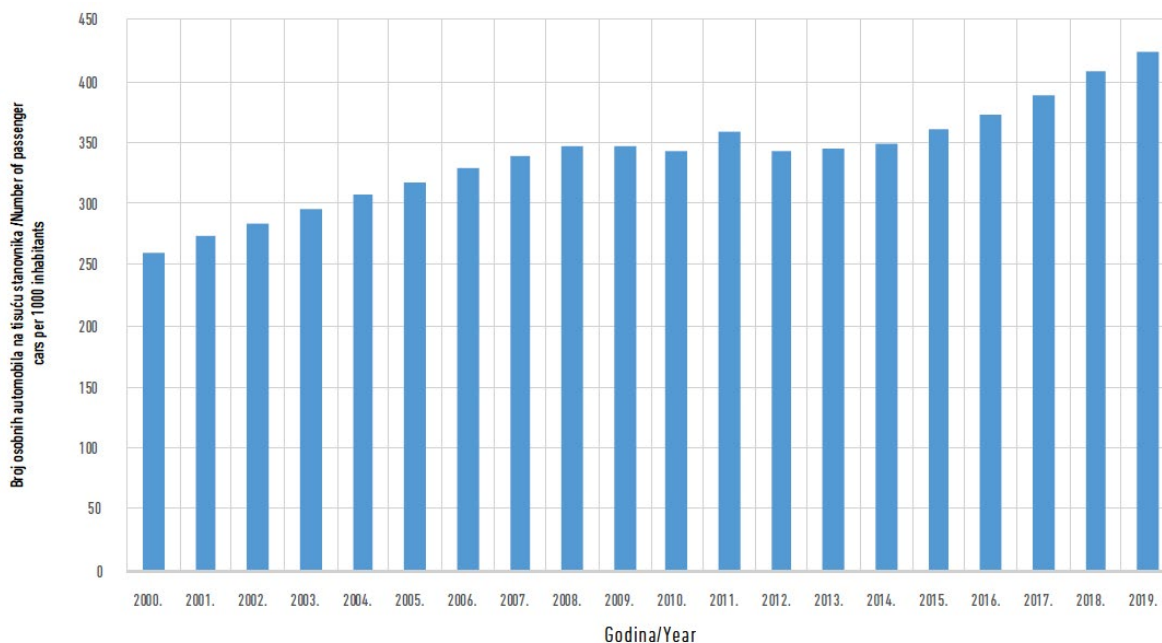


Figure 8 Number of passenger cars per 1 000 inhabitants in Croatia during the period under review
Source: Energy in Croatia 2019

Croatia saw a sharp increase in the proportion of diesel cars during the period under review (1995-2019). Out of the total number of passenger cars, the share of petrol cars fell from 80.5% in 1995 to 42.8% in 2019, while the share of diesel cars grew from 17.5% to 53.8% during the same period. The share of liquefied petroleum gas (LPG) cars increased from 2.0% in 1995 to 3.0% in 2019.

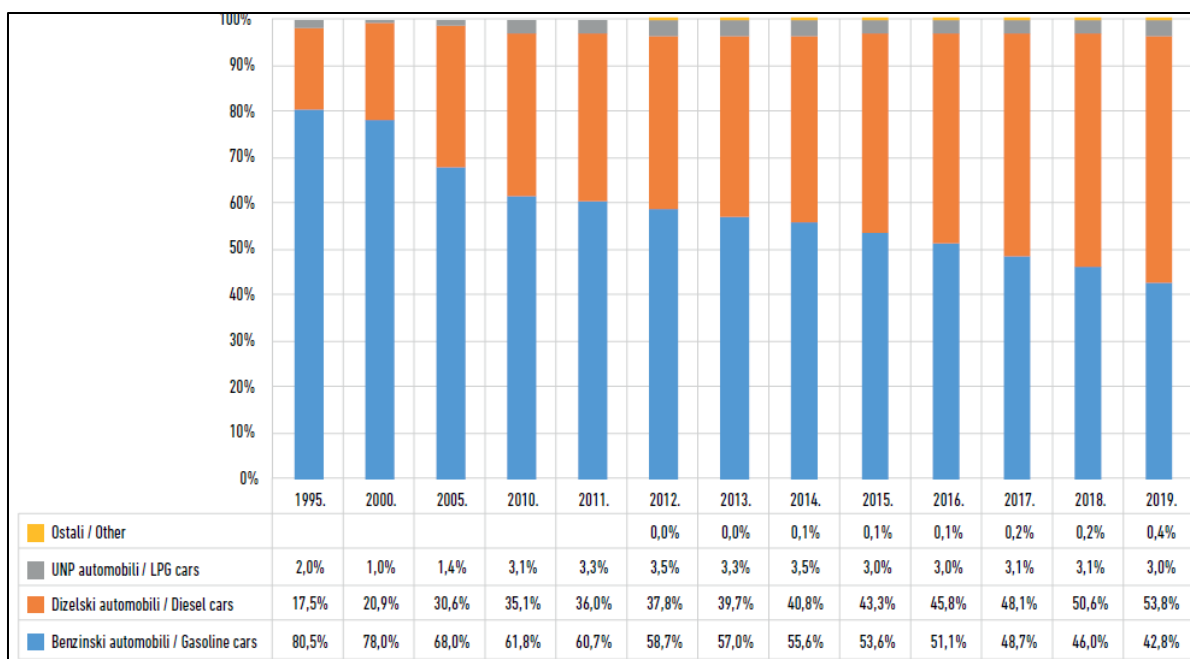


Figure 9 Breakdown of passenger cars by fuel type (1995–2019)

Source: Energy in Croatia 2019

XIII. TONNE-KILOMETRES (TKM)

The key indicator of energy efficiency in the transport sector is the breakdown of the various modes of transport, where, for example, a larger share of rail transport is an indicator of a higher degree of energy efficiency in freight transport. The tonne-kilometre breakdown (Figure 10) shows that in Croatia freight is transported primarily by road.

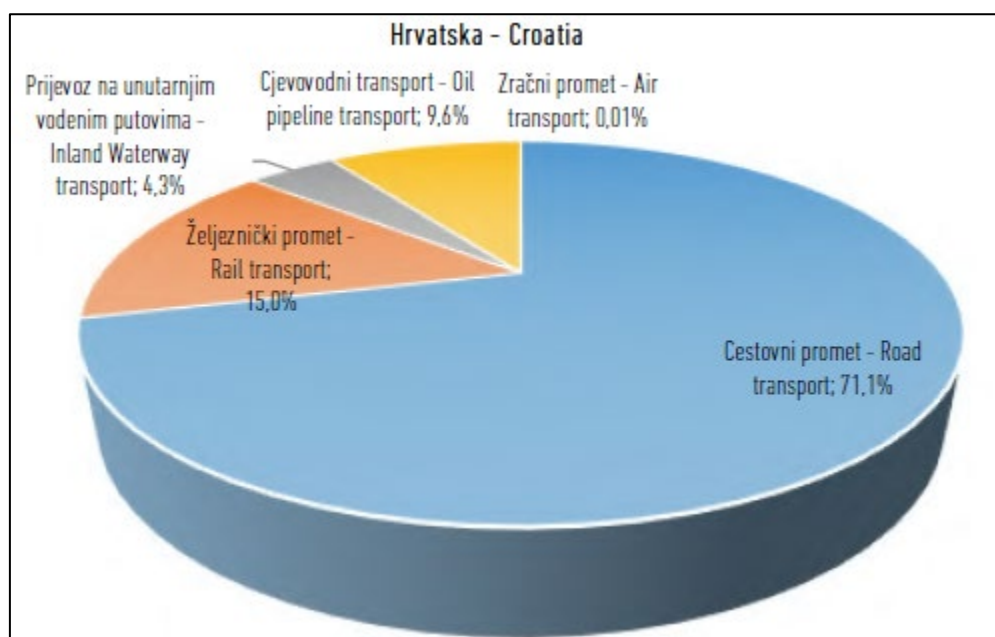


Figure 10 Breakdown of tonne-kilometres in freight transport in Croatia in 2019

Source: Energy in Croatia 2019

It should be noted that the figures for maritime and coastal transport are not included. This distorts the picture somewhat, since the large distances covered in international shipping result in a significant share of tkm across the EU.

Table 16 gives a breakdown of tonne-kilometres.

Table 16 Tonne-kilometres					
		2016	2017	2018	2019
Road transport	[10 ⁹ tkm]	11.653	13.538	13.261	13.836
Rail transport	[10 ⁹ tkm]	2.166	2.592	2.745	2.911
Pipeline transport	[10 ⁹ tkm]	1.921	2.111	2.315	1.871
Air transport	[10 ⁹ tkm]	0.002	0.002	0.002	0.002
Inland waterway transport	[10 ⁹ tkm]	0.836	0.813	0.678	0.835
TOTAL	[10⁹ tkm]	16.578	19.056	19.001	19.455

Source: Hrvoje Požar Energy Institute

XIV. COMBINED TRANSPORT KILOMETRES

The preceding sections provide data for passenger-kilometres and tonne-kilometres separately.

XV. POPULATION

Number of inhabitants: 4 065 253 (of whom 1 970 084 are male, 2 094 569 are female)

Number of households: 1 519 038 (average number of household members: 2.80)

(Source: Croatian Bureau of Statistics, 2019 Statistical Yearbook)

Population density per km²: 71.8

Capital city: Zagreb (807 254 inhabitants)

Language: Croatian

Script: Latin alphabet

Currency: Croatian kuna (HRK)

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

MAJOR LEGISLATIVE AND NON-LEGISLATIVE MEASURES IN 2020

In 2020, an Act amending the Energy Efficiency Act (*Narodne novine* (NN; Official Gazette of the Republic of Croatia) No 25/20) was adopted. The most important legal provision adopted under that Act is a change to the level of compensation for energy savings not achieved that exceed 10% of the obligation. Also adopted in 2020 were Rules on the system for monitoring, measuring and verifying energy savings (NN No 33/20), which introduced new measures for increasing energy efficiency.

Based on the amendment of the Energy Efficiency Act and the abovementioned Rules, the application for the systematic monitoring, measuring and verification of energy savings (the SMIV application) has been upgraded. Formulas and reference values have been added for new energy efficiency measures, along with a functionality for monitoring sales of energy savings.

Alternative energy efficiency measures continued to be implemented in 2020, while the scope of the energy efficiency obligation scheme was widened to include all energy suppliers and their associated companies that are also energy suppliers, where they, in all, delivered more than 100 GWh of energy in 2018 to final customers or distribution stations that sell energy to final customers.

As far as non-legislative measures are concerned, the programme for co-financing energy efficiency measures continued to be implemented using both national and EU funds. The results of those measures are presented in section E.

C. The total building floor area of the buildings with a total useful floor area over 500 m² and as of 9 July 2015 over 250 m² owned and occupied by the Member States' central government that, on 1 January of the year in which the report is due, did not meet the energy performance requirements referred to in Article 5(1)

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

D. The total building floor area of heated and/or cooled buildings owned and occupied by the Member States' central government that was renovated in the previous year referred to in Article 5(1) or the amount of energy savings in eligible buildings owned and occupied by their central government as referred to in Article 5(6)

Croatia's target for the energy savings equivalent to the energy renovation of 3% of state building stock per year was calculated as 0.00489 PJ per year. The 2020 target has not been reached. Although 205 projects involving the energy renovation of public sector buildings were completed in 2020, none of those buildings were owned or used by the central government. We should point out that 2020 was a

particularly difficult year, since in the midst of the COVID-19 pandemic Croatia was hit by severe earthquakes which greatly slowed down and shifted the deadlines for building renovations.

Table 18 3% rate of renovation of central government buildings		
	Planned annual energy savings target	Energy savings achieved in 2020
3% rate of renovation of central government buildings	0.00489 PJ	0.00 PJ

Source: National Energy Efficiency Coordination Body, System for measuring and verifying energy savings

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

Croatia's target under Article 7 stands at **54.250 PJ** of cumulative energy savings among final customers between 2014 and 2020, which corresponds to annual savings of **1.938 PJ**. To meet this target, Croatia has opted for a dual approach: the application of alternative measures, and an energy efficiency obligation scheme. The aim is to achieve 50.1% of the target using alternative policy measures and 49.9% using the energy efficiency obligation scheme.

The energy efficiency obligation scheme has been up and running since 2019. A total of 32 obligated parties were members of the scheme in 2020. Their total energy saving obligation for 2020 stood at 341 468 998 kWh, or **1.228564 PJ**. Energy suppliers that entered the energy saving obligation scheme in 2020 were able to report all savings achieved by them between 2014 and 2020. Table 19 shows the new savings reported each year during that period, the total energy savings for each year, and the cumulative savings for the 2014–2020 period. The obligation scheme achieved total cumulative energy savings of 23.7380 PJ between 2014 and 2020. New measures undertaken in 2020 achieved savings of 0.2627 PJ.

NB: The savings shown represent all savings reported by obligated parties entered in the System for monitoring, measuring and verifying energy savings, or reported in obligated parties' mandatory reports. These savings are a result of the measures undertaken in the final energy consumption sectors, but also in the generation, transmission and distribution of energy.

Table 19 Savings achieved in 2020 through the energy efficiency obligation scheme

Energy efficiency obligation scheme	Energy savings [PJ]						
	2014	2015	2016	2017	2018	2019	2020
New energy savings achieved during the year [PJ]*	0.4165	2.1011	0.9082	2.0307	0.9749	0.7487	0.2627
Total energy savings achieved during the year [PJ]**	0.4165	1.9358	2.5347	4.2307	4.7254	5.0241	4.8708
Cumulative energy savings during the 2014–2020 period [PJ]***	23.7380						

* New savings during the year are savings achieved in projects carried out that year.

** Total savings during the year are savings achieved in projects carried out that year and in previous years and which, given the lifetime of the measure, are still 'live' this year.

*** Cumulative energy savings achieved during the first cumulation period.

Table 20 shows the alternative policy measures set out in the Third and Fourth National Energy Efficiency Action Plans, which were implemented through public calls for tenders issued by the Ministry of Construction and Physical Planning for co-financing the energy renovation of multi-residential buildings and public sector buildings using resources from the European Structural and Investment Funds (ESIF) and the Operational Programme 'Competitiveness and Cohesion' 2014–2020 (OPCC).

Alternative energy efficiency measures in manufacturing industries are being implemented using resources from the European Regional Development Fund (ERDF), the OPCC – Subsidies to companies and Capital aid using EU funds.

Moreover, calls for tenders under the Environmental Protection and Energy Efficiency Fund for energy renovation of family homes, energy-efficient vehicles, and the installation of condensing boilers, also helped achieve the energy efficiency targets using alternative measures.

The data on all measures carried out are available in the System for monitoring, measuring and verifying energy savings, which calculates energy savings using a bottom-up methodology. Alternative policy measures in 2020 achieved total energy savings of 0.29567 PJ, which corresponds to 15.26% of the annual target.

Table 20 - Savings achieved in 2020 through alternative policy measures

Title of measure (for 2020)	Saving [kWh]	Saving [PJ]	Saving [tCO ₂]	Total investment amount [HRK]	Total funds disbursed [HRK]
RESIDENTIAL BUILDINGS					
Energy renovation of family homes	7 058 398.50	0.02541	1 256.93	35 847 788.98	23 315 276.54
Energy renovation of multi-residential buildings	4 434 819.90	0.01597	1 206.84	24 100 456.67	12 978 174.84
Installation of condensing boilers in buildings/family homes that were damaged in the earthquake of 22 March 2020.	9 477 322.26	0.03412	1.13	16 740 369.60	12 791 816.19
PUBLIC SECTOR BUILDINGS					
Energy renovation of public buildings	31 563 977.67	0.1136	7 627.55	280 025 828.79	162 122 997.94

COMMERCIAL NON-RESIDENTIAL BUILDINGS					
Energy renovation of commercial non-residential buildings	2 256 737.39	0.00809	623.82	14 842 265.23	8 368 963.91
PUBLIC LIGHTING					
Energy efficiency in public lighting systems	2 730 574.13	0.00983	901.09	18 711 898.19	17 540 152.35
INDUSTRY					
Energy efficiency in manufacturing industries	21 033 615.90	0.07570	6 251.51	137 685 273.19	52 282 319.93
TRANSPORT					
Energy-efficient vehicles	3 596 446.98	0.01295	832.35	74 165 488.92	21 954 782.66
TOTAL	82 151 892.73	0.29567	18 701.22	602 119 369.57	311 354 484.36

Source: System for monitoring, measuring and verifying energy savings (SMIV)

EPEEF (Environmental Protection and Energy Efficiency Fund) – Projects under these measures are co-financed using the Fund's national resources.

OPCC (Operational Programme 'Competitiveness and Cohesion') – Projects under these measures are co-financed using EU resources under the European Fund for Regional Development in accordance with the OPCC.