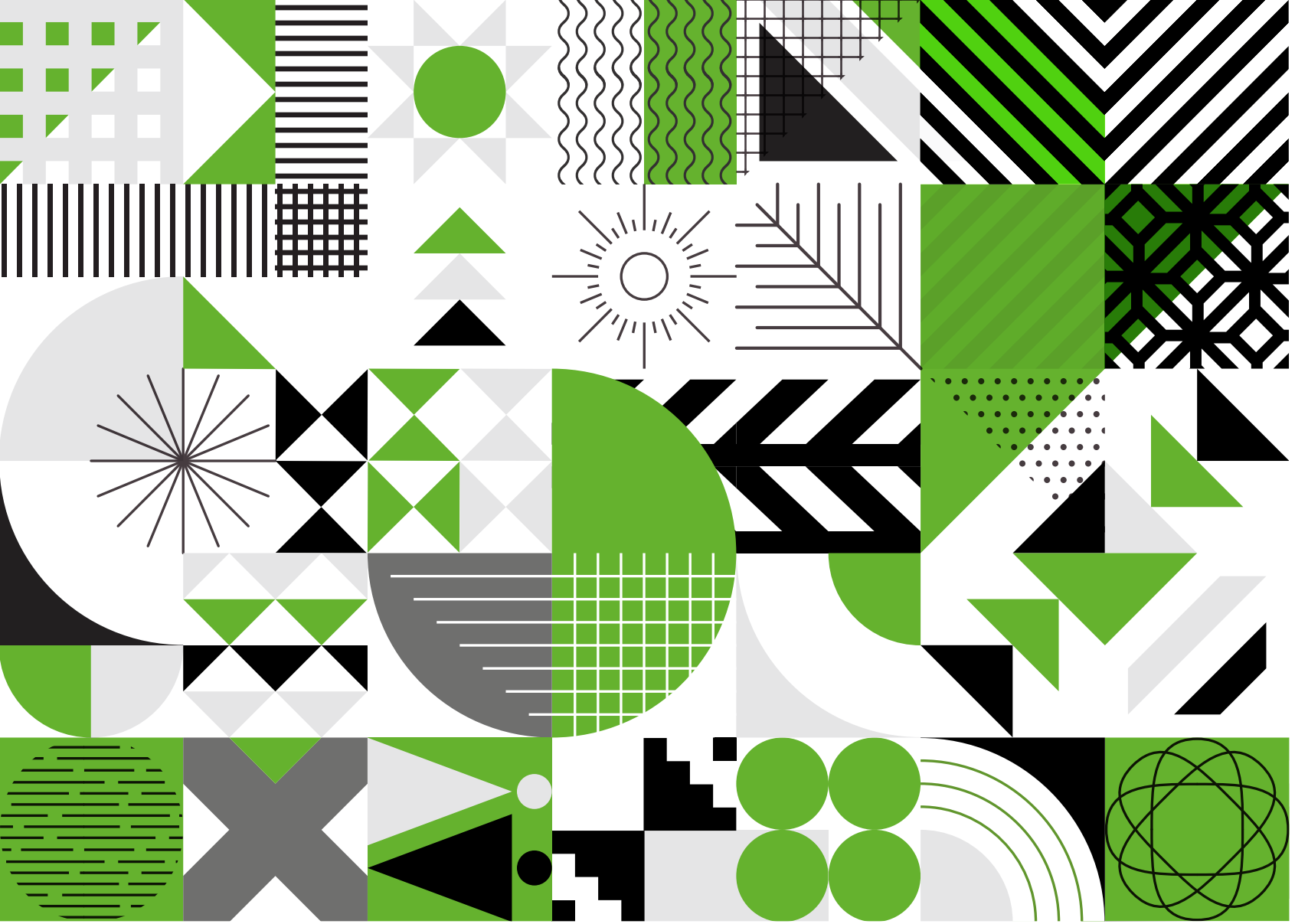
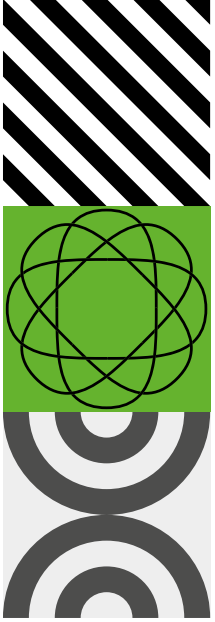


2017

REPORT ON THE

ENERGY SECTOR IN SLOVENIA

Agencija za energijo



REPORT ON THE

ENERGY SECTOR IN SLOVENIA

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FOREWORD

Establishing a single, connected and competitive energy market, providing a reliable supply and achieving climate goals also in 2017 significantly influenced activities on the Slovenian energy market.

Due to changes in the global environment the Slovenian energy sector is facing challenges that must enable sustainable use of natural sources and at the same time competitiveness and security of supply. All this is reflected in the increased use of renewable resources, which gradually replace conventional fossil fuels, better energy efficiency and in more demanding end consumers that are also becoming producers, some of them even self-sufficient. Transition to clean energy demands the development of smart grids so that their effects would create the market with flexibility and the possibility for an active participation of consumers. Especially in these areas in 2017 the scope of smart grid projects and the introduction of new technologies expanded, of which 14 projects are carried out within international and two within the Slovenian partnerships.

In the electricity market in 2017, the competitiveness of the retail markets increased and liquidity of wholesale markets improved. Due to the increased economic growth electricity and natural gas consumption grew as well. The competitiveness and efficiency of the natural gas market are also increasing, the supply of gas was not interrupted at any time during the year.

Public tenders for investors to submit projects for production facilities for electricity generation from RES and CHP to enter the support scheme are carried out as a competitive selection process. In 2017 was selected 135 projects for electricity generation from RES with a total installed capacity of 124.9 MW, and 36 projects for CHP with a total installed capacity of 34.5 MW. The actual realization of these projects also depends on spatial planning and obtaining environmental permits. Growth or changes in the share of energy from RES in total gross final consumption and changes in RES per individual sectors in the period 2005–2017 show that it is necessary to set targets and measures of the climate-energy policy of Slovenia if we want by 2020 at least approach the

target shares. We are bound by the objectives of the EU and Paris climate agreement as well as the responsibility towards our planet and society as a whole.

In enabling consumers to exercise their rights, we can observe increased awareness on both areas – at supplier switches and exercising their rights, whereby the reason for switching a supplier is not only a price but also a whole set of supplier's flexibility. Digitization and informatization of energy management and an open market namely allow consumers to participate in active management with energy, both – in production and demand response.

In the area of efficient use of energy, the suppliers of energy products that are obliged to implement measures for achieving energy savings in 2017 achieved a total of 580.1 GWh of energy savings and with that exceeded mandatory savings by 187%. Heat supply from the distribution systems was provided in 64 municipalities, and consumption of heat from these systems was by 2.3% higher than the year before.

These are just some key highlights from the report that is being produced in order to present the situation and development of the electricity and natural gas market, achievements of the objectives in the areas of electricity production from renewable sources and cogeneration, the energy savings with the efficient use of energy, and heat supply. The report includes analysis, data, and highlights, which are an important foundation for making decisions in national energy policy and decisions related to the development and investments in the power sector.

The report would not be possible without a lot of data, therefore we are grateful to all participants of the Slovenian energy market for cooperation and of course, thank you to dedicated colleagues for careful collection and processing of data, as well as detailed analysis of energy market activities.

Mag. Duška Godina,
director

2

DEVELOPMENT IN THE **ENERGY MARKETS**

In 2017 the competitiveness of the retail electricity market and liquidity of wholesale markets increased. The supply of natural gas was uninterrupted, gas prices were lower also in 2017 and more and more follow the movement of prices on developed wholesale markets. The implementation of the European network codes is being carried out successfully and contributing to the competitiveness and efficiency of the markets with electricity and natural gas.

Development of technology and competitive selection procedures for projects significantly decreased financial support for production of electricity from renewable sources

Up to **35%** lower price of natural gas for households than ten years ago

2.1 The development of the electricity market

We can establish that the competitiveness of the retail electricity market in 2017 increased and at the same time the liquidity of wholesale markets grew as well, which was reflected in the reduction of retail electricity prices. The retail market was again appealing for new suppliers entries. Electricity consumption in comparison with the year before increased by 2.7% and economic growth stimulated electricity consumption and with that caused significant price growth on the regional wholesale markets. On the Slovenian power exchange, the average Base price increased by 39%, or 49.5 EUR/MWh, which is close to the price level in 2012. According to Eurostat the electricity price for households in the EU in the second half of 2017 in comparison with the same period the year before decreased by 0.2%, and in Slovenia by one percent. The share of taxes and levies in the final price for households on average in the EU was 40%; differences between the Member States were significant, while in Slovenia this share was around 42%.

Consumers' awareness of their rights on the electricity market is growing since more and more consumers have a positive experience with supplier switches. Reasons for switching supplier are not only the price but also the whole of flexible suppliers' services provided for consumers. In 2017 in the retail market was important the group purchase of electricity which was for the second time carried out by Slovenian Consumers' Association. The number of consumers that signed new contracts for the purchase of electricity and gas was higher by 13,000, which is 19% of all supplier switches in 2017.

A final electricity consumer is more and more involved in the development of the electricity market and supply. Digitization and informatization of energy management and an open market namely allow consumers to participate in an active management with energy, both – in production and demand response. Fulfilment of conditions for an active involvement of consumers are the challenges of smart grids development and innovative activities. In this area energy companies already implement different development projects. System operators in 2017 continue work on many projects, which are parts of international projects and will help find solutions for the management of consumers' flexibility, network operation, and better utilization of electricity generation. Part of these projects was classified among the projects that were recognized as pilot or investment projects by the Energy Agency and for which the system operator is entitled to non-refundable financial incentives within the regulatory period 2016–2018.

With a package of measures called Clean Energy for all Europeans the European Commission wants the EU to lead the clean energy transition. The main goals of the legislative proposal are putting energy efficiency first, achieving global leadership in renewable energies and providing a fair deal for consumers. Consumers are becoming more and more active and central players on the energy markets.

Along with discussion of the new proposal, the implementation of already adopted measures from the third energy package from 2009 took place, which requires better cooperation of the TSOs for the efficient functioning of the common energy market. At the end of 2017, eight network codes were in force, allowing complete integration of trading zones in the EU. These codes demand from the TSOs that by 2022 at the latest, also at the national level, defined the rules governing cross-border capacity and congestion management, network operation, and reliability of electricity supply. Network codes significantly affect national system operators, electricity producers, traders, and consumers, and at the same time provide better security of supply and more competitive market for the Slovenian end consumers.

2.2 The development of the natural gas market

Changes in the Slovenian market for natural gas are constantly present since the beginning of the market opening. The implementation of the European regulation together with with the amendments of the Slovenian legislation is successfully underway and contributes to the competitiveness and efficiency of the market. In the future, we can expect harmonisation of the transmission tariffs since the rules were adopted and enforced that will uniform the requirements for the publication of information related to the determination and comparison of transmission tariffs.

From the beginning of 2017, the gas consumption is charged in energy units to all consumers; such charging enables direct comparison of costs and consumption of different energy products and identification of competitive advantages of individual energy sources. Consumers received this charging well, while suppliers and system operators carried out all the necessary activities in due time. Gas prices were in 2017 lower and more and more follow the movement of prices on developed wholesale markets.

The supply of natural gas was not interrupted. At the beginning of the year the consumption of gas was due to low temperatures high, nevertheless, the suppliers provided enough natural gas volumes. There were no

interruptions of supply even during the accident in Baumgartner hub when the supply through the Ceršak entry point was terminated for several hours without prior notice. In order to ensure further gas supply, the Energy Agency as a competent authority for the security of gas supply announced the level of early warning, which represents the first stage of a crisis.

For the third consecutive year, the consumption of the Slovenian consumers of gas increased, and the transfer to other transmission systems in the last quarter of 2017 decreased due to fewer lease agreements on annual transmission capacity at entry and exit points. System users optimized their leased transmission capacity in a way that they replaced their long-term agreements with short-term ones and by purchasing capacity in the secondary capacity market.

Suppliers of natural gas have been increasing for several years the share of gas purchased on the basis of short-term contracts. Some years ago the natural gas was mainly imported directly from Russia under long-term contracts, but at present suppliers are buying gas mostly in Austria under short-term contracts.

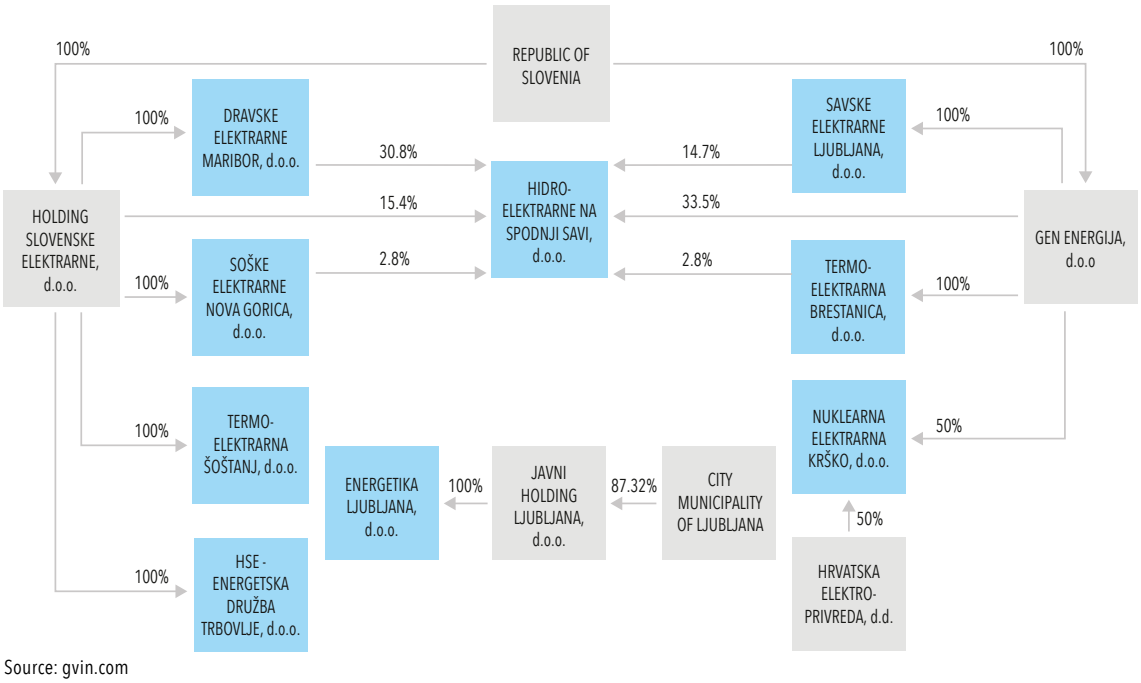
The wholesale natural gas market was in 2017 livelier, in particular, the balance groups' leaders performed numerous trading transactions. Compared to previous year, a strong decline of trading on the trading platform was detected, which was the result of smaller deviations of balance groups' leaders. On the trading platform, the balancing price was formed, which indicates a strong correlation with prices on the neighbouring hub and strong connection between the two markets.

The number of supplier switches in 2017 did not increase, although natural gas prices had fallen and consumers could choose between a larger number of suppliers and supply offers. The natural gas price for households in the EU according to Eurostat data decreased significantly in the second half of 2017 compared to the same period last year; in Slovenia, the drop was the largest – as much as 5.5%.

2.3 Ownership of energy companies

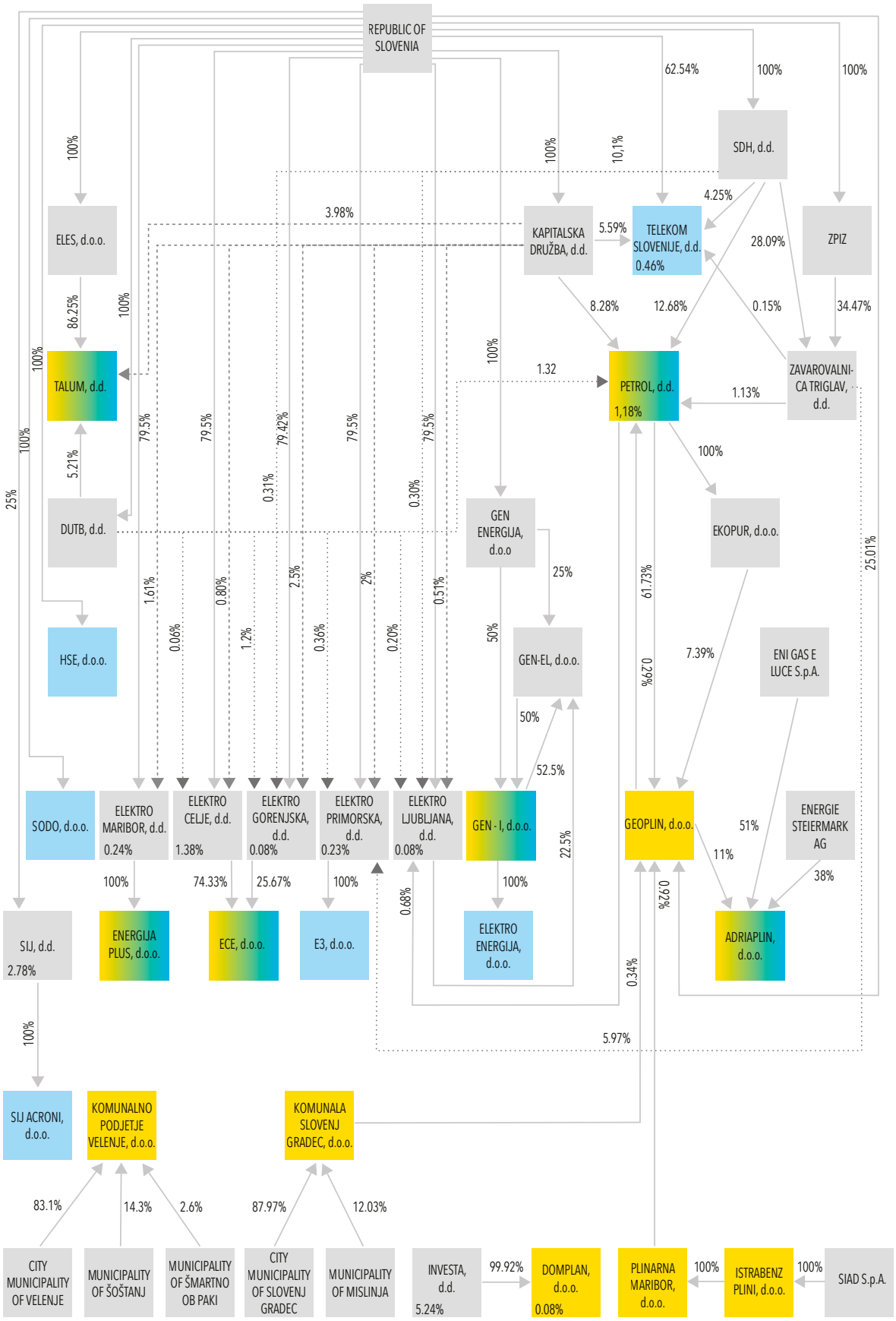
There are changes in numbers of suppliers, their services and in their integration or ownership relations. In recent years, the number of suppliers, which provide the supply with electricity and gas, has increased; there have been also some mergers of suppliers. The competitiveness and transparency of the energy market is also influenced by the ownership structure of large electricity production companies. Figure 1 and 2 show the ownership structure of electricity natural gas suppliers in Slovenia in May 2018 (at the time of writing this report). The structure includes the suppliers to end consumers. More about market transparency is described in the chapter on electricity (3.3.1.2 and 3.3.2.2) and gas (4.3.1.2 and 4.3.2.2) wholesale and retail market transparency.

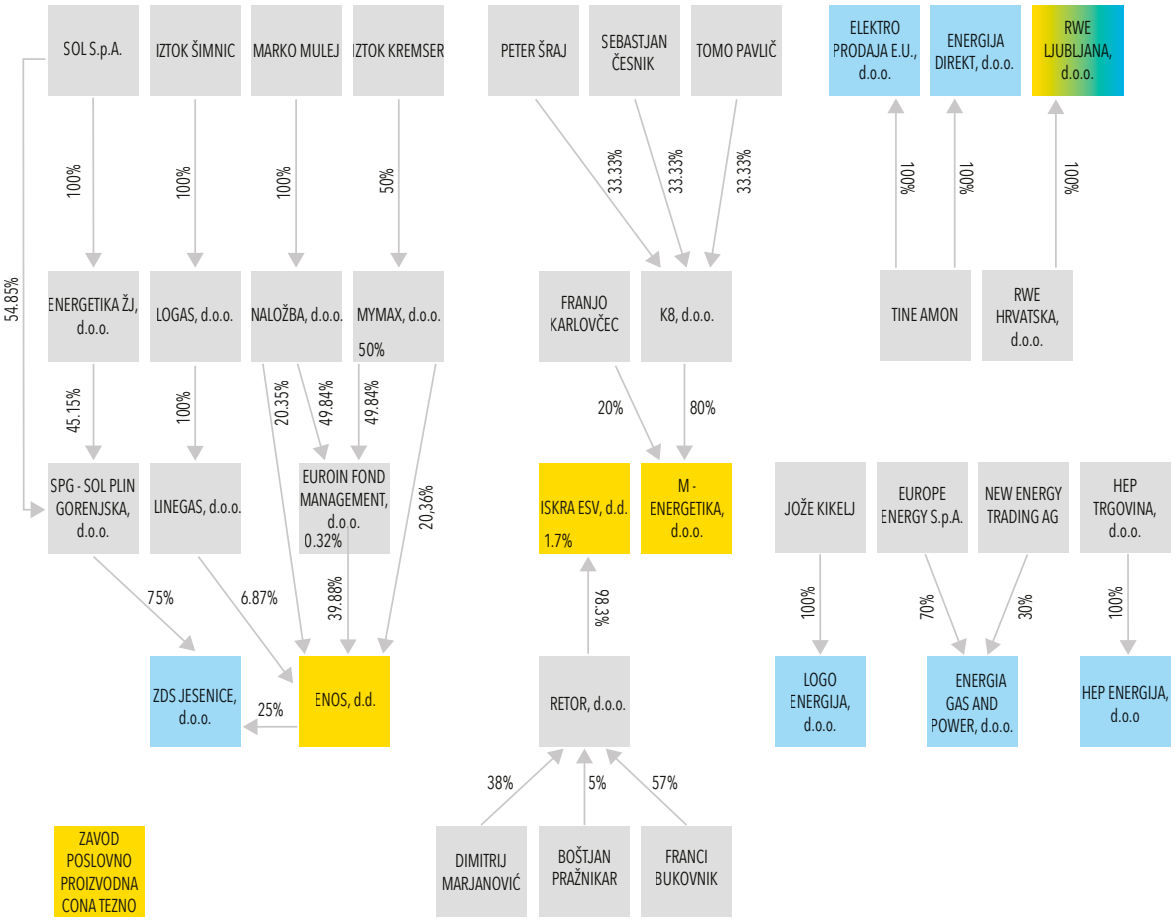
Figure 1: Ownership structure of electricity and natural gas suppliers - May 2018



Source: gvin.com

Figure 2: Ownership structure of electricity producers with installed capacity more than 10 MW - May 2018





Natural gas supplier Electricity supplier Electricity and natural gas supplier

Source: gvin.com

3

ELECTRICITY

In 2018, 30% of electricity was produced from renewable sources; total electricity consumption increased by 2.7%, and the number of household consumers by 0.5%. As many as 57% of consumers on the distribution system were at the end of 2017 already equipped with smart meters. The range of smart grid projects increased as well. The wholesale electricity market was well developed, the retail market was open and competitive, and there were 21 suppliers active.

€ 143.5
million paid support for production of electricity from RES and CHP

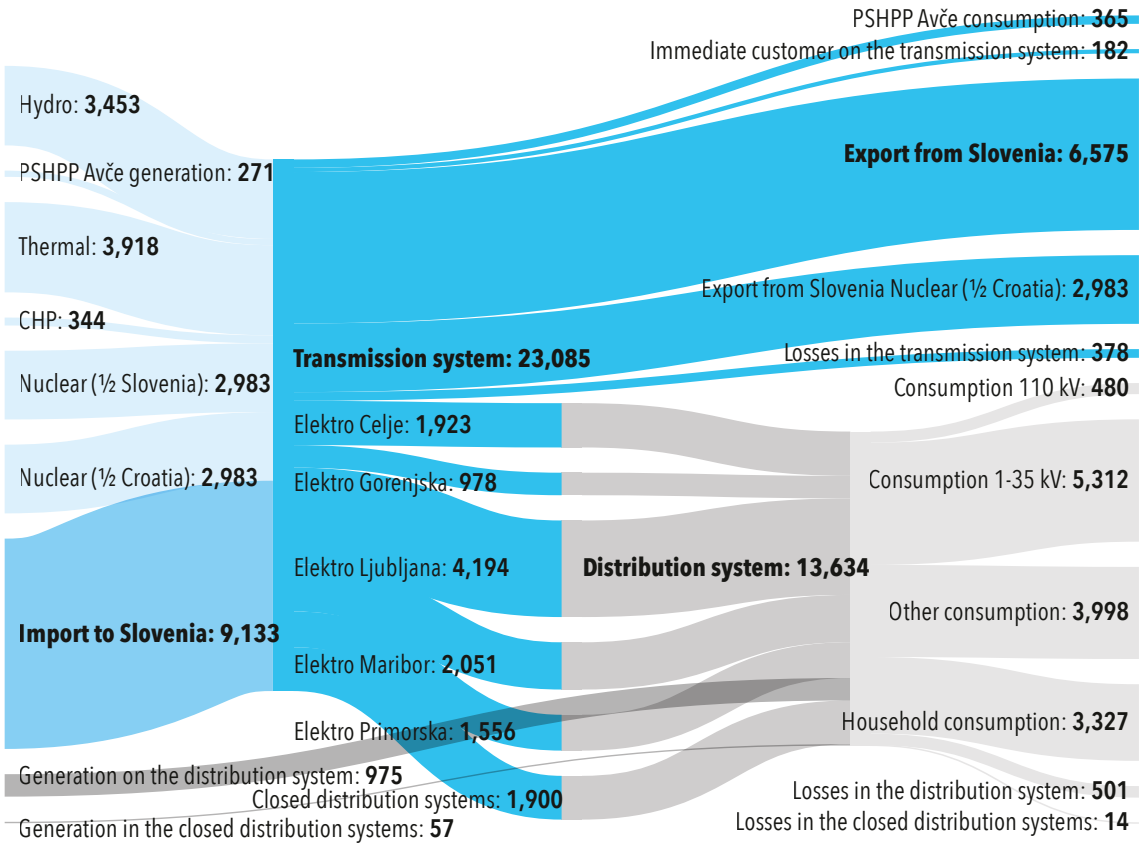
17.1%
of electricity import dependency in Slovenia

3.1 The balance of electricity supply and demand

14,984 GWh
of electricity delivered, of which 4,479 GWh or 30% from production facilities using RES

In Slovenia, in 2017 to the transmission and distribution system 14,984 GWh of electricity was delivered, which was 249 GWh less than in 2016. The delivery from facilities using RES was 4,479, which is 616 GWh less than the year before, generating plants using fossil fuels contributed 4,539 GWh or 176 GWh less than in 2016. The nuclear power plant Krško delivered 5,966 of electricity or 543 GWh more than the year before. These quantities are taken from the balance sheets of electricity producers on the basis of physical flows.

Figure 3: Balance between electricity supply and demand on the transmission and distribution system in 2017 in GWh



Sources: Electricity system operators, Energy Agency

In 2017, to the distribution system 1,032 GWh of electricity from the production connected to the distribution system was delivered. In internal consumers' networks additional 353 GWh of electricity or 25% of all electricity generated in facilities that are connected to the distribution system and closed distribution systems, which means 2 percentage points more than in 2016.

Table 1: Electricity delivered to the transmission and distribution systems in 2016 and 2017

Electricity delivered to the transmission system in GWh	2016	2017
Dravske elektrarne Maribor	2,826	2,312
Savske elektrarne Ljubljana	342	289
Hidroelektrarne na spodnji Savi	392	456
Soške elektrarne Nova Gorica	455	396
PSHPP Avče generation	278	271
Total Hydro	**4,293**	**3,725**
TPP Šoštanj	4,061	3,909
TPP Brestanica	3	9
TPP Trbovlje	–2	0
Javno podjetje Energetika Ljubljana	338	344
Total TPP IN CHP	**4,401**	**4,262**
Nuclear power plant Krško	5,423	5,966
Total Nuclear	**5,423**	**5,966**
Electricity delivered to the transmission system	**14,117**	**13,952**

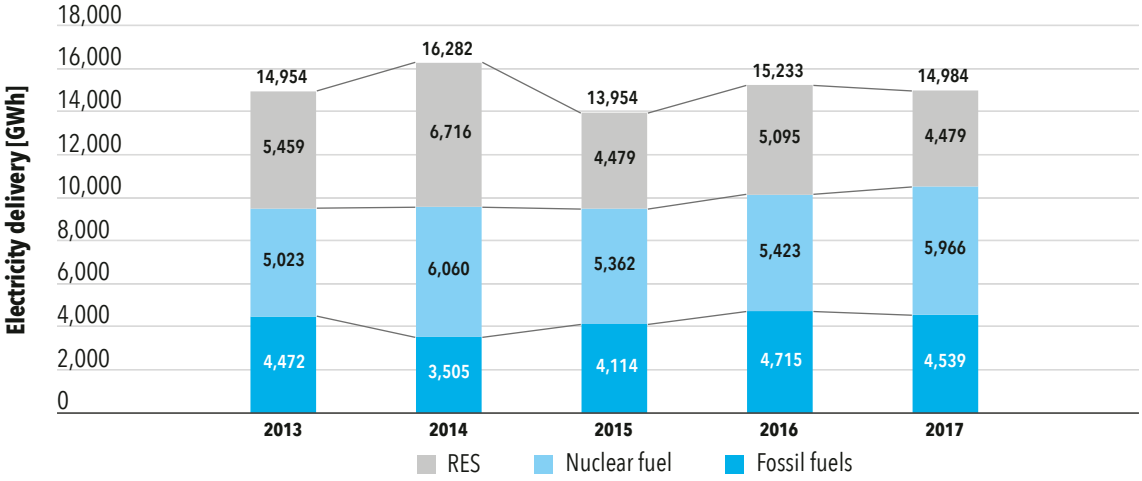
Electricity delivered to the distribution system in GWh	2016	2017
Hydro up to 1 MW	201	169
Hydro above 1 MW	183	154
Facilities using wood biomass	53	56
Wind power plants	5,78	5,72
Solar power plants	235	250
Facilities using biogas	116	112
Waste-to-energy plants	8,91	7,11
Total RES	**802**	**754**
Total conventional sources	**314**	**277**
Electricity delivered to the distribution system	**1,116**	**1,032**
Total delivery of electricity	**15,233**	**14,984**

Sources: Electricity system operators, Energy Agency

Domestic production sources by taking into account half of the production from the Krško Nuclear Power Plant contributed 12,001 GWh of electricity, and the consumption of end consumers amounted to 14,468 GWh of electricity, of which 90 GWh of electricity exported to Italy from DTSs Vrtojba and Sežana is not included. In 2017, 82.9% of electricity consumption in Slovenia was covered with domestic production sources, and electricity import dependency was 17.1%.

To the Slovenian power system new generation capacity of 18 MW was connected; facilities, connected to the distribution system contributed 17 MW, and 1 MW facilities connected to the closed distribution systems. New and renovated hydropower plants with total nominal capacity of 11.1 contributed the largest share of this increase. The important share of the increase in production capacities also contributed new solar power plants with 4.7 MW and units for CHP with 1 MW. There we no major shutdowns of existing production facilities.

Figure 4: Electricity delivered to the transmission and distribution systems in the period 2013–2017



Sources: Electricity system operators, Energy Agency

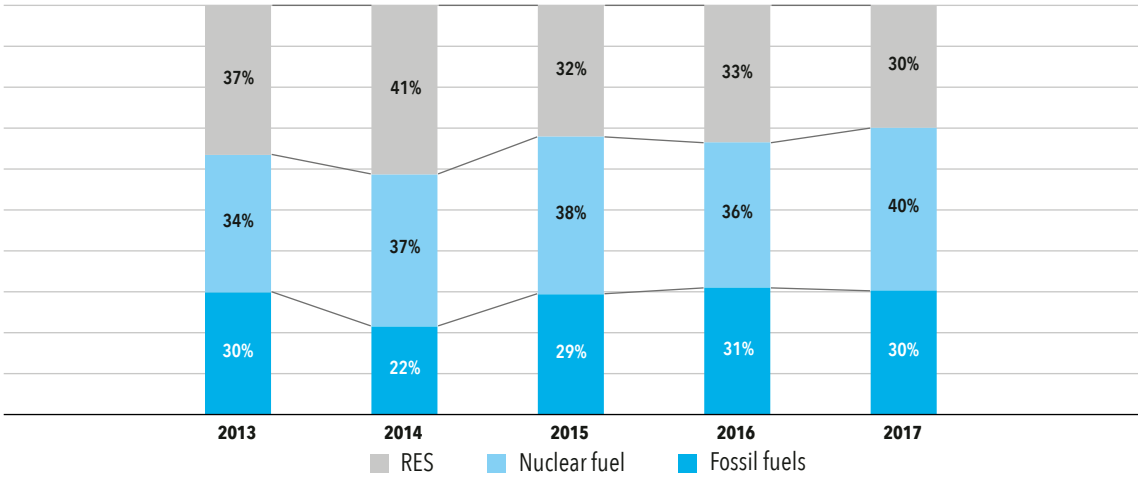
The share of electricity generated in hydro power plants and facilities using RES annually varies, depending on hydrological and other conditions, and the investments in new generating facilities using RES. In 2017 this share was around 30% of all electricity produced in Slovenia, which is three percentage points less than the previous year. Plants using fossil fuels contributed around 30%, around one percentage point that the year before, and Krško nuclear power plant 40% of all generated electricity.

Table 2: Primary energy sources for electricity generation in 2017

Primary energy sources for electricity generation	GWh	Delež
Fossil fuels	4,539	30%
Nuclear fuel	5,966	40%
RES	4,479	30%
- hydro	4,048	
- wind	5.72	
- solar	250	
- biomass	175	
Total delivery of electricity	**14,984**	

Sources: Electricity system operators, Energy Agency

Figure 5: Shares of primary electricity sources in the period 2013–2017



Sources: Electricity system operators, Energy Agency

At the end of 2017, a total of 950,257 final electricity consumers were connected to the Slovenian power system. In comparison with 2016, their number increased by 4,815, or 0.5%. The number of households with two-metering consumption increased by 1.2% and by 1.1% the number of households with single tariff metering. In 2017, to the distribution system 609 business and 77 household consumers with an installed production unit. Also to the distribution system were connected 27 business and 867 household consumers sing self-consumption.

0.5%
more final consumers of electricity than in 2016
odjemalcev električne energije kot v letu 2016

The number of business consumers on the transmission system did not change in comparison with the previous year. Three business consumers are connected to the transmission system on five delivery points and four operators of closed distribution systems on five locations, supplying electricity 239 business and 67 household consumers. Of these, 14 business consumers were connected with with an installed production unit, and nine business consumers on closed distribution systems were self-suppliers of electricity.

Table 3: Number of consumers by the type of consumption in 2016 and 2017

Number of consumers by the type of consumption in 2016 and 2017	2016	2017
Business consumers connected on the transmission system	3	3
Consumption of PSHPP Avče	1	1
All consumers connected to the transmission system	**4**	**4**
Business consumers on to the distribution system	106,649	107,463
Household consumers	838,505	842,484
– single tariff metering	260,407	257,586
– two-tariff metering	578,098	584,898
All consumers connected to the distribution system	**945,154**	**949,947**
Business consumers on the closed distribution systems	221	239
Household consumers	63	67
All consumers connected to the closed distribution systems	**284**	**306**
All end consumers	**945,442**	**950,257**

Sources: Electricity system operators, Energy Agency

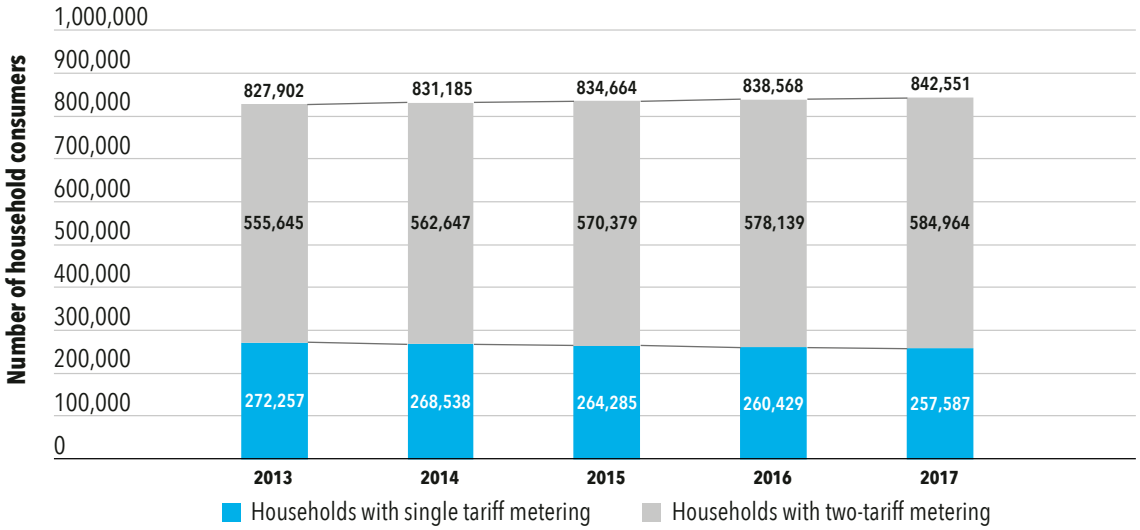
Table 4: Number of consumers by the type of consumption in 2017

Final consumers - connection types	Without connected production facilities	Installed production unit	Self-consumption	Total
Business	106,827	609	27	107,463
Households	841,540	77	867	842,484
All final consumers on the distribution system				**949,947**
Business	216	14	9	239
Household	67	-	-	67
All final consumers on the closed distribution systems				**306**
All final consumers				**950,257**

Sources: Electricity system operators, Energy Agency

Figure 6 shows the trend in the number of household consumers in the period 2013–2017. The total number of these consumers during this period increased on average by 0.4% per year. The number of households with two-tariff metering has been increasing on average by 1.3%, while the number of households with single tariff metering has been constantly decreasing. Data indicate an increased share of consumers with two-tariff metering, who can adjust their consumption and use more electricity during the low tariff and with that lower their costs. Thus, especially by using advanced metering equipment with built-in control device, consumers can use lower tariff rates between 22:00 and 6:00 and during weekends and holidays, which is an additional incentives for savings.

Figure 6: Number of household consumers in the period 2013–2017



Sources: Electricity system operators, Energy Agency

3.1.1 Electricity generation

In 2017, in Slovenia the following nine companies were operating large facilities with a capacity of over 10 MW:

- Termoelektrarna Šoštanj (TEŠ),
- Nuklearna elektrarna Krško (NEK),
- Dravske elektrarne Maribor (DEM),
- Savske elektrarne Ljubljana (SEL),
- Soške elektrarne Nova Gorica (SENG),
- Hidroelektrarne na spodnji Savi (HESS),

– Termoelektrarna Brestanica (TEB),
– Javno podjetje Energetika Ljubljana (JPEL),
– HSE – Energetska družba Trbovlje (HSE ED Trbovlje).

Production companies in Slovenia differ in their generation and primary energy sources for electricity generation. Companies DEM, SEL, HESS, and SENG, generate electricity in hydroelectric power plants (HPP), TEŠ in thermoelectric power plant, TEB and HSE ED Trbovlje are operating on liquid and gaseous fuel, NEK in a nuclear power plant, and JPEL cogenerates heat and electricity in a cogeneration process using coal and wood biomass. The company HSE ED Trbovlje was established from the former company Termoelektrarna Trbovlje, which was in liquidation since December 2014. Taken into the account the changed market situation, the conclusion of the Slovenian Sovereign Holding (SDH), and the general assessment of Holding Slovenske elektrarne (HSE) as its sole shareholder, which describe that it is reasonable to preserve and upgrade the power supply location at the TET, the liquidation of Trbovlje Thermoelectric Power Plant was suspended on 1 January 2018 . The new company is called HSE ED Trbovlje; for the production of electricity uses two gas units with the rate outpput of 62 MW.

Within the company Holding Slovenske elektrarne (the HSE), which represents the first energy pillar in the Slovenian wholesale market, the companies DEM, SENG, HESS, TEŠ, and TET were operating. The second energy pillar of the wholesale market was formed by the group of GEN energija, in which companies SEL, TEB and in accordance with an intergovernmental agreement between Slovenia and Croatia 50% of the Nuclear power plant (NEK) were included. At the same time, the group GEN-I owns 51% of HESS, while the remaining part of this company belongs to the HSE group. JPEL company is 100% owned by the City of Ljubljana Holding (Javni Holding Ljubljana).

Table 5 shows the data on on the installed power and the amount of generated electricity in 2016. It also presents the share of individual producer on the basis of the installed capacity and generated electricity in Slovenia.

Table 5: Installed capacity in the production facilities and electricity generation in 2017

Producer	Installed capacity (50% NPP)[MW]	Share - all producers in SI (%)	Generation (GWh)	Share- generation of all producers in SI (%)
HSE, d.o.o.	**1,852**	**53,0%**	**7,035**	**56,5%**
HPP	928		3,065	
TPP	923		3,969	
Other (CHP, solar, wind ...)	1.0		1.1	
GEN energija, d.o.o.	**925**	**26,5%**	**3,743**	**30,0%**
HPP	277		746	
TPP	300		12.3	
Nuclear power plant*	348		2,984	
Other (CHP, solar, wind ...)	0.6		0.7	
Javno podjetje Energetika Ljubljana (JPEL)	**118**	**3,4%**	**389**	**3,1%**
Other small producers (on the transmission system)	**35.7**	**1,0%**	**119**	**1,0%**
Small HPP	8.7		40.8	
Solar power plants	8.5		8.7	
CHP	18.5		69.2	
Other small producers on the distribution system	**559.81**	**16,0%**	**1,172**	**9,4%**
Small HPP	115		331	
Solar power plants	272		277	

* the 50-% share of the installed capacity and generation of the NPP Krško

1 http://www.hse.si/si/zanimivosti/novice/2017/12/655-TERMOELEKTRARNA-TRBOVLJE-SPET-POSLUJE-KOT-NORMALNA-GOSPODARSKA-DRUZBA

Producer	Installed capacity (50% NPP)[MW]	Share - all producers in SI (%)	Generation (GWh)	Share- generation of all producers in SI (%)
Wind power plants	3.3		5.7	
Facilities using biomass	2.2		0	
Geothermal power plants	0.0		0	
Facilities using landfill gas	7.1		7.4	
Facilities using gas from purification plants	1.1		4.4	
Facilities using biogas	31.4		125	
CHP facilities using wood biomass	14.4		79.8	
CHP using fossil fuels	111		341	
Other	1.7		0	
Total in SI	**3,491**	**100%**	**12,457**	**100%**
– on the transmission system	**2,931**			

Sources: Companies' data

With regard to Table 5, it should be made clear that the values in this Table differ slightly from the values in Table 1. The reason for the difference lies in different way of reporting of production companies and system operators. While production companies report the total quantities of electricity delivered to the network, the system operators from this amount deduct the quantities that are taken over by a power plant when it is not in operation.

In addition to the generation in large power plants, the plants for distributed generation connected to the distribution system and closed distribution systems are also important. That means mainly the generation in small hydropower plants, solar power plants, facilities using biogas and CHP units. In comparison with 2016, distributed electricity generation decreased by 8.4%, mainly due to lower production in small HPP and CHP units using fossil fuels.

8.4%
decrease in electricity generation from dispersed sources connected to the distribution system

According to the bilateral agreement between Slovenia and Croatia, half of the production from the Krško NPP belongs to Croatia, which reduces the share of the Krško NPP in the Slovenian production of electricity. Thus, in 2017 Slovenian power plants in total produced 15,440 GWh of electricity, but the actual Slovenian production was lower, amounting to 12,457 GWh. Electricity generation in comparison with 2016 decreased by 573 GWh due to lower generation of hydropower plants and thermoelectric power plants. The lower generation of electricity in hydropower plants is connected to a long dry season during summer, while lower production in thermal power plant Šoštanj is the result of outages and overhauls of units 4 and 6.

The largest share of electricity production in Slovenia in 2017 was contributed by the thermoelectric power plants, in which was generated 35.1% of all electricity for the Slovenian market. This share is followed by the share of hydroelectric power plants with 30.9%, and by 24.0% of the nuclear power plant.

Production of electricity from RES and CHP

In 2017, 944.9 GWh of electricity was generated in production facilities, which are included in the support scheme. The support scheme is aimed to promote the production of electricity from RES and CHP. As presented in Table 6, the share of this production has slightly decreased in comparison to 2016. Due to lower production of hydropower plants, wind power plants, plants using biomass and CHP units the annual decrease in electricity generation amounted to 5.8%. Generation in solar power plants was a little higher than the year before, but because the production in other types of power plants decreased, the trend of increasing production from RES from the previous years could not be maintained. With regard to 2016, the production of power plants, included in the support scheme, decreased the most in hydropower plants.

In 2017, the total electricity production in Slovenia also decreased. In this amount is included electricity generated in plants, which are not included in the support scheme. The comparison of the production of electricity in plants included into the support scheme with the total amount of generated electricity in Slovenia shows that the share of electricity production in plants that are not part of the support scheme according to the previous year decreased by 0.1 percentage point, to 7.6%. Also in the remaining power plants, the production decreased. The total amount of generated electricity in Slovenia, therefore, decreased from 13,030 to 12,457 GWh.

Table 6: Share of the installed capacity and generated electricity included in the support scheme

Year	Installed capacity included in the support scheme (MW)	Total installed capacity in SI (MW)	The share of installed capacity included in the support scheme	Generated electricity included in the support scheme (GWh)	Total generated electricity in SI (GWh)	The share of generated electricity included in the support scheme
2012	307,990	3,260,367	9.4%	654.0	12,250,1	5.3%
2013	393,230	3,273,570	12.0%	802.9	12,913,2	6.2%
2014	411,967	3,834,470	10.7%	905.9	13,597,5	6.7%
2015	432,752	3,542,229	12.2%	980.8	11,740,9	8.4%
2016	412,025	3,536,603	11.7%	1003.5	13,029,5	7.7%
2017	412,334	3,490,710	11.8%	944.9	12,456,7	7.6%

Sources: Borzen, Energy Agency

The total installed capacity in 2017 did not change significantly in comparison to the previous year. The same also stands for the installed capacity of power plants included in the support scheme. Due to small changes in the installed capacity also the share of installed capacity included in the support scheme in relation to the total installed capacity in Slovenia did not change significantly. This share in 2017 amounted to 11.8%, which is only a minimal change considering 2016 when it was 11.7%.

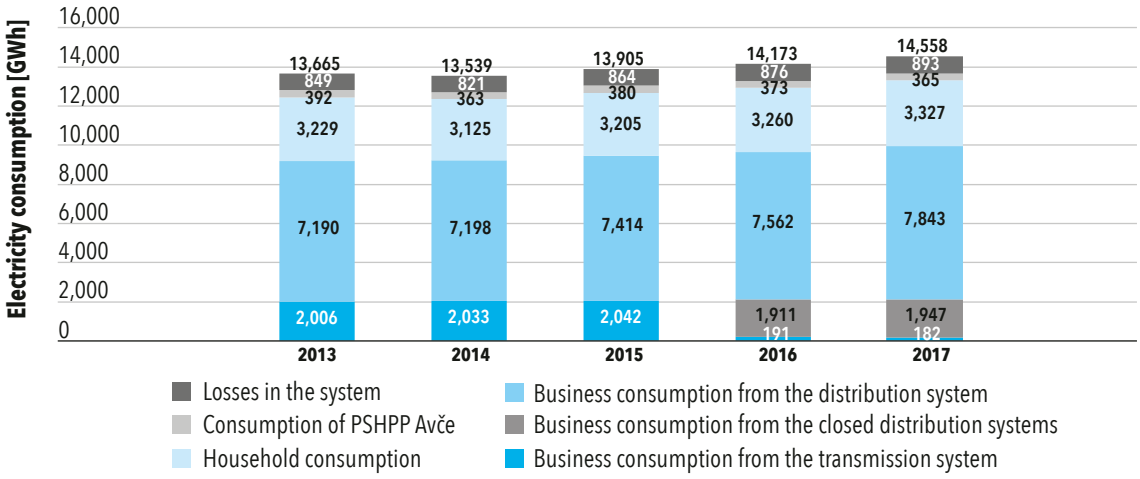
3.1.2 Electricity consumption

Total electricity consumption in Slovenia amounted to 14,558 GWh or 13,665 GWh excluding transmission and distribution system losses. In comparison with 2016, the total consumption was higher by 385 GWh or 2.7%. Three direct consumers connected to the transmission system consumed 182 GWh of electricity, of which 90 GWh were exported to Italy from DTS Vrtojba and RTP Sežana. The consumption of consumers, connected to the distribution system, was higher by 3.2% and amounted to 11,170 GWh, while the consumption of customers on closed distribution systems was 1,947 GWh. Pumped-storage power plant Avče used 365 GWh for pumping water, which is slightly less than in 2016. Losses in the transmission and distribution system amounted to 893 GWh of electricity, including losses due to transport, import and export of electricity.

2.7%
higher electricity consumption than in 2016

Peak load of the transmission system amounted to 2,131 MW, which is 153Mw more than in 2016. It was reached on 10 January in the 19th hour (between 18 p.m. and 19 p.m.).

Figure 7: Electricity consumption in the period 2013–2017



Sources: System operators, Energy Agency

Table 7: Electricity consumption in 2016 and 2017

Electricity consumption [GWh]	2016	2017
Business consumption from the transmission system	191	182
Business consumption from the distribution system	7,562	7,843
Business consumption from the closed distribution systems	1,911	1,947
Total business consumption	**9,664**	**9,973**
Household consumption	**3,260**	**3,327**
– single-tariff metering	892	893
– two-tariff metering	2,367	2,433
Consumption of PSHPP Avče	373	365
Total consumption of end consumers	**13,297**	**13,665**
Transmission and distribution systems losses	876	893
Total consumption of electricity	**14,173**	**14,558**
Export abroad	9,419	9,559
Total	**23,592**	**24,117**

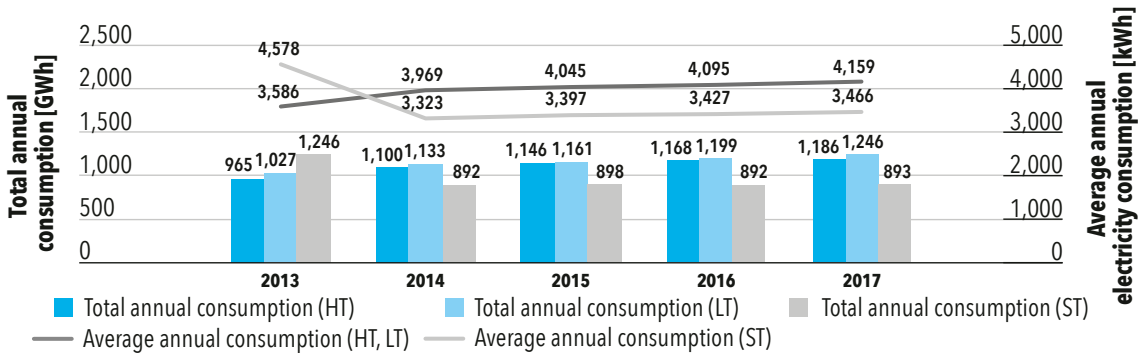
Sources: System operators, Energy Agency

Electricity consumption, including losses in the system, by taking into account the 50-percent share of installed capacity of the Krško Nuclear Power Plant, which belongs to Slovenia, was not completely covered by the production sources in Slovenia. Slovenian consumption was covered by the domestic sources in a total of 82%. The total export of electricity through the transmission and distribution system amounted to 9,559 GWh, out of which 2,983 GWh present half of the production in the nuclear power plant Krško, which belongs to Croatia. This is why the net export from Slovenia amounted to 6,576 GWh, and the import 9,133 GWh of electricity.

16%
growth in average consumption of household consumer with two-tariff metering in the last five years

Figure 8 shows the total and average annual electricity consumption of households with single and two-tariff metering. From Figure 8 is evident a constant growth of total and average annual electricity consumption in the last five years of households using two-tariff metering. In 2017 the total consumption did not change significantly in comparison with the previous year, while the trend of the last four years indicates a slight increase in the average annual consumption of electricity. The number of single tariff metering was lower by 1.1 percentage point.

Figure 8: Total and average annual consumption of household consumers with single and two-tariff metering in the period 2013–2017



Sources: System operators, Energy Agency

3.1.3 Dependency on electricity imports

Electricity import dependency in Slovenia fluctuates significantly. Over the last eight years, it has been varying from 1.8% and up to 18.2%. Electricity import dependency indicates the coverage of domestic consumption by domestic production resources and therefore is also dependent on fluctuations of production and consumption.

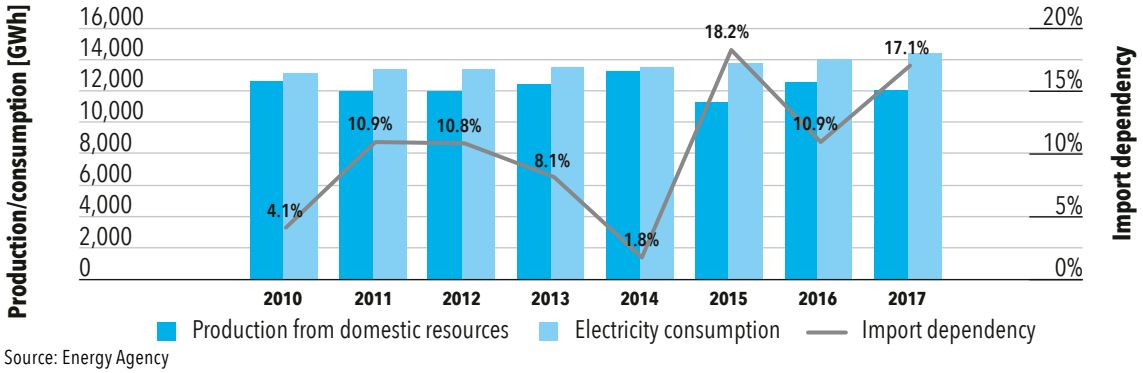
To the electricity production from domestic resources, the biggest contribution is made by large hydroelectric power plants, thermoelectric power plants, and the nuclear power plants, which are in Slovenia connected to the transmission system. A small part of production from domestic sources is connected to the distribution system. Due to an important share of electricity generation from hydroelectric power plants the total generation is highly dependent on hydrology in a particular period.

17.1%
was electricity import dependency in Slovenia, among the highest over the past eight years

For the purpose of calculating import dependency in the total consumption of electricity, are an addition to the consumption of final consumers on the transmission and distribution systems also taken into account losses on the entire power system, wherein the electricity, exported to Italy via distribution system from DTSs Vrtojba and Sežana, is deducted. In the chapter on the electricity balance, these quantities are treated as direct consumption on the transmission system.

Dependency on electricity imports is determined on the basis of the ratio between the electricity production from domestic sources and total electricity consumption. In the observed period 2010–2017 the electricity import dependency has been changing a lot on behalf of the production as well as consumption. In the observed period the electricity import dependency was the lowest in 2014 (1.8%) when due to exceptionally favourable hydrology the production of electricity in hydroelectric power plants was the largest and the consumption was lower than a year earlier. In 2017, we recorded a higher degree of import dependency (17.1%) as a consequence of lower production from domestic resources (mainly hydroelectric power plants) and simultaneously increasing the electricity consumption.

Figure 9: Electricity production, consumption and import dependency in the period 2013–2017



Source: Energy Agency

3.2 Production of electricity from RES and CHP

Slovenia has a goal set forth, namely by 2020 achieve 25% share of RES in gross final energy consumption, and 10% of RES in transport, which is the same for all Member States. For CHP there are no specific goals but a contribution of this technology to achieve the energy efficiency national targets is important. In accordance with Article 3 of Directive 2012/27/EU, Slovenia has set a target to improve energy efficiency by 2020 in a way that the use of primary energy in 2020 will not exceed 7.125 Mtoe (82.86 MWh).

In 2016, the share of RES in gross final energy consumption in Slovenia amounted to 21.3%, or 5.3 percentage points more than in 2005. Estimated share of RES in gross final energy consumption in 2017 is 21.8% and is by 0.5 percentage point higher than in 2016.To reach the target in 2020 the share of RES has to be increased by 3.2 percentage points. In the field of electricity, Slovenia is behind the target, determined for 2020 in current National renewable energy action plan 2010–2020 (implemented in 2010), by 8.5 percentage points according to situation in 2017. Taking into the account the share of electricity from RES gross final energy consumption in 2016, the share of electricity from RES will have to be by 2020 increased by 7.2 percentage points; we are, therefore, far behind the target, which will be difficult to reach. The target shares of RES in the total gross final energy consumption in heating and cooling sector was in 2016 was exceeded by 3.2 percentage points, to 34%. Estimation of this share in 2017 is by 0.4% lower than in 2016. The growth of energy from RES in the transport sector is also insufficient, and by 2020 the target share will be difficult to reach as well.

At this point it is worth to mention that the updated National renewable energy action plan 2010–2020 (NREAP) is under consideration, in which the target shares of the electricity as well as heating and cooling sectors are slightly amended. The target share of electricity energy from RES gross final energy consumption is reduced to 38.6%, and the target share of energy from RES in heating and cooling sector increased to 34.5%. The share of energy from RES in the transport sector is the same for all EU Member States and remains unchanged also in updated action plan.

The growth or a change in the share of energy from RES in gross final energy consumption in Slovenia and changes in shares of RES by individual sectors in the period 2005–2017 are presented in Table 8 and indicate that a lot of effort will be needed as well as that in the short-time period we will have to define climate and energy policy related measures, if we want to approach the target shares by 2020.

Table 8: The achieved RES targets in the period 2005–2016 and the estimation for 2017

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017, Estimation	2020
Share RES [%]														**Target share [%]**
Share RES	16.02	15.60	15.61	15.00	20.15	20.42	20.26	20.82	22.41	21.54	21.96	21.29	21.84	25
- transport	0.83	1.06	1.48	1.78	2.26	3.13	2.49	3.26	3.78	2.88	2.25	1.60	2.75	10.5
- electricity	28.65	28.23	27.70	29.96	33.76	32.20	31.04	31.63	33.09	33.94	32.73	32.06	30.80	39.3
- heating and cooling	18.95	18.55	20.40	19.24	27.56	28.14	30.29	31.46	33.40	32.42	34.07	34.01	33.58	30.8
Difference between the achieved and planned share of RES in the NREAP														Difference from the target in 2017
Total						**2.7**	**2.1**	**2.1**	**2.9**	**1.4**	**0.8**	**-0.5**	**-0.6**	**-3.2**
- transport						0.5	-0.3	0.2	0.3	-1.1	-2.5	-4.0	-3.8	-7.7
- electricity						-0.2	-1.3	-0.7	-0.6	0.4	-2.7	-3.9	-5.3	-8.5
- heating and cooling						5.8	7.0	7.1	8.0	6.1	6.8	6.0	4.9	2.8

Sources: Statistical office, Jožef Stefan Institute

3.2.1 The RES and CHP support scheme

State aid to promote the production of electricity from RES and the CHP, the so-called support scheme for RES and the CHP, in recent years represents one of the most important measures of climate and energy policy of Slovenia and other EU Member States. Primarily, the scheme should be an incentive for investments in environmentally friendly electricity-production technology. To national legislation was introduced by the amendment of the Energy Act in 2009. A similar measure was already introduced in 2002, then under the system of qualified producers, which, however, did not yield target results and at the same time, it was necessary to reform it and align it with the European Commission guidelines on state aid for environmental protection.

The disproportionate increase in the costs of the support scheme resulted in a significant burden on consumers that have to pay contributions for RES and CHP, which covers the costs of the support scheme. Due to all these facts the support scheme altered, and the change was implemented with the new Energy Act in 2014 (EA-1). The last modification was introduced with an aim to control the costs of the support scheme and to define the values of state aid, which should be encouraging for investments to invest in new RES and CHP projects, however, they will not exceed the maximum permissible values determined by the European Commission guidelines. Rules on granting state aid at the Member States level are in the exclusive competence of the EU and must be fully respected by the countries in the drafting of national legislation. This also applies to the regulation of rules and definitions of the conditions of the national support scheme, which have to be approved by the European Commission prior to its implementation. In order to coordinate the rules and conditions of the support scheme with the European Commission, the new support scheme did not come to life until the end of 2016, only after October 2016 when the notification procedure with the European Commission was successfully completed and the scheme was declared compatible with the internal market.

> Change in the support scheme for RES and CHP enable the control over costs and competition among potential investors

The operation, organizational structure of the support scheme, responsibilities and tasks of the institutions responsible for the functioning of the scheme, i.e. the Energy Agency and the Centre of Support, acting within the company Borzen, d.o.o., are governed by the Regulation on Support for Electricity Generated from Renewable Energy Sources and from High-Efficiency Cogeneration, which came into force at the end of November 2016.

Within the support scheme to the producers of electricity from RES and CHP the state aid is allocated; the difference between the production costs and the revenues, if the production costs, including normal market yields on investments, exceeds the price of this electricity that can be achieved in the market. The scheme supports the generation of electricity from the following RES: hydro energy, wind, solar energy, geothermal energy, biomass, biogas, energy from landfill gas and sewage treatment plants and energy from biodegradable waste. Since the introduction of the EA-1, grants can be obtained for the electricity produced in generating plants using RES, up to 10 MW, except for plants using wind, for which the limit is 50 MW, and high-efficiency cogeneration up to 20 MW. Until the implementation of the EA-1 generating plants on RES up to 125 MW and CHP plants up to 200 MW could participate in the scheme. In the case of cogeneration of electricity and heat grants are intended only for high-efficiency cogeneration providing primary energy savings. A general criteria for operating hours is applied; according to this criteria plants are divided into two groups with different level of support – under 4000 hours and more than 4000 annual operating hours.

> Support in the form of a guaranteed purchase price only for production facilities with the installed capacity up to 500 kW

Support for electricity from generating plants using RES and CHP is carried out as a guaranteed purchase of electricity at a predetermined fixed price or operating premium where the producer sells its energy on the market, and as a state aid they are paid the difference between the determined costs of production, which also include normal yield, and a reference market price of electricity. Future development trend of support schemes for electricity produced from RES and CHP is gradual termination of guaranteed prices, and the priority is the full integration of this electricity to the market. With change in the support scheme the buying-in price of electricity is limited only to the generating units with the nominal price up to 0.5 MW. Support can be provide for up to 15 years for units using RES and 10 years for CHP units.

In the support scheme are included the owners or operators of production facilities, for which the declaration for the operating facilities and the decision on granting support were obtained by the Energy Agency, and sign a contract with Centre for RES/CHP to provide a support. If the contract on guaranteed purchase is signed, Centre for RES/CHP takes over the electricity and pays the price determined in accordance with the decision on granting Support. The facility is included in the special balance group or subgroup established by the Centre for Support. Centre manages the settlement of differences between forecasted and actual generation and pays eligible producers for the electricity delivered to public network a guaranteed price. If an operating premium contract is signed, the Centre for Support does not pay for the electricity; on the basis of data on the net amount of electricity only pays a premium as a difference between operating costs and market price. In this case, the producers must provide for the settlement of the difference between forecasted and actual production and for the balance group; or the settlement is arranged by the supplier with whom they have signed an open contract for the sale of electricity. The support scheme funds are managed by the Centre of Support.

Until the implementation of the EA-1, all producers that installed generation units using RES and CHP and fulfilled other conditions determined by the legislation could obtain the support. The enforced the obligation that the support for electricity from RES or CHP is allocated in a competitive procedure among projects submitted for funding. With this, the support scheme was amended and in compliance with in 2014 established in 2014 Guidelines on State aid for environmental protection and energy 2014-2020, with which the European Commission set up new rules determining state aid schemes – operating aid for the producers of electricity from RES and CHP. Guidelines on state aid requires a competitive bidding process, open to all producers of electricity, with clear and non-discriminatory criteria; these rules were introduced to the EA-1 by authorizing the Energy Agency to implement public tender to investors to submit projects for production facilities using RES and CHP to enter the support scheme. Within the public invitation the Energy Agency prescribes the conditions for applying the projects, determines the highest, in the time of applying acceptable price of electricity by individual technology, and from the electricity balance sheet summarizes the value of funds available for a public tender, for which at an annual level the total value of funds for the support scheme can increase if the projects, selected at public tender, are implemented. Interested stakeholders are invited to submit their projects for planned production facilities using RES and CHP and, as a major level playing field submit the price for the megawatt hour of electricity produced at which they are ready to produce electricity. The submitted price of electricity ensures production costs recovery, including 7.2% return on investment, and at the same time it must not exceed the maximum acceptable price set by the Energy Agency. The Energy Agency among all submitted projects fulfilling requirements set forth in the public tender, selects those that offer more favourable price. There are so many projects selected that the funds determined by the public tender administratively divided by taking into account the offered price of electricity and the projected production volume. The investors whose projects are selected in the competitive procedures must carried out their projects within three since the project was selected years (or five years in case of demanding project) to be eligible for funding.

The introduction of a competitive process for selecting projects to enter the support scheme

3.2.1.1 Selected projects for RES and CHP installations under public tenders

The Energy Agency carried out two public tenders for investors to submit projects for production facilities for electricity generation from RES and CHP to enter the support scheme, i.e. two procedures for competitive selection of RES and CHP installation projects under the amended support scheme. The first one was published and the end of 2016 and completed by the end of June 2017, and the second one was published in September 2017, and the selection of the project was carried out in the beginning of January 2018.

The Government of the Republic of Slovenia in the National Energy Balance for the public tender, announced in September 2017, for the RES and CHP support scheme designated additional EUR 10 million at the annual level. The allocation of the funds to selected projects on public tender is of course only of an administrative nature. To an individual selected project are allocated as many funds as it will be necessary to provide to an applicant at the annual level, depending on the price that was offered by the applicant, and the estimated annual quantity of electricity to be generated in the facility from a project, when a project will be

In 2017 two public tenders were carried out

implemented and electricity will actually be produced. If the projects is not implemented, allocation of funds will not be carried out.

In the public tender, published in December 2016, the available funds, especially in the first round, were exceptionally distributed to target technologies of new electricity generation facilities, also approved by the European Commission, as follows:

- a) 1st round:
  - group 1: € 1 million for hydroelectric power plants of 1 MW or less;
  - group 2: € 3 million for wood biomass plants of 1 MW or less;
  - group 3: € 1 million for CHP installations using natural gas of 50 kW or less;
- b) 2nd round:
  - group 4: € 3 million for renovated CHP installations operating in district heating systems;
  - group 5: € 2 million for the projects:
    - of other installations that are not defined in the groups of the 1st round;
    - of production facilities RES and CHP that were less competitive in the 1st round.

507
projects of RES and CHP installations submitted with a total installed power of 318.5 MW

The selection of the projects under the public tender published in September 2017 had to be carried out by a two-round competitive selection procedure (two pot tender system) as defined by the European Commission and summarized in the Regulation and to what the allocation of funds was also adapted:

- a) 1st round:
  - group 1: for new RES production facilities with technologies using water, wind, sun, and biogas from waste, wastewater treatment facilities and landfills with up to 10 MW of installed capacity, or up to 50 MW of installed capacity for facilities using wind power, with available EUR 7 million;
  - group 2: for new RES and CHP facilities (using fossil fuels), the operation of which is based on the purchase or the production of fuels, raw materials for the production of biogas, or the use of geothermal water up to 10 MW of installed capacity, or up to 20 MW for CHP generation facilities, with available EUR 2 million;
- b) 2nd round:
  - for renovated RES and CHP production facilities (using fossil fuels), RES and CHP production facilities (using fossil fuels) that were not selected in the first round, and for depreciated wood biomass installation, which due to their age are no longer eligible for support and cannot cover their operating costs due to low electricity prices, with available EUR 1 million.

To the first public tender 275 projects for RES and CHP production facilities were submitted, of which 243 projects for new facilities and 32 projects for the renovation of existing facilities were applied; and to the second public tender 232 projects were submitted, of which 216 referred to new production facilities and 16 to the renovation of existing facilities. Individual energy technologies or production resources for electricity generation from each public are presented in Tables 10 and 11. Among the submitted projects in both tenders wind power plants projects are dominating, thus, the presence of this technology in Slovenia is yet negligible, while on the other hand in neighbouring countries and in a large part of other EU countries contribute a significant share to electricity production from RES.

Wind power plants projects are predominant

Table 9: Review of projects submitted to a public tender, compiled by electricity generation technology

		Public tender - December 2016		Public tender - September 2017	
Technology	**renovated/new**	**number of projects**	**Installed capacity (MW)**	**number of projects**	**Installed capacity (MW)**
Hydro power plants	new	25	7.80	11	6.07
Hydro power plants	renovated	26	3.47	14	3.68
Solar power plants	new	105	12.33	84	17.00
Wind power plants	new	41	56.19	70	139.65
Power plants on wood biomass	new	39	11.89	21	13.56
Biogas power plants – waste	new	3	0.41		
Power plants using biogas from wastewater treatment facilities	new	1	0.20	1	0.20
Biogas power plants	new	3	6.03		
CHP using fossil fuels	new	26	6.67	29	9.98
CHP using fossil fuels	renovated	6	19.15	2	4.19
All submitted projects		**275**	**124.14**	**232**	**194.32**

Source: Energy Agency

Among the applied projects to the individual tender, for which investors submitted complete applications, the Energy Agency selected the most competitive projects within the prescribed selection procedure for RES and CHP installations.

Table 10: Review of the selected projects submitted to the tender in December 2016, compiled by electricity generation technology

Technology	**renovated/new**	**number of projects**	**Installed capacity (MW)**	**Annual production (MWh)**
Hydro power plants	new	18	3.34	14,962
Hydro power plants	renovated	12	1.82	723
Solar power plants	new	7	3.80	4,890
Wind power plants	new	11	25.34	75,108
Power plants on wood biomass	new	8	2.20	17,575
Power plants using biogas from wastewater treatment facilities	new	3	0.41	2,582
CHP using fossil fuels	new	13	5.30	21,186
CHP using fossil fuels	renovated	6	19.15	6,938
All selected projects		78	**61.36**	**143,965**
Total RES		59	**36.91**	**115,841**
Total CHP (fossil fuels)		19	**24.45**	**28,124**

Source: Energy Agency

Thus, among all the submitted projects to the first tender, 78 projects of production facilities with a total installed capacity of 61.36 MW, which will in case of implementation of projects, according to the assessments of applicants, at the national level produced additional 143,965 MWh of electricity. Of these, 136,303 MWh will be produced in new facilities, and the rest in renovated facilities, for which the contribution to the production due to renovation is estimated to an additional 10% in comparison with the production before renovation. From the total assessment of additional produced electricity, 115,841 MWh

will be produced from RES, and the remaining electricity in CHP (using fossil fuels). Among the selected projects on this tender, implementation is planned in 60 cases for new production facilities with total installed capacity of 40.39 MW, and in 18 cases for the renovation of the existing production facilities with a total installed capacity of 20.97 MW and 7,661 MWh of additional annual output, mainly on behalf of renovated CHP installations in district heating systems. Also among the selected projects wind power plants prevail, with a total installed capacity of 25.34 MW, and their implementation would mean around 75,108 MWh of additional electricity produced on annual level.

Table 11: Review of the selected projects submitted to the tender in February 2017, compiled by electricity generation technology

Technology	renovated/new	number of projects	Installed capacity (MW)	Annual production (MWh)
Hydro power plants	new	1	0.35	1,784
Hydro power plants	renovated	10	2.96	1,644
Solar power plants	new	26	3.13	3,319
Wind power plants	new	37	80.92	220,662
Power plants on wood biomass	new	1	0.40	3,000
Power plants using biogas from wastewater treatment facilities	new	1	0.20	1,300
CHP using fossil fuels	new	16	7.39	36,370
CHP using fossil fuels	renovated	1	2.68	1,046
All selected projects		93	**98.03**	**269,125**
Total RES		76	**87.96**	**231,709**
Total CHP (fossil fuels)		17	**10.06**	**37,416**

Source: Energy Agency

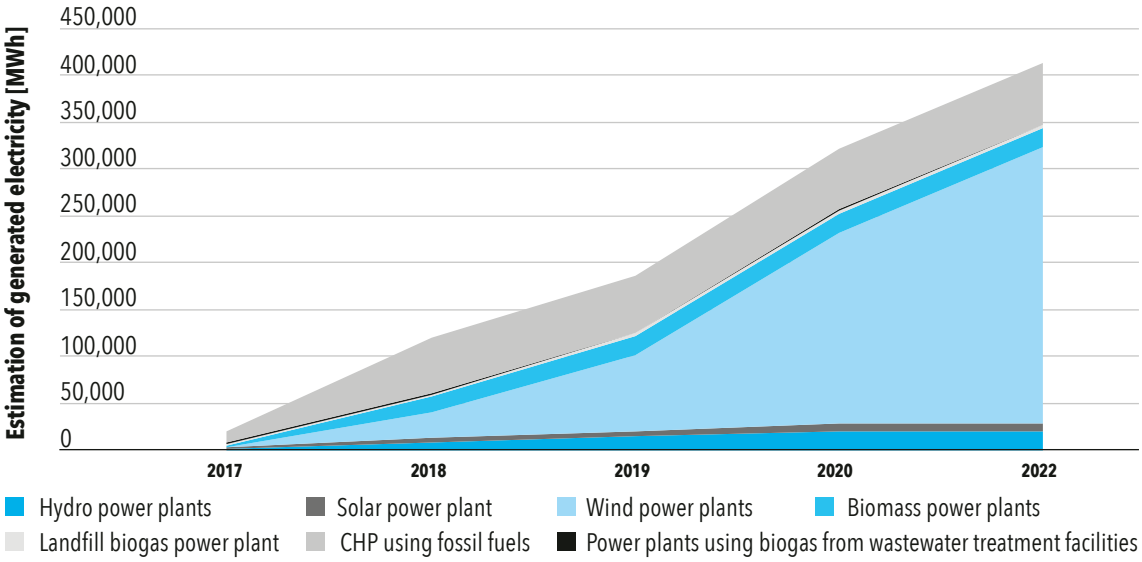
To the second tender, among all submitted projects 93 projects were selected with a total nominal capacity of 98.03 MW and 269.125 MWh of planned total annual production of electricity, out of which 231,709 MWh will be produced from RES and 37,416 MWh in selected CHP installations using fossil fuels. Out of these, 82 projects were selected for new production facilities with a total installed capacity of 92.39 MW and planned annual production of 266,436 MWh and 11 projects for renovation of production facilities with a total installed capacity of 5.64 MW and 2,690 MWh of additional planned annual production resulting from the requirement to increase energy efficiency by at least one percentage point or increase the installed capacity by at least 10% in case of the renovation of production facility. Considering the installed capacity, among the selected projects again prevailed wind power plants, more precisely 37 projects with a total installed capacity of 80.92 MW and 220,662 MWh of planned annual electricity production.

171
selected projects with a total installed capacity of 124.9 MW of RES production facilities and 34.5 MW of CHP facilities using fossil fuels

With the implementation of selected projects under both public tenders, according to the planned investments already by 2020 additional 256,700 MWh of electricity would be produced from RES, of that more than 200,000 MWh from wind and 65,462 MWh in CHP using fossil fuels. For some selected projects the implementation is foreseen in 2022, which brings production of additional 90,850 MWh of electricity from RES. In that way, the implementation of all selected projects by 2022 would also mean the inclusion of all applicants with completed projects to the support scheme and at the same time gradually spending administratively allocated funds. Therefore, in 2022 additional 400,000 MWh of electricity could be produced within the RES and CHP support scheme, which is almost 40% of the current generated electricity, for which the producers obtained the support before the change in the support scheme (Figure 10).

106.3 MW
is the total installed capacity of selected projects for wind power plants

Figure 10: Estimation of the additional electricity generated by implementation of all selected projects for RES and CHP generating plants within both public tenders



Source: Energy Agency

The implemented public tenders indicate that, along with existing incentives of RES and CHP support scheme, potential investors are still very interested in building RES and CHP generating plants. The selected projects in both public tenders show encouraging further development of such generation of electricity. But on the other hand, the fact that among the selected projects dominate wind power plants is rather worrying since the implementation of this technology is difficult due to extremely demanding spatial planning and, consequently, time-consuming. So far, in the support scheme included wind power plants have only about 3 MW of total installed capacity. At the same time, the valid National renewable energy action plan 2010–2020 by the year 2020 envisages at an annual level 191,000 MWh of electricity generated in wind power plants, while in the updated version of this document by 2020 around 100,000 MWh of annual production in wind power plants is foreseen.

256,700 MWh
additionally produced electricity per year if the selected projects would be, in line with expected dynamics, implemented in 2020

By changing the support scheme and with the introduction of a competitive bidding process for projects selection supports are decreasing. This is a result of technological development, which has lowered the prices of components of the production facilities on one side, as well as the changed method of determining producers eligible for support. Already the reference costs of electricity production, which include a 7.2% return on invested funds that are published by the Energy Agency at announcing a public tender or at the expiration of the deadline for the submission of projects, after the changes in the scheme were significantly lower for some technologies than they were at the implementation of the scheme. A competitive bidding process in the changed support scheme is additionally forcing investors to decrease electricity prices in submitted projects. Offered prices of individual projects selected in tenders and the production costs valid in certain periods and in the time of public tenders mean the upper limit of the price offered, but before the change in RES and CHP support scheme they defined values of support for most technologies. Price comparison is shown in Table 12. From the comparison is evident that the lowest tender price of the selected project for a solar power plant with an installed capacity of 0.99 MW was 60% lower than the reference costs of electricity production in the same-size solar power plants in the second half of of 2012, and the same offered price has reached less than 20% of electricity production reference costs in solar power plants at the time of the implementation of support scheme in 2010. From price comparison is also evident that the reference costs of electricity production and prices quoted within public tenders were for all technologies lower than the reference costs of production, valid before the change in support scheme, but reductions were not as great as for solar power plants. Besides the significantly lower prices of electricity production in solar power plants are nearly also halved

the costs for CHP using fossil fuels, and also costs of electricity production from wood biomass; more precisely - the reference costs within public tenders are by € 72.6 per MWh of produced electricity lower than the valid reference costs of production in a comparable power plant on wood biomass in 2012. Lower reference production costs after the support scheme alteration and unchanged or slightly higher electricity prices in the market mean lower state aids per unit of electricity produced and, consequently, less resources needed for the same volume of electricity produced from RES and CHP as before the change took effect.

Table 12: Comparison of the lowest biding price of electricity between the selected projects for some technologies in public tenders and reference costs of electricity production of the same technologies before and after support scheme alteration

Technology	Installed capacity (MW)	Offered price (EUR/MWh) - min.	RCE - tender (EUR/MWh)	RCE 2012 (2nd half) (EUR/MWh)	RCE 2010 (EUR/MWh)
Hydro power plants	0.350	84.28	90.55	92.61	92.61
Solar power plants	0.990	70.00	72.40	180.70	353.42
Wind power plants	0.999	78.35	86.01	95.38	95.38
Power plants on wood biomass	0.400	134.24	173.67	246.29	225.74
Power plants using biogas from wastewater treatment facilities	0.200	60.77	61.35	74.42	74.42
CHP using fossil fuel more than 4,000 h	0.999	72.14	73.85	141.01	125.72

Sources: agencija, Borzen

3.2.1.2 Production facilities included in the RES and CHP support scheme in the period 2010–2017

At the end of 2017, more than 2,500 producers with a total of 3,864 facilities. Among them, solar power plants are still predominant – 3,312 or more than 85%. An important share also belongs to 380 CHP installations using fossil fuels. The majority of all producers is included in the support scheme under the conditions that were in force before its change came into force. Among the producers that were included in 2017, were also four of them, whose facilities were selected at the first public tender announced in December 2016 and the projects were implemented before the end of 2017. Most of the solar power plants started to operate in 2010, 2011 and 2012, during the period when the values of support for electricity production in solar power plants were very favourable according to the values of investments in this technology. The majority of solar power plants that were included in the scheme in 2013 was built already in 2012. Because the supports for solar power plants at the end of 2012 decreased a lot, they become much less profitable and consequently the construction of these plants after this period also sharply declined. After 2012, more precisely in the period 2013–2015, there were slightly more CHP installations using fossil fuels entered the support scheme. These entries were were mainly the result of a transitional provision of the EA-1, which allowed producers to obtain the support for electricity production from RES and CHP for which producers signed contracts on the use of system within six months after the introduction of the EA-1 without a condition on preliminary selection of the projects at public tender, that is according to the old regulation. Dynamics of productions facilities inclusions in the support scheme in the period 2010-2017 is shown in Table 13.

85%
of production facilities in the support scheme are solar power plants

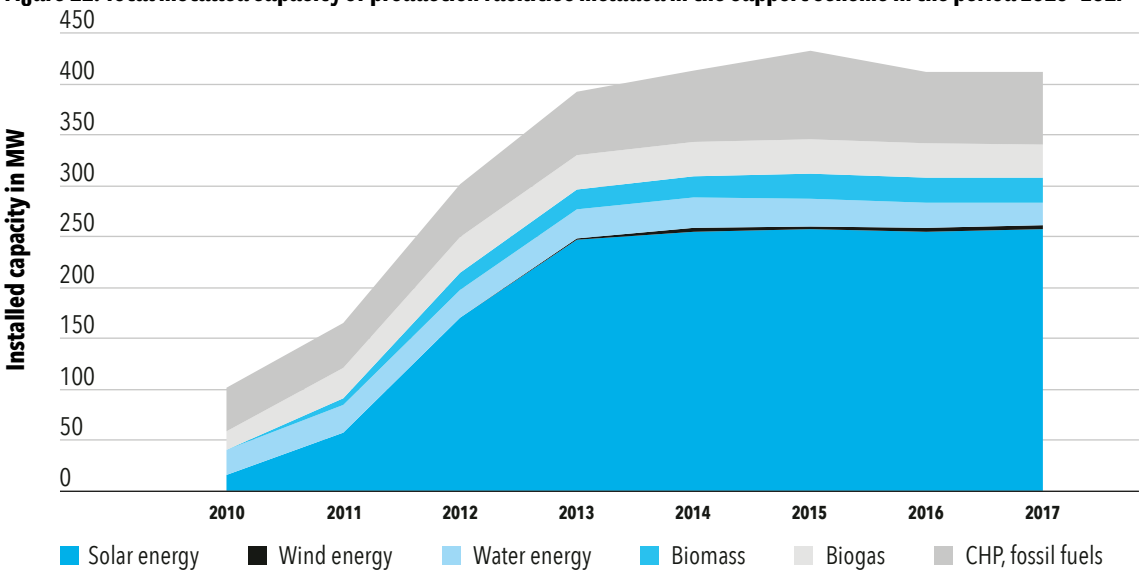
Table 13: Number of production facilities included in the support scheme and dynamics of their inclusion (under the terms before the enactment of the Energy Act)

	Number of production facilities included in the support scheme							
Source	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Solar energy	381	975	2,406	3,218	3,319	3,339	3,323	3,312
Wind energy	3	4	3	5	4	9	7	7
Hydro power	105	109	108	106	106	106	98	91
Biomass	0	3	5	10	19	43	44	43
Biogas	13	26	31	31	31	33	32	31
CHP, fossil fuels	26	46	89	184	270	390	384	380
Total	**528**	**1,163**	**2,642**	**3,554**	**3,749**	**3,920**	**3,888**	**3,864**

Sources: Energy Agency, Borzen

The total installed capacity of production facilities included in the support scheme in comparison with the previous year did not change and at the end of 2017 amounted to 412 MW. Solar power plants prevailed in number and installed capacity. Their total installed capacity was 257.6 MW, which is 62% of the installed capacity included in the support scheme. The second largest group comprise CHP installations using fossil fuels with a total installed capacity of 72.3 MW at the end of the year, which is 17% of the installed capacity included in the support scheme. Already described intensity of the integration of electricity producers or their facilities is evident in the Figure 11, which shows an obvious increase in installed capacity of solar power plants in 2010, 2011 and 2012, and more significant investment activities than expected, when a possible termination of entry in the support scheme under the conditions that applied before the introduction of Energy Act, was announced.

Figure 11: Total installed capacity of production facilities included in the support scheme in the period 2010–2017



Sources: Energy Agency, Borzen

3.2.1.3 Electricity produced in the RES and CHP support scheme

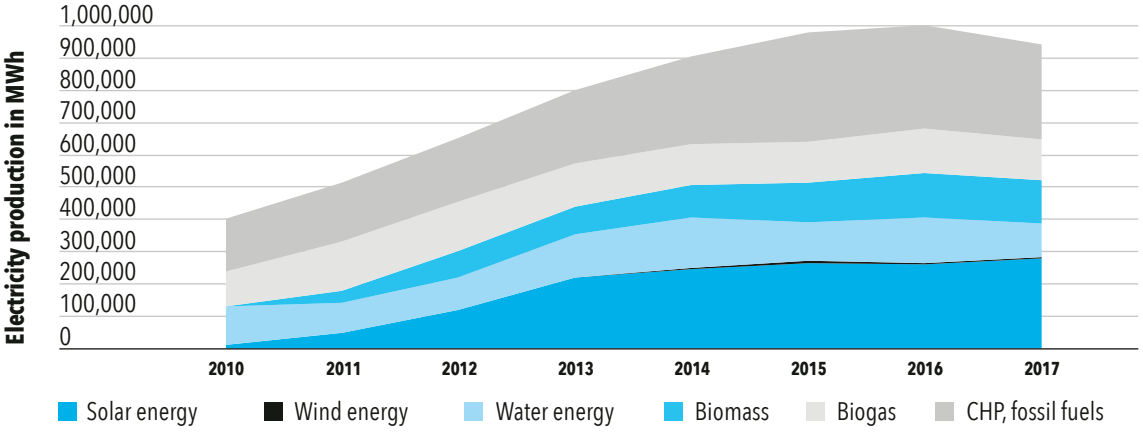
In 2017, within the RES and CHP support scheme 944,878 MWh of electricity was produced, which is 6% less than the year before, and compared to 2010 the production more than doubled. Considering the amount of produced electricity in 2017 dominated CHP installation using fossil fuels with 295,434 MWh of electricity produced, almost 8% less than in 2016, mainly due to weather conditions. In solar power plants 279,055 MWh of electricity was produced, 7% more than in the previous year; after 2014 the an-

nual change in electricity production was mainly affected by solar radiation. Although the total installed capacity of CHP units amounted to only one third of the total installed capacity of solar power plants, these units produced 6% more electricity than solar power plants. Hydro power plants in the support scheme produced 26% less electricity, mainly due to different hydrological conditions than in 2016, and 8% less electricity was also produced from biogas.

944,878 MWh
of electricity produced in 3,846 production facilities included in the support scheme

Of all electricity produced within the support scheme in 2017, 649,443 MWh were produced from RES, which is 69% of all electricity produced in the support scheme. In CHP units in the same period 295,434 MWh of electricity were produced. The movement of quantities produced in the facilities included in the support scheme in the period 2010–2017 is shown in Figure 12.

Figure 12: Electricity produced in the period 2010–2017, for which electricity producers included in the support scheme received support



Sources: Energy Agency, Borzen

3.2.1.4 Support payments

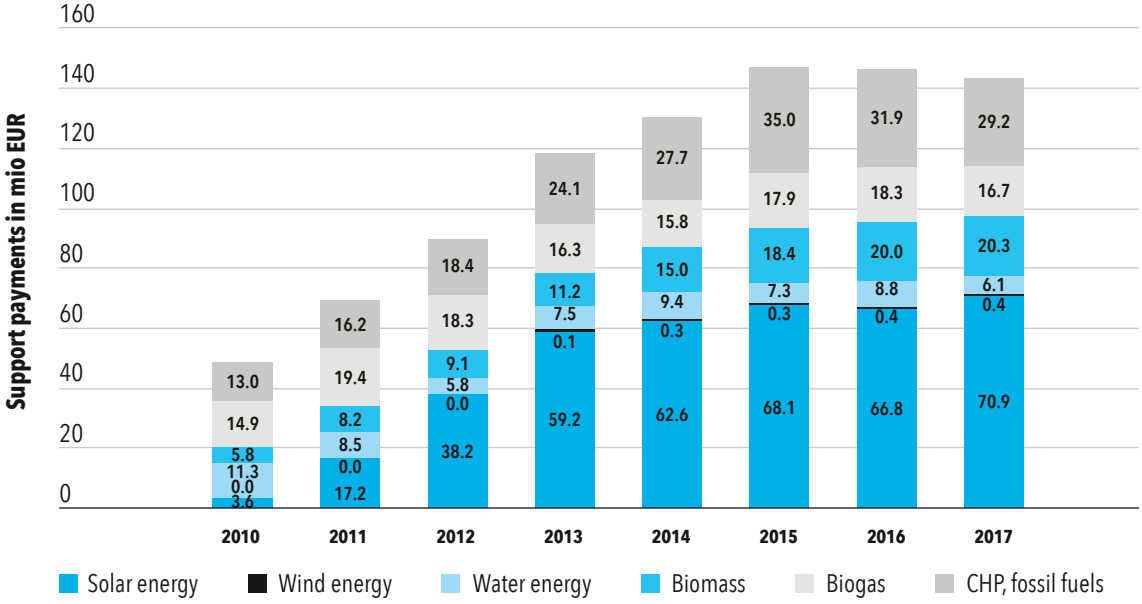
In 2017, the producers eligible for support of electricity from RES and CHP received EUR 143.5 million, or 2.7 million less than the year before. Since the implementation of the support scheme was by the end of 2017 paid 864 million euros to electricity producers for the total of 6,210,274 MWh of electricity. In 2017, EUR 70.9 million were paid for the production in solar power plants, which represents 49% of all paid support. Although in 2016 the largest share of funds was also dedicated to the production in solar power plants, this share was 46% of all paid supports and allocated EUR 4.2 million less than in 2017.

€ 864 mio
of paid support since the implementation of the support scheme

The actual amount of support payments is slightly lower than payments to the producers themselves. The amount is lower on behalf of the sold electricity, which Centre for Support takes over and purchases from the producers included in the Eco Group. Producers can be included in the Eco Group as recipient of support in form of guaranteed purchase on the basis of the EA-1. Revenue of the Centre of Support from Eco Group's electricity sold on auction in 2017 amounted to EUR 6.1 million. In that way, the actual costs of the support scheme in 2017 amounted to around EUR 137.4 million. The values of supports in the period 2010–2017 are shown in Figure 13.

49%
of all payments made in 2017 were allocated to solar power plants

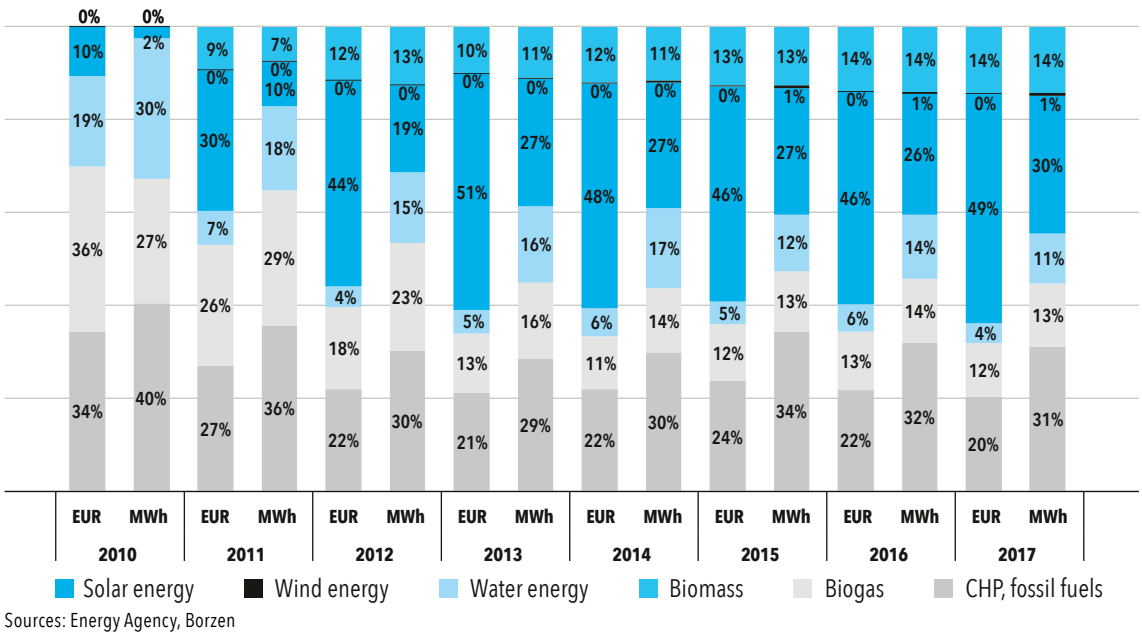
Figure 13: Support payments in the period 2010–2017



Source: Energy Agency, Borzen

Figure 14 shows the ratio between the support payments by source and the volume of electricity production by source. The ratio between the paid support and the amount of electricity produced is in favour of production in hydro power plants and CHP installations using fossil fuels. This means that for this production on average support payments are lower per unit of electricity produced than for those production sources, for which the share of funds intended for payments of support is higher than the share of produced electricity. The less favourable is the ratio between the support payment and electricity generated in solar power plants, besides smaller production units on wood biomass; the support payment for a unit of produced electricity is on average the highest.

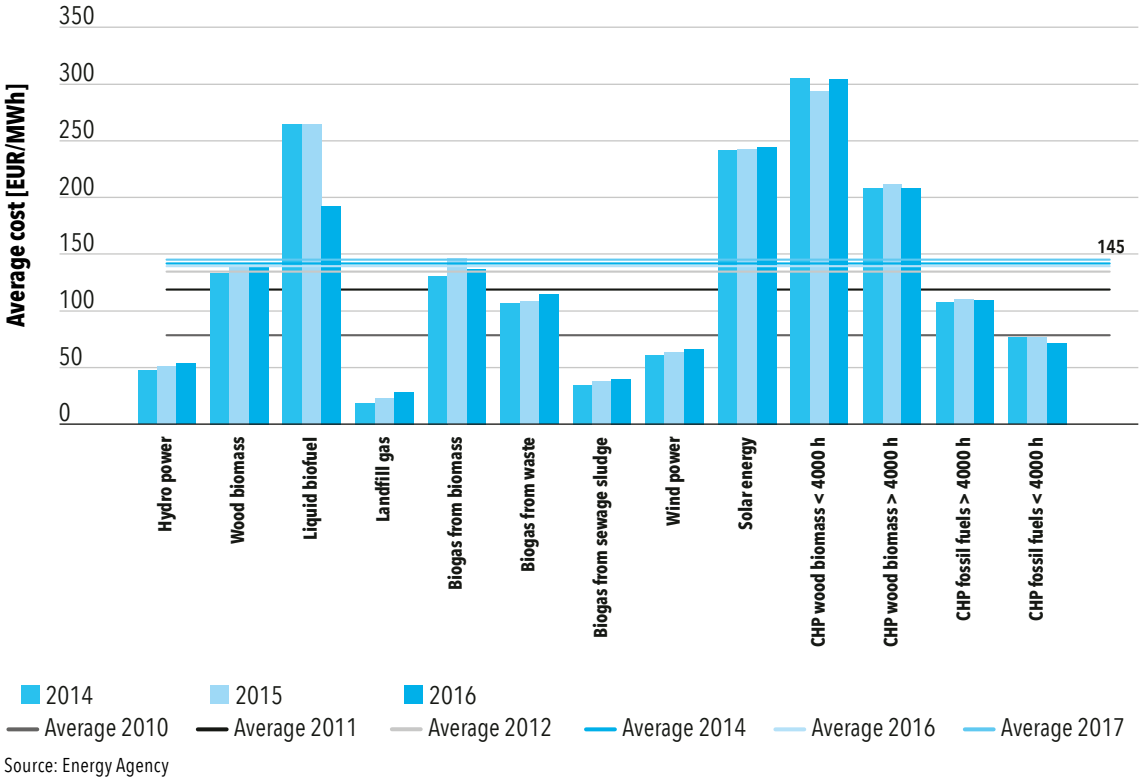
Figure 14: Ratio between the support payments by source and the volume of electricity production by source in the period 2010–2017



Sources: Energy Agency, Borzen

More electricity produced in solar power plants and consequently more funds intended for payments for this energy in comparison with the previous year, as well as the increase in share of support for electricity from solar power plants are the main reason that also in 2017 the average value of support per megawatt hour of electricity was higher than the year before and amounted to 145 EUR/MWh.

Figure 15: Average costs of support payments per production unit by energy unit in the period 2010–2017



Source: Energy Agency

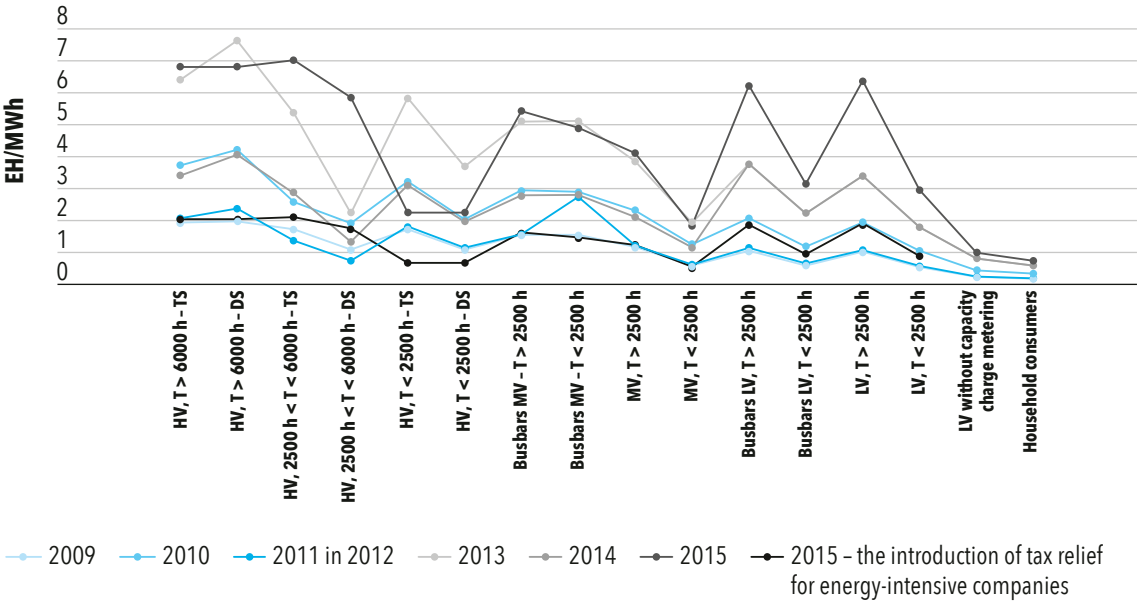
3.2.1.5 The costs of the support scheme and financial contribution of end consumer for the provision of support

Financing arrangement are determined by the Regulation on the method of determining and calculating the contribution for ensuring support for the production of electricity from high-efficiency cogeneration and renewable energy sources. It is based on contributions paid by end consumers of electricity, natural gas and other energy gases from the network and district heating for each consumption point, as well as consumers of solid and liquid fuels, natural gas, LNG, and users of district heating. Until June 2014, contributions were paid only by end consumers of electricity, and after that date the contributions for RES and CHP are paid also by final consumers of solid, liquid and gaseous fossil fuels and district heating.

14–17%
was the share of contribution in final price of electricity for household consumers

Due to the intensive development of the support scheme in the first few years after its implementation, with the same intensity was increasing the need to ensure sufficient liquid assets that enable payment of support to producers of electricity, which are included to the support scheme. That's why it was necessary to increase the contribution that is paid by end consumers of electricity, and in addition, charged fees to consumers or buyers of other energy- products to make the financial burden on end electricity consumers more acceptable. Nevertheless, the amount of contribution per unit of electricity consumption became unacceptably high for energy intensive industry. This had an impact on the implementation of an increase in the contribution for end electricity consumers in energy-intensive sectors of the economy that fulfil the conditions from Article 6 of the above-mentioned Regulation, but at the same time resulted in an increase in the contribution by other final electricity consumers. The value of the contribution for other energy products since the introduction in 2014 and until the end of 2017 did not change. The contribution paid by the end electricity consumers also hasn't been changed since 2015.

Figure 16: Changes in contributions for RES and CHP for individual consumer groups of end electricity consumers in the period 2009–2017



Source: Energy Agency

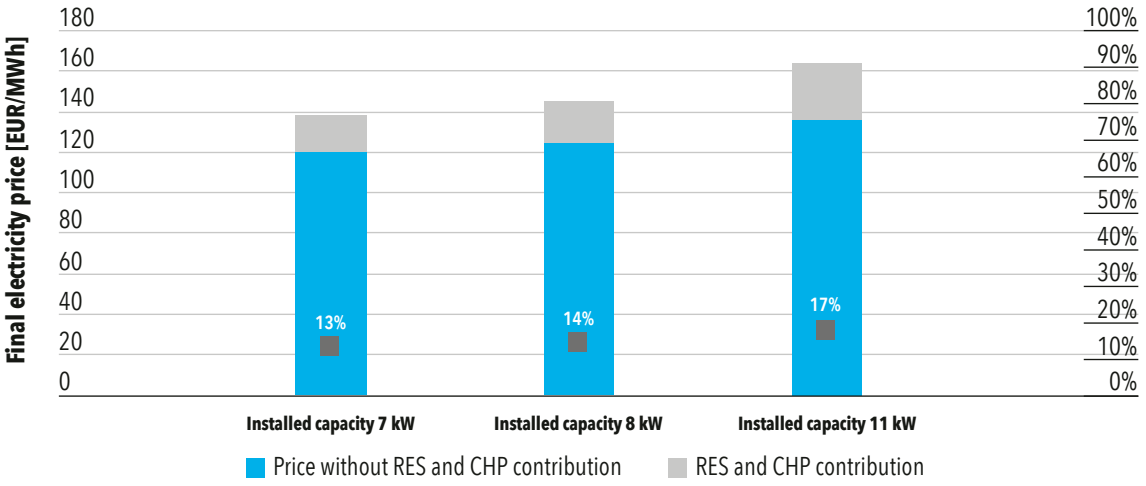
Table 14: Charges on fossil fuels, implemented in 2014

Energy product	Sales unit	Change in € per sales unit
Natural gas	MWh	0.99045
Extra light fuel oil	l	0.00990
Fuel oil	kg	0.01092
Petroleum	l	0.00911
Diesel	l	0.00990
Aviation fuel	l	0.00911
Kerosene	l	0.00913
Autogas - LPG	kg	0.01267
LPG for households	kg	0.01267
District heating	MWh	0.99045

Source: Energy Agency

Financial burden imposed on final consumers of electricity mainly depends on the consumer group and capacity charge at the delivery point. The value of contribution paid by end consumers of electricity is namely charged per unit of electric power, regardless of the amount of electricity consumed, while final consumers or buyers of other energy products pay the contribution for each unit of consumed energy product. In recent years, the contributions for RES and CHP, in particular for electricity end consumers constitute a significant part of the final electricity price. For example, the share of contributions in final electricity price for a household consumer with the installed capacity of 8 kW and annual consumption 3,500 kW in 2017 amounted to 14%, and for a household consumer with the installed capacity of 11 kW and the same consumption as much as 17%.

Figure 17: Share of RES and CHP contributions in the final electricity price for a household consumer in 2017, with 3,500 kWh individual consumer groups of end electricity consumers in the period 2009–2017



Source: Energy Agency

3.3 The regulation and regulated activities

3.3.1 The unbundling of services

Electricity companies engaged in transmission and distribution activities have to provide for the separate management of accounts for transmission and distribution activity as if these activities would be carried out by separate companies.

The service of general economic interest of the electricity system operator (the company ELES) is carried out in the legal entity, which in addition to the electricity transmission provides activities not related to the electric power sector. In its annual report, ELES provides for the separate management of accounts for them, as well as the criteria for the allocation of assets and liabilities, costs, expenses, and incomes, which are used for the preparation of accounting records and separate accounts.

The activity of services of general economic interest – electricity distribution system operator (the company SODO d.o.o.) is carried out in separate legal entities, and electricity distribution is the only activity that it is performed. For the regulation, SODO does not prepare separate accounts.

Following the consent of the Government of the Republic of Slovenia, SODO had transferred the activity of services of general economic interest of electricity DSO to the distribution companies. Electricity companies are in addition to electricity distribution engaged in other non-energy related activities. For this reason, DSOs in their annual reports provide separate accounts and prepared separate accounting records for electricity distribution and non-energy related activities. Electricity DSOs in their annual reports provided for the separate management of accounts for them, as well as the criteria for the allocation of assets and liabilities, costs, expenses, and incomes, which are used for the preparation of accounting records and separate accounts.

3.3.2 Technical functioning

3.3.2.1 The provision of ancillary services

Ancillary services are the services provided by a system operator to safeguard the normal operation of the network. The ancillary services relating to the entire Slovenian electricity system are provided by the electricity TSO – ELES. This section addresses only those ancillary services that were in 2016 financed from the network charge for the ancillary services. These services are the following:

– the control of frequency and power (secondary and tertiary control),
– the voltage control and
– the provision of a black start (system restart).

All ancillary services except the control of frequency and power the TSO purchases from the providers on the market. The participation in providing primary regulation is mandatory for all generation facilities, connected to the transmissions system, and free of charge. The provision of other ancillary services is partly funded through the network charge for the transmission system and partly by the balance sheet.

Ancillary services are frequency services, which include primary, secondary and tertiary regulation, and non-frequency services – voltage control and black start capability. The required scope of frequency services can be evaluated by the volume of reserve in MW, while for non-frequency ancillary services appropriate geographical dispersion of providers throughout the transmission system. For 2017 ELES planned the next scope of the ancillary services:

– the reserve for primary control of frequency and power: between ±14 in ±18 MW;
– the reserve for secondary control of frequency and power: ±60 MW;
– the reserve for tertiary control of frequency and power: +348 MW, – 185 MW.

The planned scope of frequency ancillary services for 2017 was the same as for the two preceding years. This scope is determined on the basis of the rules defined in operating rules for the synchronous area of Continental Europe. The reserve for primary control of frequency should, thus, cover the Slovenian share of the reference incident in this area, which at the same time represents a simultaneous failure of 3,000 MW of generation (simultaneous failure of the two largest generation units in the synchronous area). The share of an individual is calculated country is calculated on the basis of the ratio between the electricity consumption in this country and the total consumption in the synchronous area in the previous year. The scope of the reserve for secondary control is set on the basis of the deterministic method, in which the expected peak load occurs as a parameter, or a probability method based on a statistical analysis of deviations of balance groups in the previous year. On the basis of these two methods and the fact that the TSO with production units in the territory of Slovenia cannot provide more power, the required amount of reserve for secondary control was determined, which is 60 MW in positive and negative direction. The reserve for tertiary control is determined under the rule that this reserve must cover the outage of the largest generation and consumption unit. Although the largest unit in the Slovenian power system is Unit 6 of the thermal power plant Šoštanj, with 553 MW according to the connection approval, the necessary positive reserve for tertiary control in 2017 remained at the level that represents half of the capacity of the nuclear power plant Krško that is 348 MW. ELES provided the remaining reserve to cover the outage of the largest production unit on the basis of the signed agreements on sharing the reserves with adjacent system operators. The first such agreement was signed by all three TSOs, which operate within the regulation block of Slovenia¬-Croatia-Bosnia and Herzegovina, and the second one also by the Italian TSO Terna. The necessary negative reserve for tertiary control for 2017 remained 185 MW, at the level of the potential system outage of PSHPP Avče in the pumping regime.

The scope of necessary ancillary services in 2017 remained unchanged

Since ELES had already at the end of 2013 signed agreements on the provision of most of the ancillary services for the period 2014–2018, and in addition in 2014 the agreement on supply for the remaining positive reserve for tertiary control for the period 2015–2018, in 2017 with new agreements only 154 MW of additional positive reserve for tertiary control and 185 MW of negative reserve was necessary to provide.

The remaining positive reserve for tertiary control ELES divided to two products, whereby the first product was a classical reserve of 134 MW in the production facilities (Product 2017), and the second one 20 MW with including disperse production and demand side response (or demand-side management/DSM). The other bidders were chosen at two public auctions. The auction for classical reserve was carried out on 15 December 2016, and the auction for DSM on 22 November 2016. An overview of all reserve products for providing positive tertiary control is shown in Table 15.

Table 15: Products for the positive tertiary reserve in 2017

	Product 14-18	Product 15-18	Product 2017	Product DSM
The lease period	2014-2018	2015-2018	2016	2016
Quantity (MW)	144	50	134	20
Source of the reserve	Slovenia	Slovenia	Slovenia	Slovenia
Activation time	≤ 5 min	≤ 15 min	≤ 15 min	≤ 15 min
Time to announce changes in activation	≤ 15 min	≤ 15 min	≤ 15 min	≤ 15 min
Number of activations	unlimited	unlimited	Unlimited	Unlimited, but no more than 2 times per day
Time of unavailability after activation	0 min	≤ 30 min	≤ 30 min	≤ 10 h
Duration of one activation	≤ 6 h	≤ 6 h	≤ 4 h	≤ 2 h

Source: ELES

The outcome of public auctions for the lease of individual products for the tertiary reserve in 2016 is shown in Table 8. In addition, the results of the public auction for the reserve for tertiary control in the period 2014–2018, carried by ELES on 18 November 2013, and for the period 2015–2018, done on 10 December 2014 are also presented.

Table 16: Auctions results for the lease of reserve for tertiary control in 2017

Product	Leased capacity (MW)	Lease price (EUR/MW/year)	Energy price (EUR/MWh)
Product 14-18			
Bidder 1	10	55,000.00	145.79
Bidder 2	134	68,300.00	107.79
Product 15-18			
Bidder 1	50	47,000.00	151.22
Product 2017			
Bidder 1	134	31,000.00	240.00
Product DSM			
Bidder 1	15	30,990.00	240.00
Bidder 2	5	30,790.00	240.00

Source: ELES

For values shown in Table 16, it has to be noted that costs for the lease of reserve capacity are covered by the network charge for ancillary services, while energy costs in activating the reserve are covered by the imbalance settlement.

The bidder for implementation of tertiary control for 2017 was selected by ELES at public auction that was carried out on December 15, 2016. The selected bidder offer the whole scope at the price of lease 39,000.00 EUR/MW/year and price of activated energy -270 EUR/MWh.

In the implementation of secondary control of frequency and power, ELES in 2017 activated 58.8 GWh of positive and 97.7 GWh of negative energy. Here should be added that under the agreement on cross-system exchange in 2017, ELES exported 98.4 GWh for the settlement of positive imbalances, while imported 37.2 GWh for the settlement of negative imbalances. In implementing positive tertiary control, ELES engaged 7,863 MWh of energy, which is 1,017 less than in 2016. Most of the energy was activated at domestic bidders, the remaining 14% contributed providers from abroad. In 2017 there were no activations of negative tertiary control.

Providers of non-frequency ancillary services for the reserve for secondary control of frequency and power, reserve for tertiary control of frequency and power and the provision of a black start for the period 2014–2018 were selected by ELES at the end of 2013 on the basis of direct negotiations with potential providers of these services. Due to the nature of remaining ancillary services, only providers with production resources located within Slovenia could be selected.

In 2017 some important changes and novelties in the provision of ancillary services were implemented. In Slovenia, the most important was setting up the situation in the field of primary control. Since ELES in 2015 found out that some Slovenian producers did not implement the primary control appropriately, a special working group was set up, composed of representatives of the TSO and electricity producers. The purpose of its establishment was to achieve that Slovenian producers would carried out the primary control according to international standards and requirements of the Slovenian legislation. With this aim also the Energy Agency started to supervise the electricity producers. The working group in 2017 achieved significant results since the situation started to be regulated. The group prepared two documents that determine the procedures for verifying the operation of primary control at service providers and technical requirements to verify the performance of generation units for the implementation of primary control. By the end of the year the first generation units successfully completed verification and acquire the certificate issued by the TSO.

At the EU level, from the point of view of the implementation of frequency ancillary services the fact that two European regulations governing the operation of transmission systems and electricity balancing came into force is important, namely Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation and Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing. With their implementation, a transitional period began. Within this period national regulatory authorities will in a form of methodologies formally approve many procedures that were so far carried out on the basis of agreements between the TSOs, such as, for example, determination of the required volume of reserve.

The regulations are also introducing new names of ancillary services. Primary control of frequency is according to the terminology of Regulations named frequency containment process (FCP), the secondary control is called automatic frequency restoration process (aFRP), and the tertiary control a manual frequency restoration process (mFRP).

3.3.2.2 The balancing and imbalance settlement

Electricity TSO is responsible for balancing deviations from announced schedules of the electricity power system in Slovenia. When current situations of production and consumption in the system deviate from the operation schedule, the TSO must change the ratio between the production and consumption. Most often this means to increase or decrease the production of electricity. For minor deviations in the system is automatically used secondary control, and in cases of large deviations the reserve for tertiary control must be activated, or the energy must be sold or purchased in the balancing market. Balancing services incur costs to the TSO; these costs must be paid by the party responsible for costs. For this purpose, in Slovenia the balance scheme is established, which consists of balance groups, within which an unlimited number of subgroups are active. Balance group and subgroups are the members of the balance scheme represented by the balance group leader (a balance group responsible party). The rules on the operation of the electricity market determine that balance group leaders are responsible for maintaining marketing plans and operation schedules of their groups in the framework of for forecasted values. The trading plan represents the sum of all signed closed contracts of the balance group member and operating schedule the forecasted supply and consumption of delivery points, for which a balance group member has the signed open contracts. The accounting period in the Slovenian organised electricity market is one hour. When in a given hour the realization of the balance group member is not in compliance with the value determined by the trading plan and operating schedule, we talk about imbalances of a balance group member. If the realization of the balance group member is lower than forecasted (energy deficit), we talk about positive imbalances, and vice versa. Imbalances of individual group members of balance scheme are often mutually eliminated. The price of imbalances depends on costs incurred to the TSO. In accounting periods, when the entire system is

Also in 2017, balance groups mainly deviated negatively or had leased more energy than they actually needed

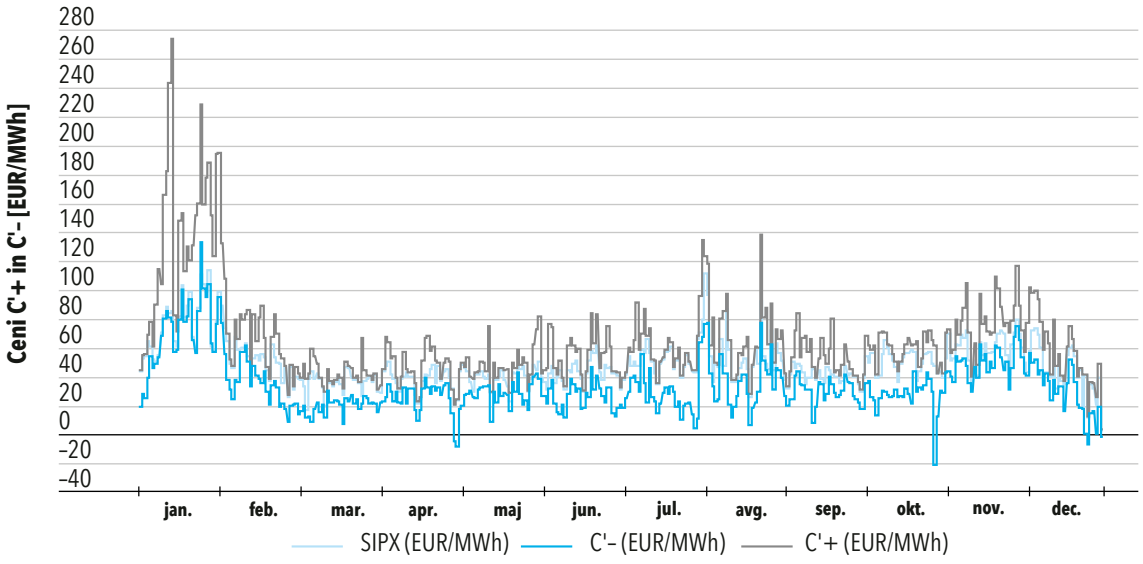
imbalanced and the TSO has additional costs, the prices are higher than in cases when the system due to the mutual balancing of individual balance groups from forecasted schedules does not deviate entirely.

In Slovenia, the market operator Borzen is responsible for imbalance settlement. The market operator determines the total amount of imbalances for each balance group for each accounting interval. Later on it prepares financial value of these imbalances, taking into account the actual costs for imbalances incurred by ELES, and hourly index of electricity on the Slovenian power exchange. In that way, basic prices of imbalances, C'+ and C'– are determined. C'+ refers to positive deviations, and C'– to negative imbalances. At imbalance settlement for each balance group it is also checked whether deviations were outside the tolerance band. If deviations in the accounting interval were outside the tolerance band, the corresponding penalties are imposed on a balance group. The market operator carries out a correction of basic prices of imbalances every month in way that revenues and expenses of imbalance settlements of balance groups, without penalization, cover all costs of ELES for balancing services. The correction of calculated prices is carried out in the case of surplus or deficit. The correction is performed in as many accounting intervals as necessary that the the TSO's costs for imbalance settlement in the accounting period are covered. In that way the prices of imbalances C'+ in C'– are set. The correction of imbalances prices is calculated without taking into account the penalties and forecasted imbalances (balance groups' imbalances without delivery points). The market operator performs calculation of penalties after price correction, which means that surpluses of balance settlement arise only for the purpose of penalizing balance groups' imbalances.

On the basis of all settlements in all accounting periods and corrections of C+ in C- the market operator every month carries out the financial settlement of imbalances. Financial settlement are prepared for all balance groups with corresponding consumption points or delivery/production points. For balance groups without physical delivery / production points financial settlement of balance sheets made only in case if balance responsible parties of these group report forecasted imbalances.

Figure 18 shows the imbalances prices C'+ in C'– and price index in the Slovenian power exchange SIPX in 2017.

Figure 18: Average daily values of basic prices of imbalances C'+ in C'– and index SIPX in 2017



Source: Borzen

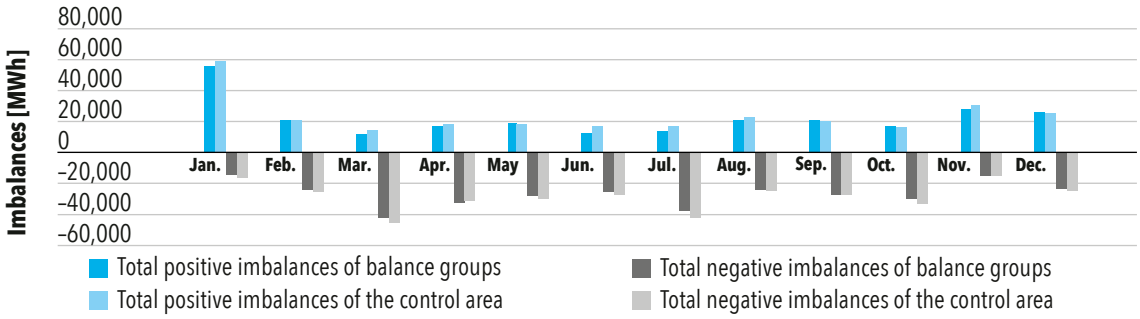
For the calculation basic prices of imbalances C'+ and C'–, and consequently for the calculation of derived prices of imbalances, C'+ and C'–, Slovenian Stock Exchange Index SIPX is used. The average value of SIPX was in 2017 49.52 EUR/MWh, which is 13.88 EUR/MWh more than the year before. The maximum value of SIPX was reached on 24 August in 8th hour, when it was 199.00 EUR/MWh, while the lowest value -42.93 EUR/MWh was reached on 24 December in 7th hour.

In the period from January to the end of December the average derived price for positive imbalances C'+ was 64.42 EUR/MWh, and for C'– – 34.62 EUR/MWh. The price C'+ reached the maximum value on 13 January in 3rd hour, when it was 1,444.62 EUR/MWh, and C'– 193.03 EUR/MWh on 24 August in 8th hour.

The lowest value of C'+ was reached on 31st December in 4th hour, -3.82 EUR/MWh, and the lowest value of C'– on 14 May in 12th hour, when it was -189.87 EUR/MWh. In comparison with the previous year the average prices of imbalances in 2017 significantly increased. The average price of positive imbalances was higher by 44.8%, and for negative by almost 53.2%. Among the reasons for the increase is of course the increase in electricity prices in the wholesale market.

In Figure 19 the total amounts of positive and negative imbalances of all balance groups in Slovenia are presented in 2017 are presented as well as total positive and negative imbalances of the Slovenia regulation area.

Figure 19: All imbalances of the Slovenian electricity power system in 2017



Sources: Borzen, ELES

The highest positive imbalances of balance groups were recorded in January and the highest negative in March. The total annual imbalances of the regulation area amounted to 280,953 MWh, and negative 344,064 MWh. At the same time the total annual imbalances of all balance groups, including imbalances at forecasting cross-border exchanges, amounted to 263,038, and negative 326,166 MWh. In comparison with the previous years, positive imbalances at the level of the regulation area as well as at the level of all balance groups decreased, while negative imbalances at the level of regulation are increased.

Table 17: Fluctuations of all imbalances of balance groups and the regulation area of Slovenia in the period 2013–2017

	2013	2014	2015	2016	2017
Total positive imbalances of balance groups (MWh)	301,777	299,692	300,292	239,765	263,038
Total positive imbalances of the regulation area (MWh)	161,056	232,311	258,325	247,527	280,935
Total negative imbalances of balance groups (MWh)	-397,808	-330,305	-387,450	-371,020	-326,166
Total negative imbalances of the regulation area (MWh)	-234,919	-292,514	-346,660	-378,773	-344,064

Sources: Borzen, ELES

In 2017, in comparison with the previous year, the total negative imbalances decreased, while positive increased. Increasing of the total amount of positive imbalances can be primarily contributed conditions in January, marked by low temperatures and a shortage of electricity across Continental Europe. As in the years before, except in January, imbalances of the system, as well as balance groups, were more negative than positive. The main reason is the imbalance settlement used in Slovenia, which is based on two prices, among which is, generally, a significant difference. This fact encourages traders to provide themselves surpluses of energy because with that they reduce their risks on the market. A big share of negative imbalances can also be partially contributed to an increasing share of unpredictable generation from RES.

In addition to the data in Table 17, it has to be mentioned that imbalances of the system are higher than those at balances groups, even though that balance groups' imbalances are due to opposite directions are partially cancelled out. The reason for this is that the balancing of the system takes place in the real time while balancing among balance groups takes place in the frame of one-hour charging intervals. Additionally, at balancing the system countertrades among regulation areas are taken into account, which are intended for energy recovery due to unintended imbalances between TSOs in the previous several-day period and which ELES carries out by buying and selling electricity in the daily market.

In 2017, four new members joined the Balance Scheme, three domestic and one foreign company. In the same period three foreign companies left the Balance Scheme. Altogether, the total number of Balance Scheme members increased by one. Also two transitions of balance groups to balance subgroups were made, and also two transitions of balance subgroups to another balance group. At the end of 2017, in Slovenia 53 balance groups were registered (17 domestic and 35 foreign companies), and 24 subgroups (21 domestic and three foreign companies).

3.3.2.3 Security and reliability of operation, and quality of supply

To ensure reliable and safe operation of the network, in Slovenia, the n-1 criterion is used for the transmission network. By using n-1 criterion, it is guaranteed that in case of an outage of any component of the system, overloading, limits exceeding, or supply interruptions are avoided. The same criterion is used for the planning and operation of MV- distribution network. The difference with regard to the transmission network is only in operation since the outage of the element in the distribution network can cause a shorter interruption needed for the manual switch and setting up the power supply from the other side of the network.

At the system level, with the implementation of appropriate regulation using quality of supply standards the level of already achieved supply quality is trying to be improved or maintained with optimal costs. When considering the quality of supply, various activities are present, such as monitoring, reporting, analysis, and assessment of the data of the following observed levels: continuity of supply, commercial quality, and voltage quality. For the continuity of supply, the Energy Agency in 2017 started the audit of reported data, submitted in 2014, and found the inconsistency with reporting rules that are determined by the legal Act on the rules for monitoring the quality of electricity supply. During the audit process, the Energy Agency also assessed the effectiveness of the monitoring the continuity of supply. Apart from the mentioned activities, the Energy Agency carries out the regulation with the quality of supply by a publication of data and analysis, which are publicly disclosed in the report on the quality of supply.

287 minutes
on average lasted discontinuance of electricity supply, and it was interrupted on average 3.5 times

In the execution of their duties, electricity system operators and distribution companies use international standards, Slovenian standards and technical reports which are implemented in the Slovenian standardization system. For continuity of supply and voltage quality the international standard SIST EN 50160 - Voltage characteristics of electricity supplied by public distribution networks.

Continuity of supply

The data on the continuity of supply are collected, reported, and analysed by the uniform methodology. In this way, the mutual comparability of data on quality of supply among distribution companies is ensured, and also international comparability of achieved parameters of continuity of supply on the EU level.

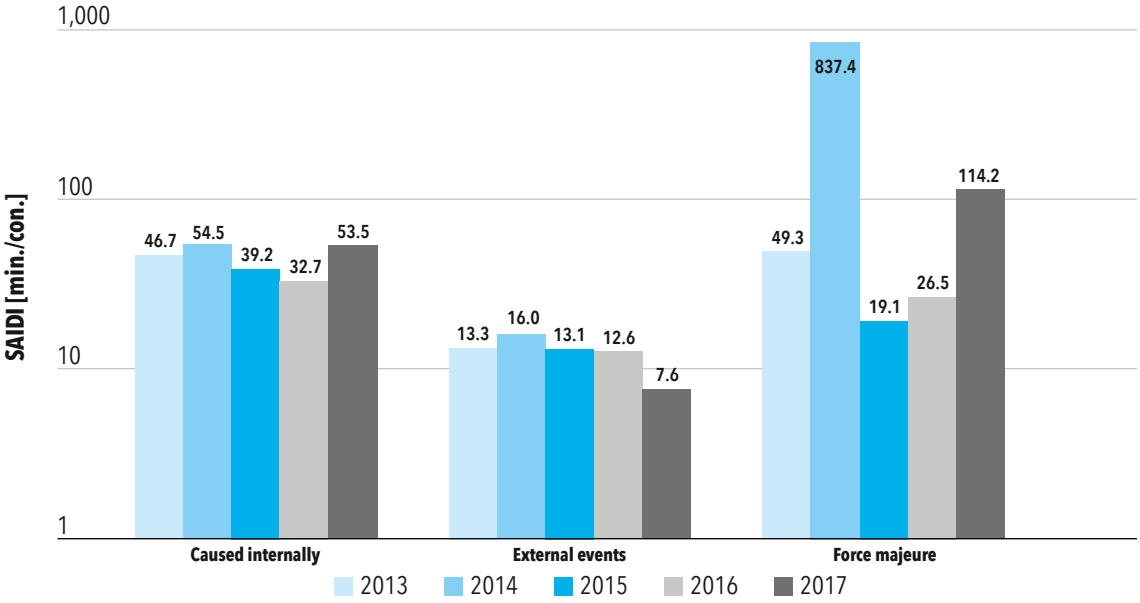
Interruptions caused by electricity system operators or distribution companies are classified into internal events. When interruptions are caused by third party, they are classified among external events. Interruptions, especially at unexpected or not foreseeable events that are not the result of the fault of the TSO or DSO or third parties, can be classified as force-majeure.

On the basis of the SAIDI and SAIFI relating to individual distribution company, the Energy Agency calculated the aggregate value of SAIDI and SAIFI indicators on the basis of the number of all consumers in Slovenia. The monitoring of SAIDI and SAIFI in the observed period indicates some year-on-year fluctuations of quality of supply. Electricity supply was in 2017 interrupted on average 3.5 times in the total duration of 287 minutes. With regard to the quality of supply for which is directly responsible distribution system operator, year-on-year fluctuations can be detected as well. In 2017, the slight increase in indicators of continuity of supply on behalf of third person was recorded.

The Energy Agency also monitors the short-term interruptions parameters MAIFI, which is calculated similarly to parameter SAIFI and which is based on short-term interruptions, shorter than three minutes and are not separated by reasons. In 2017, the value of MAIFI deteriorated to nine short-term interruptions per system user, almost the same as in 2014.

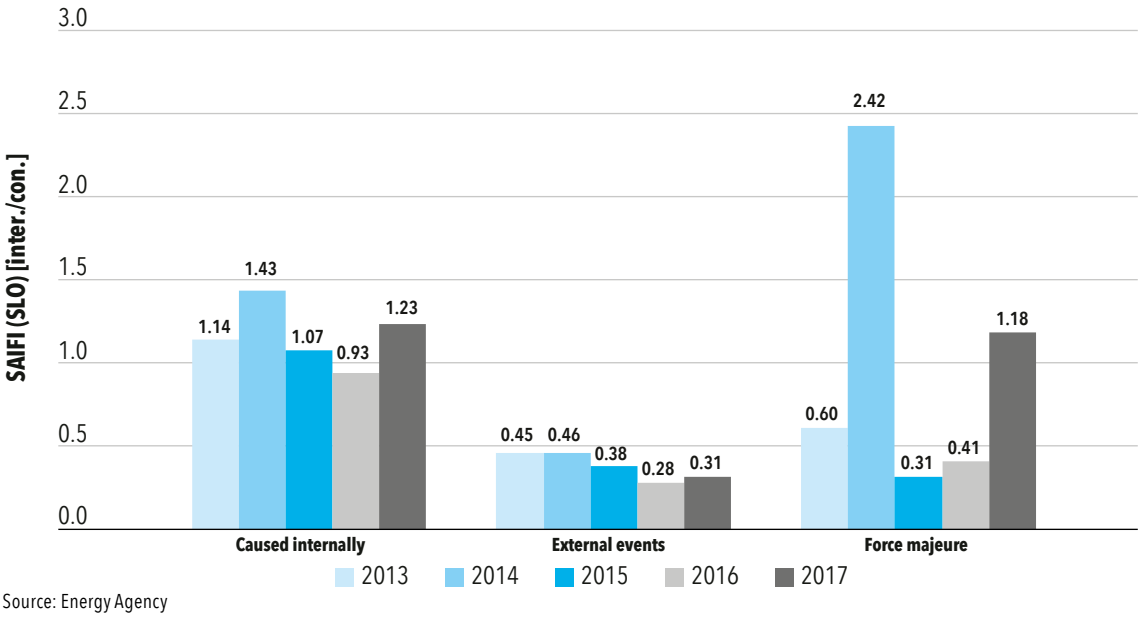
Figure 20 and 21 show SAIDI in SAIFI in the period 2013–2017 for unplanned long-term interruptions, separated by causes of interruptions to internal, external or force majeure, and Figure 22 shows MAIFI for the same observed period. All indicators are calculated at the national level.

Figure 20: SAIDI for unplanned long-term interruptions, separated by causes in the period 2013–2017



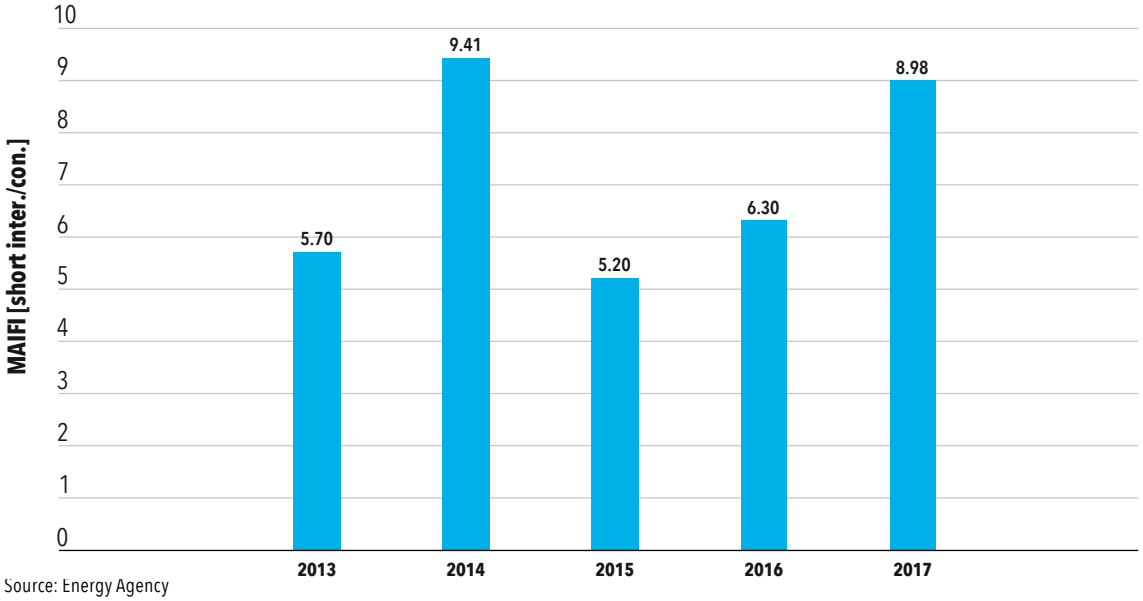
Source: Energy Agency

Figure 21: SAIFI for unplanned long-term interruptions, separated by causes in the period 2013–2017



Source: Energy Agency

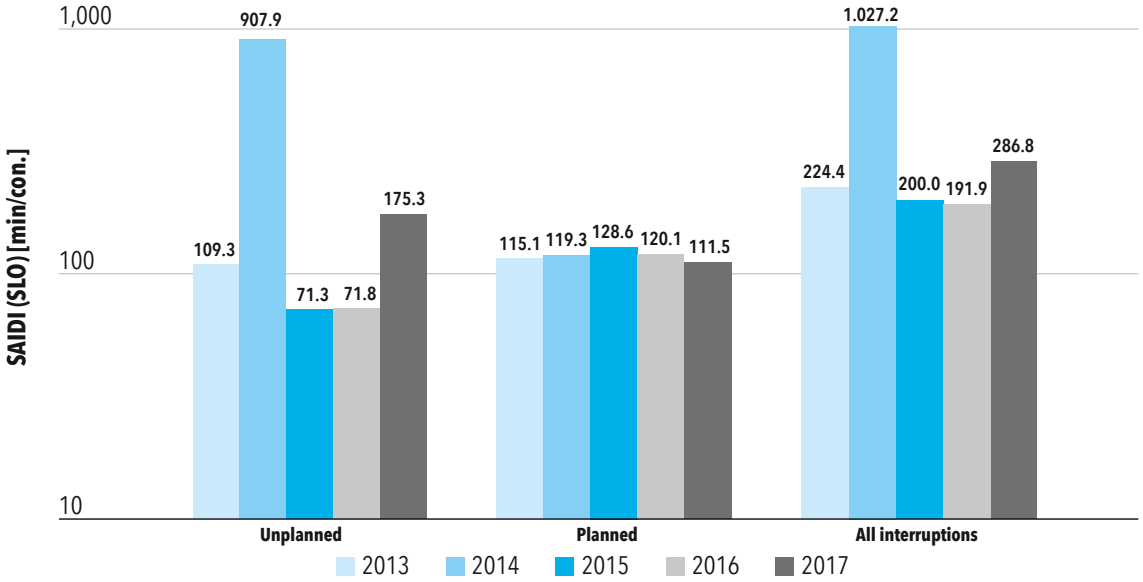
Figure 22: MAIFI in the period 2013–2017



Source: Energy Agency

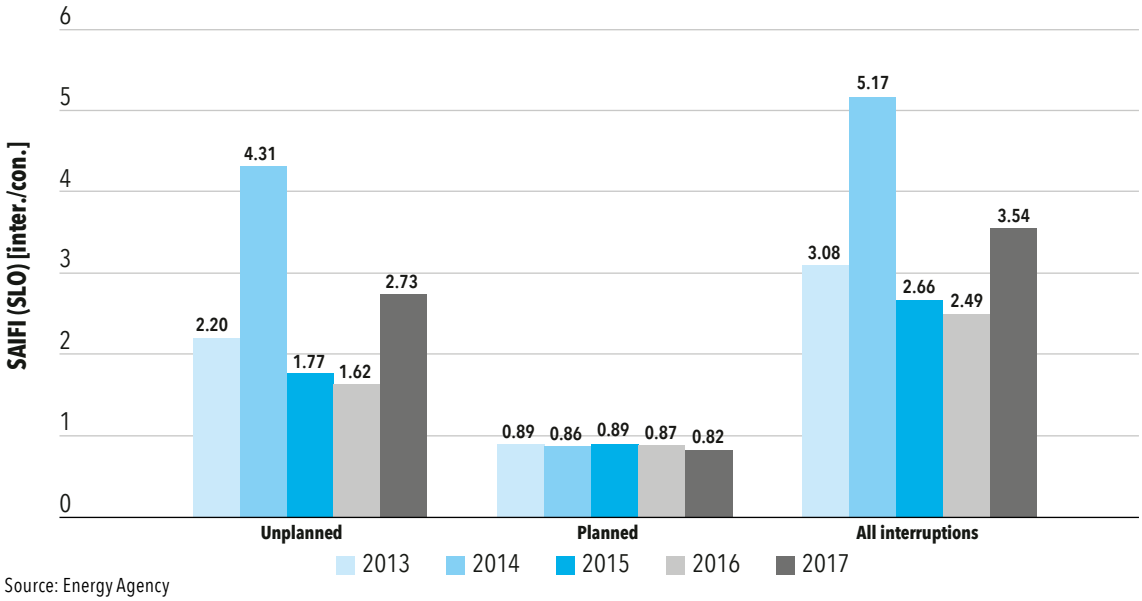
In Figures 23 and 24 are shown the total values of SAIDI in SAIFI in the period 2013–2017 for unplanned, planned, and all interruptions in Slovenia.

Figure 23: SAIDI for all long-term interruptions, separated by causes in the period 2013–2017



Source: Energy Agency

Figure 24: SAIFI for all long-term interruptions, separated by causes in the period 2013–2017



Source: Energy Agency

In 2017, the Energy Agency continued to monitor the data on supply continuity in closed distribution systems (hereinafter referred to as CDS). In CDS Petrol Energetika, which operates in two separate industrial area, on the location Ravne na Koroškem seven long-term interruption of supply due to internal causes were recorded, and in Štore six short-term power failures. In the mentioned locations all together eight planned power failures were recorded, of which one happened in the location of Štore. In CDS Jesenice in 2017 one unplanned failure occurred due to internal causes. In CDS Acroni the supply interruption happened twice, and in CDS Talum Kidričevo no supply interruptions were reported in 2017. Because of interruptions in CDS no complaints from customers were received.

Commercial quality

The required level of commercial quality is determined by the system standards and the guaranteed standards for the commercial quality. If the guaranteed standards for the commercial quality, which are defined by the legislation or set by the energy regulator, are not met, an individual service provider may have to face financial consequences, i.e., the compensations paid out to the customer concerned. A consumer can expect a certain quality on the basis of the system standards, as they indicate the average level of the service quality in the system or the share of the customers provided with a particular service. In 2017, we did not record any compensation payment for violation of commercial standards.

Maintaining the level of commercial quality

The analysis of the commercial quality indicators shows that on average the level of services is maintaining the quality, since for the majority of indicators only smaller fluctuations in the values achieved in comparison with the previously observed period. In Table 18 the ranges (minimum and maximum values) of commercial quality indicators are presented in the period 2015–2017.

Table 18: Range of the commercial quality indicators in the period 2015–2017

Commercial quality indicators	2015		2016		2017	
	Min	Max	Min	Max	Min	Max
Connection-related services						
Average time required for issuing the approval for connection [days]	6.68	24.72	6.86	20.00	8.19	19.50
Average time required for issuing cost estimation or proforma invoice for simple works [days]	1.49	6.64	1.90	3.55	2.39	3.45
Average time required for issuing the contract for the connection on LV system [days]	1.00	6.10	1.00	6.56	1.00	5.94
Average time required for activating the connection to the system [days]	1.70	4.60	1.50	5.80	2.08	5.90
Customer service						
Average response time to consumers written questions, complaints or enquiries [days]	1.67	4.80	2.11	4.51	1.59	4.97
Average hold time in the call centre [s]	24.56	94.66	18.00	122.00	15.00	126.70
Call centre performance indicator [%]	84.00	90.90	84.67	90.90	79.27	93.80
Technical services						
Average time until the restoration of supply in case of following a failure of current limiting device (06:00 - 22:00) [h]	1.01	2.43	1.00	2.17	1.01	1.86
Average time until the restoration of supply in case of following a failure of current limiting device (22:00 - 06:00) [h]	0.88	2.78	0.60	1.81	0.90	2.06
Average time for answering the voltage complaints [days]	8.37	29.04	13.70	21.50	13.70	21.05
Average time required for resolving voltage quality deviations [months]	0.25	30.30	0.83	41.00	0.31	24.00
Metering and billing						
Average time required for elimination of meter failure [days]	0.24	5.40	2.55	6.00	2.63	10.00
Average time for restoration of power supply following disconnection due to non-payment [h]	0.52	4.70	0.15	8.35	0.18	9.36

Source: Energy Agency

On the basis of a unified procedure the commercial quality data on complaints are also collected. From the data is evident that system users mostly complained to the DSOs due to exceeding the maximum time to resolve voltage quality deviations and also because of missing the deadline for replying to the complaint regarding voltage quality. Also in 2017 system operator recorded fewer complaints received by consumers than the year before. DSO received only 19 complaints, or three less than in 2016. Higher number of complaints received the electricity suppliers; in more details is this area presented in chapter Consumer protection. The share of justifiable complaints can indicate consumers' awareness of their rights, which their system operator is obliged to provide within the performance of its services.

Data on commercial complaints for 2017 are summarized in Table 19.

Table 19: Number and shares of justified complaints relating to commercial quality in 2017

Reason for a complaint	Number of all complaints	Number of justifiable complaints	Share of justifiable complaints
Connection activations			
Exceeding the time for restoration of power supply following the failure of a current limiter	1	0	0%
Quality of supply			
Exceeding the maximum time for elimination of variations of supply voltage	5	0	0%
Exceeding the deadline for responding to the complaint regarding the voltage quality	4	0	0%
Exceeding the maximum permitted duration and the number of unplanned long-term interruptions (applies only to end-users on the MV system)	1	1	100%
Metering			
Delay in elimination of metering device failure	1	1	100%
Metering, billing, and recovery of costs			
Delay in time for response to written questions, complaints and other consumers' claims	1	1	100%
Connection to the system			
Delay in issuing the contract for connecting to the LV system	1	1	100%
Delay in issuing connection approval	2	0	0%
Customer service			
Untimely information about planned interruptions	3	3	100%

Source: Energy Agency

CDS in 2017 continued to monitor the commercial quality. CDS Petrol Energetika dealt with only one application for connection approval, at the location of Štore, and also examined one justified customer complaint regarding regular reading of the electricity meter. In CDS Jesenice examined two applications for connection approval and received two applications for the conclusion of a contract for connection to the distribution system, and two requests for the replacement of the fuse. In CDS Talum in 2017 handled one new connection to the distribution system, while there were no complaints regarding commercial quality in CDS Talum, as well as in CDS Acroni.

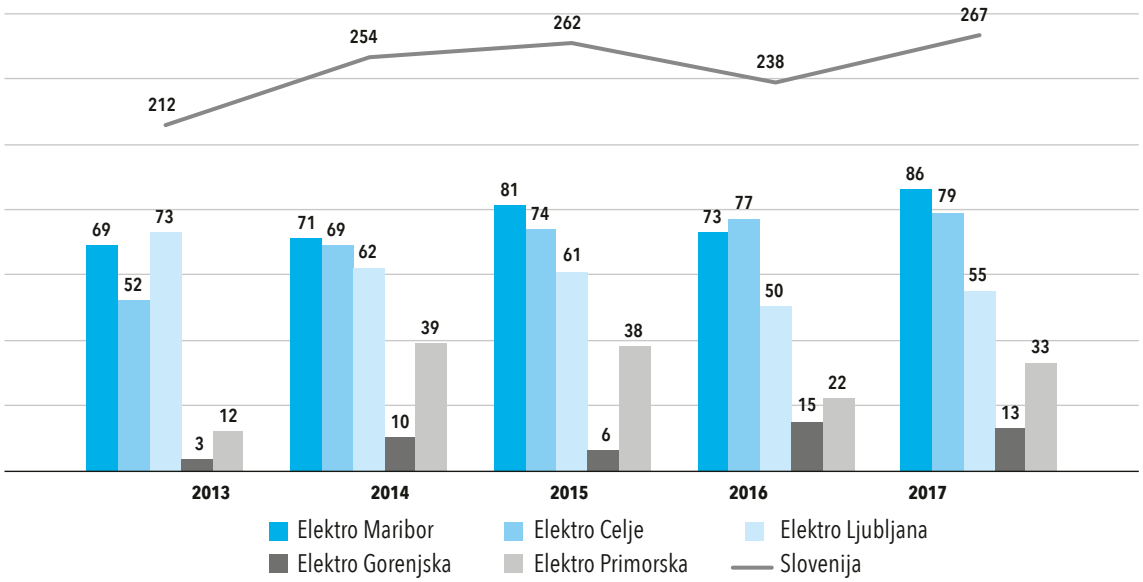
Voltage quality

The two system operators and distribution companies must carry out regular monitoring at the border of transmission and distribution networks at delivery points of all large users. Occasional monitoring is carried out according to the predetermined plan. In dealing with a consumer's complaint the monitoring of voltage quality is performed, which lasts at least a week. The monitoring of voltage quality is carried out in the procedure for connection approval when the issuer of the approval in this way checks the voltage quality conditions.

More complaints than in 2016, but less justified

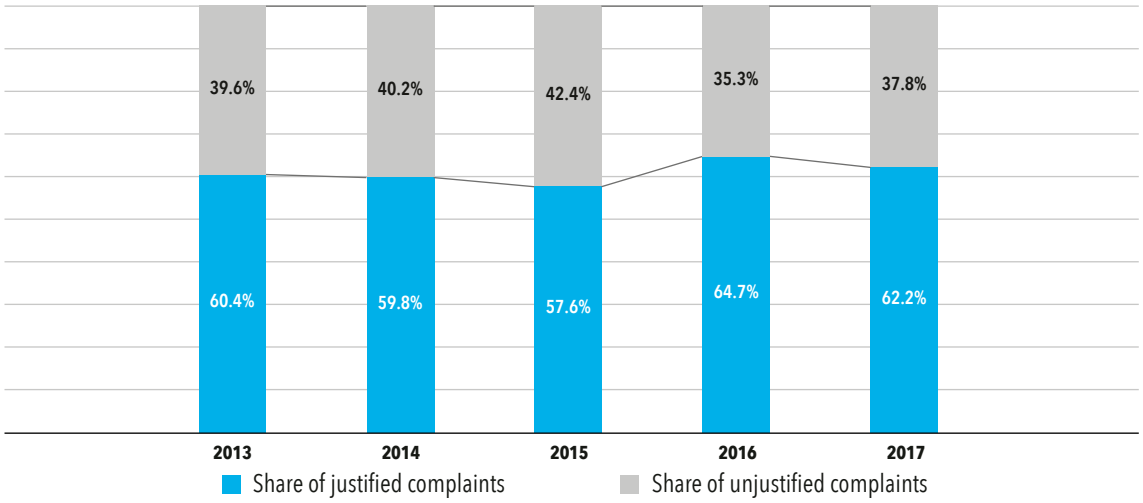
In Figure 25 the number of complaints related to voltage quality by individual distribution companies is shown and for Slovenia all together. Although the total number of complaints addressed to DSOs and TSO in 2017, in comparison to the previous year increased, the number of justified complaints decreased as it is evident from Figure 26.

Figure 25: Number of complaints relating to voltage quality by distribution companies and in Slovenia in the period 2013–2017



Source: Energy Agency

Figure 26: Shares of justified and unjustified complaints related to voltage quality in the period 2013–2017



Source: Energy Agency

ELES carried out a permanent monitoring of the voltage quality of the high-voltage network in 190 connection points between the distribution system, producers, and direct consumers). Similar to the previous year, the most violations were detected due to the occurrence of the flicker. Deviations from the standard were recorded in 170 measuring points. The monitoring of voltage quality will continue at the remaining connection points between the transmission system and its users, where permanent monitoring is not yet established, as well as at the connection points with transmission systems of Croatia, Austria, and Italy. In addition to the indicators used for continuity of supply in the distribution system (SAIDI, SAIFI, MAIFI), in the transmission system some other indicators are used, which are based on the amount of undelivered energy (AID, AIT; AIF and ENS). In more detail, the continuity of supply for the TSO is presented in the report on the quality of supply, which is every year prepared by the Energy Agency.

Also CDS were carrying out the permanent monitoring of the quality of supply in in line with SIST EN 50160 standard. In the CDS Talum, the system for permanent monitoring was implemented in December 2016. If necessary, they have at their disposal the data which are at these metering points provided by ELES, and in case of requirements by users they use portable network analyser. In CDSs Acroni and Jesenice in 2017 the situation regarding the quality of supply did not change significantly; in both cases, the limit values of the standard were exceeded due to flicker, but the CDSs on the HL do not affect flicker. Petrol Energetika performed permanent monitoring of voltage in both locations of the CDSs, Ravne na Koroškem and Štore, and also detected deviations from the standard when measuring flicker, and by occasional monitoring deviations when measuring higher harmonics components. CDSs did not receive any complaints related to voltage quality.

3.3.2.4 Multi-year development plan of the electricity network

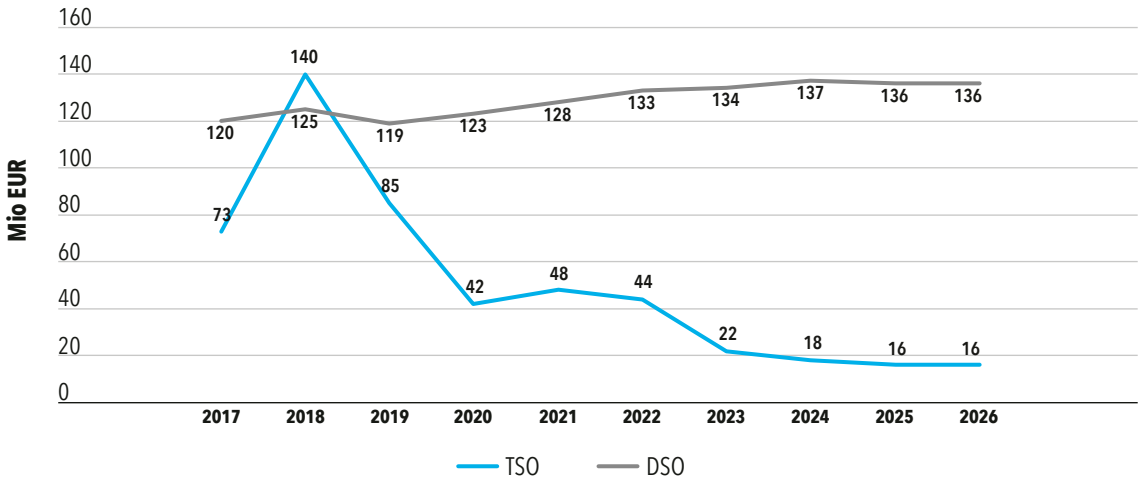
Electricity system operators have to prepare a 10-year development plan for the electricity transmission and distribution system every other year and obtain an approval by the ministry, responsible for energy. The plans must be developed on the basis of the prescribed methodology, they must be harmonized must consider national energy strategy.

The starting point for planning the network in the system operator's development plan is the analysis of the situation in the transmission system. On the basis of input data on electricity consumption and power the system operator must prepare the analysis of different forecasts of electricity consumption by taking into account the methodologies of ENTSO-E and own assessment of future economic development. A development plan must include an analysis of covering the consumption by production sources and the sufficiency of production sources as well as analysis for assessing the needs for transmission capacity that are used as a basis to define dynamics of planned investments and their financial evaluation.

The DSO must in its development plan analyse the period of previous development plan, perform an analysis of forecasted electricity consumption and electric power and prepare the plan of investments in the power system for the entire country, which has to be financially evaluated.

In the current development plans the system operators by the 2026 are planning the investments in the power system in the amount of € 504 million for the transmission system and € 1291 million for the distribution system.

Figure 27: Assessment of the investments from the electricity system operators' development plans for the period 2017–2026



Sources: ELES, SODO

The development plan of the TSO is by the year 2026 prepared on the basis of a studies on the needs for new infrastructure. They took into account the state of the network, the needs for technological renovations in the facilities of the transmission system, the needs of electricity producers and consumers, the criteria for reliable and safe operation of the transmission system, and as well as international agreements and contracts. General guidelines that were taken into account in the preparation of set of new and renewed invest-

ments include: connecting with the neighbouring power systems, managing the power flows and providing adequate voltage conditions in the entire Slovenian power system, ensuring reliable and safe operation in accordance with the recommendation and criteria of ENTSO-E, and the introduction of smart grids for better utilization of existing infrastructure and to achieve adequate stability and efficiency within the fulfilment of the European energy requirements. In relation to this, the implementation of the international project for smart grids SINCRO.GRID will continue, under which TSOs and DSOs of Slovenia and Croatia will tackle the challenges of managing the voltage in the transmission system and reducing required capacities for the secondary reserve. The most important strengthening of the transmission network in the future will be construction of the 400 kV transmission line Cirkovce–Pince, which will significantly increase the import capacity of the Slovenian power system in enable import of cheaper electricity from eastern part of Europe and improve reliability of power supply in Slovenia. Projects of transition from 220 kV transmission network to 400 kV voltage level and the new one-way connection Slovenia–Italy are still in the study phase and their realization will largely depend on market conditions in the future.

€ 1,796 mio
for planned investments in 10 years, of which € 1,291 million for the distribution network and 504 million for the transmission network

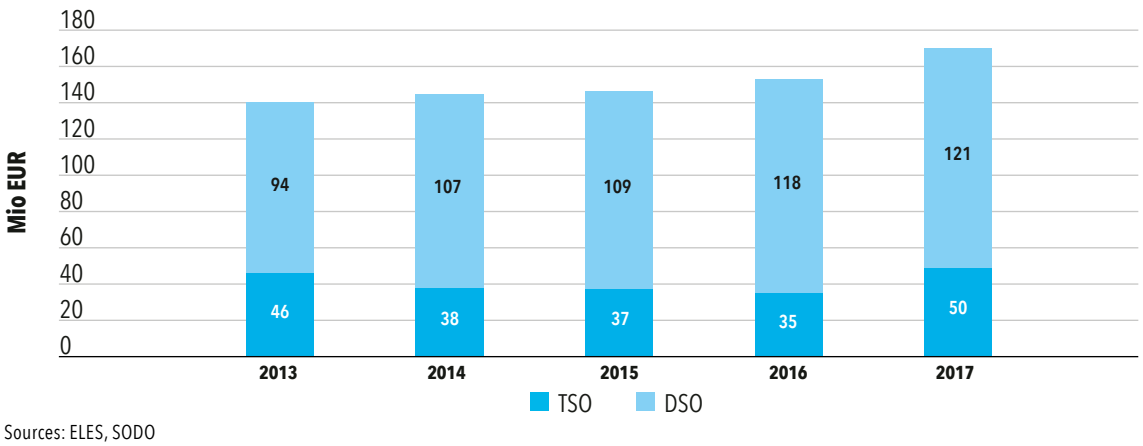
The DSO in its development plan of the distribution network by 2026 takes into account the objectives related to laid guidelines and objectives of the national energy and environmental policy. The development plan, thus, answers the questions how to provide electricity demand forecasting and power demand, how to provide a cost-effective the state of the art infrastructure and how to ensure long-term stability, reliability and availability of the distribution network while improving or maintaining quality of electricity supply and at the same time enable to achieve national climate and energy targets. In the DSO's development plan building of a new and reconstruction of the existing medium-voltage network prevail since continuity of supply is the weakest link of the power system, especially when overhead lines are in question. In the case of new facilities, therefore, the underground construction of medium-voltage cables predominates, and at reconstruction of overhead lines the replacement of not insulated electrical conductors with semi-insulated conductors or self-supportive cables. The basic development directions of the DSO are the investments in the development of the operating systems, which include a meshed medium-voltage network, automatization and management, the method of neutral point connection and network cabling, and as well improving the quality of supply by deployment the smart grid concept and smart metering.

€ 171 mio
for investments in networks, of these € 121 million investments in the distribution networks and 50 million in the transmission network

Control over the electricity system operators' development

Figure 28 presents the investments of both system operators for the period 2013–2017, whereby the investments in new assets as the reconstruction of the existing ones are included. The volume of investments of the DSO and owners of the distribution infrastructure remained at approximately the same level as in the previous year, nevertheless, the significant growth of the system operator is noticeable, but which has not yet reached the funds that are planned in the development plan and the regulatory framework.

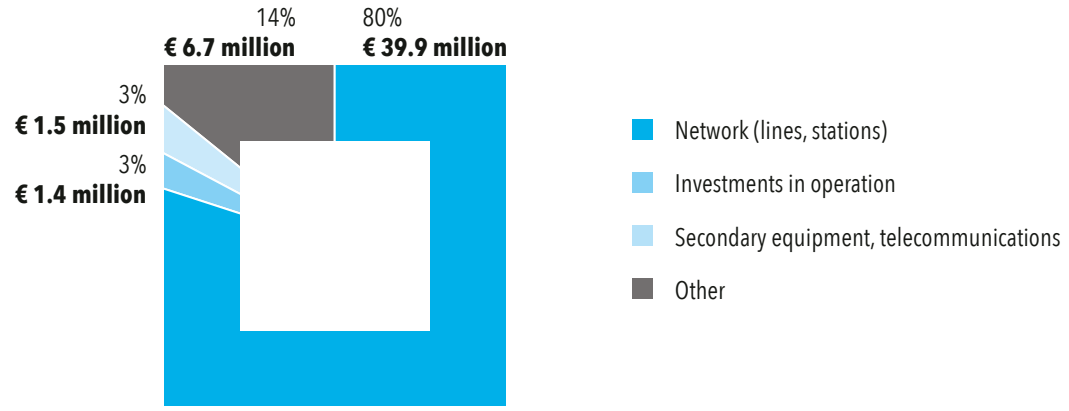
Figure 28: Investments of the TSO and DSO



Sources: ELES, SODO

The TSO in 2017 allocated only 57% of funds foreseen in the development plan, or only 75% of funds envisaged in the regulatory framework. Of the total 50 million euros, 20.9 million was allocated for the construction of new power infrastructure, 22.4 million for the reconstruction of the existing one, and 6.7 million for other investments, among which are the investments in business premises, vehicles etc.

Figure 29: Investments of the TSO in 2017

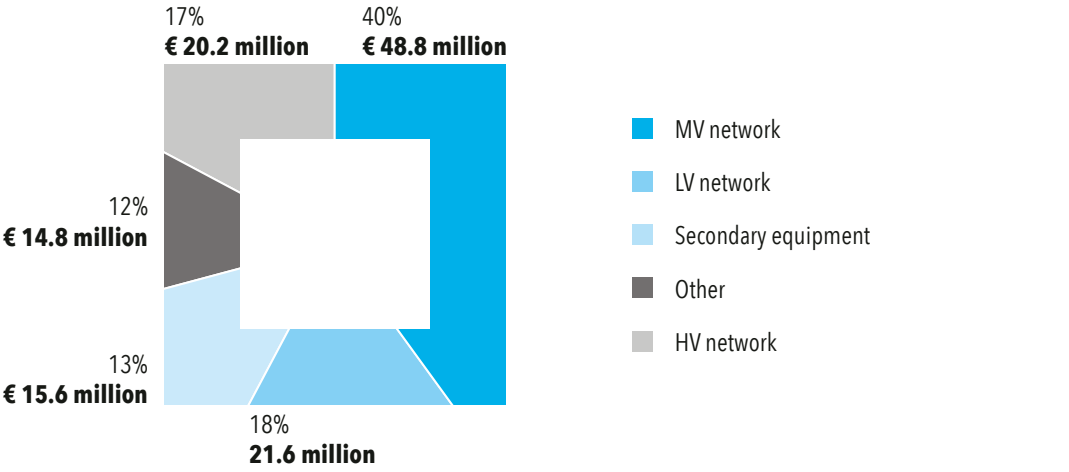


Source: ELES

The DSO and the owners of the distribution network for the investments in electricity infrastructure in 2017 allocated EUR 121 million, which is almost 110% of funds planned in the regulatory framework, and it is almost the same as funds planned in the development plan.

Of the total realized investments EUR 53.3 million were earmarked for new investments, EUR 52.8 million for reconstructions, and 14.8 million for other necessary investments. Most of the funds were allocated for the investments in MV networks, more precisely for the constructions of new MV cables and replacing overhead lines with underground lines to increase the robustness and reliability of operation in extreme weather conditions.

Figure 30: Investments of the DSO in 2017



Source: SODO

The scope of the electricity infrastructure of the transmission and distribution system in Slovenia at the end of 2017 is presented in Table 20.

Table 20: Transmission and distribution electricity infrastructure in Slovenia at the end of 2017

Transmission system	
Lines 400 kV	669 km
Lines 220 kV	328 km
Lines 110 kV	1,903 km
DTS HV/HV	27
DS 110 kV, TS 110 kV, EPS 110 kV	4

Distribution system	
Lines 110 kV	871 km
Lines 35 kV, 20 kV, 10 kV	17,880 km
Lines 0.4 kV	46,742 km
RTP 110 kV/MV	92
RTP MV/MV	10
DS MV	85
TS MV/LV	17,601

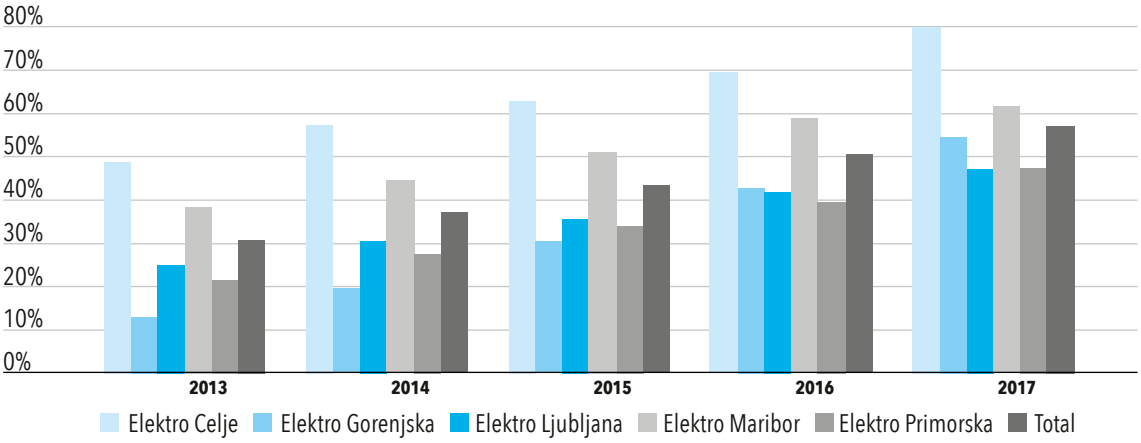
Sources: ELES, SODO, EDP

Development of advanced metering system in Slovenia

In Slovenia the installation of advanced metering system is intensively carried out. At the end of 2017 already 57% of consumers connected to the distribution system were equipped with advanced metering infrastructure, and 52% were actually connected to remote meter reading. These data place Slovenia among the leading European countries in the introduction of advanced metering. If this trend continues, Slovenia is expected to approach the goal of the European Directive that by 2020 should be at least 80% of consumers equipped with advanced metering infrastructure. Regardless of the significant progress in the deployment, the question arises whether the advanced metering system will allow the provision of services and measures required by the future electricity market. Consequently, this means that the projects' expected benefits will not be guaranteed.

57%
of consumers connected to the distribution system were equipped with advanced metering infrastructure

Figure 31: Trend of deployment of advanced metering devices



Sources: EDP

Development and regulation of smart grids and the introduction of new technology

In the last few years, the electricity networks are developing rapidly. The reasons are mainly in the implementation of the European environmental policy, the result of which is the increase in the production of electricity from RES. The electricity network of the future will be cost-effective and sustainable, merging producers, consumers, and entities, which are both (prosumers). Such network will have to be smart; it will include the ICT systems and process intelligence systems. These systems will enable communication between the elements of the network and data processing in real time and thus improve the network performance.

In the continuation, we present the projects in the area of smart grids and the introduction of new technology performed by the electricity system operators in 2017. The Energy Agency intentionally started to encourage the investments in smart grids in the regulatory period 2013–2015 and upgraded its policy in the regulatory period 2016–2018. For the investments in smart grids in 2017 two types of incentives were available – for investments and pilot projects. With the aim of bringing the smart grids closer to professional and wider public, the Energy Agency on its website publishes basic information and potential benefits of all qualified projects, which are promoted within its methodology of regulation, and also carries out the control over all qualified projects. Information on the status of implementation of the projects that are not included in the incentive scheme are acquired directly from the promoters of these projects.

Investment projects are the projects that solve specific problems in a certain part of the network, such as for example the problem of the integration of the production from RES or the voltage quality. The Energy Agency has precisely defined these areas and determined the minimum investment limit in the amount of € 200,000 as one of the key conditions for the project to be included in the incentive scheme. Another key condition is a positive result of cost-benefit study prepared under the European Commission recommendations. A project that qualifies for the incentive scheme is recognized one-off incentive in the amount 3% of carrying an amount of operating fixed asset on 31 December of the year, in which the asset was activated within an individual project. The sum of incentives is limited up to 10% of the net benefits of the entire project, which are defined in the study of the project.

In 2017, two large investment projects of smart grids were active, NEDO and SINCRO.GRID.

NEDO[2] is the project of Slovenian–Japanese cooperation and in addition to the project promoter, that is ELES, a large number of stakeholders from Slovenia is included, which is why it can be rightfully be called a national project and the only one of its kind in Europe. Similar projects in Europe are focused on narrower areas and communities, whereas in this case we can actually speak of the implementation of a smart grid on the national level. Electricity distribution companies are involved in the activities that are carried out within the implementation of measures in the areas of their distribution systems. In 2017, the content of the second phase of the project was coordinated with the Japanese partners. In the context of advanced distribution network management the development and testing of three segments to increase recognisability and conductivity are foreseen, namely: a) automatic localisation of defects, localization and service restoration; b) coordinated voltage control on both levels, 110/20kV and 20/0,4kV, depending on different optimization criteria; and c) testing the results of demand side reduction as a part of ancillary services or local optimization service use to reduce peak loads. In 2017, Elektro Maribor started to implement a sub project called Development of advanced functionalities for assessing the maximum volume of dispersed generation in the network, which includes: a) automated data processing and use of metering data for pilot network model to support the planning process with an emphasis on integration of generation sources; b) an assessment of the additional potential dispersed generation capacity; c) an analysis of technical and non-technical losses. The analysis of the situation and preparation of suitable input data were (determination of pilot network, network modelling, preparation of basic interfaces, functional-technical specifications of the solution).

€ 35 mio
is the value of
the whole NEDO project

2 https://www.eles.si/projekt-nedo

SINCRO.GRID[3] is the project of European significance, carried out in the regions of Slovenia and Croatia. The project partners are the Slovenian and Croatian TSOs, ELES and HOPS, and DSOS of both countries, SODO and HEP ODS. The project, run by ELES, is in the study phase, during which the preparation of technical specifications and project and tender documentation for the supply and installation of equipment were carried out. The project was presented to municipal councils in municipalities in which equipment will be installed. In Slovenia is planned: installation of a stationary compensation device with a SVC/STATCOM technology of +/- 150 Mvar at the Beričevo substation, the installation of variable shunt reactor of -150 Mvar at the Cirkovce substation, the installation of variable shunt reactor of -150 Mvar and the installation of a capacitor of +100 Mvar at the Divača substation and two battery storage units with a capacity of 5 MW will be installed at the existing substations of Okroglo and Pekre. At the same time the system for the assessment of power grid operating limits will be implemented, whereby is planned: the installation of hardware and software in control centres and atmospheric measuring instruments on transmission lines, as well as the upgrade of the system SUMO[4] (the system for real-time and short-term forecast assessment of power grid operating limits), which will enable better utilization of existing transmission lines and transformers. In 2017, the introduction of the virtual cross-border control centre begun, which will enable appropriate data exchange, voltage control and loss optimisation in transmission systems, better control and forecasting of electricity generation from RES, and implementation of tertiary regulation with management of consumption and dispersed generation in Slovenia and Croatia, and participation of RES in the provision of ancillary services.

€ 88 mio
is the value of the SINCRO.GRID project

In the area of research activities of the TSOs', in 2017 should be highlighted the FUTUREFLOW[5] project, also run by ELES, the aim of which is to include advanced consumers in the secondary frequency control and integration of flexibility markets. The project is funded from the European programme Horizon 2020. Project partners explore new solutions for balancing the electricity system and managing flows in the European electricity system. Distributed generation flexibility aggregation platform and regional platform for ancillary/balancing and redispatching services are being developed. The company Elektro Ljubljana participates in preparing definitions and selection of demonstrations and at the end also at installing communication interfaces at consumers. In 2017 was carried out a development of a market model of cross-border balancing harmonised with the network codes, preparation of specifications for architectural solutions, development of demonstration environment in which pilot tests will be performed, and identification of suitable advanced consumers and negotiations on the participation in the project.

Beside that there were several research and innovation projects active, in which participated ELES and electricity distribution companies. Activities are carried out mainly within the programmes FP7 and Horizon 2020 as well as within other partner projects.

ELES also participates in the MIGRATE[6] project, where partners of the consortium deal with issues related to the future electricity system, which will be predominantly or exclusively supplied for some parts of the day or year from renewable sources employing elements of power electronics. A public document was prepared, which summarizes and deals with quality of supply and sources of disturbances in the network with high number of power electronics. Two workshops were conducted for stakeholders. Within the TDX-ASSIST[7] project a demonstration environment will be set up for testing interoperability, including ELES and Elektro Gorenjska. The report was prepared and an overview of the current European state of the technical interoperability between the transmission system and distribution system operators under the European and international regulatory standards and protocols. The aim of the BIOENERGYTRAIN[8] project, in which ELES is involved, is to link tertiary education institutions, research centres, professional associations and industry representatives who encounter renewable energy sources in the course of their work. Two new postgraduate studies were developed and accredited. At Graz University of Technology a Master's Degree Programme Biorefinery Engineering will be implemented, and at the University of Twente in the Netherlands the Bioresource Value Chain Management. ELES also participates in the DEFENDER project, which is discussed in the chapter on cyber security.

3 http://www.sincrogrid.eu/

4 https://www.agen-rs.si/documents/10926/102421/Projekt-SUMO/295786f7-8143-4c06-b6ab-bd0d0051edc6

5 http://www.futureflow.eu/

6 https://www.h2020-migrate.eu/

7 http://www.tdx-assist.eu/

8 http://www.bioenergytrain.eu/

The SUNSEED[9] project finished in 2017. It was managed by the company Telekom Slovenije, and the company Elektro Primorska was in charge to prepare the test polygon and setting up use cases. The activities included testing of real time voltage-phasor measurements as a support for greater network intelligence (state estimator). The DSO Elektro Primorska also started activities in the 3SMART[10] project whose main objective is to provide a technological and legislative setup for cross-spanning energy management of buildings, grids and major city infrastructures in the Danube Region and set up a five pilot actions in different Danube Region countries. DSO Elektro Primorska is in charge for energy management in the network[11] and implementation of a pilot project in the municipality of Idrija.

Within the STORY[12] project in the distribution network of the DSO Elektro Gorenjska the installation of a larger improved energy storage system will be carried out, which will with appropriate integration in the management systems ensure more and more important functionalities of smart grids. Two demonstrations of electricity storage facility, one at the location of DS Suho and one at the location of the DSO in DS Elektro. Storage facility will be managed with advanced process control system, which will provide optimum choice of the operating mode with respect to the real time take-off from the network and production of electricity in solar power plants. The project's objectives envisage the implementation of decreasing and allocating of peak load, compensation of reactive energy, and providing tertiary frequency control. In 2017 the following activities were carried out – preparation of network models, the simulation of control algorithms, drawing up a management system and preparation of the equipment for the connection of storage facility to the distribution system.

More than **100** partners participate with the Slovenian electricity system operators in ongoing European research projects

The HYBRID-VPP4DSO[13] project in which participated the DSO Elektro Ljubljana was completed in 2017. Activities addressed active load management and production from RES in the distribution network. A hybrid-virtual power plant (hybrid-VPP) was economically evaluated, which primarily enabled demand response according to the requirements of the DSO and secondary according to the market driven use. The results of the project show that the investment in a hybrid-VPP is justified, in particular in the context of increased share of distributed generation. The DSO Elektro Ljubljana in 2017 started activities in three projects. The INTEGRID[14] project deals with demonstration of technology to enable all stakeholders to actively participate in the energy market and distribution grid management. The DSO is focused on acquiring business models and services on the basis of demand response for the needs of the distribution company as well as for comparison of pilot projects in different segments and on different levels of network. Within the FLEXITRANSTORE[15] project the DSO Elektro Ljubljana will in its MV level network on the selected power line install DLR[16] sensors to prevent sleet formation. They will test the usefulness of the real-time monitoring and assessment of the situation (temperature, weather conditions, sag, tension, and load). The DSO Elektro Ljubljana and the TSO ELES also participate in the Aktivni odjemalec[17] (Active Consumer) project, operated by the company GEN-I. The aim of the project is the development and presentation of the system that enables the inclusion of minor active consumers in electricity and ancillary services market by introducing advanced services of adapting the consumption of consumers and the production of small dispersed generation devices (solar power plants). The most important functions will be performed at the level of aggregator, which will on the basis of all received data calculate individual and total available capacity and decide on its activation. Elektro Ljubljana will determine the impact of activations on selected demonstration part of the system. Coordination of ancillary services will be carried out in cooperation with ELES. For ELES the Active Consumer project is interesting due to the connection with the NEDO project – in comparing two technical solutions of including minor consumption and aggregating minor consumption from the project with other flexible consumption of the NEDO project that will potentially be available during the second phase of NEDO project.

9 http://sunseed-fp7.eu/

10 http://www.interreg-danube.eu/approved-projects/3smart

11 Grid-side EMS module

12 http://horizon2020-story.eu/

13 http://www.hybridvpp4dso.eu/

14 https://integrid-h2020.eu/

15 http://www.flexitranstore.eu/

16 Dynamic Line Rating

17 http://www.gen-i.si/novice-in-mediji/projekt-aktivni-odjemalec/

Apart from the already mentioned projects[18], the distribution network development plan also lists the CIM project[19], which aims to ensure the effective exchange of information between various intelligent devices and systems, both within the company and between different companies. Appropriate methodologies and standards for the reference architecture of smart grids have already been developed, only a general strategy is missing how to gradually achieve an adequate level of IT systems integration in the European distribution companies. The Slovenian DSOs at some activities already use the integration platform CIM.

In 2017, DSOs Elektro Celje in Elektro Maribor, in separate pilot projects Flex4Grid[20] and Izravnava konic/prilagajanje odjema na področju RTP Breg[21] (- Peak consumption adjustment/demand response in the area of DTS Breg), were examining the effectiveness of active consumers involvement in the demand response programmes by using dynamic tariffs for decreasing local peak loads in the distribution network. The projects are presented in the following case study. The purpose of pilot projects is to answer the key questions about the development of smart grids and to prove in practice that some solutions can be successfully used in regular operation. In the incentive scheme for pilot projects in 2017 only projects of distribution system were included. An incentive in the regulatory period 2016–2018 is a special dynamic network charge tariff (critical peak tariff), which is earmarked for demand response projects. It is an implementation incentive that is designed to eliminate regulatory obstacles to the implementation of innovative measures, which are not possible under the existing legislation governing the network charges. Both pilot projects are based on the implementation of critical peak tariff for the network charge, which will be used when the system is the most heavily loaded. This tariff is much more expensive than other tariffs. Customers are timely informed about the use of this tariff and can adjust to it by significantly decrease the consumption. This help to relieve the network at peak consumption and help to reduce peak load. Peak load is the crucial for network planning, which means that the investments in network expansion can be shifted to the future. In the case study we are presenting the results of preliminary analysis since final conclusions will be available at the end of 2018, when the projects end.

14
projects are carried within international partners, and two within the Slovenian ones

18 https://www.sodo.si/_files/5203/RN_2017_2026_SODO_dopolnitev_junij_2017.pdf

19 Common Information Model

20 https://www.elektro-celje.si/si/flex4grid

21 https://premakni-porabo.si/

CASE STUDY: The effectiveness of customer engagement in demand response by using dynamic tariff

In promoting investments in smart grids the Energy Agency in the regulatory framework 2016–2018 supported the testing of the effectiveness of the active involvement of customers in the demand response programs using dynamic tariffing. The use of Pilot Critical Peak Tariff (PCPT) is envisaged, which is intended for dynamic conversion of end consumers' load during peak periods to off-peak load.

For the needs of the full implementation of two qualified pilot projects (Flex4Grid20 and Izravnava konic/ prilagajanje odjema na področju RTP Breg/ Peak consumption adjustment/demand response in the area of DTS Breg), publicly known as Premakni porabo21 / Move the consumption) the calculation of the network charge for the distribution system on the basis of the PCPT in line with Article 123 of the Act on the methodology determining the regulatory framework and network charge for the electricity distribution system (Official Gazette of the RS, Nos 66/15, 105/15, 61/16) was enabled. The minimum period for charging the network charge under this tariff is on year. The DSO in cooperation with the electricity distribution company inform end consumer about the beginning and duration of PCPT at least 24 in advance, and at the same time publish information on the website. The maximum number of PCPT in a calendar year is limited to 50.

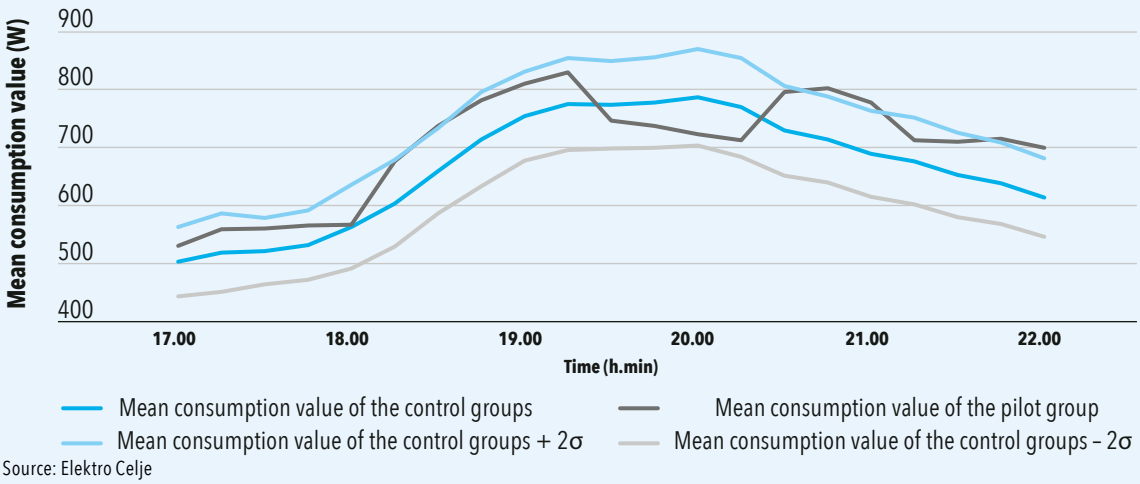
In the considered projects consumers participated in a way that they by themselves or via additional equipment[22] adjusted their consumption to the operator's requirements.

44 W
per household or metering point on average was the total flexibility in the time of critical peak event

Flex4Grid project is the European development project, which focuses on the development of an open technical system for data management and providing activities that will allow management of flexibility. In the demand response pilot activities the company Elektro Celje is involved.

From here on we describe a case of critical peak event, forecasted for 19 October 2017. Forecasts for the event were prepared the day before, on Monday morning. Figure 32 shows electricity consumption of 782 consumers, who voluntarily participate in the project. Dark grey line indicates average electricity consumption per time interval, and with a darker blue line is shown the average consumption of the control groups[23]. A light blue and light grey line present a deviation of two standard deviations from the average, so that 95% of all mean values of control groups are included in this interval. Figure shows that the behaviour of the average of pilot consumers group differs from the behaviour of the average of control groups. Pilot consumers decreased their electricity consumption at 19:15 and again increased after the critical peak event. Average flexibility guaranteed in the time of critical peak event amounted to 44 W per household or metering point.

Figure 32: Mean electricity consumption value of Elektro Celje pilot consumers on 19 October 2017, CPT event between 19:15 and 20:15 compared to the same-size randomly selected control groups



Source: Elektro Celje

22 In Flex4Grid project, 150 consumers participate in the remote management of consumption, while in the project Peak consumption adjustment/demand response in the area of DTS Breg in the remote management of consumption participate 100 consumers. The results shown are not segmented according to the consumers' participation model.

23 The control group is a randomly sampled group of consumers of Elektro Celje, from the population that belongs to the same group of transform stations as a pilot group, with the same station allocation, without pilot consumers. The size of population is more than 11,000 consumers. The size of the control group equals the size of the pilot group. The darker blue line represents mean value of 100 mean values of control groups for each represented time interval.

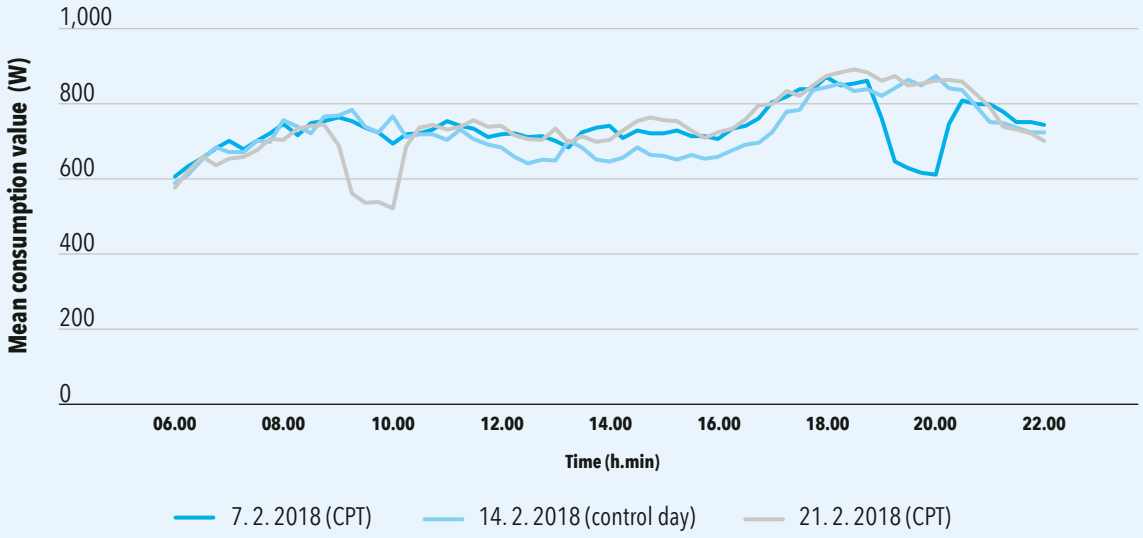
Izravnava konic/prilagajanje odjema na področju RTP Breg/ Peak consumption adjustment/demand response in the area of DTS Breg project is carried out in the area of the DSO Elektro Maribor under the NEDO agreement2, a comprehensive partner project in the area of smart grids, involving companies and institutions from Slovenia and Japan.

Below we describe an example of two activations of CPT implemented at Elektro Maribor. CPT was announced for Wednesday, 7 February 2018, between 18:00 and 19:00, and on Wednesday, 21 February 2018, between 9:00 and 10.00, while the control day is Wednesday, 14 February 2018. Consumers were informed via SMS or e-mails 24 hours before the event and again the next day 15 minutes before the event. The consumers' response to CPT is evident from the Figure 33 and is evaluated as very good, since the peak load decreased by 30%. Hourly restoration of CPT did not cause new maximum load before or after the occurrence of CPT.

30%
decrease in load by consumers during CPT

Figure 33 shows the course of daily load on the day of activations (7 February 2018, darker blue line, and 21 February 2018, grey line) compared to the control day without activations (14 February 2018, light blue line). In this case we have aggregated data of all 827 consumers, who voluntarily participate in the project, which represents 12% of metering points that meet technical and legal requirements in the area under consideration.

Figure 33: Course of daily load of pilot consumers of Elektro Maribor on the day of activations (on 7 and 21 February 2018) compared to the control day (14 February 2018)



Source: Elektro Maribor

The initial results of the two projects considered are very encouraging. Only more detailed analysis of all activations in at least one-year period of CPT calculation, segmented according to the method of demand response, will give final conclusions regarding the effectiveness of the pilot projects. The Energy Agency monitors the implementations of the projects and the results will be taken into account when preparing measures for pilot projects and incentives in the new act on on the methodology determining the regulatory framework and network charge for the electricity system operators.

Cyber security of the power system

The Energy Agency as the regulator of the Slovenian energy market approves the investments plans of the electricity and gas system operators and monitors the performing of the tasks of services of general economic interest in the context of security of supply. Within this framework it monitors the investments in cyber security and development aspects of this area. In addition, it carries out the necessary activities to ensure the cyber security of its own infrastructure.

We organized two meetings of the Slovenian Energy Security Forum with the goal of encouraging stakeholders to be effective in managing cybersecurity

Due to the importance of this investment segment the Energy Agency makes stakeholders aware and monitors their activities from the cost-effectiveness aspect and continues with organization of the Slovenian Energy Security Forum half-year meetings. Within this forum, a professional dialogue on cyber security or information security is being established with the providers of services of general economic interest in the energy sector, state authorities and European institutions (SI-CERT, Government Office for the Protection of Classified Information, Ministry of Public Administration – Information Society Directorate, ACER …)

In accordance with the recommendation of the National Associations of Regulatory Commission (NARUC) the Energy Agency executed additional activities aimed at raising awareness of providers of services of general economic interest in the energy sector.

Two SEVF consultations were organised, one in March and the second in October, in which the following topics were discussed:

- Energy sector and cyber/information security – state of affairs;
- Guidelines for cyber security: the Energy Agency in line with standards and recommendations of good practice prepared a set of minimum information security controls for business and procedural informatics;
- Smart meters and smart grids: recommendations for technology evaluation and analysis of the situation. The Energy Agency presented to stakeholders the guidelines for analysis and evaluation[24] and prepared a questionnaire, which in line with these recommendations, addresses the cyber security aspects of smart metering;
- Directive 2016/1148 concerning measures for a high common level of security of network and information systems across the Union and Regulation on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (GDPR): stakeholders were informed about the transposition of the Directive into the national legislation and the content of the Regulation together with deadlines. The Energy Agency also informed the participants with the draft law on information security, with the European Commission activities in the energy sector and the activities of the CEER working group for cyber security.

The TSO ELES continues its participation in the European project of cyber security of critical energy infrastructure - Defender[25]. The objective of the project is to identify risks on critical energy infrastructure and supported services, and also the preparation of an information environment for early risk identification and awareness-raising of employees to reduce such risks. Activities of ELES and partners in the pilot project are focused on scenarios that will be used for examining how security risks can be identified, such as malicious hacking through the inclusion of human, cyber, and physical factors.

Amongst the activities of the electricity system operators in the area of cyber/information security in 2017 we can highlight the following technical and organizational areas: security mechanisms at integration of business and procedural informatics, establishing security checks for business and procedural informatics and ensuring compliance with ISO standards, improving the organizational scheme for management of cyber/information security, improving the robustness of communication links of important energy hubs with security mechanisms and network segmentation, monitoring of security events, providing audit trails, analysis and centralized management, up-to-date upgrading of edge or central security devices, implementation of security checks, security of personal data, introduction of test environment for collecting and managing mass data, user awareness, incident and risk management.

24 BAT Reference document for the cyber-security and privacy of the 10 minimum functional requirements of the Smart Metering Systems

25 http://defender-project.eu/pilot-3/

In 2017, on the basis of risk assessment the Energy Agency was carrying out the activities within maturity improvement framework for the implementation of information system security controls and activities for upgrading the functionalities of edge security devices. In the information system the Energy Agency provided a centralized collecting of audit trails using dedicated tools for monitoring and analysis. It also performed security policy consolidation and extension of the scope of its implementation and monitored the maturity of the implementation of security controls.

3.3.3 Network charges for the transmission and distribution networks

3.3.3.1 Setting the network charge

The Energy Agency regulates the activities of electricity system operators on the basis of regulated network charge. With this method the Energy Agency determines the network charge and other revenues, and by taking into account the surplus of the network charge from the previous years the system operators the covering of all eligible costs of the regulatory period and the deficit of the network charge from previous years is ensured. The Energy Agency encouraged cost-effectiveness of service providers, guarantees permanent and stable business operation of electricity system operators as well as stable and predictable environment for investors, owners and users of the system.

With the regulatory framework the costs necessary for carrying out the activities of electricity system operators' are covered. These costs include costs of operation and network maintenance, costs of ancillary services, depreciation costs and regulated return on assets. In determining the network charge, the Energy Agency took into account also other incomes form operating activities as well as surpluses or deficits form the previous years.

The methodology for setting the network charge is also based on incentives, which depend on the recognized eligible costs, the achieved level of the quality of supply, and investments in smart grids.

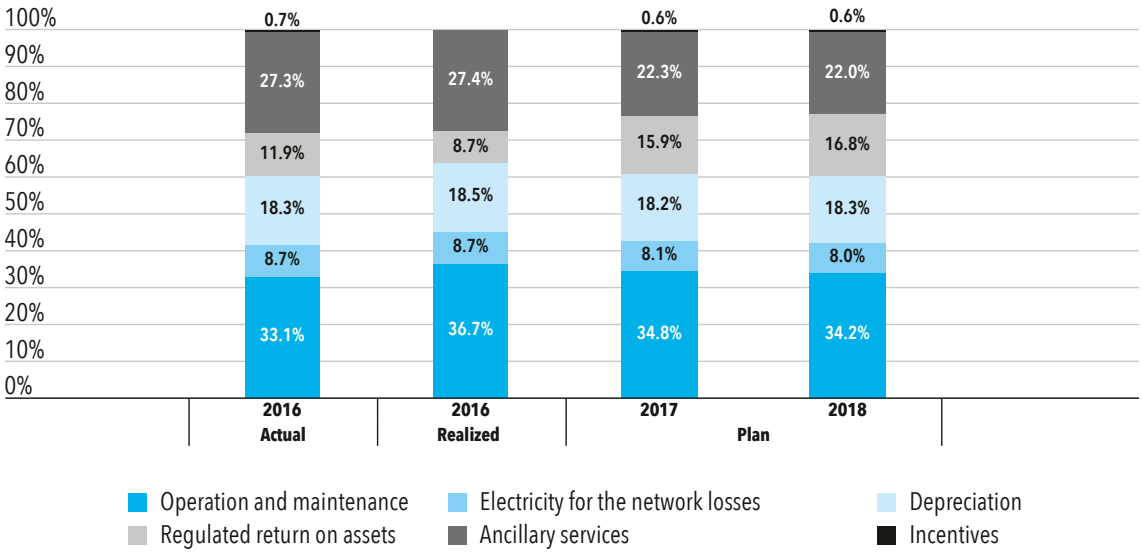
After the end of each regulatory period, derogations from the regulatory framework are identified as the difference between the actual eligible costs of a system operator and actual financing sources for covering eligible costs. The actual eligible costs and sources for covering these costs are calculated on the basis of criteria for their determination. Within the determination of deviations is also checked the eligibility to incentives. The Energy Agency issues a separate decision if deviations from the regulatory framework, which are established by the system operator, are not calculated in accordance with the methodology. Derogations are reflected in a deficit or surplus of the network charge. The method of regulated network charge determines the system operator obligation to consider the surplus of the network charge as dedicated revenue for covering deficits of the previous years or eligible costs of the following years. At the same time, the method of regulated network charge allows the system operator to enforce the network charge deficit in establishing the network charge in coming years. The regulatory framework can be modified during the regulatory period if the Energy Agency establishes that significant changes occur within the operation of the system operation.

On 1 January 2016 the new three-year regulatory period started, which last by 31 December 2018. The Energy Agency in 2015 issued Act on the methodology determining the regulatory framework and network charge for the electricity system operators. Under this Act in 2015 the Energy Agency by issuing the decisions for the TSO and DSO determined the regulatory framework for the period 2016–2018, and also set the network charge tariffs.

After the first year of this regulatory period, the electricity operators on the basis of the criteria set in the Act recalculated planned eligible costs to actual, i.e. recognized by economic regulation. The Energy Agency checked the calculation. On the basis of data from the electricity operators' and distribution companies' accounts calculated the eligible costs incurred.

Figure 34 shows the structure of the TSO's eligible costs.

Figure 34: Structure of the TSO's eligible costs

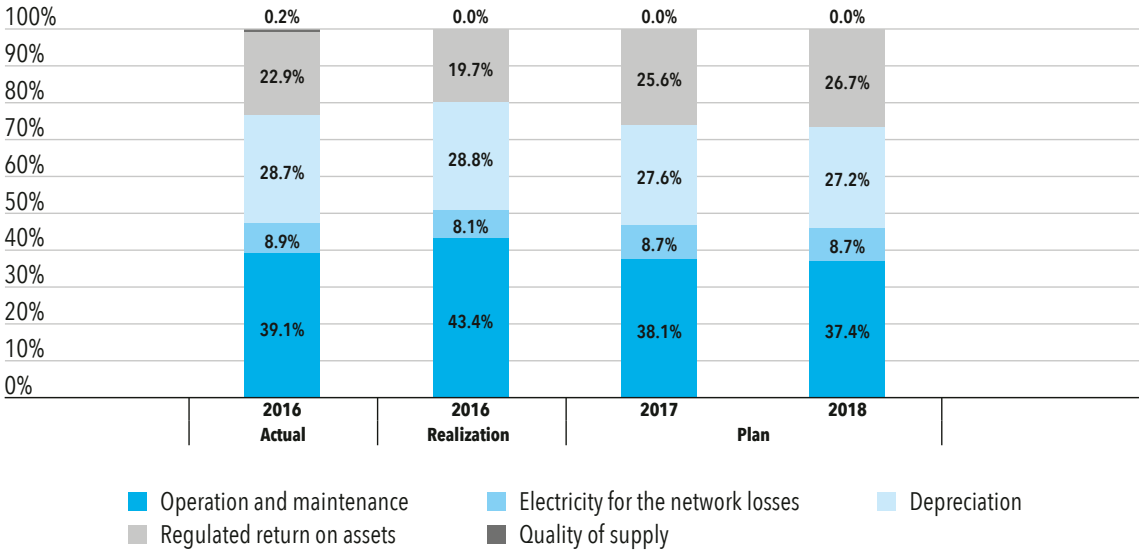


Source: Energy Agency

Note: In the operation and maintenance costs are included costs of electricity for the network losses. These costs due to comparability of data from the previous years are not included in the Figure.

Figure 35 shows the structure of the DSO's eligible costs, wherein these costs are calculated as a sum of eligible costs of distribution companies and the DSO.

Figure 35: Structure of the DSO's eligible costs



Source: Energy Agency

In general, it should be added that the realized regulated return on assets is affected by incentives, changes in resources for covering eligible costs and recording of network surpluses and deficit in the account books. This applies both to the TSO and DSO.

3.3.3.2 The charging for the network charge

To determine the charging for the network charge, the Energy Agency uses a non-transaction post-age-stamp method, which means that, with respect to charging for the network charge, the tariffs and average costs for making a connection are uniformed for the whole territory of Slovenia within the framework of individual consumer groups. For the calculation of tariffs, the planned network charges for the transmission and distribution system are considered as the costs of the system divided across different voltage levels to which consumers are connected. To ensure efficient and rational use of the network the method for setting the binominal tariff is used – that means according to the achieved capacity charge and consumed electricity. Such calculation allows demand response during the peak demand when the system is more loaded. Consumers can by lowering the maximum power significantly impact the level of the network charge, and thereby, contribute to the security of supply.

Method of accounting has not changed during the regulatory periods so far as this maintains predictability for consumers.

For covering the eligible costs of the system operator that are funded from the network charge, the Energy Agency determines the network charge tariffs for individual consumers' groups; the tariffs are divided into:

- the network charge for the transmission system
- the network charge for the distribution system
- the network charge for the excessive reactive power
- the network charge for connected load

The electricity system operator classifies the final consumer in the consumer group with respect to the voltage level (HV, MV, LV), the type of connection (busbar, feeder), operating mode (operating hours) and type of consumption. At final consumers with power metering the network tariffs for the transmission and distributions systems are seasonally differentiated:

- High season – from January to March and from October to December
- Low season – from April to September

Dependent on the time of day the network tariffs for the transmission and distributions systems are divided to:

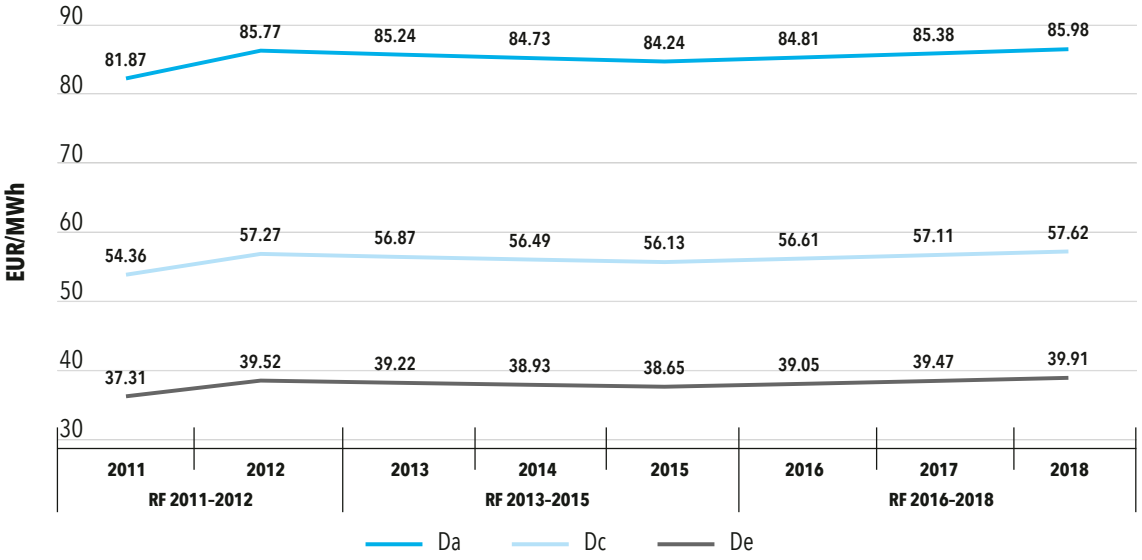
- Peak daily tariffs during peak time (for final consumers on HV and MV level with metering of 15-minute interval during peak demand);
- Higher daily tariffs during high tariff, charged from Monday through Friday from 6 a.m. to 10. p.m.;
- Low daily tariffs (off-peak electricity rates), charged in the remaining week hours and during weekends and non-working days (all day).

The capacity charge is based on nominal fuse amperage at both – final consumers on the LV level without power metering and household consumers regarding to the connection type (single-phase or three-phase connection).

Figures 36 and 37 show the network charge for the transmission and distribution systems in the past years (in the regulatory frameworks) and the valid regulatory framework for 2016–2018 for some typical household and business consumers, classified into the groups with the following characteristics:

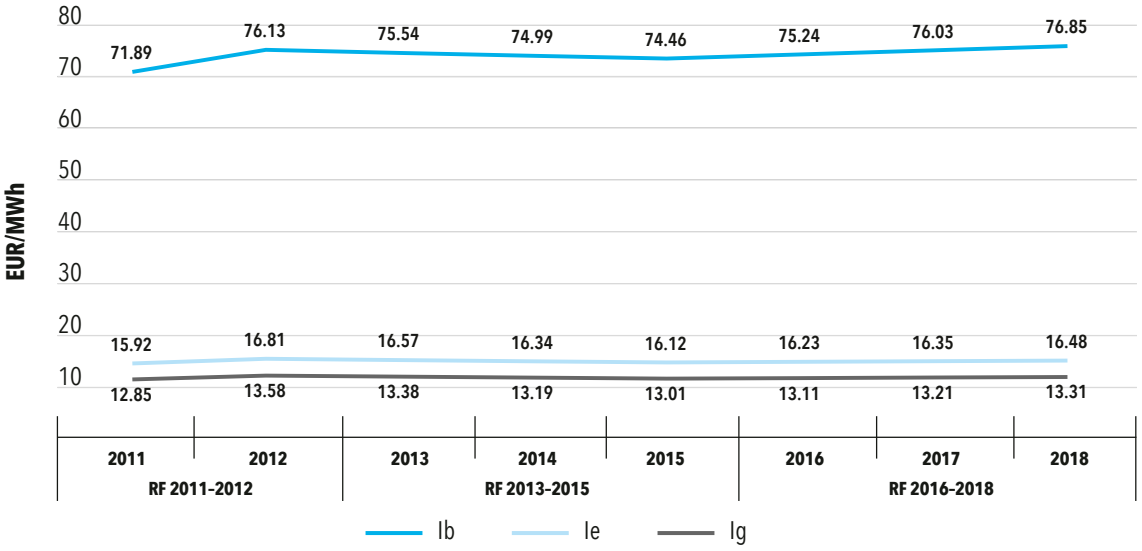
- Household consumers:
  - Da (consumption 600 kWh, single tariff, power 3 kW)
  - Dc (consumption 2,200 kWh in high tariff, and 1,300 kWh during low tariff, power 7 kW)
  - De (consumption 5,000 kWh in high tariff, and 15,000 kWh during low tariff, power 10 kW)
- Business consumers:
  - Ib (power 50 kW, annual consumption 50 MWh (tariffs ratio HT:LT=60:40), consumption group LV T<2,500 h, seasons average)
  - Ie (power 500 kW, annual consumption 2 GWh (tariffs ratio HT:LT=55:45), consumption group MV T>=2,500 h, seasons average)
  - Ig (power 4 MW, annual consumption 24 GWh (tariffs ratio HT:LT=55:45), consumption group MV T>=2,500 h, seasons average)

Figure 36: Network charge for households in the period 2011–2018



Source: Energy Agency

Figure 37: Network charge for business consumers in the period 2011–2018



Source: Energy Agency

After the network charge increase in the regulatory framework 2011–2012, followed a period of progressive reduction of the network charge for the period 2013–2015. Taking into account the criteria for determining the network charge and the method of calculation the elements of the regulatory framework for the period 2016–2018 is again expected increase in the network charge.

3.3.4 The allocation and use of cross-zonal transmission capacity

Within the Slovenian transmission system no restrictions on access to the network exist. That means that each member of the Slovenian balance scheme has the access to the transmission system and can transfer any amount of electricity between two optional points of the transmission system. However, such conditions do not prevail at the borders of the Slovenian trade area with trade areas of neighbouring countries. Our trade area is with interconnectors connected with the neighbouring trade zones of Austria, Italy and Croatia. Pipelines connected Slovenian transmission system with the systems of these three countries. Capacities of these interconnectors are limited, therefore it is necessary to establish the procedures for the access of all interested market participants in a non-discriminatory manner.

European legislation requires that the TSOs allocate the capacities of limited interconnectors among individual trading areas by using market-based methods. Market-based methods are the methods by which market participants pay for the access to the cross-zonal transmission capacities (hereinafter referred to as CZC). Prices paid for the CZCs reflect the difference between the neighbouring trading areas or countries. To ensure equal opportunities for all participants the auctions are used. In the case of explicit auctions, market participants bid only for interconnectors capacities (MWh), while at implicit auctions held through trading on power exchanges participant bid at the same time for the energy (MWh) and for CZCs. Auctions of CZCs are usually performed on annual, monthly or daily basis, and for other capacities within a day.

The EU electricity target model foresees that allocation of the CZCs on annual and monthly level would be carried out through explicit auctions, and for day-ahead and intraday through implicit auctions. All auctions should be coordinated and carried out through common trading platforms. The coordination begins already at the level of determining CZCs, which is normally at first carried out on annual level, and after that in the period which is as close as possible to the delivery time. The explicit auctions on an annual and monthly level should take place on a single pan-European platform, and implicit allocation for day-ahead and intraday should be carried out with coordinated use of single European market coupling algorithms. The electricity target model will be fully identified by the Network Codes. In 2017 were in force the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (Regulation 2015/1222), which covers determination and allocation of CZC for day-ahead and intraday, and Commission Regulation of 26 September 2016 establishing a guideline on forward capacity allocation, which sets forward capacity allocation - meaning the attribution of long-term cross-zonal capacity through an auction before the day-ahead time frame. In December 2017 came in force the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing, which determines the procedures for electricity balancing including exchanges between trading areas. Regulatory authorities at pan-European and regional levels endorsed different proposals of conditions and methodologies that were prepared by the TSOs and NEMOs (Nominated Electricity Market Operator) in accordance with the provisions of Regulations 2015/1222 and 2016/1719. These proposals addressed wide area of determination, allocation and use of CZCs.

The allocation of CZCs at the borders of the Slovenian transmission system with neighbouring countries was only partly carried out in accordance with the European target model. Table 21 shows different methods of allocation of CZCs by the borders at the end of 2017.

Table 21: Overview of the allocation of CZCs in 2017 by borders

Border	Period of the allocation of CZCs	Methods of allocating CZCs
SI–IT	Yearly	Explicit auctions
	Monthly	Explicit auctions
	Day-ahead	Pan-European market coupling – implicit auctions
	Intraday	Bilateral market coupling – complementary implicit auctions
SI–AT	Yearly	Explicit auctions
	Monthly	Explicit auctions
	Day-ahead	Pan-European market coupling – implicit auctions
	Intraday	Non-market based allocation
SI–HR	Yearly	Explicit auctions
	Monthly	Explicit auctions
	Day-ahead	Explicit auctions
	Intraday	Non-market based allocation

Source: Energy Agency

The table shows that the situation at the Slovenian-Italian border is the nearest to the electricity target model. Although this allocation model envisages the allocation of CZC through continuous trading, the Regulation 2015/1222 allows so-called complementary regional auctions. At this point, it should be mentioned that the target model for allocating CZCs within the intraday framework has not yet been introduced in Europe since the development of an appropriate algorithm under the XBID project is still under way. At the Slovenian-Croatian border, the compliance with the target model is at the lowest level since the compliance is ensured only on annual and monthly allocation, while allocation of capacity for day-ahead by explicit auctions and within intraday by non-market based manner are not consistent with the target model.

The allocation of CZCs for day-ahead at the borders with Austria and Italy is carried out within the interregional market coupling. In this coupling BSP Energy Exchange, based in Ljubljana participates as a power exchange; in December 2015 was under Regulation 2015/1222 designated as nominated electricity market operator (NEMO) for the Slovenian trading area. The power exchange in the Slovenian trading area also participates in the implementation of complementary implicit auctions for intraday capacity allocation at the Slovenian-Italian border.

All explicit auctions at the Slovenian borders are conducted by the Joint Allocation Office (JAO) with the headquarters in Luxembourg; JAO acts as a common European platform for explicit auctions for the allocation of CZCs in accordance with Regulation 2016/1719.

Table 22 shows a review of the allocated CZCs by an individual border and directions of flows, the total revenues from the auctions and the price for allocated megawatt hour in 2017.

Table 22: Overview of allocated CZCs and the revenues from the auctions by individual borders

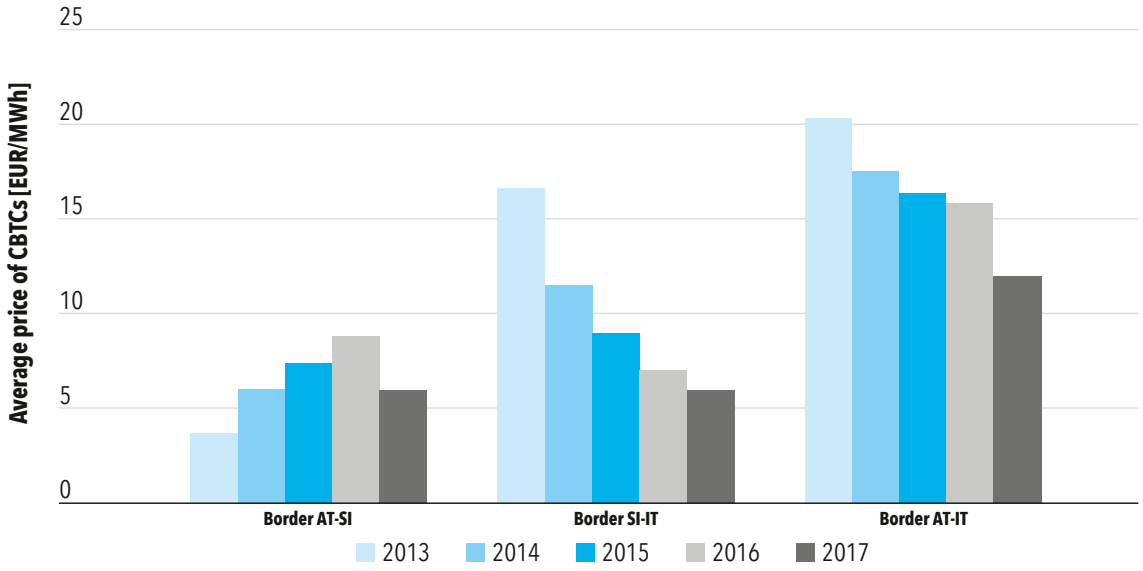
Border	Allocated (MWh)	Gross revenue (EUR)	Average price of allocated CZCs (EUR/MWh)	Net profit (EUR)
SI-IT	3,462,766	20,634,907	5.96	13,533,040
IT-SI	2,248,544	3,401,484	1.51	2,312,446
SI-AT	4,935,435	123,870	0.03	121,221
AT-SI	5,578,825	33,289,480	5.97	22,838,604
SI-HR	13,608,296	6,955,605	0.51	3,134,339
HR-SI	16,648,142	412,313	0.02	368,220

Source: ELES

Table presents gross and net revenues from auctions. Net revenues are gross incomes, of which are deducted the cost of the auctions conducted for the neighbouring system operators, repayments to traders due to capacity reduction, and repayments to traders, who by the principle use-it-or-sell-it sold the capacity, allocated at long-term auctions, to the system operator. The TSO then allocated capacities within day-ahead market coupling. The average prices of allocated CZCs for individual border and direction are calculated as gross revenue divided by the total amount of allocated CZCs.

The prices of CZCs achieved at each border reflect the difference between the prices in individual markets. The Slovenian market is embedded by the German-Austria market, in which the prices are the lowest, and the Italian market, which is characterised by high prices. In the Croatian market in 2017 the liquid electricity exchange did not operate yet, that is why reliable hourly rates are not known. Bearing in mind the average obtained price of CZCs for both directions, we can assume that prices were not very different from the Slovenian ones. Based on the above we can conclude that also in 2017 the most interesting for the traders was the possibility of selling electricity from Germany and Austria to Italy, which could be also inferred from the values of obtained average prices of CZCs at individual borders. Figure 38 shows the movement of CZCs prices from Austria to Slovenia, from Slovenia to Italy and the total price of CZCs from Austria to Italy in the period 2013–2017.

Figure 38: Average price of CZC in the direction from Austria to Italy in the period 2013–2017



Source: ELES

We can see that the total price of CZC and the price of CZC from Slovenia to Italy in years from 2013 to 2017 were continuously declining, while during this period the price of CZC from Austria to Slovenia was increasing, and in 2017, despite the increase in the difference between the prices in the Slovenian and Austrian market, the price decreased. To clarify these trends, we should compare price movements in the power exchange with the obtained average prices of CZCs.

Table 23: Price differences on power exchanges and average prices of CZCs in the period 2013–2017

Border	AT-SI		SI-IT		AT-IT	
Year	The difference between the prices in power exchanges * (EUR/MWh)	Average prices of CZCs (EUR/MWh)	The difference between the prices in power exchanges (EUR/MWh)	Average prices of CZCs (EUR/MWh)	The difference between the prices in power exchanges (EUR/MWh)	Average prices of CZCs (EUR/MWh)
2013	5.40	3.71	18.41	16.61	23.81	20.32
2014	7.66	6.02	9.92	11.51	17.58	17.53
2015	9.78	7.42	11.30	8.93	21.08	16.34
2016	6.64	8.80	7.05	7.00	13.69	15.80
2017	15.33	5.97	4.87	5.96	20.20	11.93

Sources: ELES, websites of power exchanges
* As the Austrian market price the price in the German EPEX DE is used

In Table 23 is presented the difference between the power exchange price and the obtained average prices of CZCs on the relevant borders that separate the trading zones of power exchanges. In comparison are used the prices of base load in trading for a day ahead in the individual power exchanges, i.e., the average price of all 8,760 hours of trading per year. As the reference prices in the Austrian-German market, the prices for the trading zone of Germany and Austria in the EPEX SPOT are used. From the data in the table, the high degree of correlation between the price difference on the power exchanges and the obtained prices of CZCs is evident. In 2017, however, a big difference in the price of CZCs between Slovenia and Austria occurred and the difference in prices in both trading zones. Similar discrepancies as they appeared in 2017 happened until the introduction of market coupling. The events in 2017 are mainly the result of the fact that at the Slovenian-Austrian border most of the long-term capacity also nominated, which mean that at this border traders rarely use the rule use-it-or-sell-it. Consequently, the capacity price in 2017 was mainly determined by the price achieved at the annual auction for this border, which was car-

ried out at the end of 2016, and amounted to 6.07 EUR/MWh. However, conditions in the market in 2017 caused a significantly higher price difference between the Slovenian and Austrian-German trade zone, which on average amounted to as much as 15.33 EUR/MWh. These differences were mainly the result of the large share of volatile production from RES in Germany and Austria. Therefore, traders estimated that it is more it was more advantageous to use long-term contracts than risk by participating in the day-ahead market coupling. At the Slovenian-Italian border, the situation was much more predictable also due to the relatively small share of volatile production in the Italian market. That's way traders at this border also in 2017 had been using established practices that most of the long-term allocated capacity sold to the TSO, which sold it later on within the day-ahead market coupling. Consequently, at this border in 2017, there was only a slight difference between the average price in the power exchange and the average price of allocated capacity. We can conclude that in the average difference between prices on individual markets were included also hours when the price in the Slovenian market was higher than in one of the adjacent, and also hours when prices in both markets were identical. During the hours of identical prices in the Slovenian and neighbouring markets, CZCs were available in the direction from the adjacent trading zone to Slovenia or only partially from Slovenia to the adjacent trading zone. Vice versa, when the price in the adjacent market was higher or lower, allocated CZCs were fully utilised. This may lead to the fact that the average annual price of CZCs is higher than the average difference in price in power exchanges.

The access to CZCs consists of two phases. The first phase is the allocation of the right of their use while the second is the nomination of the actual use. In the case of explicit auctions, these are two separate procedures, while in the case of implicit auctions (market coupling) obtaining of capacity automatically brings its nomination for both central counterparties. A network user who obtains CZC in an explicit auction needs to nominate it to the TSO within the specified deadline. The network user can decide to use the whole CZC, part of it or not to use it at all. In the latter case, the rule "use-it-or-sell-it" applies for the capacities obtained in yearly and monthly auctions, which means that the network user sells unused capacity back to the TSO who sells it in an auction for the shorter period. The network user gets this capacity paid by the TSO at the price achieved in this auction. In 2017, the largest share of CZCs utilization rate was achieved at the border from Austria to Slovenia and from Slovenia to Italy. Relatively high utilization of the direction from Slovenia to Croatia was the result of the fact that the half of the production in the nuclear power plant Krško belongs to Croatia. The use of CZCs for all borders in the period 2013–2017 is shown in Table 24.

Table 24: Utilization rate of CZCs in the period 2013–2017

	Utilization rate of CZCs (%)				
Border/Year	**2013**	**2014**	**2015**	**2016**	**2017**
SI-IT	96	91	87	79	58
IT-SI	7	9	3	10	20
SI-AT	28	16	12	17	8
AT-SI	75	92	96	89	93
SI-HR	49	58	46	46	58
HR-SI	54	33	36	37	28

Source: ELES

A comparison of the utilization rate of CZCs at the individual borders shows that the direction from Austria through Slovenia was the most interesting one; therefore, the CZCs in this direction were the most utilized. In comparison with the previous years, the interest of the use of the Slovenian-Italian border significantly reduced, mainly as a result of higher price convergence between the prices in the Slovenian and Italian markets. That is also why the number of hours in the year increased, in which prices in both markets were identical or the price in the Slovenian market was even higher than in the Italian. The main reason for this is the accelerated deployment of solar power plants in Italy, especially in the southern part. However, the share of these plants in Italy is far from the share of mainly wind power plants in Germany and Austria, which represent the maximum uncertainty for market participants. The CZCs utilization rate in the direction from Austria to Croatia is also heavily influenced by hydrological conditions in the countries of the Western Balkan. Under normal conditions, the prevailing flow in the direction from Austria to Croatia, but during period of favourable hydrological conditions on the Balkan Peninsula, the flow direction is

reversed. Consequently, the utilization rate of CZCs from Croatia to Slovenia and from Slovenia to Austria increases. But since the year 2017 was relatively dry, the utilization rates of CZCs from Austria to Slovenia and from Slovenia to Croatia increased.

3.3.5 Ensuring compliance with energy legislation

In accordance with the Directive 2009/72/EC concerning common rules for the internal market in electricity the Energy Agency has to provide for the implementation of binding decisions of ACER and the European Commission, and in decision-making processes ensure the compliance with the provisions of this Directive and Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity.

In the process of issuing approval to the rules of allocation and use of interconnections, the Energy Agency controls the compliance with the provision from Annex 1 to Regulation (EC) 714/2009. In 2017 the Energy Agency issued to the TSO an approval to the Long-term capacity allocation rules of all TSOs in accordance with Article 51 of the Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation and to the Rules for Daily explicit Capacity Allocation on Bidding Zone borders AT-CZ, AT-HU, HR-HU, HR-SI, CZ-DE, CZ-PL, PL-SK, and PL-DE. The first rules are used for daily explicit capacity allocation at annual and monthly level at all border of the EU's internal electricity market, and the second only for explicit capacity allocation for day-ahead at the border between Slovenia and Croatia, since in 2017 these markets were not coupled (coupled since June 2018).

In 2017, the Energy Agency participated in confirmation of proposals and the methodologies that have to be under Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (hereinafter referred to as Regulation 2015/1222) and Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation (hereinafter referred to as Regulation 2016/1719) approved by all the NRAs of the Member States or the regions concerned. Under the Regulation 2015/1222 the Energy Agency issued four approvals and 11 requests for amendments, and proposals together with other NRAs handed over to ACER. Under Regulation 2016/1719 it issued approvals to four proposals, and one was by all NRAs handed over to ACER.

The Energy Agency was also monitoring the exercising the implementation of EU regulations concerning the internal electricity market, as well as whether the electricity companies fulfil the obligations arising from European legislation. No specific breaches of the legislation were found in 2017.

In monitoring the implementation of the provisions under EU regulations concerning internal electricity market, the Energy Agency did not find any violations

In 2015, the Energy Agency issued a decision on the certification of the electricity TSO, and the Government adopted a decision on designation of ELES as the electricity system operator. After the nomination, the Energy Agency monitors whether the TSO meets the legal requirements for certification, and at the same can in individual cases may ex officio initiate the review of the conditions for the certificate. The above-mentioned activities were also carried out in 2017, whereas no violations were identified.

3.4 Promoting competition

The Energy Agency monitors developments in prices (weighting factors, price trends, the impact of liquidity on prices, etc.), market transparency (access to information about prices, implementation of REMIT, wholesale market transparency), and market efficiency (openness and competitiveness). The Energy Agency analysis the situation and implement appropriate measure within their powers in order to eliminate current barriers for the development of competition. By encouraging a competition the market strengthening is ensured, and that is for the benefit of the final consumers of electricity.

3.4.1 Wholesale market

In the electricity wholesale market producers, traders and suppliers of electricity sell and purchase electricity from each other. They trade on the basis of closed contracts, in which the quantity and the time profile of supply of contractual volumes of electricity are set in advance so that the price does not depend on the actual realization of the contracts. The wholesale market participants conclude their business by the bilateral transactions or at the exchanges in Slovenia and abroad. Power exchanges provide their market participants with Day-ahead and Intraday trading, and for the purpose of balancing the system. Trading of future products is also possible, covering time-periods longer than day-ahead.

The activity of the electricity exchange in the Republic of Slovenia is being carried out by BSP, Regional Energy Exchange, d.o.o., (hereinafter referred to as BSP SouthPool). This power exchange provides day-ahead and intraday trading. Day-ahead that is carried out as an auction trading is at the SI–IT and SI-AT borders included in the Multi-Regional Coupling (MRC). Intraday trading is performed as continuous trading and has not yet been included the intraday market coupling. The only exception is the intraday trading with Italy, which is carried out in the form of two complementary auctions, MI2 and MI6 (MI5). This form of trading, which was a pilot trading implemented in 2016, was well accepted by trades, since in 2017 the trading volume and the number of participants increased.

Trgovanje znotraj dneva poteka po načelu sprotnega trgovanja in še ni vključeno v spajanje trgov znotraj dneva. Izjema je le trgovanje znotraj dneva z Italijo, ki poteka v obliki dveh dopolnilnih implicitnih dražb, MI2 in MI6 (MI5). To obliko trgovanja, ki je bila kot pilotni projekt uvedena leta 2016, so trgovci dobro sprejeli, saj sta se v letu 2017 povečala tako trgovalni volumen kot število udeležencev.

The BSP SouthPool also enables the process of registration in the system of accounting and financial settlement (OTC clearing). OTC clearing is defined as the bilateral exchange of trades concluded outside the exchange to the system of financial settlement of the BSP SouthPool. OTC clearing starts after confirmation of a transaction between a trader and a buyer of electricity in the trading platform. The conclusion of transactions for OTC clearing takes place 24 hours a day, from 3 p.m. on the day before physical supply starts and up to one hour prior physical supply.

Borzen, the Slovenian Power Market Operator, is mandated to record all the closed contracts on an organized market. Thus, Borzen supervises the agreed contractual obligations in which electricity is bought or sold in Slovenia or is transferred across the regulation area. This includes the recording of all contracts between members of the balance scheme; all export and import closed contracts and closed business transactions on the exchange. In addition, the organizer of the market in the form of operational schedules of production and consumption keeps records of the contracts between the suppliers, the consumers and electricity producers.

3.4.1.1 Electricity prices

The Energy Agency monitors the level of wholesale prices in Slovenia and on relevant markets that affect prices in Slovenia. Information on wholesale prices in Slovenia is available on the BSP SouthPool website, as well as from commercial providers of analytical services and market information. Ensuring effective continuous market monitoring is crucial for the transparent functioning of the electricity market.

Electricity prices at power exchanges and foreign markets

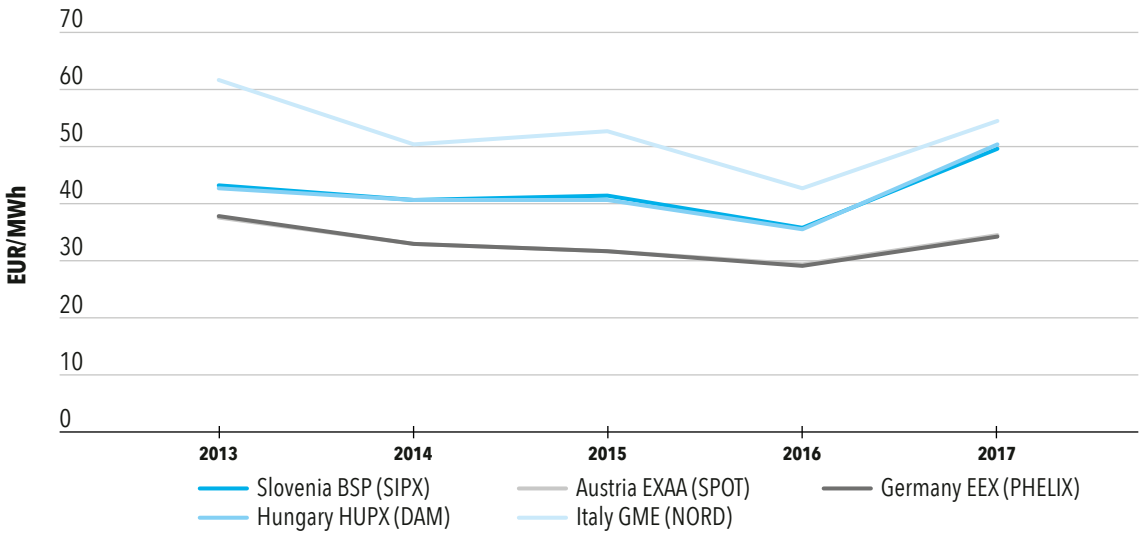
The Slovenian electricity market is situated at the juncture of the three large European markets, German-Austrian, Italian and South-Eastern Europe. The activities for separating German and Austrian markets are under way, however in 2017 have not yet been realized. Considering the fact that in fragmented markets of the South-Eastern Europe liquid power exchanges are not yet operational, we can claim that the common market of Germany and Austria and Italian market have the greatest impact on the Slovenian market. On both markets in recent years the electricity production in solar and wind power plants, which belong to unpredictable and weather dependent energy sources, has rapidly increased. An additional impact on the market situation is the fact that the most of generation facilities using wind and sun are included in the national support scheme, thus, electricity prices on the market can be very low. As a result, in recent years prices have dropped, but this trend in 2017, for the reasons described below, stopped and turned to the opposite direction.

39%
higher the average Base price compared to 2016 on the power exchange in Slovenia, and almost 42% higher the average Peak price

Market conditions are significantly influenced by day-ahead market coupling. Slovenian market was in 2017 coupled in multi-region day-ahead market coupling at the borders with Austria and Italy. Since the power exchange in Croatia was established much later than in other neighbouring countries, the border between Slovenia and Croatia has not yet been coupled. Market coupling is expected in June 2018. At intraday trading only bilateral market coupling with Italy is established, which is carried out through complementary implicit auctions. In the coming years, due to gradual implementation of European network codes market coupling for day-ahead and intraday markets is expected on all European borders. In addition, exchange of balancing energy between the countries will also take place.

In 2014, the average Base price on the power exchange in Slovenia was 40.4 EUR/MWh, and in 2016 only 35.6 EUR/MWh. In 2017, we recorded a significant increase in price, namely by 39% in comparison with the year before – the average base price was 49.5 EUR/MWh. In Figure 39 the movements of average Base prices on the power exchanges in Slovenia and neighbouring countries in recent years is presented. Among the observed exchanges is also the Hungarian HUPX, which is not part of the multi-regional market coupling, since the Slovenian and Hungarian markets are not directly connected as there is no transmission line between the countries. We can observe that in 2017 electricity prices increased in all observed markets, the most on the HUPX, where the Base prices on day-ahead market increased by more than 42% in comparison with 2016. In previous years, prices in Slovenia and Hungary were almost identical, and in 2017 were slightly higher on the HUPX. The lowest prices, which are almost identical, are in the Austrian and German power exchanges, which is understandable since power exchanges operate on the same trading area, that is, the area of Germany, Austria, and Luxemburg. Prices in this area increased, compared to 2016, by about 18%, significantly less than on other observed power exchanges. The average Base prices on the Italian power exchange are the highest among the observed power exchanges and also at the EU-wide level.

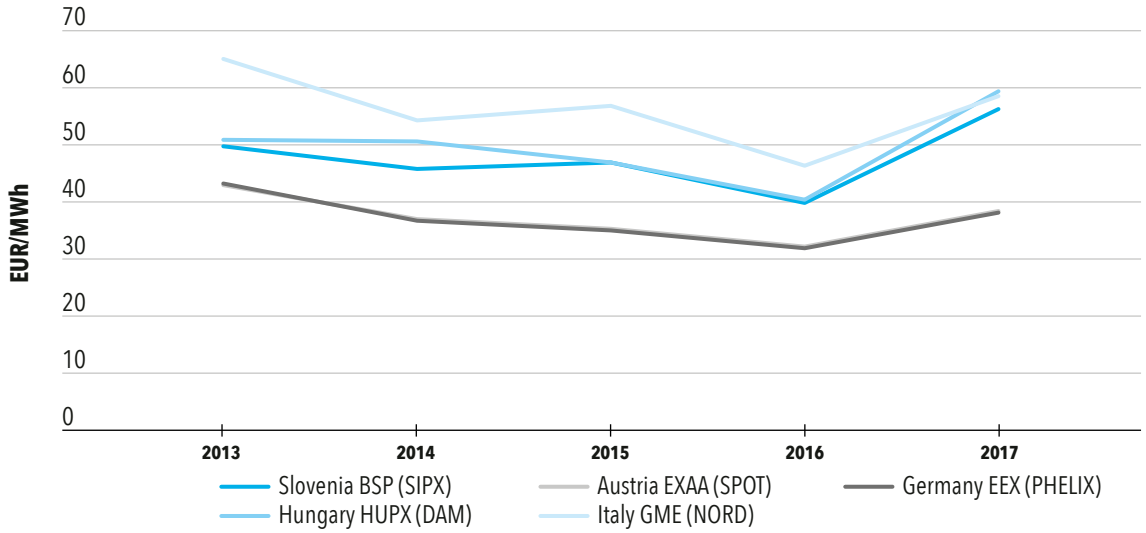
Figure 39: Average Base price in day-ahead market in Slovenia and on foreign exchanges in the period 2013–2017



Source: Montel

Peak prices on the day-ahead market in 2017 compared to 2017 also increased. In 2014, the average Peak price on the power exchange in Slovenia amounted to 45.8 EUR/MWh, and in 2016 39.9 EUR/MWh. In 2017, the average Peak price was 56.5 EUR/MWh, which is almost 42% more than in 2016. As we can see in Figure 40, Peak price increased on all observed markets, similarly as Base price, and most of all on the Hungarian power exchange HUPX – by almost 48%. The lowest prices, almost identical, were on the Austrian and German power exchanges, and the highest on the Hungarian. Prices on the Italian market in 2017 approached the prices on the power exchange in Slovenia. In 2016, the difference between average prices in both markets was 6.6 EUR/MWh, while in 2017 only 2.2 EUR/MWh. The smallest increase in prices among all observed markets was achieved on Austrian and German power exchange, namely about 19%.

Figure 40: Movement of the average Peak price in day-ahead market in Slovenia and on neighbouring power exchanges in the period 2013–2017



Source: Montel

There were several reasons for the increase in Base and Peak price on all observed day-ahead markets in 2107. Perhaps the most important reason was bad hydrology in the whole region and consequently relatively low electricity production in hydro power plants. Higher prices were also the result of economic and industrial growth in EU Member States that increased demand for energy. Among all the observed markets, the highest increase in price was in Hungary. The latter imports a lot of energy from Romania, which had, in the first half of 2017, many problems due to power failures that significantly impacted on the high energy prices on HUPX.

The highest price for the day-ahead trading was on the Slovenian power exchange reached on 27 January. Transmission capacities in the direction from Austria to Slovenia were on that day fully engaged and highly utilized were also capacities from Italy to Slovenia indicating high demand in Slovenia. On that day and days before there were many outages of the Unit 6 of the TPP Šoštanj. The unplanned outages of this unit happened in different time intervals between 21 and 26 January, on the last day the unit did not operate from 7 a.m. to 3.30 p.m., which probably affected the prices on the power exchange the following day. Besides, bad hydrology during winter is causing low electricity production.

The highest prices on the mentioned markets were reached in January and August, and on the Italian market in December (Figure 41). The reason for high prices on power exchanges in winter months is low electricity production from RES, and also low temperatures. The same is valid also for August, when the whole region suffered a heat wave with very high temperatures, which increased the need for energy, water levels were low and, consequently, electricity generation in HPP was reduced. Low water levels, however, do not affect only the generation in HPP; in Slovenia low water level of the Sava River has an important effect on the operation of the Nuclear power plant Krško[26].

As we can see in the Figure 41, the Base price on the Italian power exchange GME (NORD) in day-ahead market were in December much higher than in markets. The reasons for such situation were high prices of natural gas in this region. Italy imports large quantities of gas from the hub in Groningenu, which had in 2017 many problems due to earthquakes[27] resulted from the drilling for natural gas. Because the record low production the price increased, which affected the electricity prices on the Italian power exchange GME. On 12 December, Italy declared a state of emergency due to the incident[28] in gas hub Baumgarten in Austria. The average Base price the next day, on 13 December, reached a record value.

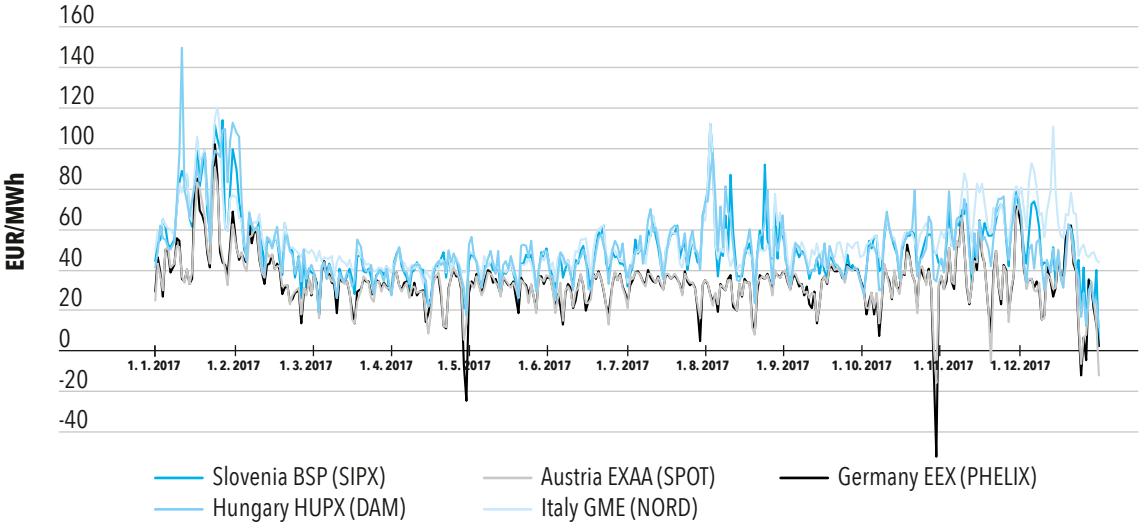
26 NPP in the normal operating state releases redundant heat, which is generated in the steam turbine condenser, to the Sava River. Since heating the water of the Sava results in the thermal pollution of the river, administrative regulations specify the permitted increase in temperature up to 3 0C are used. In the case of low water level it is necessary to use forced draught cooling towers. Forced draft are provide by fans driven by electric motors. Due to their use the own use of the plant increased, which consequently reduces the delivery to the network.

27 https://www.platts.com/latest-news/natural-gas/london/muted-response-on-ttf-to-dutch-groningen-natural-26867438

28 https://www.theguardian.com/world/2017/dec/12/italy-declares-state-emergency-gas-explosion-austria

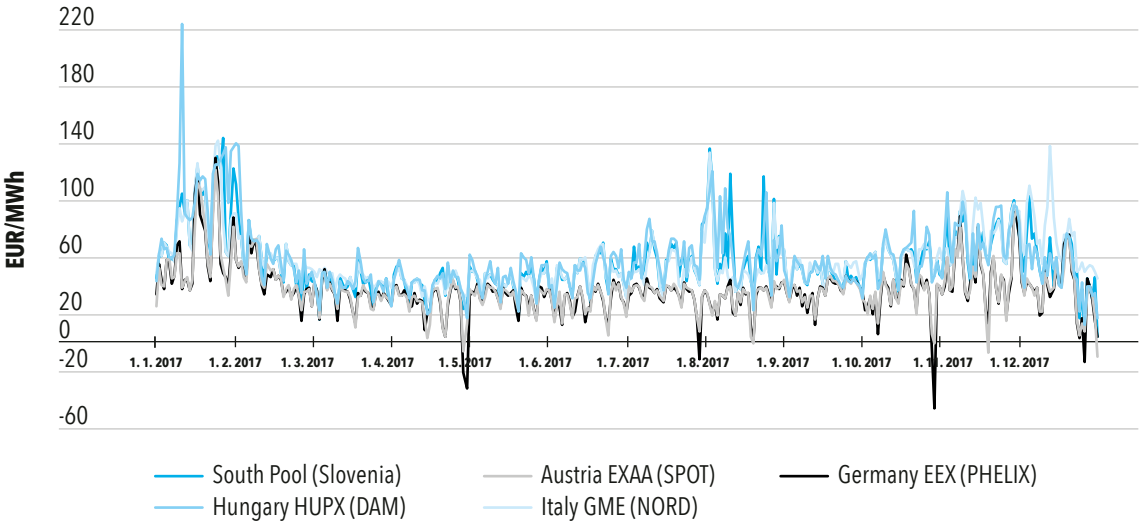
On January 11, the highest price among the observed markets was recorded on the Hungarian power exchange, where prices were inappropriately higher than on other power exchanges. The reason for this was a sequence of power system failures in Hungary and the day before the blackout of two large units in Romania. As we already mentioned, Hungary imports a lot of energy from Romania.

Figure 41: Movement of Base price in Slovenia and on the neighbouring power exchanges in 2017



Source: Montel

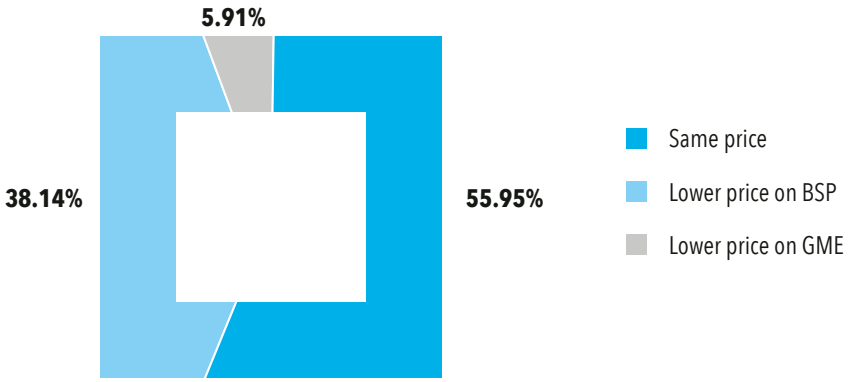
Figure 42: Movement of Peak price in Slovenia and on the neighbouring power exchanges in 2017



Source: Montel

From the market coupling point of view, an interesting analysis of the prices reached on BSP and GME is shown in Figure 43. Already in analysis of average Base and Peak prices we came to conclusion that the prices on the Italian power exchange in 2017 nearly reached the prices on Slovenian power exchange in almost 56% of hours, which means in comparison with the 43.7% share of hours in 2016 a significant enlargement on price convergence. The share of hours, when prices were lower on BSP Southpool, was smaller, and the share of hours, when the price on GME was lower than on BSP Southpool, bigger compared to 2016.

Figure 43: Analysis of the prices on BSP and GME in 2017



Source: Montel

Estimated market price of electricity from the support scheme

In 2017, the electricity produced from RES and CHP, included in the support scheme, amounted to 7.6% of all electricity production in Slovenia; the year before this share was 7.7%. Because the share of electricity included in the support scheme in comparison to the total electricity production in Slovenia is approaching 10%, it is reasonable to monitor the development of the prices of this commodity on the market.

Within the Support Scheme (feed-in support scheme) power plants owners have the option of choosing between the operating premium (operating support) and guaranteed purchase. If the producer chooses operating premium electricity can be sold freely on the market, and if he chooses guaranteed purchase, the electricity is transferred to a separate balance group – Eco group operated by Centre of Support (Borzen). In 2014 and 2015, a part of this electricity was sold on annual auctions and a part on BSP. For the energy produced in 2016, Borzen for the first time carried out the transfer of all electricity from Eco group to a balance group of balance scheme member, who at the auctions offered the best terms of purchase. The same transaction was carried out also in 2017.

The market price of electricity included in the support scheme in the period 2014–2017 has been formed on the individual level on the market, auctions, and power exchanges. When calculating the market price of electricity from the support scheme in 2014 and 2015 all three options were taken into account, and in 2016 and 2017, when Borzen did not sell electricity on the power exchange, the price was formed only at an individual level and on auctions for the purchase of all electricity from the Eco group.

The estimated electricity market price, for which the producers are eligible for support, for the first time below the average annual hourly price on BSP SouthPool

The estimated market price in 2014 and 2015 derives from the average of achieved prices on an individual level, achieved price at the auction, and the average hourly price on BSP in an individual year. The estimated market price in 2016 and 2017, however, derives from the average of the achieved prices on an individual level and auction price. Achieved prices taken into account in the calculation are weighted by the amounts of individual items.

Also in 2017, most of the electricity included in the support scheme was sold at an individual level, in the context of the operating support. The estimated market price is, thus, influenced by the price formed on the market at an individual level. The estimated market price of electricity included in the support scheme is together with the average hourly price on BSP for the period 2014–2017 presented in Table 25. For the first time since monitoring the estimated market price, this price fell below the average annual hourly price on BSP SouthPool. The main reason is the significant increase in prices on the power exchange, which was not foreseen by the producers, who are receiving operating support, when they signed new annual contracts.

Table 25: Comparison of the estimated market price of electricity included in the support scheme with the average hourly price on BSP Southpool

Year	The estimated market price of electricity included in the support scheme (EUR/MWh)	The average hourly price on BSP (EUR/MWh)
2014	43.58	40.43
2015	42.18	41.41
2016	39.04	35.62
2017	36.69	49.52

Sources: Energy Agency, Borzen, BSP SouthPool

Emission allowances

By ratifying the Kyoto Protocol, the Republic of Slovenia, made commitments to reduce greenhouse-gas emissions. The objective of establishing the EU emissions' trading is one of the instruments for reducing greenhouse-gas emissions. Emission allowance is a general term for trading with a certificate or authorization to emit one tonne of carbon dioxide or other greenhouse gas equivalent in the atmosphere.

The number of distributed emission allowances in comparison with 2016 increased by 1.4%. For the second year in a row, we recorded an increase in the number of allocated emission allowances due to more emission allowances allocated to industry outside thermal power plants[29]. Thermal power plants in 2017 in the third trading period took over 4,752,641 emission allowances that is 0.6% less than in 2016, representing 72% of all allocated emissions allowances, in Slovenia. The rest of the industry in the same period took over 1,818,308, which is 28% of all allocated emission allowances in Slovenia. An increase in allocated emission allowances is the result of increased production, thus, most of the companies needed more emission allowances than the year before.

7.2%
more allocated emission allowances than in 2017

In accordance with Decree on environmental tax on carbon dioxide emissions, the environmental tax for air pollution with CO_2 from fuel combustion is paid by certain industrial consumers and energy producers; this levy is a revenue budget of the Republic of Slovenia.

Figure 44: Number of allocated emission allowances for all three trading periods in the period 2005–2017

Source: Slovenian Environment Agency

29 The reason for increase in number of allocated emission allowances in 2016 was more emission allowances for thermal power plants.

In 2017, the price of emission allowances varied between € 4.40 and € 8.20 per tonne of CO_2 and was comparable to the price the year before (between 4.10 and € 8.10 per tonne of CO_2 in 2016).

As can be seen in Figure 45, emission allowances prices increased in the second half of 2017 as a result of large purchase of allowances in the energy companies, as the fear of extremely low temperatures during winter was spread in the market.

Figure 45: Emission allowances price (European Emission Allowances Futures – EUA) on EEX, (purchase in 2017 for 2018)

Source: EEX website

3.4.1.2 Market transparency

Regulation on wholesale energy market integrity and transparency (REMIT) is the key foundation for ensuring price transparency in the wholesale energy market. The framework consists of three major parts: prohibition of market manipulation and trading on the basis of inside information, a requirement for effective and timely disclosure of inside information, and appropriate legislative framework for market monitoring.

Trading on the basis of inside information and market manipulation is under REMIT prohibited. Any violations of this Regulation shall be fined. Any person professionally arranging transactions in wholesale energy products who reasonably suspects that a transaction might breach the prohibition of market manipulation or trading on the basis of inside information must inform the NRA without further delay.

Inside data includes information relating to the capacity and use of facilities for production, storage, consumption or transmission, including planned or unplanned unavailability of transmission infrastructure, and, furthermore, information on the connection capacities between trading zones, congestion management, balancing the system, including information on backup sources for balancing and financial settlement.

Regulation 543/2013 determines that all required data should be published by ENTSO-E on a central information transparency platform. ENTSO-E established the platform on 5 January 2015.

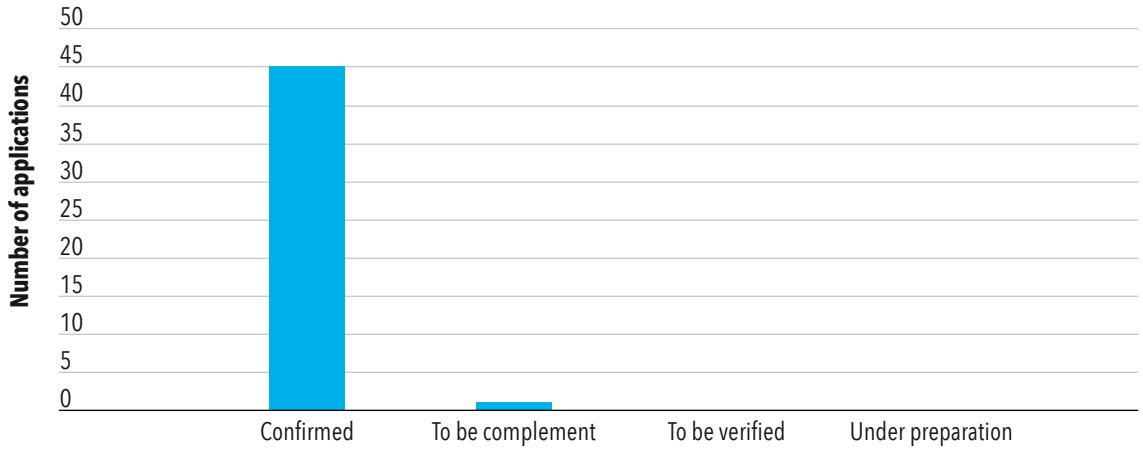
Inside information includes fundamental data that should be published by the participants of the wholesale energy market. Fundamental data includes information on the capacity and use of facilities for production, storage, consumption or transmission of electricity or natural gas or related to the capacity and use of LNG facilities. ENTSO-E and ENTSO-G in accordance with REMIT send this information to ACER on behalf of market participants.

Market monitoring under REMIT is comprehensive and includes the monitoring of all wholesale energy products, irrespective of whether they are traded on organized market places or bilateral. For monitoring of wholesale energy products the information on trader must be available.

The registration of all market participants is the task of the NRA. Market participants must register with the NRAs in the Member State in which they are established or resident or, if they are not established or resident in the Union, in a Member State in which they are active.

In the wholesale electricity and natural gas market in Slovenia, 45 participants were registered by the end of 2017 (Figure 46).

Figure 46: Registration of market participants in Slovenia at the end of 2017



Source: Energy Agency

Market participants must on the contracts, concluded in the wholesale market, report to ACER. The reporting is carried out through rapporteurs, who, according to REMIT represent so called Registered Reporting Mechanism (RRM). To minimize the burdens of market participants the third parties can be chosen as a RRM in order to report on behalf of market participants.

ACER sends the received data to the NRAs that are responsible to monitor national markets for electricity and gas. Due to high degree of this data sensitivity each NRA must prior to receiving this data pass the assessment of its information security compliance with ACER requirements. The Energy Agency is ranked among seven European regulators, which by the end of 2017 fulfilled the conditions and gained the access to REMIT data. In 2017 the Energy Agency also set up mechanisms for automated verification and validation of the key data set of REMIT and implemented certain algorithms for ad hoc data analysis for the needs of investigations. In cooperation with the power exchange, ACER and regional NRAs the Energy Agency is putting in place the comprehensive system of control over trading, with which will effectively detect manipulation and abuse and with that ensure competitive prices for consumers.

In conducting investigations under REMIT the Energy Agency participates with ACER and other NRAs in the region. Investigations commence on the basis of suspicious transactions or automatic alarms triggered by the control systems for detecting market manipulation and abuse within permanent monitoring system at ACER and in regions. Investigations were carried out in line with good practice and close cooperation with ACER and other NRAs within regional cooperation.

The Energy Agency conducts investigations of potential violations of REMIT

The Energy Agency in 2017 conducted investigations of potential breaches of REMIT on the basis of suspicious transactions via ACER's Notification Platform and also participated in investigations conducted by other national regulators or ACER.

3.4.1.3 The level of market effectiveness

The Energy Agency monitors the effectiveness of the wholesale market in Slovenia, wholesale markets in the region and markets in countries, which due to their size, influence electricity prices in the European Union. In the following chapters are presented the indicators used for monitoring the level of market effectiveness in terms of the level of competitiveness, liquidity, and markets integration.

Bilateral trading

Bilateral trading is trading outside the organized power exchange. It is performed between two contractors, which determine the conditions of purchase or sale in a bilateral contract. Unlike trading on a power exchange at bilateral trading the contracting parties bear a default risk – the possibility that a counterparty will fail to meet the contractual obligations. Bilateral trading is less transparent way of trading since contract details, such as price and quantity, are generally not disclosed to public. It allows customers optional product design, which why this is a popular way of trading. In Slovenia, most of electricity trading is done on bilateral markets.

7.9%
increase in electricity volumes from closed contracts in comparison with 2016

Contracts, signed on bilateral markets, are of a closed type. They are characterised by the fact that the quantity of delivered electricity in a relevant time scale is determined for each calculation interval. Borzen, the market operator, must register all closed contracts that affect the energy balance of a member of the Slovenian Balance Scheme. In that way, Borzen within its tasks registers all contracts signed between members of the Slovenian Balance Scheme, contracts conclude on the energy exchange and import-export contracts. Contracts concluded on bilateral markets are a part of registered import-export closed contracts, and closed contracts signed between members of the Balance Scheme.

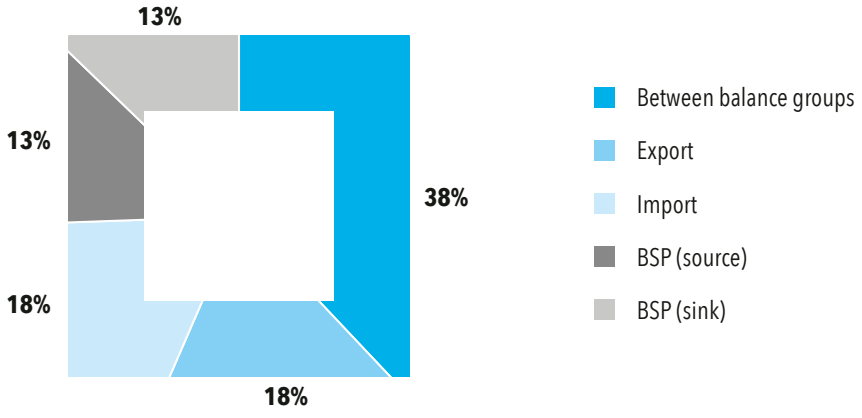
In addition to closed contracts, Borzen also registers operational forecasts that represent forecast of deliveries and consumption of electricity by the members of the Balance Scheme for a delivery point for which open contracts are concluded.

In 2017, the market operator registered a total of 114,531 closed contracts and operational forecasts in the total amount of 87,584,962 MWh. In comparison with 2016, the number of recorded closed contracts and operational forecasts increased by 4.8%, and the total amount of electricity from recorded closed contracts increased by 5.3%.

The amount of electricity sold or purchased electricity through the closed contracts was 59,114,645 MWh. This amount is in comparison to 2016 when it was 54,834,360 MWh, higher by 7.9%.

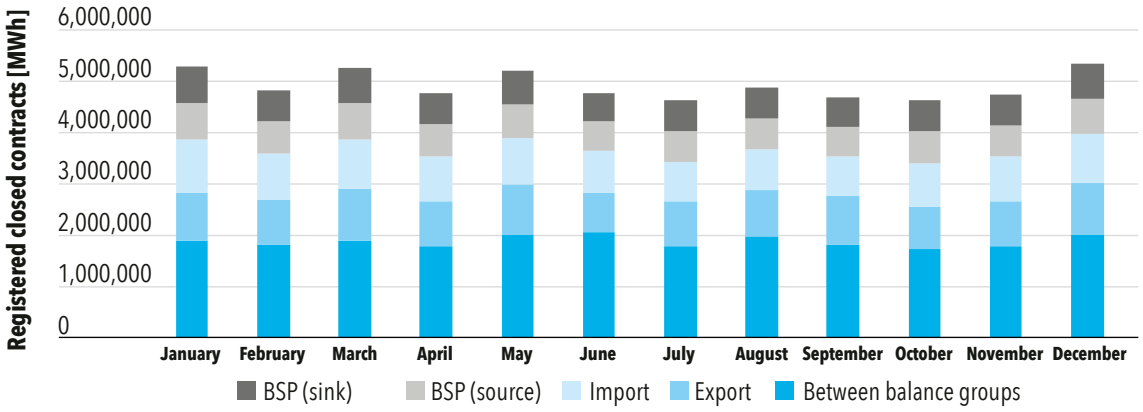
The structure of the closed contracts volumes and corresponding quantities are shown in Figures 47 and 48. At all transactions that are concluded at BSP SouthPool, the power exchange plays the role of the central counterparty, where the concluded transaction is recorded both as for quantity bought (source) and quantity sold (sink).

Figure 47: Structure of the registered closed contracts volume in 2017



Source: Borzen

Figure 48: Volumes of sold or purchased electricity through closed contracts by months in 2017



Source: Borzen

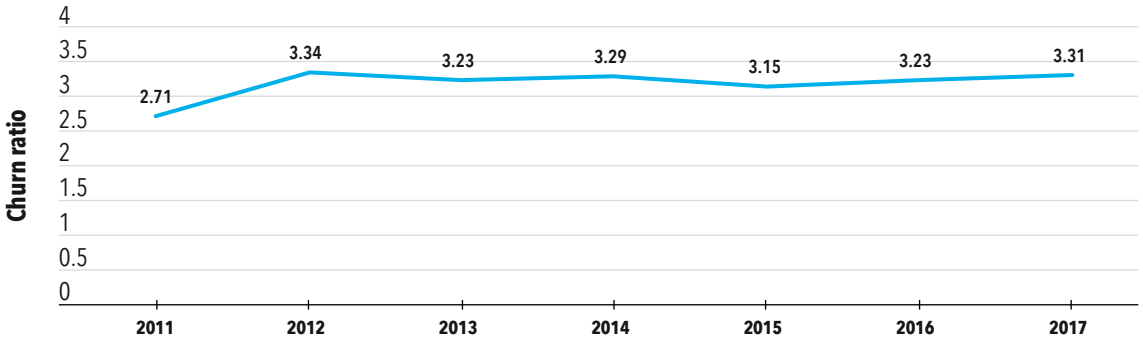
Wholesale market liquidity

The Energy Agency monitors the liquidity of the wholesale electricity market with an established index called Churn ratio. The index provides information how often a unit of electricity is traded before it is delivered to an end consumer. The calculation is based on the methodology, which takes into account the quotient between the sum of the recorded volumes from closed contracts minus exported quantities and the consumption in Slovenia. With the volumes from closed contracts in the calculation are included the quantities traded on the BSP SouthPool as well as the quantities traded in the bilateral market. Figure 49 shows the movement of the index during the observed six-year period. In 2017, the index value remained above the value 3, indicating that the Slovenian wholesale electricity market is well developed and with a high level of transparency. Considering that our market is in comparison with other European markets smaller, a relatively large number of active participants are present; they are concluding a comparable number of businesses. Therefore, the prices in the Slovenian market are stable, and in case of concluding small-business transactions do not change significantly.

Churn ratio remained above the vaue 3

Figure 49: Churn ratio by years

Source: Borzen



Day-ahead market

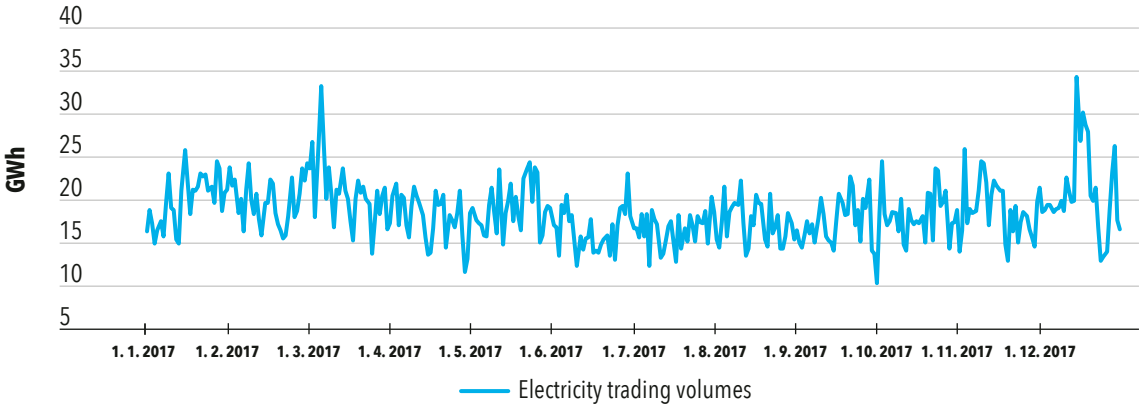
Trading in the day-ahead market is conducted on the Slovenian power exchange BSP SouthPool. The volume of trading is influenced by many factors, most importantly by the quantities of available cross-zonal capacities at SI–IT and SI–AT borders. An important factor is also the number of active participants on the exchange, and indirectly trading is affected by exceptional events on the foreign markets, or due to breakdown or overhauls of production units or non-availability of cross-zonal capacities.

3.8%
larger overall scale of trading on the Slovenian day-ahead market

The total volume of trading in the Slovenian day-head market in 2017 amounted to 6,815,662 MWh, or 3.8% more than the year before. In day-ahead trading 28 markets participants were active, less than in 2016, when 32 traders participated, most of them from abroad.

The highest monthly trading volume was reached in March, 660,550 MWh, which was 9.7% of the total trading volume in this period. It is more than 10% less than the highest monthly trading volume in 2016. The lowest monthly trading volume was reached in June, namely 496,998 MWh, or 7.3% of the total trading volume in 2017. The lowest monthly trading volume in 2017 exceeded the lowest monthly trading volume in 2016 by 22.7%.

Figure 50: Electricity trading volumes in 2017



Source: BSP Southpool

Intraday market

Intraday trading allows market participants that with posting additional bids or purchases after the close of day-ahead trading adjust their trading plans accordingly. Trading in the intraday market one hour before delivery finishes and converts to trading in balancing market, where participants trade only with the TSO.

Intraday trading is also conducted on the BSP SouthPool. Continuous trading is limited to the Slovenian market, while intraday auction trading[30] implemented on 21 June 2016 also includes market coupling with Italy.

In 2017, the total volume of continuous intraday trading amounted to 242 GWh, of which the volume of trading on balancing market was 229 GWh, and the volume of the remaining continuous trading 13 GWh. The total volume of the remaining continuous trading in comparison with 2016, when it was 74 GWh, significantly decreased. Explanation of why certain quantities at intraday trading are treated as quantities in the balancing market is given in the next chapter.

Within intraday trading is also organized the financial settlement of the transactions, which are concluded by the participants outside the organized market. In 2017, 46 transactions were sent to financial settlement (OTC), in the total amount of 27 GWh.

The volume of auction intraday trading amounted to 475 GWh (implicit auctions MI2 and MI6 at the SI-IT border). The bids in the total amount of 6,732 GWh were recorded, of which 4,446 GWh were for purchase and 2,286 for selling. The volume of bids on this auction segment is increasing.

The volume of trading on intraday power exchange represents 9.5% of all trading on the Slovenian electricity power exchange. This share is increasing due to the growing number of intraday auctions on the SI-IT border and increased trading volumes in the balancing market.

30 It is in fact the European pilot project allowing intraday and day-ahead auction trading on the same Euromarket trading platform.

Balancing market

The electricity balancing market in Slovenia is run by the market operator. The balancing market enables the TSO a transparent purchasing of energy for the settlement of imbalances in the system. For balancing the system, the TSO must have at any time at its disposal positive and negative energy for balancing. The TSO must at any time ensure the balance between the production and consumption of electricity in its control area, which is in the case of the Slovenian TSO, ELES Company, the entire power system. On the balancing market, the TSO buys the appropriate amount of positive balancing energy if there is not sufficient energy in the system, or sells potential surpluses. By doing so, the TSO releases secondary positive or negative reserves and regain the necessary volume of reserve for the implementation of the secondary regulation. In case of major disruptions in the power system such as outages of production units or major interconnectors, the TSO has in reserve the engagement of the leased reserve for tertiary control of frequency and power, which tends to be much more expensive than buying electricity on the balancing market.

Trading on balancing market is carried out in a manner of continuous trading, which means that the transaction is concluded when supply and demand meet. For practical reason trading on balancing market is carried out together with intraday trading. The balancing market is under the authority of the market operator carried by the BSP SouthPool energy exchange, which also operates the intraday market. The same rules apply to both markets, subject to the principle that intraday trading ends one hour before the time of delivery and converts to the trading on the balancing market. One hour before the time of delivery the transactions between different balance group members are not possible since in balancing market must on one side at the conclusion of transactions (buying or selling) be always the TSO.

However, the rules for implementation of the balancing market set that the offers entered by the members of the balancing market within intraday market the TSO accepts as the offers placed on the balancing market, and all transactions, concluded with offers by the TSO for the purpose of balancing the power system are regarded as the transactions on the balancing market. As a result, the transactions on the balancing market can be divided into transactions carried out in the intra-day trading stage and transactions carried out in balancing market stage.

16%
more concluded transactions on the balancing market than in 2016

In the balancing market, all members included in the Balance Scheme can through a platform participate in trading. Trading on the balancing market is carried out 24 hours a day, seven days a week, and at most one day in advance. Trading with hourly, 15-minute, base-load and peak-load products is enabled. It is also possible to trade with block products, which are defined by the participant of the balancing market and must include at least two consecutive hourly products within the same day or two 15-minute products for the delivery within the same day.

Since its introduction, the balancing market has been steadily growing both in terms of the number of concluded transactions and traded volumes. In 2017, on the balancing market, 4,713 transactions were concluded in the total volume of 228,930 MWh. Out of these, 68,809 MWh represented the purchase of balancing energy, and 160,121 MWh the sale of balancing energy by the TSO. In comparison with the previous year, the volume of concluded transactions increased by 16%. Most of the trading was performed for hourly products in the total volume of 141,616 MWh of electricity. With 3,441 transactions the most traded product on the balancing market were hourly products.

The balancing market in 2017 represented 37% of all balancing of the system, which is 5 percentage point more than in 2016 when it was 32%.

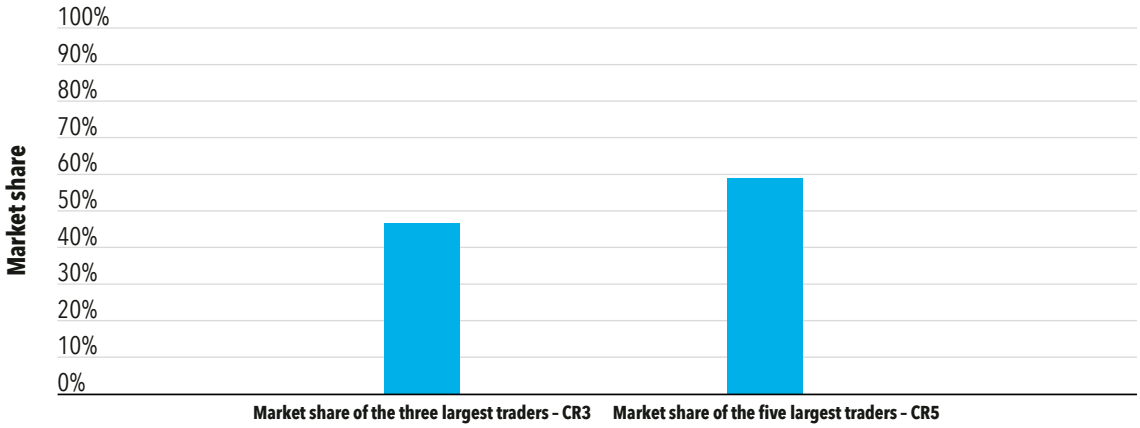
Since 2013, the number of transactions on the balancing market has been steadily increasing. In 2017 it represented 54% of all transactions concluded on the balancing market meaning that the TSO is buying or selling electricity directly before the delivery and thus more effectively balancing the system.

In 2017, the highest price for the settlement of imbalance was 310 EUR/MWh, and the lowest was -60 EUR/MWh. In January the trading volume and number of transaction achieved a record in the history of the balancing market since 716 transactions were concluded with a total amount of 38,406 MWh. The TSO on the balancing market mainly acted as a seller of electricity. Apart from the TSO, four out of 34 members of the balancing market participated in trading, less than in 2016 when 5 out of 36 members participated in trading.

Concentration of the auction market

The number of foreign and domestic companies that are trading on the BSP SouthPool in 2017 increased for the second consecutive year; in 2015 there were 36 companies, a year later 32 and in 2017 28 companies. The total market share of the three largest traders (CR3) was in 2017 46.9% and the largest five (CR5) 58.9% (Figure 51). HHI in 2017 was 1,077, which is a medium concentration of the market. In the last two years HHI due to structural changes significantly increased (for example in 2015 was only 777), which indicates a noticeable increase in concentration of the Slovenian auction market.

Figure 51: Shares of the traders on the BSP with respect to traded volumes in 2017



Source: BSP Southpool

Market coupling

Already at the beginning of 2011, the Slovenian and Italian electricity TSOs, market operators and power exchanges managers started to cooperate in the project of market coupling on the SI-IT border. The project enabled the implicit auctioning system for allocation of physical daily CZCs on this border. In 2017, market coupling extended to the SI-AT border for day-ahead auction trading, and to the SI-IT border for intraday auction trading.

Concentration of the Slovenian auction market increased for the second consecutive year

Within market coupling for the day-ahead on the SI-IT border in 2017 in the direction SI–IT was allocated 2,621 GWh out of 4,802 GWh offered CZCs, which in terms of implicit allocation of CZCs represents 54.6.5% of utilization of daily available CZCs. In comparison with 2016, when in this direction was allocated 3,633 GWh of transmission capacity, this means almost 28% decrease in the traded volume. That can be interpreted as the result of the increased price convergence – the share of the number with the same price in the Slovenian and Italian market in 2017 reached 55.9%, and the year before this share was 43.7%. The average share price of CZC in the direction SI-IT was 10.09 EUR/MWh. In the direction IT-SI in the same period was allocated 920 GWh out of 5,692 GWh offered CZCs, which is 16.2% of daily available transmission capacity utilization. In 2017 the allocation of CZC in the direction IT-SI was almost three times higher than the year before. The average price of CZC in the direction IT-SI was 6.25 EUR/MWh.

On the SI-AT border in 2017 for day-ahead trading in the direction SI-AT 244 GWh was allocated out of 12,042 GWh of offered CZC, which from the perspective of implicit allocation of transmission capacity

presents 2% of utilization of daily available transmission capacity. The average price of CZC in the direction SI-AT was 2.79 EUR/MWh. In the direction AT-SI was in the same period allocated 1,845 GWh out of 2,503 GWh offered CZC, which is 73.7% of utilization of daily available transmission capacity. Allocated capacities more than tripled in comparison with the previous year as the result of AT-IT market coupling, which started on 21 July 2016. Since that day the allocation of CZCs in carried out via implicit auctions within price coupling region (PCR). With that the SI-AT border is a part of a common European energy market (market regional coupling -MRC). The average price of CZC in the direction AT-SI was in 2017 16.14 EUR/MWh.

The Italian intraday sessions (session is the time during which it is possible to bid for a certain product) MI2 and MI6 were coupled with the associated sessions of the Slovenian intraday auctions. Session MI6 opens at 5:30 p.m. on the day before the delivery and closes at 11.15 a.m. on the day of delivery. In the direction SI-IT was within both sessions allocated 229 GWh out of 3,845 GWh offered, which is 6% of utilization of intraday available transmission capacity. In the direction IT-SI was allocated 165 GWh out of 4,271 GWh, or 3.9% of utilization of intraday available transmission capacity.

3.4.2 Retail market

In the retail market, suppliers and traders sign open contracts, in which the quantities of supplied electricity and the time profile of supply are not set in advance. Consumers pay for the supplied electricity according to actual consumption metered by the utility meters.

In 2017, to all consumers in Slovenia was delivered 13,569 GWh of electricity. In the retail market 21 electricity suppliers were active.

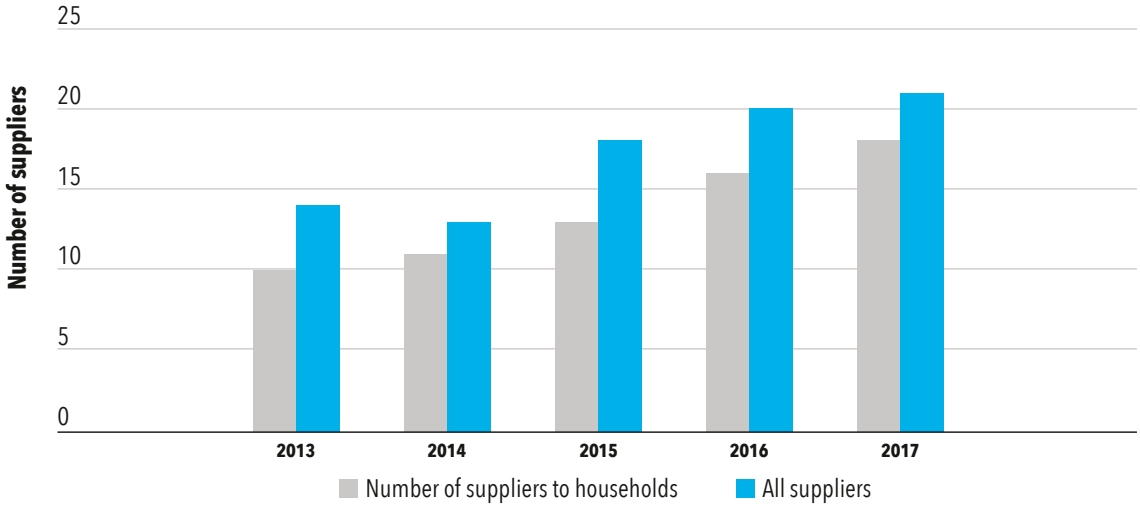
In this period, two new suppliers entered the electricity market, Adriaplin, d.o.o., and Energetika Ljubljana, d.o.o., who have been for many years already present in the retail market for natural gas. Adriaplin entered the market in November 2017 and by the end did not sign any supply contracts, while Energetika Ljubljana with its advertising persuade quite a few customers. At the end of 2017, the supplier RWE Ljubljana, d.o.o., took over the supplier Energenti plus, d.o.o., and with it all responsibilities and obligations of this company. Due to merging the company Energenti plus, d.o.o., as a legal entity does not operate anymore in the Slovenian electricity retail market.

21
active electricity suppliers, two new entrants

Business models of individual suppliers are different. Some supply electricity only to household consumers, the others to business only, and most of them to both. There are also some suppliers in the market, which generate most of their incomes in other areas (telecommunications, selling petroleum products), while with the electricity supply expand their service and product portfolio for customers. Already in 2016 we detected in the market some new business and marketing approaches of individual suppliers. Networking of suppliers with companies engaged in trade activities and field sales proved to be very effective in 2017.

In the observed period digitalization also has a significant impact on the sales activity; the availability of information and consumers awareness of products and services are rapidly increasing. The factors that are not related to the price are becoming more important for purchasing decision-making process. Many consumers do not decide only on the basis of price, but also other factors such as trust in the brand, available communication channels, extra services and benefits, various payment options and so on.

Figure 52: Number of suppliers in the retail market in Slovenia in the period 2013–2017



Source: Ministry of Infrastructure – EPOS

3.4.2.1 Retail electricity prices

The electricity market is open and competitive, thus, end electricity prices are affected by market conditions and factors. The Energy Agency regularly monitors the prices in the household and business markets since from the suppliers receives at the monthly level information on prices changes or supply offers in the retail market. The market for large business consumers is analysed at an annual level on the basis of data received from the EPOS system, which is operated by the Ministry of Infrastructure. Mentioned data are used for effective monitoring of the retail market and the comparative service within the single point of contact on the Energy Agency's website.

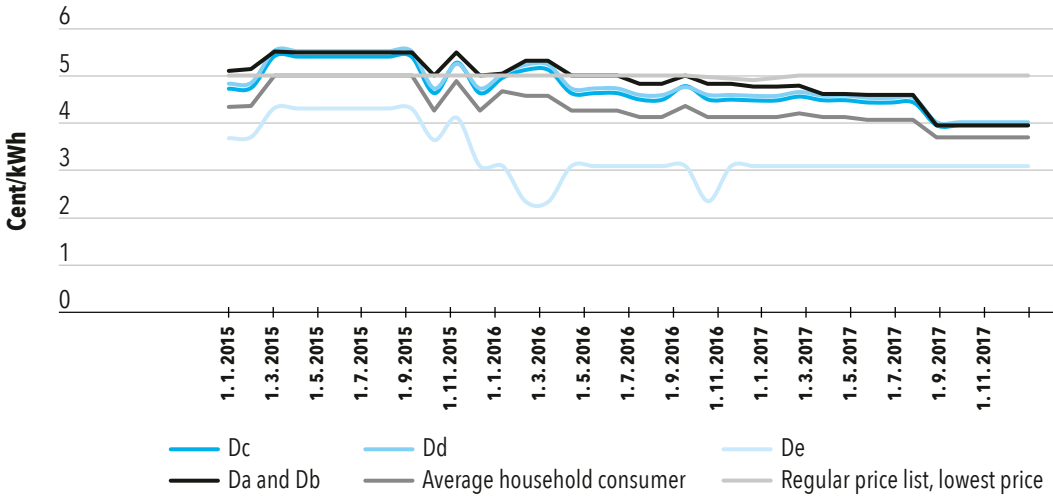
Suppliers offer electricity in the form of various products, which can be divided into so-called regular supply offers, which are based on regular price lists and their terms of supply determined by the Energy Act-1, and other supply offers; these supply offers can be further divided into discount offers, bundled offers (which in addition to electricity provide other services), and other offers, which cannot be placed in any of mentioned category. Regular offers are the products available to all consumers without binding obligations, and penalties enable supplier switching at any time. The Energy Agency monitors those regular offers that are based on the regular price list and provides comparative services of these supply offers in the single point of contact (web application Comparison of suppliers). Other offers may include penalties if a consumer before the due time withdraws from the contract and they be limited to a specific group of consumers, for example to those with installed smart meters, with the standing order payment, to consumers with heat pump, supply of other energy product from the same suppliers, paying by standing order, sending an invoice by email, etc.). A price of individual products is formed on the basis of the consumption profile, the structure of primary production sources (e.g., electricity from RES only), and other characteristics of an individual product (e.g., duration of the contract). Since price is thus only one of the characteristic of an individual supply product, the Energy Agency also monitors all other essential characteristic of products (the structure of primary production sources, general terms of supply, etc.).

On the basis of monitoring the retail market for household consumers, the Energy Agency determines the retail price indices (RPI). This index is based on the lowest offer on the retail market, accessible to all households and not restricted to the possibility of switching supplier.

The retail price index

Figure 53 shows the movements of the retail price index for standard consumers group Da, Db, Dc, Dd and De for an average Slovenian household consumer[31], and the movement of the cheapest regular price for an average household consumer in Slovenia for the period 2015–2017.

Figure 53: Retail price indexes in the period 2013–2017



Source: Energy Agency

Figure 53 indicates that in 2017 prices for all consumers group except for the group De decreased. This had happened despite the increase in price on wholesale markets, which probably means that suppliers purchased the majority of electricity for their portfolios on future markets before prices increased. The value of RPI in the second half of 2017 stabilized and by the end of the year kept the constant value, which could be the result of the price increase on spot markets. In this period fewer suppliers' activities on the market regarding new promotions and package offers.

Electricity retail price for households decreased for all consumers group except for the one with the largest consumption

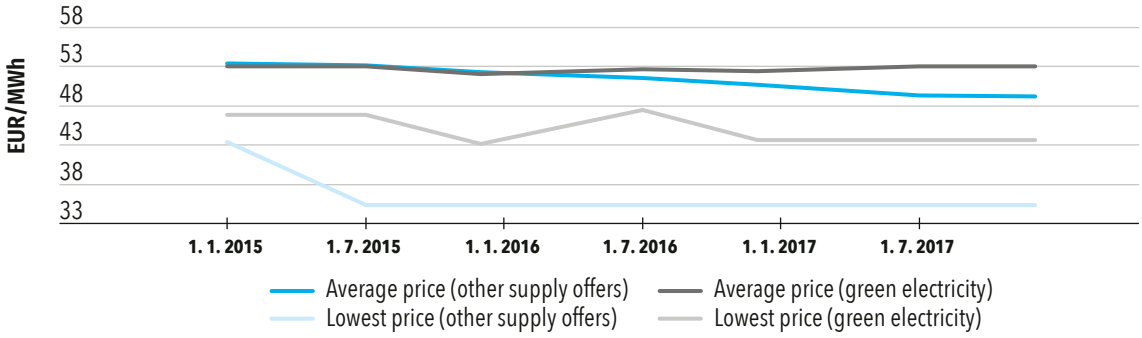
The value of RPI for the consumer group De, for which the highest price has since the beginning been determined of 2016 by the same supplier, in 2017 did not change.

Analysis of the green electricity prices

Electricity suppliers within their supply services offer consumers the products that differ among other things also in the structure of primary production sources. Consumers can choose between the supply of electricity, which was entirely produced from RES (green electricity), and also other offers, which in the production sources include other energy sources (other supply offers).

31 Consumption profile: 8 kW, 2,100 kWh (MT), 1,996 kWh (HT)

Figure 54: Comparison of green electricity and other offers in the Slovenian retail market for an average household consumer (Dc – 3,500 kWh per year) in the period 2012–2017



Source: Energy Agency

Figure 54 presents movements in average electricity prices on the basis of green electricity and other supply offers and movements of the lowest price of green electricity and other supply offers on the market in the period 2015–2017.

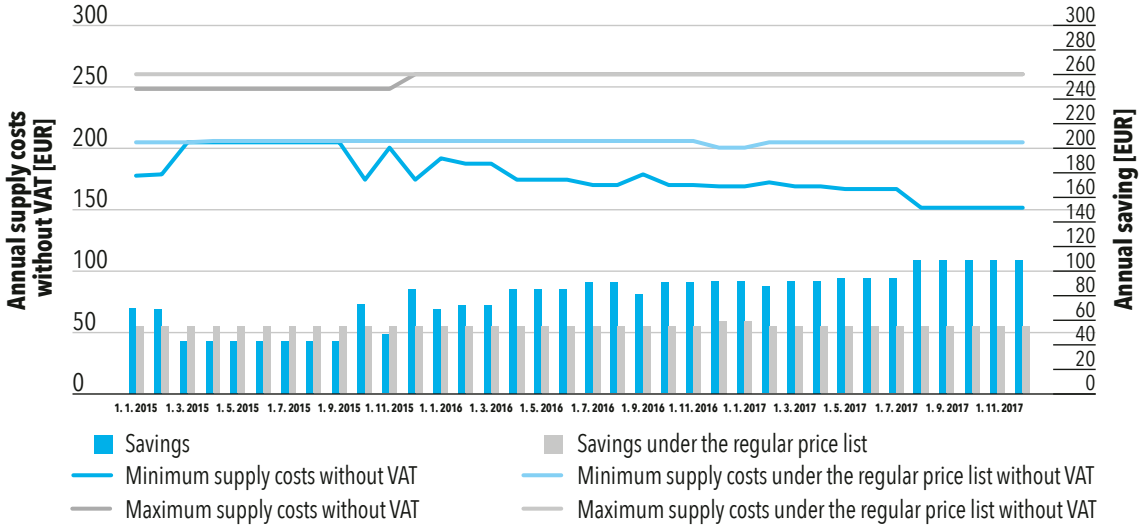
As we can see in Figure 54, in 2015 the average price of green electricity and other supply offer almost identical, but in 2016 the gap between them started to increase. This can be attributed to the increased demand of Slovenian suppliers for guarantees of origin, and because of this their price in the wholesale market started to grow. Average prices of other supply offers were in 2017 constantly lower than the average price of green electricity. Lowest prices of other supply offers were in 2017 significantly lower than the lowest price of green electricity, while the difference between them remained the same.

Potential benefits of switching supplier or an electricity supply product

By switching a supplier or an electricity supply product at the existing supplier, a consumer can potentially reduce his annual electricity costs or improve contract conditions with a supplier and, thus, gain additional benefits.

Figure 55 shows the movement of the minimum and maximum costs of electricity supply for a typical Slovenian consumer[32] in the retail market at an annual level without the network charge, levies, and VAT. We can also see the minimum and maximum cost for the supplied electricity under the regular price list.

Figure 55: Potential annual saving by switching supplier based on the most expensive and the cheapest supply offer in the market, or the supply offers under the regular price list



Source: Energy Agency

32 Standard consumer group Dc (STAT method) with consumption of 3,500 kWh/year

The potential saving by switching supplier if a consumer was supplied under the regular price list, almost did not change throughout the observed period and was € 55. Higher, almost € 60 were only in December 2016 and January 2017, when the most advantageous tender lowered the regular price.

87 to 109 €
of the potential saving per year by switching supplier

If a consumer with the most expensive electricity supply chose the cheapest offer on the market, his potential savings would be between 69 and 91 euros. In comparison with 2016 the potential saving in the market increased due to lowering the price of the cheapest offer, since the most expensive supply offer hasn't changed since December 2015. By the end of 2016 the lowest price was dictated by the supplier GEN-I, but in June 2017 the supplier, who entered the market at the end of 2016 (Energia gas and power) offered lower price. As we can see in Figure 55, in the period from August to December 2017 the potential saving increased, since in the beginning of August GEN-I provided a supply offer with lower prices than in the previous months.

Final electricity prices for household consumers

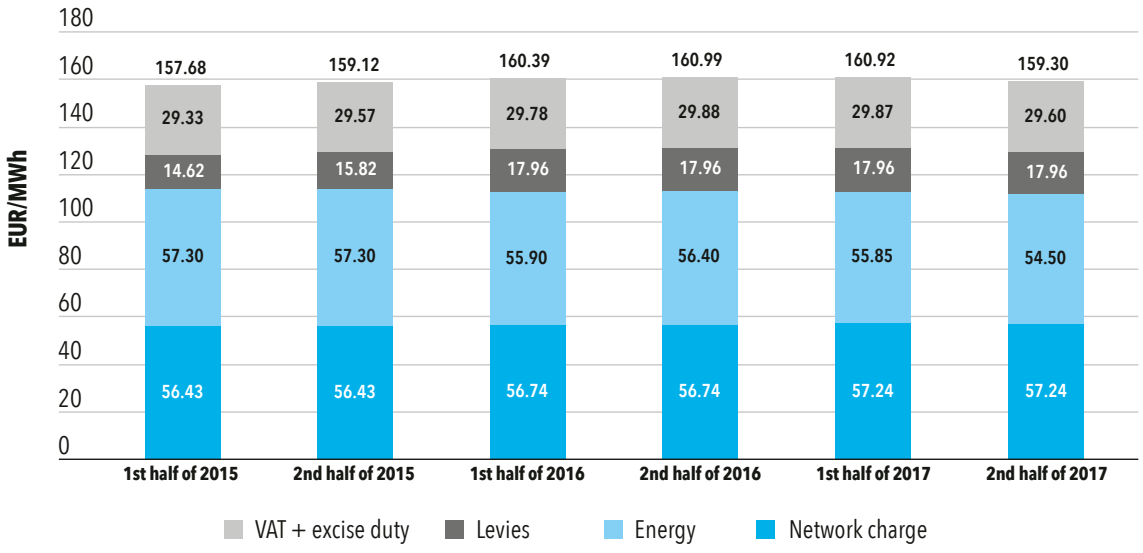
Lower final electricity price for household consumers

In the following text we present the structure of the final electricity price for household consumers. The final electricity price for consumer consists of:

- the electricity price formed freely on the market;
- the network charge (for the transmission and distribution network);
- levies (for supporting electricity production from RES and CHP, supporting energy efficiency programmes and for the operation of market operator);
- excise duty and
- value added tax (VAT).

Figure 56 shows the breakdown of final price for a typical household consumer[33] in Slovenia in the last three years.

Figure 56: Final electricity price for a typical household consumer in Slovenia (Dc – 3,500 kWh per year) in the period 2015–2017



Sources: Energy Agency, Statistical Office of the Republic of Slovenia

The final electricity price in 2017 in comparison with 2016 decreased due to decrease in the price of electricity (commodity) in the structure of final price. Over the past three years the fluctuation of this price did not exceed 2% increase considering the lowest value reached in the first half of 2015.

33 Standard consumer group Dc (STAT method) with consumption from 2,500 to 5,500 kWh/year

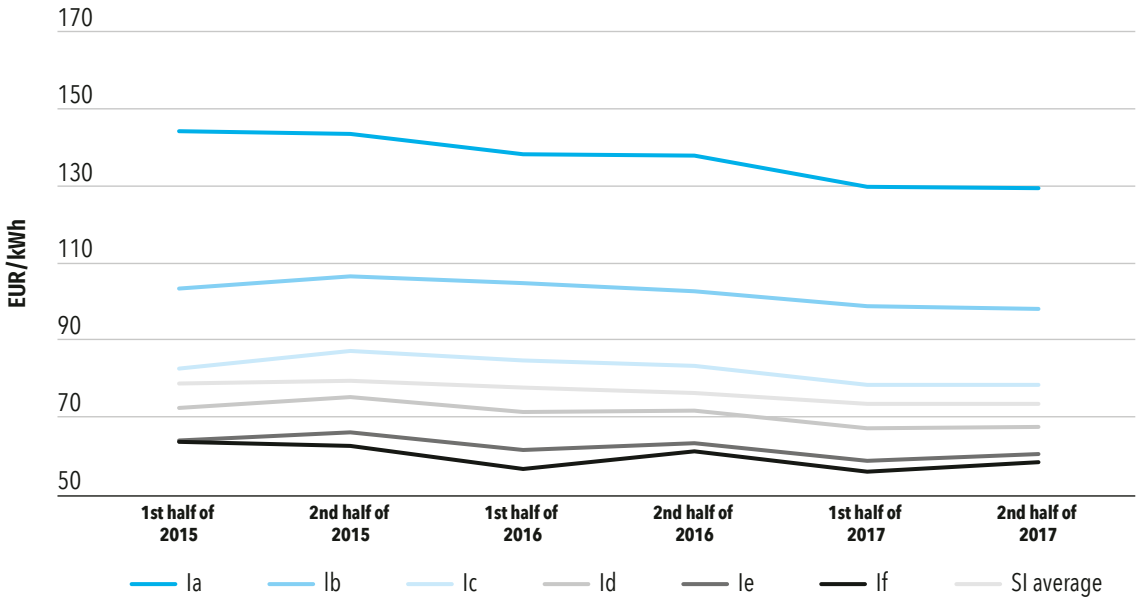
Final electricity prices for business consumers

The average final electricity price for business consumers without VAT was in the second half 2017 80.7 EUR/MWh and in comparison with the same period in 2016 decreased by 5.1%. Reduction in the retail price however does not reflect prices in the wholesale markets since prices in these market significantly increased. Pricing models of suppliers are adapted to consumers and directly and indirectly connected. We can assume that suppliers most of the energy for their portfolio bought in advance on future markets when electricity price was considerably lower (at the end of 2016).

Figure 57 shows that prices for consumers groups If and Ie in the 2nd half of 2017 compared to the 1st half increased, and for other consumers groups decreased. We can conclude that high prices in the wholesale market already influenced on retail prices. Groups If and Ie are the largest among the observed groups.[34]

Assuming that the contract price for the largest consumers is at least partly linked to the stock exchange index, then it is considered that the higher consumption means also higher risk for a consumer in case of unfavourable prices of electricity for a supplier on spot markets.

Figure 57: Movements of final electricity price for typical business consumers in Slovenia in the period 2015–2017

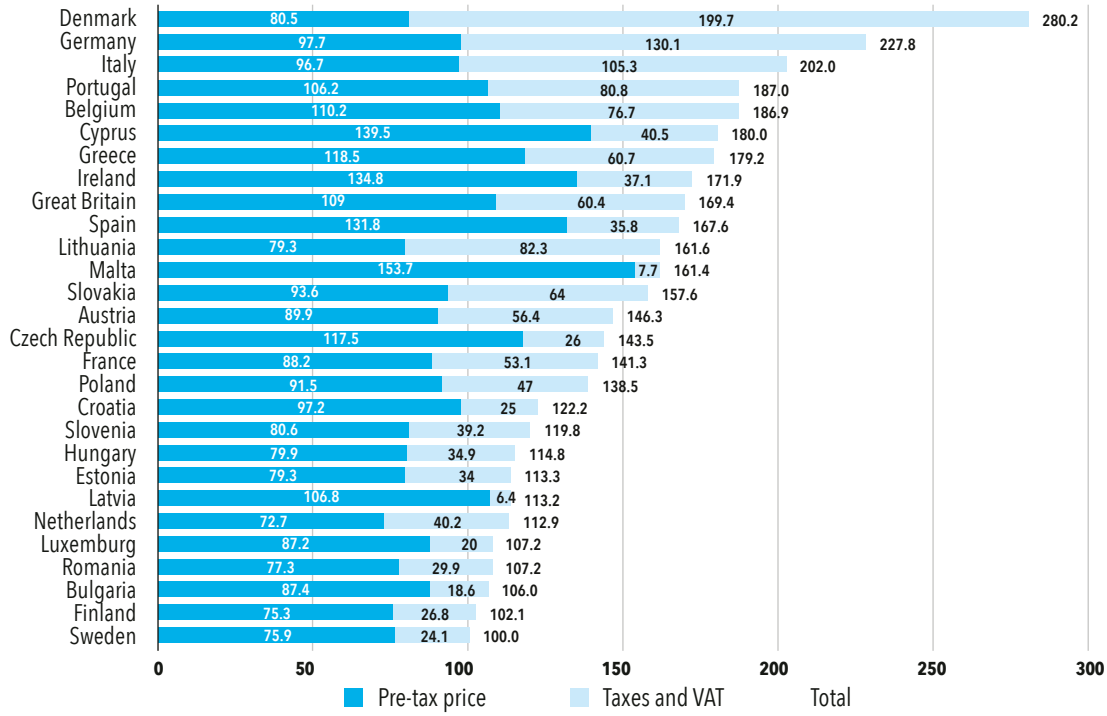


Source: Statistical office of the Republic of Slovenia

Figures 58 in 59 show the comparison of final electricity prices in the EU Member States in 2017 for two typical business consumers, selected in accordance with the Eurostat methodology. For Slovenia among levies and taxes are included contributions, excise duty and VAT, and into the price without levies and taxes the price of energy (commodity) and the network charge. For the third year in a row the highest price for business consumers was in Denmark, most of this final price form levies and taxes. In comparison with 2016, the final electricity press in Slovenia decreased for both groups and was lower than the average price in the EU, which is good for the industry.

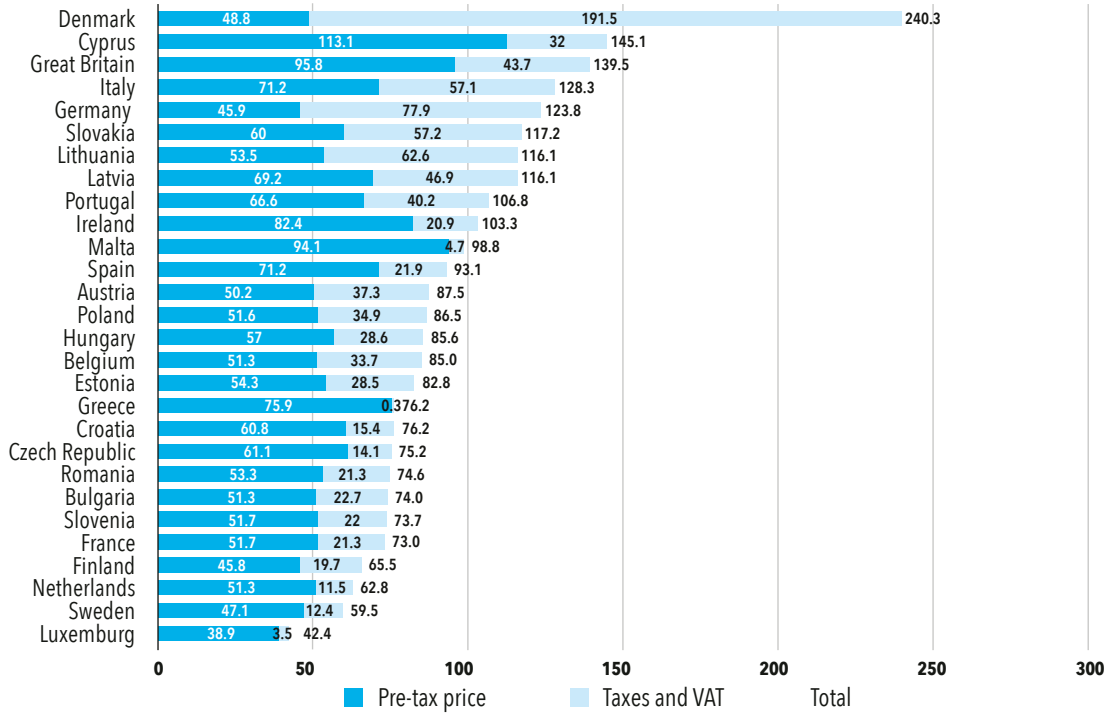
34 Consumers with annual consumption of 2,000 MWh (Ie) and 10,000 MWh (If)

Figure 58: Comparison of electricity prices for a typical business consumer with an annual consumption of 20 to 500 MWh (Ib) in the EU and Slovenia in 2017



Source: Eurostat

Figure 59: Comparison of electricity prices for a typical business consumer with an annual consumption of 20 to 70 GWh (Ie) in the EU and Slovenia in 2017



Source: Eurostat

3.4.2.2 Transparency

Financial transparency of suppliers

In the context of market monitoring the Energy Agency analysis the annual reports of suppliers. The results of these analysis are internal basis and reports on the business performance of these companies, which the Energy Agency uses in correlation analysis for the needs of market monitoring. The Energy Agency also in 2017 estimates that a common legislative framework provides for a sufficient level of financial transparency of supplier in the retail market.

Invoice transparency and electricity disclosure

On electricity bills to their consumers, in the promotional materials and on the internet, electricity suppliers must indicate the shares of individual energy production sources in the whole structure of the electricity of individual supplier in the preceding year. The shares for the preceding year must be published since 1 July of the current year.

The structure of production sources disclosed by the electricity suppliers is based on the amount of cancelled guarantees of origin for RES of each supplier and other structure of production sources (residual mix). The methodology determining the shares of individual electricity production sources, which is in Slovenia used for electricity disclosure since 2013, does not take into account the data on production sources that may be determined by the contract between the wholesale electricity market participants. The shares of an individual supplier are determined on the basis of the number of cancelled guarantees of origin, while the shares of other production sources (fossil fuels, nuclear) are determined only on the basis of the remaining structure of production sources (residual mix).

By 31 May, the Energy Agency must on its websites publish residual mix for the preceding year. The residual mix is based on the statistic of electricity production, from which all the production from RES with issued guarantees of origin is deducted. To the remaining structure of production sources is added the electricity with corresponding guarantees of origin whose period of validity has expired in the preceding year. The amount of electricity corresponding to the determined national residual mix is compared to the electricity consumed in the preceding year, from which the amount for the Slovenian suppliers and final consumers of cancelled guarantees of origin and the electricity consumption of PSHPP is deducted. In this amount of electricity, losses in the transmission and distribution systems are also taken into account. If this amount exceeds the amount corresponding the residual mix, the remaining amounts are replaced in a way that as their structure the European residual mix is taken into account; the European residual mix is every year published by the Association of Issuing Bodies (AIB). The AIB publish the European Residual Mixes by 15 May for the preceding year. By supplementing the national residual mix with the European residual mix, we obtain the residual mix, which is published by the Energy Agency and is the basis for determining the electricity disclosure of an individual supplier.

Each supplier in the calculation of electricity disclosure covers its amount of the supplied electricity from RES with their cancelled guarantees of origin, and with the part of cancelled guarantees of origin from facilities using RES that receive support as the guaranteed purchase. How much of the electricity from the guaranteed purchase belongs to an individual supplier is determined by the Energy Agency in respect to its share of the electricity in the overall supply of electricity to end consumers. This amount is considered as electricity from RES. A supplier replaces his remaining amount of supplied electricity with the residual mix, while such replaced mix is taken into account in the proportionate share of the total supplied electricity by a supplier and the amount of cancelled guarantees of origin. In that way, each supplier determines its electricity disclosure (the structure of production sources) at the company level. Electricity disclosure must be published by all active suppliers in the Slovenian retail market. When a supplier is offering specific electricity products, for example "100 percent energy from solar power plants" or a certain share from renewable sources must to the customers, buying this product, indicate the share in the whole company structure, and in addition, the structure, which refers to the specific electricity product .

In May 2017, the Energy Agency calculated and on its website published the residual mix for 2016. In the composition of residual mix, we can detect, from year in and year out, that the share of electricity from RES is decreasing. The reason for this is that the use of guarantees of origin in Slovenia is increasing, which, in addition to the export of this certificates to foreign markets, in Slovenia causes less and less quantities of cancelled guarantees of origin and with that volumes of electricity for which these guarantees haven't

been issued at all. In the residual mix for 2017 the share of electricity from RES was only 4.63%, while the share of electricity from fossil fuels was 63.27% and from nuclear power plants 32.10%.

Regular price list and publication of price lists

The suppliers to household and small business consumers must make public offers for electricity supply and the related price lists as well as general conditions for the supply services. With the implementation of the Energy Act, the offers must be formed and published on the basis of the valid regular price lists. According to the Energy Act, regular price list means a price list for a particular type of consumer (a household or small business), which applies to all consumers that conclude a supply contract with the supplier for a particular type of consumer, with the exception of promotional or package price lists, and includes at least 50% of consumers and at least 1000 customers with each supplier.

Activities for providing transparency

The Energy Agency contributes to the transparency of the retail market with monitoring the transparency of this market and providing information within the single point of contact. The monitoring of the retail market is carried out on the basis of publicly available data and other data required from the reporting agents. On the basis of the results of market monitoring, reports of violations or restrictive practices, etc. the Energy Agency also carries out market researches and surveillance activities and implement measures for providing transparency, which include:

- bilateral cooperation;
- the preparation of amendments to the legislation;
- influencing on the content and approving the rules for market operation and other secondary legislation to which the Energy Agency gives consent;
- introduction of public consultations in accordance with active regulation of the energy networks of the future (AREDOP);
- corrective influence on the functioning of market participants by implementing supervisory procedures;
- directing stakeholders through their participation in professional associations (e.g. in the Section IPET).

On the Energy Agency's website are within the single point of contact available e-services, among which the application for comparison of electricity supply costs is the key one (hereinafter referred to as comparison of suppliers). Comparison of suppliers enables the calculation and comparison of the costs of electricity supply for an individual consumption type on the basis of the valid supply offers, or price lists under which consumers are still served but are no longer available to new consumers. Comparative calculations can be carried out for the supply to household and small business consumers. Suppliers submit their offers to the Energy Agency in a standard format on a monthly level in accordance with Act concerning the method of electronic data reporting for valid regular tariffs comparison of electricity and natural gas suppliers for household and small business customers. The comparison based on the Energy Act-1 is limited to the comparison of the costs under regular price lists. This means that consumers no longer have the single access to all price lists and offers and that they have to search for this information at an individual supplier, which makes impossible to effectively compare, or at commercial providers of comparative services. However, commercial comparative services are not regulated and not managed by an independent institution, which is one of the requirements of the new European regulation proposal[35]. In the application, the Energy Agency provides an up-to-date list of suppliers and system operators that includes identity card of an individual company and other useful information.

In the single point of contact, the Energy Agency also provides e-service for checking monthly bill (online application Check the bill), where consumers can check the accuracy of issued electricity bill according to the selected supplier, supply offer and type of consumption. The calculation is done separately according to the legal requirements, possible for all products on the market and not only for those based on regular price lists. The functionality does not support checking balance payments. The Energy Agency also provides the comparison of costs for the use of the network for all consumers groups according to consumption profile (application Calculation of costs for the use of the network).

In the single point of contact are also other important and updated information to support retail market transparency and services (list of legislation, explanation of the bill, etc.).

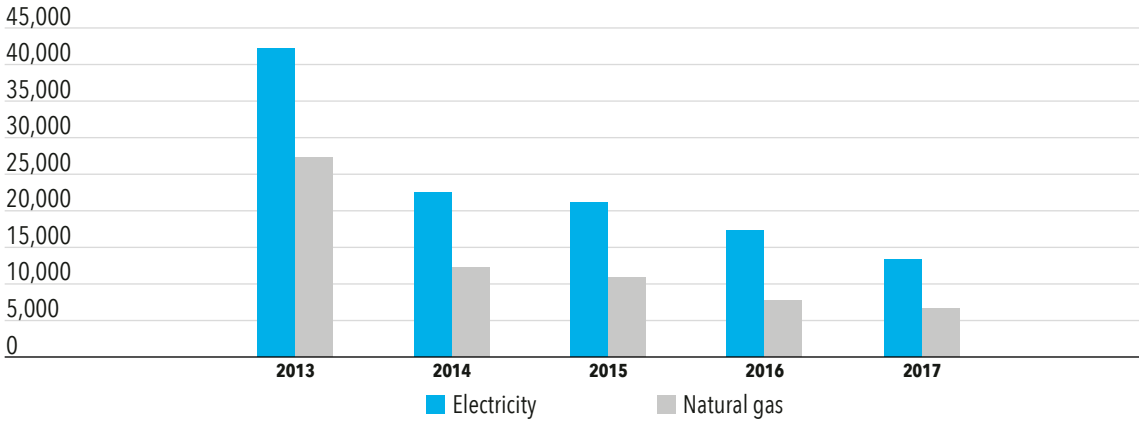
35 Clean Energy for all Europeans

In the retail market, in 2017 seven suppliers provided supply offers based on the regular price list, wherein prices of four suppliers, whose activity is not connected with distribution companies, where for a typical household consumer almost identical. The market makes available diverse enough services, which are not restrictive regarding binding and contractual penalties; consumers may choose among the supply services that allow switching supplier theoretically almost every month. These are not only offers based on regular price lists, but also many other offers for electricity supply in the market. Household consumer otherwise may withdraw from the supply contract without paying penalties, reimbursement, compensation or any other payment due to the withdrawal before a specified date if the termination of the contract takes effect for at least one year after its conclusion.

Decline in interest for the supply based on regular price lists

Consumers are less and less interested in the supply based on regular price lists, which can be confirmed by the analysis of the the Energy Agency's comparison services performed; since the implementation of the Energy Act-1 utilization of the tools reduced by half and continues to decline. We can assume that one of the causes is the potential of savings at switching suppliers, which is much higher at transfer to another supply offer, which is not based on regular price lists, or discounted offers (Chapter 3.4.2.1).

Figure 60: Number of comparison of annual costs of supply offers based on regular price lists



Source: Energy Agency

To ensure the appropriate level of transparency of a number of offers on the market an independent and regulated comparison of all offers on the market should be re-established. This would be possible in the single point of contact, which also provides all other necessary supporting information.

For the transparency of the retail market, the Energy Agency within its jurisdiction carries out the control over the electricity suppliers and in accordance with its findings imposes sanctions.

In 2017, the Energy Agency carried out control over electricity suppliers related to a uniform identifier of a metering point. It was established that suppliers used different identifiers. The Energy Agency called upon the suppliers to use determined unique identifier. All suppliers acted in line with the agency's warning, and the control procedures were in 2017 terminated.

The Energy Agency also carried out the supervision over the legal obligation to nominate an independent person responsible for out-of-court consumer dispute settlement. In its review, it was established that some suppliers had not yet nominated an independent person, listed in the Register of a person responsible for out-of-court resolution of consumer disputes, which is under the Out-of-Court Resolution of Consumer Disputes Act managed by the Ministry of Economic Development and Technology. Thus, the agency imitated the procedure over six suppliers and urged them to nominate the responsible person in line with Articles 48 and 50 of the EA-1. Three suppliers complied with the warning, and the procedures were concluded, while three procedures continue in 2018.

3.4.2.3 Market effectiveness

The Energy Agency carries out monitoring of the effectiveness and competitiveness of the retail market on the basis of continuous collection of data from market participants and aggregators of public data (Ministry of Infrastructure).) In the following chapters are presented specific indicators by which the effectiveness and competitiveness of the retail market are measured.

Electricity supply to all end consumers

Table 26 shows the market shares of suppliers calculated on the basis of the supplied electricity by taking into account in the entire retail market, which means that the market for larger business consumers connected to the closed distribution systems is included as well.

Table 26: Market shares and HHIs of suppliers to all end consumers in Slovenia in 2017

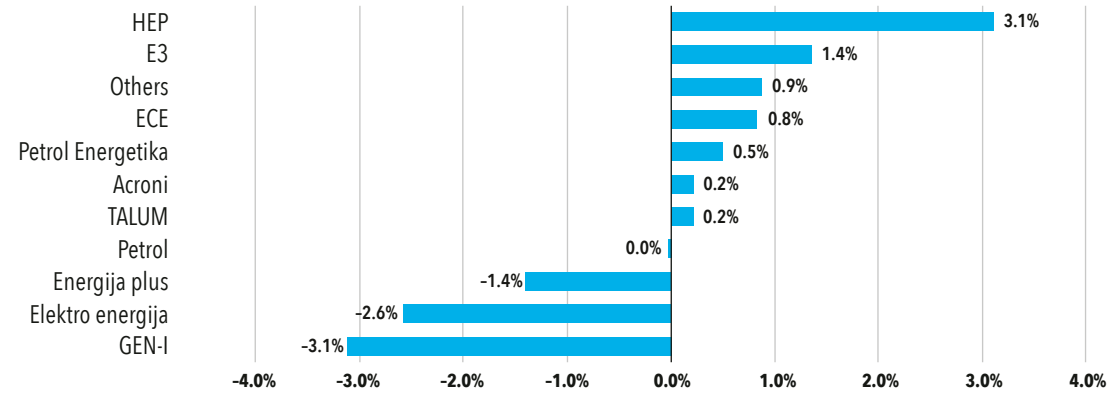
Supplier	Supplied electricity(GWh)	Market shares
GEN-I	2,723.7	20.1%
ECE	2,719.6	20.0%
Energija plus	1,537.3	11.3%
E3	1,263.0	9.3%
Elektro energija	1,248.8	9.2%
TALUM	1,207.5	8.9%
Petrol Energetika	777.6	5.7%
Petrol	714.6	5.3%
HEP	628.5	4.6%
Others	389.9	2.9%
Acroni	358.3	2.6%
Total	**13,569**	**100%**
HHI of the suppliers to all end consumers		**1,281**

Sources: Companies' data

The value of HHI shows that this is a moderately concentrated retail market (HHI = 1000–1800). In comparison with 2016, the HHI decreased due to changed relationships of companies with the largest market share and increased market shares of small suppliers.

In 2017, in comparison with the previous year the market shares of suppliers HEP, GEN-I, Acroni and other small suppliers increased the most. The Croatian company HEP is in the retail market present only in the supply of large business consumers, since it does not have publicly available starting offer for small business consumers. HEP in 2017 supplied three times more electricity than in 2016 and, thus, significantly increased its market share. Their market share also increased E3 and other small suppliers, which can be result of effective marketing activities good communication with consumers about innovations. More about acquiring new customers or increasing the market shares of small suppliers is presented in Case study on page 100. The biggest loss of market share in 2017 recorded Elektro energija and GEN-I. At Elektro energija this can be the result of reconstruction of its portfolio according to a new business model dictated by ownership association with GEN-I. Changes in market share are shown in Figure 61.

Figure 61: Changes in markets shares of the suppliers to all end consumers in 2017 with respect to 2016



Source: Energy Agency

Electricity supply to all business consumers

In Table 27 are presented market shares of suppliers in the retail market to business consumers in 2017.

Table 27: Market shares and HHI of suppliers to all business consumers in 2017

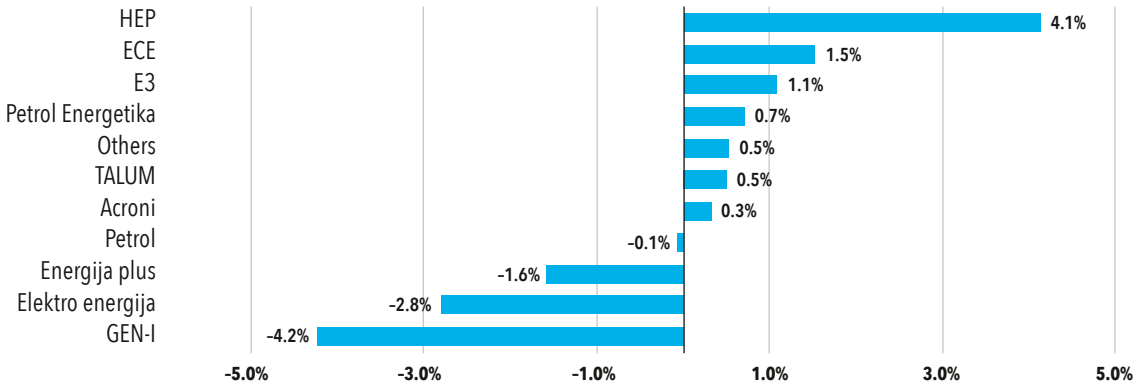
Supplier	Supplied electricity (GWh)	Market share
ECE	2,099.1	20.4%
GEN-I	1,978.2	19.3%
TALUM	1,207.5	11.8%
Energija plus	1,030.8	10.0%
Petrol Energetika	756.8	7.4%
E3	745.7	7.3%
Elektro energija	696.6	6.8%
HEP	628.5	6.1%
Petrol	476.9	4.6%
Acroni	358.3	3.5%
Others	287.2	2.8%
Total	**10,265**	**100%**
HHI of suppliers to business consumers		**1,261**

Source: EPOS portal

HHI shows that this is a moderately concentrated retail market (HHI= 1000–1800). In comparison with 2016, when HHI was 1,390, in 2017 decreased to 1,261.

As we can see in Figure 62, the biggest market shares in comparison with 2016 were gained by HEP, ECE, and E3. HEP, which supplies only business consumers, in 2017 delivered almost three time more electricity as the year before. The biggest market share lost Elektro energija and GEN-I.

Figure 62: Changes in markets shares of the suppliers to all business consumers in 2017 with respect to 2016



Source: Energy Agency

Electricity supply to household consumers

Market shares of electricity suppliers in the retail market for household consumers in 2017 are shown in Table 28.

Table 28: Market shares and HHI of suppliers to all household suppliers in 2017

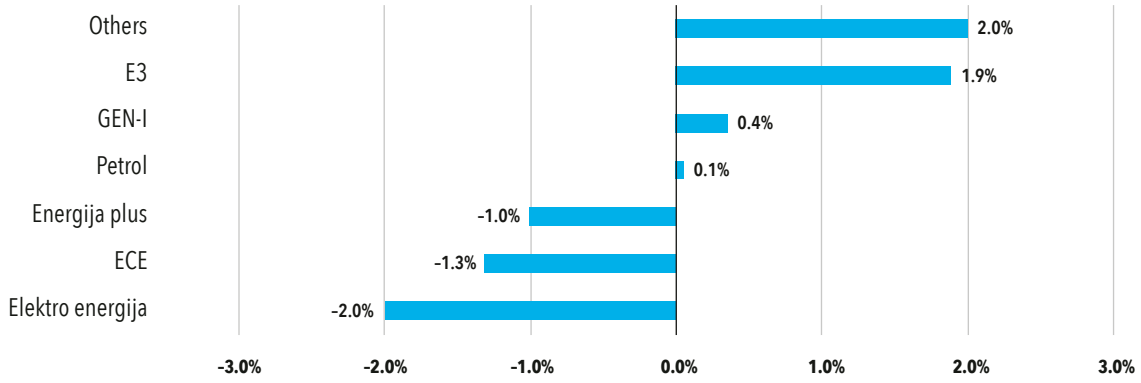
Supplier	Supplied electricity (GWh)	Market share
GEN-I	745.5	22.6%
ECE	620.6	18.8%
Elektro energija	552.2	16.7%
E3	517.3	15.7%
Energija plus	506.5	15.3%
Petrol	237.7	7.2%
Others	123.5	3.7%
Total	**3,303**	**100%**
HHI of suppliers to household consumers		**1,688**

Sources: Companies' data

HHI shows that this is a moderately concentrated retail market in 2017, since the value of HHI was 1,688. In comparison with 2016, the value of market share decreased. The biggest market share had GEN-I, followed by ECE and Elektro energija. Market share of the three largest suppliers was 58.1%, which is a little less than in 2016 when it was 61%.

Figure 63 shows that some smaller suppliers, as well as E3, GEN-I increased their market shares in comparison with the year before. One of the smaller suppliers gained more than 11,000 new customers during this period. Given the fact that in the market there are many suppliers with favourable supply offers is such extensive acquisition of new customers quite unexpected. This confirms that an aggressive marketing approach, quick response and quality sales service are assurance for acquiring new customers or customers' satisfaction.

Figure 63: Changes in market shares of suppliers to all household consumers in 2017 with respect to 2016

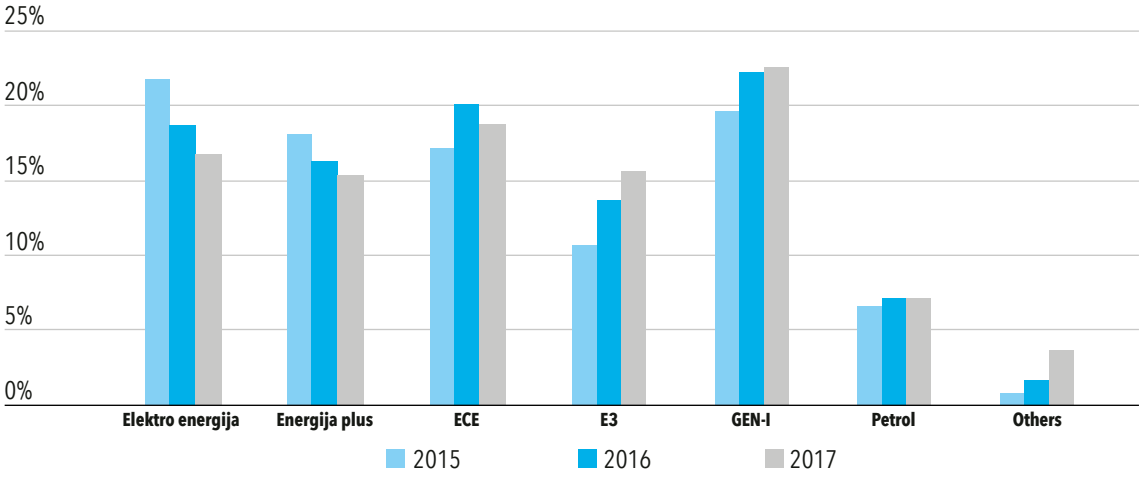


Source: Energy Agency

Electricity retail market remains moderately concentrated

As we can see in Figure 64, in the period from 2016 till the end of 2017 the companies GEN-I, E3, Petrol and some small suppliers were constantly increasing their markets shares. The loss of its market share recorded ECE, while throughout the observed period the market share was decreasing for companies Elektro energija and Energija plus.

Figure 64: Market shares of electricity suppliers in the period 2013–2017

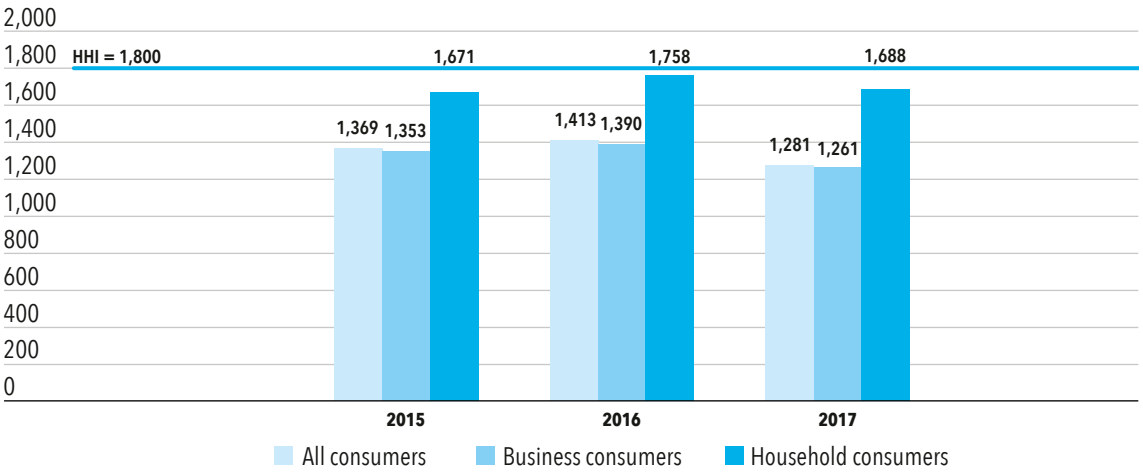


Source: Energy Agency

HHI for the period 2013–2017

The market concentration ratio in 2017 slightly decreased on all observed markets, which indicates better competition between suppliers in the market, mostly in the case of supply to business consumers. Market concentration at household consumption is still around upper level of moderately concentrated market.

Figure 65: HHI of the retail markets in the period 2015–2017

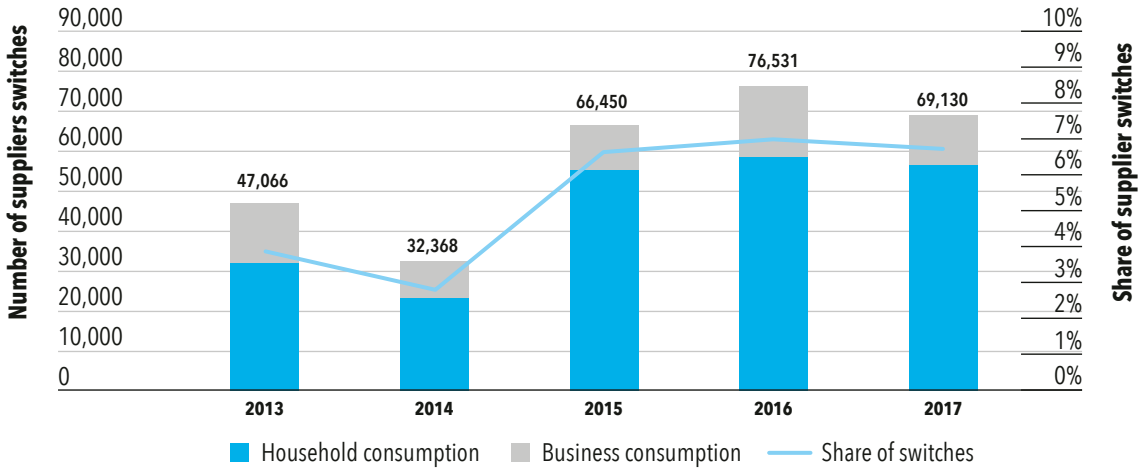


Source: Energy Agency

Switching supplier

In 2017, 69,130 consumers changed supplier, of which 56,679 were household consumers and 12,451 business consumers. The number of switches in comparison with the previous year decreased by almost 10% since there were 76,531 switches in 2016. Figure 66 shows a five-year trend of the total number of switches according to the consumption type and the share of switching supplier.

Figure 66: Number of supplier switches in the period 2013–2017



Source: SODO

In 2017, the largest number of consumers gained the company, which according to its market share in 2016 did not rank among the three largest electricity suppliers to all end consumers. The second largest number of consumers goes to the supplier whose market share in 2016 was less than one percent.

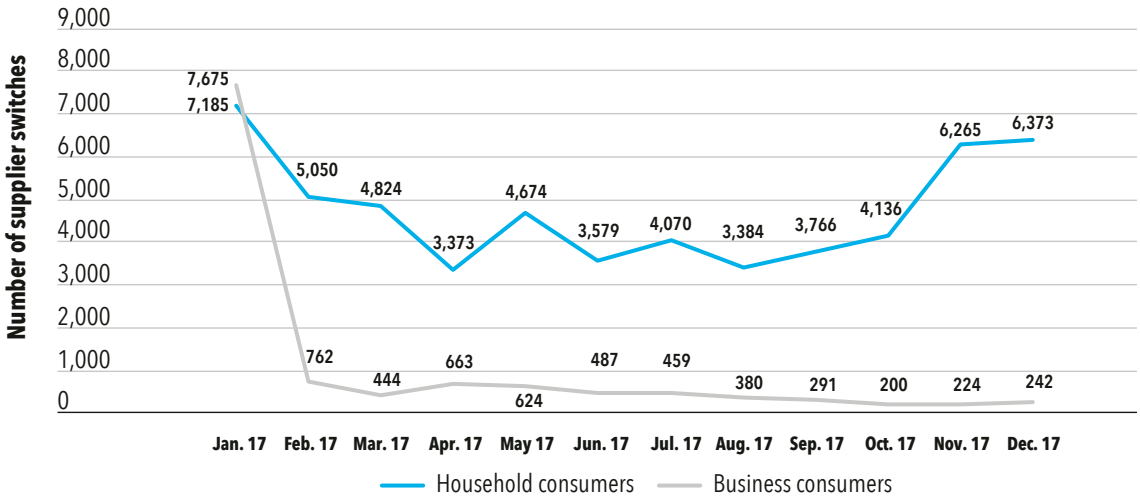
Despite the Switch and save #2 group purchase of electricity and natural gas organized by the Slovenian Consumers' Association in May 2017, in 2017 electricity supplier was switched by fewer end consumers than the year before. Group purchase was slightly more successful than the first one in 2015; then more than 13,000 consumers switched their supplier[36], which is almost 20% of all supplier switches in 2017. Due to announced campaign it is likely that a certain part of active consumers planned their annual supplier switch in advance and carried it out by participating in the mentioned campaign, which could result in lower number of switches in the observed period. We can conclude that the awareness of potential savings unfortunately does not spread outside the circle of active consumers so far – the potential saving in 2017 further increased. More on this you can find in Chapter 3.4.2.1 on page 86.

6.7%
or 69,130 electricity supplier switches, which is less than in 2016

The dynamics of the number of switches in 2017 (Figure 67) shows that the majority of households changed their supplier at the beginning of the year, which was influenced by more intensive activities of suppliers at the end of 2016 and the associated price decrease in the retail market[37].

In the figure we can also see an increased activities at switching supplier at the end of 2017. The number of switches at the time significantly deviated from the monthly average, and the increased activities can be attributed to the ending of the Switch and save #2 campaign at the end of October and, consequently, the extensive promotional activities. The share of supplier switches amounted to around 6.7% and in comparison with 2016 decreased. From the perspective of suppliers' activities that has no positive effects on the market. The research done by VassaETT[38] namely confirmed that at 8.5% share of switches in the market suppliers already risk a loss of a significant number of customers, if they are not active in the market or made a mistake in keeping a desired level of consumers' loyalty.

Figure 67: Dynamics of supplier switches in 2017 with respect to the type of consumption



Source: SODO

In Figure 67 we can also see that the number of switches by business consumers is much higher at the beginning of the year that in the rest of the year, since the contracts usually expire at the end of a calendar year.

On average, 4,723 household and 1,038 business consumers switched their supplier per month.

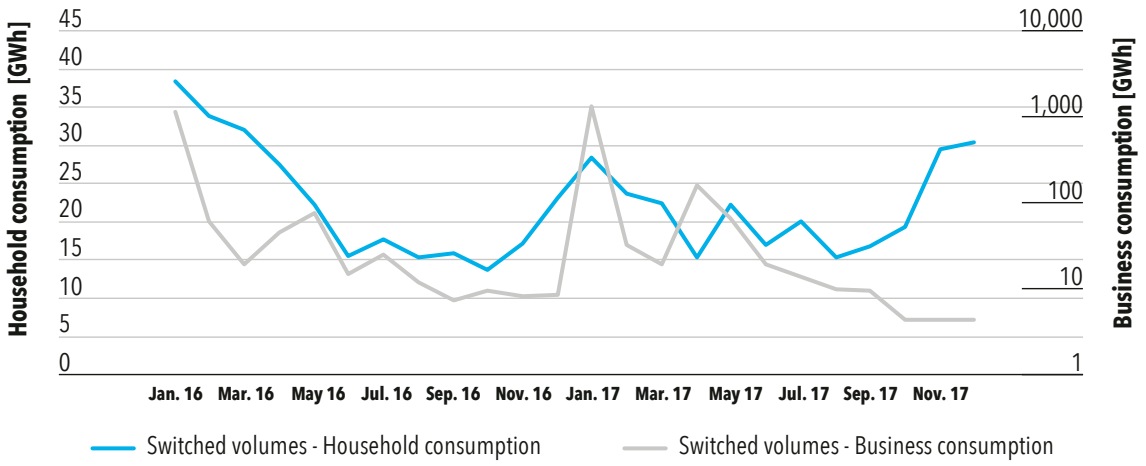
Figure 68 shows the trend of switched volumes of electricity from January 2016 to December 2017.

36 https://www.zamenjajinprihrani.si

37 Decrease in the retail price index (RPI) for individual standardized consumption types and an average household consumer calculated on the basis of the regular price list (the latter occured for the first time after the implementation of the EA-1)

38 VassaETT World Energy Retail market Rankings

Figure 68: Volumes of switched electricity with respect to the consumption type

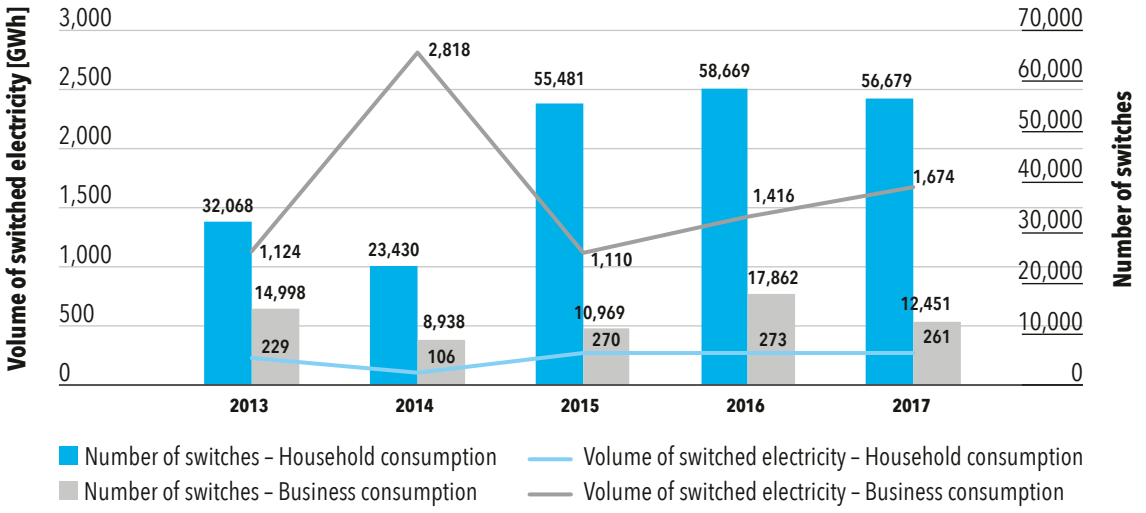


Source: SODO

The amount of switched electricity at household and business consumption is closely related with the number of supplier switches. The exception was in April 2017 at business consumers, when the volume of switched electricity was very high despite very low number of switches. The reason for this were switches of one or more large electricity suppliers of industrial consumers.

Figure 69 shows that in comparison with 2016 the volume of switched electricity at business consumers in 2017 bigger, regardless of smaller number of switches in this year. This is the result of supplier switches of larger industrial consumers of electricity. In households, due to fewer supplier switches in comparison with 2016, the volume of switched electricity was smaller as well.

Figure 69: Volumes of switched electricity with respect to the consumption type in the period 2013–2017



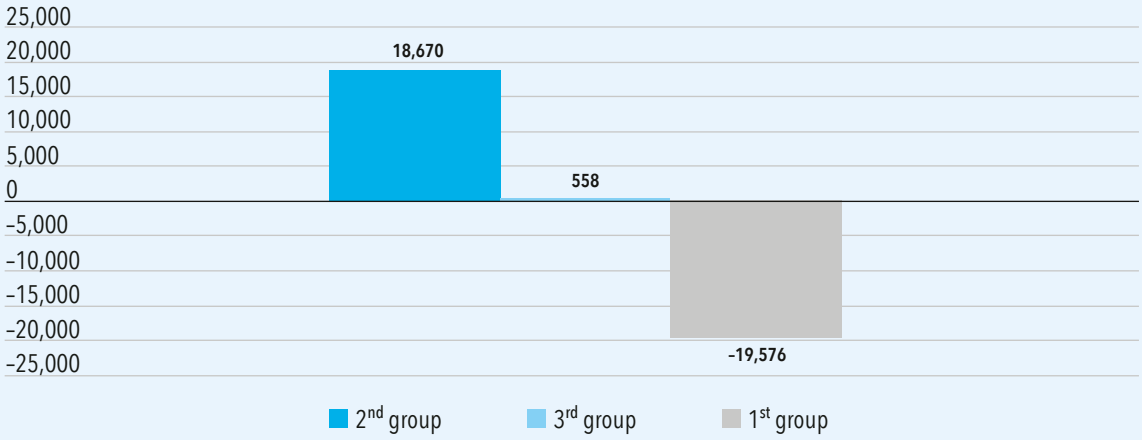
Source: SODO

CASE STUDY: Correlation between the market share, size of supplier and acquiring new consumers

The Energy Agency analysed which suppliers in Slovenia were most successful in acquiring new consumers and what was the impact of market share on their performance. There were 17 suppliers involved without taking into account the companies that have a status of a closed distribution system and electricity DSO. Suppliers were classified in three groups according to the size of their market share in the retail market for household consumers in 2016. Six suppliers with the largest market share was ranked in group 1, the following six in group 2 and the remaining five with the smallest market share in group 3. We wanted to establish how successful individual groups in acquiring new consumers were.

The retail electricity market has recently undergone significant changes, and among the main reasons for this are the increase of competition due to the entry of two new suppliers, new business and marketing approach, field sale and easier access to information. All these simply consumers a decision on changing a supplier or terms of a contract with existing supplier. The analysis is based on the assumption that the largest suppliers with rich trading history, highly diversified sales network, recognizable brand, good human resources report and economic power gain new customers easily.

Figure 70: Final increase or decrease in the number of consumers in 2017 in relation to the size of market share of suppliers in 2016

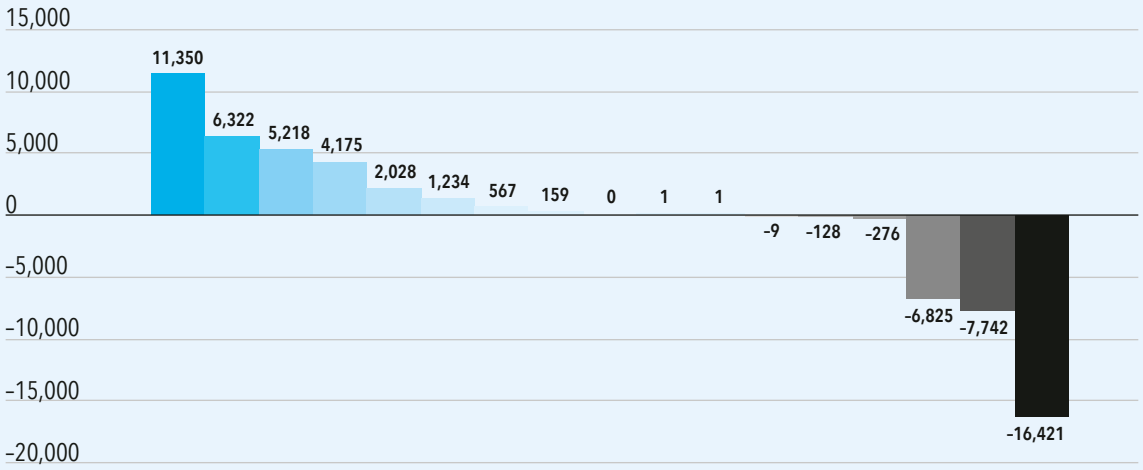


Sources: SODO, Energy Agency

Almost **20,000** consumers the largest suppliers lost in 2017

Figure 70 shows that the largest suppliers lost almost 20,000 consumers, and the second group gained most customers. The total increase or decrease in number of customers means the net increase by all suppliers in the control group (from gained consumers are deducted lost consumers).

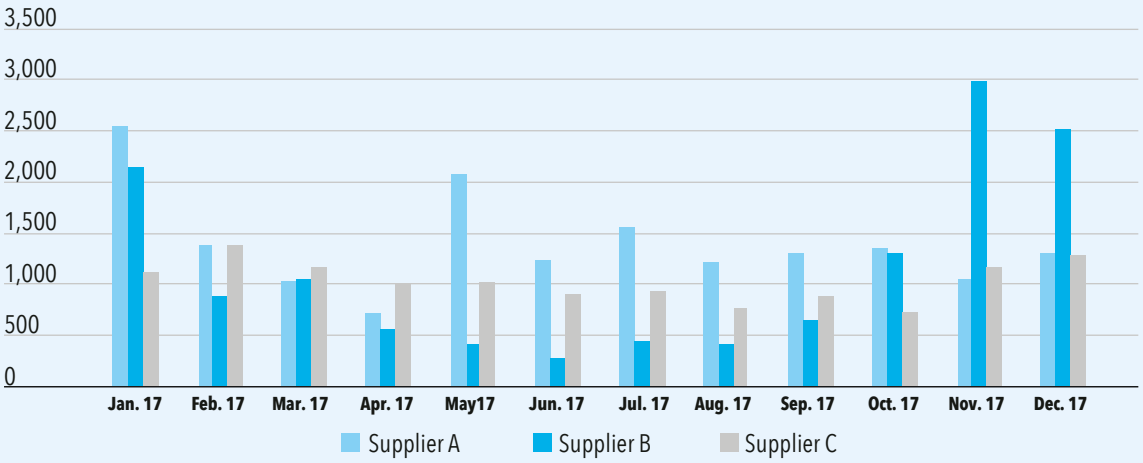
Figure 71: Final increase or decrease in number of customers in 2017 in relation to the size of market share in 2016



Sources: SODO, Energy Agency

Figure 71 shows how successful were individual suppliers included in the analysis. The most successful supplier, which gained more than 11,000 new consumers, was in 2016 according its size of the market share in 2016 ranked in group 2. Three suppliers, who in 2017 lost the most of consumers, are among the largest suppliers (group 1).

Figure 72: Acquisition of customers by months at suppliers, which in 2017 acquired the most customers



Sources: SODO, Energy Agency

Figure 72 shows the dynamic of acquiring customers by the most successful suppliers. Losses in this case are not taken into account. As we can see, the supplier C was steadily successful at gaining new suppliers throughout the year, while suppliers A and B in some months acuired more customers as in others. This may have been the result of attractive offers or increased sales activities.

We can conlcude that the size of the market share size or size of a supplier by themselves are not circumstances that put one in a favourable position to acquire new customers. The most successful suppliers are those who use creative sales ideas and provide attractive sales offers, regardless of their market share. The retail market for households in Slovenia shows enough potential for entries of new suppliers, which is also confirmed by new suppliers in recent years.

> Regardless of their market share the most successful suppliers are those who use creative sales ideas and provide attractive sales offers

Complaints

The Energy Agency monitors market effectiveness and competitiveness on the basis of consumers' complaints against suppliers. In Slovenia is established Supplier centric market model, thus, it is necessary to classify complaints by the subject to those actually related to a supplier, and others related to the DSO. In more detail, this subject is presented chapter Consumers' protection (5.1.5).

Effective data exchange in key market processes

In accordance with the third package of energy legislation the Energy Agency with the implementation of a consultation process AREDOP in areas that directly and indirectly address an effective data exchange in the market, contributes to harmonisation of data exchange processes for the most important market processes in the electricity market. The Energy Agency's strategy is based on directing market participants to use of open standards in data exchange. The use of open standards eliminates barriers for entering new participants to the market and reduce entering costs. In that way, market competitiveness is enhancing.

All key data entities in electronic data exchange must in accordance with the Energy Agency's general act base on standardized identifiers, therefore in 2017 the activities in the electricity retail market for the use of standard for the global definition of metering points continued. On the basis of available information by SODO all required activities were carried out to provide electronic data exchange from 1 January 2018 in line with Act on the identification of entities in the data exchange among participants in the electricity and natural gas markets in the following areas:

- metering points – a standard identifier GS1-GSRN will be used,
- distribution system area - a standard identifier EIC-Y will be used,
- suppliers – a standard identifier EIC-X will be used,
- products and services - a standard identifier GS1-GTIN will be used.

The deployment of the advanced metering system in Slovenia is ongoing under requirements of Regulation on measures and procedures for the introduction and interoperability of advanced electric power metering systems and Plan of the introduction of advanced metering systems in the Slovenian power system[39]. In the plan are among other things defined the system architecture, its minimum functionalities, and data exchange aspects, which will be based on relevant standards (CIM, etc.). The Regulation imposes on the DSO to establish a single access point for accessing data on advanced metering; the system, based on the aforementioned plan, is implemented as a central system for the access to metering data (CSDMP), which provides data exchange services with business entities and network users (B2B and B2C).

Implementation of a single point for accessing metering data from advanced metering infrastructure is delayed, which adversely affects development of the market and active participation of consumers

Also in 2017, the Energy Agency monitored the compliance of the advanced metering system with the requirements of legislation, the plan and the state of the art. The agency discovered major deviations from the implementation of advanced metering infrastructure in Slovenia, especially in the area of establishment of CSDMP, which has a negative impact on market development in Slovenia. Due to some open questions on development stopped activities related to public procurement of CSDMP and decided to carry out "proof of concept", within which individual solutions on the representative sample will be partially tested, and the results will be taken into account as the input elements at the next public procurement. The DSOs dedicated a lot of attention to the provision of cyber and information security at all parts of companies' operation, and especially at the advanced metering infrastructure. Distribution companies were also carrying out activities to adapt the information security systems (SUVI) to the requirements of new legislation on personal data protection and information security laid down by the European Regulation on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (Regulation (EU) 2016/679) and the proposals of Personal Data Protection Act (ZVOP-2) and Act on information security (ZIV), and Critical Infrastructure Act (ZKI).

39 https://www.sodo.si/_files/3320/Nacrt_uvedbe_NMS_SODO_07072016.pdf

3.4.2.4 Recommendations on supply prices, investigations and measures taken to promote competition

The Energy Agency monitors the retail market, cooperates with other regulatory and supervisory authorities (Market Inspectorate, Competition Protection Agency) as well as independent and non-profit organizations. It is also responsible for the updating of information on market developments, and ensures market transparency with the activities within the single point of contact. On its websites provides comparative services, which enable the comparison of supply costs based on a regular price lists.

There are many factors that influence on the retail market prices, such as wholesale prices, suppliers' procurement strategies, environmental requirements (e.g. efficient use of energy), etc.; the total cost of supply is also dependent on the network charges, levies (RES and CHP, for the market operator, energy efficiency, excise duty). Retail market prices are not regulated, therefore the Energy Agency does not give recommendations on retail prices. The exception is the price for last resort supply, which is regulated by the provisions of the Energy Act-1. The electricity DSO must automatically and without transfer windows ensure supply to final consumers connected to its system if the contract for supply is terminated because of measures resulting from the insolvency or illiquidity of a supplier, in accordance with the regulation governing the operation of the electricity market. The same acts at the request of household or small business consumer. The price of last resort supply must be made public and be higher than the market price of the supply to a comparable consumer, but it must not exceed the price by more than 25%. If the electricity DSO does not set the price of electricity for last resort supply, the price is set by the Energy Agency. The same as in 2016, no consumer was supplied under the conditions of last resort supply and no corrective measures were taken in this area.

In 2017 the majority of suppliers to the retail market did not have the supply offers based on regular price lists, which is the result of deficiencies and ambiguities of regular price list definition and its limitations. Some suppliers intentionally changed their products portfolio after the implementation of the Energy Act-1 and introduction of a regular price list, and adapt their business in a way that they do not meet the criteria of the regular price list. The comparison also exclude all new suppliers, which had entered the market and not yet acquired 1000 consumers. There are many supply offers in the market not covered by the web application for comparison of electricity supply costs, which negatively affects the transparency of the retail market for household consumers since an independent comparison of all supply offers at a single point of contact is not possible.

In the electricity market, the same rules for the prevention, restriction, and distortion of competition apply as for other goods. As it is evident from publicly available data, in 2017 the Slovenian Competition Protection Agency did not take any decision or any action against electricity market participant. In the context of a concentration assessment this agency in 2017 decided that in 2016 announced concentration of five DSOs and the company Informatika, d.d., is in line with the competition rules. The same decision was taken also in case of a concentration of companies Petrol, d.d., and Megaenergija, d.o.o, announced in 2017. The concentration of companies HSE, d.o.o., Elektro Celje, d.d., Elektro Gorenjska, d.d., and Elektro Primorska, d.d., and ECE, d.o.o., was also announced, but the decision was not taken by the end of 2017.

Act on the Identification of Entities in the Data Exchange among Participants in the Electricity and Natural Gas Market, which binds market participants to use standardized identifiers of key data entities in the electronic exchange of data in the market. The mentioned general act sets the minimum standards of identification and recommends the use of two standardized identification schemes, EIC in GS1, depending on a scope of application. The Energy Agency monitored and directed the activities of the DSO in the planning phase of the transition from the use of their own identification schemes to standardized schemes. It was also very active in monitoring the use of appropriate identification of market participants in balance schemes at market operators.

In November 2017, the Energy Agency published a consultation document Regulatory Changes for the Establishment of new market role Active consumer[40], which addressed the problem of determination and identification of metering points or point for the needs of charging the services at an active consumer.

40 https://www.agen-rs.si/zaprta/-/asset_publisher/M2GdU2jRtCxV/content/regulativne-spremembe-za-vzpostavitev-nove-vloge-na-trgu-aktivni-odjemalec?inheritRedirect=false&redirect=https%3A%2F%2Fwww.agen-rs.si%2Fzaprta%3Fp_p_id%3D101_INSTANCE_M2GdU2jRtCxV%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-1%26p_p_col_count%3D1

Among other issues the Energy Agency proposed a set of data services, which a DSO should provide to a user of advanced metering system. Data services are based on effective identification of metering points in the electricity distribution system.

Regarding the measures implemented on the basis of the third energy package for unifying the most important data exchange processes at the national and regional level the Energy Agency insists on the use of open standards and reuse of generic models of the European forum for energy Business Information eXchange (ebIX) and ENTSO-E models to the greatest extent possible. Within ebIX® in 2017 a lot of development activities were focused on the area of the harmonised electricity market role model (introduction of new roles, such as aggregator or flexibility service provider) and modelling of a data exchange process for trading with flexibility. At the national level, an expert communication on this subject is underway in IPET Section, which operates within Chamber of Commerce and Industry of Slovenia. The Energy Agency is actively involved in the work of the section, both in its management and relevant issues.

3.5 Reliability of the electricity supply

The reliability of the electricity supply to the consumers depends on the capacity of the power system and the sufficiency of production sources and energy. We can speak of the two functional aspects of the reliability of supply - sufficiency of production sources and the security of the network. The sufficiency of production sources describes the ability of all available production sources to meet the demand for electricity at any time, taking into account planned and unplanned outages of the system. In a broader sense, the sufficiency means a sufficient reserve of affordable raw materials and resources for the production of electricity.

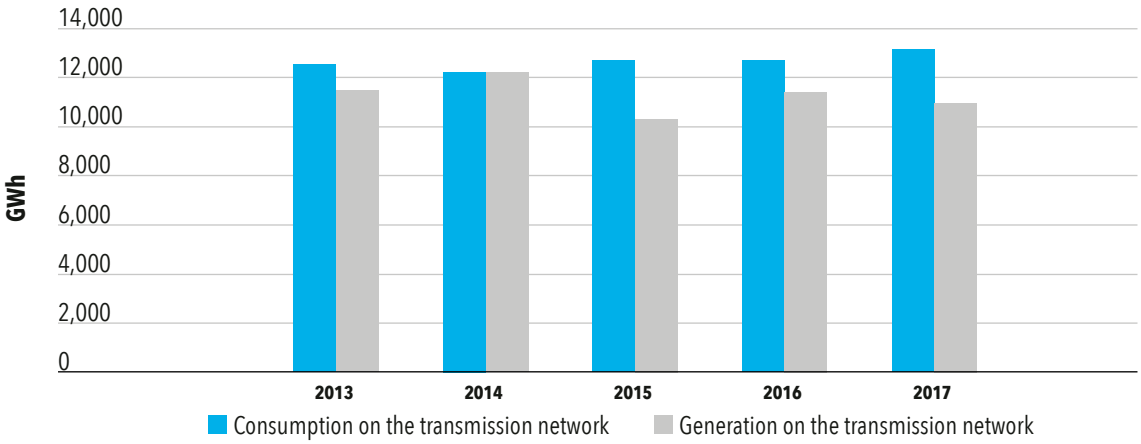
Electricity network security is the ability of the system to withstand disturbances such as outages of elements, failures, such as short circuits. In order to ensure the network security, in Slovenia the n-1 criterion is used for the transmission network, and for higher levels of the distribution networks. By using n-1 criterion, it is guaranteed that in case of an outage of any component of the system, the overloading, exceeding the limits or supply interruptions are avoided.

Under the Energy Act in the event of a sudden crisis in the energy market, and when the physical safety or security of persons, facilities or installations or power system integrity is threatened, the electricity TSO may impose measures to reduce the energy supply to certain categories of consumers, determine the order of reductions, lay down the method for using energy and determine obligatory energy production. The electricity TSO implements measures in cooperation with the electricity DSO, or by itself if the conditions for the introduction of the measures are limited to the distribution system. The method of implementation and the reasons for imposing the measures are set by the government by means of a decree, whereas a more detailed specification is made by electricity system operators within the framework of system operating instructions.

3.5.1 Monitoring balance of supply and demand

Consumption of electricity from the transmission system in recent year has been slowly increasing; in 2017 increased by around 3% in comparison with the year before. Slightly higher fluctuations of electricity demand, mainly related to nuclear power plant scheduled maintenance outages and hydrological conditions can be detected in electricity generation on the transmission system, and they affect electricity generation in hydropower plants. Multiannual trend of consumption and generation, shown in Figure 73 and which takes into account half of the generation in NPP Krško, indicates that electricity generation on the transmission network was lower by almost 4% than the year before, mainly due to lower generation in hydropower and thermal power plants, while nuclear power plant delivered more electricity than in 2016.

Figure 73: Electricity consumption and generation on the transmission network in Slovenia in the period 2013–2017



Source: ELES

3.5.2 Monitoring investment in production capacities in relation to the security of supply

When planning the scenarios of future electricity consumption in Slovenia is to the greater extent possible taken in to account the ENTSO-E methodology, which defines four visions of development. Scenarios are primarily defined by macroeconomic developments since scenarios with high objectives for the development of gross domestic product determine higher possibilities of investments related to efficient use of energy, renewable sources and other parameters that affect the scope of final electricity consumption.

New investments in conventional generation is hampered due to low electricity prices and difficult spatial planning

Table 29 shows changes to be made by the Slovenian electricity producers as expected in the development plan of the transmission network for the period 2017–2026. The positive power values in the second column indicate new production facilities or a renovation of the existing facility, where an increase in the capacity is planned, and the negative values indicate shutdowns of the concerned units or reducing of the nominal power of the unit. The sign in the last column presents the scenario or the development vision according to which the investment will be carried out. According to the current situation the most realistic scenario in V2 implying that the electricity prices continue to be too low to allow investments in conventional production sources and the economic growth in Slovenia will not be high enough for large investments in RES. The results of the analysis of the system operator for the period 2017-2026 show the deficit of domestic production by all four scenarios at the similar level, which is mainly a consequence of the uneconomical operation of available domestic production.

For the next ten-year period the second unit of nuclear power plant is not on the list of planned production units since the investor expects its integration only after 2030, and the decision on building has not yet been taken.

Table 29: Changes to the generation facilities on the transmission system by 2026

	Installed capacity (MW)	Expected year of change	Scenario
Hydroelectric power plants			
HPPs on the Drava River			
PSHPP Kozjak	403	2025	V4
HPPs on the Mura River			
Ceršak	20	2025	V4
Hrastje Mota	20	2022	V4
HPPs on the Sava River			
Mokrice	28	2020	V3,4
Moste 2, 3	47	2020	V3,4

	Installed capacity (MW)	Expected year of change	Scenario
Suhadol	44	2025	V3,4
Renke	35	2023	V3,4
HPPs on the Soča River			
Učja	34	2022	V4
Thermoelectric power plants			
TPP Šoštanj			
Unit IV	-248	2023	V1,2,3,4
TPP Brestanica			
TPP PB 1-3	-63	2018	V1,2,3,4
GU VI	53	2018	V1,2,3,4
GU VII	50	2021	V2,3,4
TPP GU VIII-IX	100	2026	V3,4
TE-TO Ljubljana			
Unit I, coal	-39	2020	V1,2,3,4
Unit II, coal	-39	2020	V1,2,3,4
Unit CCPP	123	2019	V2,3,4

Source: ELES

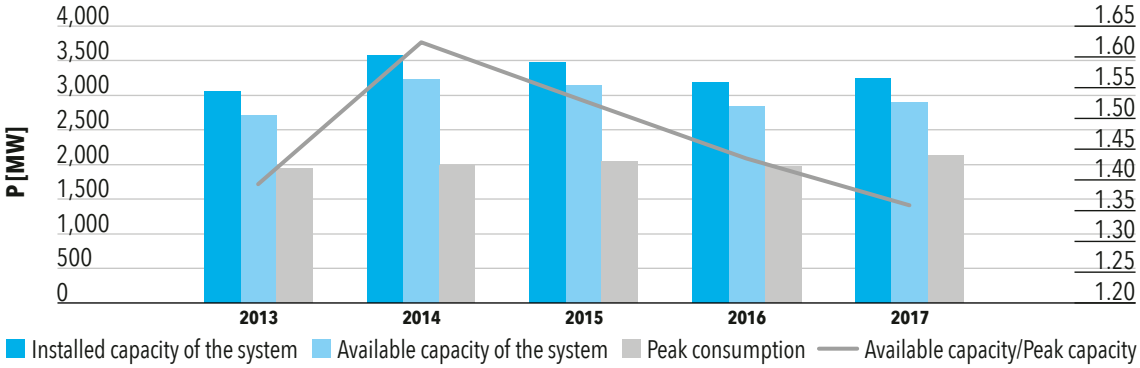
3.5.3 Measures to cover peak demand and shortages of electricity

The ratio between the installed capacity or available capacity of production sources and peak power is the indicator of the availability of adequate production sources. The system must have at its disposal enough power to cover demand and reserve power at normal operation, and in the event of unforeseen circumstances. The ratio between the available capacity and peak load in 2017 slightly decreased despite the increased installed capacity of production sources on the transmission system mainly due to significantly higher peak load.

Figure 74 presents the values of peak demand, installed capacity and available capacity, and the ratio between the available capacity and peak demand on the transmission system for the Slovenian market for the period 2013-2017. The difference between the installed capacity of the production facilities and actual available capacity represents one half of the power from the Krško power plant, which belongs to Croatia.

Changes in peak load fluctuations in the transmission system are mainly the result of economic activities and meteorological deviations. In general, peak loads occur in the evenings during winter. In 2017, a significant increase in peak load occurred on 10 January at 7:00 pm, during extremely cold weather.

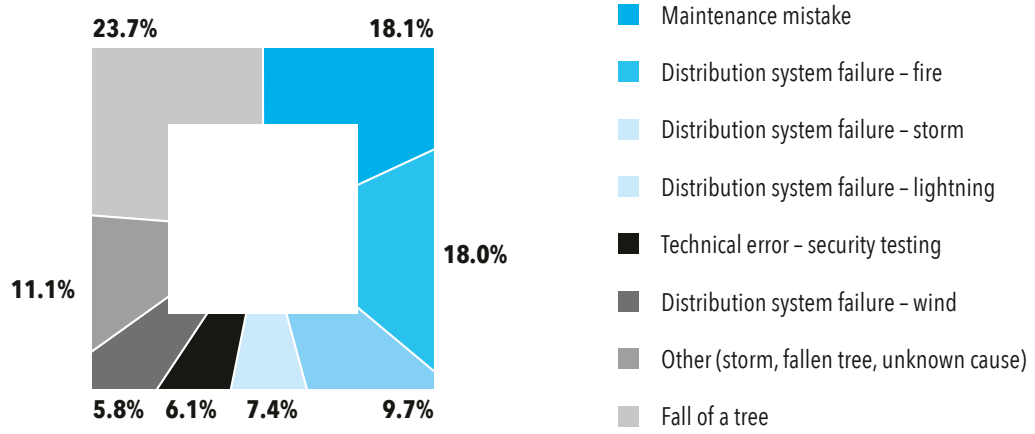
Figure 74: Installed capacity of production facilities, available capacity for the Slovenian market and peak consumption, and the ratio between the available and peak consumption on the transmission network in the period 2013-2017



Source: ELES

The volume of unsupplied electricity to the transmission system in 2017 was higher than the year before and amounted to 77.64 MWh. This was mainly related to supply failure caused by the fall of a tree to 110 kV pipelines, circuit breaker fire, and a maintenance mistake. Unsupplied electricity is calculated in accordance with Act on the Rules for Monitoring the Quality of Electricity Supply, therefore it should be mentioned that actual volumes of unsupplied electricity may be lower than indicated since a significant share of consumers in the affected areas could be supplied by the medium-voltage network.

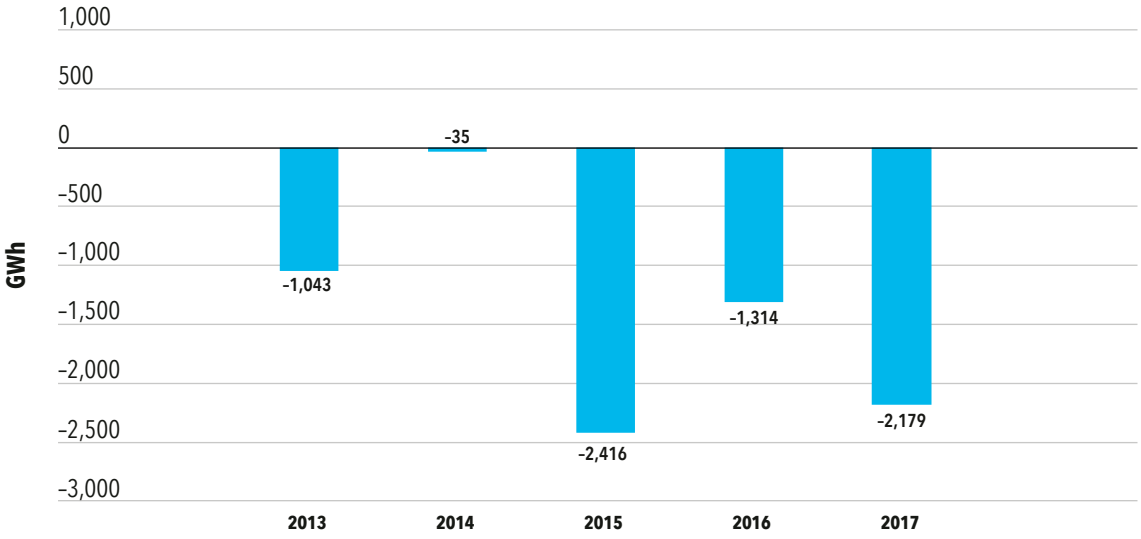
Figure 75: Unsupplied electricity from the transmission system with respect to the causes



Source: ELES

In 2017 we recorded one of the largest deficits in covering the demand for electricity on the transmission system in recent years since import dependency amounted to 17.1%, which is almost twice as much than multi-year averages. The reason for this is mainly in increased electricity consumption from the transmission system and at the same time lower production in thermal and hydroelectric power plants, connected to the transmission system. Nevertheless, the electricity supply was not at risk despite shortages, as the Slovenian transmission system is well connected with neighbouring power systems of Austria, Italy, and Croatia; net transfer capacity at borders next to the management of electricity flows also enable the security of domestic supply.

Figure 76: Surpluses and deficits of electricity on the transmission system in the period 2013–2017



Source: ELES

4

NATURAL GAS

Natural gas consumption on the Slovenian market in 2017 has increased for the third consecutive year. Increased consumption was observed in all consumer groups. Number of consumers connected to the distribution network increased and was, compared with the previous year, higher by 19%.

28
active suppliers of natural gas in 2017, six of them newcomers

5.5%
lower gas price for households in the second half of 2017 compared to the same period last year

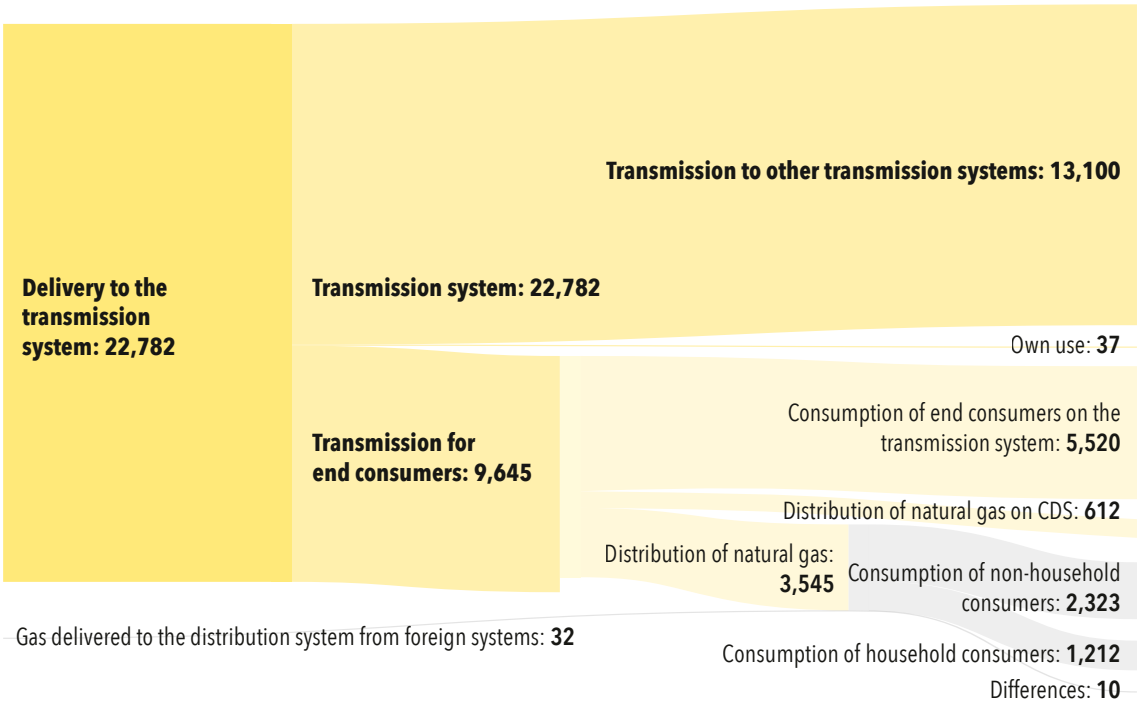
4.1 The balance of natural gas supply and demand

In 2017, through the transmission system, 2,114 million Sm^3 or 22,745 GWh of energy were transferred, which is almost 2% less than the previous year. Gas transmission to neighbouring countries or foreign transmission systems decreased by almost 5% in comparison with the previous year, and the transfer for Slovenian consumers increased by more than 3%.

Natural gas consumption on the Slovenian market in 2017 has increased for the third consecutive year and amounted to 900 million Sm^3 or 9678 GWh. Increased consumption was observed in all consumer groups. Volumes of natural gas distributed in closed distribution systems were until 2017 recorded as consumption of final consumers on the transmission system, and from 2017 as consumption of final consumers in closed distribution systems.

Consumption of final consumers connected to the transmission system, and consumers on three closed distribution systems, which were in 2016 recorded as consumers from the transmission system, increased by 3.5%. For consumers, connected to the distribution systems, more than 3.6% more gas was delivered as in the previous year. Higher consumption was a result of various factors, such as weather conditions with annual temperature deficit, reliable supply with competitive natural gas prices, favourable economic conditions, and other individually determined factors.

Figure 77: Delivered, distributed and consumed quantities of natural gas in GWh



Source: Energy Agency

Differences between distributed quantities of natural gas and delivered gas to the distribution systems are mainly the results of used measurement techniques, which at consumption points of final consumers generally do not allow acquisition of data on consumption at the or simultaneous control of quantities at the entry and exit from the systems. Other reasons for differences may also be prescribed tolerance limits of maximum permissible errors of measuring instruments and existing method for determination of distributed quantities for consumption points whose measurement devices are read only once a year.

At the end of 2017, 133,630 end consumers were connected to the natural gas transmission and distribution systems.

Distribution of natural gas was carried out by 15 natural gas DSOs and three operators of closed distribution systems.

Table 30: Number of consumers according to consumption type in 2016 and 2017

Number of consumers according to consumption type	2016	2017	Index
Business consumers on the transmission system	132	135	102.27
Business consumers on distribution systems	13,724	13,782	100.42
Business consumers on closed distribution systems	34	35	102.94
Household consumers	119,583	119,678	100.08
Total	133,473	133,630	100.12

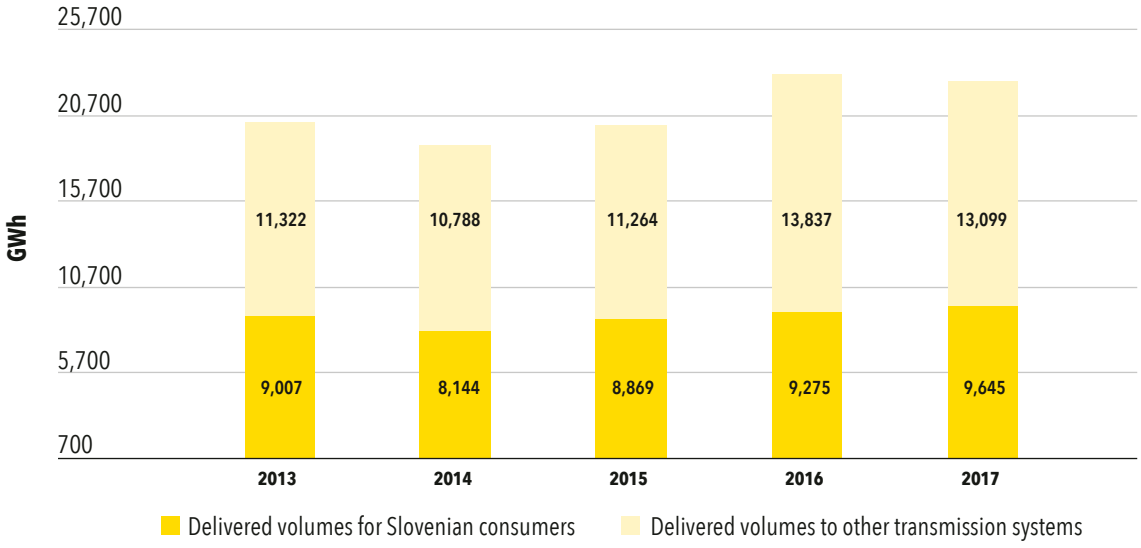
Source: Energy Agency

4.1.1 Prenos zemeljskega plina

The transmission system is owned and operated by the TSO, the company Plinovodi, d.o.o. It consists of 947 kilometres of high-pressure pipelines with a nominal pressure of more than 16 bars and 211 kilometres of pipelines with a nominal pressure less than 16 bars. The transmission system also consists of 200 metering-regulation stations, 42 metering stations, seven reducing stations, and compressor stations in Kidričevo and Ajdovščina. The Slovenian gas transmission system is connected to the gas transmission networks of Austria (Ceršak MRS), Italy (Šempeter MRS) and Croatia (Rogatec MRS). Border points are at the same time relevant points of the transmission system. The fourth relevant point is the exit point in Slovenia. Gas trading on the wholesale market is carried out in the virtual point.

In 2017, the gas TSO had transferred 9645 GWh of natural gas for consumers in Slovenia, almost 3% more than the year before. Transmission of gas to other transmission systems in comparison with 2016 decreased by almost 5%.

Figure 78: Delivered natural gas volumes

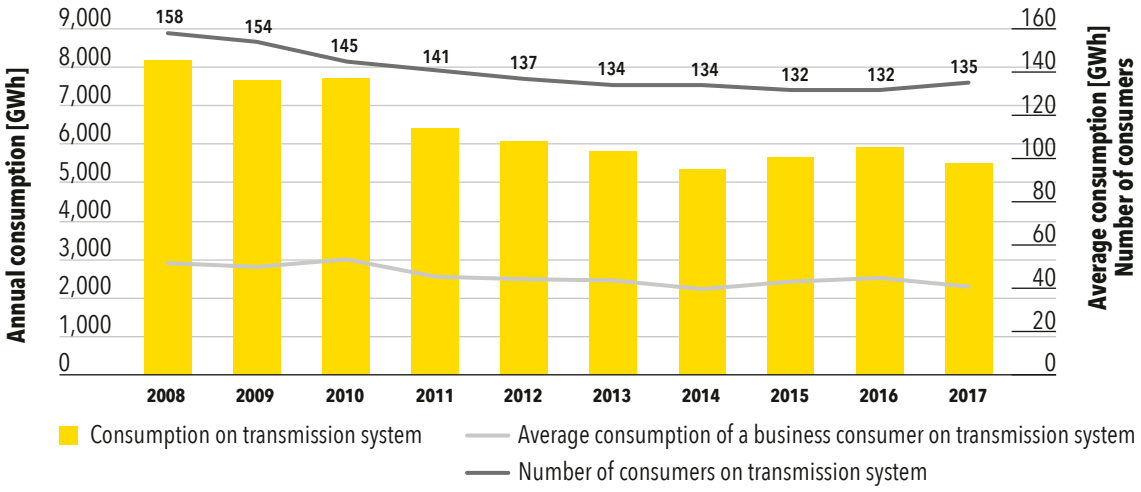


Sources: Energy Agency, Plinovodi

Seven new industrial consumers were connected to the transmission system. Two were disconnected due to bankruptcy, and two transferred their delivery contract to two existing users. In total, the number of end consumers increased by three to 135 at the end of the year.

Lower consumption of business consumers on transmission system in 2017 is the result of exclusion the volumes on three closed distribution systems, whose operators were last year treated as end users on the transmission system. If take into account consumed gas on closed distribution systems along with consumption on the transmission system, the consumption on annual level increased by 3.5%.

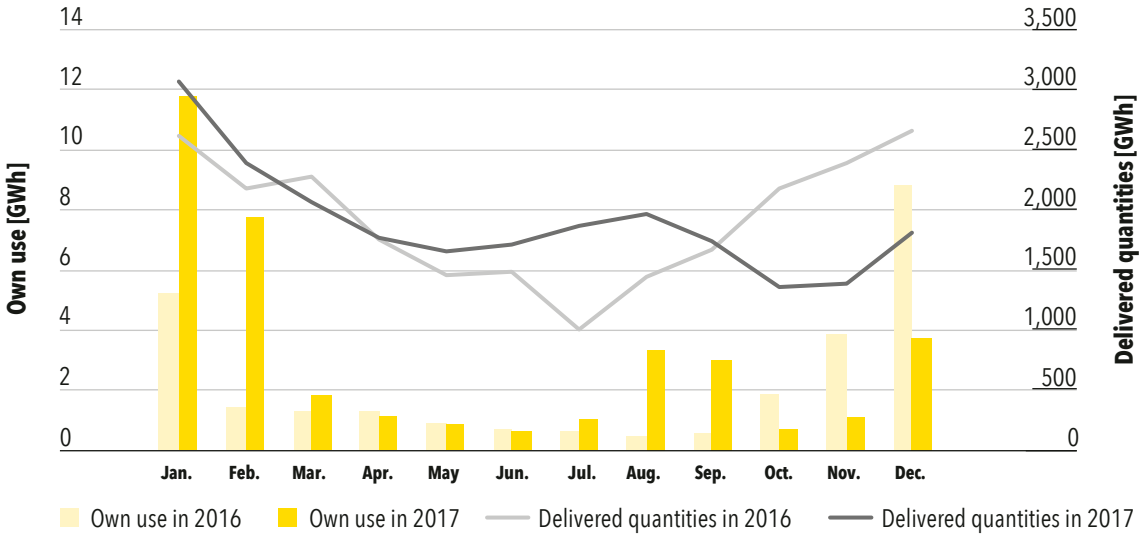
Figure 79: Total and average consumption of a business consumer and number of consumers on the natural gas transmission system



Sources: Energy Agency, Plinovodi

Gas TSO used for operation of compressors in both compressors stations 36.8 GWh of natural gas, or 36% more than the year before. According to quantities delivered volumes for own consumption amounted to 16‰ (per mille) and the year before 12‰ of all delivered volumes. Increased own use in individual months reflects bigger consumption of compressor due to transfer of larger quantities of gas or more activities for balancing the transmission system.

Figure 80: TSO's own consumption of gas and delivered quantities



Sources: Energy Agency, Plinovodi

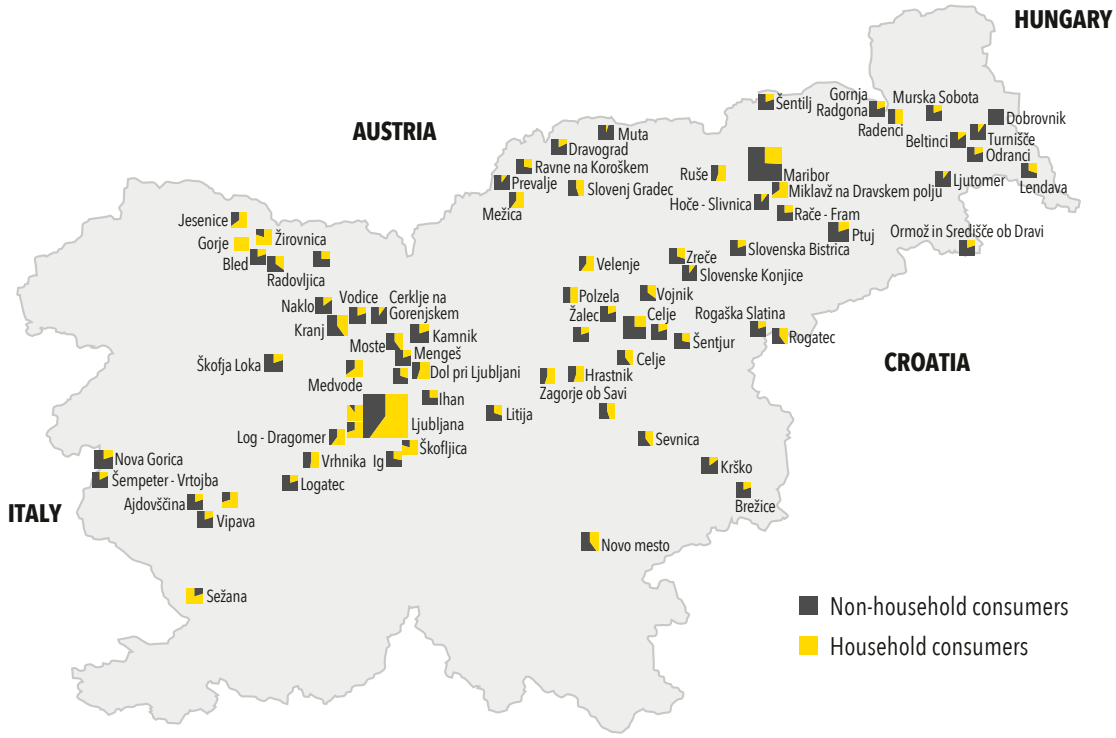
3,535 GWh
of distributed energy is the highest amount of natural gas since the beginning of the distribution

4.1.2 Distribution of natural gas

Distribution of natural gas is carried out as a service of general economic interest by a DSO for general consumption of gas in towns and settlements and for distribution of gas to industrial and business consumers on closed distribution systems (CDS). In 2017, for the first time 35 consumers were recorded in the areas of three CDS in Jesenice, Kranj and Kidričevo; the consumption of them was in the previous year treated as consumption on the transmission system.

On these systems distribution of natural gas is not performed as a service of general economic interest. To consumers in these areas 612 GWh of natural gas were distributed. Access to CDS is only available to customers within closed area of these systems.

Figure 81: Natural gas distribution systems by the distributed amount of gas



Source: Energy Agency

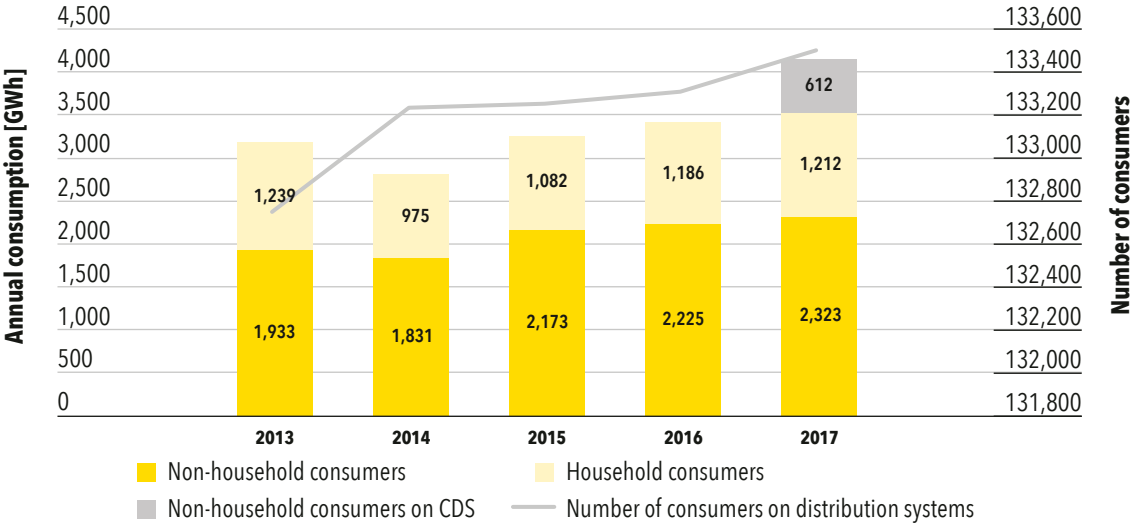
The content and data following, where is not explicitly stated that refer to CDSs, describe distribution areas with organized local service of general economic interest. In 2017, natural gas distribution was carried out in 79 municipalities within the majority of urban areas in Slovenia, except on Primorska Region. In these municipalities a service of gas DSO was performed by 15 undertakings. In 64 municipalities this service is organized with concession contract between a concessionaire and local community, in 14 is carried out by public undertakings, and in one municipality service of general economic interest is implemented in the form of investment of public funds in the private law activities. In four areas of the municipality of Šenčur the service of general economic interest was carried out by two DSOs on the basis of concessionary agreements concluded with the municipality. Concession for implementing activities of DSO was awarded already to some areas in new municipalities, but gas distribution was not possible yet since distribution systems have not yet been built or ready for use. Gas DSOs in 2017 distributed almost 329 million Sm^3 of gas or 3,535 GWh of energy, the highest distributed amount of gas since the beginning of gas distribution in Slovenia. In comparison with 2016 the amount of distributed gas increased by 3.6%. Consumption of household consumers increased by almost 2%, and non-household consumers used 4.4% more gas than the year before. A part of higher increase can be with great probability attributed to weather conditions and also to changed structure of consumers. In 2017, the same as in 2016, the number of household consumers in groups CDK1 and CDK2 with annual consumption up to 5,000 kWh, while the number of those with annual consumption between 5,000 and 50,000 increased. The most notable was the decrease in number of consumers using natural gas only for cooking or cooking and preparation of sanitary hot water.

15%
more natural gas was supplied than five years ago

Industrial and business customers consumed on CDS 612 GWh of natural gas.

Consumption of household and non-household consumers on distribution systems and closed distribution systems, as well as number of consumers by the consumer and system type for the last five years are presented in Figure 82.

Figure 82: Consumption of household and non-household consumers on distribution systems and closed distribution systems according to the type of consumption and number of active consumers

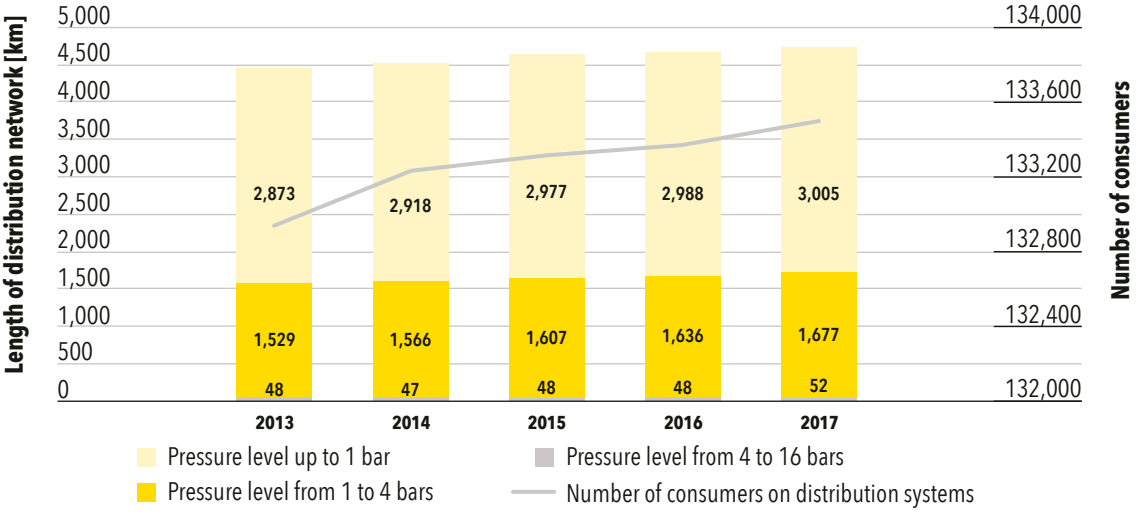


Source: Energy Agency

The length of distribution network did not increase significantly. At the end of the year was the total length of active pipelines of distribution systems and closed distribution systems 4,734, this is 1.3% more than the year before. Distribution pipelines with related infrastructure are mainly owned by DSOs. In areas of three CDS 7.5 kilometres of pipelines were activated, of which 3.5 kilometres with pressure level from 4 to 16 bars, around 2 kilometres (1 to 4 bars) and one kilometre with pressure level up to 1 bar.

Length of distribution networks and closed distribution networks by pressure levels, extension of pipelines and increase in number of consumers in the period 2013–2017 are shown in Figure 83.

Figure 83: Length of distribution networks, closed distribution networks, and number of active consumers



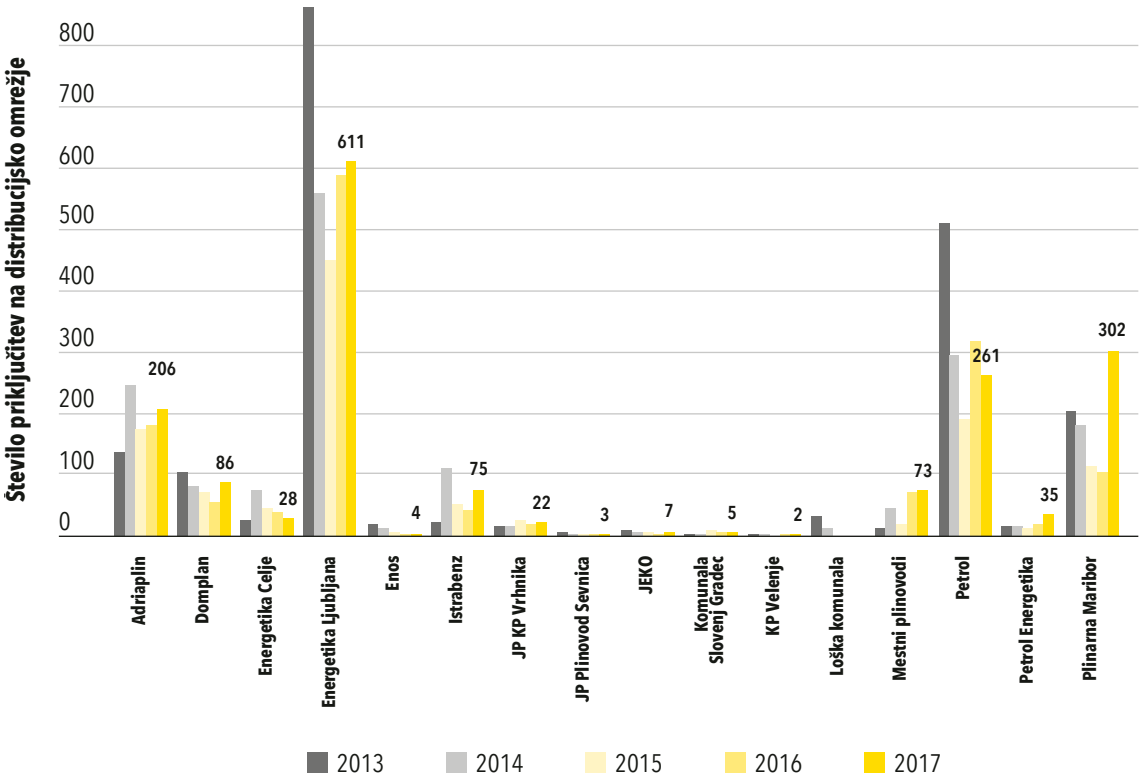
Source: Energy Agency

DSOs connected 1,720 consumers to the distribution network. The number of connections increased for the second consecutive year and was by 19% bigger than the year before. Due to simultaneous disconnections the total number increased by 153, and at the end of the 2017 there were 133,460 consumers connected to the distribution systems. On closed distribution systems additional 35 consumer were supplied with gas, while one new connection to these systems was registered in 2017.

Regrowth of the number of connections is probably the result of favourable prices of natural gas and competitiveness of natural gas supply.

133,495
end consumers connected to distribution and closed distribution systems

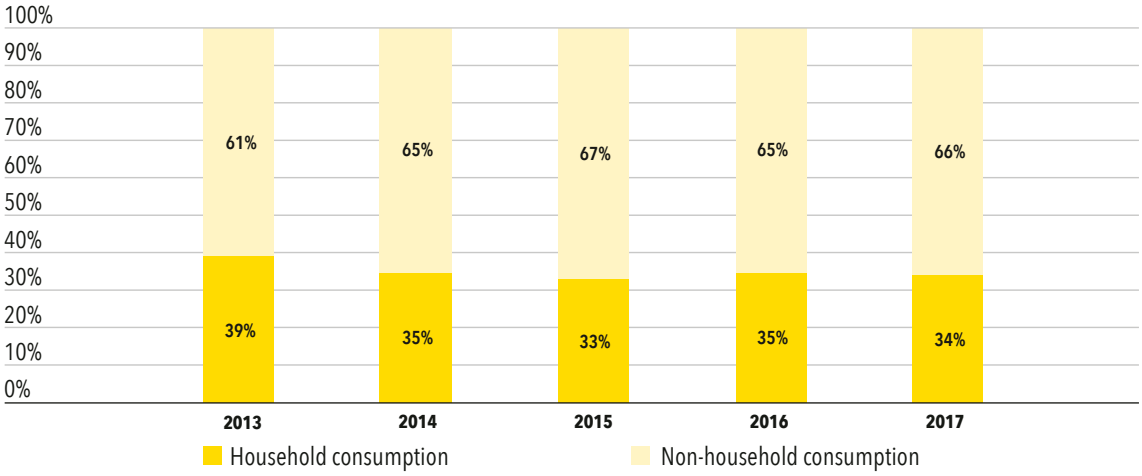
Figure 84: Number of new consumers on distribution systems in the period 2013–2017



Source: Energy Agency

The structure of customers in 2017 did not change. In the last five-year period household consumers account for around 90% of all consumers on distribution systems. Also data on distributed amounts of natural gas in 2017 do not show significant change in shares of household and non-household consumption. The share of household consumption decreased by 34%, the remaining 66% of quantities were distributed to non-household consumers.

Figure 85: Share of consumed natural gas from distribution systems for household and non-household consumers



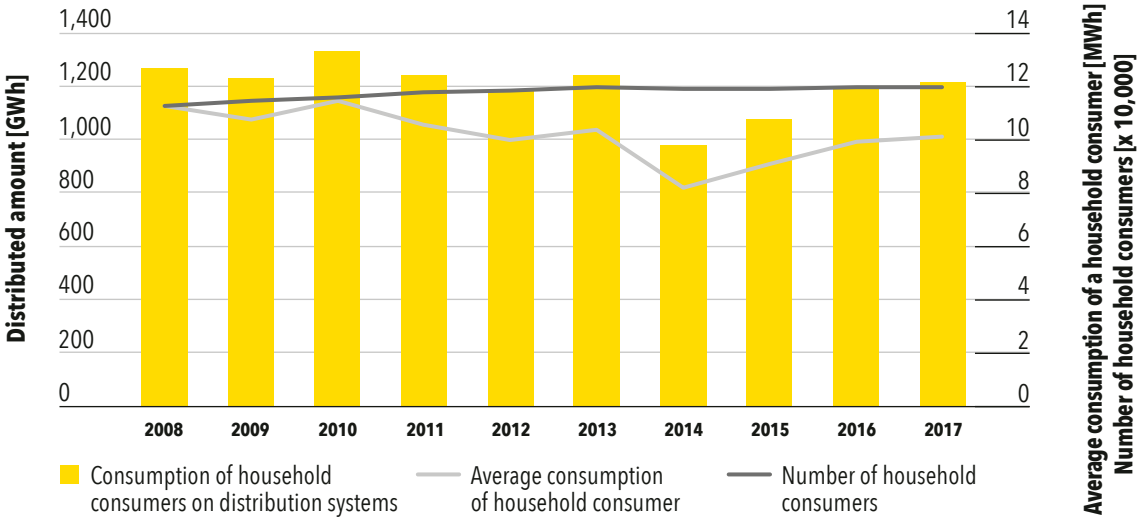
Source: Energy Agency

Household consumers use natural gas mainly for cooking, sanitary hot water, and heating. Similarly to the previous period also in 2017 more than 96% of all consumers had annual consumption up to 48,461 kWh of energy (or 4,500 Sm^3). More than 90% of consumers in a year consumed less than 26.923 kWh of energy or up to 2,500 Sm^3. The share of consumers with annual consumption more than 48,461 kWh amounted to 3.6% of all consumers, and their consumption accounted for as much as 66.7% of total consumption of all consumers connected to the distribution network,

4%
less gas was consumed by household consumers than ten years ago

Total and average household consumption of natural gas and number of consumers during the period 2008–2017 is shown in Figure 86. The number of consumers in groups CDK1 and CDK2 with the lowest annual consumption decreased, while the number of consumers in other groups with higher annual consumption increased. Due to that fact, the average consumption on distribution systems increased, which benefits utilization of the network.

Figure 86: Total and average consumption of household consumers on distribution systems

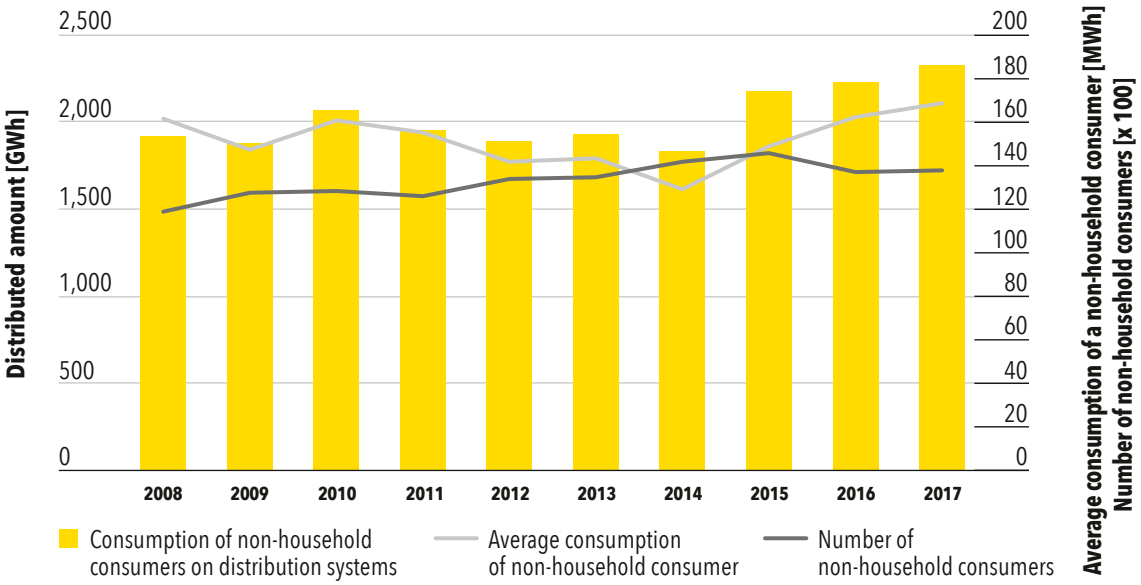


Source: Energy Agency

Non-household consumers use gas also for cooling, technological and production processes and other other types of uses. Figure 87 shows the consumption and number of non-household consumers. The number of non-household consumers only slightly changed, their number increased by 0.4%. Annual consumption increased by almost 4.5%, thus, reached peak consumption since the start of using gas in Slovenia.

21%
more gas used non-household consumers than ten years ago

Figure 87: Total and average consumption of non-household consumers on distribution systems



Source: Energy Agency

From CDSs no gas was supplied to household consumers. Customers, connected to CDSs, on average used much more gas on annual level in comparison with consumers on distribution systems. In the areas of CDS the average annual consumption of 17.5 GWh represented around 43% of avergae consumption of consumers on transmission system. The majority of gas in the areas of CDS was used for technological and production processes of industrial consumers.

4.1.3 The use of compressed and liquefied natural gas and other gases from distribution systems

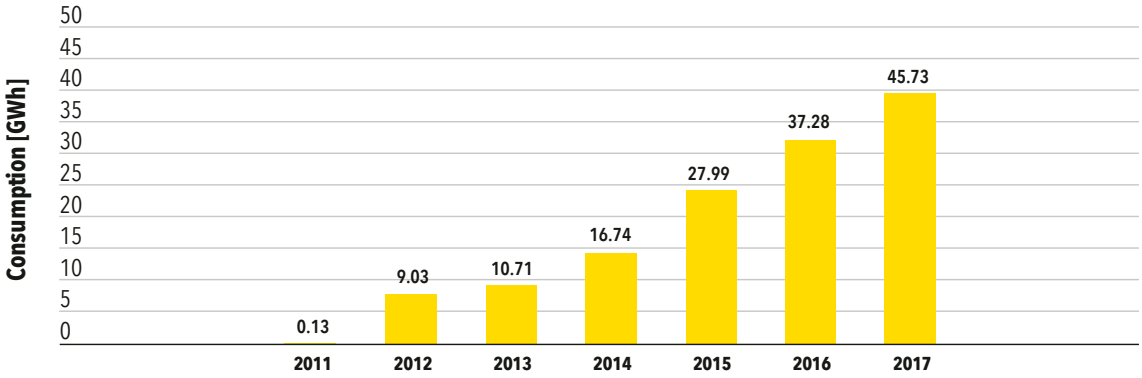
4.1.3.1 Compressed natural gas in transport

Compressed natural gas (CNG) in transport can be used as a fuel source for personal, delivery and goods vehicles, and public bus transport vehicles, especially for short and medium distances. In Slovenia there are four charging stations, one in Jesenice, two in Ljubljana and one in Maribor. Existing stations could supply up to 4,000 vehicle. Construction of additional ones is planned for 2018.

In October 2017, the Government adopted the Strategy on alternative fuels infrastructure in transport in the Republic of Slovenia, which among other things determines the measures to achieve the national goals related to charging stations for CNG in congested areas and motorway network. The measures envisaged include subsidizing appropriate number of publicly available charging stations, informing the public about the implemented infrastructure, benefits and effects of using this type of gas, maintaining tax relief compared to other fossil fuels and subsidizing the purchase of vehicles. By consistently implementing measures planned, we can expect the establishment of an infrastructure to such an extent that this alternative fuel will become more recognizable and interesting for use by potential users, and also that at retailers there will be available a greater range of serial vehicles on compressed natural gas.

Total consumption of CNG in transport in 2017 in comparison with the previous year increased by almost 800,000 Sm³ or 8.5 GWh. Total annual consumption reached almost 4.25 million Sm³ or 45.7 GWh. Increased consumption was recorded in the area of Ljubljana, while annual consumption in Maribor and Jesenice slightly decreased in comparison with 2016. Increased use of CNG in transport contributed to reduce pollutant emissions, while simultaneously providing users with cheaper fuel compared to conventional fuels. Taking into account the retail price for a kilogram of compressed gas in Ljubljana, which was 0.92 euros, and vehicle manufacturer's data on average consumption in 2017 costs for 100 kilometres of distance travelled by a passenger car (urban conditions), for example, Volkswagen Golf TGI, was between 4 and 4.5 euros, and less than 3 euros outside cities; for users travelling a lot, such consumption provides high cost-effectiveness. Annual consumption of CNG in public charging stations is shown in Figure 88.

Figure 88: Consumption of CNG in transport in the period 2011–2017



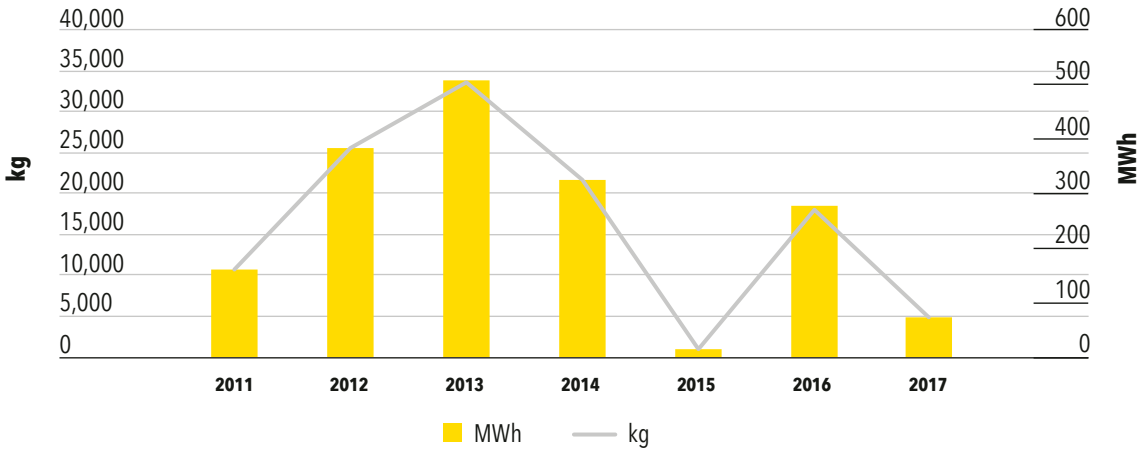
Source: Energy Agency

4.1.3.2 Liquefied natural gas

Liquefied natural gas (LNG) is used for temporary supply of gas systems, which have been disconnected from the supply of natural gas due to failures or maintenance work. It is also suitable for regular supply of consumers in geographical areas to which transmission or distribution networks have not yet been built. In transport, LNG is used as an alternative fuel for the supply of heavy-duty motor vehicles for long distances and shipping.

In 2017, in Slovenia LNG was used for temporary supply of natural gas consumers due to planned or unplanned works on the networks. The quantities used were relatively small. Sold quantities by individual years are shown in Figure 89.

Figure 89: Sales of liquefied natural gas in the period 2011–2017



Source: Energy Agency

The strategy adopted in October 2017 also for LNG envisages the implementation of the same measures as in the case of CNG with the aim of promoting the use of LNG in transport.

At the end of November 2017, the first charging station for LNG was opened in Ljubljana, making an important step towards introducing this type of alternative fuel in transport in Slovenia, as well as in pursuing the aims of Directive on the deployment of alternative fuels infrastructure (TENT-T). Directive envisages implementation of refuelling points for LNG along the main traffic flows every 400 kilometres.

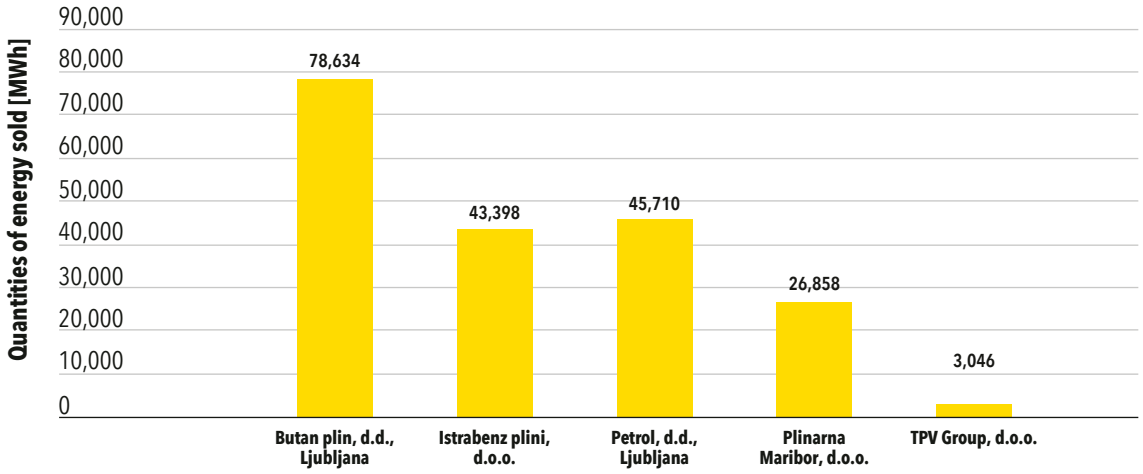
In 2017, LNG was not yet used in transport. Given the average annual kilometres driven by heavy-duty motor vehicles and planned incentive measures, we can expect that first users will quickly recognise new opportunities offered by the use of this alternative fuel.

4.1.3.3 Other energy gases from distribution systems

Distribution of other energy gases (energy gases used as a fuel, other than natural gas) from distribution systems from isolated distribution systems was in 2017 in Slovenia carried out by five DSOs. Primarily, propane (C3H8) and propane-butane mixture (C3H8-C4H10) were distributed. Distribution of other energy gases was carried out in 160 distribution systems in 120 Slovenian municipalities. In 117 municipalities DSOs of 151 distribution systems carried out the activity as a commercial distribution, while in the remaining nine distribution systems in nine local communities the supply was performed as an optional local service of general economic interest.

In 2017, 8,620 consumers were supplied from the distribution systems for other energy gases, and energy value of distributed gases amounted to 46 GWh. The total length of distribution systems in 121 municipalities was 17.6 kilometres. DSOs according to the energy value of distributed gas in 2017 are presented in Figure 90.

Figure 90: Quantities of other energy gases in 2017 by DSOs



Source: Energy Agency

4.2 The regulation and regulated services

4.2.1 Unbundling

In 2017 in Slovenia the service of general economic interest of gas TSO was performed by one entity and a service of general economic interest of gas DSO was carried out by 15 entities.

The gas TSO, the company Plinovodi, owns the assets with which performs its activity, and it is certified and appointed as an independent transmission system operator. Due to change of legal form of the company Geoplin, d.o.o. the gas TSO since 28 June 2017 is no longer 100% owned by the supplier. The owner of the gas TSO became the company Plinhold, d.o.o. which operates as a holding company, predominantly owned by the Republic of Slovenia. Because of the mentioned changes the Energy Agency in 2017 initiated a supervision procedure to examine, in particular, the composition of gas TSO supervisory board.

For gas DSOs legal separation of activities is not required since the number of connected consumers does not exceed 100,000.

System operators are required to prepare annual financial statements according to the Companies Act and submit to audit and make public as it is for large companies required by the Companies Act.

Since the operators of distribution systems were also engaged in other energy and market activities must, therefore, they prepared separate accounting statements.

In the notes to the audited financial statements, the DSOs must disclose the criteria for the allocation of the activities identified by the internal company's acts and that were used in the preparation of separate financial statements. Audited annual reports have to include the rules used for the production of separate accounts by energy-related activity. The use of the listed rules for producing separate accounts has to be examined by an auditor. System operators must submit to the Energy Agency audited annual report and special report by the auditor within eight days of receipt of auditor's report or no later than six month after the end of the calendar year.

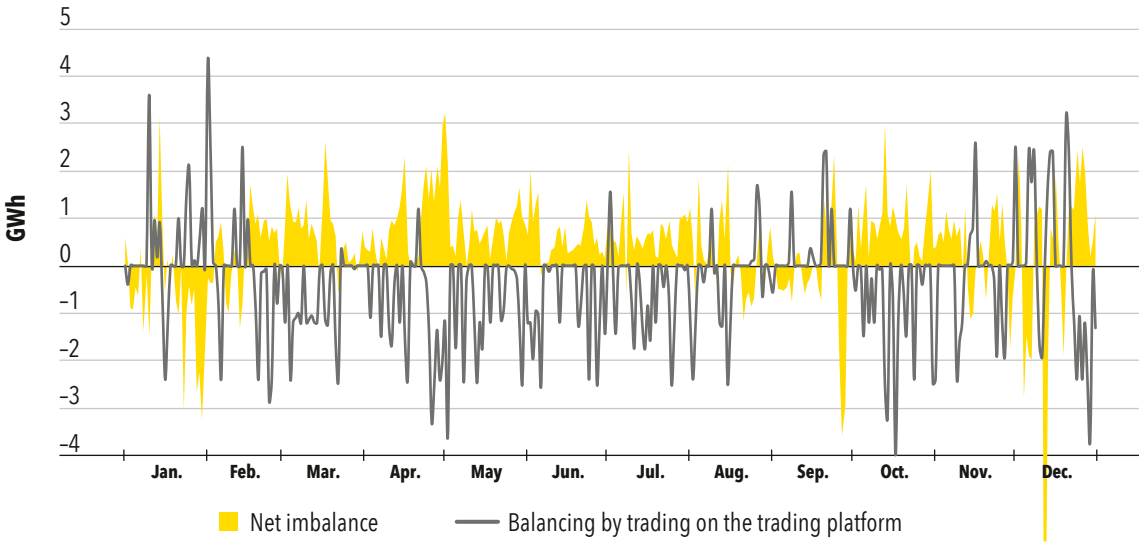
4.2.2 Technical functioning

4.2.2.1 Balancing services

In 2017, the number of registered leaders of balance groups increased by six members. At the end of the year, there were 23 of them, of which seven in the Slovenian balancing market were regularly active, the same as the year before. Six of them were active from one to three months, eight of them only transferred gas through Slovenia, and two were inactive. The gas TSO through buying and selling natural gas on trading platform and with an annual contract on balancing took care for balancing the system and charged for imbalance. The entire transmission system is one balancing zone; imbalances are determined on a daily basis and calculated monthly for each gas day.

Imbalances of balance groups' leaders in 2017 were marked by above-average cold January, announced four-day complete shut-off of the gas flow through Ceršak in September and the accident in Baumgarten in Austria on 12 December 2017. The consequences of these events were the large negative imbalances of the majority of balance groups' leaders. With trading on trading platform and dynamic control of pressure conditions, the gas TSO managed to ensure normal operation of the transmission system. The balancing service had to be used only in January, when, in accordance to the annual agreement on balancing, purchased 2.1 GWh of gas, and in December, when it sold 2.2 GWh of gas from the transmission system.

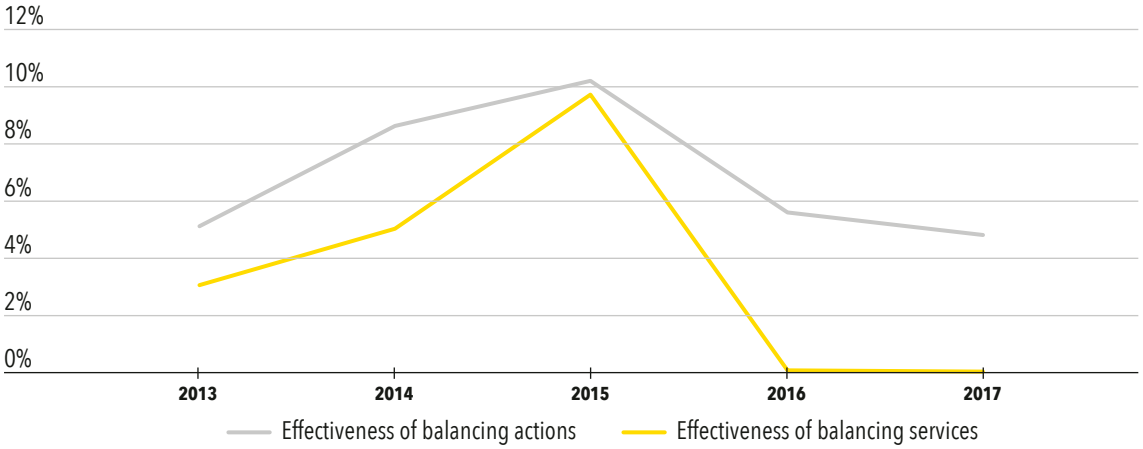
Figure 91: Net imbalance of balance groups' leaders and traded volumes on trading platform



Sources: Energy Agency, Plinovodi

Despite circumstances and events that resulted in large negative imbalances, on average, the volumes for imbalances were compared with previous years lower, since the amounted only to 4.8% of the volumes consumed by Slovenian natural gas consumers. Indicators of how successful are daily balancing actions and balancing services were the best in the last five years (Figure 92, the lower value of the indicator means a better result). Balancing improvement is the result of the new rules introduced by the European regulation in October 2015. With the establishment of market mechanisms and the possibility to correct forecasts, the new rules made it possible to increase flexibility of balance groups' leaders to balance their portfolios.

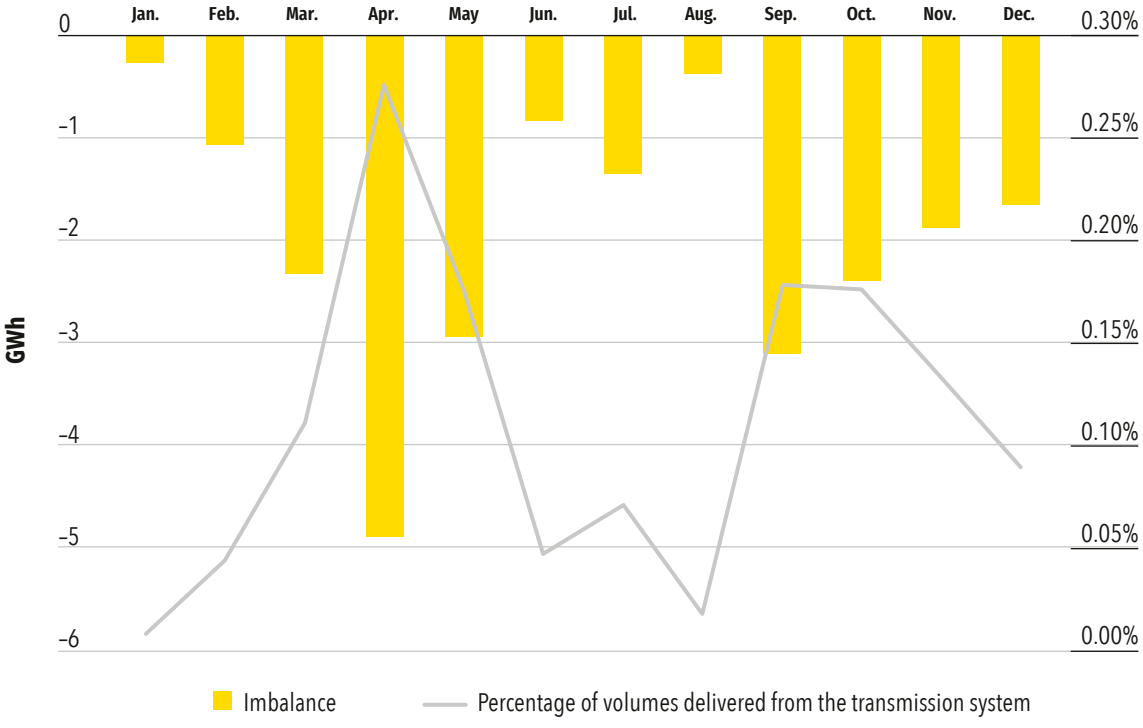
Figure 92: Effectiveness of balancing actions and balancing services



Source: Energy Agency

In 2017, gas imbalances accounted for 22.9 GWh. They were negative in all months.

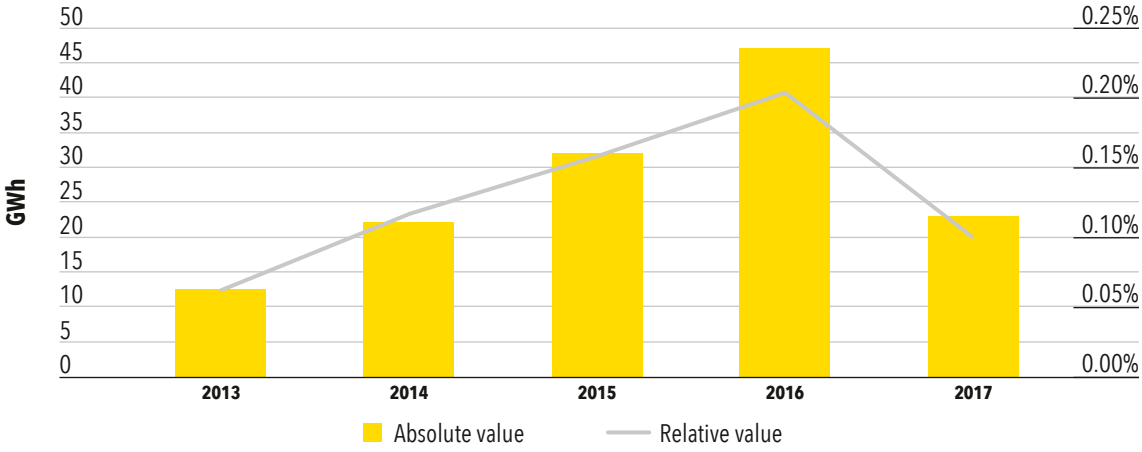
Figure 93: Imbalance in 2017 by months



Sources: Energy Agency, Plinovodi

After three years of growing imbalances, they fell in 2017 and were approximately half that of the year before. In relative terms, imbalances represented one per mille of all dedicated quantities from the transmission system.

Figure 94: Absolute value of imbalance in GWh and relative value in percentages



Sources: Energy Agency, Plinovodi

4.2.2.2 The secondary market for transmission capacity

Trading in the secondary market was carried out at borders entry point Ceršak and exit point Rogatec. Trading at entry point accounted for 87% of all subleased capacity and 59% of all signed contracts on subleased capacity.

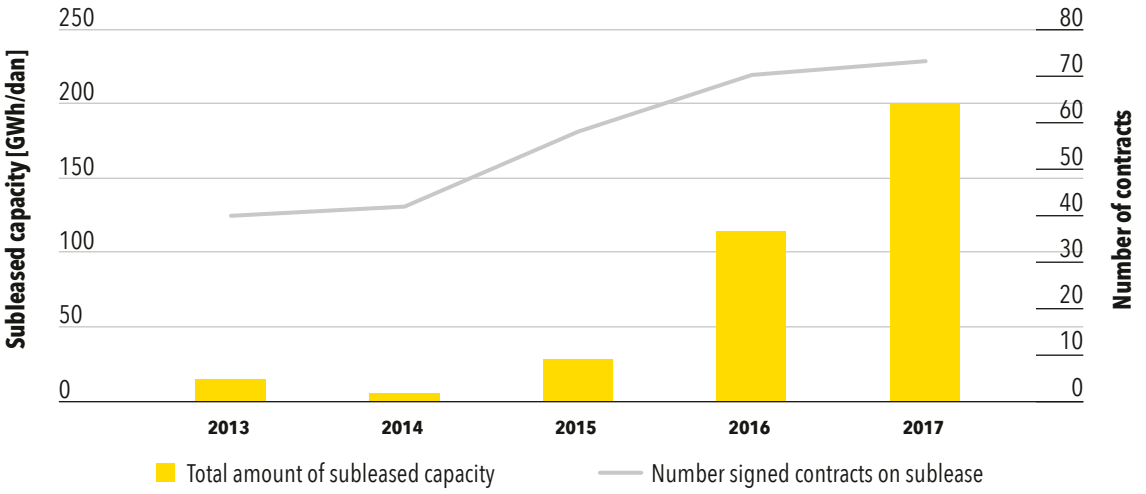
Table 31: Trading of transmission capacity in the secondary market

	Border entry points	Border exit points
Number of transmission capacity providers	8	5
Number of bids	43	30
Total amount of offered capacity in v kWh/day	173,258,520	26,496,096
Number of enquirers for capacity	7	8
Number of enquires	43	30
Total amount of enquired capacity in kWh/day	173,258,520	26,496,096
Number of providers who sold transmission capacity	8	5
Number of enquirers who leased capacity	7	8
Number of signed contracts for sublease	43	30
Total amount of subleased capacity in kWh/day	173,258,520	26,496,096
Number of refused subleases	0	0

Sources: Energy Agency, Plinovodi

73 contracts on sublease were signed, three more than the previous year. The amount of subleased capacity was by 75% bigger than in 2016.

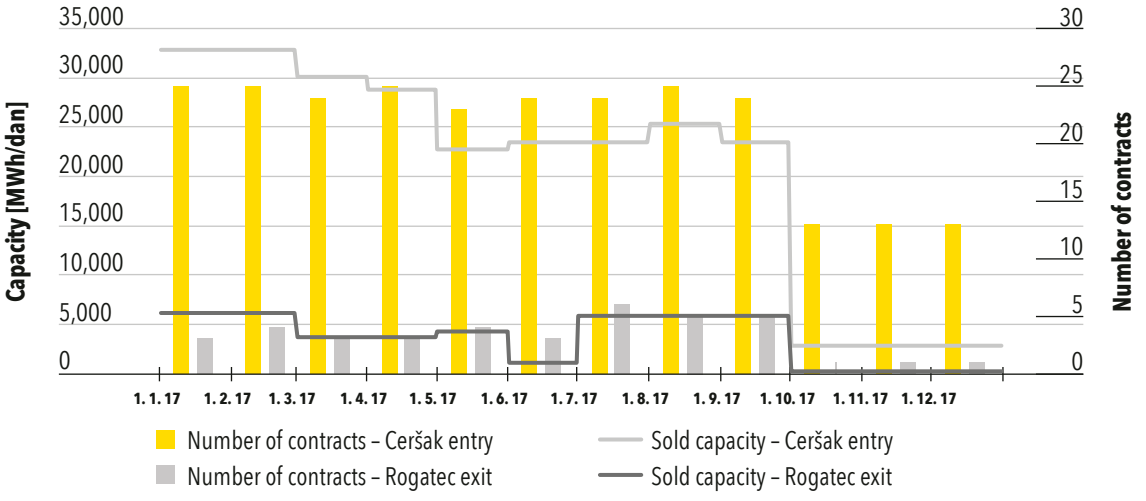
Figure 95: Trend in development of the secondary capacity market



Sources: Energy Agency, Plinovodi

The trends of the last three years show that the development of the secondary market with transmission capacity is still intensive. In a new gas year, starting in October 2017, due to the smaller volume of leased capacity and less free capacity from the existing transmission contracts, there was a decrease also in trading in the secondary market with transmission capacity.

Figure 96: Sold capacity and signed contract in the secondary market in 2017



Sources: Energy Agency, Plinovodi

4.2.2.3 Planning of non-daily metered off-takes

Consumption points of end consumers on the transmission system and consumption points of end consumers on distribution systems that are expected to take over more than 800 MWh of natural gas per year must be equipped for daily metering of natural gas acquired. Consumers whose measurement devices do not allow daily metering are the majority of consumers on distribution systems. For them, the forecasting party must provide the forecasting methodology for non-daily metered off-takes of natural gas, which will determine individual consumption types of non-daily metered off-takes, forecasting model, parameters and type of information, their form and the method of transmission.

Under the methodology, each non-daily metered off-take will be assigned with a load profile that will with the highest probability reflect the actual consumption and thus provide quality data for allocation of consumption type or according to the balance group. The data will ensure to the balance group's leaders more effective imbalance settlement.

In 2017 a number of activities were undertaken to establish a testing period for preparing forecasts in heating season 2017/2018. The forecasting party prepared a forecasting application for DSOs and enable them to enter data on consumption and consumption type. DSOs were provided with data exchange interfaces with the application and a forecasting algorithm, as well as the forecasting algorithm and subsequent allocations for those who decided to process data on consumption of non-daily metered off-takes in their own information system. Already in June, forecasts were performed in the test environment for three entire distribution systems and some test areas covering only a limited share of consumption points of an individual distribution system. In the second half of the year, measures were implemented to adapt the information systems of the DSOs and to effective data exchange in order to establish as many as "data-closed" distribution systems. Simultaneously, testing of the application and accuracy control, as well as application updates were performed according to emerging problems.

The use of forecasting methodology will become mandatory on 1 October 2018; the methodology will replace the current method of determining consumption, which was planned for determination of monthly consumption of consumers without monthly meter readings. The new methodology will allow processing of daily consumption forecasts with three within day updates for non-daily metered off-takes connected to the natural gas distribution system.

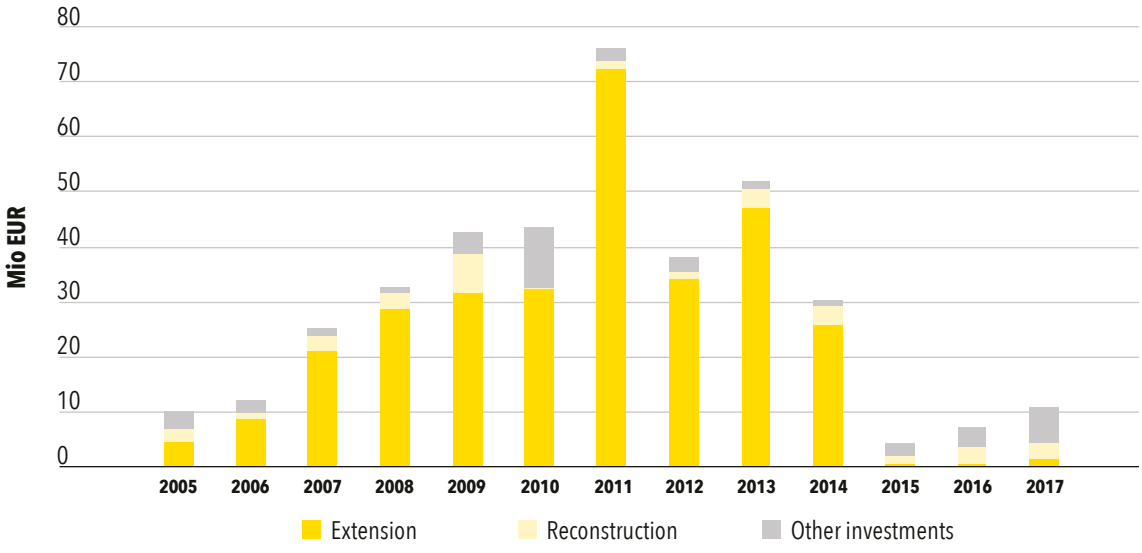
4.2.2.4 Multi-year development of the transmission network

The investments in the natural gas transmission system

10.8 mio €
investments in the natural gas transmission system

In 2017, the TSO invested EUR 10.8 million in the transmission system, which is 47% more than the previous year. Investments in expansion and reconstruction amounted to EUR 4.5 million, and other investments EUR 6.4 million, or 75% more than 2016. All investments were covered by the depreciation of fixed assets.

Figure 97: Investments in the natural gas transmission system in the period 2005–2017



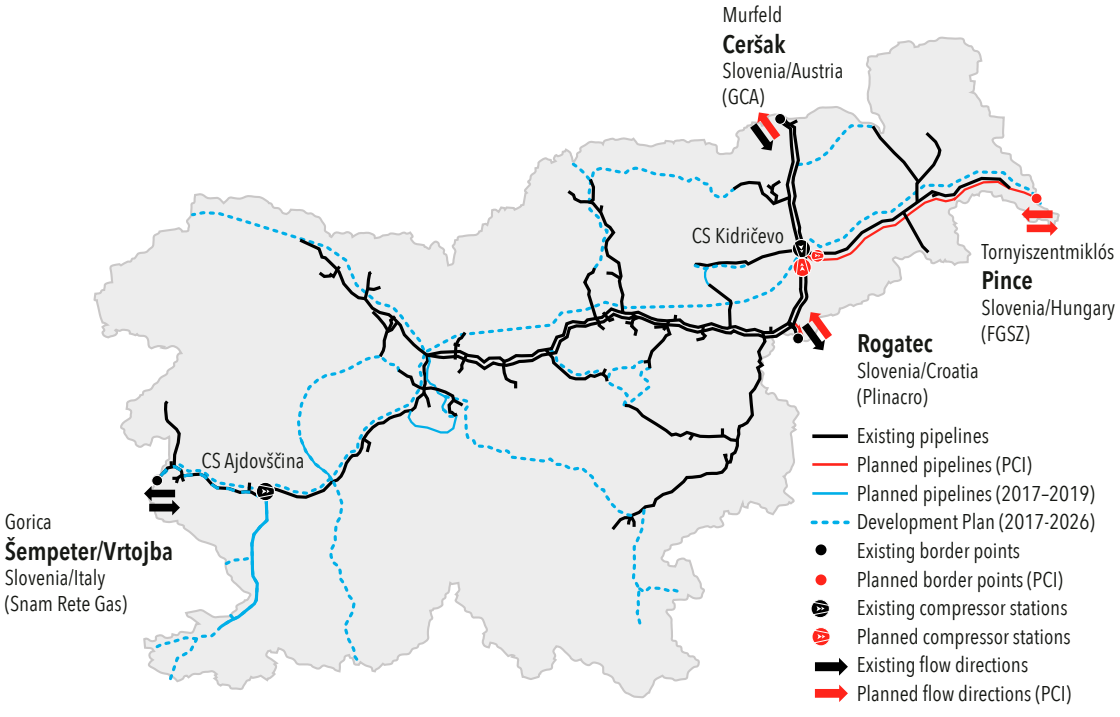
Sources: Energy Agency, Plinovodi

After the end of intensive investment cycle in 2015 investments activities reached the lowest level, but from 2016 the level of investments is gradually increasing. The TSO started with the construction transmission pipeline R38 Kalce–Godovič, which is intended also for connection of the distribution system supplying the municipality of Idrija. In metering-regulation station Rogatec the distribution system for the municipality of Rogatec was connected, which was previously connected to the Croatian distribution system. Renovation of the transmission pipeline M1 – crossing the Zlatoličje Channel and section of the pipeline R26 Dešen on a landslide area was completed. Works began to enable bidirectional flow at metering-regulation station Rogatec, and at the same time, the preparations of projects for obtaining the status of PCI continued.

The Energy Agency issued an approval to the Ten-Year Network Development Plan of the Gas Transmission Network for the Period 2018–2027. This development plan is in compliance with the Ten-Year Network Development Plan by ENTSOG TYNDP 2017. At the same time, the Energy Agency also approved the Investment Plan for the period 2018-2020, in which in more detail investments to be carried out over the next three years are presented.

The most important future investments activities remain the same as in the previous year. Building of the new management centre that will allow substantive and technological upgrade is planned. The construction of connecting pipelines M5 Vodice–Jarše and R51 Jarše–TE-TOL will enable the connection of thermal power plant. Work will continue on the construction of pipeline M6 Ajdovščina–Lucija, which will bring gas to Coast-Karst Region. By building the system loop R51c Kozarje–Vevče, the reliability of supply of Ljubljana with its surroundings will increase. Work will also continue on the potential gas connection between Slovenia and the Hungarian gas market.

Figure 98: Natural gas transmission system in December 2017



Source: Plinovodi

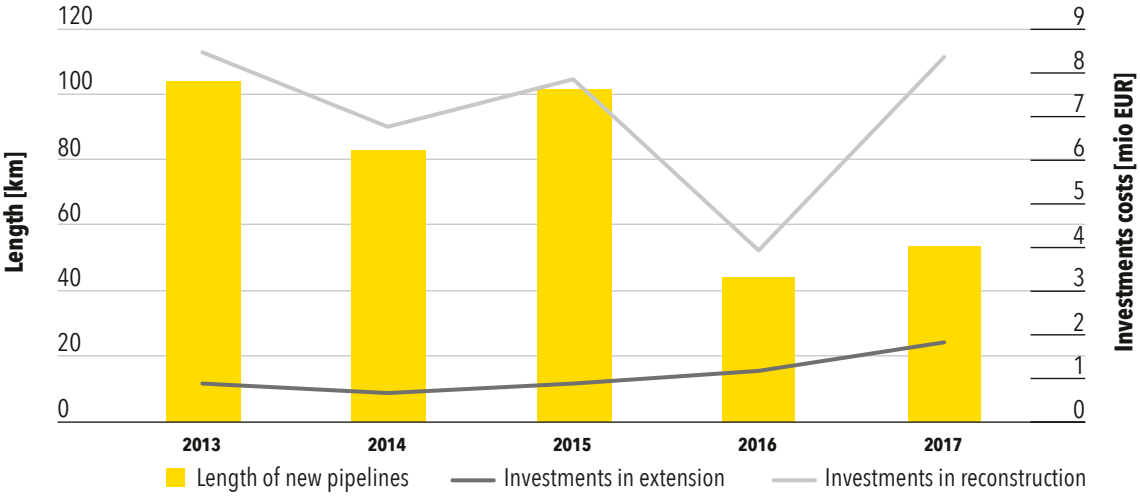
The investments in the natural gas distribution systems

DSOs built 53.8 kilometres of new pipelines, or a quarter more than a year earlier. The total length of distribution pipelines was in that way increased by 1.2%. There were 43.6 kilometres of newly activated pipelines and reconstructed around 13 kilometres of distribution pipelines.

53.8 km
of new distribution pipelines

The total values of investments in distribution systems was EUR 10.9 million, of which EUR 8.3 million was provided for already activated pipelines. Gradually the investments in a reconstruction of distribution systems are increasing, and in 2017 amounted to EUR 1.8 million. Value of other investments amounted to EUR 0.75 million.

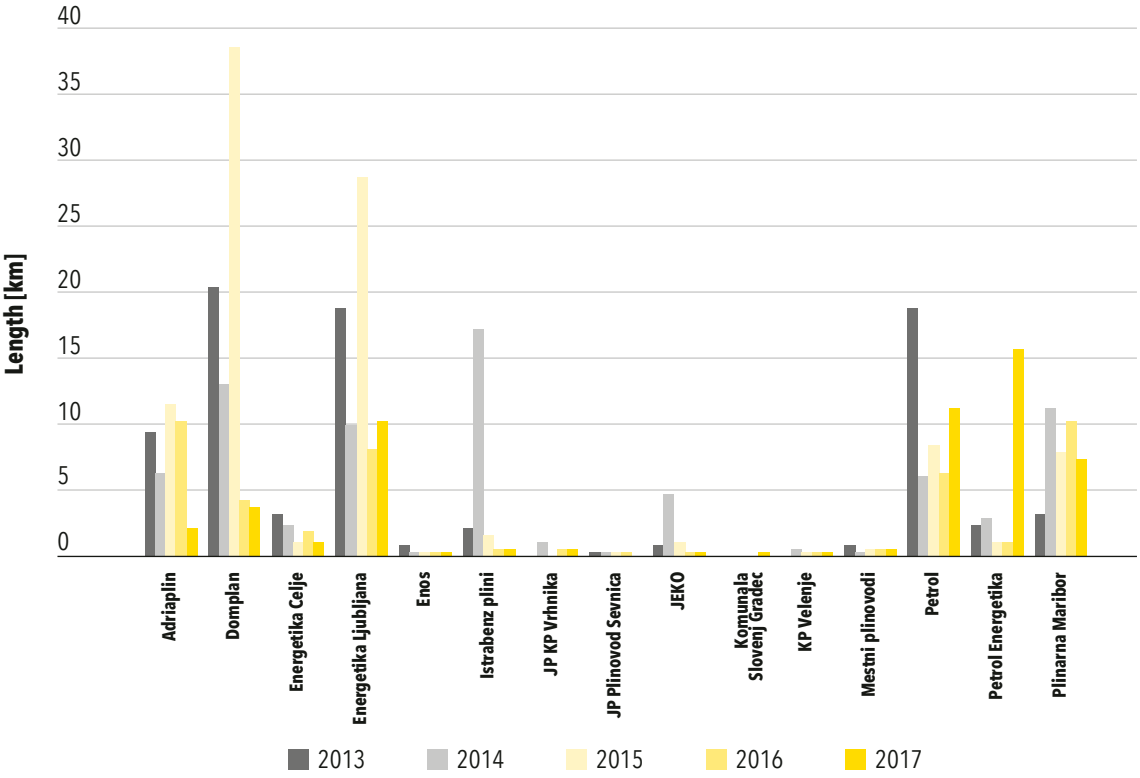
Figure 99: Trend of building new pipelines and investments costs



Source: Energy Agency

Figure 100 shows the intensity of construction of new pipelines by individual DSO. Four operators together built 80% of new pipelines, while eight operators in the last three years more or less did not expand their distribution systems - in 2017 they together built only 2.2 kilometres of pipelines, less than 300 meters per each operator.

Figure 100: Length of new pipelines in the period 2013–2017



Source: Energy Agency

4.2.2.5 Security and reliability of operation and quality of supply

The maximum daily peak load of the transmission system was recorded on 11 January 2017 and amounted to 2,323,412 kWh/h. The transmission of gas was carried out in accordance with plans and without any operational disruptions. The capacities of the border entry/exit points were sufficient since no contractual or physical congestion occurred.

The gas TSO issued 17 approvals for connection, 10 more than the previous year. Eight physical connections were carried out, a year before only one. The average duration of physical connection was 99 days, while in 2016 only 49. The average duration of the whole procedure together with administrative procedure was 155 days, almost three times longer than the year before, when it was 58 days.

The gas DSOs received 2,082 applications for connection approval and issued the same number of approvals. The number of issued approvals in comparison with the previous year increased by almost 18%. Operators in this year connected 1720 consumption points or consumers.

The average duration of the connection procedure of new consumers was at 11 DSOs on average shorter than 20 days after the submission of an application for connection to the distribution system. At two operators the connection procedure lasted on average 30 days, and at the remaining two 90 and 104 days.

The physical connection to the network was by majority of DSOs made on average in the period from one to three days; at eight DSOs in one day. At two DSOs physical connection lasted 30 and 79 days, which is a significant difference.

In 2017 only one of the operators of closed distribution systems carried out the connection of a new consumer. The entire connection procedure lasted 16 days.

By performing regular and unplanned maintenance the gas DSOs provided reliable and safe operation of the networks. The TSO carried out 12 planned, and 267 unplanned maintenance works on the transmission network. There were no interruptions of supply.

On the distribution networks, more than 5,100 planned works were carried out. The number was almost the same as the year before, while the total duration of works was reduced by 10%. Execution of planned activities resulted in 1,360 hours of gas supply interruptions. In the case of three operators, the planned works caused no interruptions, while at five the total duration of interruptions was less than six hours. The recorded time of an individual interruption was at least one hour and no more than 96 hours. At 13 operators the time of individual interruption did not exceed eight hours.

There were 436 unplanned interventions on distribution systems, causing 111 interruptions of supply. Total duration of unplanned interruptions lasted 10,696 hours, while almost 93% of this time is referring to only one event or disruption due to landslide in the area of one DSO. There were no such interruptions at eight operators, at three interruption did not last more than eight hours, and at the remaining three the total time of interruptions was between 79 and 168 hours.

On distribution systems 462 works were performed on demand and for the needs of third parties; the total duration of these work was 2,873 hours.

In the areas of two operators of closed distribution systems, scheduled maintenance works were carried out; at one operator works lasted 336 hours without interruptions of supply, and 54 hours in case of another operator, while interruption of supply lasted for the entire duration of works. In the area of the third operator 20 planned works were carried out in the total duration of 532 hours, with 452 being spent on carrying examination, tests and control measurements on the network. There were no interruptions of supply.

The number of connections, time spent for carrying out individual activities and data on the performed maintenance activities on the transmission and distribution systems over the period 2015–2018 are presented in Table 32.

Table 32: Parameters on connection and maintenance work in the period 2015–2017

	Transmission system operator		Distribution system operators		
	2016	2017	2015	2016	2017
Connection-related services					
Number of issued approvals	13	7	17	2,101	1,761	2,082
Average duration of administrative procedure [days]	14	9	63	10	15	14
Maximum length of administrative procedure [days]	–	–	–	20	80	60
Minimum length of administrative procedure [days]	–	–	–	1	1	1
Number of performed connections	6	1	8	1,168	1,446	1,720
Average duration of the entire connection procedure [days]	63	58	155	25	22	26
Maximum length of the entire connection procedure [days]	–	–	–	60	60	104
Minimum length of the entire connection procedure [days]	–	–	–	4	4	4
Maintenance work on the system					
Number of performed planned works	12	12	12	4,216	5,108	5,118
Total duration of the planned work [hours]	108,560	107,144	105,728	109,961	105,905	95,206
Total duration of supply interruption due to planned work [hours]	48	0	0	1,368	608	1,360
Maximum duration of each scheduled interruption [hours]	48	0	0	103	88	96
Minimum duration of each schedule interruption [hours]	48	0	0	9	7	1
Number of performed unplanned interventions	320	264	267	428	486	436
Total duration of unplanned interventions [hours]	789	502	559	2,097	1,761	2,858
Number of supply interruptions due to unplanned interventions	0	0	0	83	71	111
Total duration of supply interruption due to unplanned interventions [hours]	0	0	0	482	7,939	10,696

Source: Energy Agency

4.2.3 The network charges for gas transmission and distribution systems

4.2.3.1 Setting the network charge

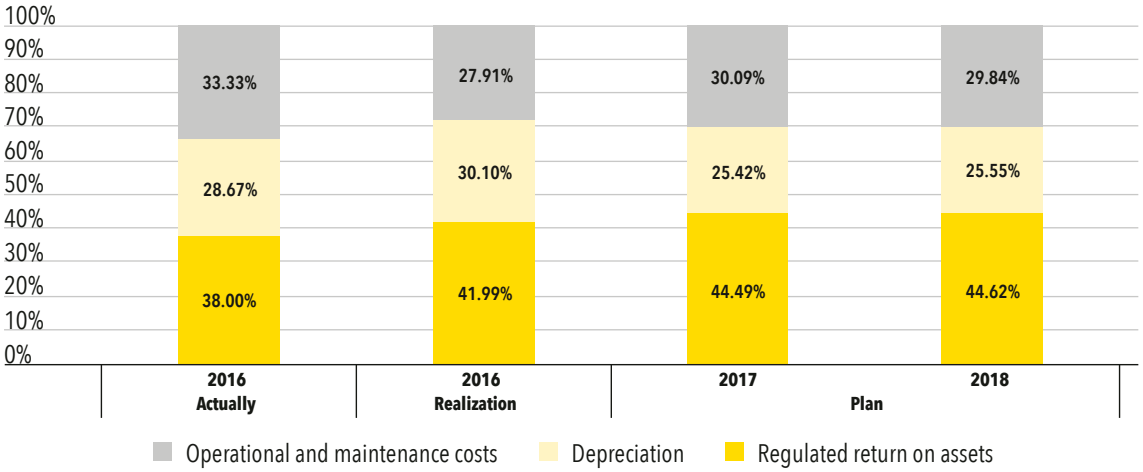
The network charge for the transmission and distribution systems is set by the system operators within the regulatory framework with the approval given by the Energy Agency. The foundations for setting the network charge for 2016 for the transmission system were provided by Act on the methodology for determining the regulatory framework of the natural gas transmission system operator and Act Determining the Methodology for Charging for the Network Charge for the Gas Transmission System, and for the distribution systems Act on the methodology for determining the regulatory framework of the gas distribution system operator and the Act Determining the Methodology for Charging for the Network Charge for a Gas Distribution Network. All four legislative documents were prepared and adopted by the Energy Agency in 2015. In the methodologies for setting the network charge the mode, conditions, and method of setting the network charge, and the criteria for establishing the eligible costs of the system operator, which also include incentives for more efficient operation of the system operator, are determined. When setting the network charge the method of regulated network charge is used, which determines a causal relationship between the eligible costs and the revenues of the system operator. Network charge, which was in 2017 a part of the price for the use of the network is an annual revenue of the system operator, used for covering the eligible costs of a system operator as a provider of service of general economic interest.

System operators for the regulatory period, which is determined on the basis of the methodology setting the network charge, establish the regulatory framework in a way that with the network charge the costs for carrying out the activities of the system operator. These include costs of the operation and maintenance, depreciation costs and regulated return on revenues. In setting the network charge, the system operators take into account also other incomes from operating activities as well as surpluses and deficits of the network charge from previous years.

On 1 January 2016 a new three-year regulatory period started, which lasts until 31 December 2018. After the first year of this regulatory period, the system operators in line with the criteria set in the Act recalculated the planned eligible costs into the actual costs, i.e. recognized the regulation. Calculations were checked also by the Energy Agency. On the basis of data from the system operators books of accounts it calculated realised eligible costs.

In Figure 101 is presented a comparison of the structure of actual and realised eligible costs of the gas TSO.

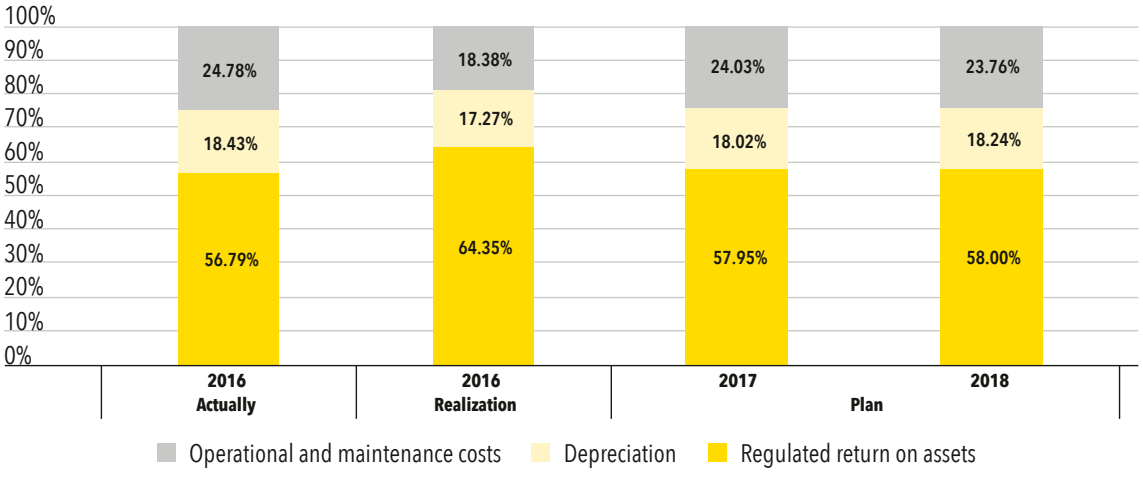
Figure 101: The structure of gas TSO eligible costs



Source: Energy Agency

Figure 102 presents the structure of eligible costs of all gas DSOs.

Figure 102: The structure of gas DSOs eligible costs



Source: Energy Agency

4.2.3.2 The network charge for the natural gas transmission system

The network charge for the gas transmission system is charged to the users of the transmission system with the following items:

- network charge for entry points
- network charge for exit points
- network charge for own use
- network charge for metering

The network charge tariffs are determined by the gas TSO before the start of the regulatory period of each year of the period and with the Energy Agency's prior consent to the regulatory framework.

The method for setting the network charge for entry and exit points is based on the method of entry-exit points, which means a system of uniform tariffs for individual entry or exit point. Calculation of the network charge for entry and exit points takes into account the leased contractual capacity. The network charge for own use depends on the transferred gas at an individual exit point. The network charge for metering takes into account the size of the measuring device, the number of pressure reduction units, and the ownership of a measuring device at the exit points.

In accounting the network charge for standard capacity products, which determine daily, monthly and quarterly lease of capacity, is in addition to the network charge also considered the network charge item. The charging for the interruptible capacity is conducted in a way that in the event of termination or reduction of the contractual capacity the gas TSO charges a system user the network charge with the corresponding amount of discount.

The entry and exit network charges in 2017 increased by 1.3% in comparison with 2016.

Tariffs items of the network charge, which gas TSO charges system users, must promote effective gas trading and competition between gas systems. Since in 2016 the prices for access to neighbouring systems changed, a comparative analysis of tariffs for individual entry and exit points of Slovenian and neighbouring systems was made. The Energy Agency called upon the gas TSO to align the network tariffs and thereby allow the expected lease of capacity of exit point Rogatec.

1.3%
higher network charge tariffs for the transmission system

Based on the analysis of the TSO and its application for the change of network charge tariff for exit point Rogatec, the Energy Agency in January 2017 issued an approval to this change. In October 2017, the new tariff entered into force, which according to the existing price decreased by 32%.

In 2017, the activities related to Commission Regulation (EU) 2017/460 of 16 March 2017 on harmonised transmission tariff structures for gas (Official Gazette, No 72 of 17 March 2017). On the basis of the requirements of the Regulation the TSO in due time published the information that have to be announced before the start of the tariff period. Information include data on technical characteristics, the methodology used for reference prices, TSO's revenues, transmission and non-transmission tariffs and simplified tariff model. In 2018 new regular consultation will be held in regards to reference price methodology, TSO's revenue information, and network charge tariffs.

4.2.3.3 The network charges for the natural gas distribution systems

Consumers connected to the distribution systems pay the network charge to the system operators; the network charge includes the costs related to the use of the transmission system at the exit points in Slovenia. When setting the network charge the method of regulated network charge is used, which determines a causal relationship between the eligible costs and the revenues of the system operator.

Tariffs for the distribution networks are unified for individual consumers groups for individual geographical areas, where a DSO carries out the distribution activity. Tariffs of the same DSO may differ only in cases where the systems are not comparable. Prices for all typical customers in different areas are not the same as the prices reflect different costs of DSOs in the individual geographical area. Individual consumers groups are defined in line with the methodology for charging for the network charge.

Tariffs for the distribution networks were determined by the individual acts on setting the network charge for the distribution system and for individual areas.

In 79 municipalities 18 acts on setting the network charge for the distribution system were used.

The network charge for the distribution system depends on the leased distribution capacity and power, distributed volumes of natural gas, the metering device and other parameters under the

DSO charged for the network charge by disclosing separately:

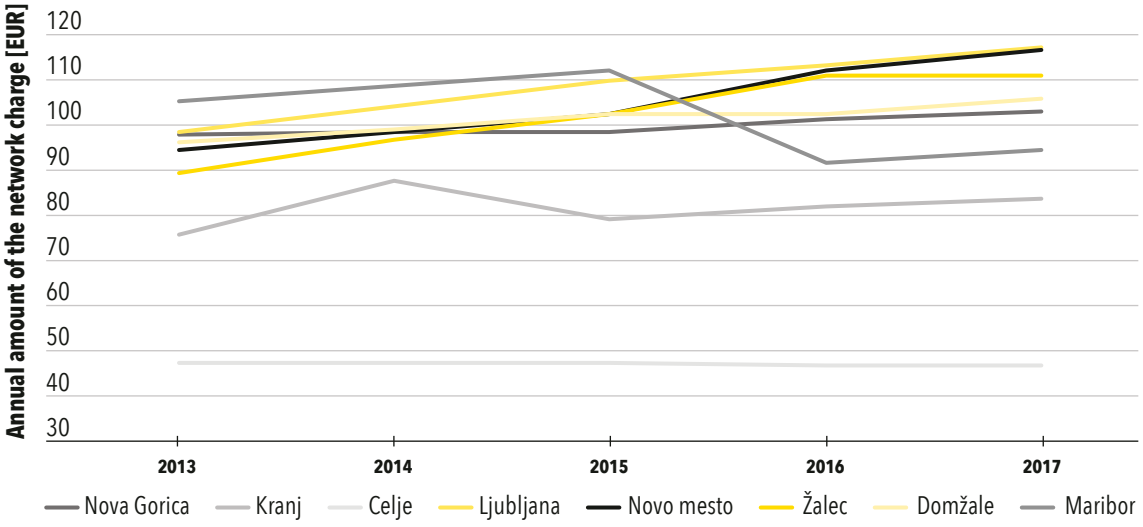
- the amount of natural gas distribution and
- the metering charging.

Figures 103, 104, 105 and 106 show the movement of distribution network charges for a typical household consumer and medium-sized industrial consumers in the period from 2013 to 2017 in the eight largest municipalities; in these municipalities more than 72% of all consumers connected to the distribution systems are supplied with gas.

For small household consumers (consumer group D1, annual consumption 3,765 kWh), medium-sized household consumers (consumer group D2, annual consumption 32 MW) and large household consumers (group D3, annual consumption 215 MWh) in seven out of eight geographical areas the annual amount of network charge in 2017 slightly increased in comparison with the previous year. The average increase in the network charge for typical consumption of households compared with 2016 was 2%. Individual values of increase were up to 4% for the smallest consumers and up to 3% for the remaining ones. In individual cases, the annual amounts of the network charge were lower than five years ago.

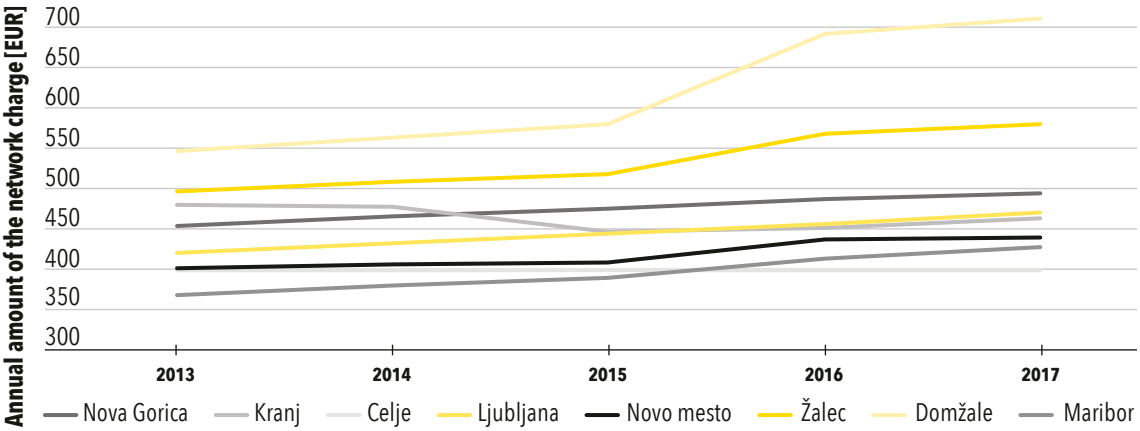
For medium-sized industrial consumers (consumer group I3, annual consumption 8,608 MWh) the average annual amount of network charge increased by almost 2% in comparison with the year before. In the last five years, the average annual increase in the network charge amounted to 2.5%. The mentioned changes of annual amounts refer to areas of eight larger municipalities, while in this five-year period changes in annual values of the network charge in other municipalities vary according to the economic and technical criteria and conditions of distribution system operation in an individual municipality. Differences in the amount of annual network charge in individual municipalities are the result of incomparable structure of consumers and their consumption, as well as the age and the extent of distribution systems.

Figure 103: The annual amount of the distribution network charge for small household consumers – D1 (3,765 kWh) in the period 2013–2017



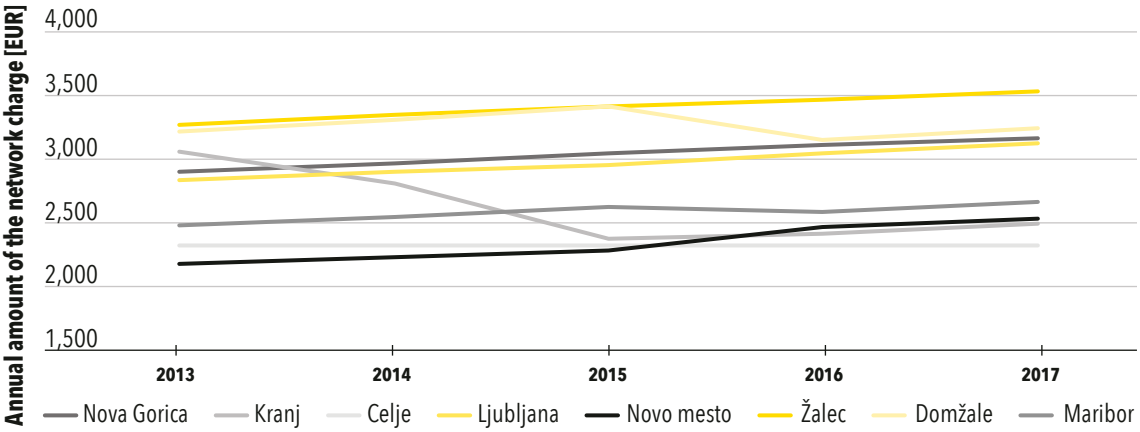
Source: Energy Agency

Figure 104:The annual amount of the distribution network charge for medium-sized household consumers – D2 (32 MWh) in the period 2013–2017



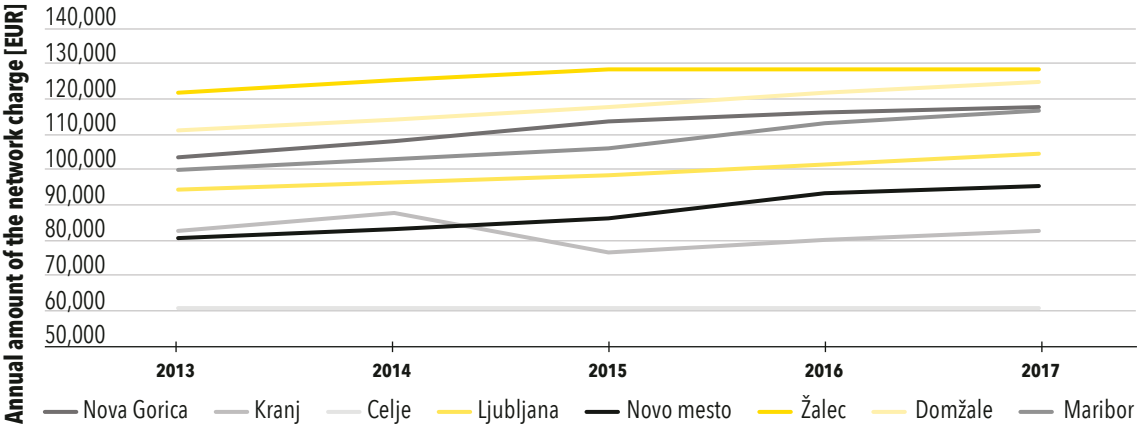
Source: Energy Agency

Figure 105: The annual amount of the distribution network charge for large household consumers – D3 (215 MWh) in the period 2013–2017



Source: Energy Agency

Figure 106: The annual amount of the distribution network charge for medium-sized industrial consumers – I3 (8,608 MWh) in the period 2013–2017



Source: Energy Agency

In accordance with the provisions of Regulation on the operation of the natural gas market, which entered into force on 8 October 2016 and determined kilowatt or megawatt hour (kWh, MWh) as the new account unit, on 1 January 2017 a successful transition to a new method of billing the network charge for the gas DSOs was carried out. The implementation of energy unit as a unit of account has unified the account unit with the natural gas transmission system in most of the EU countries, and ensured that a consumer pays the variable part of the network charge and gas supply according to the amount of delivered energy.

47,343
capacity auctions based on market methods

The transition was carried out without recorder major problems. Most of the DSOs on their websites in January 2017 published recommended information related to determination of the calculated quantities in energy units intended to understand the new calculation method. Minor issues related to rounding calculated values (altitude, volume units, intermediate results …) and to the use of the upper calorific value were solved by additional Energy Agency's explanations by the end of February.

4.2.4 Capacity at border points

Slovenian transmission system is connected with neighbouring transmission systems in three border points that are in Ceršak, Rogatec and Šempeter. The transmission of natural gas through the border point Ceršak is enabled only in direction from Austria to Slovenia, and through the border point Rogatec the transmission is possible in the direction from Slovenia to Croatia, but presumably from October 2018 it will be also enabled in the opposite direction. The transmission of natural gas through the border point Šempeter is possible in both direction, from Italy to Slovenia and vice versa.

The capacities were allocated on the basis of market methods through the online booking platform PRISMA. Auctions of firm and interruptible capacity products were carried out. There were 47,343 auctions announced at which individual and bundled capacity were offered. 364 auctions were successful, out of which two thirds were auctions of bundled capacity, and 23 of interruptible capacity, all for individual individual capacity. The share of successful auctions was 1.6%.

Table 33: Capacity auctions in 2017

Number of successful transmission capacity auctions	Ceršak - entry	Rogatec - exit	Šempeter - entry	Šempeter - exit
Annual	4	2	0	0
Quarterly	8	2	0	0
Monthly	13	10	0	1
Day-ahead	160	23	6	10
Intraday	91	14	3	17
Bundled capacity	167	37	9	27
Individual capacity	109	14	0	1

Source: Plinovodi

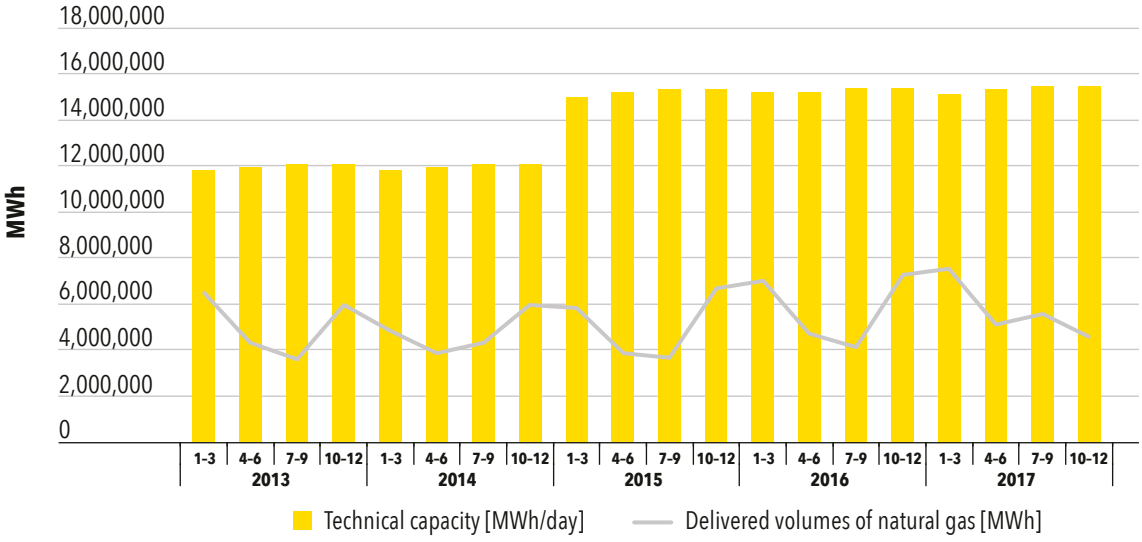
As a pilot project at the border point Ceršak an auction of incremental capacity was carried out. The auction showed that users of the transmission system did not need to increase existing capacity.

In accordance with the new EU legislation the gas TSO in cooperation with neighbouring TSOs (Austria, Croatia, Italy, and Hungary) for the first time carried out market assessments of demand. Interested parties gave one non-binding offer for capacity lease in direction Croatia-Austria (border point Ceršak), Croatia-Italy (border point Šempeter) and in the direction Croatia-Hungary (planned border point Pince) for the period of four gas years with the beginning of the gas year 2019/2020 in the amount of 1445.4 GWh/year for each individual point.

Individual connection points of the transmission system have different technical capacities that are uneven utilized under the long-term or short-term capacity lease.

Figure 107 shows that technical capacity in the border entry points during the five-year period increased more than gas flow, which has distinct seasonal characteristics.

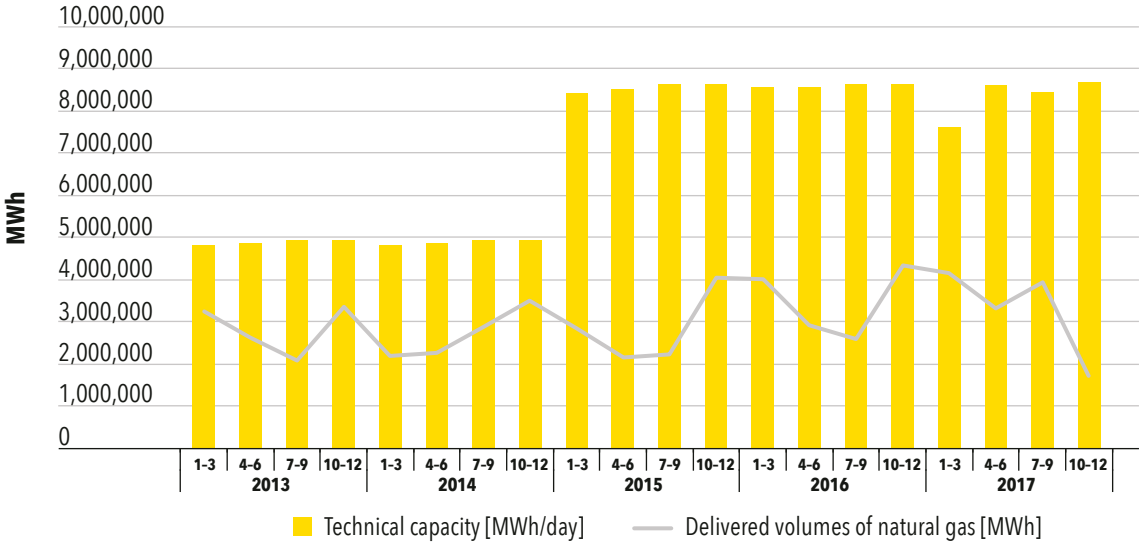
Figure 107: Quarterly technical capacity at all border entry points and delivered volumes of natural gas to Slovenia in the period 2013–2017



Source: Energy Agency, Plinovodi

The same refers to the construction of additional capacity at the border entry points, since gas flows from Slovenia in the last five years did not increased with such intensity as technical capacity (Figure 108).

Figure 108: Quarterly technical capacity at all border exit points and delivered volumes of natural gas in the period 2013–2017

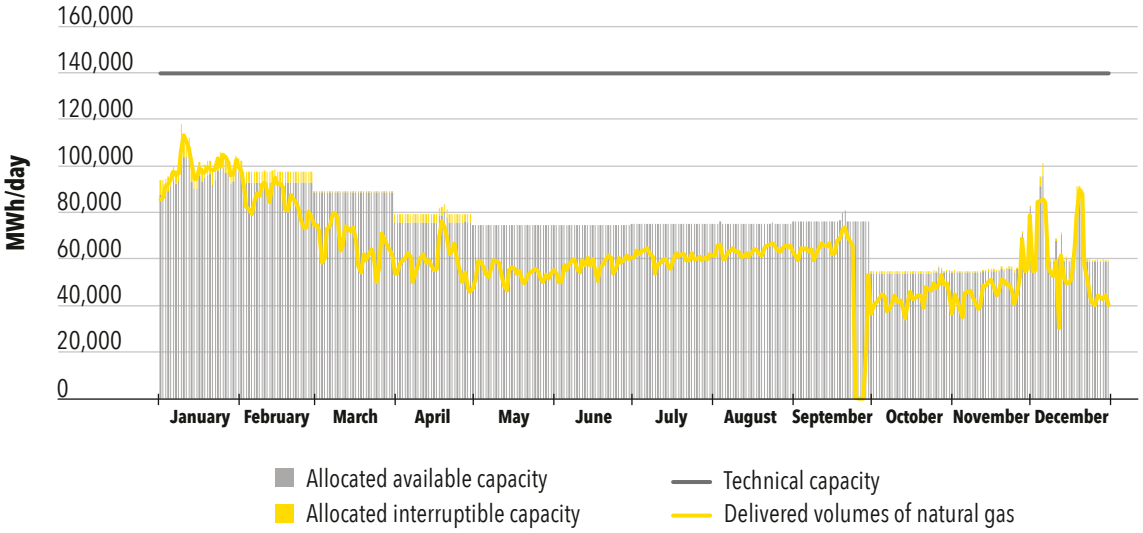


Source: Energy Agency, Plinovodi

With the beginning of the new gas year in October 2013, due to termination of long-term contracts on capacity lease and redirection of gas for Croatia through Hungary, there was a decline in capacity lease and gas flows at the border entry point Ceršak.

In September, due to maintenance work on the Austrian side, a four-day complete blocking of gas transmission through entry point Ceršak.

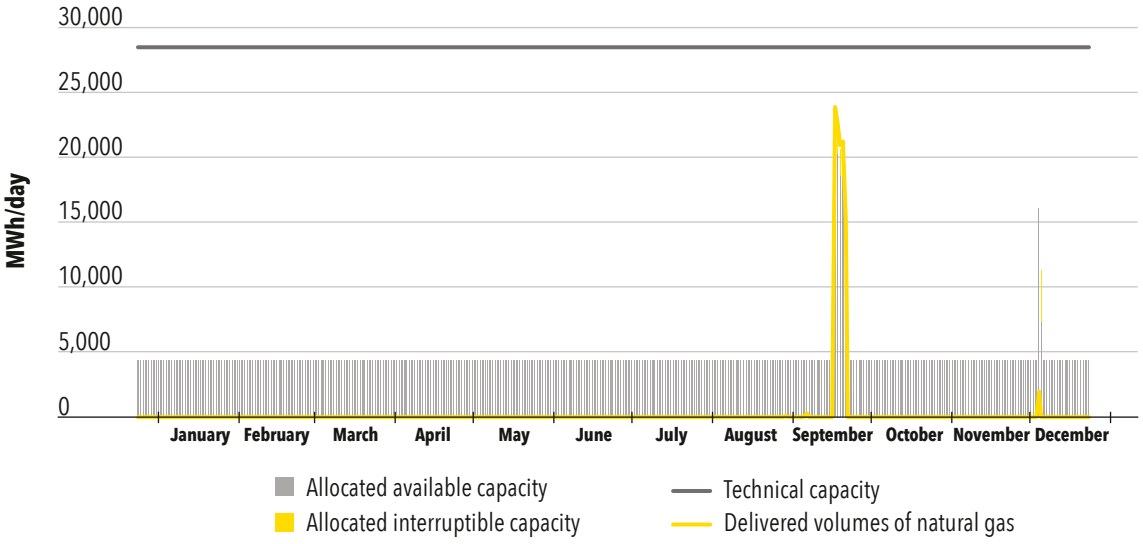
Figure 109: Dynamics of daily delivered volumes of natural gas, technical capacity, allocated available and interruptible capacity at the entry point Ceršak in 2017



Source: Energy Agency, Plinovodi

The entry point Šempeter was not active most of the year, and was more importantly used only in days of the complete closure of the entry point Ceršak.

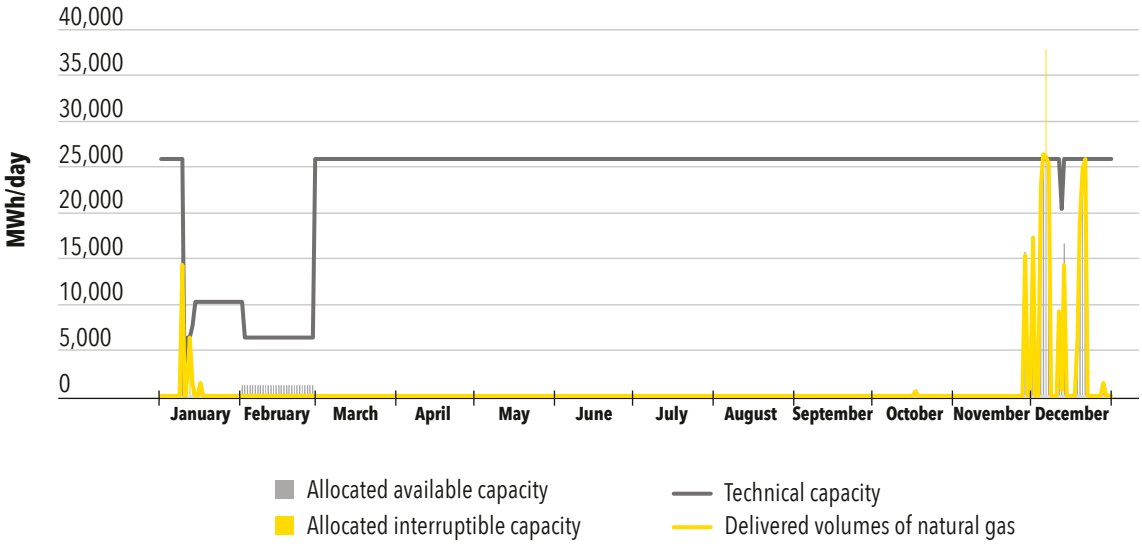
Figure 110: Dynamics of daily delivered volumes of natural gas, technical capacity, allocated available and interruptible capacity at the entry point Šempeter in 2017



Source: Energy Agency, Plinovodi

Also the exit point Šempeter was low utilized, where gas flow was carried only on individual days in January or December. At the beginning of the year the technical capacity at this point was reduced due to maintenance work.

Figure 111: Dynamics of daily delivered volumes of natural gas, technical capacity, allocated available and interruptible capacity at the exit point Šempeter in 2017

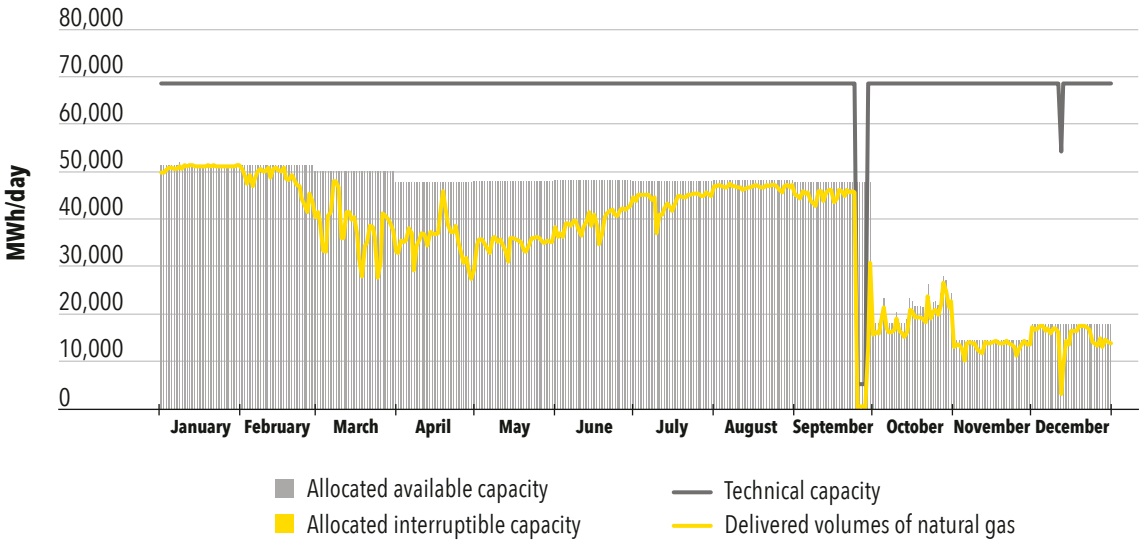


Sources: Energy Agency, Plinovodi

Even more than in Ceršak, in October decreased capacity lease at the exit point Rogatec. Since Croatia with the beginning of the new gas year started to larger extent use the transport route through Hungary, there was a significant decrease in gas transmission at the exit point Rogatec. In the last quarter of 2017 through the exit point Rogatec 66% less gas was transmitted than in the same period of 2016.

The complete closure of the entry point Ceršak in the last days of September was also reflected in exit volumes for Croatia.

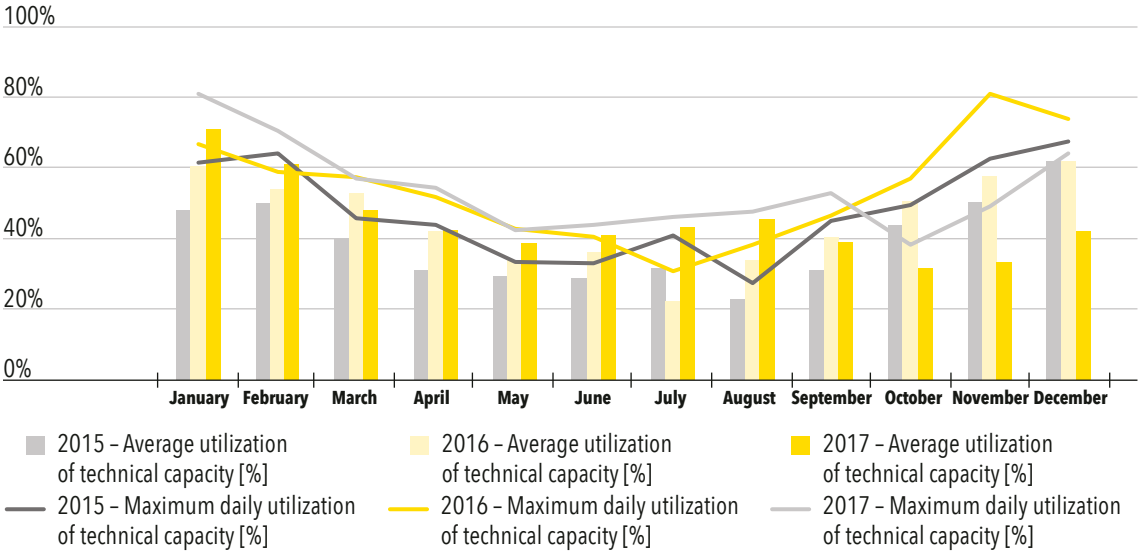
Figure 112: Dynamics of daily delivered volumes of natural gas, technical capacity, allocated available and interruptible capacity at the exit point Rogatec in 2017



Sources: Energy Agency, Plinovodi

Comparison of capacity utilization at the border point Ceršak in the last three years show that in 2017, with the exception of the last quarter, the average monthly and the highest daily utilization of technical capacity in generally higher than in the previous two years.

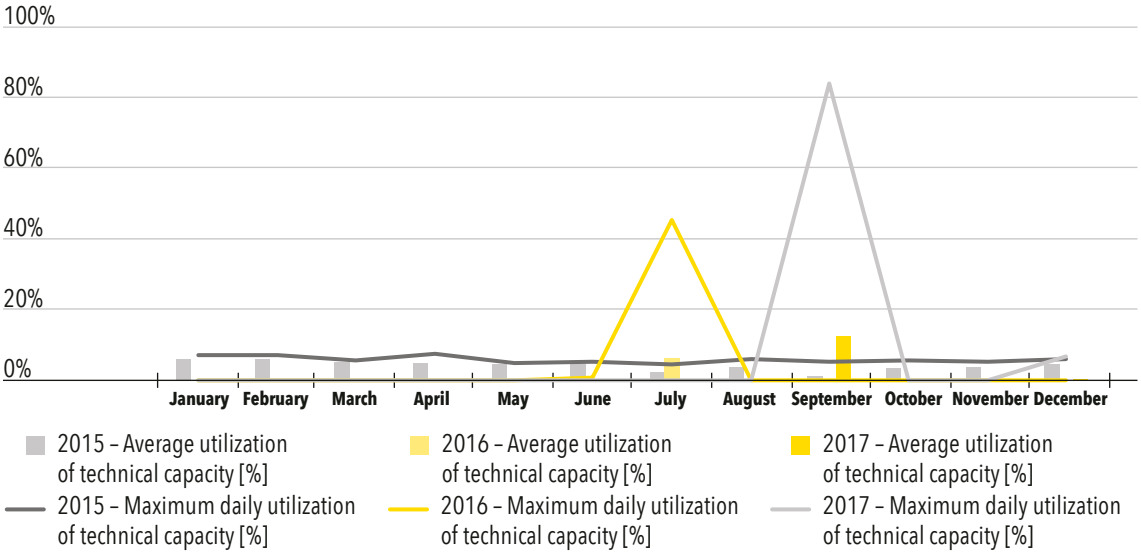
Figure 113: Maximum daily and average monthly utilization of capacity at the border entry point Ceršak in the period 2015–2017



Sources: Energy Agency, Plinovodi

Monthly utilization of the border entry point Šempeter in the last three-year period was on average lower than 10%. In September 2017 the highest daily utilization of technical capacity reached 84%, which was the result of a four-day closure of the border entry point Ceršak.

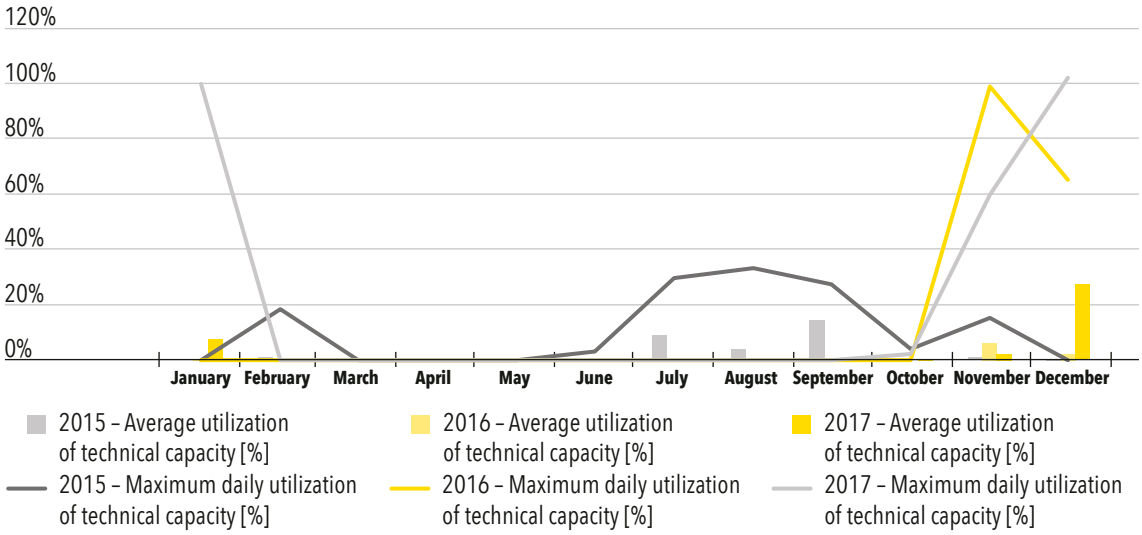
Figure 114: Maximum daily and average monthly utilization of capacity at the border entry point Šempeter in the period 2015–2017



Sources: Energy Agency, Plinovodi

The average monthly utilization of technical capacity of the border exit point Šempeter in the period 2015–2017 was also low; the highest was in December 2017, when it reached 27%. In individual days in December 2017 the highest daily utilization of technical capacity reached 100%. Full utilization of technical capacity was also reached in one day in November 2016, and in January 2017 technical capacity was fully utilized in times of reduced technical capacity due to maintenance work.

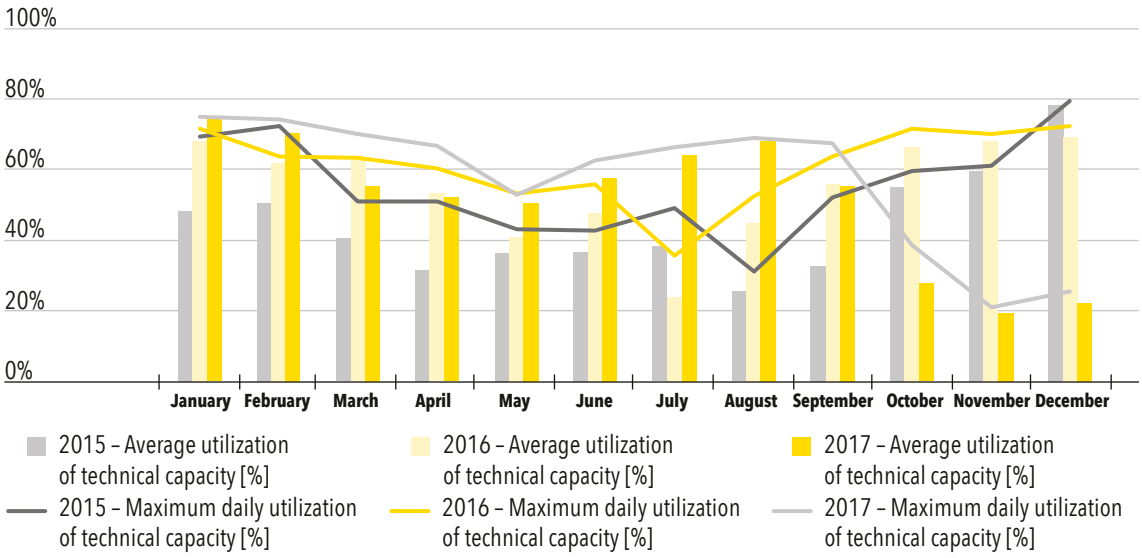
Figure 115: Maximum daily and average monthly utilization of capacity at the border exit point Šempeter in the period 2015–2017



Sources: Energy Agency, Plinovodi

The same as at the border entry point Ceršak in 2017 the average monthly utilization of tehnical capacity of the border exit point Rogatec was mostly higher than in the previous two years. The exception was again the last quarter of 2017, when, due to redirection of gas flow to Croatia average utilization of technical capacity fell from 65% in the third quarter to 23% in the fourth quarter. With the average monthly utilization decrease in the last quarter also decreased maximum daily utilization of technical capacity. In December 2017, the highest daily utilization of technical capacity was 25%, while in December 2015 was 79% and in December 2016 72%.

Figure 116: Maximum daily and average monthly utilization of capacity at the border exit point Rogatec in the period 2015–2017



Sources: Energy Agency, Plinovodi

4.2.5 Ensuring compliance with energy legislation

The Energy Agency must in accordance with Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (hereinafter referred to as Directive 2009/73/EC) comply with and carry out all relevant legal binding decisions of the European Commission and ACER to ensure the compliance with this Directive and Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005 (hereinafter referred to as Regulation (EC) No 715/2009).

The Energy Act issued three approvals to the TSO's commercial and financial contracts with vertically integrated company and gave consents to the Act amending the System operation instructions for natural gas transmission system. In the supervisory procedure, the Energy Agency assessed the composition of gas TSO supervisory board. It also issued a positive opinion to the Guidelines on capacity conversion service, which in accordance with Commission Regulation (EU) 2017/459 establishing a network code on capacity allocation mechanisms in gas transmission systems and repealing Regulation (EU) No 984/2013 where prepared by the TSO.

Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas (hereinafter referred to as Regulation 2017/460), which entered into force on 6 April 2017, establishes a network code setting out the rules on harmonised transmission tariff structures for gas, including rules on the application of a reference price methodology, the associated consultation and publication requirements as well as the calculation of reserve prices for standard capacity products. The Energy Agency instructed the TSO to carry out at least one (final) consultation in accordance with Article 26 of Regulation 2017/460 and to publish information for interconnection points before the annual yearly capacity auction prior to the gas year beginning under Article 29 of Regulation 2017/460.

On 1 November 2017 the new Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010. This Regulation introduces a higher level of coordination of measures to cope with a gas supply crisis. In addition, it introduces a risk assessment at the level of risk groups (regions) and sets additional requirements regarding the content of risk assessment at the national level. Besides that, it requires from Member States to conclude bilateral inter-state agreements on solidarity in case of supply crisis. The preparation of the risk assessment at the risk groups' level started already at the end of 2017. The preparation of the risk assessment and emergency plan are still valid until the amendment and alignment with the new regulation.

The Energy Agency monitored the compliance with Regulation (EC) No 715/2009 and guidelines adopted under this Regulation and supervised whether the gas undertakings were fulfilling the obligation arising from the European legislation. In particular, it monitored the correctness of publication of data on the TSO's website, finding that published data are in a vast majority in compliance with the legislation, and some minor deficiencies are being eliminated.

No breaches of the European legislation were identified, thus, no penalties were imposed in 2017.

4.3 Promoting competition

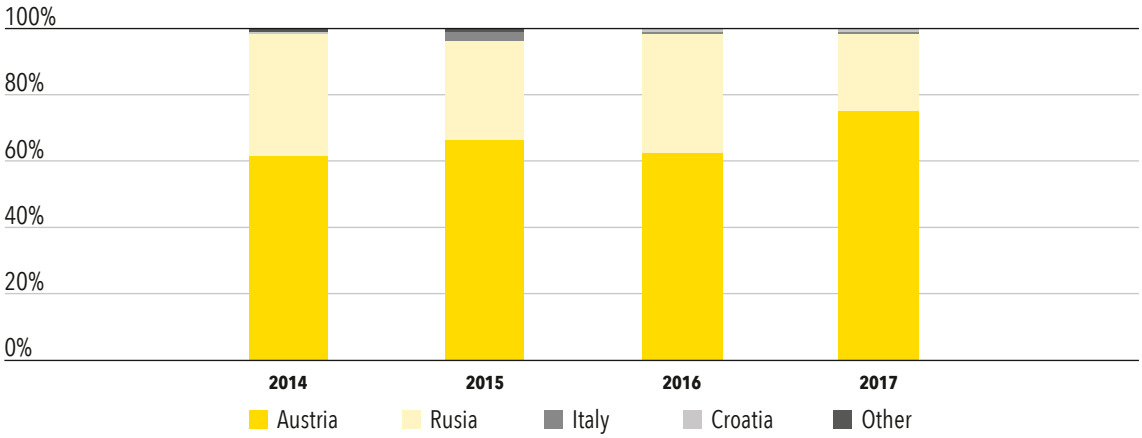
4.3.1 Wholesale market

Since Slovenia does not have its own sources of natural gas, storages of natural gas or LNG terminals, therefore, the wholesale natural gas market is limited by imports of gas through neighbouring transmission systems. Traders, who are also importers of gas, deliver gas through neighbouring transmission systems to the Slovenian transmission system. Natural gas traded on the wholesale market comes from transmission systems of neighbouring countries with their own gas sources. The wholesale market is supplied by gas from Austria and Italy, and Croatia.

Most of the natural gas is still imported from Austria

From Figure 117 is evident that Slovenian traders or suppliers among given possibilities mostly use the connection with Austria, where at the gas hub Baumgartner and Austrian storages buy most of the gas. Due to liberalization of the relevant market the import from Russia declined, and on the other hand the import from Austria increased. In a four-year period observed, the import from Austria was higher by 60%, and in 2017 increased to 75%. Adverse price differences are the reason that the share of gas from Italy also decreased.

Figure 117: Natural gas sources in the period 2014–2017

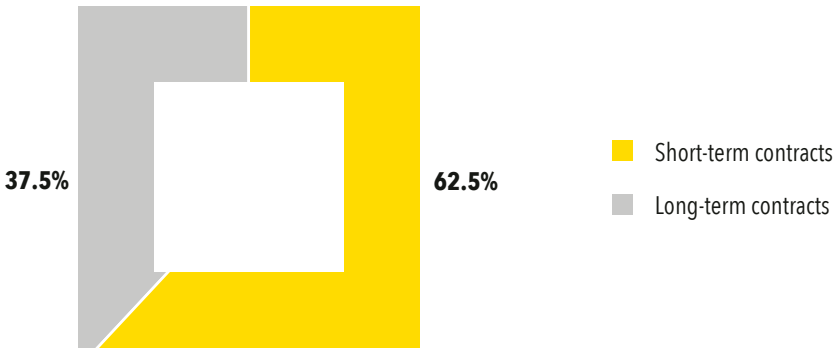


Source: Energy Agency

As a result of market liberalization already in 2015 was recorded a decrease in number of long-term contracts signed directly with natural gas producers in Russia. They were replaced by short-term contracts concluded at gas hubs, power exchanges and other points within the EU. In 2016, to Slovenian natural gas market again more gas purchased under long-term contracts was imported than in 2016, while in 2017 we did not detect this trend again. As can be seen from Figure 118, in 2017 more than 62% of natural gas was purchased on the basis of short-term contracts. Compared to 2016 this is a major change, since then the share of gas, bought under long-term contracts, was almost equal to the share of gas bought on the basis of long-term contracts.

The maturity of contracts or the relationship between long-term and short-term contracts can affect reliability of supply, since in the event of gas shortages insufficient supply of gas can occur because it is not possible to buy necessary quantities on spot markets.

Figure 118: Structure of imported gas in relation to contracts maturity



Source: Energy Agency

Increased import of natural gas under short-term contracts

Among the volumes of gas traded on the Slovenian wholesale market only those volumes of gas are registered that are sold by traders to other traders or suppliers. These volumes exclude the volumes that are imported for the supply of the consumers on the retail market when a supplier of the retail market is at the same time also an importer of natural gas. With this methodology we can determine market shares and the Herfindahl-Hirschman index (HHI) of the Slovenian wholesale market. The calculated values are presented in Table 34. The largest market share had again the company Geoplin, d.o.o, Ljubljana, and

almost one fourth belonged to Petrol Energetika, d.o.o. By taking into account the distribution of the market share, displayed data indicate that important suppliers to the retail market purchase gas independently on the foreign markets while smaller suppliers buy gas from importers. Market concentration measured by HHI shows a very high degree of concentration on the Slovenian wholesale market. The HHI value strongly exceeds the limit, which is a boundary between middle and high concentration level.

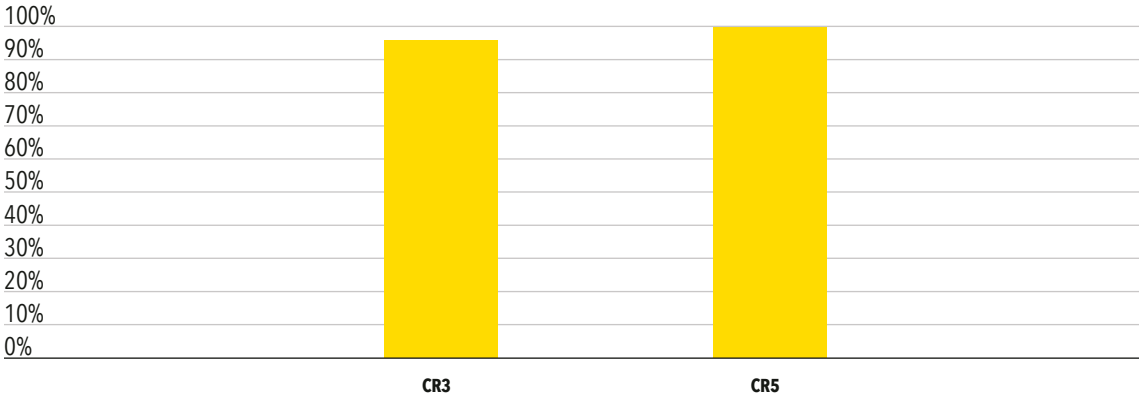
Table 34: Market shares and the HHI of the natural gas wholesale market

Company	Market share
Geoplin	64.06%
Petrol Energetika	27.78%
Adriaplin	4.17%
Plinarna Maribor	2.51%
GEN-I	1.06%
ENOS	0.29%
Istrabenz Plini	0.13%
Total	100.00%
HHI of the wholesale market	**4,900**

Source: Energy Agency

A high degree of concentration is also indicated by CR3 and CR5 indices shown in Figure 119. Index CR3 shows the market shares of the three largest suppliers, while CR5 of the five largest suppliers. The three largest suppliers manage 96% of the wholesale market, and the largest five almost the entire market (99.58%).

Figure 119: The concentration of the wholesale gas market



Source: Energy Agency

4.3.1.1 The level of market transparency

REMIT (Regulation No 1227/2011), Implementing regulation (Commission implementing Regulation (EU) No 1348/2014), and the Energy Act (EA-1) represent a comprehensive legal framework for ensuring the transparency of the wholesale electricity and natural gas market.

This issue is in more details addressed in Chapter 3.4.1.2.

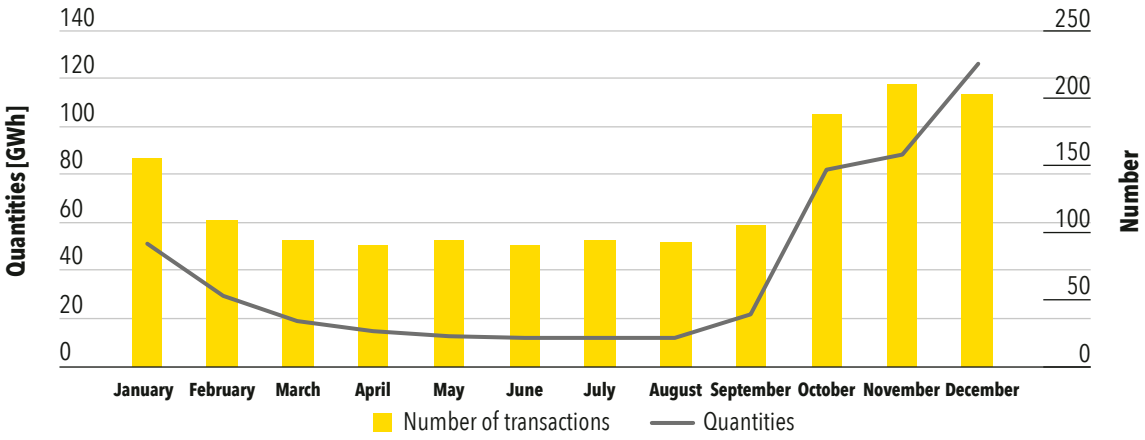
4.3.1.2 The level of market effectiveness

In October 2015 the gas TSO set up a virtual point for gas that is intended for transactions with natural gas, the operation of a trading platform for balancing and for the bulletin board. Within transactions, namely trading on an open market, the members of the virtual point perform all transactions with natural gas in

the Slovenian transmission system. The transaction is any legal operation that makes a change in the right to dispose with a certain amount of gas in the Slovenian transmission system.

The first transaction was made in January 2016. Among the members trading in an open market was well received, which is also reflected in the increase in number of performed transactions and exchanged volumes. As shown in Figure 120, after a moderate trading during summer in the last quarter of 2017 followed a leap in number of performed transactions and also exchanged volumes. The year 2017 ended with a record volume of exchanged gas in an open market since the first transaction in this market. In December 2017, more than 100 GWh of natural gas were exchanged for the first time in the open market. The exact value is 126,230,240 kWh. In total, in 2017 there were 1,521 transactions carried out, in which 478,8 GWh of natural gas were exchanged, out of which 21 transactions were carried out for delivery within day and others for day ahead.

Figure 120: Trading in virtual point (open market)



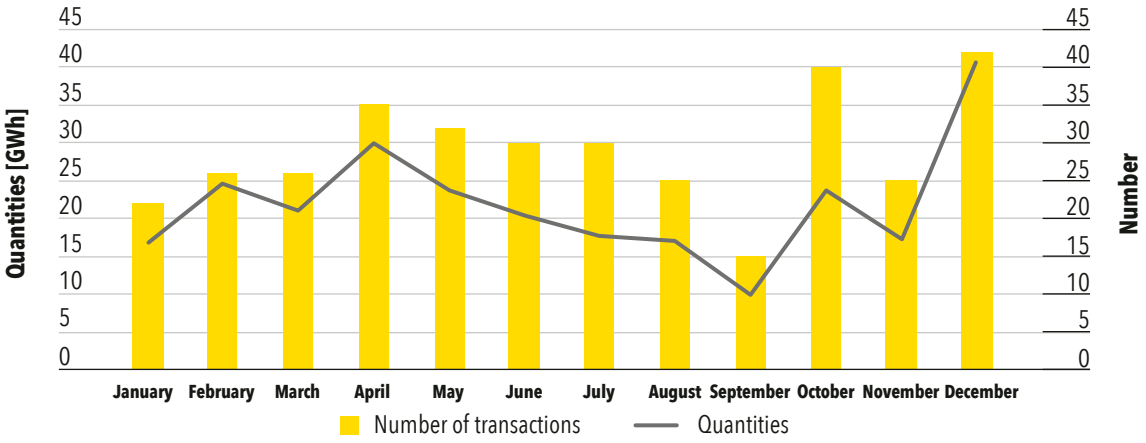
Source: Plinovodi

As a service of the virtual point, a trading platform was also introduce. A trading platform enables balancing group leaders trading within day and day ahead with gas for balancing. On the trading platform, the trading with short-term standardised products is possible. On the trading platform, the TSO on an equal footing with other participants trades with gas for balancing of the transmission system. If the TSO by trading on the trading platform at the end of an account day cannot successfully balance quantities in the transmission system, may use balancing service that is based on an annual contract with the most favourable bidder.

On the basis of performed transactions on the trading platform within the virtual point, 262.7 GWh of natural gas for balancing the transmission system were purchased or sold. Compared to 2016, when the amount was 466.0 GWh, the reduction of volumes in transactions in 2017 represents a decline of 43.6%. All together in 2017, 348 transactions for balancing were carried out, 206 of these with the short-term standardised product within day, and 138 on the basis of standardised product day ahead. Exchanged quantities of natural gas and the number of performed transactions at the trading platform for 2016 by months are shown in Figure 121.

A significant drop in trading on trading platform

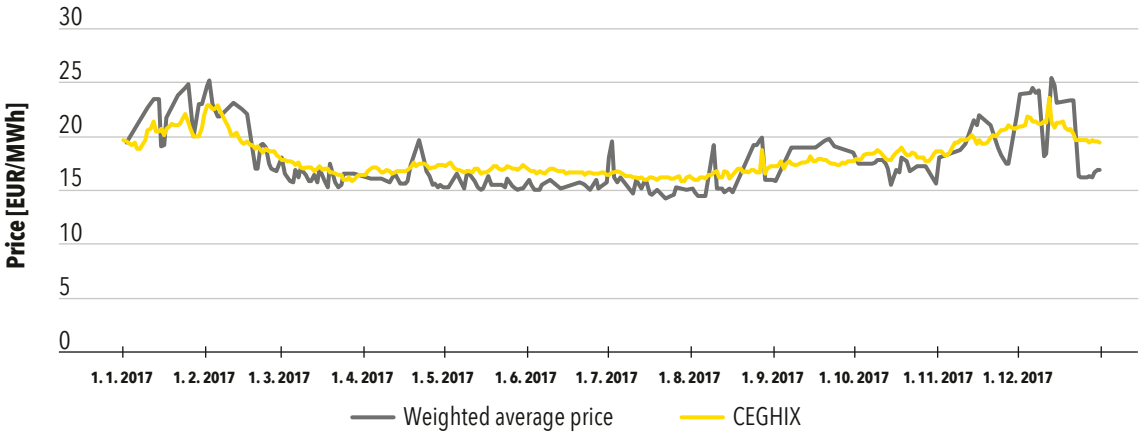
Figure 121: Trading on the trading platform (balancing market)



Source: Plinovodi

For each transaction, carried out through the trading platform, the price at which natural gas was purchased or sold is recorded. Balancing of these prices with exchanged quantities gives us a weighted average price achieved on the trading platform. Since also this index is set at a daily level, is comparable to the stock market index CEGHIX. CEGHIX is the index of Central European Gas Hub AG (CEGH), located in Vienna. A comparison of the weighted average price and CEGHIX is shown in Figure 122. It is evident that there is a strong correlation between the indices. Due to lower liquidity on the trading platform, there were also days in 2017 when in the balancing market no transaction was carried out. For these days the index of weighted average price cannot be determined. For the illustration of weighted average price, as shown in the figure, the values for those days were determined by the linear interpolation method.

Figure 122: Weighted average price on the trading platform (balancing market) and values of CEGHIX



Sources: Plinovodi, CEGH

In addition to trading in the open market and trading platform, the virtual point includes the bulletin board. This board provides members of the virtual point transparent publication of bids and demands for quantities of natural gas in the Slovenian transmission system. Published announcements do not include prices. In 2017, on bulletin board were placed 89 bids and 37 demands for gas in the Slovenian transmission system. The average bidding capacity was 76,348 kWh, and average demand for capacity 87,297 kWh/h.

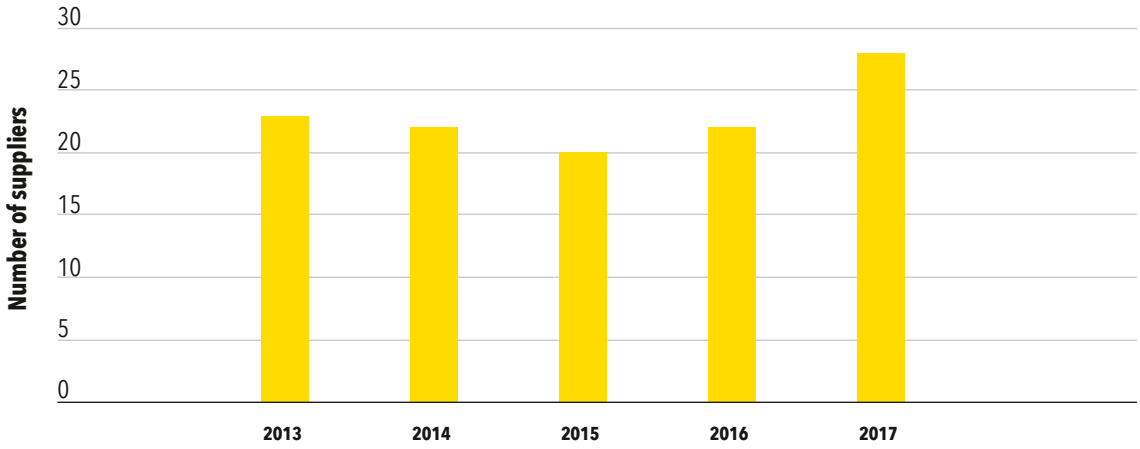
4.3.2 Retail market

In the retail natural gas market suppliers are selling gas to consumers. Consumers can choose between the offers of all suppliers, which are active in their local communities. In the market there also suppliers of natural gas, which supply gas only to certain local communities. Consumers pay for the delivered natural gas according to actual consumption, which is metered by appropriate metering devices. According to suppliers data in 2017 all consumers were supplied by 9,577,711 MWh of natural gas.

28
suppliers in the retail market supplied natural gas to 133,630 consumers

In 2017, in the Slovenian retail market were active 28 natural gas suppliers, which according to contracts supplied gas to 133,630 consumers. Six new suppliers entered the retail market, of which only the company RWE since October 2017 offered natural gas also to household consumers. The remaining five suppliers were selling gas to business consumers only in restricted (industrial) area. No supplier left the retail market this year.

Figure 123: The number of natural gas suppliers in Slovenia in the period 2013–2017



Source: Energy Agency

Suppliers offer natural gas in the form of various products. Next to offers based on regular price lists suppliers provide promotional offers (the action price valid for a certain period) and package offers (apart from natural gas other services are available and a specific payment method). Promotional and package offers can be limited to a specific circle of customers, and, as a rule, contain contractual penalties in case of early termination of the contract. Regular offers for an individual type of consumption are based on the regular price list and available to all natural gas consumers in Slovenia. Consumers can change their suppliers at any time. Suppliers must on their websites published their offers for household and small business consumers, and consumers have the right to be informed about natural gas prices in a comprehensive manner and be able to compare prices. On the Energy Agency's website within the single point of contact comparative services of supply with natural gas are available only for regular offers.

43 Supply of natural gas without any special conditions regarding time limit or contractual penalties in line with point 33 of Article 36 of the EA-1

4.3.2.1 Retail natural gas prices

The Energy Agency monitors prices in the retail market on the basis of public data and data on the offers on the market for household and small business consumers, which it acquires on a monthly basis within single point of contact comparative services.

For the sixth year in a row, natural gas prices have been falling. This was a result of favourable conditions on wholesale markets, improving competitiveness, new suppliers, market activities and new sales approaches. Individual suppliers who in the past were offering only the supply of electricity, also entered the natural gas market and vice versa.

Lower natural gas prices in the retail market were the result of lower gas prices in the wholesale market and entry of new suppliers to the market

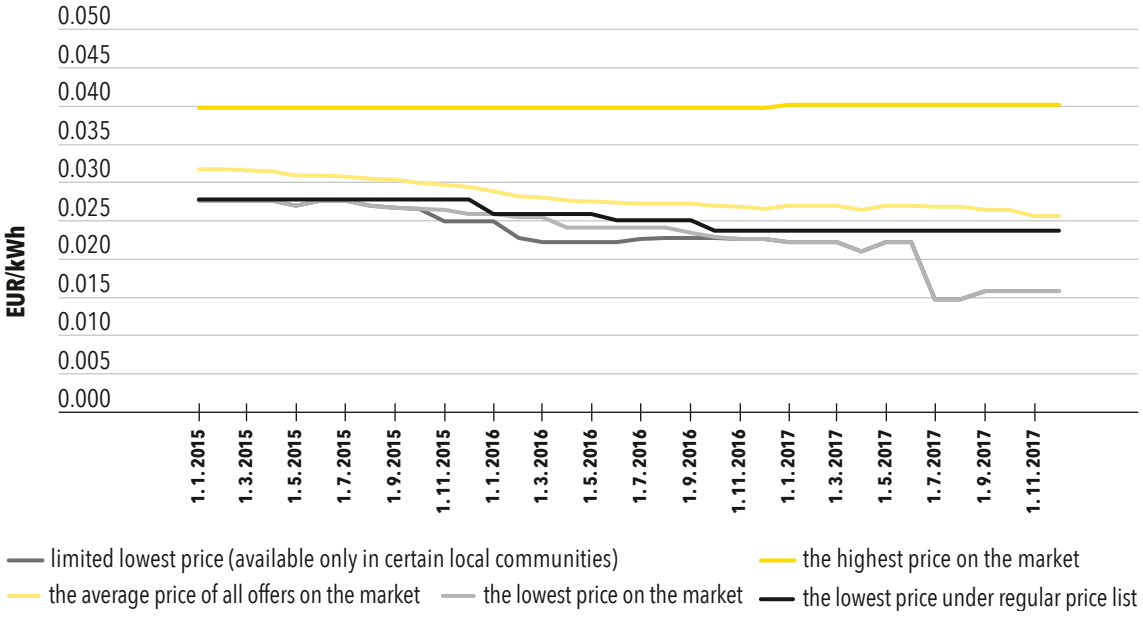
Retail Price Index

The Energy Agency monitors prices in the retail market for household consumers and determines the retail price index (RPI). RPI is based on the cheapest, to all consumers available offer on the market, which allow switching supplier at any time without contractual penalties.

Figure 124 shows the trend of typical natural gas prices for a standard household consumer for following prices:

- limited lowest price (available only in certain local communities)
- the lowest price on the market
- the lowest price under regular price list
- the average price of all offers on the market
- the highest price on the market

Figure 124: Retail price index and some typical natural gas prices excluding network charge, duties and VAT in the period 2015–2017



Source: Energy Agency

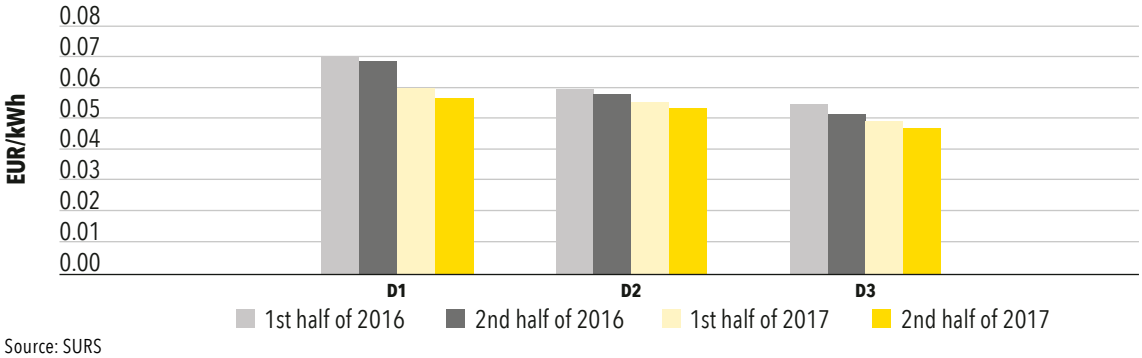
Since 2011 we recorded a decrease in the price of natural gas, which is the result of price trends in the wholesale market and a significant increase in competition in the retail market. Also in 2017, individual prices in the market were falling. The lowest price in the market, available under a specific offer in all local communities, in the second part of 2017 ranged between 0.01466 and 0.01585 EUR/kWh. Since July, the company GEN-I had been offering gas at significantly reduced price. The lowest price on the market and limited lowest price (available only in certain local communities) were since November 2016 identical.

The lowest price on the market was offered by the company GEN-I, which had also the lowest price under the regular price list. The average price in 2017 had been dropping as a result of lower gas prices in the most favourable offers at individual suppliers. We can conclude that that the decrease in prices in the second part of 2017 caused an increased number of supplier changes in this period (Figure 138). The highest price on the market, which in 2017 also slightly increased, had the same supplier since the beginning of 2012 and did not changed significantly over the last five years. Again, it pays to observe offers on the market, since the highest price was almost 2.7 times higher than the lowest price on the market.

Comparative analysis of prices for typical consumption at the national and EU level

Figure 125 shows the movements of natural gas prices with all taxes and levies for household consumers in 2016 and 2017. Since the beginning of 2016 prices for all consumers groups started to decline. The largest decrease in prices in comparison with 2016 was for the group of the smallest consumers – D1, for which the price in the second half of 2017 was by almost 20% lower than in the first half of 2016.

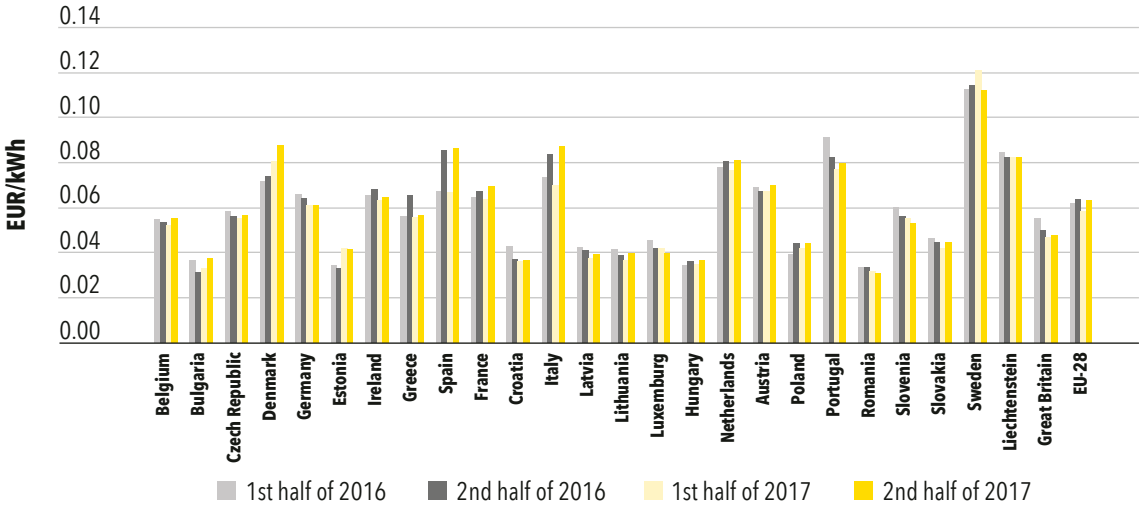
Figure 125: Final natural gas price including all taxes and levies for household consumers in Slovenia in 2016 and 2017



Source: SURS

Figure 126 shows the final prices of natural gas for typical household consumers – group D2 with an annual consumption from 5,556 to 55,556 kWh in Slovenia and EU countries. In most EU countries, prices decreased in comparison with 2016, which is also reflected in the average price at the EU level, which decreased as well. The largest increase in natural gas prices was recorded in Estonia, and the largest decrease in Great Britain. Natural gas price in Slovenia remained below the EU-28 average.

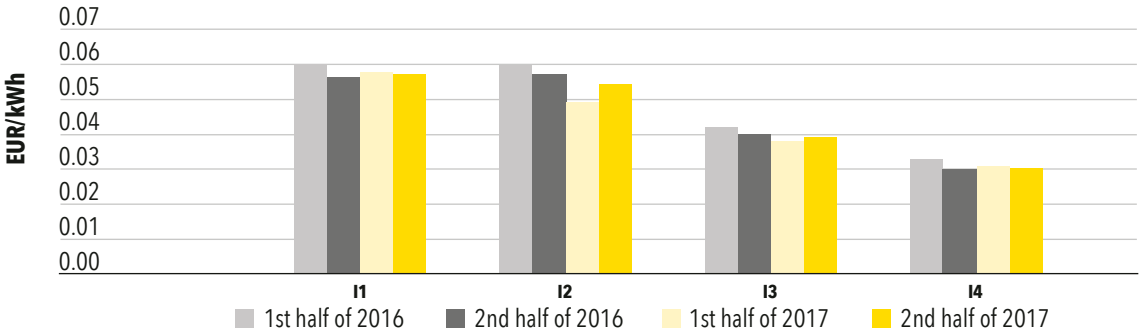
Figure 126: Final natural gas prices including all taxes and levies for typical household consumers (D2) in Slovenia and individual EU countries in 2016 and 2017



Source: Eurostat

Figure 127 shows that the final prices of natural gas for business consumption in comparison with 2016 decreased for groups I2 and I3, and increased for groups I1 and I4. The prices for individual groups were lower in the first half of 2017 and then increased in the second half of the year. The largest decrease in prices compared to 2016 was for the group I2. Individual increases in final prices can be attributed to a significant increase in prices on the wholesale market in the second half of 2017.

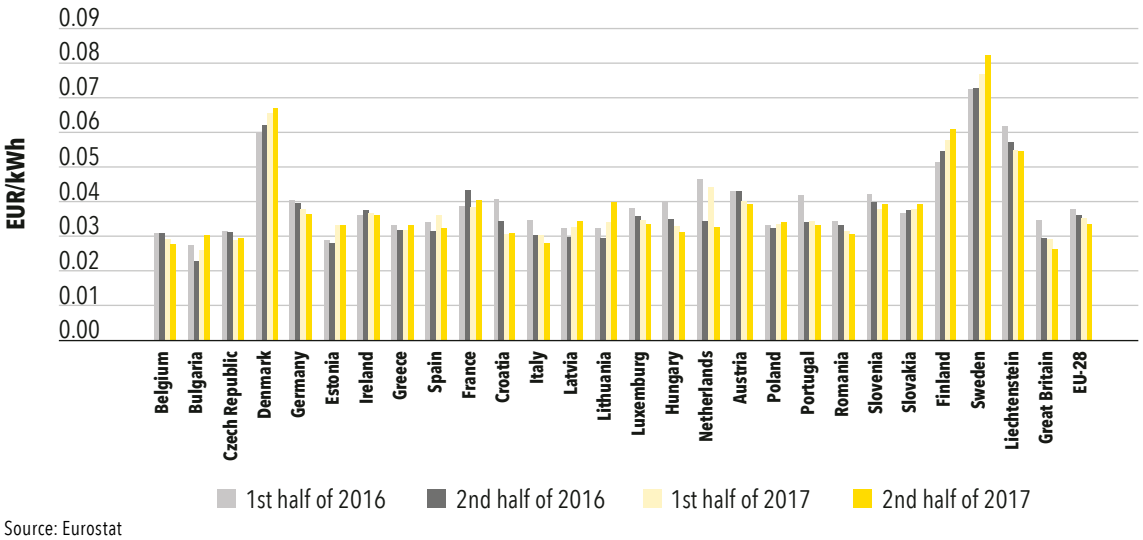
Figure 127: Final natural gas prices including all taxes and levies for industrial consumers in Slovenia in 2016 and 2017



Source: SURS

Figure 128 shows semi-annual natural gas price movements including all taxes and levies in 2016 and 2017 in Slovenia and EU countries for large industrial consumers (group I3) with annual consumption between 2,777,800 and 27,778,000 kWh. In more than half of the EU countries, the prices for this group decreased in comparison with 2016, and the average EU-28 price decreased as well. The largest increase in natural gas prices was recorded in Lithuania, and the largest decrease in Croatia. Natural gas price in Slovenia remained above the EU-28 average.

Figure 128: Final natural gas prices including all taxes and levies for typical industrial consumers (I3) in Slovenia and individual EU countries in 2016 and 2017

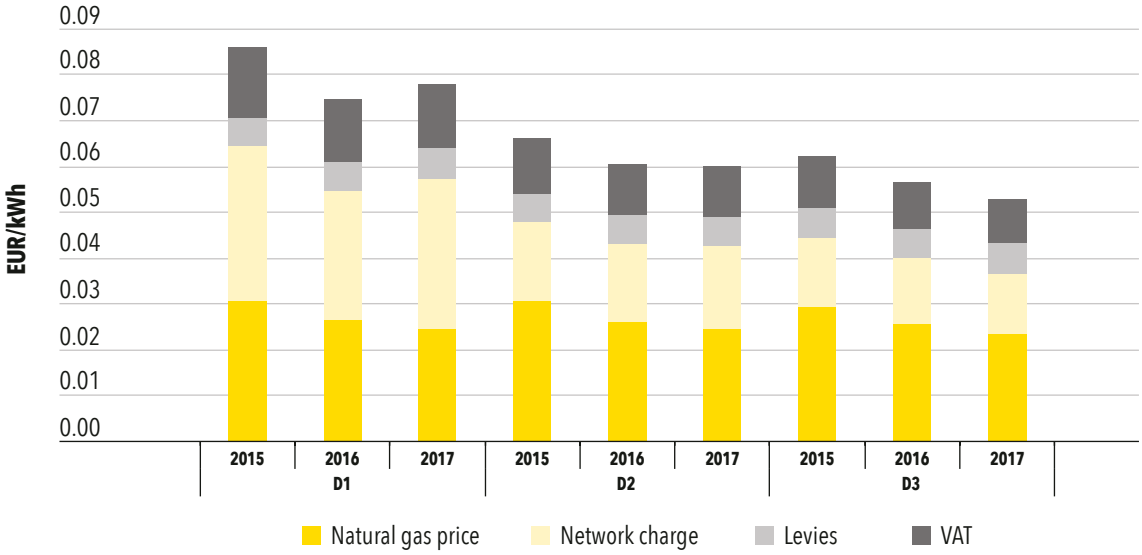


Source: Eurostat

Structure of the final price for natural gas supply

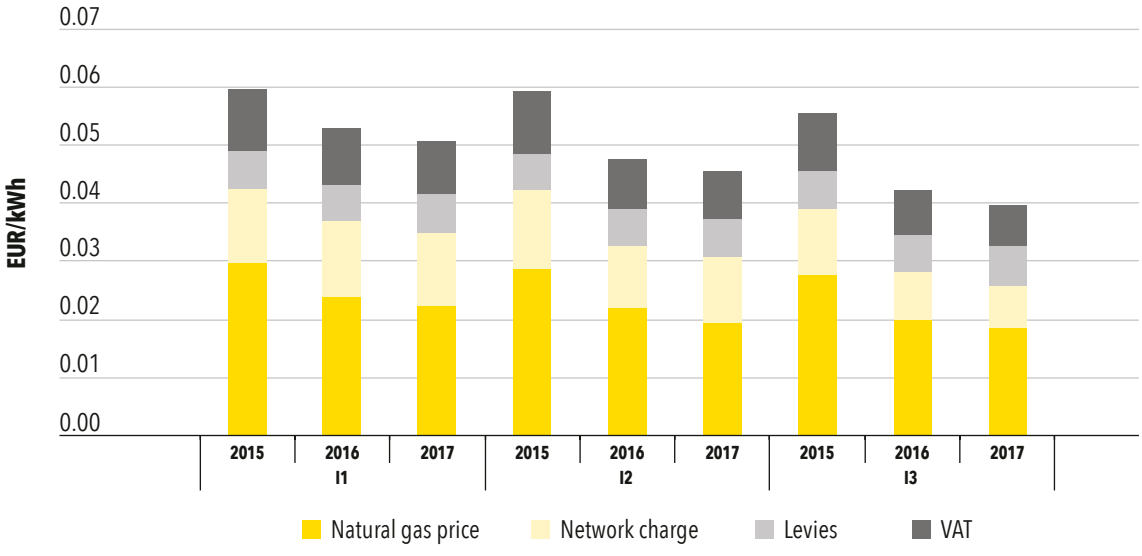
Figures 129 and 130 show the structure of the final price for typical household and business consumers, connected to the distribution systems in the period 2015–2017.

Figure 129: Structure of the final natural gas price for household consumers in the period 2015–2017



Sources: Suppliers' data

Figure 130: Structure of the final natural gas price for business consumers in the period 2015–2017



Sources: Suppliers' data

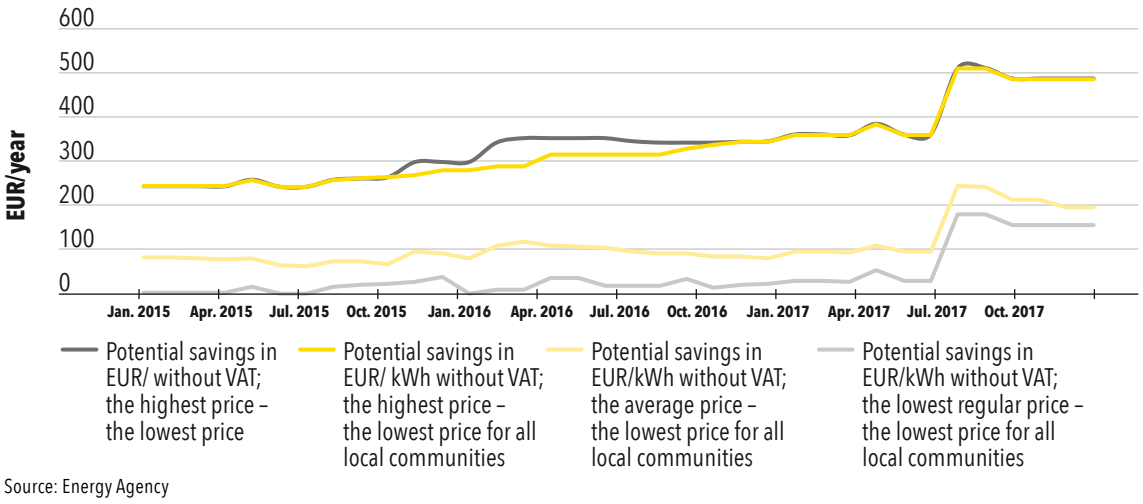
The structure of final prices did not change significantly in the observed period, and due to favourable conditions on the natural gas markets the final price for gas was decreasing as a result of the smaller share of the energy product in the final price. The exception was the group D1, or which the final price increased due to higher network charge. The price of energy product has a dominant influence in the structure of final price, therefore, the individual lower increase in levies or network charge does not affect the final price of gas.

Estimation of potential benefits of changing the supplier or the service of natural gas supply

With change of supplier each household or legal entity can reduce its annual costs for the supply of natural gas, adjust and improve contractual relations with suppliers, thus, gaining additional benefits. Because at large number of consumers the increased consumption of gas is associated with heating season, consumers can during peak consumption achieve large savings if they, in time, choose the best offers on the market.

The annual potential savings for a consumer with an annual consumption of 20,000 kWh are shown in Figure 131.

Figure 131: Potential savings in supply costs for a typical household consumer in case of supplier switching



Source: Energy Agency

The difference between the lowest and the highest price had risen in 2017, the biggest difference was in July and August. The potential annual saving in case of changing supplier in 2017 ranged between EUR 358 and EUR 510. The supplier who offered gas at the lowest price on the market guaranteed this price in all local communities with organized distribution of natural gas.

Potential saving when changing the product with the lowest price under the regular price list with the cheapest product on the market was at the beginning of the year minimal, but when the lowest price dropped the saving increased a lot and was around EUR 180. Potential saving on the basis of the average price ranged between EUR 94 and EUR 244.

€ 510
potential annual savings by supplier switching

4.3.2.2 Market transparency

The financial transparency of suppliers

Suppliers must make public their annual reports and provide data for the needs of national statistics to Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). The Energy Agency within the context of market monitoring analysis annual reports and prepares relevant internal reports on business performance, which are used in correlation analysis for market monitoring purposes. Framework legislation provides a sufficiently high degree of financial transparency of suppliers in the retail market.

Energy bill transparency

Energy bill transparency is systemically regulated in line with the Energy Act and Act on the methodology for determining network charge for the natural gas distribution system in force. On the bill for the delivered natural gas are separately disclosed items for consumed gas, network charge (costs for distribution and metering) and contributions for energy efficiency, RES and CHP, environmental tax (CO_2 tax), excise duty and VAT.

Obligation to establish a regular offer and publication of supply services

Gas suppliers must provide household and small business consumer with transparent information on applicable prices and tariffs and on standard terms and conditions in respect of natural gas supplies and associated price lists, at least by publishing these on their websites. They must also prepare and publish an offer based on regular price list if they have it. Regular price list means a price list for a particular type of customer (a household, or small business consumer), which applies to all consumers that conclude a supply contract with the supplier for a particular type of consumer, with the exception of promotional or package price lists, and includes at least 50% of consumers and at least 250 consumers with each supplier.

The Energy Agency's activities for providing transparency

The Energy Agency regularly monitors of the natural gas retail market, meaning monitoring price movements, number, and characteristics of offers with an emphasis on possible rapid actions in case of malpractice. The information on current tenders and any modification of their characteristics are by liable entities every month sent to the Energy Agency, which in the single point of contact uses this information to inform all stakeholders.

To ensure transparency of the natural gas retail market, the e-services are available on the Energy Agency's websites, among which is a web application for comparison the gas supply offers. The application allows the calculation and comparison of the costs for the gas supply for an individual type of consumption according to price lists entered in the application by suppliers.

The web application for comparison of gas supply also includes the service "Check the bill", which allows a consumer to check the accuracy of a bill for supplied gas, according to the supply and consumption profile. Billing on a monthly basis is shown separately in line with legal components.

A comparison of the costs is in the publicly available part of the comparative services from the implementation of the Energy Act-1 onward restricted to regular price lists. This means that consumers no longer have the single access to all price lists and offers and that they have to search for this information at an individual supplier. Nevertheless, by using the application for comparison the gas supply offers the users have the quick access to websites of all suppliers and their price lists.

In order to ensure the transparency of the retail market, the Energy Agency controls natural gas suppliers and system operators and on the basis of its findings and applicable legislation imposes control measures.

In 2017, the Energy Agency carried out a supervision of the content of general contract terms as a part of natural gas supply contract between a household consumer and natural gas supplier. During the procedure, in more than half of the cases examined, the Energy Agency found out the violations of Article 172 of the EA-1, more precisely, a contract sample or general terms of supply did not contain mandatory content, and in some cases suppliers did not properly designate an independent provider of out-of-the court settlements. Based on the Energy Agency's findings, the suppliers eliminated all irregularities.

In 2017, the Energy Agency also carried out an overview of the DSOs' obligation to publish information related to determination of the calculated quantities in energy units (MWh, kWh). These were, in accordance with Act on the methodology for determining network charge for the natural gas distribution system, related to the publication of altitude, conversion factor Z, and the upper calorific value of natural gas for internal exit points in the natural gas transmission system. During the review it was established that some DSOs on their websites did not have all information published, so in four cases a control over system operator was initiated. In one case it was established that executive regulation had not been violated, so the procedure was terminated, while three operators followed the Energy Agency's notification and therefore all procedures were completed in 2017.

4.3.2.3 The level of market effectiveness

Monitoring of the natural gas retail market effectiveness and competitiveness is carried out on the basis of continuous data collection from reporting entities sent to the Energy Agency. We are describing some indicators for measuring market effectiveness and competitiveness of the natural gas retail market.

Table 35 shows market shares of the suppliers in the retail market in Slovenia. HHI in the natural gas retail market was 2,529 and was in comparison with 2016 lower. Over the last three years the value of HHI decreased by more than 500 points, meaning that the competitiveness is improving. Nevertheless, HHI in the retail market still indicates high market concentration, which due to possible abuse of market power requires detailed monitoring by the competent authorities.

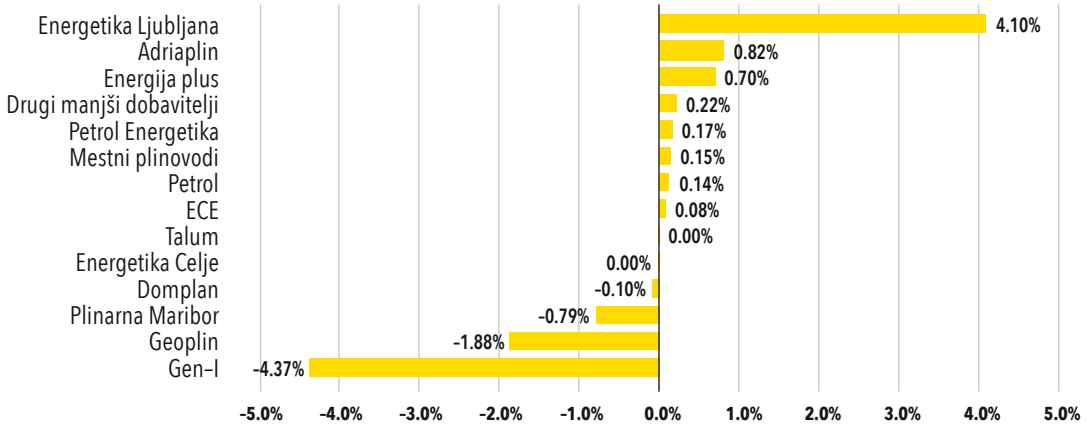
Table 35: Market shares and HHI of the natural gas retail market

Supplier	Market share
Geoplin	45.92%
GEN–I	10.32%
Energetika Ljubljana	10.18%
Adriaplin	9.56%
Plinarna Maribor	5.17%
Petrol	4.37%
Petrol Energetika	3.28%
Talum	2.16%
Domplan	1.70%
Energetika Celje	1.50%
Mestni plinovodi	1.21%
Energija plus	1.18%
ECE	1.01%
Other small suppliers	2.40%
Total	**100%**
HHI of the retail market	**2,487**

Source: Energy Agency

In 2017 compared to 2016 the market share of suppliers JP Energetika Ljubljana, Adriaplin and Energija Plus increased the most. After GEN-I in 2016 gained the biggest market share compared to the previous year, in 2017 recorded the largest decrease in market share compared to the previous year (4.3 percentage point). Almost 1.9 percentage point also lost Geoplin, but less than in 2016, when it lost almost 2.7 percentage point. Changes in market shares in comparison with 2016 are shown in Figure 132.

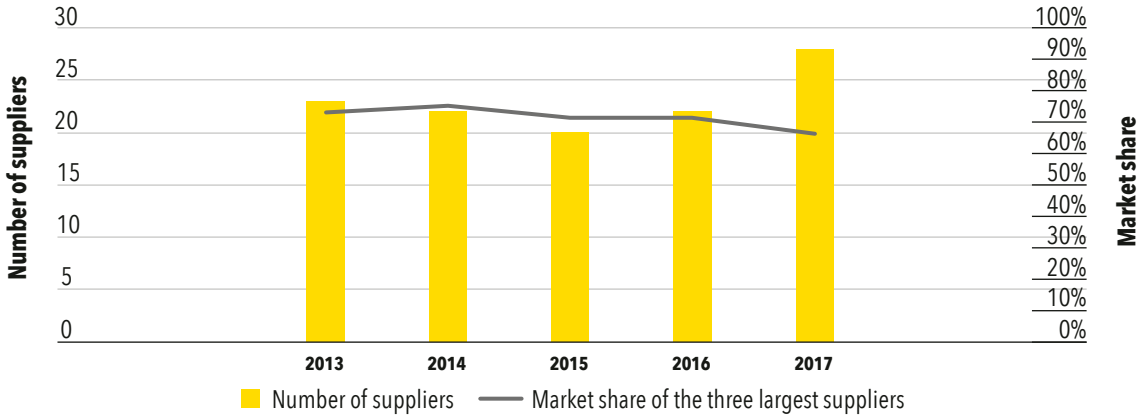
Figure 132: Changes in market shares in 2017 in comparison to 2016



Source: Energy Agency

Figure 133 shows the trend in the number of suppliers in the period 2013–2017 and total market share of the three largest suppliers in the retail market in Slovenia. In 2017 the number of suppliers increased by six, among which only one supply gas also to household consumers. The remaining five suppliers were selling gas only to business consumers in a limited area. Total market share of the three suppliers in the observed period in 2017 for the first time fell below 70% and amounted to 67%. The decrease in market share is mainly the result of changed market shares of the most dominant companies in the market.

Figure 133: Market shares of the three largest suppliers in the natural gas retail market and the number of all suppliers in the period 2013–2017



Source: Energy Agency

Table 36 shows the market shares of supplier to household consumers in the retail market in 2017.

Table 36: Market shares of suppliers in the natural gas retail market to all household consumers in 2017

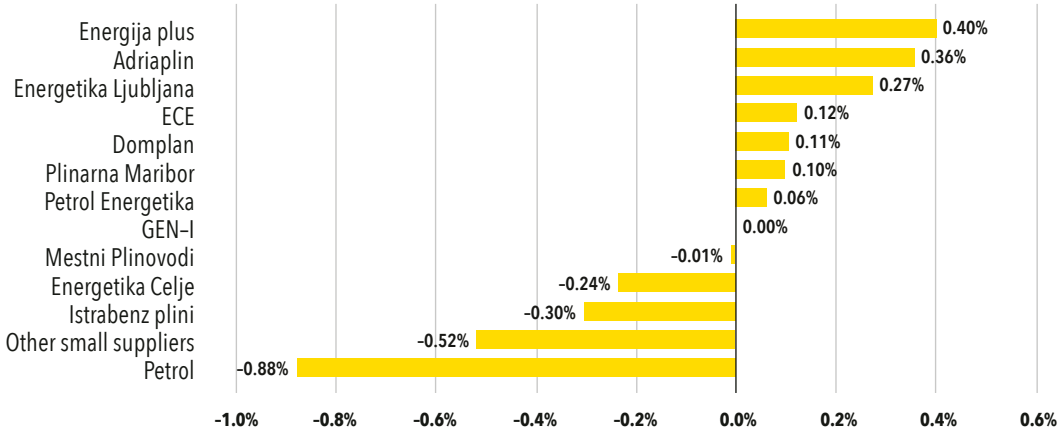
Supplier	Market share
Energetika Ljubljana	30.0%
GEN-I	21.2%
Plinarna Maribor	12.3%
Adriaplin	8.6%
Petrol	7.5%
Energetika Celje	4.5%
Domplan	3.3%
Mestni Plinovodi	2.5%
Petrol Energetika	2.0%
Istrabenz plini	1.7%
ECE	1.3%
Energija plus	1.1%
Other small suppliers	4.0%
Total	**100%**
HHI of the retail market for household consumers	**1,698**

Source: Energy Agency

In the retail market for household consumers was in 2017 a medium market concentration, the HHI value, which in comparison with 2016 insignificantly increased, was closed to upper limit of this class (1,800). The market share of the two largest suppliers ((CR2) was more than 50%. The biggest market share had Energetika Ljubljana, followed by GEN-I and Plinarna Maribor.

Energija plus, Adriaplin in Energetika Ljubljana (Figure 134) increased their market share the most, while Petrol and other small suppliers lost the biggest part of their shares.

Figure 134: Changes in market shares in the retail market for household consumers in 2017 compared to 2016



Source: Energy Agency

Market shares of natural gas suppliers to business consumers in 2017 are shown in Figure 135.

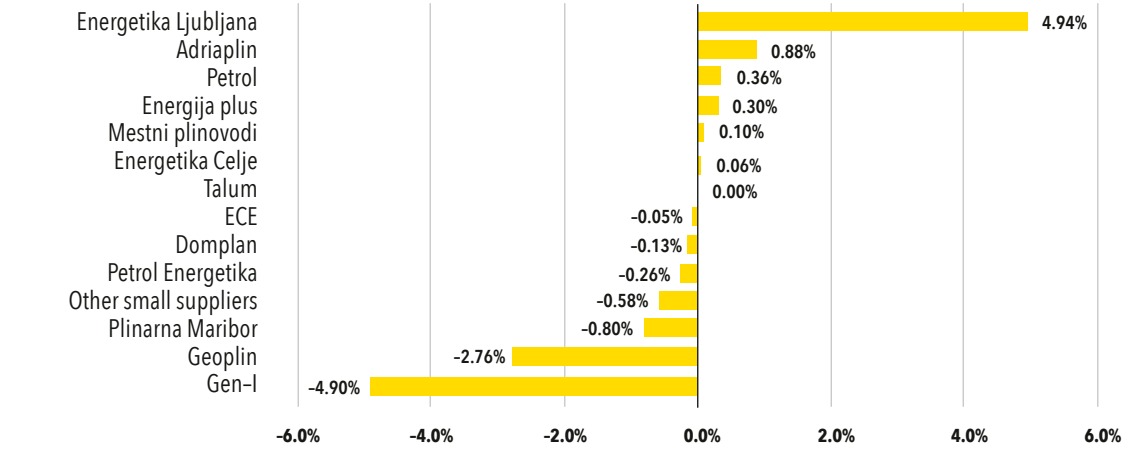
Table 37: Market shares of suppliers in the retail market for all business consumers in 2017

Supplier	Market share
Geoplin	52.3%
Adriaplin	9.7%
GEN–I	8.8%
Energetika Ljubljana	7.4%
Plinarna Maribor	4.2%
Petrol Energetika	3.5%
Petrol	3.9%
Talum	2.5%
Domplan	1.5%
Energija plus	1.2%
Energetika Celje	1.1%
Mestni Plinovodi	1.0%
ECE	1.0%
Other small suppliers	2.0%
Total	**100%**
HHI of the retail market for business consumers	**3,022**

Source: Energy Agency

The retail market for business consumers was by HHI value 3,070 highly concentrated. In comparison with 2016, the value of HHI decreased by 300 points, indicating a slight increase in competitiveness in the market. The largest market share had the company Geoplin, followed by Adriaplin and GEN-I.

Figure 135: Changes in market shares in the retail market for business consumers in 2017 compared to 2016



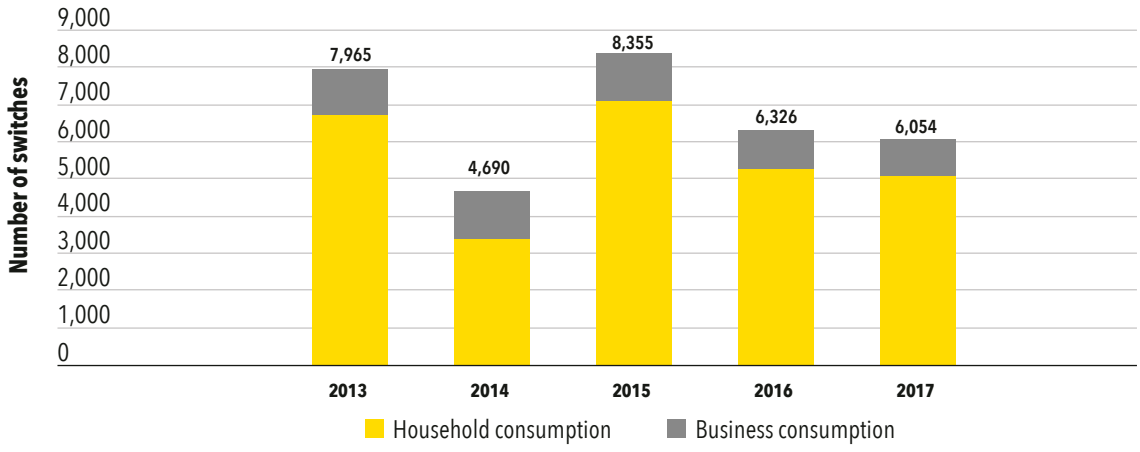
Source: Energy Agency

In this part of the retail market the largest increase in market share compared to 2016 is recorded at Energetika Ljubljana, Adriaplin and Energija plus, while the majority of the share lost GEN-I in Geoplin.

Switching supplier

In 2017, 6,054 consumers, connected to the distribution system changed their natural gas supplier, namely 5,087 households and 967 business, and on average 424 households and 81 business per month. Number of switches was by 4.3% lower than the year before. In the last five-year period, the largest number of switches was recorded in 2015. The number of switches by individual year and consumption type in presented in Figure 136.

Figure 136: Number of switching supplier in the period 2013–2017



Source: Energy Agency

The company RWE in 2017 entered the retail natural gas market; RWE is also offering the supply of electricity. In the last period more natural gas suppliers started to offer also electricity supply.

Slovenian Consumers' Association in May 2017 organized the second group purchase of electricity and natural gas (Switch and save #2), which aimed to provide consumers with the best possible offer without binding and hidden costs and ceiling price for the period of one year. The first campaign that took place

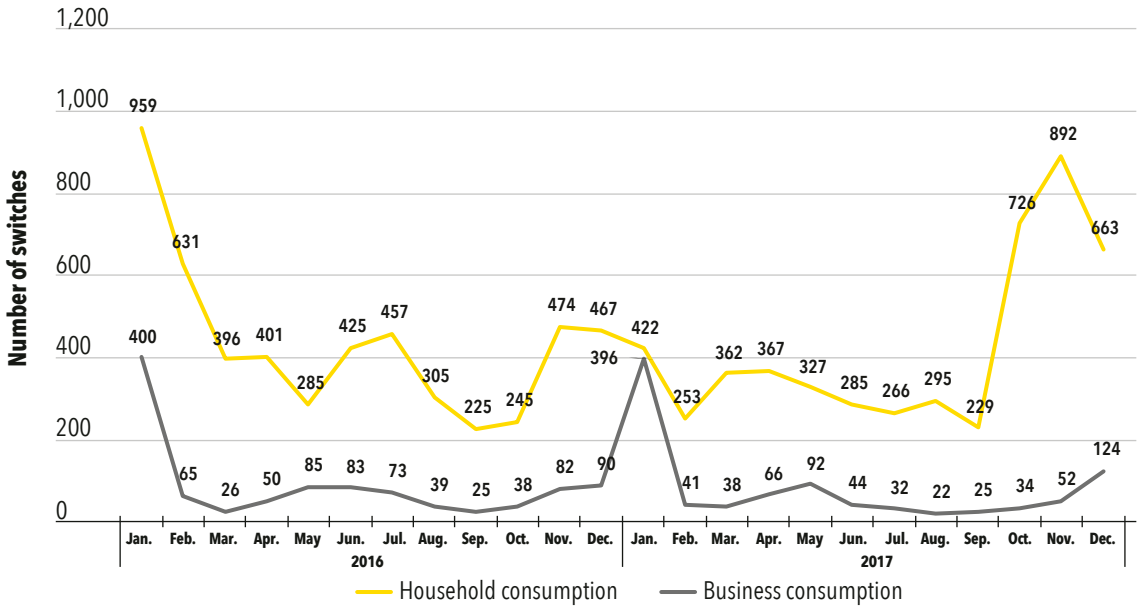
in 2015 (Switch and save) significantly contributed to the number of switches, since within the campaign more than 12,000 consumers of electricity and gas changed their supplier. Campaign Switch and save #2 was even more successful – as much as 2,765 gas consumer changed their supplier . That is 46% of all gas supplier switches in 2017. We can concluded that active consumers planned their activity of annual supplier switching after the campaign was announced in May and participate in the campaign, which could be the reason for reduced dynamic of changing supplier in the market. Considering attractive potential saving by changing a supplier in 2017, we can see that the awareness of consumers is not expanding from already existing circle of active consumers.

At the beginning of 2017 we recorded a significantly smaller number of supplier switches by household consumers than at the end of 2017 (Figure 137). Switches largely depend on heating season, when consumption is higher and energy prices have significant influence on costs for natural gas supply. The increased number of switches at the end of the year can be result of more intense promotional activities at the conclusion of the campaign Switch and save #2 in October. In the second half of 2017, the company GEN-I come out with more offers for gas supply, which prices were very appealing. The lowest prices were by 35% lower than in 2007 at the natural gas market opening.

Up to 35%
lower gas prices for household consumption than ten years ago

At business consumers in comparison with 2016 no major deviations occurred, since a pattern with several suppliers switches at the beginning of the year, when contracts with suppliers terminate.

Figure 137: Dynamics of the number of supplier switches in 2016 and 2017 depending on the type of consumption

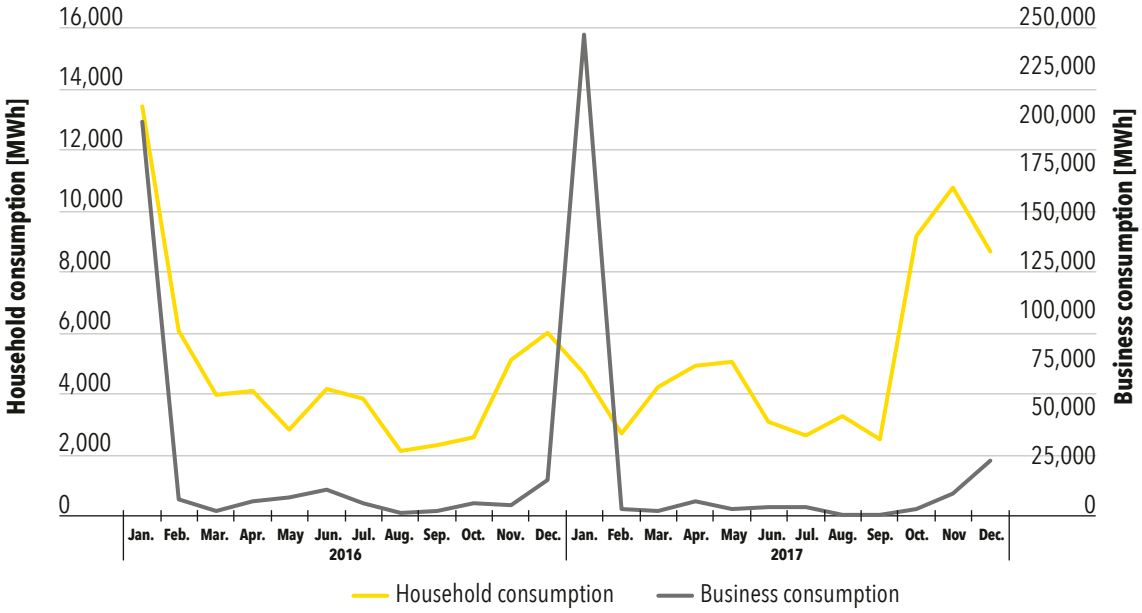


Source: Energy Agency

Figure 138 shows the trend in the movement of natural gas volumes in 2016 and 2017. Amounts that are exchanged are usually connected with the number of supplier switches. At the beginning of 2016 and at the end of 2017 volumes of exchanged gas were significantly higher than at the beginning of 2017.

44 https://www.zamenjajinprihrani.si

Figure 138: Amounts of gas exchanged among suppliers with respect to the consumption type in 2016 and 2017

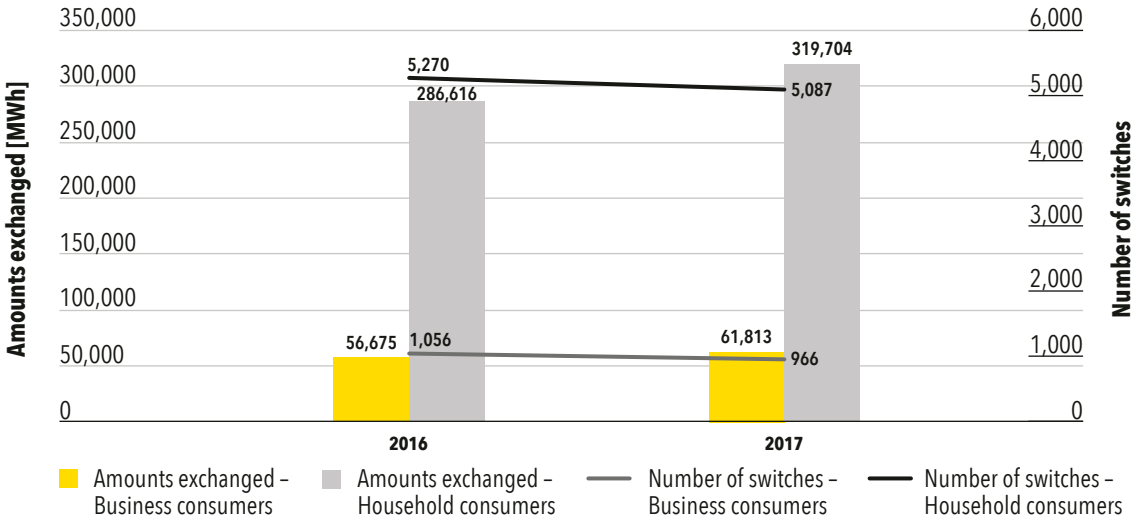


Source: Energy Agency

As we can see in Figure 139, the total amount of natural gas that was exchanged due to supplier switches by business customers in 2017 was in comparison with 2016 bigger despite the smaller number of switches in 2017. The reason can be a different structure of consumers or annual consumption of consumers that changed a supplier.

Even at households, in spite of less switches in 2017 than in 2016, the volumes were bigger. A detailed analysis of the data revealed that in 2016 more suppliers with lower annual consumption changed their supplier (consumption group C_{DK1} in C_{DK2}), while in 2017 more switches were made by suppliers with higher annual consumption (C_{DK3} in C_{DK4}).

Figure 139: Amounts of gas exchanged and number of switches with respect to the consumption type in 2016 and 2017



Source: Energy Agency

4.3.2.4 Recommendations on supply prices, investigations and measures to promote effective competition

The price of natural gas as an energy product is not regulated and is formed freely according to supply and demand in the wholesale and retail markets. Gas prices in supply offers depend mainly upon on business strategies of an individual supplier and supply conditions that are provided to suppliers at trading. The purchase price is influenced by several factors, which are characteristics of signed contracts, movements of prices of oil and oil products, foreign exchange rates, weather conditions, supply offers on international power exchanges and competition on the market.

The final amount of gas supply paid by consumers includes in addition to the amount of delivered gas also the regulated part of the network charge for the use of the transmission and distribution system and contributions for energy efficiency, RES and CHP, environmental tax (CO_2 tax), excise duty and VAT, determined by the government.

One of the Energy Agency's task is consumer protection. The Energy Agency continuously monitors the retail market, cooperates with regulatory and supervisory authorities on the national level (Market Inspectorate, Competition Protection Agency) and with independent and non-profit consumers organizations. It is also responsible for updating of information on market developments and ensures market transparency with activities and services that are provided in the single point of contact.

For the natural gas market, the same rules on the prohibition of restriction of competition and abuse of a dominant position are applied as for other types of commodities.

From the publicly available data, it is evident that the Slovenian Competition Protection Agency of the Republic of Slovenia in 2016 in case of companies operating in the natural gas market did not identify any restrictive practices or potential in dominant positions in the market. In the context of a concentration assessment in 2017 a concentration of the DSOs, the companies Adriaplin d.o.o. and Mestni Plinovodi d.o.o. was notified, but no decision was taken in the current year.

In the area of measures carried out in accordance with the third package of energy legislation on harmonisation of data exchange at the national and regional level. Act on the identification of entities in the data exchange among participants in the electricity and natural gas market binds market participants to use standardized identifiers of key data entities in the electronic exchange of data in the market. The Energy Agency on the basis of market monitoring in 2017 established that data exchange in the market is not in compliance with the provisions of the relevant Act. Uniform and standardize identification of measuring points in the entire country is important for lowering the costs of the implementation of IT systems (entry costs of new participants) and for effective deployment of data and other services in the market. Data exchanges processes in the natural gas market do not comply with open standards at the EU level. At the end of 2017, the Energy Agency began planning the implementation of adequate measures to improve the situation.

> Energy Agency notes the incompatibility of the implementation of electronic data exchange processes with the secondary legislation, which has a negative impact on market efficiency and development of competition

4.4 Security of supply

In 2017, the security of gas supply was marked by two events. The first one was the introduction of new Regulation No. 2017/1938, which repeals Regulation (EU) 994/2010 and introduces new requirements to the Member States and competent authorities. The second event was unexpected interruption of gas delivery at the border entry point Ceršak following the accident in Baumgarten. Except for these two events, the supply of natural gas in 2017 was reliable and without additional interruptions.

Improving the overall security of supply at the EU level is the aim of the new Regulation (EU) No. 2017/1938, which on the Member States and their competent authorities imposes additional requirements related to the preparation of risk assessment, preventive action plans, and emergency response plans. These plans should be more detailed and comprehensive, and the regulation also introduces a new status of solidarity protected customers, which is limited to household consumers and essential social services. It also introduces Union solidarity mechanism design to address extreme situation.

> The new regulation raises the level of security of supply at the EU level and requires more uniform and comprehensive plans in the Member States

Risk assessments at the level of risk groups (regions) began to prepare at the end of 2017 and should be completed in 2018. Slovenia is a part of three operating risk groups, named after the countries of Ukraine, Libya, and Algeria. Regional risk assessments will provide some input data and will also allow for greater consistency among the Member States in their risk assessments at the national level. The competent authorities will take this into account in the next renewal of risk assessments.

The Energy Agency conducted a public hearing on amendments and supplementation of the Preventive Action Plan and Emergency Plan that were prepared under the previous Regulation (EU) No. 994/2010. The proposed changes only implement the European Commission's proposals for additional transparency. Plans will remain in force until the changes, which will also include renewed risk assessment and adjustments to the new regulation, are introduced.

In accordance with the current Preventive Action Plan, the Energy Agency in 2017 published the Report on the security of natural gas supply, which refers to the provision of the supply standard for the supply of protected customers for the next gas year (the period October 2017–September 2018). The report notes that suppliers met the requirements set by the standard for the supply of protected customers with different measures, most of them on the supply side and some of them on the demand side. The suppliers are according to this act bound to increase sources diversification, and they fulfil this task. Under the methodology, published in this act, the suppliers to protected consumers must provide a minimum average daily amount of gas for three borderline cases. In Slovenia, gas suppliers are required in total provide 1,216,879 Sm^3/day (13,093 MWh/day) during a seven-day period with the lowest temperature, 608,613 Sm^3/day (6,549 MWh/day) during a thirty-day period with extremely high demand, and over a thirty-day period after the interruption of supply on the largest infrastructure 853,452 Sm^3/day (9,183 MWh/day). Suppliers can also own or acquire the capacity needed for the supply of protected customers with no additional restrictions.

Suppliers to protected consumers in 2017 met the supply standard

The Slovenian gas pipeline system is at risk, if an unannounced interruption of gas through the border point Ceršak happens since almost all gas supply runs through this point. There are no storages and neither LNG terminals in the Slovenian gas system, therefore, managing the consequences of unplanned interruptions of supply is much more demanding. In the long run, the gas TSO solves such situation by adequate investments into the transmission system. The establishment of the reverse flow for a part of capacity at the interconnection point Rogatec will be the first such measure, introduce already in October 2018. Additional long-term measures are planned upgrading of the system and increases of capacity in parts of the existing transmission system. In 2017, the preparations of the new interconnector to Hungary were held, which would allow the access to storages and contribute to the diversity of transmission routes. For the security of gas supply, the access to the gas-oil filed Petišovci and transfer and distribution of this gas to the Slovenian consumers would have a positive impact. Short-term measures to address these risks on the supply are the diversity of the supply sources and use of alternative transmission routes by using other existing entry sources. Short-term measures on the demand side mean reducing consumer spending during the crisis.

CASE STUDY : Gas supply on 12 December 2017 after a crisis event in Austrian gas hub

On Tuesday, 12 December 2017, at 8:45 CET), an explosion occurred at European gas hub at Baumgarten an der March in Austria, near the Slovakian border, followed by the fire. Due to the interruption of supply through this hub the operation of Austrian natural gas transmission system was. Transmission of gas from Austria to Slovenia through the border entry point Ceršak stopped at 11:00 a.m. To Slovenia gas can also be transported through the entry point Rogatec whose technical capacity reaches only 20% of the technical capacity of entry point Ceršak.

In cold days, gas consumption is dictated by outside air temperature. On that day, the temperatures did not reach low winter level; at 7 a.m.in the centre of Ljubljana the temperature was above 12°C, at 14:00 p.m. around 11°C, and remained above 9°C at 21:00 p.m. That day the gas was also not used for the production of electricity. Before the termination of supply, the transfer through the entry point Ceršak amounted to around 43% of the maximum daily flow in 2017.

The gas TSO, the company Plinovodi, notified the Energy Agency and suppliers, which immediately started to act in order to provide natural gas for their customers through different routes.

Emergency plan for the natural gas supply regulates the competencies and envisages measures at different crisis levels. The Energy Agency as the competent authority on that day at 12:47 declared an early warning phase by publishing a notice on its website. At this stage it was not yet clear how long the termination of supply through entry point Ceršak will last.

> An early warning phase was declared in Slovenia for the first time

Early in the afternoon, a coordination meeting took place, on which the TSO, suppliers and the Energy Agency exchanged status information. On the basis of this meeting, the Energy Agency estimated that the current situation of supply was stable and no additional measures were not necessary; this was also published at 16:39 p.m.

The gas TSO was in constant contact with suppliers and the Energy Agency. In the evening of the same day, the TSO informed other stakeholders that transfer of gas from Austria will be restored later this day, and about 23:00 that also happened. For the next gas day, both TSOs coordinated nominations, thus, it was announced that on 13 December transfer of gas from Austria would take place smoothly. On that day, in the morning, the Energy Agency considered that there were no longer any grounds for the declared level of early warning, and, therefore, at 7:12 a.m. the Energy Agency announced the end of the early warning phase.

The supply of gas was continuously carried out smoothly, the transmission system operated appropriately, and coordination among the natural gas undertakings was quickly established. The gas market was working without any interruption.

This event showed that when the supply through the border entry point Ceršak is terminated, it is only for a short time possible to continue without taking any measures. If the interruption lasted longer, according to the Energy Agency's assessment measures determined in Emergency Plan would be required. This would mean call a meeting of crisis group, take decisions on higher crisis levels and, in extreme circumstances if it were not available enough gas, limitation of consumption.

> The crisis lasted one day and finished without limitation of consumption

5

CONSUMERS **PROTECTION**

Household consumers of electricity and natural gas are protected by regulations governing the energy market and regulations protecting consumers' rights. Access to information regarding rights, applicable legislation, and methods for dealing with complaints in connection with electricity and gas supply is provided to household consumers in the single point of contact on the Energy Agency's website.

The lowest number of disconnections of household consumers due to non-payment in the last five years

The number of household consumers' complaints against a supplier have risen sharply, most of the complaints were related to billing and metering

5.1 Protection of electricity and natural gas consumers

One of the most important tasks of the Energy Agency is the protection of household consumes, especially the protection of vulnerable consumers. Household customers of electricity and natural gas are consumers who purchases electricity and natural gas for their own use in households, which excludes the use for commercial or professional activities. These consumers are protected with regulations governing the energy market and regulations protecting consumers' rights. The Energy Act ensures that electricity and natural gas consumers have:

- right to conclude a supply contract with a electricity and gas supplier;
- right to switch electricity or gas supplier;
- right to access their consumption data, on which a supplier provides periodic information;
- right to be informed of the energy source of delivered energy, provided on supplier's invoice, in the promotion materials or on the internet;
- right to last resort supply of electricity under conditions defined in the Energy Act;
- right to out-of-court dispute resolution with a selected supplier in accordance with the law governing out-of-court resolution of consumer dispute;
- right to protect their rights in administrative procedures before the Energy Agency.

All described consumer rights as well as access to information on these rights, applicable regulations and general acts for exercising public authority and methods for dealing with complaints in connection with electricity and gas supply is provided to household consumers in the single point of contact on the Energy Agency's website for the third consecutive year.

Single point of contact is on the Energy Agency's website available to household consumers for the third year

The Energy Agency on its website also provides household consumers comparative online services for electricity and gas supply; the tool contains information on regular price list, and it also enables comparison and calculation of supply costs on a monthly or annual basis.

Vulnerable consumers are household consumers who, due to their financial circumstances or living conditions, income and other social circumstances are unable to obtain an alternative source of energy for household use that would incur the same or smaller costs for essential household use. These consumers are entitled to the emergency supply under certain conditions. If a vulnerable consumer fulfils the conditions for emergency supply of electricity, threatened disconnection is shifted for the time of emergency supply, and the costs of emergency supply are covered by a DSO.

20 household natural gas consumers exercised the right to emergency supply no household electricity consumers

In case of emergency supply in the area of natural gas emergency supply means a postponement of disconnection for a certain time period, while costs of energy and network charge are paid by the vulnerable consumer after the emergency supply ends.

Emergency supply is carried out by electricity or gas DSO under the procedure set in system operating instructions, and in the area of electricity also in accordance with the rules and criteria determined by the Energy Agency in Act on the criteria and rules for providing emergency supply of electricity.

Tables 38 and 39 show the number of disconnections of household consumers of electricity and natural gas due to non-payment. Number of disconnections due to non-payment decreased compared to the previous year and represents only a small percentage of all electricity and natural gas consumers. More disconnections were related to electricity on behalf of more electricity consumers. It is a matter of concern, however, that despite the possibility of emergency supply disconnections still happened. The reasons may be that the eligibility criteria for emergency supply are set too high. The fact that in 2017 the right to emergency supply claimed 20 household suppliers of natural gas and no electricity consumer.

Table 38: Number of disconnections of electricity household consumers due to non-payment in the period 2013–2017

	2013	2014	2015	2016	2017
Total number of disconnections due to non-payment	6,877	7,926	5,949	6,045	5,770
Number of all household electricity consumers	827,902	831,185	834,664	838,505	841,540

Sources: Electricity suppliers, SODO, Energy Agency

Table 39: Number of disconnections of natural gas household consumers due to non-payment in the period 2013–2017

	2013	2014	2015	2016	2017
Total number of disconnections due to non-payment	1,207	861	711	531	427
Number of all household natural gas consumers	119,468	119,025	118,719	119,583	119,678

Sources: Natural gas suppliers, DSOs, Energy Agency

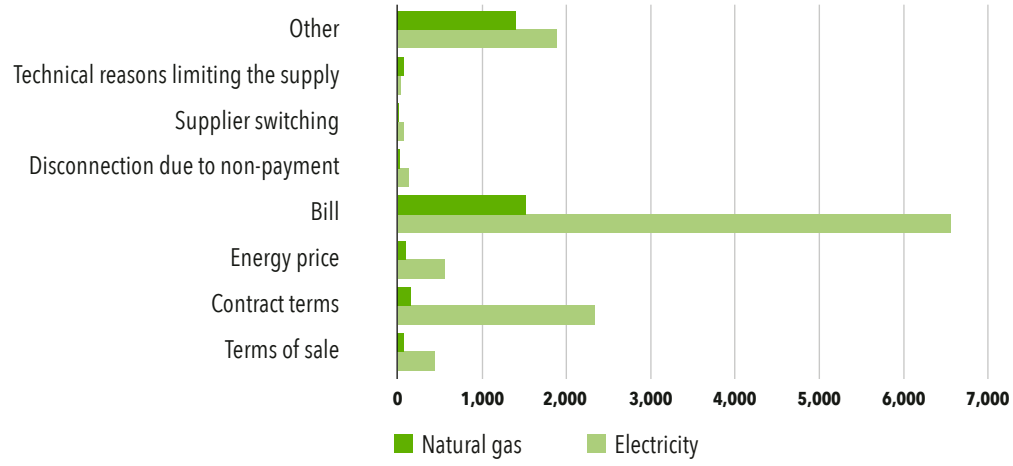
5.1.1 Consumers' complaints and dispute settlement

Supply contracts concluded with household consumers must among other things include information on how to initiate a procedure and handling complaints related to electricity or gas supply, that is information on the appointment of an independent provider of out-of-the court settlements. In 2017, the Energy Agency carried out a supervision of suppliers, checking whether suppliers in accordance with the Energy Act appointed and independent and impartial person or several persons responsible for deciding on appeals; to these persons a consumer may address his complaint with regard to the alleged violations of the supply contract by supplier. It was established that not all suppliers appointed an independent provider of out-of-the court settlements, who is undoubtedly inevitable for the non-discriminatory consumer protection. With supervisions the Energy Agency achieved that most of suppliers appointed an independent provider of out-of-the court settlements. Three supervision procedures started in 2017 will continue in 2018, and the Energy Agency will perform supervisions also in the future.

The number of complaints in 2017 rose sharply

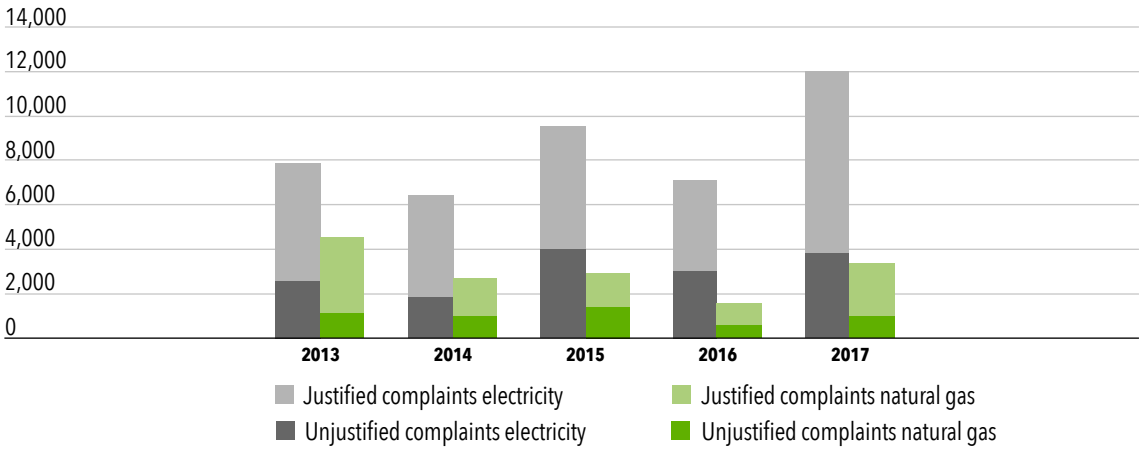
Within market monitoring the Energy Agency obtains information from suppliers on household consumer complaints against suppliers. The number of complaints in 2017 rose sharply, which can be result of better awareness of consumers about the possibilities of filing a complaint against a supplier.

Figure 140: Number of electricity and gas household consumers' complaints against suppliers in 2017 by reasons



Sources: Electricity and natural gas suppliers, Energy Agency

Figure 141: Number of electricity and gas household consumers against suppliers in 2017 against suppliers in the period 2013–2017



Sources: Electricity and natural gas suppliers, Energy Agency

Possible violations of the general rules for the protection of household consumers in Slovenia are monitored also appropriately sanctioned be the Market Inspectorate.

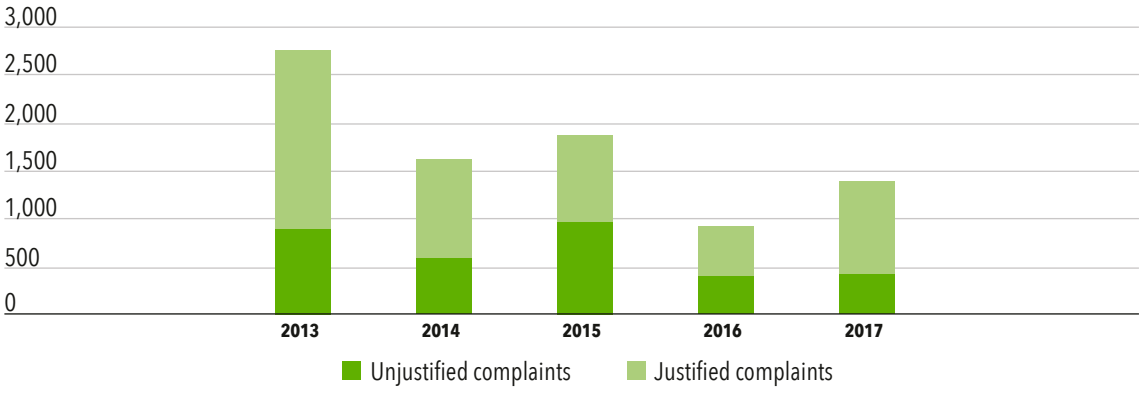
5.1.2 Consumer protection in administrative procedure

The Energy Agency ensures that consumer rights are respected also in administrative procedures run by the Energy Agency. These procedures are free of charge since no administrative fees are charged for administrative appeal as well as final decisions. Given the short-time limits, procedures are very fast. Namely, the Energy Agency must decide on application within two months after filing a complete application and assuming that client carried out a preliminary procedure in accordance with the provision of the Energy Act. A two-month deadline can the Energy Agency extend only with the consent of the applicant.

In 2017, the Energy Agency did not decide on requests related to natural gas since cases were already settled with a DSO.

A total of 1401 complaints were lodged with gas DSOs in 2017. The number increased significantly compared to the previous year when only 919 complaints were submitted. Numbers of filed and justified and unjustified complaints against decisions of gas DSOs are presented in Figure 142.

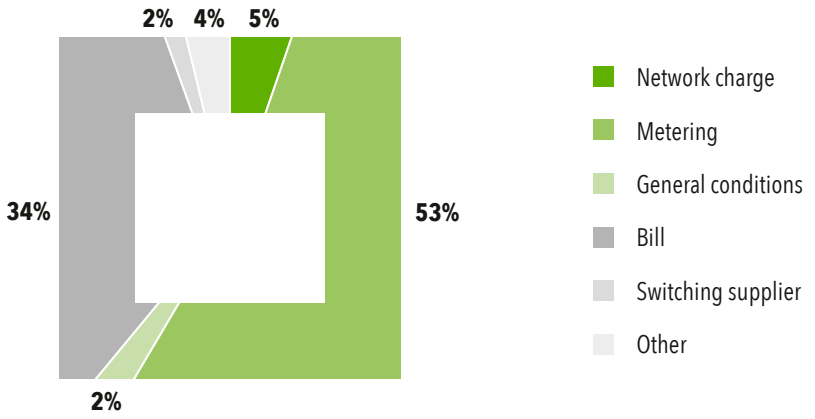
Figure 142: Total number of complaints of household gas consumers against gas DSOs decisions in the period 2013–2017



Sources: Gas DSOs, Energy Agency

Figure 143 shows that more than half of complaints were related to disagreement with metering done by DSOs, and the third to issued bills.

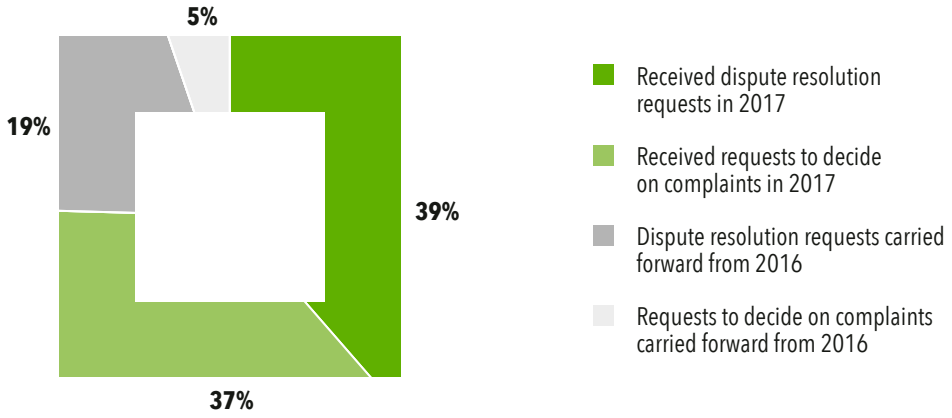
Figure 143: Complaints of natural gas household consumers by the reason of complaint in 2017



Sources: gas DSOs, Energy Agency

In the area of electricity, the Energy Agency in 2017 decided on 43 applications (requests to decide on dispute, complaints). In 22 cases decided in the first and in 21 cases in the second instance. The Energy Agency also decided in 11 cases in the first instance and in three cases in the second instance for 2016. Complaints related to electricity and decided by the Energy Agency in 2017 are presented in Figure 144.

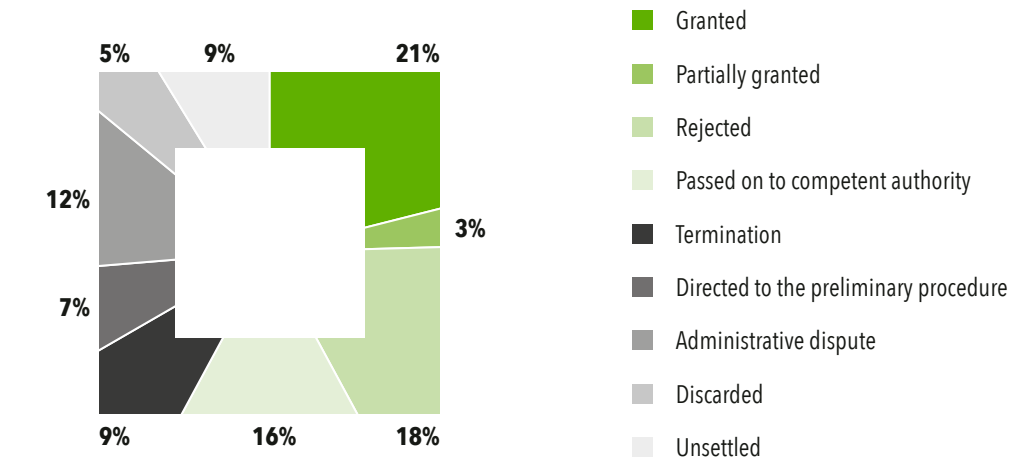
Figure 144: Odločanje agencije v sporih in o pritožbah s področja električne energije v letu 2017



Source: Energy Agency

Figure 145 shows the diversity of the Energy Agency's decisions. In the vast majority, consumers trusted the Energy Agency's decisions since only in small percentage of cases the administrative dispute against Energy Agency decisions was initiated.

Figure 145: Decisions on disputes and complaints in 2017



Source: Energy Agency

The content of the submitted requests related to electricity was very diverse. The Energy Agency, thus, decided on disputes concerning charged electricity and network charge, incorrect functioning of metering or control devices, undue consumption, compensation for alleged breaches of the guaranteed quality standards, and procedural reasons. In dealing with complaints the Energy Agency in most case decided on procedural irregularities, and in questions of content about appeals concerning unsolved relationship between the owners of property when issuing connection approval.

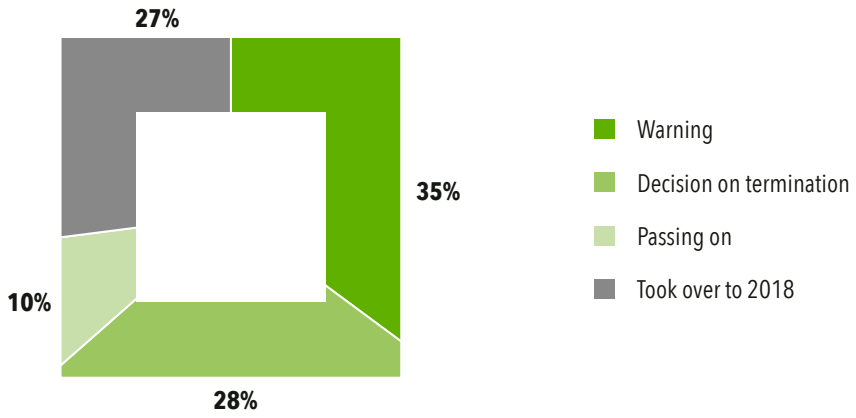
In the vast majority, consumers trusted the Energy Agency's decisions since only in small percentage of cases the administrative dispute against Energy Agency decisions was initiated

5.1.3 Monitoring the electricity and natural gas market

Consumer protection is also ensured by monitoring system operators, suppliers and other energy-related providers. In 2017, the Energy Agency with its supervisions achieved that suppliers provided information on out-of-the court settlements between household and small business consumers and suppliers in order to protect consumers' rights and independent resolution of complaints.

Compared to 2016, when Energy Agency dealt with 86 issues related to monitoring, the number of cases decreased a little. There were 50 new cases, and from 2016 it was transferred 24 cases. Out 74 cases, 42 were related to electricity and 32 to natural gas. Most of the procedures were initiated ex officio and 33 after receiving applications. The Energy Agency's actions are shown in Figure 146.

Figure 146: Energy Agency's decisions in the procedures of supervision



Source: Energy Agency

Due to violations of the provisions of the EA-1, the Energy Agency did not initiate any minor offence proceedings in 2017, and from the previous period closed two proceedings with a warning. The Energy Agency also did not in any case temporarily prohibit the activity or temporarily seized items or documents or proposed to other authority to take measures.

6

ENERGY EFFICIENCY

Also in 2017 obligated parties, suppliers of energy products to final customers exceeded mandatory energy savings. Most of them were achieved in transport and industry.

64%
of all savings in transport were reached by adding fuel additives

187%
more energy was saved by obligated parties than required

6.1 Final energy savings achieved with contributions from suppliers

6.1.1 Energy efficiency obligation scheme in Slovenia

The target saving on the annual level in the energy efficiency obligation scheme in the period from 1 January 2014 to 31 December 2020 has to be at least 1.5% of the annual energy sold to final consumers by obligated parties to achieve energy savings averaged over a three-year period before 1 January 2013. From this, the quantity of energy sold for transport can be exempted. The basis for the calculations of the target energy savings by the distributors on the Slovenian level is an average final consumption of energy over the period 2010-2012, which is, in accordance with the third paragraph of Article 7 of the Directive energy efficiency, reduced by 25%.

Slovenia will meet target savings by using combined system of policy measures, which means that obligated parties - suppliers of electricity, gas, heat, solid and liquid fuels, who sell energy to final consumers have to gradually achieve 0.75% of savings on the annual level. The same share of savings must be achieved with measures taken by Eco-Fund and are financed through contributions for energy efficiency paid by final consumers of electricity and other energy products.

Obligated parties must achieve mandatory savings gradually. Thus, in 2015 they had to reach 0.25% savings of 2014, in 2016 and 2017 energy savings of 0.5% of the previous year. In 2018 and 2019 the obligated parties will have to fulfil their obligations entirely, which means that they will have to achieve 0.75% of savings in relation to the sold energy in the previous calendar year. As an exemption applies to obligated parties supplying liquid fuels; they must every year by 2020 achieve savings to the extent of 0.25% of sold petrol and diesel fuels to final consumers in the previous year.

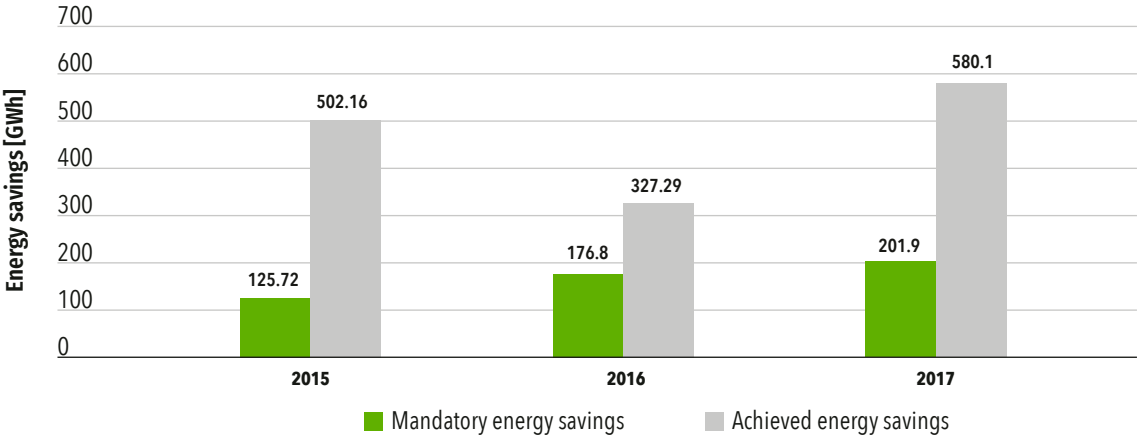
Final energy savings

Mandatory energy savings and liable entities activities are determined in the regulation on energy efficiency; liable entities in 2017 had to achieve energy savings to the extent of 0.50% of sold energy in 2016, with the exception of liable entities selling petrol and diesel fuels, which had to achieve 0.25% of energy savings in 2017.

580.1 GWh
of savings achieved obligated parties in 2017

According to the collected data from obligated parties, the sum of sold energy to final consumers in 2016 amounted to 51,603.41 GWh, and mandatory savings for 2017 201.90 GWh. In 2015, according to the submitted reports of obligated parties, less energy was sold, namely 46,425.75 GWh, and obligated parties had to achieve 176 GWh of energy savings. More energy sold in 2016 was also the result of increased use of final energy, since according to Statistical Office of the Republic of Slovenia consumption increased by 4% in comparison to 2015.

Figure 147: Comparison between the mandatory energy savings and achieved energy savings by obligated parties in the period 2015–2017



Source: Energy Agency

In 2017, obligated parties achieved 580.10 GWh of energy savings. The scope of savings that exceeds the mandatory value in 2017 for 378.20 GWh can obligated parties claim as mandatory saving in the next three years since its creation. Obligated parties from 2015 transferred 237.34 GWH, and from 2016 243.19 243.19 GWh. With a surplus of savings from 2015 and 2016 the obligation for 2017 fulfilled 54 obligated parties.

In achieving energy savings by implementing measures should be noted that the scope of achieved savings is not a measured category; energy savings are determined mathematically using methodology for calculation individual measures, defined in Annex 1 of Rules amending the Rules on the methods for determining energy savings.

Activities of obligated parties in achieving energy savings

The Energy Agency invited 193 suppliers to submit a report on achieved energy savings. The report for 2017 submitted 185, for 2016 167 suppliers of energy products, while the first year, i. e. about the savings in 2015, reported 161 suppliers.

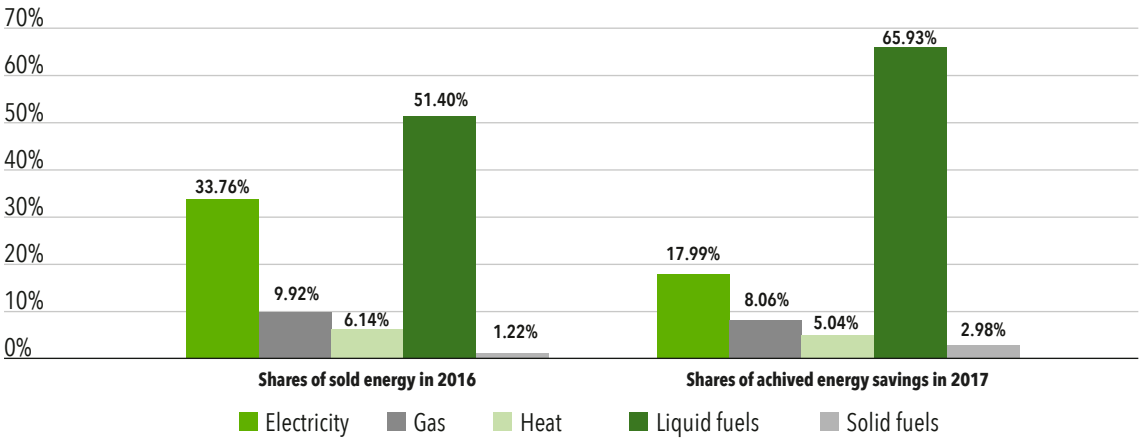
In 2017, 124 obligated parties in total achieved 99.7% of all realized savings in this year. Among them, 54 covered their mandatory savings entirely with surpluses from the previous years, and 31 suppliers achieved savings with participation in implementation of measures to achieve energy savings, and all others with their own contribution in implementing measures.

124
obligated parties fully achieved energy savings, representing 99.7% of total energy savings in 2017

For obligated parties who fail to reach target savings, the legislation provides the alternative option, with which mandatory savings can be achieved by contributing financial compensation to Eco-Fund; its amount depends on the amount of saving that would be achieved by an obligated party and the specific cost in EUR/MWh determined by Eco-Fund. In 2017, none of obligated parties previously decided to pay certain funds to meet their obligations of achieving mandatory final energy savings.

More than half of all obligated parties involved in the system of energy efficiency obligations were suppliers of heat and liquid fuels. The largest share of energy, in total of 85.16%, in 2016 was sold by suppliers of liquid fuels and electricity, and the smallest share (1.22%) suppliers of solid fuels, which together represented 23.44% of all obligated parties. According to this, most of the savings had to be achieved by suppliers of electricity and liquid fuels. From analysis of data on sold energy and end-users energy savings in Figure 148, it is evident that suppliers of electricity and liquid fuels in total achieved 83.92% of energy savings in 2017. The smallest share achieved suppliers of solid fuels, only 2.98%.

Figure 148: Comparison of shares of sold energy in 2016 and share of achieved energy savings in 2017 by the energy product



Source: Energy Agency

The Energy Agency also in 2017 had difficulties to identify all obligated parties for achieving energy savings, especially suppliers of solid fuels since there is no uniform evidence of energy product suppliers at the national level.

Achieved energy savings by implementing measures

Obligated parties achieved their target savings with the implementation of the measures set in Articles 5 and 6 of the Regulation. In 2017, there were 33 different measures to achieve mandatory energy savings in the service and public sectors and, besides, additional measures in energy conversion, distribution, and transmission sectors, within which they can also exercise savings in end-use energy savings.

373.5 GWh
of all energy savings were achieved by adding fuel additives

As shown in Table 40, in 2017 around 90.5% (524.79 GWh) of all energy savings were achieved with only four measures: introducing energy management systems, adding fuel additives, installation of energy-efficient lighting systems in buildings, and replacement of boilers using all types of fuels with new high-efficiency boilers using gas. Almost two thirds of these saving were achieved by adding fuel additives, a measure by which obligated parties achieved the most of energy savings also in 2015. Achieved amount of energy savings generated by adding fuel additives is high despite the change in the calculation method with the introduction of the regression scale of maximum recognized savings factor, which was implemented with Rules amending the Rules on the methods for determining energy savings.

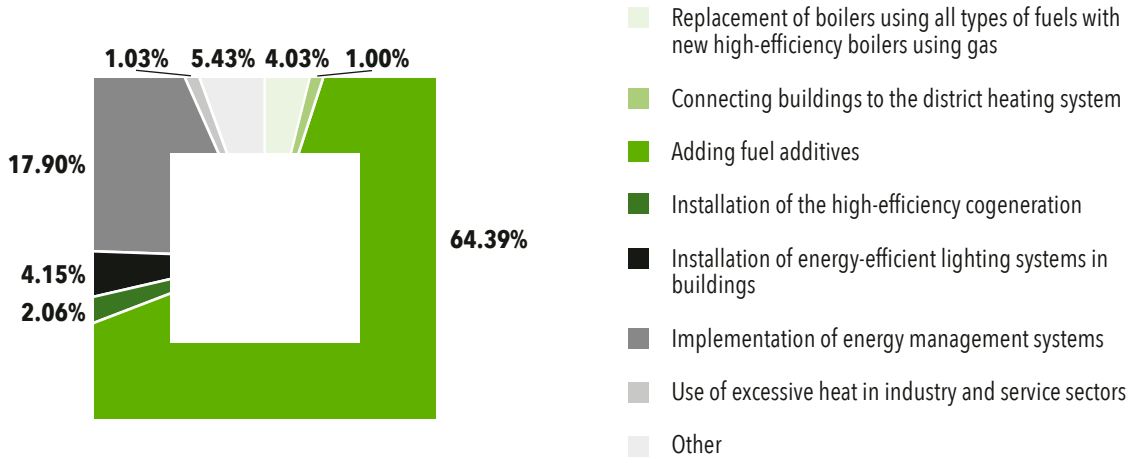
Table 40: Energy savings by measures in the period 2015–2017

	2015	2016	2017
Replacement of boilers using all types of fuels with new high-efficiency boilers using gas	7.60	13.57	23.38
Replacement of boilers using all types of fuels with new high-efficiency boilers using wood biomass	1.57	2.39	0.82
Installation of heat pumps for heating	2.72	0.34	1.35
Comprehensive renovation of heat station	73.49	3.08	0.75
Connecting buildings to the district heating system	2.25	4.68	5.82
Renovation of the distribution network for district heating	3.92	4.37	2.93
Systems for the recovery of waste heat in buildings	0	9.16	1.95
Optimization of technological processes, which is based on implemented energy audit	15.27	9.98	3.01
Adding fuel additives	195.52	98.7	373.51
Installation of the high-efficiency cogeneration	37.66	9.84	11.96
Installation of energy-efficient lighting systems in buildings	14.49	15.49	24.09
Renovation of outdoor lighting systems	0.07	0	2.82
Energy-efficient electric motors	0.21	0.06	1.64
Use of frequency converters	1.12	0.37	5.60
Implementation of energy management systems	98.34	139.27	103.81
Use of excessive heat in industry and service sectors	0	0	6.00
Other	47.10	15.98	10.63

Source: Energy Agency

The most of energy savings were achieved with only two measures, by adding fuel additives and implementation of energy managements systems; for 2017 this is also shown in Figure 149, from which we can see that 80% of all energy savings were reached with these two measures – by adding fuel additives 64.39% and 17.90% by introducing energy management systems. Rest of the savings were achieved with other measures.

Figure 149: Energy savings by individual measures in 2017



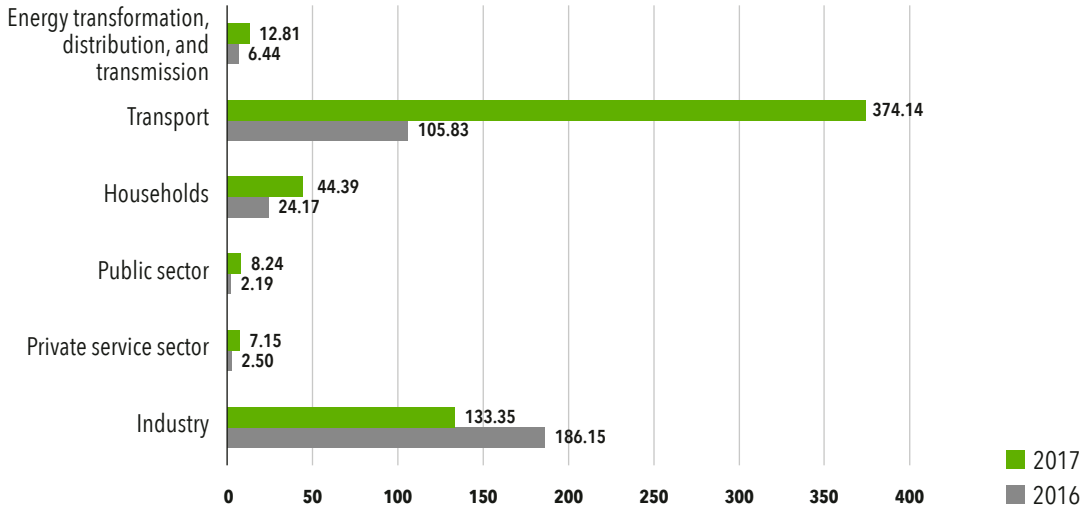
Source: Energy Agency

On the basis of the methodological tool determines the CO_2 emissions of individual measures, defined in Annex 1 of Rules amending the Rules on the methods for determining energy savings, obligated parties managed to reduce CO_2 emissions by 686,232.26 per tonne/year.

Energy savings by sector

In 2017, obligated parties achieved the highest savings in transport and industry, in total of 507.49 GWh, which is 87.48% of total final energy savings in 2017. Big energy savings in transport are the result of adding fuel additives, measures mostly used by suppliers of liquid fuels. In industry most of savings were achieved by implementation of energy management systems.

Figure 150: Energy savings by individual sectors in 2016 and 2017 in GWh



Source: Energy Agency

7

HEAT
SUPPLY

In 2017, consumption of heat was 2.34% higher than a year before. Supply of heat was provided from 93 distribution systems by 55 heat suppliers in 64 Slovenian municipalities. As much as 86.76% of heat for the supply was produced by cogeneration of electricity and heat.

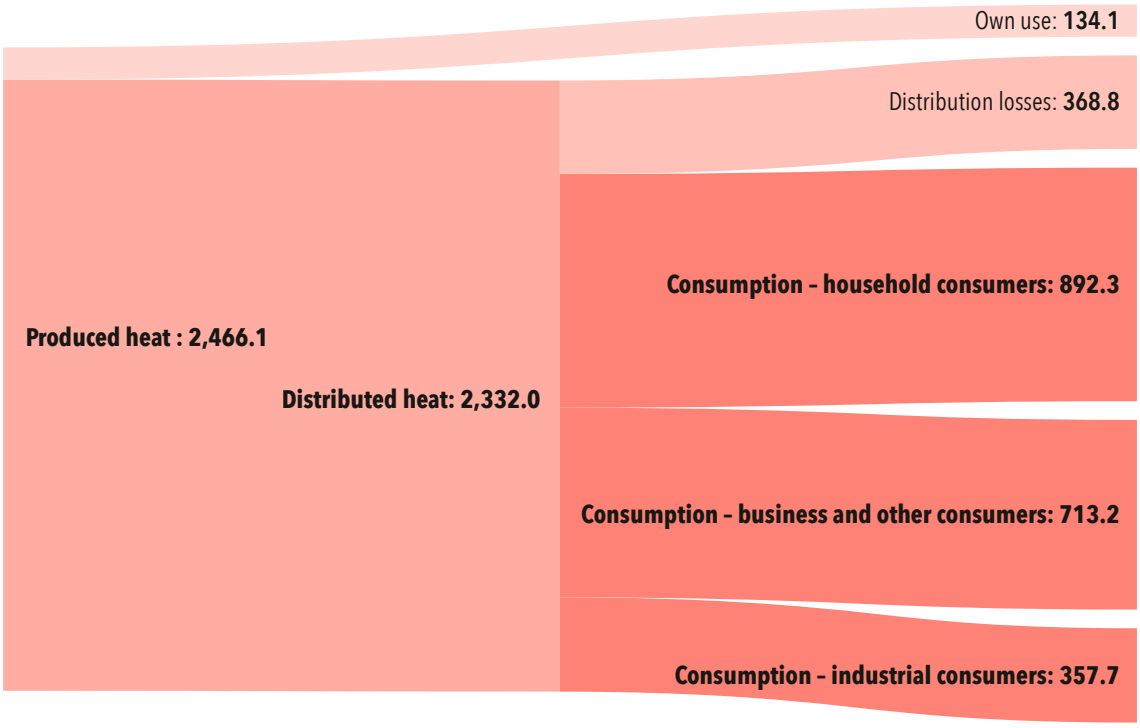
5.4%
increase in the number of heat consumers

4.6%
higher average monthly retail price for a typical household heat consumer

Heat supply is distribution of heat and cold, which are used for heating and cooling, industrial processes, and sanitary hot water. Heat supply covers activities of distribution and supply of heat, and the heat distribution itself can be carried out as an optional local service of general economic interest or commercial activity. The supply of heat can also be carried out by prvate distribution systems, which are fully owned by heat consumers.

The report on heat supply from distribution systems includes aggregated data recorded distribution systems and the data of recorded heat producers that supply heat to these systems.

Figure 151: Basic data on produced and distributed heat for consumers of heat connected to the distribution systems in 2017



Source: Energy Agency

7.1 Supply of heat

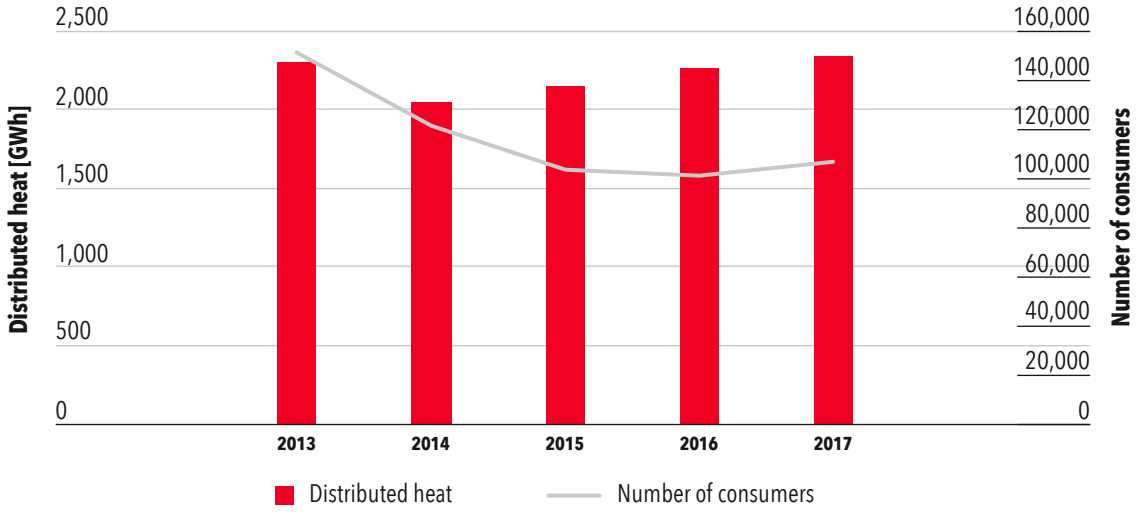
In 2017, in Slovenia supply of heat was provided from 93 distribution systems by 55 heat suppliers in 64 Slovenian municipalities.

Heat distributors supplied 106,292 consumers and delivered 1,963.2 GWh of heat. Consumption from recorded distribution systems was in 2017 higher by 2.34% than the year before, and in comparison with 2015 by 6.7% - excluding own consumption of heat producers.

2.3%
increase of heat consumption from distribution networks

The downward trend in the number of consumers of heat connected to district heating has stopped, since in 2017 the number of consumers increased by 5.4%. This is certainly the result of reliable and cost-effective supply, which among other things enable consumers to lower the costs of regular maintenance of their own heating system.

Figure 152: Distributed heat and the number of heat consumers in the period 2013–2017



Source: Energy Agency

In 2017, only two large distribution systems were operating, with a total installed capacity of 3.88 MW of cooling units, which are mainly serving business and industrial consumers. The cooling distribution system with a total installed capacity of 0.965 MW, which uses heat from district heating, operates in the Municipality of Velenje, and the cooling distribution system with the installed capacity of electrical generators 2 X 1.45 MW in a former industrial complex of the company Iskra Labor in the Municipality of Kranj.

For heat supply, producers of heat with their own production and heat producers that supply heat to distribution systems generated 2466.1 GWh of heat. At the same time 939.8 GWh of electricity, or 838.0 GWh at the busbars of the cogeneration processes for heat supply were produced. The share of heat generated to supply distribution systems from cogeneration accounted to 86.8% of all generated heat.

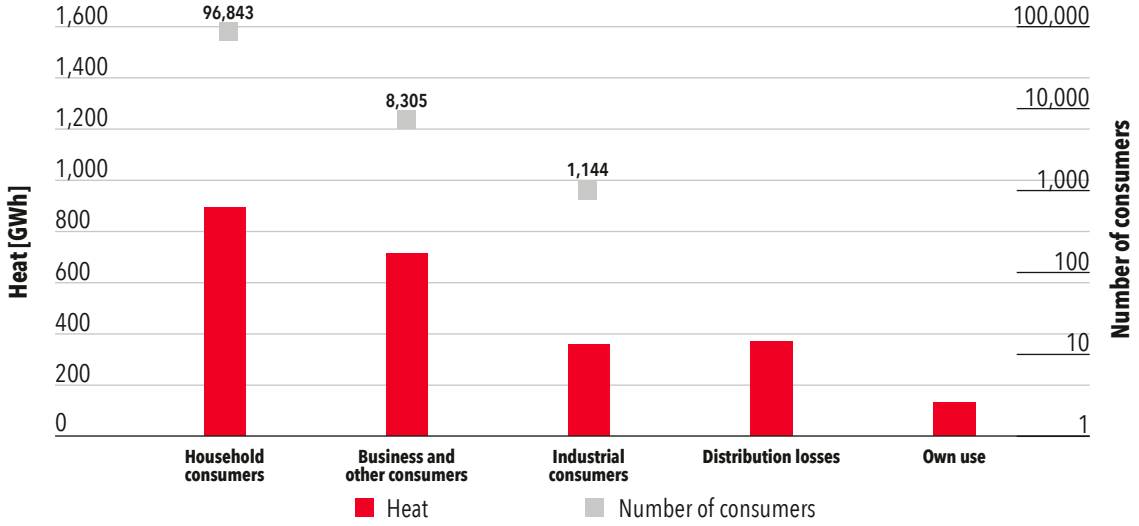
86.8%
was the share of heat produced in cogeneration units

The largest share of useful heat, 36.2% was used for 96.843 household consumers; 28.9% for the supply of 8305 business consumers, and 14.5% of heat for 1144 industrial consumers.

The average annual losses at distribution are estimated on 14.9% of the produced heat and were 0.41% higher than in 2016. The difference between the produced and supplied heat and heat losses presents the share of heat, which was used in industrial processes of producers or suppliers.

The consumption of heat by type of consumers and their number is shown in Figure 153.

Figure 153: Heat consumption by the type of consumers and number of consumers

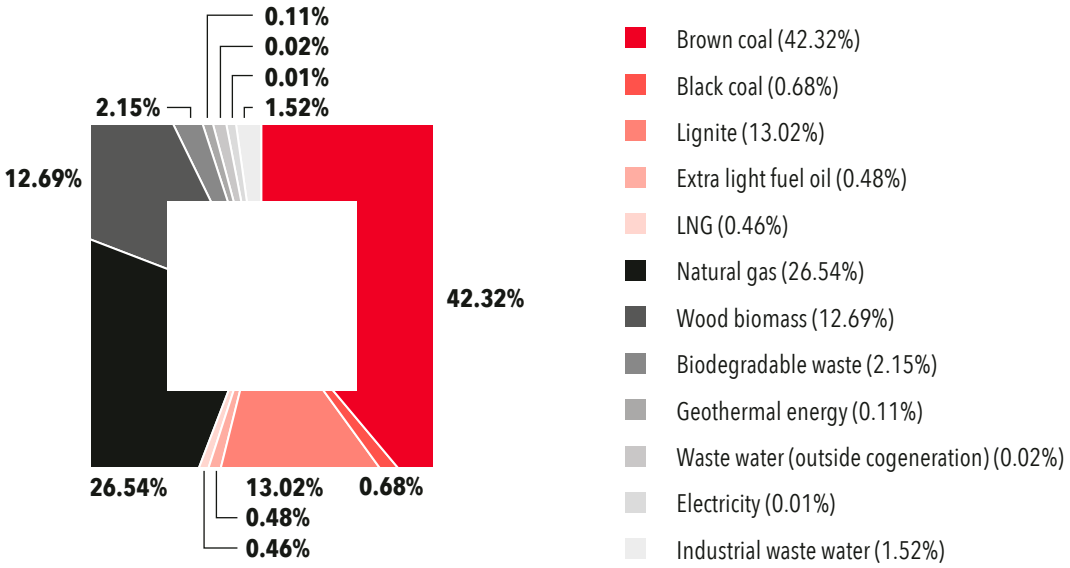


Source: Energy Agency

In 2017, 3.4% more heat was generated than the year before, while the consumption of primary energy products for heat generation increased by 7%. Increase in use of primary energy products in comparison to the previous year was mainly due to different structural share of the used energy products in cogeneration of electricity and heat (CHP) and variable calorific values of used wood biomass and biodegradable waste.

The primary energy source of heat production for the supply of heat distribution systems was also in 2017 coal with a 56.02% share, followed by natural gas with 26.5% share. Oil and oil derivatives were represented with almost 1% share, while renewable sources in the structure of primary energy products reached a 12.8% share (Figure 154).

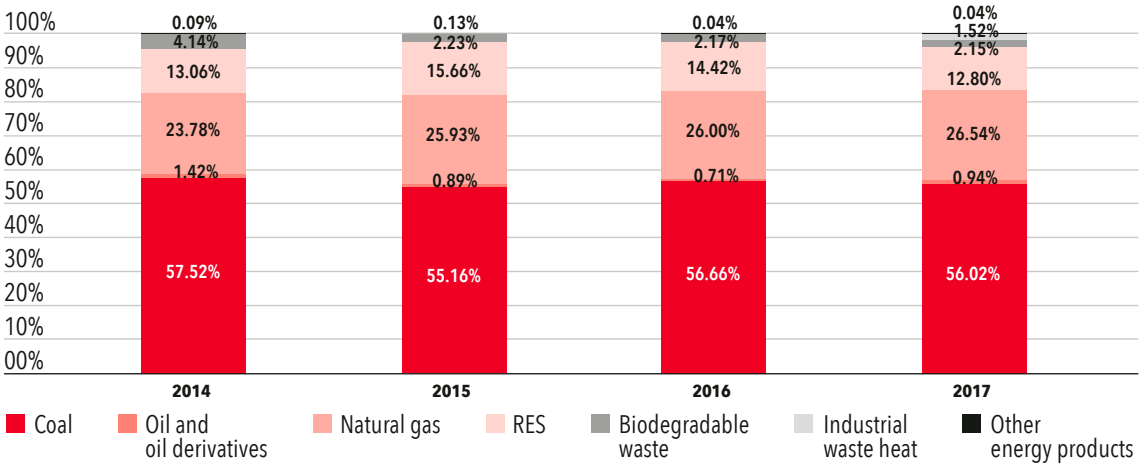
Figure 154: Structure of the primary energy products for heat generation



Source: Energy Agency

In Slovenia, only in the municipal waste incinerator in Municipality of Celje heat is produced from biodegradable waste, and in the area of former ironwork Ravne na Koroškem (SIJ Metal Ravne, d.o.o.) waste heat from industrial processes is used for heat distribution. Heat, produced from biodegradable waste covered 2.15%, and waste heat from industrial processes 1.5% of all generated heat for the supply of distribution systems.

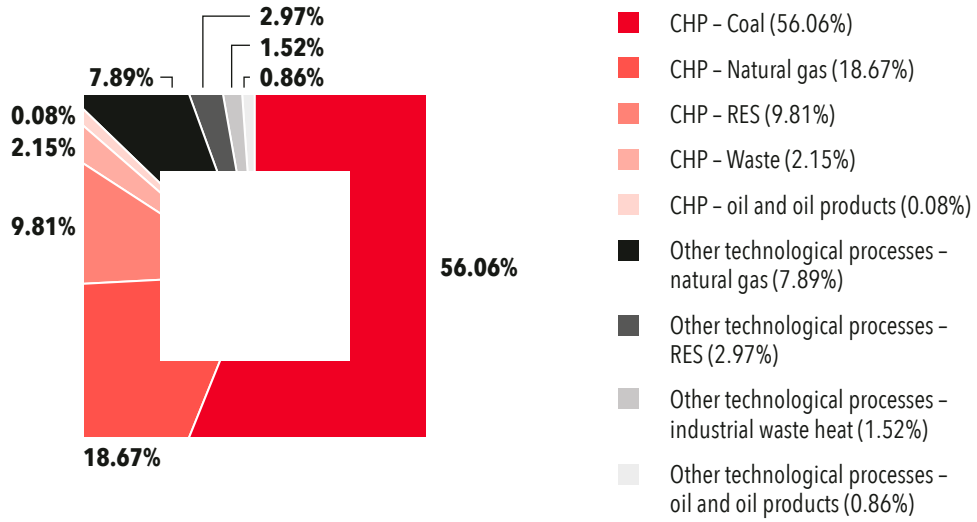
Figure 155: Structure of the primary energy products in the period 2014–2017



Source: Energy Agency

As much as 86.8% of all produced heat for the supply of distribution systems was produced in cogeneration of electricity and heat (CHP), while the remaining 13.2% in other processes of heat production (wood biomass boilers, gas and LNG, heat from geothermal wells, waste heat from industrial processes, etc.). Shares of primary energy products used for the supply of heat distribution systems in relation to the technology is shown in Figure 156.

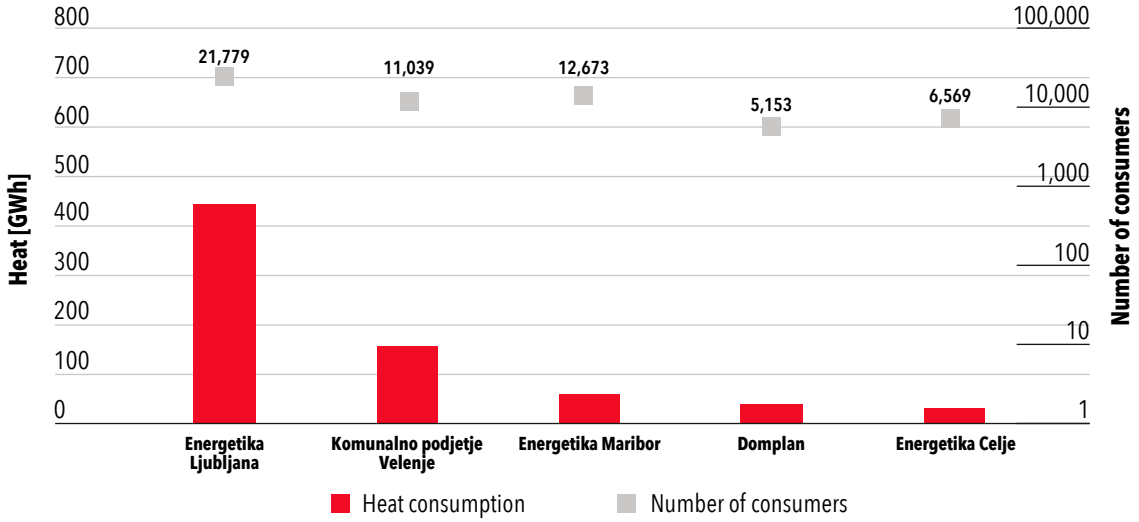
Figure 156: Structure of the primary energy products for production of heat in CHP and boiler rooms



Source: Energy Agency

The first five largest heat distributors supplied 82.9% of all energy delivered to final consumers. The first five largest heat distributors supplying heat to household consumers in 2017 supplied 59.1% of all household consumers and delivered them 81.2% of all heat supplied to these consumers. These facts are shown in Figure 157.

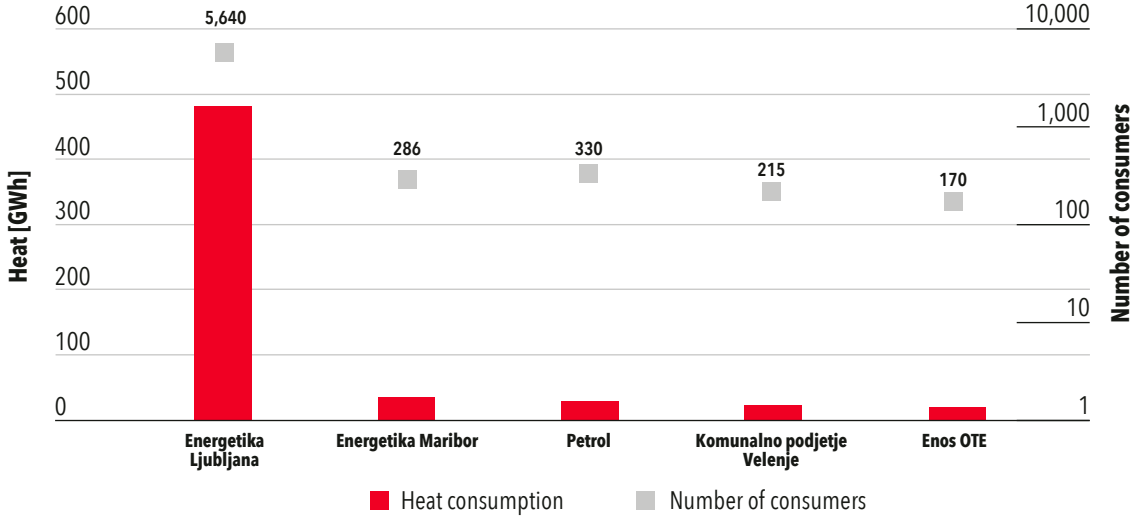
Figure 157: Heat consumption and the number of household consumers at the largest heat distributors to household consumers



Source: Energy Agency

The first five largest heat distributors regarding amount of heat delivered to business and other consumers supplied as much as 80% of these consumers and provided 82.1% of all heat for this group of consumers (Figure 158).

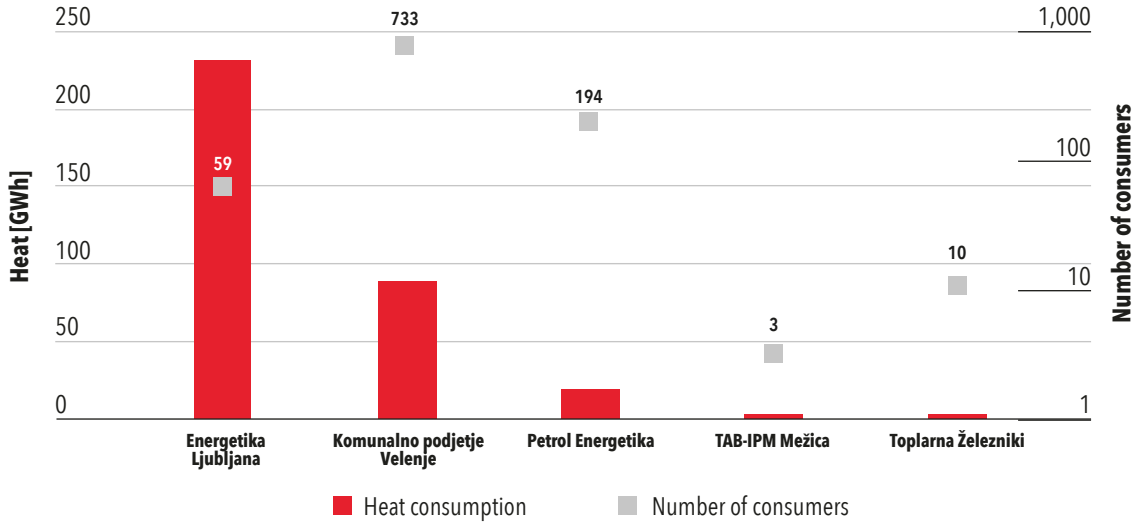
Figure 158: Heat consumption and the number of business and other consumers at the largest heat distributors to these groups



Source: Energy Agency

The first five largest heat distributors regarding amount of heat for industrial processes and heating supplied 87.3% of these consumers and delivered them 96.9% of heat for industrial consumers (Figure 159).

Figure 159: Heat consumption and the number of industrial consumers at the largest heat distributors to industrial consumers



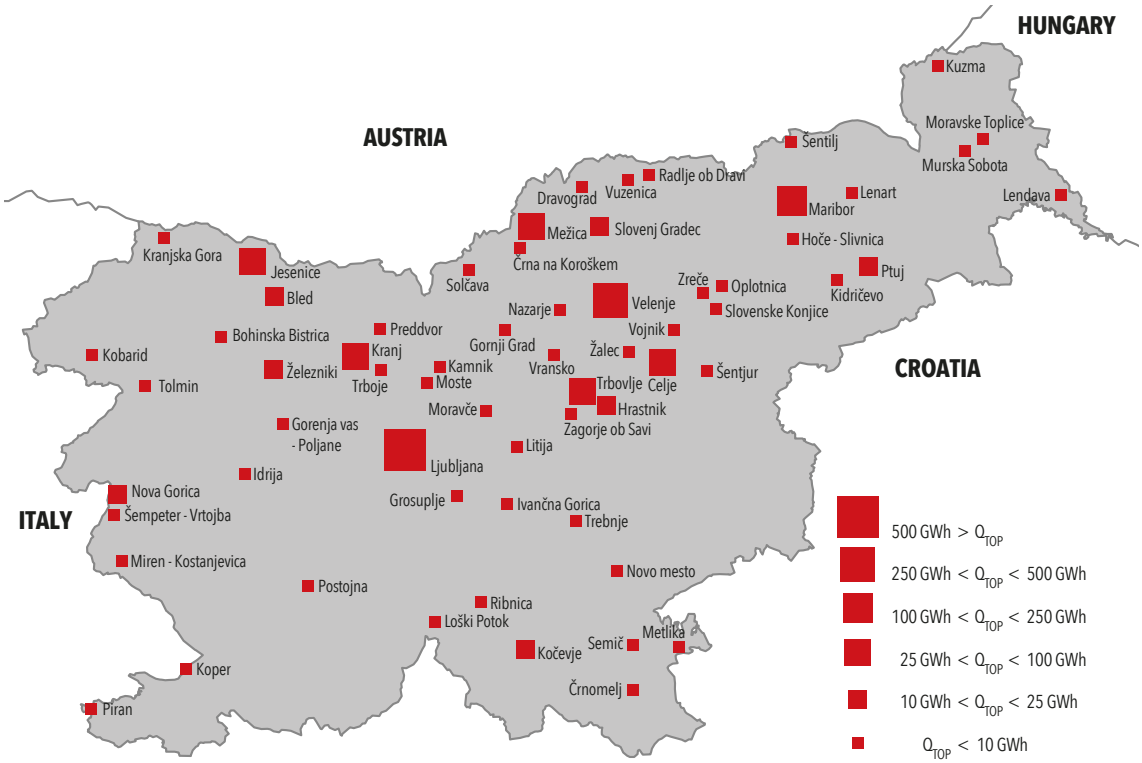
Source: Energy Agency

7.2 Heat distribution systems

In 2017, the service of heat distribution was carried out by 93 distribution systems, set in 59 out of 212 Slovenian municipalities; their total length was 893.2 kilometres. The activity of heat distribution was in 37 cases carried out as an optional local service of general economic interest in 49 Slovenian municipalities; in nine the activity was carried out as commercial distribution, and in 15 as the supply from a private distribution system. Private distribution systems in the municipalities of Kranj, Koper, Maribor, and Žalec are among large distribution systems for heat supply, since they supplied as much as 10,053 consumers, out which 9931 were households. The distribution systems, where the activity was carried out as an optional local service of general economic interest, supplied 89.3% of all consumers, and the share of delivered heat was 93.6%. Two longest district cooling systems are in Velenje and Kranj in the total length of 1.5 kilometres.

Heat distribution systems and heat consumption by individual municipalities are shown in Figure 160.

Figure 160: Heat distribution systems in 2017

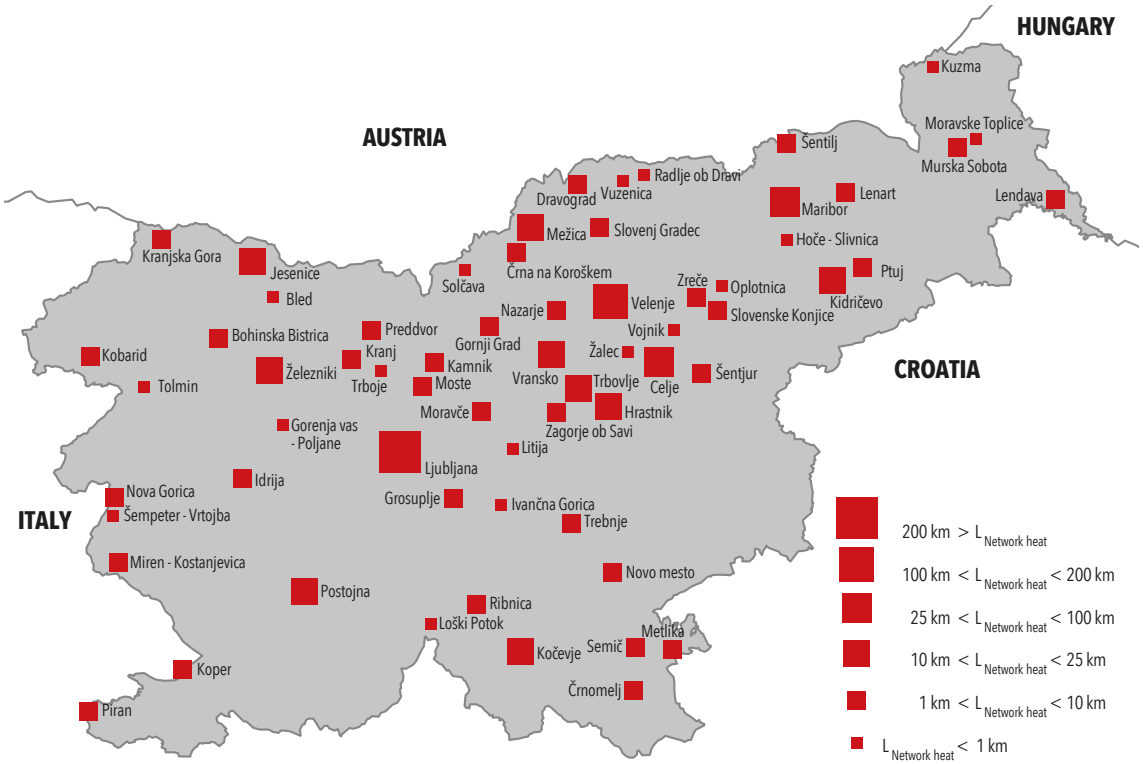


Source: Energy Agency

With respect to the temperature regime of the operations of the individual system, the systems are the warm-water systems, hot-water systems, and steam distribution systems. Warm-water networks and hot-water networks cover 98.8%, steam networks 0.5% and cooling networks less than 0.2% of the total distribution systems.

Two longest systems are in Ljubljana (262.8 kilometres of a hot-water system), and in Velenje, together with Šoštanj, (176.5 kilometres of a warm-water system).

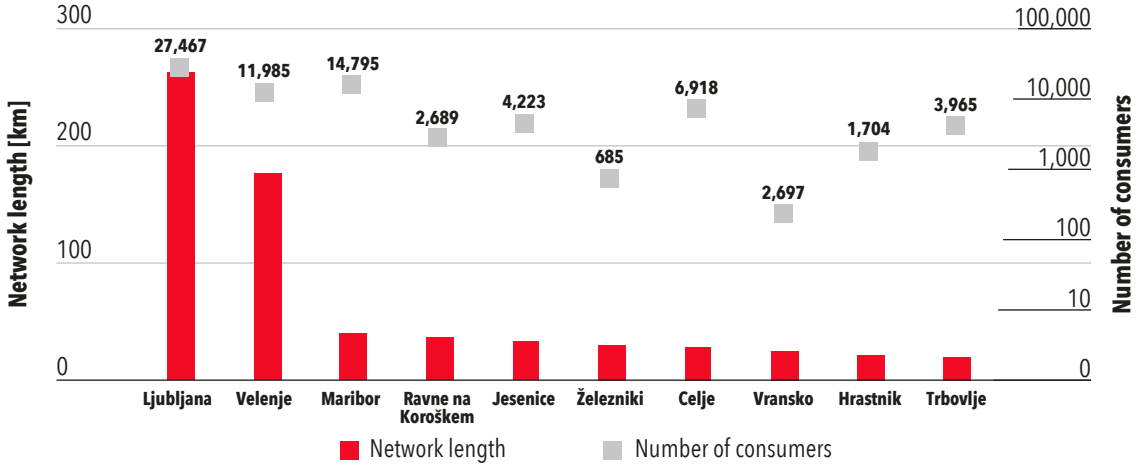
Figure 161: Heat distribution systems in Slovenian municipalities according to the length of the distribution network



Source: Energy Agency

Figure 162 shows the lengths of the ten largest heat distribution systems and heat consumers in 2017.

Figure 162: Length of heat distribution systems and number of connected consumers in individual municipality



Source: Energy Agency

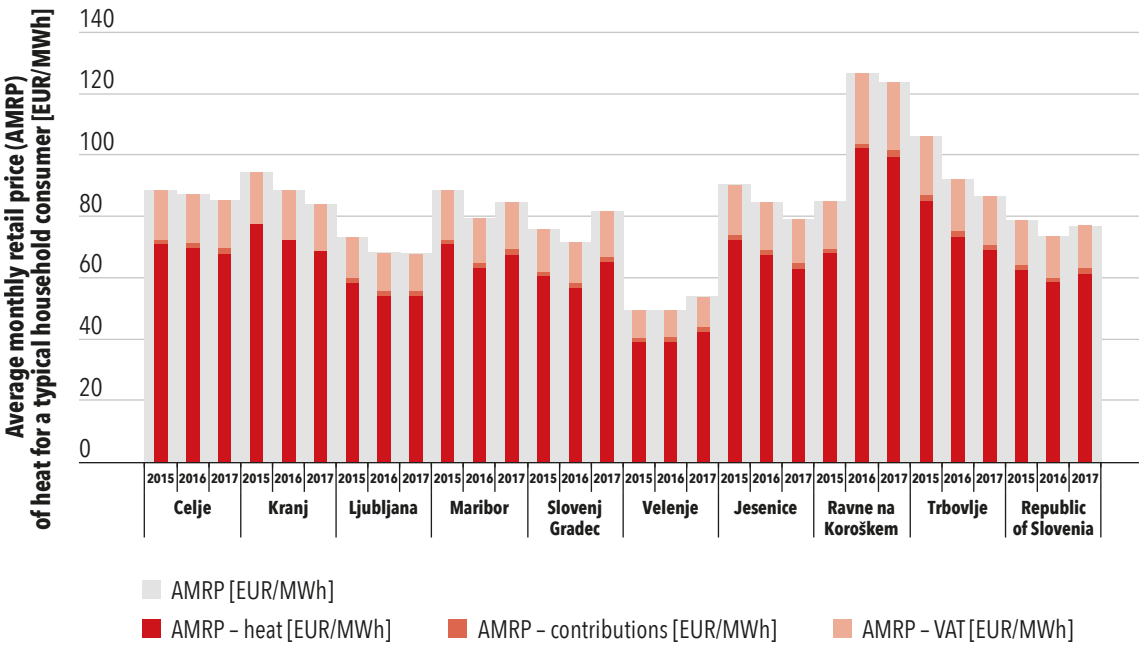
7.3 Price of heat

The average price of heat is determined as the average monthly retail price of heat supply for residential heating and sanitary hot water in selected Slovenian municipalities on the basis of publicly announced price lists of heat distributors for 2017 for a typical household consumer in a multi-dwelling residential building with annual capacity charge 7.00 kW and average annual consumption of 6.21 MWH.

Presentation of the average heat price includes heat delivered to household consumers in selected Slovenian municipalities, which in 2017 represents 87.2% of all heat delivered to these consumers through all distribution systems. Distribution systems in selected Slovenian municipalities supplied heat to 71.1% of all heat consumers in Slovenia.

Average retail prices of heat in selected Slovenian municipalities are shown in Figure 163. They are calculated as the weighted average monthly retail prices for a typical household heat consumer living in a multi-dwelling residential building. At the same time it is also presented weighted average monthly retail price of heat for Slovenia, weighted by number of supplied household consumers. The figure shows that the average monthly retail price of heat for household consumers increased by 0.5% on average in comparison to the previous year. Increase in retail prices was recorded in municipalities of Maribor (6.9%), Velenje (8.8%) and Slovenj Gradec (14.15%). In other municipalities the average monthly retail price decreased from 0.3 to 6.5%.

Figure 163: Average retail price of heat for household consumers in individual Slovenian municipalities for the period 2015–2017



Source: Energy Agency

7.4 Regulation of the price of heat for district heating

On the basis of the EA-1 the Energy Agency is obliged to regulate the price of heat for district heating. Regulation is carried out in accordance with the Act on the methodology for district heating pricing. Persons subject to regulation are distributors of heat performing optional service of general economic interest and producers of heat that supply heat distributors more than 30% of the intended distributed heat or have ownership links with them. Persons subject to regulation must obtain the consent to the starting price of heat from the Energy Agency for an individual distribution system or for the heat supply. Starting price is determined in accordance with the criteria and grounds settled by the act.

In 2017, the Energy Agency dealt with five requests for issuing approval to the starting price of heat, which due to reasons on the side of persons subject to regulation remained unsettled in 2016. In this respect, two approvals were issued, and three requests were rejected. In 2017 the Energy Agency received eight requests for issuing approvals, among which four of them were related to new distribution systems. To four of received requests were issued approvals valid for 2018, and four due to reasons on the side of persons subject to regulation remained unsettled in 2017. At the end of the year, 53 approvals to the starting price of heat were valid, which refer to nine regulated heat distributors, 41 distributors with own production of heat and three distributors without own production of heat.

Monitoring and analysing the received notification of starting heat price changes are important factors in assessing the suitability of the proposed starting and average price in the request for granting consent to the starting price of heat. In 2017, the Energy Agency received 117 notification on adjusting the variable price of heat and one notice on adapting the fixed part of the starting price. New starting prices of heat were mainly related to changed price of energy product for heat production. The Energy Agency monitored and analysed changes in starting prices of heat due to modification of eligible costs, and also supervised the method for heat calculation and publishing of heat tariffs.

7.5 Unbundling

Distributors that provide services of general economic interest and, in addition to carrying out the activity of distribution, also carry out other activities, must keep separate accounting records in accordance with accounting standards; their accounting records shall show separate accounts for heat distribution, heat production and other activities as required if the activities in question are carried out by separate undertakings. The heat distributors must in their internal acts set the criteria for the allocation of assets and liabilities, costs, expenditure and revenue to be observed in keeping separate accounting records and preparation of separate accounting records and fully disclose them in explanatory notes to the financial statements. The suitability of the criteria and their proper use must be audited annually by an auditor, who must draw up a special report.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACER	Agency for the Cooperation of Energy Regulators
AREDOP	Active regulation of energy activities and networks of the future
B2B	Business to Business
B2C	Business to Consumer
Borzen	Borzen, operater trga z elektriko, d.o.o., Power market operator
BSP Southpool	Regional Energy Exchange
C+ in C-	Basic Imbalance Prices
CCPP	Combined-Cycle Power Plant
CEE	Central-East Europe (electricity region)
CEGH	Central European Gas Hub AG Vienna
CEER	Council of European Energy Regulators
CEREMP	Centralised European Registry for Energy Market Participants
CHP	Combined Heat and Power
CIM	Common Information Model (IEC 61970-3XX)
CNG	Compressed natural gas
CPI	Consumer Price Index
CSE	Central-South Europe (electricity region)
CSLOeX	Hourly Index
CWE	Central-West Europe (electricity region)
CZC	Cross-zonal capacity
DSM	Demand Side Management
DSO	Distribution System Operator
DTS	Distribution-Transformer Station
EA-1	Energy Act-1 (Official Gazette of the RS, No 17/14
ebIX	European forum for energy Business Information eXchange
EEX	European Energy Exchange AG, Leipzig
EIC	Energy Identification Code
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
EU	European Union
EXAA	Energy Exchange Austria
GDP	Gross Domestic Product
GME	Gestore Mercati Energetici, Italian Power Exchange
GO	Guarantee of Origin Certificate
GPP	Gas Power Plant
GS1	Global languages of Business (http://www.gs1.org)
HHP	Hydroelectric Power Plant
HHI	Herfindahl-Hirschman index
HS	High Season
HV	High Voltage
HT	Higher Tariff price
HUPX	Hungarian Power Exchange
IPET	Energy Market Data Exchange (IPET Section)
IDS	Isolated Distribution Systems
JAO	Joint Allocation Office
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LS	Lower Season
LV	Low Voltage
LT	Lower Tariff price
MAIFI	Momentary Average Interruption Frequency Index
MRS	Metering-Regulation Station
MV	Medium Voltage
NREAP	National Renewable Energy Action Plan
P	Power
PSH	Pumped-Storage Hydroelectric power plants
PT	Peak Tariff
NPP	Nuclear Power Plant (Krško Nuclear Power Plant)
RECS	Renewable Energy Certificate
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
RES	Renewable Energy Sources
RF	Regulatory Framework
RPI	Retail Price Index
RRM	Registered Reporting Mechanism
RRM	Registered Reporting Mechanism
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SEE	South-East Europe
SIPX	Slovenian Price Index
SODO	Slovenian Distribution System Operator
SURS/STAT	Republic of Slovenia, Statistical Office
TOE	Tonne of Oil Equivalent
TPP	Thermoelectric Power Plant
TS	Transformer Station
TSO	Transmission System Operator
VAT	Value Added Tax

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Report on the Energy Sector in Slovenia for 2017
June 2018
Design and typesetting: Studio 8