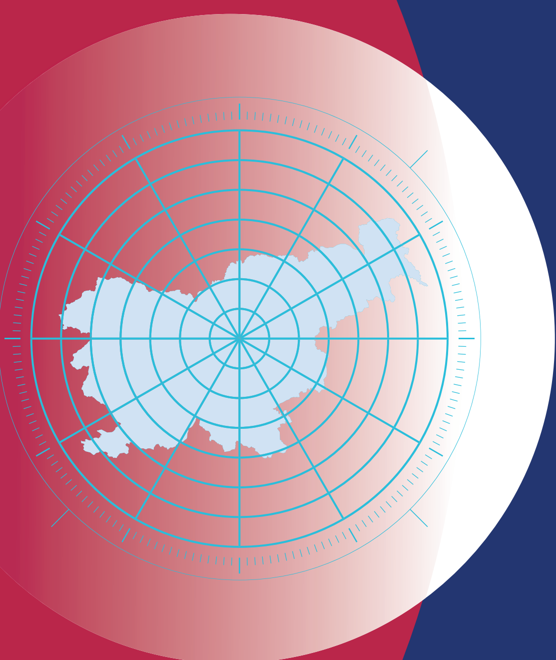
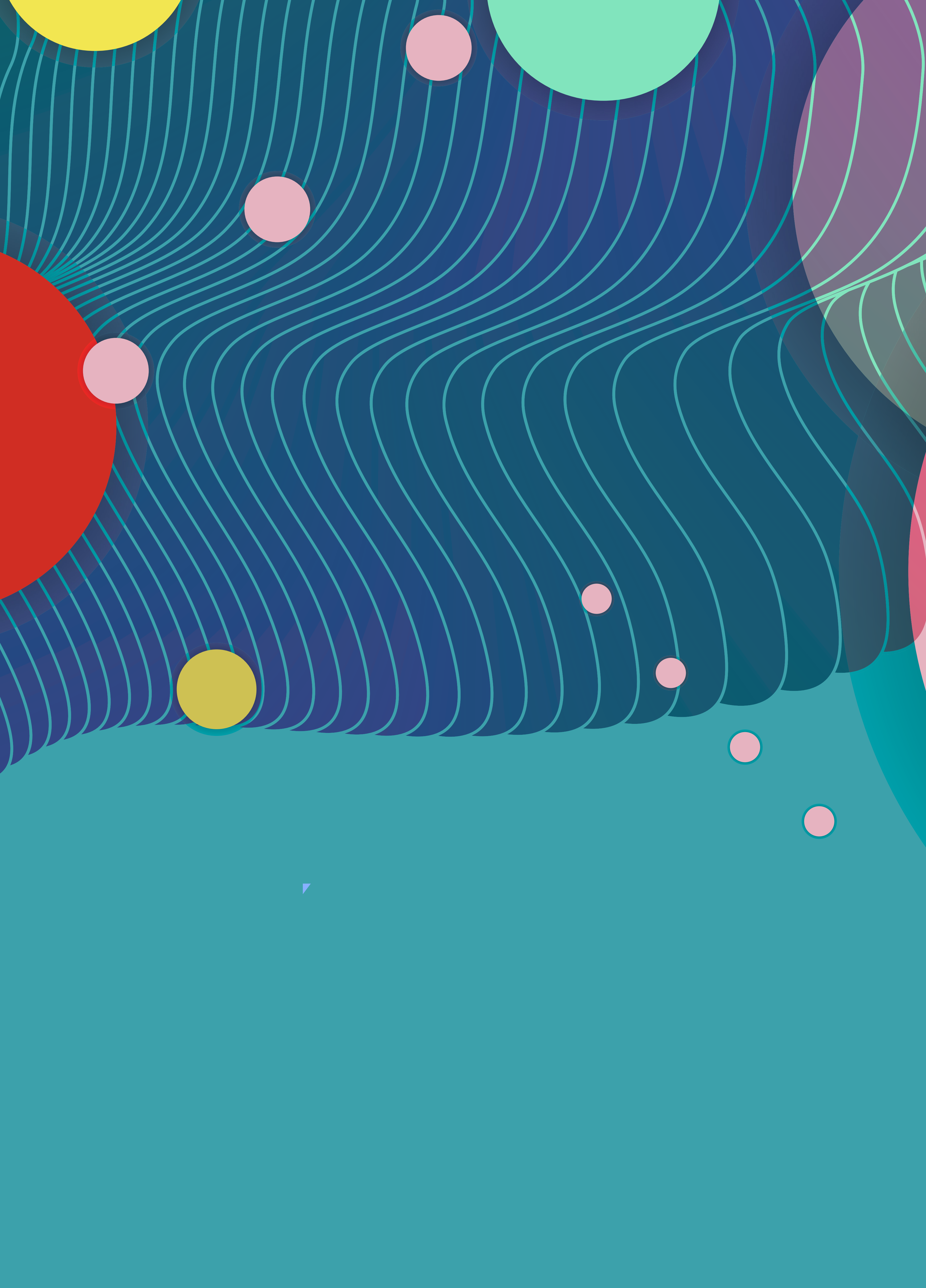
REPORT ON THE ENERGY SITUATION IN SLOVENIA



2023

Agencija za energijo



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2023

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INTRODUCTION

MAG. DUŠKA GODINA

DIRECTOR

I am proud to present the Energy Agency's annual report on the energy situation in Slovenia. The report provides a comprehensive overview of the key events, changes and developments in the electricity and natural gas markets, energy efficiency, consumer rights protection and heat supply in Slovenia over the past year.

Energy is one of the foundations of society, enabling our daily activities and providing the conditions for a decent life. In recent years, we have witnessed numerous changes and challenges in this field, both at the European and national levels. The energy crisis has had a significant impact on energy prices and the security of supply. Still, it has also highlighted the importance of energy self-sufficiency for the European Union (EU) countries and raised dilemmas related to the use of nuclear energy as a stable source, particularly in view of the phasing-out of coal.

Two years after adopting Europe's ambitious RePowerEU plan, the European Commission notes that the Member States' joint efforts have significantly reduced energy imports from Russia and thus dependence on energy imports, accelerating the transition to clean energy and stabilising the energy prices. The Union's natural gas consumption decreased by 18% between August 2022 and March 2024, the share of natural gas imports from Russia decreased from 45% to 15% between 2021 and 2023, and as a result, energy security of supply increased in 2023. The share of renewable energy increased rapidly over the period. Since 2022, almost 96 GW of new solar capacity has been installed in the Union, while wind capacity has increased by 33 GW. For the first time since 2022, the Union has generated more electricity from wind and solar than from gas.

Slovenia has also met its targets and in 2023, for the first time, exceeded its target regarding the estimated share of renewable energy sources in the gross final energy consumption. The coverage of consumption by domestic production approached its highest level in the last five years, at 90.9%, mainly due to highly favourable hydrology and, thus, above-average production in hydroelectric power plants. Solar generation also grew, with almost 36% more solar electricity produced than in 2022. More than 44,000 self-supply generating installations were in operation last year, and the share of customers generating electricity at the same time was almost 5%.

Electricity consumption was 8% lower than in 2022 and heat consumption was 10.4% lower. Natural gas consumers consumed 9.3% less than the average consumption over the reference period of the last five years. This was considered insufficient by the European Commission, as reducing energy use, in particular natural gas, is one of the key measures to reduce the dependence on Russian energy imports, and Member States should take measures to achieve at least a 15% reduction in natural gas use, as recommended.

In 2023, electricity and natural gas prices have been steadily decreasing and stabilising at their pre-Ukraine war levels due to the large-scale intervention measures in the Member States. Still, they remain higher than before the pandemic. Energy markets in the Union have been regulated to a greater extent than before the energy crisis. In Slovenia, price caps have also been imposed on retail and the system services markets, extending into 2024. As a result, market competition and the dynamics observed in the markets have been reduced. Suppliers have bid virtually at the level of the price caps, there have been no promotional offers in 2023, the potential savings from switching suppliers have been minimal, and as a result, we have seen a record low number of switches of energy suppliers compared to previous years.

The Union has decided to reform the internal electricity market to avoid future price shocks. Despite the high share of renewables in electricity generation, the strong price jumps for fossil fuels, in particular natural gas, have led to a sharp increase in electricity prices in 2022, as the price of electricity in the Union is based on the cost of fossil fuels used in electricity generation. The reform of the design of the Union's internal electricity market model focuses on long-term solutions to avoid the future situation we saw in 2022, when the electricity prices on the wholesale markets soared to record highs, reaching an unimaginable €1,000 per MWh. The new market rules will make electricity prices less dependent on the price of fossil fuels and will give consumers more options when contracting their electricity supply. They will have increased availability of fixed-price and time-limited contracts, the flexibility to choose dynamic pricing with the possibility of entering into multiple supply contracts, easier access to renewable energy through local trading, and the possibility of selling excess power from a self-supply plant to neighbours, for example. The market reform also includes measures to protect vulnerable customer groups and regulate retail markets more effectively.

The country's priority, closely linked to the energy sector, is an effective green transition. This includes increasing the share of renewable energy sources, improving energy efficiency, and developing new technologies and energy storage facilities. Self-sufficiency and the security of energy supply remain priorities, particularly in light of the global situation and the volatile energy markets.

The energy transition must be socially inclusive and just. With limited resources, we need to ensure the population's well-being, including those on the margins of society who cannot secure a decent material standard. We need to think about a change in the paradigm of civilisation. Instead of taking paths that aim at constant, steep economic growth, we need to take paths of sustainable development and, in so doing, create a community of solidarity and justice. It is against this background that the recent report by the European Court of Auditors, which warns about the security of the natural gas supply in the Union and that some Member States are still reluctant to conclude solidarity agreements and would even be prepared to cut off gas supplies to a neighbouring country in an emergency situation, is perhaps worrying.

The report on the situation in the energy sector looks back with its rich content. It is an essential tool to help tackle the challenges and find successful solutions to make sustainable, reliable and affordable energy a reality. Thank you to everyone who has provided information for this comprehensive report and to all the staff at the Energy Agency. I offer a sincere thank you for your dedicated and highly professional work.

ELECTRICITY

CONSIDERING THE TOTAL PRODUCTION OF NPP, SLOVENIA IN 2023 A NET EXPORTER

- 37.6% NUCLEAR FUEL
- 40.3% RENEWABLES
- 22.1% FOSSIL FUELS

RES
9.4
PERCENTAGE POINTS HIGHER SHARE OF RES

ESTIMATED
25.3%
SHARE OF RES

IN TOTAL GROSS FINAL ENERGY CONSUMPTION - TARGET EXCEEDED FOR THE FIRST TIME WITHOUT STATISTICAL PURCHASE

36% MORE
ELECTRICITY GENERATED BY SOLAR POWER PLANTS

8.1%
REDUCTION IN CONSUMPTION BY
ALL FINAL CONSUMERS

3.1%
REDUCTION IN CONSUMPTION BY
HOUSEHOLD CONSUMERS
— NOT TAKEN INTO ACCOUNT THE CONSUMPTION BEHIND THE METER IN THE INDOOR INSTALLATION (SELF-SUPPLY)

10.1%
REDUCTION IN CONSUMPTION BY
BUSINESS CONSUMERS

A cornerstone of modern lifestyle, technological development, and achieving climate neutrality

€3.5 BILLION

NEEDED FOR DISTRIBUTION SYSTEM INVESTMENTS - NEW DEVELOPMENT PLANS - ALREADY €1 BILLION MORE THAN ESTIMATED

€16.4 m INVESTMENT IN

SMART GRIDS - NEGLIGIBLE SHARE OF INVESTMENT IN DISTRIBUTION COMPANIES

54.2% SHARE OF UNDERGROUND LINES

IN THE DISTRIBUTION SYSTEM - GROWTH SLOWING DOWN

4.7% OF ALL CONSUMERS ON

THE DISTRIBUTION SYSTEM AT THE SAME TIME IN THE ROLE OF PRODUCER

94.5% OF CONSUMERS

ON THE DISTRIBUTION SYSTEM EQUIPPED WITH ADVANCED METERING SYSTEMS

44,459 CONNECTED SELF-SUPPLY INSTALLATIONS

- TOTAL CONNECTION CAPACITY 556 MW
- ESTIMATED GENERATION 417.1 GWh

14,463 ELECTRIC VEHICLES

1.18% OF ALL REGISTERED VEHICLES IN SLOVENIA, 2.79% SHARE IN THE EU

108 ACTIVE

COMMUNITY SELF-SUPPLY SYSTEMS

ELECTRICITY PRICES ON ALL EXCHANGES REDUCED BY AROUND 60%

1,608 PUBLIC CHARGING POINTS

FINAL ELECTRICITY SUPPLY PRICE FOR A TYPICAL HOUSEHOLD AND BUSINESS CONSUMER STILL BELOW EU AVERAGE

6 ACTIVE AGGREGATORS

ON THE SLOVENIAN MARKET

20.3% INCREASE IN

THE AVERAGE ANNUAL FINAL SUPPLY PRICE FOR A TYPICAL HOUSEHOLD CONSUMER

21.4% INCREASE IN FINAL SUPPLY PRICES FOR

THE AVERAGE BUSINESS CONSUMER

81% LESS SWITCHING OF SUPPLIERS

INACTIVE MARKET MAINLY DUE TO PRICE CAPS

ELECTRICITY

Electricity Balance

Inputs and Outputs of Electricity in the System

In 2023, 14,194 GWh of electricity was delivered into the electricity system from the generation units connected to the transmission or distribution system, which was 2,002 GWh more than in 2022. The electricity balance of inputs and outputs shown in Figure 1 also includes the withdrawal of 41 GWh from battery storage in the context of generation in the distribution system and within closed distribution systems. The delivery from facilities using RES amounted to 5708 GWh, which is 1947 GWh more than the year before, while facilities using fossil fuels contributed 3121 GWh or 24 GWh more compared to 2022[1], but still 599 GWh less than in 2021. The Krško Nuclear Power Plant (NPP) delivered 5,323 GWh of electricity or 21 GWh more than the year before. These quantities are taken from the balance sheets of the electricity system operators and are based on physical flows.

The quantity of electricity delivered into the electricity system produced by facilities connected to the distribution system, which includes closed distribution systems (CDS), increased by 226 GWh compared to 2022 to a total of 1,197 GWh, or 1,238 GWh if including the electricity drawn from battery storage. In internal consumers' networks with connected production facilities in installed production units, an additional 456 GWh of electricity was produced and consumed, which represents 37% of all electricity delivered into the distribution system from facilities connected to the distribution system and closed distribution systems. The estimated production from self-supply devices amounted to 418 GWh[2], while system operators' reports state that 343 GWh were delivered into the distribution system at the metering points of consumers with the annual calculation of electricity, while 350 GWh of electricity was delivered from the distribution system.

14,194 GWh of electricity delivered into the electricity system, 40.3% which was generated in production facilities using RES

1 With regard to the delivery from facilities using fossil fuels, the Report on the Energy Situation in Slovenia in 2022 also included 31.8 GWh from battery storage.

2 The report, drafted in accordance with Article 20 of the Decree on the self-supply of electricity from renewable energy sources (Official Gazette of the Republic of Slovenia, no. 43/22) states that the estimated output is based on very limited input data.

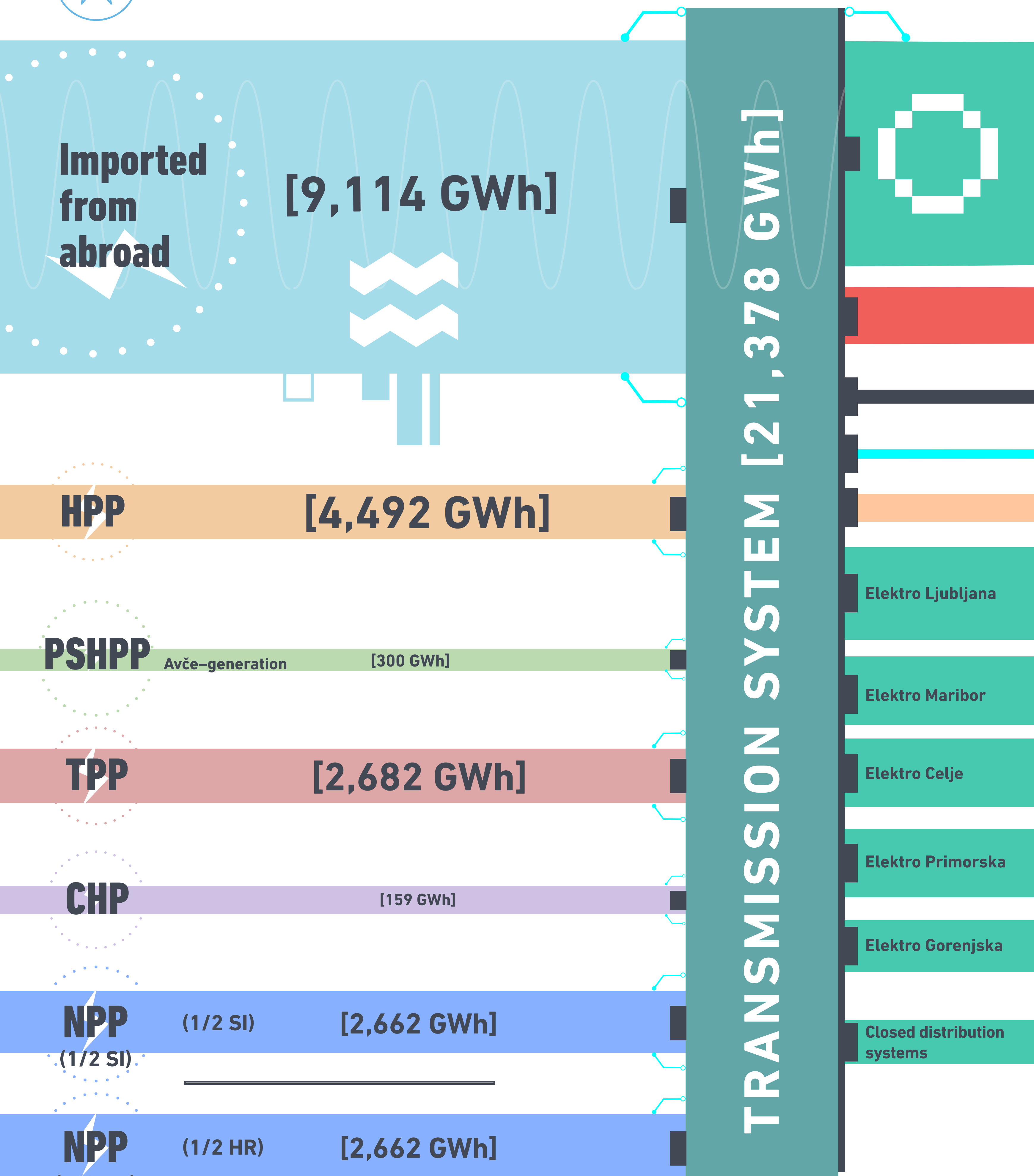
TABLE 1: ELECTRICITY DELIVERED TO THE TRANSMISSION AND DISTRIBUTION SYSTEMS IN THE 2021–2023 PERIOD, IN GWh

Electricity input to the transmission system [GWh]	**2021**	**2022**	**2023**
Dravske elektrarne Maribor	2,888.3	1,846.9	2,958.6
Savske elektrarne Ljubljana	339.8	225.7	397.4
Hidroelektrarne na spodnji Savi	549.8	400.0	682.9
Soške elektrarne Nova Gorica	442.5	313.0	452.9
Avče PSHPP in the generation regime	283.3	251.2	300.2
Total Hydro	**4,503.7**	**3,036.7**	**4,792.0**
Šoštanj TPP	3,112.0	2,541.8	2,682.9
Brestanica TPP	46.1	40.8	–0.1
Trbovlje TPP	–1.6	0.1	–1.1
Javno podjetje Energetika Ljubljana	272.4	258.8	159.1
Total TPP and CHP	**3,429.0**	**2,841.4**	**2,840.8**
Krško Nuclear Power Plant	**5,411.3**	**5,302.2**	**5,323.4**
Total electricity input into the transmission system	**13,344.1**	**11,180.4**	**12,956.1**
Electricity input into the distribution system [GWh]	**2021**	**2022**	**2023**
HPP up to and including 1 MW	211.3	158.7	247.3
HPP above 1 MW	165.6	114.1	156.6
Woody biomass-fuelled facilities	59.6	41.5	32.8
Wind farms	5.5	5.7	6.4
Solar power plants	252.6	286.8	361.1
Facilities using biogas	92.6	117.1	111.9
Waste-to-energy plants	0.9	0.7	0.1
Total RES	**788.2**	**724.6**	**916.2**
Total conventional sources	**291.0**	**255.5**	**280.6**
Unidentifiable (withdrawal from storage facilities)	**20.6**	**31.8**	**41.3**
Total electricity input into the distribution system	**1,099.8**	**1,011.9**	**1,238.1**
TOTAL ELECTRICITY INPUT	**14,443.9**	**12,192.3**	**14,194.2**

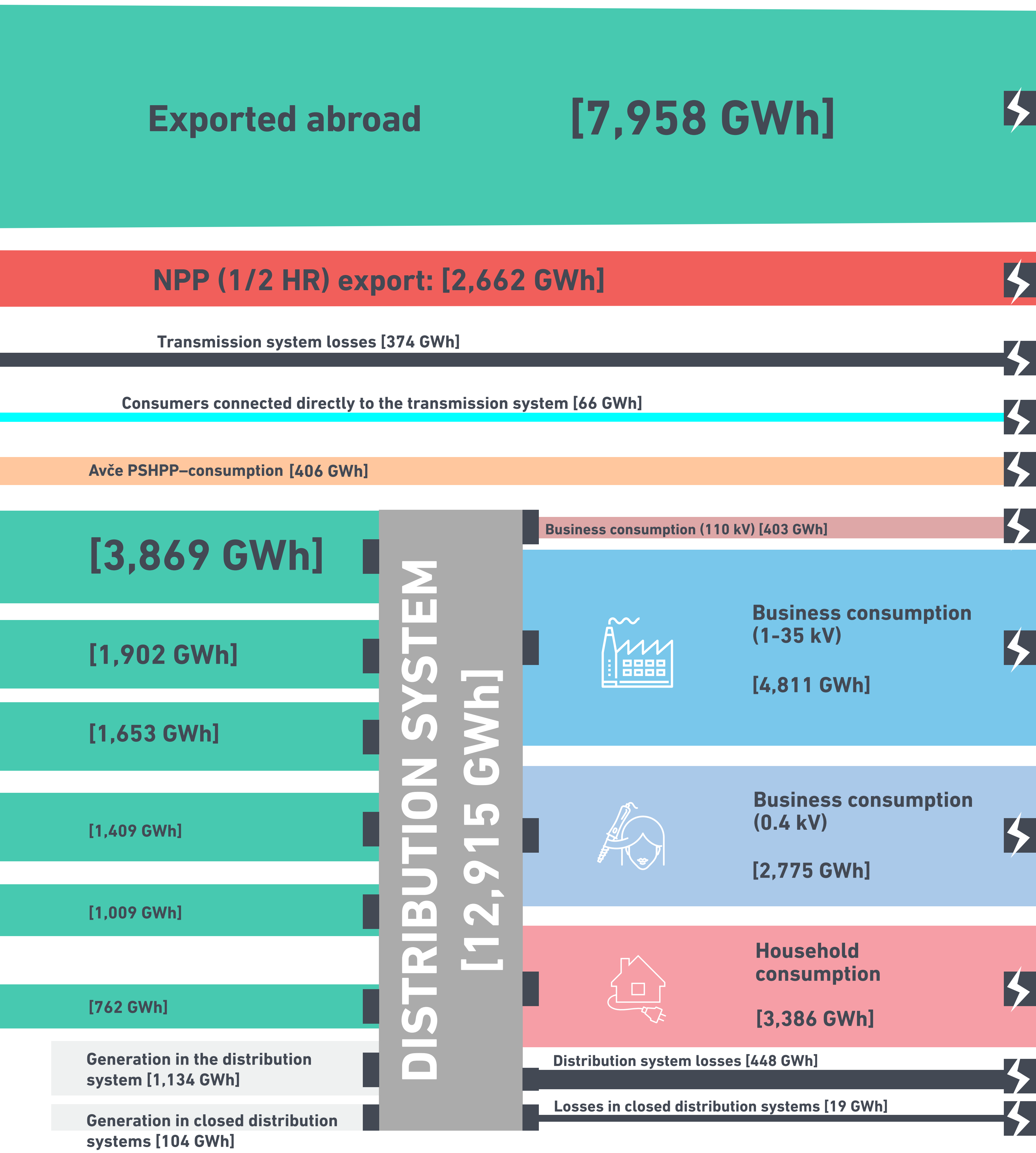
SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

ELECTRICITY

FIGURE 1: THE BALANCE OF ELECTRICITY INPUTS AND OUTPUTS IN THE TRANSMISSION AND DISTRIBUTION SYSTEMS IN 2023[3]



3 Withdrawal of electricity from battery storage is covered in Generation in the distribution system and Generation in closed distribution systems.

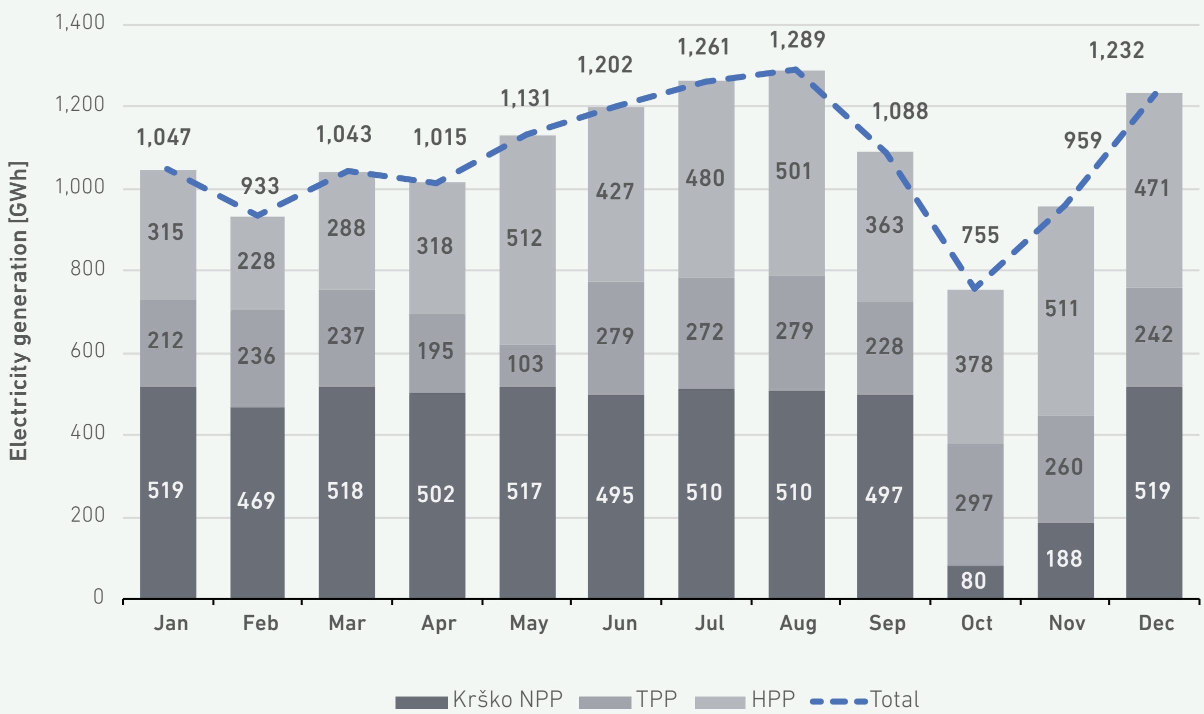


SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

Domestic production sources – which include half of the production from the Krško NPP – contributed 11,533 GWh of electricity to the Slovenian electricity system. The demand from final consumers, including system losses, amounted to 12,688 GWh. In 2023, 90.9% of the electricity consumption by final consumers in Slovenia was covered by domestic production sources.

Figure 2 shows the monthly movement of electricity production in power plants that were connected to the transmission system in 2023. Compared to the previous year, 2023 was marked by excellent hydrological conditions and some of the highest electricity production in hydropower plants in recent years. Electricity production in the Krško Nuclear Power Plant was disrupted due to a malfunction between October 6 and November 22, while the TPP was partially stopped in May due to market conditions that favoured the import of electricity.

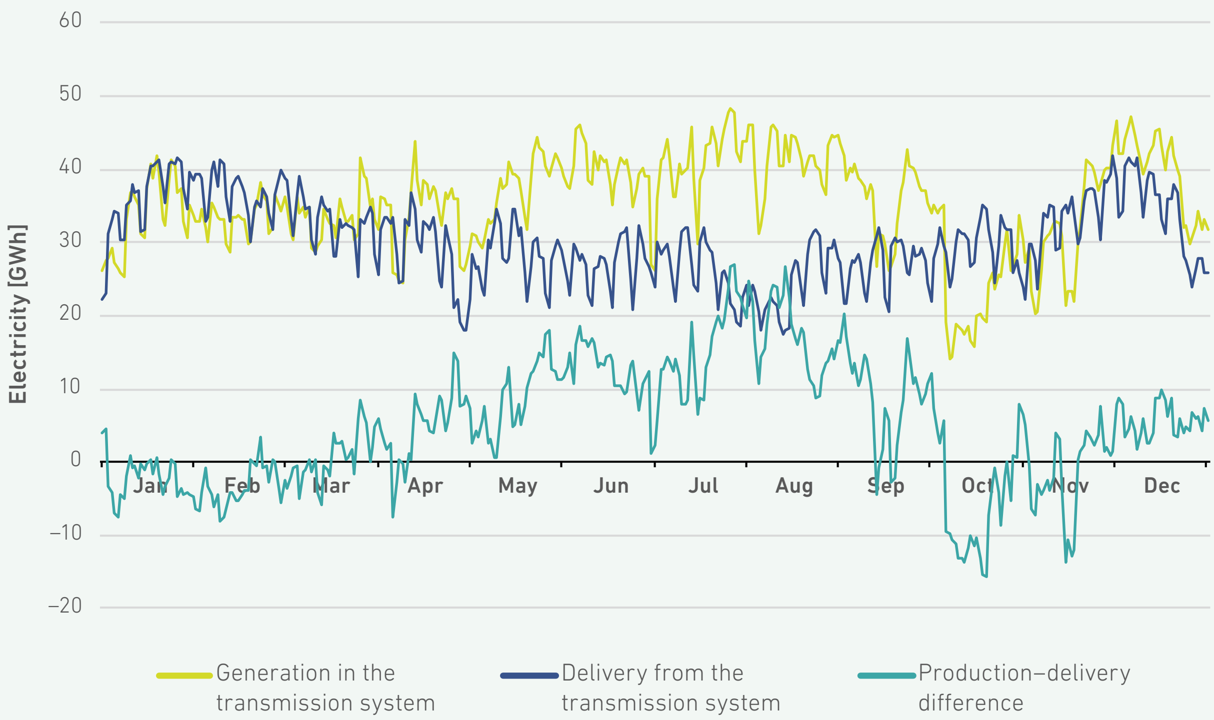
FIGURE 2: MONTHLY VARIATION OF ELECTRICITY PRODUCTION IN LARGE POWER PLANTS CONNECTED TO THE TRANSMISSION SYSTEM.



SOURCE: ENERGY AGENCY, ELES

Figure 3 shows the variation in electricity production and delivery from the transmission system, which shows a deficit of production especially during the Krško NPP shutdown due to malfunction in October and November, and to a lesser degree at the beginning of the year, when production in hydropower plants was also somewhat lower. In other months, the domestic production on average kept up with domestic needs, and even significantly exceeded them in the period between May and September.

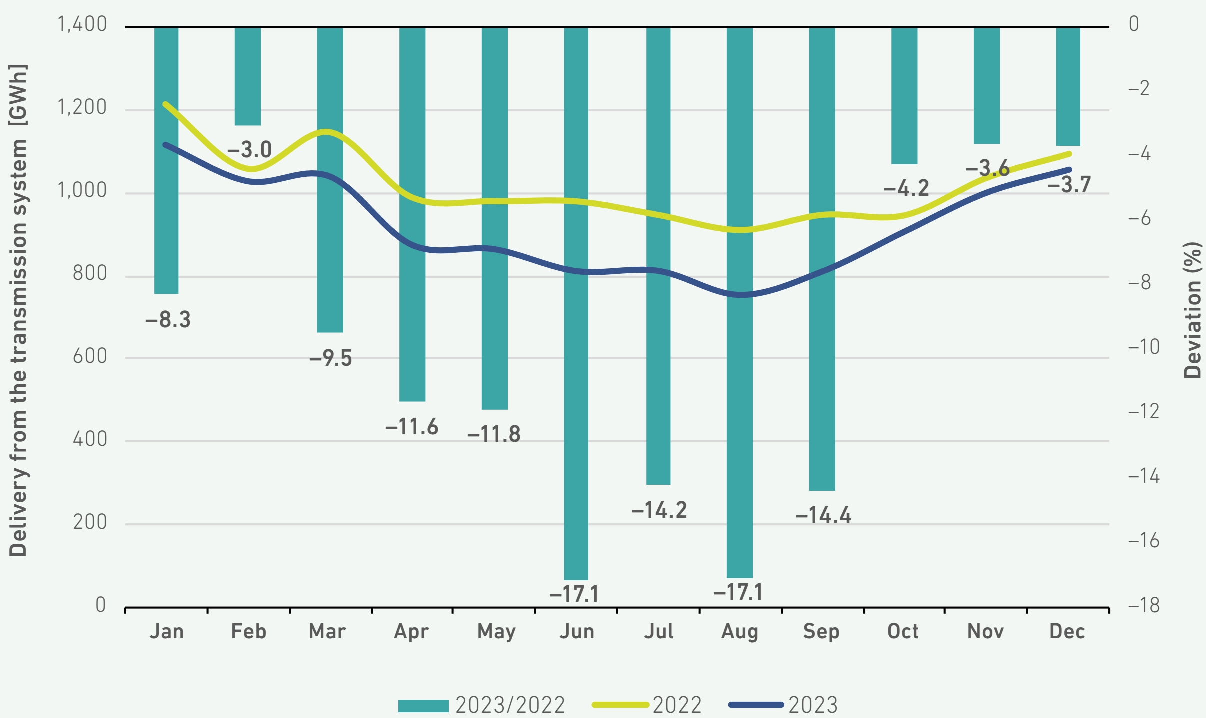
FIGURE 3: DAILY VARIATION OF ELECTRICITY PRODUCTION AND INPUT INTO THE TRANSMISSION SYSTEM



SOURCE: ENERGY AGENCY, ELES

Figure 4 shows the monthly variation in the delivery of electricity from the transmission system in 2022 and 2023. Shown separately is the monthly margin of delivery during both years, which shows a significant reduction in electricity delivery from the transmission system in 2023 compared to the year before. This reduction in delivery can be observed for all months and especially in the period between April and September.

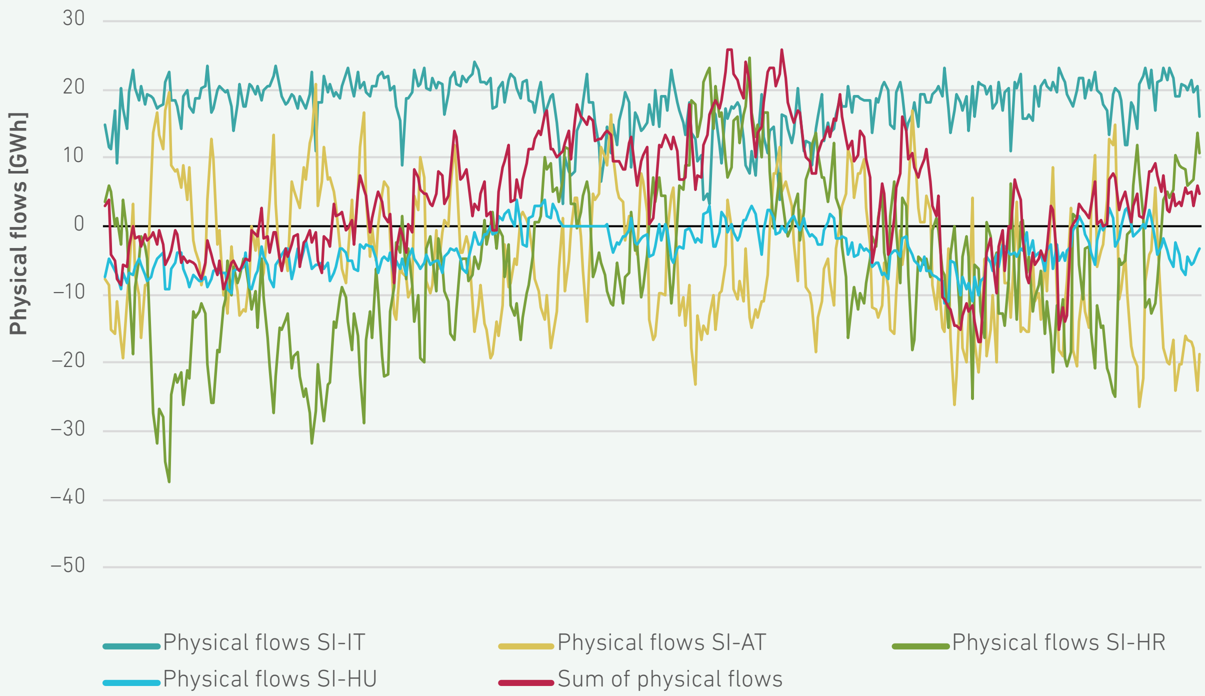
FIGURE 4: MONTHLY DELIVERY OF ELECTRICITY FROM THE TRANSMISSION SYSTEM IN 2022 AND 2023, ALSO SHOWING MONTHLY DEVIATIONS



SOURCE: ENERGY AGENCY, ELES

The Slovenian electricity transmission system is connected to the transmission systems of neighbouring countries on the borders with Austria, Croatia, Italy and Hungary. Based on the sum of physical flows at the borders, we can determine whether the need to balance the electricity system at a certain point in time led to the import of the deficit or the export of the surplus electricity from the transmission system. Figure 5 shows the sum of the physical electricity flows at all four borders (SI-AT, SI-HR, SI-IT and SI-HU) in addition to the movement of individual physical flows.

FIGURE 5: PHYSICAL ELECTRICITY FLOWS AT THE BORDERS WITH NEIGHBOURING COUNTRIES AND THE NET SUM OF PHYSICAL FLOWS

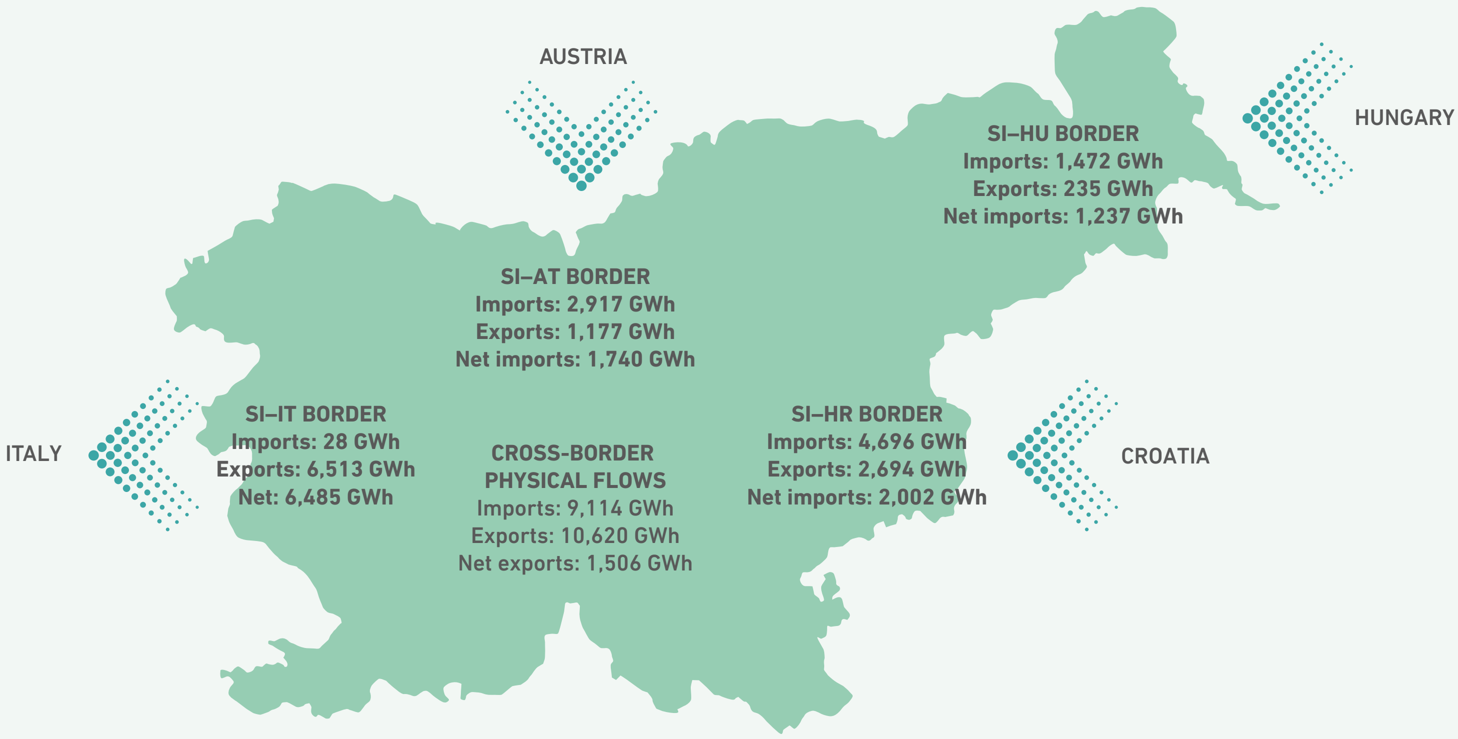


SOURCE: ENERGY AGENCY, ELES

To keep the electricity system balanced, it is important to exchange electricity with neighbouring countries using cross-border interconnectors. Considering the separate observation of physical flows at individual borders with neighbouring countries in 2023, Slovenia was a net exporter of electricity to Italy and a net importer of electricity at the other three borders. Given the total exchanges of electricity at the borders with neighbouring countries and taking into account the entire production from the Krško NPP, Slovenia was a net exporter of electricity in 2023. Figure 6 shows the annual volumes of physical flows at the borders with neighbouring countries. These prove that the Slovenian transmission system is an important element in energy flows within the EU internal electricity market, especially in the direction of Italy, which remains a large importer of electricity due to differences in prices on the annual level.

Slovenia a net exporter of electricity in 2023, considering the total production of NPP

FIGURE 6: PHYSICAL ELECTRICITY FLOWS ACROSS THE BORDERS WITH NEIGHBOURING COUNTRIES

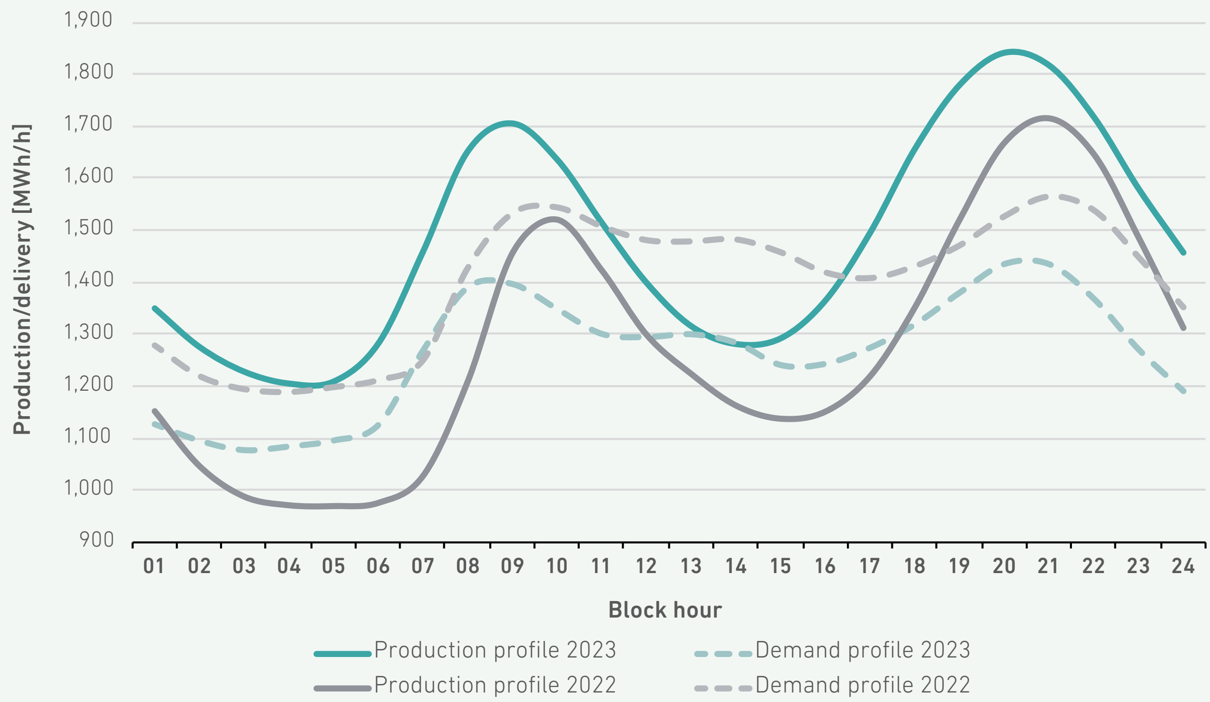


SOURCE: ENERGY AGENCY, ELES

Figure 7 shows the average daily profile of electricity generation and delivery in the transmission system in the years 2022 and 2023. In 2023, the transmission system saw the lowest load at night (at around 03:00). There were two peaks, the first in the morning (between 08:00 and 9:00) and the second in the evening between 21:00 and 22:00. From the comparison of the profiles of generation and delivery in both years, it can be seen that for virtually all hours of 2023, the production was on average higher than the delivery during the majority of hours, while in 2022 this was only true for five hours in the evening (between 18:00 and 22:00).

The highest hourly load on the electric transmission system in 2023 was 2025 MW – 84 MW less than in 2022. It was reached on Friday, 10 February 2023, in the 8th block hour (between 7:00 and 8:00). For the second time in a row, the peak occurred in the morning hours, which is unusual considering the previous years, when the peak usually occurred in the evening hours or around noon and never in the morning.

FIGURE 7: THE AVERAGE DAILY PROFILE OF ELECTRICITY GENERATION AND DELIVERY FROM THE TRANSMISSION SYSTEM IN THE YEARS 2022 AND 2023

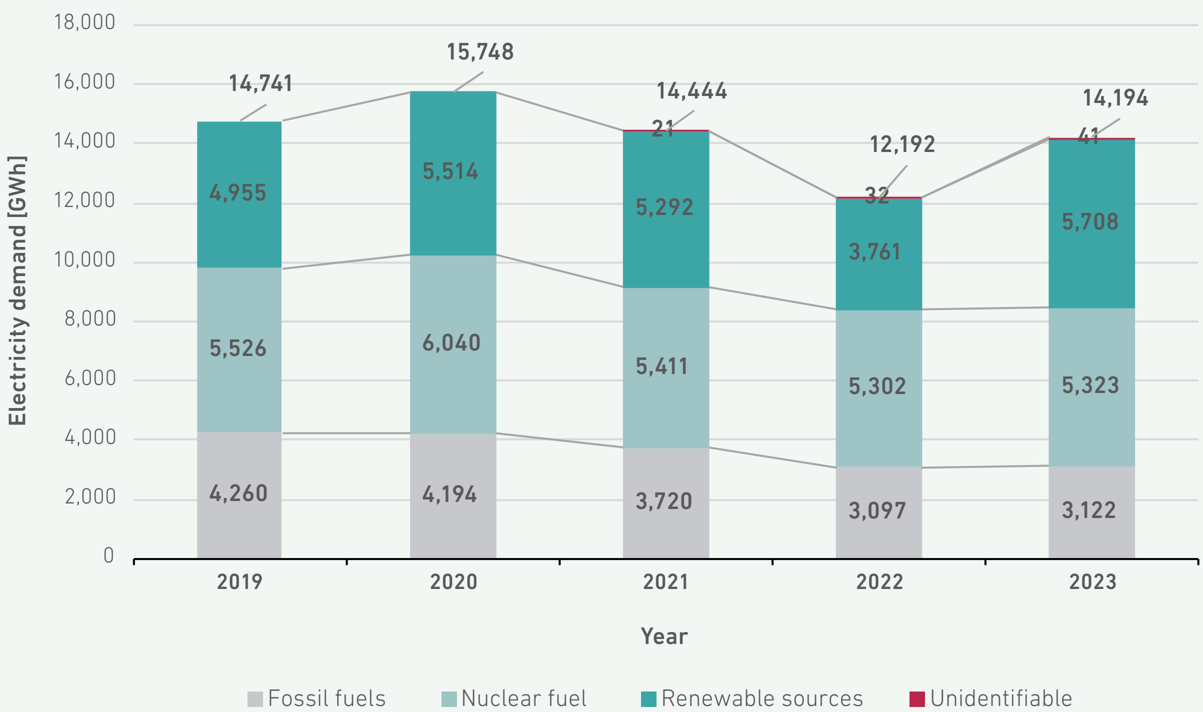


SOURCE: ENERGY AGENCY, ELES

The share of electricity generated in hydropower plants and facilities using RES varies annually depending on hydrological and other conditions and investments in new generating facilities using RES. In 2023, especially due to the very good hydrological conditions, the share of renewable energy sources was around 40.3% of all the electricity produced and delivered in the electricity system in Slovenia, which is 9.4 percentage points more than the previous year. Fossil-fuel power plants contributed 22.1% of the total generation, which is 3.4 percentage points less than in 2022, while the Krško NPP contributed 37.6% of all electricity produced, which also includes the 50% share belonging to Croatia in accordance with the intergovernmental agreement.

37.6% of all produced and delivered electricity is from the nuclear power plant, 40.3% from RES, and 22.1% from fossil fuels

FIGURE 8: ELECTRICITY DELIVERED FROM THE GENERATION FACILITIES TO THE TRANSMISSION AND DISTRIBUTION SYSTEMS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

TABLE 2: PRIMARY ENERGY SOURCES DELIVERED TO THE TRANSMISSION AND DISTRIBUTION SYSTEMS IN THE 2021–2023 PERIOD

Primary energy sources for electricity generation	2021		2022		2023	
	GWh	Share	GWh	Share	GWh	Share
Fossil fuels	3,720	25.8%	3,097	25.5%	3,122	22.1%
Nuclear fuel	5,411	37.5%	5,302	43.6%	5,323	37.6%
Renewable sources	5,292	36.7%	3,761	30.9%	5,708	40.3%
• Hydro	4,881	92.2%	3,310	88.0%	5,196	91.0%
• Wind	5.54	0.1%	5.7	0.2%	6.36	0.1%
• Solar	253	4.8%	287	7.6%	361	6.3%
• Biomass	153	2.9%	159	4.2%	145	2.6%
Unidentifiable	21	-	32	-	41	-
TOTAL ELECTRICITY INPUT	**14,444**		**12,192**		**14,194**	

SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

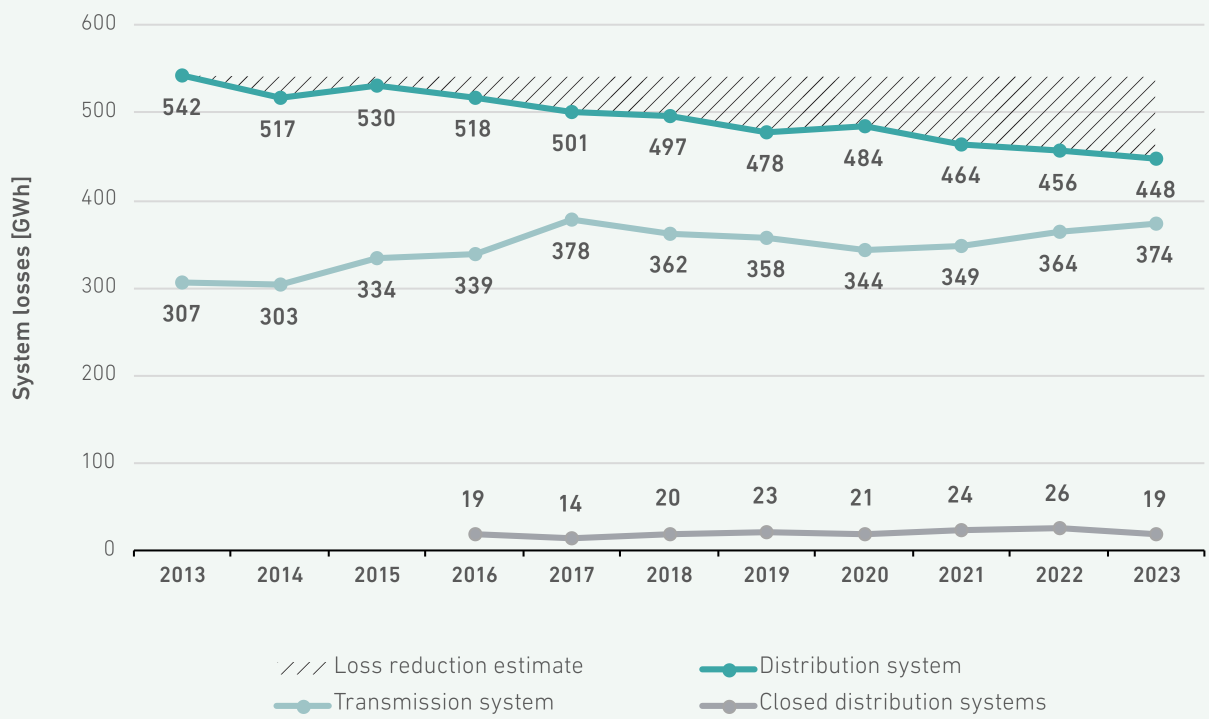
Losses in the Electricity System

The quantities of losses in the transmission system are determined based on the differences between the quantities of electricity produced in the transmission system and the quantities of electricity at the connection points between the transmission and distribution systems and the direct consumption of electricity from the transmission system. Losses in the transmission system are determined based on the differences between the quantities of electricity at the borders between the transmission and distribution systems and the quantities of electricity measured for the final consumers.

Despite the fact that 2023 has also seen an increase in the percentage of electricity losses in the distribution system, the downward trend in the amount of losses is continuing due to various measures, especially the introduction of advanced metering systems, which allow better monitoring and control over commercial and technical losses, and the growing transition to medium- and low-voltage networks. In the 2013–2023 period, these measures led to an estimated 512 GWh of savings in electricity to cover distribution system losses.

The varying amount of electricity losses in the transmission system is significantly influenced by the inclusion of the Avče PSHPP after 2014 and the increased share of cross-border electricity trading in exports, imports and transit. Electricity losses in transmission, distribution and closed distribution systems along with an estimation of the savings in the 2013–2023 period are shown in Figure 9.

FIGURE 9: THE QUANTITIES OF ELECTRICITY LOSSES IN THE TRANSMISSION, DISTRIBUTION AND CLOSED DISTRIBUTION SYSTEMS IN THE 2013–2023 PERIOD AND AN ESTIMATE OF THE REDUCTION IN LOSSES ON THE DISTRIBUTION SYSTEM



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

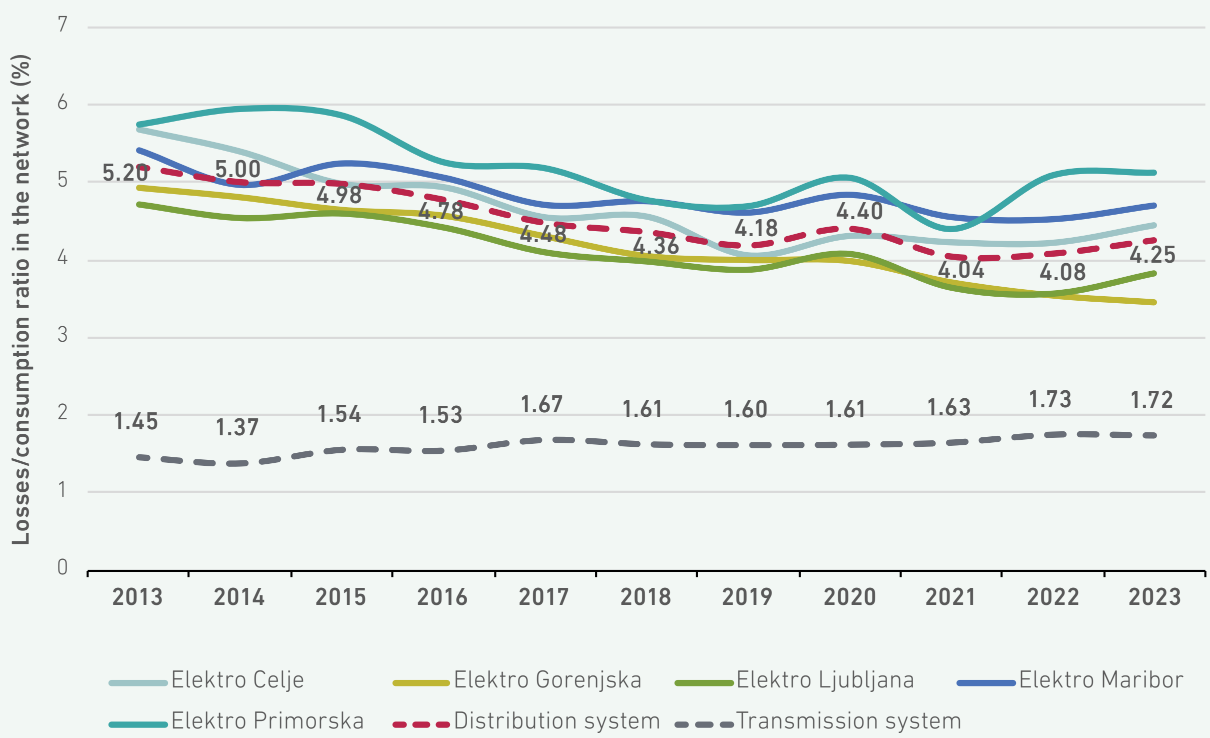
The task of effectively managing and reducing losses falls on ELES as the combined transmission and distribution system operator, which is also responsible for covering the electricity losses in the electricity system. As the electricity needed to cover losses must be provided in a transparent and market-efficient manner, ELES must strive for the lowest possible price when purchasing such electricity. In so doing, ELES must choose the right marketing strategy that takes into account the mechanisms for forecasting the required quantities of electricity and the diversification of (long-term and short-term) purchases. In this way, ELES can have a significant impact on the cost of electricity for covering losses, which in the tightening conditions in the electricity market represent an increasing share of the eligible costs of the electricity system operators.

The share of electricity losses on the distribution system is increasing due to a reduction of billed consumption

The share of losses is calculated based on the quantities consumed from the transmission or distribution system. Distribution system losses on the distribution system in 2022 and especially in 2023, is partially due to the actual reduction of consumption with business consumers and partially due to the virtual reduction of consumption with household and small business consumers as a consequence of the annual netting of production and consumption with self-supplying consumers. Due to the additional transit of electricity across the country in the past, the transmission system has been seeing an increase of electricity losses in the past, which in the last two years reached the highest value of the last ten years. This is due to a combination of factors, including the increased transit in the Slovenian transmission system, lower domestic production, higher import of electricity and, to a lesser extent, the entry into service of the Cirkovce–Pince transmission line.

Figure 10 shows the shares of losses for ELES, SODO and the distribution companies in the 2013–2023 period.

FIGURE 10: SHARES OF LOSSES FOR THE TRANSMISSION SYSTEM, DISTRIBUTION SYSTEM AND DISTRIBUTION COMPANIES IN THE 2013–2023 PERIOD



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

Electricity Generation

In 2023, there were nine companies operating in the Slovenian electricity market with an installed capacity of more than 10 MW. One of them is Energetika Ljubljana, while the rest are consolidated into one of two groups: HSE, which represents the first energy pillar of the Slovenian wholesale market, and GEN energija, representing the second energy pillar. The GEN energija group also owns 51% of the Hidroelektrarne na spodnji Savi company (HESS), while the remaining part of this company belongs to the HSE group.

Record high production of electricity in hydropower plants

TABLE 3: INSTALLED CAPACITIES OF THE PRODUCTION FACILITIES AND THE QUANTITY OF ELECTRICITY PRODUCED

PRODUCER	Installed capacity [MW]	Share – installed capacity, all producers in Slovenia	Generation [GWh]	Share – generation, all producers in Slovenia
HSE, d.o.o.	**1,931.6**	**43.4%**	**6,393.5**	**52.0%**
Hydropower plants	938.6		3,707.5	
Thermal power plants	990.0		2,681.8	
Other (CHP, solar, wind)	3.0		4.2	
GEN energija, d.o.o.	**1,043.2**	**23.5%**	**3,741.9**	**30.4%**
Hydropower plants	279.4		1,071.8	
Thermal power plants	406.0		−0.01	
Nuclear power plant*	350.0		2,661.7	
Other (CHP, solar, wind)	7.8		8.4	
Javno podjetje Energetika Ljubljana, d.o.o	**119.0**	**2.7%**	**159.0**	**1.3%**
CHP	110.8		117.0	
Generation using woody biomass	8.2		42.0	
Other small producers in the distribution network and in closed distribution systems**	**1,352.8**	**30.4%**	**1,999.5**	**16.3%**
Hydropower plants	123.3		475.8	
Solar power plants	1,020.4		851.2	
Wind farms	3.3		6.4	
Facilities using woody biomass	18.6		60.5	
Geothermal power plants	0.0		0.0	
Facilities using biogas	39.4		133.3	
CHP	147.8		472.3	
Total in Slovenia	**4,446.6**	**100.0%**	**12,293.9**	**100.0%**
• **in the transmission system**	**3,093.8**		**10,294.4**	

* Taking into account the 50% share of the Krško NPP's installed capacity and production
** Other small producers in the distribution system and in CDS (Talum, Acroni, Ravne, Štore, Jesenice and Salonit) and generation in internal consumers' networks (also includes the estimated generation in self-supply devices)

SOURCE: ENERGY AGENCY, PRODUCERS, BORZEN, ELECTRIC SYSTEM OPERATORS

Compared to the previous year, the installed capacity with larger producers (the HSE and GEN energija, as well as Energetika Ljubljana) did not change. The same applies to closed distribution systems (CDS), where the total installed capacity only increased in solar power plants. However, significant changes occurred in production facilities connected to the distribution network, where the installed capacity of production facilities increased by almost 460 MW, no less than 396 MW of which were due to newly connected solar power plants. This increase is largely due to the increased interest of household and small business consumers in self-supply based on the annual calculation of the received and delivered electricity. According to the data from production companies and electricity system operators, in 2023, 3 MW of facilities in cogeneration using fossil fuels, 0.7 MW of solar power plants and 0.3 MW of hydropower plants were taken offline.

The largest part of the electricity produced by small producers connected to the distribution system and CDS was generated by solar power plants, followed by small hydropower plants, and industrial facilities for CHP. In 2023, small producers generated 16.3% of electricity, which, despite the record production of 2,000 GWh of electricity, represents a decrease of 0.1 percentage point compared to the previous year. The main reason for this decrease is the significantly increased production in large hydropower plants connected to the transmission system.

51.7% renewable sources

26.6% fossil fuels

21.7% nuclear fuel –

Actual shares of primary electricity sources in Slovenia, taking into account 50% of electricity produced and delivered by the Krško NPP

Due to the intergovernmental agreement between Slovenia and Croatia, half of NEK's production belongs to Croatia, which reduces the Krško NPP's share in the actual Slovenian electricity production. In 2023, power plants in Slovenia thus generated a total of 14,956 GWh of electricity, while Slovenia's actual electricity production was lower, at 12,294 GWh. Compared to 2022, production increased by 2,091 GWh, which represents 17.4%.

The electricity balance of delivery and generation, shown in Figure 1 and Table 1, and the structure of energy sources in Figure 8 and Table 2, take into account the generated electricity delivered in the transmission system of the Republic of Slovenia. On the other hand, the data on electricity generation in Table 3 also includes electricity that was generated and consumed in internal networks of end-consumers, including the estimated electricity from self-supply devices. Considering the electricity generated in production facilities, connected in the internal networks of end-consumers and the 50% share generated by the Krško NPP, the primary sources for electricity generation in the Republic of Slovenia in 2022 were fossil fuels with 26.6%, nuclear fuel with 21.7% and RES with 51.7%. By taking into account the electricity generated in the consumers' internal networks, the total amount of RES has seen an increase of 10 percentage points compared to 2022, mainly due to increased electricity generation in hydropower plants in 2023.

TABLE 4: PRIMARY ENERGY SOURCES FOR ELECTRICITY GENERATION IN SLOVENIA IN THE 2021–2023 PERIOD

	2021		2022		2023	
PRIMARY SOURCES	**Generation [GWh]**	**Share of generation (%)**	**Generation [GWh]**	**Share of generation (%)**	**Generation [GWh]**	**Share of generation (%)**
Fossil fuels	3,925.1	31.8%	3,279.6	32.1%	3,271.2	26.6%
Nuclear fuel	2,709.3	21.9%	2,651.1	26.0%	2,661.7	21.7%
Renewable sources	5,721.3	46.3%	4,272.6	41.9%	6,361.0	51.7%
• Hydro	5,049.2		3,356.7		5,255.0	
• Solar	422.7		628.2		863.8	
• Wind	5.5		5.7		6.4	
• Biomass	153.1		122.2		102.5	
• Biogas	90.8		159.8		133.3	
TOTAL	**12,355.7**	**100.0%**	**10,203.3**	**100.0%**	**12,293.9**	**100.0%**

SOURCE: ENERGY AGENCY, PRODUCERS, ELECTRIC SYSTEM OPERATORS

Electricity Consumption

The total electricity consumption in Slovenia (taking into account consumption by Avče PSHPP) in 2023 was 12,688 GWh, or 11,847 GWh without counting the transmission and distribution system losses. Compared to 2022, the total consumption decreased by 950 GWh, which is 7%, not taking into account the electricity generated and consumed behind meters in the internal installation of consumers.

8.1% lower consumption by end-consumers

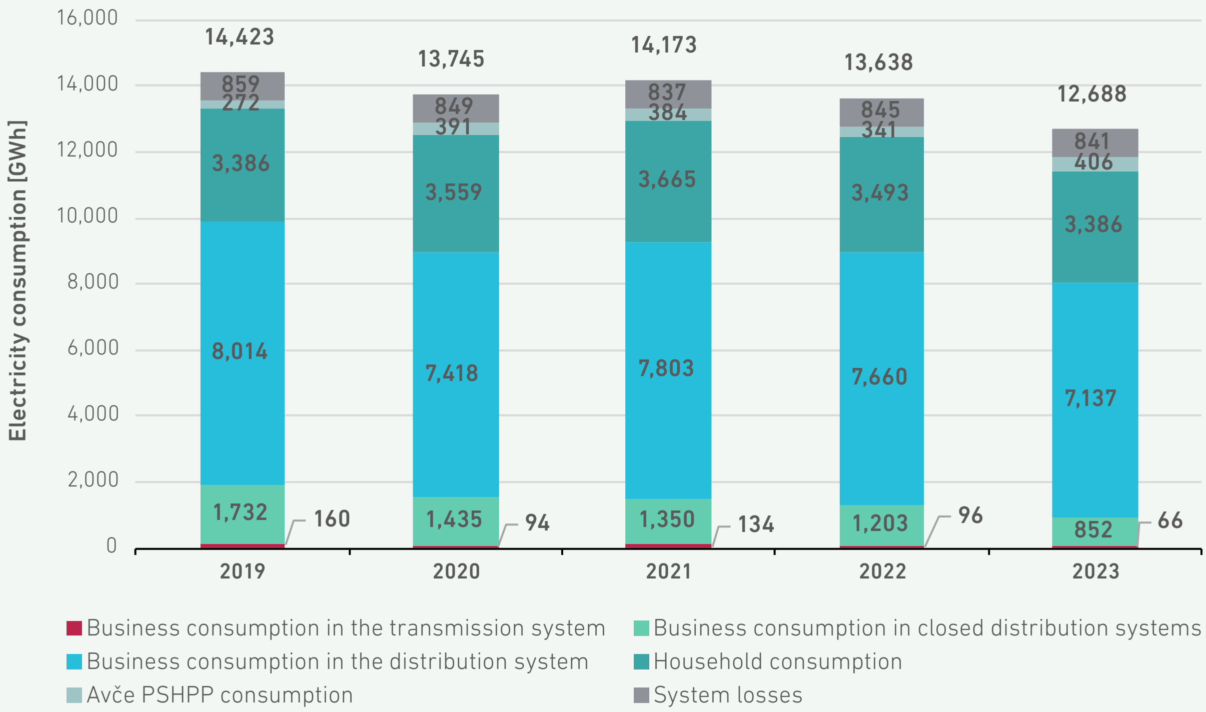
- **3.1% lower consumption by household consumers**
- **10.1% lower consumption by business consumers**

This does not take into account the electricity generated and consumed behind the metering point (self-supply)

There are three direct consumers connected to the transmission system, who consumed 66 GWh of electricity in 2023. 0.1 GWh of electricity was exported to Italy over the distribution system from DTS Vrtojba and DTS Sežana. Consumption of electricity by consumers in closed distribution systems was 852 GWh, 351 GWh less than in 2022, mainly due to lower consumption in CDS Talum and CDS Acroni. The Avče pumped-storage hydropower plant consumed 406 GWh for pumping water into the storage basin, 65 GWh more than the year before. Electricity losses in the transmission and distribution systems amounted to 841 GWh; this includes losses due to imports, exports and the transfer of electricity, transferred across the country.

Consumption by business and household consumers in the distribution system was 10,523 GWh, which represents a decrease of 5.6% in comparison with 2022. In 2023, household consumers consumed 3386 GWh of electricity, a decrease of 3.1% compared to the previous year. Consumption by business consumers in the distribution system in 2023 was 7,137 GWh, which is 6.8% less than in 2022. In 2023, the total consumption by all end-consumers (not including losses and consumption by Avče PSHPP) was 8.1% lower than in 2022.

FIGURE 11: ELECTRICITY CONSUMPTION IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

TABLE 5: ELECTRICITY CONSUMPTION IN THE 2021–2023 PERIOD

ELECTRICITY CONSUMPTION [GWh]	2021	2022	2023
Business consumption in the transmission system	134	96	66
Business consumption in the distribution system	7,803	7,660	7,137
Business consumption in closed distribution systems	1,350	1,203	852
TOTAL BUSINESS CONSUMPTION	**9,287**	**8,959**	**8,056**[4]
HOUSEHOLD CONSUMPTION	**3,665**	**3,493**	**3,386**
• single-tariff metering	916	863	854
• dual-tariff metering	2,748	2,629	2,532
Total consumption by end-consumers	**12,952**	**12,452**	**11,442**
Avče PSHPP consumption in the pumping regime	384	341	406
Losses in the transmission and distribution systems	837	845	841
Total electricity consumption	**14,173**	**13,638**	**12,688**

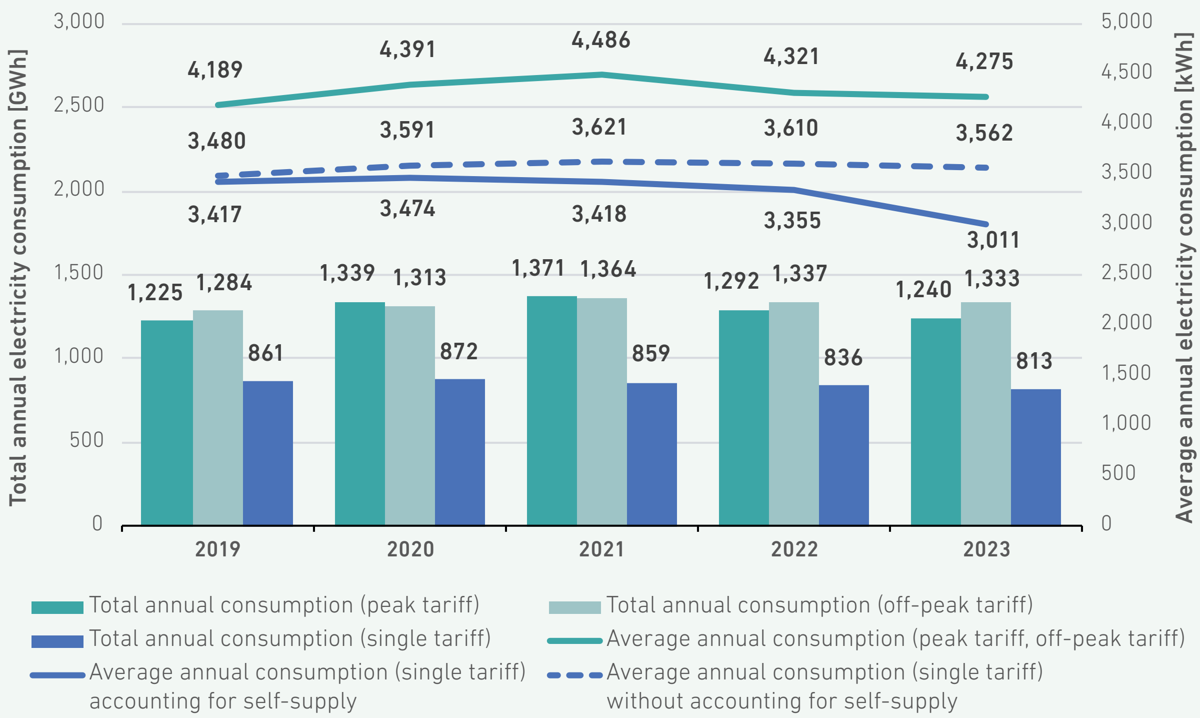
SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

4 Rounding of percentages to whole numbers may result in discrepancies in the totals.

Figure 12 shows the total and the average annual electricity consumption by household consumers with single- and dual-tariff metering; when calculating the average annual consumption, we also take into account the number of household consumers with each metering type. The average consumption of consumers with single-tariff metering appears to be declining from year to year (the solid line on the graph) because the consumption of household consumers with self-supply devices is taken into account, which accounts for a very distorted calculation of the average consumption due to the annual netting of consumption. If we eliminate these consumers from the calculation of average consumption (dashed line on the graph), the average consumption of a consumer with single-tariff metering of electricity consumption is much higher and does not show a considerable decreasing trend.

Due to the increased number of consumers opting for self-supply, the number of consumers with the single-tariff metering of electricity consumption rose again, this time by 4.9% compared with 2022. With household consumers with dual-tariff metering, a decrease in the number of consumers and a downward trend of total and average annual electricity consumption is continuing, which is largely due to a large number of consumers with dual-tariff metering transitioning to a self-supply system with annual consumption netting and the single-tariff metering of electricity consumption.

FIGURE 12: THE TOTAL AND THE AVERAGE ANNUAL ELECTRICITY CONSUMPTION BY HOUSEHOLD CONSUMERS WITH SINGLE- AND DUAL-TARIFF METERING IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

Demand Covered by Domestic Production

Demand covered by domestic production represents the ratio of electricity consumption by end-consumers to electricity production in Slovenia. As shown in Table 6, the largest contributors to domestic production are the large hydropower plants, thermal power plants and the nuclear power plant (with half of its generation), which are connected to the transmission system in Slovenia. A small part of the domestic production is connected to the distribution system.

90.9% of electricity demand covered with domestic production

TABLE 6: CONSUMPTION, PRODUCTION AND COVERAGE OF DEMAND WITH DOMESTIC PRODUCTION IN THE 2019–2023 PERIOD

	2019	2020	2021	2022	2023
Generation in the transmission system [GWh]	**10,934**	**11,639**	**10,638**	**8,529**	**10,294**[5]
• hydropower plants	4,225	4,747	4,504	3,037	4,792
• thermal power plants	3,946	3,872	3,429	2,841	2,841
• nuclear power plant (50% share)	2,763	3,020	2,706	2,651	2,662
Generation in the distribution system [GWh]	**1,044**	**1,088**	**1,079**	**1,012**	**1,238**
Total domestic production [GWh]	**11,978**	**12,727**	**11,717**	**9,541**	**11,533**
Total electricity consumption [GWh]	**14,341**	**13,744**	**14,142**	**13,638**	**12,688**
• total consumption by final consumers	13,292	12,506	12,952	12,452	11,442
• system losses	858	849	837	845	842
• Avče PSHPP consumption	271	391	384	341	406
• export to Italy (DTS Vrtojba and Sežana)	–81	–2	–31	–0,15	–0,1
Demand covered by domestic production	**83.5%**	**92.6%**	**82.9%**	**70.0%**	**90.9%**

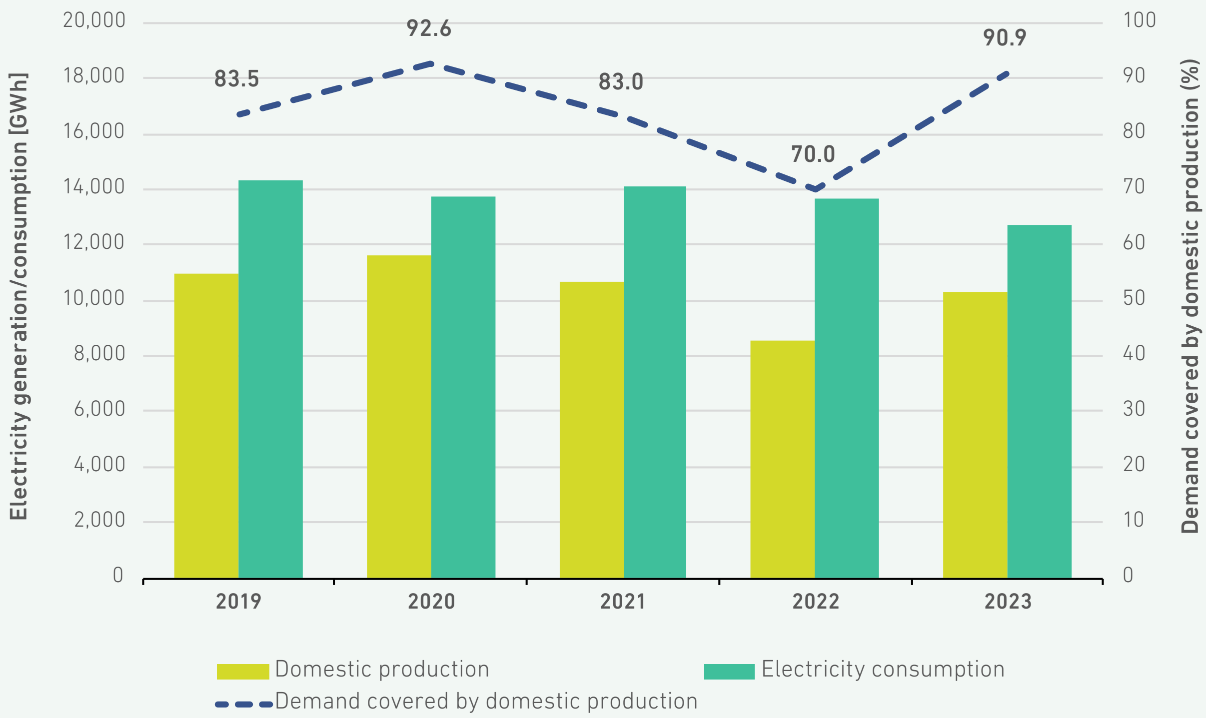
SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

In the 2019–2023 observation period, we observed inter-annual fluctuations in the amount of demand covered by domestic production. This amount is also directly affected by changes in electricity consumption. The dynamics and structure of total demand are explained in more detail in the previous chapter. In addition to the consumption by final consumers in the transmission and distribution systems, the total electricity demand also includes losses in the entire electricity system. The quantities of electricity exported to Italy through the distribution system via DTS Vrtojba and DTS Sežana are not counted as final consumption in Slovenia.

In 2023, the coverage of the demand with domestic production approached the highest value recorded in the last five years, amounting to 90.9%, which is a consequence of the good hydrological conditions and production in hydropower plants.

5 Rounding of percentages to whole numbers may result in discrepancies in the totals.

FIGURE 13: CONSUMPTION, PRODUCTION AND COVERAGE OF DEMAND WITH DOMESTIC PRODUCTION IN 2019–2023



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

Consumers in the Electricity System

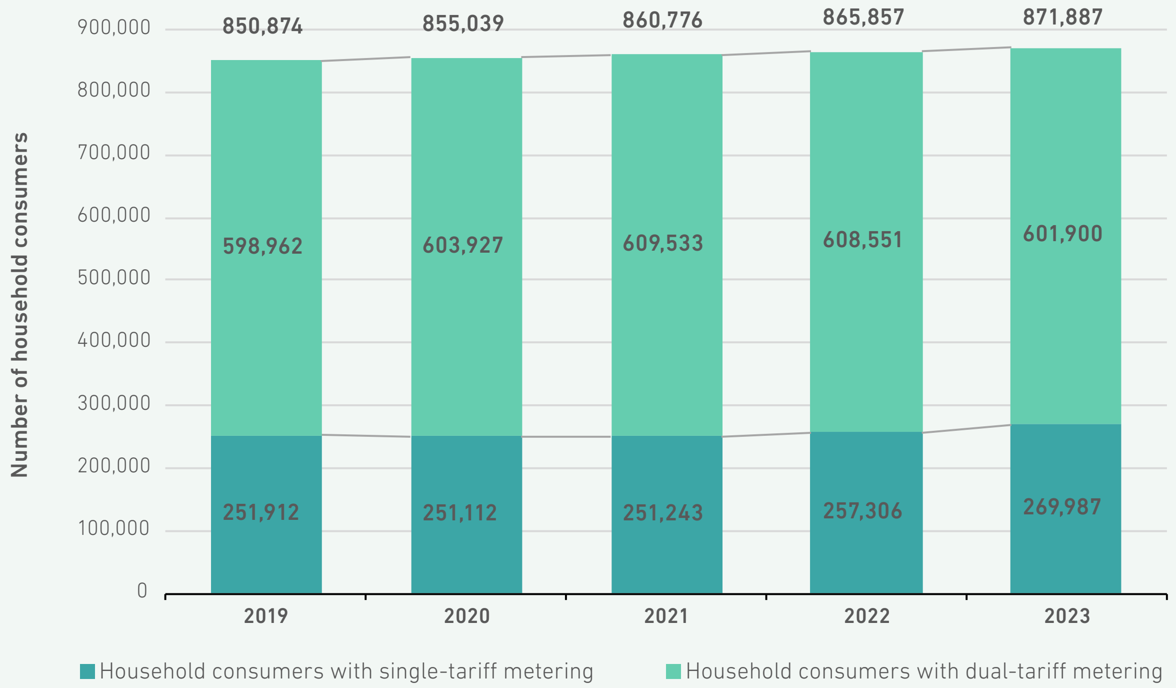
By the end of 2023, 983,194 end-consumers of electricity were connected to the Slovenian electricity system. Compared to 2022, their number has increased by 6,571 or 0.7%, of which 6,030 were household consumers and 541 were business consumers.

0.7% more end-consumers,

0.5% more business consumers

Figure 14 shows the evolution of the number of household consumers in the 2019–2023 period. The total number of household consumers increased by an average of 0.6% per year during this period, with the number of household consumers with single-tariff metering increasing again in 2023 by no less than 4.9%. On the other hand, the number of consumers with the dual-tariff metering of electricity consumption decreased again by 1.1% compared to 2022. An analysis of the consumer structure data shows that this unusual reversal is due to the increasing number of consumers switching to self-supply with annual consumption netting and single-tariff metering.

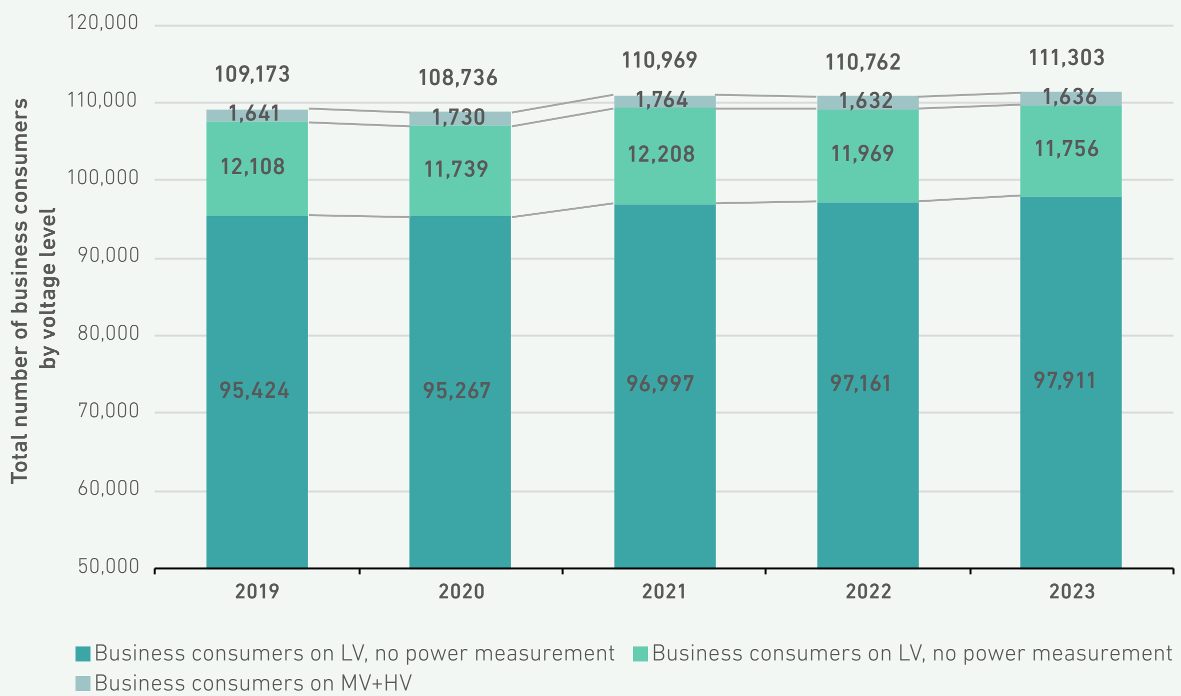
FIGURE 14: THE NUMBER OF HOUSEHOLD CONSUMERS IN 2019–2023



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

Figure 15 shows the evolution of the total number of business consumers in the distribution system and in closed distribution systems, shown separately by voltage levels. After a decrease in the number of business consumers in 2022, 2023 saw a 0.5% increase in consumers, largely due to an increase in the number of business consumers on LV, whose consumption is not measured directly, but instead determined on the basis of the current limiting device rating. Such consumers represent 88% of all business consumers. On the other hand, there was a 1.8% decrease in the number of LV consumers, whose load is metered.

FIGURE 15: THE NUMBER OF BUSINESS CONSUMERS IN DISTRIBUTION SYSTEMS AT DIFFERENT VOLTAGE LEVELS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

In 2023, 1,354 business and 100 household consumers with an installed production unit were connected to the distribution system under the PS.2 connection scheme and 2,886 business and 41,760 household consumers were connected to the self-supply system with annual consumption netting. 4.7% of all consumers in the distribution system were both consumers and producers of electricity, an increase of 1.8 percentage points compared to the year before.

The number of business consumers connected to the transmission system remained unchanged from the previous year. There were three business consumers connected to the transmission system at five delivery points, as well as five closed distribution system operators at six locations supplying electricity to 204 business consumers, 18 of which connected the in CDS have an installed production unit.

4.7% share of consumers who are also producers

TABLE 7: THE NUMBER OF FINAL CONSUMERS OF ELECTRICITY BY TYPE OF CONSUMPTION IN THE 2021–2023 PERIOD

The number of end-consumers of electricity by type of consumption	**2021**	**2022**	**2023**
Business consumers in the transmission system	3	3	3
Avče PSHPP consumption in the pumping regime	1	1	1
Total number of end-consumers in the transmission system	**4**	**4**	**4**
Business consumers in the distribution system	110,766	110,552	111,099
Household consumers	860,776	865,857	871,887
• single-tariff metering	251,243	257,307	269,987
• dual-tariff metering	609,533	608,552	601,900
Total number of end-consumers in the distribution system	**971,542**	**976,409**	**982,986**
Business consumers in closed distribution systems	203	210	204
Household consumers	0	0	0
Total number of end-consumers in closed distribution systems	**203**	**210**	**204**
TOTAL NUMBER OF END-CONSUMERS	**971,749**	**976,623**	**983,194**

SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

TABLE 8: THE NUMBER OF FINAL CONSUMERS OF ELECTRICITY BY TYPE OF CONNECTION IN THE 2021–2023 PERIOD

TYPE OF FINAL CONSUMER CONNECTION	End-consumers in the distribution system			End-consumers in closed distribution systems			TOTAL		
	2021	2022	2023	2021	2022	2023	2021	2022	2023
Without grid-connected production facilities									
Business	109,180	108,091	106,877	197	203	186	109,377	108,294	107,063
Household	846,606	840,010	830,027	0	0	0	846,606	840,010	830,027
TOTAL	955,786	948,101	936,904	197	203	186	955,983	948,304	937,090
Installed production unit									
Business	712	823	1,342	6	6	12	718	829	1,354
Household	107	104	100	0	0	0	107	104	100
TOTAL	819	927	1,442	6	6	12	825	933	1,454
Self-supply									
Business	874	1,638	2,880	0	1	6	874	1,639	2,886
Household	14,063	25,743	41,760	0	0	0	14,063	25,743	41,760
TOTAL	14,937	27,381	44,640	0	1	6	14,937	27,382	44,646
End-consumers in the distribution system and in the closed distribution systems									
Business	110,766	110,552	111,099	203	210	204	110,969	110,762	111,303
Household	860,776	865,857	871,887	0	0	0	860,776	865,857	871,887
TOTAL	971,542	976,409	982,966	203	210	204	971,745	976,619	983,190
End-consumers in the transmission system							**4**	**4**	**4**
TOTAL NUMBER OF END-CONSUMERS							**971,749**	**976,623**	**983,194**

SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATORS

Renewable Sources

Share of Renewables in the Final Gross Consumption

The Integrated National Energy and Climate Plan (NECP) is a strategic document defining objectives, policies and measures for five areas of the Energy Union: decarbonisation, energy efficiency, energy security, the internal market, research, innovation and competitiveness. Pursuant to Regulation (EU) 2018/1999 of 11 December 2018 on the Governance of the Energy Union and Climate Action[6] in 2023 Slovenia adopted the draft update of the notified NECP, which was subsequently supplemented several times and with which it committed to reducing the total greenhouse gas emissions by at least 55% by 2033 compared to 2005, to reduce greenhouse gas emissions in buildings by at least 70% by 2030 compared to 2005, and to achieve at least a 33% share of RES in the final energy consumption by 2030. The sectoral target shares for 2030 set to achieve the 33% share of RES are as follows:

- At least a 55% share of RES in the electricity sector,
- At least a 45% share of RES in the heating and cooling sector, and
- At least a 26% share in the transport sector.

Based on the assessed projected evolution in the total share of RES in the final electricity consumption, which anticipates a 36.7% share of RES in gross final consumption in Slovenia by 2030, the total share of RES achieved in Slovenia in 2023 should be 25.4%.

In 2022, Slovenia achieved the target 25% share of RES from 2020; however, the said share was achieved with a statistical transfer of 1,193 GWh of energy from RES from another member country, since the share of RES in the total gross final consumption amounted to only 22.94%. In the heating and cooling sector, the share was 33.99%, in the electricity sector 37.01%, and in the transport sector 7.83%.

25.3% estimated share of RES in the gross final consumption

For 2023, the share of RES in the total gross final consumption is estimated at 25.3%, which is 2.4 percentage points more than the RES share achieved in 2022, which excludes statistical energy transfers, and 0.1 percentage points lower than the planned RES share for 2023 in the proposal for the updated NECP. In this way, Slovenia has for the first time achieved an RES share in the final consumption that is higher than the target share for 2020. The reason behind the increase of the RES share is mainly due to the increase in the RES share in the transport and electricity sectors. The share of RES in transport is estimated at 9.9% for 2023, which is mainly a result of the decrease in energy use in transport with the concurrent increase in the use of biofuels. The use of electricity in road transport has not yet had a significant impact on the share of RES. The estimated share of RES in the electricity sector increased to 41.4%, which is 4.4 percentage points higher than in 2022. This is mainly due to a decrease in the gross electricity consumption in 2023, which has amounted to no less than 4% according to SURS. Contributing significantly to this decrease is the discontinuation of production of primary aluminium and the additional increase of electricity prices for the business sector. In addition, the gross electricity production using RES has grown by 7%, on the one hand as a consequence of an increase in the installed solar power plants capacities and on the other hand due to favourable hydrological conditions compared to 2022. The estimated share of RES in the heating and cooling sector remains the same as in 2022, amounting to 34%.

6 Regulation (EU) 2018/1999 of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending regulations (EC) No. 663/2009 and (EC) No. 715/2009 of the European Parliament and Council of the directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and Council, the directives of the Council 2009/119/EC, and (EU)205/652, and Repealing Regulation (EU) No. 525/2023 of the European Parliament and Council.

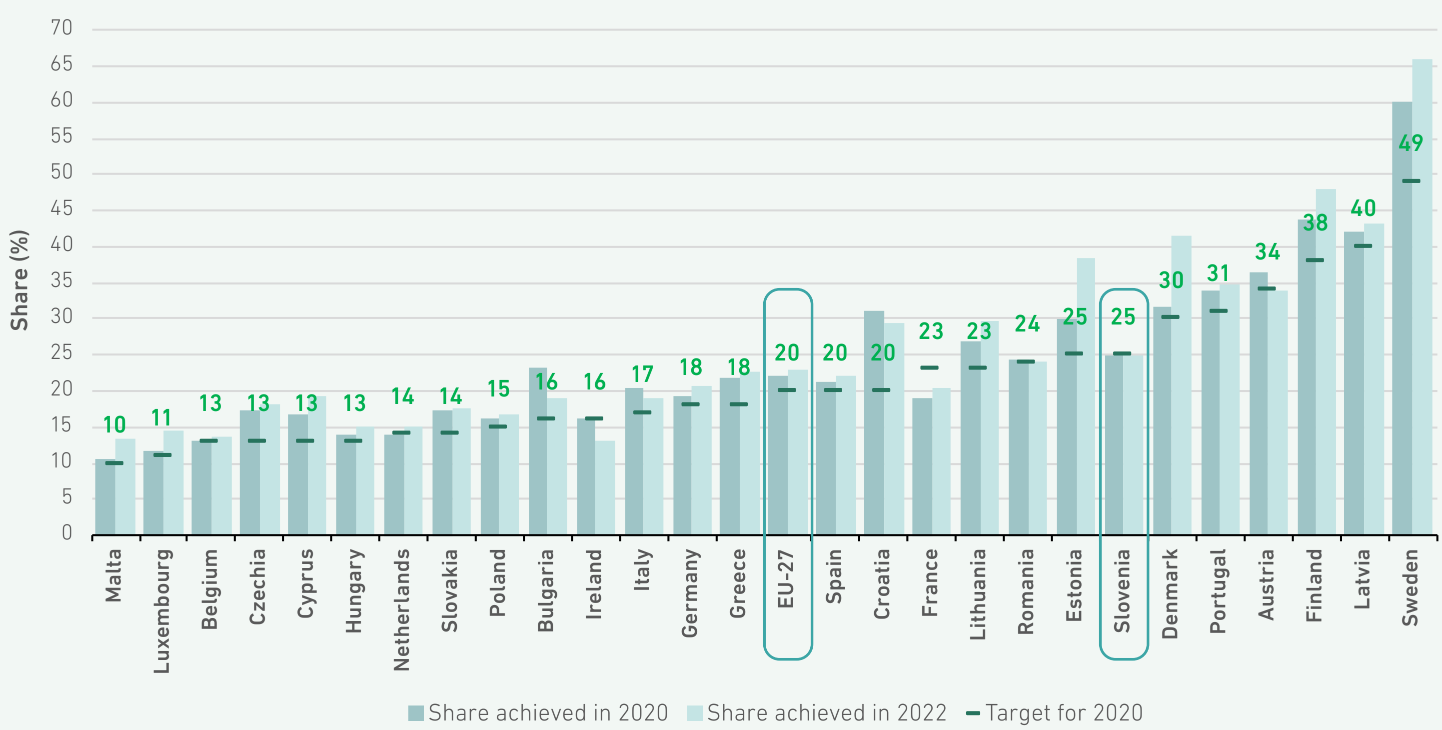
TABLE 9: RES TARGETS ACHIEVED IN 2005 AS THE BASE AND IN THE 2010–2022 PERIOD, ALONG WITH AN ESTIMATE FOR 2023

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2030
RES share (%)															esti-mate	Target share
RES share	**19.8**	**21.1**	**20.9**	**21.6**	**23.2**	**22.5**	**22.9**	**22.0**	**21.7**	**21.4**	**22.0**	**25.0**	**25.0**	**25.0**	**25.3**	**33.0**
RES – heating and cooling	26.4	29.5	31.8	33.2	35.1	34.6	36.2	35.6	34.6	32.3	32.1	32.1	35.2	34.0	34.0	45.0
RES – electricity	28.7	32.2	31.0	31.6	33.1	33.9	32.7	32.1	32.4	32.3	32.6	35.1	35.0	37.0	41.4	55.0
RES – traffic	0.8	3.1	2.5	3.3	3.8	2.9	2.2	1.6	2.6	5.5	8.0	10.9	10.6	7.8	9.9	26.00

SOURCE: THE JOŽEF STEFAN INSTITUTE, SURS (STATISTICAL OFFICE OF THE REPUBLIC OF SLOVENIA)

In 2022, most Member States maintained their national RES targets from 2020 or increased them in 2022. In 2023, the 32% EU-wide RES target to be achieved by 2030 was updated to a new 42.5% target. In view of this, most Member States will have to considerably increase electricity production from RES in the following years and increase energy efficiency.

FIGURE 16: RES SHARES ACHIEVED BY EU COUNTRIES

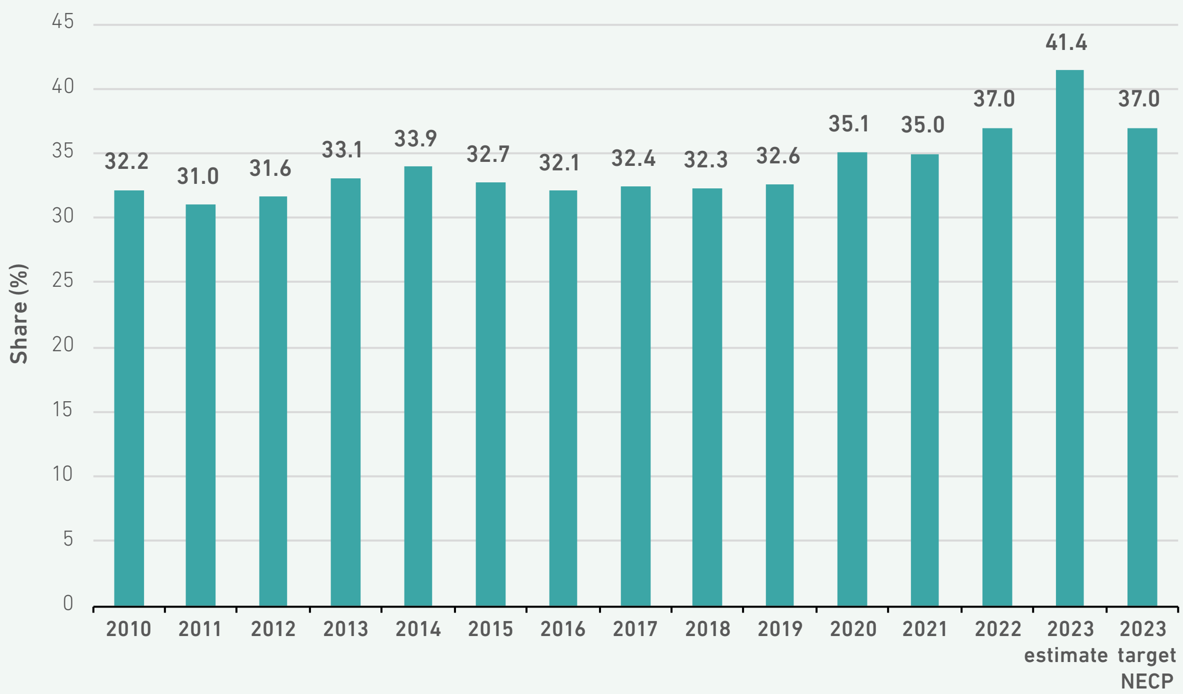


SOURCE: EUROSTAT

Share of Renewables in the Electricity Sector

The proposal for the updated NECP sets out sectoral targets for the 2021–2030 period, including a 43% target share of electricity from RES in the electricity sector by 2030. The proposal for the updated NECP likewise lays out the projected evolution of the RES share in the final consumption in the 2020 to 2030 period by individual sector, starting out with a 35.1% share of RES in the final energy consumption in the electricity sector in 2020 as the base year. In 2022, this share was exceeded, since it amounted to 37%, which is 0.5 percentage point more compared to the assessed projected evolution from the proposal for the updated NECP, where this share is 36.5%. In the 2005 to 2022 period, the RES share in this sector increased by 8.3 percentage points, while for 2023, the estimated share for the electricity sector is 41.4%, which exceeds the planned share from the proposal for the updated NECP for this year by 2.6 percentage points.

FIGURE 17: RES SHARES IN THE ELECTRICITY SECTOR IN THE 2010–2022 PERIOD AND AN ESTIMATE FOR 2023



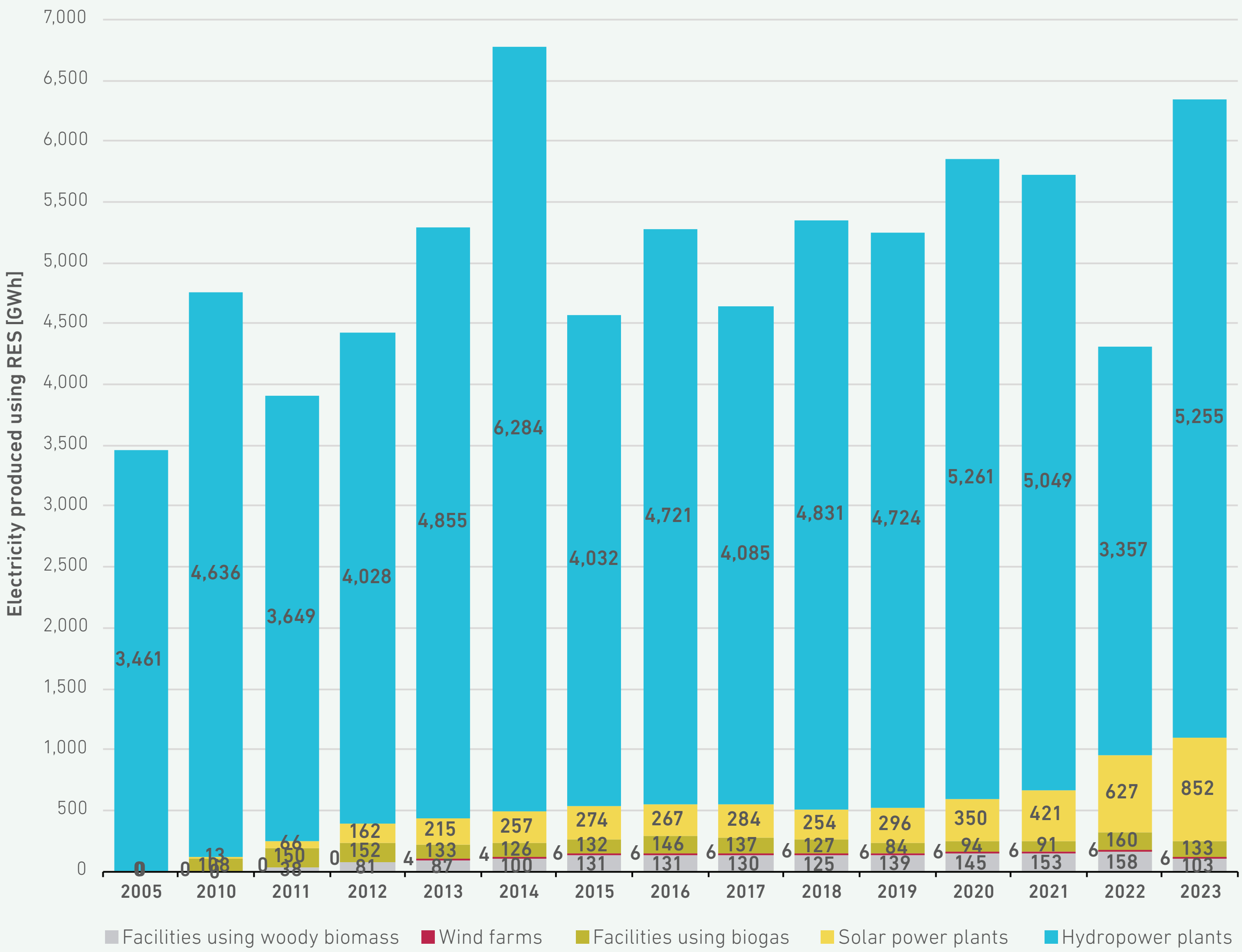
SOURCE: THE JOŽEF STEFAN INSTITUTE, SURS (STATISTICAL OFFICE OF THE REPUBLIC OF SLOVENIA)

Production from Renewable Sources

In 2023, there were 6,349 GWh of electricity produced using RES in Slovenia, which is no less than 47% more compared to 2022, where the electricity produced using RES amounted to 4,308 GWh. The reasons behind this increase are mostly due to improved hydrological conditions and a significant growth in energy produced in solar power plants. The latter grew by nearly 36% compared to 2022. The rise in electricity, produced in solar power plants is due to the implemented support scheme for RES and CHP production facilities, and self-supply with electricity from RES. Nevertheless, the bulk of the electricity from RES continues to be produced in hydropower plants, which is, much like production with solar power plants, weather-dependant and can fluctuate dramatically from year to year, given the same amount of production capacity.

Solar power plants produced nearly 36% more electricity than in 2022

FIGURE 18: ELECTRICITY PRODUCTION USING RES IN THE 2005 BASE YEAR AND IN THE 2010–2023 PERIOD



SOURCES, ENERGY AGENCY, BORZEN, ELECTRIC SYSTEM OPERATORS, SURS

Incentives for Production from Renewable Sources

The development of electricity production from RES plays a key role in reducing greenhouse gas emissions. Electricity production using RES is one of the paramount activities to achieve the common objectives of the sustainable development of the energy sector. EU countries can introduce a number of measures and incentives to encourage the development of this type of production that count as state aid. The main criterion taken into account when approving state aid is whether it will have an incentive effect, meaning that without the state aid, the measure would not be carried out, or would not be carried out to the same extent.

Since 2009, Slovenia has had a state aid scheme or support scheme for electricity production using RES and CHP. The aid takes the form of the guaranteed purchase of electricity or operational support. In addition to the operational support, funds for RES development are also available in the form of investment incentives, mostly as part of cohesion policy measures. In 2023, grants for co-financing were available for the production and storage of electricity and heat using renewable energy sources.

In addition to the measures mentioned above, the development of electricity generation from RES in recent years has also been significantly influenced by the self-supply of end-consumers, who are able to connect the production unit to the internal wiring of the buildings where they are installed. Until the end of 2024, final consumers, i.e. household and small business customers, can still enter the self-supply system under the previous regime; however, from 2025 onwards, they will only be able to enter the self-supply system under the new regime in which the calculation of network charges and levies will change. Due to this change, a record number of applications for issuing connection approvals for self-supply production facilities were submitted in 2023. The connection of self-supply production facilities under the terms set forth in the previous regime will only be possible provided that the connection application was submitted by the end of 2023, and the self-supply final consumers will be connected by the end of 2024.

RES and CHP Support Scheme

The Projects for RES and CHP Production Facilities Chosen in Open Calls

In 2023, the Agency published two open calls inviting investors to apply with their RES and CHP production facility projects for admission to the support scheme. The second open call was published in December and had not terminated by the end of the year since the application deadline was in February 2024. As follows from the plan of operation of the RES and CHP support scheme, defined in the Energy Balance for 2022, each open call made available 10 million Euro. Since 2020, promoters could submit their projects alongside investors. As in the years before, in 2023, natural gas-fired facilities were not permitted to apply to the open call, in accordance with the Act on Measures for the Management of Crisis Conditions in the Field of Energy Supply.

The open call, published and concluded in 2023, attracted 60 applications. Once again, the majority of applications were for projects involving solar power plants, which amounted to 96.7% of all applied projects. A total of 17.77 MW of solar power plants, one woody biomass-fuelled facility with a power of 0.51 MW, and one facility using biogas with the power of 0.03 MW were applied for. The relatively low number of projects submitted and the high reference price for electricity in 2023, which was set at 180.00 EUR/MWh under the Act Regulating Emergency Intervention to Address High Energy Prices, contributed to the fact that no funds were administratively allocated at the end of the open call. All formally suitable applications of production facility projects were confirmed, which means that 15.68 of production facilities were confirmed in 2023. Since only the applications for solar power plant projects were suitable, all the confirmed projects involve new solar power plants.

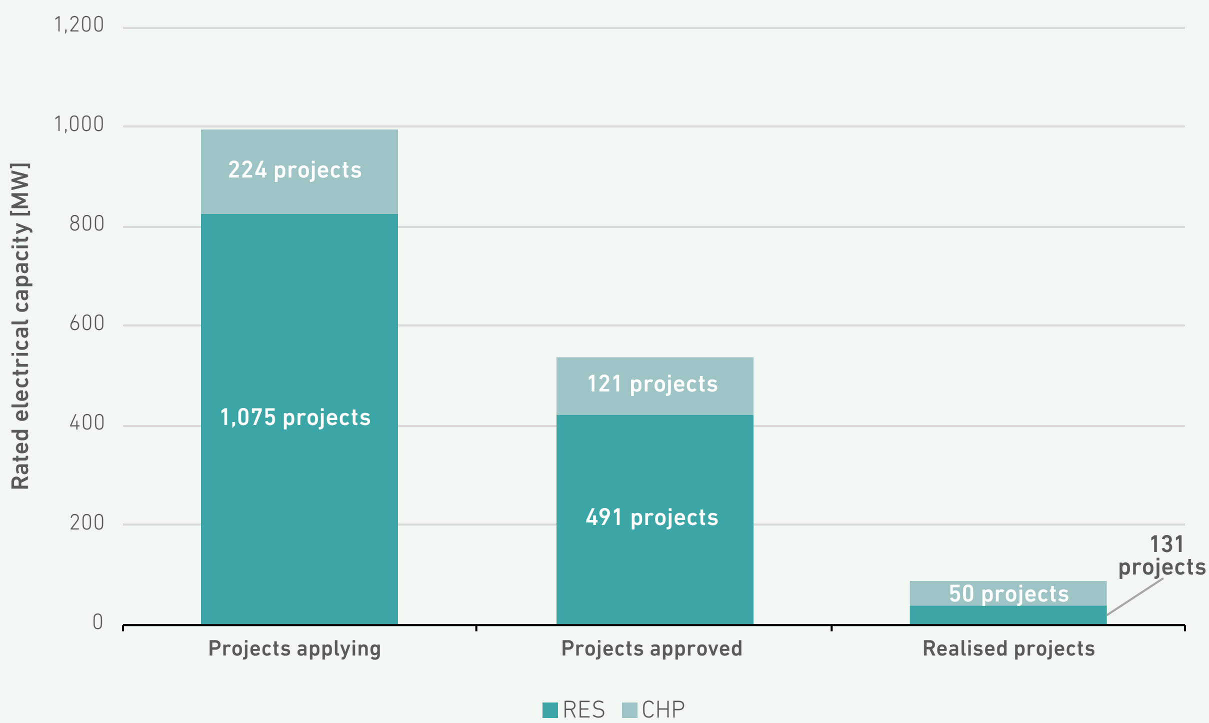
TABLE 10: AN OVERVIEW OF THE PRODUCTION FACILITY PROJECTS APPLYING TO AND SELECTED IN OPEN CALLS IN 2023, GROUPED ACCORDING TO THE TECHNOLOGY EMPLOYED FOR ELECTRICITY GENERATION

Open call – April 2023		Applying projects		Selected projects	
Technology	**Renovated/ New**	**No. of projects**	**Installed capacity [MW]**	**No. of projects**	**Installed capacity [MW]**
Hydropower plants	**New**	0	0.00	0	0.00
Hydropower plants	**Renovated**	0	0.00	0	0.00
Solar power plant	**New**	58	17.77	53	15.68
Wind farms	**New**	0	0	0	0
Facilities using biogas	**New**	1	0.03	0	0.00
Woody biomass-fuelled facilities	**New**	1	0.51	0	0.00
Woody biomass-fuelled facilities	**Renovated**	0	0.00	0	0.00
Fossil-fuelled CHP	**New**	0	0.00	0	0.00
Fossil-fuelled CHP	**Renovated**	0	0.00	0	0.00
Total number of applications		**60**	**18.31**	**53**	**15.68**

SOURCE: ENERGY AGENCY

Since the changes to the support scheme in 2016, the Agency concluded 12 open calls inviting investors to apply with their RES and CHP production facility projects for admission to the support scheme. In the open calls, applicants submitted a total of 1,299 production facility projects with a total rated electrical capacity of 995 MW, the majority of which are projects for RES production facilities. 612 production facilities projects were selected, with a total rated electrical capacity of 536 MW, 491 of which were projects for RES production facilities with a total rated electrical capacity of 423 MW and 121 fossil-fuelled CHP production facilities projects with a total rated electrical capacity of 113 MW. As the applicants are obliged to complete the project within three years of the date on which the applicant was notified that their project was selected, or within five years for more complex projects, applicants with 164 projects with a total rated electrical capacity of 186 MW can no longer enter the support scheme. Solar power plants dominate in terms of number since the decision on the selection of the project ceased for no less than 66 solar power plant projects with a total rated electrical capacity of 25 MW and 17 wind farm projects with a total rated electrical capacity of 126 MW, due to the applicants' failure to obtain building permits. Out of a total of 612 projects selected, only 181 projects with a total rated electrical capacity of 86 MW have been realised by the end of 2023, with solar power plants dominating in terms of number with 77 projects with a total rated electrical capacity of 22 MW, followed by CHP production facilities with 50 realised projects with a total rated electrical capacity of 50 MW, 35 MW of which are renovations of existing CHP facilities, followed by 47 hydropower plant projects with a total rated electrical capacity of 11 MW, 9 MW of which are renovations, as well as five woody biomass-fuelled production facilities, one facility fuelled by biomass-derived biogas, and one facility fuelled by sewage treatment biogas.

FIGURE 19: THE NUMBER AND RATED ELECTRICAL CAPACITY OF THE PROJECTS FOR RES AND CHP PRODUCTION FACILITIES THAT APPLIED AND WERE CONFIRMED AND CARRIED OUT IN ALL THE OPEN CALLS



SOURCE: ENERGY AGENCY

Production Facilities Included in the RES and CHP Support Scheme, Their Total Rated Electrical Power and the Quantity of Electricity Generated

By the end of 2023, 3,560 production facilities were included in the support scheme. The total rated electrical capacity of the production facilities included in the support scheme was 386.545 MW, 318.338 MW of which were RES production facilities, and 68.207 MW were fossil-fuelled CHP facilities. Compared to 2022, there were 158 fewer production facilities included in the support scheme, which accounts for a 4.25% drop. The number of production facilities covered by the support scheme has thus declined for the eighth consecutive year. The cessation of support eligibility due to the age limit of the production facilities (15 years from the start of operation for RES and 10 years for CHP) is the main reason behind the drop in the number of production facilities included in the support scheme. Additionally, producers opt to exit the support scheme due to improved market conditions.

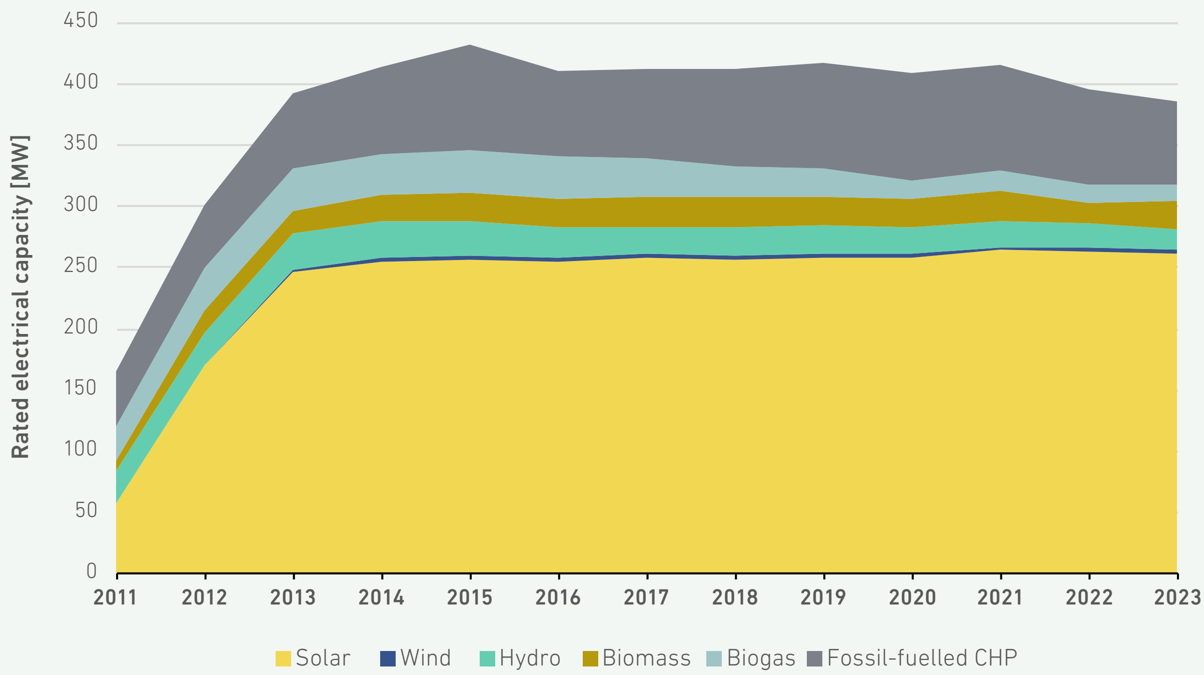
TABLE 11: THE NUMBER OF PRODUCTION FACILITIES IN THE SUPPORT SCHEME AND THE DYNAMICS OF THEIR INCLUSION IN THE 2010–2023 PERIOD

Source	The number of facilities participating in the support scheme													
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Solar	381	975	2.406	3.218	3.319	3.339	3.323	3.312	3.301	3.304	3.297	3.286	3.245	3.170
Wind	3	4	3	5	4	9	7	7	6	4	4	3	2	2
Hydro	105	109	108	106	106	106	98	91	93	92	90	92	85	73
Biomass	0	3	5	10	19	43	44	43	44	46	40	40	38	54
Biogas	13	26	31	31	31	33	32	31	27	24	22	24	22	20
CHP Using fossil fuels	26	46	89	184	270	390	384	380	388	388	386	366	326	241
Total	528	1.163	2.642	3.554	3.749	3.920	3.888	3.864	3.859	3.858	3.839	3.811	3.718	3.560

SOURCES: ENERGY AGENCY, BORZEN

The lower number of production facilities included in the support scheme contributes to the lower total rated electrical capacity of the production facilities included in the support scheme. At the end of 2023, the total rated electrical capacity of the production facilities amounted to 386.545 MW, which is 8.655 MW less compared to 2022. The biggest drop, which was 8.5 MW, was recorded for CHP using fossil fuels.

FIGURE 20: THE TOTAL RATED ELECTRICAL CAPACITY OF THE PRODUCTION FACILITIES INCLUDED IN THE SUPPORT SCHEME IN THE 2011–2023 PERIOD



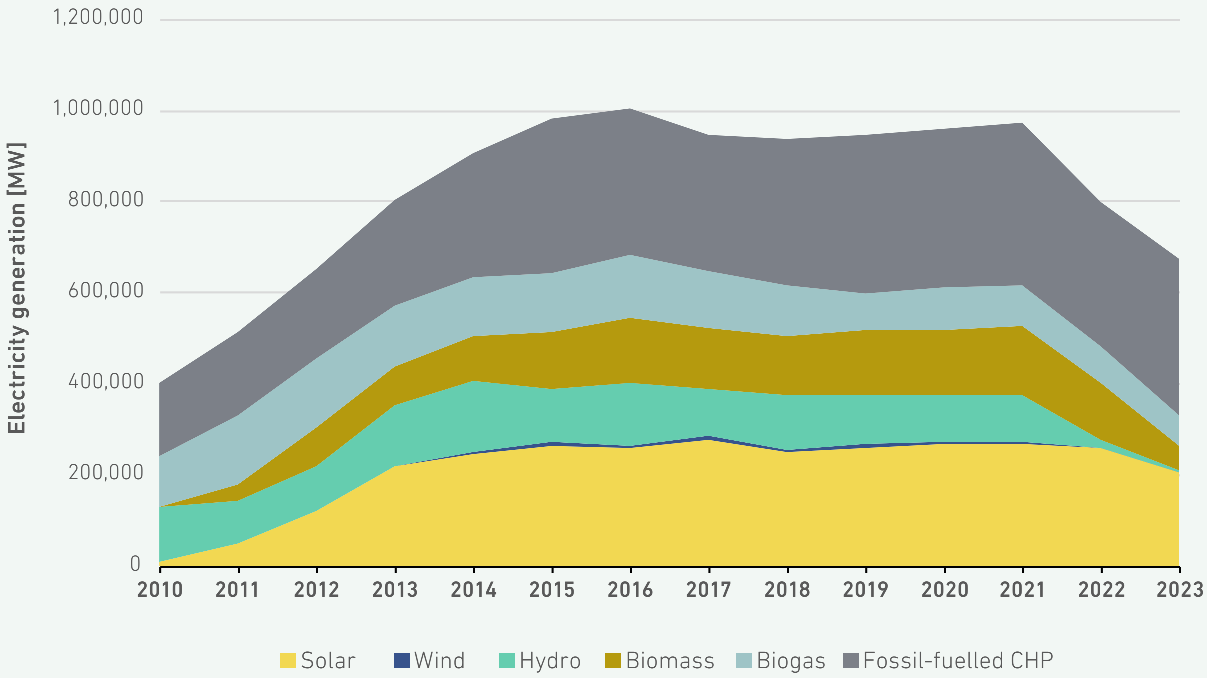
SOURCES: ENERGY AGENCY, BORZEN

Compared to previous years, the amount of electricity for which support was paid out also fell significantly in 2023: The support was only paid out for 675.8 GWh of electricity, which is 125 GWh less than in 2022 and the same as in 2013. In addition to the drop in the number of production facilities included in the support scheme, the main reason for the decrease of the quantity of electricity for which support was paid out is the reference price of electricity, which was set at 180.00 EUR/MWh in 2023. In the case of as many as 248 production facilities, producers were paid no support in 2023 as the reference price of electricity exceeded the value of the production costs of this electricity.

Support paid for 125 GWh of electricity less than in 2022

Out of the 675.8 GWh of electricity for which support was paid out, 333.3 GWh of electricity was produced using RES and 342.5 GWh of electricity was produced from fossil-fuelled CHP. The majority of the electricity produced using RES is produced with solar energy, followed by electricity produced with biomass and biogas.

FIGURE 21: ELECTRICITY PRODUCTION ELIGIBLE FOR SUPPORT IN THE 2010–2023 PERIOD



SOURCES: ENERGY AGENCY, BORZEN

In 2024, support was paid out for 675.8 GWh of electricity, which amounts to 5.5% of all the electricity produced in Slovenia. The Agency monitors this share due to the possible impact of the electricity production eligible for financial support on the wholesale prices on the market. The quantity of subsidised electricity on the market may let to electricity market disruptions, since it can lead to downward pressure on the wholesale price of electricity not eligible for support.

Support was paid out for 5.5% of all the electricity generated in Slovenia

The Agency found that both the share of electricity and the share of the installed capacity of power plants covered by the support scheme have been dropping since 2018, as seen in Table 12; however, this does not contribute to a significant change.

TABLE 12: THE SHARE OF THE INSTALLED CAPACITY AND ELECTRICITY PRODUCTION INCLUDED IN THE SUPPORT SCHEME

Year	Installed capacity included in the support scheme [MW]	Total installed capacity in Slovenia [MW]	Share of the installed capacity included in the support scheme [MW]	Electricity generated for which support is paid [GWh]	Total Slovenian electricity production [GWh]	Share of the generated electricity included in the support scheme [MW]
2018	412,4	3.584,0	11,5%	937,9	12.578,8	7,5%
2019	417,1	3.617,7	11,5%	947,5	12.511,1	7,6%
2020	408,9	3.581,0	11,4%	962,2	13.220,7	7,3%
2021	415,3	3.783,5	11,0%	973,2	12.247,9	7,9%
2022	395,3	3.983,4	9,9%	800,8	10.203,3	7,8%
2023	386,5	4.446,6	8,7%	675,8	12.294,5	5,5%

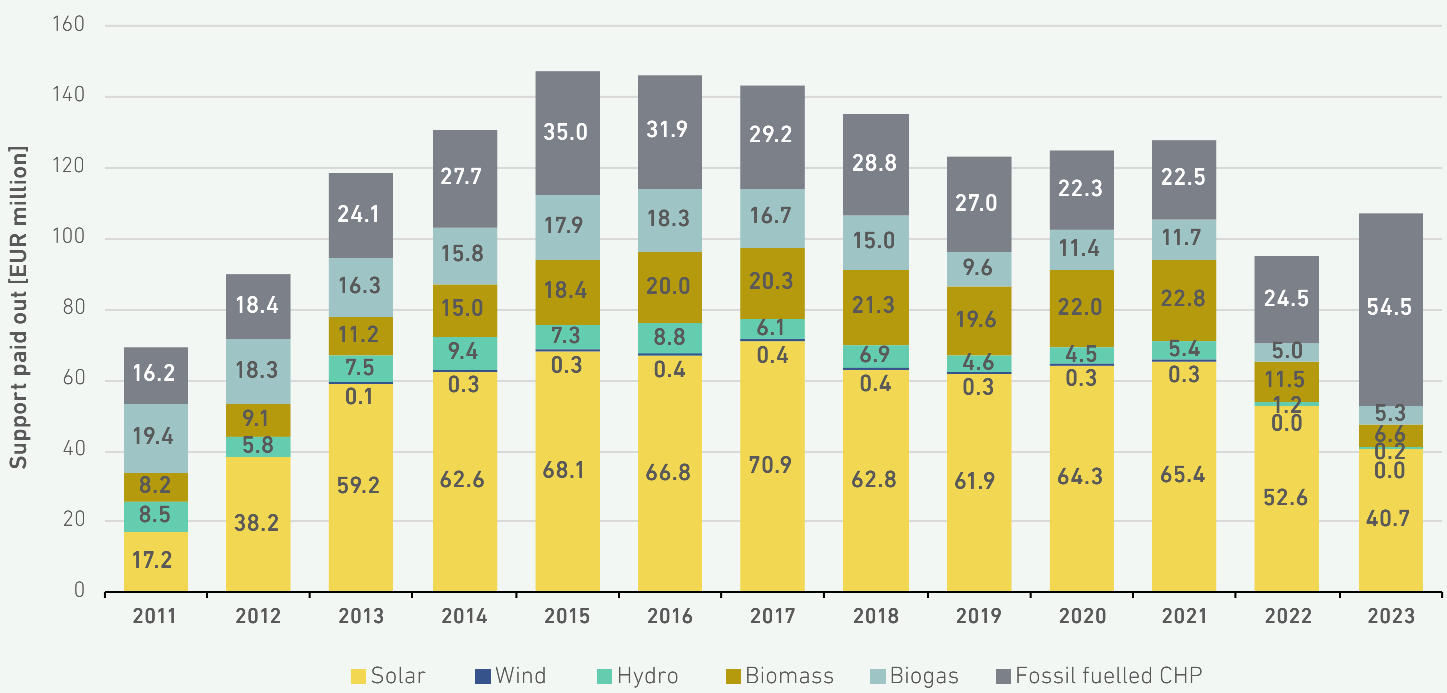
SOURCES: ENERGY AGENCY, BORZEN

Support Paid Out–Support Scheme Costs

In 2022, 107.3 million EUR was paid to support-eligible electricity producers. 52.8 million EUR was paid out for electricity generated from RES, representing 49.2% of the total payments. 54.5 million EUR was paid out for electricity generated from fossil-fuelled CHP, representing 50.8% of the total payments. For electricity produced using RES, the majority of the payments was still paid out for electricity, produced in solar power plants. In 2023, this segment received 40.7 million EUR, which is 37.9% of all payments, followed by facilities using woody biomass with 6.6 million EUR or 6.2% of all payments, and facilities using biogas with 5.3 million EUR or 4.9% of all payments. The smallest amount, a mere 0.2 million EUR or 0.2%, was paid out to electricity produced in hydropower plants in 2023. This is a consequence of the high reference price of electricity in 2023, which affects the amount of payment for operational support, since the latter is established as the difference between the price of electricity of the production facility or the reference costs of the production in production facilities, and the reference price of electricity.

Despite the high reference price of electricity, 12.5 million EUR more was paid out in support compared to 2022

FIGURE 22: THE VALUE OF SUPPORT PAY-OUTS IN THE 2011–2023 PERIOD



SOURCE: BORZEN

In 2023, a mere 19.6 million EUR was paid out for electricity produced in production entering the support scheme as approved projects in open calls, of which EUR 19.4 million EUR, or 99%, was paid out for electricity produced in CHP. The reason for this is the high price of natural gas, which was 146% higher in 2023 compared to 2022. From the start of the support scheme in 2010 until 2023, a total of 1.6 billion EUR in support has been paid for a total of 11.5 TWh of electricity produced by electricity producers in the support scheme.

Despite the reference price of electricity, which was 49.17% higher compared to 2022 and amounted to 180.00 EUR/MWh, and the influence of the said price on the payments of the financial support for operation, in 2023, producers received no less than 12.5 million EUR more in support compared to the previous year. The main reason behind this is a higher reference price of natural gas, which amounted to 169.72 EUR/MWh in 2023, and the higher reference price of woody biomass and maize silage substrate used to readjust the variable part of the reference costs of electricity production using RES and CHP. For the first time this year, the majority of the support was paid out for electricity produced using fossil-fuelled CHP, namely 50.8% of all funds.

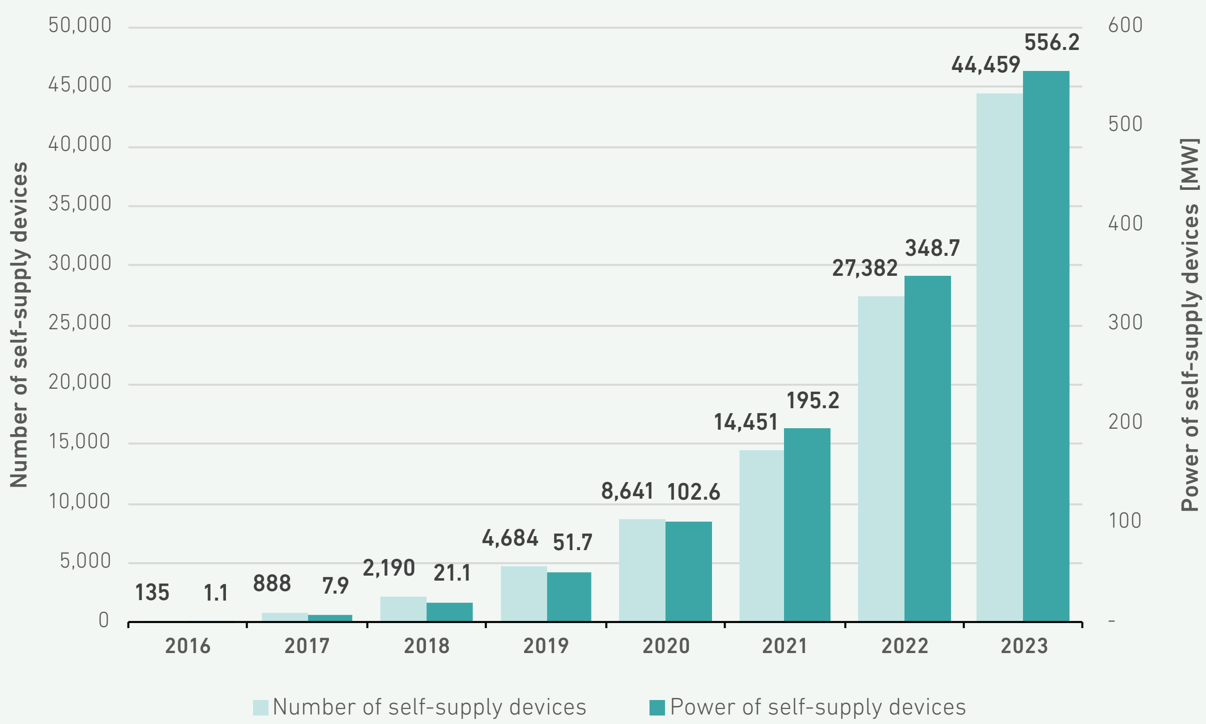
Renewable Electricity Self-Supply

Self-supply is the generation of electricity from renewable sources using a production facility connected to the internal low-voltage installation of a building. Its purpose is to help final consumers, i.e., households or small business consumers, to cover their own electricity consumption. The final consumers feed their surplus electricity into the distribution network and draw from the network at times when the output of the self-supply device is insufficient. In this case, the distribution network acts as a virtual storage or battery due to the mismatch between the output of the consumer's self-supply device and the final consumer's consumption.

In 2016, when self-supply installations began to be connected, only 135 self-supply installations with a total connection capacity of 1.1 MW were connected. In 2023, by contrast, 14,772 new installations were connected, totalling a capacity of nearly 223 MW. In 2023, a total of 44,459 self-supply devices with a total installed capacity of 556 MW and an average installed capacity of 12.5 kW were thus in operation. As the number of self-supplying consumers grows, so does the average power of self-supply devices – in 2016, for instance, the average newly connected self-supply facility was rated at 8.1 kW. The increase in the power of self-supply devices can be attributed to the increasing use of electricity to heat buildings using heat pumps and the emerging interest in using self-supply measures to charge electric vehicles at home.

Considering the current legislation, a number of connections of self-supply devices with an annual netting system are expected to be made in 2024 as well, which mostly depends on the number of issued connection approvals, submitted by users by the end of 2023.

FIGURE 23: NUMBER AND INSTALLED CAPACITY OF SELF-SUPPLY DEVICES IN THE 2016–2023



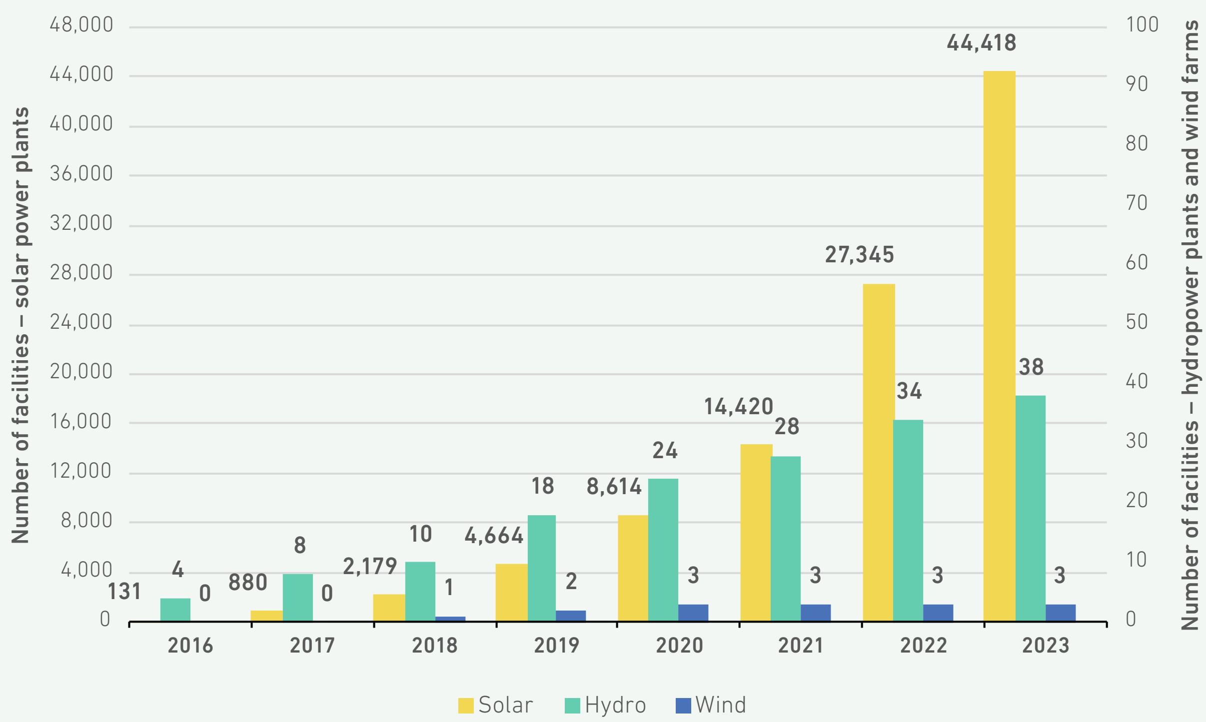
SOURCES: ENERGY AGENCY, ELES, ELECTRICITY DISTRIBUTION COMPANIES, BORZEN

According to the legislation, a self-supply device may produce electricity using solar, wind, hydro or geothermal energy, or it may be a CHP unit that uses RES as the primary source. In practice, solar power plants are overwhelmingly predominant (44418 devices), while there are only 38 devices using hydropower and only three installations using wind power.

Among the existing self-supply devices, there are no devices using geothermal energy as of yet, nor any CHP units using RES as the primary source.

In recent years, the number of production facilities for community self-supply also increased. The first facility for community self-supply, with a rated power of 14 kW was connected in 2019. In 2020, four such installations with a total connected capacity of 86 kW were connected. In 2021, 25 installations with a total connected capacity of 1100 kW were connected. In 2022, an additional 29 installations with a total connected capacity of 2,000 kW were connected, while in 2023, 122 more installations with a total connected capacity of 5000 kW were connected. By the end of 2023, there were already 171 community self-supply facilities in operation, totalling 8200 kW.

FIGURE 24: NUMBER OF SELF-SUPPLY DEVICES IN THE 2016–2023 BY PRODUCTION SOURCE

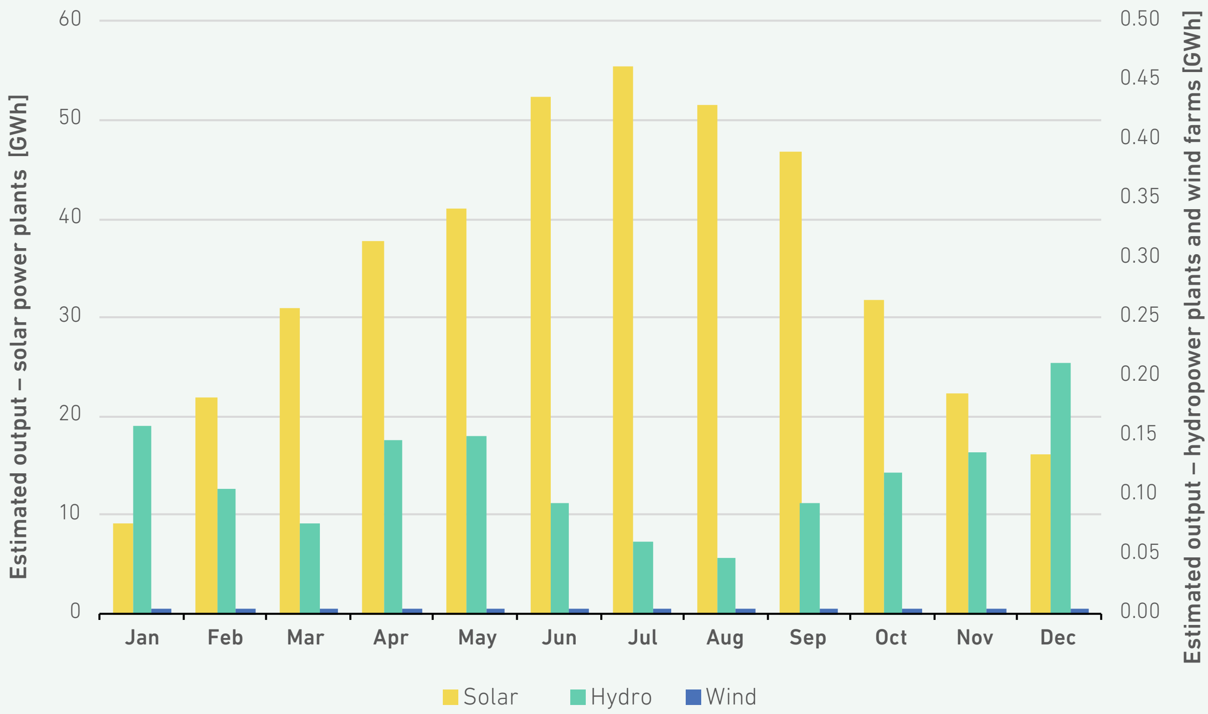


SOURCES: ENERGY AGENCY, ELES, ELECTRICITY DISTRIBUTION COMPANIES, BORZEN

Due to the measuring method and the annual netting of electricity produced and consumed, the annual production of electricity in self-supply devices connected behind the final consumer delivery point can only be estimated. This estimate depends on the type of production facility, the installed capacity and the reference monthly operating hours.

As many as 99.8% of all self-supply devices are solar power plants, which means that the estimated electricity production depends heavily on the time of year and geographical and weather factors. In 2016, the estimated amount of electricity produced in self-supply devices was only 0.6 GWh, while in 2023 it was already 417.1 GWh.

FIGURE 25: ESTIMATED OUTPUT OF SELF-SUPPLY DEVICES IN 2023 BY MONTH AND TECHNOLOGY



SOURCE: BORZEN

44,459 of self-supply installations were connected.

- **total installed capacity of 556 MW**
- **estimated production in 2023 amounted to 417.1 GWh**

Regulation of Network Activities

Unbundling of Activities

Electricity transmission and distribution companies are required to keep separate accounts for each of their transmission and distribution activities, as would be required if the distribution and transmission activities were carried out by separate undertakings.

On 2 October 2023, SODO, which had been the distribution system operator, was merged with ELES. With this merger, ELES became a combined system operator carrying out transmission and distribution as public service activities. In addition to the public service activities, ELES performs activities that are not electricity-related. In its annual report, ELES discloses separate financial statements for those activities, as well as the criteria for the allocation of assets and liabilities, costs, expenses and revenues used in the preparation of separate accounting records and separate financial statements.

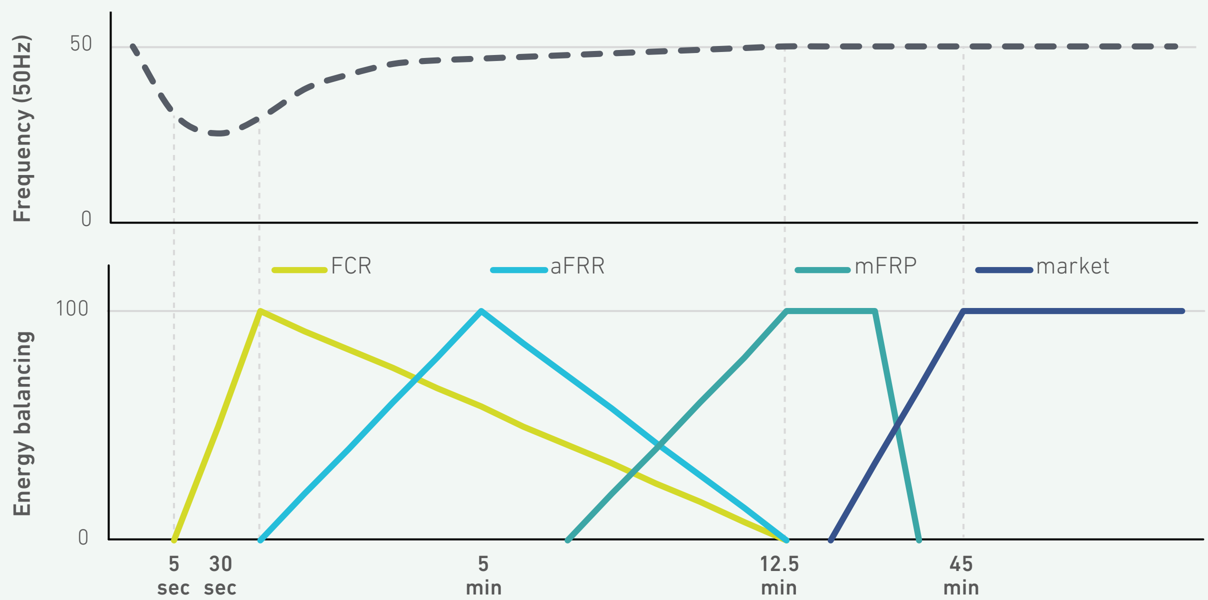
Based on the approval of the Government of the Republic of Slovenia (the Government), SODO–and, since the merger, ELES–delegated the public service activities provided by the DSO to distribution companies. The distribution companies engage in other non-electricity-related activities in addition to the activity contractually delegated to them by the provider of public service activities of the DSO. Therefore, the distribution companies maintain separate accounting records in their books and draw up separate financial statements for the activity contractually delegated to them by the provider of public service activities of the DSO and for their non-electricity-related activities. In their annual reports, distribution companies disclose separate financial statements for those activities, as well as the criteria for the allocation of assets and liabilities, costs, expenses and revenues used in the preparation of separate accounting records and separate financial statements.

Technical Services by the Operators

Ancillary Services

In case of major load fluctuations, such as power plant outages or other unpredictable changes in the supply or consumption in the European transmission and interconnected network (the ENTSO-E Network) (Figure 26), individual control area operators respond through their primary control, which is available almost instantaneously. The quantity of ancillary services provided by individual control area operators is agreed on a voluntary basis and calculated on the basis of the relevant production quantities using an agreed-upon formula.

FIGURE 26: RESERVE ACTIVATION PROCEDURES IN CASES OF MAJOR LOAD FLUCTUATIONS



SOURCE: ELES

Ancillary services are services that the transmission system operator must provide to facilitate the normal operation of the entire electricity system. They encompass the following:

- frequency containment reserve (FCR),
- automatically activated frequency restoration reserve (aFRR),
- manual frequency restoration process (mFRP);
- voltage and reactive power control; and
- provision of a black start.

The TSO sources all ancillary services from providers in the market; the costs of their provision are covered by the network charge for the transmission system.

Ancillary services are categorised into frequency services, which encompass FCR, aFRR and mFRR, as well as non-frequency services, which include voltage regulation and the provision of a black start. Frequency ancillary services belong to balancing services in the electricity system in addition to purchasing on the balancing market. The required scope of frequency services can be evaluated using the volume of reserves in MW, while for non-frequency ancillary services, an appropriate geographical distribution of providers throughout the transmission system is crucial. For 2023, ELES has planned the following reserve capacities for frequency ancillary services:

- FCR: ±15 MW,
- aFRR: +60 MW, –60 MW,
- mFRR: +240 MW, –41 MW.

The projected volume of the frequency services for 2023 in the area of automatic frequency containment and automatic activation was the same as in the previous two years. Meanwhile, the required volume of manual activation was reduced, largely due to changes in the definition of the reserve that an individual transmission system operator is required to provide within an SCB block.

In 2023, as in the previous year, there was full implementation in the area of frequency ancillary services of the provisions of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereinafter: Regulation (EU) 2017/2195). These provisions mandate the leasing of services on the basis of market principles for the shortest possible leasing period, with aFRR and mFRR leases to be made separately for the positive and negative balancing directions, and the leasing of balancing power to be separated from the purchase of balancing energy. In 2023, ELES chose the aFRR and mFRR providers locally through the Slovenian balancing platform, while the FCR providers were chosen through the international FCR Cooperation platform, which ELES has participated in since 2021.

The selection of FCR providers through FCR Cooperation takes the form of auctions for four-hourly reserve provisioning products. The auctions are conducted on a common platform operated by one of the four German TSOs.

TABLE 13: THE PRICE OF FCR AND THE SHARE OF FCR LEASED IN SLOVENIA SINCE 2023

	Average marginal lease price [EUR/MW/h]	**Lease cost not considering the FCR cooperation benefits price [EUR]**	**Lease cost price [EUR]**	**Share of FCR leased domestically (%)**
January	16.39	182,912.25	133,678.29	11.04%
February	15.82	159,446.70	151,365.78	6.47%
March	16.84	187,735.65	172,921.71	10.57%
April	9.02	97,400.25	89,745.91	3.44%
May	10.64	118,727.85	51,849.76	4.91%
June	9.79	105,733.80	20,394.97	4.70%
July	9.51	106,101.45	49,280.64	5.30%
August	9.94	110,887.05	40,092.30	2.22%
September	9.70	104,724.60	21,948.38	3.07%
October	16.14	180,413.25	68,758.73	6.19%
November	15.90	171,685.80	–112,516.42	2.22%
December	14.01	156,339.00	72,917.67	5.30%
Total	**12.81**	1,682,107.65	**760,437.71***	**5.45%**

* Note: there may be discrepancies in the totals due to the rounding of percentages to two decimal places.

SOURCE: ELES, HTTPS://WWW.REGELLEISTUNG.NET

Table 13 shows ELES's total FCR costs by month. It likewise shows the share of Slovenian FCR requirements covered by Slovenian providers. Compared to the previous year, the average FCR prices have decreased, mainly due to ELES leasing greater quantities on the EU FCR Cooperation platform, which is becoming more widespread across EU countries each year. The impact of participating in the cooperation, as well as the fact that cooperation under the current rules is still in the process optimisation cycle, was demonstrated by an event that took place in November in the Netherlands, where, in a few hours, lease prices reached extreme levels, leading to a situation where, in the process of calculating the cross-border FCR marginal price for ELES (and several other operators), the benefit of participation was found to exceed the lease cost itself. Accordingly, the total cost of providing this service decreased by EUR 1,456,619.43 compared to the year before. Slovenian providers ended up contributing only 5.45% of the required FCR, which represents an additional significant decrease since 2022, when their contribution was 15.9%. There are several possible reasons for this. Certainly, in a period of high energy prices, the providers preferred to dedicate their full capacity to participation in the primary energy market than to offer a service that, in the long term, due to the variance in the power output, also contributes to shortening the lifetime of certain components in the electricity production facilities.

In 2023, ELES managed the aFRR service providers for power (aFRR) and balancing energy separately. All the providers with a valid certificate of technical competence for the provision of aFRR services were eligible for participation in the aFRR auctions. Each day, the selected aFRR providers had to provide an amount of energy corresponding to the balancing capacity assigned at the auction, while all the providers with a valid certificate of technical competence for the provision of aFRR services could offer balancing energy up to the amount corresponding to the total recognised aFRR regulation capacity.

In line with the provisions of Regulation (EU) 2017/2195, ELES ceased to hold annual aFRR and mFRR auctions in 2023. ELES leased the total reserve of ±60 MW in two parts, leasing ±36 MW of balancing capacity at monthly auctions and ±24 MW at daily auctions. Only two bidders participated in the auctions throughout the year, one providing services with conventional production sources and the other deploying battery storage as well. The bidders submitted balancing energy bids up to two hours before the time of delivery (H-2).

TABLE 14: AUCTION RESULTS FOR aFRR

Positive balancing direction (aFRR+)		
	Allocated volume [MW]	Average weighted price [EUR/MW/h]
Monthly auctions	36	8.073
Daily auctions	24	8.080
Negative balancing direction (aFRR–)		
	Allocated volume [MW]	Average weighted price [EUR/MW/h]
Monthly auctions	36	7.734
Daily auctions	24	7.717

SOURCE: ELES

The frequency restoration reserve (FRR) dimensioning requirements are set out by SO GL, SONPO-E, ZOEE and SAFA. In accordance with the dimensioning requirements for mFRR provisioning and the agreement on the joint provision and sharing of reserves within the SCB block (Slovenia, Croatia and BiH), under which the partners share the provisioning of the necessary mFRR volumes, ELES has somewhat reduced the planned lease of capacity in 2023 to 240 MW of positive mFRR and 41 MW of negative mFRR. A key reason for the reduction was a change in the definition of the reserve that an individual transmission system operator within the SCB block is expected to provide.

In 2023, ELES collected bids for mFRR services separately for capacity (mFRR) and balancing energy and for the positive (mFRR+) and negative (mFRR–) directions. Only providers with a valid certificate of technical competence for the provision of mFRR services met the eligibility criteria for participation in the mFRR auctions. ELES additionally had a five-year contract with one of the mFRR+ providers for the provision of 178 MW of this service, which expired at the end of 2023. This required ELES to lease 62 MW of reserve on a daily basis for each hour in the positive direction for 2023, while for the negative direction, it leased all the required reserve on a daily basis for each hour. The entire volume of mFRR+ services was thus provided by five providers, with one of them furnishing a major share (77%) due to the 5-year product. The rest provided 11%, 8% and two times 2%. With respect to mFRR–, the shares are somewhat more evenly distributed among the providers, with a single provider responsible for less than half of the volume, at 47%, and the rest providing 34%, 14%, 4% and 1%. It is noticeable that the providers offering smaller shares of the reserve volume only offered mFCR- for part of the year and not for all the months in 2023. These providers are first-time participants in these mFCR- auctions and it is possible to link their participation to either the technologies they are using to provide the service or the demand response capabilities of contracted users. Participants in auctions for mFCR+ and mFCR- offered reserve capacity largely from conventional production facilities, with a smaller share provided from distributed sources and battery storage, as well as through demand response. The auction results are shown in Table 15.

TABLE 15: AUCTION RESULTS FOR mFRR

Positive balancing direction (mFRR+)		
	Already allocated volume [MW]	Price achieved [EUR/MW/h]
Five-year product	178	6.770
	Allocated volume [MW]	Average weighted price [EUR/MW/h]
Daily auctions	62	2.619
Negative balancing direction (mFRR–)		
	Allocated volume [MW]	Average weighted price [EUR/MW/h]
Daily auctions	41	3.244

SOURCE: ELES

ELES did not have a special selection process for non-frequency ancillary service providers in 2023. At the end of 2022, it added annexes to existing contracts for the provision of voltage and reactive power control and black start ancillary services for 2023.

Table 16 shows the total costs of individual ancillary services for 2023. Note that only the costs funded from the network charge for the transmission system are shown. These are the costs of all non-frequency ancillary services and the costs of leasing reserves for frequency ancillary services. It needs to be pointed out that the energy activation costs for frequency ancillary services are funded from the imbalance settlement, the costs of which are covered by the balance responsible parties.

The total costs of ancillary services in 2023 were lower than in 2022, largely due to the reduction in the costs of FCR and cheaper leases of non-frequency services. Among the individual services, leases of both manual reserves are higher.

TABLE 16: COSTS OF ANCILLARY SERVICES IN 2023

Ancillary service	**Annual cost not including VAT [EUR]**
FCR	760,437.71
Positive aFRR	4,244,755.45
Negative aFRR	4,061,587.96
Positive mFRR	11,978,735.30
Negative mFRR	1,165,048.37
Voltage and reactive power control	3,831,702.21
Provision of a black start	1,212,095.16
Total	**27,254,362.16**

SOURCE: ELES

ELES leased all the necessary reserve capacity, energy and other services in 2023 within the scope of the prescribed ancillary services, recording no deviations from the planned volumes. It is worth noting a situation that occurred on 10 June 2023, when ELES failed to secure the required volumes of aFRR at the monthly and daily auctions, triggering the fallback procedures as foreseen by the ZOEE. On that date, the lease price was set by the Agency's decision at EUR 8.06/MW/h for aFRR+ and EUR 7.73/MW/h for aFRR–.

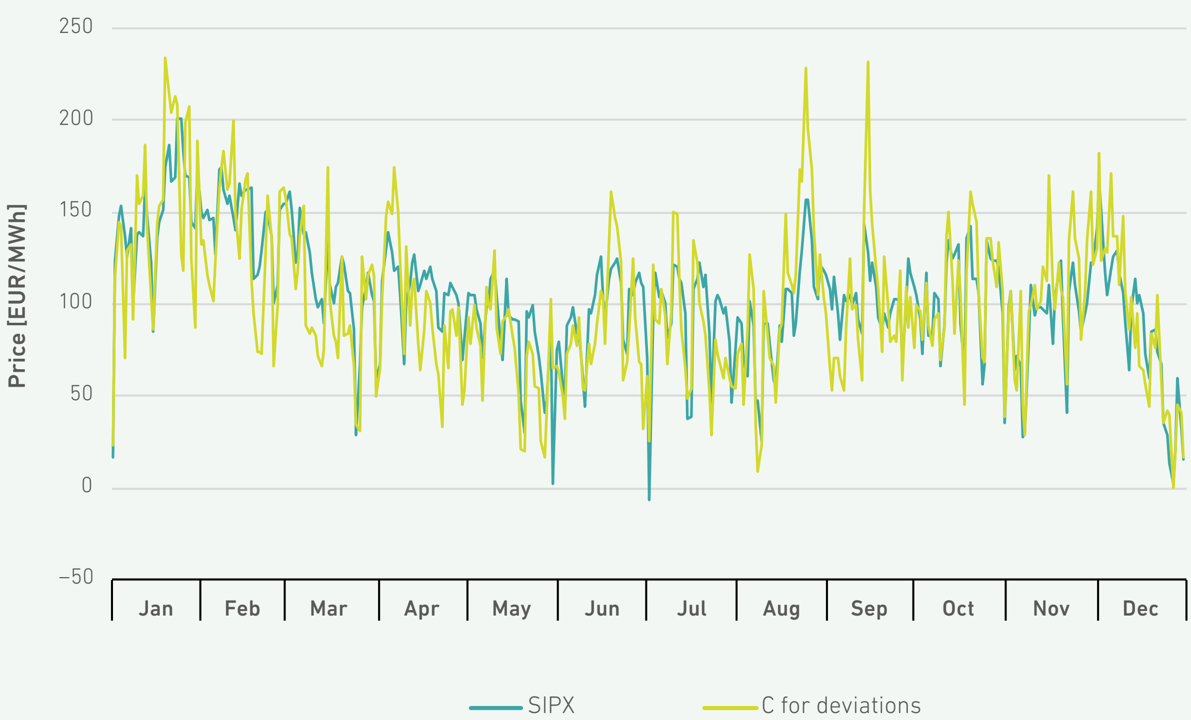
Balancing and Imbalance Settlement

The entity responsible for balancing the deviations of the electricity system from the forecasts in Slovenia is the transmission system operator, ELES. Minor system imbalances are balanced by tapping into the automatic frequency restoration reserve (aFRR), while larger imbalances require either the activation of the manual frequency restoration reserve (mFRR) or buying/selling energy on the balancing market. The costs associated with balancing are covered by the balance responsible parties using imbalance settlement, which features a chargeable interval of 15 minutes.

In 2023, the revised Rules on the operation of the electricity market came into force, which set out a new model for calculating imbalance prices based on a single price in each settlement period, irrespective of the direction of the deviation. The market operator has thereby successfully implemented the requirements of the European electricity balancing guidelines, ACER's decision to harmonise the main characteristics of the imbalance settlement and the Electricity supply act.

The price calculation period was marked by a gradual stabilisation of electricity market prices compared to the previous highly volatile year. Compared to the record-high prices and their extreme volatility in 2022, the prices in 2023 were significantly lower with fewer extremes. Despite this, the average annual SIPX in 2023 was 104 EUR/MWh, which is much higher than in the period before the so-called »energy crisis«. The imbalance prices, which generally follow the day-ahead market prices, thus averaged EUR 101.18/MWh in 2023. This is much less than in 2022 when the average price for negative imbalances was EUR 263/MWh and for positive imbalances EUR 188/MWh.

FIGURE 27: AVERAGE DAILY VALUES OF THE BASIC IMBALANCE PRICES C'_{pos} AND C'_{neg} AND SIPX INDEX



SOURCE: BORZEN

Figure 27 shows the average daily values of the imbalance prices and the SIPX index in 2023. Under the new rules, starting with January 2023, only one price per interval is calculated for imbalances, regardless of the direction of the deviation. As a consequence, it is impossible to directly compare the imbalance prices with those from 2022, when the derived imbalance prices for negative and positive deviations were still calculated separately. In 2023, the maximum imbalance price was reached on 12 September 2023, namely 1,306.84 EUR/MWh, while the lowest price was –600.06 EUR/MWh and was reached on 9 March 2023.

On average, the imbalance prices were lowest in May, at 72.45 EUR/MWh, and highest in January, when they averaged 147.24 EUR/MWh.

Under certain conditions, a situation may arise where two imbalance prices are calculated, separately for positive and negative deviations, as in the past. The figures, including the table below (Table 17), therefore still quote the C_{neg} and C_{pos} prices, though they are identical in the vast majority of cases, as only single prices will be calculated in the context of the imbalance settlement.

TABLE 17: AVERAGE, MAXIMUM AND MINIMUM VALUES OF C'_{neg}, C'_{pos} AND SIPX IN 2023 AND 2022

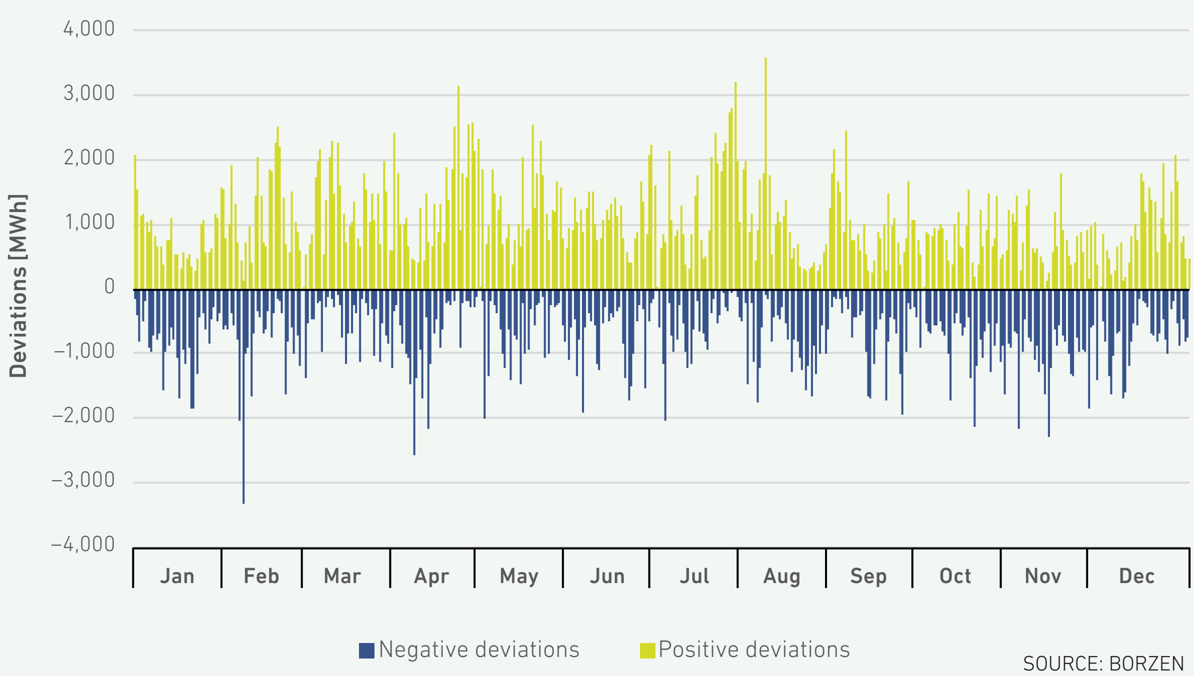
	2023 [EUR/MWh]			2022 [EUR/MWh]		
	C_{neg}	C_{pos}	SIPX	C'_{neg}	C'_{pos}	SIPX
Average	101.18	101.18	104.10	307.16	214.23	274.46
Maximum	1.306.84	1.306.84	426.18	1.148.27	879.29	879.29
Minimum	**–600.06**	**–600.06**	**–500.00**	**0.00**	**–431.42**	**0.00**

SOURCE: BORZEN

The highest total monthly positive deviations (energy surplus) of the balance responsible parties were recorded in July, amounting to 45,046 MWh. The highest total monthly negative deviations (energy deficit) of the balance responsible parties were recorded in November, amounting to 31,488 MWh.

The average monthly imbalance (positive and negative deviations combined) of the balance responsible parties in 2023 is 56,146 MWh, which is on average more than 30% higher than the monthly average in 2022.

FIGURE 28: SUM OF THE DAILY IMBALANCES IN THE SLOVENIAN GRID IN 2023



SOURCE: BORZEN

The data no longer shows the high positive deviations in December, which in previous years were largely due to the then-existing arrangements for taking into account the surpluses from self-supply installations. From the beginning of 2023 onwards, with the entry into force of the new Rules on the Operation of the Electricity Market, the surpluses from these installations have been accounted for in the annual imbalance settlement. In accordance with the dynamics of inclusion of customers in the metered diagrams, as set out in the applicable network code for the electricity distribution system, 2023 saw all non-household consumers with a connected load of less than 43 kW included among the metered customers. This had a serious impact on the shape and scale of the remaining consumption diagram, which the market operator, per its competences, could only influence by adequately and timely informing all the market stakeholders.

Balancing energy for balancing deviations in the Slovenian electricity system is provided by the transmission system operator ELES. In 2023, the amount of energy consumed to balance negative deviations was 299 GWh and the amount used to balance positive deviations was 413 GWh. The figure below shows the average hourly prices for balancing the electricity system, calculated from all the costs and balancing volumes. S+ represents the prices of short positions (purchasing energy) and S– represents the prices of long positions (selling energy). The volumes account for all types of regulation: FCR (Frequency Containment Reserve), aFRR (Automatic Frequency Restoration Reserve, called »secondary regulation« before the change of terminology), mFRR (Manual Frequency Restoration Reserve, formerly »tertiary regulation«), RR (replacement reserves – this also includes the balancing market), FSkar (deviations at the borders) and energy from the IGCC mechanism or some other type of balancing in accordance with Article 91 of the current Rules on the Operation of the Electricity Market.

FIGURE 29: AVERAGE MONTHLY VALUES OF THE COSTS OF REGULATION (S+ AND S–) IN 2023

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
S+ [EUR/MWh]	120.36	145.31	97.25	100.35	84.16	100.21	89.58	104.76	102.18	104.35	99.15	81.73
S– [EUR/MWh]	58.73	94.08	67.98	75.08	58.32	79.01	67.58	72.67	69.15	70.39	64.3	56.35

SOURCE: BORZEN

The average balancing prices in 2023 were significantly lower than in 2022. In 2023, the relative spread between the average prices for positive and negative balancing was about the same as in 2022, but it was almost 240% lower on average in absolute terms.

TABLE 18: TRENDS IN THE TOTAL IMBALANCES OF THE BALANCE RESPONSIBLE PARTIES AND AT THE BOUNDARIES OF THE SLOVENIAN REGULATION AREA IN THE 2019–2023 PERIOD

	2019	2020	2021	2022	2023
Total positive imbalances of the balance responsible parties [MWh]	278,713	245,421	245,997	304,004	395,440
Total positive imbalances of the regulation area [MWh]	305,042	300,190	324,665	374,111	496,849
Total negative imbalances of the balance responsible parties [MWh]	152,982	177,414	236,796	210,779	278,317
Total negative imbalances of the regulation area [MWh]	**225,191**	**262,243**	**341,339**	**335,860**	**413,335**

SOURCES: BORZEN, ELES

Even in 2023, there was a noticeable discrepancy in the quantities recorded at the regulation area and balance responsible party levels, with both showing more positive than negative deviations. The chief reason for this is the risk optimisation performed by the balance responsible parties. The large share of positive imbalances can also partially be ascribed to an increased share of unpredictable generation from renewable sources and the higher prices of long-term contracts in comparison to day trading.

Quality of Supply

At the system level, the regulation of the quality of supply aims to improve or maintain the existing level at optimised costs. Various activities are carried out to address the quality of supply, such as monitoring, reporting and analysing data on the following observed dimensions: continuity of supply, commercial quality and voltage quality.

Continuity of Supply

The data on the continuity of supply are collected, reported, and analysed using a uniform methodology. This ensures the mutual comparability of data on the quality of supply among distribution companies and the international comparability of the achieved parameters of continuity of supply at the EU level.

Interruptions caused by electricity system operators or distribution companies are classified as internal events, while interruptions caused by third parties are classified as external events. Unexpected or unforeseen events that are not attributable to electricity system operators or distribution companies, or third parties, can be classified as force majeure.

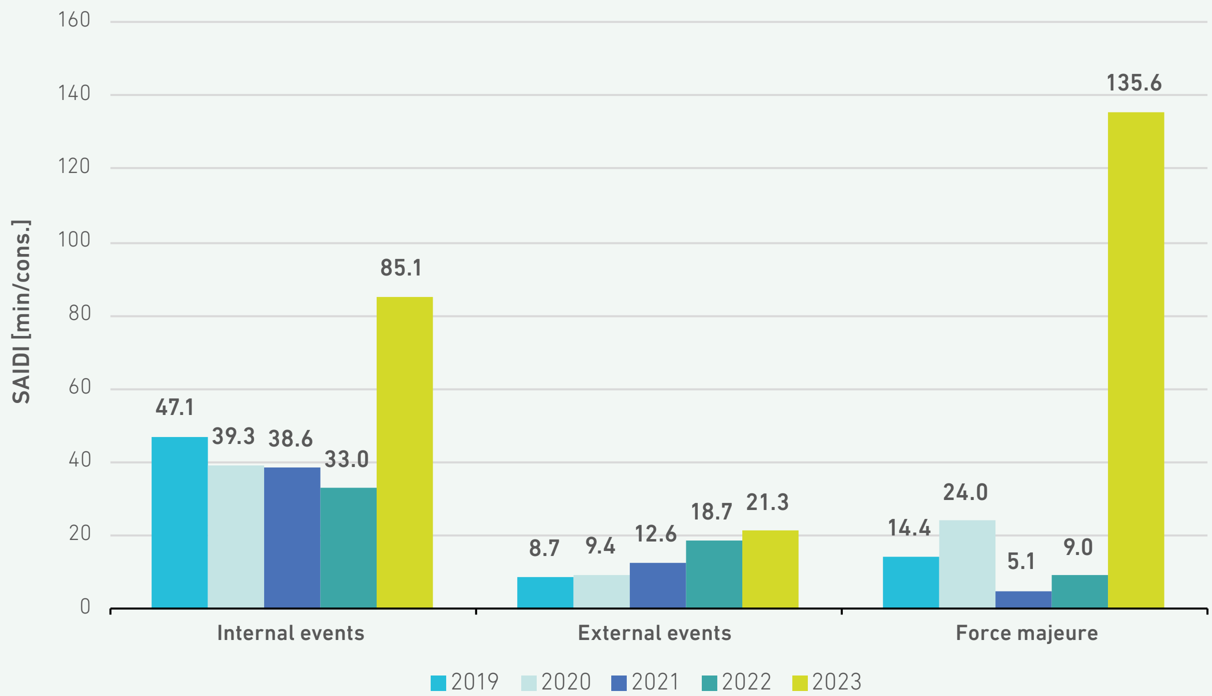
The average electricity supply interruption was 335 minutes, due largely to the extraordinary events that hit Slovenia in 2023

Based on the data on SAIDI and SAIFI indicators, calculated at the level of individual distribution companies, the Energy Agency calculated the aggregate value of these indicators considering the number of all the consumers in Slovenia. The monitoring of SAIDI and SAIFI parameters over the observation period shows a gradual improvement in the level of quality of supply, except in case of major weather events, such as the August floods in 2023 and, in part, the high winds at the beginning of the year. In 2023, the electricity supply to each consumer was interrupted 3.54 times on average for an average duration of 335.3 minutes per interruption – comparable even to 2014, when the continuity of supply was disrupted due to widespread glaze ice at the beginning of that year. After a thorough analysis of the data on the continuity of supply, the Agency has therefore decided to exclude 2023 from continuity regulation.

The Energy Agency also monitors the MAIFI parameter, which is calculated similarly to the SAIFI parameter and indicates short-term interruptions of under three minutes, which are not classified by causes. In recent years, the MAIFI parameter has shown some volatility, with a marked deterioration in 2023, caused by the extraordinary events associated with flooding.

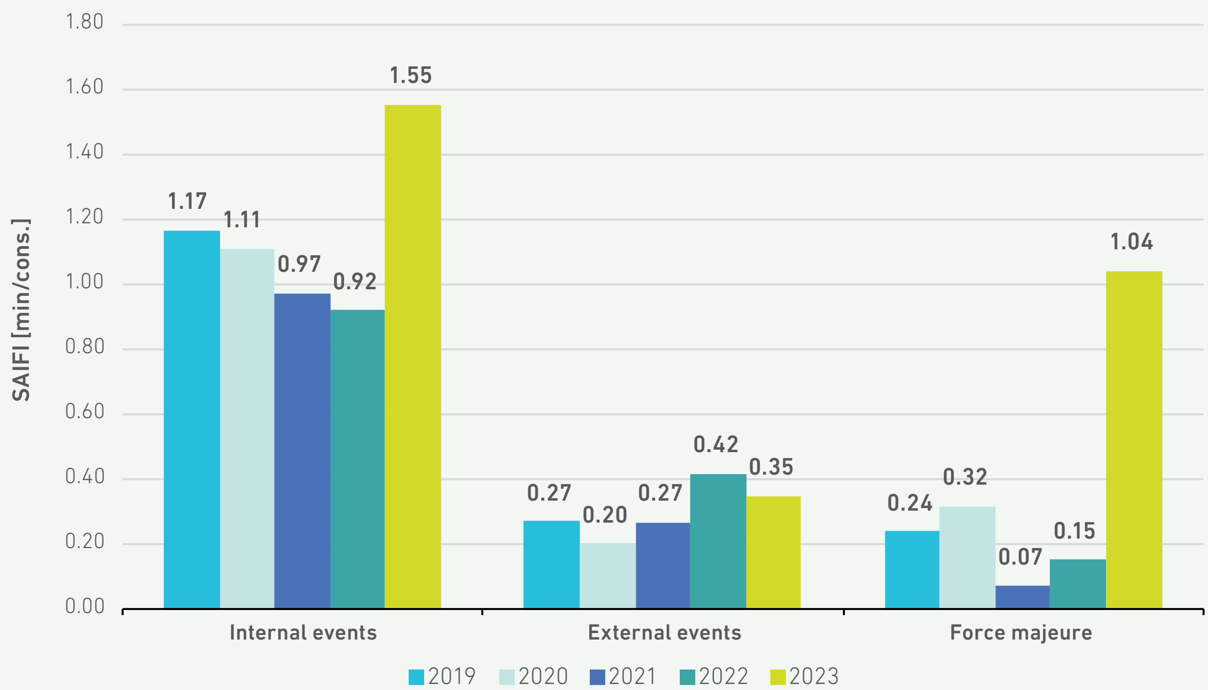
Figures 30 and 31 show the SAIDI and SAIFI indicators for unplanned long-term interruptions, classified by causes of interruption (internal and external events, as well as force majeure), for the 2019–2023 period, while Figure 32 shows the MAIFI indicator for the same observed period. All the indicators are calculated at the national level.

FIGURE 30: SAIDI FOR UNPLANNED LONG-TERM INTERRUPTIONS, CLASSIFIED BY CAUSES, IN THE 2019–2023 PERIOD



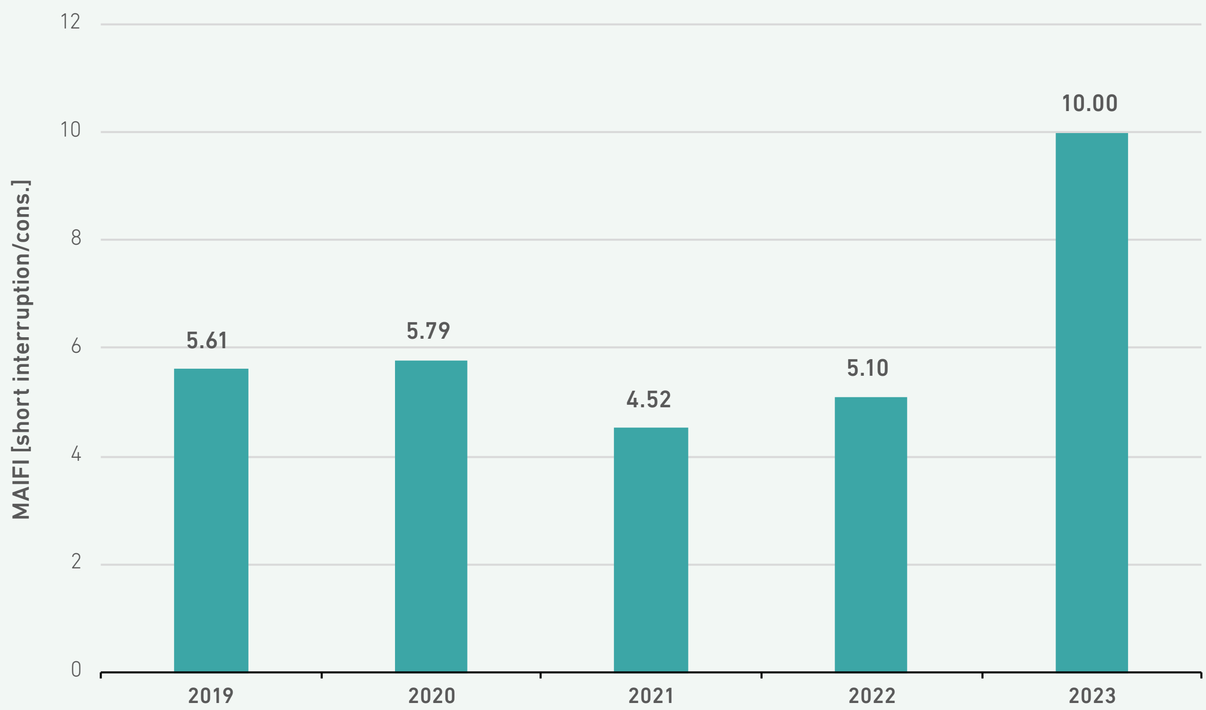
SOURCE: ENERGY AGENCY

FIGURE 31: SAIFI FOR UNPLANNED LONG-TERM INTERRUPTIONS, CLASSIFIED BY CAUSES, IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

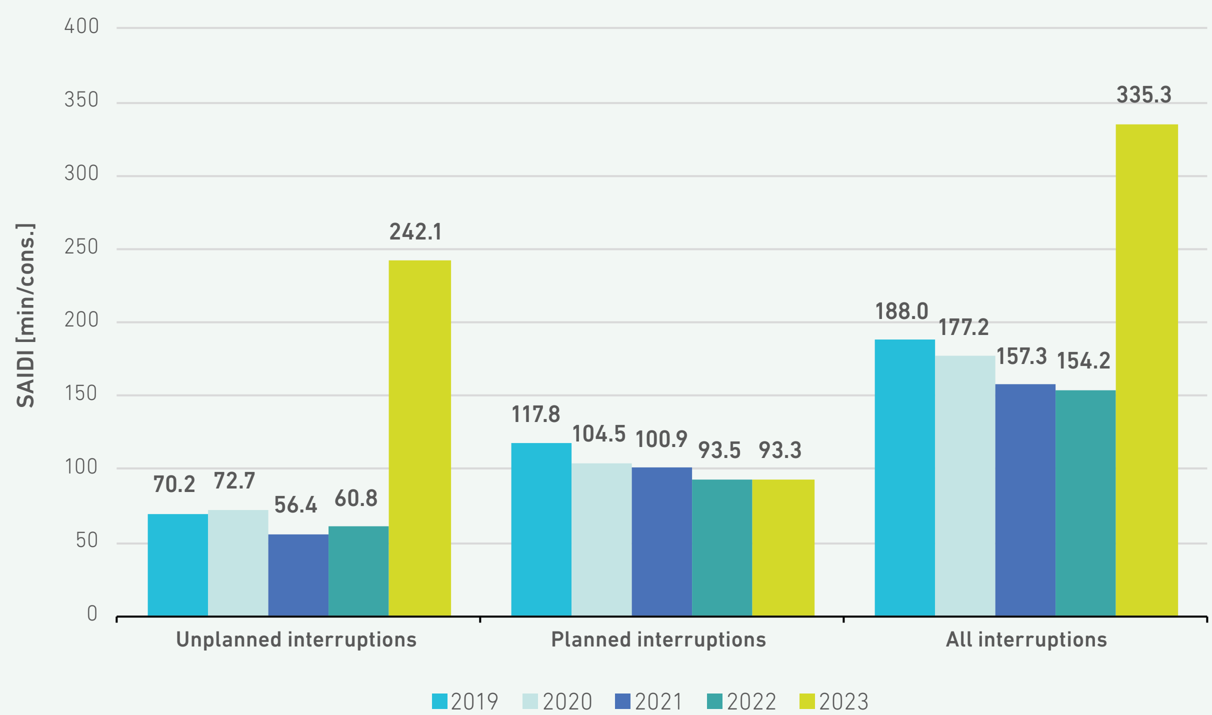
FIGURE 32: MAIFI IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

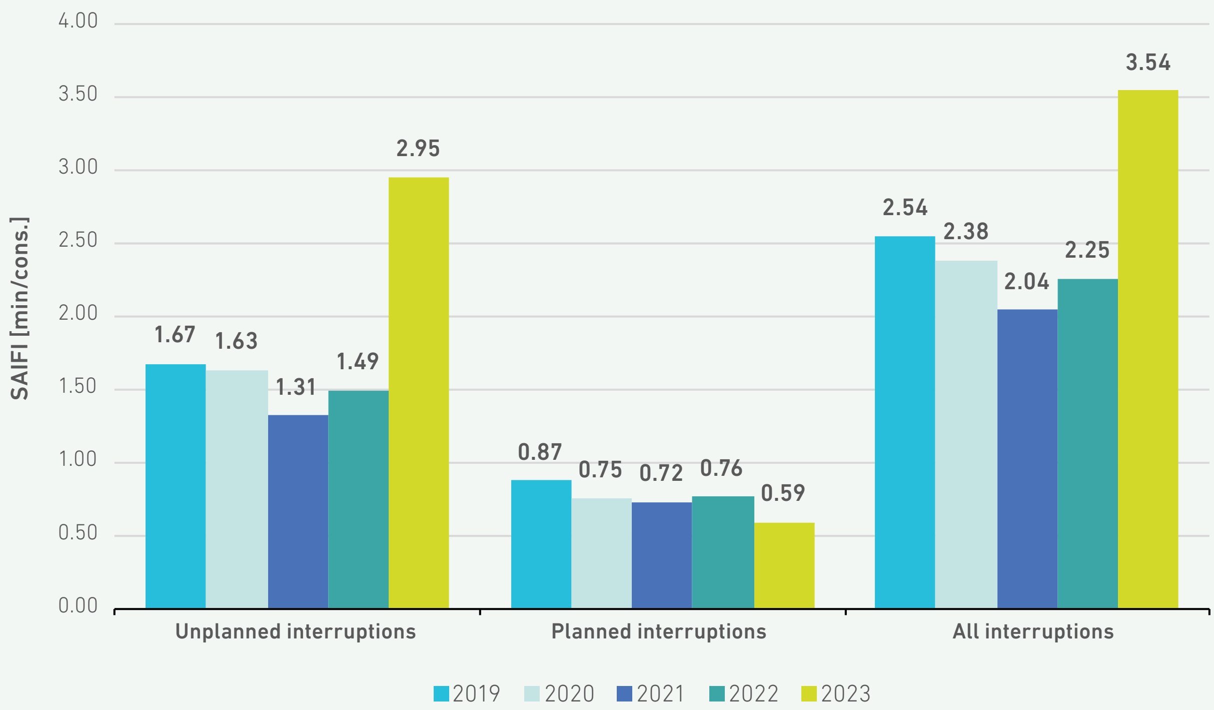
Figures 33 and 34 show the aggregate value for the SAIDI and SAIFI indicators for unplanned, planned and all interruptions in Slovenia in the 2019–2023 period.

FIGURE 33: SAIDI FOR ALL LONG-TERM INTERRUPTIONS, CLASSIFIED BY CAUSES, IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

FIGURE 34: SAIFI FOR ALL LONG-TERM INTERRUPTIONS, CLASSIFIED BY CAUSES, IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

In 2023, the Energy Agency also continued to monitor the data on supply continuity in CDSs. That year, CDSs did not receive any complaints from consumers with regard to the continuity of supply; however, they did record electricity supply interruptions, as shown in Table 19. The relatively small number of recorded outages in CDSs is a consequence of the methodology employed to monitor electricity supply continuity, in which only outages at the medium-voltage feeder level are recorded. In 2023, only one of the CDSs recorded a significant number of interruptions, when all medium-voltage feeders were interrupted simultaneously due to the failure of the high-voltage line supplying the entire CDS.

TABLE 19: OVERVIEW OF THE NUMBER OF INTERRUPTIONS IN CDSs, CLASSIFIED BY CAUSES IN 2023

Number of electricity supply interruptions in 2023	CDS Petrol Ravne	CDS Petrol Štore	CDS Jesenice	CDS Sij Acroni	CDS Talum	CDS Salonit
Unplanned interruptions	**46**	**0**	**0**	**4**	**2**	**0**
• internal events	0	0	0	4	2	0
• external events	6	0	0	0	0	0
• force majeure	0	0	0	0	0	0
Planned interruptions	**4**	**1**	**0**	**1**	**0**	**8**
Short-term interruptions	**0**	**0**	**0**	**2**	**0**	**0**

SOURCES: CDSs

Commercial Quality

The required level of commercial quality is determined by the system and guaranteed standards for commercial quality. A breach of the guaranteed commercial quality standards defined by the Energy Agency may bring financial consequences for the service provider, i.e., payment of compensation to the consumer concerned. On the basis of system standards, a consumer can expect a certain quality level, as these standards indicate the average level of service quality or the share of all customers provided with the required service quality.

The level of the commercial quality of services in the area of connection-related services is falling, largely due to delays in connection approvals for self-supply devices

In 2023, compensation was paid to one consumer for a breach of guaranteed standards regarding the time taken to correct non-compliance in terms of the supply voltage deviations. Based on the three-year trend of commercial quality parameters, we conclude that the level of commercial quality has generally remained steady; by contrast, there has been a decrease in quality in the area of connection-related services. The time taken to issue a connection approval increased beyond the minimum standard requirements in all areas of the distribution system, largely due to difficulties in connecting self-supply devices.

Table 20 shows the ranges (minimum and maximum values) of the commercial quality parameters in the 2021–2023 period.

TABLE 20: RANGE OF THE COMMERCIAL QUALITY INDICATORS IN THE 2021–2023 PERIOD

Commercial quality parameters	2021		2022		2023	
	Min.	Max.	Min.	Max.	Min.	Maks.
Connection-related services						
Average time to issue an approval for connection (days)	10.4	47.9	18.2	36.7	21.2	68.1
Average time to issue a cost estimate or pro forma invoice for simple works (days)	2.8	7.9	2.8	7.7	2.4	7.2
Average time to issue a contract for connection to the LV system (days)	2.0	14.2	4.3	22.6	4.3	12.5
Average time to activate a connection to the system (days)	1.6	5.9	1.7	7.3	2.5	19.3
Customer service						
Average response time to consumers' written questions, complaints or enquiries (days)	1.3	3.3	1.7	3.8	2.2	5.2
Average hold time in the call centre (seconds)	13.0	93.7	5.0	87.9	5.0	107.8
Call centre performance indicator (%)	88.0	94.0	83.0	94.5	86.8	90.8
Technical services						
Average time to restore supply following a failure of a current limiting device (06:00–22:00)	0.8	2.2	1.1	2.2	0.8	2.0
Average time to restore supply following a failure of a current limiting device (22:00–06:00)	1.2	6.1	1.0	2.0	1.4	2.1
Average response time to voltage quality complaints (days)	14.4	31.9	14.1	25.1	11.9	27.6
Average time to resolve voltage quality inconsistencies (months)	0.3	41.8	0.8[7]	29.3	0.2	32.5
Metering and billing						
Average time to remedy meter failures (days)	3.3	9.6	1.4	5.6	1.1	20.5
Average time to restore supply following disconnection due to non-payment (hours)	0.1	9.2	0.1	6.3	0.1	0.3

SOURCE: ENERGY AGENCY

A significant increase again in the total number of complaints due to delays in issuing connection approvals

In relation to commercial quality, data on consumer complaints is also collected through a standardised procedure. For a second consecutive year, there has been a significant increase in the total number of complaints, most often due to delays in issuing a connection approval, which were in most cases associated with connecting self-supply devices and exceeding the maximum time to resolve voltage quality deviations. Both of these had already represented the most frequent grounds for complaints in the past. However, while the total number of complaints is increasing, the share of justified complaints due to delays in issuing connection approvals has decreased in 2023 compared to 2022. The data on commercial quality complaints for the 2021–2023 period is summarised in Table 21.

7 Correction for 2022

TABLE 21: NUMBER AND SHARES OF JUSTIFIED COMMERCIAL QUALITY COMPLAINTS IN THE 2021–2023 PERIOD

Reason for complaint	Total number of complaints			Number of justified complaints			Share of justified complaints		
	2021	2022	2023	2021	2022	2023	2021	2022	2023
Connection activations									
Exceeding the time to activate the connection to the system	1	1	6	0	1	5	0%	100%	83.3%
Inadvertent disconnection due to an error by the maintenance crew	4	0	1	4	0	1	100%	-	100%
Quality of supply									
Exceeding the maximum time to resolve voltage quality deviations	15	22	25	3	11	21	20%	50%	84%
Exceeding the time limit to respond to a voltage quality complaint	0	4	3	0	3	3	-	75%	100%
Exceeding the maximum permitted duration and number of unplanned long-term interruptions (applies only to end-consumers on the MV system)	0	0	0	0	0	0	-	-	-
Metering									
Delay in repairing a meter malfunction	1	86	16	1	3	0	100%	3.5%	0%
Billing, invoicing and debt collection									
Delay in responding to consumers' written questions, complaints or enquiries	2	25	19	2	8	7	100%	32%	36.8%
Connection-related services									
Delay in issuing a connection approval	14	50	531	8	40	83	57%	80%	15.6%
Consumer services									
Failure to notify consumers about a planned interruption in time	7	5	5	6	0	0	86%	0%	0%
TOTAL	**44**	**193**	**606**	**24**	**66**	**120**	**55%**	**32.7%**	**19.8%**

SOURCE: ENERGY AGENCY

In 2023, CDSs continued to monitor commercial quality. Due to greater system rigidity and a relatively low number of consumers, CDSs did not receive any consumer complaints relating to commercial quality.

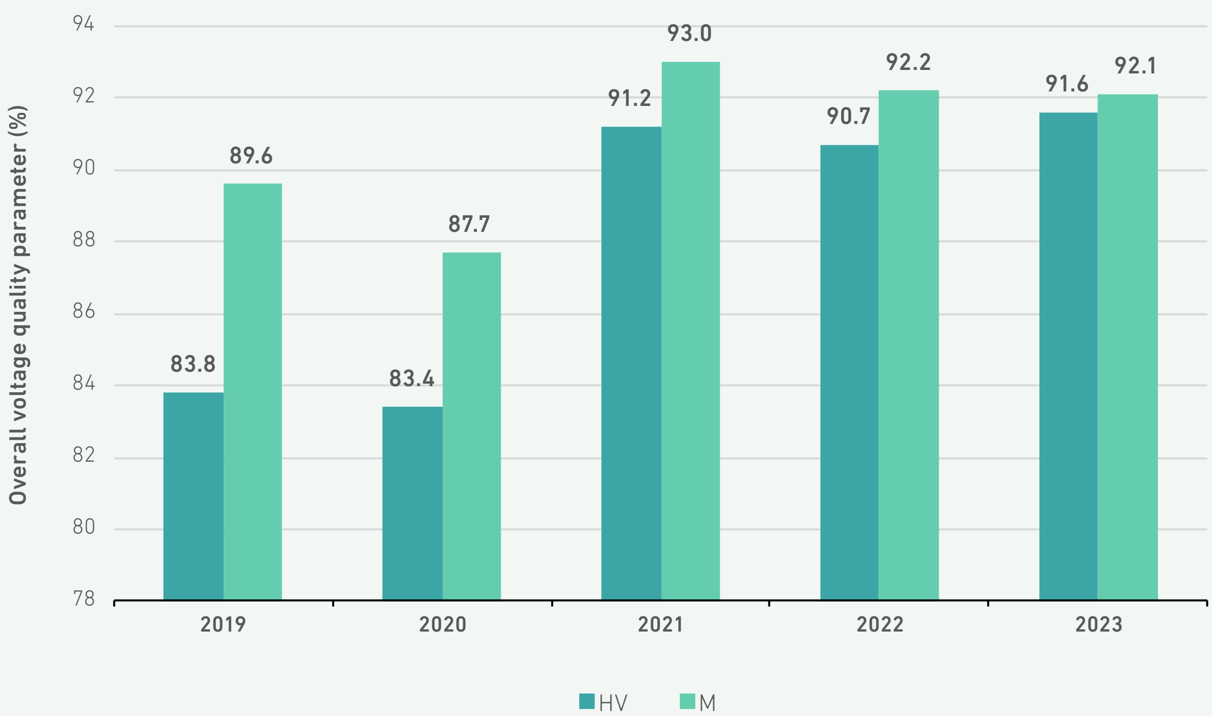
Voltage Quality

The two system operators and the distribution companies are required to perform regular monitoring at the border of the transmission and distribution networks, and at delivery points for larger users. In addition, occasional monitoring is carried out according to a predefined plan. When addressing a consumer's complaint, the voltage quality is monitored for at least one week. The voltage quality is also monitored as part of the procedure for issuing connection approvals, before a new consumer is connected.

A reduction in the total number of complaints and an increase in the share of justified complaints regarding voltage quality

On the basis of continuous voltage quality monitoring, an overall voltage quality parameter is calculated, reflecting the proportion of weeks in a calendar year during which the voltage quality parameters were in compliance with the requirements of the technical standard.

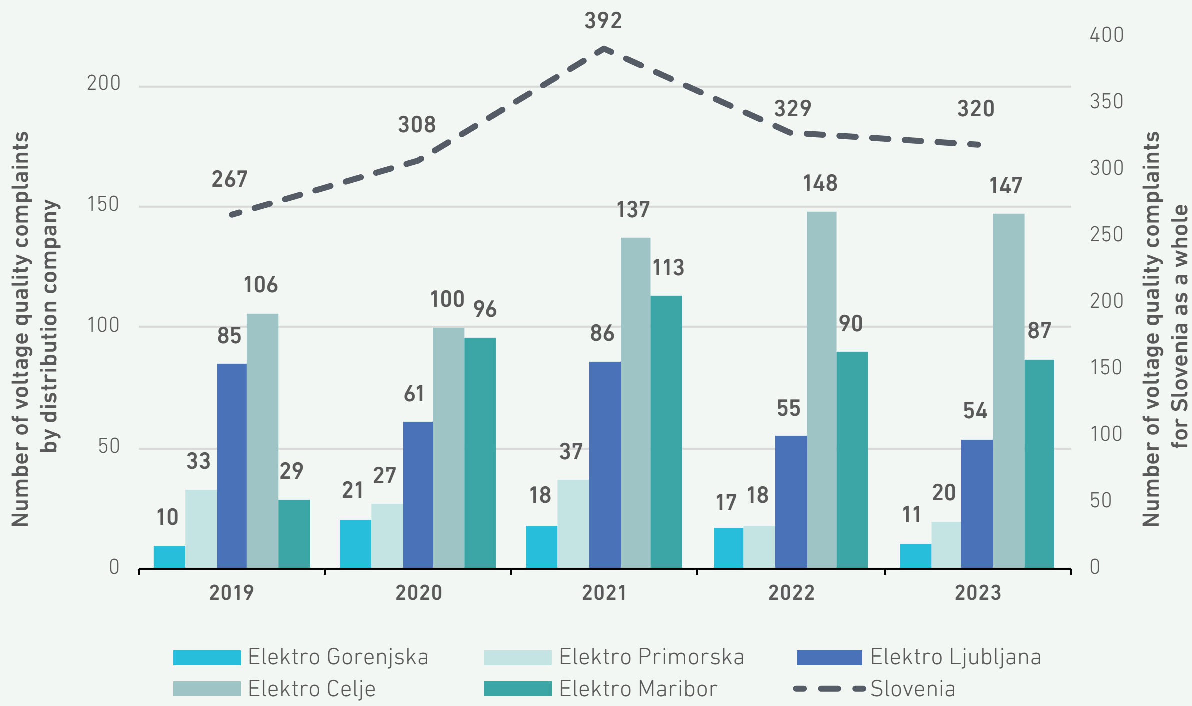
FIGURE 35: THE OVERALL VOLTAGE QUALITY PARAMETER BY INDIVIDUAL VOLTAGE LEVEL IN THE DISTRIBUTION SYSTEM OVER THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

Figure 36 shows the trend in the number of voltage quality complaints for individual distribution companies and for the entire territory of Slovenia, which has slightly decreased in 2023 for the second year in a row and correlates with the overall voltage quality parameter for the MV network in Figure 36.

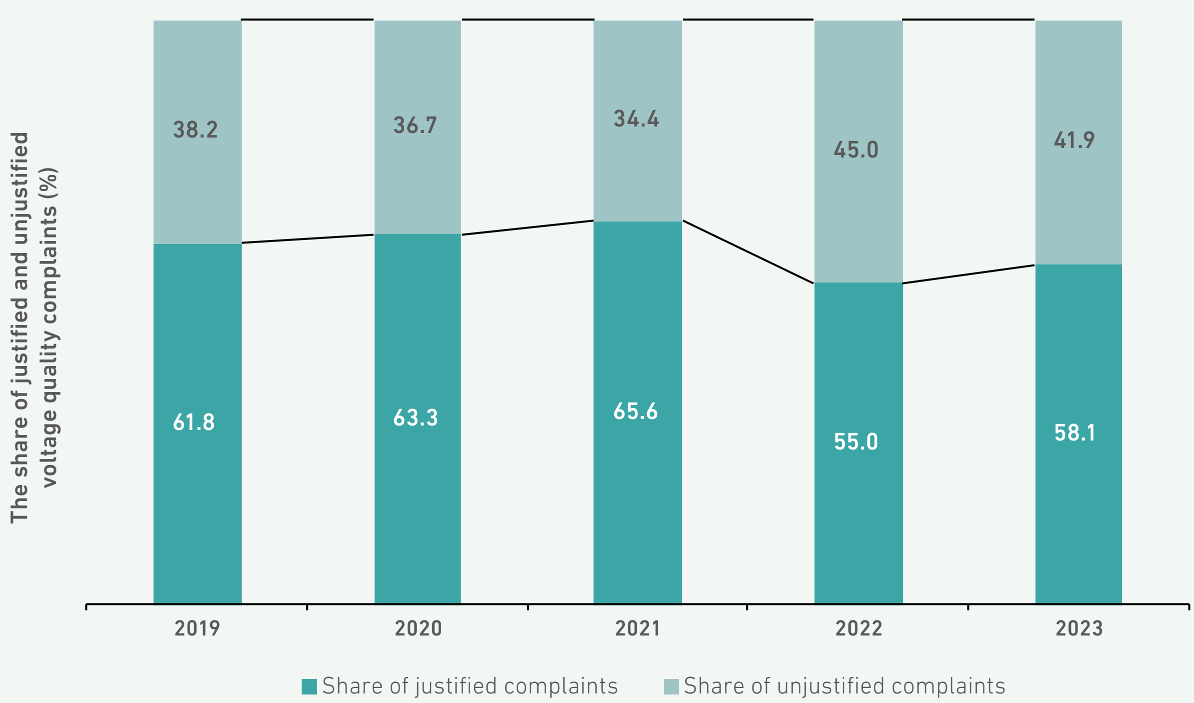
FIGURE 36: NUMBER OF VOLTAGE QUALITY COMPLAINTS BY DISTRIBUTION COMPANY AND IN SLOVENIA IN GENERAL IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

In 2023, despite the slight decline in the total number of voltage quality complaints, the number of justified complaints somewhat increased, as can be seen in Figure 37.

FIGURE 37: SHARE OF JUSTIFIED AND UNJUSTIFIED VOLTAGE QUALITY COMPLAINTS IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

ELES carried out the continuous monitoring of voltage quality in the high-voltage network at 195 connection points between the distribution system, producers and direct consumers. Similar to previous years, there have been repeated breaches of standards due to the occurrence of flicker. Non-compliance with the standard for flicker was found at 181 measuring points, where long-term flicker stayed above 1 for at least one week, with an average out-of-compliance period of 6.4 weeks per individual non-compliant measuring point. No other breaches of voltage quality compliance were observed in the transmission system.

In 2023, voltage quality monitoring according to the standard was also conducted by CDS operators, who recorded no complaints related to voltage quality.

Multi-Year Development of the Electricity Network

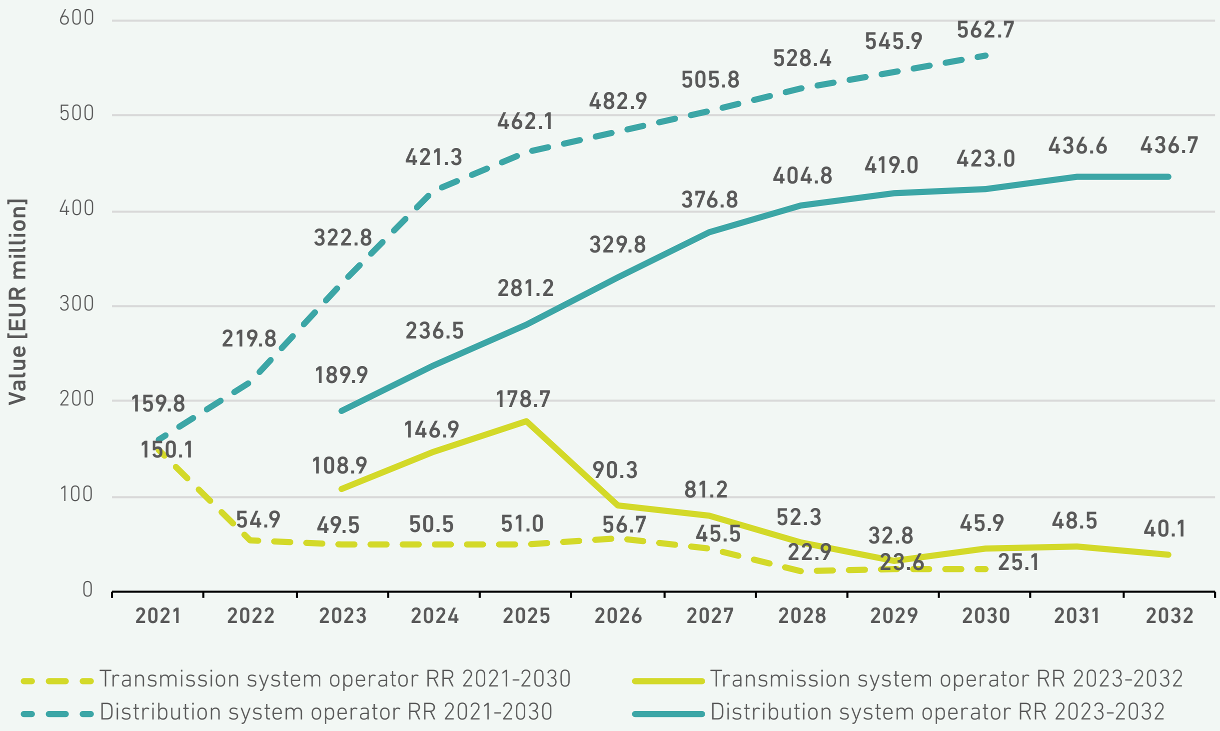
The development of the electricity network is based on ten-year development plans for the electricity transmission and distribution system formulated every other year by the two electricity system operators and approved by the agency. The two plans must be developmentally coherent and take into account the country's strategic energy goals. In their planning, the two electricity system operators apply the prescribed uniform methodology that takes into account long-term consumption forecasts, analyses of expected operating conditions, the degree of reliability of the supply to customers, economic analyses, and the potential locations of new production sources.

Planning in the transmission system operator's development plan starts with an analysis of the transmission system conditions. The development plan must include an assessment of the opportunities for increasing the energy efficiency of the electricity infrastructure and an analysis of consumption coverage with existing production sources and the sufficiency of said sources, as well as an assessment of the necessary transmission capacity to determine the time dynamics of planned investments and evaluate them financially.

The DSO's development plan must include an analysis of the period covered by the previous development plan, an analysis of the electricity and electric power consumption forecast, and a country-wide distribution infrastructure investment plan, which must also be financially evaluated, with priority given to measures for increasing the energy efficiency of the existing electricity infrastructure through load management and demand response, as well as the purchase of ancillary services.

In their development plans for the 2023–2032 period, the electricity system operators take into account, inter alia, the various scenarios for a transition to a low-carbon society as set out in the NECP and the related investments in the electricity infrastructure, valued at EUR 825.6 million by the transmission system operator and at over EUR 3.5 billion over the ten-year development plan period by the distribution system operator.

FIGURE 38: ASSESSMENT OF INVESTMENT RISKS FROM THE DEVELOPMENT PLANS PREPARED BY ELECTRICITY SYSTEM OPERATORS FOR THE 2023–2032 PERIOD AND A COMPARISON TO THE PREVIOUS DEVELOPMENT PLAN



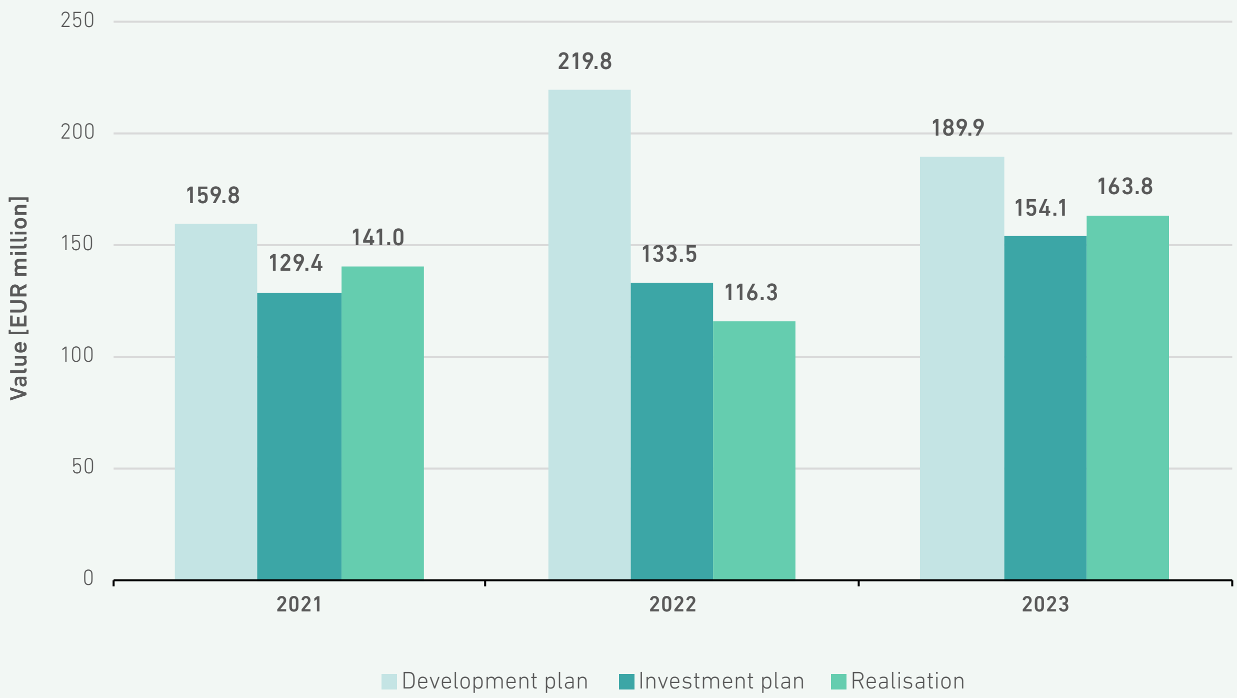
SOURCES: ELES, SODO

At the end of 2022, the Agency received both of the electricity system operators' development plans for the 2023–2032 period and issued approvals to both at the beginning of 2023. Compared to the distribution system operator's previous development plan, which had been formulated on the basis of the targets set out in the NECP, the plan for 2023–2032 shows a significant reduction in investments into the distribution infrastructure. The distribution system operator justifies this on the basis of improvements in input data and taking into account the implementation of flexibility as an alternative to grid reinforcements. However, the transmission system operator's development plan for the 2023–2032 period does show a significant increase in the value of investments in the years up to 2028 compared to the previous development plan – a result of the implementation of the GreenSwitch smart grid project, which the transmission system operator has developed together with the transmission system operators of Austria and Croatia. In addition to an absolute decrease in the value of the planned investments, a comparison of the distribution system operator's 2023–2032 development plan with the previous development plan (Figure 38) shows major investments being shifted further and further into the future.

That said, in light of the reduced value of investments in the 2023–2032 development plan, the question arises as to whether the distribution system operator and the owners of the distribution network will be able to realise the planned investments necessary for achieving the national goals set out in the NECP. In the investment plans submitted for the 2021–2023 period, the planned investment funds are significantly lower than those envisioned by the development plan; while the investment realisation in 2021 at least somewhat exceeded the investment plan, this was not the case in 2022, when the investment realisation fell significantly short of both the development and the investment plan. This is at least partly related to the government's intervention measure, which suspended the payment of the network charge for all consumers in Slovenia for a period of three months. In 2023, investment realisation once again slightly exceeded the investment plan but still fell short of the amount foreseen in the development plan.

While this report was being prepared, ELES published a consultation document, Development Plan for the Electricity Distribution System in the Republic of Slovenia for the 2025–2034 Period, which estimates the required funding for a ten-year period at almost €4.5 billion. Justifying the nearly €1 billion increase in necessary investments over the 2023–2032 period is the updated NECP (increase in RES integration targets, electrification of heating and transport) and the significant increase in the prices of material and equipment.

FIGURE 39: COMPARISON OF THE AMOUNTS IN THE DEVELOPMENT AND INVESTMENT PLANS FOR THE ELECTRICITY DISTRIBUTION SYSTEM ALONG WITH THE REALISATION

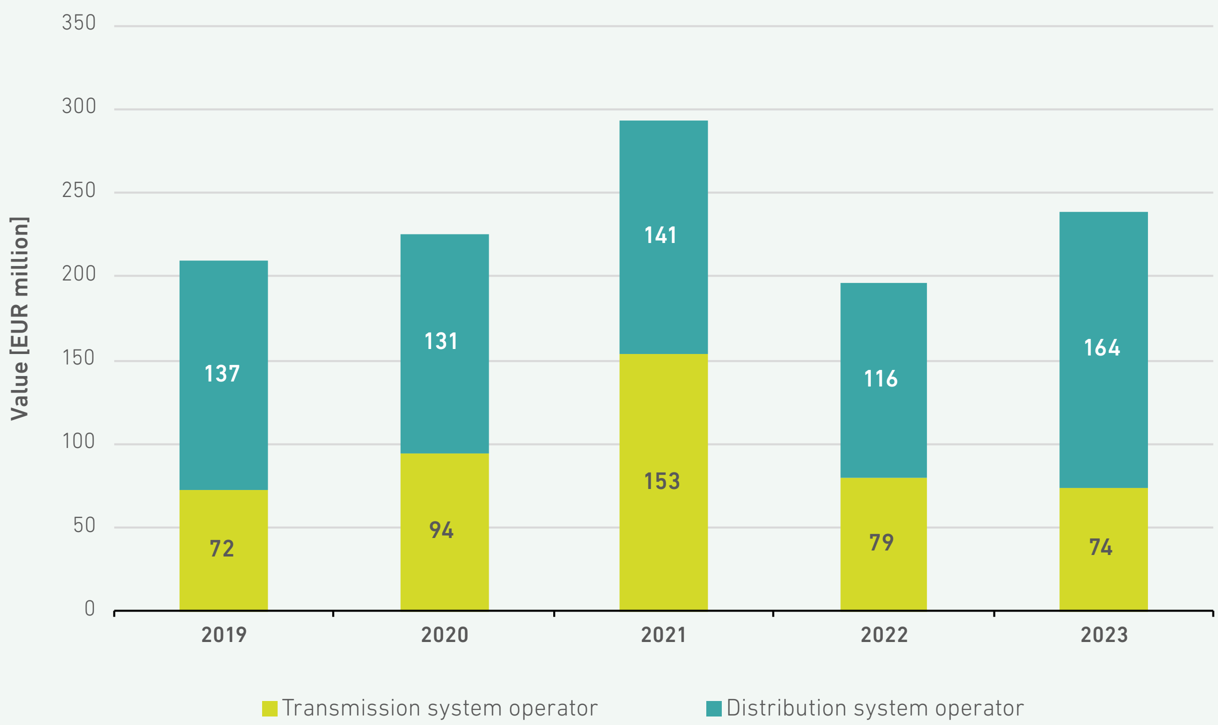


SOURCE: SODO

Supervision Over the Implementation of Electricity System Operators' Development Plans

In 2023, the transmission system operator allocated EUR 74.2 million to investments, which is 49.9% more than the resources envisioned in the regulatory framework – the latter, however, was formulated on the basis of the previous development plan. Out of that amount, EUR 35.2 million was allocated to new investments, EUR 31 million to reconstructions, and EUR 8 million to other business investments. The largest share, 80.5%, was allocated to network investments, followed by the rest of the business investments at 10.7%, investments into secondary equipment at 4.5%, smart grid investments at 2.5% and other operational investments at 1.8%. Among the new constructions, the investments that stand out in terms of value include the EUR 13.5 million for the 110 kV Koper–Izola transmission line, the completion of the Cirkovce–Pince 400 kV cross-border transmission line for EUR 6.6 million, and the construction of the station building and the replacement of secondary equipment in DTS Maribor at EUR 5.5 million. Among the major reconstruction-related investments is the renovation of the 2x110 kV Divača–Pivka transmission line, amounting to nearly EUR 14 million.

FIGURE 40: TRANSMISSION SYSTEM OPERATOR AND DISTRIBUTION SYSTEM OPERATOR INVESTMENTS FOR 2019–2023



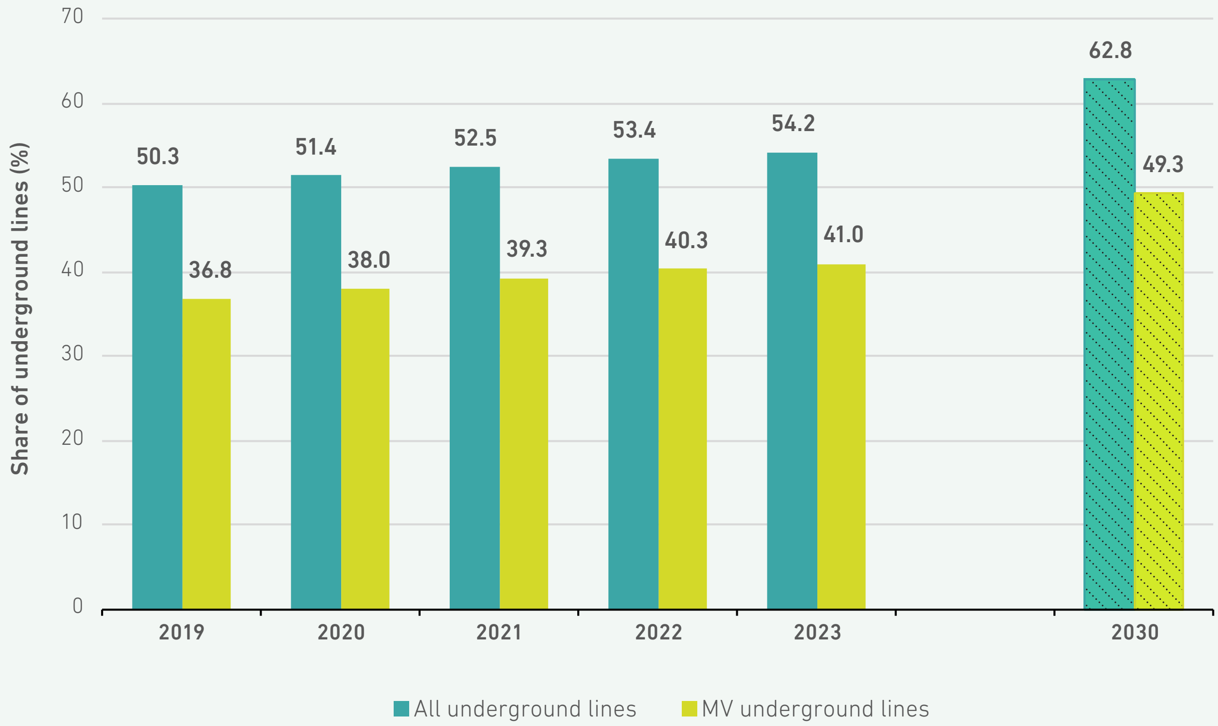
SOURCES: ELES, SODO

In 2023, the DSO and the owners of the distribution system earmarked EUR 163.8 million for investments, which is 6.3% more than what was planned in the regulatory framework, but still only 86.3% of the funds planned in the development plan. Out of that amount, €86 million was allocated to new investments, €61.6 million to reconstructions, and €16.2 million to other business investments. In terms of voltage level, the majority of the investments, 39%, were made in the medium-voltage network, followed by 26.5% in the low-voltage network and 11.5% in the high-voltage network. The remaining amount comprises investments in secondary equipment (13.1%) and other business investments. In 2023, the highest investment realisation in terms of value by a distribution system operator in history was recorded. This does not necessarily reflect a proportionally higher scope of investment realisation, however, since in this area too, the operators are facing a significant increase in the prices of materials and services for the construction of the electricity infrastructure.

Growth in the share of underground lines in the distribution system is slowing down

In recent years, the share of underground lines in the distribution system has been increasing by 1.1% a year on average, representing 54.2% of all the distribution lines at the end of 2023, or 41% when looking only at the MV distribution lines. That said, the growth in the share of underground lines has slowed down slightly in the last two years and was thus only 0.8 percentage points for the share of all underground lines and 0.7 percentage points for the share of MV underground lines in 2023. If growth continues at this rate, it will be difficult to approach the NECP target of at least 50% of underground MV lines by 2030 to increase the resilience of the electricity distribution network.

FIGURE 41: GROWTH IN THE SHARE OF UNDERGROUND DISTRIBUTION LINES IN THE 2019–2023 PERIOD AND THE PROJECTION FOR 2030



SOURCES: ENERGY AGENCY, SODO, EDC

TABLE 22: TRANSMISSION AND DISTRIBUTION ELECTRICITY INFRASTRUCTURE IN SLOVENIA AT THE END OF 2023

Transmission system	
400 kV lines	828 km
220 kV lines	328 km
110 kV lines	1,958 km
HV/HV DTS	8
110 kV DS	1
Distribution system	
110 kV lines	919 km
35-kV, 20-kV, 10-kV lines	18,656 km
0.4 kV lines	45,902 km
110 kV/MV DTS	96
MV/MV DTS	7
MV DS	78
MV/LV TS	18,649

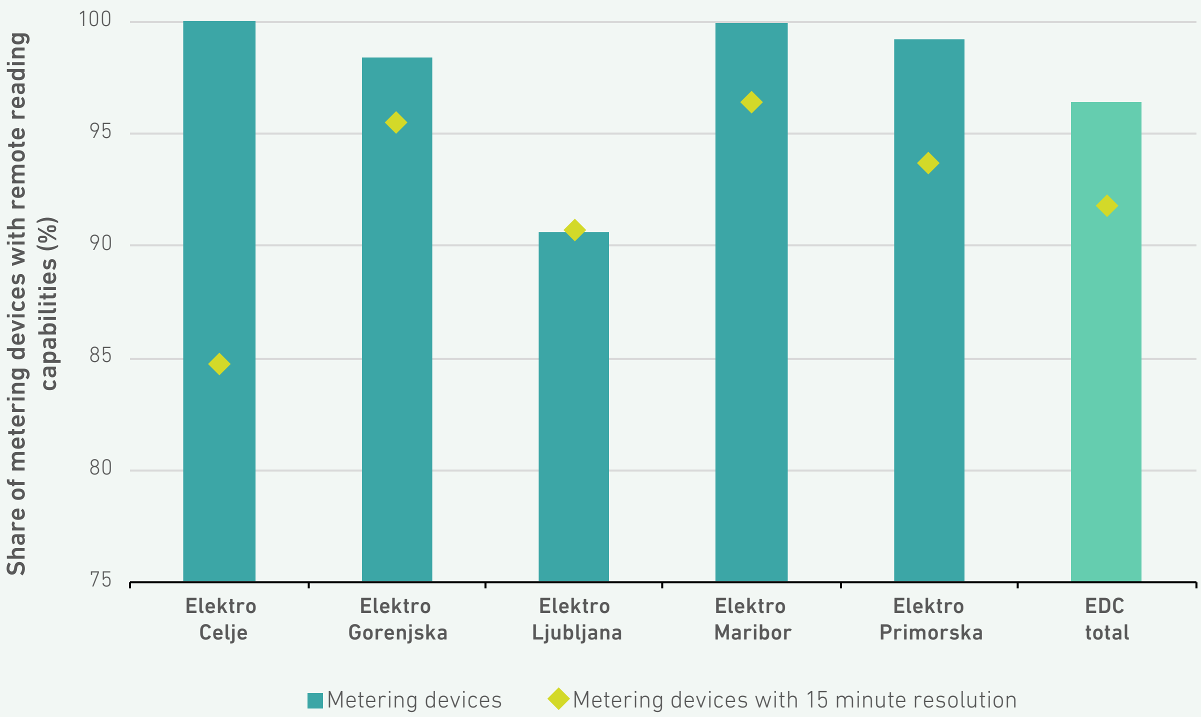
SOURCES: ELES, SODO, EDCs

Development of the Advanced Metering System in Slovenia

Slovenia is one of the leading European countries in terms of the installation of advanced metering devices. At the end of 2023, no fewer than 94.5% of consumers connected to the distribution system were equipped with advanced metering devices, and 93% were included in remote meter reading. Approximately 91.8% of these permit the acquisition of detailed metering data at a 15-minute resolution, meaning that they are already compliant with the renewed network charge calculation methodology. The share of smart meters that do not yet facilitate 15-minute metering is between 1–15%, according to the electricity distribution companies (Figure 42).

94.5% of consumers connected to the distribution system were equipped with advanced metering devices

FIGURE 42: SHARE OF METERING DEVICES WITH REMOTE READING CAPABILITIES AND 15-MINUTE RESOLUTION (INCLUDING AMR)



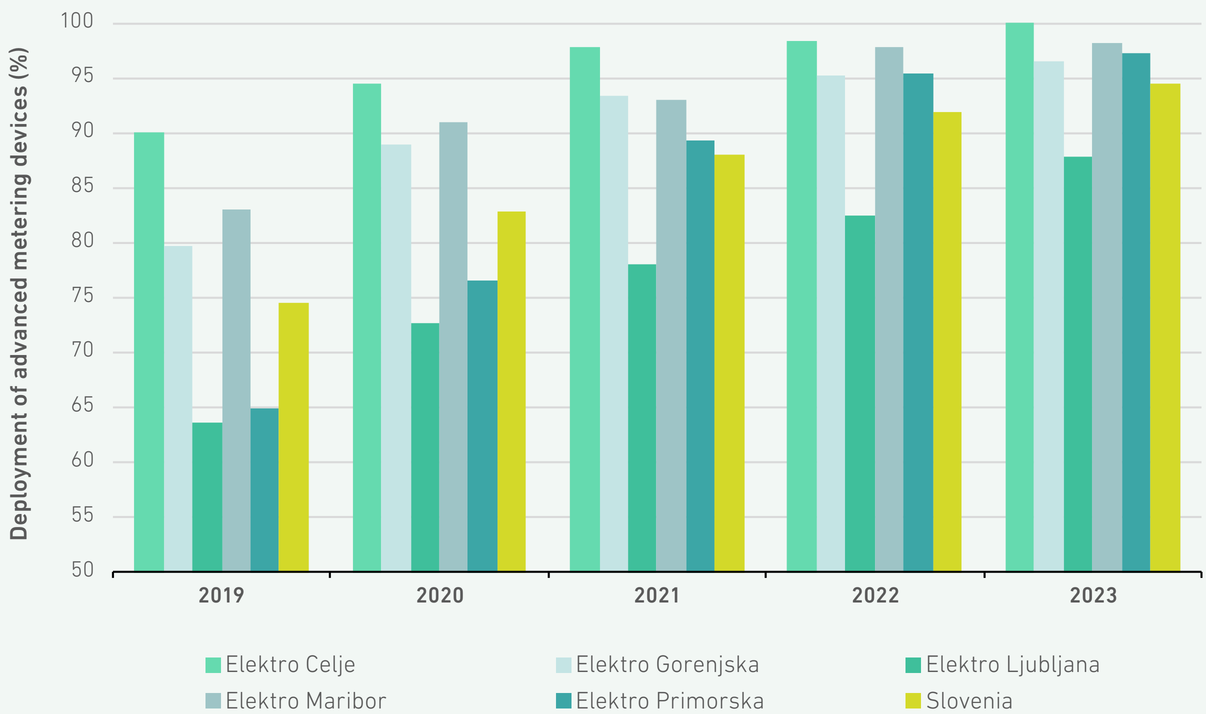
SOURCES: EDCs

Roughly half of the metering devices with a 15-minute reading resolution (50.9%) are equipped with a dedicated local I1 interface, which allows detailed metering data processing in near real-time. This functionality is of crucial importance for the advanced final consumers (prosumers) participating in ancillary and other advanced energy services. In the last quarter of 2023, the AMS operator was proactively carrying out several activities aimed at improving the quality of metering data by either eliminating or limiting the sources of interference on the end-consumer side that affect the communication paths or the transmission of metering data to the metering centres. In order to ensure a unified approach to the quality assurance of metering data at the highest layers of the AMS architecture, i.e. at the level of the national data hub (MyElectro, CEEPS, etc.), the AMS operator designed AMS as an additional intermediate layer in a dedicated system for the centralised management, validation and substitution of detailed metering data (POMP).

The methodological and technological concepts implemented as part of POMP allow Informatika d.o.o., the central IT service provider for EDCs, to carry out all the data processing necessary to support the network charge calculation. The concepts introduced also ensure a high degree of business process digitisation and advanced integration mechanisms, as well as allow the introduction of business models based on flexibility. By introducing advanced data and streaming solutions, POMP also enables scalable data processing and mass data storage that can be directly and usefully employed in a wide range of scenarios based on advanced data analytics and machine learning.

92% of smart meters are compliant with the renewed network charge calculation methodology

FIGURE 43: TREND OF DEPLOYMENT OF ADVANCED METERING DEVICES IN THE 2019–2023 PERIOD



SOURCES: EDCs

The Agency has carried out extensive activities to verify the compliance of the advanced metering system and the new network charge calculation methodology with Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (hereinafter: Directive EU 2019/944) and Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to making measuring instruments (hereinafter MID) available on the market. Within the scope of these activities, the Agency has concentrated most of its efforts on the analysis of the requirements of Section 10.1, which addresses the minimum requirements for metering equipment and their implications. It has

The smart meters employed also meet the requirements of the MID in the context of the requirements of the new network charge methodology

undertaken extensive activities at the national (co-operation with the Metrology Institute) and EU levels, firstly by conducting a targeted questionnaire via the CEER platform of the sectoral regulators in the Member States on the substantive issues related to Section 10.1 of the MID, and by elaborating on the definition of certain vague provisions in the MID while taking into account Directive (EU) 2019/944. Based on the results of the questionnaire and in particular due to the negative position of the EDCs, the Agency sought the EC's opinion on the potential conflicts between the MID, by that point more than 20 years old, and Directive (EU) 2019/944, by issuing a request to the EC to formally verify the normative compatibility of the existing metrology regime with Directive (EU) 2019/944 and, indirectly, with the 2022 network charge reform (Act on the Methodology for Charging the Network Charge for Electricity System Operators (Official Gazette of the Republic of Slovenia, No. 146/22, 161/22, 50/23, 71/23, 117/23, 5/24 and 30/24)). The latter is based on the implementation of the directives related to the green transition and the associated redesigned market model (split-supply models, dynamic prices, etc.) and the implementation of the Agency's rules on network charge calculation. Through this initiative, it has directly contributed to the response activities of the EC, which has given WELMEC a mandate to update the MID in terms of substance, limited to the technical requirements with the aim of bringing them into line with the state of the art. The Agency also took part in the public debate on the draft amendments to the MID, along with the Metrology Institute, who actively contributed within WELMEC. The cooperation at different levels has led to the conclusion that a revision of the MID is called for, but that the metering equipment installed complies with the requirements of the MID in terms of billing for innovative services, as it allows the local display of the minimum set of information that is used as the basis for calculating the amount to be charged for services (15-minute metering data).

Development of Smart Grids and Deployment of New Technologies

Smart grid development in Slovenia is defined, in terms of substance, by the study Update of the national smart grid roadmap[8]. The study lists the key projects that, through the use of the technologies identified in the study, are expected to contribute to achieving the national targets in an optimal way. For distribution companies, the emphasis is on new smart grid-supported planning and operational approaches, while on the transmission network, the focus is on intersectoral integration.

The new smart grid regulation scheme based on KPIs

The Agency introduced regulation on the basis of incentives for the performance of smart grid investments based on a limited set of performance indicators (KPIs) for the 2023/2024–2028 regulatory periods. Such regulation is implemented gradually, depending on the data availability, data exchange efficiency, administrative burden, state of the art and taking into account the national strategies for the green transition. In 2023, the Agency carried out the first sampling of smart grid investment performance data based on the KPIs for 2022 to fully prepare those with the obligation to produce annual reports in the future. In addition to the submission of raw data, the entities with the reporting obligation commented on any difficulties in calculating indicators or in obtaining the relevant input data for the reporting process to the Agency, as one of the primary objectives of the sampling campaign was to obtain feedback on the quality or availability of the data needed to calculate the indicators. The information provided is used in subsequent consultations with the entities with the reporting obligation as a starting point for discussion and further optimisation of the reporting process. The KPIs have zero impact on the eligible costs of the entities with the reporting obligation in the 2023 regulatory period, whereas in the 2024–2028 regulatory period, the impact is limited to incentives, with no penalties given.

In addition to the aforementioned KPI-based regulation of smart grid investment performance, which is implemented at the system level and is not directly associated with a specific project, the Agency has also maintained dedicated incentives for smart grid investment projects and an incentive scheme for research and innovation projects. The schemes have remained unchanged since the previous regulatory period and were presented in detail in the Report on the State of the Energy Sector in Slovenia in 2020. Smart grid projects are subject to appropriate constraints to avoid the potential for multiple financial incentives to deliver the same benefits.

8 Update of the national smart grid roadmap, study No: 2444, EIMV, FE, FERI, Ljubljana, November 2020

On its website, the Energy Agency publishes research and innovation project applications and the basic information about the investment projects, as well as reports on all the projects it has qualified under its regulatory methodology. In addition to that, it also supervises the qualified projects.

The start of the PCI project GreenSwitch with a total value of EUR 146.2 million

Smart Grid Investments

In 2023, the Agency received no applications for new smart grid investment projects; the SINCRO. GRID project concluded and the NEDO project is in the final phase. The year did mark the start of the third major investment project, GreenSwitch[9], one of the Projects of Common Interest (PCI) in the area of smart grids, which is expected to run until 2028. The total value of the project is EUR 146.2 million, with EUR 73.1 million co-financed by the EU. The project is coordinated by ELES and involves six partners from Austria, Croatia and Slovenia: KNG-Kärnten Netz GmbH, HOPS, HEP Operator distribucijskog sustava d.o.o., Elektro Celje, Elektro Gorenjska and Elektro Ljubljana. The investments of the Slovenian members in the GreenSwitch partnership are focused on the following segments:

1. Increasing the operational efficiency and controllability of the transmission system, which includes: a) installation of new power flow control devices (SSSCs and PSTs); b) installation of High-Temperature Low-Sag conductors (HTLS); c) upgrading the system for the assessment of transmission capacity that accounts for atmospheric conditions and the load on the electricity system (DTR); and d) integration of the new components into the Supervisory Control and Data Acquisition/Energy Management System (SCADA/EMS).
2. Sector-coupling integration, which includes the establishment of: a) high-voltage grid connections for heavy-duty and fast charging stations, and b) a system for extracting waste heat from high-voltage transformers.
3. Increasing distribution grid efficiency, security of supply and cross-border transmission capacity, including: a) automation and upgrade of substations; b) upgrade of the Advanced Distribution Management System (ADMS); c) upgrade of the communication infrastructure; d) implementing loops into the medium-voltage network and e) upgrade of the emergency cross-border distribution connection.

Due to the mechanism for accounting for deviations from the regulatory framework, the investment realisation data for 2023 is not available. All of the values below therefore pertain to 2022. Figure 44 shows the structure of ELES' investment realisation per individual smart grid functionality. The total value of ELES' investments in smart grids amounted to approximately EUR 16.15 million, making up 20.3% of the company's total realised investments in that year. 64.1% of this is due to the finalisation of the acquisition of Japanese equipment from the NEDO project, which is intended to optimise the consumers' use of electricity.

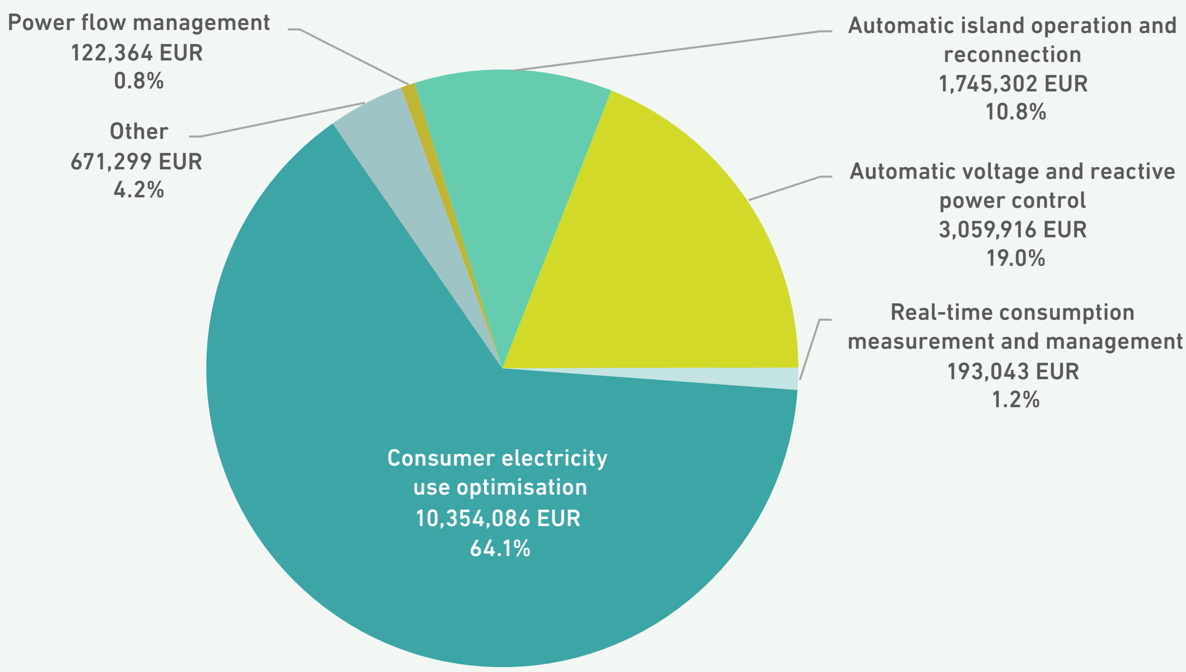
The total value of the distribution companies' investments in smart grids[10] amounted to approximately EUR 0.24 million, making up 0.20% of the total investments in distribution and consisting solely of Elektro Ljubljana's investment in big-data management.

A total of EUR 16.4 million in smart grid investments in 2022, with an insignificant share of investment by distribution companies

9 https://www.greenswitchproject.eu/

10 In 2022, Elektro Ljubljana was the only distribution company to invest in smart grids.

FIGURE 44: STRUCTURE[11] OF ELES' INVESTMENTS IN 2022 BY SMART GRID FUNCTION



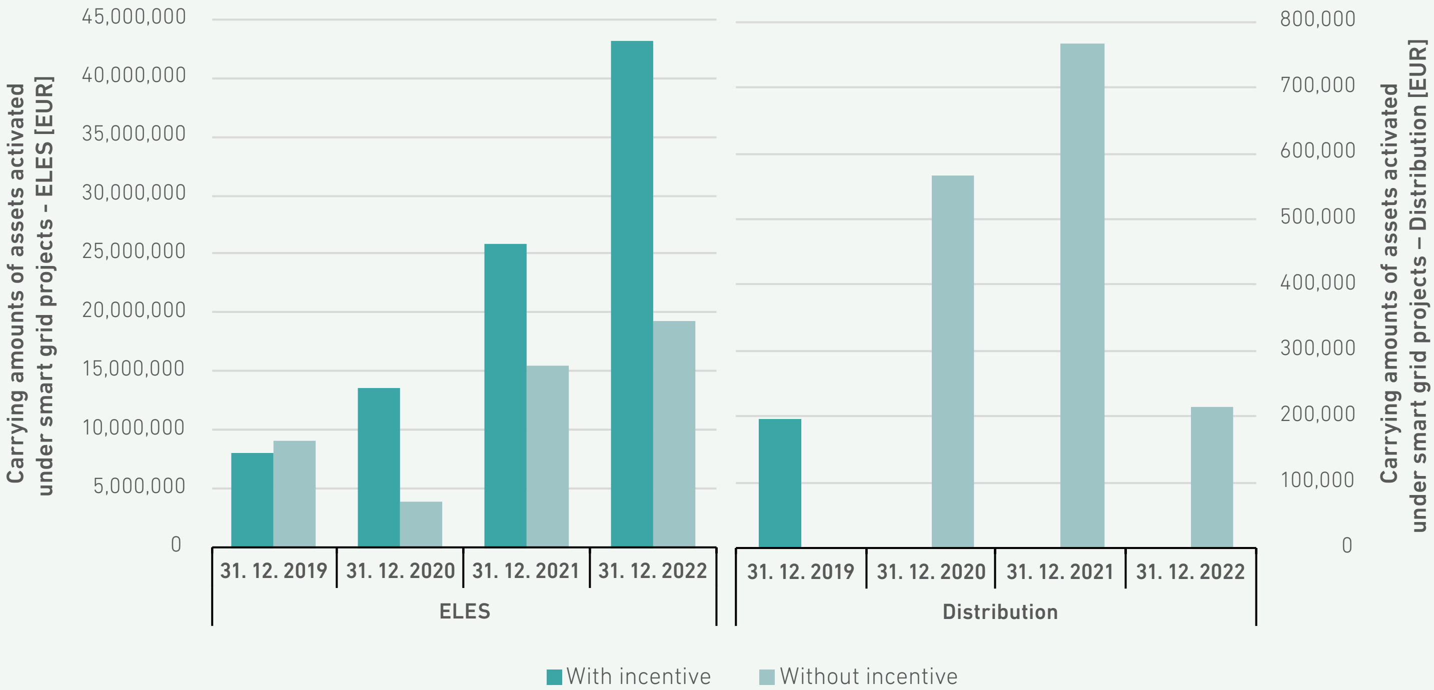
SOURCE: ENERGY AGENCY

The smart grid investment incentive scheme projects are qualified for implementation on the basis of a project application submitted to the Energy Agency. Incentives are granted on the basis of the qualification of the project and an assessment of the associated activated assets, which must meet the definition of smart grids and smart energy infrastructure as set out in the general act governing the methodology for determining the regulatory framework. The Energy Agency grants incentives on the basis of an assessment of the assets actually activated under the qualified smart grid project as reported by those with the reporting obligation in the annual process of identifying deviations from the regulatory framework. Figure 45 shows a comparison of the carrying amounts of assets activated under smart grid projects that were granted an incentive and the carrying amounts of smart grid assets for which the regulated companies do not receive incentives[12] or for which the regulated companies have not applied for project qualification under the smart grid investment incentive scheme. Over the period under observation, the data shows an increase in the value of activated smart grid assets at ELES. At the distribution level, SODO received an investment incentive in 2019, whereas Elektro Ljubljana did not apply for an incentive for investments in 2020 and 2022. The rest of the EDCs did not invest in smart grids, despite the revised strategy for smart grid development[13].

At the distribution level, there still aren't enough investments into smart grids – inconsistency with the development strategy

11 The difference between the total and the sums of the individual shares is due to rounding.
12 While companies internally classify these projects as smart grid projects, they do not meet the Agency's formal criteria.
13 Update of the national smart grid roadmap, study No: 2444, EIMV, UL-FE, UM-FERI, Ljubljana, November 2020

FIGURE 45: OVERVIEW OF THE CARRYING AMOUNT OF ACTIVATED SMART GRID ASSETS



SOURCE: ENERGY AGENCY

Data shows the continued general passivity of the distribution companies with respect to smart grid investments, which fall short of the projections in the smart grid strategy set out and, as a consequence, may hinder the development of the grid needed to achieve the green transition objectives. Likewise, the Agency observes no apparent transitions of project results, in cases where they have proven to be efficient and useful, beyond the scope of the research and innovation schemes, which are generally limited in scope to a specific part of the network, to more ambitious investment projects.

The aforementioned investments by SODO in 2019 are linked to the implementation of the ELES-led SINCRO.GRID project. Similarly, four[14] of the EDCs are involved, as infrastructure owners, in the implementation of the NEDO project, likewise led by ELES. At the end of the project, part of the NEDO project assets are expected to be transferred from ELES to the EDCs, as some of the assets currently held by ELES are essentially intended for use in distribution. As mentioned above, the three[15] EDCs are also planning to increase their smart grid investments under the GreenSwitch project.

14 Elektro Celje, Elektro Ljubljana, Elektro Maribor, Elektro Primorska
15 Elektro Celje, Elektro Gorenjska, Elektro Ljubljana

Projects Included in the Research and Innovations Scheme

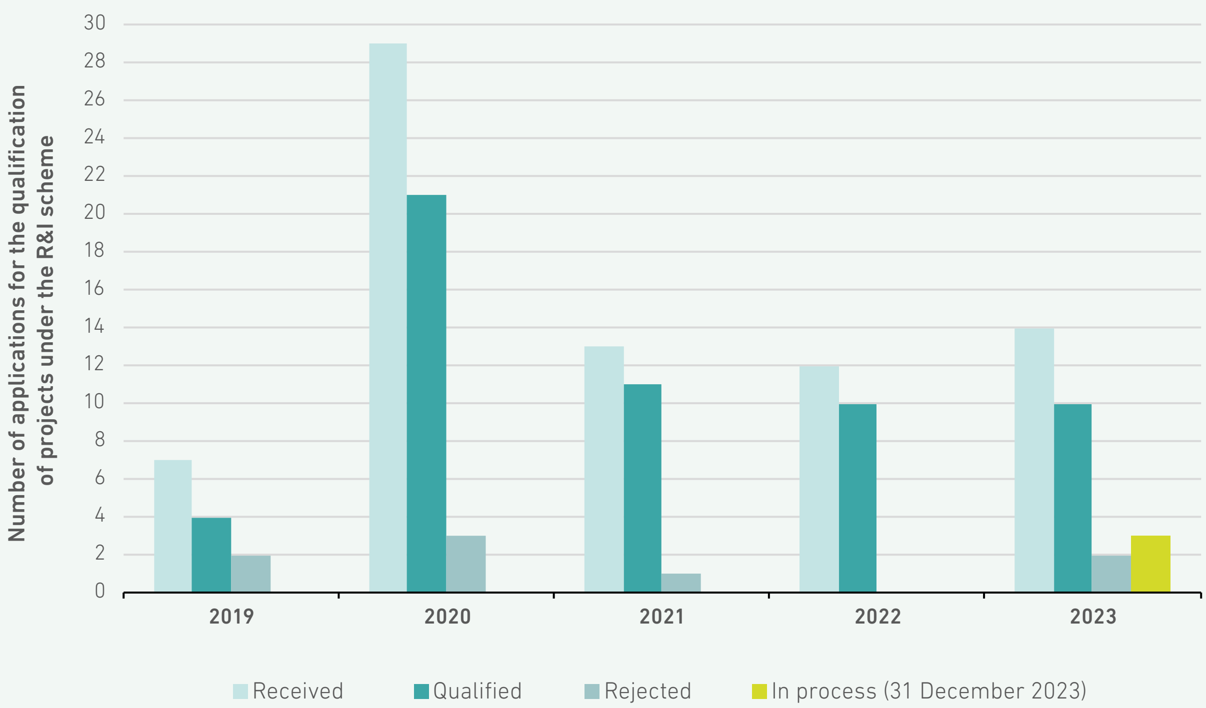
For the 2023/2024–28 regulatory periods, The Agency updated the process of project qualification[16] into the research and innovation scheme (R&I scheme). There were no substantive changes to the R&I scheme. In the updated process, the application consists of two parts. The first part, the so-called »basic application«, is now much shorter than the single application used previously. The basic application is intended as a basic check to verify that the proposed project is in line with the purpose and objectives of the R&I scheme. If the Agency, upon reviewing the basic application, finds that the project is not compliant, it will not invite the applicant to submit an extended application and will instead reject the project at this stage. Otherwise, the Agency will invite the applicant in writing to submit the second part of the application (the extended application), roughly equivalent in scope to the single application used previously, no later than 30 days after receipt of the complete basic application. The Agency will either notify the applicant of the qualification of the project or reject the project no later than 45 days after receipt of the complete extended application. The first year of use of the updated qualification procedure shows that the procedural update was beneficial – the content of the applications is typically more focused and the Agency's processing can consequently be carried out more quickly.

Updating the project qualification process for the R&I scheme

In 2023, the Agency received 14 applications for the qualification of projects for the research and innovation scheme (R&I scheme). 10 projects qualified[17] and 10 were finished. By the end of 2023, three projects remained in the process of qualification. Figure 46 shows the number of applications for the qualification of projects under the R&I scheme by individual year.

10 projects newly qualified for the R&I scheme

FIGURE 46: OVERVIEW OF THE NUMBER OF APPLICATIONS FOR THE QUALIFICATION OF PROJECTS UNDER THE RESEARCH AND INNOVATION INCENTIVE SCHEME

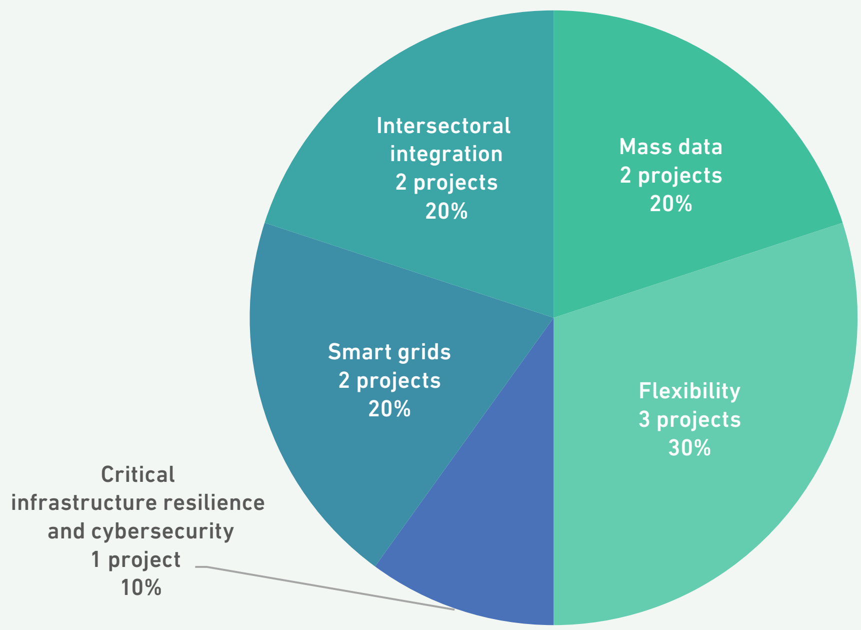


SOURCE: ENERGY AGENCY

16 https://www.agen-rs.si/documents/10926/102421/Diagram-poteka---raziskave-in-inovacije-V2.pdf/f225c148-327d-4bb4-989a-cb84102e979c
17 Some of the applications were submitted in 2021.

Figure 47 features an overview of the central subjects of all the projects qualified in 2023. The structure of the subjects is similar to the previous period, with a noticeable increase in projects addressing intersectoral integration. The shares of projects addressing smart grids, flexibility and the use of mass data for the benefit of the electricity system remain high.

FIGURE 47: STRUCTURE OF THE MAIN TOPICS OF QUALIFIED PROJECTS UNDER THE RESEARCH AND INNOVATION INCENTIVE SCHEME IN 2023



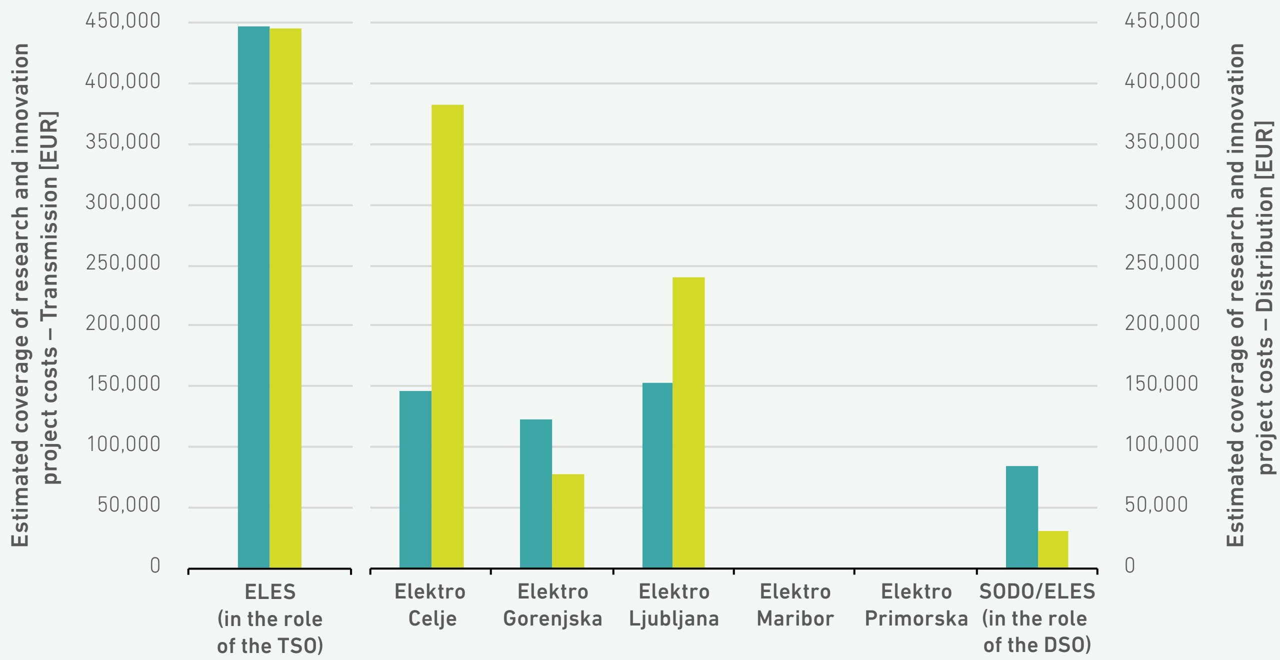
SOURCE: ENERGY AGENCY

In the 2023 regulatory period, the electricity system operators and the EDC developed new projects, as well as continued to implement those in progress, with approximately EUR 0.96 million covered by the R&I scheme and EUR 1.17 million from other sources (Horizon Europe, Slovenian Research and Innovation Agency, etc.). Compared to the previous regulatory period, 2022, the 2023 regulatory period continues to show a fairly balanced proportion of coverage from the R&I scheme with coverage from other sources, reflecting how well-established the R&I scheme has become with the regulated firms. Figure 48 shows the estimated[18] costs of the projects covered by the R&I scheme and other sources by company for 2023. Compared to the 2022 regulatory period, a rebalancing of the cost coverage from the R&I scheme and other sources is evident at ELES in the role of the TSO; meanwhile, an increase in cost coverage from other sources can be seen for Elektro Celje and Elektro Ljubljana, whereas coverage from the R&I scheme continues to predominate at Elektro Gorenjska and SODO, or ELES in its role as a DSO. Elektro Maribor and Elektro Primorska did not carry out project activities under the R&I scheme.

EUR 0.96 million for qualified projects under the R&I scheme

18 If the duration of a project exceeds the regulatory period, the costs of the project are distributed between the regulatory period in question and the remaining duration of the project assuming an even distribution of costs over time for the duration of the project.

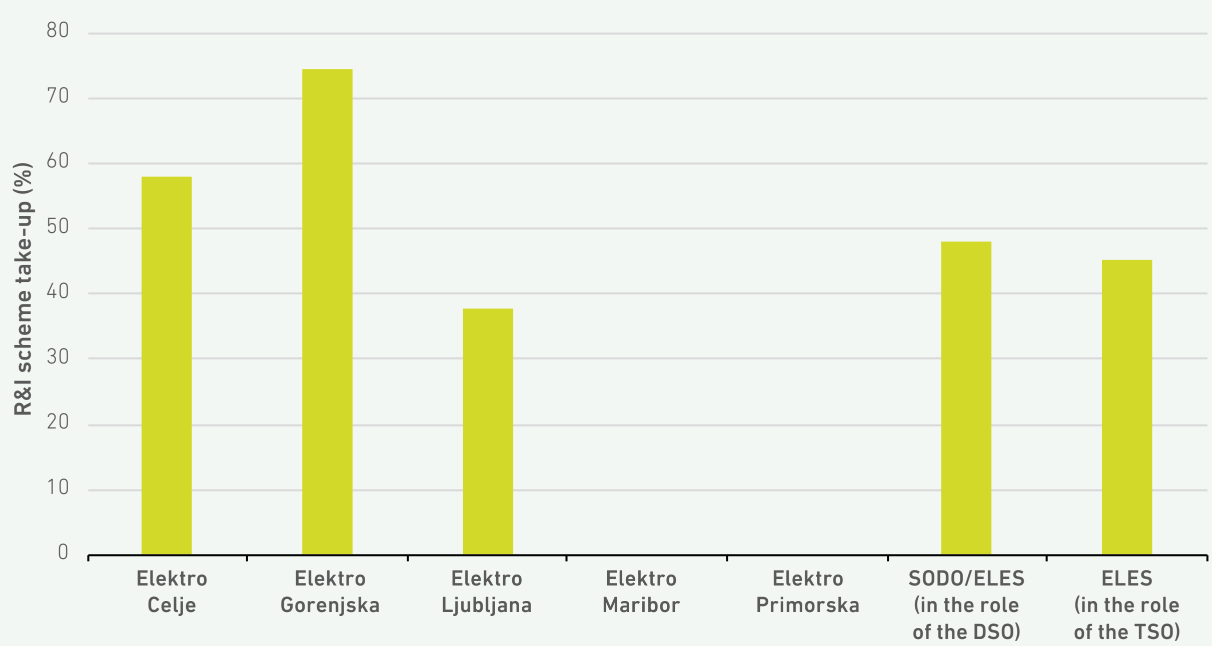
FIGURE 48: COST COVERAGE FOR QUALIFIED PROJECTS UNDER THE RESEARCH AND INNOVATION INCENTIVE SCHEME BY COMPANY (ESTIMATE FOR THE 2023 PERIOD)



SOURCE: ENERGY AGENCY

The costs earmarked for research and innovation for a given company are capped at 0.5% of the recognised sources for covering the company's eligible costs. This also makes it possible to assess the uptake[19] of the R&I scheme with qualified projects on a company-by-company basis against the planned values under the regulatory framework, as shown in Figure 49. The assessment shows that none of the regulated companies exceeded the cost cap in the 2023 regulatory period.

FIGURE 49: TAKE-UP OF THE R&I SCHEME BY COMPANY AS A PERCENTAGE OF THE PLANNED VALUES UNDER THE REGULATORY FRAMEWORK (ESTIMATE FOR 2023)



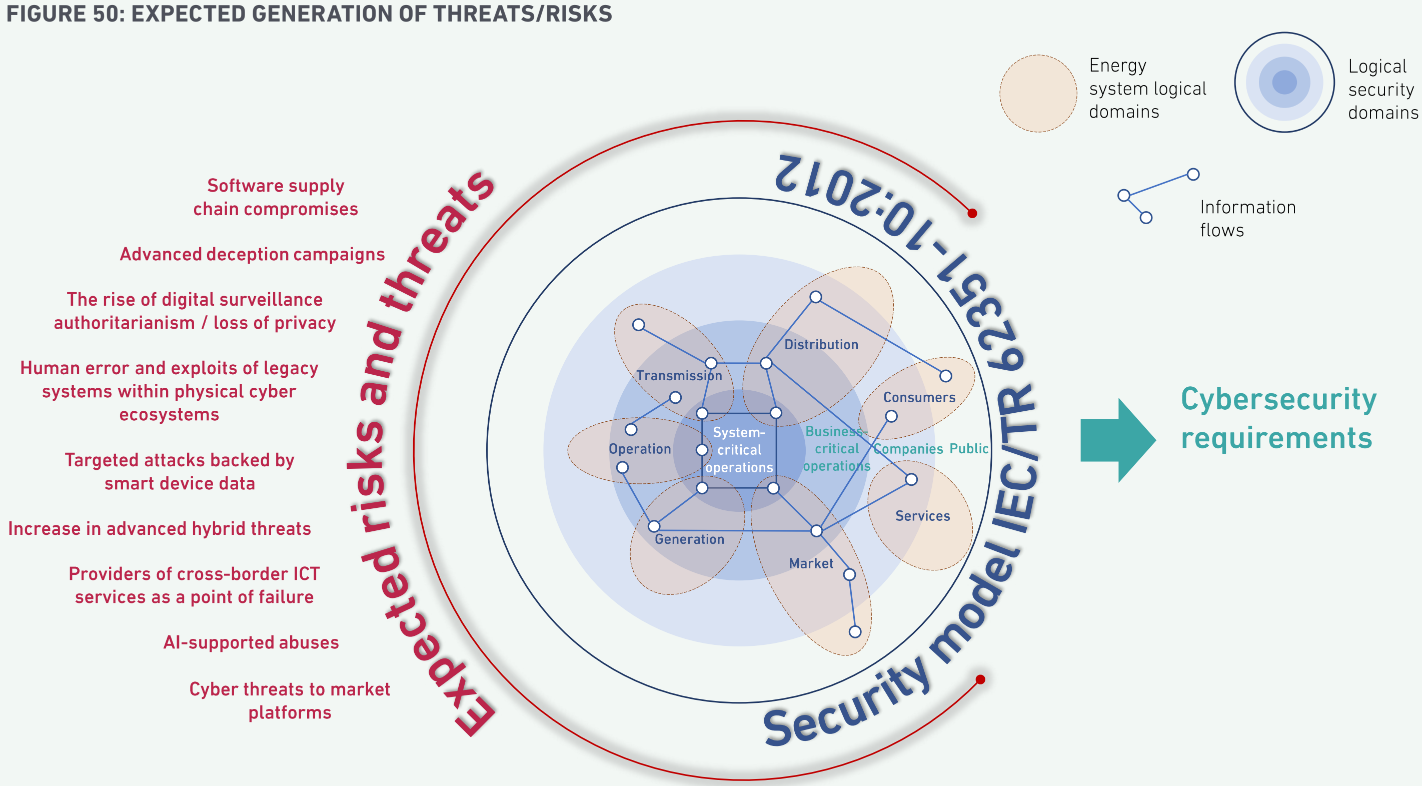
SOURCE: ENERGY AGENCY

19 The mechanism for accounting for deviations from the regulatory framework prevents an assessment of the actual realisation.

Cybersecurity of the Power System

At a time when the electricity sector is undergoing significant evolution marked by continuous innovation, the sector faces unprecedented challenges, as well as incredible opportunities. The increasing electrification and digitisation, key drivers of modern development, are leading to major changes in the way electricity is generated, distributed and consumed. At the same time, these indispensable innovations can expand the landscape of risks and threats that require sophisticated analysis, careful consideration and proactive action. Electrification, especially in the transport, heating and industrial sectors, is considered a key component of the global decarbonisation efforts. While accelerated electrification can make a significant contribution to reducing greenhouse gas emissions, it also brings with it complex challenges for the electricity sector. These include the need to increase and optimise the generation and transmission capacity, as well as system services, integrate renewable energy sources and ensure security and the security of supply. Digitisation offers promising opportunities for improving the efficiency, reliability and flexibility of electricity systems. The introduction of advanced technologies, such as smart grids, artificial intelligence and the Internet of Things, (IoT) signals revolutionary changes in the way electricity systems are managed and optimised, but also brings increased exposure to cyberattacks and a need for robust security measures to protect critical/essential/important infrastructure. In the context of increasing electrification and the associated digitisation, the electricity sector faces an expansion of the risk and threat landscape. This is also underlined by the recent ENISA[20] report »Identifying Emerging Cyber Security Threats and Challenges for 2030«, which highlights the potential expansion of the sector's vulnerability to advanced cyberattacks, with risks including the exploitation of the complexity of digitised and interconnected energy systems and the likelihood of cascading effects (Figure 50).

FIGURE 50: EXPECTED GENERATION OF THREATS/RISKS



SOURCES: THE AGENCY, ENISA, SGTF EG2[21]

20 https://www.enisa.europa.eu/publications/enisa-foresight-cybersecurity-threats-for-2030

21 EU-Smart-Grid-TF-Final-draft-report-published-Recomendations-to-the-EC-for-the-implementation-of-an-EU-Cybersecurity-Network-Code.pdf (beama.org.uk)

Similar warnings have been issued by the WEC[22], WEF[23], IEA[24], NREL[25] and CISA[26]. Special emphasis is given to the need for a comprehensive approach to the safety and reliability of electricity systems, including increasing resilience to natural disasters and ensuring cyber security. At the same time, the European Commission is in the final stages of adopting the Network Code on Cybersecurity, which provides important legislative levers to improve the security of electricity networks in Europe. While this Code is designed to strengthen resilience to cyberattacks and ensure the reliable operation of electricity systems, it also brings challenges, key among which will be ensuring compliance with the network rule requirements, adapting existing elements of infrastructure to new standards, and maintaining and updating security measures in a rapidly changing cyber risk/threat environment. In light of these challenges, it is clear that successfully navigating the coming changes will require a comprehensive strategy combining technological innovation, regulatory adaptation and international cooperation. Taking proactive measures to address these threats/risks will not only improve the security and reliability of electricity systems, but also enable us to seize the opportunities that electrification and digitisation bring for the transition to a sustainable and low-carbon future.

Regulatory Aspects – Important Activities

The strategic normative framework for ensuring the information security of the energy system is based on the EU's Cybersecurity Strategy for the Digital Decade, the EU Action Plan on Digitalising the Energy Sector, Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (NIS), Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive) and in 2024 also on network rules for cyber security in the EU energy sector (CSNC[27]), which are in the final stage of validation with the European Commission.

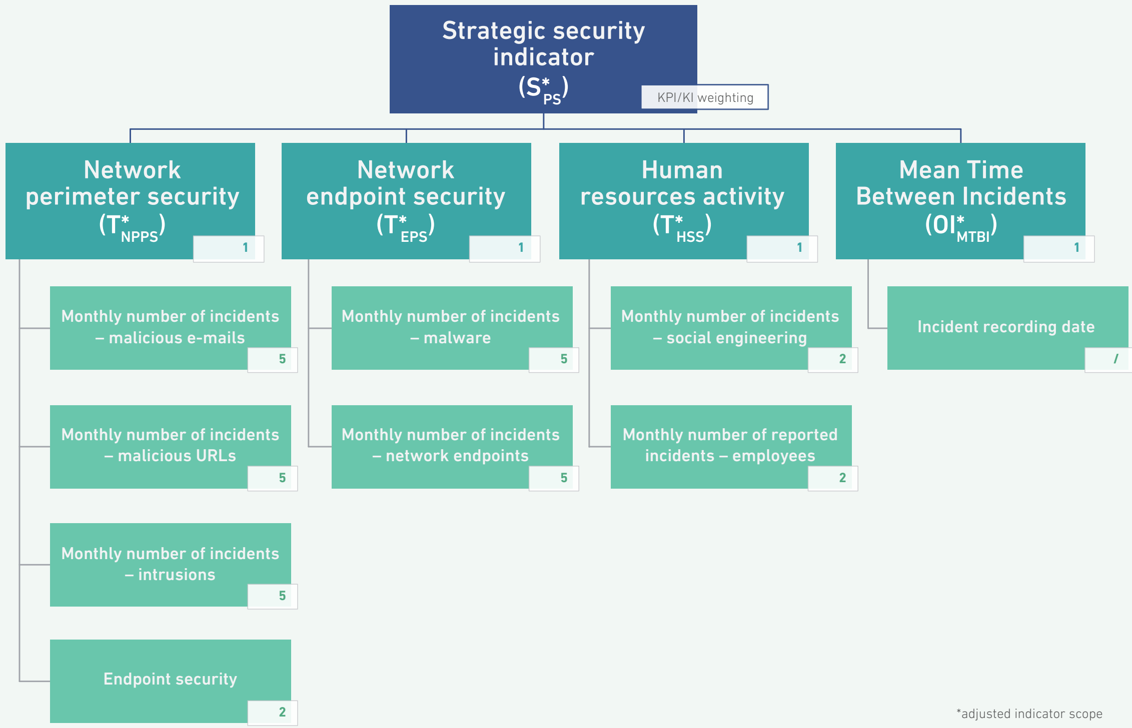
Test sampling of cyber threat preparedness indicators

In 2023, activities covering the legislative aspects of cybersecurity in the energy sector and specific regulatory aspects within the scope of national regulators continued. Part of the Energy Agency's responsibilities is to monitor investments in cybersecurity, including activities performed by public service companies in the area of information security and data protection, and the associated development activities. In addition, as part of the regular monitoring and reporting on the state of cybersecurity, the Agency carried out a test sampling of key indicators of cyber risk/threat preparedness. In defining the indicators and their scope, the Agency followed an adapted methodology of the Electric Power Research Institute[28] – EPRI. The test sampling encompassed the indicative tactical and operational indicators needed to calculate the strategic indicators (Figure 51). In the test sampling, the Agency focused on the key strategic security indicator (S^*_{PS}), calculating it based on a limited set of the most heavily weighted related indicators: the tactical indicator of network edge or network perimeter security (T^*_{NPPS}), the tactical indicator of network endpoint security (T^*_{EPS}), the tactical indicator of human resources activity (T^*_{HSS}) and the operational indicator of the mean time between incidents (OI^*_{MTBI}), along with their subordinate indicators.

As part of the cyclical process, the Energy Agency also raises awareness among the regulated companies and monitors their activities in the area of cybersecurity and discusses topical issues at the Slovenian Energy Security Forum (SEVF).

22 https://www.worldenergy.org/
23 https://www.weforum.org/
24 https://www.iea.org/
25 https://www.nrel.gov/
26 https://www.cisa.gov/
27 Cybersecurity Network Code
28 https://www.epri.com/

FIGURE 51: A SELECTION OF INDICATORS FOR EVALUATING CYBER THREAT PREPAREDNESS



SOURCES: ENERGY AGENCY, EPRI

The Energy Agency, as part of the CEER Cybersecurity Work Stream (CEER CS WS), participated in the process of monitoring/amending the draft network rules on cybersecurity in the energy sector and in the preparation of the annual report on cybersecurity activities in the energy sector. Within ACER's REMIT Information Security Implementation Group (ACER RISIG), the Agency presented its internal risk assessment methodology and self-assessment of identified risks as part of the cyclical triennial review, thus renewing the conditions for the exchange of REMIT data. Within the RISIG, it also participated in the assessments of regulators in the process of enabling/extending access to the REMIT data exchange. It was also involved in other instances of the substantive coordination of REMIT data exchange between national regulators and external authorised stakeholders.

Operational Aspects – Important Activities

Public Service Companies

The SEVF continued its expert dialogue in the area of information/cyber security and data protection with the state authorities, European and other institutions (SI-CERT, URSIV, ACER and CEER) and with the public service companies in the energy sector also proactively through the concrete test sampling of selected key indicators of cyber security risk preparedness. The Energy Agency informed SEVF participants about the current activities of the EC in the field of cybersecurity in the EU energy sector and the activities of the CEER CS WS. Relevant security threat alerts published by the national and European cyber security response centres SI-CERT, US-CERT and CERT-EU, as well as by the other sectoral response centres for information technology, ICS-CERT and MS-ISAC, are promptly forwarded by the Energy Agency to the stakeholders. The Energy Agency also occasionally informs stakeholders about notifications from the cybersecurity group of the Hungarian regulator, E-ISAC.

Additional measures were taken by public service companies, primarily in the area of business data processing (IT), which accounted for 54% of the activities carried out, and operational technology (OT), responsible for 33% of the activities. Of the remaining activities, 2% were carried out in the area of measurements and 11% were in miscellaneous areas (Table 23, item Other). A summary of the scope of the most important measures/activities by stakeholder, broken down by domains and areas per ISO/IEC 27002, is provided in Table 23, while the polar chart in Figure 52 shows the normalised distribution of activities by domain.

TABLE 23: SCOPE OF PUBLIC SERVICE COMPANY ACTIVITIES IN THE FIELD OF INFORMATION/CYBER SECURITY

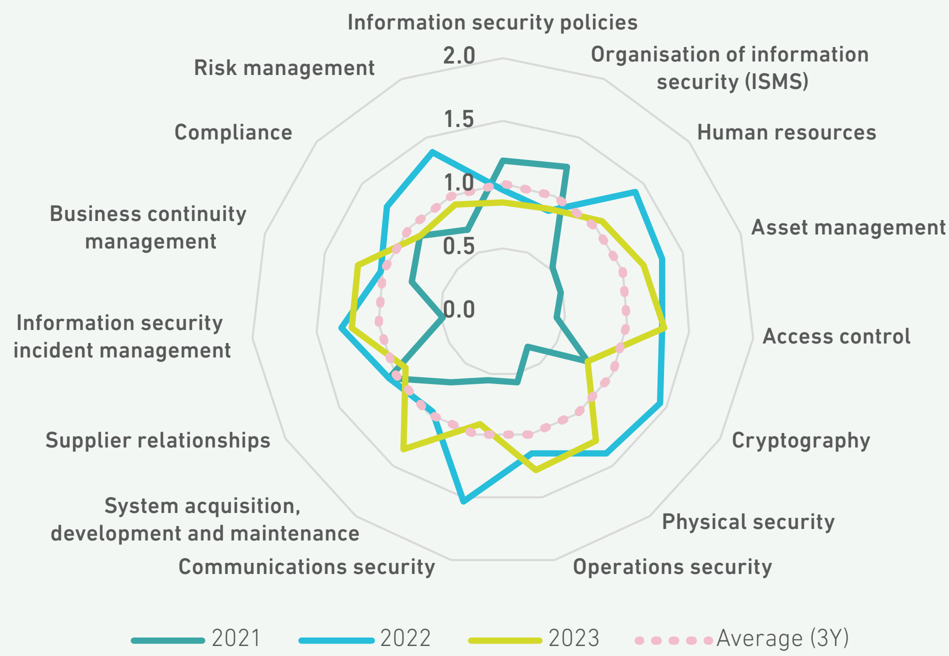
Domain	Area	ELES	EL-MB	EL-CE	EL-LJ	EL-GO	EL-PR	Gas pipelines
IT	Information security policies	✓	✓	–	–	–	–	✓
OT		–	✓	–	–	–	–	–
Measurements		–	✓	–	–	–	–	–
Other		✓	–	✓	–	–	–	✓✓
IT	Organisation of information security (ISMS)	–	✓	✓	–	–	✓	✓
OT		–	✓	–	–	✓	–	✓
Measurements		–	✓	–	–	–	–	–
Other		–	–	✓	✓	✓	–	✓
IT	Human resources	✓	–	✓	✓	✓	✓	–
OT		✓	–	–	–	✓	–	–
Measurements		–	–	–	–	–	–	–
Other		✓✓	–	✓	–	✓	–	✓
IT	Asset management	–	–	–	–	✓	–	✓✓✓
OT		–	✓	–	–	–	–	✓✓✓
Measurements		–	–	–	–	–	–	–
Other		–	–	✓	–	–	–	✓
IT	Access control	✓✓	✓✓	✓	✓✓	✓✓✓	✓✓	✓✓✓
OT		–	–	✓	✓	–	–	✓✓✓
Measurements		✓	–	–	–	–	–	–
Other		–	–	✓	–	–	–	✓✓
IT	Cryptography	–	✓	–	–	–	–	✓
OT		–	–	–	–	–	–	–
Measurements		–	–	–	–	–	–	–
Other		–	–	–	–	–	–	–
IT	Physical security	–	✓✓✓	–	✓	✓	–	✓✓✓
OT		✓	✓✓✓	–	–	–	–	✓✓
Measurements		–	✓✓✓	–	–	–	–	–
Other		–	–	–	–	–	–	✓✓✓
IT	Operations security	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓	✓✓✓
OT		✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	–	✓✓✓
Measurements		–	–	–	–	–	–	–
Other		–	–	–	–	–	–	✓✓
IT	Communica-tions security	✓✓	–	✓	✓	✓✓	–	✓✓✓
OT		✓✓	–	–	✓✓	–	–	✓✓✓
Measurements		–	–	–	–	–	–	–
Other		–	–	–	–	–	–	–
IT	System acquisition, develop. and maintenance	–	✓✓	–	✓	–	✓	✓✓
OT		–	✓✓	–	✓	✓✓✓	–	✓
Measurements		–	–	✓	✓	–	–	–
Other		–	–	–	–	–	–	–
IT	Supplier relationships	–	–	✓	✓	–	–	✓
OT		–	–	–	–	–	–	✓
Measurements		–	–	–	–	–	–	–
Other		–	–	–	–	✓	–	✓
IT	Information security incident management	–	✓✓✓	✓✓	✓✓	✓✓	✓✓	✓✓✓
OT		–	✓✓✓	✓	–	–	✓	✓✓✓
Measurements		–	–	–	–	–	–	–
Other		–	–	–	✓	–	–	✓✓
IT	Business continuity management	–	✓✓	✓	✓	✓	–	✓
OT		–	✓✓	✓	✓✓	✓	–	✓✓
Measurements		–	–	–	–	–	–	–
Other		–	–	✓	–	–	–	✓✓
IT	Compliance	✓✓	–	✓✓	–	✓✓	✓✓	✓✓✓
OT		✓	–	–	–	✓	–	✓✓
Measurements		–	–	✓	–	–	–	–
Other		✓	–	✓✓	✓	✓✓	✓	–
IT	Risk management	–	✓	✓	✓	–	–	✓
OT		✓	✓	–	–	–	–	✓
Measurements		–	–	–	–	–	–	–
Other		–	–	✓✓	–	✓✓	–	–

Key: Domain/area covered
✓ 0 ≤ x < 3
✓✓ 3 ≤ x < 6
✓✓✓ 6 ≤ x
– No additional activities

Number of additional activities (x)

SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATOR, GAS PIPELINES, EDCs

FIGURE 52: NORMALISED[29] DISTRIBUTION OF ACTIVITIES AND THE DEVIATIONS IN THE VOLUME OF ACTIVITIES BY PUBLIC SERVICE COMPANIES BY DOMAIN



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATOR, EDCs, GAS PIPELINES

FIGURE 53: THE MOST IMPORTANT SUB-AREAS OF ADDITIONAL ACTIVITIES BY PUBLIC SERVICE COMPANIES BY SUB-AREA ACCORDING TO ISO 27002

SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATOR, GAS PIPELINES, EDCs

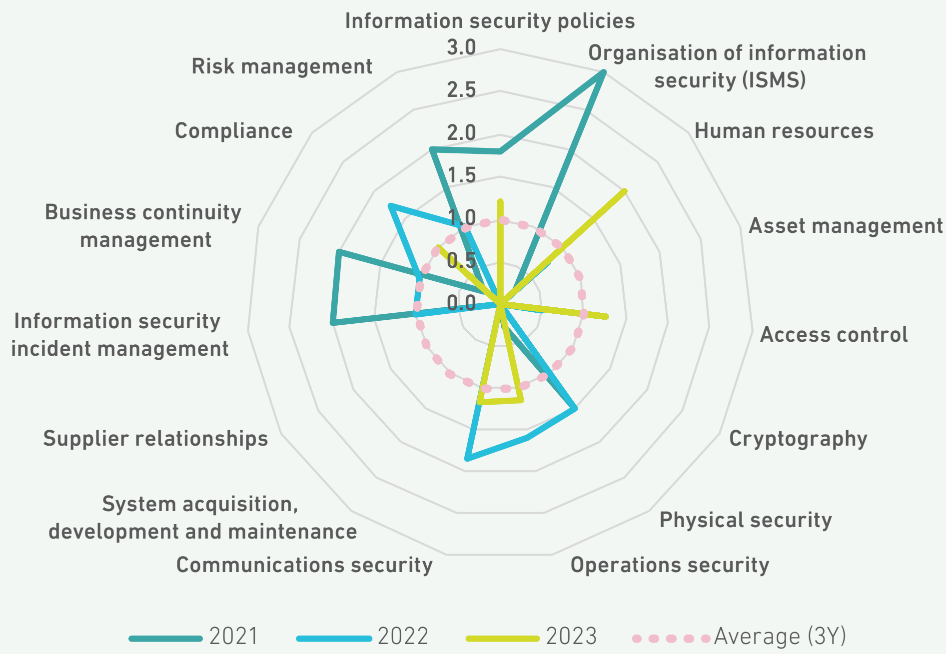
29 Agregirane aktivnosti so normirane na triletno povprečje

In the scope of additional activities by the public service companies, the most prominent sub-areas according to ISO 27002 are given in a multi-level pie chart (Figure 53). Most activities were in the areas of operational security, access control, information security incident management and communications security.

ELES

In 2023, the combined transmission and distribution system operator carried out 39 additional activities in the scope of regular activities, of which 56% were in the area of business data processing, 28% in the area of operational technology and 15% were miscellaneous activities[30]. Compared to a three-year average, the most important areas of improvement in terms of improvement in the maturity of information security controls under ISO 27002 were human resources, access control and communications security, and information security policies.

FIGURE 54: NORMALISED[31] DISTRIBUTION OF ACTIVITIES AND THE DEVIATIONS IN THE VOLUME OF ACTIVITIES BY ELES BY ISO 27002 DOMAIN



SOURCES: ENERGY AGENCY, ELECTRICITY SYSTEM OPERATOR

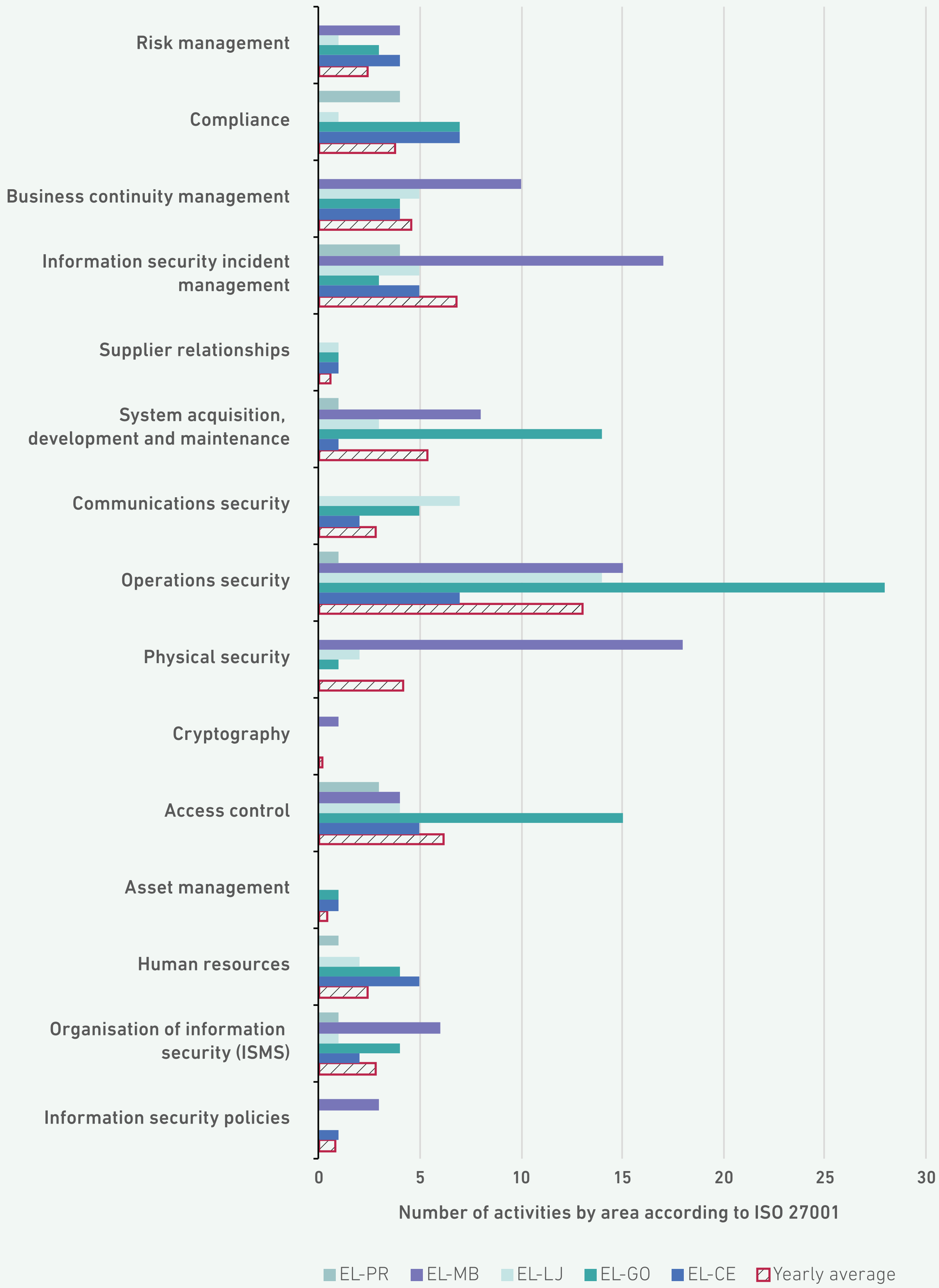
Distribution Companies

In 2023, EDCs carried out a total of 282 important activities in the area of information security, which is twice the 2022 amount. Of those activities, 55% were in the area of business data processing, 31% in the area of operational technology, 4% in the area of measurements and 10% were miscellaneous activities. The major areas of additional activities or improvement of the maturity of controls in information security in areas according to ISO 27002 are shown in Figure 55. A normalised comparison of activities by area is shown. A comparison of the aggregated volume of activity of distribution companies with annual trends is shown in Figure 56.

Compared to the previous year, most of the EDCs' activities were in the areas of operational security, incident management, access control and in the area of systems acquisition, development and maintenance. A comparison of the total activities against the three-year average with trends is given in the chart in Figure 56.

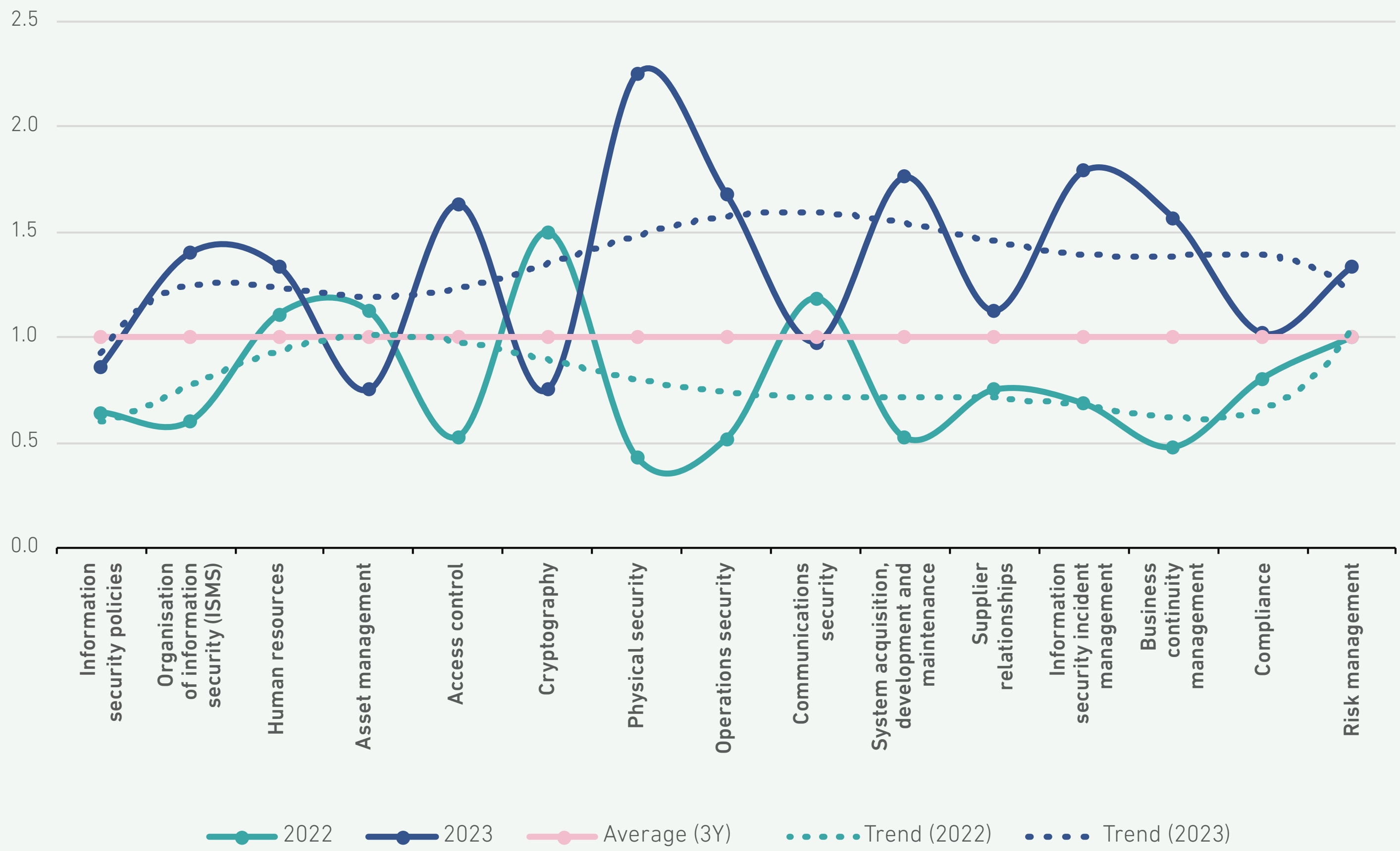
30 The difference between the total and the sums of individual shares is due to rounding to one decimal place.
31 Aggregated activities are normalised to a three-year average.

FIGURE 55: NORMALISED DISTRIBUTION OF THE VOLUMES OF ACTIVITIES BY EDCs BY AREA WITH RESPECT TO THE ANNUAL AVERAGE



SOURCES: ENERGY AGENCY, EDCs

FIGURE 56: NORMALISED[31] COMPARISON OF AGGREGATED VOLUME AND EDC ACTIVITY TRENDS

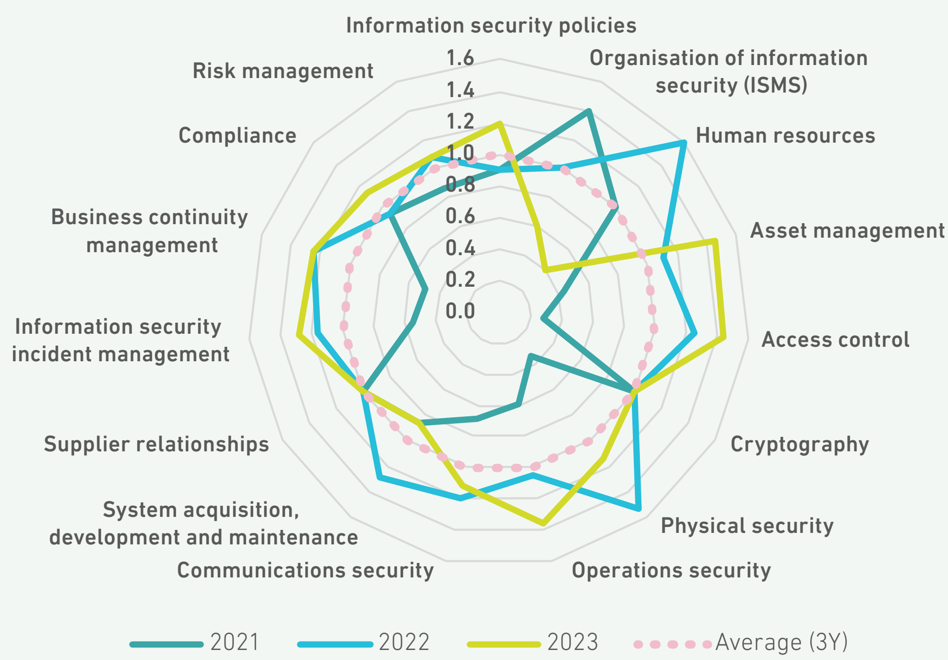


SOURCES: ENERGY AGENCY, EDCs

Plinovodi

In 2023, the volume of additional activities carried out by the natural gas transmission system operator increased. Complementing the regular activities, 262 additional activities were carried out – 52% in the area of business data processing, 36% in the area of operational technology and 12% were miscellaneous activities (e.g. personal data protection, etc.). In comparison with the three-year average, the improvement in the maturity of informational security controls in areas according to ISO 27002 was focused on asset management, the management of access to systems and applications, operational security, incident management and business continuity (Figure 57).

FIGURE 57: NORMALISED[31] COMPARISON OF THE TOTAL VOLUME AND TRENDS OF ACTIVITIES BY THE PLINOVODI COMPANY



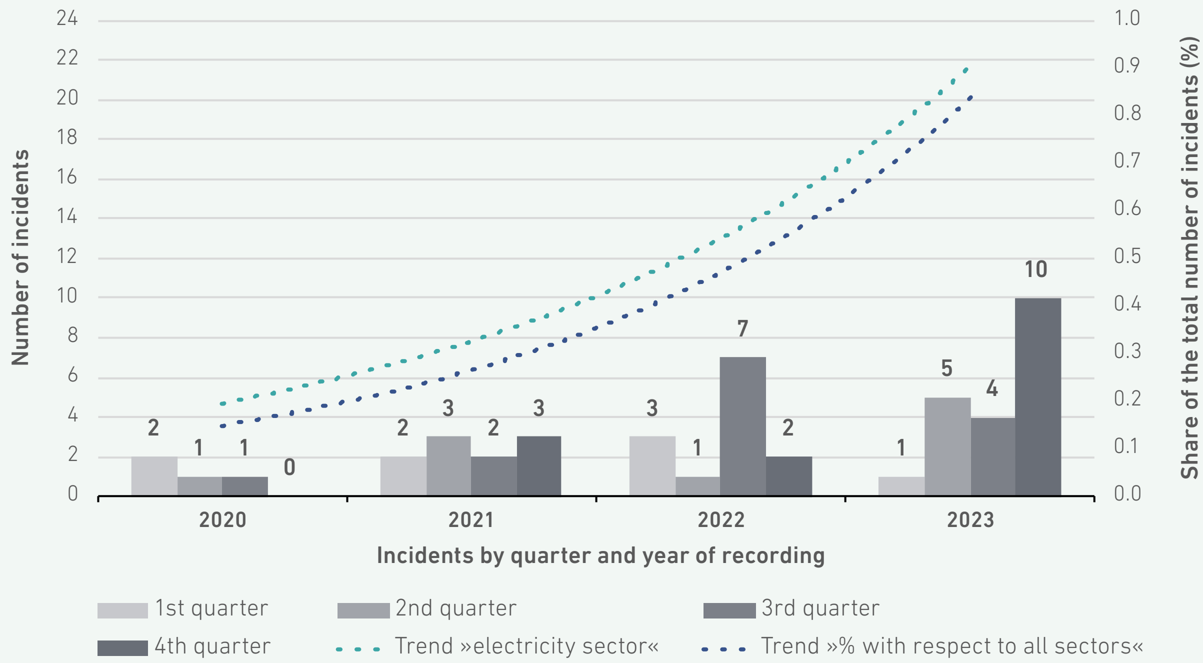
SOURCES: ENERGY AGENCY, PLINOVODI

Cyber Incidents in the Energy Sector

In 2023, both the first and the second halves of the year were marked by cyber-activities, very likely linked to the tense geopolitical situation. Compared to previous comparable periods, the number of incidents[32] was higher in the first and second halves of 2023. The increasing trend in incidents in the energy sector appears proportional to the increase in the total number of reported incidents (an aggregate of more complex technical incidents and less serious incidents) in the report by the Slovenian Computer Emergency Response Team (SI-CERT). Although there has been a slight decrease in the aggregation of incidents, the same trend is not apparent in the energy sector. The number of incidents reported to SI-CERT (excluding phishing incidents[33]) evaluated by NOKI[34] was 3,759, a decrease of approximately 10% compared to the previous year. Despite the observed cumulative decrease, the share of incidents in the energy sector (which the public service companies are a part of) has increased from 0.4% to 0.9% in the last year (Figure 58).

32 More technically complex incidents as defined by SI-CERT in the annual report for 2023.
33 phishing
34 The national cyber incident response plan

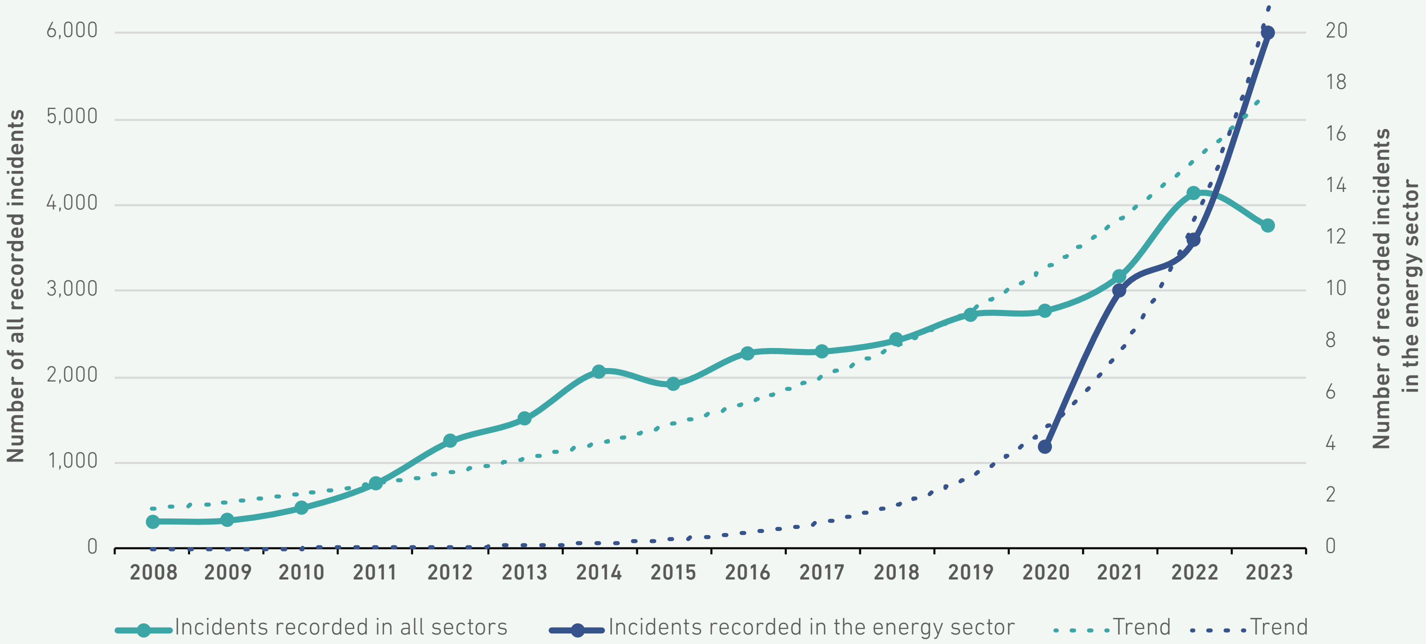
FIGURE 58: CYBER INCIDENTS IN THE ENERGY SECTOR AND THE SHORT-TERM TREND



SOURCES: THE AGENCY, URSIV, SI-CERT

Despite the small – but not at all insignificant – percentage, there are indications of a growth in the number of incidents in the energy sector. The share of incidents in the energy sector within the total number of incidents reported to SI-CERT, which is 4% in the 2023 Cybersecurity Report[35], indicates a significant correlation with the overall trend of growth in other sectors, despite the fact that the number of cumulative reported incidents has decreased in the last year (Figure 59). While the short-term trends in the growth of incidents show no significant differences, the long-term projection of the worst-case scenario suggests a different outlook.

FIGURE 59: LONG-TERM PROJECTION (EXPONENTIAL – WORST-CASE – APPROXIMATION) OF THE GROWTH OF INCIDENTS IN THE SECTOR



SOURCES: THE AGENCY, URSIV, SI-CERT

35 https://www.cert.si/letna_porocila/porocilo-o-kibernetski-varnosti-za-leto-2023/

Strategic Aspects – Challenges

Public service companies responsible for energy supply face mounting challenges in addressing the increasing cybersecurity risks. The main risks include a lack of strategic focus, a general tendency towards limiting the disclosure of institutional information, a limited pool of human resources, skills and know-how and reduced information exchange among stakeholders. Despite the focus in terms of prevention being on threat reduction, vulnerability analysis and reducing the impact of attacks, the main emphasis of the public service companies is on a flexible digital layer allowing safe operation. This entails the development of a new security concept involving the design and retrofitting/upgrading of systems to delay, absorb and re-adapt the vulnerable but indispensable digital layer.

The challenges identified as important to the decision-makers in the energy sector are as follows:

- Investments in advanced infrastructure: The use and integration of modern and adaptable technologies, such as advanced systems for the detection and prevention of attacks, strong authentication mechanisms and security solutions, as well as the use of artificial intelligence in the cybersecurity domain, increase the readiness and improve the flexibility of energy systems in facing cybernetic threats.

- Improving cooperation among sectors and institutions: effective defence against cyberattacks demands close cooperation between the energy sector, government agencies, regulatory bodies, information security experts and other institutions. Suboptimal intersectoral cooperation can impede the exchange of information about threats and sharing experiences and best practices, as well as hinder the joint efforts for increased cybersecurity.

- The need for more extensive intersectoral and interinstitutional cooperation: The goal is to establish an effective and distributed common defence against cyberattacks, which requires close cooperation and long-term planning on the part of the energy sector, the competent national authorities and agencies, regulatory bodies, information security experts and other institutions. Intersectoral cooperation is recommended as it is needed in order to foster the exchange of information about risks/threats and the sharing of experiences and best practices, as well as to promote joint efforts to strengthen, where possible, cybersecurity in a more systemic and sustainable way, through solidarity.

- The rapidly evolving cybernetic landscape: technological progress and the development of new devices and systems bring novel security challenges. The Internet of Things (IoT), smart grids and other advanced technologies can potentially present a larger attack surface that needs to be secured/defended. Real-time monitoring, adaptation and the timely introduction of security solutions in the constantly shifting cyber environment are key to ensuring cybersecurity in the energy sector.

- Awareness and competences: It is vitally important to ensure that energy sector employees have an adequate level of knowledge and awareness about cyber threats and best practices for attack prevention. Education, complemented by regular training, awareness-raising campaigns and comprehensible and in-depth cyber exercises is key to improving cyber resilience. Developing and carrying out specialised educational programmes will increase risk awareness, enable an understanding of best practices and improve the ability to respond effectively to cyberattacks.

- Strengthening cooperation among/with security experts: Dedicated investments in cybersecurity can also include the establishment of private/public partnerships with leading security experts in order to support companies in the energy sector. Cooperation with external experts enables us to improve the existing knowledge, keep up-to-date with trends and implement innovative and effective cybersecurity practices.

- Internal organisation improvements: In order to achieve greater synergy in the area of ensuring integral security (including cybersecurity) in terms of human resources and other available potentials, it is useful to improve internal organisation by effectively integrating and deploying human resources.

Network Charge for the Electricity Transmission and Distribution System

Determining the Network Charge

The Energy Agency accomplishes the economic regulation of the electricity system operators' activities using the regulated network charge method. By setting the network charge and other revenues while taking into account the network charge surplus from previous years, the Energy Agency allows the electricity system operator to cover all the eligible costs within the regulatory period, as well as the network charge deficit from previous years.

Through regulation, the Energy Agency incentivises the efficiency of electricity operators and system use, research and innovation, and investment in new or innovative technologies, ensures the operators' continuous and stable operation and maintains a stable environment for investors and owners, as well as stable and predictable conditions for the consumers in the system.

Before the start of the regulatory period, the Energy Agency uses certain criteria to determine the planned eligible costs and the planned resources to cover them. Within these parameters, the network charge and, consequently, the tariff rates for the network charge are set, taking into account the regulated network charge method.

Eligible costs are the costs necessary to perform an activity and they are determined on the basis of criteria set out in the general act governing the methodology for determining the regulatory framework. Eligible costs include operation and maintenance costs (SDV), costs of electricity losses in the system (SEEI), ancillary services costs (SS), depreciation costs (AM), research and innovation costs (RI), the regulated return on assets (RROA), quality of supply (Q) and incentives (S). Since 1 January 2023, the eligible costs have included the costs of flexibility services by the distribution operator (FSC) and performance incentives for smart grid investments (S(E)).

After the end of each year of the regulatory period, deviations from the regulatory framework, defined as the difference between the recognised eligible costs of the electricity system operator and the recognised resources available to cover the eligible costs, are determined. Deviations from the regulatory framework are reflected in a deficit or surplus of the network charge, which is taken into account when the next regulatory framework is set.

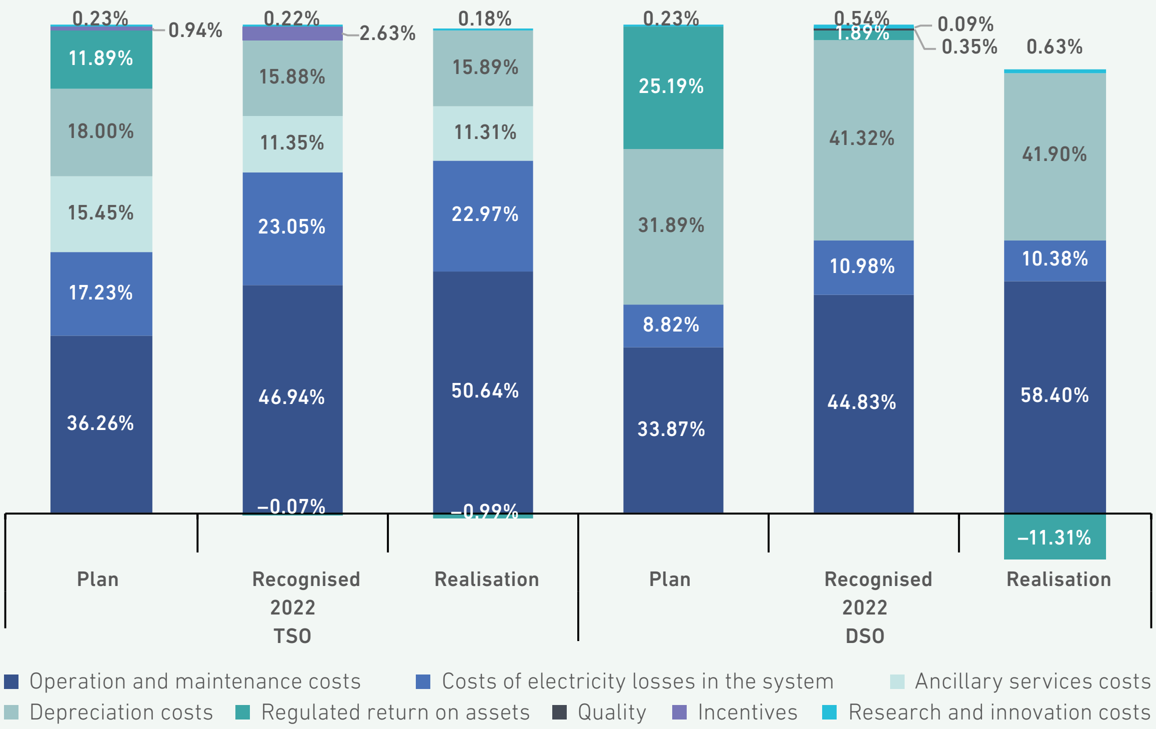
It should be noted that on 2 October 2023, SODO, which performed the activity of distribution system operator, merged with ELES, which performed the activity of transmission system operator. Since the merger, ELES has been the operator of the combined system, carrying out the activities of a transmission and distribution system operator.

2022 Regulatory Period

In 2023, the two system operators (a combined operator from 2 October 2023 onwards) converted the projected eligible costs in 2022 into the costs recognised by regulation on the basis of the criteria set out in the amendment to the Act on the Methodology for Establishing the Regulatory Framework and the Methodology for the Charging of Network Charges for System Operators, issued by the Agency in 2021. The Energy Agency verified the conversion process and issued special decisions. The Energy Agency also calculated the realised eligible costs using the accounting records of the electricity system operators and electricity distribution companies.

Figure 60 shows the structure of eligible costs for the activities of the transmission and distribution system operator, with the costs of the distribution system operator calculated as the sum of eligible costs of EDCs and the distribution system operator.

FIGURE 60: THE STRUCTURE OF THE ELIGIBLE COSTS OF THE ACTIVITIES OF THE TRANSMISSION AND DISTRIBUTION SYSTEM OPERATOR IN THE 2022 REGULATORY PERIOD



SOURCE: ENERGY AGENCY

As regards 2022, it should be pointed out that less was billed in network charges than planned as a result of the network charge exemption, since in the period from 1 February to 30 April 2022, the network charge tariff rates in the distribution and transmission system for final consumers of all consumer groups were reduced to zero on the basis of the Act Determining Emergency Measures to Mitigate the Consequences of the Impact of High Energy Commodity Prices. As a result, EUR 94 million in network charges were not billed during that period, with the network charge for the distribution system accounting for EUR 70 million and the network charge for the transmission system EUR 24 million. The network charge deficit resulting from the exemption for the distribution and transmission system was covered through a reduction in the recognised return on investments, as shown in Figure 60. As a result, the reduction in the recognised regulated return on investments was reflected in the operating results of the system operators and distribution companies. The Agency set the recognised regulated return on investments in a decision on the identified deviation for the period from 1 January to 31 December 2022. The distribution companies brought an action against this decision before the Administrative Court of the Republic of Slovenia.

Comparing the structure of the recognised and realised eligible costs (Figure 60) of the transmission system operator for the 2022 regulatory period shows that in all the years of the 2019 regulatory period, significant differences in the operation and maintenance costs and regulated return on assets are apparent. As in past regulatory periods, the share of realised operation and maintenance costs in the total realised eligible costs was higher than in the recognised eligible costs. This means that the TSO operated in a cost-inefficient way on the operation and maintenance cost side and consequently realised a regulated return lower than that recognised by the regulation.

Comparing the structure of the recognised and realised eligible costs of the distribution system operator in the 2022 regulatory period shows that the distribution operator's activity in the area of operation and maintenance costs was likewise cost-inefficient, a fact reflected in the realised regulated return, which was lower than that recognised by the regulation.

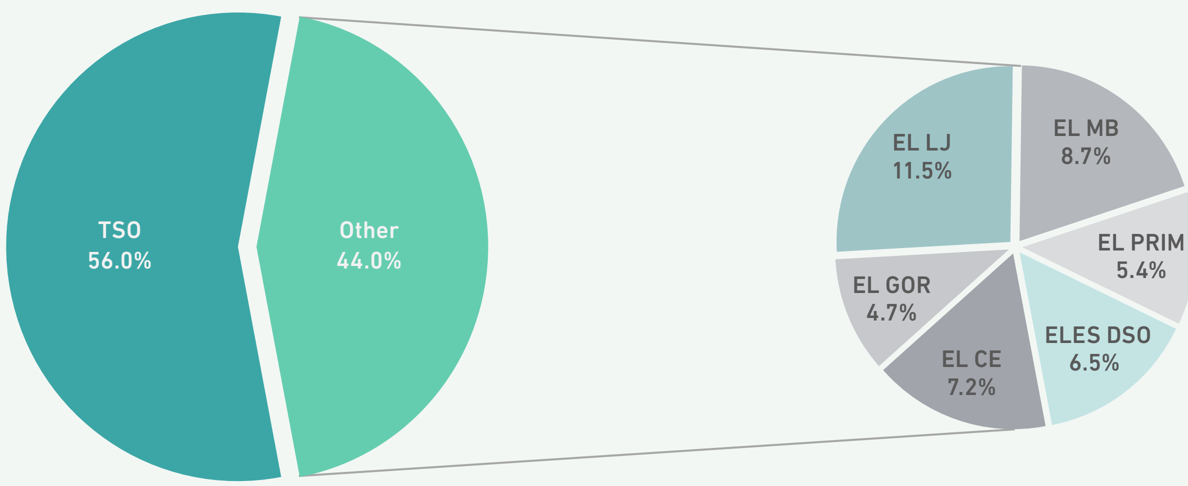
Other than by business performance, the actual regulated return on assets of the transmission and distribution system operator is affected by incentives, other revenues and the recording of network charge surpluses and deficits in the account books.

2023 and 2024–2028 Regulatory Periods

1 January 2023 marked the beginning of a one-year regulatory period that ran until 31 December 2023. In 2022, the Energy Agency set the regulatory framework for the transmission and distribution system operators for the period from 1 January 2023 to 31 December 2023 through two decisions in which it also set the network charge tariffs. The regulatory framework for the above regulatory period was set by the Agency on the basis of the Act on the Methodology for Establishing the Regulatory Framework for System Operators, issued in 2022.

For the 2023 period, the Energy Agency set the planned eligible costs for the transmission system operator at EUR 397 million, an increase of 100.5% compared to 2022, and those for the distribution system operator at EUR 312.2 million, an increase of 4.18% compared to 2022.

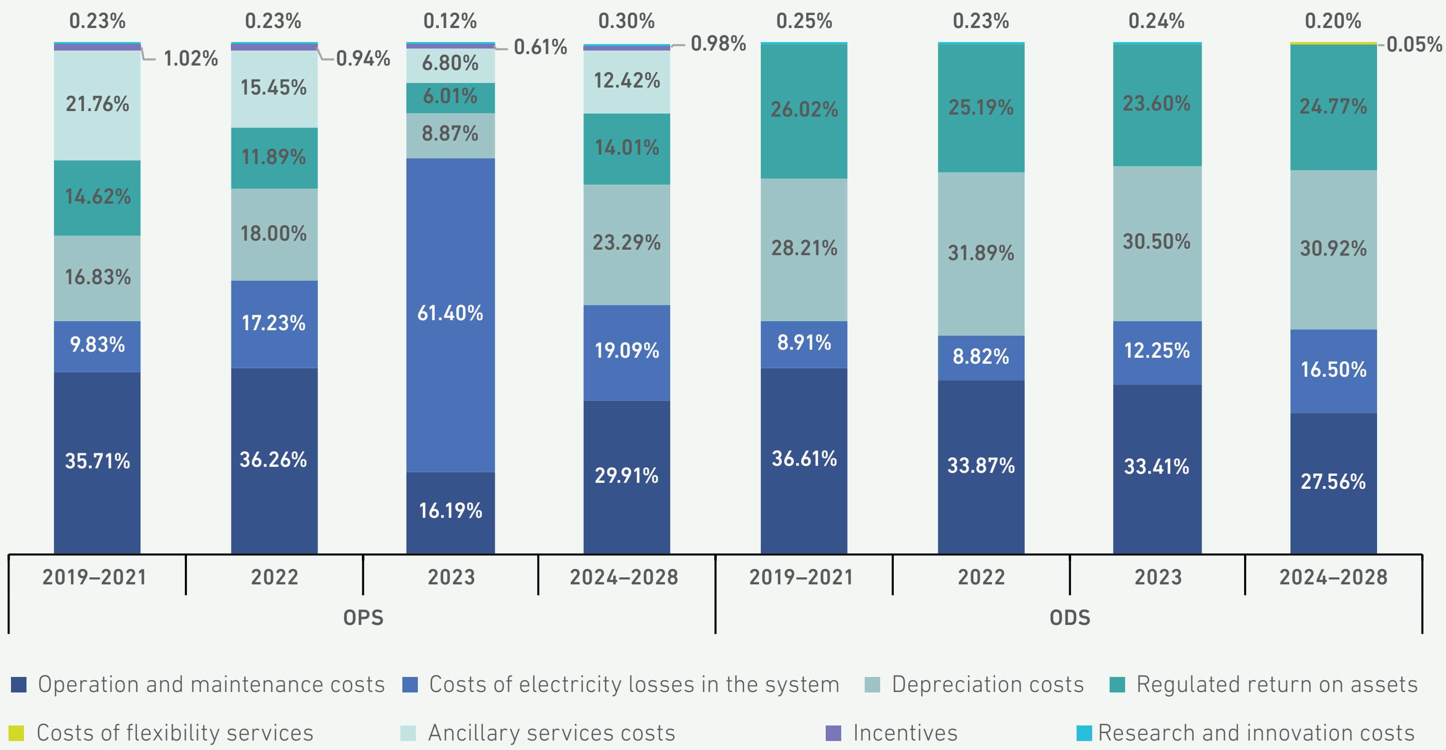
FIGURE 61: THE STRUCTURE OF THE PLANNED ELIGIBLE COSTS OF THE ACTIVITIES OF THE TRANSMISSION AND DISTRIBUTION SYSTEM OPERATOR IN THE 2023 REGULATORY PERIOD BY INDIVIDUAL COMPANY



SOURCE: ENERGY AGENCY

The structure of the planned eligible costs of the transmission system operator (Figure 62) is significantly different to the previous years as a result of the high costs of the electricity for covering system losses. The high costs of the electricity for covering system losses are a result of the high electricity costs and the coverage, in part, of these costs for the distribution system as well. While the structure of the DSO's planned eligible costs in the regulatory period from 1 January to 31 December 2023 did not change significantly compared to previous regulatory periods.

FIGURE 62: THE STRUCTURE OF THE PLANNED ELIGIBLE COSTS OF THE ACTIVITIES OF THE TRANSMISSION AND DISTRIBUTION OPERATOR FOR THE 2019–2028 PERIOD



SOURCE: ENERGY AGENCY

For 2023, EUR 96.4 million of the transmission system operator's eligible costs were planned to be covered by the network charge, EUR 131.7 million by other revenues and EUR 63.3 million by the network charge surplus from previous years. The planned deficit in the transmission system network charge will be covered from other sources in accordance with the intervention legislation. In 2023, EUR 92.6 million in network charges was billed to cover the eligible costs of the transmission system operator, or 3.9% less than the planned amount.

The plan was to cover the distribution system operator's eligible costs in 2023 by the network charge (EUR 290.6 million), with other revenues contributing EUR 15.8 million. In addition, the plan for 2023 entailed covering the EUR 5.3 million network charge deficit from the previous years. The planned deficit in the distribution system network charge will also be covered from other sources in accordance with the intervention legislation. In 2023, EUR 281.7 million in network charges was billed to cover the eligible costs of the distribution system operator, or 3.06% less than the planned amount.

Regulatory framework for the period from 1 January 2024 to 31 December 2028 and tariff rates for 2024 set in 2023

In 2023, the Energy Agency established the regulatory framework for both activities for the period from 1 January 2024 to 31 December 2028 by means of two Decisions, in which it also set the network charge tariffs for the year 2024, on the basis of the Act on the Methodology for Establishing the Regulatory Framework for System Operators, issued in 2022, based on which it had already established the regulatory framework for the regulatory period from 1 January 2023 to 31 December 2023. The transmission and distribution system network charge in 2024 remains at the level planned for 2023.

For the period from 1 January 2024 to 31 December 2028, the Agency has set eligible costs for the TSO at EUR 1,214 million and for the DSO at EUR 1,929 million.

Calculating the Network Charge

To calculate the network charge, the Energy Agency uses a non-transaction postage-stamp method, which means that the tariffs for calculating the network charge are unified for the whole territory of Slovenia within each consumer group. The electricity system operator classifies the final consumer into a consumer group according to voltage level (HV, MV or LV), type of connection (busbar or feeder), operating mode (operating hours) and type of consumption.

To cover the eligible costs of the electricity system operator that are funded from the network charge, the Energy Agency determines network charge tariffs for individual consumer groups. The tariffs are divided into:

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

Depending on the time of day, the network charge tariffs for the transmission and distribution systems are divided into:

- High daily tariffs during high tariff time (HT), charged from Monday through Friday from 06:00 to 22:00, and
- low daily tariffs (LT) during off-peak time, charged in the remaining week hours and Saturdays, Sundays and public holidays (all day), or
- single daily tariffs (ST), charged every day all day.

For both final consumers on the LV level without power metering and household consumers, the billed capacity is determined based on the nominal capacity of the device preventing the contracted load being exceeded (billing fuse) and the connection type (single-phase or three-phase connection), while for customers with a connection capacity greater than 43 kW, the billed capacity is determined on a monthly basis from the average of the three highest capacity peaks achieved during the high tariff period.

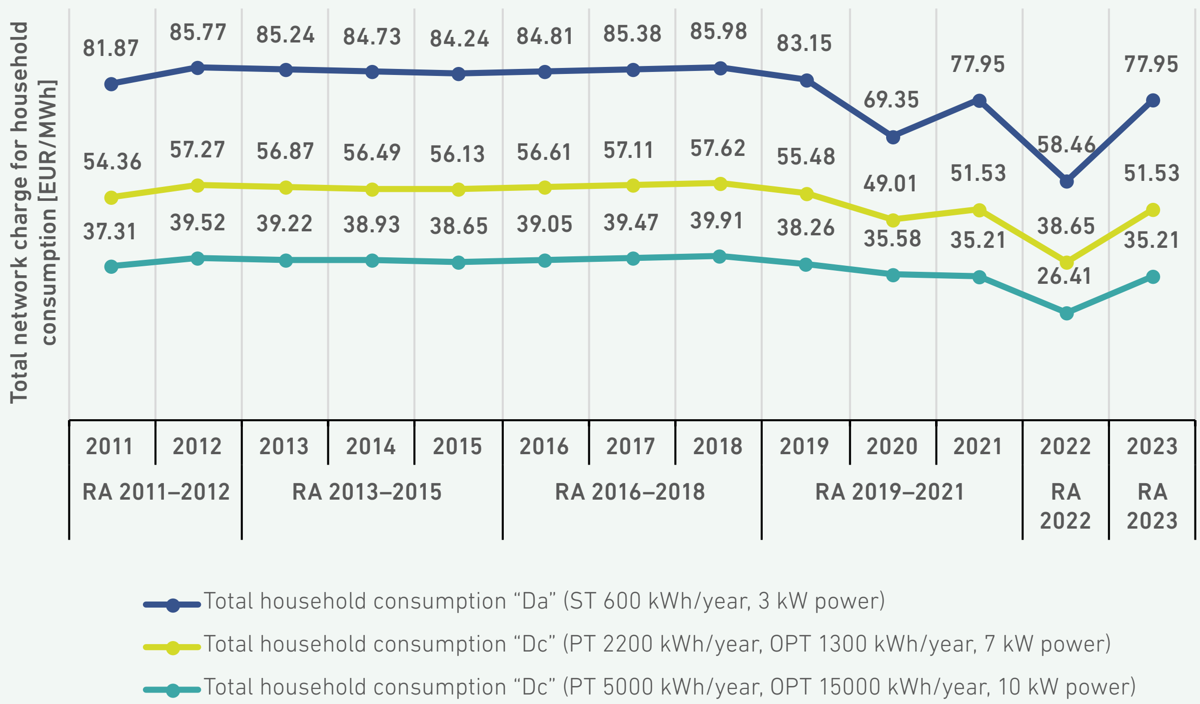
Figures 63 and 64 show the fluctuation of the total network charge for the transmission and distribution systems per year of regulatory periods for some typical household and business consumers, defined by standard consumer groups.

There was noticeable fluctuation in the network charge for household consumption in the period from 1 March to 31 May 2020, when household and small business consumers were exempt from paying the billed capacity tariff due to the Energy Agency passing the emergency measure for the mitigation of the social and economic consequences of the COVID-19 epidemic, as can be seen in Figure 63.

Another notable drop in the amount of the total network charge was observed in 2022, when the Slovenian government adopted a similar measure. For both electricity system operators, all tariffs for the billed capacity and the effective energy received for all consumer groups were reduced to zero from 1 February to 30 April 2022. As a result of that measure, there was a shortfall of EUR 70 million in billed network charges for the distribution system and EUR 24 million for the transmission system, representing a nearly 27% shortfall of planned network charges in 2022.

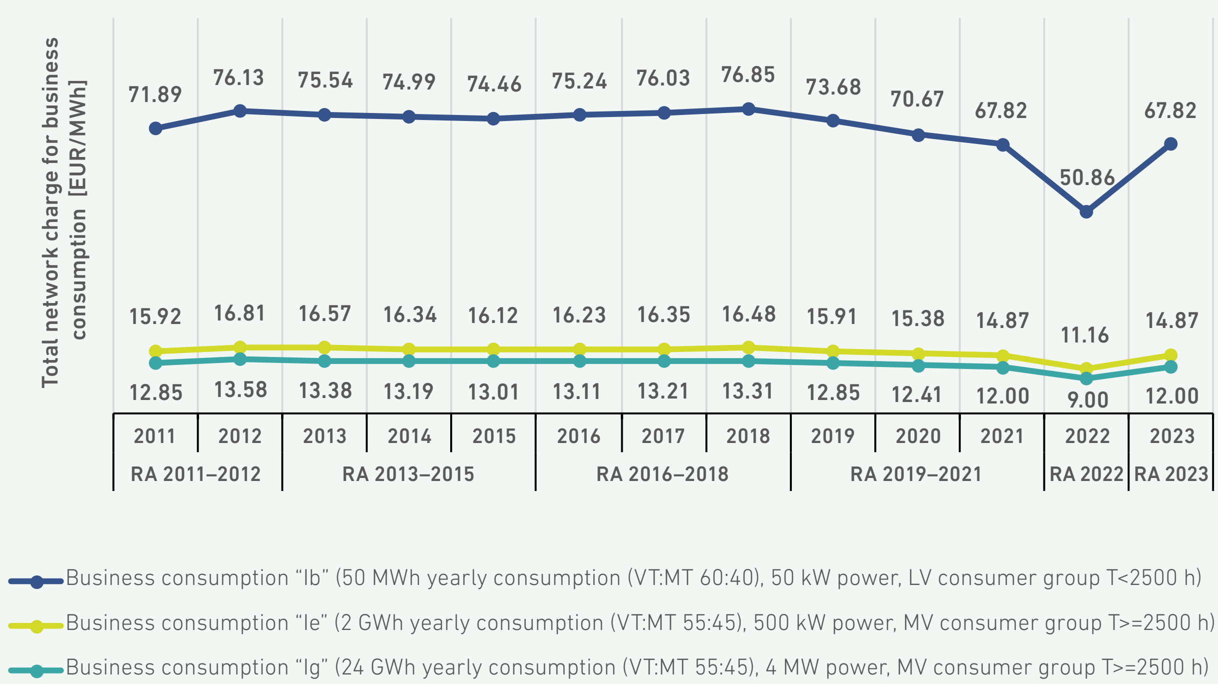
Considering all the measures in 2022, EUR 62 million more network charges for the distribution system and EUR 19.8 million more network charges for the transmission system were collected in 2022 compared to 2023. Not taking into account the 2022 measures, EUR 8.5 million more distribution system network charges and EUR 4.4 million more transmission system network charges were collected in 2023 than in 2022.

FIGURE 63: FLUCTUATION OF THE TOTAL NETWORK CHARGE FOR THE TRANSMISSION AND DISTRIBUTION SYSTEMS FOR SOME TYPICAL HOUSEHOLD CONSUMERS PER REGULATORY PERIOD



SOURCE: ENERGY AGENCY

FIGURE 64: FLUCTUATION OF THE TOTAL NETWORK CHARGE FOR THE TRANSMISSION AND DISTRIBUTION SYSTEMS FOR SOME TYPICAL BUSINESS CONSUMERS PER REGULATORY PERIOD



SOURCE: ENERGY AGENCY

Allocation and Use of Cross-Zonal Transmission Capacities

The allocation and use of cross-zonal transmission capacities (hereinafter: CZCs) in the EU is governed by Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (hereinafter: Regulation (EU) 2019/943). The regulation stipulates, among other things, the mandatory use, in all time periods, of market-based methods for allocating the CZCs available. In 2022, this area was additionally governed by Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (hereinafter: Regulation (EU) 2015/1222), which governs the day-ahead and intraday calculation and allocation of CZC, and Commission Regulation (EU) 2016/1719 of 26 September 2016 on establishing a guideline on forward capacity allocation (hereinafter: Regulation (EU) 2016/1719), which lays down the rules on calculating and allocating CZCs for time frames longer than day-ahead.

Regulation (EU) 2015/1222 stipulates that the day-ahead CZC allocation must take place within the framework of continuous market coupling in the form of auction trading. Intraday CZC allocation must likewise take place within the framework of continuous market coupling, but in the form of continuous trading. On the other hand, Regulation (EU) 2016/1719 decrees that, for time periods longer than day-ahead, the allocation of CZCs may take the form of assigning physical or financial rights to use the CZCs through the use of explicit auctions. This assignment should be conducted through a common European auction platform and using unified rules for a common European market. Slovenia has been participating in the so-called pan-European day-ahead market coupling at the border with Italy since February 2014 and at the border with Austria since July 2016. In June 2018, the Slovenian-Croatian border was added to this market coupling. In June 2022, the Cirkovce-Héviz 400 kV transmission line began operating. With that, a direct transmission link between Slovenia and Hungary was established. Immediately after this link was established, the border in question was integrated into the European single day-ahead market coupling. In June 2022, there was also an important change in the Core region, which includes Slovenia's borders with Austria, Croatia and Hungary, as from then on a power flow-based (FB) method will be used to allocate the available CZCs instead of the Available Transmission Capacity (ATC) method used previously. The ATC method continues to be used in the region of Northern Italy, which includes the Slovenian border with Italy.

This means that in 2023, day-ahead CZC allocation at all Slovenian borders took place in the context of pan-European single day-ahead market coupling, in line with the provisions of Regulation (EU) 2015/1222.

In addition to the TSO, BSP Energetska Borza – re-designated by the Agency as the Nominated Electricity Market Operator (IOTEE) for the Slovenian trading area at the end of October 2023 for an indefinite period on the basis of the conditions set out in Regulation (EU) 2015/1222 – also took part in the allocation of capacity in the context of day-ahead and intraday market coupling on the Slovenian side.

In the context of the forward allocation of CZCs, governed by Regulation (EU) 2016/1719, capacity was allocated on an annual and monthly basis at all Slovenian borders. This allocation took place in the form of explicit auctions where capacities in the form of physical usage rights were being allocated according to the use-it-or-sell-it principle. According to this principle, any capacities that their holders fail to nominate by a certain deadline to confirm they're actually being used are transferred to day-ahead allocation, whereby holders of CZC use rights are compensated by a payment equal to the product of the price difference between the two markets resulting from the day-ahead market coupling and the amount of unused capacity. The Joint Allocation Office (JAO) headquartered in Luxembourg took the role of the common European auction platform at all Slovenian borders. All annual and monthly auctions at the Slovenian borders were conducted in accordance with the so-called harmonised auction rules, which also apply at all other borders in the common European electricity market.

The introduction of CZC allocation based on power flows means that it is no longer possible to show the allocated volumes and revenues at individual borders, as this method also makes use of a virtual bidding zone, which takes into account the boundaries between bidding zones outside the Core region. This means that only the realised revenue at individual borders and in the virtual area can be shown. Table 24 gives the revenue by borders, where the virtual area is called the »slack zone«. Revenues are shown according to both the gross and the net approach. The gross approach means that the total amount of congestion income is shown, while in the net approach, the costs of compensating transmission capacity holders for their curtailment and reimbursing non-nominated long-term transmission capacity are deducted.

TABLE 24: REALISED REVENUE IN 2023 AT EACH BORDER

Border	Gross approach [EUR]	Net approach [EUR]
Austria	29,031,649	18,184,286
Croatia	20,332,771	13,777,869
Italy	92,900,736	52,018,742
Hungary	11,761,804	6,617,193
Slack Zone	35,700,853	35,700,853
Total	**189,727,812**	**126,298,942**

SOURCE: ELES

It is clear that a large part of the revenue in 2023 was also realised in the virtual area. This is a consequence of the fact that a considerable portion of the power flows between Slovenia and the bidding zones in the Core region are transmitted through the Italy and Swiss bidding zones, which are not part of the region. Even after 2022, when revenues from the allocation of CZCs almost tripled compared to previous periods before the energy crisis, they were further increased by EUR 11.8 million in 2023. The period following the biggest energy crisis signalled certain changes in the allocation of CZCs in electricity trading between trading areas. Due to the reduction and moderation of prices on the electricity forward and daily exchanges, the Slovenian borders have seen a significant increase in the auction prices for the annual CZC allocations (between 1.7 at the AT-SI border to 11 times at the IT-SI border), which, with almost the same allocation volumes, has ensured high revenues.

Promoting Competition

Reforming the design of the EU internal electricity market model

Russia's invasion of Ukraine in 2022 caused energy prices to spike across the EU. In 2023, they progressively declined and stabilised as a result of large-scale intervention measures in Member States, based on the European Commission's response framework and other influencing factors, which we will reveal in the following chapters. As a result, the markets are more regulated than they were before the crisis and, in Slovenia, we have had price caps on both the retail market and the market for ancillary services, which have been extended until 2024. All this has a clear impact on the level of competitiveness of the energy markets and the markedly reduced dynamics of the markets observed.

To avoid future price shocks, the EU has decided to reform the internal electricity market. Electricity market reform is the EU's long-term response to the 2022 energy crisis. Despite the high share of renewables in energy production, high spikes in fossil fuel prices (especially gas) have led to a steep rise in electricity prices. This is due to the operation of the electricity market in the EU, where the price of electricity is based on the cost of the fossil fuels used to generate electricity (the marginal production unit concept). The reform focuses on long-term solutions to avoid similar situations in the future. The new rules will make electricity prices less dependent on the price of fossil fuels. This will create a buffer between the markets and the electricity bills paid by consumers. Consumers will have more options when signing an electricity contract, as the following will be guaranteed:

- Increased availability of fixed-price and fixed-term contracts;
- Flexibility in the choice of dynamic pricing, with the possibility of multiple or combined supply contracts;
- Increased transparency before signing contracts, clearer supporting information;
- Easier access to renewable energy due to the local trading of electricity generated from renewable sources (for example, it will be possible to sell surpluses of self-supply electricity to neighbours).

Vulnerable consumers will be better protected:

- Governments will ensure that there are enough last-resort supply providers so that no consumer is left without electricity;
- Governments will be able to regulate retail prices for households and small businesses more effectively.

Companies will enjoy more stable prices due to the possibility of entering into long-term contracts (such as contracts on electricity supply, whereby a producer of electricity commits to sell electricity directly to consumers at a certain price). This will in turn provide producers of electricity with more stable revenues. Investments in new wind, solar, geothermal, hydro (without reservoir) and nuclear power generation facilities will be made in the form of two-way contracts for difference (CfDs). This ensures a minimum return on such investments, on the one hand, and prevents excessive costs in the event of a new crisis, on the other.

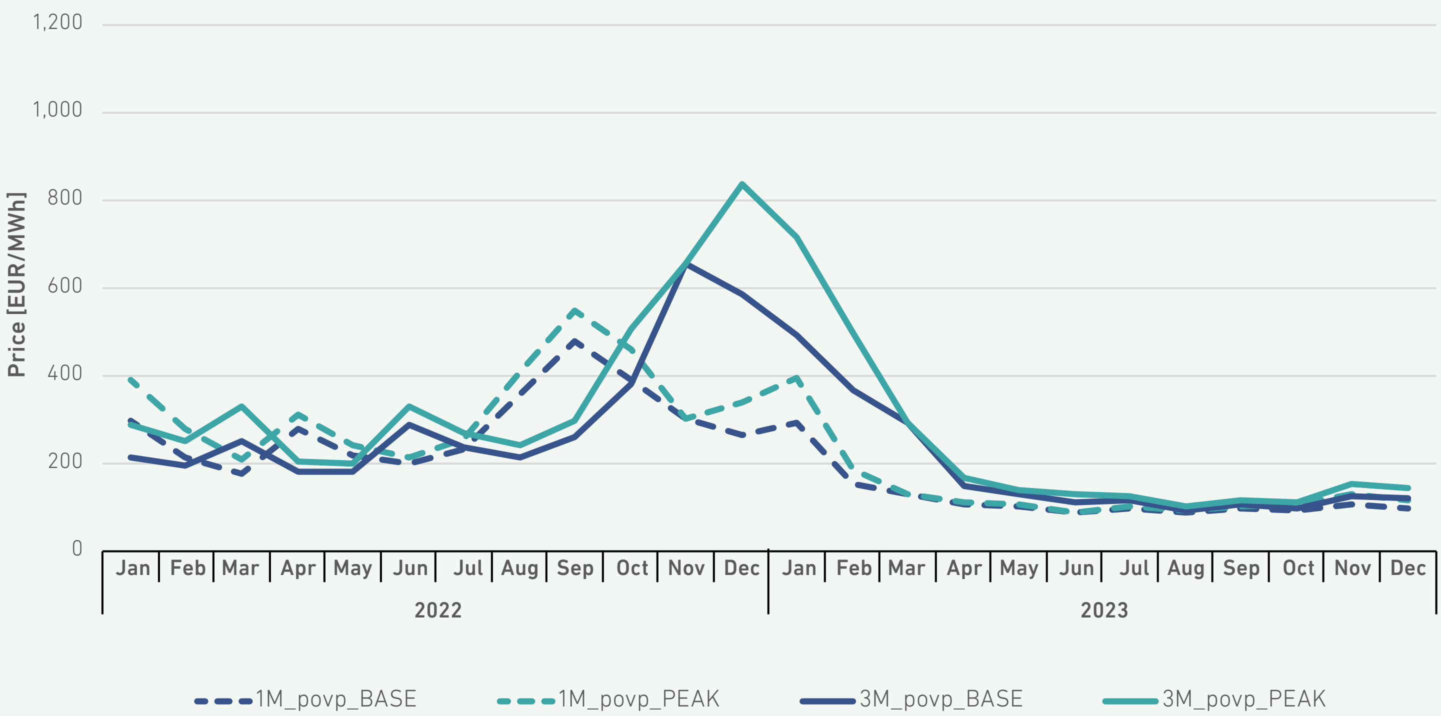
Wholesale Market

In the following sections, we focus mainly on trading on continuous wholesale markets, which is also organised in Slovenia and allows for comparison with other reference markets.

Electricity Prices

In 2023, prices in the wholesale forward markets have been gradually declining. Markets have gradually recovered from the energy crisis in 2023, as shown by the decrease in future prices. The crisis highlighted the importance of futures markets, where the low liquidity of these markets made it very challenging to manage price extremes in the day-ahead markets. Therefore, in February 2023, ACER launched a discussion on the further development of the futures electricity market.

FIGURE 65: PRICE DEVELOPMENT OF REFERENCE MONTHLY PRODUCTS ON THE EEX[36]



SOURCE: MONTEL

36 Example: For delivery in January 2023, the forward trading for the month ahead for BASE and PEAK energy is the average of the trading prices in December 2022 (for the monthly product BASE or PEAK Jan 23), and for the forward trading for the three months ahead for base and peak energy is the average of the trading prices in October 2022 (for the monthly product BASE or PEAK Jan 23).

As a result, stabilisation has also been observed in the continuous markets, where prices have returned to 2021 levels, but not to pre-pandemic levels.

Prices in Day-Ahead Power Exchanges in Slovenia and on Foreign Markets

The Slovenian electricity market is situated at the juncture of four large European markets: the German, Austrian and Italian markets and that of South-Eastern Europe. The Slovenian market is part of the interregional day-ahead market coupling at the borders with Austria, Italy, Croatia and Hungary. As regards intraday coupling, the Slovenian electricity exchange joined the European single intraday market on its borders with the neighbouring countries as of 2022.

Influencing Factors

Wholesale electricity prices on the day-ahead market in 2023 were significantly lower than those reached in 2022, a year characterised by sharp increases and volatility, mainly due to the geopolitical situation in Eastern Europe. Thus, the average day-ahead electricity market price within the EU-27/EEA (Norway) and Switzerland in 2023 was 93 EUR/MWh[37]. Although this value represents 42.5% of the 2022 wholesale price (219 EUR/MWh), it is still higher than in the pre-crisis period (almost twice as high on average).

The decrease in electricity prices on the day-ahead market over the past year is mainly due to the reduced dependence on natural gas supplied via pipelines from Russia, reduced electricity consumption as a result of the energy crisis[38] and an increase in the share of electricity produced from low-carbon sources. At the EU level, electricity demand has been declining until the third quarter of 2023, making a key contribution to reducing dependence on fossil fuels.

The price dynamics in the electricity market are closely linked to wholesale natural gas prices. The successful substitution of Russian gas imports by imports from other countries (notably the US and Norway) and increased imports of liquefied natural gas (LNG), as well as reduced gas consumption, have led to above-average natural gas storage volumes in Member States and consequently lower wholesale gas and electricity prices. Average natural gas prices have fallen from between 150 and 300 EUR/MWh in 2022 to less than 130 EUR/MWh in 2023, reaching the level of above 80 EUR/MWh of 2012. They were highest in Ireland and Italy and lowest in Scandinavia. This was further boosted by Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No 715/2009 with regard to gas storage, which stipulated that gas storage facilities must be at least 90% full before the start of the 2023/24 heating season, in addition to favourable weather conditions (mild winter, adequate windiness and hydrology, and a higher number of sunshine hours). In 2023, the natural gas prices at European gas hubs were converging again after a year of large spreads, which was driven by new LNG import terminals and increased transport capacity. The EU's increased dependence on LNG requires adjustments in cross-border gas flows to ensure its efficient transmission. Uncoordinated national measures that increase the costs of cross-border trade can disrupt these flows, risk market fragmentation and hamper price convergence. It is therefore essential to promote more coordinated approaches between Member States for a more stable and integrated natural gas market.

37 ACER. (2024). Key developments in EU electricity wholesale markets. 2024 Market Monitoring Report

38 Despite low prices on the continuous markets, energy demand continued to decline, driven by economic effects and the ending of supportive intervention measures.

After lower generation from nuclear, wind and hydropower plants contributed to the price increases in 2022, the accelerated connection of renewable electricity sources (RES) at the EU level and increased nuclear generation in France[39] increased the share of electricity produced from low-carbon sources in 2023 and, in addition to lower consumption, further contributed to reducing the dependence on fossil fuels. The differences in shares between countries are due to the local specificities of the energy mix. As a result, Italy and Ireland experienced the highest electricity prices in 2023, while the Nordic countries recorded the lowest, mainly due to the efficient operation of pumped-storage power plants.

In 2023, a day-ahead electricity market was established in South-Eastern Europe, in Albania, Montenegro and North Macedonia. In addition, the legislative basis for support schemes for the accelerated connection of RES were prepared in Albania, Bosnia and Herzegovina, Georgia, Moldova and Ukraine in 2023 and the first RES auctions were held in Albania, Georgia, North Macedonia, Kosovo and Serbia. Prices in South-Eastern European countries with more cross-border interconnections were at similar levels to the EU markets.

In 2023, the impact of the heightened geopolitical situation and the global energy crisis continued to be felt, also driven by inflation and lower economic growth. For example, in European countries, the US and Japan, electricity demand was declining, mainly due to a reduction in the activity of the more energy-intensive industries as a result of a decrease in competitiveness due to energy price increases.

The year 2023 was also characterised by an increased incidence of negative day-ahead market prices as a result of the increased number of connected RES[40] and their inherently unpredictable nature of operation. This factor further underlines the need to integrate markets and allow flexibility.

Despite the decline in wholesale prices, energy remains expensive, mainly because of the risks suppliers face and market volatility. The energy crisis has highlighted the crucial role of futures markets. Futures markets allow market participants to stabilise and secure their future cash flows, thereby protecting their businesses against the risks of future price changes.

39 In 2023, in contrast to 2022, France became a net exporter and Germany a net importer, with Italy remaining the largest net importer. Italy, Lithuania and Luxembourg imported cheaper electricity from neighbouring Member States almost every hour in 2023.

40 Solar capacity increased by 20% compared to 2022 and was twice as large as in 2019, while wind capacity increased by 8%.

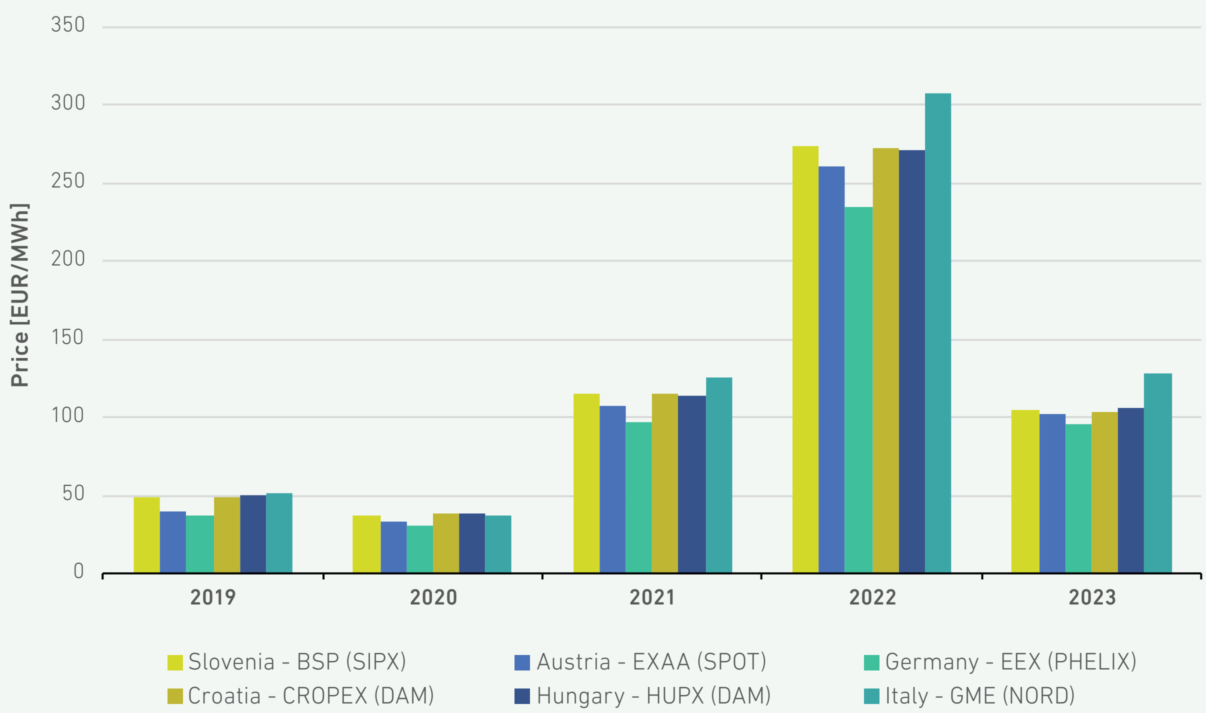
Figure 66 shows the trends in the average base prices on power exchanges in Slovenia, its neighbouring countries and Germany in the last five years. In 2023, the prices on the power exchange in Slovenia were most comparable with the prices in Hungary, Croatia and Austria.

In 2023, the average base price on the power exchange in Slovenia decreased by 62% compared to 2022, thus amounting to 104.33 EUR/MWh. As shown in figure 66, electricity prices have fallen dramatically in all the markets observed to levels comparable to 2021. The highest average day-ahead market price in 2023 (127.78 EUR/MWh) was recorded in the Italian GME market (NORD).

Prices on power exchanges fall by around 60% compared to the previous year

Once again, the lowest average base price (95.18 EUR/MWh) out of all compared prices was recorded on the German power exchange, where the average prices decreased by 60% compared to 2022. The average prices in Austria are slightly higher. Due to electricity liquidity, the prices on the German power exchanges affect other EU markets.

FIGURE 66: TRENDS IN THE AVERAGE BASE PRICE IN THE DAY-AHEAD MARKET IN SLOVENIA AND IN FOREIGN EXCHANGES IN THE 2019–2023

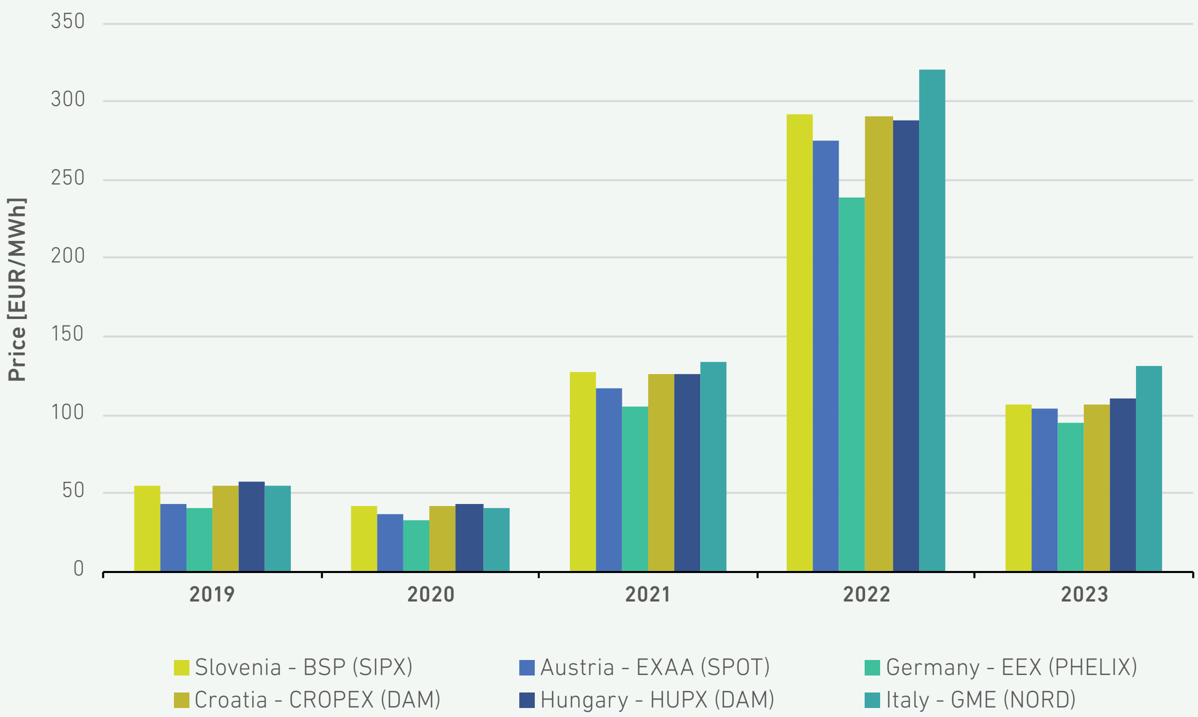


SOURCE: MONTEL

The trends in the average peak price in individual day-ahead markets are shown in Figure 67. In 2023, the average peak price on the power exchange in Slovenia decreased by 63% compared to the average price in 2022, thus amounting to 106.86 EUR/MWh. Together with Croatia, this is the highest year-on-year percentage price decrease compared to the other exchanges. The average peak prices in the respective markets fell even below the 2021 level, so that the difference between the average peak and band prices in 2023 is not significant.

The smallest price increase is recorded in the Italian GME market (59%). Nevertheless, among all the observed markets, the average peak price in 2023 was the highest in the Italian GME market (NORD), at 131.40 EUR/MWh.

FIGURE 67: TRENDS IN THE AVERAGE PEAK PRICE IN THE DAY-AHEAD MARKET IN SLOVENIA AND IN FOREIGN EXCHANGES IN THE 2019–2023



SOURCE: MONTEL

The wholesale electricity prices on spot markets had been falling since the beginning of the year and until June. In the second half of the year, there was a constant price fluctuation around the level of around 100 EUR/MWh, but towards the end of the year, we saw prices falling again. Prices peaked towards the end of January, when the price rose above 200 EUR/MWh. At the beginning of July, we saw record low prices, with the price on the German stock exchange falling to –53.9 EUR/MWh. While the price on the other exchanges analysed was also slightly negative, the price on the Italian exchange remained unchanged at 109.1 EUR/MWh. On Christmas Day, extremely low prices were again recorded, moving close to 0 EUR/MWh.

According to the Ministry of the Environment, Climate and Energy in 2023, electricity sales to end-consumers decreased by around 11.4%. The sales have dropped in the segments of business consumers (14.4%) and household consumers (3.0%).

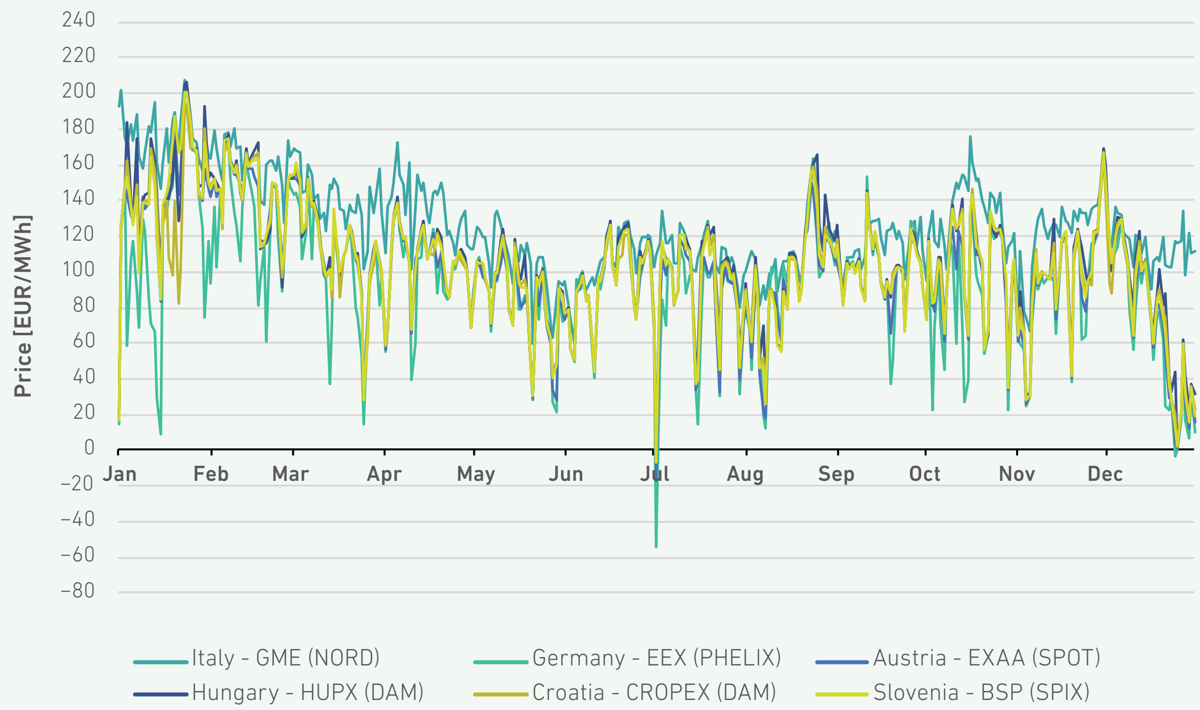
With the exception of the Italian market, the base prices in 2023 were the lowest in the last quarter. In Slovenia, the average price in the last quarter was 91.59 EUR/MWh, while in Germany it was 82.27 EUR/MWh. In all the markets monitored, the price peaked in the first quarter of 2023. The average base price in Slovenia at the time was 134.91 EUR/MWh, in Germany 115.80 EUR/MWh and in Italy 159.94 EUR/MWh.

In 2023, the highest base prices on day-ahead power exchanges were recorded in January, when the daily base price on the Slovenian exchange reached the absolute top on 24 January 2023 with 201.158 EUR/MWh. In 2022, the maximum base price was as high as 747.987 EUR/MWh. The highest hourly price in 2023 was recorded on 11 September, when it reached 426.18 EUR/MWh between 19:00 and 20:00. The year before, the highest price was reached in August, in the same time window, amounting to 879.29 EUR/MWh.

Defining (arbitrarily) price peaks as exceeding three times the amount of the average hourly rates, Slovenia saw the exceeding of price peaks in 3 cases, which is around 77% less compared to 2022. The reason for such a large reduction was the record prices in 2022.

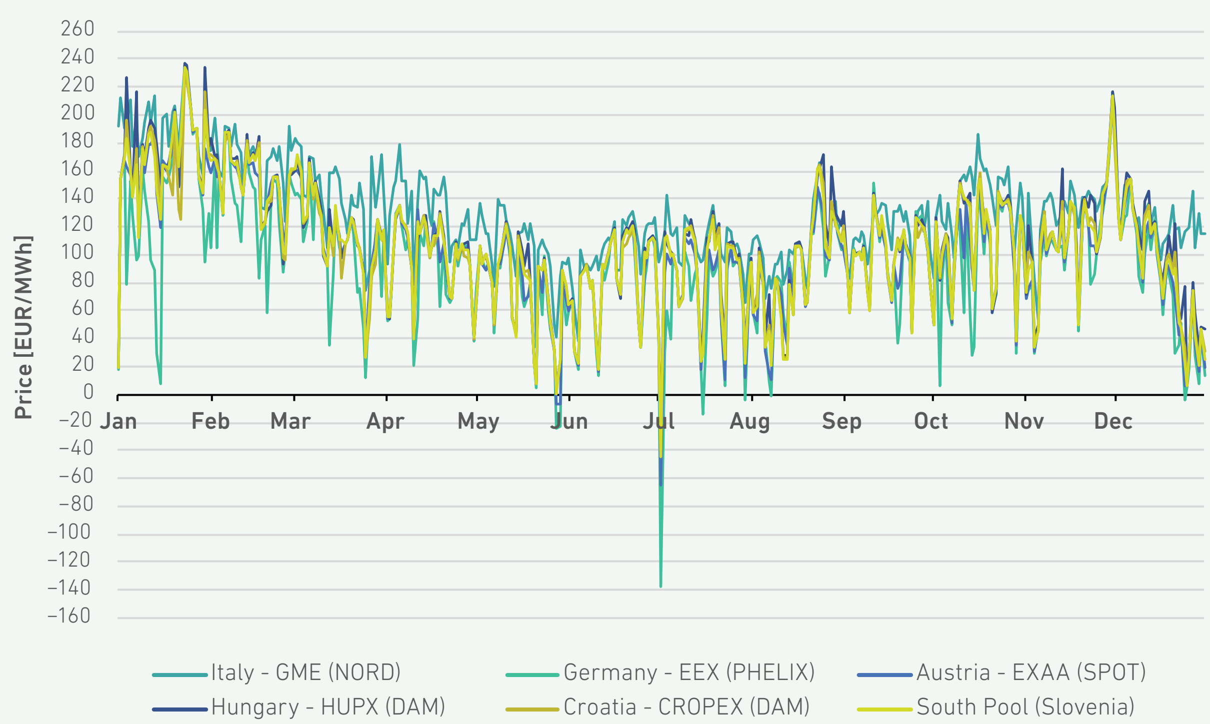
In 2023, negative hourly prices were recorded on the Slovenian power exchange in 96 hours, while there were none in 2022. In the German power exchange, negative hourly prices were recorded in as many as 301 hours, compared to only 69 hours last year.

FIGURE 68: TRENDS IN THE BASE PRICE ON THE DAY-AHEAD MARKET IN SLOVENIA AND ON THE NEIGHBOURING EXCHANGES



SOURCE: MONTEL

FIGURE 69: TRENDS IN THE PEAK PRICE ON THE DAY-AHEAD MARKET IN SLOVENIA AND ON THE NEIGHBOURING EXCHANGES



SOURCE: MONTEL

Table 25 shows the results of a comparative analysis of the prices that were reached on the day-ahead market on the BSP (Slovenia), GME (Italy), EXAA (Austria), CROPEX (Croatia) and HUPX (Hungary) exchanges in 2022 and 2023.

The difference between electricity prices has decreased as the Slovenian and Hungarian markets coupled[41], as greater comparability between the BSP and HUPX markets can be observed. Compared to the previous year, the share of hours in 2023 when the prices on the Austrian exchange (EXAA) were the same as those on the BSP, increased. On the other hand, the share of hours when the prices on the Italian (GME) and Croatian (CROPEX) exchange were the same as on the BSP decreased in 2023 compared to the year before. The biggest differences remain when comparing with the Italian market, where the prices are much higher.

TABLE 25: COMPARISON OF PRICES (ACCORDING TO THE SHARE OF HOURS) BETWEEN POWER EXCHANGES ON THE DAY-AHEAD MARKET

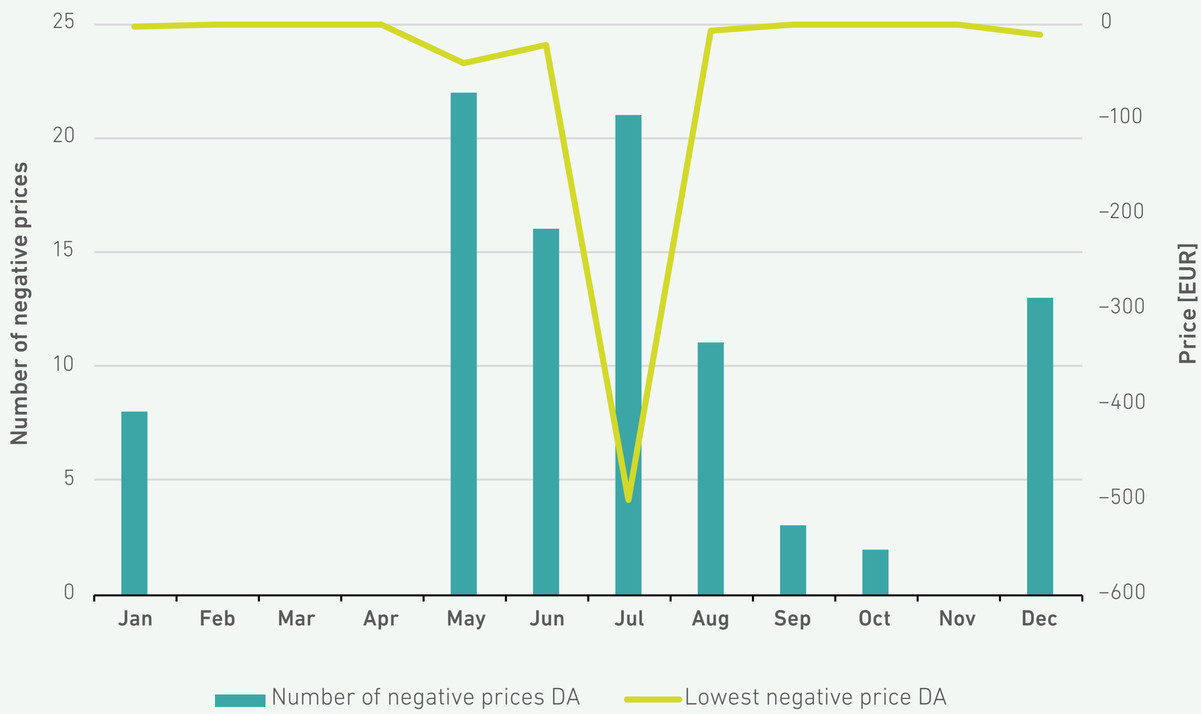
	Share of hours in 2022	Share of hours in 2023
Lower price in BSP than GME	62.60%	82.09%
Lower price in GME than BSP	9.00%	9.59%
Same price in BSP and GME	28.40%	8.32%
Lower price in BSP than EXAA	21.20%	27.91%
Lower price in EXAA than BSP	51.90%	41.74%
Same price in BSP and EXAA	27.00%	30.35%
Lower price in BSP than CROPEX	25.80%	42.48%
Lower price in CROPEX than BSP	34.00%	27.17%
Same price in BSP and CROPEX	40.30%	30.35%
Lower price in BSP than HUPX	32.40%	47.93%
Lower price in HUPX than BSP	42.50%	23.32%
Same price in BSP and HUPX	25.10%	28.74%

SOURCE: ENERGY AGENCY, MONTEL

In 2023, there was an increase in the negative prices, which occurred on the BSP day-ahead auction market in January, May, June, July, August, September, October and December. The most negative prices occurred in May 2023, when a negative price appeared 22 times. The lowest price, –500 EUR/MWh, was reached on 2 July 2023 for an hour of H15.

41 The markets on the Slovenian-Hungarian border were officially coupled and integrated on 30 June 2022, while trading kicked-off in early July.

FIGURE 70: DAY-AHEAD ANALYSIS OF NEGATIVE PRICES IN THE BSP MARKET



SOURCE: BSP

CASE STUDY

Analysis of the Level of Volatility of Electricity Prices in the Day-Ahead Market Over the 2021–2024 Period

As part of the explicit new tasks under Article 53 of the Energy Act (EZ- 2), the Energy Agency is also required to monitor the level of price volatility, in the context of the impact of price volatility on the bills of final consumers. Given the very limited range of supply products based on dynamic prices linked to the prices in continuous wholesale markets, we present below an analysis of the level of volatility over a longer period, with the aim of gaining a deeper insight into the market situation.

The analysis of electricity price volatility on the Slovenian energy exchange BSP SouthPool was carried out by evaluating the standard deviations of the hourly electricity indices $SIPXhourly_i$ from the value of the SIPXbase index, where index *i* represents the hour of the day. SIPXbase is an index of electricity on the electricity exchange market in Slovenia and represents the average daily price for transactions concluded in hours *i* on the Slovenian exchange market.[42]

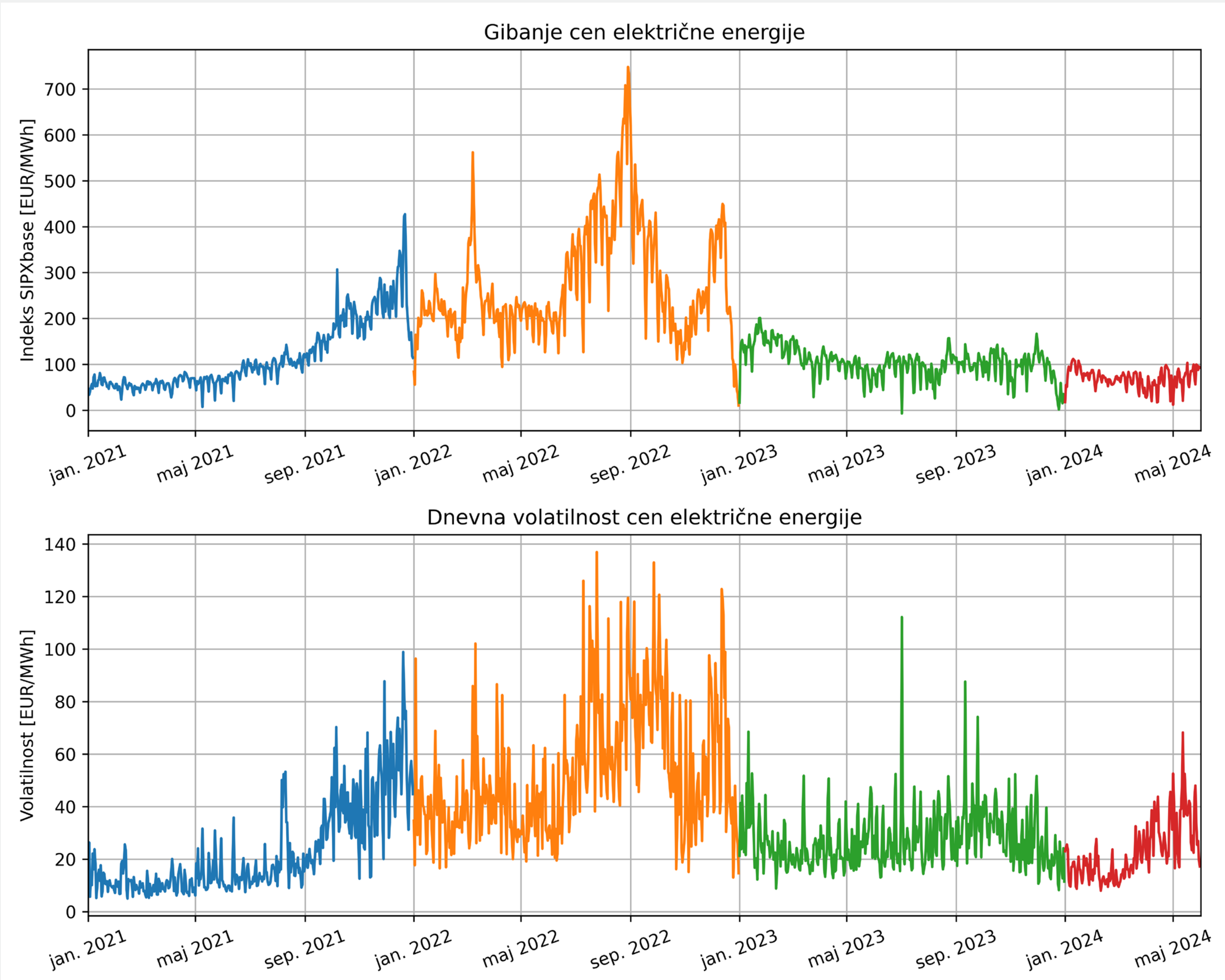
The daily volatility of the electricity price V_d for each day *d* during which *N* hours occur was determined as given in formula (1) below. On the day of the changeover to summer time, the day is considered to consist of 23 hours, and on the day of the changeover from summer time to winter time, the day is considered to consist of 25 hours.

$$V_d = \sqrt{\frac{\sum_{i=1}^{N}(\mathrm{SIPXhourly_i} - \mathrm{SIPXbase})^2}{N}}$$

42 BSP SouthPool Energy Exchange, Slovenian Price Index [accessed 31 May 2024] https://www.bsp-southpool.com/sipx.html

The trends of the average daily electricity prices (SIPXbase) and the daily volatility values for the period from 1 January 2021 to 31 May 2024 are shown in the figure below.

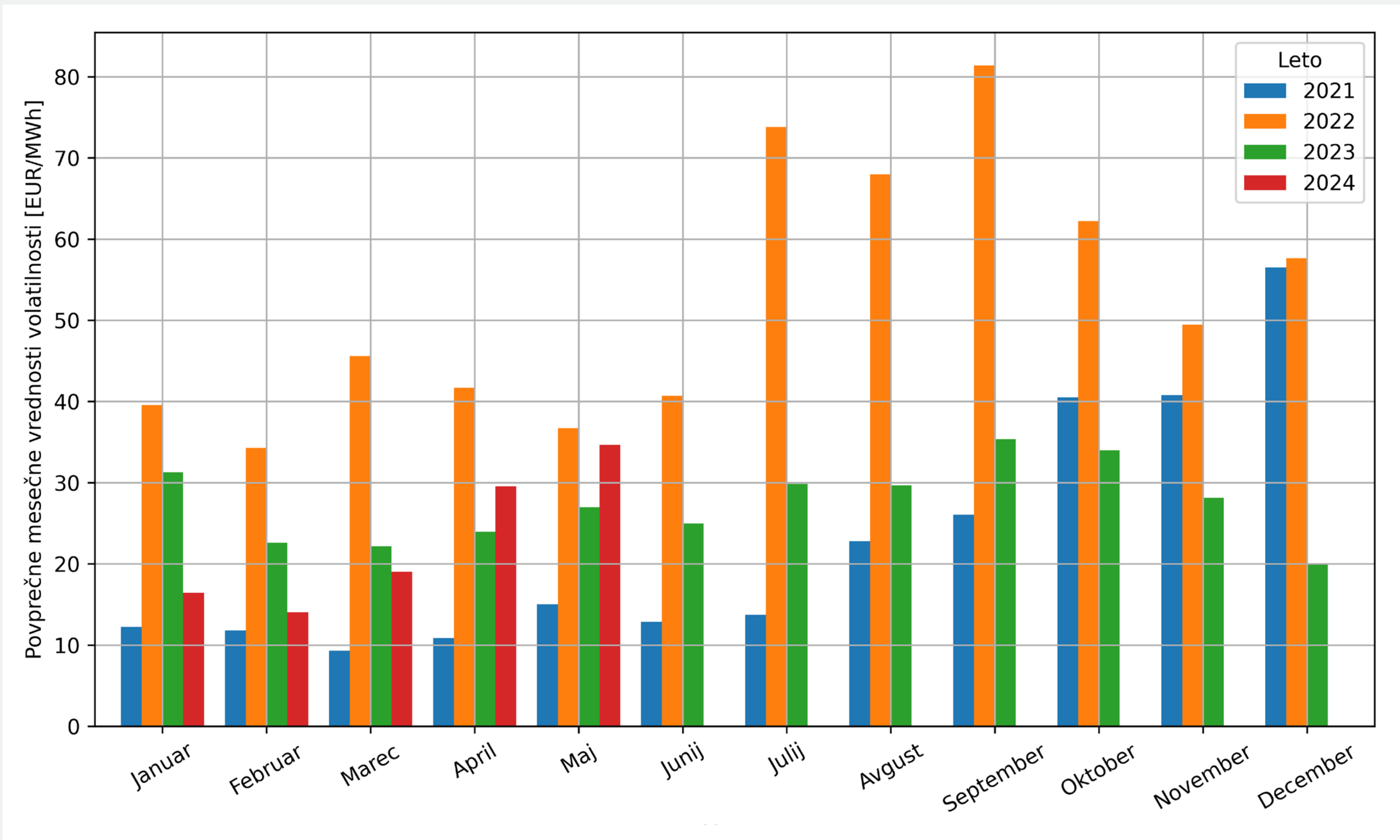
FIGURE: TRENDS OF SIPXbase INDICES AND DAILY VALUES OF VOLATILITY PRICES



SOURCES: BSP, ENERGY AGENCY

There is a correlation between the level of volatility and the trends in the electricity prices in 2021, 2022 and 2023. Volatility increased markedly at the end of 2021 and in the crisis year 2022, before stabilising to a much lower level in 2023 (with the exception of »isolated« volatilities, mainly related to the occurrence of negative price spikes), and interestingly increasing again in the second quarter of 2024.

FIGURE: AVERAGE MONTHLY VALUES OF ELECTRICITY PRICE VOLATILITY



SOURCE: ENERGY AGENCY

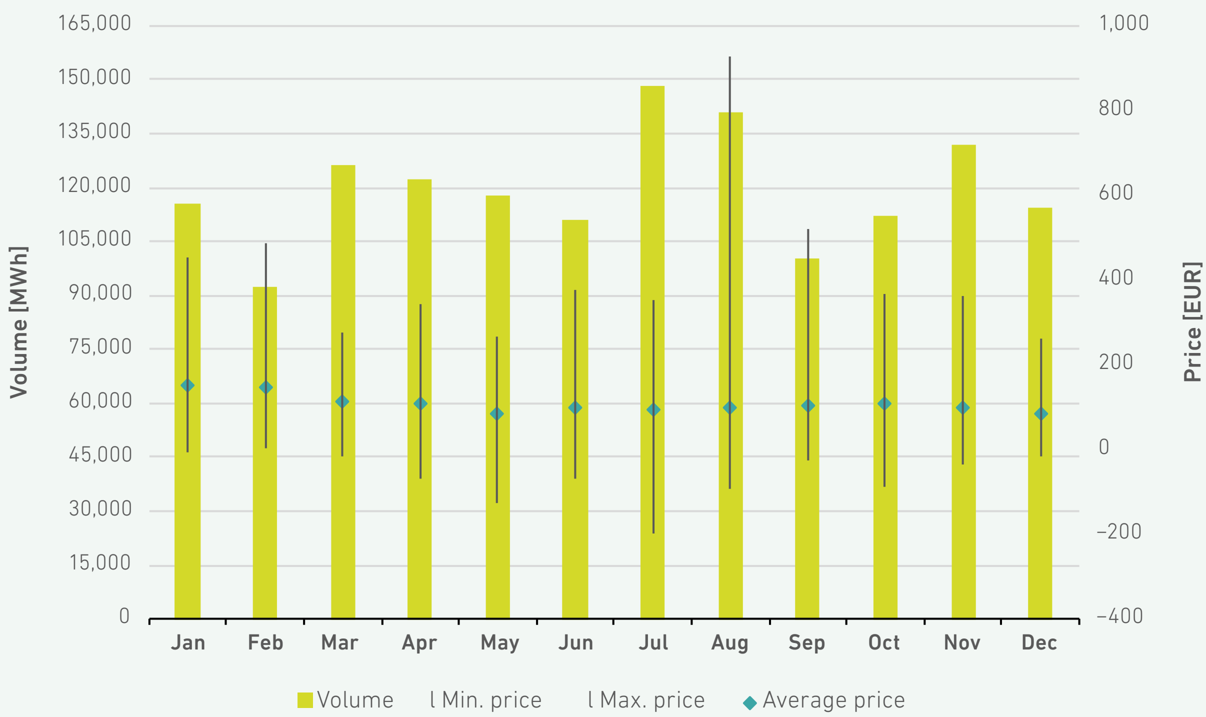
Clearly, it is not yet possible to get a complete picture of price volatility in 2024 based on a five-month observation period, though we can expect higher price volatility over the summer due to the increase in RES generation.

Price volatility in the day-ahead continuous market is one of the key risk factors for end-users when concluding supply contracts based on dynamic prices (see the case study »Analysis of Market Conditions for the Development of Electricity Supply Products on the Basis of Dynamic Prices«).

Prices on the Intraday Continuous Market

Figure 71 shows the trends in trading quantities and price ranges of all products on the intraday continuous market. The summer months saw an increase in the volume of continuous trading, and in August there was a significant price range, with prices between –91.83 EUR/MWh and 928.17 EUR/MWh.

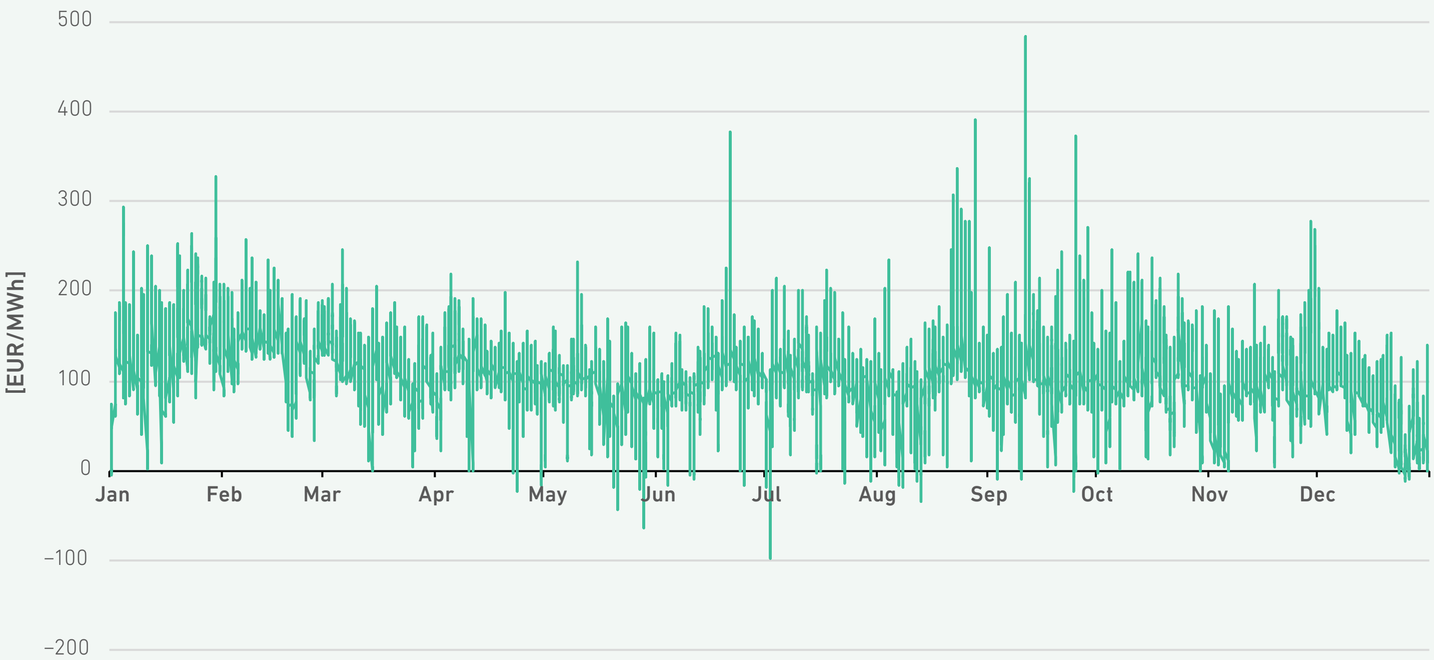
FIGURE 71: VOLUME OF TRADING AND PRICE RANGES IN THE INTRADAY MARKET



SOURCE: BSP

In 2023, the average price of hourly products on the intraday market amounted to 107.55 EUR/MWh, which is 60% lower than in 2022, when the average prices amounted to 268.84 EUR/MWh. Compared to 2022, the average price of hourly products is 4% lower in 2023. The highest price for an hourly product on the intraday market occurred on 11 September 2023 for the H20 hour and amounts to EUR 483.10/MWh, while the lowest price occurred on 2 July 2023 for the H15 hour and amounts to EUR –97.18/MWh.

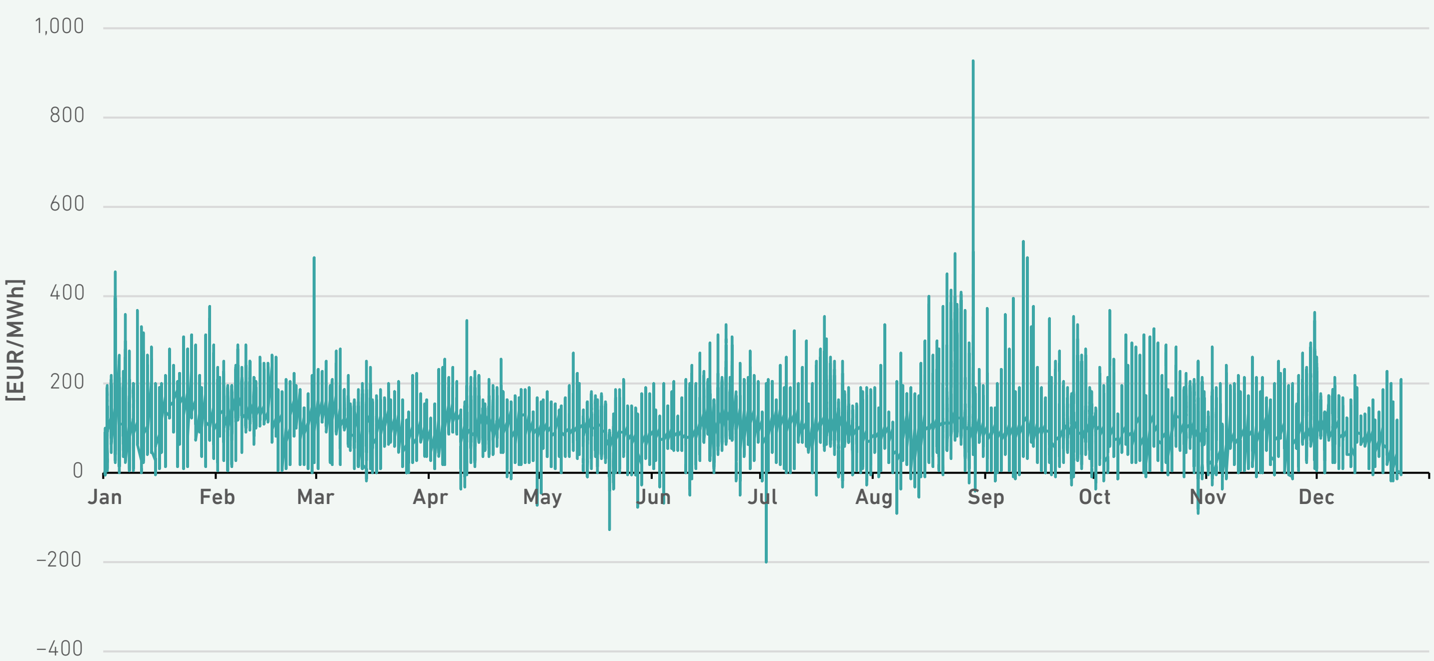
FIGURE 72: DEVELOPMENT OF PRICES OF THE HOURLY PRODUCT ON THE BSP INTRADAY MARKET



SOURCE: BSP

In 2023, the average price of 15-minute products on the intraday market amounted to 107.5 EUR/MWh, which is almost 61% lower than the price in 2022, when the average price amounted to 275.09 EUR/MWh, and almost 6% less than in 2021, when the average price amounted to 114.08 EUR/MWh. The highest price for a 15-minute product on the intraday market occurred on 28 August 2023 for the 20:00-20:15 interval and amounts to EUR 928.17/MWh, while the lowest price occurred on 2 July 2023, the same as for the hourly product, for the 14:00-14:15 interval and amounts to EUR −200.00/MWh.

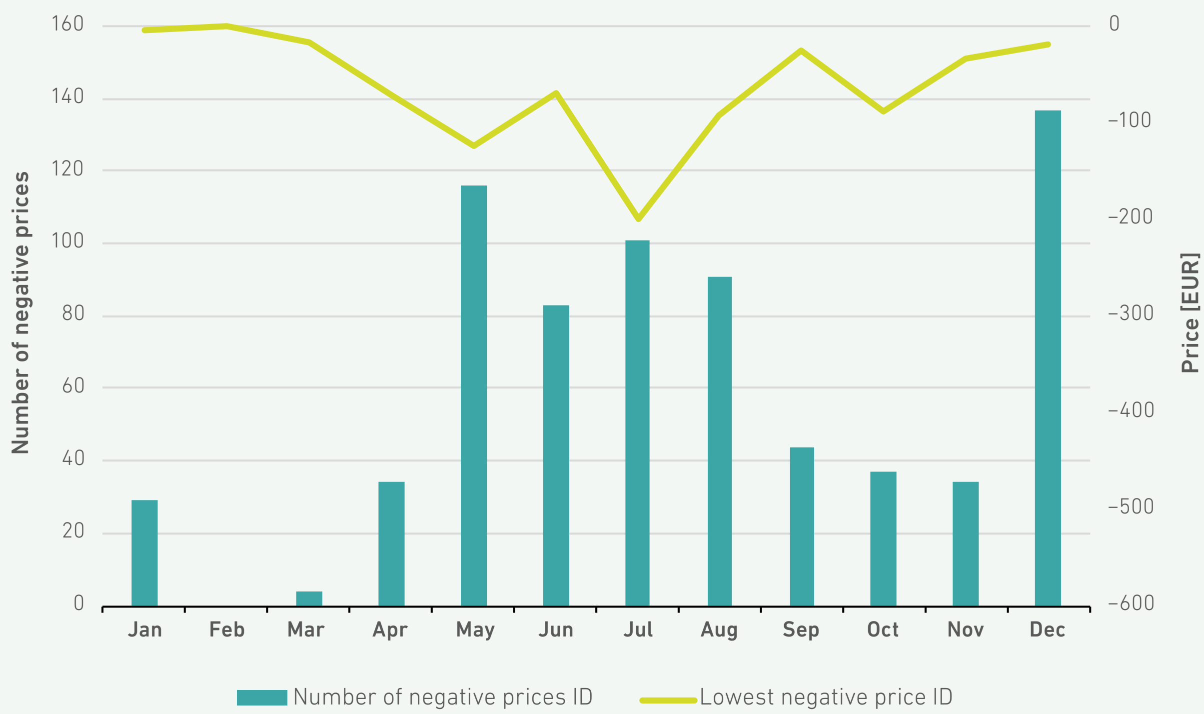
FIGURE 73: DEVELOPMENT OF THE PRICES OF THE 15-MINUTES PRODUCT ON THE BSP ID MARKET



SOURCE: BSP

The intraday market also recorded an increase in the amount of negative prices in 2023, with negative prices occurring in all months except February 2023. The most negative prices occurred in December 2023, where a negative price appeared 137 times for both hourly and 15-minutes products. The lowest negative price, –200.00 EUR/MWh, was reached on 2 July 2023 between 14:00 and 14:15 for a 15-minutes product.

FIGURE 74: VOLUME OF NEGATIVE PRICES IN THE INTRADAY MARKET

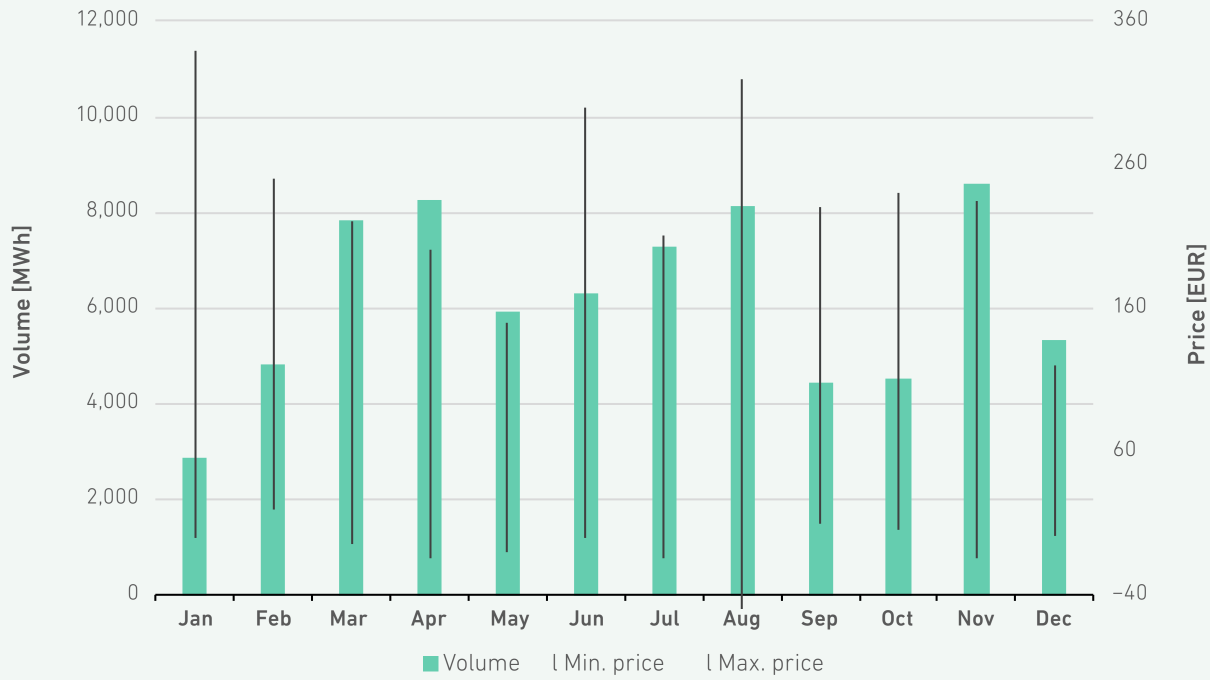


SOURCE: BSP

Energy Prices on the Systemic Balancing Markets

The Energy Agency continues to monitor all organised markets trading with energy for systemic balancing, i.e. the ancillary services market organised by the transmission system operator and the market operator balancing market. The purchase prices of balancing capacity with the object of guaranteeing the availability of units included in the ancillary services market, the unintentional imbalances (FSkar) and imbalance netting (IGCC) are addressed in the Ancillary Services chapter. The following analysis exclusively addresses the prices of balancing energy. In 2023, the highest price of electricity on the market operator balancing market was 340 EUR/MWh and the lowest was –50 EUR/MWh. The highest prices occur when balancing energy is purchased, while the lowest occur when the transmission system operator sells energy surpluses. In addition to the TSO, three other members participated in the balancing market of the operator. The maximum price was reached in the morning hours of 19 January 2023. The TSO mainly acted as a seller of electricity in the balancing market.

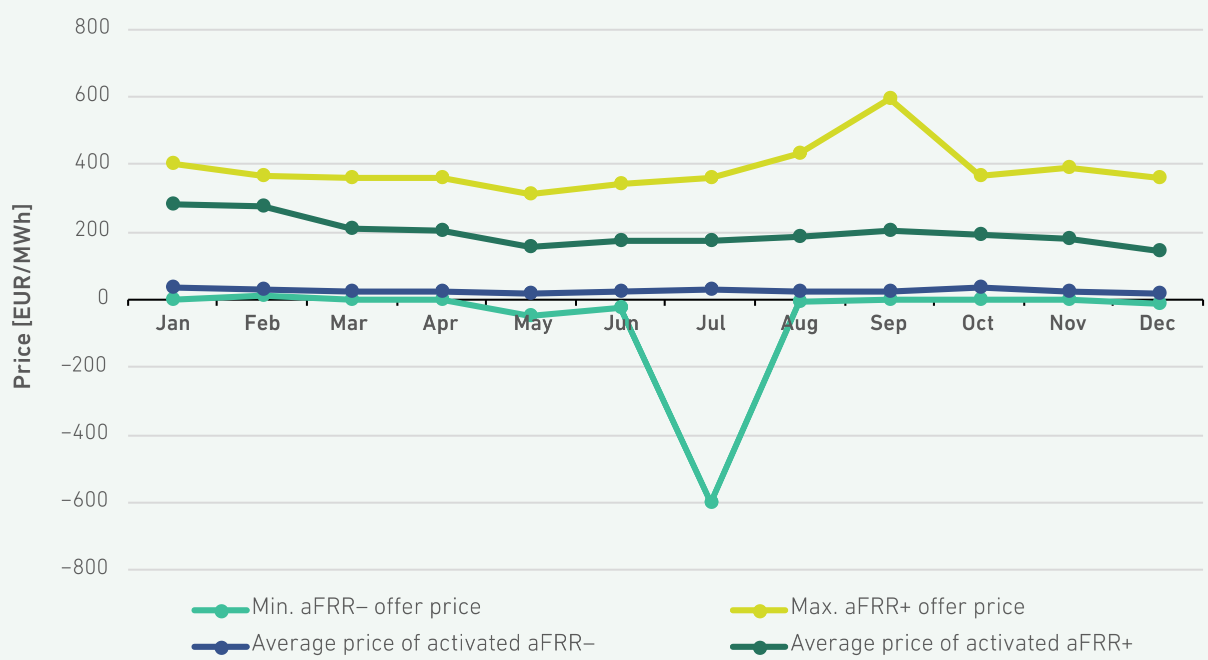
FIGURE 75: VOLUME OF TRADING AND PRICE RANGES IN THE MARKET OPERATOR BALANCING MARKET



SOURCE: BORZEN

In the frequency services market, the prices of balancing energy regarding the reserve capacity for frequency restoration (FRR) are established depending on the submitted offers from qualified providers of balancing services, which submit separate offers for positive (FRR+) and negative (FRR–) balancing, and separate offers for automated (aFRR) and manual frequency restoration reserve (mFRR). The transmission system operator uses a trading platform to collect offers and activate aFRR and mFRR energy. Every hour, the trading platform collects offers while the system selects the most favourable offer based on the list of offers and the current balancing needs. This is then the basis for the activation of balancing energy in the final concluded transaction according to the pay-as-bid principle.

FIGURE 76: PRICE TRENDS OF OFFERS AND ACTIVATED aFRR ENERGY



SOURCE: ELES

Figure 76 shows price trends and activated energies of the aFRR– and aFRR+ reserve for frequency restoration. Due to activations according to the list of offers, the actual prices are more favourable than the range of prices shown here. The highest prices for the aFRR+ positive balancing were reached in January, when the average price of the activated energy amounted to 283.77 EUR/MWh. The lowest and the least favourable prices for the aFRR– negative balancing were reached in December, when the average price of activated energy amounted to 18.78 EUR/MWh. The lowest offered hourly price for aFRR– was on 2 July for the H15 hour[43] and, due to price caps, coincided with the lowest day-ahead market price of –600 EUR/MWh.

The largest difference between positive and negative balancing prices was recorded in July, when it amounted to EUR 958.74/MWh.

In the market for system services for the automated aFRR reserve, the Act on Measures for the Management of Crisis Conditions in the Field of Energy Supply (ZUOKPOE), which entered into force on 22 September 2022, is still in force. At first, the Act limited the offer prices to 1.3 times the reached price for the day-ahead trading for positive balancing, and 0.7 times the reached price for the day-ahead trading for negative balancing. At the beginning of 2023, due to lower prices in the day-ahead market, the methodology was adjusted to redefine the following limiting factors:

TABLE 26: THE aFRR CAPPING FACTOR, WHICH IS SET ACCORDING TO SIPXh

SIPXh in EUR/MWh	aFRR+ Factor	aFRR– Factor
Up to 0.00	0.8	1.2
From 0.01 to 200.00	1.8	0.2
From 200.01 to 350.0	1.5	0.5
From 350.01 to 450.00	1.4	0.6
450.01	1.3	0.7

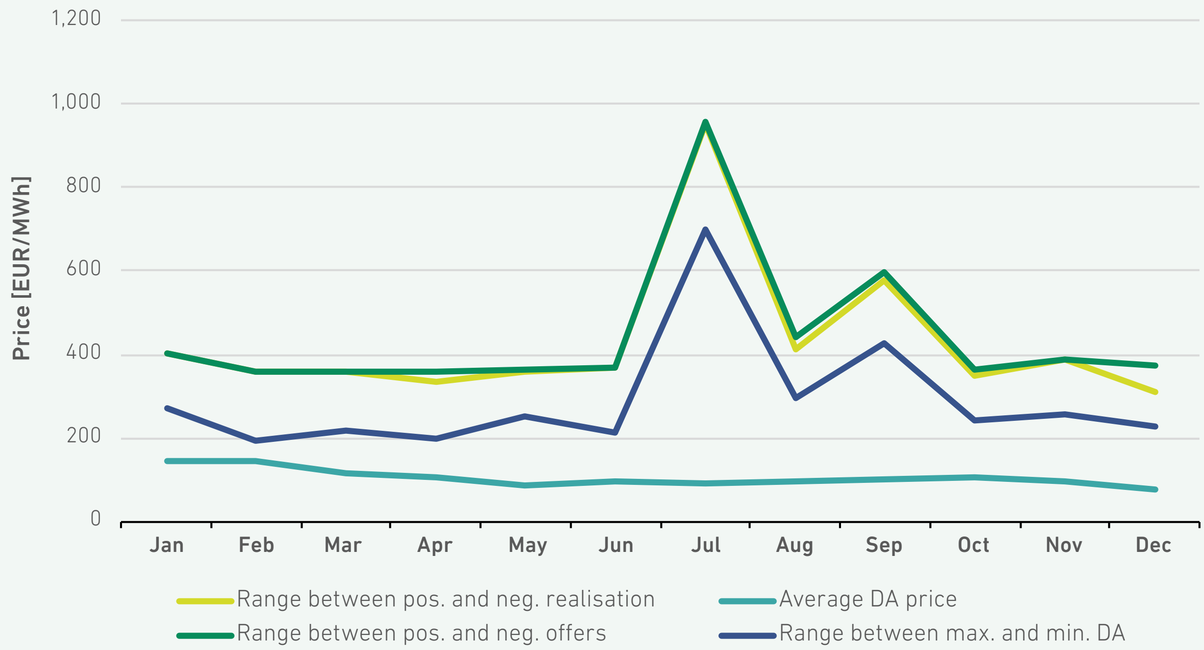
SOURCE: ELES

The maximum price for the aFRR+ balancing energy and the minimum price for the aFRR– balancing energy per hour of supply *h* shall be determined as the product of SIPXh and the respective aFRR+ or aFRR– Factor. This value represents the maximum price for aFRR+ and the minimum price for aFRR– that can be quoted by the provider of balancing services when submitting energy offers for the aFRR balancing energy for a delivery hour *h*.

Figure 77 shows that there are no significant differences in offers and realisations in the range between positive and negative energy throughout the year. This is due to the measures still in force under the ZUOKPOE, which limited the offered prices, as indicated in table 26. It is also noticeable that all the providers tend to offer prices close to the maximum or minimum allowed. As a consequence, the realisation is carried out at these prices and thus does not lead to significant differences in the range of aFRR+/aFRR– realised/available. The biggest difference between the latter is observed in December, when the realised prices were still slightly lower than the offered ones.

43 The Agency deliberately removed from the analysis some »isolated« price data points for hour 15 on 2 June 2023, which were caused by an error in the data exchange between ELES and the BSP energy exchange. In fact, the error resulted in a price of activated aFRR– energy above the cap of –1,696.72 EUR/MWh during the time interval in question. Since the vast majority of the aRFP balancing energy was activated in a positive direction in hour 15, the impact on the balancing costs was completely negligible. This data intervention avoids a distorted perception of what was happening in the relevant market. .

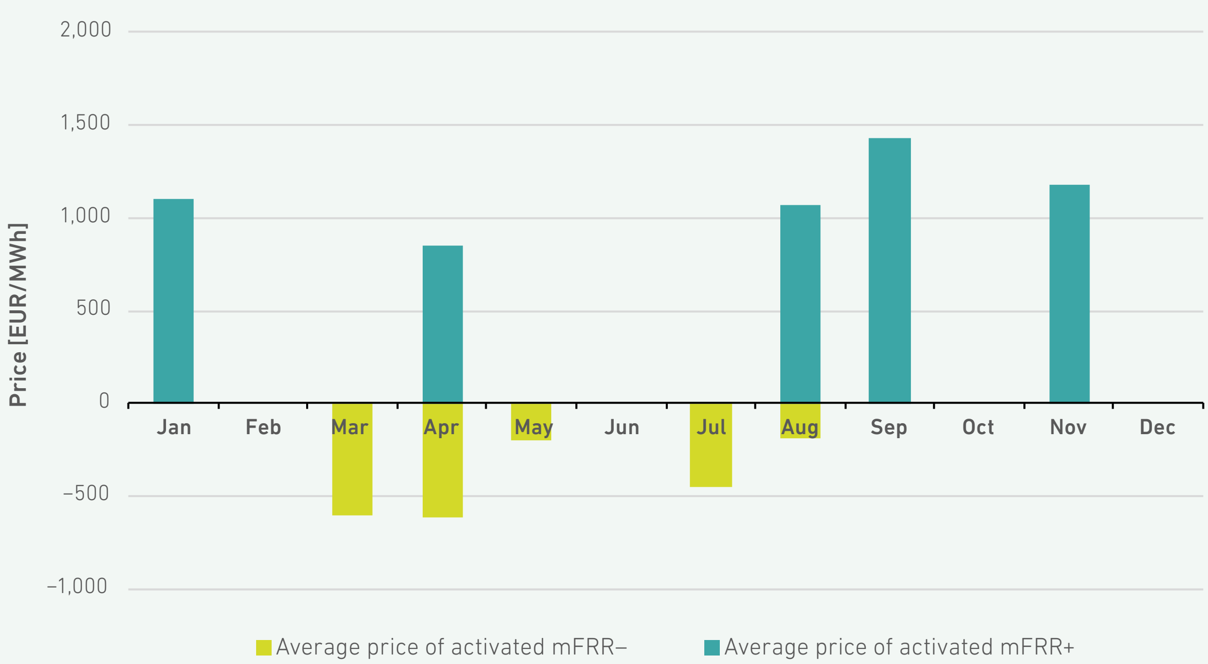
FIGURE 77: THE CORRELATION BETWEEN THE RANGE OF MINIMUM PRICES OF THE REALISED/OFFERED aFRR– AND THE MAXIMUM PRICES OF THE REALISED/OFFERED aFRR+, THE AVERAGE PRICE OF THE DAY-AHEAD TRADING AND THE RANGE OF THE MINIMUM AND MAXIMUM PRICE OF THE DAY-AHEAD TRADING



SOURCE: ELES

With regard to the mFRR+ positive balancing, the average prices of activated energy in 2023 reached 1,125.99 EUR/MWh, while for the mFRR– negative balancing they amounted to –411.23 EUR/MWh. Figure 78 shows the average prices of activated mFRR– and mFRR+ energy for the months in which the energy was activated. The mFRR+ positive balancing was only activated in January, April, September and November, while the mFRR– negative balancing was only activated in March, April, May, July and August.

FIGURE 78: PRICE TRENDS OF ACTIVATED mFRR ENERGY



SOURCE: ELES

Estimated Market Price of Electricity for which Producers are Eligible for Support

The Energy Agency establishes the estimated market price of electricity produced in power plants that are included in the support scheme. This is done as part of monitoring the effect that this electricity has on the development of the prices of other electricity on the market that does not benefit from financial support for production. That monitoring aspect is particularly important if the share of electricity for which producers are eligible for support is large. That is because it can begin to distort market prices while placing producers without support in a non-competitive position. The share of generated electricity for which producers can receive support remained below 10% of all the electricity generated in Slovenia (Table 12). Although no influence of the support on pricing was detected, the Energy Agency keeps monitoring the market and determining the estimated market price of electricity for which producers are eligible for support.

For the third year in a row, the estimated market price of electricity is below the average hourly price in BSP

The model for calculating the market price of electricity for which producers are eligible for support has not changed since its introduction. It is described in more detail in previous reports on the energy situation in Slovenia. It is based on the weighted price of electricity generated and sold in the market by producers that are eligible for operational support and the weighted price of electricity acquired by Borzen in the so-called Eco Group, for which the producers receive support in the form of guaranteed purchase. The weighted price of electricity acquired by Borzenis formed at an annual auction carried out by Borzen. The latter sells the Eco Group electricity to the provider presenting the best offer.

As has been the case for several consecutive years now, most of the electricity included in the support scheme in 2023 was sold freely on the market, so within the framework of operational support. The estimated market price was thus mainly influenced by the weighted price of electricity achieved by the producers by selling the generated electricity to the suppliers on the market. Table 27 shows the estimated market price of electricity together with the average base price in BSP for the 2019–2023 period. In 2023, as in the previous two years, it was lower than the average base price, namely by 27%. When the electricity purchase prices were determined for 2023, no one could have foreseen the upcoming record-level increases. Due to that, the purchase prices were set at considerably lower values compared to those that were later established in the BSP in 2023.

TABLE 27: COMPARISON OF THE ESTIMATED MARKET PRICE OF ELECTRICITY FOR WHICH PRODUCERS ARE ELIGIBLE FOR SUPPORT AND THE AVERAGE ANNUAL BASE PRICE IN BSP IN THE 2019–2023 PERIOD

Year	Estimated market price [EUR/MWh]	Average hourly price in BSP [EUR/MWh]
2019	55.86	48.74
2020	53.10	37.55
2021	44.71	115.03
2022	108.71	274.47
2023	45.86	104.33

SOURCES: ENERGY AGENCY, BORZEN, BSP

Allowance Trading

Allowance is a general term for a certificate or authorisation to emit one tonne of carbon dioxide equivalent in the atmosphere.

The adjustments to the free allocation of greenhouse gas emission allowances introduced by Directive (EU) 2018/410[44] and made effective by Commission Implementing Regulation (EU) 2019/1842[45] have improved the efficiency and incentives provided by the free allocation, but have increased the administrative burden and made the previous date of issue of the free allocation, 28 February, unrealistic. In order to better take into account the adjustments to the free allocation of allowances, it was appropriate to make adjustments to the compliance cycle. The deadline for competent authorities to allocate allowances free of charge should therefore be postponed from 28 February to 30 June and the deadline for operators to surrender allowances should be postponed from 30 April to 30 September (Directive (EU) 2023/959[46])[47].

Figure 79 shows the price trends for allowances for forward[48] contracts with a maturity in December 2023 (product of EUA on EEX). The average price in the observed period was around 85 EUR per tonne of CO_2, which is 5.4% higher compared to the average price of allowances from 2022 for forward contracts matured in December 2022. The lowest clearing price for allowances was reached at the end of the trading day on 15 December 2023 (66.35 EUR per tonne of CO_2). During the year, a trend of fluctuating prices was observed on the allowance market. The highest clearing price for allowances was reached at the end of the trading day on 21 February 2023 (100.34 EUR per tonne of CO_2).

The EUA price averaged €85.3/t in 2023, after breaking the symbolic €100/t level in February and setting a new record since its introduction in 2005. The allowance price remained at relatively high levels throughout the year, mainly due to positive progress on ETS policy as EU lawmakers finalised the ambitious ETS reform legislation under the Fit for 55 plan. In the last quarter of 2023, the European carbon price fell sharply due to a weak demand for allowances in a context of sluggish industrial activity, low gas prices that encouraged fuel switching and additional allowance sales to finance REPowerEUs. Towards the end of 2023, EUA prices fell, reaching around €70 at the end of the year.

The EUA price was significantly affected by the return of coal-to-gas substitution

A key feature of the development of the European EUA market in 2023 was the return of fuel switching, which was related to the low gas prices that encouraged the substitution of coal for gas in the power generation sector. The European TTF gas price fell from 80 EUR/MWh at the start of 2023 to just €23/MWh in June and remained below 40 EUR/MWh in the fourth quarter. The low gas price combined with mild winter weather reduced the operating hours of coal-fired power plants and limited the emissions of public institutions and the demand for allowances. As a consequence, the daily results of the EUA auctions deteriorated in the fourth quarter, when the stagnating demand for allowances caused the EUA reference forward supply contract to fall to a one-year low, below 70 EUR/t on 14 December. The price then recovered in the last two trading weeks of 2023 as investors built up new positions for 2024 in anticipation of a lower supply of allowances.

44 Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814.

45 Commission Implementing Regulation (EU) 2019/1842 of 31 October 2019 laying down rules for the application of Directive 2003/87/EC of the European Parliament and of the Council as regards further arrangements for the adjustments to the free allocation of emission allowances due to activity level changes.

46 Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system.

47 Data on surrendered allowances will only be available in October 2024. As a result, the analysis of emissions trading is shortened compared to the content of previous years.

48 Forward contracts are long- and short-term. Long-term forward contracts mature in the period that is longer than one year (an example of such a contract is the forward supply contract for 2024), while short-term contracts mature in the period that is shorter than one year (for example, the forward supply contract for December 2022).

FIGURE 79: PRICE TRENDS OF ALLOWANCES (EUA) IN THE EEX EXCHANGE (BOUGHT IN 2023 FOR 2024)

SOURCE: MONTEL

Market Transparency

Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (hereinafter the REMIT Regulation) is key to ensuring the integrity and transparency of the energy market. Together with Commission Implementing Regulation (EU) No 1348/2014 of 17 December 2014 on data reporting implementing Article 8(2) and (6) of Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency (hereinafter Implementing Regulation (EU) No 1348/2014) and the Energy Act (EZ-2, until 8 May 2024 EZ-1) it represents a comprehensive regulatory framework for monitoring and supervising the European electricity and natural gas wholesale markets. The Regulation consists of three major parts: prohibition of market manipulation and insider trading, a requirement for the effective and timely publication of inside information, and the appropriate legislative framework for comprehensive market monitoring.

Monitoring the market based on the REMIT Regulation includes monitoring all wholesale energy products including orders to trade regardless of the place of trading. It also includes basic information on the availability of the energy infrastructure. The type and method of reporting information are specified in Implementing Regulation (EU) 1348/2014. All data is gathered by the Energy Agency for the Cooperation of Energy Regulators (ACER). Pursuant to an agreement, the ACER provides the Agency with the data the latter needs to monitor the national energy market. It submits daily data, covering the Slovenian bidding zone and the bidding in the EU, and data related to the activity of market participants that are registered with the Energy Agency.

The Energy Agency is handling 18 cases of alleged breaches of the REMIT Regulation

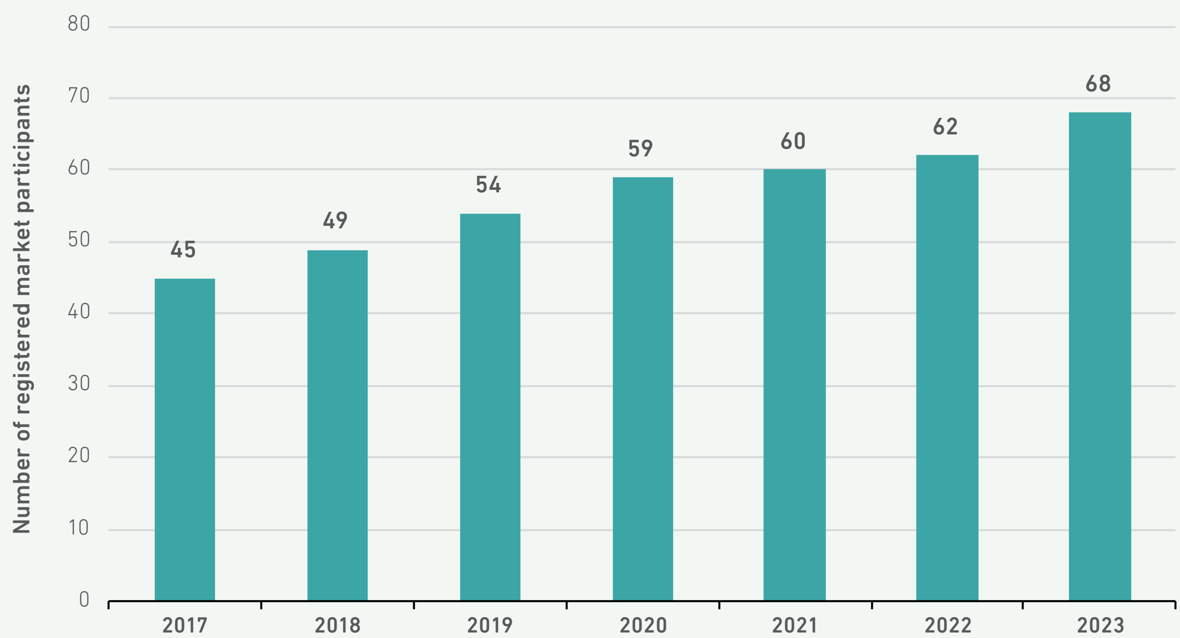
On 14 March 2023, the European Commission presented its Proposal for a Regulation of the European Parliament and of the Council amending Regulations (EU) No 1227/2011 and (EU) 2019/942 to improve the Union's protection against market manipulation in the wholesale energy market (European Commission, Proposal No COM(2023) 147 final 2023/0076 (COD) of 14 March 2023).[49]

49 Adoption procedure can be found at the following link: https://eur-lex.europa.eu/legal-content/EN/HIS/?uri=CELEX:52023PC0147.

The main elements of the proposal were to redefine the concepts of market manipulation and inside information and to improve cooperation and the sharing of information between the national regulatory authorities and the national financial authorities of EU Member States. The upgraded legislation also provides for the harmonisation of penalties and sanctions at the EU level and introduces new competences for the ACER. With the aim of ensuring the greater transparency and integrity of the markets, the amended REMIT Regulation proposes the creation of digital reference centres for market data and the development of advanced mechanisms for reporting and detecting suspicious transactions. These improvements will help stabilise energy prices and provide better protection for final consumers by allowing prices on the wholesale markets to reflect more credibly the dynamics between supply and demand. Transparent and regulated markets are key to promoting competitiveness, increased investment in energy infrastructure and innovation, which can lead to lower prices and improved quality of service. On 17 April 2024, Regulation (EU) 2024/1106 of the European Parliament and of the Council of 11 April 2024 amending Regulations (EU) No 1227/2011 and (EU) 2019/942 as regards improving the Union's protection against market manipulation on the wholesale energy market was published in the Official Journal of the European Union. This Regulation is also known as the REMIT II Regulation.[50]

In accordance with REMIT, market participants have to register with the national regulatory authority in the Member State in which they are established or resident or, if they are not established or resident in the EU, in a Member State in which they are active. 68 participants registered with the Energy Agency by 31 December 2023.

FIGURE 80: REGISTRATION OF MARKET PARTICIPANTS IN SLOVENIA IN THE 2017–2023 PERIOD



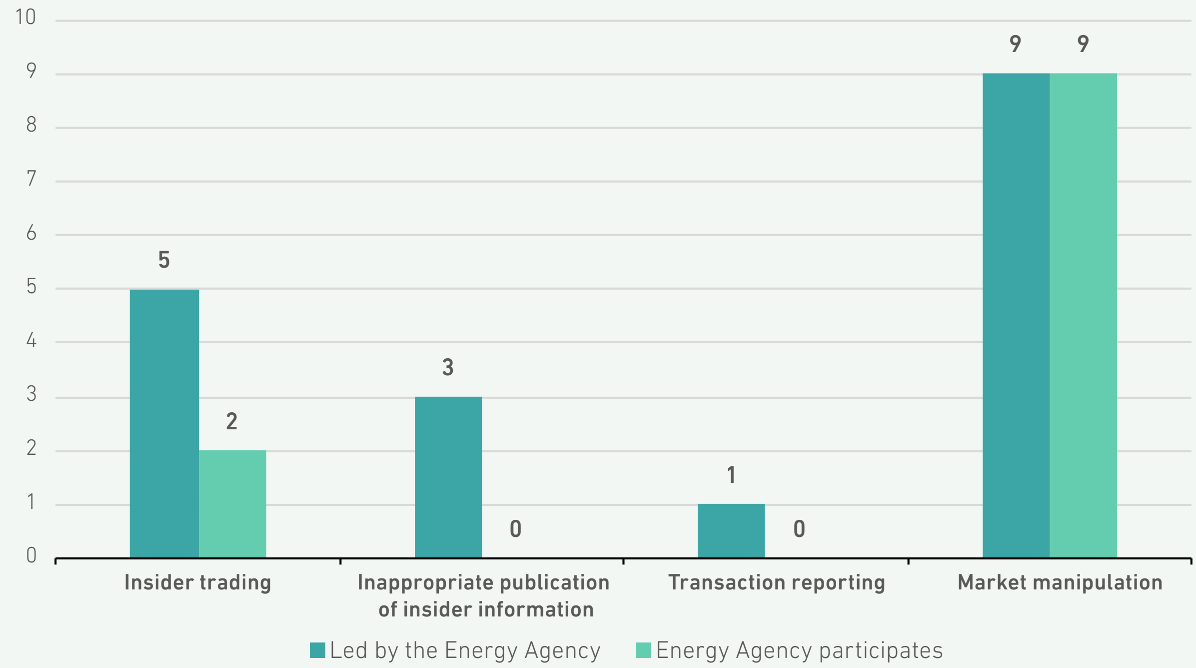
SOURCE: ENERGY AGENCY

In 2023, as part of monitoring the wholesale energy markets according to the REMIT Regulation, the Energy Agency conducted 18 cases and was at the same time included in nine foreign cases as part of mutual assistance between national regulative bodies. The number of cases conducted by the Energy Agency may vary year by year, if a case is taken over by another national regulative body due to changes in competence, which usually occur in the early phase of investigation and based on newly acquired facts. In 2023, the Energy Agency concluded one procedure.

Types of breaches in the investigations led by the Energy Agency are shown on the left-hand side of the chart, and the investigations are carried out independently or in collaboration with foreign national regulative bodies, as shown in Figure 81. In some cases a multitude of violations may be under investigation, therefore the total number of violations under investigation is higher or equivalent to the number of cases under investigation. The same figure shows a number of violations that are under investigation by foreign national regulators, with the Energy Agency being involved as expert assistance.

50 Link to the text of REMIT II: https://eur-lex.europa.eu/legal-content/SL/TXT/PDF/?uri=OJ:L_202401106.

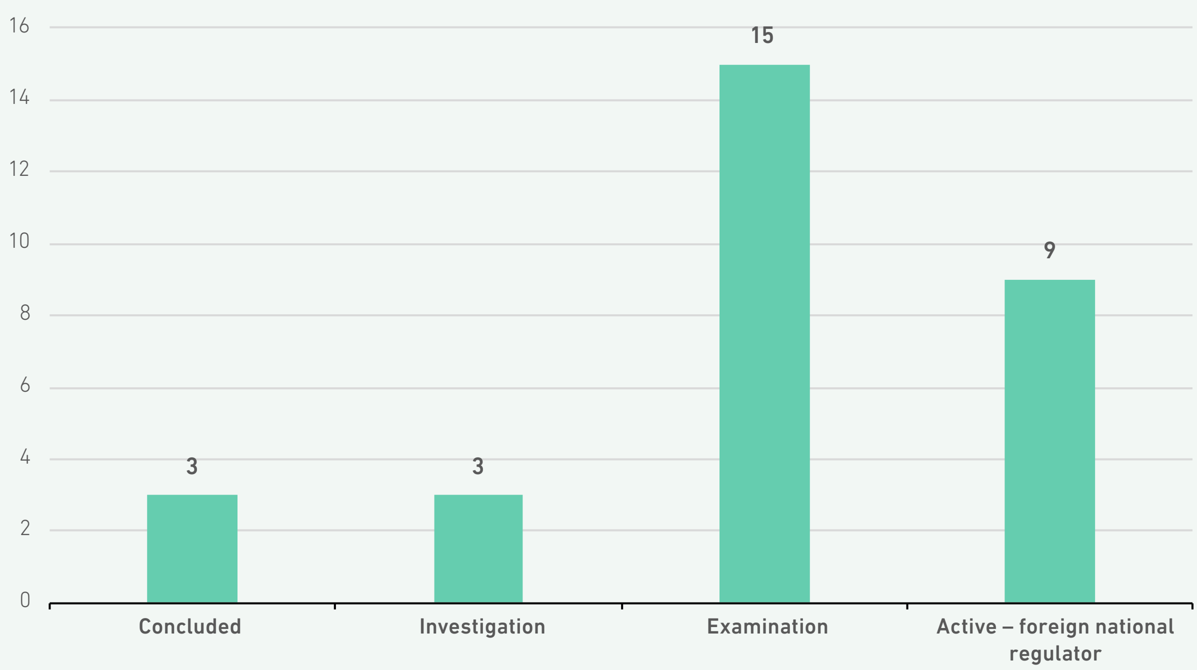
FIGURE 81: THE NUMBER OF VIOLATIONS BASED ON THE TYPES OF VIOLATIONS ALLEGED AGAINST MARKET PARTICIPANTS IN PROCEEDINGS INVOLVING THE ENERGY AGENCY



SOURCE: ENERGY AGENCY

An overview of the status of the cases is shown in Figure 82. In 2023, the Energy Agency concluded one case and conducted three investigations, while fifteen were in the examination phase. The objective of the examination is to gain a deeper understanding of suspicious conduct by collecting additional information. In this phase, the Energy Agency identifies the circumstances in which the alleged violation occurred and reaches a decision on whether there are sufficient grounds for suspicion of prohibited conduct. If the grounds are sufficient, the Energy Agency commences an investigation. In the nine cases in which the Energy Agency is involved as expert assistance, the procedures are at least in the examination phase.

FIGURE 82: INVESTIGATION STATUSES



SOURCE: ENERGY AGENCY

Five out of the eighteen cases led by the Energy Agency were initiated by the ACER based on the cooperation agreement concluded with them. Procedures were initiated on the basis of reported suspicious transactions or alarms triggered by the control system for detecting manipulation and abuse within the ACER continuous market monitoring system. Twelve cases were remitted to the Energy Agency directly by the persons involved in arranging transactions with wholesale energy products as part of their activity. According to Article 15 of the REMIT Regulation, these persons are mandated to immediately notify the national regulatory activity if they have reason to suspect that a transaction has taken place on the wholesale market that constitutes a breach of the prohibition on insider trading or if such a transaction constitutes market manipulation. One case was initiated on the basis of a self-report by a market participant.

The Energy Agency has been dealing with all the cases in close cooperation with foreign regulatory authorities in the region and with ACER, which ensures a coordinated approach to solving the cases.

Through this comprehensive and proactive approach, the Energy Agency contributes to ensuring transparency, fairness and stability in the European energy market, which benefits all market participants and promotes confidence in the energy system.

Market Effectiveness

Below, the effectiveness of the wholesale market in Slovenia in terms of their level of competitiveness and liquidity is analysed. Monitoring the registration of closed contracts and operational forecasts, which is essential for ensuring an effective market, provides a bigger picture of trading because it includes bilateral trading.

Registration of Closed Contracts and Operational Forecasts

The registration of closed contracts and operational forecasts is carried out by the market operator Borzen. These contracts are the basis for drawing up the trading plans of the members of the balance scheme and for the production of a transmission system operator's schedule, and, after the supply has taken place, for calculating the imbalances of balance responsible parties.

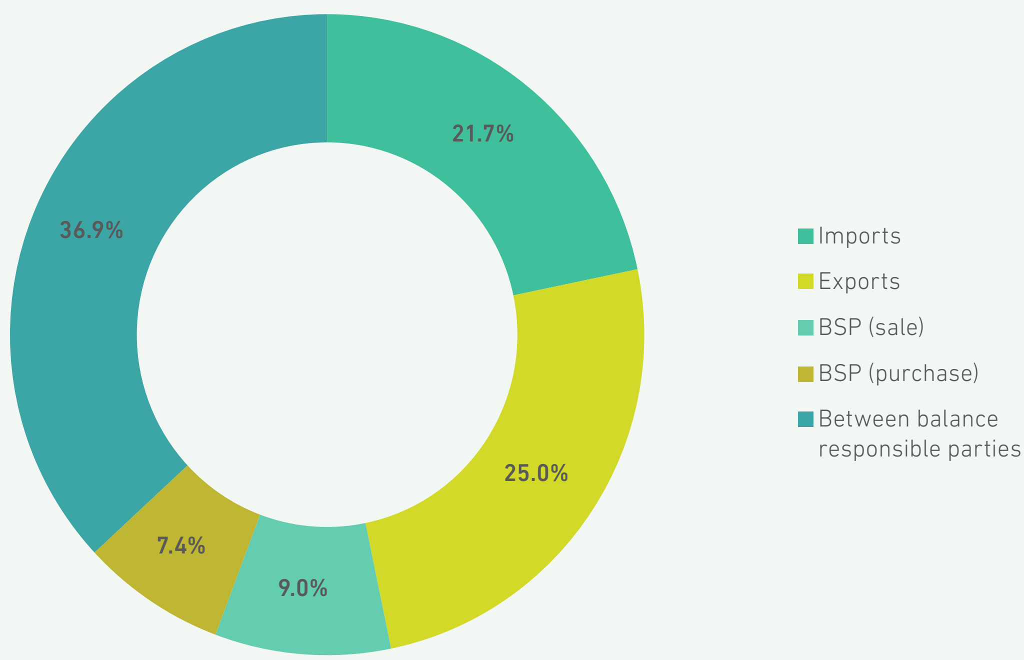
Borzen registers all closed contracts that affect the energy balance of a member of the Slovenian balance scheme. It registers all contracts concluded between members of the balance scheme, contracts concluded on the energy exchange and import-export closed contracts. Contracts concluded on bilateral markets are part of the registered import-export closed contracts and closed contracts concluded between members of the balance scheme. Bilateral trading is carried out between two contracting parties outside an organised power exchange.

In addition to closed contracts, Borzen also registers operational forecasts, which represent forecasts of the delivery and consumption of electricity by the members of the balance scheme for those delivery points for which open contracts are concluded. In 2023, the market operator registered a total of 101,914 closed contracts and operational forecasts for a total amount of 71,198,510 MWh. Compared to the previous year, the total number of registered closed contracts and operational forecasts rose by 2.6% in 2023, while the trading volume dropped by 5.5%.

The amount of electricity sold or purchased through closed contracts in 2023 was 44,380,977 MWh. Compared to 2022, when the total amount of closed contracts was 50,077,730 MWh, that amount decreased by 11.4%. The total amount of closed contracts decreased due to a drop in the trading volume within Slovenia, namely less trading between the members of the balance scheme, while the amount of the closed contracts on regulation area margins increased compared to 2022.

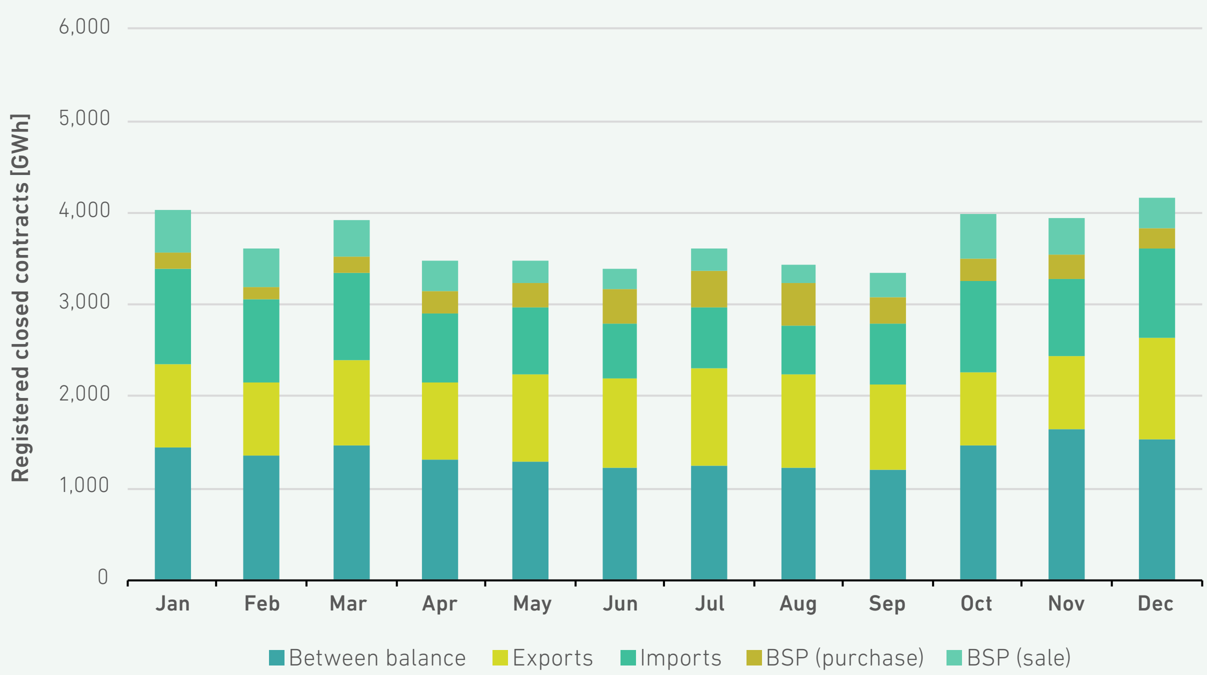
The structure of the volume of registered closed contracts and their corresponding quantities are shown in Figures 83 and 84.

FIGURE 83: STRUCTURE OF THE VOLUME OF REGISTERED CLOSED CONTRACTS



SOURCE: BORZEN

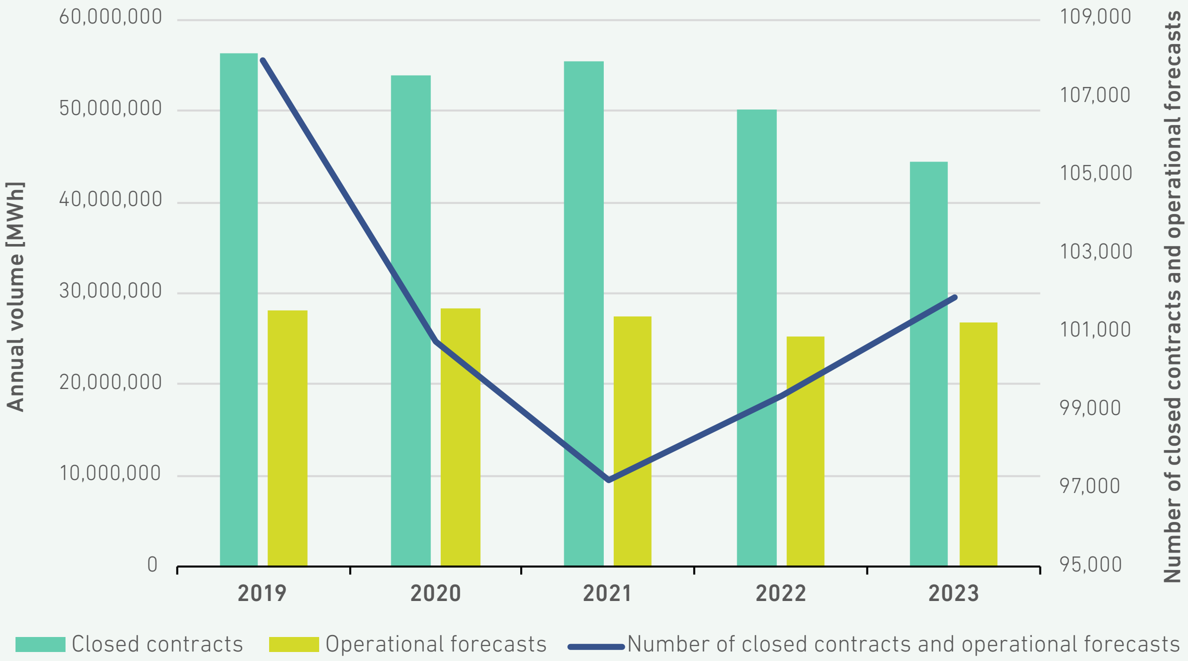
FIGURE 84: AMOUNT OF ELECTRICITY SOLD OR PURCHASED THROUGH CLOSED CONTRACTS PER MONTH



SOURCE: BORZEN

Figure 85 shows the evolution of the annual volume of registered closed contracts, the annual volume of operational forecasts and the annual number of the two over a five-year period. It can be observed that the volume of closed contracts has decreased by 11.4% in the last year and by 19.9% compared to 2021.

FIGURE 85: ANNUAL VOLUME OF CLOSED CONTRACTS, OPERATIONAL FORECASTS AND NUMBER OF CLOSED CONTRACTS AND OPERATING FORECASTS IN THE 2019–2023 PERIOD



SOURCE: BORZEN

Day-Ahead Market

Day-ahead trading takes place on the BSP in the form of auction trading. During the trading stage, market participants enter the standardised hourly products into a trading application. The marginal price is calculated based on an algorithm of the trading application. Such trading is included in interregional market coupling, where any available CZCs are allocated. In 2023, market coupling included the borders of the Slovenian bidding zone with the bidding zones of Italy, Austria, Croatia and Hungary. The latter coupled with the Slovenian bidding zone in July[51]. The volume of trading is influenced by numerous factors, most importantly by the quantities of available CZCs.

16 market participants were involved in day-ahead trading in 2023, which is one fewer than in 2022. The majority of them were domestic participants.

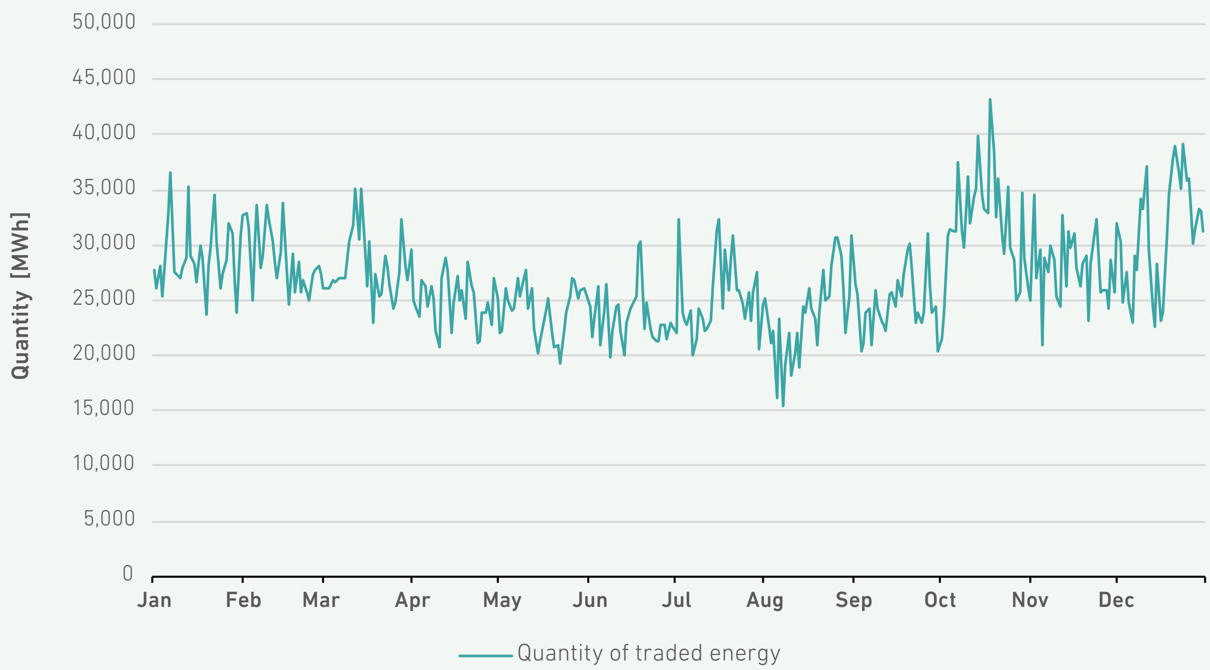
The total volume of trading in the Slovenian day-head market in 2023 amounted to 9,817,580 MWh or 4.0% more than in 2022. Bids in the total amount of 6450 GWh were recorded, of which 3821 GWh were purchase bids and 2629 GWh were sales bids. Despite the increase in sales bids, the volume of bids in this exchange segment declined due to a significant decrease in the volume of purchase bids. The average daily trading volume was 26,897 MWh and the highest daily trading volume, which was reached on 18 October 2023 for the delivery day of 19 October 2023, was 43,161 MWh. To illustrate the trading volume better, we can say that the average bidding for a single hour was 1.12 GW of capacity.

51 On 8 June 2022, the BSP together with 10 electricity market operators and 16 transmission system operators entered the Core Capacity Calculation Region as part of the day-ahead market coupling. Since then, the Core Calculation has been underway on all borders except with Italy. The last coupling was established on 30 June 2022 on the border with Hungary. In commercial terms, the coupling was included in the process of calculating cross-border capacity from 6 July 2022 for the day-ahead auction and from 7 July 2022 it was added for trading on the intraday market.

The highest monthly trading volume in 2023 was again reached in October, at 991,554 MWh. The lowest monthly trading volume was reached in June. In the first half of 2023, trading volumes exceeded those of the same period in 2022 by 12.4%, with the highest level in March. Meanwhile, in the second half of 2023, trading volumes fell by 2.8%, most markedly in November.

4% larger volume of trading in the Slovenian day-ahead market

FIGURE 86: AMOUNT OF ELECTRICITY TRADED IN 2023



SOURCE: BSP

Intraday Market

Intraday trading on the Slovenian organised market is conducted on the BSP. As regards intraday coupling, the Slovenian electricity exchange joined the European single intraday market on its borders with Croatia, Austria, Italy and Hungary[52]. On the continuous intraday market, trading is carried out 24 hours per day with hourly, 15-minute and block products[53].

Intraday trading allows market participants and balance responsible parties to post additional bids or purchases after the close of day-ahead trading and thus adjust their trading plans accordingly and harmonise them with the operational forecasts. Trading in the intraday market concludes one hour before physical delivery and converts into trading in the balancing market, where market participants are left to trade with only the TSO. Prices in the intraday market always provide a clearer reflection of the real-time value of energy, which can be put to use by market participants. As providers of flexibility, they can adjust their generation and/or consumption within a short period of time.

Ten Slovenian and four foreign market participants participated in the intraday market on the BSP at the end of 2023. Besides continuous trading, market participants can perform intraday auction trading through complementary regional auctions with Italy.

52 As of 7 June 2022, the border with Hungary was also added for trading on the intraday market.
53 A more detailed definition of products included in intraday continuous trading is available on the BSP Southpool official website: https://www.bsp-southpool.com/podatki-in-informacije/pravila-borze-in-cenik.html

In 2023, trading volumes increased by 42% in the segment of intraday continuous trading[54] and decreased by 27% in the segment of auction intraday trading.

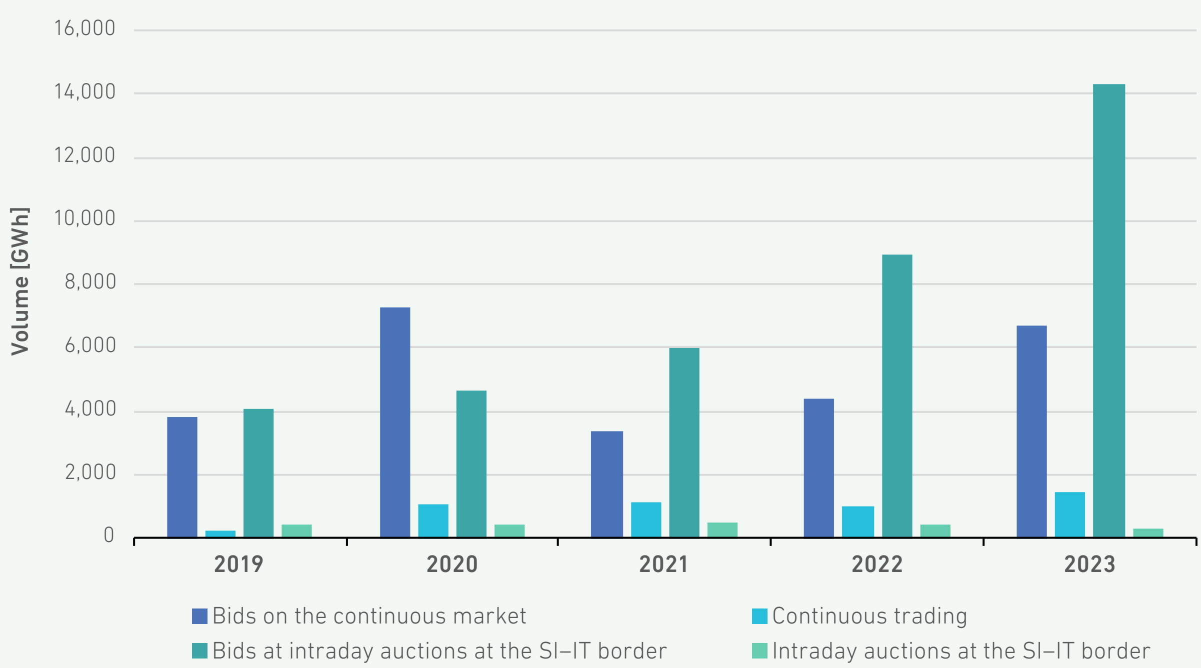
In 2023, the total volume of continuous intraday trading amounted to 1,434 GWh, which is more than the year before, when the total volume of continuous intraday trading amounted to 1,011 GWh (see the chapter Prices on the Intraday Continuous Market). Bids in the total amount of 6,692 GWh were recorded, of which 2,890 GWh were purchase bids and 3,802 GWh were sales bids. The volume of bids in this exchange segment grew by 52.09% in 2023.

As part of the total volume of intraday trading, the trading volume on the balancing market amounted to 71 GWh. An explanation of why certain quantities in intraday trading are treated as quantities in the balancing market is given in the following chapter.

In 2023, the volume of auction intraday trading amounted to 325 GWh (implicit auctions MI1, MI2, MI3 and MI6 at the Slovenian-Italian border), which is 27% lower compared to the previous year, when the volume of the auction intraday trading amounted to 444 GWh. Bids in the total amount of 14333 GWh were recorded, of which 7636 GWh were purchase bids and 6697 GWh were sales bids. In 2023, the volume of bids in this exchange segment reached the highest mark of the comparative period of the last three years. The volume of trading on the intraday power exchange in 2023 accounts for 15.2% of all trading on the Slovenian electricity exchange, which is slightly less compared to 2022, when the volume of trading on the intraday power exchange accounted for 13.3% of all trading on the Slovenian electricity exchange.

42% larger volume of trading in the Slovenian continuous intraday market

FIGURE 87: THE VOLUME OF TRADING AND BIDS ON THE INTRADAY POWER EXCHANGE FOR THE PERIOD 2019–2023



SOURCE: BSP

54 This was driven, among other things, by increased transmission capacity at the SI-AT border based on the coordinated allocation of cross-border transmission capacity on the basis of intraday power flows.

Trading on the Market Operator Balancing Market

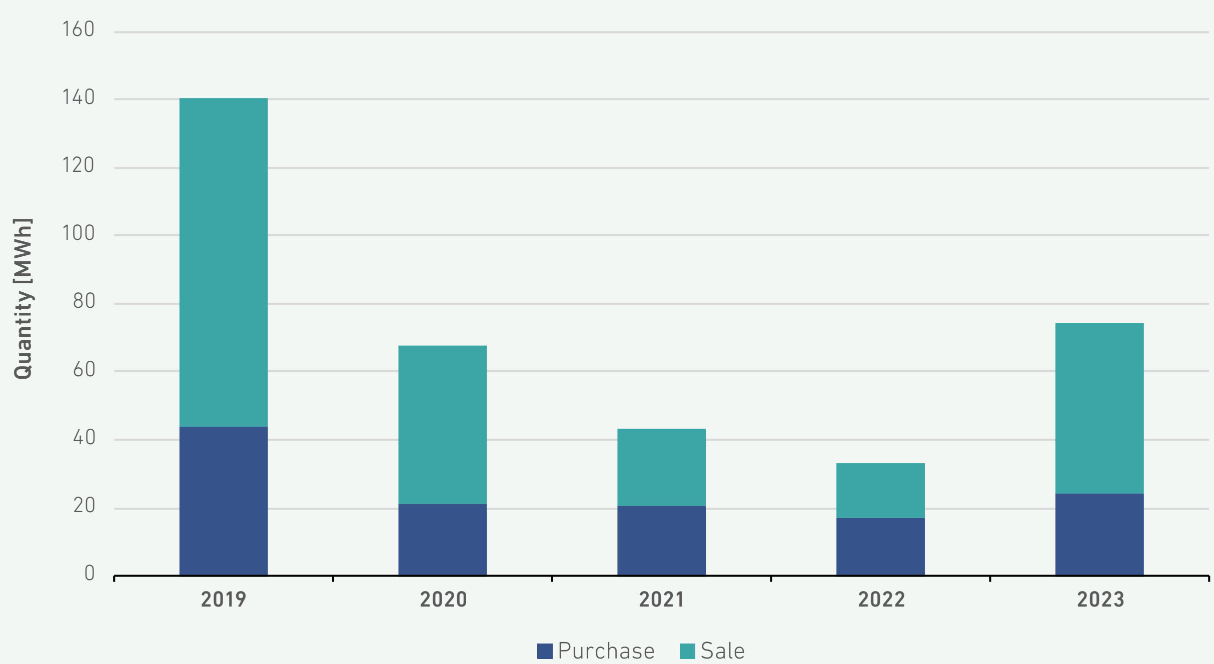
The balancing market in Slovenia is run by the market operator Borzen. On the balancing market, the transmission system operator may purchase or sell balancing energy to keep the electricity system balanced. By doing this, the operator releases volumes of frequency restoration reserves. The rules for implementing the balancing market set that bids entered by members of the balancing market within intraday trading may be accepted by the TSO as bids placed in the balancing market, and that all transactions concluded with the TSO's bids for the purpose of balancing the electricity system are regarded as transactions in the balancing market. Transactions in the balancing market can be divided into transactions carried out in the intraday trading stage outside of the period of the last hour before the supply, and transactions carried out in the trading stage in the last hour before the supply. The latter is very high and reached a 96% share in 2023 (71 GWh). In 2021 and 2022, the percentage was as high as 99%. This means that the transmission system operator mostly purchases or sells electricity on the market operator balancing market in the last hour before the supply. For practical reasons, trading in the Slovenian balancing market is carried out together with intraday trading. Under the authority of the market operator, both markets are carried out by BSP. The same rules apply to both markets, subject to the principle that intraday trading ends one hour before the time of delivery and converts into trading in the balancing market.

A 124% increase in trading volume on the balancing market

In 2023, 2451 transactions were concluded in the market operator balancing market for a total volume of 74.4 GWh. Of these, 24.4 GWh represented the purchase of balancing energy and 50 GWh the sale of balancing energy by the TSO. Compared to the year before that, the quantity increased by 124%. The sharp increase is mainly attributable to the higher negative and positive imbalances of the balance responsible parties in 2023. As a result, the TSO has increased the activation of almost all types of regulation (with the exception of aFRR, where we see a minimal decrease in activations), including the market operator platform for balancing energy.

Most of the trading was performed for hourly products with a total volume of 68 GWh of electricity. With 1,821 concluded transactions, hourly products were also the most traded product in the balancing market.

FIGURE 88: TRADING VOLUME OF ALL PRODUCTS ON MARKET OPERATOR BALANCING MARKET IN THE PERIOD BETWEEN 2019 AND 2019–2023



SOURCES: BORZEN, BSP

In 2023, the market operator balancing market accounted for 10,5%[55] of the entire system balancing, which is 4.6 percentage points more compared to 2022, when the share of the balancing market in the entire system balancing accounted for 5.9%. Besides the TSO, another four out of a total of 29 members included in the market operator platform participated in trading, which is one more than in 2022 when only three members participated. The total number of members has increased by three, from 29 to 32.

Trading with Balancing Energy on the ELES Systemic Services Market

The ELES ancillary services market is run by the TSO. Since the beginning of 2020, ELES has used the Slovenian platform for balancing services, which is controlled and managed by the transmission system operator, to activate aFRR and mFRR balancing energy. The platform is monitored and managed by the TSO and it also enables the collection and activation of aFRR and mFRR offers. The activation of the aFRR energy offers is carried out automatically via the management system, while with mFRR offers, the activation is done on demand via the mFRR auction and activation application. Providers of balancing services must meet the market criteria and many technical and communication requirements in line with the Rules and conditions for providers of balancing services on the ELES balancing market. The offers for balancing energy may only be submitted by qualified providers of balancing services. The provider of balancing services submits separate offers for balancing power and balancing energy, which must also be separated by balancing direction. The provider that was successful in the auction for balancing power must submit mandatory offers for balancing energy with an hourly resolution in line with the quantity and period of collected offers for balancing power. The remaining qualified providers can submit offers for balancing energy on a voluntary basis. According to the order of activation of the balancing energy offers, the most favourable offers on the list, classified according to price, are activated first. Based on the selected offers, the aFRR and mFRR balancing energy is accounted for according to the pay-as-bid principle.

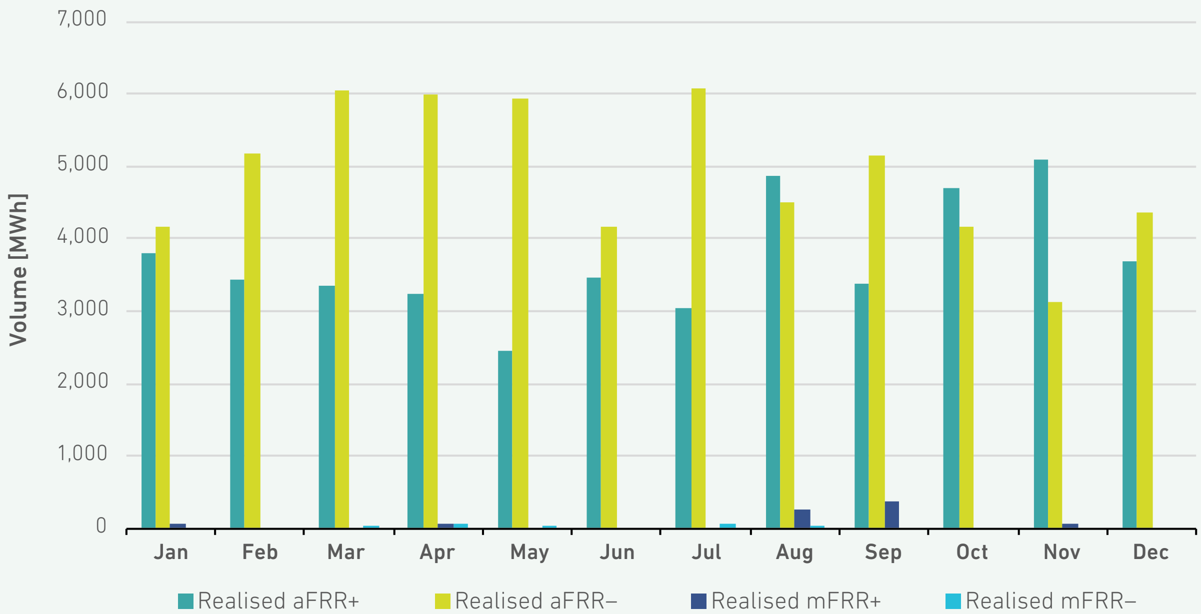
The level of competition on the aFRR and mFRR ancillary services market remains unchanged and extremely low

In 2023, only two providers bid on the aFRR balancing energy, while bids for the mFRR balancing energy were made by five qualified providers of balancing services. Consequently, there is a very high concentration of the ancillary services market, while competitiveness and liquidity remain low. In 2023, the quantity of bids for the positive balancing direction on the aFRR balancing energy trading platform was 523.4 GWh, and 522.9 GWh for the negative direction. The activated energy for the positive direction amounted to 44.5 GWh, and 58.8 GWh for the negative direction. The bids for the mFRR+ balancing energy amounted to 2143.2 GWh, while the bids for the mFRR– balancing energy amounted to 385.0 GWh. Out of this, the activated energy for the positive direction amounted to 799.0 GWh, and for the negative direction 164.0 GWh. The volumes of bids in certain months exceed the minimum volume of ancillary services, which means that bidders have made use of the option to submit voluntary competitive offers. The sum of the bid volumes by month shows that voluntary offers for the aFRR+ balancing energy were definitely made in October and for the mFRR balancing energy in September, October, November and December[56]. Nevertheless, the volume of voluntary offers is very small compared to mandatory offers, representing only 0.001% to 0.005% of the total volume of offers in the months concerned. This indicates poor competition for balancing service providers and low liquidity in this segment of the market.

55 Share of the sum of FCR, aFRR, mFRR, RR, IGCC, and Fskar quantities

56 From the aggregated data available, it is not possible to confirm with certainty the existence of these offers in other months, as not all providers are able to fully meet the minimum contractual requirements for the provision of services, which consequently reduces the monthly sum of the quantities offered.

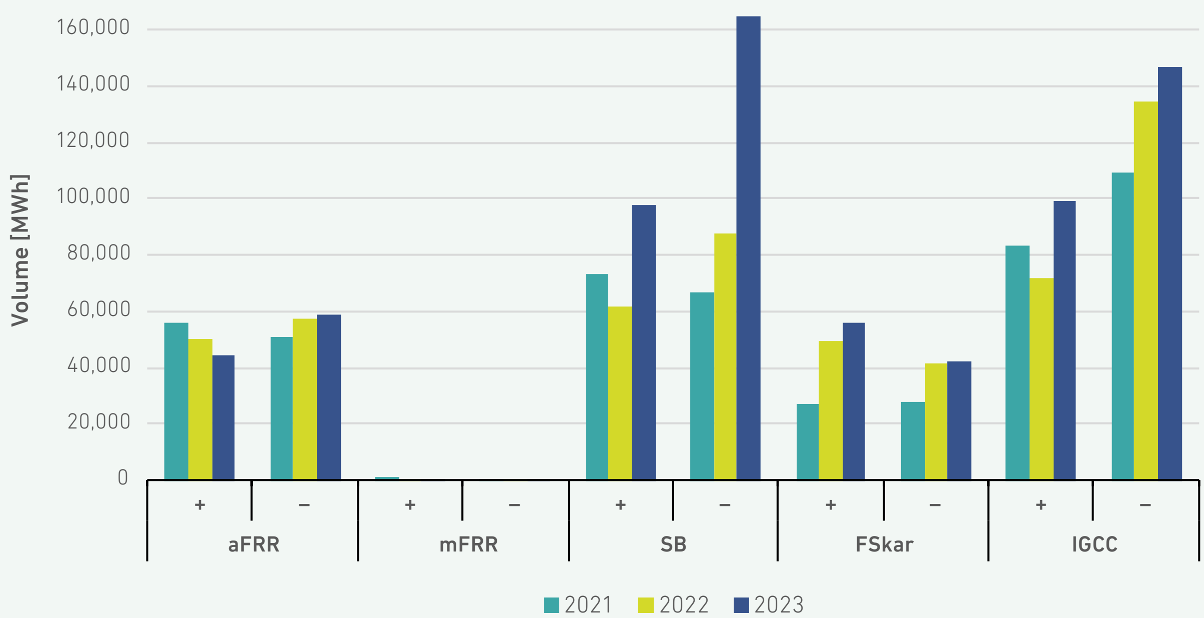
FIGURE 89: REALISED aFRR AND mFRR QUANTITIES



SOURCE: ELES

In the provisioning of the aFRR-activated quantities, 44.5 GWh of positive and 58.8 GWh of negative energy indicates that in 2023, ELES activated less positive and more negative energy compared to 2022, when they activated 50.3 GWh of positive and 57.7 GWh of negative energy. Similarly to the imbalance netting, the aFRP service showed a slightly higher need for regulation in the negative direction than in the positive direction for the second year in a row. As a result, in the context of offsetting positive imbalances within the IGCC in 2023, ELES exported 146.9 GWh to offset positive imbalances, reducing the need for negative aFRP energy activation, and imported 99.2 GWh to offset negative imbalances, with the corresponding decrease in the activation of positive aFRP energy. Since 2019, Slovenia has been participating in the imbalance netting project within the IGCC; as can be seen, the amount of energy exchanged in this process is increasing from year to year.

FIGURE 90: AMOUNT OF ACTIVATED POSITIVE AND NEGATIVE ENERGY BY SERVICE IN THE 2021–2023 PERIOD



SOURCE: ELES

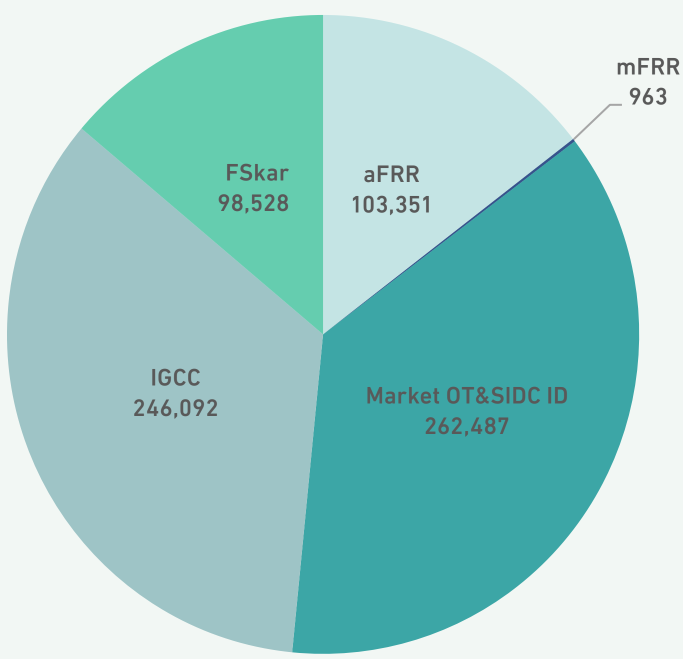
In performing mFRP, ELES activated 799.0 MWh of positive energy, which is considerably more than in the previous year, when it activated only 100 MWh of positive energy. Almost all the activated energy as part of the mFRP was contributed by domestic providers of balancing services. The rest was contributed by a 1 MW test activation by the foreign transmission system operator NOS BIH under the VTL[57] energy exchange mechanism. On the other hand, in 2022, ELES activated 164.0 MWh of negative mFRR, which is an increase of 38 MWh compared to the previous year. In 2023, there were a total of ten mRFF activations, five of which were in the positive direction and five in the negative direction. This is more than in 2022 when there was a total of eight activations of the manual frequency restoration reserve.

In 2023, ELES purchased part of the energy to keep the electricity system balanced on the market operator balancing market and had to ensure part of the energy for the balancing of unintentional deviations of the electricity system (FSkar). In terms of unintended energy exchanges (FSkar settlement), 56.3 GWh of positive and 42.2 GWh of negative energy were exchanged in 2023.

In the intraday market, which includes the balancing market of the market operator and the continuous intraday market, ELES activated 97.5 GWh of positive and 165.0 GWh of negative energy.

Figure 91 shows the distribution of the activated absolute quantities (sum of absolute negative and positive balancing energy) according to the type of service. In 2023, there was an increase in trading for the purpose of balancing in the intraday continuous market, accounting for 36.9% of the absolute value of the activated balancing energy volumes. This also demonstrates the great importance of balancing with neighbouring transmission system operators, which accounts for 34.6% of the absolute value of activated balancing energy volumes, for the Slovenian electricity system.

FIGURE 91: ABSOLUTE VALUES OF ACTIVATED QUANTITIES OF BALANCING ENERGY IN MWh



SOURCE: ELES

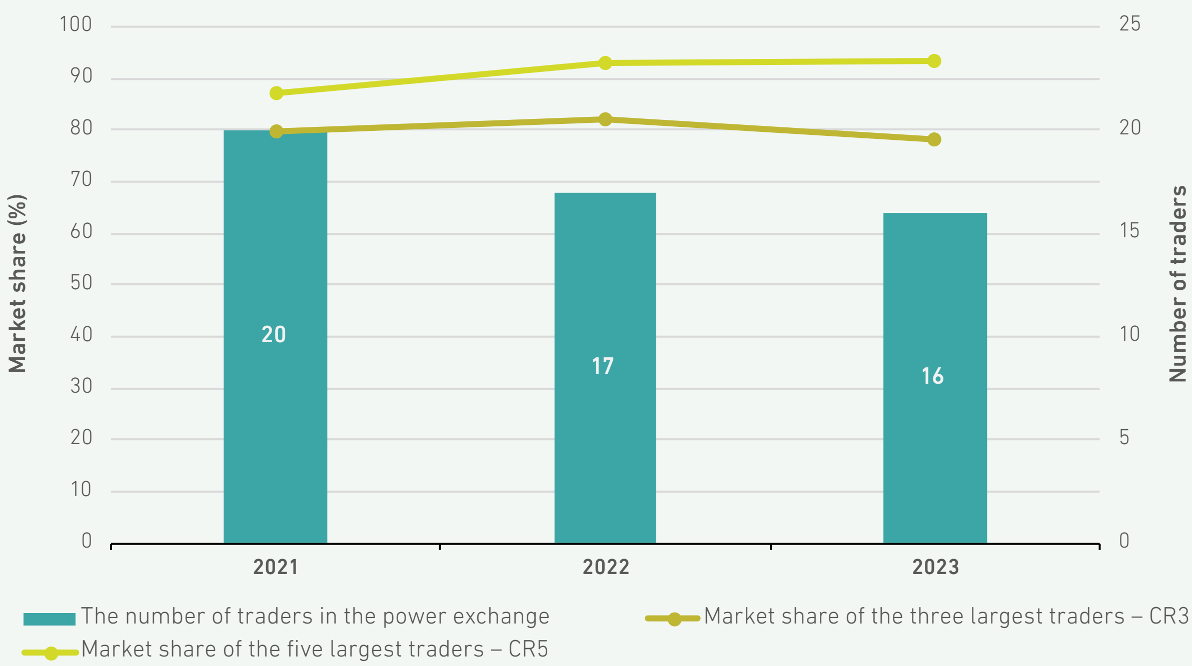
57 A »Virtual Tie Line« is a mechanism used to virtually assign a production unit to another load-frequency control (LFC) area in which the production unit has not been physically connected.

Concentration in the Power Exchange

In 2023, 16 Slovenian and foreign companies traded on the BSP in the day-ahead market, which is one fewer than at the end of 2022. The number of traders operating on the BSP has been steadily falling in the last five years. As an indicator of the level of concentration, the total market share of the three largest traders (CR3) was 78.3% in 2023, which indicates a slight decrease compared to 2022 when the share was 82.2%. The total market share of the five largest traders (CR5) was 93.2%, which is an increase compared to 2022 when it was 92.8%.

The HHI index has decreased by 274 compared to 2022 and now amounts to 3,452, still indicating a high concentration in the wholesale market.

FIGURE 92: MARKET SHARE AND NUMBER OF TRADERS IN THE SLOVENIAN POWER EXCHANGE ACCORDING TO TRADED VOLUME



SOURCE: BSP

Wholesale Market Liquidity

The Energy Agency monitors the liquidity of the Slovenian wholesale electricity market using an established index called the churn ratio. This index provides us with information on how many times a unit of electricity had been traded before it was delivered to the final consumer[58]. Figure 93 shows the trends of the index during the five-year period under review.

In 2023, the index is down from a year earlier and is at its lowest level in the 13 years since the Agency has been monitoring the churn ratio. The index value is 2.62, which is below the threshold value of 3 for achieving satisfactory liquidity in the Slovenian wholesale electricity market[59].

58 The calculation is based on a methodology that takes into account the quotient between the sum of the recorded volume from closed contracts minus the exported volume, and the consumption in Slovenia. The volume from closed contracts includes the volume traded on BSP as well as that traded on the bilateral market.

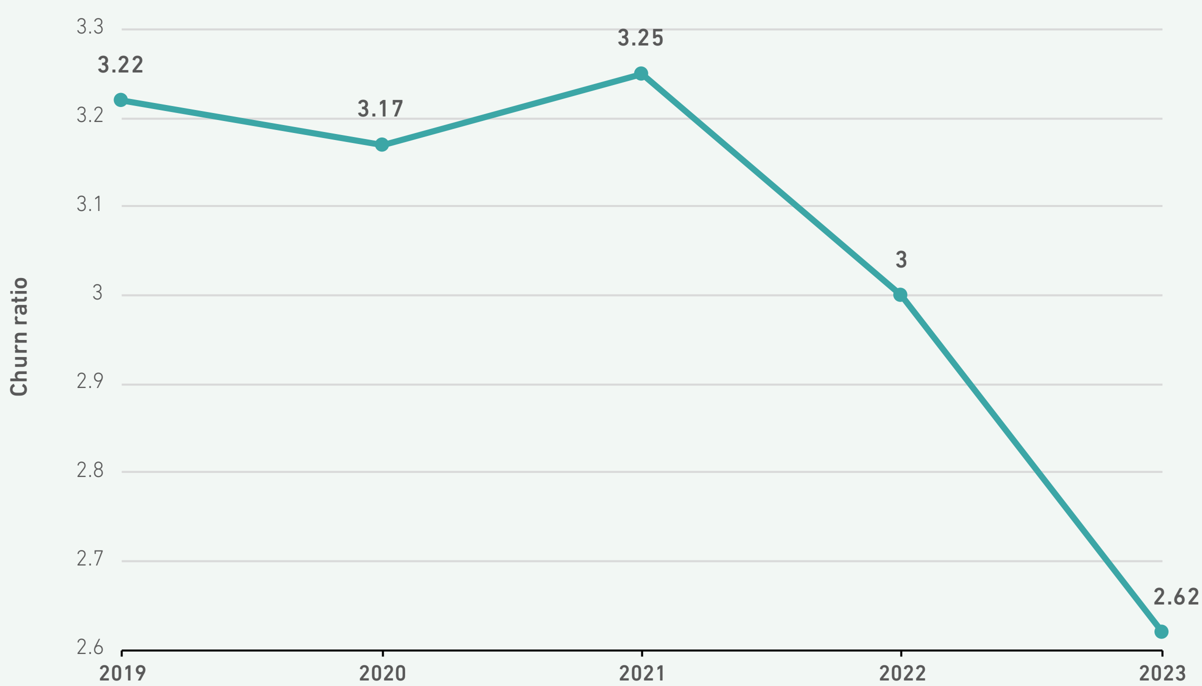
59 ACER/CEER Annual Report on the Results of Monitoring the Internal Electricity Market in 2015, September 2016, p. 34

Compared to other European markets, the wholesale market is smaller in size but still has a relatively large number of active players, despite the negative trend over the last two years. They are Slovenian and foreign, large and small, which shows that the Slovenian market is open to the entry of new participants. Similarly to foreign markets, the market conditions that shape the prices elsewhere also reflect product prices in Slovenia.

In any case, the reduction of the churn ratio below the threshold means that participants in the Slovenian market in 2023 did not conclude a comparable number of transactions in terms of volume as participants in liquid foreign markets.

Liquidity in the wholesale electricity market has fallen below the theoretical threshold of satisfactory development

FIGURE 93: TRENDS OF THE CHURN RATIO PER YEAR IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, BORZEN

Retail Market

Suppliers and end-consumers in the Slovenian retail market sign open contracts, in which the quantities of supplied electricity and the time profile of supply are not set in advance.

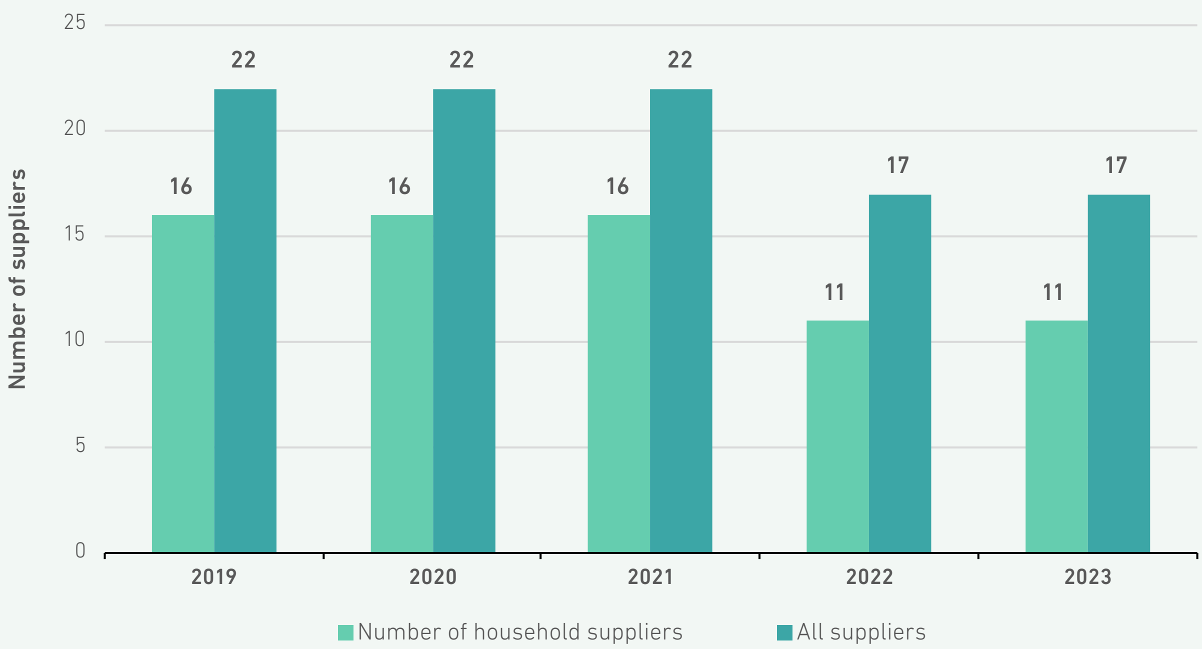
The retail market in Slovenia has experienced considerable changes in recent years. In the market, the exit of suppliers (mainly in the 2021–2022 period) and ownership changes in major electricity suppliers have increased market concentration and, at least statistically, competition has started to decline. On the other hand, advances in digitisation made information more accessible, consumers became more informed in the context of the energy crises and many new services emerged in the market. In 2022 in particular, retail prices were changing at a significantly faster pace compared to previous years until 1 September 2022, which had an impact on the suppliers' business models. All that contributed to a rise in consumer activity in 2022, until the implementation of retail market interventions to mitigate the effects of the energy crisis, when the Government of the Republic of Slovenia capped the maximum prices allowed with the aim of protecting the smallest consumers. The price cap was also in place for the whole of 2023, which has a significant impact on the indicators monitored by the Energy Agency as part of its ongoing market monitoring.

As of 1 January 2023, the Mercator Group, which did not have an influential market share, ceased supplying, while NEXT MOVE ENERGY d.o.o. started operating as a supplier in August 2023.

The number of suppliers remains at the same level as last year, despite changes

At the end of the year, there were 17 electricity suppliers active in this market, of which 11 supplied electricity to household consumers.

FIGURE 94: TRENDS IN THE NUMBER OF SUPPLIERS IN THE SLOVENIAN RETAIL MARKET IN THE 2019–2023 PERIOD[60]



SOURCE: ENERGY AGENCY

The business models of suppliers are still different. Some only supply electricity to household consumers, others to businesses only, but most of them to both.

Prices

Due to the rapidly changing and growing wholesale and retail prices in 2022, the Government of the Republic of Slovenia adopted the Decree on the determination of electricity prices on 14 July 2022 (applicable from 1 September 2022 until 31 August 2023), and it adopted the Decree on the determination of the electricity price on 13 April 2023, which was applicable from 1 September 2023 until 31 December 2023. The Decrees established the highest permitted retail selling price (hereinafter retail price) for household consumers, small business consumers, and for use in common areas of multi-dwelling buildings and common spaces in mixed multi-dwelling and business buildings. The price cap for household consumers, including multi-apartment buildings, was:

- high tariff (HT): 0.11800 EUR/kWh
- low tariff (LT): 0.08200 EUR/kWh
- single tariff (ST): 0.09800 EUR/kWh.

60 The statistics of suppliers includes suppliers, which supplied electricity on the last calendar day of individual years.

The maximum allowed price for electricity for consumers with an installed capacity equal to or less than 43 kW who are not household consumers (small business consumption) was:

- high tariff: 0.13800 EUR/kWh
- low tariff: 0.09900 EUR/kWh
- single tariff: 0.12400 EUR/kWh.

Small business consumers may have more than one metering point, but the total installed capacity of all metering points must not exceed 86 kW.

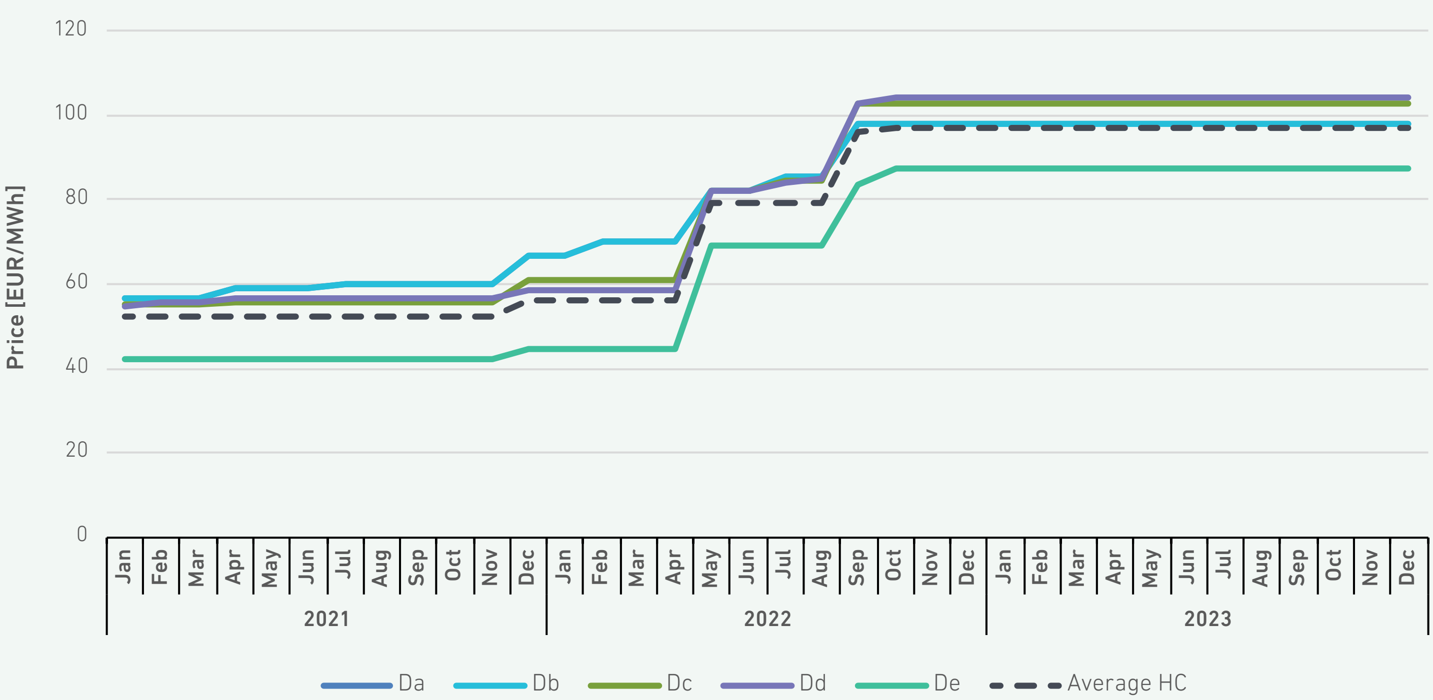
In accordance with the Decree on the Determination of the Amount of Excise Duty on Energy Products and Electricity, a lower excise duty remained in force until the end of 2023.

Retail Price Index for Typical Household Consumers

On the basis of monitoring the retail market for household consumers, the Energy Agency determines retail price indices (RPI). The RPI is based on the lowest offer in the retail market that is accessible to all household consumers and enables them to switch suppliers at any time without a contractual penalty. So, the RPI reflects the price potential of the relevant market.

Figure 95 shows the trends of the RPI for standard consumer groups Da, Db, Dc, Dd, De[61] and an average Slovenian household consumer[62] in the 2021–2023 period. Most of the consumers in the retail market (except those who have contracts that include contractual penalties) have the option of switching their supplier or the product (offer) provided by their current supplier. In that way, they are sure to be supplied electricity at a price reflected by the RPI.

FIGURE 95: RPI IN THE 2021–2023 PERIOD



SOURCE: ENERGY AGENCY

61 Consumer groups according to the EUROSTAT methodology used until 2007 (Dc: annual consumption 3,500 kWh of which 1,300 kWh (off-peak tariff)) – https://ec.europa.eu/eurostat/databrowser/view/NRG_PC_204_H__custom_6471365/default/table?lang=en

62 Consumption profile of an average household consumer in Slovenia: billed capacity 8 kW, annual consumption 1,996 kWh (peak tariff) and 2,100 kWh (off-peak tariff).

Figure 95 shows that the RPI was constant for the duration of the setting of the maximum retail price in accordance with the Government Decree on the determination of electricity prices across all consumer groups. As a result, 2023 has seen the lowest number of supplier switches in recent years.

Table 28 shows the difference in the norm price per MWh according to the lowest price offered on the market to all consumers (RPI) and the capped price by consumer group for households, taking into account the EUROSTAT methodology in force until 2007. For the average household consumer, the RPI is EUR 2.35 below the capped price.

The constant MPI throughout the year, almost at the level of the ceiling, is due to the price cap – there are no promotional offers on the retail market in 2023

TABLE 28: COMPARISON OF THE RPI WITH THE CAPPED PRICE, TAKING INTO ACCOUNT THE CONSUMPTION PROFILE OF THE HOUSEHOLD CONSUMER GROUPS

	RPI [EUR/MWh]	Capped price [EUR/MWh]	Difference [EUR]
Da	98.00	98.00	0.00
Db	98.00	98.00	0.00
Dc	102.93	104.63	1.70
Dd	104.47	106.00	1.53
De	87.57	91.00	3.43
Average HC	97.19	99.54	2.35

SOURCE: ENERGY AGENCY

The comparison shows that the suppliers have practically set their offer prices at the cap level, with the difference between the lowest offered price and the cap price by consumption profile not exceeding EUR 3.5.

Analysis of Green Electricity Prices

As part of their electricity supply services, electricity suppliers offer consumers specific products that, among other things, differ in the structure of primary production sources. Consumers can choose between the supply of electricity produced exclusively from RES (green electricity), electricity produced exclusively with nuclear technology and other products that include other energy sources.

Figure 96 shows the trends in the average prices of electricity[63], based on offers from 100% RES, 100% nuclear energy, and other offers from suppliers, and the trends in the lowest price of electricity, based on offers from 100% RES, 100% nuclear energy, and other offers from suppliers available in the market for a typical household consumer[64] in the 2021–2023 period.

63 The energy price also includes flat-rate operating costs and other surcharges that are slightly more common in green offers.
64 Consumption profile of an average household consumer: billed capacity 8 kW, annual consumption 1996 kWh (peak tariff) and 2100 kWh (off-peak tariff).

FIGURE 96: PRICE TRENDS OF OFFERS FROM 100% RES, 100% NUCLEAR ENERGY, AND OTHER OFFERS IN SLOVENIA FOR A TYPICAL HOUSEHOLD CONSUMER IN THE 2021–2023 PERIOD

SOURCE: ENERGY AGENCY

From 1 September 2022 to 31 December 2023, the Government of the Republic of Slovenia limited the maximum electricity prices for household consumers, including multi-apartment buildings, with the Decree on the determination of electricity prices[65] and the Decree on the determination of the electricity price[66]. As a consequence, the average and lowest prices of the offers consisting of 100% RES for the household customer concerned were at the same level and amounted to EUR 107.77/MWh, thus representing the highest price of all offers as well. The average and lowest prices of the offers composed of 100% nuclear power are also the same at €105.37/MWh, just as in the second half of the previous year. The average price of energy based on other offers from suppliers on the market was 12% lower in 2023 compared to 2022 as a result of the abovementioned government measure and was the lowest compared to the average prices of green offers.

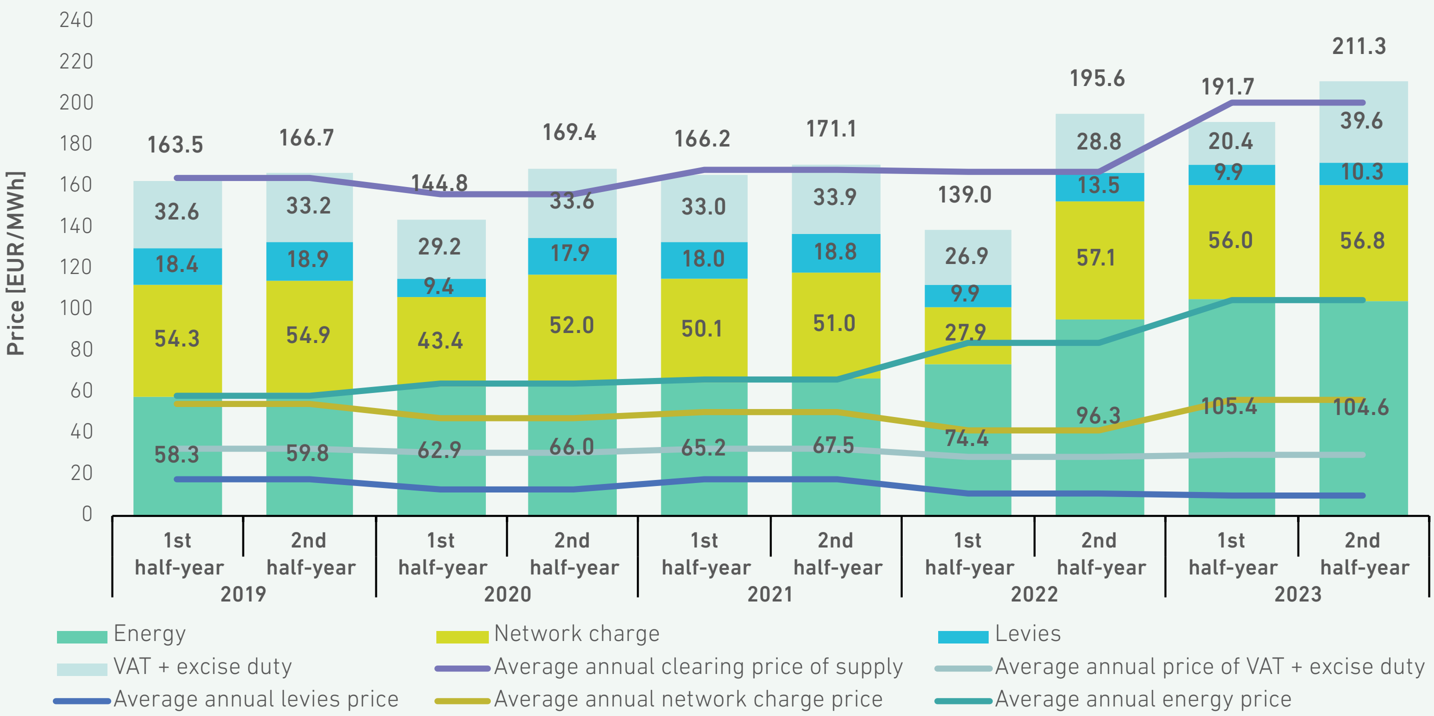
Final Electricity Prices for Household Consumers

An analysis of the structure of the final prices of electricity supplied to household consumers from the standard consumer group DC[67]is presented below. The final electricity supply price for consumers includes:

- electricity prices, which were capped in 2023;
- network charges:
  - network charges for the transmission and
  - network charges for the distribution network;
- levies:
  - levy for supporting electricity production with high-efficiency cogeneration and renewable electricity (RES);
  - the energy efficiency levy, and
  - levy for the operation of the market operator;
- excise duties and
- value-added tax (VAT).

65 Official Gazette of the Republic of Slovenia, No. 95/22 and 98/22
66 Official Gazette of the Republic of Slovenia, No. 45/23
67 The standard consumer group DC includes household consumers with an annual consumption of between 2,500 and 5,000 kWh.

FIGURE 97: TRENDS OF THE FINAL ELECTRICITY SUPPLY PRICE IN SLOVENIA FOR A TYPICAL HOUSEHOLD CONSUMER IN THE 2019–2023 PERIOD[68]



SOURCES: ENERGY AGENCY, SURS

The average annual final price increased by 20.3% in 2023. To mitigate the energy crisis, a cap on the maximum electricity price for household consumers, including multi-apartment buildings, was in place in 2023. Until August 2023, the RES and CHP levies were charged at 50%, and from 1 November 2023 and until the end of 2024, they have been exempted for household consumers. From 1 September 2022 to 31 May 2023, the VAT rate on the supply of energy products was reduced and a lower excise duty was in force until the end of 2023.

A 20.3% increase in the final average annual supply price for a typical household consumer, mainly due to the increase in the price of energy and the return of the network charge to its normal level

The final supply price was affected by the increase in the price of electricity, which on the annual level in 2023, amounted to 24.0% compared to 2022. In addition, there is a 33.6% increase in the network charge, a 3.8% overall increase in VAT and excise duty, and a 13.8% decrease in the RES and CHP contribution, mainly due to the Government's measures – the abolition of the network charge and RES contribution, and the reduction of the excise duty to the lowest possible rate in the period from 1 February to 30 April 2022.

The share of the network charge in the final electricity supply price for a typical household consumer in 2023 was 28%, the share of energy was 52%, the share of the levies was 5% and the share of VAT and the excise duty was 15%.

68 The difference between the total and the sums of individual components of the final electricity supply price is due to rounding to one decimal place.

Final Electricity Prices for Business Consumers

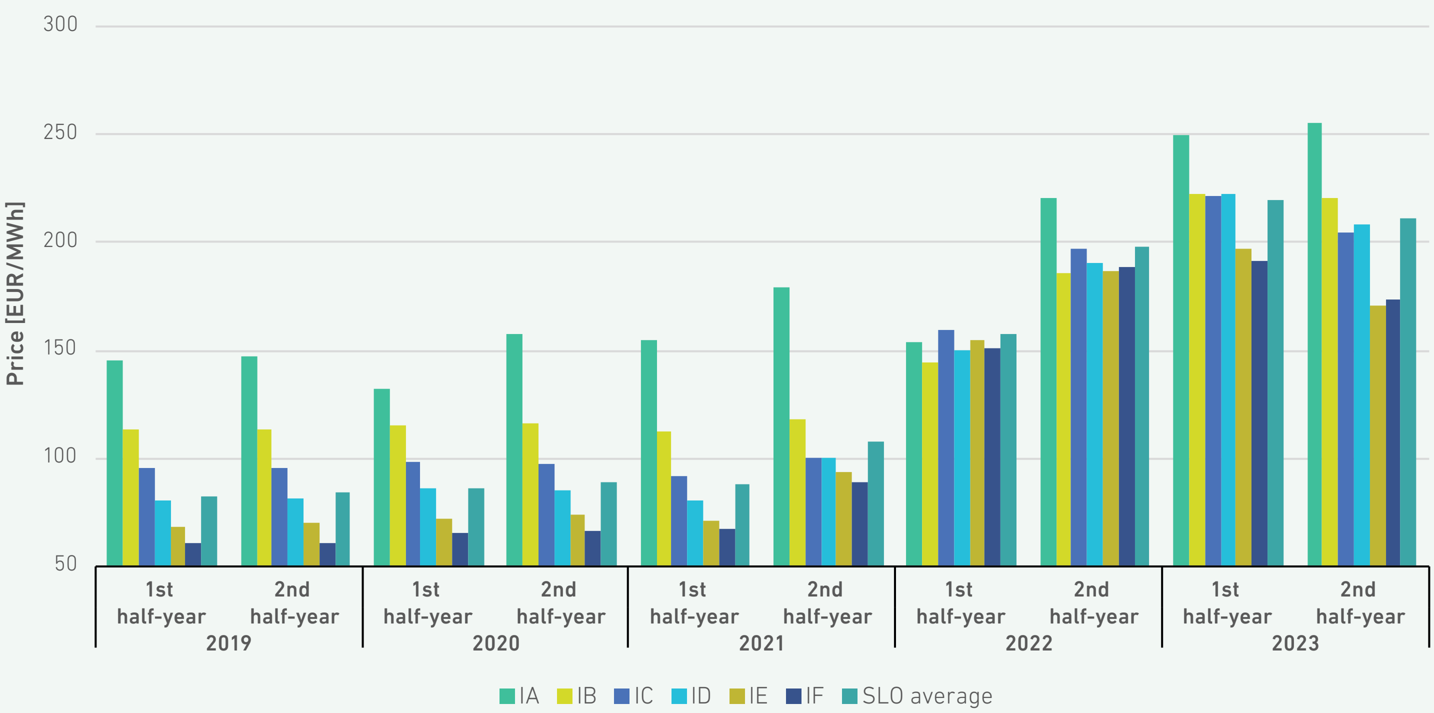
The average final electricity supply price for business consumers, which represents the average of the prices for the first and the second half of the year excluding VAT[69], was 215.6 EUR/MWh in 2023, which is a 21.4%[70] rise compared to 2022. The final prices for supply rose for all consumer groups.

A 21.4% increase in the final electricity supply prices for business consumers

The final average annual supply price for the smallest group IA had increased by 35.3% in 2023 compared to 2022, which represented the biggest increase. The final average annual supply price for the largest group IF had increased by 7.5% in 2023 compared to 2022, which represented the smallest increase.

The trends of the final electricity supply price in Slovenia for typical business consumers between 2019 and 2023 according to half-year periods and comparison with the average final supply price for business consumers are shown in Figure 98.

FIGURE 98: TRENDS OF THE FINAL ELECTRICITY SUPPLY PRICE IN SLOVENIA FOR A TYPICAL BUSINESS CONSUMER IN THE 2019–2023 PERIOD



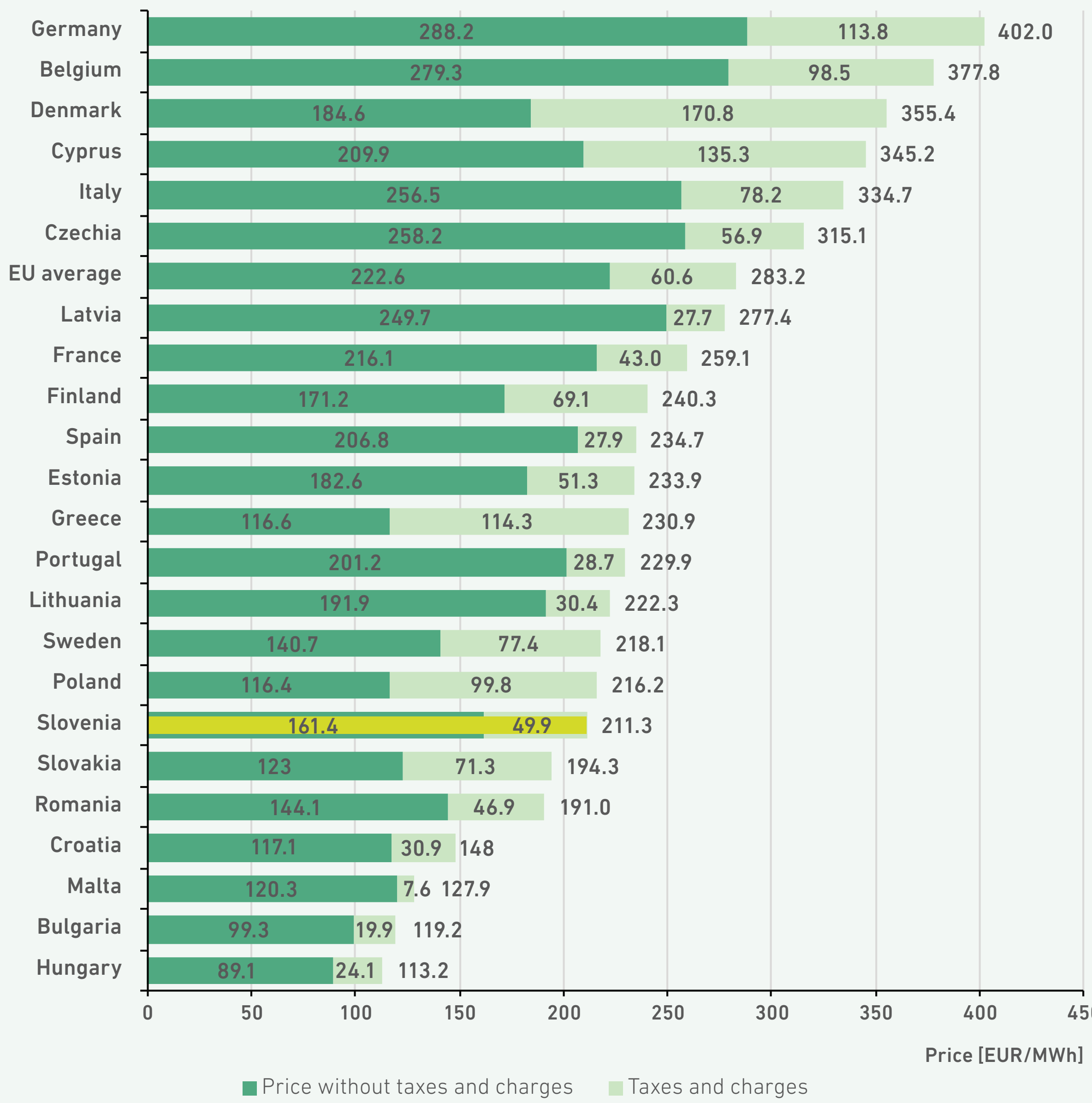
SOURCE: STATISTICAL OFFICE OF THE REPUBLIC OF SLOVENIA

69 The VAT is not taken into account to ensure comparability with Eurostat's methodology.
70 The difference is rounded to one decimal place.

Comparison of the Final Electricity Prices in the EU Member States

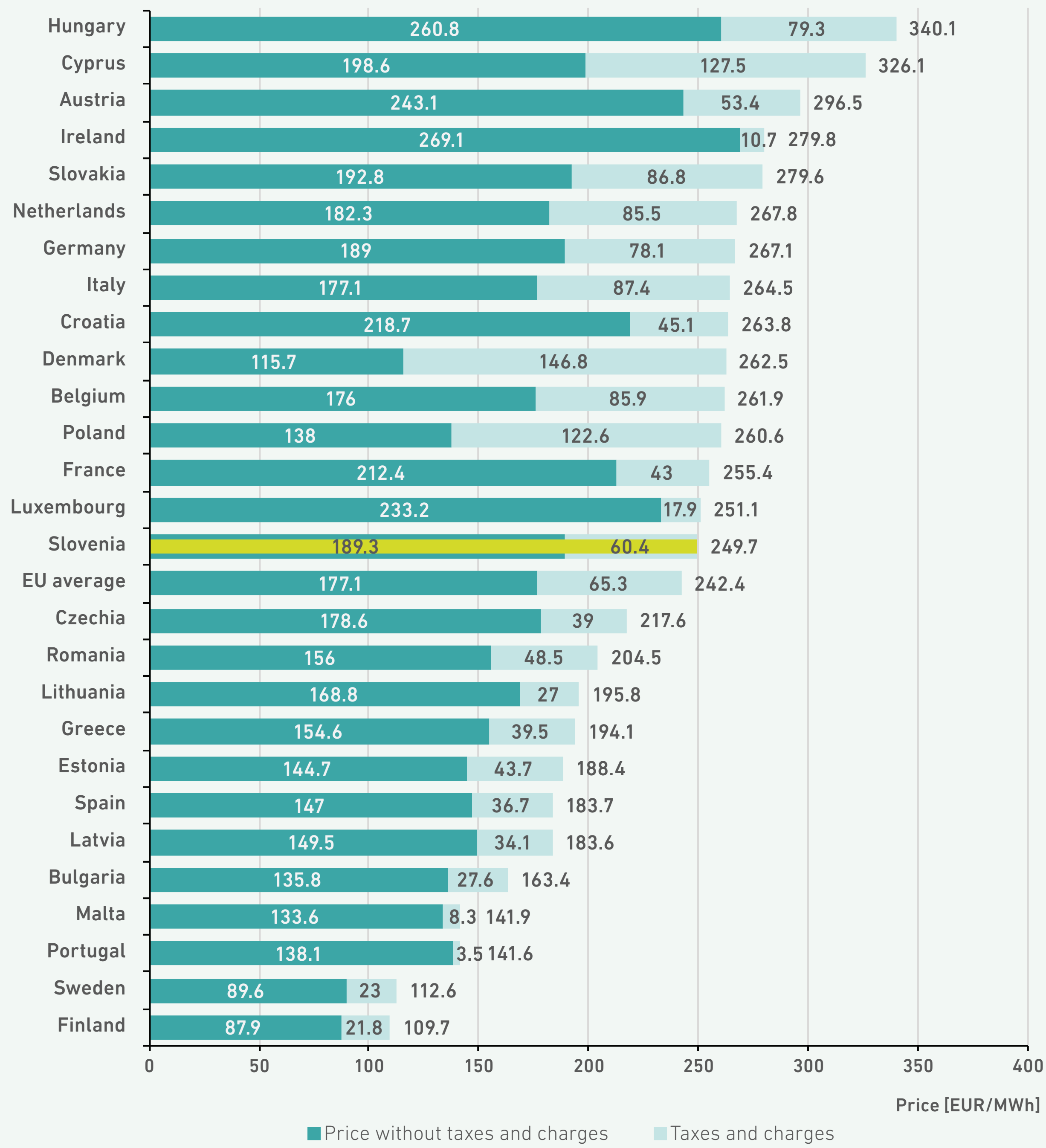
Figures 99 and 100 show a comparison of the final electricity supply prices in EU Member States in the second half of 2023 for typical household and business consumers selected in accordance with the Eurostat methodology. Taxes and charges include levies, excise duty and VAT, while the price without charges and taxes includes the price of energy and the network charge.

FIGURE 99: COMPARISON OF THE FINAL ELECTRICITY SUPPLY PRICES FOR A TYPICAL HOUSEHOLD CONSUMER WITH AN ANNUAL CONSUMPTION OF BETWEEN 2500 kWh AND 5000 kWh (DC) IN THE EU MEMBER STATES AND SLOVENIA IN 2023 IN EUR/MWh



SOURCE: EUROSTAT

FIGURE 100: COMPARISON OF THE FINAL ELECTRICITY SUPPLY PRICES FOR A TYPICAL BUSINESS CONSUMER WITH AN ANNUAL CONSUMPTION OF BETWEEN 20 MWh AND 500 MWh (IB) IN THE EU MEMBER STATES AND SLOVENIA IN THE SECOND HALF OF 2023 IN EUR/MWh



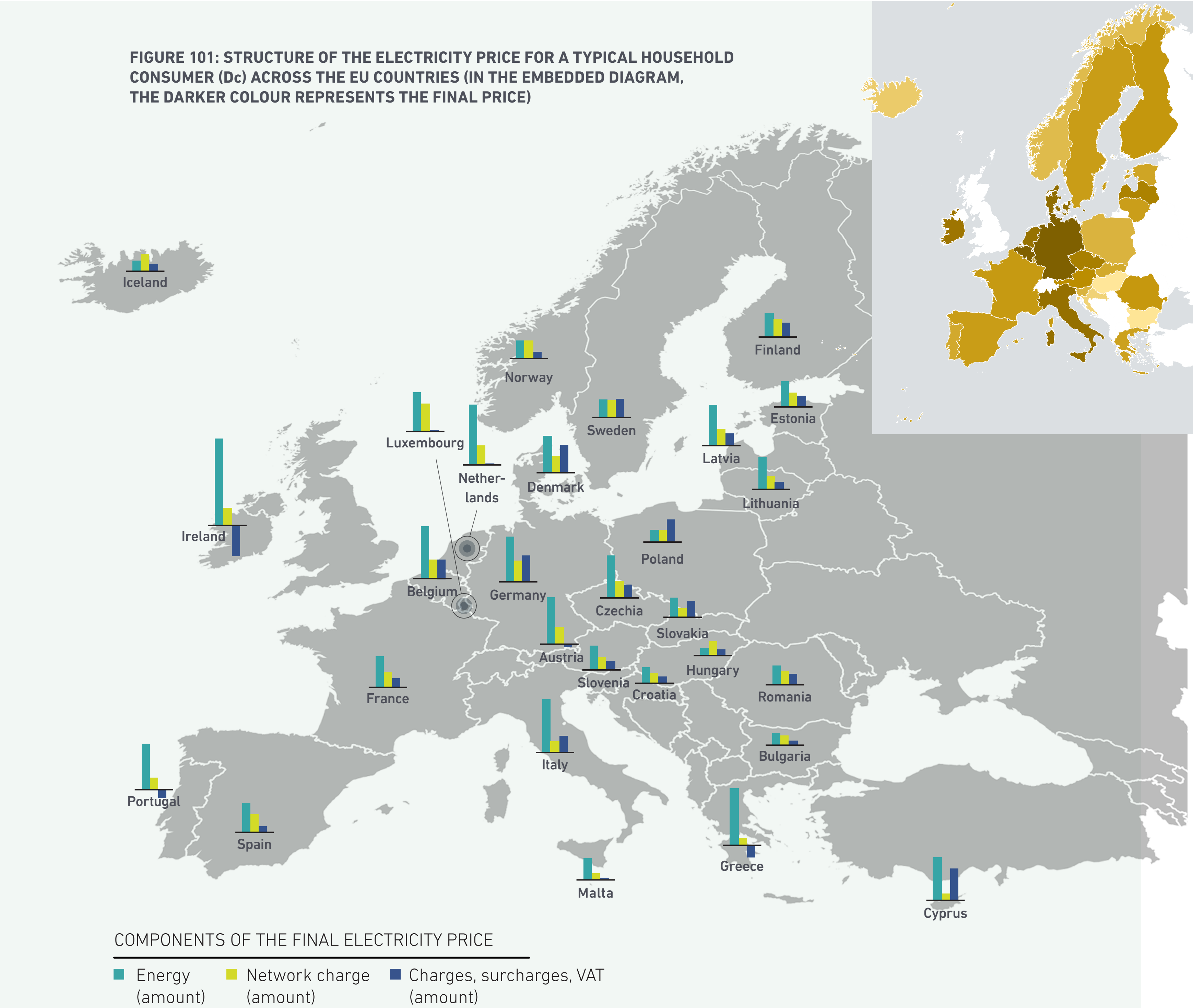
SOURCE: EUROSTAT

In the internal electricity market, the retail electricity pricing is market-based, while in some EU countries, the regulated electricity retail prices are also present. The retail price depends on the structure of the production sources and accessibility to neighbouring markets, as well as on market activities.

Despite the well-functioning market where electricity prices converge over years, differences in final supply prices occur in network charges, charges in support for renewable energy production policies and in taxes. In 2023, the differences are also due to different intervention measures in the Member States.

The final total supply price for a typical Slovene household consumer was below the EU average and also lower than in Austria and Italy, yet higher than in Croatia and Hungary. The final electricity supply price for a typical business consumer in Slovenia is just above the EU average in nominal terms. Compared to neighbouring countries, the price is lower than in Austria, Italy, Hungary and Croatia.

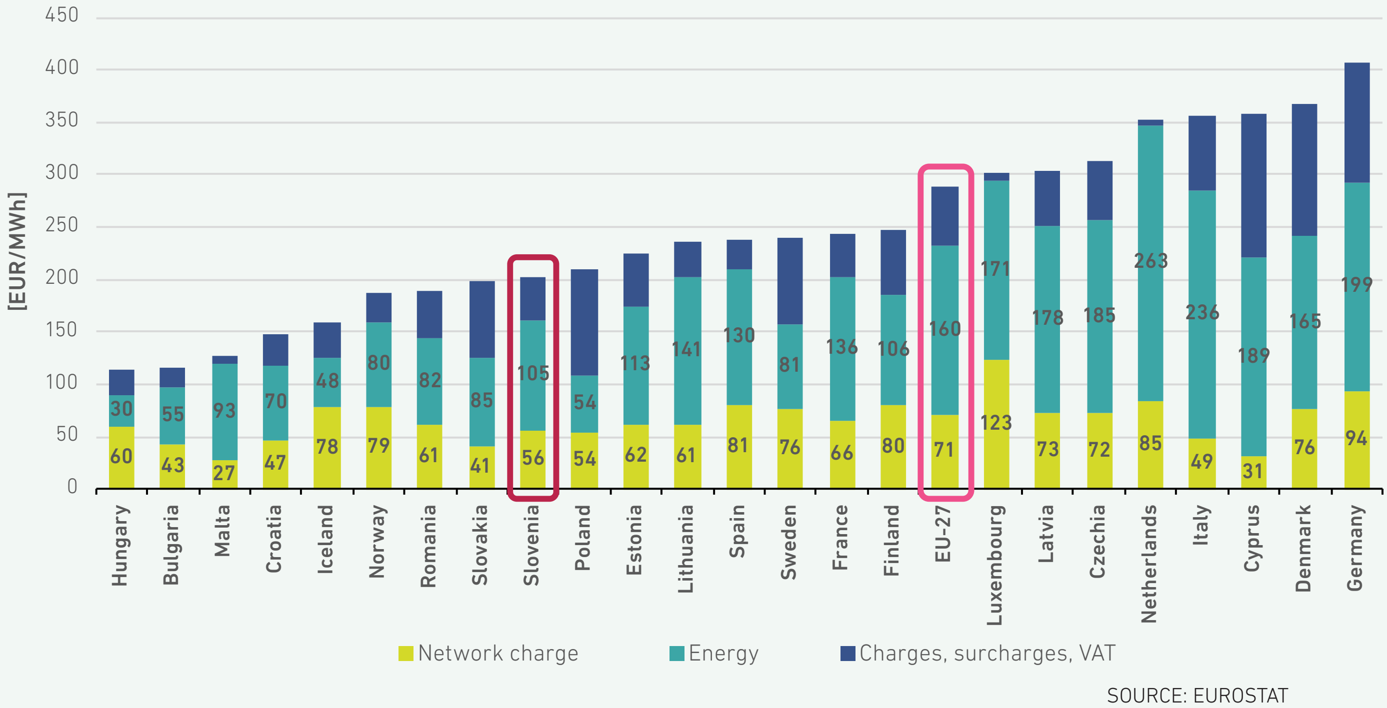
FIGURE 101: STRUCTURE OF THE ELECTRICITY PRICE FOR A TYPICAL HOUSEHOLD CONSUMER (Dc) ACROSS THE EU COUNTRIES (IN THE EMBEDDED DIAGRAM, THE DARKER COLOUR REPRESENTS THE FINAL PRICE)



SOURCE: EUROSTAT

It is evident that the components of the overall price (energy, network charges, charges or taxes) have been shaped differently across countries in the aftermath of the energy crisis, when national measures to mitigate electricity price increases were allowed (Figure 101). The impact of the electricity price increases has been mostly mitigated through charges and taxes and partly in electricity price regulation, which reflects the wide divergences across the EU. The least interventions in price changes were in the area of network charges, which are regulated. However, changes in individual network charges are attributable to the increased cost of purchasing electricity or the cost of operation of electricity systems (ancillary services), which are generally included in the cost of the network charge.

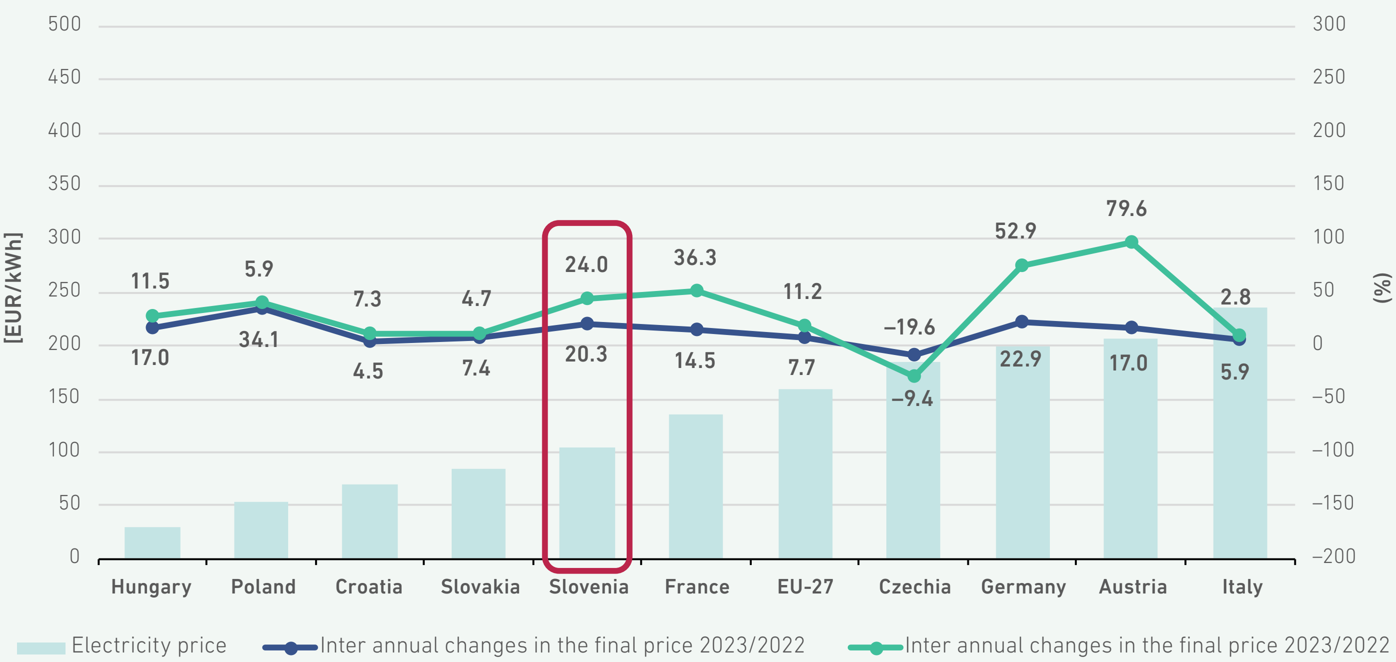
FIGURE 102: COMPARISON OF SHARES IN THE FINAL PRICE OF THE ELECTRICITY SUPPLY FOR A TYPICAL HOUSEHOLD CONSUMER IN EU MEMBER STATES



SOURCE: EUROSTAT

The consequences of the electricity price mitigation measures adopted by the Government of the Republic of Slovenia in the summer of 2022 and extended until the end of 2023 have resulted in the stabilisation of prices in the country. The most significant impact on the year-on-year change in the final electricity price in 2023 compared to 2022 was caused by the three-month suspension of the network charge in 2022 and, in addition, by the resumption of the full value-added tax charge as part of the temporary measures to regulate the retail prices of certain energy products, which relieved the cost burden on final consumers. Similar trends in consumer relief can be observed in other countries in the region (Figure 103).

FIGURE 103: INTER-ANNUAL CHANGES IN THE FINAL PRICE AND ELECTRICITY PRICES FOR A TYPICAL HOUSEHOLD CONSUMER IN EU COUNTRIES

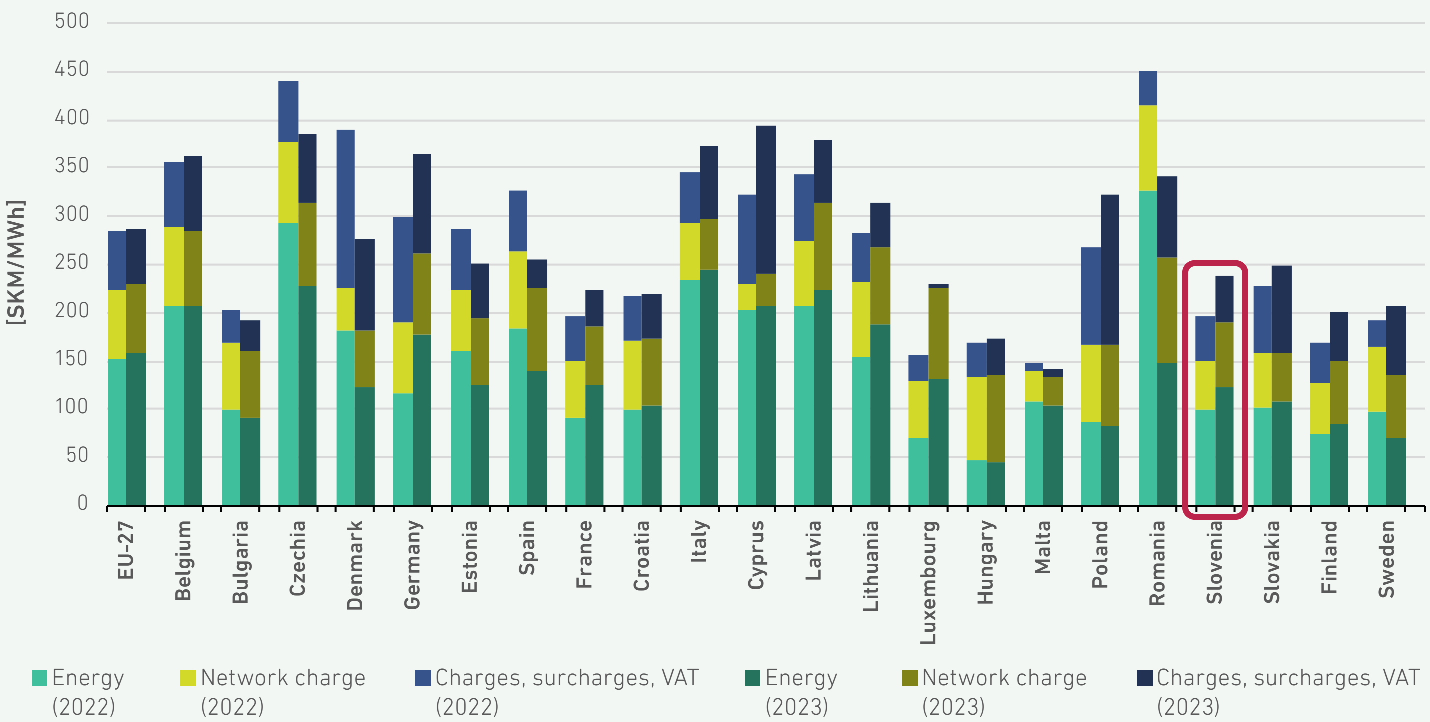


SOURCE: EUROSTAT

The rise in electricity and energy prices in general during the energy crisis has also swung consumer spending power, which was reflected in higher inflation. When looking at the comparison of the purchasing power of electricity supply, we observe that in most EU countries' electricity supply became more expensive in 2023 than in the previous year, with the level of purchasing power of electricity supply being affected in part by measures on individual components. Figure 104 shows the changes in costs according to the purchasing power of consumers (Purchasing Power Standard (PPS)[71]) for each electricity component. Notwithstanding the inter-annual changes, a comparison of electricity supplies shows that, despite a well-functioning internal market, there are still significant differences between countries, with the ratio between the cheapest and the most expensive electricity supply being as high as 1:2. The cost of supply in Slovenia was still below the EU average.

Measures to mitigate the energy crisis ensured that the final price of electricity for household consumers in Slovenia remained below the EU average

FIGURE 104: INTER-ANNUAL COMPARISON OF THE COMPONENTS OF THE TOTAL ELECTRICITY SUPPLY PRICE FOR A TYPICAL HOUSEHOLD CONSUMER IN THE EU MEMBER STATES ACCORDING TO THEIR PURCHASING POWER STANDARD IN 2022 AND 2023



SOURCE: EUROSTAT

Margin and Responsiveness of Retail Prices

An analysis of the correlation between wholesale prices and the energy component of retail prices for household consumers represents the suppliers' estimated gross margin but it also indicates the level of responsiveness of retail prices to changes in wholesale prices. The analysis illustrates the total indicators for Slovenia and does not compare the margins of individual suppliers.

71 The Purchasing Power Standard (PPS) is an artificial currency. It equals one euro at the average level of the EU Member States. In theory, one PPS can buy the same amount of goods and services in any Member State. Cross-border price level differences mean that different amounts of units in the national currency are necessary for the same goods and services. The PPS is calculated by dividing any economic aggregate of a country in its national currency into its purchasing power parities. Purchasing power parities are exchange rates that equalise the purchasing power of different currencies by eliminating the price level differences between countries.

Here, the margin is only a theoretical indicator; namely, a positive margin does not imply the suppliers' profit since they have other expenses related to their comprehensive offer besides electricity supply. However, a negative margin is very likely to be an unfavourable operating result, if we restrict it to the context of profit.

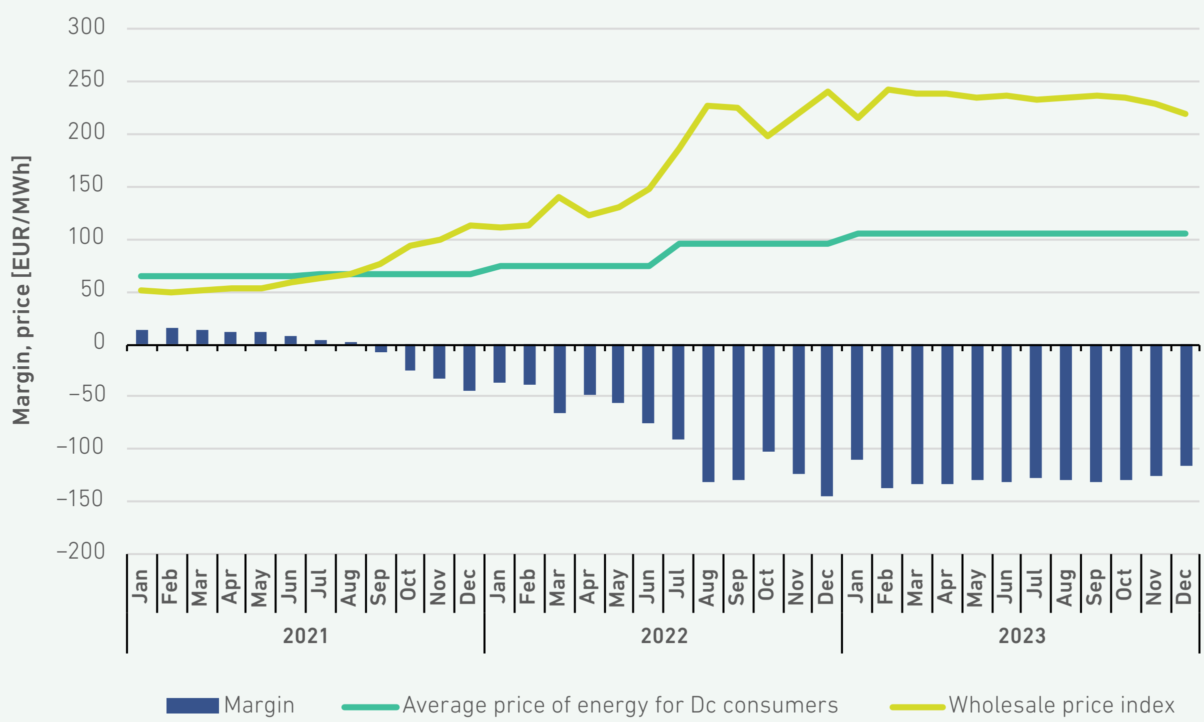
In that context, the markup is the difference between the price on the energy bills of a typical household consumer with an annual consumption of between 2,500 kWh and 5,000 kWh (consumer group DC) and the estimated costs of supplying that energy. To estimate the costs of energy supply, we use the wholesale price index, which is weighted so as to represent an approximation of the optimum strategy for energy supply in the forward and daily wholesale markets[72].

The level of convergence between the energy component of retail prices and the wholesale prices over a longer period of time can be used as an additional indicator of the efficiency and competitiveness of the retail market.

In 2023, the average retail margin, which in 2022 amounted to −86.79 EUR/MWh, dropped to −127.97 EUR/MWh. The impact of the increasing prices on the continuous market, the increasing prices of long-term forward contracts, and the delayed price growth for household consumers started gaining momentum already in the last quarter of 2021 and continued throughout 2022, causing an increase in the negative margin. In 2023, the negative margin stabilised, although it started to decrease in the winter due to the reduction in wholesale prices in the context of the retail price cap.

Compensation of suppliers for negative margins on electricity supply as a Government measure

FIGURE 105: MARGIN AND RESPONSIVENESS OF THE ENERGY COMPONENT OF RETAIL PRICES



SOURCES: ENERGY AGENCY, SURS

72 The methodology is explained in more detail in Annex 6 of the ACER/CEER Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014.

Figure 105 shows that a very high negative margin was present throughout 2023. In September, the Decree on the determination of electricity prices entered into force, which put a price cap on the permitted retail price. The capping of the maximum retail price stopped the increase in retail prices, thus preventing the pass-through of relatively high wholesale prices to the retail market.

Negative retail margin in the last two years

The Decree on the determination of compensation to electricity suppliers, adopted by the Government of the Republic of Slovenia at the beginning of 2023 and amended in the summer of the same year, regulates the determination of the manner and procedure for the payment of appropriate compensation until 31 December 2023 for damages incurred to electricity suppliers as a result of the regulation of the retail price for certain beneficiaries. The Government has caused harm to suppliers by capping prices at a lower level than suppliers themselves would have been likely to set based on their purchase and production costs and the price and conditions on the retail and wholesale markets, as indicatively confirmed by the Energy Agency's analysis of the theoretical margin. However, the Government has taken into account that suppliers with production in Slovenia are in a different position and has applied a different measure to them.

Compared to the previous year, the energy components of retail prices for household consumption increased by 24.0% in 2023, while the wholesale price index increased by 35.3%. The correlation coefficient of the monthly levels of these two price elements is 0.22, indicating strong convergence, which is a consequence of the prevailing price growth trend that has been present for some time now. Positive correlations indicate an adequate response on the retail market.

Dynamic Prices

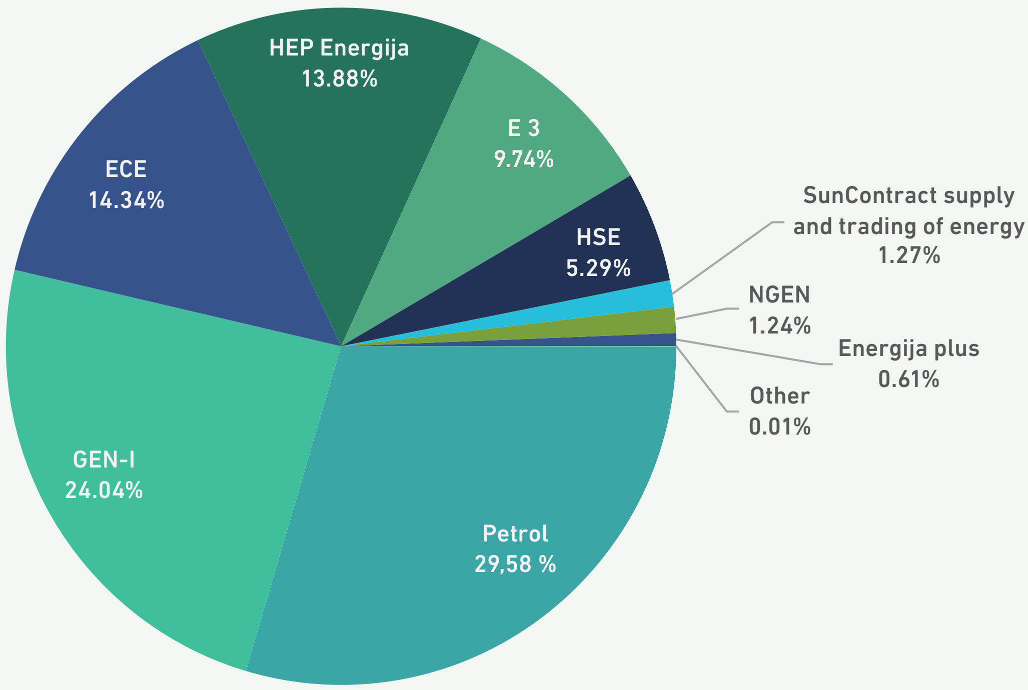
Contracts based on dynamic prices have been a regular feature of the business consumption segment of the Slovenian retail market for several years but were first introduced in the household and small business consumption segment in 2022, following the implementation of Directive (EU) 2019/944 in the Electricity Supply Act (ZOEE). The ZOEE Act addresses dynamic prices in Article 17, which defines the right to contracts with dynamic electricity prices. Every supplier that concludes electricity supply contracts with over 100,000 final consumers must offer contracts with dynamic electricity prices. At the same time, every final consumer with an installed advanced meter can require that a contract with dynamic prices be concluded.

In 2023, there were four suppliers with over 100,000 consumers. These suppliers were (in alphabetical order) E 3, Elektro Energija, Energija plus and GEN-I. The continuous market monitoring, the examination of a complaint from an external entity and suppliers' reports showed that not all suppliers bound by the applicable legislation offered household and small business consumers contracts with dynamic prices. According to an analysis of the offers on the websites of the abovementioned suppliers, only E3 and Energija plus were offering dynamic pricing contracts at the end of the year. With both suppliers, the conclusion of such contracts was possible following prior individual consultation on the basis of a notice published on their websites. This way of providing the service is not in line with the ZOEE Act, which requires a minimum transparency of offers with dynamic prices by obliging the regulator to include the offer in the comparison services. The Energy Agency has therefore been actively monitoring the impact of these deviations on the development of the market or on consumer benefits.

The suppliers' data shows that in 2023, Bisol has concluded contracts with dynamic prices with one household consumer and one small business consumer. The supplier SunContract supplied 26 small business consumers with electricity based on such contracts. A total of 10 different suppliers had such contracts with a total of 729 business consumers. The total volume of electricity supplied under contracts with dynamic prices amounted to 2.83 TWh, 113% more than the previous year.

Both suppliers have set up a pricing model based on the SIPX index and a relative markup (SIPX +%). Consumers who have entered into such contracts have been provided with information on access to reference prices, which they can use to determine the prices achieved (including in near real-time) and to draw conclusions on price developments. We have only identified a price cap with SunContract, namely for negative prices, which they have charged at EUR 0/MWh.

FIGURE 106: SHARES OF ELECTRICITY SOLD ON THE BASIS OF CONTRACTS WITH DYNAMIC PRICES



SOURCE: SUPPLIERS

The analysis of the offer, the related general terms and conditions and the model supply contracts, showed that the two suppliers concerned met the minimum requirements of Article 17(3) of the EAECL regarding the supplier's obligation to fully inform final consumers about the opportunities, costs and risks of dynamic pricing contracts and to provide them with adequate information before concluding the contract.

CASE STUDY

Analysis of Market Conditions for the Development of Electricity Supply Products on the Basis of Dynamic Prices

2023 Period

The analysis compares the electricity prices on the day-ahead market (BSP)[73] and the maximum allowed tariff rates for household consumers and for consumption in the common areas of multi-apartment buildings, as prescribed by the Decree on the determination of electricity prices[74] and the Decree on the determination of the electricity price[75]. The maximum allowed tariff rates for 2023 were:

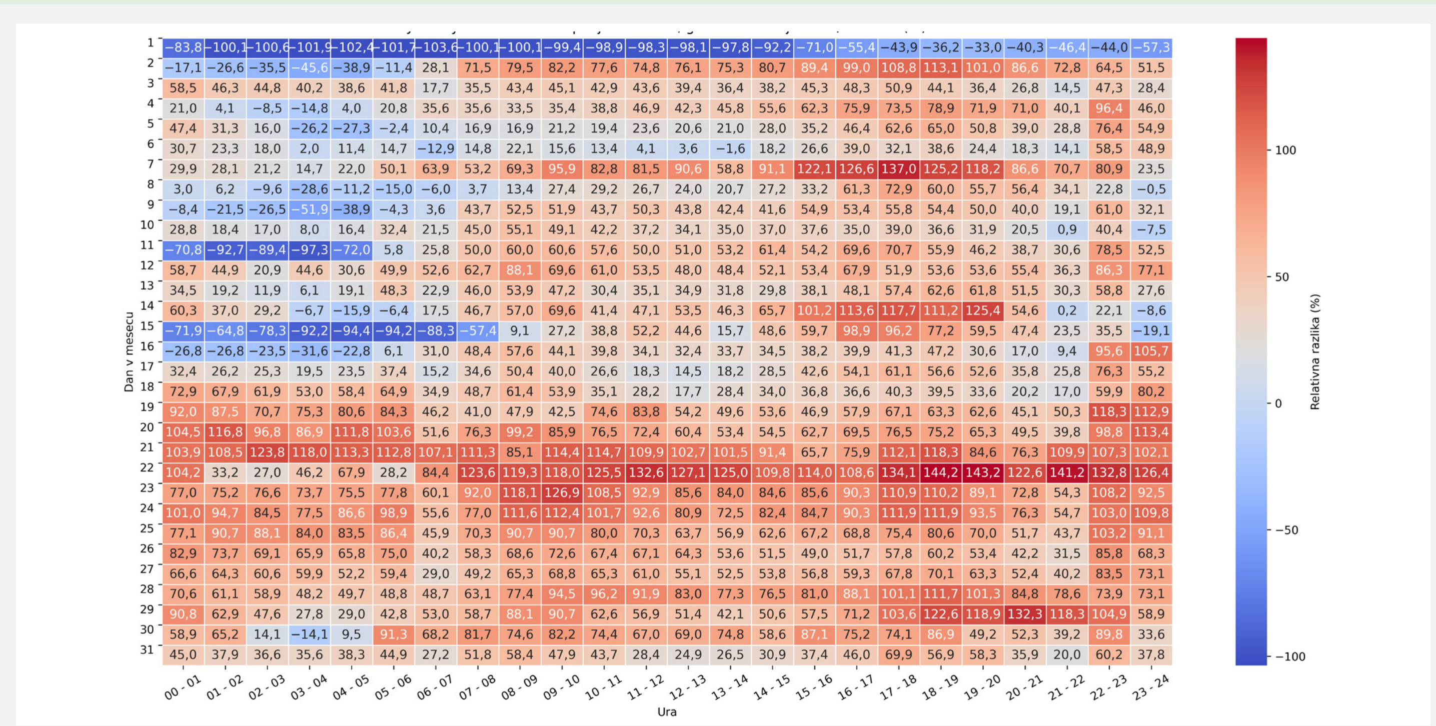
- for the high daily tariff (HT) $C_{VT_{reg}}$ = 118 EUR/MWh,
- for the low daily tariff (LT) $C_{MT_{reg}}$ = 82 EUR/MWh.

LT applies during the night, between 10 pm and 6 am of the following day, and all day on Saturdays, Sundays and public holidays, while HT applies outside these time windows.

The price comparison is made by subtracting for each hour in 2023 the value of the tariff for the hour in question (the capped price) from the day-ahead price of electricity on the Slovenian Energy Exchange ($SIPXHourly_i$). The resulting absolute value of the difference represents the relative deviation of the BSP price with respect to the capped price. Based on the analysis of the deviations, it can be evaluated whether there was a potential to offer dynamic prices on the market despite the price cap.

From the heat map of relative price differences for January 2023, it can be seen that the lower values of the electricity prices on the exchange with respect to the respective maximum allowed tariffs occurred 74 times. The highest negative deviation occurs on 1 January between 6 and 7 a.m. (–103.8%) and the average negative deviation is –49.6%. On the other hand, the highest positive deviation (BSP prices higher than capped prices) is 144.2% and the average of 670 positive relative deviation values is 59.6%.

FIGURE: RELATIVE DEVIATION BETWEEN THE SIPXHOURLY INDEX AND CAPPED PRICES (JANUARY 2023)



SOURCE: ENERGY AGENCY

73 BSP SouthPool Energy Exchange, Day-ahead Trading Results – Archive Data Slovenia 2023, [accessed on 23 May 2024] https://www.bsp-southpool.com/day-ahead-trading-results-si.html

74 Official Gazette of the Republic of Slovenia, No. 95/22 and 98/22

75 Official Gazette of the Republic of Slovenia, No. 45/23

The table below shows the aggregated results of the analysis for the year 2023. It presents the results of the evaluation of the number of hours when the prices on the BSP exchange (SIPXHourly$_i$) were lower or higher than the maximum allowed tariffs, and the average value of the negative and positive deviation respectively for each month. The upward or downward trend in the proportion of hours by month is in line with the predominantly downward trend in day-ahead prices in the exchange.

TABLE: ANALYSIS OF SITUATIONS WHERE PRICES IN THE POWER EXCHANGE WERE LOWER THAN THE CAPPED PRICES

Month	Total number of hours in a month	SIPXhourly$_i$ lower [No of hours]	Share of hours (%)	Average value of the negative deviation (%)	SIPXhourly$_i$ higher [No of hours]	Share of hours (%)	Average value of the positive deviation (%)
January	744	74	9.9	−49.60	670	90.1	59.6
February	672	20	3.0	−11.20	652	97.0	51.6
March	744	218	29.3	−26.10	525	70.6	32.0
April	720	229	31.8	−26.30	489	67.9	28.5
May	744	422	56.7	−34.20	322	43.3	18.6
June	720	371	51.5	−29.70	349	48.5	24.3
July	744	388	52.2	−37.70	355	47.7	23.1
August	744	353	47.4	−37.70	391	52.6	27.5
September	720	291	40.4	−28.80	428	59.4	26.8
October	744	295	39.7	−31.80	449	60.3	27.7
November	720	334	46.4	−34.20	386	53.6	20.8
December	744	485	65.2	−47.00	259	34.8	20.6

SOURCE: ENERGY AGENCY

A comparison of the proportion of hours and the average positive and negative deviations suggests that in 2023, there were six months suitable or favourable for offering dynamic prices, taking into account the price cap on retail prices for households and small business, as the average deviations in the positive direction (BSP price higher) are smaller than the average deviations in the negative direction (BSP price lower) for a comparable proportion of hours. The remaining months were unfavourable for dynamic pricing.

As a point of interest, we also show the shares of hours when the BSP price is lower separately for the period of higher (HT) and lower tariffs (LT). It can be observed that the shares of hours tend to be higher when the conditions for the operation of distributed generation resources (mainly solar power plants) are more favourable, i.e. mainly during the onset of HT. An exception is December, which was characterised by extremely low electricity prices on the power exchange in the second half of the year.

TABLE: OCCURRENCE OF LOWER PRICES ON THE POWER EXCHANGE AT THE TIME OF HT OR LT TARIFFS

Month	HT – prices on BSP lower (No of hours)	Total number of hours HT	Share of hours HT (%)	LT – prices on BSP lower (No of hours)	Total number of hours LT	Share of hours LT (%)
January	2	336	0,6	72	408	17,6
February	7	304	2,3	13	368	3,5
Marec	137	368	37,2	81	376	21,5
April	130	288	45,1	99	432	22,9
May	249	336	74,1	173	408	42,4
June	241	352	68,5	130	368	35,3
July	222	336	66,1	166	408	40,7
August	223	352	63,4	130	392	33,2
September	192	336	57,1	99	384	25,8
October	114	336	33,9	181	408	44,4
November	142	336	42,3	192	384	50
December	190	304	62,5	295	440	67

SOURCE: ENERGY AGENCY

It can be concluded that in 2023, dynamic products could bring more significant benefits to active consumers, especially during the period of large-scale RES generation that occurs within the HT time slot. Correspondingly, innovative business models for energy supply could also be fully specialised, e.g. for the electrification of transport by exploiting the split-supply model, and offered on a seasonal basis. This indirectly means that offering this type of dynamic pricing would increase choice and hence market activity, as it would encourage the switching of suppliers that has stopped completely, or at least the seasonal switching of products.

Despite the identified potential, the observed marginal situation in the market regarding dynamic price offers, which requires a mature active consumer able to monitor price developments and actively manage risks by timely switching between dynamic and static products in 2023, does not provide a sufficiently stable environment to incentivise consumers to enter into such offers.

Notwithstanding the marginal situation, it is essential to ensure a minimum of supply transparency in this area, especially as the analysis for 2024 shows a strong potential for the development of dynamic offers with a price cap now somewhat relaxed.

2024 Period

In 2024, a revised retail price cap came into force. The Decree on the determination of electricity prices[76] sets a maximum retail price for electricity for 90% of the actual monthly consumption for household consumers and for consumption in common areas of multi-apartment buildings and common areas in mixed multi-apartment and commercial buildings. The maximum allowed tariffs for 90% of the actual monthly consumption are capped at the following value in 2024:

- for the high daily tariff C_{VTreg} = 118 EUR/MWh,
- for the low daily tariff C_{MTreg} = 82 EUR/MWh.

For the remaining 10% of consumption, the price of the electricity supply contract applies.

The market prices of the selected suppliers for the higher (C_{VTtr}) and lower (C_{MTtr}) daily tariffs in place at the time of preparation of this analysis are given in the table below.

TABLE: MARKET PRICES FOR ELECTRICITY FROM ELECTRICITY SUPPLY CONTRACTS

	HIGH DAILY TARIFF $C_{VT_{tr}}$ [EUR/MWh]	LOW DAILY TARIFF $C_{MT_{tr}}$ [EUR/MWh]
E 3	165.85	149.95
Petrol	163.95	147.95
NGEN	159.89	142.49
SunContract	160.64	149.58
ECE	184.49	138.49
Elektro energija	169.99	147.99
GEN-I	162.90	144.90
Energija plus	184.49	138.49
Energetika Ljubljana	163.89	146.89
Average price	**168.45**	**145.19**

SOURCE: ELECTRICITY SUPPLIERS' WEBSITES

Based on the regulated and market shares, the capped electricity prices for the higher daily tariff (C_{VT}) and the lower daily tariff (C_{MT}) are determined:

$$C_{VT} = 0{,}9C_{VTreg} + 0{,}1C_{VTtr} = 0{,}9 \cdot 118 + 0{,}1 \cdot 168{,}45 = 123{,}045 \text{ EUR/MWh} \qquad (1)$$

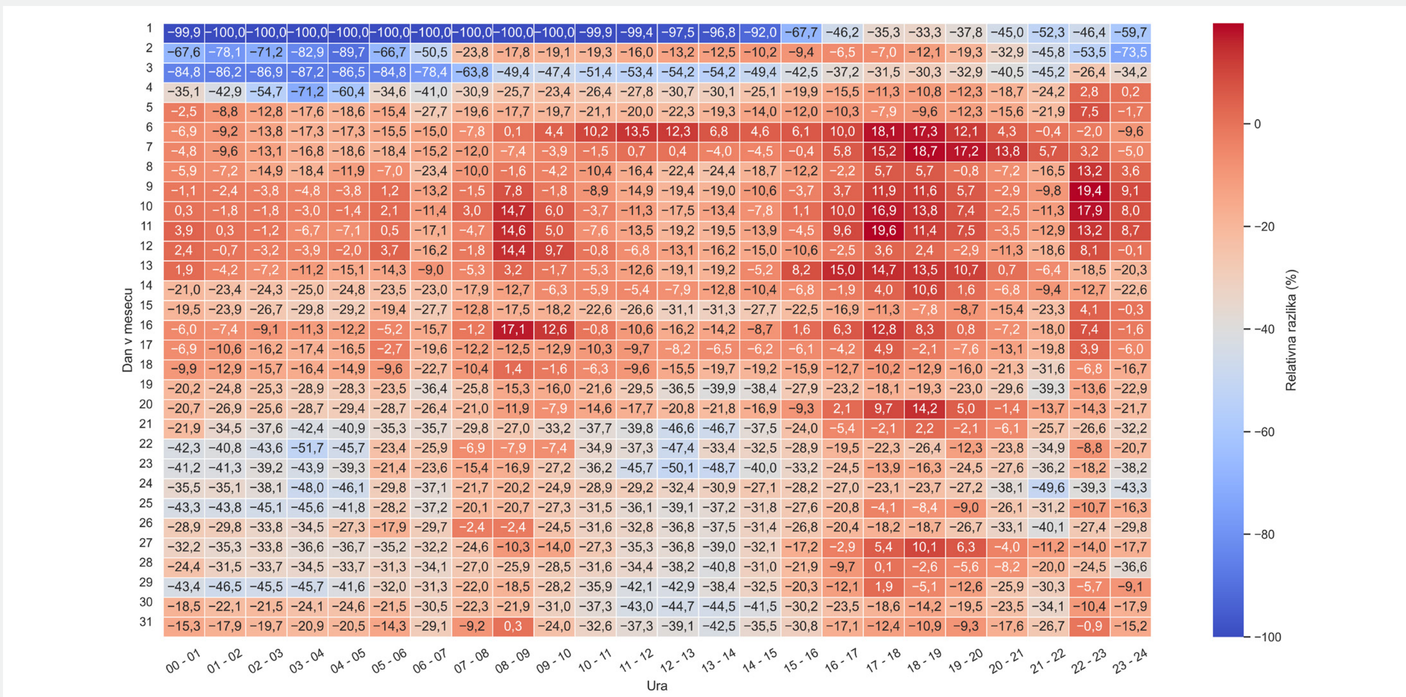
$$C_{MT} = 0{,}9C_{MTreg} + 0{,}1C_{MTtr} = 0{,}9 \cdot 82 + 0{,}1 \cdot 145{,}19 = 88{,}319 \text{ EUR/MWh} \qquad (2)$$

76 Decree on the determination of electricity price, Official Gazette of the Republic of Slovenia, No. 107/23

The following is a comparison of the dynamic electricity prices on the Slovenian day-ahead power exchange (BSP SouthPool)[77] with the applicable tariffs, based on 90% regulated and 10% market share (C_{VT}, C_{MT}). The price comparison is made by subtracting the value of the relevant price cap tariff (higher or lower tariff i.e. C_{VT} or C_{MT}) for each hour in 2024 (for the period from 1 January 2024 to 31 May 2024) from the hourly electricity index on the electricity exchange market in Slovenia (SIPXhourly$_i$). The resulting absolute value of the difference is then divided by the corresponding tariff in order to evaluate the relative deviation of the exchange prices with respect to the corresponding capped tariff of the capped prices.

From the heat map of relative price differences for the month of January 2024, it can be seen that the lower values of the SIPXhourly$_i$ hourly indices with respect to the corresponding capped price tariffs occurred 643 times, i.e. 86.4% of the total hours in the month. The highest negative deviation occurs on 1 January in the morning hours (-100%) and the average negative deviation is –24.8%. On the other hand, the highest positive deviation (SIPXhourly$_i$ higher than capped prices) is 19.6% and the average of 670 positive relative deviation values is 7.6%.

FIGURE: RELATIVE DEVIATION BETWEEN THE SIPXHourly$_i$ INDEX AND CAPPED PRICES (JANUARY 2024)



SOURCE: ENERGY AGENCY

The outcome of the analysis for the period of January-May 2024 is given in the table below, which shows the results of the evaluation of the number of hours when the prices on the power exchange were below the maximum allowed tariffs of the price cap (SIPXHourly$_i$ lower) and the average value of the negative deviation for each month, or the reverse situation, i.e. when the prices on the power exchange were higher than the price cap levels (SIPXHourly$_i$ higher).

77 BSP SouthPool Energy Exchange, Day-ahead Trading Results – Archive Data Slovenia 2023, [accessed on 27 May 2024] https://www.bsp-southpool.com/day-ahead-trading-results-si.html

TABLE: ANALYSIS OF SITUATIONS WHERE PRICES IN THE POWER EXCHANGE WERE LOWER OR HIGHER THAN THE CAPPED PRICES

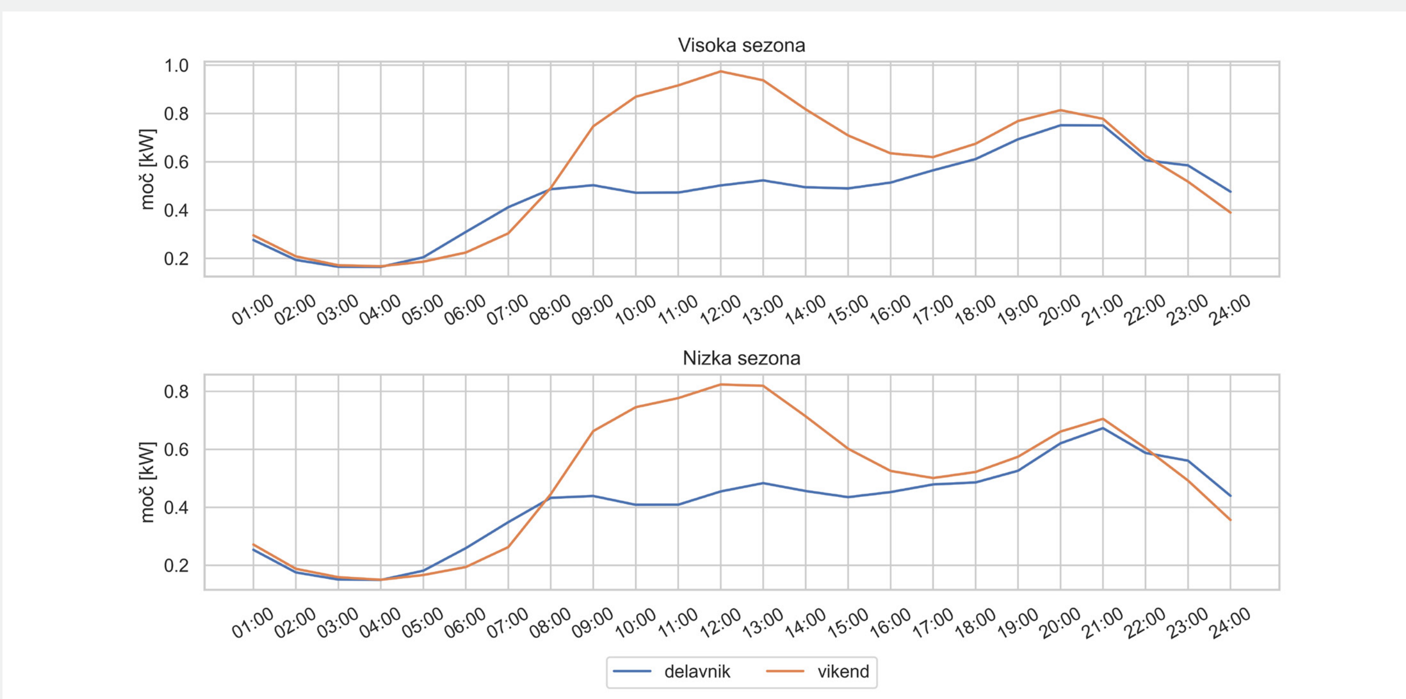
Month	Total number of hours in a month	$SIPXhourly_i$ lower (No of hours)	Share of hours (%)	Average value of negative deviation (%)	$SIPXhourly_i$ higher (No of hours)	Share of hours (%)	Average value of positive deviation (%)
January	744	643	86.4	–24.8	101	13.6	7.6
February	696	680	97.7	–36.2	16	2.3	10.1
March	743	729	98.1	–39.3	14	1.9	10.8
April	720	658	91.4	–48.2	62	8.6	13.3
May	744	577	77.6	–42.7	167	22.4	15.3

SOURCE: ENERGY AGENCY

Next, we use a synthetic electricity consumption profile defined for a group of household consumers with an installed capacity of between 7-14 kW and an annual consumption of between 2,500-5,000 kWh to evaluate the difference in electricity costs that a consumer would pay for the period of 1 January 2024-31 May 2024, taking into account the $SIPXhourly_i$ indexes (i.e. the dynamic price) and the capped price.

The average daily consumption profiles for the high and low seasons – working day and weekend/holiday are normalised so that a household consumer uses 4,000 kWh of electricity per year. The high season is considered to be from the beginning of November to the end of February.

FIGURE: SYNTHETIC PROFILE OF A VIRTUAL HOUSEHOLD CONSUMER



SOURCE: ENERGY AGENCY

The monthly cost of electricity consumed is determined, taking into account dynamic electricity prices, as the sum of the products of the $SIPXhourly_i$ indices and the electricity consumed for each hour of the selected month. Similarly, the price of electricity with respect to the capped prices is determined as the sum of the products of the capped price tariffs and the electricity consumed for each hour of the selected month.

The table below shows the amount and the monthly cost of electricity consumed, taking into account dynamic or capped prices. It also shows the relative difference in the cost of electricity consumed, i.e. the percentage by which the cost is lower when dynamic prices are taken into account. As can be seen from the table, the benefits to the consumer in terms of lower monthly electricity costs would occur each month in a proportion ranging from 18% to 43%.

TABLE: ESTIMATE OF MONTHLY ELECTRICITY CONSUMPTION AND COMPARISON OF ELECTRICITY COSTS

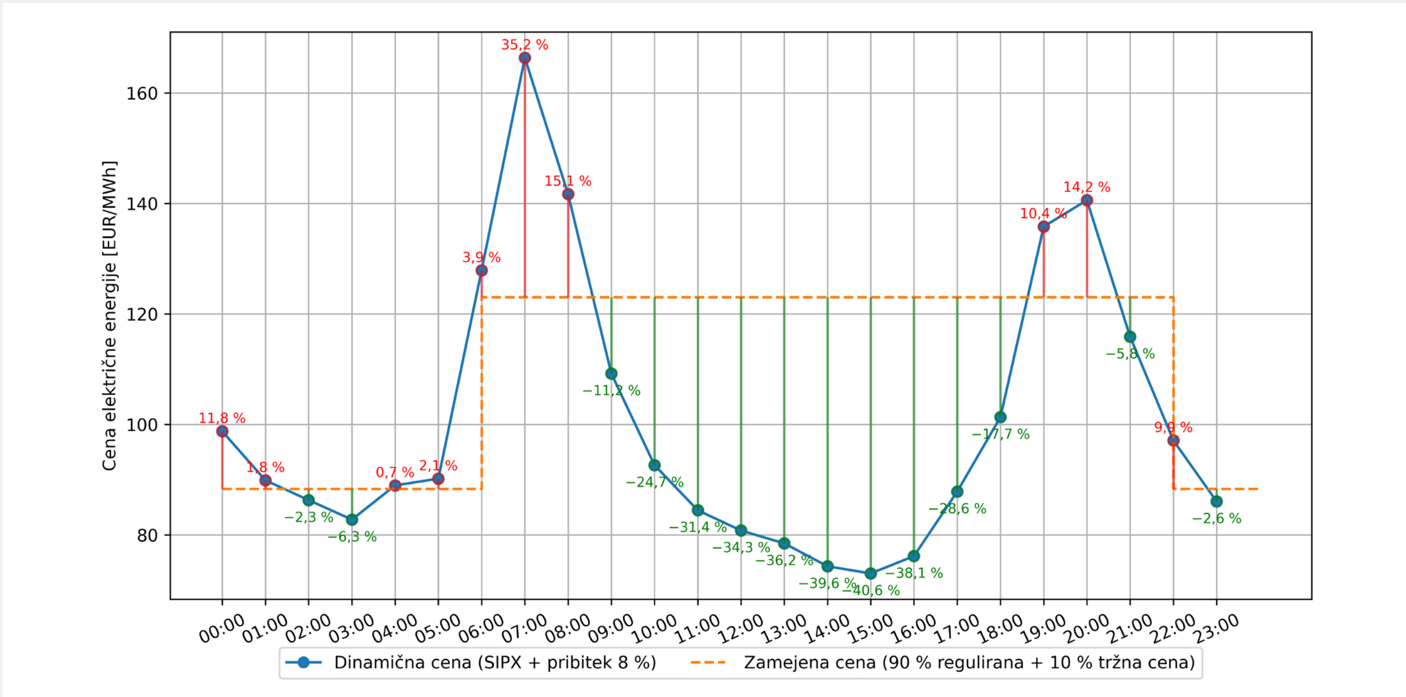
Month	Monthly electricity consumption [kWh]	Electricity costs – dynamic price [EUR]	Electricity costs – capped price [EUR]	Relative difference in costs (%)
January	374.37	32.31	39.52	–18.26
February	349.28	24.42	37.00	–34.01
March	326.19	20.97	34.42	–39.06
April	314.42	18.91	33.38	–43.35
May	326.35	23.36	34.43	–32.16

SOURCE: ENERGY AGENCY

Based on the information obtained from the market analysis, we note that when setting the dynamic price, the supplier usually includes a markup of up to 12% of the value of the $SIPXhourly_i$ index.

The following is a comparison of the dynamic and capped electricity prices (EUR/MWh) that could be taken into account in the customer's calculation of the cost of electricity consumed on 18 April 2024. The positive relative deviations between the dynamic and the capped prices (shown in red in the figure) represent periods where the cost to the customer will be higher than if they used the static, i.e. tariff capped, pricing model. The negative relative deviations between the dynamic price and the capped price (in green) represent the periods during which the benefits to the consumer would occur – i.e. the dynamic price is lower than the capped price. In order to evaluate the net benefit to the consumer at a daily level, it will be necessary to take into account their hourly consumption profile for the selected day.

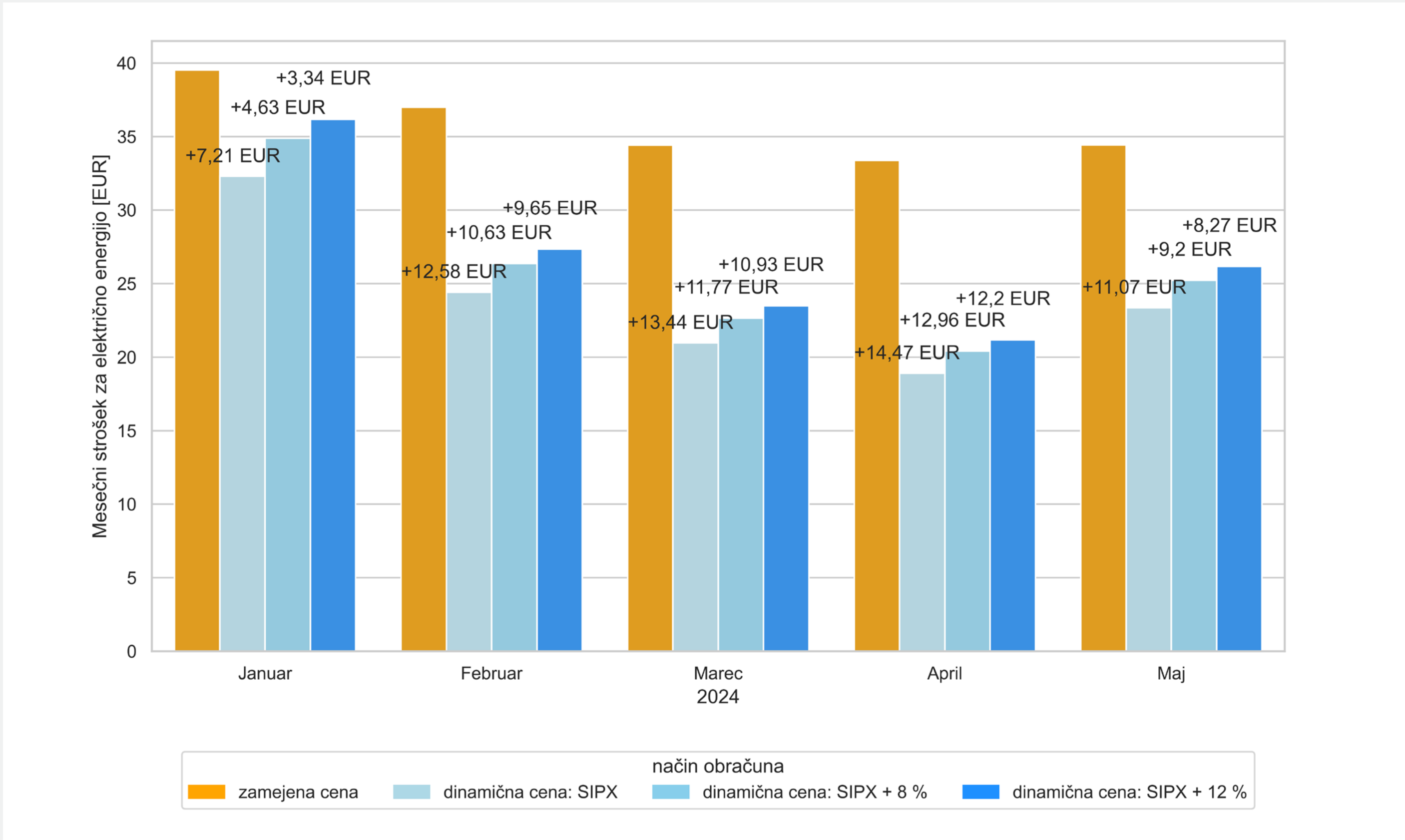
FIGURE: DAILY DIFFERENCE IN THE HOURLY VALUES OF THE DYNAMIC PRICE AND THE CAPPED PRICE



SOURCE: ENERGY AGENCY

Considering the movements of the electricity prices on the day-ahead exchange in Slovenia, taking into account the different suppliers' mark-ups (0%, 8% and 12%), the benefits that dynamic pricing can bring to consumers are estimated. The benefits are reflected in the monthly cost reductions taking into account the different mark-ups. These values depend mainly on market price developments and also on the electricity consumption profile itself.

FIGURE: EVALUATION OF THE BENEFITS THAT DYNAMIC PRICING COULD BRING TO THE CUSTOMER



SOURCE: ENERGY AGENCY

The analysis indicates that offering dynamic electricity supply products linked to SIPX in 2024 would benefit both the supplier and the consumer, with the latter saving significantly on the cost of energy supply compared to the government's price cap.

The outcome of an »ex-post« analysis is, of course, no guarantee of future benefits for the customer. When opting for a dynamic supply product, especially in the case of the smallest consumers, it is essential to take into account other influential risk factors. In the context of the requirements of Article 17(3) of the ZOEE Act with respect to the obligations of suppliers to inform final consumers in advance about the opportunities, costs and risks of dynamic pricing contracts and to provide them with adequate information, price volatility is one of the key risk factors and, at the same time, opportunities (e.g. the occurrence of negative prices). Despite the relatively low prices, especially compared to the crisis year 2022, the increased volatility level in the second quarter of 2024 (see the case study »Analysis of the level of volatility of electricity prices in the day-ahead market over the 2021–2024 period«) can certainly be a key risk factor for end-users entering into supply contracts based on dynamic prices directly linked to products in continuous wholesale markets. Furthermore, an analysis of the existing supply has shown that certain suppliers cap the prices downwards (not allowing payment for taking over electricity when negative prices occur), but do not allow an upward cap to be charged to the final consumer as an additional cost heading, based on good practice from the EU. This reduces the opportunities and increases the risks for the end-consumer. However, the risk assessment needs to evaluate the extent of the benefits against the costs of the primary electricity supply options (static products), which were subject to price caps for the smallest consumer groups in 2023 and remain largely price-capped in 2024 as well.

Transparency

Financial Transparency of Suppliers, Transparency of Invoices and Obligation of Public Price Quotes

Electricity market participants are required by the Companies Act (ZGD-1) to provide annual reports, which ensures suitable financial transparency in the field of electricity supply. The consolidated annual reports must give a true and fair view of the financial position and operating result of the group of companies and are audited by independent auditors and submitted to AJPES for public release.

In 2023, the framework legislation from this field ensured a minimum level of transparency even without a specific regulatory framework. In fact, the suppliers' bills display a breakdown of the costs of electricity, the network charge, levies, the excise duty and VAT. In addition, the bills include information on the structure of the primary electricity sources, carbon dioxide emissions and the resulting radioactive waste. The »Act on the method for presenting information on electricity bills and in the additional explanatory note«, which entered into force in March 2023 and was subsequently amended in November 2023, ensures an adequate systemic regulation of the transparency of electricity invoices and adequately regulates the manner of displaying the information related to the reform of the methodology for calculating the network charge.

The implemented reform of the tariff system for the network charges brings a somewhat greater complexity to the tariff for the use of the network. The requirements of the Clean Energy for All Europeans package, which are implemented in the ZOEE Act, oblige certain suppliers on the retail market to provide end-users with supply products based on dynamic energy prices linked to wholesale prices, e.g. day-ahead market prices, which, however, entails a significant increase in the complexity of the bills, especially when it comes to joint bills for the network charge and the supply of energy, as the dynamic tariff rates vary within the day on an hourly basis. Other, innovative energy services may contribute to the further complexity of the information on the bill. These novelties represent a new challenge for suppliers, who are especially concerned with how to design combined bills for electricity supply and network use, to ensure the transparency and clarity of the bills. It can be expected that in cases of energy supply based on dynamic pricing products or other innovative energy supply products, suppliers will most likely no longer issue a joint invoice. Instead, the consumer will receive separate invoices for the use of the network and for the more innovative energy supply service.

In any case, the current technology allows for new, more modern approaches to the provision of information to customers: it is thus also possible and advisable to provide detailed information about the services subject to charges for suitable electronic data services via the national data hub or suppliers' web applications. This way, suitably structured information can be provided, along with the necessary tables and charts, which will enable end-consumers to gain clear information and a detailed analysis of the charged quantities.

As in previous years, in 2023 suppliers had to provide household consumers and small business consumers with transparent information on their offer of electricity supply and the related price lists, as well as the general terms and conditions for their supply services, at least by publishing this information on their website. At the same time, this information serves as input data for comparison services used to compare supply costs for electricity and natural gas, which, by law, are provided by the Energy Agency.

Guarantees of Origin for Electricity

A guarantee of origin is a document issued by the Agency at the request of a producer of electricity. This document enables traceability and serves as the proof of provenance of certain electricity. Guarantees of origin are particularly important for consumers since they prove the origin of the supplied electricity. They are also important from the suppliers' point of view, because they use them to demonstrate the origin of electricity supplied to the consumers, and they are mandatory for electricity from RES. However, guarantees of origin can also be issued to producers for other, conventional sources. Each guarantee is equipped with an ID number enabling the traceability of the producer and the origin of the electricity. Additionally, it includes data on the origin of electricity and the quantities of produced electricity for which the guarantee is being issued, the data on the producers, the production facility and information about the support for the produced electricity and the production period. The guarantees of origin and transactions and their cancellation are issued electronically in the register of guarantees of origin. With its cancellation, the guarantee of origin is used and serves suppliers and consumers as proof of the source of electricity supplied.

For electricity produced in 2023, 13,314 GWh guarantees of origin were issued, 5,077 GWh of which were issued for electricity from RES and 5,323 GWh for electricity from nuclear energy (the guarantees of origin are issued for the entire quantity of electricity from the Krško NPP). The remaining guarantees were issued for electricity generated from fossil fuels.

To prove the origin of electricity on the domestic market, 4,220 GWh of guarantees of origin were cancelled, 1,931 of which were for RES. 4,466 GWh of guarantees of origin for electricity were transferred to other EU member states (4,377 GWh of which for electricity from RES) and 1,723 GWh of guarantees of origin (of which 1,451 GWh for electricity from RES) were transferred from other EU members to Slovenia.

Ensuring Retail Market Transparency

Transparency in the retail market with numerous participants, which under normal circumstances offer a very large and diverse range of services, is ensured in particular by making all the necessary information publicly available. Suppliers publish information about their offers and products on their websites, as well as their terms of cooperation. After the implementation of the Clean Energy for All Europeans package, increased development of the retail market is expected to occur, which has at least temporarily been hampered by the price regulation as a consequence of the energy crisis. However, while there were a few innovative business models in the retail market that included flexibility on the demand side, suppliers did not contract on the basis of products with dynamic electricity supply prices for the smallest customers, as, with the prices capped, static products brought them more revenue. The still small share of electromobility in 2023 did not generate a need to develop new business models based on the split-supply model. The end of retail price regulation is expected to increase the diversity of supply and new players can be expected to enter the market.

Regardless of the poor development, the amount of information that is important in terms of transparency and need to be processed remains considerable, while this information is highly scattered. In accordance with the applicable legislation, transparency is being ensured by the Energy Agency and market operator Borzen.

The Energy Agency monitors the retail market based on public and other data obtained from persons with the reporting obligation. Based on the results of monitoring, reports on violations or restrictive practices, etc., the Energy Agency carries out surveillance activities and implements measures with the aim of providing transparency. The Energy Agency contributes to transparency by publicly publishing information and services at its single point of contact[78], which comprise comparison and validation e-services, including a list of suppliers and electricity system operators that includes the identity cards of individual companies, key indicators in energy markets (eMonitor portal[79]), reports on the state of the retail and wholesale markets and other useful data and relevant and up-to-date information contributing to the transparency of the retail market and services (structured list of legislation, explanation of the invoice, etc.).

In accordance with Article 20(1) of the ZOEE Act, free access to the comparison tool for comparing suppliers' offers is limited to household and micro-enterprise consumers with an expected annual consumption of less than 100,000 kWh. In terms of additional protection, the law addresses household and small business consumption, with the latter, according to available analyses, very rarely reaching 100,000 kWh. This might suggest that free access to the comparison tool should also be offered to some final consumers who do not meet the definition of small business consumption, but are still micro-enterprises. An electricity supplier makes a supply offer for a consumption profile that cannot be satisfactorily taken into account in representative synthetic profiles separately for each such end-user. Therefore, it cannot be expected that suppliers could, in accordance with Article 15(8) of the ZOEE Act, develop standard supply products and associated price lists for such end-users and make them publicly available, as is the case for household and small business consumption. Thus, the condition for the inclusion of such offers in the comparator services is not fulfilled.

The set of comparison e-services enables users to calculate and compare the costs of electricity supply according to individual consumption types. Comparative calculations can be carried out for the supply to household and small business consumers. Suppliers submit information about their offers to the Energy Agency in a standard format on a monthly basis in accordance with the Act concerning the method of electronic data reporting for valid regular tariff comparison of electricity and natural gas suppliers for household and small business customers. The web application Check

78 https://www.agen-rs.si/skt/ee
79 https://www.agen-rs.si/web/emonitor

Your Monthly Bill enables users to verify the accuracy of the issued monthly electricity bill according to the selected supplier, supply offer and type of consumption. This calculation is performed separately according to the bill's legally required items; it is possible for all products on the market but does not support checking balance payments. As part of its comparison services, the Energy Agency enables users to perform a comparative calculation of the costs for the use of the network i.e. network charges for all consumer groups according to the user's consumption type (the apps Calculate the Costs for the Use of the Network and Network Charge Comparator).

Comparison of Energy Supply Offers – Electricity Supply Costs Comparator

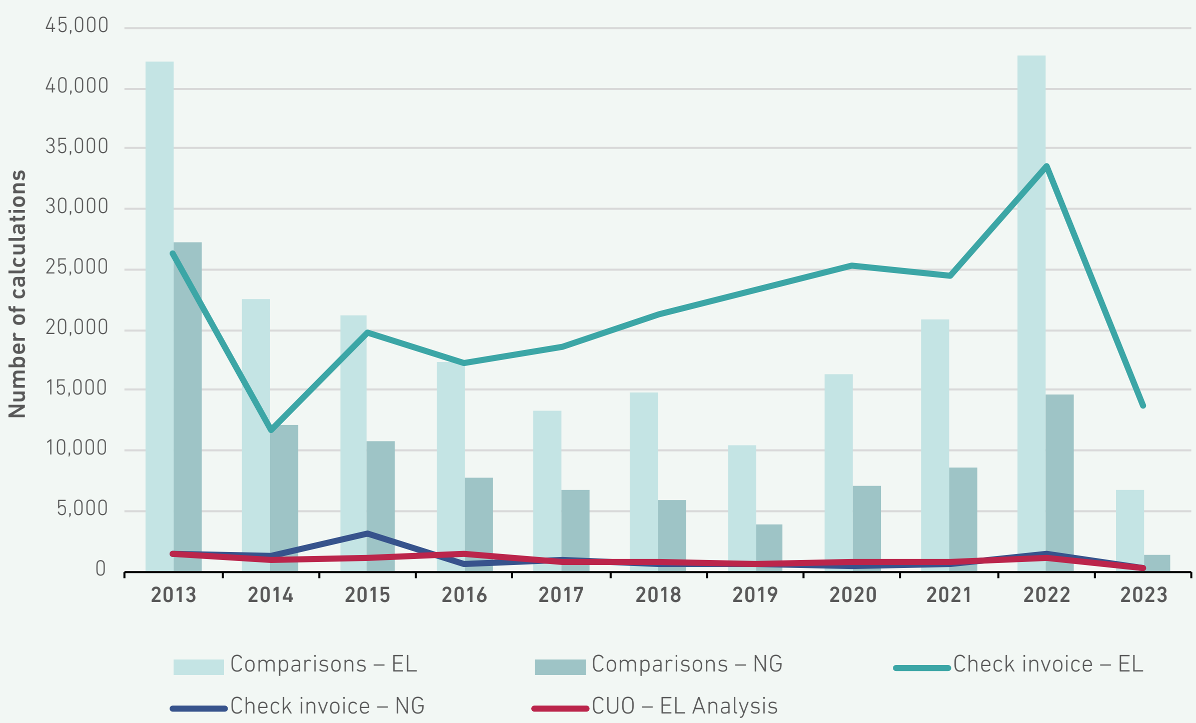
An independent comparison of all the offers on the market in one spot fundamentally contributes to more transparent offers in the retail market. Comparing the cost of the network charge before and after the reform of the calculation methodology provides end-users with an analysis of the effects of the changes and possible pre-preparation for the more efficient use of the network.

Therefore, the Energy Agency provided comparisons of all the offers on the retail market in 2023 as well, as part of its comparison services, with individual exceptions: only individual offers from suppliers whose design or characteristics did not ensure a minimum level of comparability or would distort the comparison, or had a very specific design that prevented comparison due to systemic limitation, were excluded. In a year of price caps, such offers were even more limited and irrelevant.

The lowest number of comparisons carried out for electricity supply since full market opening in 2007

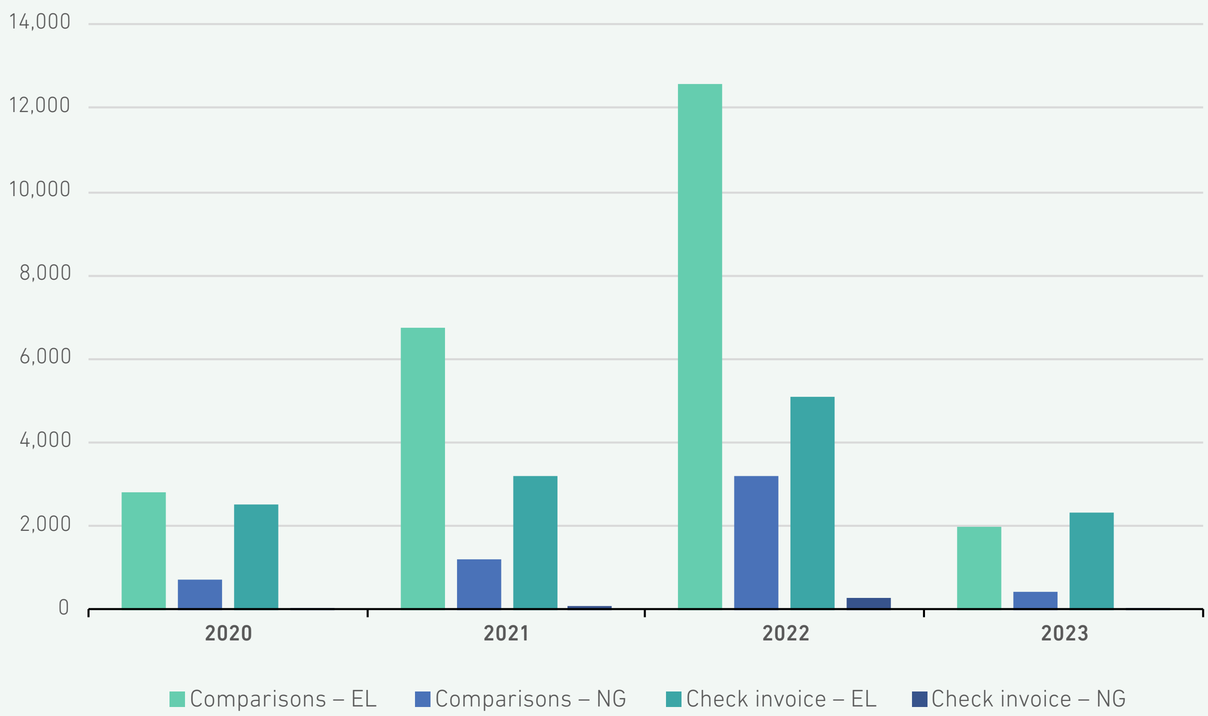
An analysis of the number of comparisons and invoice verifications (Figure 107) confirms the drastically reduced interest of consumers: the number of comparisons carried out has decreased by 84% (electricity supply) and 91% (natural gas supply) compared to 2022. Users checked their invoices between 2.5 (electricity supply) and more than 5 times (natural gas supply) fewer compared to 2022 (Figure 108). At the same time, the number of consumers using the comparator services decreased by between 54% (invoice verification) and 84% (comparative calculation) in electricity supply and between 76% (invoice verification) and 87% (comparative calculation) in natural gas supply. There was also a significant decrease in the number of analyses of the costs of the use of the electricity network (see »CUO – EL Analysis« in the figure below), namely by 71%.

FIGURE 107: ANALYSIS OF THE NUMBER OF COMPARISONS CARRIED OUT AS PART OF THE AGENCY'S SERVICE



SOURCE: ENERGY AGENCY

FIGURE 108: NUMBER OF USERS OF THE DIFFERENT COMPARISON SERVICES BY YEAR



SOURCE: ENERGY AGENCY

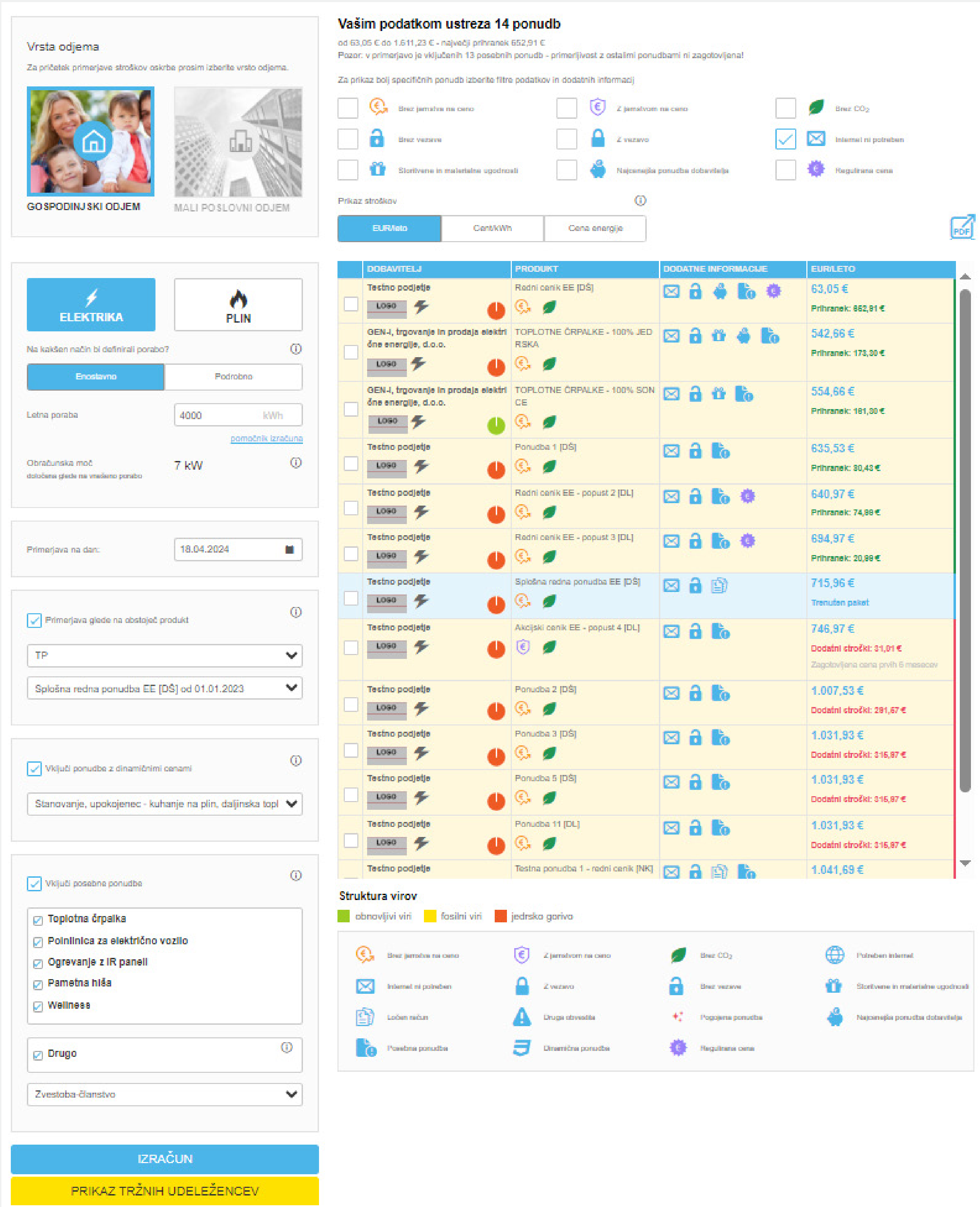
Since the introduction of the price cap and the stabilisation of the retail market structure in autumn 2022 for all customers with an installed capacity less than or equal to 43 kW (household and small business consumption), the interest in comparison services has decreased markedly, as expected, and the number of comparative calculations has been following the trend of decreasing usage since the last quarter of 2022. The substantial decline in interest in energy supply comparator services coincides with an insignificant level of dynamics in the retail market (a marked decrease in the share of supplier switches).

Due to the conclusion of the service life of the existing solution, the Energy Agency has a project in progress to renovate the comparison services in order to ensure compliance with the Clean Energy for All Europeans package and the CEER recommendations. The key novelty and challenge in the area of comparison services will be to support the comparison of offers on the basis of dynamic tariffs and, later, flexibility products. The renovation addresses the shortcomings and limitations of the current solution and provides consumers with a better user experience.

New Energy Agency's comparison services aimed at comparing energy supply offers are to be further upgraded

The introduction of the new solution has been postponed again, to 2024, due to interventions on the market (changes in the amount of levies, price capping, etc.), which required the solution to be upgraded, and the unsatisfactory level of definition of the products of energy supply based on dynamic prices (despite the Agency's measures). The graphical interface of the new comparison services, which are already under final testing or upgrade to support the calculation of capped prices on the basis of the Government Decree in the Agency's test environment is shown in Figure 109. The new application supports all known types of special offers in addition to offers based on dynamic prices, but does not yet support flexibility products because this type of offer is not yet sufficiently developed in the market.

FIGURE 109: GRAPHICAL USER INTERFACE OF THE ENERGY AGENCY'S NEW COMPARISON SERVICES IN THE FIELD OF ENERGY SUPPLY



SOURCE: ENERGY AGENCY

Given the significant reduction of interest in comparison services due to electricity and natural gas retail price regulation, the postponed introduction of the new solution will not have a significant negative impact.

Comparison of Network Charge Costs Before and After System Renewal – »Network Charge Comparator«

As a result of the reform of the methodology for calculating the network charge, the Agency has made additional comparison services available to all end-users, allowing them to calculate their estimated annual costs for using the network under the new system and to compare these with the costs they would have incurred if the current charging system had remained in place. The online application »Network Charge Comparator«[80] also allows calculations based on the adjustment of the agreed billed capacity, both in cases where the consumption is also adjusted accordingly and in cases where the final consumer does not provide an adjustment of the consumption and the excessive capacity is therefore charged. In addition, the user is provided with an analysis of the peak loads caused on the network by their consumption.

The »Network Charges Comparator« is a new comparison tool to support customers' preparation for the reformed methodology for calculating the network charge

Conditions for the comparison are the use of a 15-minute load diagram that the user can export from the Moj elektro portal for their delivery point and the sufficient availability of 15-minute metering data within this load diagram. A trial of the Network Charge Comparator was provided to customers with an installed capacity equal to or less than 43 kW at the beginning of October, but the Energy Agency decided to temporarily discontinue the service and upgrade the solution, mainly due to problems on the user side (usability of the solution) and the delay in the application of the renewed methodology for calculating the network charge. At the end of December, the Agency provided the upgraded service to all final consumers.

80 https://www.agen-rs.si/web/primerjalnik-stroskov-omreznine

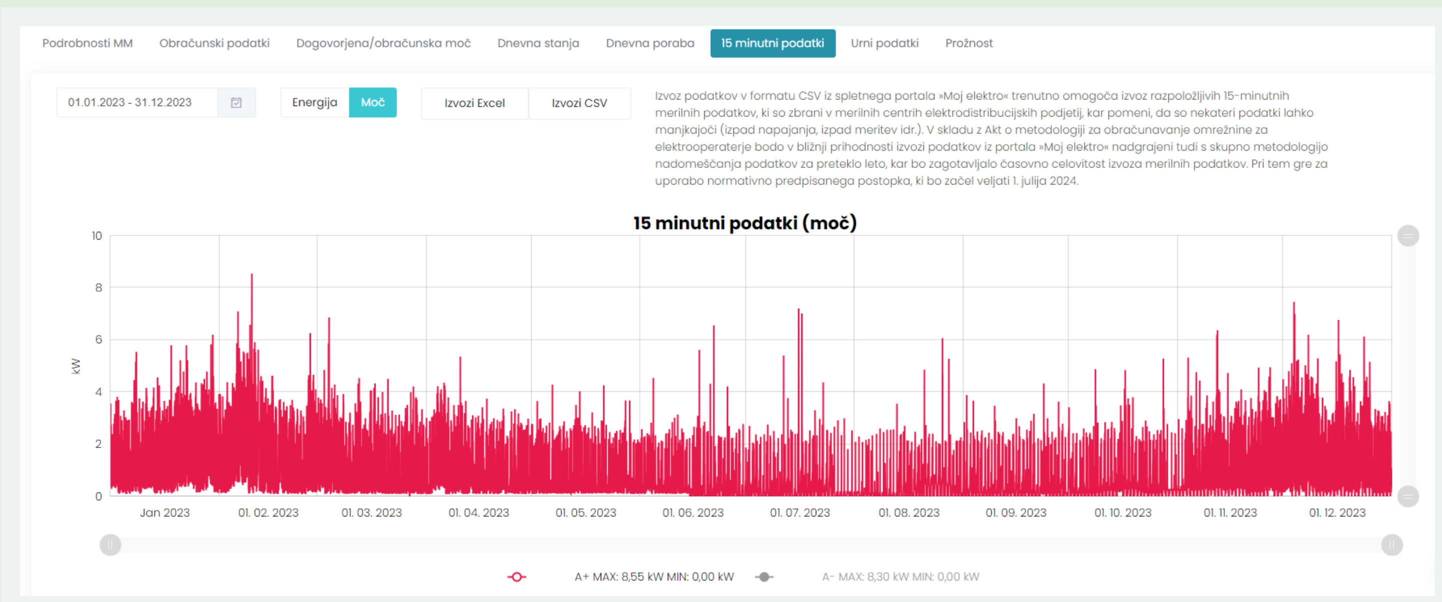
CASE STUDY

The Network Charges Comparator as a Support Tool in Preparation for the Application of the Revised Methodology for Calculating the Network Charge

The online application »Network Charges Comparator«, which is available 24/7, allows users to compare network charges on an annual basis, which is now a minimum requirement for a correct comparison due to the seasonality of network charges.

The application can only be used by registered users who are provided with an adequate level of personal data protection and for whom the Energy Agency provides 8/5 customer service. For the calculation, the user needs 15-minute data for the annual period of observation, which is retrieved from the national data hub or the Moj elektro web portal operated by the electricity distribution companies and the electricity operator in the form of an export in CSV format.

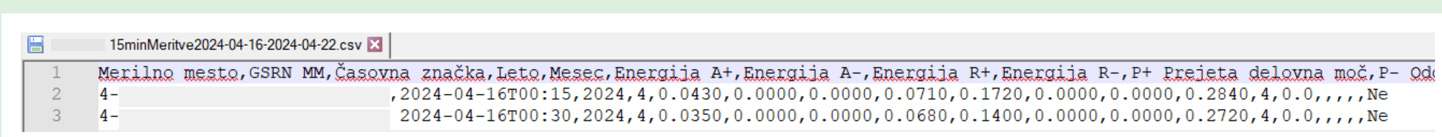
FIGURE: SCREENSHOT OF THE »MOJ ELEKTRO« WEB PORTAL DISPLAYING 15-MINUTE METERING DATA



SOURCE: ENERGY AGENCY

The CSV file with 15-minute metering data, which is a key input for the comparative calculation:

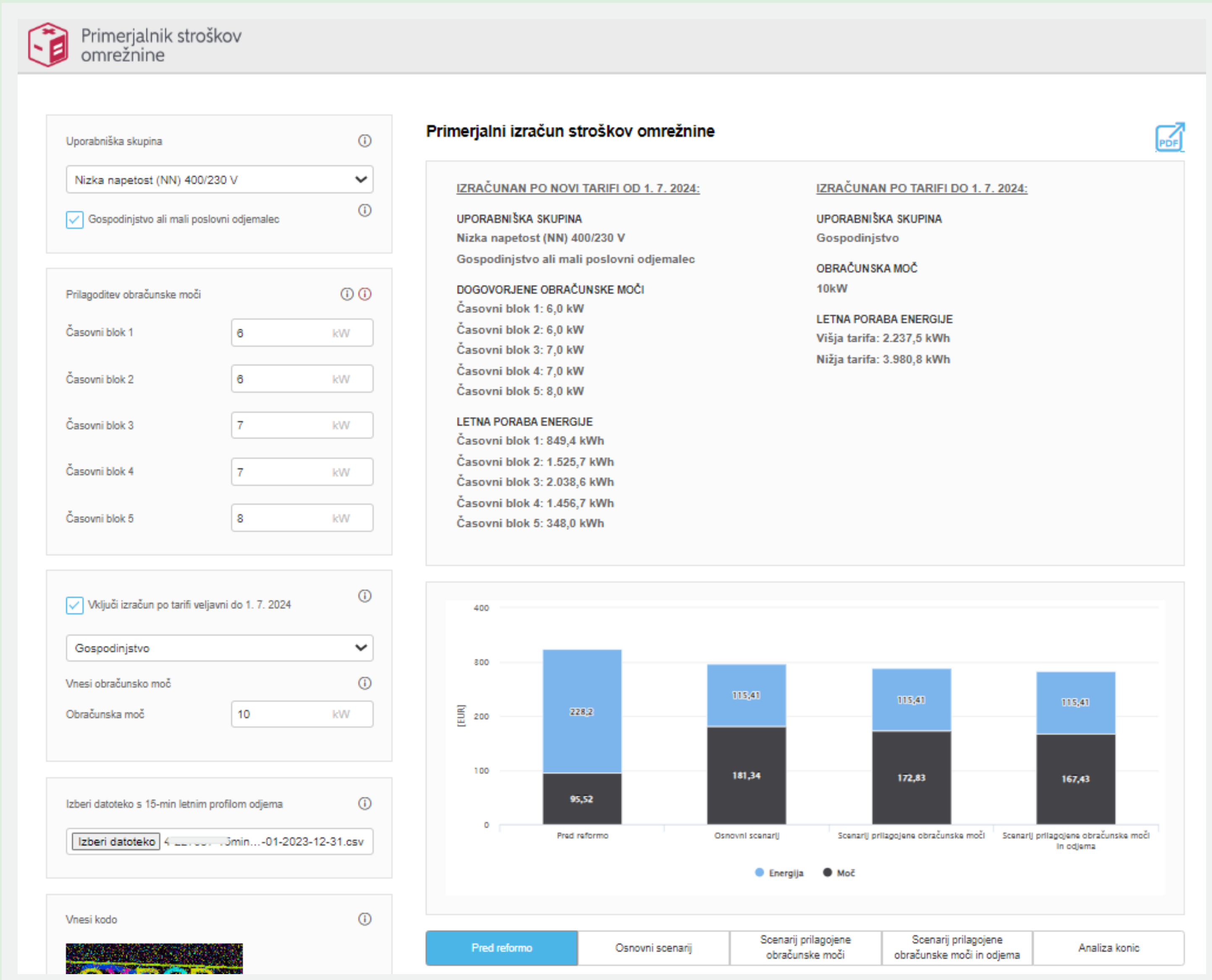
FIGURE: SCREENSHOT OF THE CONTENT IN THE »NOTEPAD++« TEXT EDITOR DISPLAYING THE CONTENT OF THE EXPORTED CSV FILE WITH 15-MINUTE METERING DATA



SOURCE: ENERGY AGENCY

The graphical user interface of the application immediately after the calculation is shown in the figure below.

FIGURE: SCREENSHOT OF THE »NETWORK CHARGES COMPARATOR« WEB APP SHOWING THE RESULT OF THE CALCULATION



SOURCE: ENERGY AGENCY

The user may include in the comparative calculation a comparison of the costs according to the methodology for calculating the network charge in force before the renovation. The figure below shows the annual network charge costs before the reform (»Before Reform«), which the user can compare with different usage scenarios under the new methodology.

FIGURE: SCREENSHOT OF THE WEB APPLICATION »NETWORK CHARGES COMPARATOR« SHOWING A BREAKDOWN OF ANNUAL NETWORK CHARGES BEFORE THE REFORM

Pred reformo	Osnovni scenarij	Scenarij prilagojene obračunske moči	Scenarij prilagojene obračunske moči in odjema	Analiza konic

Tarifna postavka	Količina [kW]|[kWh]	Cena [EUR/kWh]|[EUR/kW]	Število mesecev	Znesek [EUR] (brez DDV)
Obračunska moč	10,0	0,79600	12	95,52
Energija MT	3.980,8	0,03310		131,80
Energija VT	2.237,5	0,04310		96,39
Stroški skupaj (brez DDV)				**323,72**

SOURCE: ENERGY AGENCY

Below are comparative calculations for the following three scenarios of network use, if calculated according to the new methodology:

- Unchanged network use (»Baseline scenario«): the end-user accepts the agreed billed capacities as set by the electricity operator, as these reflect the unchanged habits of the user;
- unchanged network use with adjusted agreed billed capacity (»Adjusted Billed Capacity Scenario«): the final consumer adjusts the agreed billed capacities to the expected future network use but does not ensure that the consumption is adjusted to these new billed capacities. Due to surpluses, excess capacity is charged to the consumer;
- adjusted network use to the new agreed billed capacities (»Adjusted Billed Capacity and Demand Scenario«): the final consumer adjusts its demand in such a way that it does not exceed the new agreed billed capacities.

FIGURE: SCREENSHOT OF THE WEB APPLICATION »NETWORK CHARGES COMPARATOR« SHOWING A BREAKDOWN OF THE ANNUAL NETWORK CHARGES AFTER THE REFORM (BASELINE SCENARIO)

Pred reformo	Osnovni scenarij	Scenarij prilagojene obračunske moči	Scenarij prilagojene obračunske moči in odjema	Analiza konic

Tarifna postavka	Časovni blok (ČB)	Količina [kW]|[kWh]	Cena [EUR/kWh]|[EUR/kW]	Število mesecev	Znesek [EUR] (brez DDV)
Obračunska moč	1	6,5	3,61324	4	93,85
Obračunska moč	2	6,5	0,88240	12	68,76
Obračunska moč	3	7,6	0,19137	12	17,53
Obračunska moč	4	7,6	0,01316	12	1,21
Obračunska moč	5	7,6	0,00000	8	0,00
Energija	1	849,4	0,01958		16,63
Energija	2	1.525,7	0,01844		28,13
Energija	3	2.038,6	0,01837		37,45
Energija	4	1.456,7	0,01838		26,77
Energija	5	348,0	0,01847		6,43
Stroški skupaj (brez DDV)					**296,75**

SOURCE: ENERGY AGENCY

FIGURE: SCREENSHOT OF THE WEB APPLICATION »NETWORK CHARGES COMPARATOR« SHOWING A BREAKDOWN OF ANNUAL NETWORK CHARGES AFTER THE REFORM (ADJUSTED BILLED CAPACITY SCENARIO)

Pred reformo	Osnovni scenarij	Scenarij prilagojene obračunske moči	Scenarij prilagojene obračunske moči in odjema	Analiza konic

Tarifna postavka	Časovni blok (ČB)	Količina [kW]|[kWh]	Cena [EUR/kWh]|[EUR/kW]	Število mesecev	Znesek [EUR] (brez DDV)	Znesek – presežna moč [EUR]	Število presežkov moči	Količina presežne moči [kW]
Obračunska moč	1	6,0	3,61324	4	86,72	4,05	2	1,7
Obračunska moč	2	6,0	0,88240	12	63,53	1,00	2	1,8
Obračunska moč	3	7,0	0,19137	12	16,08	0,35	2	2,0
Obračunska moč	4	7,0	0,01316	12	1,11	0,00	0	0,0
Obračunska moč	5	8,0	0,00000	8	0,00	0,00	0	0,0
Energija	1	849,4	0,01958		16,63			
Energija	2	1.525,7	0,01844		28,13			
Energija	3	2.038,6	0,01837		37,45			
Energija	4	1.456,7	0,01838		26,77			
Energija	5	348,0	0,01847		6,43			
Stroški skupaj (brez DDV)					**288,24**			

SOURCE: ENERGY AGENCY

FIGURE: SCREENSHOT OF THE WEB APPLICATION »NETWORK CHARGES COMPARATOR« SHOWING A BREAKDOWN OF ANNUAL NETWORK CHARGES AFTER THE REFORM (ADJUSTED BILLED CAPACITY AND DEMAND SCENARIO)

Pred reformo	Osnovni scenarij	Scenarij prilagojene obračunske moči	Scenarij prilagojene obračunske moči in odjema	Analiza konic

Tarifna postavka	Časovni blok (ČB)	Količina [kW]|[kWh]	Cena [EUR/kWh]|[EUR/kW]	Število mesecev	Znesek [EUR] (brez DDV)	Premaknjena poraba [kWh]
Obračunska moč	1	6,0	3,61324	4	86,72	
Obračunska moč	2	6,0	0,88240	12	63,53	
Obračunska moč	3	7,0	0,19137	12	16,08	
Obračunska moč	4	7,0	0,01316	12	1,11	
Obračunska moč	5	8,0	0,00000	8	0,00	
Energija	1	849,4	0,01958		16,63	0,4
Energija	2	1.525,7	0,01844		28,13	0,4
Energija	3	2.038,6	0,01837		37,45	0,5
Energija	4	1.456,7	0,01838		26,77	0,0
Energija	5	348,0	0,01847		6,43	0,0
Stroški skupaj (brez DDV)					**282,85**	

SOURCE: ENERGY AGENCY

The web application also performs an analysis of the end-user's peak loads over the observation period by time slot, including the average consumption capacity and its deviation from the maximum peak load in a given time slot.

FIGURE: SCREENSHOT OF THE »NETWORK CHARGES COMPARATOR« WEB APP SHOWING THE ANALYSIS OF PEAK LOADS

Pred reformo	Osnovni scenarij	Scenarij prilagojene obračunske moči	Scenarij prilagojene obračunske moči in odjema	Analiza konic

	Časovni blok 1	Časovni blok 2	Časovni blok 3	Časovni blok 4
1. konica [kW]	7,1	7,0	8,5	6,2
2. konica [kW]	6,6	6,8	7,5	6,1
3. konica [kW]	5,8	5,7	6,9	5,9
Povprečje treh največjih konic [kW]	6,5	6,5	7,6	6,1
Povprečna moč [kW]	1,0	1,2	1,5	1,5
Odstopanje največje konice od povprečne moči [kW]	6,1	5,8	7,0	4,7

SOURCE: ENERGY AGENCY

Based on this analysis, the consumer can verify the appropriateness of the agreed billed capacity as set by the electricity operator, and the analysis also provides information on the advisability of adjusting the agreed billed capacity or deciding to optimise costs by adjusting the demand – the greater the difference between the average consumption and the peak demand, the less frequently increased demand capacity occurs. Additional comparison calculations with appropriately adjusted billed capacities (e.g. reduction in the two most expensive time slots) allow the user to verify the savings or potential additional costs of excess capacity if the adjustment of the consumption could not be ensured. It can also check the maximum cost of the billed power if the agreed billed power is equal to the installed capacity.

The support tool can be of great help in familiarising end-customers with the new way of calculating the network charge and its implications for cost. It also encourages end-users to use the Moj elektro portal, where all the accounting data is provided in a user-friendly, structured and visualised way. In the future, the My Electro web portal will provide network users with a multitude of data services and information that will support the end-consumer in checking network charges, contracting with suppliers, deciding whether to participate in demand adjustment programmes, optimising network use and thus network charges, etc.

The Energy Agency has seen a high level of interest from the interested public in the comparison service, and the number of users and calculations has been increasing significantly since its launch at the end of December 2023 for all end-users. While there were 66 registered users in December, of whom 53 agreed to the terms of use and performed 38 calculations, in January 2024 there were already 1,247 registered users, of whom 929 agreed to the terms of use and performed 1,893 calculations.

Other Transparency Measures

Borzen provides the Sustainable Energy web portal Spletni portal Trajnostna energija[81] with the aim of creating an information hub, a contact point for access to information on the efficient use of energy and RES in Slovenia. It brings together, in a simple and transparent way, high-quality and expert information that helps consumers use energy more efficiently, while also serving an educational purpose, with the aim of raising awareness of the benefits of RES and their use. While not directly related to the retail market, the information published helps, among other things, to raise awareness among consumers of the importance of more environmentally friendly energy supply products, the potential for conservation and thus energy supply cost savings, and provides an overview of the opportunities and benefits of self-supply from RES, which has an impact on the choice of electricity supply products and helps with decisions on investing in RES, storage devices, energy-saving devices or smart devices.

81 https://www.trajnostnaenergija.si/

Market Effectiveness

Market Shares and Concentration in Retail Markets

Electricity Supply to all Consumers

Table 29 shows the market shares of suppliers according to their electricity supply, taking into account the supply in the entire retail market, which also includes large end-consumers connected to the transmission system and closed distribution systems. An HHI above 2,000 indicates a highly concentrated retail market, an HHI between 1,000 and 2,000 defines a moderately concentrated market and an HHI below 1,000 shows a market with no competition concerns.

Compared to 2022, when it was 1273, in 2023 the HHI increased by 8.1% to 1376.

TABLE 29: MARKET SHARES AND HHI OF SUPPLIERS TO ALL FINAL CONSUMERS[82]

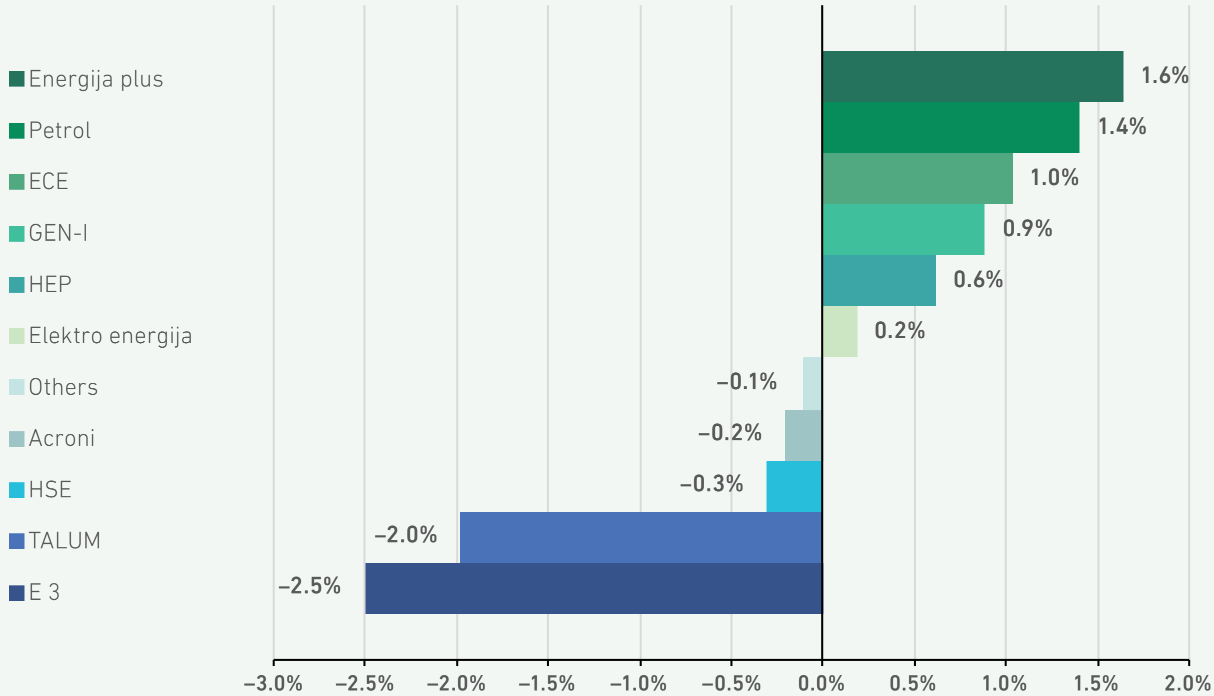
Supplier	Supplied electricity [GWh]	Market share
GEN-I	2,481.4	21.6%
ECE	1,858.9	16.2%
Petrol	1,813.0	15.8%
Energija plus	1,531.2	13.3%
E 3	1,029.7	9.0%
HEP	1,005.8	8.8%
Elektro energija	580.9	5.1%
Other	477.6	4.2%
HSE	449.3	3.9%
Acroni	255.5	2.2%
TOTAL	**11,483.2**	**100.0%**
HHI of suppliers to all end-consumers	**1,376**	

SOURCE: EPOS PORTAL

Structural changes with an impact on market concentration are in the rank of up to 2.5% in absolute terms. In comparison with the preceding year, the market share that increased the most in 2023 was that of Energija plus. On the other hand, the greatest loss of market share in 2022 was recorded by E 3. TALUM continued their trend of reducing electricity consumption, which had been present since 2019. In terms of the scale of the changes, the market shares of other suppliers did not deviate considerably from the previous years, meaning that their market positions did not change significantly, as shown in Figure 110.

82 Energy supplied and market shares are rounded to one decimal place. The difference between the total and the sums is due to rounding to one decimal place.

FIGURE 110: CHANGES IN THE MARKET SHARES OF SUPPLIERS TO ALL END-CONSUMERS IN 2023 COMPARED TO 2022[83]



SOURCE: EPOS PORTAL

Electricity Supply to Business Consumers

Table 30 shows the market shares of electricity suppliers in the retail market to business consumers in 2023. The retail market for business consumers continued registering low market concentration in 2023.

The HHI was 1325, an increase of 11.5% compared to 2022, when it was 1188.

83 The changes in the market shares of suppliers in 2023 compared to 2022 are rounded to one decimal place. A direct comparison with last year's figures may result in a difference of +/- 0.1% due to rounding.

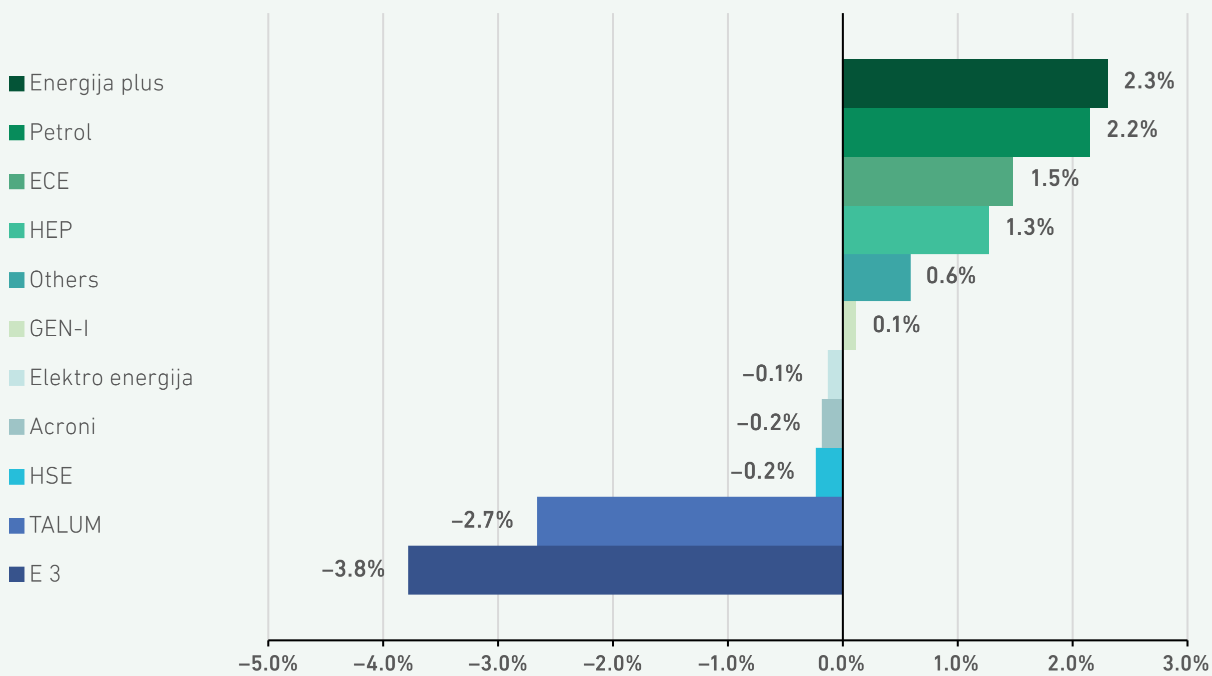
TABLE 30: MARKET SHARES AND HHI OF SUPPLIERS TO BUSINESS CONSUMERS[84]

Supplier	Supplied electricity [GWh]	Market share
Petrol	1,477.8	18.2%
ECE	1,370.8	16.9%
GEN-I	1,276.2	15.7%
Energija plus	1,120.6	13.8%
HEP	1,005.8	12.4%
E 3	548.2	6.7%
Other	461.8	5.7%
HSE	449.3	5.5%
Acroni	255.5	3.1%
Elektro energija	168.4	2.1%
TOTAL	**8,134.4**	**100.0%**
HHI of suppliers to all end-consumers	**1,325**	

SOURCE: EPOS PORTAL

As shown in Figure 111, the largest market share in this segment compared to 2022 was gained by Energija plus and Petrol. The greatest loss of market share compared to 2022 was recorded by E 3 and TALUM. This market is also experiencing minor structural changes with an impact on market concentration.

FIGURE 111: CHANGES IN MARKET SHARES OF SUPPLIERS TO BUSINESS CONSUMERS IN 2023 COMPARED TO 2022[85]



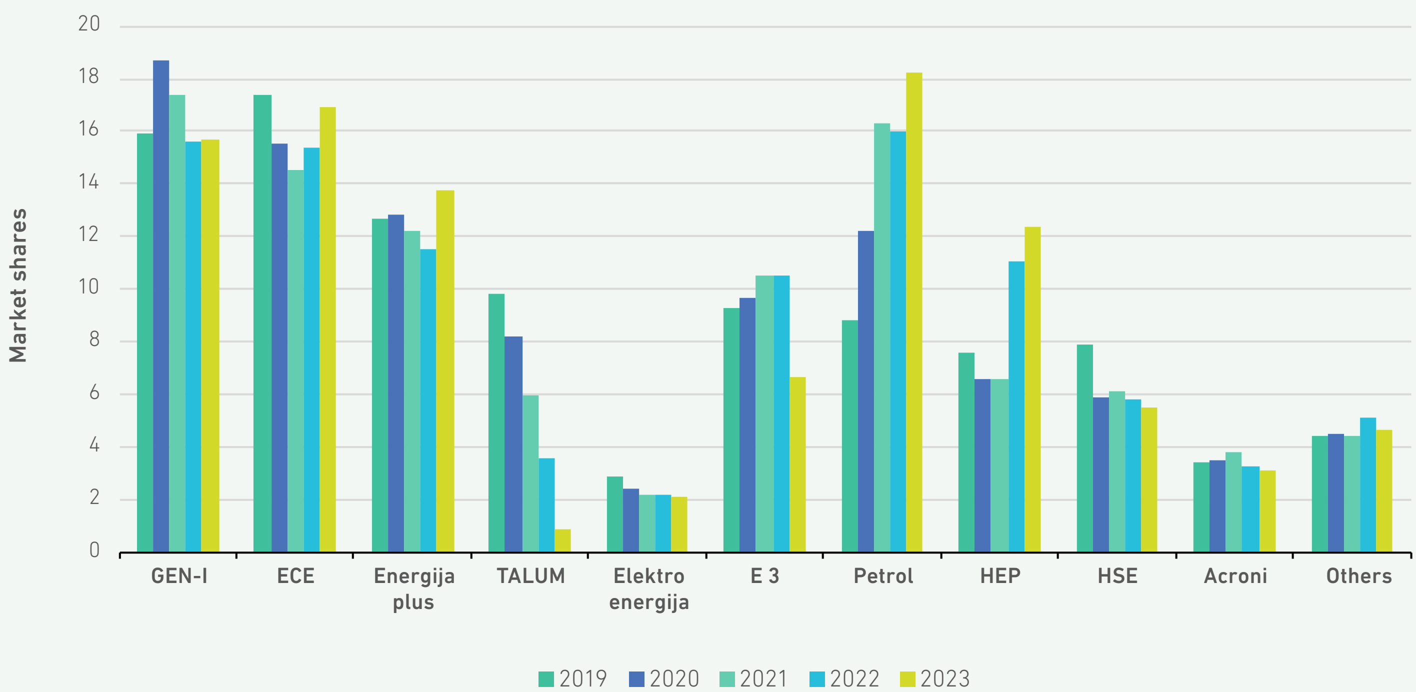
SOURCE: EPOS PORTAL

84 The energy supplied and market shares are rounded to one decimal place. The difference between the total and the sums is due to rounding to one decimal place.

85 The changes in the market shares of suppliers in 2023 compared to 2022 are rounded to one decimal place. A direct comparison with last year's figures may result in a difference of +/- 0.1% due to rounding.

Figure 112 shows the five-year evolution of the market shares of suppliers to business consumers. The suppliers TALUM and Elektro energija have been losing their market share in this segment, the former markedly in recent years. Elektro energija is no longer a major player in the market. After four consecutive years of market share gains in the 2019–2022 period, E3's market share declined in 2023, while ECE had increased its market share in the last three years (2021–2023).

FIGURE 112: COMPARISON OF THE MARKET SHARES OF SUPPLIERS TO BUSINESS CONSUMERS IN THE 2019– 2023 PERIOD



SOURCE: EPOS PORTAL

Electricity supply to household consumers

The 2023 market concentration in the retail market for household consumers indicated that this was a highly concentrated market. The HHI exceeded 2,000 for the second year in a row and stood at 2,117 in 2023. Compared to 2022 the HHI saw an increase of 4.1%.

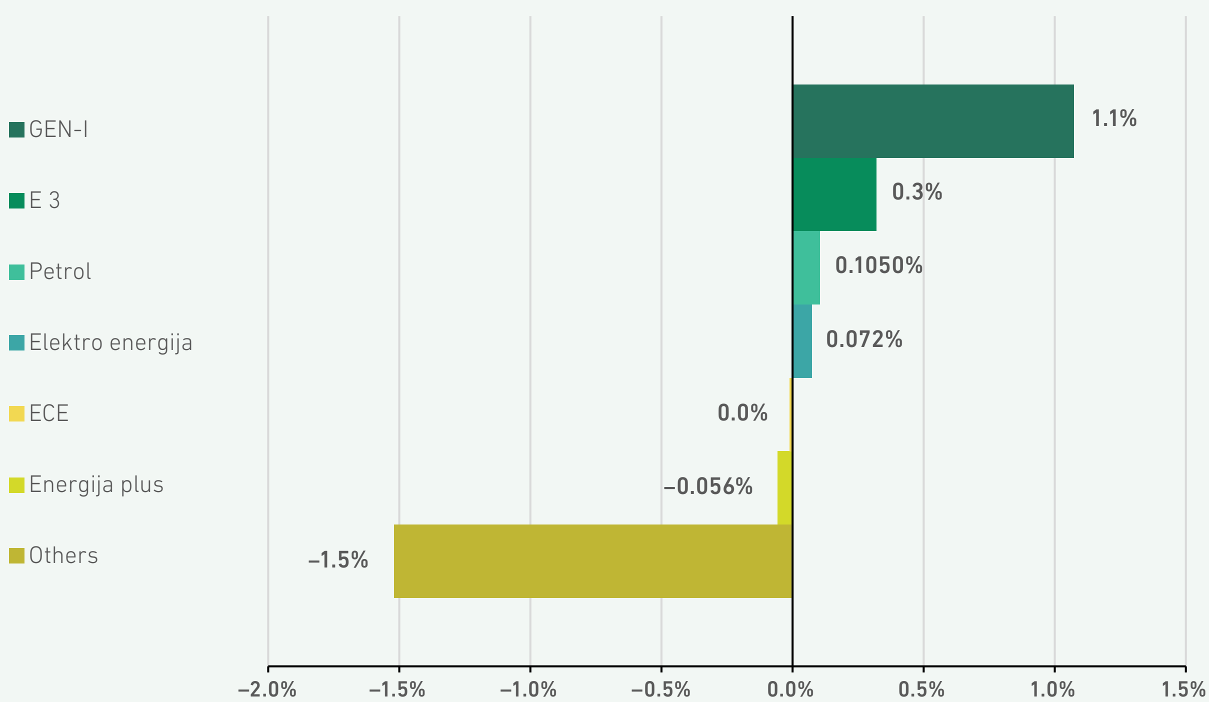
TABLE 31: MARKET SHARES AND HHI OF SUPPLIERS TO HOUSEHOLD CONSUMERS[86]

Supplier	Supplied electricity [GWh]	Market share (%)
GEN-I	1,205.2	36.0%
ECE	488.1	14.6%
E 3	481.4	14.4%
Elektro energija	412.5	12.3%
Energija plus	410.5	12.3%
Petrol	335.2	10.0%
Other	15.8	0.5%
TOTAL	**3,348.9**	**100.0%**
HHI of suppliers to all household consumers	**2,117**	

SOURCE: EPOS PORTAL

As shown in Figure 113, structural changes with an impact on market concentration are in the rank of up to 1.5% in absolute terms. Compared to 2022, the largest increase in market share in the household consumption segment in 2023 was again recorded by GEN-I, namely by 1.1 percentage points. The market share of the three largest suppliers was 64.9% and has increased by 1.4 percentage points compared to 2022. The upward trend is visible from 2020 onwards, mainly due to the market share of the supplier GEN-I, which has been increasing its portfolio every year. The greatest loss of market share compared to 2022 was recorded by other smaller suppliers.

FIGURE 113: CHANGES IN MARKET SHARES OF SUPPLIERS TO HOUSEHOLD CONSUMERS[87]



SOURCE: EPOS PORTAL

86 The energy supplied and market shares are rounded to one decimal place. The difference between the total and the sums is due to rounding to one decimal place.

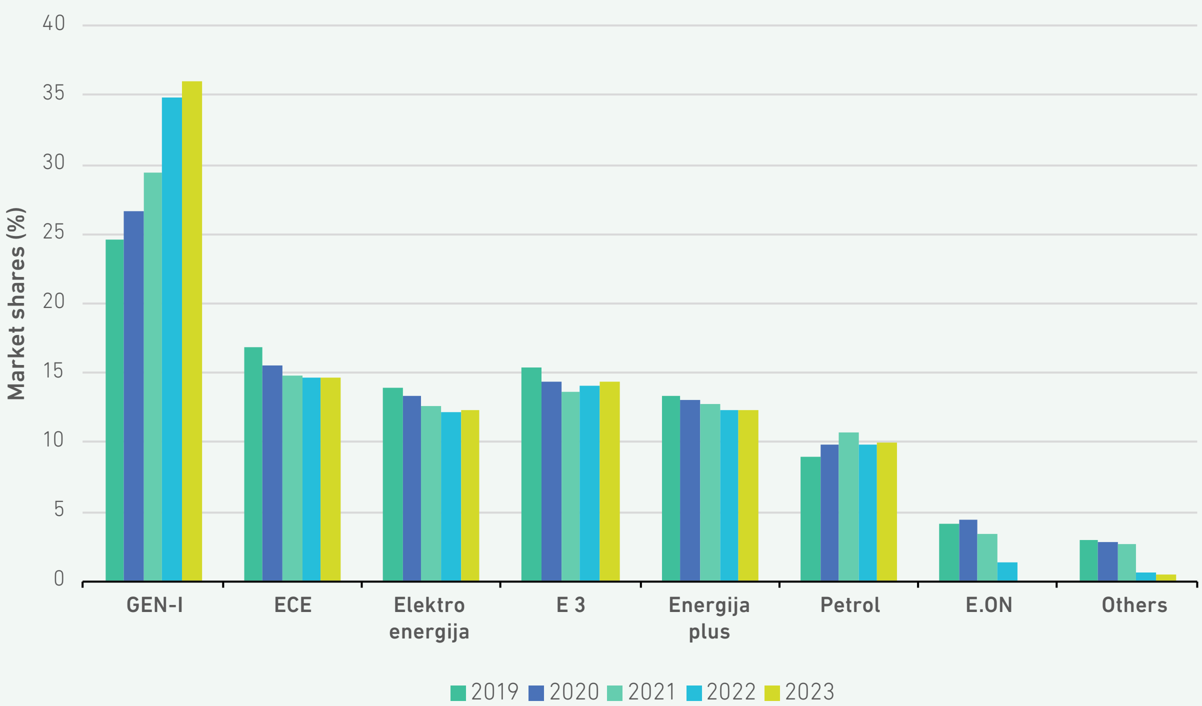
87 The changes in market shares of suppliers in 2023 compared to 2022 are rounded to one decimal place. A direct comparison with last year's figures may result in a difference of +/- 0.1% due to rounding.

Figure 114 shows the market shares of suppliers to household consumers. It presents their market shares in the 2019–2023 period. In this five-year period under review, ECE, Elektro energija and Energija plus were continuously losing their market shares. On the other hand, over the same observation period, only GEN-I had been gaining market share each year, increasing its share by 11.4% from 2019 to 2023. The marked strengthening of GEN-I's position is particularly noticeable in 2022 when they seem to have been able to use the opportunities of the crisis period to their advantage.

For several years now, the increasing trend of the strengthening of GEN-I and the weakening of the position of the others has been reflected through the HHI indicator in the high concentration of the retail market concerned.

Further strengthening of the market share of the already dominant supplier of electricity to households

FIGURE 114: COMPARISON OF THE MARKET SHARES OF SUPPLIERS TO BUSINESS CONSUMERS IN THE 2019– 2023 PERIOD



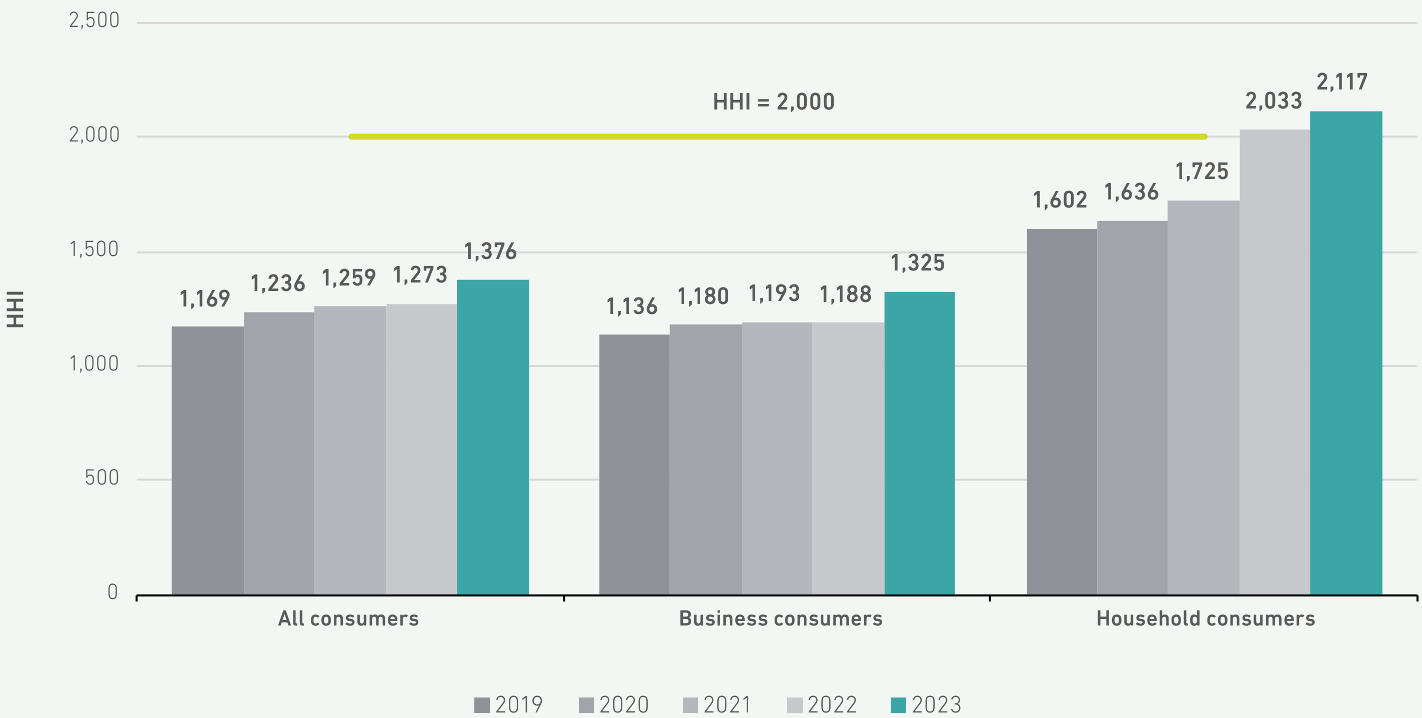
SOURCE: EPOS PORTAL

Comparison of concentrations in the relevant markets

When evaluating the market power on the basis of market shares, we need to be cautious and take into account the limitations of the indicators. A high market share does not automatically imply that there are competition problems and is not in itself prohibited. It is always assessed in the light of the position of the direct competitors. The European Commission identifies concentrations that must be subject to a more detailed assessment – this is carried out for concentrations above 40%, while concentrations above 60% are only admissible in exceptional circumstances. The European Commission considers markets with an HHI above 2,000 to be highly concentrated, markets with an HHI between 1,000 and 2,000 to have conditional competition concerns and markets with an HHI below 1,000 to have unusual competition concerns. For the US and UK competition authorities, on the other hand, it is the difference in the HHI before and after the concentration that is important when considering the need for additional assessment – in the case of a moderately concentrated market (HHI between 1,000 and 1,800), a 100-point difference can lead to a more detailed assessment, whereas in a highly concentrated market, a difference of 50 points can already be decisive.

As can be seen from Figure 115, the HHI in 2023 has increased in the segment of supply to all final customers. In the segment of supply to business consumers, the HHI increased by 11.5% compared to the previous year, which is the largest increase in the last five years. The HHI in the segment of supply to household consumers increased by 4.1% compared to the previous year.

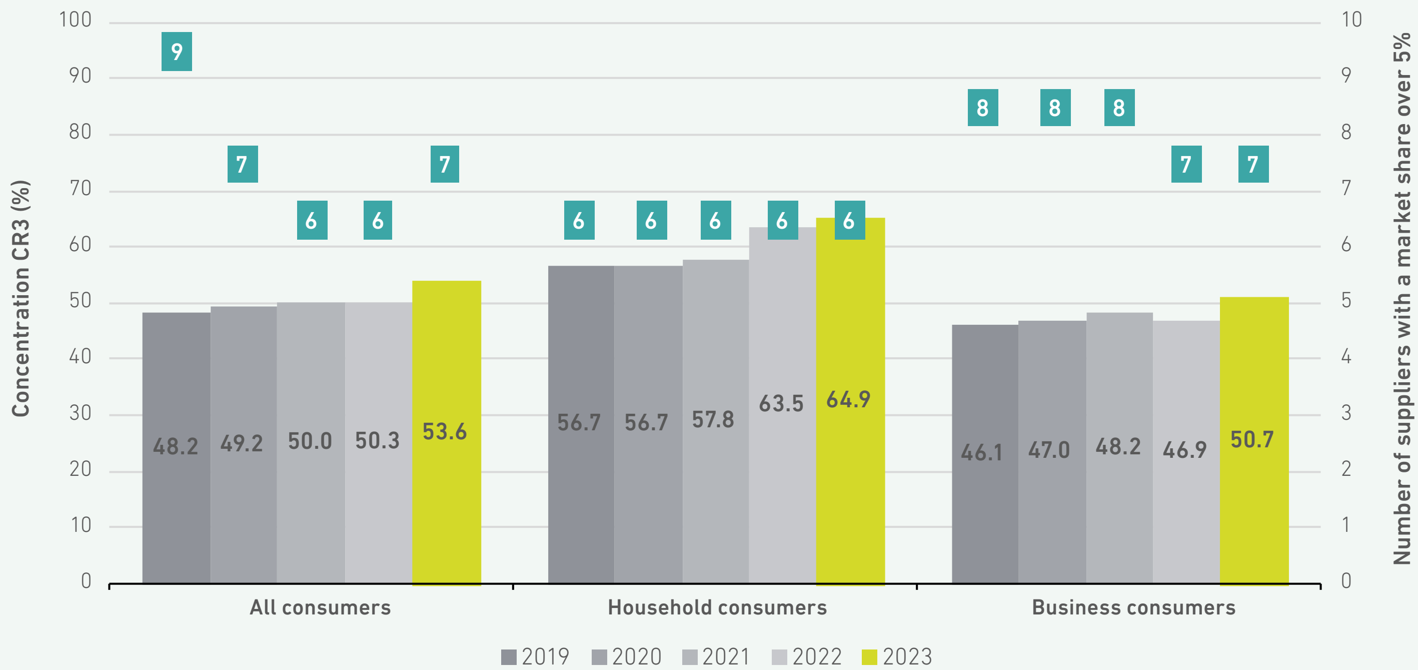
FIGURE 115: HHI EVOLUTION IN RETAIL MARKETS IN THE 2019– 2023 PERIOD



SOURCE: EPOS PORTAL

A concentration ratio (CR) is a standard indicator of market concentration according to market shares. For the purposes of this report, CR3 is shown, which measures the total market share of the three largest suppliers in the market. Figure 116 shows the CR3 indicator and the number of suppliers with market shares bigger than 5%. Compared to 2022, the CR3 increased in 2023 in the segments of supply to all consumers and business consumers. The latter, in particular, saw a considerable increase, with CR3 rising by 8.1 percentage points. In the segment of supply to household consumers, the CR3 remained approximately at the same level as the year before. The total number of suppliers to all consumers increased by one supplier – Elektro energija, which increased its market share by 0.2 percentage points compared to 2022, thus exceeding the 5% threshold.

FIGURE 116: CONCENTRATION (CR3) IN THE RETAIL MARKETS AND NUMBER OF SUPPLIERS WITH OVER 5% OF MARKET SHARE IN THE 2019– 2023 PERIOD



SOURCE: EPOS PORTAL

The Energy Agency has presented the market concentration with regard to ownership links in the 2022 Report on the Energy Situation in Slovenia, showing a CR3 of close to 100% on the retail market for household consumers and a market share of close to 50% for the virtual dominant ownership-linked supplier. The situation in 2023 did not change significantly in terms of concentration.

High concentrations require appropriate attention from the competent authorities in the area of market power valuation

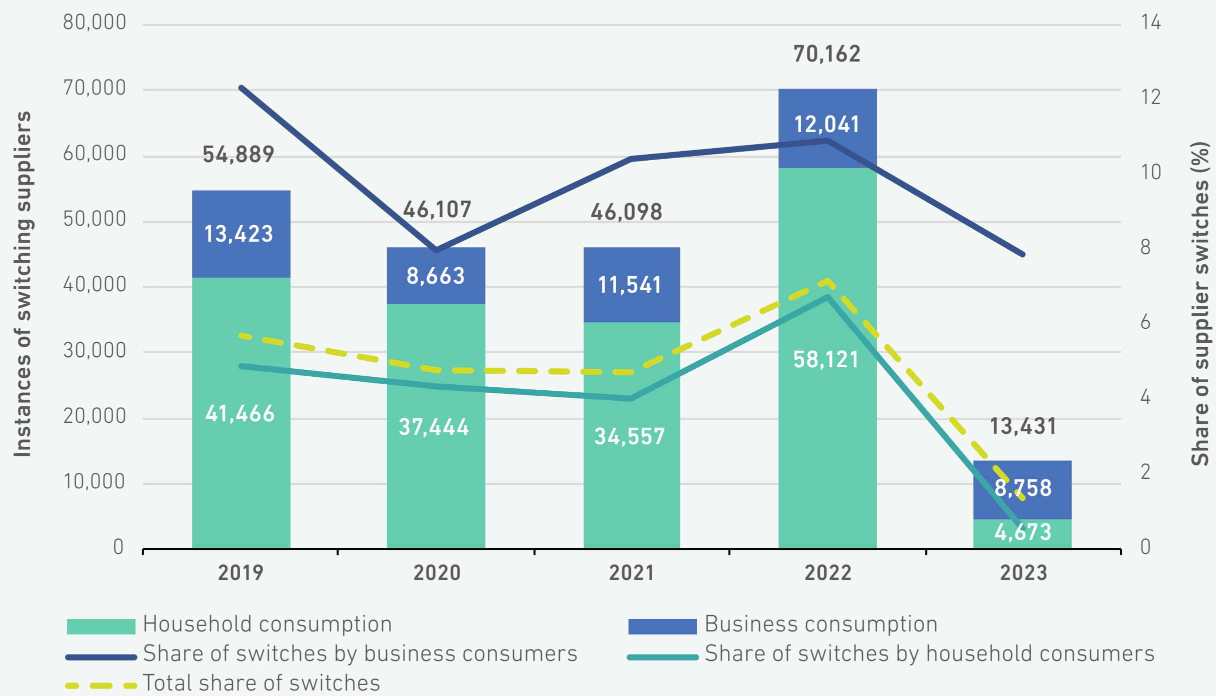
Switching Suppliers

In 2023, there were 13,431 electricity supplier switches, of which 4,673 were made by household consumers and 8,758 by business consumers, representing an 81% drop compared to the year before. On average, 389 household consumers and 703 business consumers switched their electricity supplier every month. The reason for such a large reduction in switching is the retail price cap for household consumers imposed in 2023.

A record low number of switches due to the effects of the government's price cap

The government's decree on electricity pricing, which capped the maximum retail price of electricity, has sharply reduced the price differentials between suppliers, and we are seeing a record drop in switching in 2023. Figure 117 shows the trends in the total number of switches according to consumption type and the share of switches made by household and business consumers in the 2019–2023 period.

FIGURE 117: TRENDS IN THE NUMBER OF SUPPLIER SWITCHES IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, SODO

The share of supplier switches made by household consumers was 0.5% in 2023, 6.2 percentage points less than the previous year. Such a market is defined as a dormant market[88], where exchanges exist only in theory. While such markets are officially open to competition and all consumers have the right to choose, in practice only larger consumers have the incentive or ability to do so, competitors may not have the ability to compete on price, and the market conditions are generally not satisfactory for genuine competition. In 2023, such a market situation was caused by the government's price cap. In 2022, 12 EU countries had a higher share of supplier switching than Slovenia, three had a switching share above 20% (Norway, Spain and Belgium) and seven had a switching share above 10%[89]. Only Slovakia's share of switches in 2022, which did not exceed 1%, is comparable to Slovenia's share in 2023.

In Slovenia, competition is getting weaker in the household segment, which is also influenced by ownership links between suppliers. The share of supplier switches made by business consumers was 7.9% in 2023, three percentage points less than the previous year.

81% fewer supplier switches compared to 2022

Figure 118 shows the number of switches in 2023 by month, with January standing out as the month with the highest number of switches.

In 2023 there were 92.0%[90] fewer supplier switches by household consumers and 27.3% fewer supplier switches by business consumers compared to the year before. A higher number of switches by business consumers at the beginning of the year is normal, as most of them have one-year supply contracts expiring, but in January the increase in switching was also influenced by the exit of one of the suppliers (Poslovni center Mercator). However, for business consumers, there was also an increase in switching in April and July; while the July dynamics may be due to the expiry of supply contracts, the April increase was not typical of previous years. The changed pattern may be due to

88 World Energy Retail Market Rankings 2012, Utlity Customer Switching Research Project, VaasaETT
89 ACER/CEER Energy Retail and Consumer Protection 2023 Market Monitoring Report, September 2023, Figure 58
90 The changes in the share of supplier switches in 2023 compared to 2022 are rounded to one decimal place.

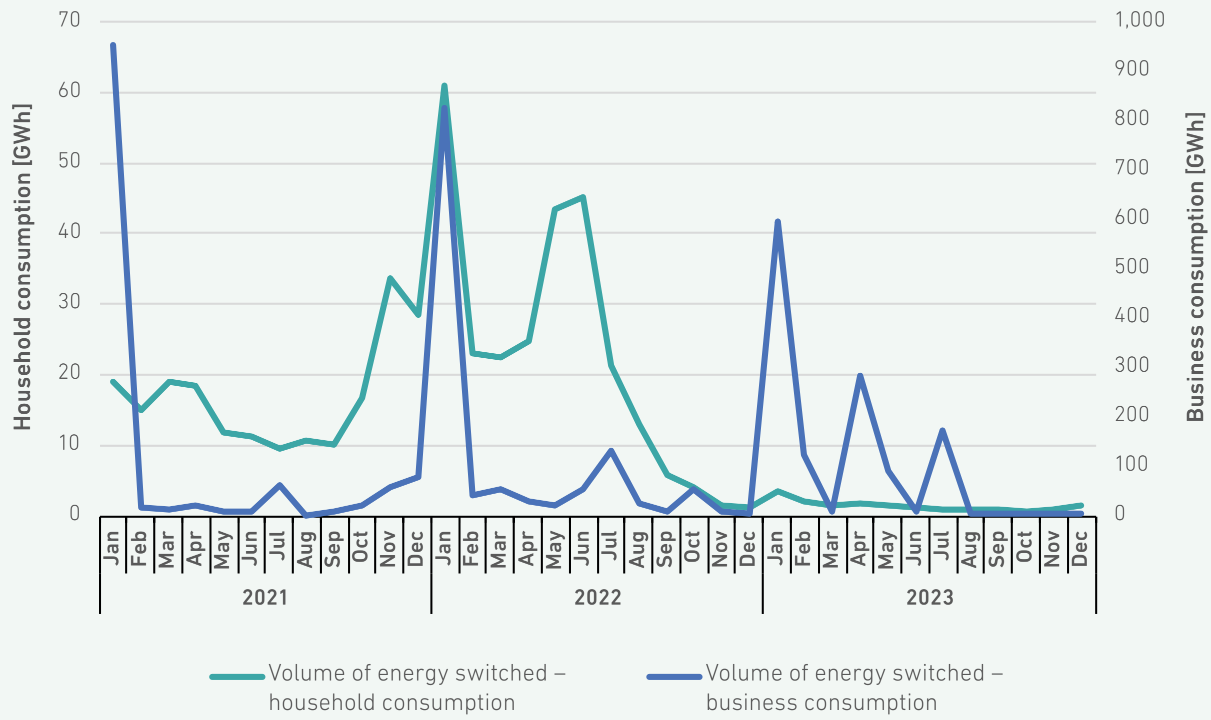
volatility and uncertainty in the evolution of wholesale prices. In the first quarter of 2023, when the prices were at their highest quarter-on-quarter, we observed a decrease in energy prices on the wholesale markets, which could have led to the development of competitive supply, especially for suppliers who adapted their energy procurement strategy more quickly to the situation. Price volatility increased slightly in the summer months, partly due to the emergence of negative prices.

FIGURE 118: THE DYNAMICS OF THE NUMBER OF SUPPLIER SWITCHES IN 2023 BY CONSUMPTION TYPE

SOURCES: ENERGY AGENCY, SODO

Figure 119 shows the trends in the switched volume of electricity in the 2021–2023 period. The volume of switched electricity is closely related to the number of supplier switches. Switched electricity is the volume consumed by a consumer over one year that will cause an increase in electricity consumption with another (new) supplier due to the switch. That is why a higher number of supplier switches made by household and business consumers usually implies a higher volume of switched electricity. The leap in the volume of switched electricity in household consumption at the beginning of 2023 is clearly evident in the figure. In the case of household consumers, the volume of switched electricity in 2023 was 93.6% lower than the year before, while the share of the switched electricity volume was 0.01%. On the other hand, the volume of switched electricity in the case of business consumers in 2023 was 4.5% higher than the year before and the share of the switched electricity volume was 16.1%, which represents an increase of 2.9 percentage points compared to 2022.

FIGURE 119: VOLUMES OF SWITCHED ELECTRICITY BY CONSUMPTION TYPE



SOURCES: ENERGY AGENCY, SODO

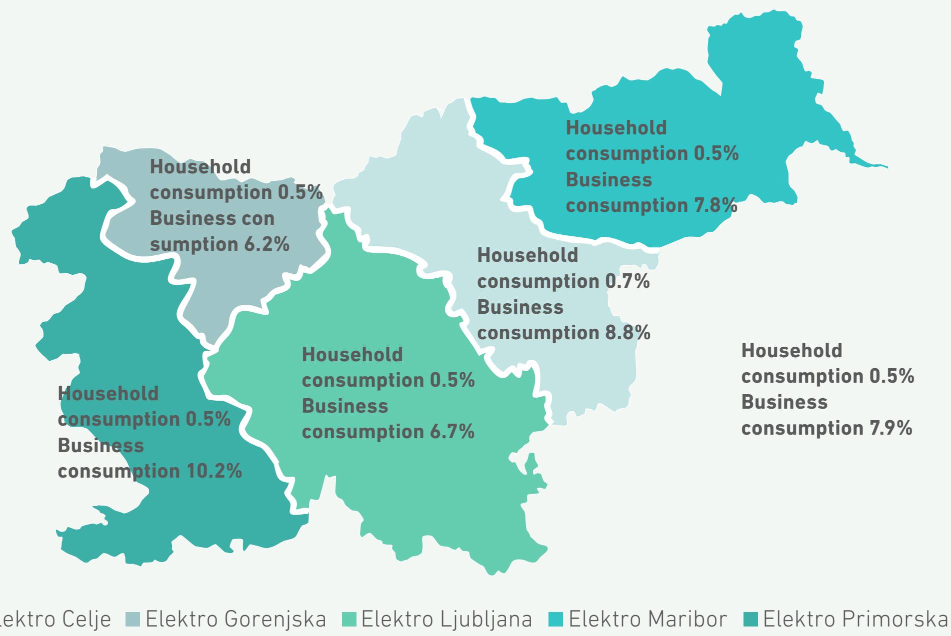
Below is an analysis of supplier switches made by household and business consumers in individual geographic areas, the aim of which was to find any deviations from the Slovenian average. The consumer's choice (supplier and product) does not depend on their location but the economic and demographic development of the areas is diverse. There are still suppliers on the market that historically originate from electricity distribution companies, i.e. the owners and contractual managers of networks in individual distribution areas, the so-called incumbent suppliers. In 2023, however, all the incumbent suppliers[91] were no longer majority-owned by the undertakings performing the service of general economic interest provided by the TSO or DSO.

All electricity suppliers supply electricity on the entire Slovenian territory, so all consumers are guaranteed the same freedom of choice. The higher or lower shares of switches in the areas of individual distribution companies may, in general, be due to larger or smaller price elasticities of demand in those areas. The number of switches also depends on the consumers' increased activity in previous periods, targeted advertising by suppliers, the loyalty to suppliers that are or used to be integrated with a distribution company, consumer trust in a brand, etc. If the consumers' level of engagement was the same on the entire Slovenian territory, so just in theory, the number of supplier switches would be proportional to the total number of connected household consumers in individual areas of the distribution system. Consequently, the shares of switches would be the same.

While the actual data for 2023 show different shares of supplier switches, as shown in figure 120, the differences in the level of switching between areas are insignificant. The reasons for this are given below.

91 Suppliers linked to the service of general economic interest before full market opening in 2007, i.e. incumbent suppliers.

FIGURE 120: SHARE OF SUPPLIER SWITCHES MADE BY HOUSEHOLD AND BUSINESS CONSUMERS IN THE AREAS OF INDIVIDUAL DISTRIBUTION COMPANIES



SOURCES: ENERGY AGENCY, SODO

The analysis shows that the shares of supplier switches of household consumers in distribution areas are mostly around 0.5%, except for the area of Elektro Celje, where the switching rate is 0.7%. The share of supplier switches is 0.5% also taking into account the total market. In the absence of conditions for the development of competition, the comparison with 2022 is not meaningful.

Below is an analysis of the total number of annual switches in the 2019–2023 period showing how many times consumers have switched supplier in a year. This analysis shows the frequency of supplier switches by household or business consumer in a year. As expected, the results show that in any given year, the majority (96.5% on average) of consumers who switched supplier in that year, did so only once. If we separately analyse household and business consumers, the average share of business consumers who switched once a year is 93.7%, while for household consumers it is 97.7%.

However, there are also consumers who switched supplier more than once in a year. Among both household and business customers, there are some who switched supplier four times in one year. In 2022, there were household consumers who switched five times and one consumer who switched as many as six times, most likely due to the extremely high prices in 2022. In addition to the usual indicator (the proportion of switches), we look at the proportion of customers who switched supplier. This share is slightly lower than the share of the number of switches, as the analysis takes into account the number of consumers, some of whom switched more than once in a year. Detailed information on the number and share of switches in the 2019–2023 reference period can be found in table 32 below.

TABLE 32: NUMBER AND SHARE OF SUPPLIER SWITCHES IN THE 2029–2023 PERIOD BY YEAR

All consumers	**2019**	**2020**	**2021**	**2022**	**2023**
Number of consumers connected to the system	959,817	963,544	971,542	976,411	983,190
Instances of switching suppliers	54,889	46,107	46,098	70,162	13,431
• Once a year	52,993	44,772	42,429	64,386	11,773
• Twice a year	901	621	1,645	2,580	761
• Three times a year	26	31	81	174	31
• Four times a year	4	0	0	17	9
• Five times a year	0	0	0	5	0
• Six times a year	0	0	0	1	0
Number of consumers who switched supplier	53,924	45,424	44,155	67,163	12,574
Share of supplier switches	5.72%	4.79%	4.74%	7.19%	1.37%
Share of consumers who switched supplier	5.62%	4.71%	4.54%	6.88%	1.28%

Business consumers	**2019**	**2020**	**2021**	**2022**	**2023**
Number of consumers connected to the system	108,943	108,505	110,766	110,552	111,303
Instances of switching suppliers	13,423	8,663	11,541	12,041	8,758
• Once a year	12,919	8,509	9,355	9,717	7,407
• Twice a year	243	71	973	1,016	640
• Three times a year	6	4	80	96	21
• Four times a year	0	0	0	1	2
Number of consumers who switched supplier	13,168	8,584	10,408	10,830	8,070
Share of supplier switches	12.32%	7.98%	10.42%	10.89%	7.87%
Share of consumers who switched supplier	12.09%	7.91%	9.40%	9.80%	7.25%

Household consumers	**2019**	**2020**	**2021**	**2022**	**2023**
Number of consumers connected to the system	850,874	855,039	860,776	865,859	871,887
Instances of switching suppliers	41,466	37,444	34,557	58,121	4,673
• Once a year	40,074	36,263	33,074	54,669	4,366
• Twice a year	658	550	672	1,564	121
• Three times a year	20	27	1	78	10
• Four times a year	4	0	0	16	7
• Five times a year	0	0	0	5	0
• Six times a year	0	0	0	1	0
Number of consumers who switched supplier	40,756	36,840	33,747	56,333	4,504
Share of supplier switches	4.87%	4.38%	4.01%	6.71%	0.54%
Share of consumers who switched supplier	4.79%	4.31%	3.92%	6.51%	0.52%

SOURCE: ENERGY AGENCY

We also looked at the percentage of consumers who had not switched supplier in five and three years respectively, and in the case of multiple switching within the same year, this was counted as a single switch. The number of total consumers represents the average number of consumers over the last five or three years. The result is shown in table 33.

81.1% of consumers did not switch supplier in the last five years

TABLE 33: NUMBER AND PERCENTAGE OF CONSUMERS WHO DID NOT SWITCH SUPPLIER IN THE 2019–2023 AND 2021–2023 PERIODS

	2019–2023		2021–2023	
	Number	%	Number	%
Household consumption	713,195	82.84%	774,495	89.42%
Business consumption	73,683	66.98%	87,016	78.48%
Total	**786,878**	**81.05%**	**861,511**	**88.17%**

SOURCE: ENERGY AGENCY

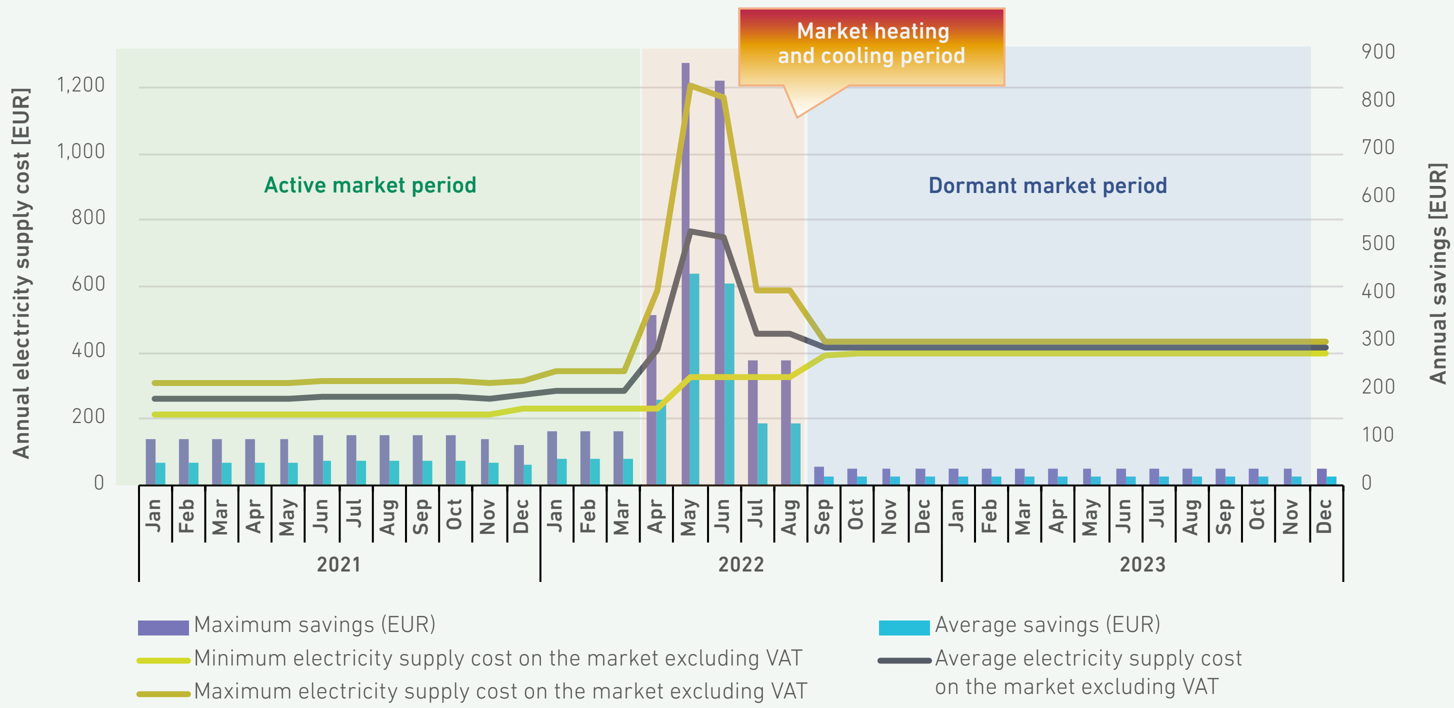
Assessment of the Potential Benefits of Switching Suppliers

By switching its supplier, every consumer can reduce their annual electricity supply costs, coordinate and improve the contractual relations with its supplier and therefore gain additional benefits.

Figure 121 shows trends in the minimum, maximum and average costs of a typical Slovenian household consumer[92] for electricity supply in the retail market on an annual basis without the network charge, levies, excise duty and VAT, stemming for the offers published in the Supply Cost Comparator – a web application for comparing electricity supply costs.

92 Consumption type: capacity charges 8 kW, annual consumption 2100 kWh (MT) and 1996 kWh (VT).

FIGURE 121: POTENTIAL ANNUAL SAVING BY SWITCHING SUPPLIER BASED ON THE DIFFERENCE BETWEEN THE MOST EXPENSIVE AND THE CHEAPEST AND BETWEEN THE MOST EXPENSIVE AND THE AVERAGE SUPPLY OFFER IN THE MARKET



SOURCE: ENERGY AGENCY

The maximum (annual) costs consider the most expensive offer for electricity supply in the retail market[93]. The minimum (annual) costs consider the cheapest offer published in the Supply Cost Comparator and available to any consumer. The average (annual) cost of electricity supply is calculated on the basis of the average between the most favourable and the most expensive offer in the retail market based on which the supply of energy to consumers was effected. At the level of the individual month, the difference between the maximum and minimum annual costs is taken into account in the determination of the potential maximum saving, while the difference between the average and minimum annual costs is taken into account in the determination of the potential average saving.

In September 2022, the Decree on the determination of electricity prices[94] came into force, setting the maximum retail electricity prices and remaining in force until the end of August 2023. In September 2023, the Decree on the determination of electricity prices[95] entered into force and remained effective until the end of 2023. It caused a considerable reduction in the difference between the most expensive and the most favourable offer in the retail market, resulting in lower potential maximum and average savings. At the time when the two Decrees were applied or in force, all suppliers who had retail prices below the government-imposed caps raised their prices practically to the caps. Thus, at that time, the difference between the most favourable and most expensive offer on the retail market was only caused by the minimal price difference due to the impact of a single offer on the market and the lump-sum costs charged by suppliers to each other for individual offers.

The expected benefits of switching suppliers were significantly reduced by the intervention measures taken to mitigate the effects of the energy crisis

93 According to the suppliers' information, the share of household consumers supplied under this offer was higher than 0.03%.
94 Decree on the determination of electricity prices, Official Gazette of the Republic of Slovenia, No. 95/22 and 98/22)
95 Decree on the determination of electricity prices, Official Gazette of the Republic of Slovenia, No. 45/23)

Measures for Promoting Competition

The Energy Agency monitors the retail electricity market and, in doing so, cooperates with regulatory and supervisory authorities at the national level, e.g. the Market Inspectorate of the Republic of Slovenia, the Slovenian Competition Protection Agency and, when appropriate, independent and non-profit consumer organisations. The Energy Agency's measures are varied and derive from its internal analyses, bilateral operations and the results of public consultations.

In ordinary circumstances, retail electricity prices are not regulated so the Energy Agency does not issue any recommendations on retail pricing. The only exception is the price of electricity for last resort supply, which is regulated and provided by the DSO. The price of that supply is set and made public by the DSO. It must be higher than the market price of the supply to a comparable consumer but it must not exceed it by more than 25%. If the DSO does not set the price or sets it contrary to the regulations, it is set by the Energy Agency. Deviations from this methodology are possible during a state of emergency in the market. On 1 July 2023, on the basis of an analysis of the situation and in consultation with the Energy Agency and the Ministry responsible for energy, SODO implemented a significant adjustment of the price of last resort supply, which had been in place since 1 August 2022, by reducing it in line with the trend in wholesale prices. Since the price of last resort supply for household consumption was 260.44 EUR/MWh for seven months and 312.57 EUR/MWh for five months, the average price of last resort supply in 2023 was 282.20 EUR/MWh. This was significantly higher than the methodological limit under the ZOEE Act, taking into account the level of the retail price cap. However, the price took into account the risks to the operator due to the volatility of the market situation and was thus a deterrent, with the aim of getting consumers to switch as quickly as possible from last resort supply to the supply of products available to them on the market.

Effective Data Exchange in Key Market Processes

As part of the measures implemented in line with its competences aimed at unifying the most important data exchange processes at the national and regional levels, the Energy Agency has been establishing an efficient data exchange between the market participants, steering the participants towards the use of open standards and the reuse of generic models of the European forum for energy Business Information eXchange (ebIX®) and ENTSO-E models to the greatest extent possible.

The new regulatory framework and the vision for the evolution of energy networks by 2050 envisage the full integration of energy networks (electricity, gas and heat) and the consumers' complete engagement (development of a flexibility market). The harmonisation of data exchange processes using open standards in energy markets is thus becoming even more important and a crucial action to eliminate certain barriers to entry for new market participants and to reduce entry costs. Data exchange has been becoming more and more complex and is usually required in near real-time or real-time. Due to the development of new business models and energy services based on access to detailed metering data, there is a distinctive need in the retail markets as well to harmonise access to and the exchange of data on consumption or production, as access to this data must be ensured centrally or locally (on a metering device) for users eligible to access data (aggregator, suppliers, energy service providers, etc.), subject to the customer's authorisation. To support green transformation, regulatory frameworks must ensure a sufficient level of data protection and privacy, tools for the empowerment and promotion of active consumption, a non-discriminatory environment and a level playing field for all the stakeholders, a technologically neutral regulatory framework, and recognise the new roles of traditional actors. Besides the requirements regarding efficient and safe data exchange, Directive (EU) 2019/944 also defines the context for ensuring interoperability for the first time.

EU countries are expected to enable the full interoperability of energy services across the EU to stimulate competition and avoid excessive administrative costs. A primary objective is also to further protect and empower consumers through digitalisation to take a more active role in the energy transition. The EC's strategy is to ensure harmonisation through the implementation of a process reference model[96], which can largely accommodate national practices and specificities.

Directive (EU) 2019/944 requires the Commission to adopt interoperability requests and non-discriminatory and transparent procedures for access to metering, consumption and customer

96 A set of reference procedures for accessing data, describing the exchange of information between roles (not stakeholders). It includes a semantic model of the data to be exchanged, as well as a description and integration of the systems and procedures used to control, access and exchange this data.

switching data, demand adjustment and other services. In June 2023, Commission Implementing Regulation (EU) 2023/1162 of 6 June 2023 on interoperability requirements and non-discriminatory and transparent procedures for access to metering and consumption data[97] was adopted. The requirements and procedures implemented under this new secondary legislation will ensure that one common reference model is used for the exchange of metering and consumption data across EU countries. The Implementing Regulation is the first of a number of such regulations that will be put in place over the next two years to facilitate the interoperability of customer energy data in line with Article 24 of Directive (EU) 2019/944 and one of the key deliverables of the EU Digital Energy Action Plan. Subsequent legislation will focus on data related to switching, demand adjustment and other services. Under the aforementioned implementing Regulation, consumers will be able to easily access their metering data and also allow their consumption or energy production data to be used by third parties in ways that benefit them. This could include, for example, receiving a personalised assessment of which contract would be the best and cheapest to meet their energy needs, information on the installation of renewable energy sources or estimates of energy savings. In this way, the new rules are an important enabler for the European Green Deal and REPowerEU, empowering consumers to actively participate in the energy transition and giving them access to more affordable energy. For companies, TSOs and DSOs, these rules and those that will come with the next wave of data-related implementing acts will make it easier to operate in the internal market and allow data to flow easily, securely and efficiently to those who need it. In turn, this will help operators improve existing processes and encourage the development and provision of new energy services such as energy sharing and consumption adjustment.

The implementation of data exchange between the participants in the Slovene electricity market is predominantly carried out in compliance with the relevant reference models (e.g. the ENTSO-E/ebIX/EFET harmonised model of roles in the electricity market, etc.). In 2023, the processes were intensely adapted to the updated market model based on the introduction of the metering point[98], supporting the development of sub-metering and allowing, among other things, the use of the concept of split-supply[99] and the development of flexibility services, which finally eliminated incompatibilities with the reference model at the national level and provided optimum possibilities for the development of energy services and for the strengthening of competition in the retail market.

The National Data Hub online data portal mojelektro.si is designed to ensure the compatibility of the centralised data access with the draft implementing act on access to the data on consumption (B2C segment). The areas with the most incompatibilities are as follows: ensuring interoperability at the level of local access to data (I1 interface on the smart meter); implementation in the field of flexibility where planned deviations from reference models can be identified, starting with unsuitable definitions of roles and responsibilities. As this is a developing area, the Energy Agency assumes those incompatibilities are of a transitional nature.

The Act on the identification of entities in the data exchange among participants in the electricity and natural gas markets requires market participants to use standardised identifiers of key data entities in the electronic exchange of data in the market. In accordance with the Energy Agency's general act, all key data entities in an electronic data exchange have to be determined using standardised identifiers.

The Energy Agency has been implementing its harmonisation strategy through public consultations, bilateral cooperation and participation in professional platforms, such as the IPET Section and ebIX®.

In 2023, the following key issues were considered in the framework of the IPET Section:

- The impact of self-supply on the remaining consumption diagram (imbalance settlement) and calculation,
- The start of the implementation of split delivery (SONDSEE),
- Transition of household customers from the remaining diagram to metered consumption for imbalance settlement,
- Changes in the calculation of the network charge,
- Single entry point,
- Procedures for ending the life cycle of the ebIX® association.

The work of ebIX® in 2023 was marked by the formal decision of the ebIX Forum to close down ebIX in May 2023 and the work was transferred to other organisations, mostly in the framework of the EU DSO. In the area of the harmonisation of data exchange, the focus was on modelling processes in the area of flexibility by developing and publishing data exchange models at the Business Requirement Specification (BRS) level for distributed flexibility and on the active contribution of ebIX® to the emerging EU Interoperability Assurance Framework. In this context, ebIX®, in cooperation with ENTSO-E and EFET, has published a new version of the harmonised role model.

97 https://eur-lex.europa.eu/legal-content/SL/TXT/PDF/?uri=CELEX:32023R1162
98 Implementation of the Metering Point domain in compliance with the reference model.
99 See the USEF report.

CASE STUDY

EU and National Aspects of the Termination of ebIX®

Challenges in the area of the interoperability of consumer data include national differences in traditional retail market processes and the handling and definition of specific exemption procedures. The two retail processes mentioned above, such as switching or billing, differ in terms of the number of interactions required between market participants to complete the process. Exemptions may be due to countries taking into account regional considerations related to public service obligations or taxes and levies. A high degree of harmonisation between Member States is unlikely in the short term, as individual countries have invested considerable time, effort and cost in defining procedures and developing standardised procedures and formats at the national level. The implementation of emerging services could face fewer barriers. However, differences remain between Member States in the speed of smart meter deployment, the history and fragmentation of consumption data, and the functionality of smart meters. These differences can pose a challenge to the interoperability of services based on data sharing.

ebIX® has played a key role in the harmonisation of market processes in the EU over the last 20 years, which is why the Energy Market Data Exchange Section (IPET Section), established at the end of 2010 and operating under the auspices of the Energy Industry Chamber of Slovenia, in strategic cooperation with ebIX®[100], has been able to make significant strides towards the harmonisation of the relevant processes by guiding its members. In doing so, it has taken into account the ENTSO-E/ebIX®/EFET harmonised role model (HRM), which has been maintained and upgraded throughout this period in line with market developments as a result of normative changes at the EU level. The latest major achievement of the cooperation between IPET and ebIX® is the introduction of the so-called metering point, which is key to supporting the new business models and concepts of the »Clean Energy for All Europeans« legislative package, even though this change has taken more than 10 years of professional discourse. The cooperation with ebIX® has been crucial for the application of open standards in the exchange of energy market data in Slovenia, including the use of standardised entity identification schemes, the use of HRM in the modelling and implementation of data exchange processes, as well as in the transposition of the EU normative framework into national legislation, in particular in the implementation of the split-supply model and the use of flexibility and the related concepts of roles and responsibilities. Certain ebiX® standards have been used for the implementation of data exchange processes in Slovenia, e.g. in the domain of the market operator and the DSO's service of general economic interest, without significant adaptations.

What is ebIX®?

ebIX®, the European forum for energy Business Information eXchange, is a non-profit organisation whose aim is to accelerate, develop and standardise the electronic exchange of information in the European energy industry for gas and electricity. ebIX® is an independent organisation that works with relevant organisations to promote the use of the open ebIX® standards. ebIX® focuses on the exchange of administrative data for the internal European electricity and gas markets and on harmonising the exchange of electricity and gas data between the different actors in the liberalised European energy markets. ebIX® pursues this objective by using international and open standards to create a technology-independent model that represents common generic data exchange processes, based on best practices and suitable for implementation in energy data management software. ebIX® deals with processes between the market participants that handle business and administrative data. ebIX® primarily covered the needs of the downstream retail market and the interfaces to the upstream wholesale market. ebIX® complied with the European Union rules wherever feasible.

A Short History

It all started back in 1993 when the Norwegian electricity exchange Statnett Marked (today Nord Pool Spot) produced standardised implementation guidelines based on the international UN/CEFACT EDIFACT standard. The implementation instructions described the exchange of messages containing information on offers and sales reports between the actors and the electricity exchange. This standard was then extended to cover the exchange of metering data between Nordic energy market players,

100 https://www.ebix.org/

leading to the establishment of the Ediel Nordic Forum (ENF) in 1995. Other European countries have recognised the importance of this work and have joined the ENF as observers. They implemented messages based on the Ediel standards, as the versatility of these messages allows for national adaptations. ENF members and observers wanted this extended forum to develop into a pan-European initiative, so ebIX® was established as a pan-European organisation in 2002. Almost ten years later, Slovenia joined ebIX® and plays a more prominent role through the representatives of the IPET Section by co-chairing the ebIX® Forum and actively contributing to the ebIX® working bodies.

The Role and Results of ebIX® in Harmonising Retail Market Processes in the EU

ebIX® provides standardised and harmonised processes for liberalised electricity and gas sales markets, with a focus on information exchange, while respecting EU rules and allowing for national adaptations. More specifically, ebIX® offers workable process models, including the definition of the information exchanged, based on best practices and lessons learned in Member States, using open international standards and »business language« to make it as understandable as possible for business people. In addition, ebIX® provides a forum as an expert platform for knowledge exchange between Member States. The ebIX® models are based on a Harmonised Electricity Market Role Model[101] maintained by a harmonisation body that works holistically and takes into account the broader aspects of adaptation.

ebIX® offers harmonised Business Requirement Specifications (BRS) for all key downstream business processes in the European electricity and gas sector, based on experience and best practices. These include, among others, data exchange processes such as the administration of consumer consent, change of supplier, consumer migration, end of supply, reconciliation of consumer billing point characteristics, network areas and metering configurations, management of billing points, advance request for master metering point data, change of balance responsible persons, change of responsible entities for metering data and their termination, combined network and supply billing, meter reading/determination, settlement of deviations, energy labelling, reconciliation, billing, specifications for the use of distributed flexibility including the administration of the flexibility register, and others. Other important products are the business information models (BIM) for specific processes, a proposal for the conversion of BRS to CIM, recommendations for the use of data entity identification schemes and supporting guidance documentation.

The ebIX® UML Model for the European energy market with associated BRS and business information models (BIM) is the only known robust interoperability framework in the downstream domain used for the implementation of data exchange in a national energy market. Some ebIX® member states have implemented different versions of the ebIX® model, usually with an extension for national specificities. In other ebIX® member states, the selected eBIX® BRSs have been taken as reference models for national implementation. The ebIX models are currently the only known process models available for the downstream energy market and are considered important in the process of achieving interoperability. They can be used as a basis for implementing some of the necessary domain reference models at the functional layer (ebIX BRS) as well as the information layer (ebIX BIM), while allowing for national or regional specificities and customisation.

At its meeting on 30 May 2023, the eEbIX® Forum formally decided to close down ebIX® by the end of 2023 and to hand over its results achieved over the years to the EU DSO Entity.

The transfer of the scope of work and results to the emerging EU DSO Entity is expected to result in a lack of competence and a stagnation or marked reduction of efficiency in the harmonisation of data exchange processes in the domain of retail markets in the EU. At least in the initial phase, the EU DSO Entity will be much less agile and will have yet to establish the relevant competences. In addition, participation in the EU DSO is to a large extent conditional on membership, which is largely limited to representatives of DSOs. This makes the participation of experts from national regulators practically impossible, and the same applies to representatives of suppliers, aggregators and, last but not least, transmission system operators, which are grouped together in the ENTSO-E framework. A gap has certainly occurred at the EU level, as the open expert platform, based solely on expertise, which bridged the limitations of the organisation and representation of entities such as ACER, ENTSO-E the EU DSO and the working bodies of the European Commission and others in the field of the natural gas market, has ceased to function. The big question is also to what extent, if any, the harmonisation of roles and responsibilities and further processes in the natural gas markets will continue.

101 https://www.ebix.org/artikel/role_model

Providing Consumers with Standardised Data Services

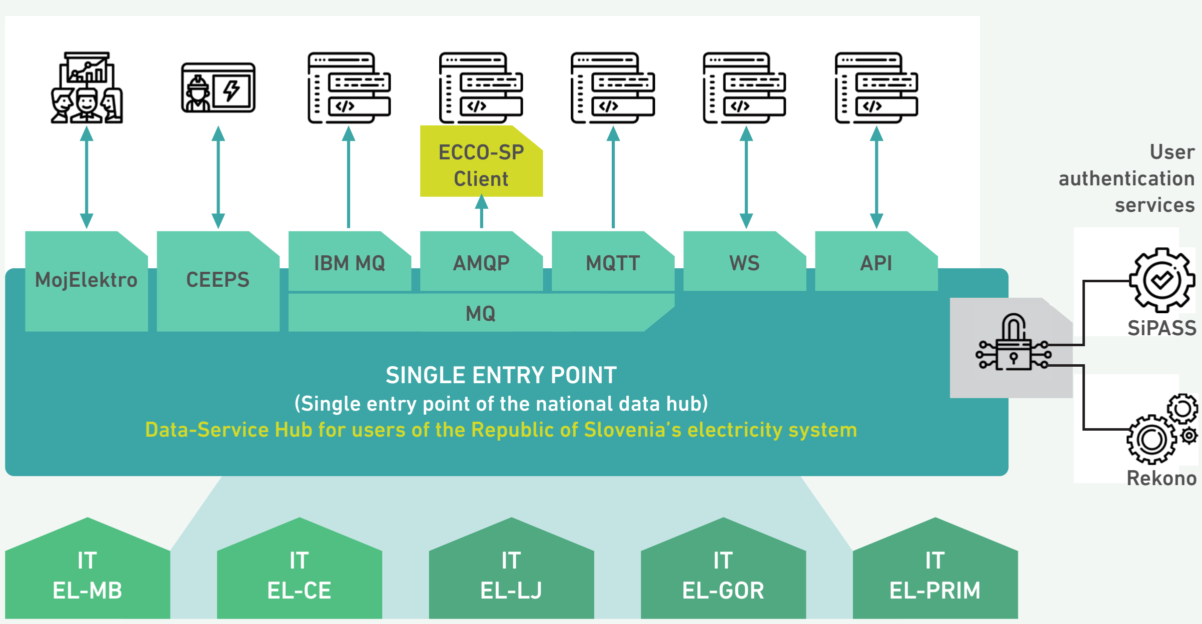
The Government Decree on measures and procedures for the introduction and interoperability of advanced electric power metering systems (hereinafter the Decree) and the Plan for the introduction of an advanced metering system in the Slovenian electricity distribution system (hereinafter the Plan) define, among other things, the advanced metering system architecture, roles and responsibilities, its minimum functionalities, and some aspects of the implementation of data exchange based on relevant standards (CIM, etc.). The Decree requires the DSO to establish a single access point for accessing data in the advanced metering system. Based on the Plan mentioned above, the system is implemented as a central system for accessing metering data (the national data warehouse), which is managed by the DSO and provides data exchange services among business entities and network users in the B2B and B2C domains, with a plan to further extend the area of exchange to the B2G segment.

The development was carried out within an initiative by distribution companies, united under the Electricity Distribution Economic Interest Grouping, with the participation of the DSO.

In the second half of 2022, the Electricity Distribution Economic Interest Grouping adopted a vision for the development of digital services for users of the distribution system in Slovenia, which envisaged the introduction of three key components for the digital future of distribution companies. The key components define the single entry point as a central and unified access to metering and accounting data, the EDC-side data exchange systems that serve to exchange key data already processed by EDCs, and the EDC-side mass data management platforms that collect data from different data sources and use it both to optimise their own processes and exchange key data with network users. In 2023, two such platforms were launched, in Elektro Ljubljana and Elektro Celje. In early 2023, however, a decision was then taken by all the distribution companies to implement a common system for the processing of the accounting data for electricity, the so-called platform for the advanced processing of metering data – POMP, to be deployed by Informatika d.o.o., which will be used for the collection and preparation of 15-minute data for the needs of the electricity billing process and the operation of the data solutions within the single entry point of the national data hub (EVT).

The EVT is a hub ensuring the exchange of data among distributors and suppliers of electricity, final consumers and their authorised representatives (e.g. aggregators and ancillary services providers) and at the same time the central data hub for the exchange of data in the electricity market. The EVT allows access to available metering data independently of the electricity distribution area or supplier.

FIGURE 122: HIGH-LEVEL ARCHITECTURE OF THE EVT NATIONAL DATA HUB



SOURCE: EDCs

The EVT provides a safe (with two-step verification of a user's electronic identity) and unified registration and authentication, as well as the autonomous management of authorisations and user rights. It provides the multi-step authentication of users through the SiPASS and REKONO identity verification services, which allow the verification of the identity of different users (citizens, business entities and public officials). EVT also allows the electronic signing of applications and other documents.

The following EVT modules are relevant for data processing purposes:

- **The MojElektro Portal** – an online user portal intended for all end-consumers and their authorised representatives who can access all the metering points and metering and accounting data they are entitled to, regardless of their supplier or distribution area. It enables an overview and export of all available 15-minute data by metering points (received and delivered active/reactive power, the possibility of aggregation by hour, day, month, etc.), monitoring consumption and production above the self-supply metering points, submission of a new tax ID number for a metering point, submission and entry of the meter reading at a metering point;
- **CEEPS Portal** – this enables centralised imbalance settlement, access to and export of 15-minute data based on balance sheet eligibility, the submission and entry of meter readings on behalf of end-users, carrying out the supplier switching process in line with the SONDSEE requirements, access to accounting data (the so-called Annex A), management of all the changes at the metering points, etc. All electricity suppliers, Borzen, the Centre for RES/CHP support, the closed distribution systems and the distribution system operator are registered on the portal;
- **Massive data – B2B Type – MQ services:** continuous daily massive data exchange for the individual eligible user, daily transmission of the available 15-minute metering data for the previous day, addition of new measuring points to the daily transmission and specific inquiries for the available 15-minute metering data;
- **WS/REST-API** – data access services for the Distribution System Operator (WS) and planned restAPI services for accessing end-user or proxy data without having to register on the MyElektro portal. The rest API services are under development and will allow the further development and usability of the data from the advanced metering system in consumption monitoring and in analysis carried out for the purpose of the new tariff systems;
- **ECCO-sp web services** for the transmission system operator to provide real-time generation data and structural data on metering points.

These modules take advantage of the functionalities of the new intermediate layer or **POMP** platform. POMP is designed to allow integration with a variety of additional interfaces, ensuring the flexibility and extensibility of the system. The transfer of metering data from the lower architectural layer, consisting of the Head End System (HES) of the distribution companies, to the POMP platform is done in two ways:

- by continuous data loading (»push« mechanism) and
- by extracting historical data.

The POMP includes integration with three key systems of the national data hub, which is the highest architectural layer of the AMS: the eIS, the My Elektro portal and the CEEPS portal (Central Electricity Portal of Slovenia). By introducing advanced data and streaming solutions, POMP enables the scalable processing and storage of big data that can be directly and usefully applied to a wide range of scenarios based on advanced data analytics and machine learning.

The EVT has been upgraded to support new methodology for calculating the network charge

The EVT is a single portal for the combined operator and distribution companies to access data from third parties. The system includes all metering points and each owner of a metering point or their proxy, who can access the data via the EVT. Depending on the equipment of the metering point and the measurement data captured, all available data is already being transferred to the system. The EVT is constantly evolving. In 2023, key upgrades included:

- **Moj Elektro portal:** export of metering data for a period of three years, upgrades to display the agreed billed capacity for each metering point, modification of the agreed billed capacity, upgrades to the displays, e.g. request to register an active consumer, access to the data via a Rest-API call without entering the web portal, registration of end-user flexibility;

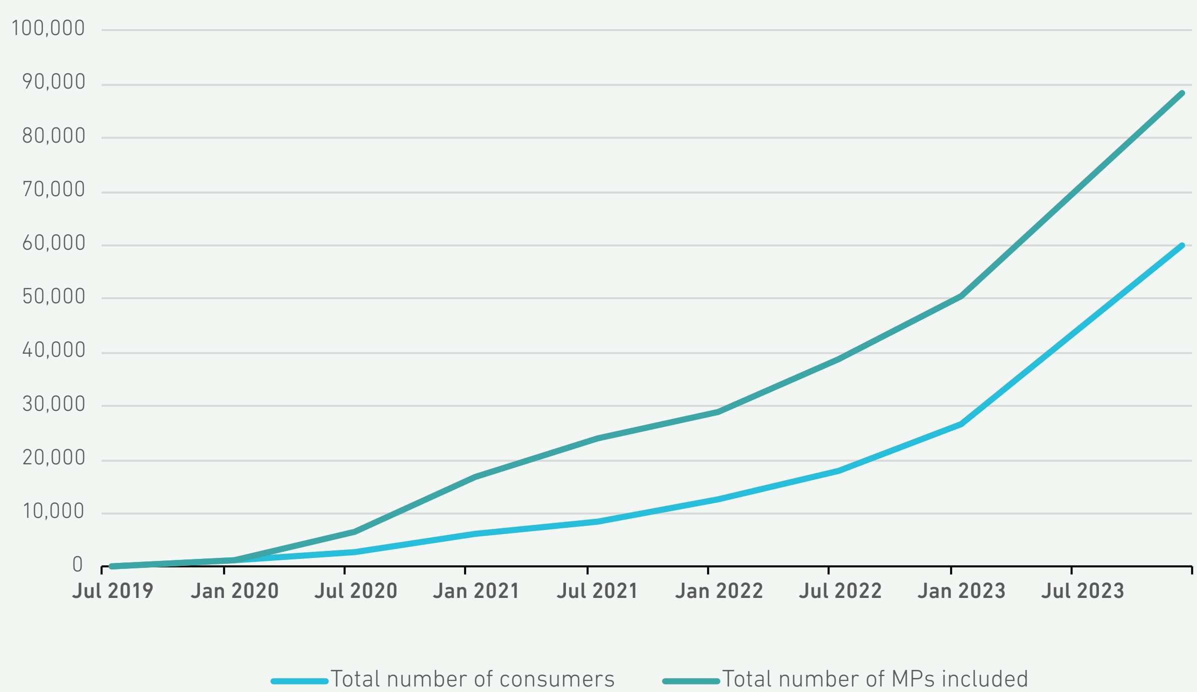
- **CEEPS portal:** introduction of a new role – »flexibility service providers«, access to and editing of data on the agreed billed capacity for each metering point on behalf of the user, upgrade of functionality for the closed distribution system (CDS Jesenice is included);
- **B2B services:** changing the agreed billed capacities.

In 2023, the Flexibility service was being developed on the MojElektro and CEEPS portals for the purpose of collecting the offers of active consumers in the distribution system regarding flexibility and for registration in the provisional flexibility register of electricity distribution companies. In the area of Elektro Ljubljana, a contract was concluded with a service provider to provide flexibility from a source connected to the distribution system, which was finally used in 2024.

Elektro Ljubljana successfully uses the EVT Flexibility service and concludes the first contract for the provision of flexibility

Consequently, the number of users of the Moj Elektro portal has constantly been growing. At the end of 2023, almost 60,000 users (124% more than the previous year) or over 88,000 metering points (74% more than the previous year) were registered in the Moj Elektro portal.

FIGURE 123: DEVELOPMENT OF THE NUMBER OF REGISTERED USERS AND THE NUMBER OF REGISTERED METERING POINTS IN THE MOJELEKTRO.SI PORTAL



SOURCE: EDCs

The exponential growth is largely due to raising consumer awareness through the implementation of the Energy Agency's communication strategy on the reform of network charging.

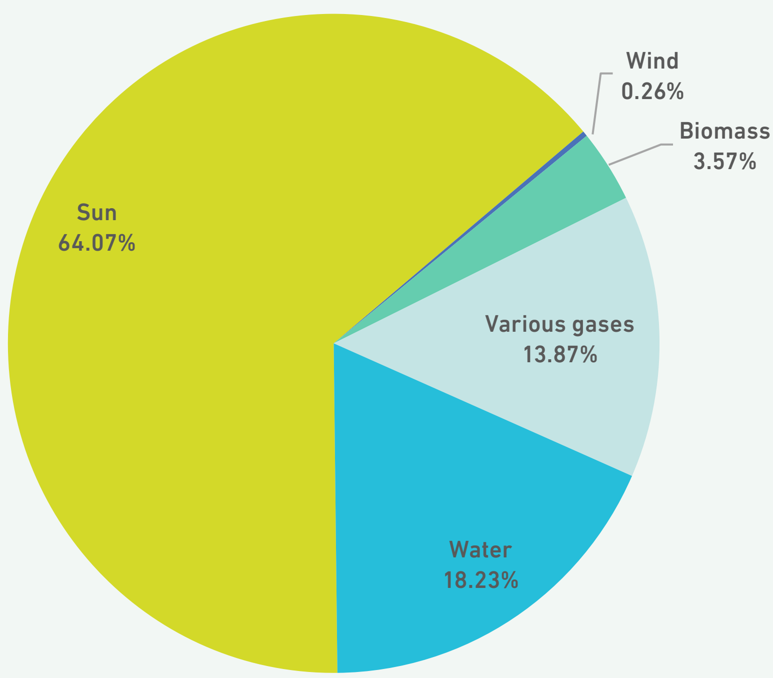
At the end of 2023, electricity suppliers were receiving 15-minute metering data for more than 470,000 metering points daily through the EVT (B2B) services.

Almost 60,000 users registered on mojelektro.si by 31 December 2022

In line with the requirements of the tripartite contract between the two electricity system operators and distribution companies, the foreseen scope for equipping the metering points of energy sources with an installed capacity of over 100 kW, which enable data transmission to the transmission system operator in near real-time, was concluded in 2022. In total, more than 758 metering points were equipped, which transmit 15-minute data on the energy sources with a total capacity of 420 MW directly to the TSO in near real-time.

In the near real-time exchange of data on RES generation defined above, solar and hydropower prevail, while other sources together do not reach 20%.

FIGURE 124: PROPORTIONS OF RES TYPES IN THE NEAR REAL-TIME EXCHANGE OF PRODUCTION MEASUREMENT DATA BETWEEN ELES AND EDCs



SOURCE: EDCs

A formal definition of the range of standardised data services provided by the DSO to system users either free of charge or for a fee remains undetermined. A set of data services is available through the EVT, which is not adequately documented. The issue of providing effective local access to metering data in real-time (in the I1 interface of a smart meter) to all users equipped with smart meters is still not resolved in a satisfactory manner, especially due to the technical restrictions of some built-in smart meters and the inadequate standardisation of the interface. Partial resolution in this area is expected in 2024 with the entry into force of the new SONDSEE.

Scope and Quality of the Data Provided in the Framework of the AMS

Based on the Decree on measures and procedures for the introduction and interoperability of advanced electric power metering systems and the related tasks of regulatory control, the Energy Agency monitors the extent and quality of the provision of metering data within the Advanced Metering System (AMS).

In order to manage the risks associated with the implementation of the reform of the network charging methodology, the Energy Agency has defined a set of indicators to monitor data availability and quality in 2022 comprising more than 20 different key performance indicators (KPIs). With these KPIs, the Agency monitors the progress of the introduction of the AMS at the level of the shares of advanced meters installed and integrated into the AMS, the availability of different volumes of metering data of various types (e.g. 15-minute metering data for the previous day (D-1) and for the previous month (M-1), validated/non-validated) at the levels of the delivery point, metering post, metering point and consumer, the share of metering devices by communication technologies, etc.).

Selected key performance indicators related to this issue:

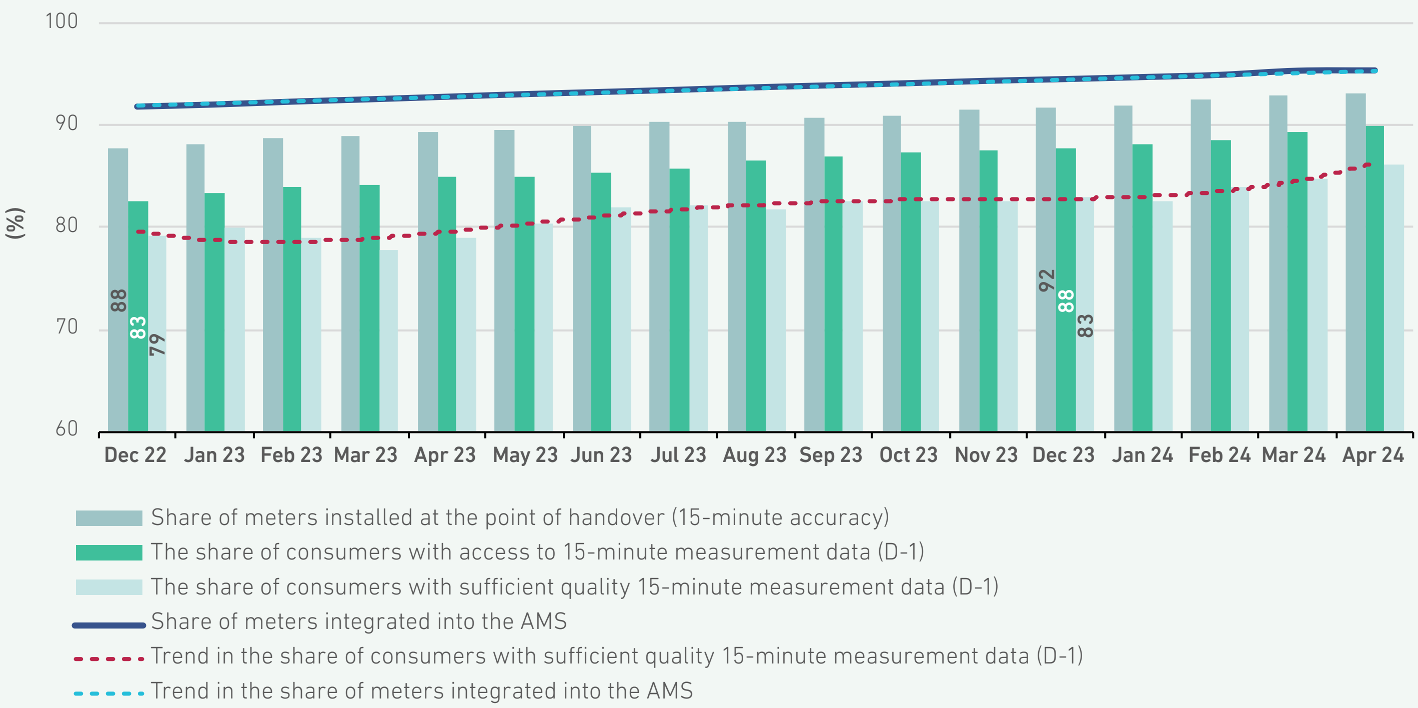
#	KPI
1	**The share of installed meters at the point of handover (15-minute resolution):** the share of metering equipment capable of providing the data necessary for the billing of the network charge and other services
2	**The share of users with guaranteed access to minute measurement data (D-1):** user access to unvalidated 15-minute data on use/production for the previous day at the national data hub level (mojelektro.si).
3	**The share of users at the point-of-handover level with 15-minute data of sufficient quality (M-1):** user access to validated 15-minute data on use/production for the previous month (with the substitution of missing values) at the national data hub level (mojelektro.si) – accounting data (15-minute profiles)
4	**The share of built-in meters included in the AMS:** the share of meters with adequate communication facilities included in the AMS whose data is processed in accordance with the range of standardised services of the AMS (this share also includes meters that record measurements with a resolution of more than 15 minutes)

The new network charge methodology is based on the use of 15-minute accounting data on consumption or achieved capacity. The new methodology is fairer in the allocation of costs between the different user groups and mostly results in lower network charges for LV-connected final consumers. It is therefore essential that the largest possible share of consumers is provided with adequate metering to enable billing based on the Energy Agency's new methodology as of 1 July 2024[102] and to ensure that users enjoy the full benefits of this methodology, which is CEP-compliant and designed to support the green transition.

Despite the achieved targets for the extent of advanced meters, installations comply with the EU normative requirements (80% by 2020) and deviate only slightly from the roadmap set out in the Plan for the introduction of an advanced metering system[103] (indicator of the percentage of meters installed), the Energy Agency found significant deviations when establishing the volume and quality of metering data at the level of metering centres and the national data hub in 2022: while the Agency certainly recognises a trend of progress in the availability of advanced metering devices for consumers during the period under review, the progress in data quality was not as significant (Report on the Energy Situation in Slovenia in 2022, p. 187, Figure 144).

102 During the preparation of this report, the Energy Agency postponed the application of the revised network charging until 1 October 2024.
103 https://www.sodo.si/objave/nacrt-uvedbe-naprednega-merilnega-sistema-v-elektrodistribuc

FIGURE 125: SELECT KEY INDICATOR TRENDS IN THE AMS



SOURCES: ELES (SODO), ENERGY AGENCY

The deviations resulting from deficient data processing in the measurement centres or an inadequate data »clean-up« process, necessary due to sensitivity to interference[104], as well as the delayed correct interpretation of EU legislation with respect to the use of detailed metering data within an AMS[105], have noticeably decreased over the past year.

The growth factor of the improvements in the measurement data, as detected in the trend curve for the equivalent comparison period (Sept. 22 – Apr. 23), increased by more than 4%. The projection curve for the share of users with 15-minute data of adequate quality has reversed over the past year and shows a noticeable upward trend (Figure 125). The number of consumers with quality-assured 15-minute metering data (accounting data, M-1) increased by around 7% during the period under consideration. The progress observed suggests that the »data clean-up« process through the POMP platform with other supporting actions by the metering data manager at the distribution level is working. We consider that further improvements are still possible despite technological limitations (e.g. by using a higher frequency range on PLC communication links). Data quality still varies between areas at the level of the distribution companies, as well as between areas within distribution companies, but the trends indicate an improvement. The results of the progress monitoring suggest that the stagnation and degradation of quality relative to the volume of users observed in 2022 are no longer as problematic as in the past. This is also indicated by the analysis, according to which the Energy Agency concludes that, despite the limitations of the state of the art (susceptibility of the communication channels in the network infrastructure to electromagnetic interference in the PLC frequency range used), there is further potential in the area of data clean-up and modification of the frequency range of PLC communications, which can help to additionally improve the percentage of good quality measurements available for both M-1 and D-1. However, it will be the limitations of the technology and the disproportionality of the costs associated with the measures that will set the upper limit of possible improvement[106]. The proportion of adequate metering devices and the proportion of transmission and delivery points with the required quality of metering data could be fully approached within the two-year transition period for the billing of excess capacity under the new methodology for calculating the network charge.

104 Due to the technical limitations of Power Line Communication (PLC)
105 For many years, data services related to this data have been inappropriately prioritised and not provided.
106 According to the Energy Agency's estimate, we could expect to reach a level of around 95%.

Due to the new network charge billing methodology, which is based on 15-minute billing data, it is vitally important to adopt the measures necessary to ensure the required availability of quality data for all suitably technically equipped consumers. For this reason, EDCs, in cooperation with SODO and ELES respectively and with technical implementation by Informatika d.d., began conducting mass data analysis (POMP), which is progressively moving towards a satisfactory, technically feasible data quality with perceptible advances. It is the responsibility of ODS and the EDC to ensure suitably technically equipped consumers are not discriminated against and that they can make use of the potentials and benefits of the reform.

Other Measures

The same rules on the prevention and restriction of competition and the abuse of a dominant position apply to the electricity market as to other types of goods. As publicly available information indicates, the Slovenian Competition Protection Agency did not identify any restrictive practices or possible dominant positions on the market in companies operating on the electricity market in 2023.

Active Consumption, Flexibility Market and Other Development-Related Aspects

Active consumption is one of the key factors that would reduce greenhouse gas emissions and increase the share of RES in the end-use of energy and the electrification of heating and traffic, while still ensuring an appropriate level of cost-effective supply quality. Active consumers can adjust their consumption and production of electricity to their needs and external signals and offer flexibility services in the electricity market independently or via aggregators.

The European regulatory framework in this area is still evolving. The European Commission has mandated the ACER to draw up framework guidelines for demand response to enable many consumers wanting to participate in energy markets to do so. »Demand response« means a change in electricity consumption when consumers (individually or collectively) respond to a market signal, such as a change in electricity prices or financial incentives to increase, reduce or shift the timing of their electricity consumption. These framework guidelines only cover the active participation of demand response in electricity markets. The ACER framework guidelines set out the main principles for the development of binding pan-European rules on demand response. The purpose of these new rules is to facilitate demand response as much as possible, including with consumer electricity consumption, storage and distributed production (e.g. roof solar panels, electric vehicles) in wholesale electricity markets, as well as to facilitate the market-based procurement of balancing, congestion management and voltage control services required by network operators. ACER submitted the framework guidelines to the European Commission on 20 December 2022. In March 2023, the European Commission approved the document and invited ENTSO-E and the EU DSO Entity to prepare a draft for new binding EU rules within 12 months. In 2023, a public consultation of the EU DSO and ENTSO-E took place in the context of the proposal for new network codes on demand response. The new codes will facilitate the integration of technologically neutral flexibility of demand into connected services of transmission and distribution systems and generally benefit the consumers by:

- ensuring the access of all available resources to electricity markets;
- defining principles to develop harmonised rules, and
- identifying market processes to select the most cost-effective sources.

ACER will consult and review the proposed new EU rules[107] before submitting them to the European Commission.

This said, the field of flexibility is more or less developing in a harmonised way and with varying intensity in the EU and also in Slovenia. Numerous research projects and studies are underway, as well as the first implementations. At the end of 2023, the final phase of coordination with the Energy Agency also included new systemic operating instructions from the distribution operator, which

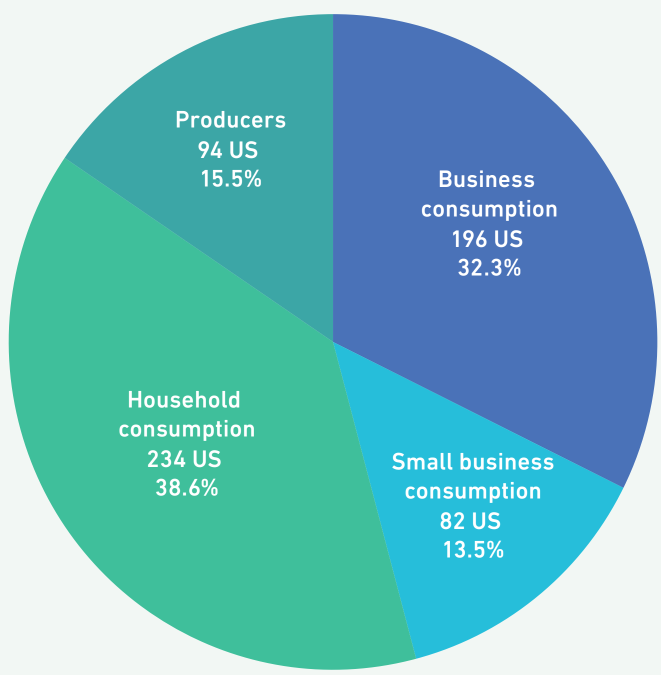
107 A joint proposal of the EU DSO and ENTSO-E for network codes in the field of demand response was prepared on 8 May 2024.

include a minimum framework for the procurement and use of flexibility, coordination between operators, the implementation of qualification processes for service providers, and also define a minimum framework for data exchange. The absence of a network code for demand response, which will also form the basis for the envisaged implementing regulations in the field of interoperability, still constitutes a certain obstacle to greater progress in the area of data exchange.

According to the aggregators, in 2023, their portfolios included 606 system users in addition to their own sources of flexibility. A particular consumer can be included in several portfolios at the same time. Aggregators estimate that system users contributed a total of 2.93 GWh of flexibility energy, representing 1.69% of the total energy traded by the aggregators. As a result, we can conclude that the level of engagement of active demand is still immature.

Six active aggregators in the Slovene market

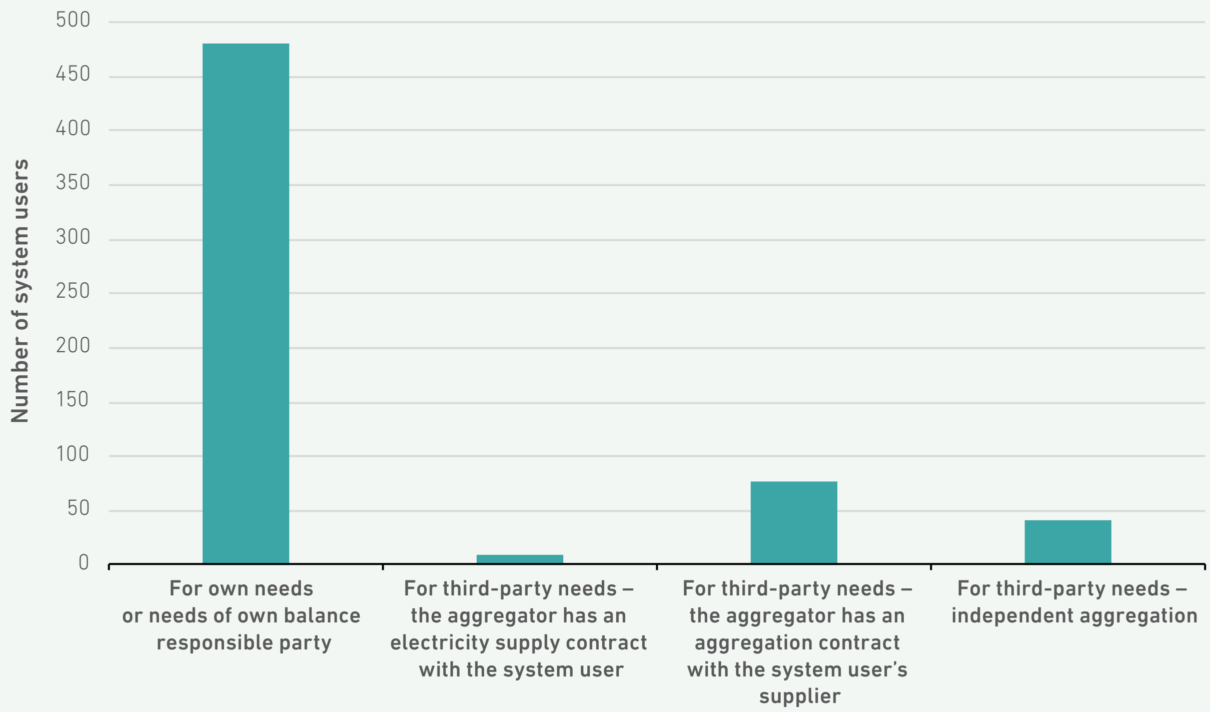
FIGURE 126: STRUCTURE[108] OF CONSUMERS (C) IN THE AGGREGATION, WHERE STORAGE AND GENERATION DEVICES MAY ALSO BE LOCATED CONNECTED BEHIND THE DELIVERY POINT OF THE USER



SOURCES: AGGREGATORS

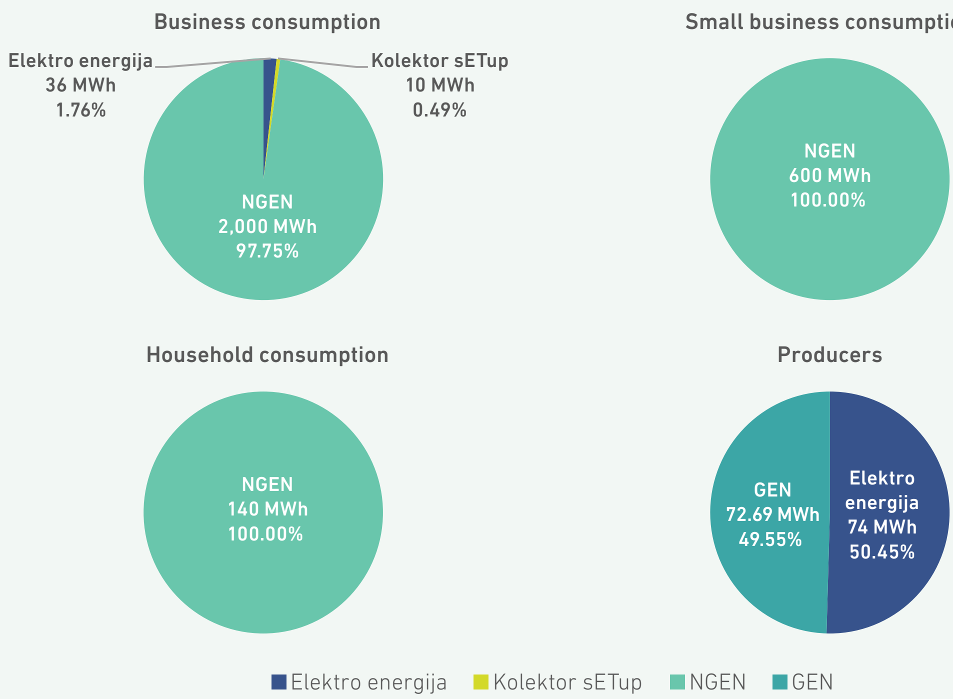
108 The difference between the total and the sums of individual shares is due to rounding.

FIGURE 127: NUMBER OF CONSUMERS IN PORTFOLIOS COVERING VARIOUS NEEDS, WHERE A USER MAY BE INCLUDED IN SEVERAL PORTFOLIOS



SOURCES: AGGREGATORS

FIGURE 128: ESTIMATED SHARES OF ENERGY FLEXIBILITY OF FOREIGN SOURCES BY AGGREGATORS AND TYPES OF SYSTEM USERS

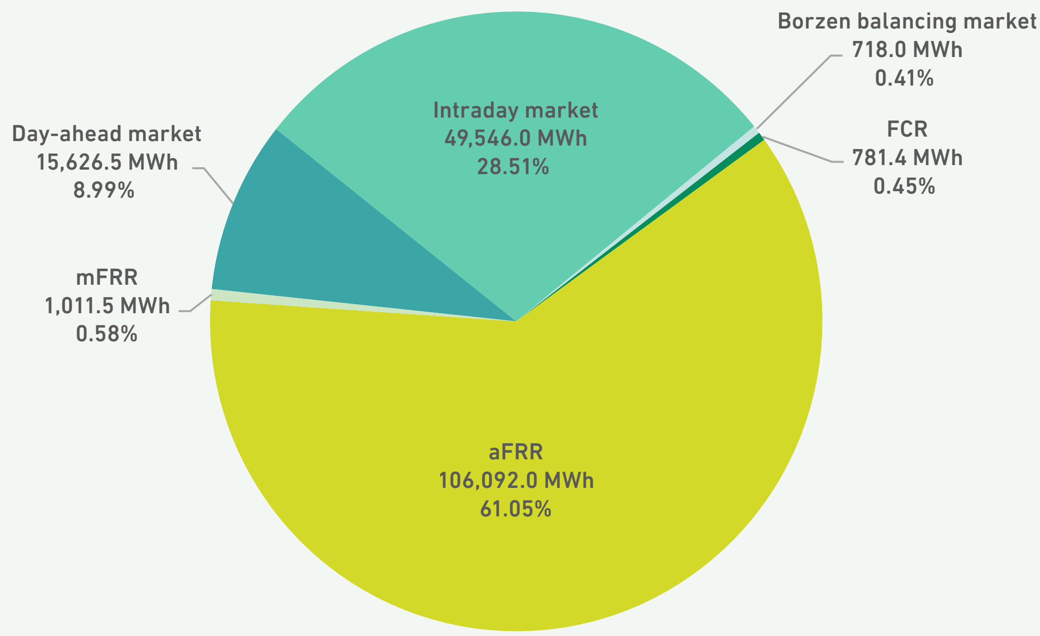


SOURCES: AGGREGATORS

Aggregators traded on all Slovenian wholesale markets. Figures 129 to 131 show the energy shares by individual markets or services, calculated as the sum of energy purchases (or production reduction and/or consumption increase) and energy sales (or production increase and/or consumption reduction) in these markets. The total amount of energy traded by aggregators is determined as the sum across all markets and amounted to 173 GWh in 2023[109].

173 GWh of energy traded by aggregators

FIGURE 129: STRUCTURE[110] OF TRADED ENERGY FROM AGGREGATION BY MARKET OR SERVICE AND THE CORRESPONDING SHARES

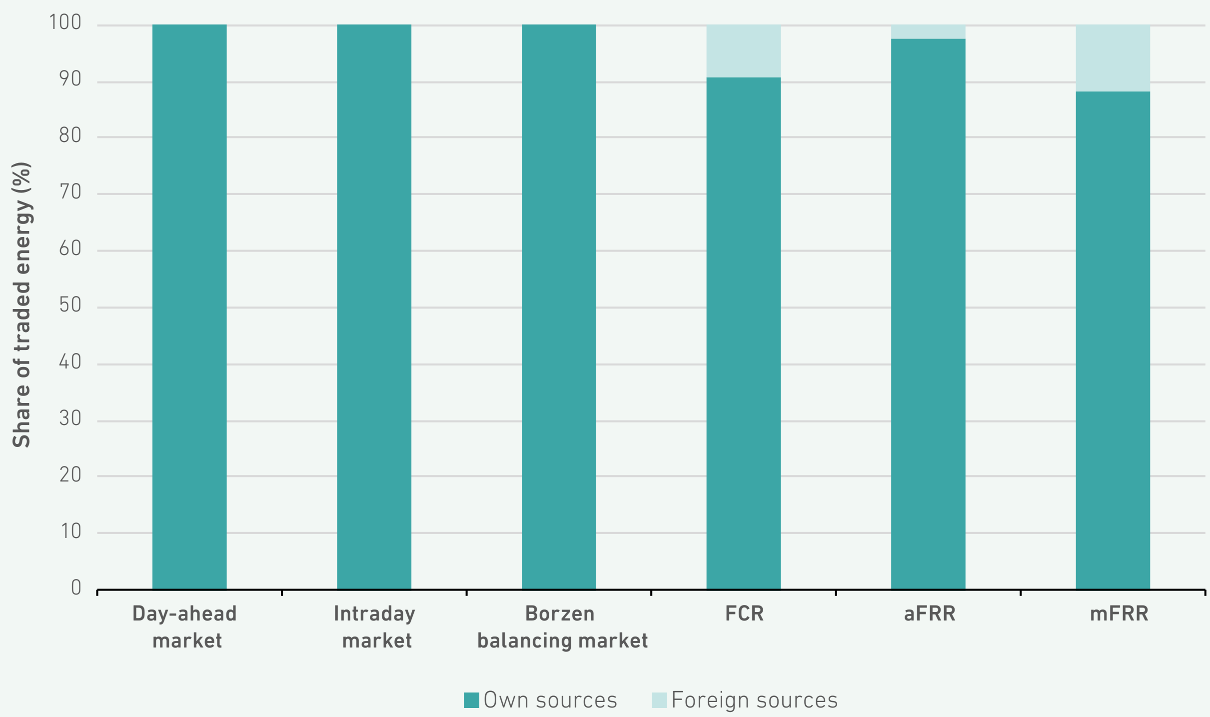


SOURCES: AGGREGATORS

109 The quantities of traded energy from aggregation listed in the Report on the State of the Energy Sector in Slovenia in 2022 (last year's report) are not directly comparable with the data in this report, since the quantities of certain entities in last year's report were excluded from the aggregated quantities due to different definitions.

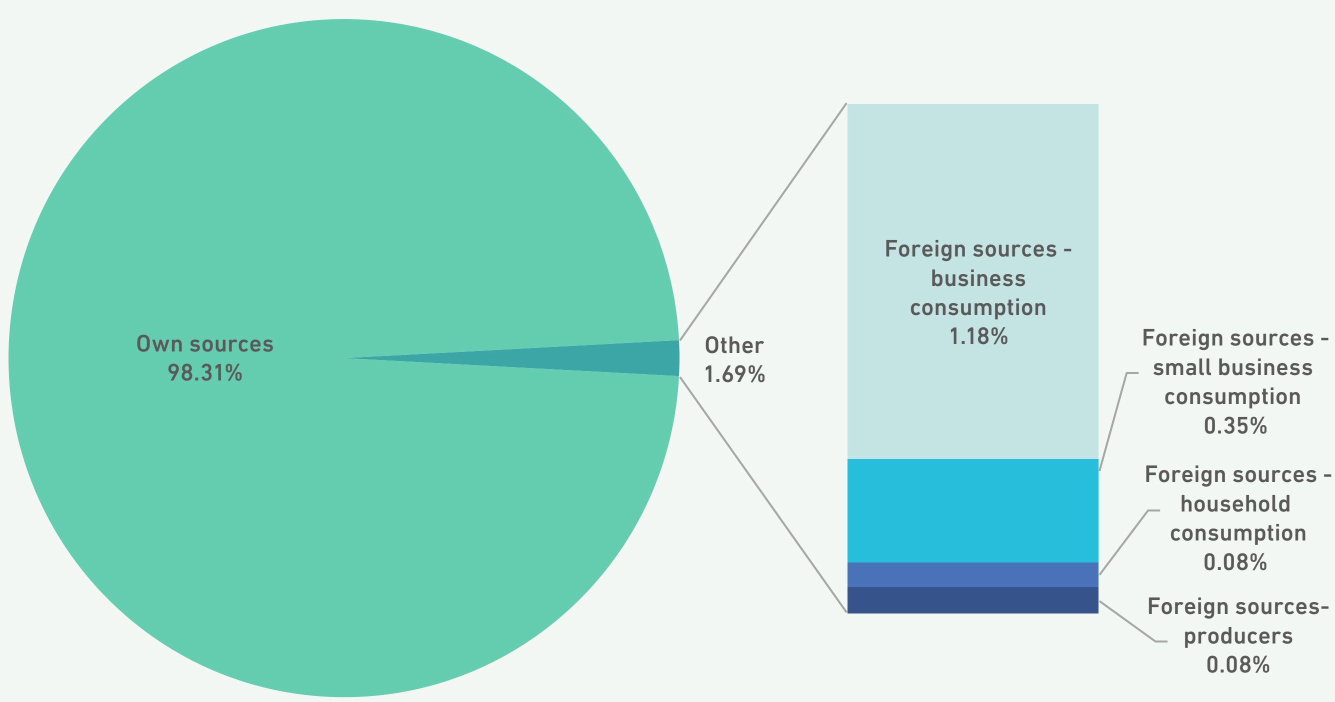
110 The difference between the total and the sums of the individual shares is due to rounding.

FIGURE 130: MARKET SHARES OF TRADED ENERGY ACCORDING TO THE OWNERSHIP OF RESOURCES



SOURCES: AGGREGATORS

FIGURE 131: STRUCTURE OF THE SOURCES OF TRADED ENERGY FROM AGGREGATION IN TERMS OF THE 173 GWh TOTAL



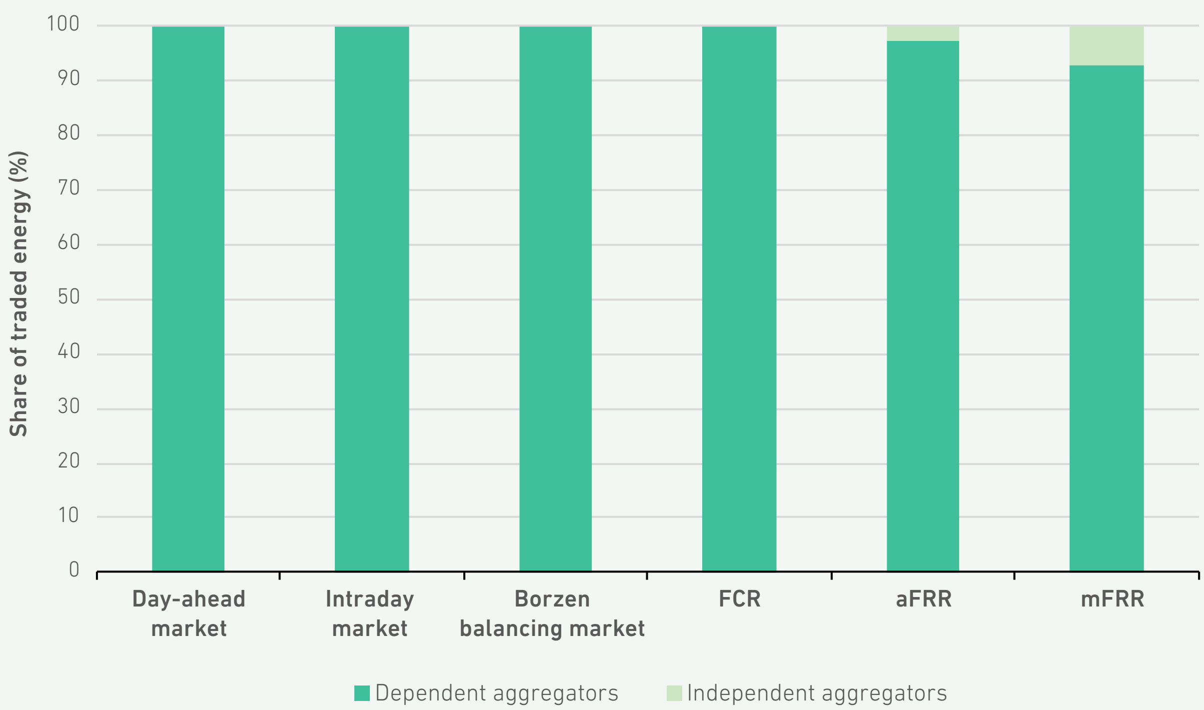
SOURCES: AGGREGATORS

The role of an aggregator in the electricity market can be assumed by an independent aggregator or an electricity supplier. At the end of 2023, six aggregators were active on the Slovenian electricity market[111], which at the same time acted as an electricity supplier. In 2023, all the active aggregators were also electricity suppliers on the Slovenian market. The quantities of independent aggregation shown in Figures 132 and 133 are therefore aggregated quantities of sources of flexibility, for which the aggregator did not supply electricity itself and for which the aggregator did not conclude a contractual relationship with the electricity supplier of these flexibility sources for the aggregation activity, and for which the aggregator did not own or manage the electricity supplier of these flexibility sources.

Data on the included consumers and independent aggregation show that despite the operation of six aggregators in the market and a regulatory framework that is consistent with the Clean Energy for All Europeans legislative package, only a small part of traded energy flexibility is offered through independent aggregation, namely only 2.58% as part of aFRR in only 7.12% as part of rFRR. When reserving capacity for the provision of balancing services, only 17.3% of the rFRR capacity is offered through independent aggregation, which suggests that the engagement of independent aggregation has not reached the level of maturity yet.

A small proportion of independent aggregation

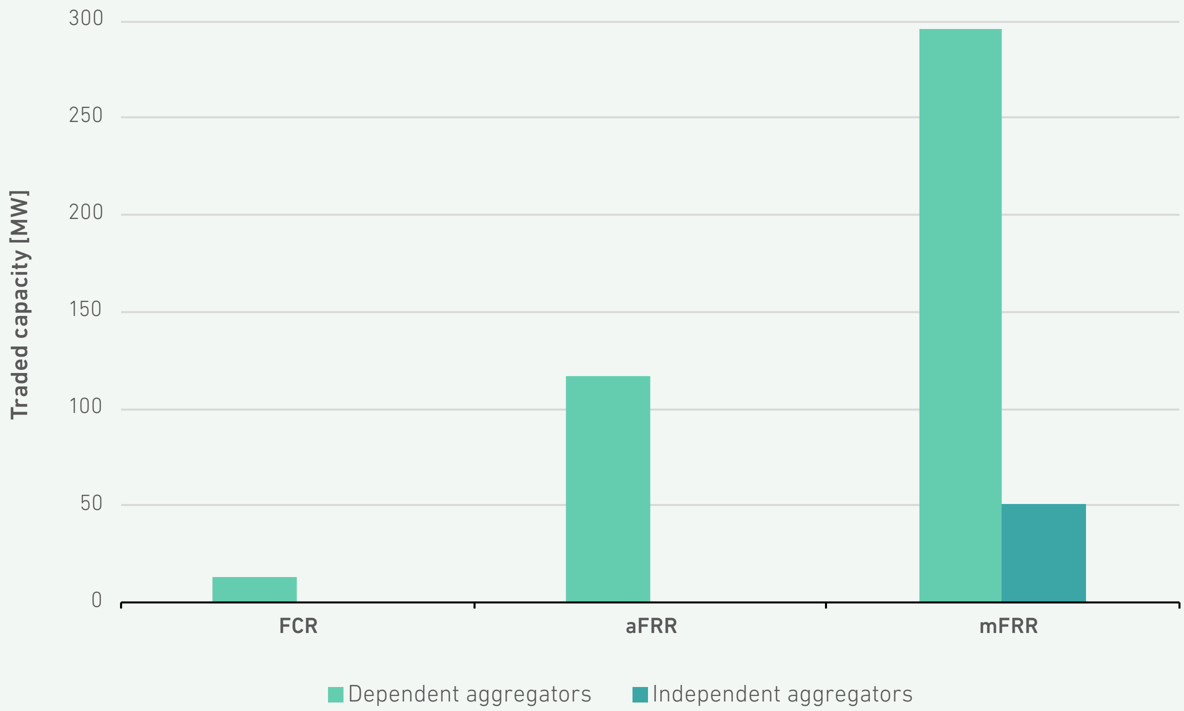
FIGURE 132: MARKET SHARES OF TRADED ENERGY ACCORDING TO THE CONNECTION BETWEEN THE AGGREGATOR AND THE SUPPLIER



SOURCES: AGGREGATORS

111 Elektro energija, GEN, HSE, Kolektor sETup, NGEN, Petrol

FIGURE 133: TRADED CAPACITY ACCORDING TO THE CONNECTION BETWEEN THE AGGREGATOR AND THE SUPPLIER[112]



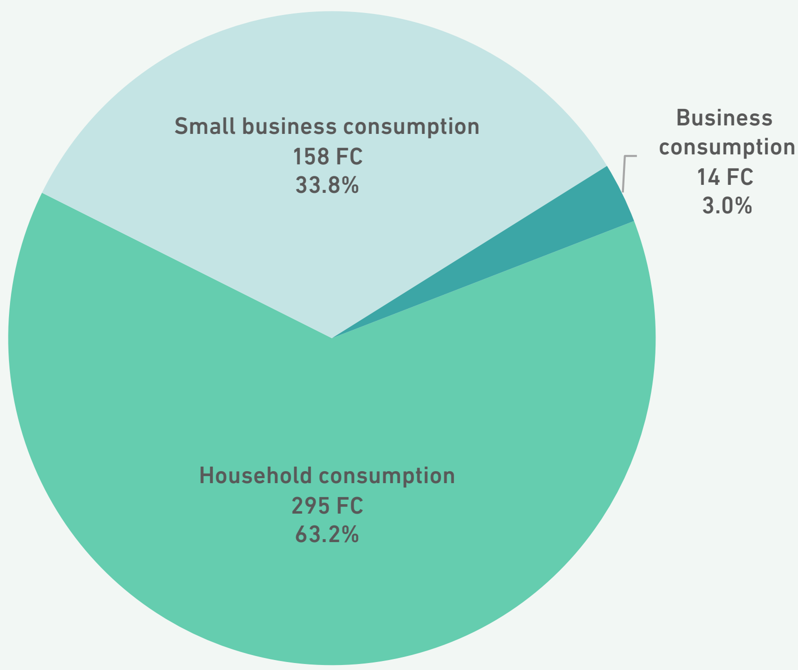
SOURCES: AGGREGATORS

Another key factor that would reduce greenhouse gas emissions and increase the share of RES in the end-use of energy are different forms of energy communities, which include: community self-supply in accordance with Article 72 of the Act on the Promotion of the Use of Renewable Energy Sources (ZRSOVE), self-supply of multi-dwelling buildings, self-supply of communities for supplying energy from RES in accordance with Article 37 of the ZSROVE, and the Energy Community of citizens in accordance with Article 24 of the ZOEE. Supplier data for 2023 shows that suppliers have served a total of 467 end-consumers[113] included in 108 communities[114]. This represents an increase of 103% in the number of final customers included in communities compared to the previous year, and a 140% increase in the number of communities compared to the previous year. The total amount of electricity supplied to final consumers in communities was 3,503 MWh. The suppliers purchased a total of 465 MWh of electricity from the community, while the total amount of electricity taken from the communities free of charge was 134 MWh.

108 active communities (a 140% increase) with 467 final customers (a 103% increase)

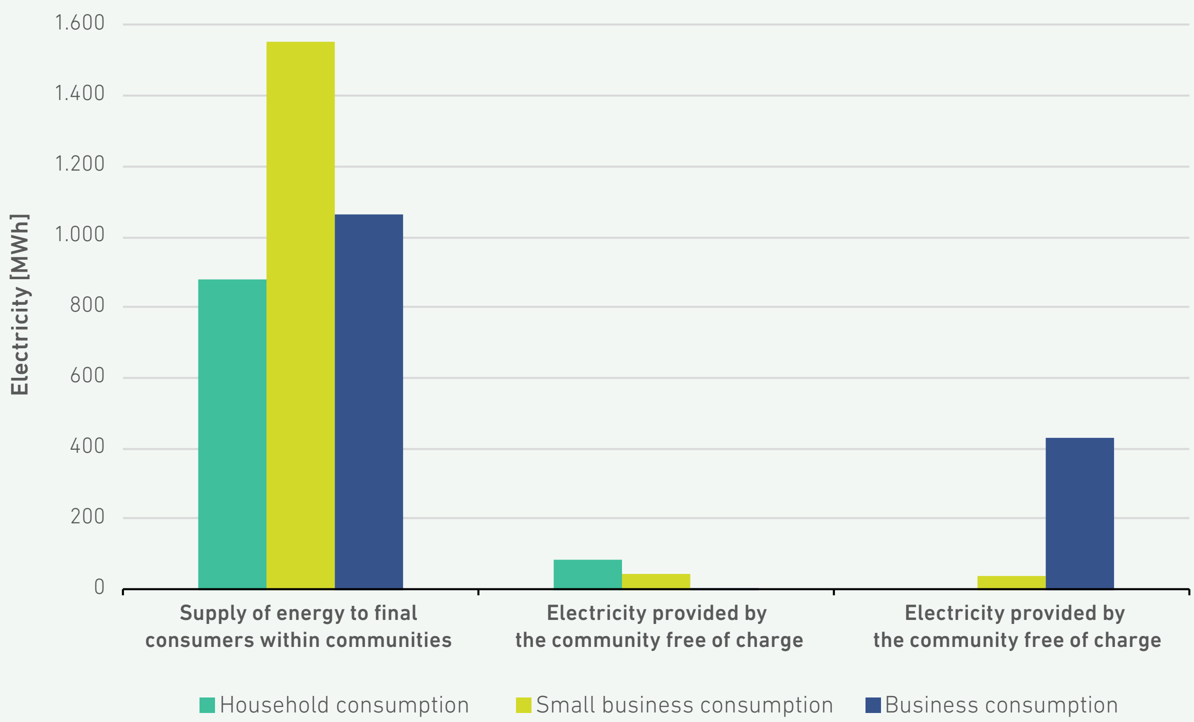
112 The shares of leased capacity by market or service are calculated as the sum of the capacity leased to reduce generation or increase consumption and the capacity leased to increase generation or reduce consumption in those markets.
113 Data provided by suppliers and by the DSO can differ due to various levels of realisation of individual communities.
114 Consumers were associated in self-supply communities in accordance with Article 72 of the ZSROVE, which allows for annual netting, and the self-supply of multi-dwelling buildings in accordance with Article 37 of the ZSROVE.

FIGURE 134: STRUCTURE OF FINAL CONSUMERS INCLUDED IN COMMUNITIES



SOURCES: SUPPLIERS

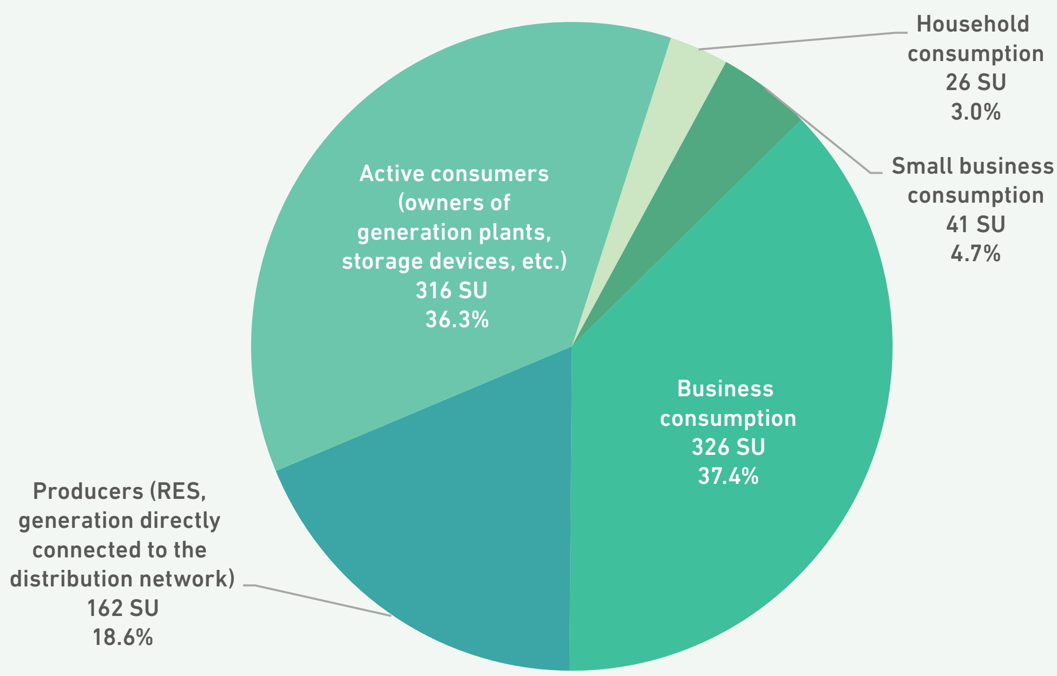
FIGURE 135: A COMPARISON OF AGGREGATED ELECTRICITY SUPPLIED TO CONSUMERS IN THE COMMUNITIES, ELECTRICITY PURCHASED FROM COMMUNITIES, AND ELECTRICITY TAKEN FROM THE COMMUNITIES FREE OF CHARGE



SOURCES: SUPPLIERS

For the purpose of electricity exchange between active consumers within the same balance responsible party, two platforms were active in 2023; the first being managed by SunContract[115] and the second by NGEN[116]. SunContract has developed an energy exchange market for customers who are also suppliers. This way, the supplier is able to cover potential energy shortfalls up to the required quantities of electricity supply. The platform provided by NGEN enables the adjustment of consumption to dynamic price signals with the support of storage units, and the connection of users in virtual groups where those users with their own production can share excess electricity. The total estimated volume of this type of trading was 18.2 GWh. The structure of system users who participated in this type of trading is shown in Figure 136.

FIGURE 136: THE SYSTEM USERS STRUCTURE IN THE EXCHANGE OF ELECTRICITY BETWEEN ACTIVE CONSUMERS WITHIN THE SAME BALANCE RESPONSIBLE PARTY



SOURCES: SUPPLIERS

115 https://suncontract.org/si/elektricna-trznica-proizvajalce-odjemalce-energije/

116 When activating the charging of storage units via the energy exchange platform, NGEN offers its customers (https://www.sgconnect.eu/sl) a discount on the regular price of electricity agreed in the supply contract, depending on the capacity of the storage units. The same platform also allows users to connect into virtual groups, where those users with their own production can share excess electricity with other users. Real-time management of excess and deficits of electricity is carried out through electricity storage units.

CASE STUDY
Promoting the development of new energy services based on the impact of the reformed network charge calculation methodology

The backbone of the green transition is the electricity network, especially the distribution network, which, due to the green transition, must be able to reliably supply energy for the significantly increased electrification of heating and transport. Today's network was not planned and thus built for this kind of increased capacity or for the expected significantly increased network peak loads. As a result, the green transition will require a significant increase in network investment, which means a significant impact on the network charge paid by electricity consumers. This will be particularly pronounced in the period from 2027 to 2032 when at least a 70% increase in network charges is expected. As the sector regulator, the Energy Agency must, on the basis of European legislation, provide electricity system operators with conditions in which they can benefit from flexibility and give price signals to system users to use the networks as efficiently as possible. In this way, electricity system operators will be able to avoid or at least postpone certain investments in the network, while consumers will be able to seize new opportunities and contribute to lower network charges and optimise their costs of electricity through demand response.

And it is precisely the active role of consumers, both household and business customers and industry, that the reform of the network charging methodology will adapt to. Network charges will continue to be charged in terms of power and energy, but based on greater time granulation and stronger price signals.

The reform of the network charging methodology is based on actual 15-minute usage data, which is provided to all final consumers at the level of the national data hub (mojelektro.si) in the form of standardised data services. This way, the reform will ensure a fairer calculation of network charges for all consumers with appropriate metering equipment or with the necessary metering data, and suitable methodological improvements will also ensure a fair calculation for the smaller share of the remaining consumers lacking advanced metering devices. Other key novelties of the new methodology for calculating network charges are the introduction of new time slots, the distinction between agreed and excess billed capacity and the reallocated cost burden of tariff rates for the connected load and energy. The agreed billed capacity[117, 118] for individual consumers will be determined in advance by the electricity operator on the basis of their actual consumption profile in the previous period. The agreed billed capacity will therefore reflect past electricity consumption patterns and will be determined individually for each consumer[119]. The consumer will be able to change this pre-determined agreed billed capacity according to their expected consumption, allowing the dynamic adjustment of the consumer's billed capacity in proportion to the use of the network. If the consumer decides to change the agreed billed capacity, the agreed billed capacity will be charged on the basis of the consumer's proposal. The distribution operator will determine on a monthly basis whether the achieved demand capacity exceeds the agreed capacity and if a positive difference between the

117 https://www.agen-rs.si/documents/10926/106759/D7_AGEN_Reforma_Obra%C4%8DunOMR-TarifniSistem_SLO_V6/132abc24-10b5-4b6e-a5b2-bf4c055c5c3f

118 https://www.dnv.com/publications/effective-and-cost-reflective-distribution-tariffs-162913/

119 Final consumers with an installed capacity equal to or less than 43 kW (household and small business consumers) will not be charged excess capacity until the end of 2025, if they do not change the agreed billed capacity proposed by the distribution operator during this period. However, these consumers will be informed every month of the overruns and the costs that they might incur.

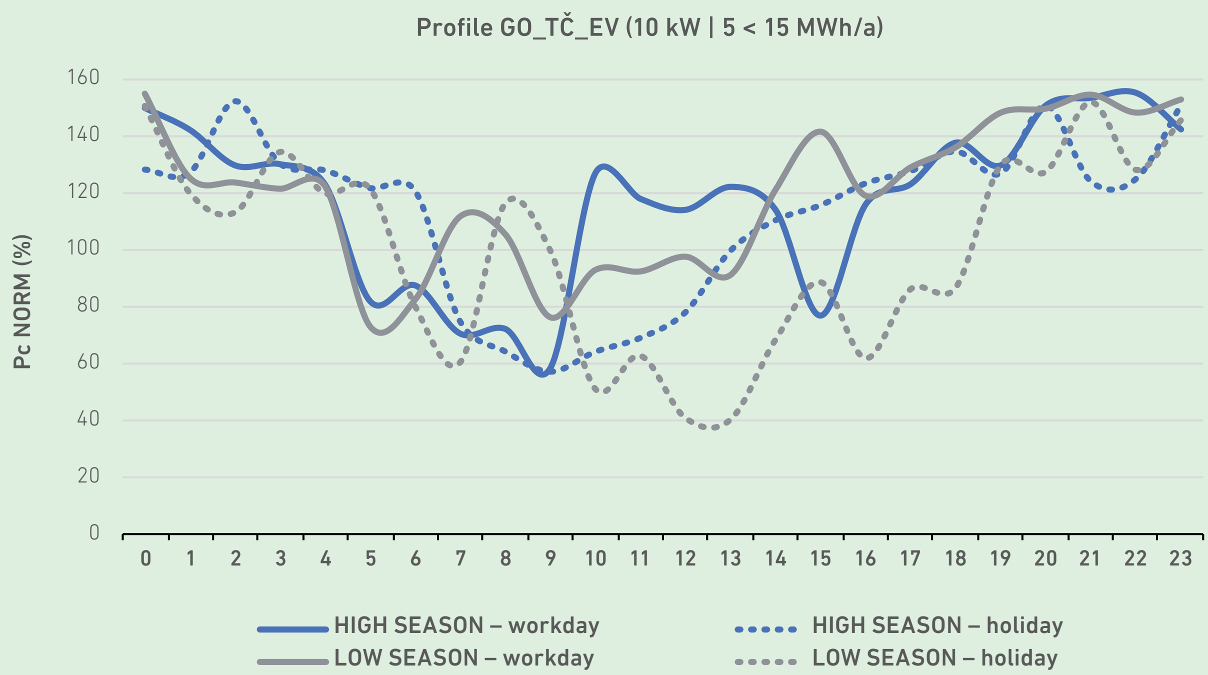
achieved 15-minute capacity and the agreed billing capacity will be established, the difference will be calculated as a network charge for excessive capacity. The time differentiation is seasonal with an intraday time slot of medium load that always occurs during the current high load and presents an opportunity for demand response. During the lower season (March-October), the seasonal differentiation of tariff rates allows for the exploitation of lower electricity supply prices during production from RES, which allows for greater demand response effects. It is ensured that the periods of increased system load, and hence higher tariffs, are synchronised with the existing higher tariff, which simplifies the understanding for less well-advised consumers and those who are not flexible within the current higher tariff and will continue with old network usage habits. The third key novelty is the significantly higher cost burden on tariff rates for capacity compared to the tariff rates for energy, with respect to the current distribution of network costs, since the network costs are mainly related to network capacity and network peak load. This ratio is mostly reflected in lower voltage levels of consumer connection, which is in line with the established problem of the state of the network in relation to the requirements of the green transition. The new price signals stimulate consumers connected to the lower voltage network to manage peak energy consumption, while consumers with self-supply, both individual and collective, or those who are in the process of deciding whether to engage in self-supply, are also stimulated to make more efficient investments in RES, achieving the highest possible level of self-sufficiency and consequently using storage units. At the same time, the reform takes into account the benefits of distributed RES generation, since producers or active consumers do not pay for the use of the network or for the electricity delivered into the network. At the same time, it reduces the negative impact of the annual consumption netting (»net metering«) scheme on network charge revenues and ensures the fair billing of network charges for members of energy communities with incentives supporting national strategies. In addition to an enabling environment for active demand based on the digitalisation of the distribution system, the reform of the network charging methodology ensures the equal treatment of energy storage facility operators in the flexibility market by overcoming the problem of the negative impact that participating in flexibility markets has on other cost components of the final supply price with exemption from network charges during the provision of system services. The reform also allows for the use of the local dynamic network charge tariffs on the energy network charge with time discrimination by the electricity system operators for resolving local overloads. The active consumer may take advantage of all of the above in the context of new business models of suppliers or other electricity companies that provide such offers.

Considering all the above, the new network charge methodology promotes digitalisation and the development of new business models in the field of electricity supply and the use of demand-side flexibility. We expect that consumers will have available electricity supply products based on dynamic prices, which will take advantage of the opportunities brought by the split-supply market model, local dynamic charge tariffs, new energy services, such as the services of managing loads to limit peak energy consumption through the energy management systems, and other innovative services that will promote self-sufficiency (e.g. Sharing electricity) etc. All of these services will be supported by suitable technological solutions, which will bring new jobs with a higher added value.

Below are some typical examples of consumers who will be able to take advantage of these new products in the context of network charges or in the market to achieve wider net benefits, i.e. to simultaneously provide benefits to the network by actively contributing to the reduction of peak load and by reducing costs for the use of the network.

The final consumer with self-supply using a heat pump, an electric vehicle and other powerful electric heaters, who, especially in winter, strongly depends on the network in terms of supply, despite their own electricity production. The following is an example of a self-supply consumer who has a 12 kW solar power plant installed on the roof, heats the house with a heat pump and charges their electric car via alternating current on a 22 kW charging station, where the limitation of the battery charger of the electric car only allows for 11 kW charging power. During the time in which they charge the car, the user simultaneously uses other devices, such as the washing machine, the dryer, the oven, air conditioning and the heat pump during the winter. The agreed billed capacity that this consumer has for the use of the network is 10 kW (P_c). The consumer is included in the annual net-metering system, and they cover their annual demand for electricity with their own production.

FIGURE: EXAMPLE OF THE LOAD DIAGRAM OF A FINAL CONSUMER WITH SELF-SUPPLY



SOURCE: ENERGY AGENCY

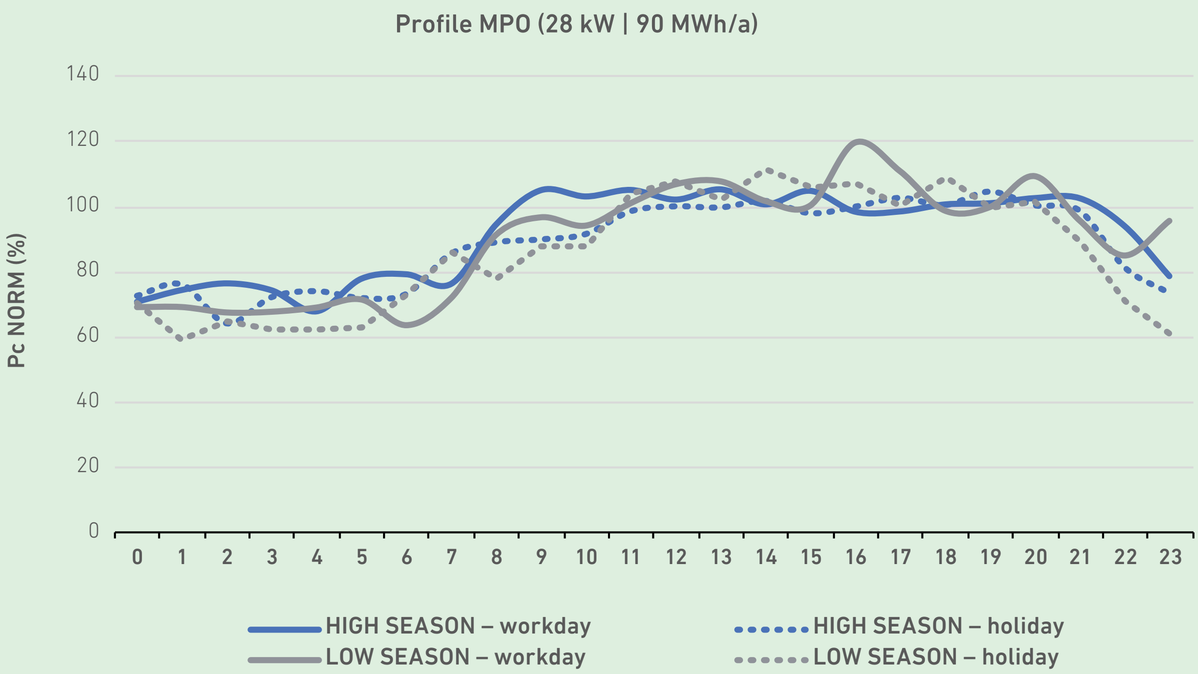
Based on the devices used and the current habits connected to the use of the network, it is clear that the burden to the network due to this consumer is significantly higher than the one established by the billed capacity, meaning that the consumer pays a far too low amount for the use of the network.

An analysis of the consumer's peak power consumption shows that they burden the network the heaviest during the night (up to 16 kW), as well as during the day when they apparently occasionally charge their electric vehicle (with peak power consumption reaching almost 13 kW). According to the new network charge calculation methodology, these peaks, with the daily peak having the most impact, will also be taken into account, which will result in significantly higher network charge costs. This means that on the annual level, the consumer will pay 377 EUR (VAT excluded) in network charges, which is 281 EUR more per year or approximately 23 EUR more per month.

The analysis shows that this consumer has good possibilities for adjusting consumption, namely by changing the time when they charge their electric vehicle or use the heat pump and other devices to a time characterised by a medium or low network load. By adjusting consumption to reduce the agreed billed capacity from 13 or 14 kW in the two most expensive time slots that occur during the day, to for example, 7 kW, and by maintaining peak power consumption at 15 kW in the other three time slots, this consumer can save about 165 EUR per year, or about 14 EUR per month. This will enable them to optimise the network charge costs and contribute to the unburdening of the network during peak network loads that require the network to be reinforced.

A small business consumer with supply reliability issues due to exceeding the installed capacity (P_{cn}) working in the hospitality industry and with the maximum electrification, which contributes to occasionally exceeding the installed or billed capacity (by up to 6% on work days and up to 20% on weekends, mostly in the low season) causing unwanted interruptions in the electricity supply during operating hours. Due to network capacity limitations, the consumer is not able to increase the installed capacity. Consequently, they implement extremely limited manual measures aimed at consumption adjustment.

FIGURE: EXAMPLE OF THE LOAD DIAGRAM OF THE SMALL BUSINESS CONSUMER

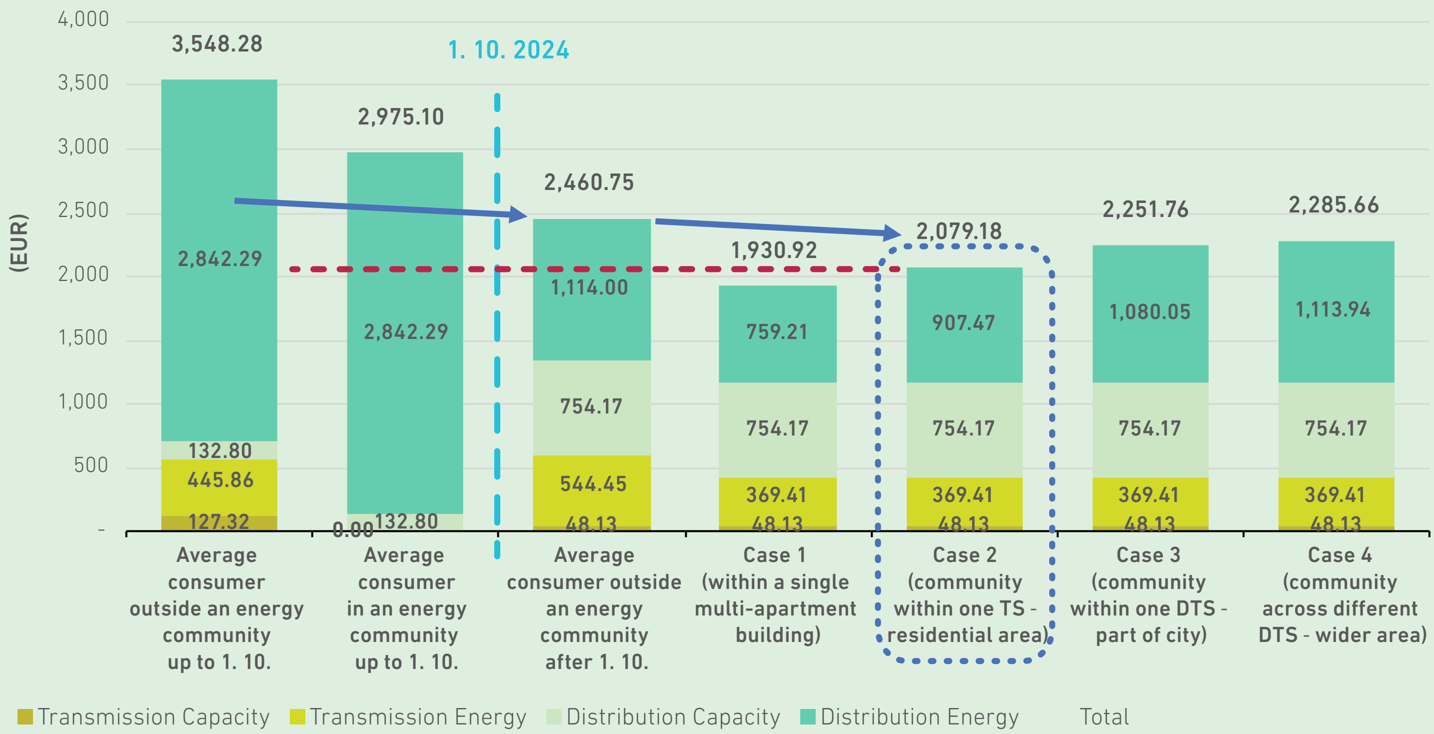


SOURCE: ENERGY AGENCY

In this case, the reform of the network charging methodology mainly due to high electricity consumption (90 MWh) together with the maintenance of peak consumption at around the connection capacity level ($P_c = P_{cn} = 28$ kW)[120] will significantly reduce the costs of the network charge, namely by as much as 1,184 EUR per year (VAT excluded). The savings on the network charge enable investment in an electricity storage unit with a return on investment in less than 10 years, with which it will be possible to limit peaks. A sensibly planned capacity of the storage unit may even increase the level of self-sufficiency and improve cost optimisation if the customer opts to participate in a local energy community (compared to the costs of the network charges before the reform of the network charging methodology, the participation in such a community will reduce the cost by nearly 900 EUR per year). In order to achieve maximum financial savings, it is necessary in this case to provide the automated storage unit and load management via an energy management service (EMS) to ensure smooth operation.

120 For the small business consumer, the billed capacity P_c before the reform of the network charging methodology is the same as the installed capacity, therefore the new meteorology does not bring any changes for the said consumer.

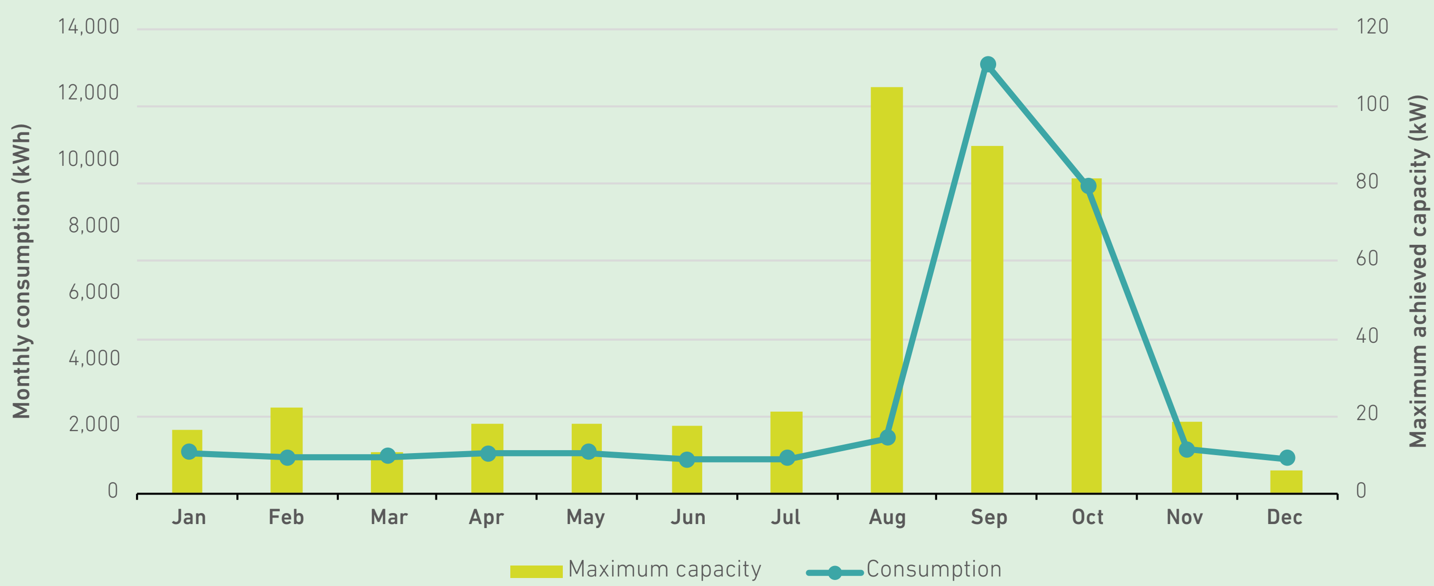
FIGURE: NETWORK CHARGE AND THE IMPACT OF PARTICIPATION IN AN ENERGY COMMUNITY (BEFORE AND AFTER 1 OCTOBER 2024[121]) – ALL CONNECTION CASES – 2 CONSUMERS IN A 60kW COMMUNITY – EACH MEMBER HAS A 50% SHARE



SOURCE: ENERGY AGENCY

Business consumers with seasonal consumption connected to a low-voltage network (NN < 2,500 h) with a consumption of approximately 35 MWh per year can take advantage of the monthly or seasonal adjustment of the agreed billed capacity to optimise network charge costs. Due to seasonal consumption, it is the capacity in time slot TS2 that will establish the minimum level of agreed billed capacity on the annual level for time slots TS3, TS4 and TS5.

FIGURE: ANNUAL DIAGRAM OF THE USE OF THE SYSTEM



SOURCE: ENERGY AGENCY

121 At the time of preparing this report, the Energy Agency has postponed the implementation of the reformed network charging to 1 October 2024.

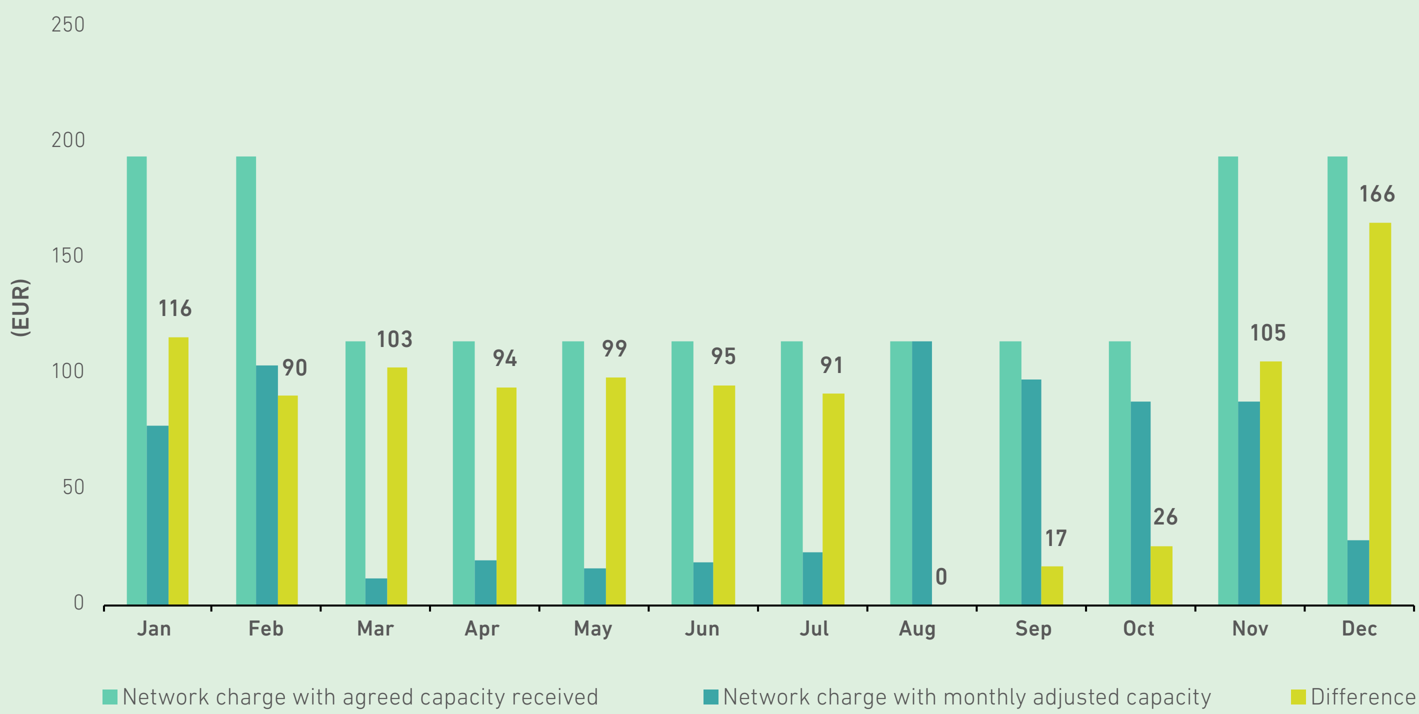
FIGURE: DEFAULT AGREED CAPACITIES BY TIME SLOTS

TS1	TS2	TS3	TS4	TS5
22.0	105.1	105.1	105.1	105.1

SOURCE: ENERGY AGENCY

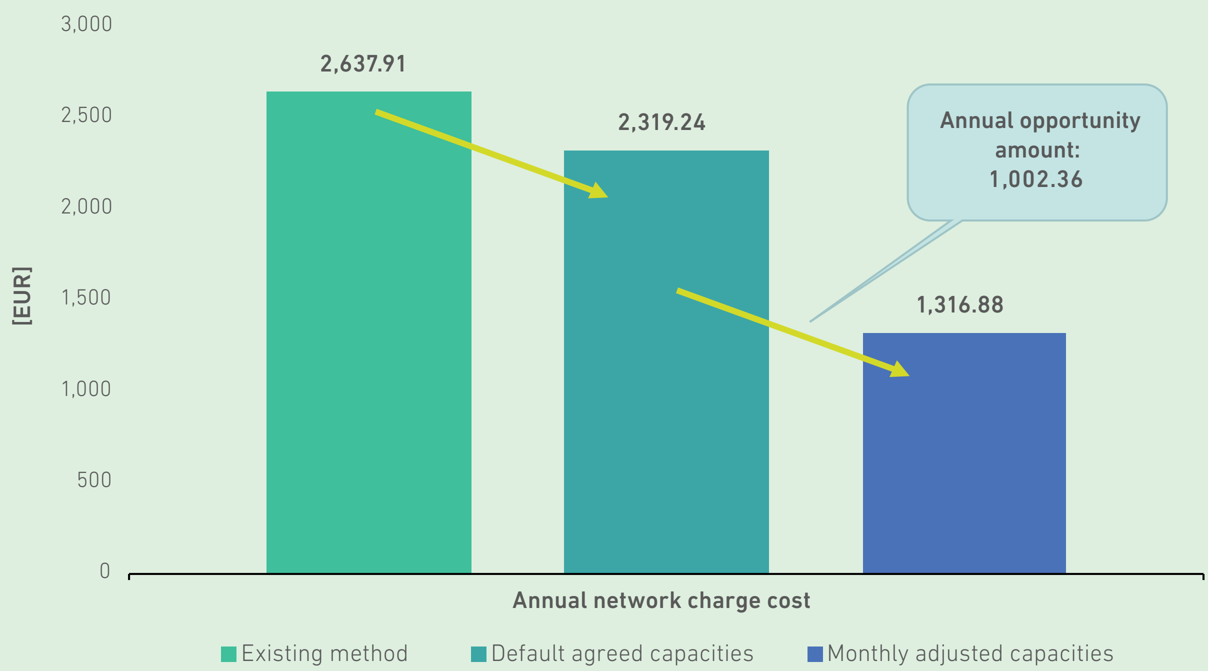
In the case of the monthly adjustment of the agreed billed capacity (taking into account the maximum achieved peak in individual time slots), the customer will achieve a significant reduction in the costs of the network charge, namely by 1,000 EUR (VAT excluded).

FIGURE: MONTHLY NETWORK CHARGES FOR AGREED CAPACITY



SOURCE: ENERGY AGENCY

FIGURE: ANNUAL IMPACT OF THE MONTHLY ADJUSTMENT OF AGREED CAPACITY



SOURCE: ENERGY AGENCY

The reduction in network charges due to the changed calculation methodology justifies the investment in automated load management via the energy management service (EMS) system, which ensures that the monthly adjusted billed capacity, and thus the billing of excess billed capacity, is not exceeded.

In addition to reducing their costs, the above consumers provide for the more efficient use of the network by managing peak energy consumption during the periods with the highest loads. However, in order to do so, they need the right solutions or services. For this case study, we conducted a brief survey with which we explored the availability of this kind of service on the market. The survey revealed that in terms of promoting the development of new energy services, the changed methodology is already effective. In fact, as part of their business models, providers of various energy services are already seizing the advantages of the changed methodology of network charging. With their services, companies enable users to make a contribution towards achieving the green transition objectives through user-friendly innovative solutions that take advantage of the use of solar energy, battery systems, and electric vehicles, and that the integrated interoperable systems work in harmony and maximise benefits for the users (comfort, costs) and for the electricity system (costs). Below you can read about some of the typical business models and related solutions that characterise the most dominant providers of the said solutions.

For several years, a provider has been successfully performing on the market as a supplier and aggregator, whose product portfolio includes electricity supply at a dynamic tariff through its own platform, as well as the adjustment of consumption to price dynamics. In periods with low electricity prices, the network user's consumption usually increases due to the charging of batteries and the use of other devices. In periods with higher electricity prices, on the other hand, devices are powered via the storage unit. In exchange for the activation of storage units during the periods of excess electricity in the system through the provider's energy exchange platform, the provider concerned offers its customers a discount on the regular electricity price agreed in the supply contract. The platform used also allows energy exchange between users, which allows users to connect into virtual groups, where those users with their own production can share excess electricity with other users. On account of these measures, the user will be able to adjust the consumption of electricity from the electricity system and thus reduce the cost of electricity supply, as well as the network charge. The mentioned provider also emphasises the importance of user participation in generating benefits for users and for the network with the aim of facilitating the green transition, which can be achieved thanks to storage units in larger apartment blocks, where residents can set up shared storage units and share their benefits rather than install individual storage units for each apartment.

The opportunities brought by dynamic electricity and network charge billing have also been identified by one of the renowned heat pump manufacturers, which emphasises the importance of comprehensive energy supply solutions for buildings, which would entail any complementary combination of solar power plants, heat pumps, electric vehicles, other electrical devices and energy management systems. Such a system can be used to regulate consumption by balancing devices so that the peak is at its minimum. In addition, energy consumption can also be adjusted in accordance with the price-changing dynamics on the electricity market and the different time slots of network tariffs. The company also offers its customers a calculation of the costs of energy supply including an analysis of a series of characteristic examples based on 15-minute consumption data to identify the benefits of flexible electricity supply and ways to reduce the costs of electricity supply, as well as network charges. In addition, the company highlights the importance of storage units in promoting the maximum self-sufficiency of network users.

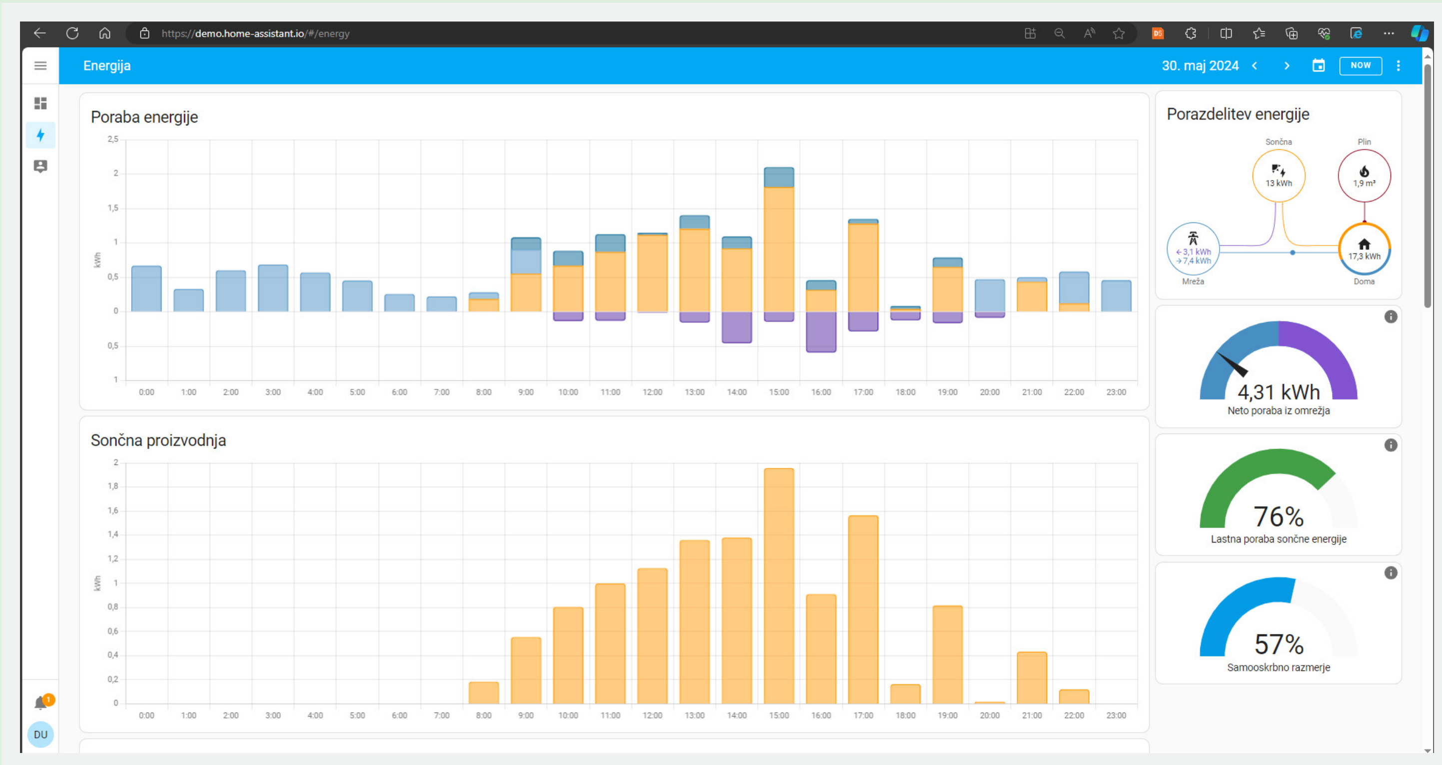
With its innovative solutions based on their proprietary hardware and software, this development-oriented company offers solutions for monitoring and managing connected devices in real-time. Their advanced energy management system (EMS) also enables the monitoring, management, forecasting and automatic adjustment of consumption to limit peak energy consumption, solar power generation, and optimisation of the cost of electricity supply in combination with storage units. With the help of advanced algorithms and the establishment of target scenarios and by accounting for the state of prices or tariffs according to the model of dynamic billing, the system maximises user benefits or minimises their costs. The EMS system may include a variety of different devices (charging stations for electric vehicles, heat pumps, washing machines, etc., solar panels and battery storage units). Thanks to special converters, the EMS system may also include devices using older communication methods.

In the sense of providing comprehensive solutions, one of the car importers that is also a system provider of e-mobility services took a step further with its product portfolio in cooperation with other companies. Their offer includes a system of integrated energy management that constantly monitors the electricity demand and the state of the electricity network in the building, thus optimising the consumption of electricity. With the right energy management devices and a cloud service, the consumer continuously measures and limits the power of the energy taken from the network. The device monitors 15-minute intervals of electricity or power consumption and ensures that the capacity remains below the limit specified by the user for each time slot. It can limit the power to controlled devices, such as electric car charging stations and heat pumps, provided that they allow for it, but not to non-controlled devices: If they exceed the agreed power over 15-minute intervals, the system warns the consumer about possible consumption excess and the consumer must switch off the device manually.

Advanced smaller active consumers or DIY[122] enthusiasts can employ a relatively simple and convenient approach to set up their own system for the automatic control of energy systems or devices, provided that the connectivity of their devices allows them to do so. The simplest solution is to use the Open Source Home Assistant system[123] with the integration of IoT devices, such as real-time electrical quantities meters, sensors and actuators (smart switches, etc.) to turn off loads. Active customers can also access real-time measurement data via the smart meter user interface using the relevant OSM devices[124]. A more advanced integration includes load management via the SG Ready interface, which is enabled by smart devices such as heat pumps. The screenshot below shows a simple web-based Home Assistant control panel used for monitoring the consumption and production of electricity and electricity flows between the network, the devices and energy modules in the house.

122 »do it yourself«
123 https://www.home-assistant.io/
124 »Other Service Module«

FIGURE: CONTROL PANEL OF THE HOME ASSISTANT OPEN-SOURCE SYSTEM



SOURCE: HOME ASSISTANT

Home Assistant is home automation software that is usually installed on a local microserver (Raspberry Pi, ODROID, etc.) and connected to smart devices via ZigBee or WiFi connections. This makes it independent of cloud services, which is a big advantage in terms of privacy. It enables more than 2,700 smart device integrations and provides for powerful automation by easily defining triggers, conditions and actions.

Only a few solutions offered by the most prominent Slovenian providers are presented together with the DIY solution that can be achieved by advanced active consumers. The latter requires a one-time investment of a few 100 Euros, while the other services are of course slightly more expensive, but also include monitoring the operation of devices or user support. Regardless of the chosen option, the investment in the automatic management of devices or energy modules via an EMS system is recouped in less than five years even in the case of the smallest consumer from the above profiles[125].

Using such solutions, network users can not only reduce their individual environmental footprint, but can also generate savings in network charges and electricity supply, as well as actively participate in society's transition to a greener, sustainable and energy-efficient future.

As we may observe, one of the objectives of the network charge calculation methodology, i.e. the promotion of the development of new innovative services and solutions on the market, has already been achieved.

125 The investment in energy modules is not included; it is also assumed that connected devices are already present in the house.

Electromobility

The Energy Agency monitors the development of electromobility from the point of view of the development of the electricity market. As e-mobility booms, electric vehicles can be expected to join the flexibility market with so-called smart charging, where charging parameters can be adjusted according to the needs of the vehicle's user, as well as those of the electricity system.

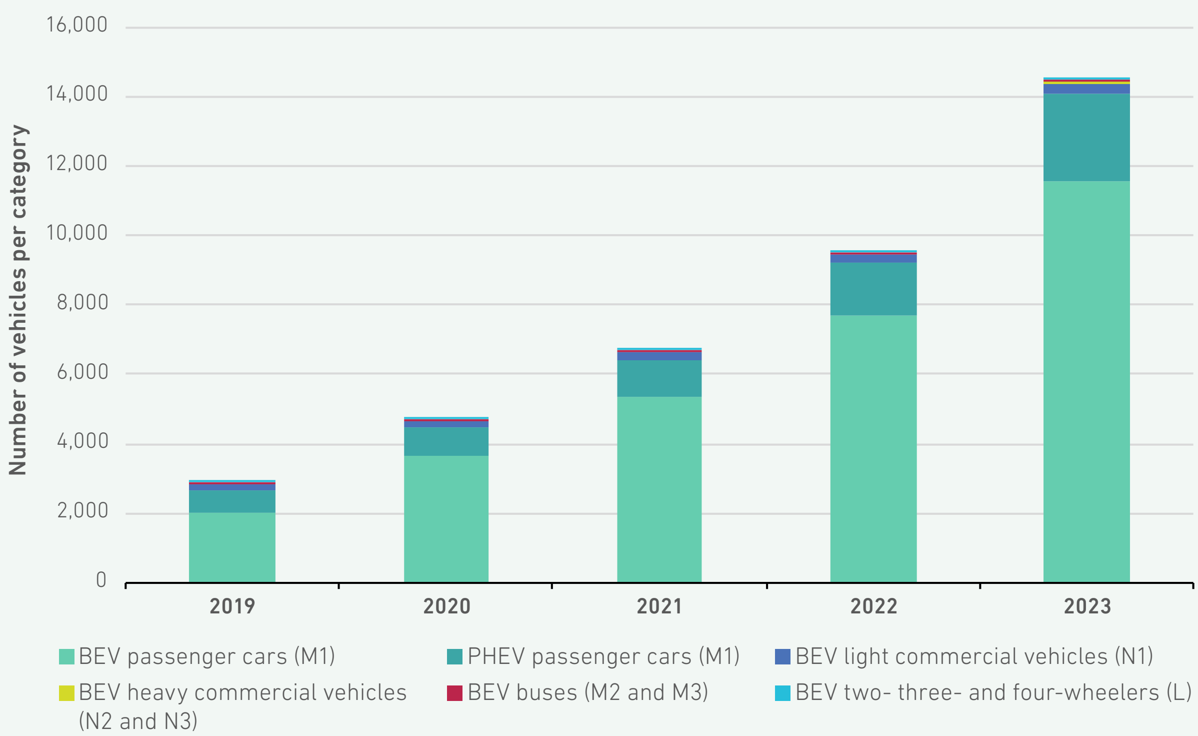
52.2% increase in the total number of electric vehicles

In Slovenia, the total number of electric vehicles in 2023 was 14,463[126]. Like the year before, the biggest contributor was battery electric vehicles (BEV). In the category of passenger vehicles (M1) their number increased by 3859, which represents a 50.3% increase in comparison to the year before. The number of plug-in hybrids (PHEV) in the same category increased by 977 vehicles or 63.2% compared to the previous year. The number of light commercial BEV (category N1) grew by 101, which means a 42.1% increase compared to the previous year. The number of light BEVs, which include two-, three- and four-wheel vehicles (category L), remains the same as the year before at 34 vehicles. The number of BEV buses (categories M2 and M3) grew by 26, which means a 160.0% increase compared to the previous year. 2023 saw the first registrations of six heavy commercial BEVs (categories N2 and N3).

The data shows a steady growth in the number of electric vehicles and a slightly larger increase in the introduction of electric vehicles in the Slovenian vehicle fleet compared to the year before.

Taking into account the figure of 1,223,820[127] of all M1 and N1 vehicles in Slovenia, the overall share of electric vehicles in these two categories in Slovenia is 1.18%. At the EU level, the comparable figure is 2.79%, while the comparable figure for Sweden, which had the highest share of electric vehicles among the EU countries in 2023, is 12.97%.

FIGURE 137: NUMBER OF REGISTERED ELECTRIC VEHICLES IN SLOVENIA



SOURCE: EAFO[128]

126 Data for 19 April (source: European Alternative Fuels Observatory - EAFO)
127 Data for 19 April (source: EAFO)
128 European Alternative Fuels Observatory

The number of recharging points per number of electric vehicles in Slovenia complies with the EU regulative framework

According to the EAFO data, there were a total[129] of 1608 public[130] recharging points[131] in Slovenia in 2023. Taking into account the data on the number of electric vehicles in categories M1, N1 and L in Slovenia, we can conclude that Slovenia has a ratio of 8.97 electric vehicles per recharging point, which corresponds to the envisaged European framework[132]. The ratio for the whole EU was 13.7 electric vehicles per recharging point and in Sweden it was 18.1. Figure 138 shows a detailed structure of recharging points in Slovenia by maximum charging power (P), with 16.3% of recharging points providing DC fast recharging and the remaining 83.7% providing AC recharging[133]. In the EU, 12.9% of the recharging points are DC charging points and 87.1% are AC charging points, while in Sweden 12.8% of recharging points are DC charging points and 87.2% are AC charging points. Figure 139 shows a slightly different structure of charging points in Slovenia, the EU and Sweden. The biggest difference is the considerably different share of slow recharging points (up to 7.4 kW) and normal recharging points[134] (up to and including 22 kW). The structurally slightly different but in general comparable share of high-power recharging points[135] provides for a comparable transfer capacity.

129 Data for 19 April (source: EAFO)

130 The data shows that 84.9% of the recharging points are accessible without restrictions (unlimited accessibility 24/7 for all users) and the remaining 15.1% have some access restrictions, where specific albeit non-discriminatory access restrictions apply (such as limited time of use – e.g. recharging points in the car parks of large shops, hotel and catering establishments, etc.).

131 Due to the change in the methodology for counting the number of recharging points for electric vehicles, it is not possible to give a uniform overview of the evolution of the number of recharging points over the years. Also, the Energy Agency's analytical work in monitoring the development of electromobility in Slovenia in general is hindered by the volatility of the data in the reference databases where it is possible to detect changes of data even for the past.

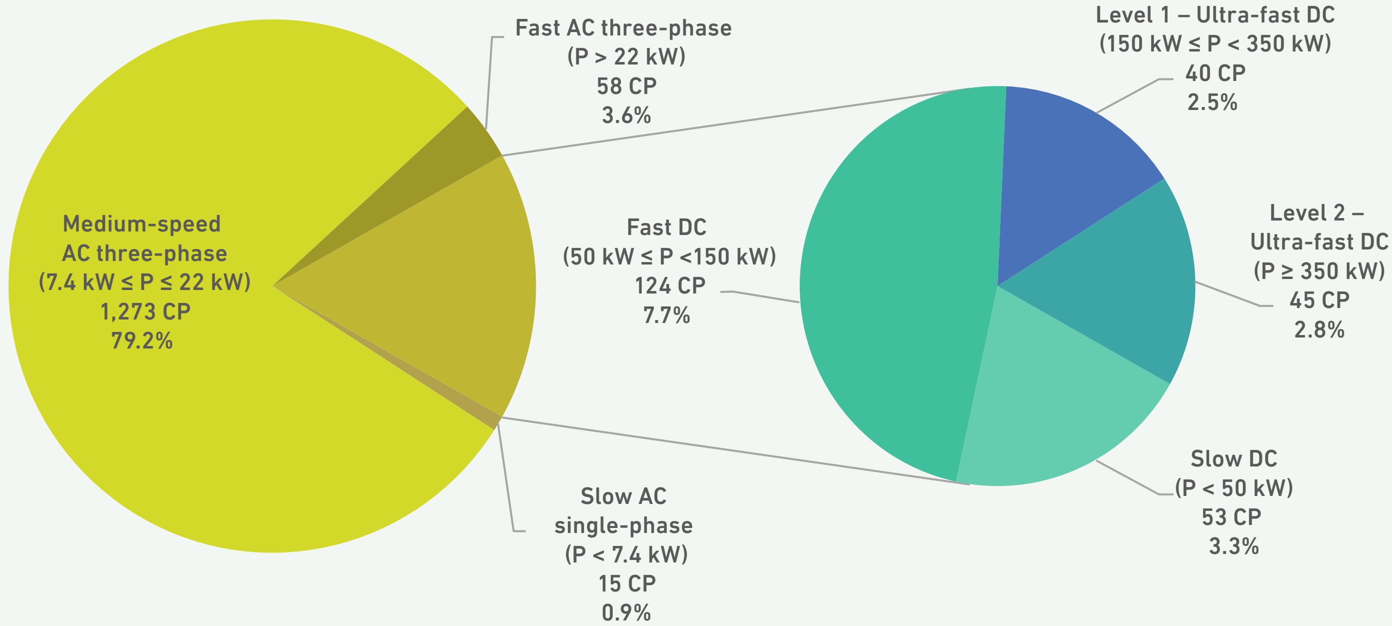
132 As an indication, the appropriate average number of recharging points should be equivalent to at least one recharging point per 10 cars, also taking into consideration the type of cars, charging technology and available private recharging points (repealed Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure). In 2023, Regulation (EU) 2023/1804 of the European Parliament and of the Council of 13 September 2023 on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU, was published requiring a different assessment of the suitability of the recharging infrastructure for electric vehicles. The Regulation, which applies from 13 April 2024, requires a cumulative approach to meeting the power output targets for publicly accessible recharging stations for light-duty electric vehicles proportionally with the implementation of light-duty electric vehicles (categories M1 and N1) into the vehicle fleets of Member States. In terms of adequate coverage of the TEN-T transport network in the territory of a Member State, the Regulation requires a minimum coverage of the transport network with publicly accessible recharging pools in relation to the distance between them and the minimum charging power with different requirements for recharging infrastructure for light-duty (categories M1 and N1) and heavy-duty (categories M2, M3, N2 and N3) electric vehicles.

133 For example, charging with a power of 22 kW can charge an electric vehicle with an average consumption of 14.5 kWh in about 40 minutes at the maximum charging power for a range of 100 km. With higher charging power, the charging time is correspondingly shorter.

134 »Normal recharging point« means a recharging point that allows for the transfer of electricity to an electric vehicle with a power of less than 22 kW or equal to 22 kW, excluding devices with a power of less than 3.7 kW or equal to 3.7 kW that are installed in private households or whose primary purpose is not the charging of electric vehicles and that are not accessible to the public (Act on Infrastructure for Alternative Fuels and Promoting the Transition to Alternative Fuels in Transport (ZIAG), Official Gazette of the Republic of Slovenia, no. 62/23).

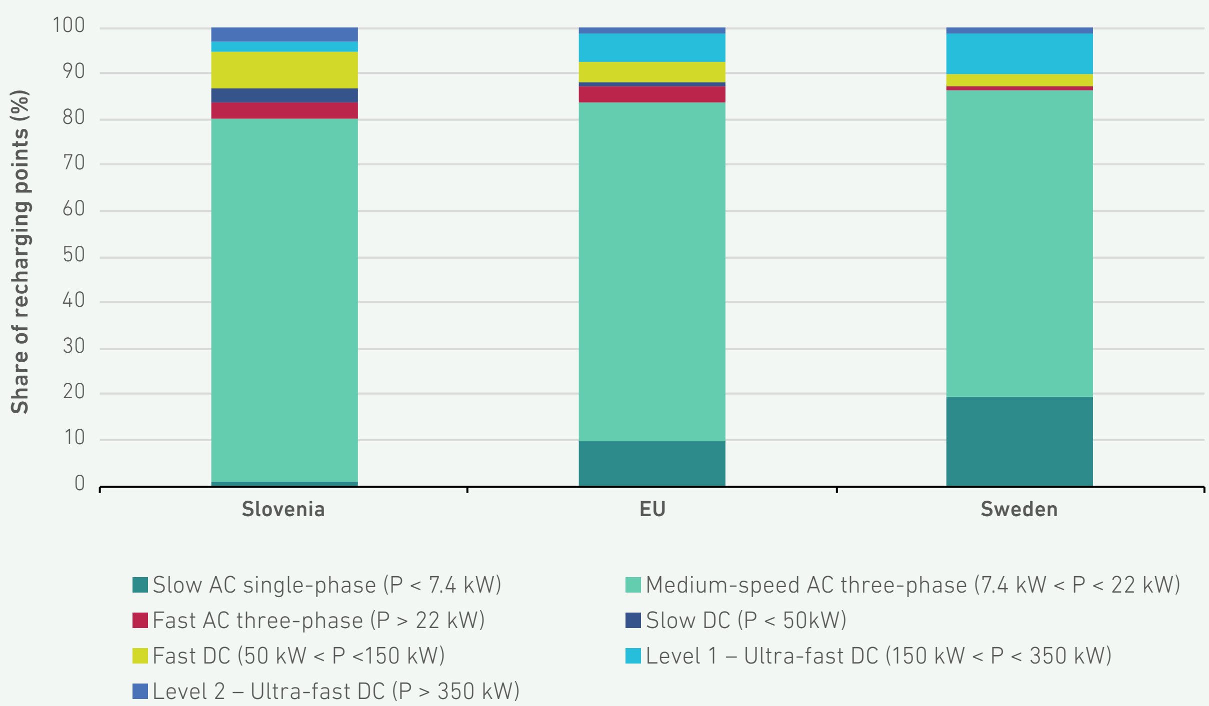
135 »High-power recharging point« means a recharging point that allows for a transfer of electricity to an electric vehicle with a power output of more than 22 kW (ZIAG).

FIGURE 138: STRUCTURE[136] OF THE NUMBER OF RECHARGING POINTS FOR ELECTRIC VEHICLES IN SLOVENIA BY MAXIMUM CHARGING POWER (P)



SOURCE: EAFO

FIGURE 139: STRUCTURE OF THE NUMBER OF RECHARGING POINTS FOR ELECTRIC VEHICLES IN VARIOUS COUNTRIES BY MAXIMUM CHARGING POWER (P)



SOURCE: EAFO

136 The difference between the total and the sums of individual shares is due to rounding.

A comparison of the above data with the data from the sector strategy and related documents[137] shows a slower uptake of electromobility than anticipated in the sectoral strategy, both in the field of electric vehicles and charging infrastructure, which is supposed to keep pace with the development of the use of electric vehicles.

New sectoral legislation for alternative fuel infrastructure

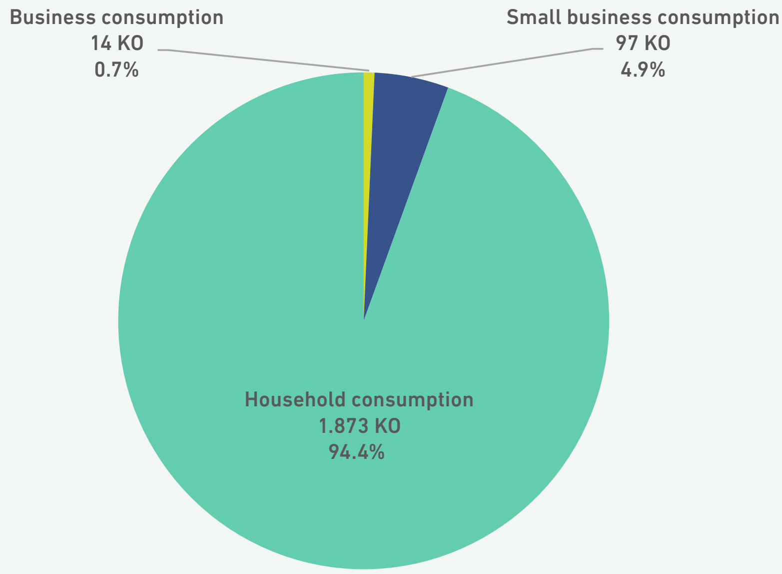
In 2023, the Act on Infrastructure for Alternative Fuels and Promoting the Transition to Alternative Fuels in Transport (ZIAG) entered into force, which provides the legislative framework for the establishment, development, expansion and safe usage of an interoperable and user-friendly charging and supply infrastructure for alternative fuels in road, air and marine traffic. In addition, in 2023 Regulation (EU) 2023/1804 of the European Parliament and of the Council of 13 September 2023 on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU, which obliges Member States to meet targets in the area of establishing recharging infrastructure and alternative fuels infrastructure. The purpose of the latter is to provide an adequate smart, interoperable and user-friendly network of publicly accessible recharging and supply infrastructure in the Member States to support the use of alternative fuel vehicles in all modes of transport. The new Regulation requires a cumulative approach to meeting power output targets for publicly accessible recharging stations for light-duty electric vehicles proportionally with the implementation of light-duty electric vehicles. In terms of adequate coverage of the TEN-T transport network in the territory of a Member State, the Regulation requires a minimum coverage of the transport network with publicly accessible recharging pools in relation to the distance between them and the minimum charging power.

In 2023, five suppliers were active in the field of the supply of electricity specifically for electromobility – either operating their own charging infrastructure, supplying electricity to the charging infrastructure operators, or having an energy supply contract with consumers that requires the ownership or use of an electric vehicle. Supplier data shows that approximately 2.78 GWh of electricity was supplied to cover electromobility needs, which is 1.64 GWh, or 37.1% less compared to the year before. The suppliers delivered 0.29 GWh, or 10.4%, of electricity to the final consumers, with an electricity supply contract adapted to the use of electric vehicles, with the rest used to cover their own charging infrastructure management overheads.

A 37.1% reduction in electricity supply related to electromobility retail products

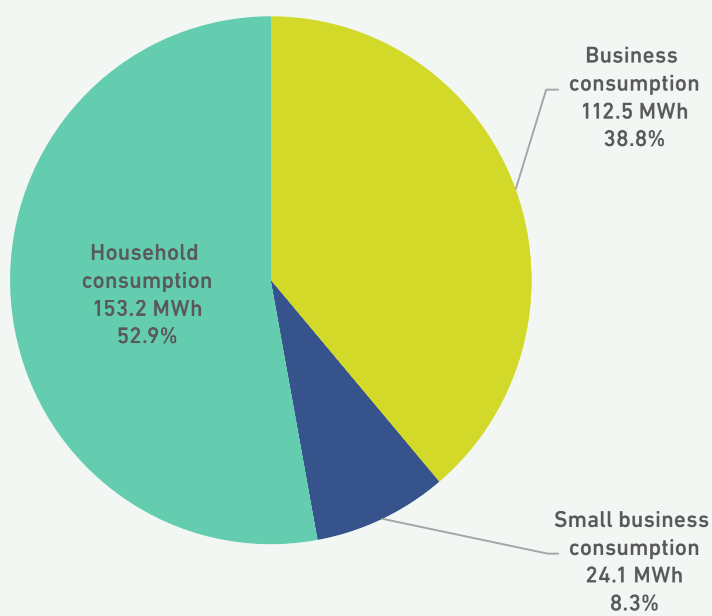
137 Market Development Strategy for the Establishment of Adequate Alternative Fuel Infrastructure in the Transport Sector in the Republic of Slovenia of (12 October 2017), Action plan for alternative fuels in transport (23 December 2021), Report on the implementation of the Action plan for alternative fuels in transport in 2022 (27 July 2023).

FIGURE 140: THE NUMBER OF FINAL CONSUMERS (FC) WITH AN ELECTRICITY SUPPLY CONTRACT ADAPTED TO THE USE OF ELECTROMOBILITY



SOURCE: SUPPLIERS

FIGURE 141: THE STRUCTURE OF THE ELECTRICITY SUPPLY FOR THE NEEDS OF ELECTROMOBILITY BY TYPE OF FINAL CONSUMER



SOURCE: SUPPLIERS

Reliability of the electricity supply

The reliability of the electricity supply is determined by the probability that the system will be capable of supplying energy of sufficient quality to all the delivery points in sufficient quantities. The reliability of the supply is quantified using two basic parameters – sufficiency and security. Sufficiency is an indicator of the system's ability to meet the consumers' demand for electricity and power in all the anticipated operational conditions, i.e. taking into account planned and unplanned outages of the system's elements. Operational security is the system's ability to maintain a normal state or to return to a normal state as quickly as possible, that is, to withstand a set of disturbances under a specific operational condition (e.g. short circuits in the network, outages of the system's elements and unexpected changes in consumption in relation to generation constraints) so that the consumers do not feel the consequences of a disturbance, which is eliminated without jeopardising the system's integrity.

The required level of security of the electricity supply in a country is transparently represented by a reliability standard typically expressed using the Loss of Load Expectation (LOLE) indicator. The reliability standard is defined on the basis of a marginal reduction in the Expected Energy Not Served indicator in the results of the latest national, regional and European resource adequacy assessments, which include assessments of the LOLE and EENS indicators. The LOLE reliability standard is calculated by taking into account the Value of Lost Load, or VOLL, and the Cost of New Entry, or CONE, of the generation technologies that can take part in the reduction of the LOLE indicator. The TSO has already determined the value of the VOLL in 2018, and in 2022, in cooperation with external institutions, they calculated the cost of new entry for generation or the adjustment of consumption and the reliability standard. The calculation shows that the LOLE reliability standard for Slovenia is 0 hours/year, mainly due to the excellent interconnection of the Slovenian electricity system with those of the neighbouring countries. On the other hand, the European Resource Adequacy Assessment (ERRA[138]) produced by the ENTSO-E in 2023 shows an increased risk with regard to ensuring adequate electricity production, mainly due to the economic non-viability of electricity production from fossil fuels. In one scenario, the assessment of the reliability standard for Slovenia increases to 0.2 hours/year as early as 2028, while in the other scenario, it increases up to 1 hour/year in 2033.

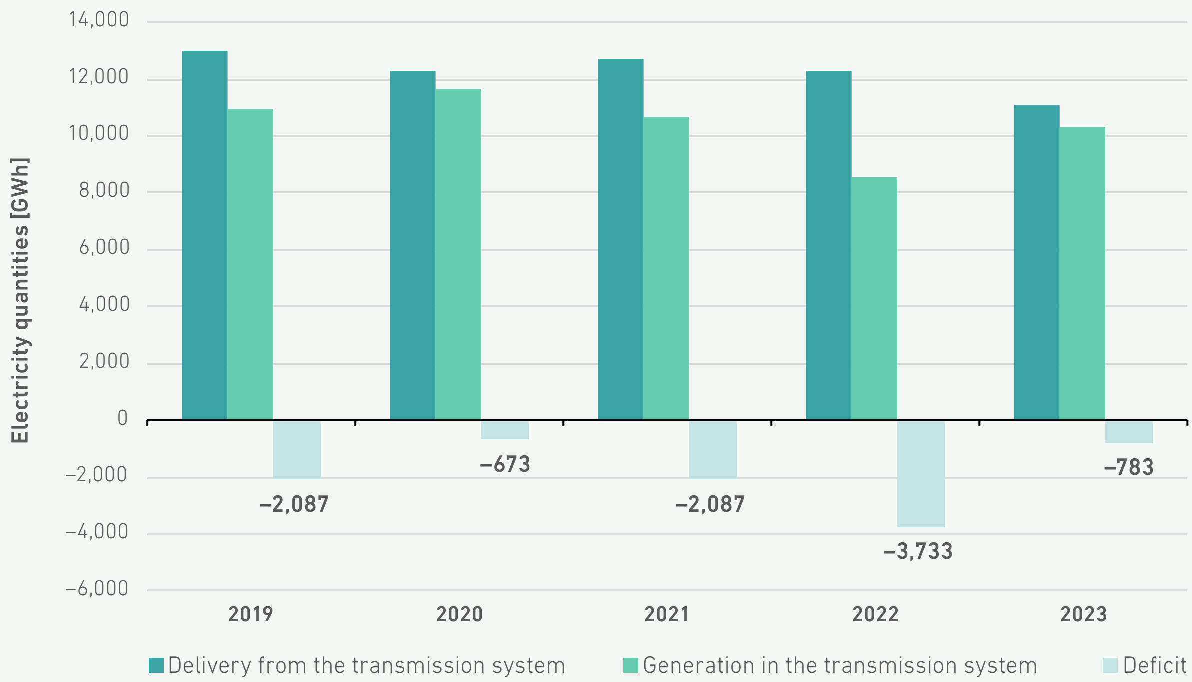
Monitoring the Balance Between Generation and Consumption

In 2022, the delivery of electricity from the transmission system decreased by 9.7% compared to the year before. Taking into account half of the capacity of the Krško NPP, electricity generation in the transmission system in 2023 was no less than 20.7% higher than the year before, which is, considering the roughly equal production in coal power plants and the Krško NPP, mainly due to a 57.8% increase of production in hydropower plants. In 2023, the consumption of electricity from the transmission system covered by domestic production reached one of its highest levels in the last ten years, at nearly 93%.

The high consumption of electricity from the transmission system covered by domestic resources is a consequence of extremely good production at the hydropower plants

138 https://www.entsoe.eu/outlooks/eraa/2023/

FIGURE 142: ELECTRICITY CONSUMPTION AND GENERATION IN THE SLOVENIAN TRANSMISSION SYSTEM WITHOUT TAKING INTO ACCOUNT LOSSES IN THE 2019–2023 PERIOD



SOURCE: ELES

Monitoring Investment in Production Capacities to Ensure a Reliable Supply

Besides taking into account the anticipated economic developments to estimate future electricity consumption in Slovenia, the requirements of the European Network of Transmission System Operators (ENTSO-E) from the ten-year EU development plan have been considered to the greatest extent possible, along with the scenarios from the NECP. Electricity demand at the transmission level is mainly covered by sources connected to the transmission system. So, in order to provide a forecast of the situation in the Slovenian electricity system that is as accurate as possible, those planned production sources whose construction is considered less likely should be excluded.

All scenarios up to 2032 show a shortfall in domestic generation to cover the consumption of electricity from the transmission system

In order to develop the forecast of the coverage of the consumption of electricity from the transmission system, the TSO obtained data from the producers on planned new production units and on shutdowns of existing production units and divided them into four scenarios according to the likelihood of their implementation. Scenario 1 is the most pessimistic, only taking into account the generation sources that are already under construction or that have obtained planning permission, scenario 2 considers investments in generation units that can be realistically expected while taking into account delays in the construction of new hydropower plants due to siting problems, and scenario 3 is very ambitious and in addition to the construction of hydropower plants on the Sava river, also envisages considerable investments in wind farms and solar power plants in the transmission system. Scenario 4 is as ambitious as scenario 3, except that it provides for certain hydropower plants and the second unit of the Krško NPP to be built beyond the ten-year development period. None of the scenarios foresee any HPP being constructed on the Mura River by 2032, and the construction of other hydropower facilities is also highly uncertain due to siting problems and opposition from environmentalists.

TABLE 34: CHANGES TO THE GENERATION FACILITIES IN THE TRANSMISSION SYSTEM BY 2032

	Installed capacity [MW]	Anticipated year of change	Scenario
Hydropower			
HPPs on the Drava			
Kozjak PSHPP	420	2031	4
HPPs on the Sava			
Mokrice	28	2025	1, 2, 3, 4
Suhadol	44	2030	3
Trbovlje	36	2032	3
Thermal power			
Šoštanj TPP			
Šoštanj TPP unit V	–305	2028	
Šoštanj TPP PT 51	–42	2028	
Šoštanj TPP PT 52	–42	2028	
Šoštanj TPP PPE1	151	2028	
Brestanica TPP			
PB 1	–23	2026	
PB 2	–23	2026	
PB 3	–23	2026	
TPP TOL			
Unit III, coal	–45	2032	

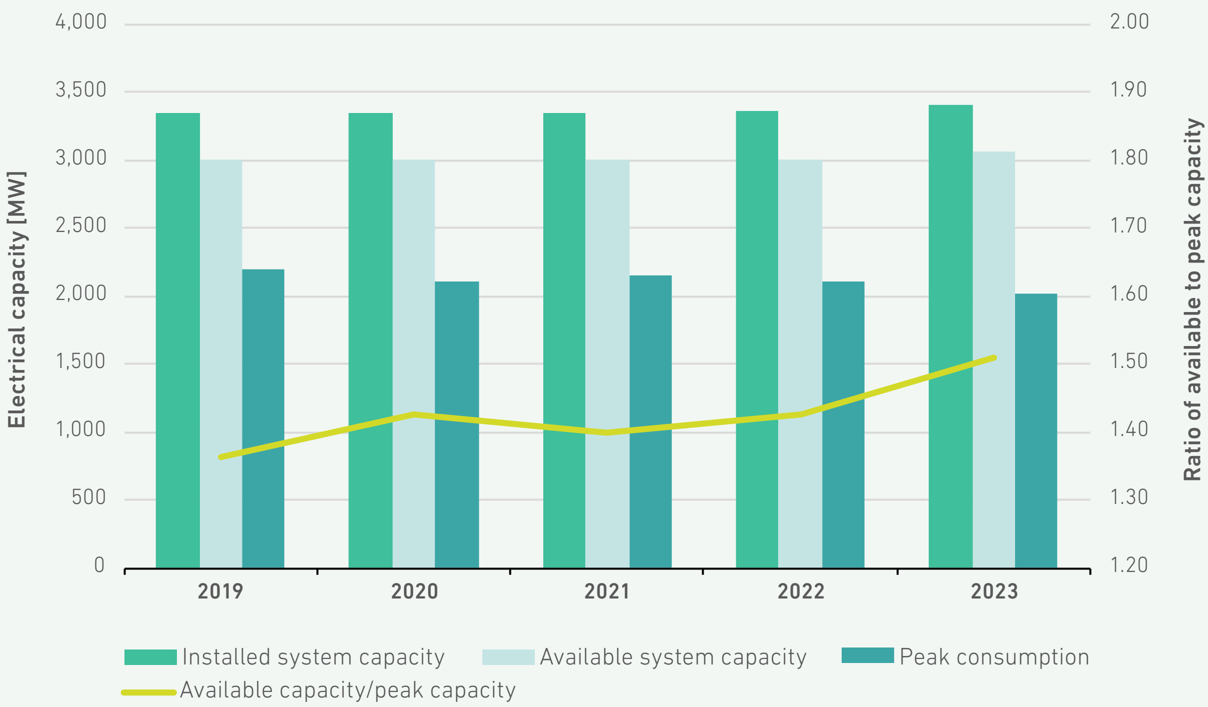
SOURCE: ELES

Measures to Cover Peak Demand and Shortages of Electricity

One of the indicators providing information on the sufficiency of production sources is the ratio between the installed or available capacity of production sources and peak load. The system must have enough power at its disposal to cover demand and reserve power during normal operation and in the event of unforeseen circumstances. The actual capacity available on the Slovenian market is equal to the total installed capacity of the production facilities minus half of the power from the Krško NPP that belongs to Croatia. In 2023, the ratio between the capacity available and the peak load in the transmission system improved slightly compared to the previous year, due to a slightly higher installed or available power of production units and lower demand at peak load. Although the actual availability of production units depends on weather conditions for RES, and market signals for thermal power plants, the supply of electricity to final customers in 2023 was not compromised, as the Slovenian electricity system is well connected to neighbouring countries through cross-border interconnections and there was sufficient electricity available on the market.

Imports through cross-border interconnections enable electricity deficits to be covered

FIGURE 143: INSTALLED CAPACITIES OF PRODUCTION FACILITIES, CAPACITIES AVAILABLE FOR THE SLOVENIAN MARKET AND PEAK DEMAND, AND THE RATIO BETWEEN THE AVAILABLE CAPACITY AND PEAK LOAD IN THE TRANSMISSION SYSTEM IN THE 2019–2023 PERIOD

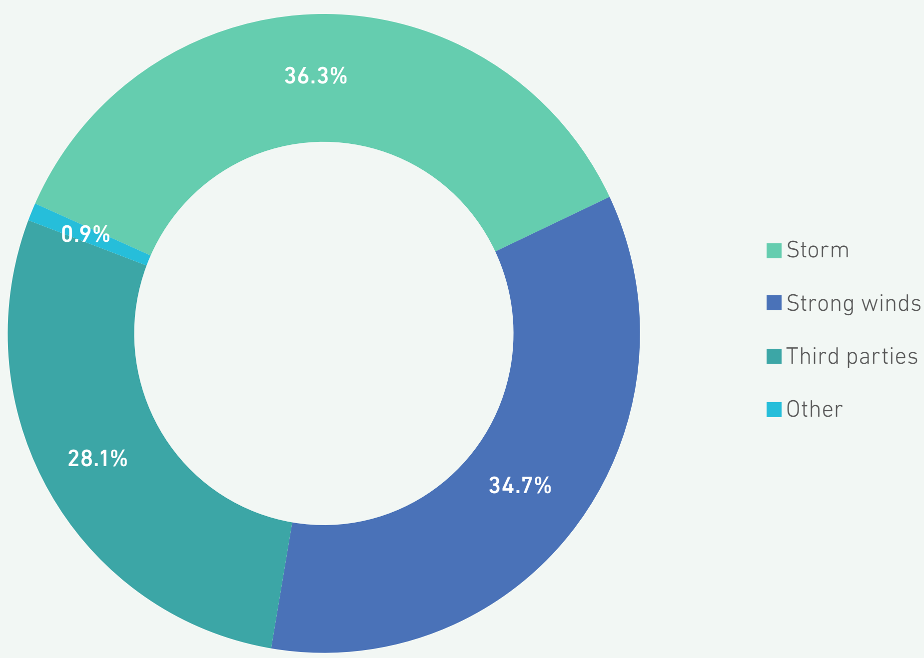


SOURCE: ELES

Extreme weather or damage to the grid can lead to supply interruptions. Energy not supplied (or Energy not Served) is energy that could potentially be delivered by the system had there not been an interruption of supply. Interestingly, the volume of electricity not supplied has been growing steeply in the last three years, rising from 10.3 MWh in 2021 to 79.6 MWh in 2022, and 220.8 MWh in 2023. The largest share of electricity that has not been supplied is due to weather, namely heavy storms (80.2 MWh) and wind (76.8 MWh), followed by supply interruption due to external events (61.9 MWh), while the remaining share of non-supplied electricity is a consequence of a number of smaller-scale interruptions due to erroneous manipulations of switches, lightning strikes, additional load due to snow, trees touching due to a landslide and unknown causes.

Electricity that is not supplied is calculated in accordance with the Act on the rules for monitoring the quality of the electricity supply. Therefore, the actual volume of not supplied electricity may be lower than indicated since a significant share of consumers in the affected areas could be oversupplied by the medium-voltage network.

FIGURE 144: ELECTRICITY NOT SUPPLIED FROM THE TRANSMISSION SYSTEM IN 2023 ACCORDING TO CAUSE



SOURCE: ELES

NATURAL GAS

The cleanest fossil fuel

€10.8 MILLION
OF INVESTMENTS IN THE DISTRIBUTION SYSTEMS

12 DSOs
PERFORMED THE SERVICE OF GENERAL ECONOMIC INTEREST IN 87 LOCAL COMMUNITIES

2.3% LOWER
NATURAL GAS CONSUMPTION THAN IN 2022

1,346 FEWER NATURAL GAS CONSUMERS
ON DISTRIBUTION SYSTEMS PERFORMING THE SERVICE OF GENERAL ECONOMIC INTEREST

20% LESS
VOLUMES TRANSPORTED THROUGH THE TRANSMISSION SYSTEM AND
55% less
VOLUMES OF NATURAL GAS TRANSPORTED TO OTHER TRANSMISSION SYSTEMS

ALMOST **20%** FEWER NEW CONNECTIONS
TO THE DISTRIBUTION SYSTEMS THAN IN 2022

SIGNIFICANT DECLINE IN GAS TRANSMISSION THROUGH CERŠAK AND SIGNIFICANTLY INCREASE IN ENTRY VOLUMES IN ŠEMPETER

28.3% OF NATURAL GAS IMPORTED FROM ALGERIA

NEW DISTRIBUTION SYSTEM IN THE MUNICIPALITY VRANSKO

€21.3 MILLION
INVESTMENTS IN THE TRANSMISSION SYSTEM

AT THE **2-year level**
DISTRIBUTION NETWORK CHARGES FOR MOST CONSUMERS REMAINED AT THE LEVEL OF THE PREVIOUS TWO YEARS

0% OF NATURAL GAS IMPORTED DIRECTLY FROM RUSSIA

NO CHANGE IN THE NUMBER OF SUPPLIERS IN THE RETAIL MARKET

0.5%
ABOVE EU AVERAGE

FINAL PRICE OF NATURAL GAS FOR BUSINESS CONSUMERS

1.6%
BELOW EU AVERAGE

THE FINAL PRICE OF NATURAL GAS FOR HOUSEHOLD CONSUMERS

3
SUPPLIERS

OFFERED GAS TO HOUSEHOLD CONSUMERS AT A LOWER PRICE THAN THE CAPPED PRICE

HOUSEHOLD CONSUMERS HAVE HARDLY RESPONDED TO A LOWER PRICE THAN THE CAPPED PRICE

20%
HIGHER PRICE

FOR SMALLER HOUSEHOLD CONSUMERS

EARLY WARNING LEVEL STILL DECLARED

THE LOWEST NUMBER OF SUPPLIERS´ SWITCHING SINCE THE OPENING OF THE NATURAL GAS MARKET

VOLUNTARY GAS REDUCTION MEASURES CONTINUE IN 2023

9.3%
DECREASE

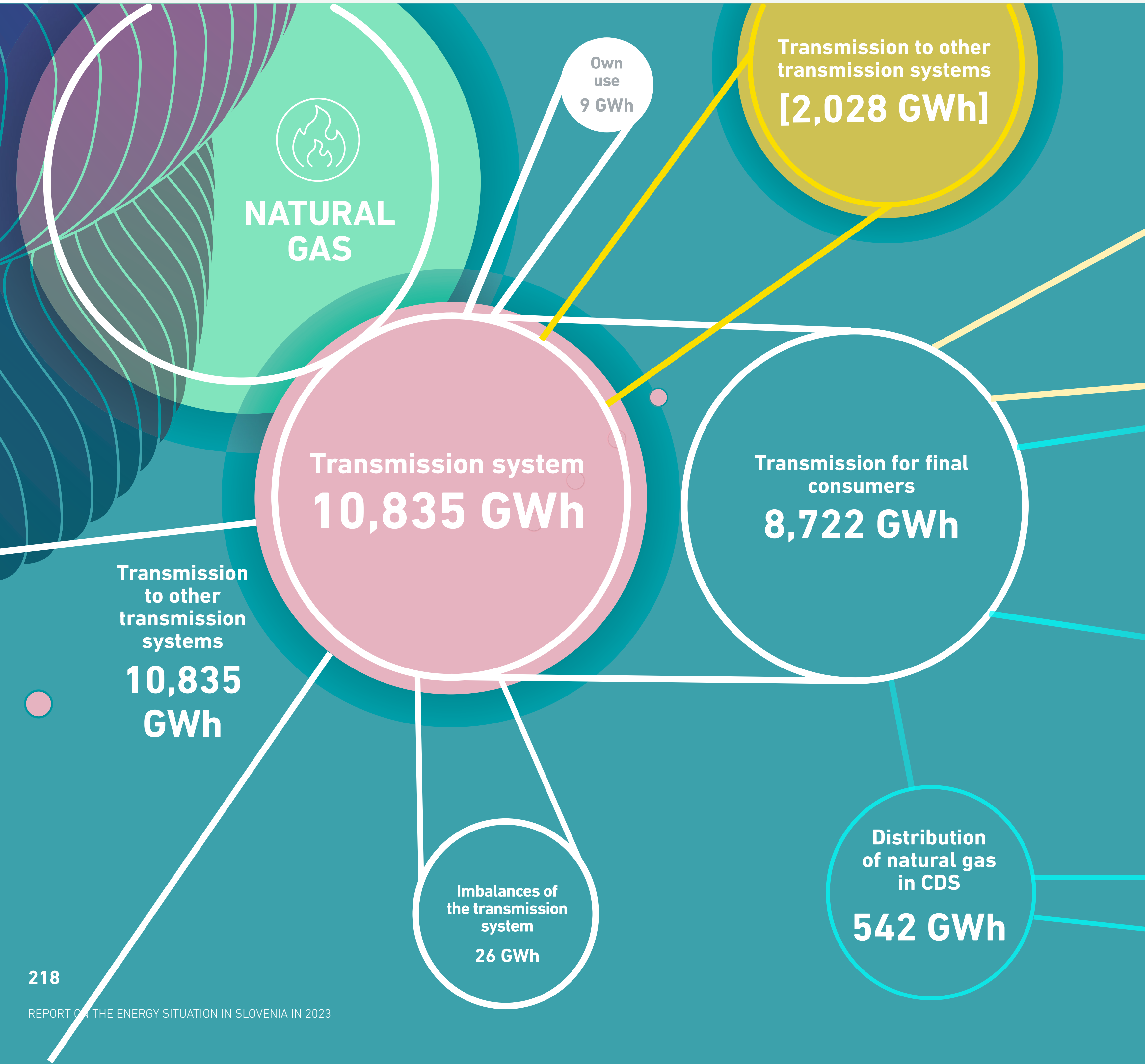
IN CONSUMPTION OF NATURAL GAS COMPARED TO THE AVERAGE CONSUMPTION IN THE REFERENCE PERIOD

AN INTERGOVERNMENTAL AGREEMENT CONCLUDED WITH CROATIA ON SOLIDARITY MEASURES TO ENSURE SECURITY OF SUPPLY

NATURAL GAS

The Supply of and Demand for Natural Gas

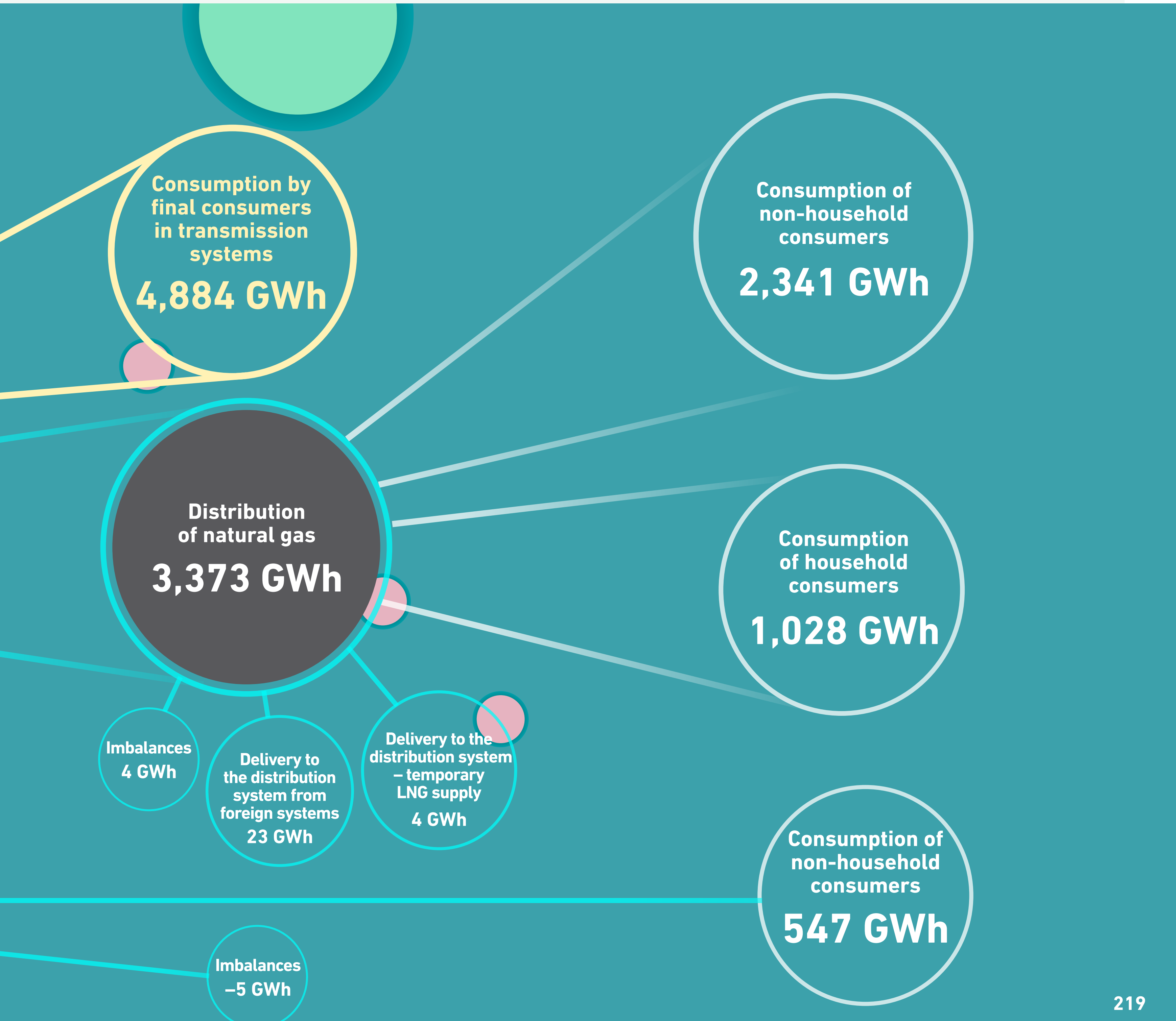
In 2023, 10,835 GWh of natural gas were transported through the natural gas transmission system, a decrease of almost 20% compared to the previous year. The decline in the total quantities transported is due to lower volumes transported to neighbouring transmission systems and lower



quantities transported to meet the needs of domestic consumers. 8,772 GWh, or 2.3% fewer than in the previous year, were transferred to supply domestic customers. In comparison, 2,028 GWh of natural gas were transferred to other transmission systems, almost 55% less than in the previous year and 11% more than in 2021, representing the lowest quantities in the period since 2005. The transmission quantities to other transmission systems have decreased by more than 75% compared to the previous decade's annual average. The difference between the quantities taken and the quantities handed over of 35 GWh are system differences and the transmission system's own use.

19.9% less natural gas transported due to less transmission to other transmission systems

FIGURE 145: BASIC DATA ON THE QUANTITIES OF NATURAL GAS TRANSFERRED, DISTRIBUTED AND CONSUMED



SOURCE: ENERGY AGENCY

The total consumption of domestic natural gas consumers amounted to 8,800 GWh, 212 GWh or 2.3% lower than the previous year. Gas consumption in 2023 was only 8% above 2014, representing the lowest annual gas consumption since 2000. Domestic consumers saw the most significant reduction in consumption, down 13.8%. Consumers in closed distribution systems (CDS) consumed 12.1% less, while consumers in the transmission system consumed 0.3% more. A smaller increase in consumption was also recorded for non-household consumers on distribution systems, who consumed half a percent more than in the previous year. Data on natural gas transmission and consumption by type of customer from 2019 to 2023 is shown in Table 35.

2.3% lower consumption of natural gas

TABLE 35: TOTAL TRANSFERRED QUANTITIES OF NATURAL GAS AND CONSUMPTION BY NATURAL GAS CONSUMERS ACCORDING TO THE TYPE OF CONSUMPTION DURING THE 2019–2023 PERIOD

Total consumption of natural gas	2019	2020	2021	2022	2023
Delivery to the transmission system [GWh]	15,985	16,783	12,015	13,527	10,835
Transmission to other transmission systems [GWh]	6,320	7,137	1,829	4,484	2,028
Consumption by business consumers in the transmission system [GWh]	5,478	5,382	5,527	4,868	4,884
Consumption by business consumers on CDSs [GWh]	619	581	650	622	547
Consumption by business consumers on the distribution systems [GWh]	2,421	2,446	2,673	2,329	2,341
Consumption by household consumers [GWh]	1,134	1,175	1,313	1,193	1,028

SOURCE: ENERGY AGENCY

The total number of active delivery points has fallen for the second year in a row. There were 1,347 fewer active delivery points on the distribution systems at the end of the year and four fewer delivery points in the transmission system. The total number of active delivery points fell by around one percent, compared to 1.2% a year earlier. The fall in the total number of active delivery points is probably due to several disconnections due to the above-average natural gas prices for most consumers, as well as the energy policy objectives of phasing out the use of fossil energy sources, which has encouraged individual consumers to seek alternative sources of supply.

At the end of 2023, 134,272 final consumers were connected to the natural gas transmission and distribution systems and the natural gas CCS. Twelve DSOs and five CDSs carried out natural gas distribution activities.

TABLE 36: NUMBER OF CONSUMERS ACCORDING TO CONSUMPTION TYPE IN 2022 AND 2023

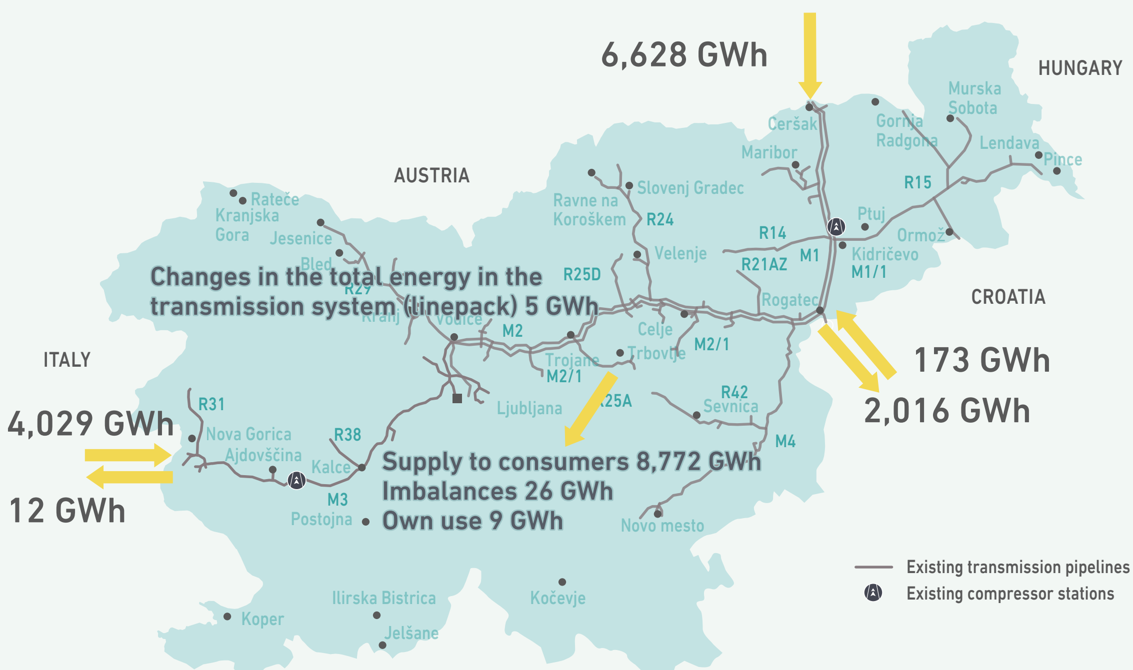
Number of consumers according to consumption type	2022	2023	Index
Business consumers connected to the transmission system	158	155	98.10
Business consumers connected to the distribution systems	14,369	14,296	99.49
Business consumers in CDSs	48	50	104.17
Household consumers	121,044	119,771	98.95
Total	**135,619**	**134,272**	99.01

SOURCE: ENERGY AGENCY

Transmission of Natural Gas

The transmission system is owned and operated by the transmission system operator, Plinovodi. It consists of 1197 kilometres of pipelines, including 989 kilometres of high-pressure pipelines with a nominal pressure above 16 bar and 208 kilometres with a nominal pressure below 16 bar. The transmission network also consists of 213 metering and regulating stations (MRP), 46 metering stations (MP), eight reduction stations and compressor stations in Kidričevo and Ajdovščina. There are no gas storage facilities in Slovenia. The transmission network is connected to the natural gas transmission networks of Austria (MRP Ceršak), Italy (MRP Šempeter pri Gorici) and Croatia (MRP Rogatec). At the border crossing points with Italy and Croatia, the two-way transmission of natural gas is possible, while at the border crossing point with Austria, gas only flows to Slovenia. The border points are also relevant points in the transmission system. The sixth relevant point is the exit point in the Republic of Slovenia. Trading in natural gas on the wholesale market takes place at a virtual point. No natural gas, biomethane or synthetic methane production sources were connected to the transmission system in 2023. No hydrogen has been added to the transmission system.

FIGURE 146: NATURAL GAS TRANSMISSION SYSTEM AND TRANSFERRED QUANTITIES OF GAS AT THE ENTRY AND EXIT POINTS IN 2023



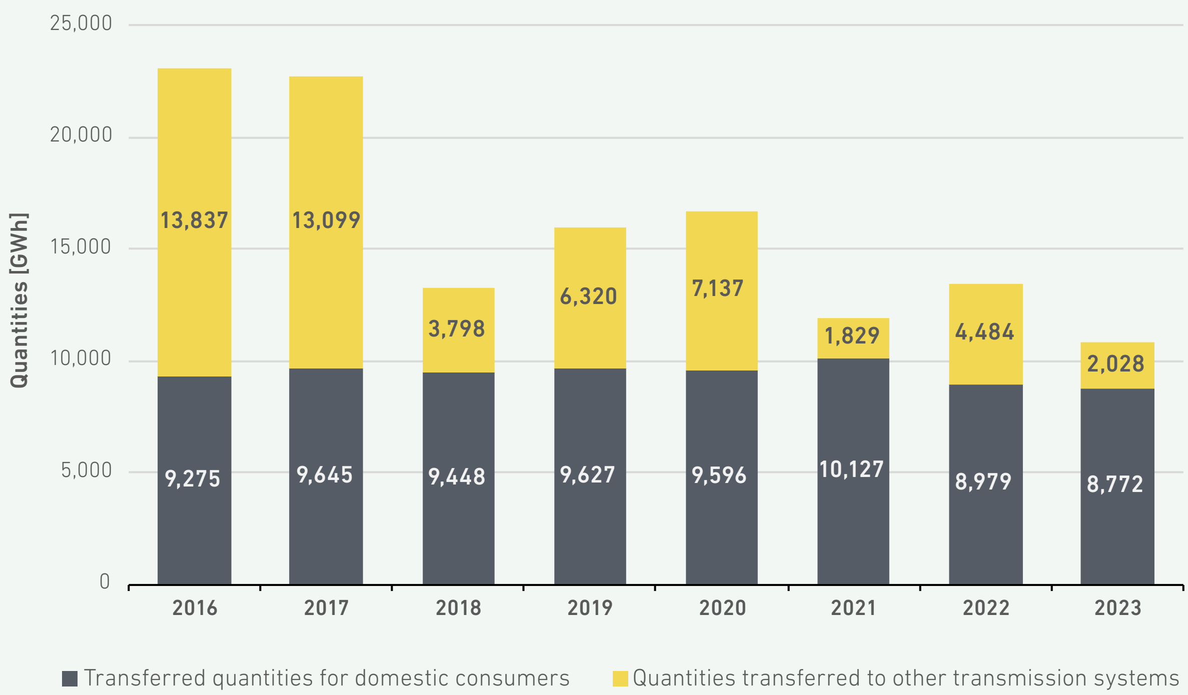
SOURCES: ENERGY AGENCY, PLINOVODI

The consumption of natural gas by Slovenian consumers in 2023 was 2.3% lower than in the previous year. After the quantities transported to other transmission systems increased 2.5 times in 2022, these quantities fell again in 2023 and amounted to only 45% compared to 2022. Therefore, the total quantities of gas transported through the transmission system in 2023 were at a record low. The main reason for this is the significant reduction in gas transmission to Croatia as, with the construction of the LNG terminal at Krk, Croatia no longer needs natural gas from the Austrian gas hub.

Total volumes of gas transported through the transmission system at record lows

Gas transmission to Croatia reduced by 53%

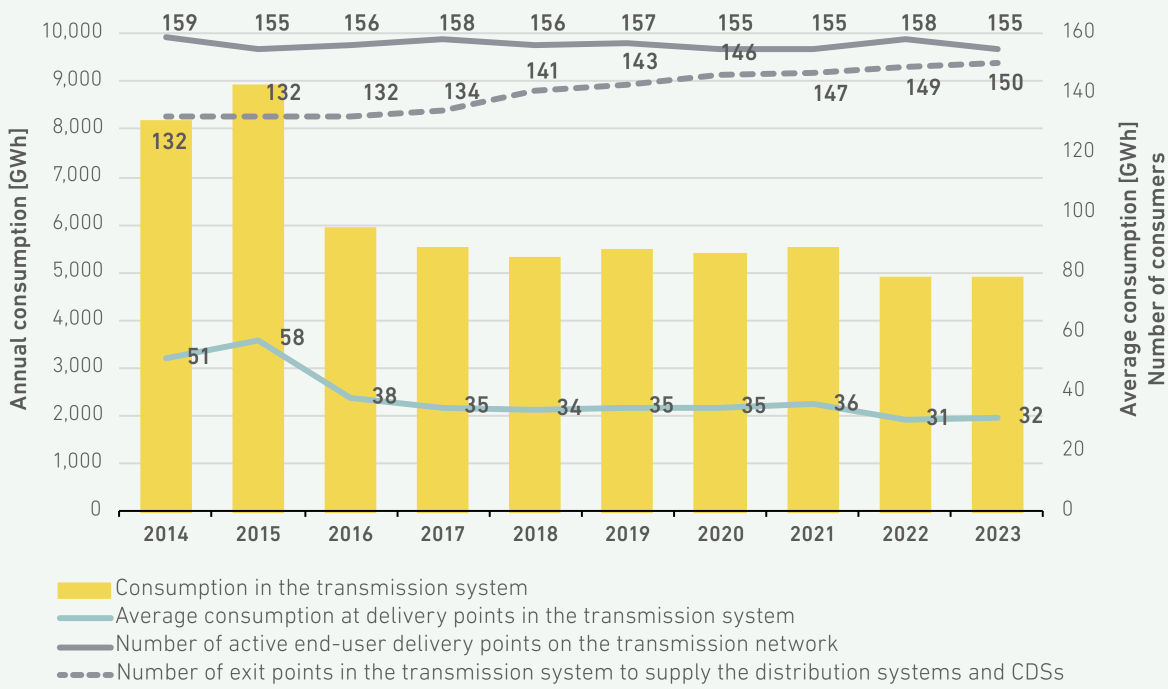
FIGURE 147: QUANTITIES OF NATURAL GAS TRANSFERRED IN THE 2016–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

The number of final consumers' delivery points decreased by three to 155.

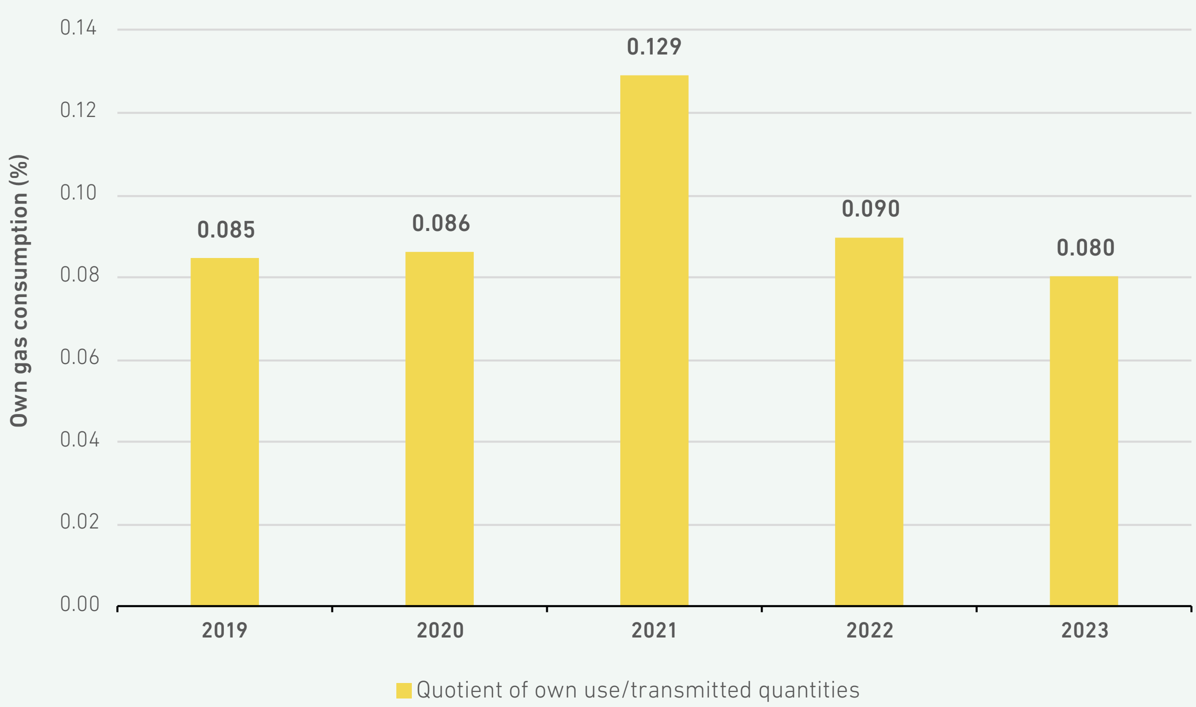
FIGURE 148: TOTAL AND AVERAGE CONSUMPTION PER CONSUMER'S DELIVERY POINT IN THE TRANSMISSION SYSTEM AND NUMBERS OF FINAL CONSUMERS', DISTRIBUTION SYSTEM OPERATORS' AND CLOSED DISTRIBUTION SYSTEM OPERATORS' DELIVERY POINTS IN THE NATURAL GAS TRANSMISSION SYSTEM IN THE 2014–2023 PERIOD



SOURCES: ENERGY AGENCY

Own gas consumption, which is required to drive compressors and heat gas in the metering-regulation stations, amounted to 8.7 GWh, 28.4% less than the previous year. The specific consumption of gas for own use, expressed as a quotient between the quantities of gas consumed for own use and the quantities of gas transferred at the border entry points, also decreased.

FIGURE 149: OWN GAS CONSUMPTION, CALCULATED BASED ON TRANSFERRED GAS QUANTITIES IN THE 2019–2023 PERIOD

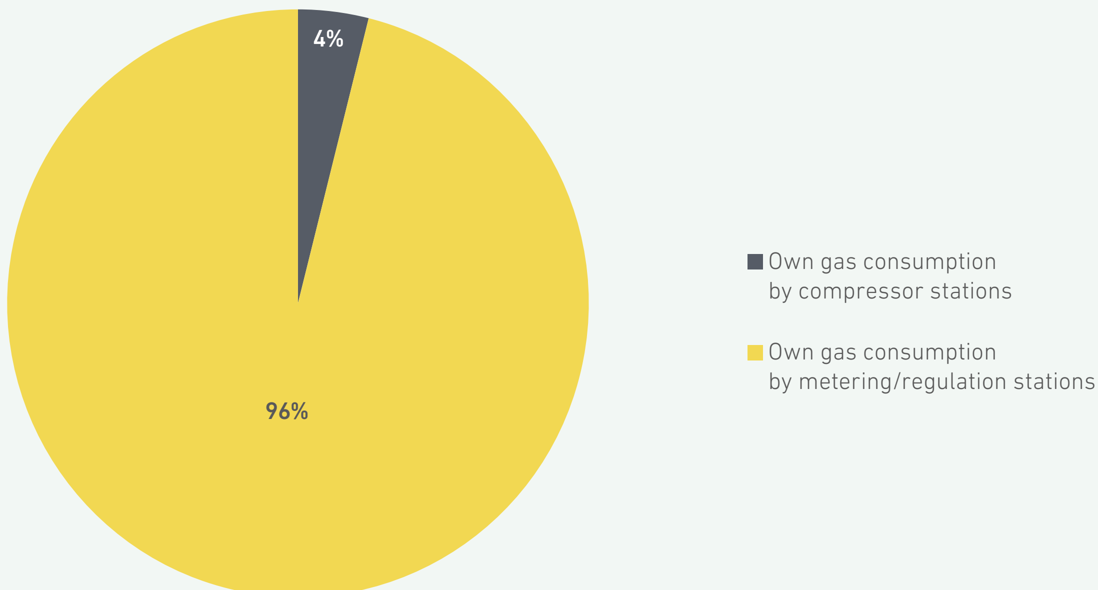


SOURCES: ENERGY AGENCY, PLINOVODI

Only 4% of the gas was used by the compressor stations; the rest was used in the metering and control stations. A year earlier, the compressor stations used 19% of the gas. The lower amounts of gas use in the compressor stations coincides with lower volumes transported through the transmission system and is also influenced by the direction and dynamics of gas transport.

Own gas consumption of compressor stations was 6.5 times lower than the previous year

FIGURE 150: THE RATIO BETWEEN THE OWN USE OF GAS IN THE COMPRESSOR STATIONS AND IN THE METERING AND REGULATION STATIONS IN 2023



SOURCES: ENERGY AGENCY, PLINOVODI

Distribution of Natural Gas

The distribution of natural gas is carried out as an optional local service of general economic interest of the distribution system operator to supply general consumption consumers in urban areas and settlements and as distribution to industrial and business consumers in the CDS areas.

Natural gas distribution as a local service of general economic interest is carried out by 12 distribution system operators in 87 municipalities, most recently in the Municipality of Vransko

The content and data below, if it is not explicitly stated that they refer to the CDS, describe the distribution areas with an organised optional local service of general economic interest. All distribution and closed distribution system operators have carried out distribution without interruption and have provided a safe and reliable supply to final consumers. In 2023, natural gas distribution as a local service of general economic interest was provided in 87 municipalities in most of the urban areas of Slovenia, except for Primorska. As of November, natural gas distribution was launched in the Municipality of Vransko. In 2023, natural gas distribution as a local service of general economic interest was provided by 13 DSOs until 31 May 2023 and by 12 DSOs after that. As of 31 May 2023, the distribution of natural gas ceased to be provided by Javno podjetje komunalno podjetje Vrhnika. The distribution of natural gas in the territory of the Municipality of Vrhnika was taken over by Adriaplin, which had previously carried out the same activity in 29 municipalities. In 72 municipalities, this activity is organised through a concession relationship between the concessionaire and the local community, and 14 public undertakings carry it out. In one municipality, a local service of general economic interest is carried out as an investment of public capital in the activity of private law entities. In Šenčur and Hrastnik, two distribution system operators performed the local service of general economic interest based on concession contracts concluded with the municipality. In some municipalities with an existing concession for natural gas distribution activities, the supply has not yet been made possible because the distribution network has not yet been built or put into operation or because the connection to the transmission system is not yet possible.

FIGURE 151: NATURAL GAS DISTRIBUTION SYSTEMS BY QUANTITIES DISTRIBUTED

SOURCES: ENERGY AGENCY, DSOS

Distribution system operators distributed 3,369 GWh of natural gas in 2023, down 4.3% from the previous year and 7.5% below the average for the five-year 2018–2022 period. The decrease in the distributed volumes was likely due to several factors, including the plans adopted at the EU level to extend the requirement for voluntary reductions in natural gas consumption by 15%, the still relatively high prices of natural gas supplies, the decline in the number of consumers, as well as the relatively warmer weather. According to the operators' data, consumption by household consumers fell by almost 14% in 2023, while non-household consumers consumed half a percent more than the year before. The number of household consumers fell by 1,273 (1%), while the number of non-household consumers also fell by 73 (0.5%). At the end of 2023, 119,771 households and 14,296 non-household consumers were registered. The most significant decrease in the number of customers is registered in customer groups C_{DK3} to C_{DK5}, which consume between 5,000 kWh and 50,000 kWh of natural gas per year. In many cases, these consumers are also the most flexible when switching

1,346 fewer consumers connected to the distribution systems

Consumers connected to the distribution systems consumed 3,369 GWh of natural gas, 4.3% less than in 2022 and 7.5% less than the average of the previous five years

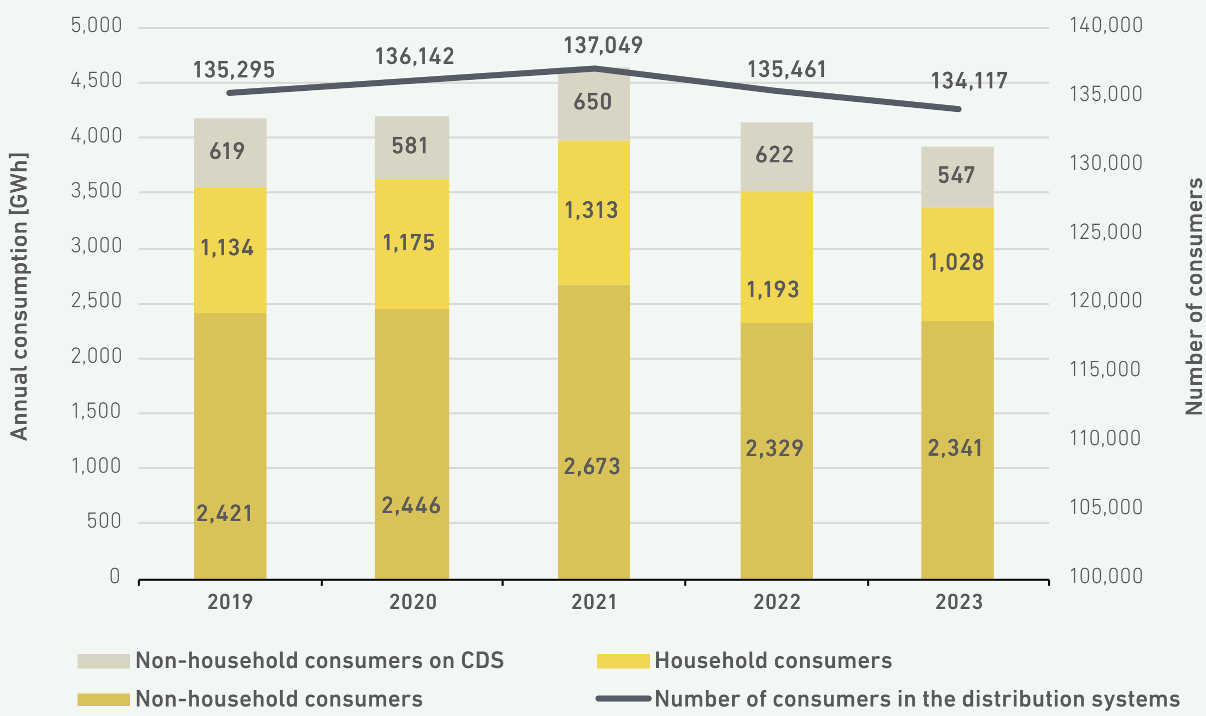
to another energy source due to their lower consumption. For larger consumers, switching is often more challenging because of the larger investments involved, which require more sophisticated planning and, thus, a longer time needed to switch to a competing technology or energy source.

In the five CDS areas of Jesenice, Kranj, Kidričevo, Štore and Anhovo, 50 consumers were registered at the end of 2023, two more than the year before. Natural gas distribution is not carried out in these closed areas as a service of general economic interest. Access to the CDS is only granted to consumers within the rounded geographical area of these systems. The operators of CDSs distributed 547 GWh of natural gas in these areas. Compared to 2022, consumption was 12.1% lower.

4.3% less natural gas consumed in the CDS areas

The consumption of household and non-household consumers on distribution systems and CDCs and the number of consumers by the type of consumption and type of system for the five years is shown in Figure 152.

FIGURE 152: CONSUMPTION BY CONSUMERS IN THE DISTRIBUTION SYSTEM AND CDSS BY THE TYPE OF CONSUMERS AND THE NUMBER OF ACTIVE CONSUMERS IN THE 2019–2023 PERIOD

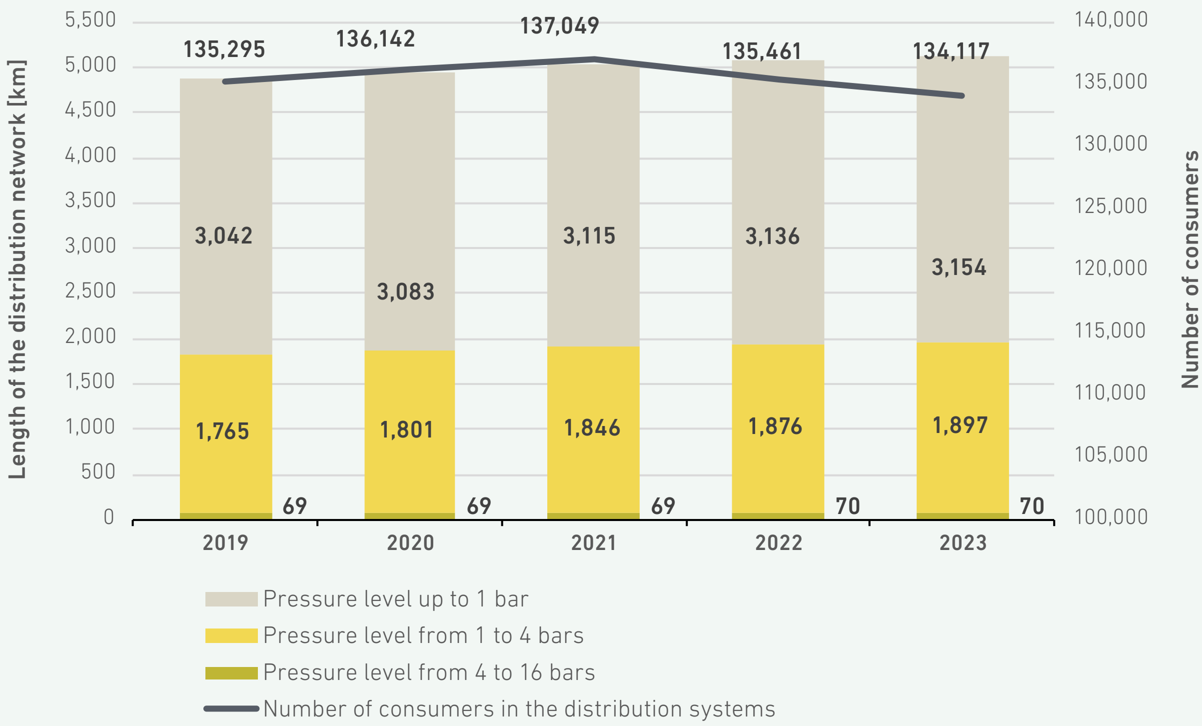


SOURCES: ENERGY AGENCY, DSOS

At the end of 2023, the total recorded length of active lines in the distribution systems and CDSs was 5,121 kilometres, an increase of 0.8% compared to the previous year. The distribution lines and associated infrastructure are mainly owned by the DSOs. In the five CDS areas, 16.9 kilometres of activated pipelines were recorded, including 8.5 kilometres of pipelines with a pressure level of 4 to 16 bar, about 6.2 kilometres with a pressure level of 1 to 4 bar, and 2.2 kilometres with a pressure level of up to 1 bar. Over the last five years, the distribution network has been extended by an average of 1.2% per year.

The length breakdown of the distribution systems and CDSs, pressure levels, extensions of pipelines together with connections and the growth in the number of active delivery points in the 2019–2023 period are shown in Figure 153.

FIGURE 153: LENGTH OF THE DISTRIBUTION NETWORKS AND CDSS, AND THE NUMBER OF ACTIVE CONSUMERS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, DSOS

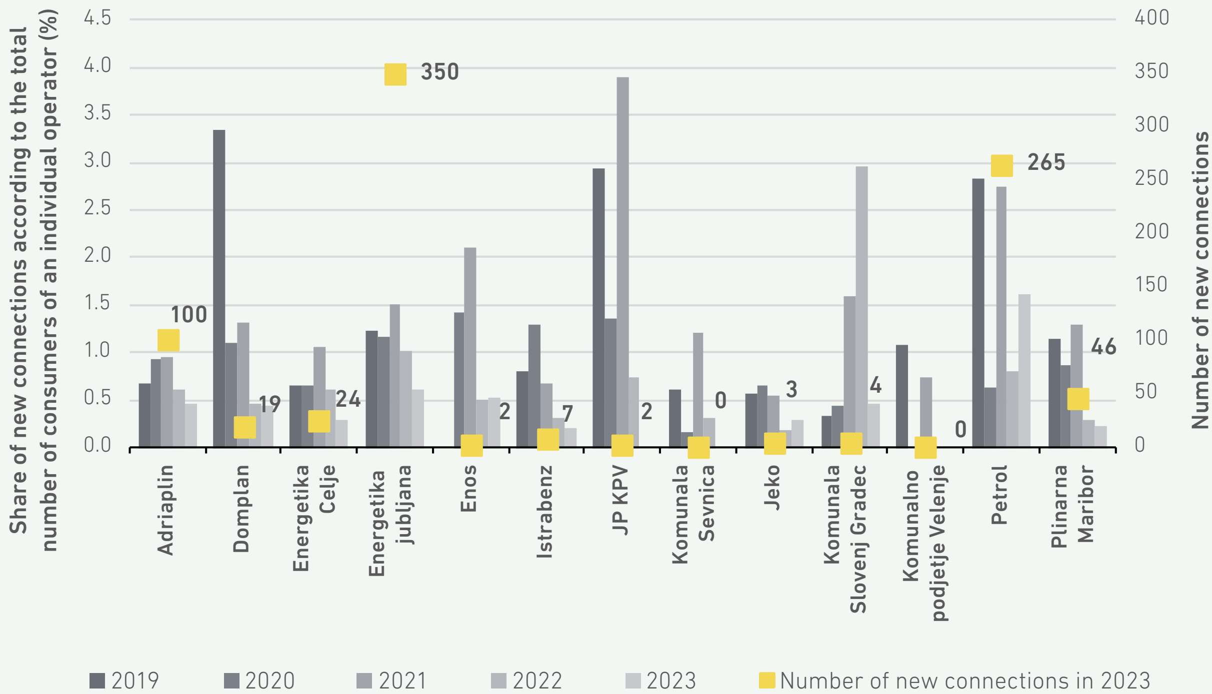
Natural gas distribution system operators connected 822 new consumers to their distribution networks, the lowest level in a decade. The number of new connections fell by almost 20% compared to the previous year, with the second consecutive year of the decrease in new connections. Until 2022, an increase in the number of active customer connections was recorded. In 2022, a more significant reduction in the number of customers was recorded for the first time, and this trend continued in 2023. Considering both new connections and simultaneous disconnections, the total number of consumers connected to the distribution systems decreased by 1,346. At the end of 2023, 134,067 final consumers were connected to the distribution systems. The data collected shows that 2,168 grid disconnections occurred in 2023. The number of consumers was reduced in 62 and 57 municipalities in 2022.

Nearly 20% fewer new connections to distribution systems than in 2022

The reasons for the further decline in the number of consumers were very likely the still higher than average natural gas prices and consequently high supply costs for certain groups of consumers, perhaps partly also the fear of a possible crisis recurrence, and also the energy policy with its targets to reduce the share of gas used in the total energy supply.

The shares of new connections in relation to each operator's total number of consumers and the number of new connections to the distribution systems of each operator are shown in the next Figure. Two new consumer connections were made to the CDS in 2023.

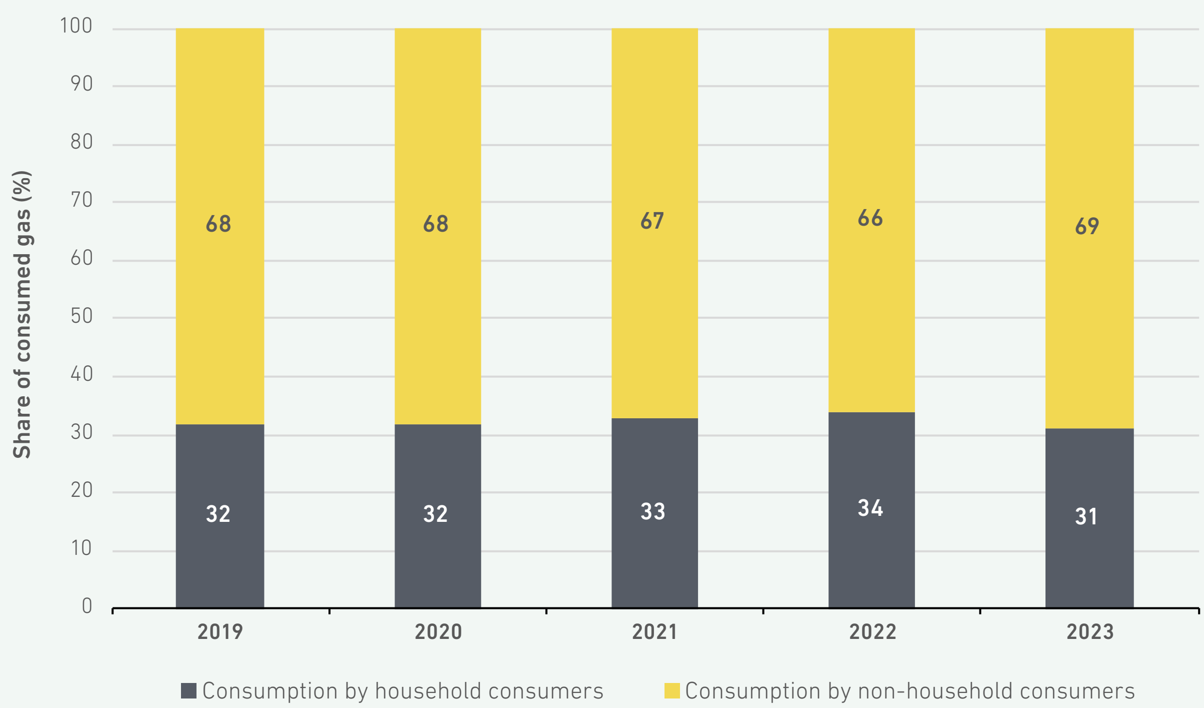
FIGURE 154: SHARE AND NUMBER OF NEW CONSUMERS IN THE DISTRIBUTION SYSTEMS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, DSOs

The structure of consumers remains unchanged. Household consumers accounted for almost 90% of all consumers in the distribution systems. The data on the distributed quantities of natural gas in 2023 compared to previous years does not show any significant changes in the ratios of the shares of household and non-household consumers.

FIGURE 155: SHARE OF CONSUMED NATURAL GAS FROM THE DISTRIBUTION SYSTEMS BY HOUSEHOLD AND NON-HOUSEHOLD CONSUMERS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, DSOs

In 2023, just over 91% of consumers on distribution systems consumed less than 25,000 kWh of natural gas.

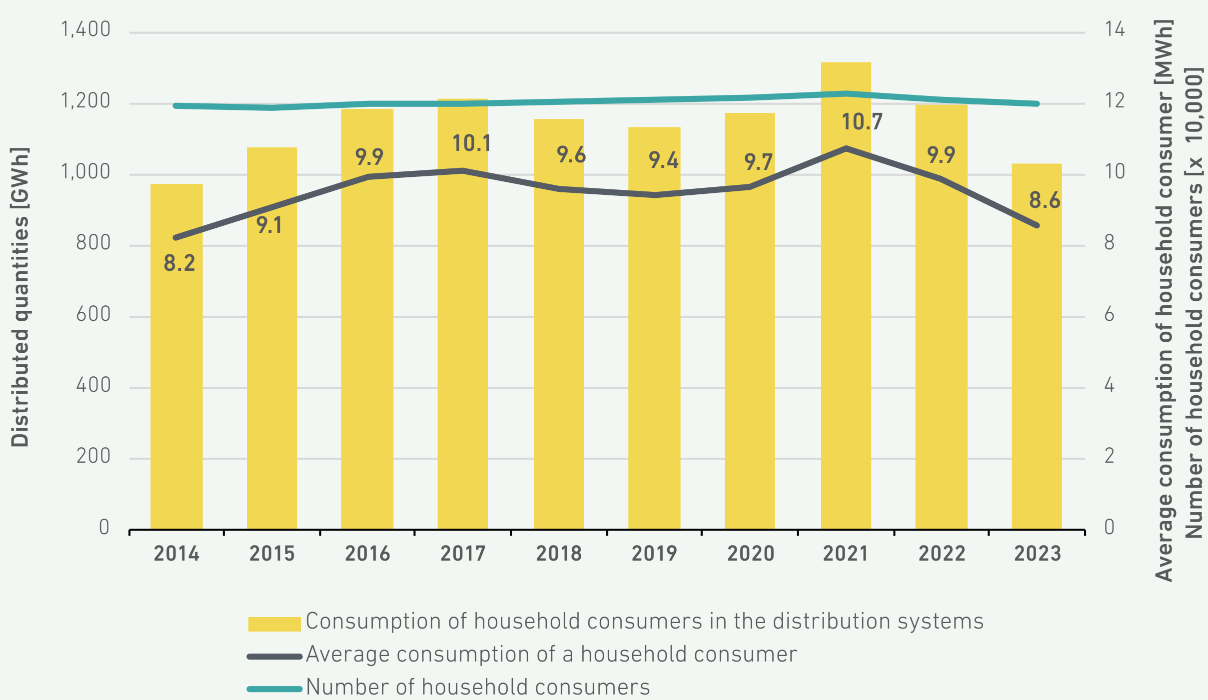
The share of consumers with an annual natural gas consumption above 50,000 kWh was 3.7%, and their consumption represents almost 71% of the total consumption of all consumers connected to the distribution networks.

Household consumers mainly use natural gas for space heating, domestic hot water and, to a lesser extent, cooking. Among household consumers, almost 96% consumed up to 25,000 kWh per year, and 99.4% consumed less than 50,000 kWh per year. The total share of consumption quantities of household consumers consuming up to 25,000 kWh per year was 69.2%, while those consuming up to 50,000 kWh accounted for 82.3% of the total household consumption. Household consumption also includes the consumption points of the shared boiler rooms owned by the residents, where natural gas is used to heat multi-apartment buildings and prepare domestic hot water centrally. The total consumption of household consumers with an annual consumption of more than 50,000 kWh (»shared boiler rooms owned by residents«) was 17.7% in 2023.

The average consumption of household consumers is down by almost 13%

The average annual consumption of household consumers fell by almost 13%, probably mainly due to the continued above-average high gas prices and the mild winter, which reduced the use of gas for heating. The total and average consumption of natural gas by household customers and the number of these customers in each year of the 2014–2023 period are shown in Figure 156.

FIGURE 156: TOTAL AND AVERAGE CONSUMPTION OF HOUSEHOLD CONSUMERS IN THE DISTRIBUTION SYSTEMS IN THE 2014–2023 PERIOD

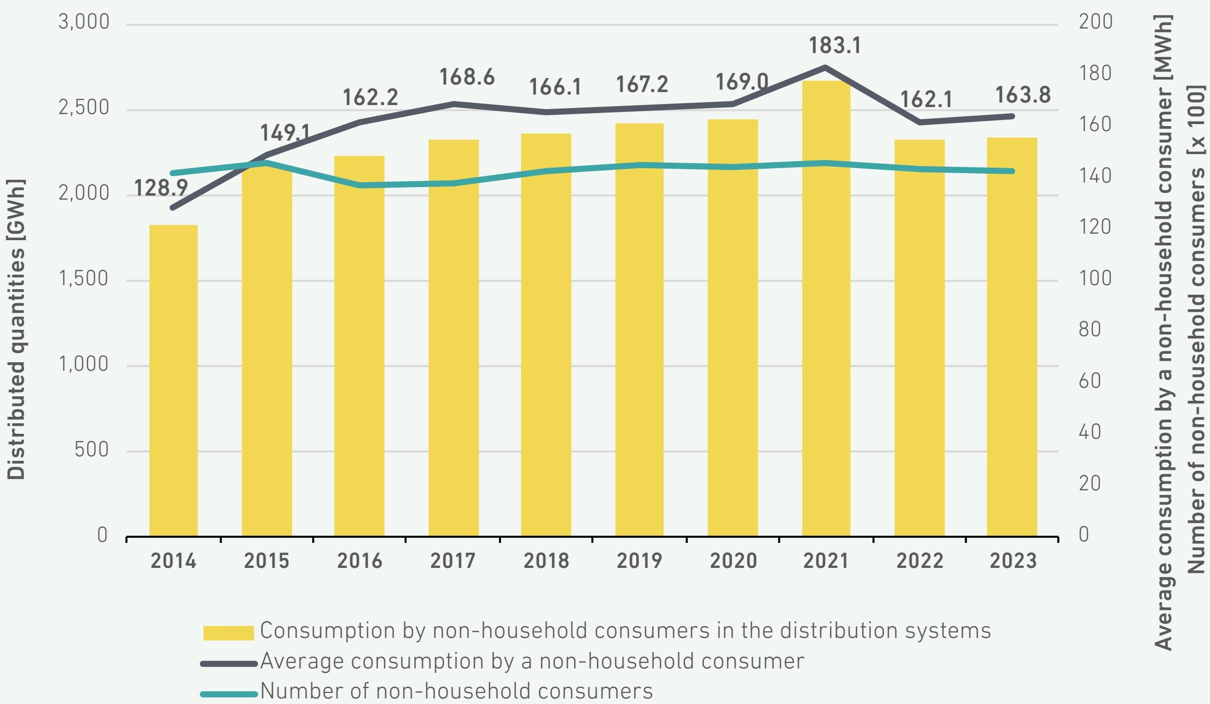


SOURCE: ENERGY AGENCY, DSOS

In addition to heating, non-household consumers were using natural gas for technological and production processes, cooling and other activities. At the end of 2023, 73 fewer non-household consumers were connected to the distribution system than the year before, while the total annual consumption of non-household consumers increased by half a percent. Non-household consumption was a good 4% lower than the average for the five-year period of 2018–2022, while the average annual consumption of non-household customers increased by 1%. The trend in consumption and the number of non-household customers is shown in Figure 157.

A decrease in the number of non-household consumers and a slight increase in consumption

FIGURE 157: TOTAL AND AVERAGE CONSUMPTION BY NON-HOUSEHOLD CONSUMERS IN THE DISTRIBUTION SYSTEMS IN THE 2014–2023 PERIOD



SOURCE: ENERGY AGENCY, DSOS

None of the five CDS operators served household consumers. The average annual consumption of natural gas consumers connected to CDSs was 10.9 GWh. Most of the consumption in the CDS areas is intended for industrial customers' technological and production processes, while a negligible part is by smaller business consumers who use gas mainly for space heating and sanitary water.

Distribution systems are still without connected generating sources

None of the distribution system operators and CDSs had a connected production source of natural gas, biomethane or synthetic methane, and no hydrogen was added to any of the distribution systems.

At present, only one of the smaller operators indicates that it can take up to 10% of hydrogen into the distribution system, while the remaining 11 have not yet reported the possibility of taking a certain share of hydrogen into the distribution system.

The Use of Compressed and Liquefied Natural Gas and Other Gases from the Distribution Systems

Compressed Natural Gas in Transport

In 2023, the network of publicly accessible filling stations has not been expanded. The supply was mainly provided to users on the Maribor-Celje-Ljubljana-Jesenice route through a network of six public refuelling stations, three in Ljubljana and one each in Maribor, Celje and Jesenice. The expansion of the public filling station infrastructure is one of the key factors for increasing the number of users, alongside a competitive supply price and an adequate supply of competing vehicles. Based on the data collected, none of the existing filling service providers have plans to expand their network. The unstable situation in the international markets and the above-average high prices of natural gas in the wholesale and retail markets have a weak impact on the business interest to expand the network or to set up new filling infrastructures in the areas of all major cities with an available gas network. According to the information received from the DSOs, two consents have been granted to connect public CNG filling stations in Murska Sobota to petrol stations on both sides of the Pomurje motorway.

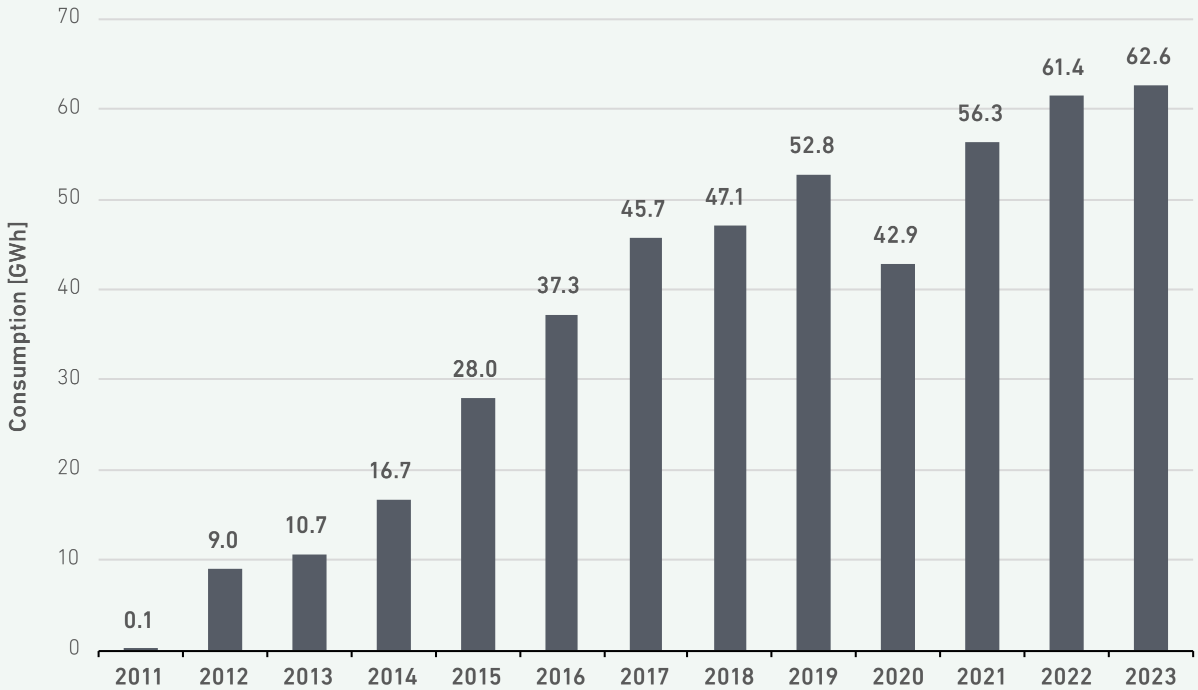
The first two filling stations planned on the Pomurje motorway in the Murska Sobota area

A 2% higher consumption of CNG in transport than in 2022 and 15% higher than in 2021

In 2023, consumption has increased again, rising for the third year. The total consumption of CNG in transport has increased significantly compared to previous years, by 2% compared to 2022, 15% compared to 2021 and almost 44% compared to 2020. The overall consumption growth is driven by increased consumption in the Ljubljana area, while the annual consumption in all other regions has fallen. This situation is likely the result of somewhat different levels of retail prices in each supply area, which offered mixed signals to existing and potential users in 2023. The retail prices per kg of compressed gas have historically been relatively stable over a long period. From October 2015 to July 2021, the price was lowest in Ljubljana at €0.92, before decreasing to €0.85 in the second half of 2021, rising to €1.4 in February 2022, €1.63 in May, €1.7 in September and €2 in October. In the other areas where publicly accessible filling stations have been set up, in Maribor, Celje and Jesenice, the prices varied from €1.2 to €1.75. In 2022, Celje's lowest retail price was €0.95 until 14 June and €1.25 for the rest of the year. In Maribor, the prices were also favourable, at €1.3 in January 2022 and €1.2 per kilogram for the rest of the year. In 2023, the prices in the Ljubljana area gradually stabilised, falling to EUR 1.79 in February, EUR 1.65 in April, EUR 1.39 in July and EUR 1.29 per kilogram at the end of the year. Supply was also favourable in Jesenice, where the closing price was EUR 1.37 per kilogram, while prices were significantly higher in Celje and Maribor. In Celje, the price per kilogram was EUR 1.9 from February to mid-August and then EUR 1.69. In Maribor, the supply was even less competitive. At the beginning of the year, the price was EUR 2.6, EUR 1.71 from June onwards, and EUR 2 per kilogram from 20 November onwards.

The annual consumption of CNG at Slovenian public filling stations is shown in Figure 158.

FIGURE 158: CONSUMPTION OF CNG IN TRANSPORT IN THE 2011–2023 PERIOD



SOURCES: ENERGY AGENCY, OPERATORS OF CNG FILLING STATIONS

Liquefied Natural Gas

Liquefied natural gas (LNG) is used for the temporary supply of consumers and as an alternative fuel for goods vehicles.

The total LNG volumes sold in 2023 increased by more than 105% compared to the previous year but were down by more than 34% compared to 2021. The main reason for the increase in consumption was the significantly higher consumption of temporary supply in 2023 offered by ENOS, while the consumption of transport also increased by less than 10%. The total LNG volumes consumed for the temporary supply of gas systems increased by more than seven compared to the previous year. Of the total LNG consumption, the share of temporary refuelling was just under 54%, with the remaining share of just under 46% coming from LNG filling stations for refuelling heavy goods vehicles.

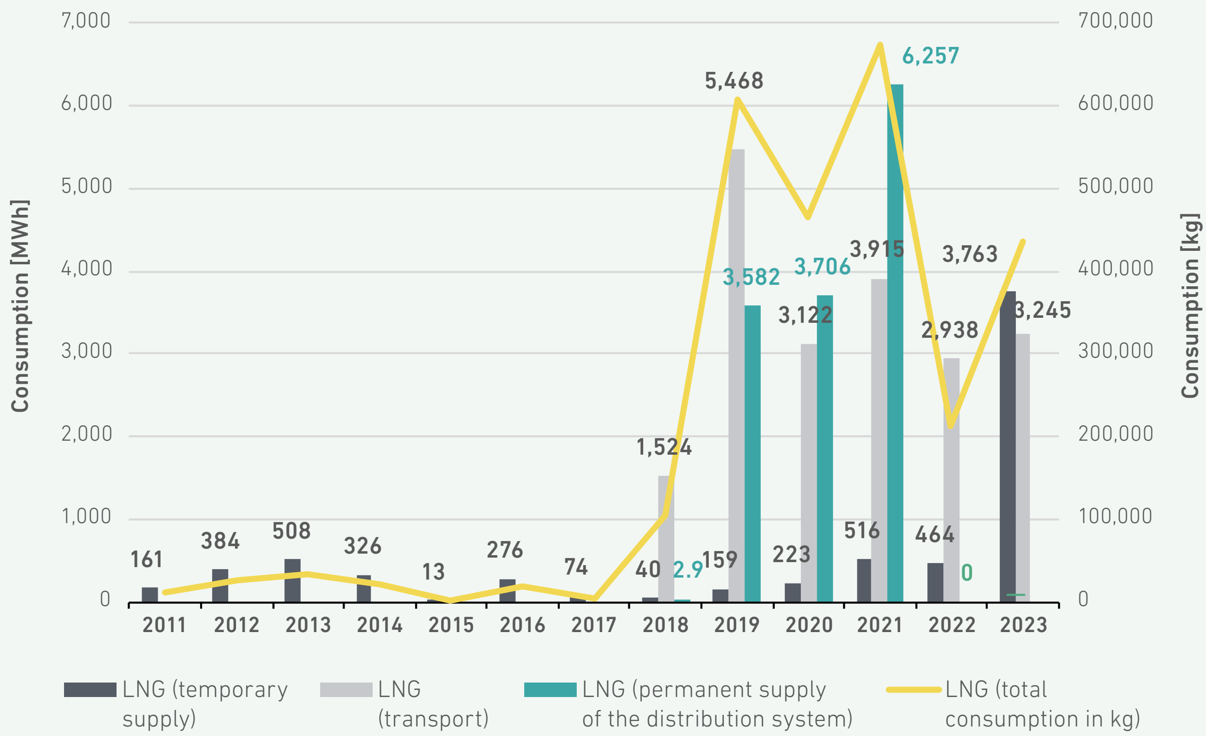
In transport, LNG is used in Slovenia as an alternative fuel for refuelling heavier road vehicles over longer distances. In 2023, two public LNG filling stations were in operation in Sežana and Ljubljana. The only provider of refuelling services indicates that it has no current plans to expand its network of LNG filling stations due to the discouraging environment for the purchase and use of LNG-fuelled trucks and the high LNG exchange prices. Based on the data collected, the construction of an LNG filling station in Slovenia has also been postponed by another provider, which had planned three the year before, the first one in 2024 and the remaining two in 2026 and 2027. The volumes of LNG sold for transport fuelling increased by almost 10% in 2023 compared to 2022. The cost competitiveness of LNG compared to diesel improved significantly due to the decrease in LNG prices in 2023. The price per kg of LNG at the end of 2023 was EUR 1.49/kg, which, considering the higher energy value, again ensures cost competitiveness compared to diesel. The stagnation in the development of the LNG supply market mainly reflects the unstable situation and the lack of incentives, with very mixed signals of supply competitiveness reflected in the reluctance of potential new users of this energy.

105% higher consumption of LNG

High prices and an unsupportive environment reduce interest in LNG use

Figure 159 shows the volumes sold by individual year and the type of use

FIGURE 159: CONSUMPTION OF LNG IN THE 2011–2023 PERIOD



SOURCE: ENERGY AGENCY

Other Energy Gases from Distributions Systems

The distribution of other energy gases (energy gases used as an energy fuel other than natural gas) from distribution systems that are not directly or indirectly connected to the gas transmission system was carried out by four distribution companies in Slovenia in 2023.

Propane and propane-butane mixture were primarily distributed as other energy gases. The distribution of other energy gases was carried out from 518 distribution systems in 122 Slovenian municipalities. In 116 municipalities, distributors from 471 distribution systems carried out supply as a market activity, and as a service of general economic interest in the remaining 47 distribution systems in nine municipalities.

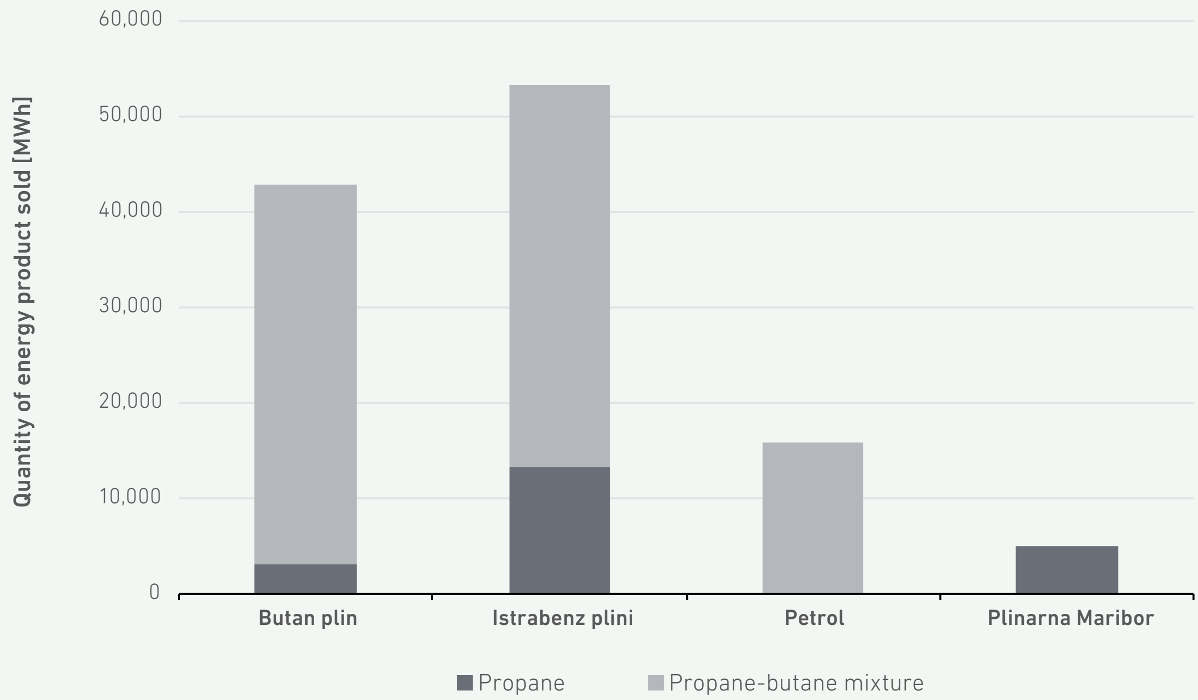
6.0% lower consumption of other energy gases

In 2023, 6,993 consumers were supplied from the distribution systems of other energy gases, which is 3.9% fewer than the previous year, and the distributed energy value of gases[139] reached 117.4 GWh, which is a 6.0% decrease compared to last year. The consumer's average annual consumption in 2023 amounts to 16.8 MWh, a 2.3% decrease compared to the previous year. The number of consumers connected to the distribution systems in individual municipalities varied from 2 to 1,780, and the average number of consumers per distribution system was 14.

The total length of the distribution systems decreased by 0.1% compared to 2022 and amounted to 114.4 kilometres. Figure 160 shows the distributors according to the type and quantities of other energy gas sold.

139 Due to corrections to the 2022 data received from reporters after the publication of last year's report, the comparative changes between 2023 and 2022 may differ from the data presented in last year's report.

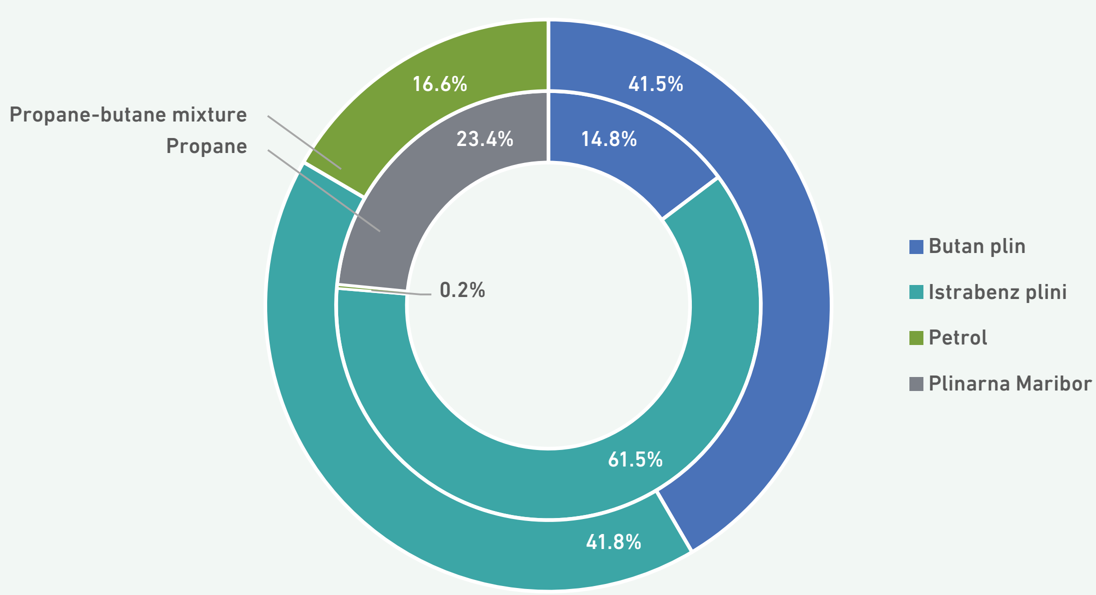
FIGURE 160: DISTRIBUTED QUANTITIES OF OTHER ENERGY GASES BY DISTRIBUTORS AND THE TYPE OF GAS



SOURCE: ENERGY AGENCY

Figure 161 shows the market shares[140] of distributors of other energy gases by type of gas and the energy value of the quantities sold in 2023, while Figure 162 shows the market shares of distributors by the type of energy gas sold and the number of consumers served.

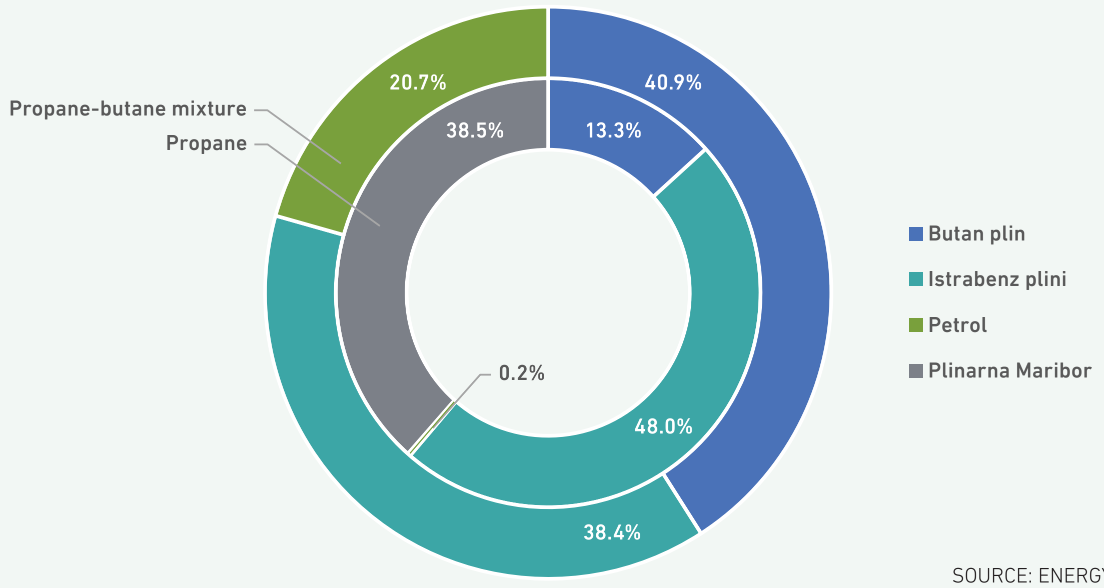
FIGURE 161: MARKET SHARES OF OTHER ENERGY GAS DISTRIBUTORS (energy value of the quantities sold)



SOURCE: ENERGY AGENCY

140 The difference between the total and the sums of individual shares is due to rounding to one decimal place.

FIGURE 162: MARKET SHARES OF OTHER ENERGY GAS DISTRIBUTORS (number of consumers)



SOURCE: ENERGY AGENCY

The Regulation of Network Activities

Unbundling

In 2023, the Plinovodi Company performed the obligatory service of general economic interest of natural gas TSO in Slovenia. The TSO, Plinovodi, owns the assets with which it carries out its activities and is certified and designated as an independent TSO. The transmission system operator is owned by Plinhold, of which the Republic of Slovenia is the majority shareholder with a 60.10% share. Until 31 May, the service of general economic interest of gas DSOs was carried out by 13 entities, and then 12, since Javno podjetje komunalno podjetje Vrhnika ceased to distribute natural gas.

Distribution system operators are not legally separated, as there are no more than 100,000 consumers connected to each distribution system. Given that other energy and market activities were carried out by the distribution system operators, they prepared separate accounts following Article 101 of the Gas Supply Act. System operators are required to prepare annual financial statements as required by the Companies Act for large companies. In the audited annual financial statements, natural gas undertakings have to disclose the criteria for business allocation. The adequacy of the criteria and the correctness of the application have to be audited annually by an auditor who makes a special report.

Technical Functioning

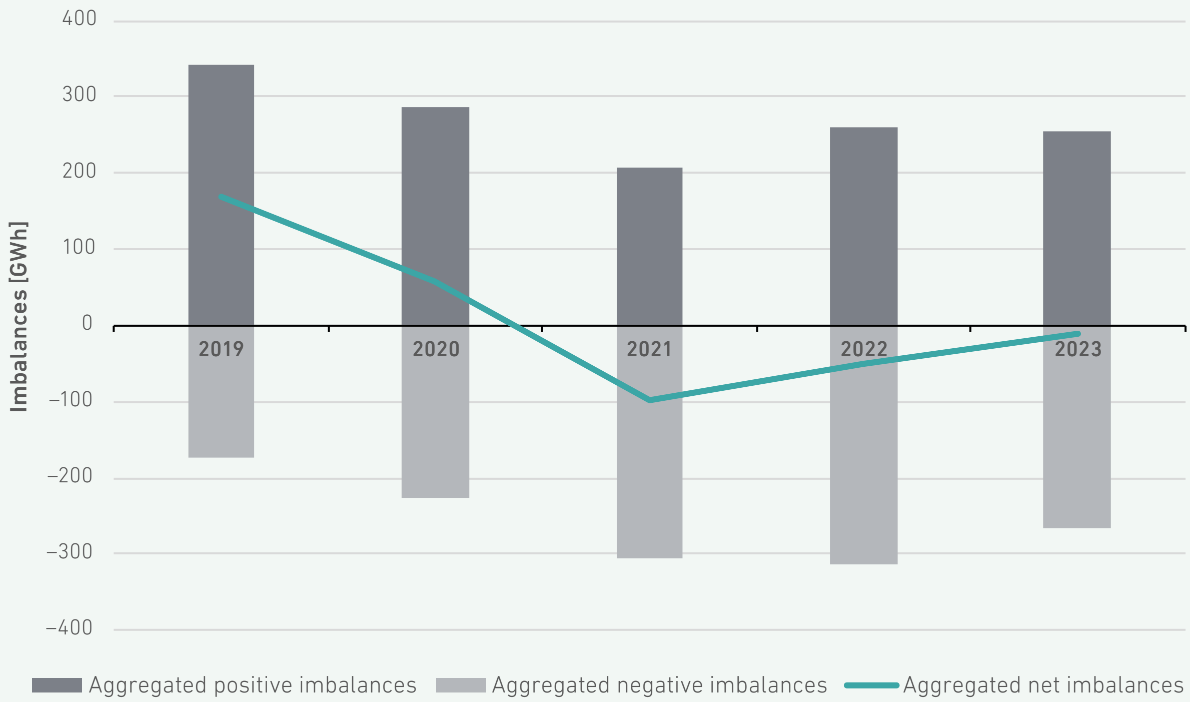
Balancing Services

In 2023, there were 17 active balance group leaders in Slovenia, four fewer than the year before. Five of these also transported natural gas through Slovenia to other transmission systems.

Through the purchase and sale of natural gas on the trading platform and with an annual balancing contract, the transmission system operator has managed to balance the transmission system and carry out imbalance accounting. The entire transmission system is one balancing area; imbalances are determined daily and calculated every month for each gas day.

255 GWh of positive imbalances (2% annual decrease), 267 GWh negative imbalances (14% annual decrease)

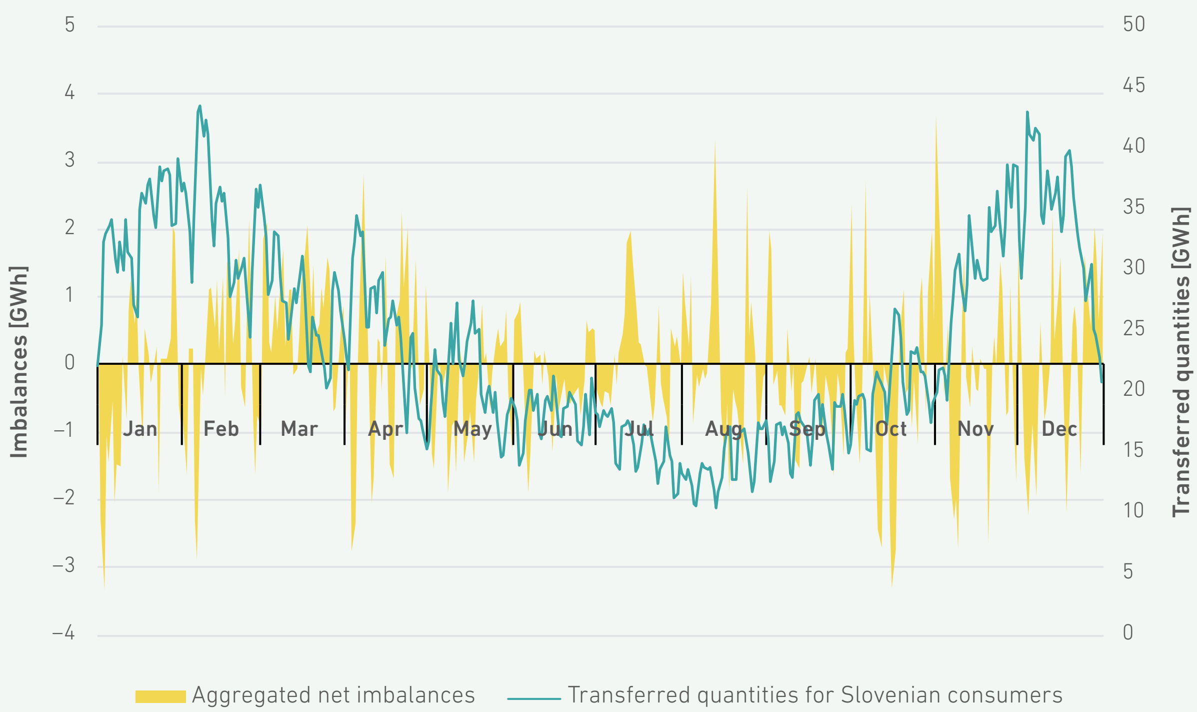
FIGURE 163: AGGREGATED NET IMBALANCES OF THE BALANCING GROUP LEADERS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

Both positive and negative imbalances of the balance group leaders have decreased compared to the previous year. In absolute terms, negative imbalances were still almost 5% higher than positive imbalances. This is the largest ever balancing of positive and negative imbalances achieved.

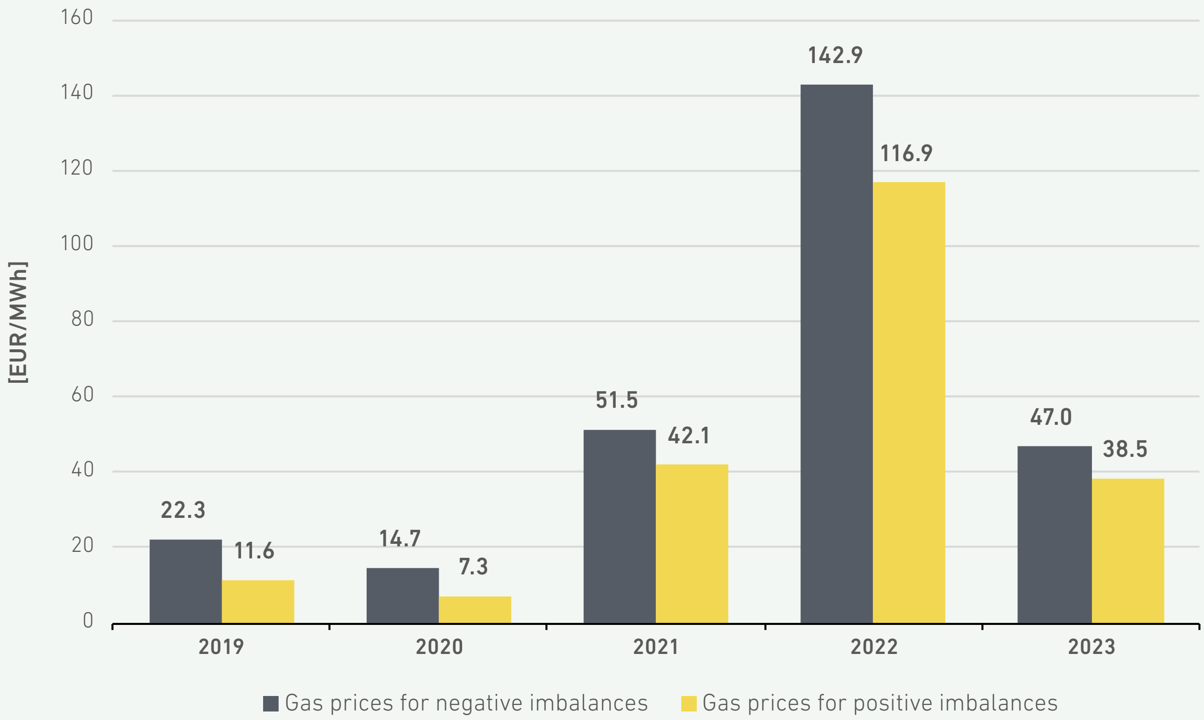
FIGURE 164: AGGREGATED NET IMBALANCES OF THE BALANCE GROUP LEADERS AND TRANSFERRED QUANTITIES FOR SLOVENIAN CONSUMERS IN 2023



SOURCES: ENERGY AGENCY, PLINOVODI

The imbalances of the balance group leaders amount to 5.9% of the volumes consumed by Slovenian natural gas consumers on an annual basis, which is 0.4 percentage points lower than the previous year. The prices for imbalances have fallen again after the crisis year 2022 and were slightly lower than in 2021.

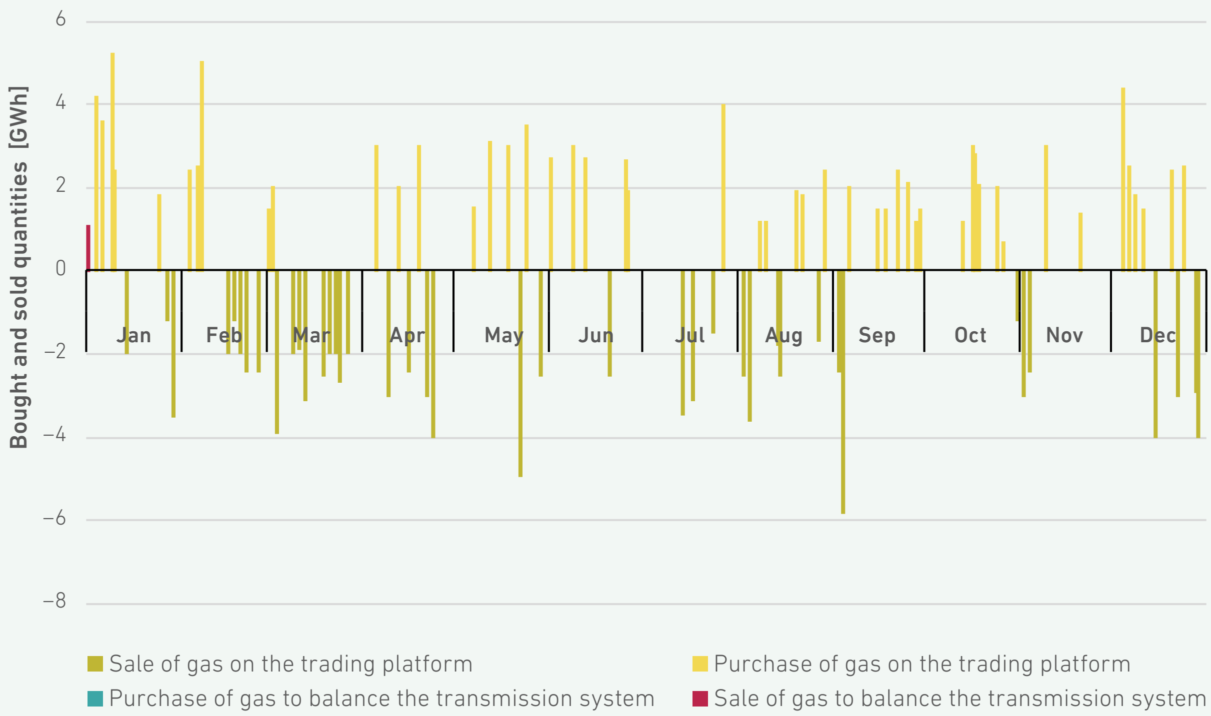
FIGURE 165: AVERAGE GAS PRICES FOR IMBALANCES IN THE 2018–2022 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

The TSO has managed to ensure the regular operation of the transmission system through trading on the trading platform and dynamic pressure regulation. After using the system balancing service 16 times in 2022, the TSO sold gas only once in 2023 under the annual balancing contract.

FIGURE 166: TSO's TRADING ON THE TRADING PLATFORM AND THE USE OF THE SYSTEM BALANCING SERVICE IN 2023



SOURCES: ENERGY AGENCY, PLINOVODI

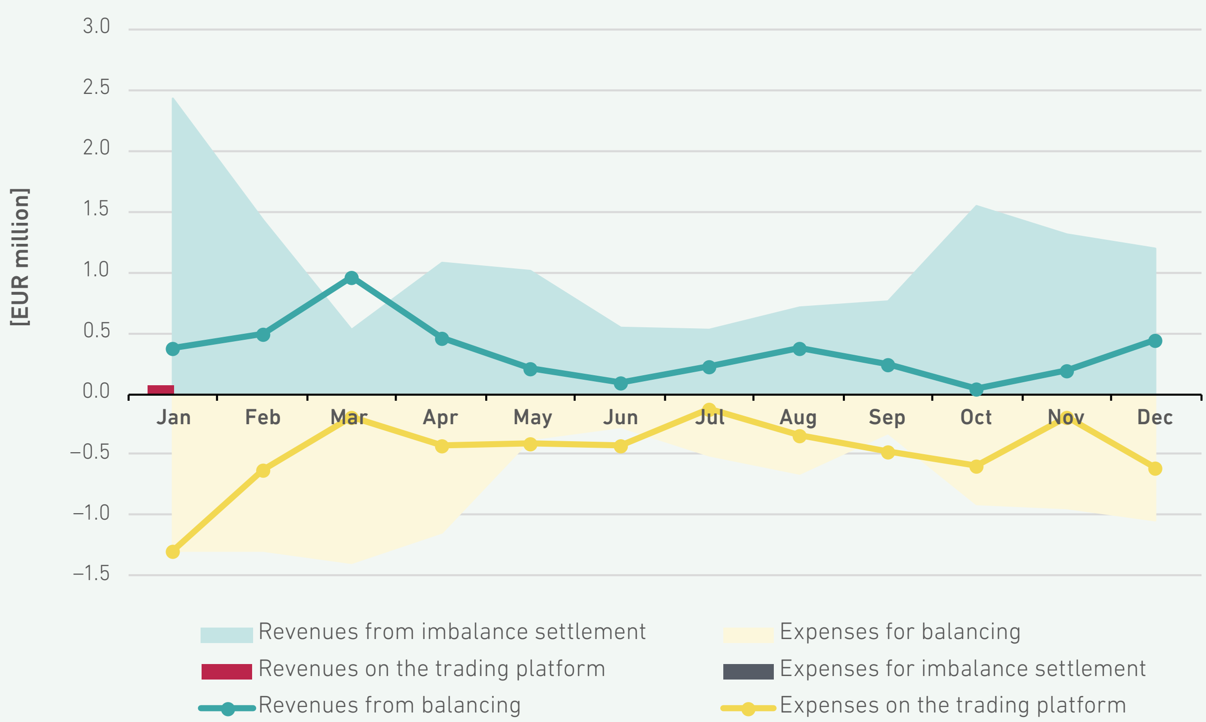
The TSO generated 3.1 times less revenue on the trading platform than the previous year while incurring 3.6 times lower expenditure. The lower revenues and expenses from trading on the platform and balancing deviations are due to lower volumes and two to three times lower selling and buying prices for natural gas. The TSO is cost-neutral in accounting for imbalances, in buying and selling gas to balance the transmission system, and in trading on the trading platform, which means that surpluses or deficits are distributed proportionally among the balance group operators. In 2023, it thus generated a surplus of EUR 1.32 million, which is 2.1 times less than the previous year.

TABLE 37: REVENUES AND EXPENSES OF TSOs ON THE TRADING PLATFORM, SETTLEMENT OF DAILY IMBALANCES AND AVERAGE SALES/PURCHASE PRICES

Activity/ TSO's service		2020	2021	2022	2023
Trading platform	Revenues [EUR million]	1.4	3.4	12.8	4.1
	Average sales price [EUR/MWh]	7.5	37.9	110.5	37.5
	Expenses [EUR million]	–2.1	–10.1	–20.6	–5.7
	Average purchase price [EUR/MWh]	14.3	50.4	124	48.2
System balancing service	Revenues [EUR million]	0	1.1	1.9	0.1
	Average sales price [EUR/MWh]	/	103.4	113.2	65.6
	Expenses [EUR million]	0	–0.2	–1.3	0
	Average purchase price [EUR/MWh]	/	76.3	149.7	/
Imbalances	Revenues [EUR million]	3.5	16.4	38.9	13.0
	Average marginal purchase price – settlement of negative imbalances [EUR/MWh]	14.7	51.5	142.9	47.0
	Expenses [EUR million]	–2.1	–9.8	–28.8	–10.2
	Average marginal sales price – settlement of positive imbalances [EUR/MWh]	7.3	42.1	116.9	38.5

SOURCES: ENERGY AGENCY, PLINOVODI

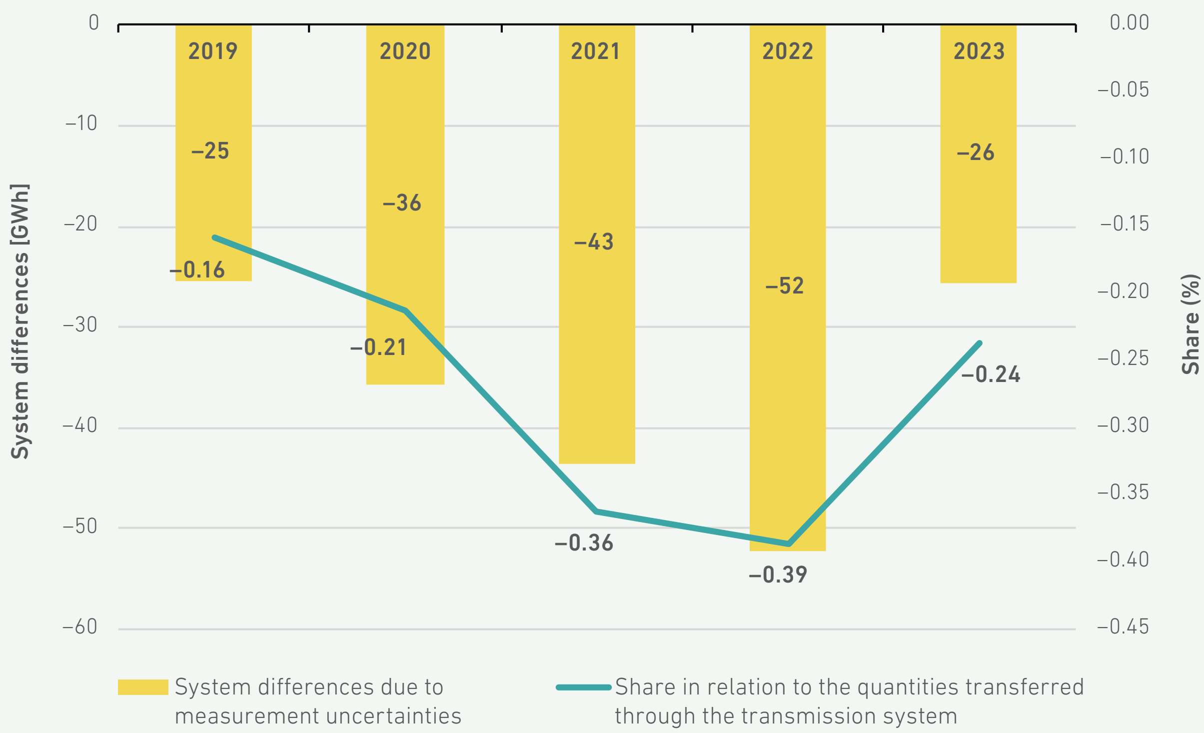
FIGURE 167: REVENUES AND EXPENSES OF TSOs ON THE BALANCING MARKET IN 2023



SOURCES: ENERGY AGENCY, PLINOVODI

From November 2022, system differences are divided into system differences due to measurement uncertainties (SD_{MU}) and system differences due to losses (SR_L). After three years of increases, system differences due to measurement uncertainties decreased in 2023. As in previous years, they were negative in all the months of 2023. Compared to a year earlier, they were half as large

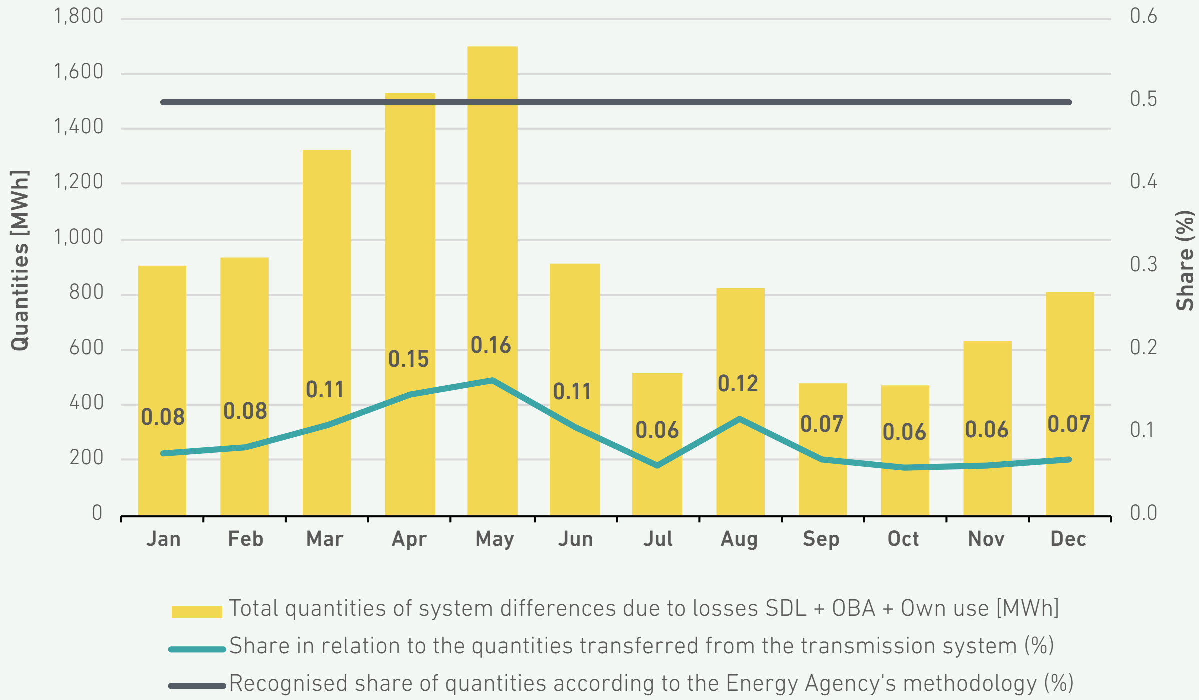
FIGURE 168: SYSTEM DIFFERENCES SD_{MU} AND THE SHARE IN RELATION TO THE QUANTITIES TRANSFERRED THROUGH THE TRANSMISSION SYSTEM IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

The TSO is recognised for the costs of system differences due to losses, quantities for own use and quantities for billing purposes under the Operational Balancing Agreement (OBA), up to 0.5% of the amounts transported in the transmission system. In 2023, the sum of these quantities averaged 0.09%.

FIGURE 169: MONTHLY MOVEMENT OF SYSTEM DIFFERENCES DUE TO LOSSES, OWN USE AND OBA BILLING QUANTITIES IN 2023

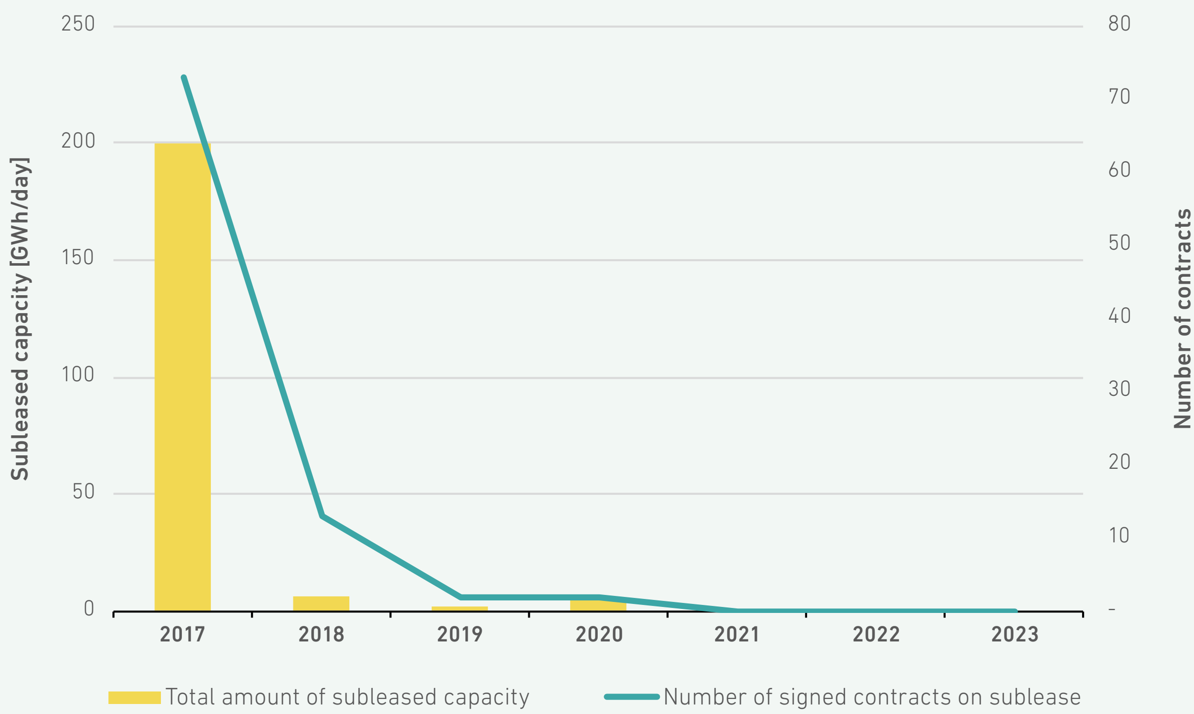


SOURCES: ENERGY AGENCY, PLINOVODI

Secondary Market for Transmission Capacity

For the third year, there was no trading on the secondary market for transmission capacity.

FIGURE 170: TREND IN THE DEVELOPMENT OF THE SECONDARY TRANSMISSION CAPACITY MARKET IN THE 2017–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

The year 2017 was a turning point for trading in the secondary market for transmission capacity, with most of the long-term transmission contracts expiring. The sharply reduced capacity booking at border points, the growing trend towards short-term capacity booking, the introduction of electronic capacity booking auctions and the better optimisation of capacity booking by transmission system users have also contributed to the declining role of the secondary market.

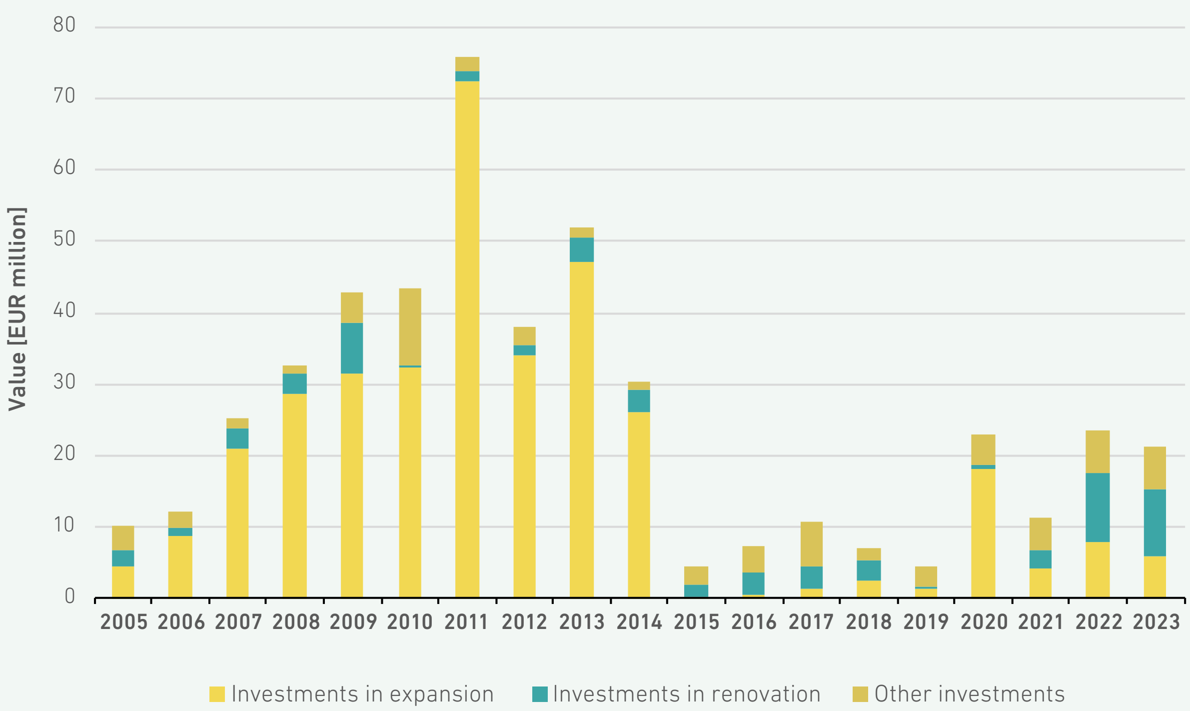
The Multi-Year Development of the Transmission Network

Investments in the Natural Gas Transmission System

The TSO allocated EUR 21.3 million in investments in the transmission system, 9% less than the previous year. Expansion investments amounted to EUR 6.1 million, renewal investments to EUR 9.3 million and other investments to EUR 5.9 million. Depreciation of fixed assets financed 80% of the investments, while the remaining part was financed from other funds.

EUR 21.3 million of investments in the transmission system

FIGURE 171: INVESTMENTS IN THE NATURAL GAS TRANSMISSION SYSTEM IN THE 2005–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

The most significant investment activities in 2023 were related to the M6 Ajdovščina-Lucija project (pipe supply completed, request for a construction permit for the Sežana-Dekani section submitted); the construction permit for most of the R21AZ Konjiška vas-Oplotnica pipeline route was obtained, the delivery and installation of a new compressor unit was carried out on the Ajdovščina CS extension project, and work was completed and the permit for use was obtained on the project Replacement Premises and Access Arrangements; the Zadobrova MRS and Vransko MRS projects were completed; the technical and spatial bases for the R42/1 Anže-Brestanica transmission pipeline were prepared, property and legal matters were settled, and opinions were obtained on the documentation for the construction permit for the R25A/1 Trojane-Hrastnik Second Stage project: Trbovlje-Hrastnik, design work was in progress.

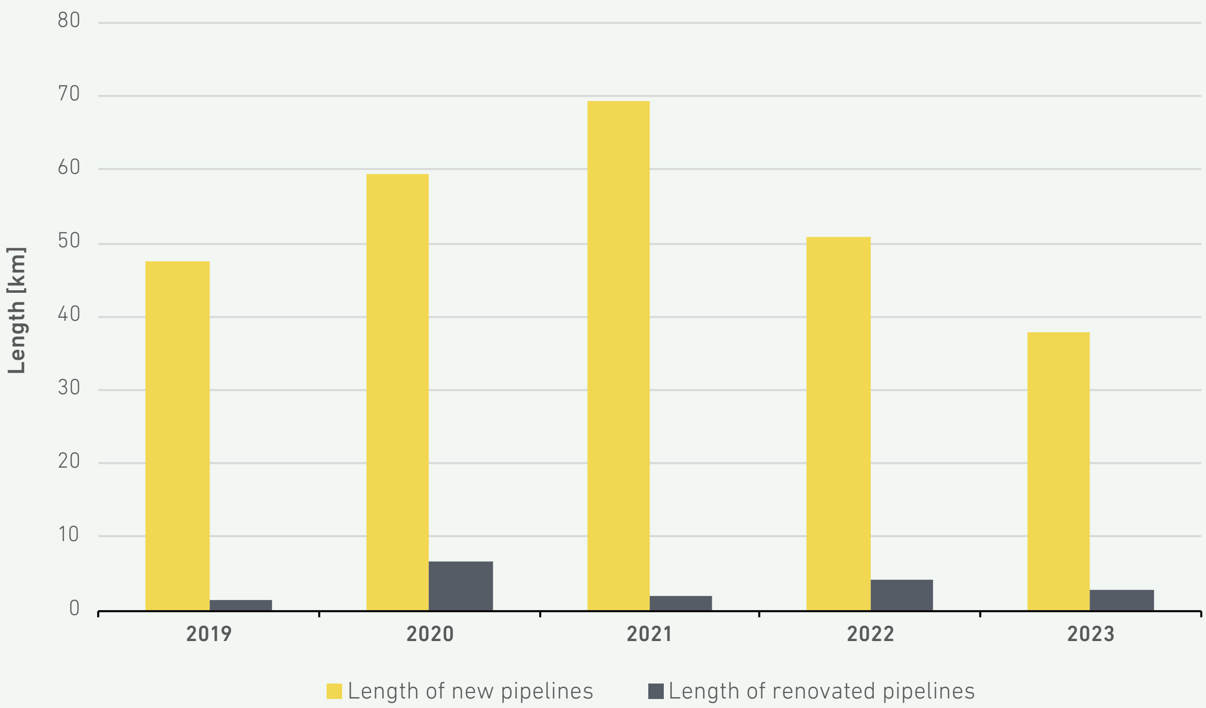
In 2024, the TSO will continue the construction of the M6 Ajdovščina-Lucija pipeline and start the construction of the R51c Kozarje-Vevče investment. Among the connection projects, work will be carried out on the Verovškova/KEL MRS, the Dobrunje MRS, the Sava MRS, the Koto MRS and the Donit MRS. The design and acquisition of easements for the R51a Jarše-Sneberje pipeline will be carried out, and the design of the first stage of the gas pipeline connection with Hungary (construction of the MMRS Pince and the Pince-Lendava pipeline) is planned to start.

Investments in the Natural Gas Distribution Systems

Distribution system operators built 37.7 kilometres of new gas pipelines, which means 26% less than the previous year. There were 3 kilometres of distribution gas pipelines renovated, which is 31% less than in 2022.

37.7 km of new distribution pipelines, 26% less than the year before

FIGURE 172: TREND OF BUILDING AND RENOVATING PIPELINES IN THE 2019–2023 PERIOD



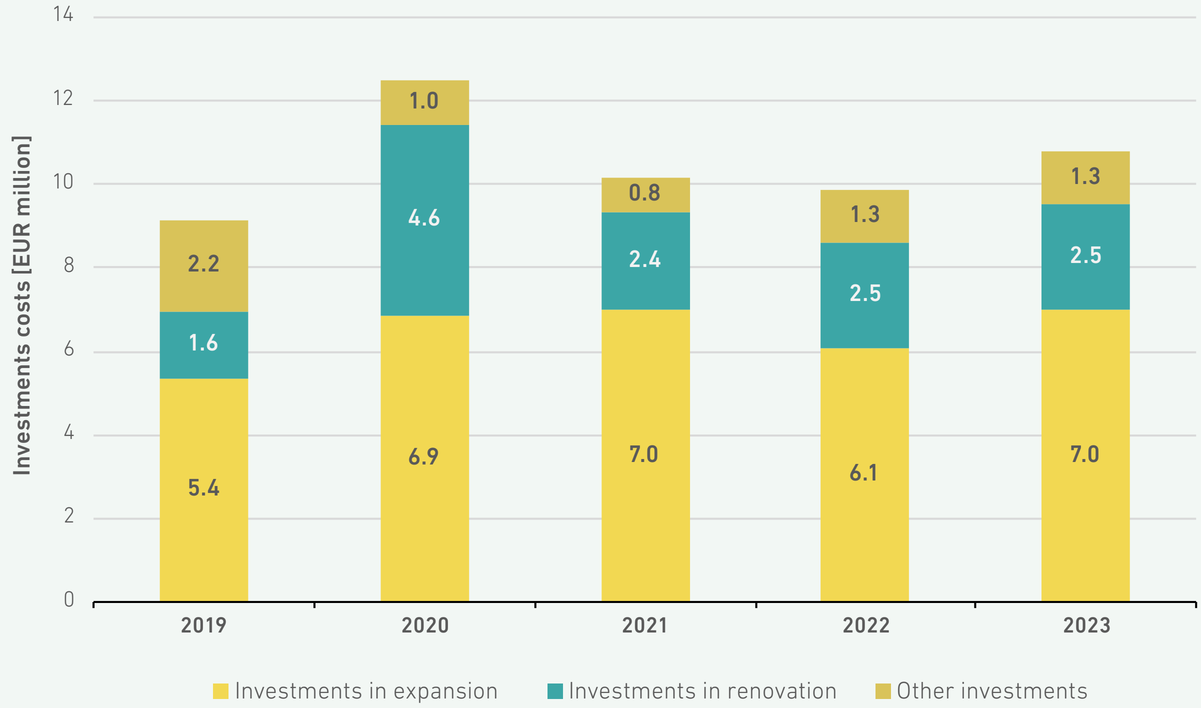
SOURCE: ENERGY AGENCY

The total value of investments in distribution systems amounted to EUR 10.76 million, which is 9% more than the previous year. Investments in network expansion amounted to EUR 6.98 million, investments in the renovation of distribution systems amounted to EUR 2.53 million, and other investments not directly related to the construction or renovation of distribution systems amounted to EUR 1.25 million.

Therefore, the increase in the value of investments compared to the previous year is not due to an increase in the volume of investments but to higher purchase prices for equipment and construction materials and higher prices for labour or services.

3 km of renovated distribution pipelines – 31% less than in 2022

FIGURE 173: COSTS OF INVESTMENTS IN GAS DISTRIBUTION PIPELINES IN THE 2019–2023 PERIOD

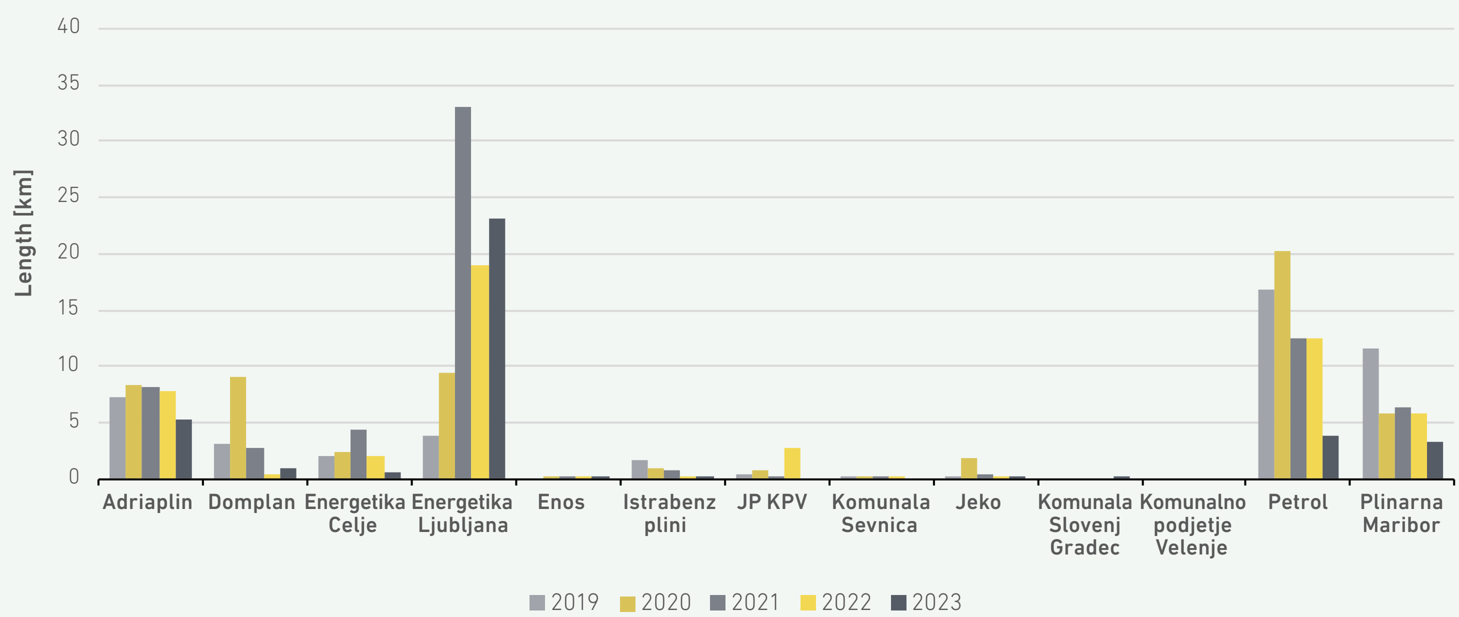


SOURCE: ENERGY AGENCY

Figure 174 shows the intensity of new pipeline construction by each DSO. Over the last five years, the six most active operators together cover 96% of the new pipelines, while the remaining seven operators have hardly expanded their distribution systems, building only 4% of the new pipelines.

EUR 10.8 million investments in distribution systems – 9% more than the year before

FIGURE 174: LENGTH OF THE NEW DISTRIBUTION NETWORKS IN THE 2019–2023 PERIOD BY OPERATORS



SOURCE: ENERGY AGENCY

The Security and Reliability of Operation and the Quality of Supply

The TSOs, DSOs and CDSs ensured the safe and reliable transport of natural gas through their networks, connected and performed all the necessary maintenance work on the networks.

The daily peak load in the transmission network was recorded at the end of the winter (28 March 2022) and amounted to 2,229 MWh/h.

The TSO issued five connection consents, four less than the previous year. One consumption point was connected to the transmission system and activated[141]. The overall connection process took an average of 429 days.

A 20% decrease in connections to distribution systems compared to the previous year

In 2023, operators of natural gas distribution systems received 796 applications for granting connections and issued the same number of consents. The number of applications received and approvals issued decreased by almost 17% compared to the previous year and by nearly 65% compared to 2021. The operators connected 822 consumption points in 2023, a decrease of almost 20% compared to last year and a reduction of 60% compared to 2021.

For nine operators, the average time to connect new consumers to the distribution system after submitting a complete connection application was up to 20 working days. The overall connection process took from 26 to 30 working days on average at the other five. The physical connection to the network took 10 operators up to four working days on average; one operator completed the work within five working days on average, and one had to wait 23 working days for a physical connection.

Two connections were recorded in the five CDS areas in 2023. One operator took seven working days for the whole process, the other 33.

The TSO and the DSOs ensured reliable and safe operation for the uninterrupted supply of consumers through regular and extraordinary maintenance work.

The TSO carried out 75 planned and 329 unplanned works on the transmission system. The scheduled works caused 71 hours of natural gas supply interruptions, while the unplanned works caused one interruption of 14 hours.

On the distribution systems, operators carried out 2,368 planned works. The number of scheduled works decreased slightly in 2023, while the total duration of the work was lower by around 18%. Notwithstanding the shorter duration of work, the planned works caused around 30% longer natural gas supply interruptions to customers compared to 2022. This is mainly because the total duration of interruptions in 2022 was around 35% shorter than in the previous year. The total time of supply interruptions due to planned works was 1,036 hours. The planned work was carried out on the distribution systems of the six operators without any disruption or interruption of supply. On the distribution systems of the two operators, the total time of all interruptions due to planned works was three and six hours, respectively. In the areas of the remaining five operators, the total time of interruptions due to planned works was recorded as between 35 and 749 hours. A total of 749 hours of interruptions were recorded for the operator with the most consumers. The duration of each interruption varied by operator from a minimum of one hour to a maximum of eight days. For the longest interruption, 24 out of 54,707 consumers had their supply interrupted in October. For two of the seven operators with interruptions, the longest interruption did not exceed three hours and for two seven hours. For the others, the longest interruptions were up to 12 hours for two and eight days for the operator with the longest interruption. Most of the planned interruptions lasted up to six- hours.

Compared to 2022, the total supply interruption time due to planned works increased by around 30%

141 The number of new connections does not reflect the difference in the number of active consumption points in the transmission system at the end of 2023 compared to the previous year, because the total number of active consumption points only includes those with a contract for leasing transmission capacity.

There were 929 unplanned interventions on distribution systems, an increase of just under 57% compared to the previous year. These interventions caused 78 interruptions to supply. The total unplanned interruptions were 6,908 hours, which is incomparable with the year before when interruptions lasted just under 200 hours. Five operators had no such interruptions, three had total unplanned interruptions of between 8 and 43 hours, and the remaining had total unplanned interruptions of between 66 and 2,633 hours. The long unplanned interruptions were due to force majeure related to the August floods. This situation is also reflected in the supply continuity indicators SAIDI, which shows the length of the interruptions per customer, and SAIFI, which indicates the number of interruptions per customer. The SAIDI for the distribution networks in total for 2023, which considers the length of all interruptions, is 492.91 min/consumer, while it was only 29.32 min/consumer in 2022. Due to flooding, the SAIDI indicator for unplanned interruptions reached a value of 489.29 min/consumers in 2023 and only 5.05 min/consumer in 2022. These are also reflected in the change in the SAIFI indicator, which for the same period and all distribution networks was 0.0837 interruptions/customer in 2023 and 0.045 interruptions/consumer in 2022. The SAIFI indicator for unplanned interruptions reached 0.079 interruptions/customer and 0.020 interruptions/consumer in 2022.

The long-lasting unplanned interruptions were due to force majeure in connection with floods in August

498 works were also carried out on distribution systems at the request and for the needs of third parties; the total time spent on these works amounted to 5,109 hours, an increase of 52% compared to the previous year.

Maintenance work was carried out in the areas of all TSO operators, resulting in a total of eight hours of supply interruption. The work was carried out during collective leave so that consumers were not disrupted. The total duration of the planned work was 6,414 hours, of which the total duration of routine maintenance work was 3,365 hours, inspections were 2,240 hours, tests were 265 hours, and check measurements were 344 hours.

The activities of the TSO and DSOs related to the connection of system users and maintenance works on the system in the 2021–2023 period are shown in table 38.

TABLE 38: CONNECTION AND MAINTENANCE WORK PARAMETERS IN THE 2021–2023 PERIOD

Gas operator	TSO			DSOs		
	2021	2022	2023	2021	2022	2023
Connection-related services						
Number of approvals issued	13	9	5	2,257	956	796
Average duration of the administrative procedure [days]	40	32	2	7	7	7
Maximum length of the administrative procedure [days]	-	-	-	15	15	15
Minimum length of the administrative procedure [day]	-	-	-	1	1	1
Number of connections performed	1	7	1	2,042	1,021	822
Average duration of the entire connection procedure [days]	188	381	429	15	20	15
Maximum length of the entire connection procedure [days]	-	683	429	31	48	30
Minimum length of the entire connection procedure [days]	-	-	-	2	4	8

Maintenance work on the system						
Number of planned works performed	15	54	75	2,275	2,398	2,368
Total duration of the planned work [hours]	108,560	106,720	107,568	107,372	130,254	106,314
Total duration of supply interruption due to planned work [hours]	21	35	71	1,223	793	1,036
Maximum duration of each scheduled interruption [hours]	11	8	54	150	55	192
Minimum duration of each schedule interruption [hours]	10	6	6	1	1	1
Number of unplanned interventions performed	259	275	329	777	592	929
Total duration of the unplanned interventions [hours]	581	789	777	2,390	2,107	6,169
Number of supply interruptions due to unplanned work [hours]	-	-	1	123	68	78
Total duration of the supply interruption due to unplanned interventions [hours]	-	-	14,00	522	201	6,908

SOURCE: ENERGY AGENCY

Network Charges for Gas Transmission and Distribution Systems

Setting the Network Charge

The Energy Agency regulates natural gas transmission and distribution activities using the regulated network charges method. It ensures system operators can cover all the eligible costs of the regulatory period and any network charge deficit from previous years by setting network charges and other revenues, considering the network charge surpluses of earlier years. The eligible costs of a system operator are the costs necessary for the performance of the distribution or transmission of natural gas and that meet the criteria set out in the methodology for establishing the regulatory framework issued following Article 104 of the Gas Supply Act.

Through economic regulation, the Energy Agency promotes the cost-efficiency of the system operators, ensuring their continued and stable operations, a stable environment for investors or owners, and stable and predictable conditions for system users. Incentives are conditional on the realisation of eligible costs, the assets taken over free of charge and the achievement of a 25% difference between the TSO's revenues and costs when purchasing additional capacity under the excess leasing and repurchase programme.

Before the start of the regulatory period, system operators, with the agreement of the Energy Agency, determine the planned eligible costs and the planned resources to cover these costs on the basis of the methodology for setting the regulatory framework. At the same time, taking into account the methodology for the calculation of the network charge, they determine the tariffs for the regulatory period.

After the end of each regulatory period year, the system operators must identify any deviations from the regulatory framework as the difference between the recognised eligible costs and the recognised resources to cover the eligible costs, calculated based on the criteria for their determination set out in the methodology for setting the regulatory framework. In the context of identifying deviations from the regulatory framework, the eligibility of system operators for incentives is also verified. Deviations from the regulatory framework are reflected in a deficit or surplus of the network charge.

The Regulated Network Charge method requires system operators to consider the network charge surplus as a dedicated resource to cover network charge deficits from previous years or eligible costs in subsequent years. At the same time, the method gives the system operator the right to take the network charge deficit into account when setting the network charge in subsequent years.

A new three-year regulatory period for system operators came into force on 1 January 2022 and will last until 31 December 2024. In 2021, the Energy Agency issued an Act amending and supplementing the Act on the Methodology for Determining the Regulatory Framework for the Operator of the Natural Gas System.

Based on that Act, in 2021, the system operators, with the prior consent of the Energy Agency, set the regulatory framework, the network tariffs, and the tariffs for other services for the 2022–2024 period.

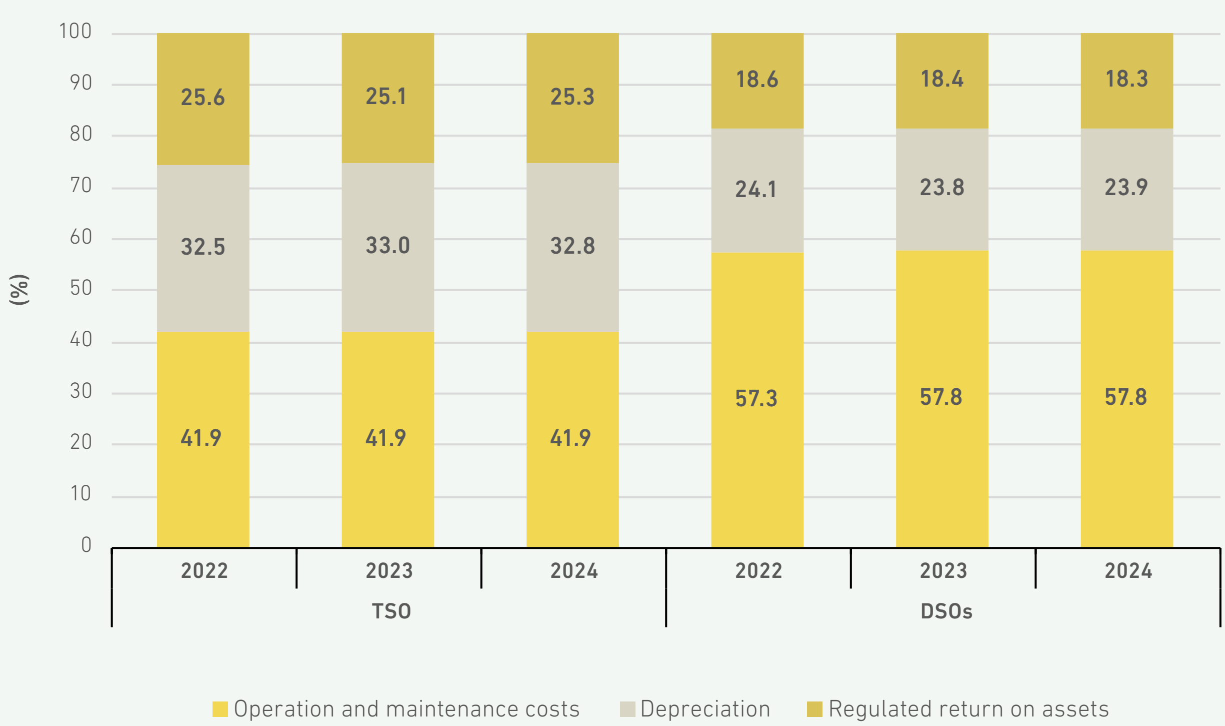
For this three-year period, the TSO has planned eligible costs of EUR 147.6 million, 10% lower than the previous three-year regulatory period. The distribution system operators have planned a total of EUR 154.5 million of eligible costs for the 2022–2024 regulatory period, which is 1% lower than the previous three-year 2019–2021 regulatory period.

EUR 154.5 million for the operation of distribution systems in the 2022-2024 regulatory period

EUR 147.6 million for the operation of the transmission system in the 2022-2024 regulatory period

Figure 175 shows the structure of the planned eligible costs of the system operators for each year of the 2022–2024 regulatory period. The comparison of the structures of the planned eligible costs shows that for each year of the 2022–2024 regulatory period, the structure of the planned eligible costs of both the distribution system operators and the transmission system operator does not change significantly.

FIGURE 175: THE STRUCTURE OF THE PLANNED ELIGIBLE COSTS OF THE SYSTEM OPERATORS IN THE 2022–2024 PERIOD

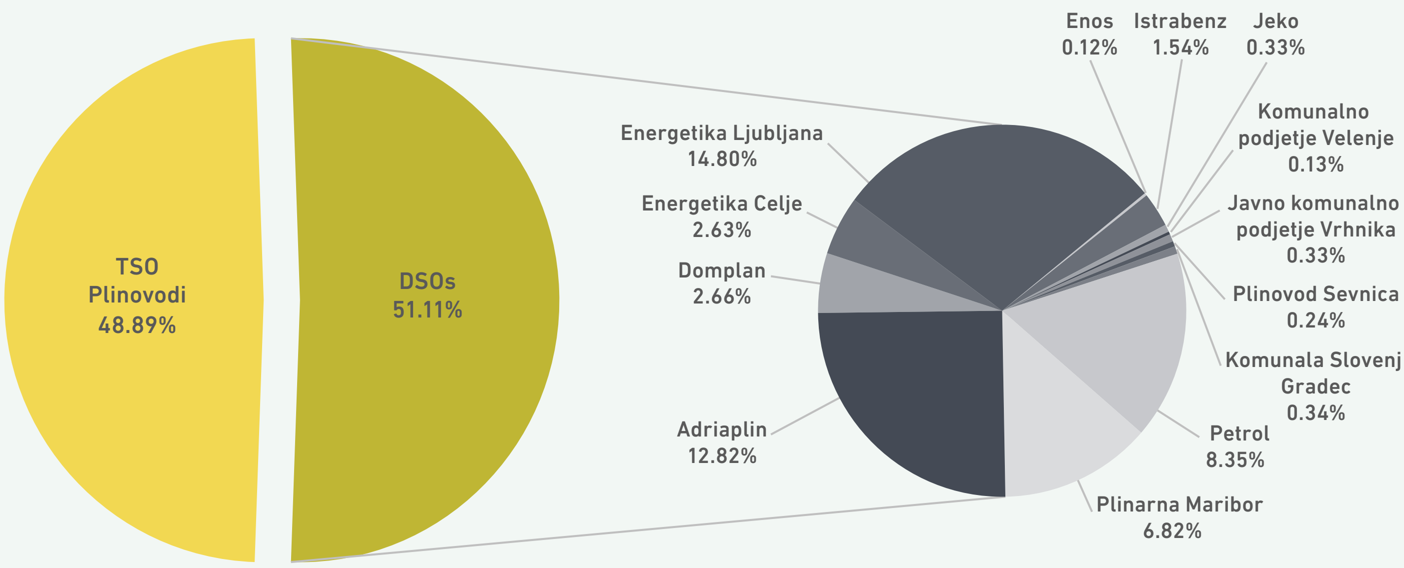


SOURCE: ENERGY AGENCY

The year 2023 was the second year of the 2022–2024 regulatory period. For 2023, the distribution system operators planned eligible costs of EUR 51.3 million and the transmission system operator EUR 49 million. Figure 176 shows the structure of the planned eligible costs in 2023 for the activities of the system operators.

The largest share of the eligible costs of the transmission and distribution system operators is allocated to operation and maintenance costs

FIGURE 176: THE STRUCTURE OF THE PLANNED ELIGIBLE COSTS OF SYSTEM OPERATORS FOR 2023



SOURCE: ENERGY AGENCY

The Network Charge for the Natural Gas Transmission System

The network charge for the natural gas transmission system is levied on transmission system users and consists of:

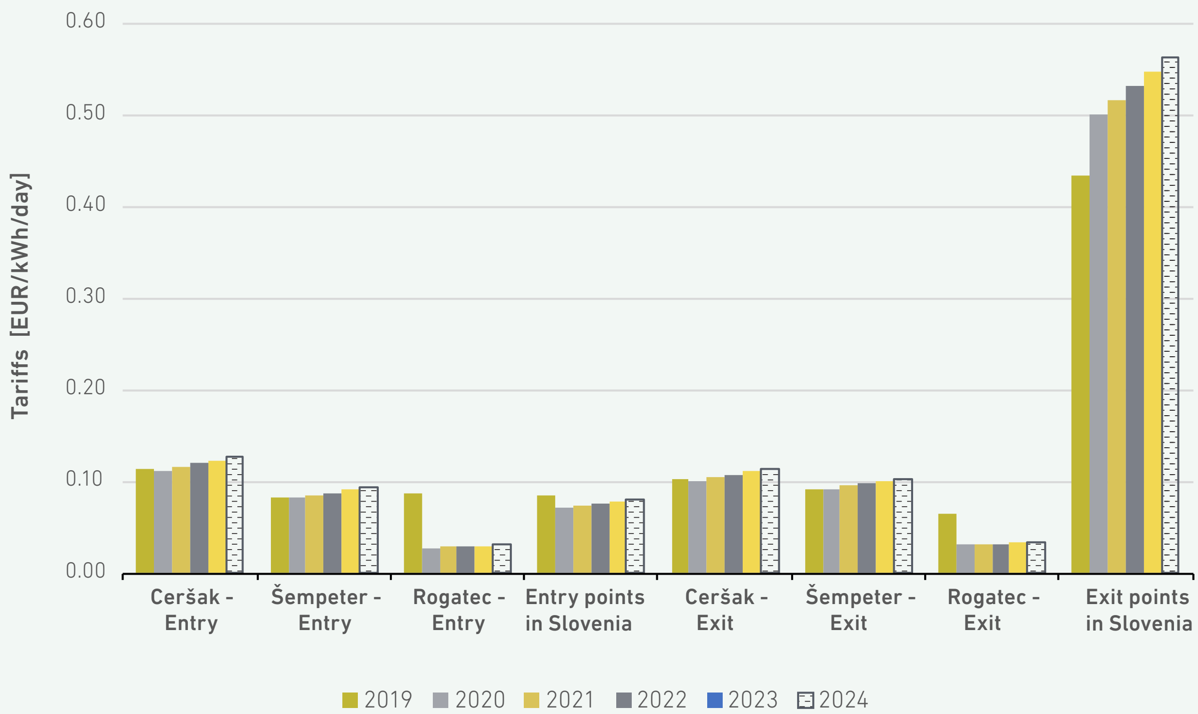
- network charge for the entry point,
- network charge for the exit point,
- network charge for own use; and
- network charge for measurements.

The network charge for each entry/exit point depends on the product's capacity and booked capacity. Transmission system users book the capacity of interconnection points or border points via an online booking platform as an annual, quarterly, monthly, daily or intraday standard capacity product.

System users leasing capacity within Slovenia may, however, lease annual, monthly or daily standard capacity products and day-ahead standard capacity products. For these users, the network charge for the intra-Slovenian exit point until 2024 will also be determined based on their classification into a consumption group according to the level of capacity booked.

Transmission system users who book capacity are charged the network charge for their use and the network charge for measurements. The network charge for own use depends on the amount of natural gas transferred at each exit point, and the network charge for measurements depends on the size of the measuring device and the number of pressure reductions.

FIGURE 177: MOVEMENT OF THE NETWORK CHARGE TARIFFS FOR THE ENTRY AND EXIT POINTS OF THE TRANSMISSION SYSTEM DURING THE 2019–2024 PERIOD



SOURCE: ENERGY AGENCY

The network charge tariffs for 2023 were set by the TSO in the context of the determination of the 2022–2024 regulatory period. The network charge tariffs increased by 2.9% in 2023 compared to 2022.

Network Charges for the Natural Gas Distribution Systems

The natural gas distribution system's network charge consists of a distribution network charge and a network charge for measurements.

The distribution system operator determines the network charge tariffs uniformly for all the areas where it distributes natural gas. Only in specific cases may network charge tariffs differ for different areas of service.

The distribution system users pay the network charge for distribution according to the quantity of natural gas distributed, which forms the variable part of the distribution tariff, and according to the booked capacity, which reflects the fixed part of the network charge. For smaller consumers, this is calculated as a monthly flat-rate fee, and for larger consumers, it is calculated as the amount of connected power or booked capacity.

The network charge for metering depends on the size and type of the measuring device and the ownership or management of that device.

The 2023 network charge tariffs were set in 2021 when the consents to the 2022–2024 regulatory framework were issued. In 87 municipalities, 17 Acts setting the network charge tariffs for the distribution network were applied to calculate the network charge.

Distribution system operators are required to show the amount for natural gas distribution separately from the amount for metering on the distribution system user's bill.

The annual amounts of the network charges paid by consumers with an estimated annual consumption of up to 50,000 kWh, which is just under 96% of all consumers in distribution systems, have mostly stayed the same for most consumers in 2023 compared to 2022 and 2021.

The network charges for the majority of consumers in distribution systems remained at the level of the previous two years

The following figures show the movement of the network charge for distribution per megawatt-hour of natural gas consumed for typical household and medium-sized industrial consumers in each year of the 2019–2023 period for the seven operators distributing natural gas in the 10 largest municipalities by number of consumers. These operators are responsible for distribution in 72 other municipalities, meaning that the network charges apply to 82 geographical areas in 80 municipalities out of a total of 87 and to just under 98% of all consumers.

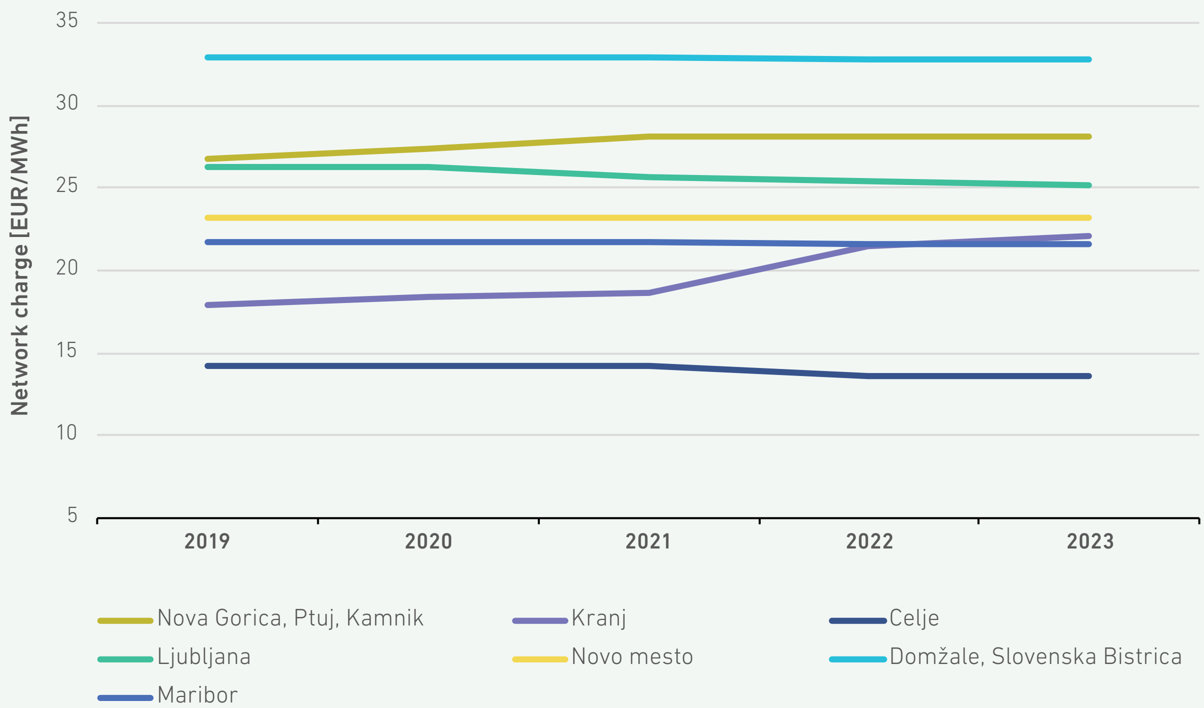
For typical smaller household consumers (group D1 with an annual consumption of 3,765 kWh), medium-sized household consumers ('consumer group D2' with an annual consumption of 10 MWh), medium-sized household consumers ('consumer group D2' with an annual consumption of 32 MWh) and large household consumers ('consumer group D3' with an annual consumption of 215 MWh), the network charge has increased in three geographic areas compared to the previous year in the range from 3.3% to 3.9%; consumers in 70 geographic areas paid the same as the previous year and nine geographic areas saw a reduction of around 1%.

The average values of the changes in the annual network charge amount for each type of household consumer over the five years between 2018 and 2023 are:

- smaller household consumers (group D1 with an annual consumption of 3,765 kWh) ranging from –22.8% to +20.6% (annual average from –4.6% to +4.1%);
- medium-sized household consumers (group D2 with an annual consumption of 10 MWh) in the range from –20.1% to +6.8% (annual average –4% to +1.4%);
- medium-sized household consumers (group D2 with an annual consumption of 32 MWh) in the range from –33.1% to +5.2% (annual average –6.6% to +1%);
- large residential consumers (group D3 with an annual consumption of 215 MWh), ranging from –15.4% to +19.1% (annual average from –3.1% to +3.8%).

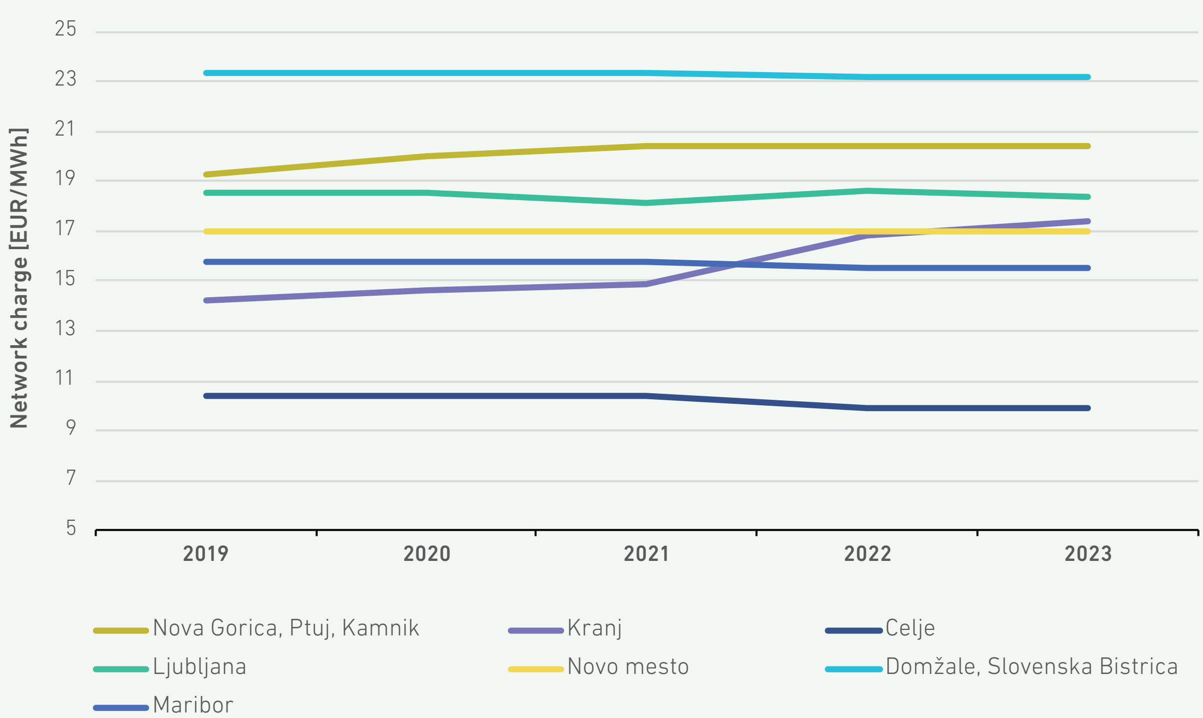
For individual DSOs, the annual network charges were up to 33% lower than five years ago. The highest increase in network charges between 2018 and 2023 was recorded for DSO Petrol, for the smallest consumers with an average annual consumption of 3,765 kWh and the largest consumers with an average annual consumption of 215,200 kWh. For the smallest consumers, the network charges were 20.6% higher than five years ago, while for the largest household consumers, the network charges were 19.1% higher than in 2018. The evolution of the network charges in the 2019–2023 period is shown in Figures 178, 179, 180 and 181.

FIGURE 178: DISTRIBUTION NETWORK CHARGE MOVEMENT FOR SMALL HOUSEHOLD CONSUMERS D1 (3,765 kWh) IN THE 2019–2023 PERIOD



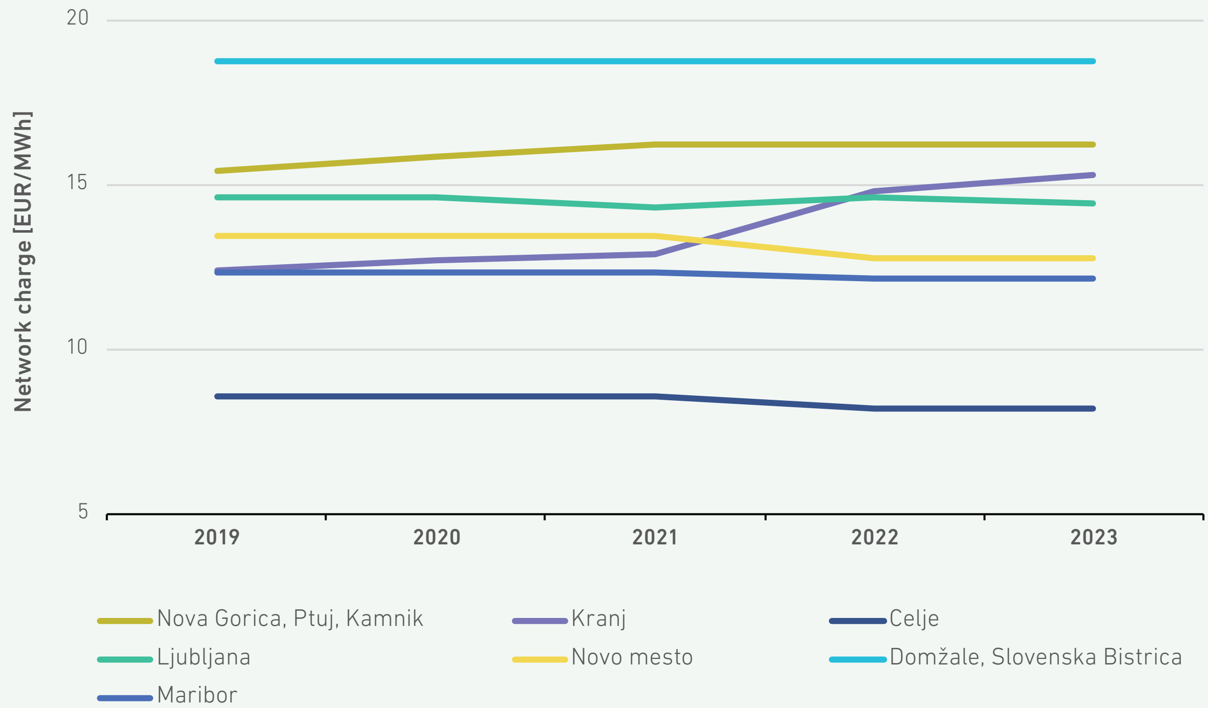
SOURCE: ENERGY AGENCY

FIGURE 179: DISTRIBUTION NETWORK CHARGE MOVEMENT FOR MEDIUM-SIZED HOUSEHOLD CONSUMERS D2 (10 MWh) IN THE 2019–2023 PERIOD



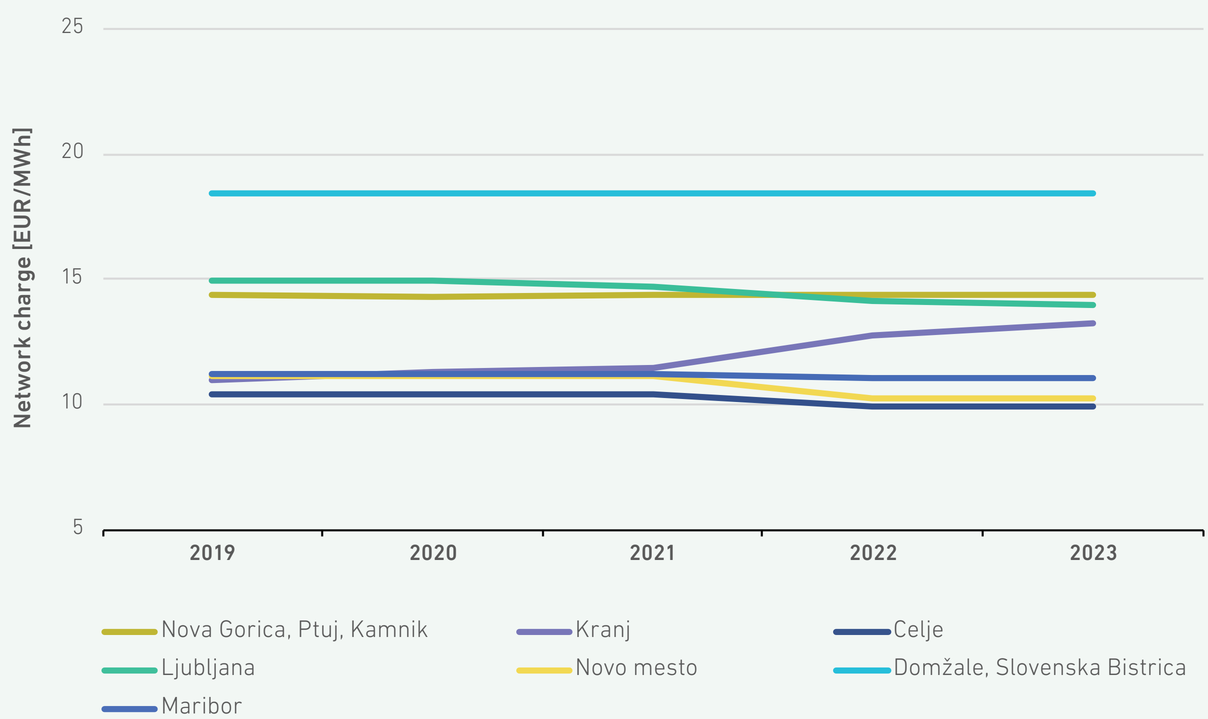
SOURCE: ENERGY AGENCY

FIGURE 180: DISTRIBUTION NETWORK CHARGE FOR MEDIUM-SIZED HOUSEHOLD CONSUMERS D2 (32 MWh) IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

FIGURE 181: DISTRIBUTION NETWORK CHARGE FOR LARGE HOUSEHOLD CONSUMERS D3 (215 MWh) IN THE 2019–2023 PERIOD



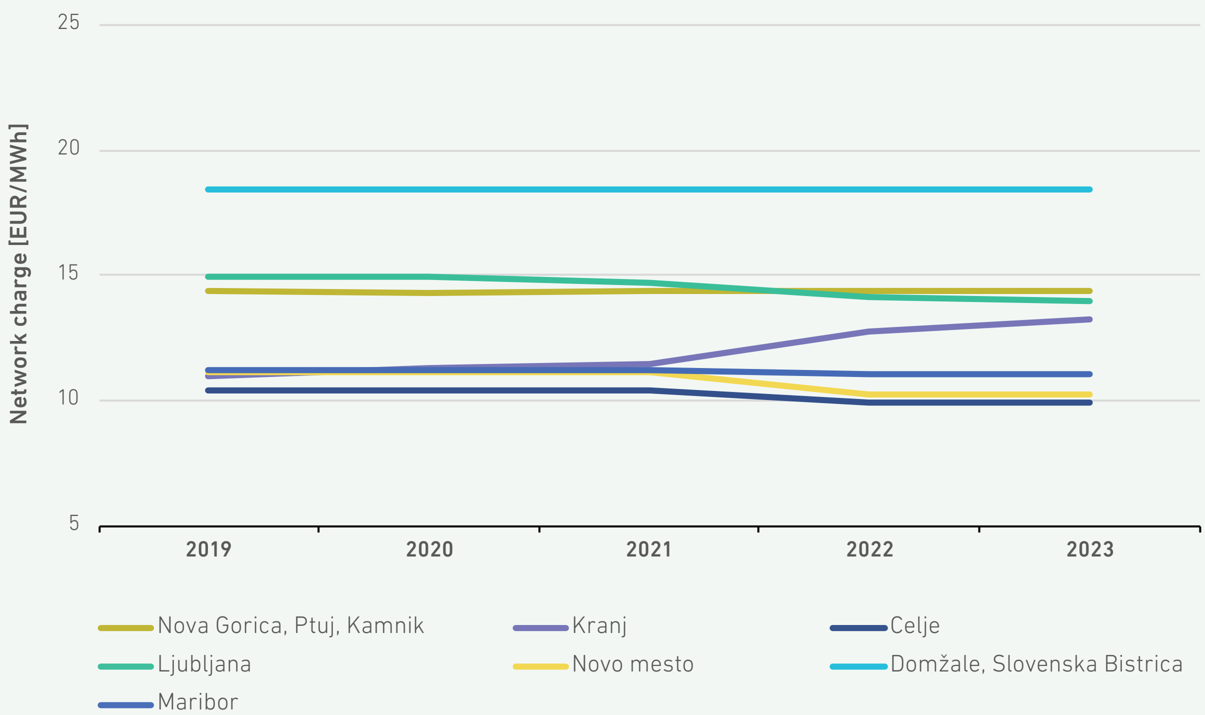
SOURCE: ENERGY AGENCY

For medium-sized industrial consumers (group I3 with an annual consumption of 8,608 MWh), the average annual network charge increased by 1.7% compared to the previous year in three geographic areas, consumers paid the same network charge as the previous year in 70 areas, and it decreased by around one percent in nine areas.

Most medium-sized industrial consumers paid equal or lower network charges in 2023

Depending on the operator, the average annual change in network charges for these consumers over the last five years ranged between −12.5% and +6.2%. In 79 geographic areas, consumers paid between 1.3% and 12.5% less network charges than five years ago. The differences in the annual network charge amounts in the individual municipalities reflect the different structures of consumers and their consumption, as well as the age and size of the distribution systems. The movement of network charges for medium-sized industrial consumers in the 2019–2023 period is shown in Figure 182.

FIGURE 182: DISTRIBUTION NETWORK CHARGE MOVEMENT FOR MEDIUM-SIZED INDUSTRIAL CONSUMERS – I3 (8.608 MWh) IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

Capacity at Border Points

Capacities at border points were allocated on the basis of market-based methods through the online reservation platform PRISMA. Auctions have been carried out for firm and interruptible capacities. There were 62,354 auctions published. Individual and bundled capacities were offered at auctions. The number of successful auctions of firm capacity was 1,020, 15% less than in the previous year. Of the total successful auctions, 80% were auctions of bundled capacity, and the overall success rate was 1.6%. There were also six successful auctions of interruptible day-ahead capacity at the Rogatec border entry point. There were no auctions of incremental capacity in 2023.

TABLE 39: NUMBER OF SUCCESSFUL FIRM CAPACITY AUCTIONS 2023

Auction	Ceršak entry	Rogatec entry	Rogatec exit	Šempeter entry	Šempeter exit	Total
Annual	2	1	1	1	0	5
Quarterly	4	7	0	1	0	12
Monthly	21	6	5	4	0	36
Day-ahead	372	42	19	53	57	543
Intraday	164	67	43	26	124	424
Total	**563**	**123**	**68**	**85**	**181**	**1,020**
Bundled	360	122	68	85	181	816
Individual capacity	203	1	0	0	0	204

SOURCES: ENERGY AGENCY, PLINOVODI

Compared to the previous year, the number of auctions at the Šempeter exit point increased the most, while the number of auctions at the Rogatec exit point decreased the most.

TABLE 40: COMPARISON OF THE NUMBER OF SUCCESSFUL AUCTIONS OF FIRM CAPACITY IN 2022 AND 2023

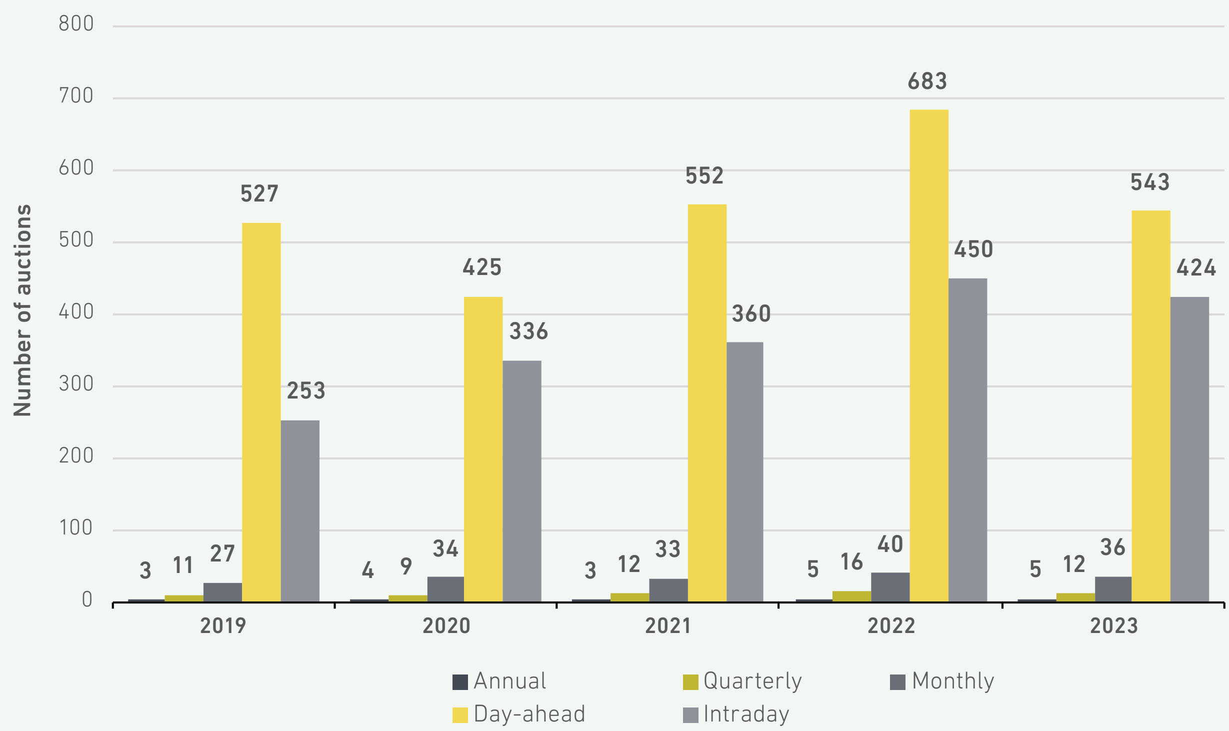
Year	Ceršak entry	Rogatec entry	Rogatec exit	Šempeter entry	Šempeter exit	Total
2022	592	105	240	184	73	1,194
2023	563	123	68	85	181	1,020
Index	0.95	1.17	0.28	0.46	2.48	0.85

SOURCE: ENERGY AGENCY, PLINOVODI

Figure 183 shows the auctions of firm transmission capacity held over the last five years. Compared to a year earlier, the number of day-ahead auctions in 2023 is down by 20%, but they still account for more than half of all auctions. Intraday capacity auctions follow with 42% of all auctions, while monthly, quarterly and annual capacity auctions account for only 5%. Short-term capacity booking remains the most commonly used method of capacity booking. The reasons are the increasing optimisation of capacity booking, the unpredictability of the natural gas market and the sufficient available capacity at border crossing points.

20% fewer successful auctions of day-ahead capacity

FIGURE 183: SUCCESSFUL AUCTIONS OF FIRM CAPACITY IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

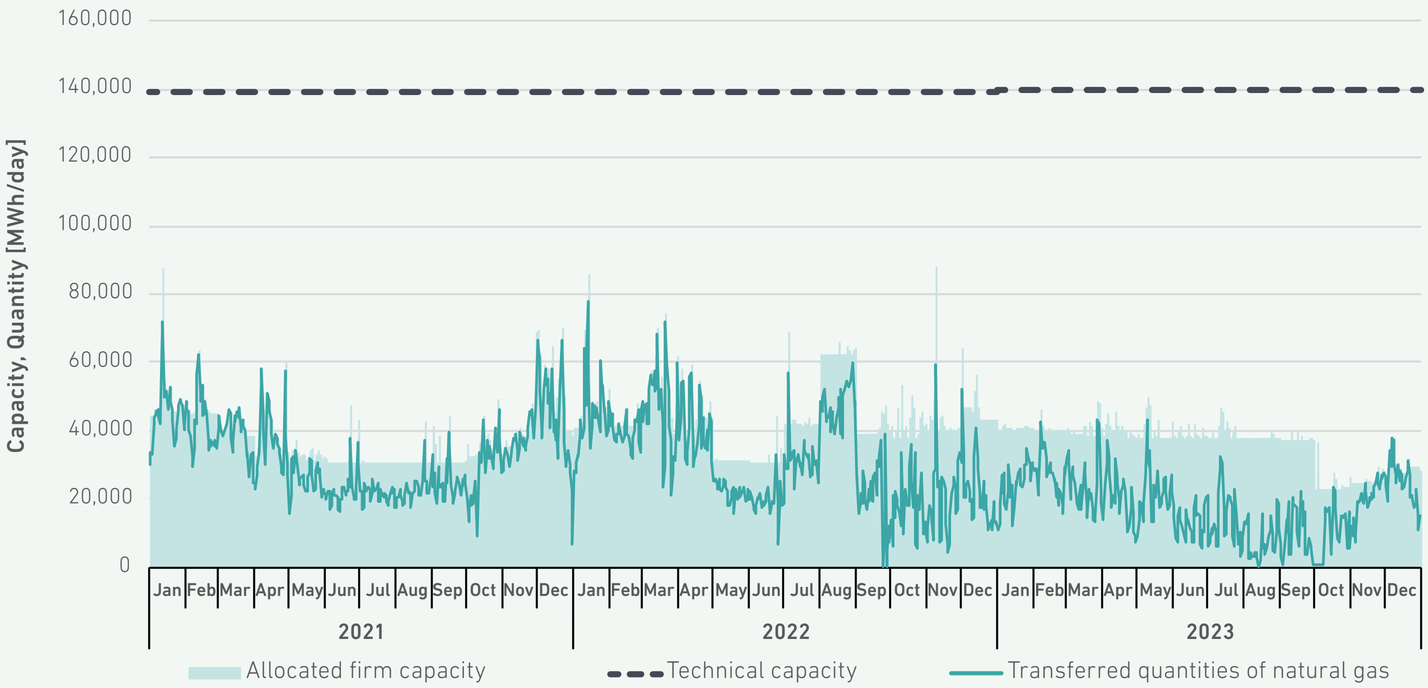
The TSO carried out a market demand assessment in cooperation with neighbouring TSOs.

At the Rogatec entry point, non-binding interest has been expressed in booking more capacity than the current technical capacity. Therefore, the Slovenian and Croatian TSOs decided to carry out technical studies to increase the capacity. Although there was no non-binding demand for the new planned border point at Pince, which would connect the Hungarian and Slovenian transmission systems, the TSOs of Slovenia and Hungary decided to continue their activities to establish a bi-directional pipeline link between them.

The leasing of firm capacity at Ceršak, Slovenia's largest border entry point, fell by 17% compared to the previous year. The reduction in the annual quantities transported was even greater, with a 42% drop compared to last year. There was no leasing of interruptible capacity.

At Ceršak, 17% less capacity was booked and 42% less gas was transported

FIGURE 184: DYNAMICS OF THE DAILY TRANSFERRED QUANTITIES OF NATURAL GAS, TECHNICAL CAPACITY, AND ALLOCATED FIRM AND INTERRUPTIBLE CAPACITY AT THE CERŠAK ENTRY POINT IN THE 2021–2023 PERIOD



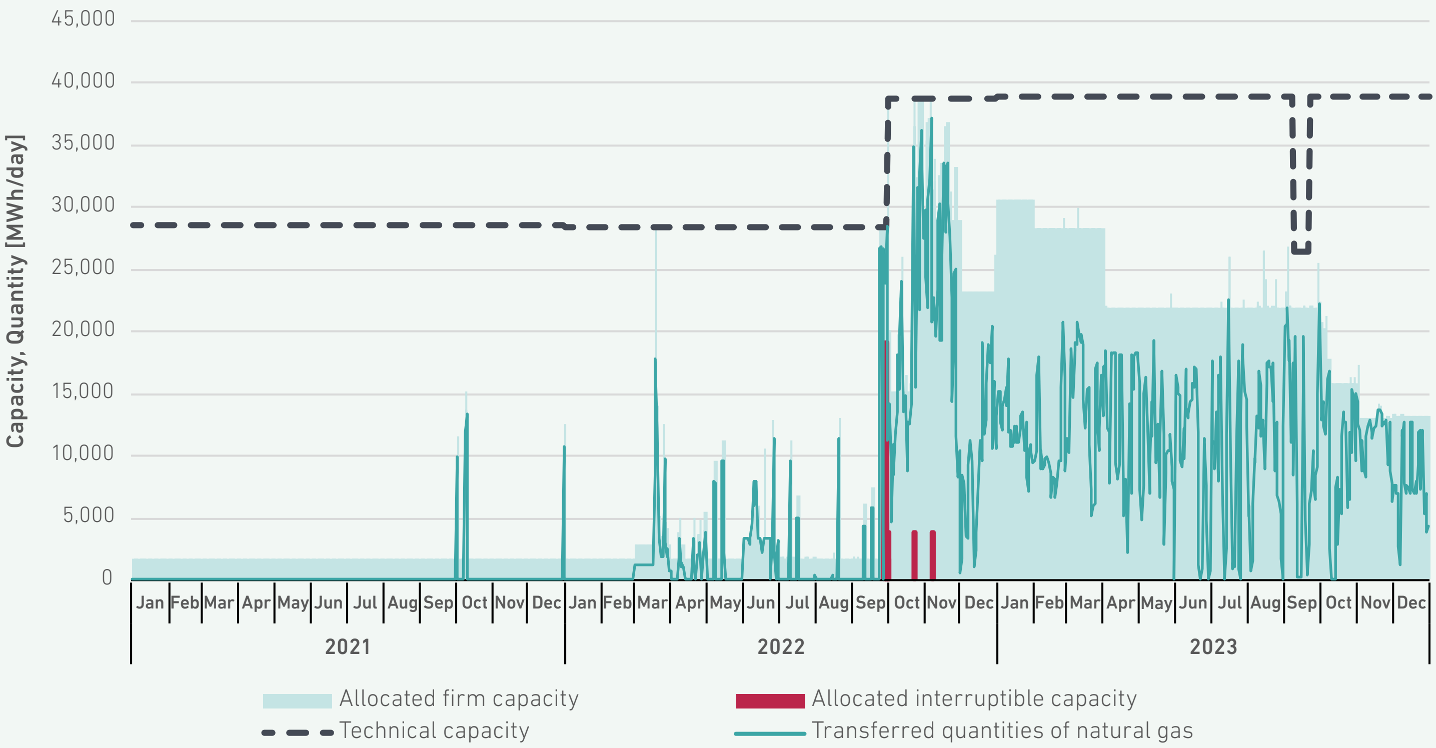
SOURCES: ENERGY AGENCY, PLINOVODI

At the Ceršak border point, there is no physical gas flow from Slovenia to Austria, so gas flowed virtually to Austria as gas swaps (swapping). 26 GWh of gas was swapped, representing only 5% of the 2022 volumes.

At the Šempeter entry point, 2.3 times more capacity was booked than the previous year. As the technical capacity was increased in 2022, there was no need to lease interruptible capacity in 2023. The quantities of gas transported were 1.9 times higher than the previous year. Due to necessary maintenance work on the transmission system, the technical capacity at this entry point was reduced by one-third for 14 days in September.

2.3 times more capacity booked and 1.9 times higher gas volumes were transported to Šempeter-entry

FIGURE 185: DYNAMICS OF THE DAILY TRANSFERRED QUANTITIES OF NATURAL GAS, TECHNICAL CAPACITY, AND ALLOCATED FIRM AND INTERRUPTIBLE CAPACITY AT THE ŠEMPTER ENTRY POINT IN THE 2021–2023 PERIOD

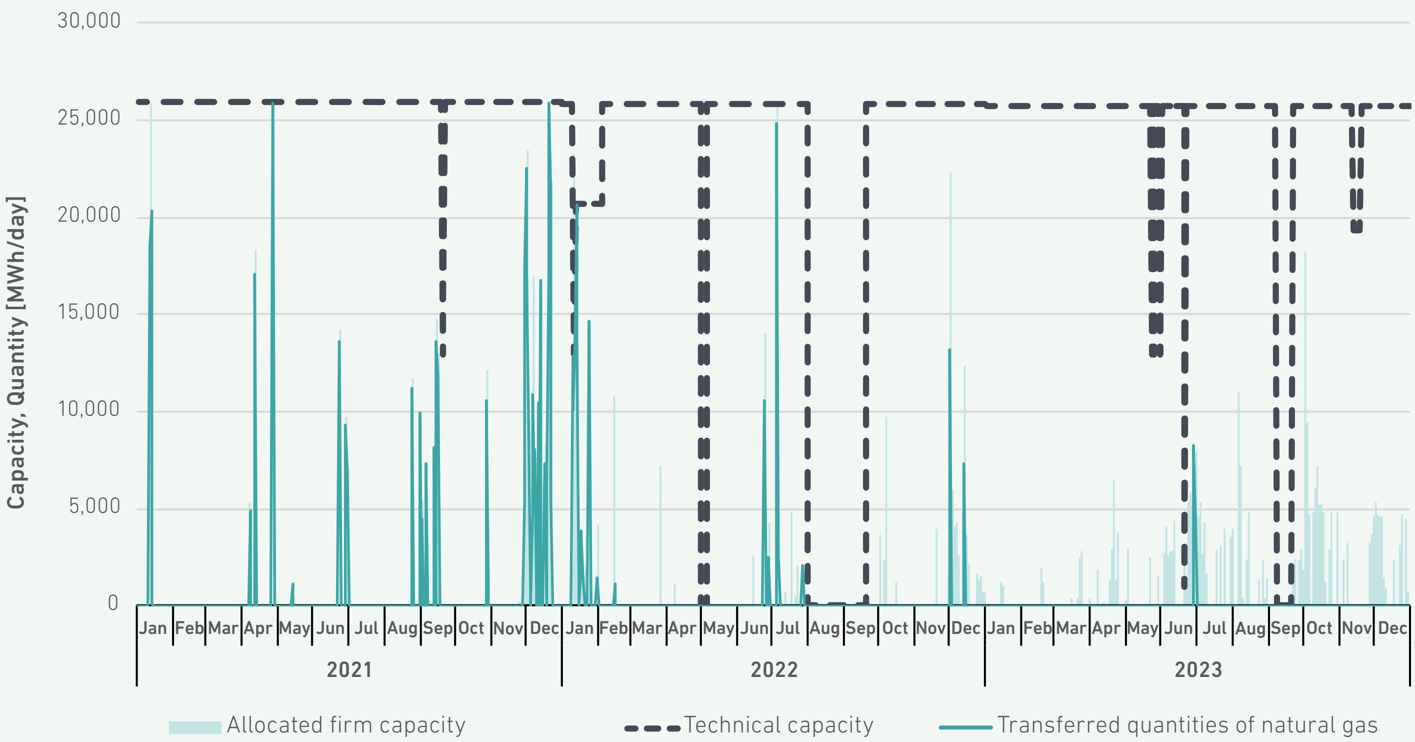


SOURCES: ENERGY AGENCY, PLINOVODI

At the Šempeter exit point, with no long-term booked capacity, the capacity was booked only on individual days, with the largest amount in the last quarter. The average annual leasing of transmission capacity was only 4.6% of the technical capacity. Gas transmission took place on only two days, with 12 GWh of gas transferred to Italy, 13 times less than the previous year. There was no booking of interruptible capacity.

Due to necessary maintenance work on the transmission system, a complete reduction of the guaranteed transmission capacity was completed at this exit point for 14 days in September. Technical capacity was also reduced on specific days in May and June and seven days in November.

FIGURE 186: DYNAMICS OF THE DAILY TRANSFERRED QUANTITIES OF NATURAL GAS, TECHNICAL CAPACITY, AND ALLOCATED FIRM AND INTERRUPTIBLE CAPACITY AT THE ŠEMPETER EXIT POINT IN THE 2021–2023 PERIOD

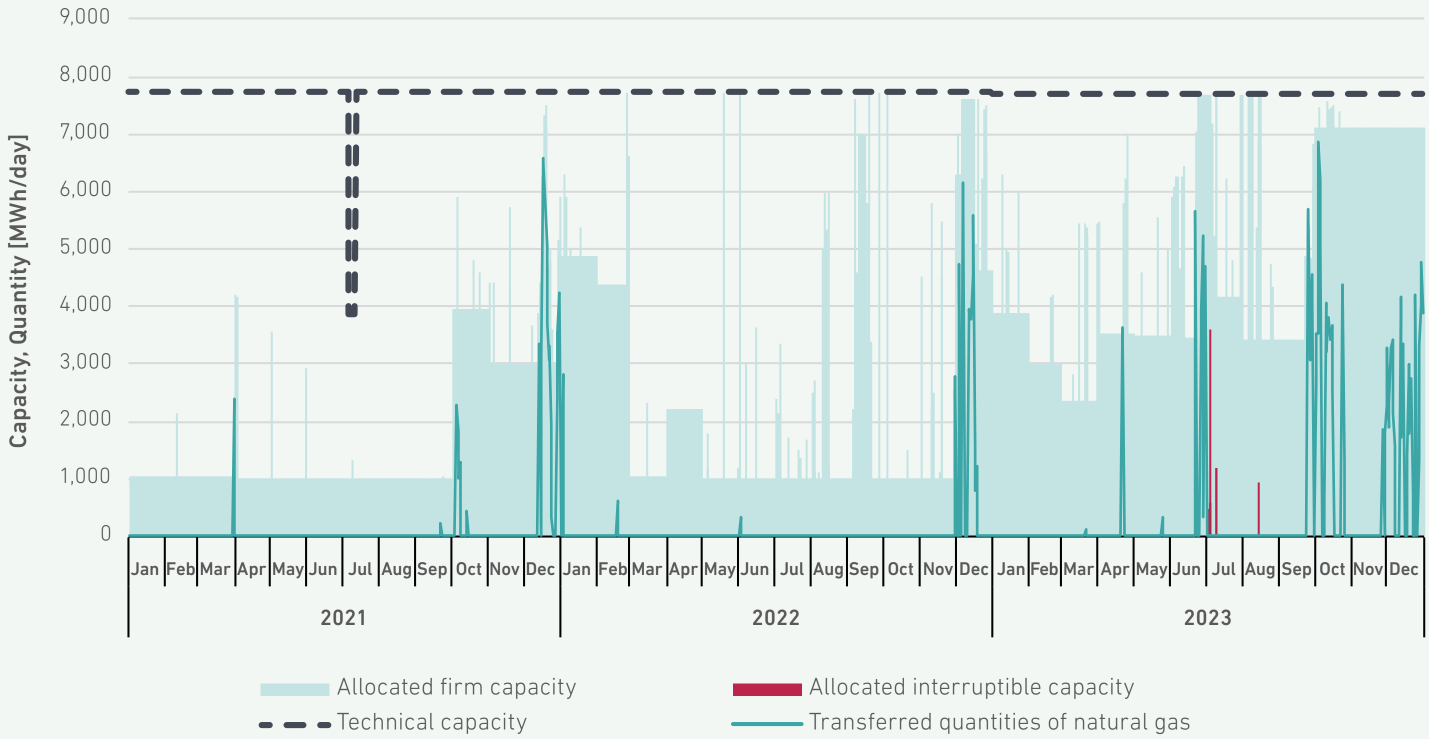


SOURCES: ENERGY AGENCY, PLINOVODI

At the Rogatec entry point, the highest demand for leased transmission capacity was in the last quarter of the year. On an annual basis, transmission capacity booking averaged 64% of the technical capacity, an increase of 30 percentage points compared to the previous year. As the technical capacity of the Rogatec entry point is only 7.7 GWh/day, both contractual and physical congestion can occur rapidly in the case of gas import needs from Croatia. In 2023, at least 90% of the technical capacity was thus leased for 118 days.

Physical gas flows were significantly lower than the contracted capacity, with the highest amount in the last quarter. Interruptible capacity was also booked on six days.

FIGURE 187: DYNAMICS OF THE DAILY TRANSFERRED QUANTITIES OF NATURAL GAS, TECHNICAL CAPACITY, AND ALLOCATED FIRM AND INTERRUPTIBLE CAPACITY AT THE ROGATEC ENTRY POINT IN THE 2021–2023 PERIOD

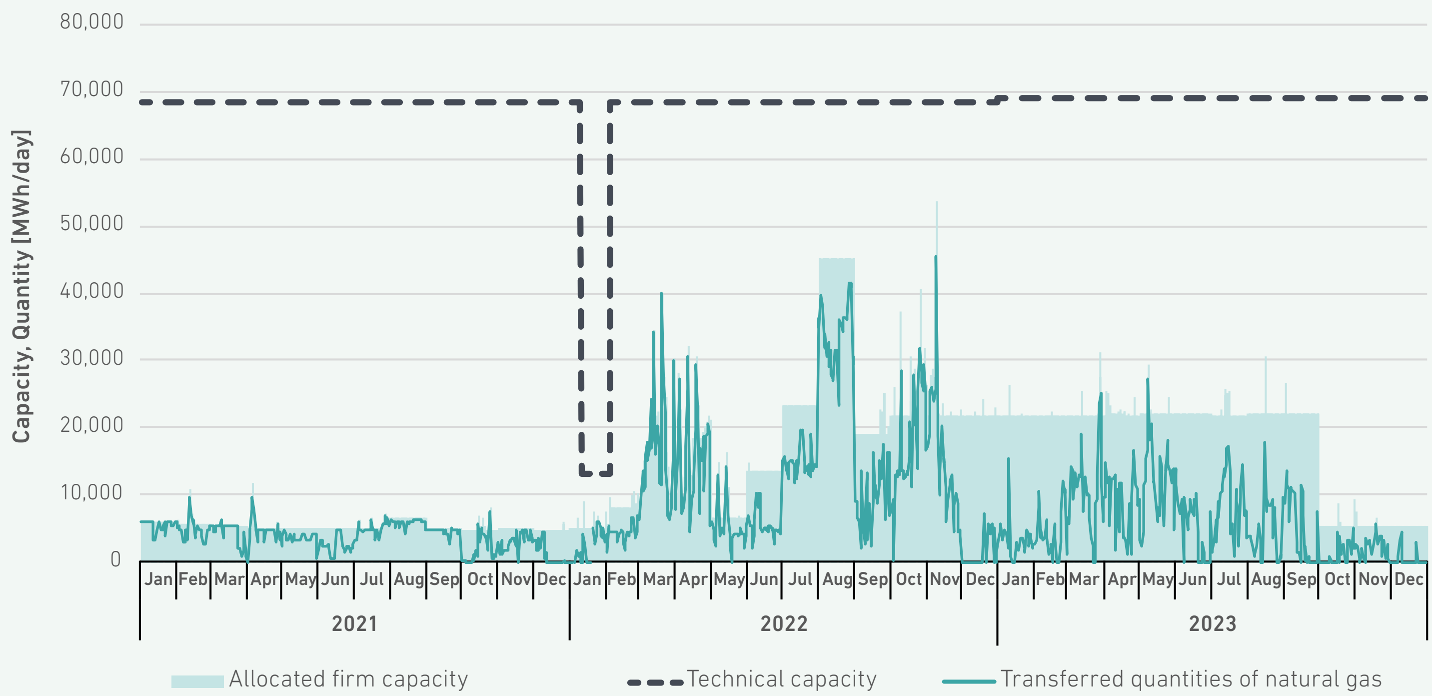


SOURCES: ENERGY AGENCY, PLINOVODI

At Rogatec, the largest exit point, 7% less transmission capacity was leased than the previous year. On average, 26% of the technical capacity was leased, down 4 percentage points compared to last year. Transmission volumes decreased significantly more than the leased capacity, with only 2,016 GWh, a decrease of 53%. There was no leasing of interruptible capacity.

7% less capacity leased and 53% less gas quantities transported to Rogatec-exit

FIGURE 188: DYNAMICS OF THE DAILY TRANSFERRED QUANTITIES OF NATURAL GAS, TECHNICAL CAPACITY, AND ALLOCATED FIRM AND INTERRUPTIBLE CAPACITY AT THE ROGATEC EXIT POINT IN THE 2021–2023 PERIOD

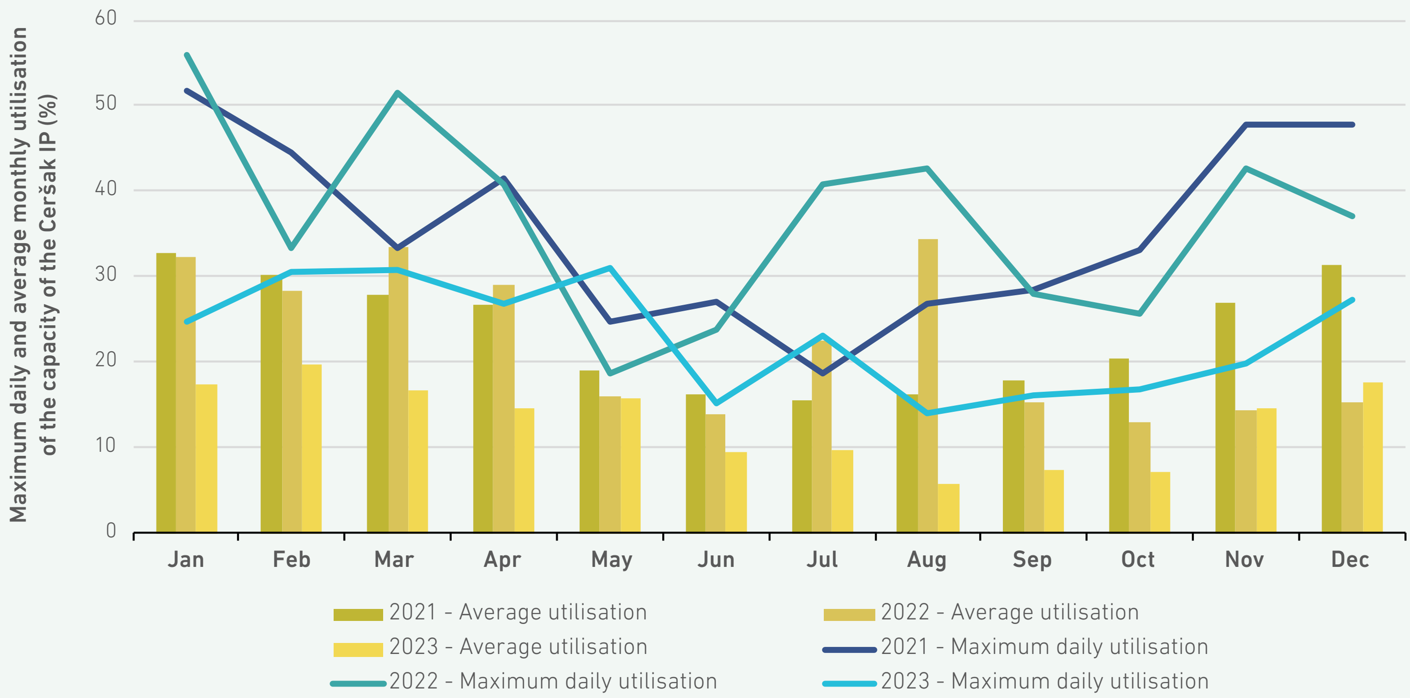


SOURCES: ENERGY AGENCY, PLINOVODI

The highest average monthly utilisation of the technical capacity of the Ceršak entry point was reached in February (20%) and the lowest in August (6%). The higher flows in the first half of the year are due to the heating season and the filling of storage facilities in Croatia. The highest daily technical capacity utilisation of 31% was reached in May.

The average monthly utilisation of the technical capacity at the Ceršak entry point was 13%, a decrease of 9 percentage points compared to the previous year.

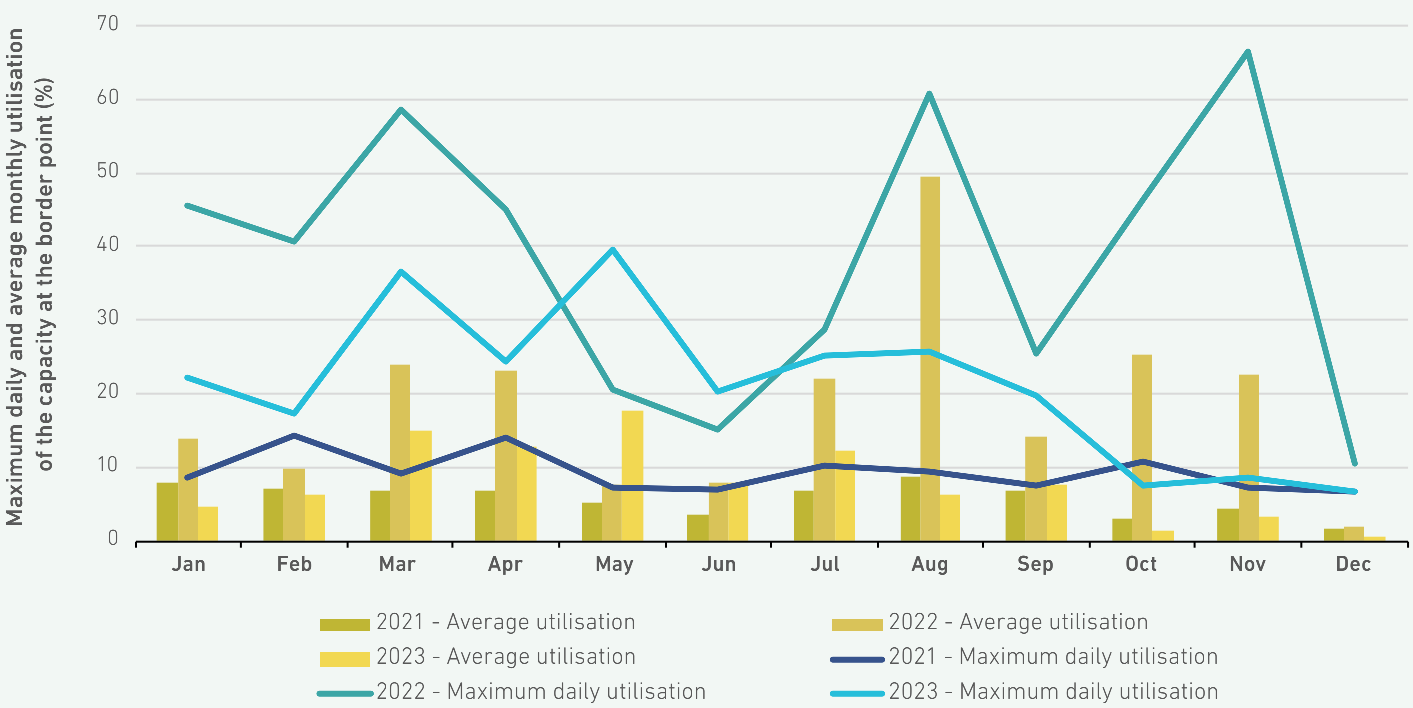
FIGURE 189: MAXIMUM DAILY AND AVERAGE MONTHLY UTILISATION OF THE CAPACITY OF THE CERŠAK BORDER ENTRY POINT IN THE 2021–2023 PERIOD



SOURCE: ENERGY AGENCY, PLINOVODI

The maximum daily utilisation of the Rogatec exit point's technical capacity was 40%, a decrease of 27 percentage points compared to the previous year, achieved in May. The average monthly utilisation of technical capacity was also significantly lower – at 8%, it was more than two times lower than the previous year. The highest average monthly technical capacity utilisation was 18%, achieved in May.

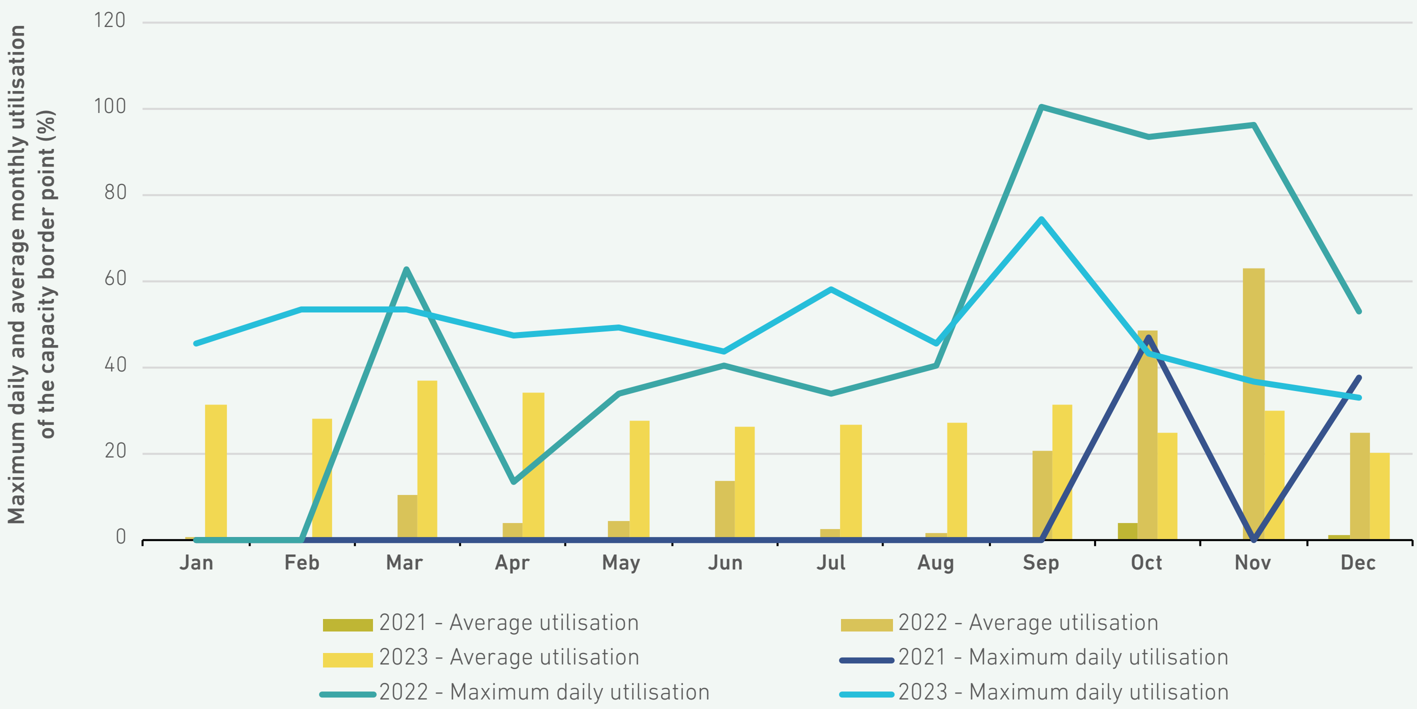
FIGURE 190: MAXIMUM DAILY AND AVERAGE MONTHLY UTILISATION OF THE CAPACITY OF THE ROGATEC BORDER EXIT POINT IN THE 2021–2023 PERIOD



SOURCE: ENERGY AGENCY, PLINOVODI

The average monthly utilisation of the technical capacity of the Šempeter entry point was 29%, while the highest average monthly utilisation of the technical capacity was in March (37%). The highest daily utilisation of the technical capacity was recorded in August at 74%.

FIGURE 191: MAXIMUM DAILY AND AVERAGE MONTHLY UTILISATION OF THE CAPACITY OF THE ŠEMPETER BORDER ENTRY POINT IN THE 2021–2023 PERIOD

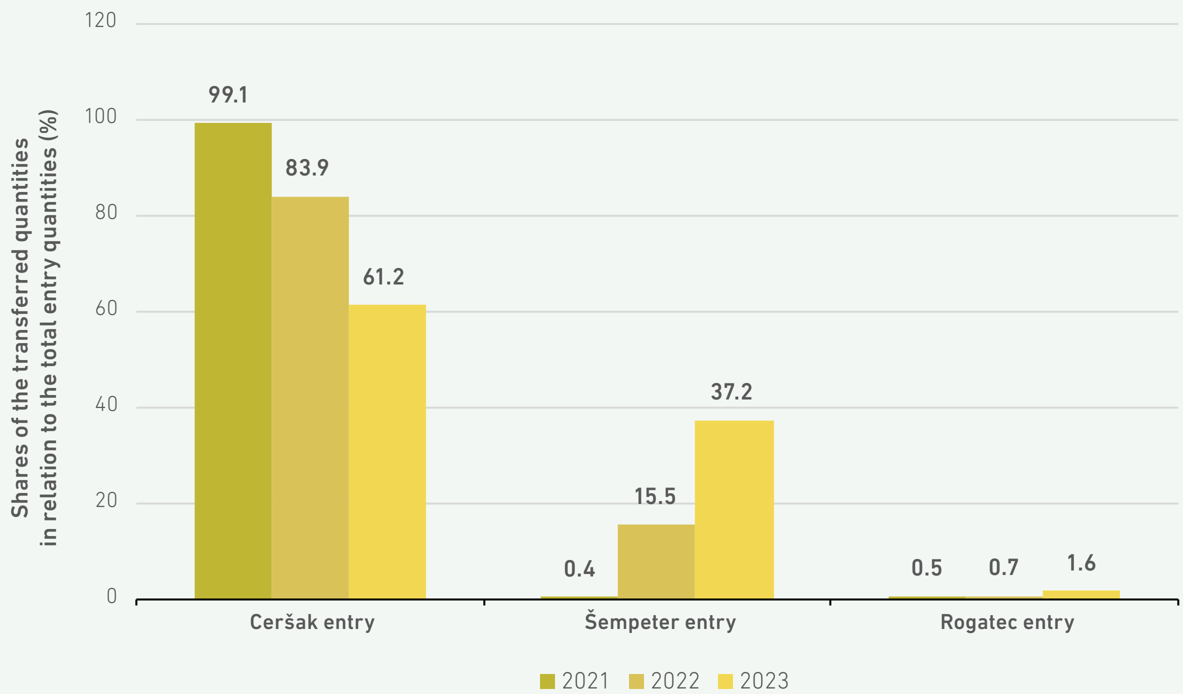


SOURCES: ENERGY AGENCY, PLINOVODI

Over the last two years, the quantities of gas transported at the two largest entry points have changed significantly. While in 2021, almost all gas entry quantities were transported through Ceršak, in 2023, gas transport through this entry point accounted for only 61% of the total volumes transported. In contrast, gas quantities through the Šempeter entry point increased from negligible in 2021 to 37% of the total quantities transported in 2023. The entry quantities at Rogatec have risen threefold in the last two years but still represent less than 2% of the total quantities transported.

A significant decrease in gas transmission through Ceršak and a significant increase in gas entry quantities through Šempeter

FIGURE 192: AVERAGE DAILY GAS TRANSPORT AT ENTRY POINTS TO SLOVENIA IN THE 2021–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

In the coming years, new supply contracts with Algeria and the increasing quantities of gas from Russia are expected to lead to even higher gas flows through the Šempeter entry point. The offloading of this entry point can only be expected by increasing the capacity at the Krk LNG terminal and by upgrading the entry capacity at Rogatec.

Promoting Competition

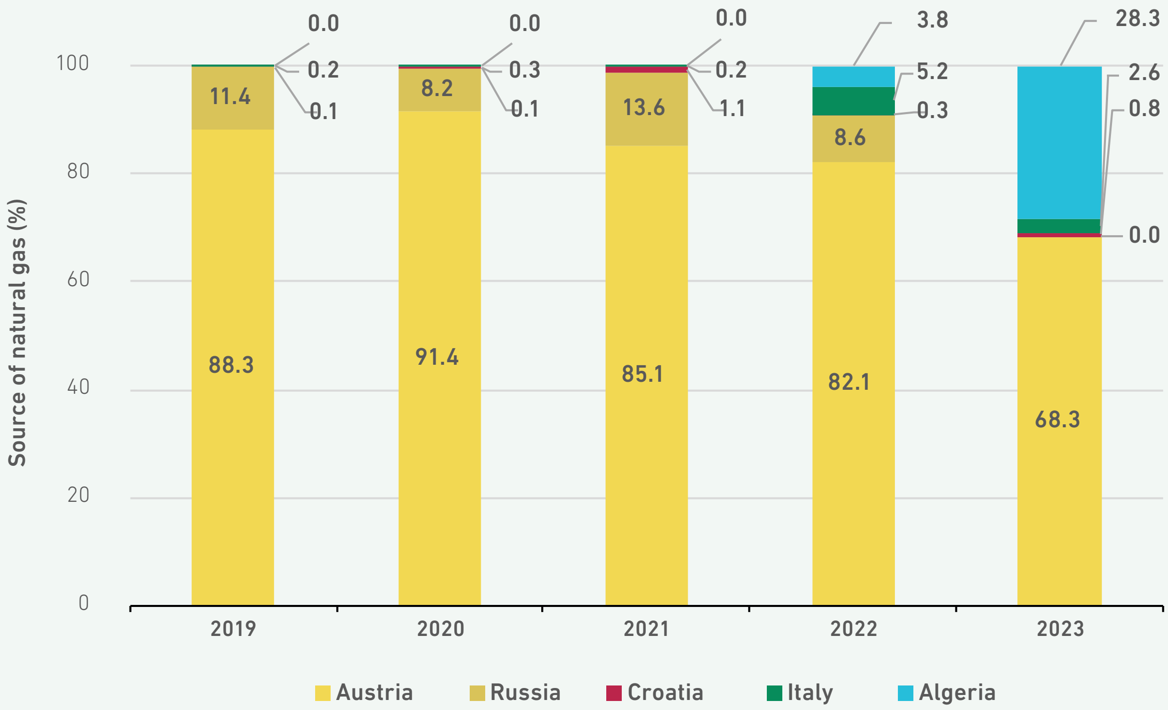
The following section sets out the state of play in the natural gas markets, covering pricing (influencing factors on prices, price movements, the impact of liquidity on prices, etc.), the transparency and integrity of market functioning, and market efficiency (openness and competition). The publication of the results of the continuous market monitoring, in addition to other measures taken by the Energy Agency, contributes to enhancing market competition and transparency and providing quality energy supply services at an optimal price.

Wholesale Market

Slovenia does not have its own natural gas sources, natural gas storage facilities or LNG terminals, and the Slovenian wholesale market is therefore exclusively supplied with gas imported from neighbouring countries via the transmission systems of traders. In recent years, the Slovenian wholesale market has mainly been provided with gas from Austria, Russia, Croatia and Italy. In line with the reduction of gas volumes from Russia, gas imports from Algeria have recovered in the last two years. Most gas is still shipped from Austria, but the importance of this supply route is diminishing as Russian gas supplies decline. While more than 90% of gas imports were still from Austria in 2020, the share of gas from this country in 2023 is just under two-thirds of the total imports.

28% of gas imported from Algeria

FIGURE 193: SOURCES OF NATURAL GAS IN THE 2019–2023 PERIOD BY PLACE OF PURCHASE



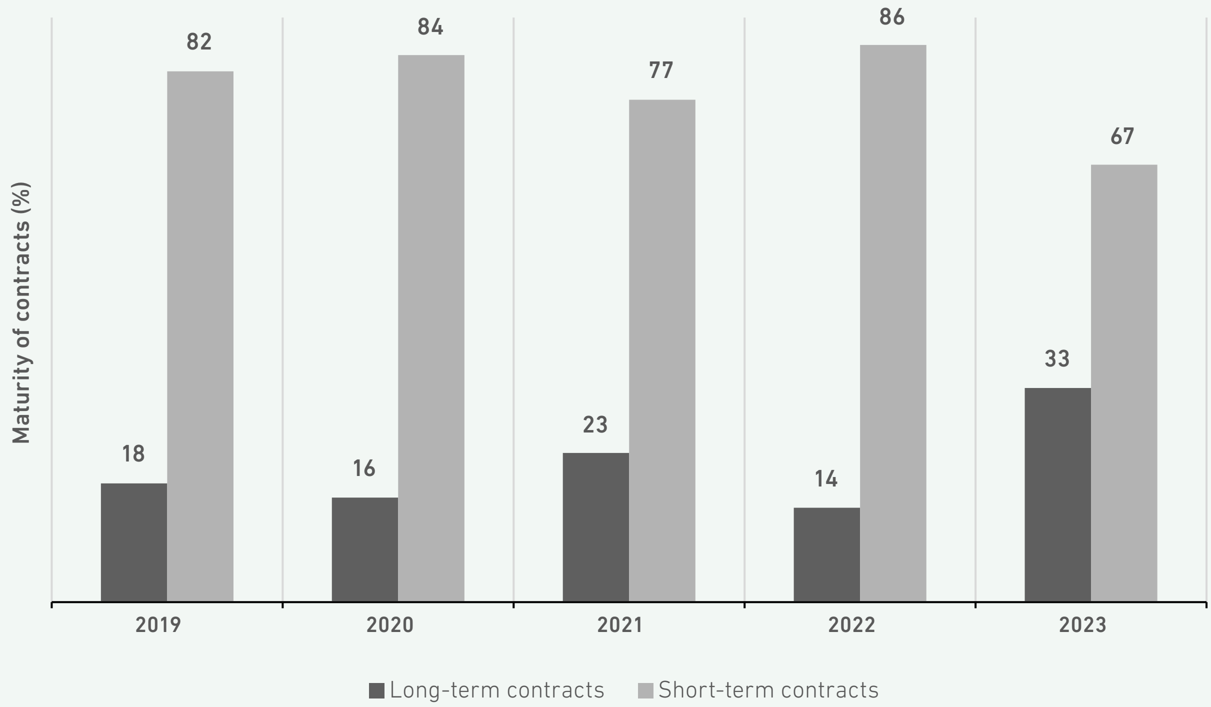
SOURCE: ENERGY AGENCY

In recent years, Slovenia has been highly dependent on natural gas from Russia for its energy needs. While the Energy Agency monitors the amount of natural gas imported for domestic consumption, it does not track the gas source to production. Slovenian traders or suppliers indeed buy the vast majority of their natural gas at the gas hub in Austria. Still, this hub is known to be dominated by gas arriving from Russia. Therefore, Slovenia's dependence on Russian gas is higher than that shown in Figure 193. The Figure does not show the geographical origin of the natural gas but the country from which traders or suppliers imported the natural gas into Slovenia.

Market liberalisation over the past decade has led to a reduction in long-term contracts, typically concluded directly with natural gas producers in Russia, replaced by short-term contracts concluded at gas hubs, exchanges and other points within the EU. In 2022, short-term contracts peaked, but in 2023, this share fell by 19 percentage points. The energy crisis in 2022 encouraged suppliers and traders to resume long-term contracts, as the maturity of the contracts, or the ratio of short-term to long-term contracts, can impact supply security.

The share of long-term contracts increased by 2.4 times

FIGURE 194: STRUCTURE OF IMPORTED GAS IN RELATION TO THE MATURITY OF CONTRACTS



SOURCE: ENERGY AGENCY

The Herfindahl-Hirschman Index (HHI) increased in 2023, reflecting the increased concentration of the Slovenian market. The reason for this is the tightening of the wholesale gas market in the EU and the wider region due to the war in Ukraine. Smaller suppliers, which find it more difficult to guarantee the security of supply in a tight environment, have lost market shares. Geoplin, Slovenia's largest supplier, has thus further strengthened its role in the Slovenian wholesale market, increasing its market share by 9 percentage points. Petrol's market share decreased by the same amount. The other smaller suppliers saw their market share decrease insignificantly.

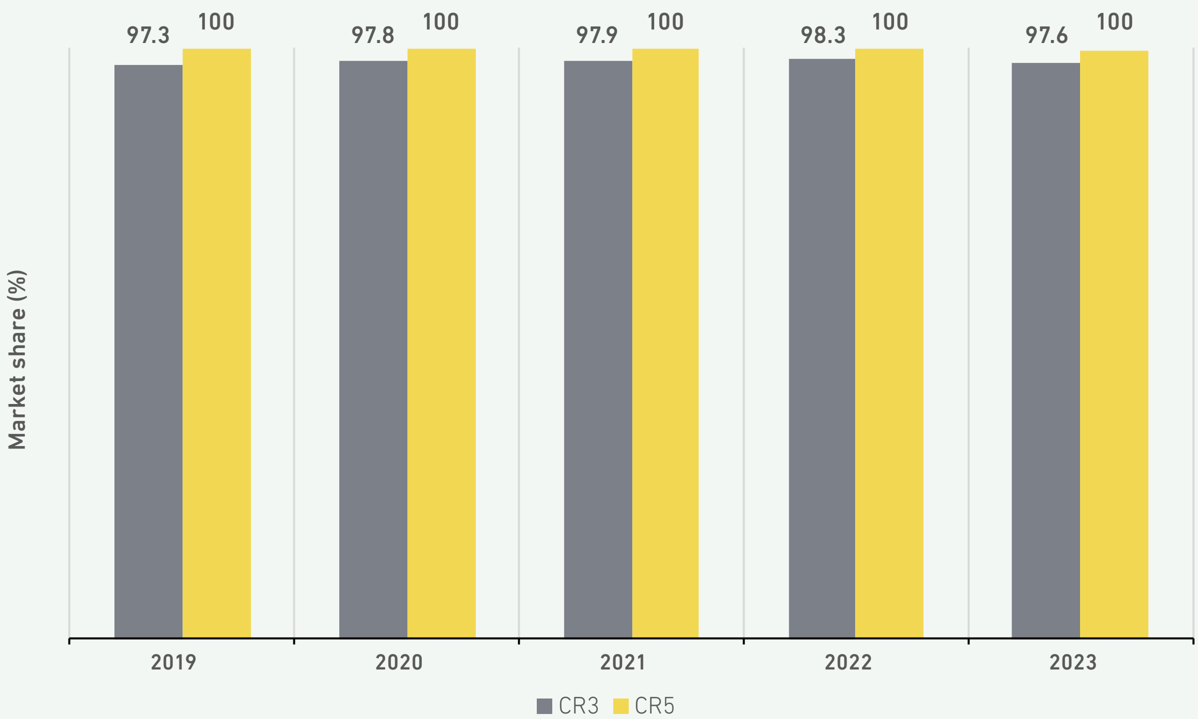
TABLE 41: MARKET SHARES AND THE HHI OF THE WHOLESALE NATURAL GAS MARKET

Company	Market share (%)	
	2022	2023
Geoplin	76.0	84.9
Petrol	19.4	10.0
Energetika Ljubljana	2.9	2.7
Plinarna Maribor	1.6	1.4
Others	0.1	1.0
HHI of the wholesale market	**6,159**	**7,312**

SOURCE: ENERGY AGENCY

The CR3 and CR5 indices also show a high degree of concentration. The CR3 index gives the market shares of the three largest suppliers, and the CR5 index gives the market shares of the five largest suppliers. In 2023, the three largest suppliers controlled 97.6% of the wholesale market, while the five largest suppliers controlled the entire Slovenian market. Concentration has remained virtually unchanged over the last five years.

FIGURE 195: WHOLESALE NATURAL GAS MARKET CONCENTRATION



SOURCE: ENERGY AGENCY

Market Transparency

The REMIT Regulation, Implementing Regulation (EU) No1348/2014[142] and the Energy Act provide a comprehensive legal framework to ensure price transparency in the wholesale electricity and natural gas markets. This area is discussed in more detail in the chapter on electricity market transparency.

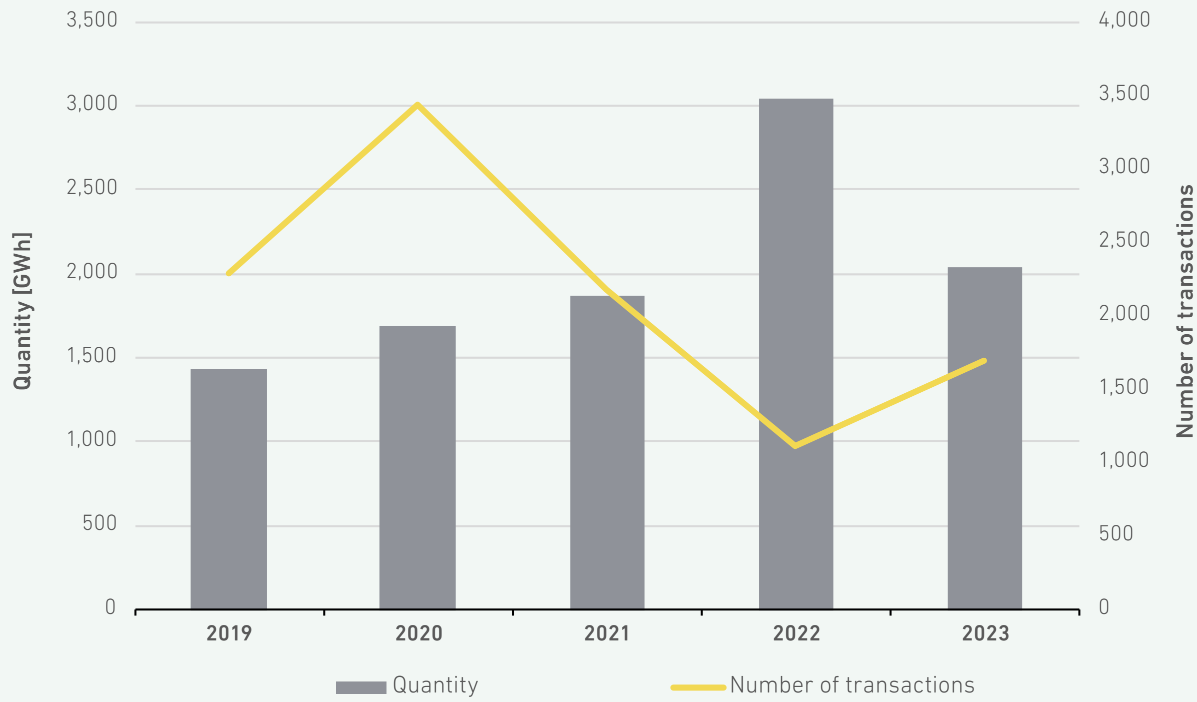
Market Effectiveness

The volumes traded in the Virtual Point followed the seasonal dynamics of gas consumption. Compared to the previous year, which was a record year for trading volumes, one-third less gas was traded in 2023 (2,037 GWh). The number of trades has been lower in the last three years compared to 2020, due to the introduction of a monthly trading product in 2021.

One-third less gas sold on the free market

142 On 17 April 2024, Regulation (EU) 2024/1106, known as the REMIT II Regulation, was published, improving the protection against market manipulation in the energy market. For more details, see section Market Transparency on page 113.

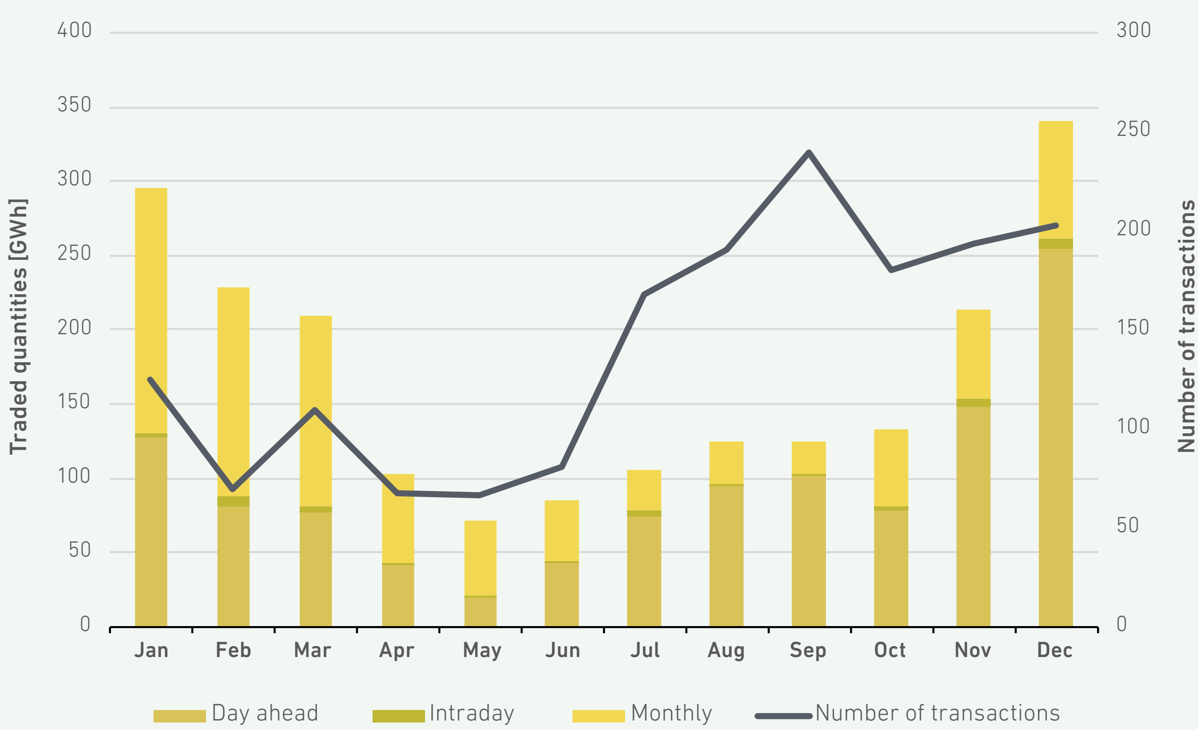
FIGURE 196: TRADING IN THE VIRTUAL POINT (FREE MARKET) IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

Most of the volumes sold (56%) were sold for the day ahead, 42% were sold on a monthly basis, and only 2% were sold intraday. Day-ahead products also dominated in terms of the number of transactions (1,692) (91%), with 5% of the monthly transactions and 4% of day-ahead transactions. The weekly product, introduced at the same time as the monthly product, had no transactions. On average, nine traders traded in the Virtual Point each month and 11 were active there during the year.

FIGURE 197: TRADING IN VIRTUAL POINT BY TRADING PRODUCT IN 2023

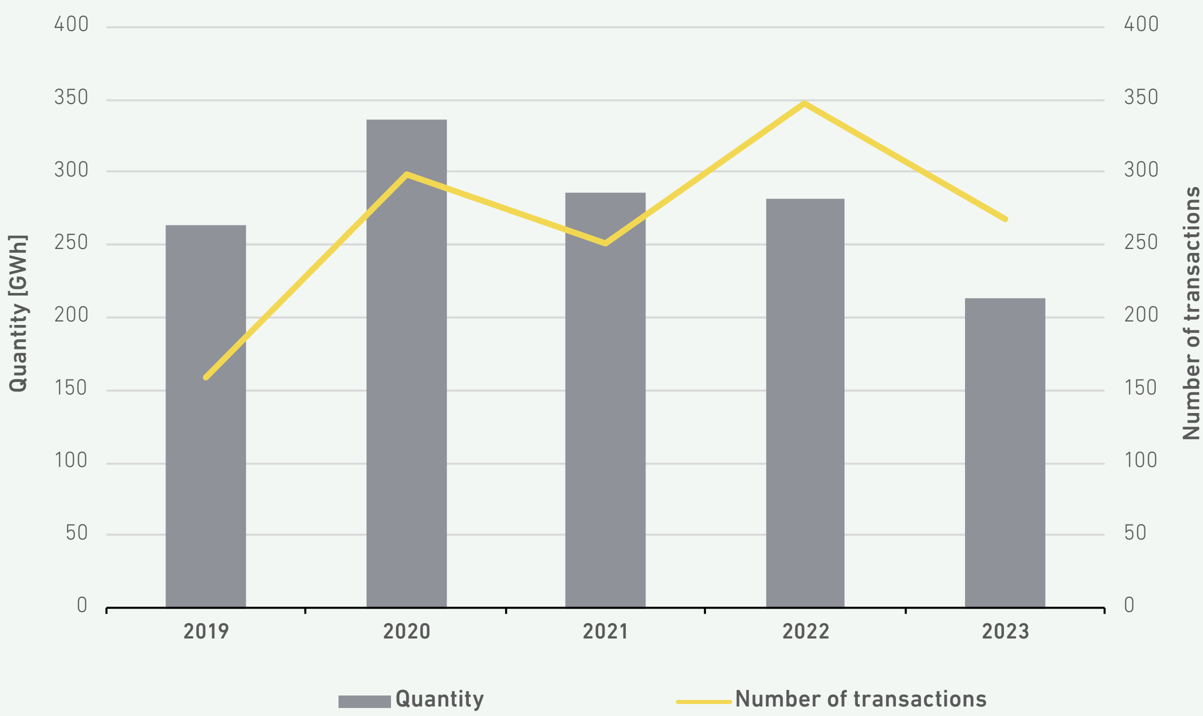


SOURCE: ENERGY AGENCY, PLINOVODI

While the TSO does not trade on the virtual point, most trades are executed between the TSO and the balancing group leaders on the trading platform, where trades are executed to balance daily deviations. Transactions between balancing group holders are rare, with only one transaction in 2023. On the trading platform, the volumes traded and the number of transactions are approximately a factor of 10 lower than on the virtual point. In 2023, 229 GWh of gas was exchanged, a decrease of 18.6% compared to the previous year. The number of transactions was also 23% lower than in 2022.

19% less gas sold on the trading platform, 23% fewer transactions

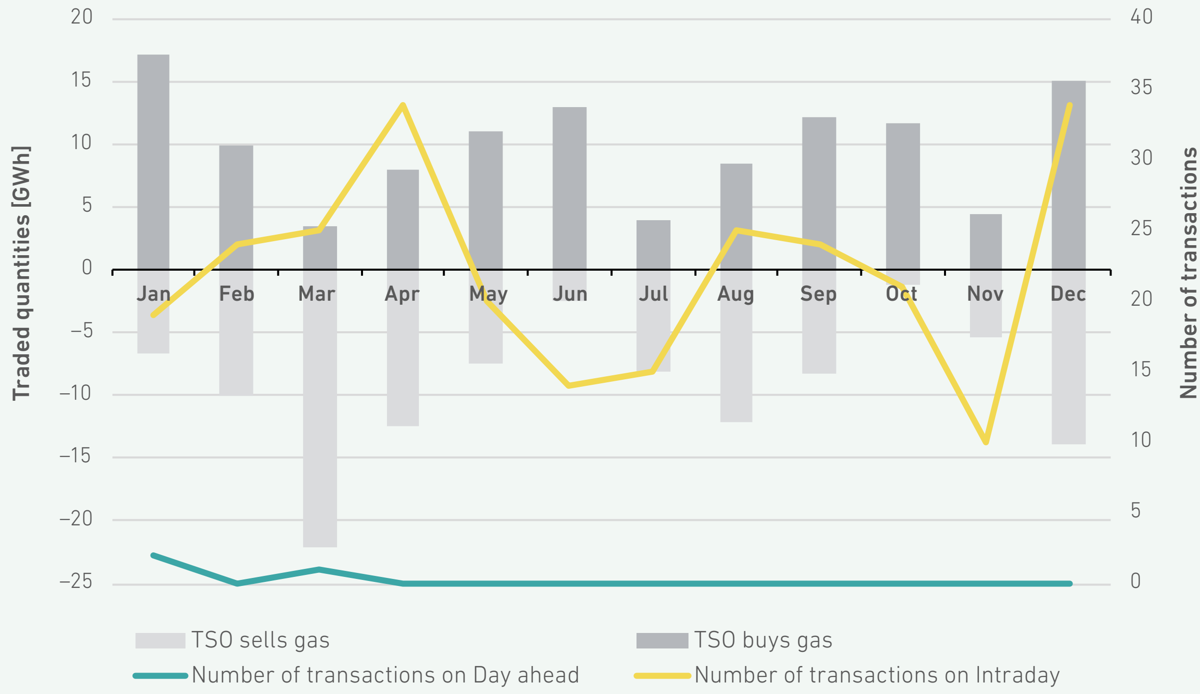
FIGURE 198: TRADING ON A TRADING PLATFORM (BALANCING MARKET) IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, PLINOVODI

Almost all transactions were intraday (265), while only three were for the day ahead. On average, three balancing group holders traded on the trading platform monthly in addition to the TSO, and six balancing group leaders traded on the platform over the year.

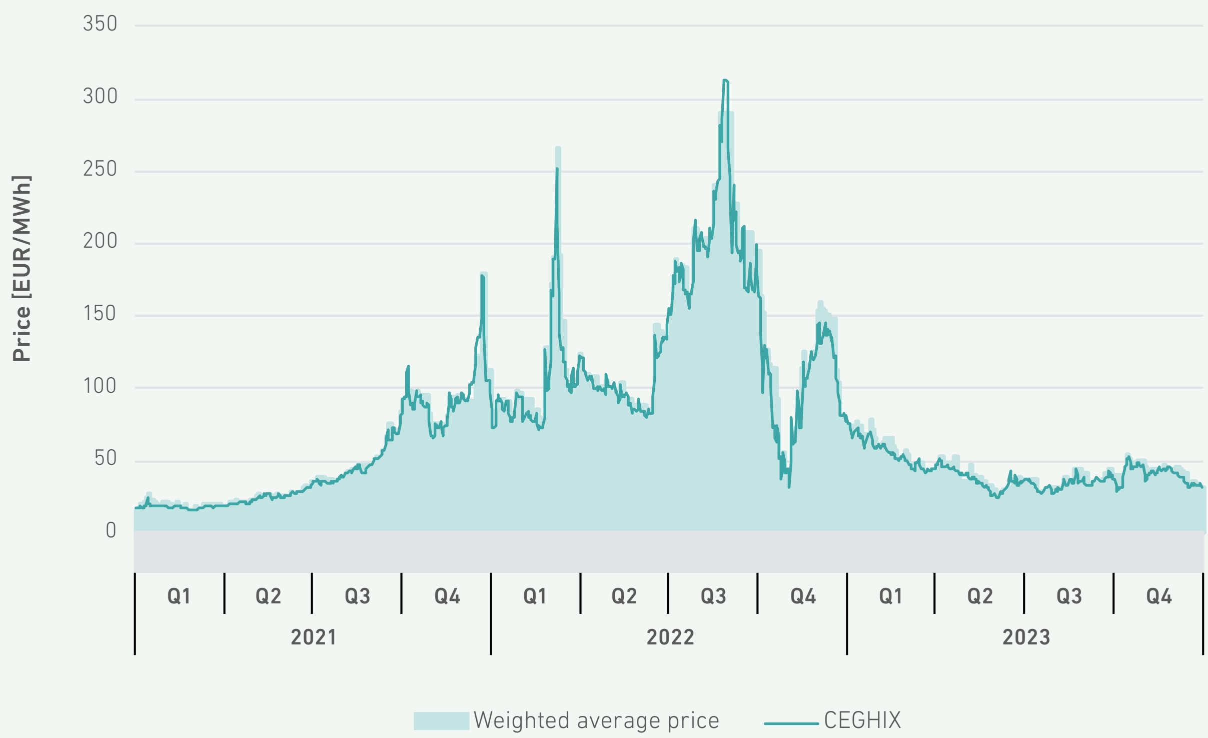
FIGURE 199: TRADING IN THE VIRTUAL POINT IN 2023



SOURCES: ENERGY AGENCY, PLINOVODI

The weighted average price of trades on the trading platform matched the CEGHIX stock index from the CEGH gas hub in Vienna quite well. On 41% of the days, the average price index was slightly lower, and on 59%, it was slightly higher than the CEGHIX.

FIGURE 200: WEIGHTED AVERAGE PRICE ON THE TRADING PLATFORM (BALANCING MARKET) AND VALUES OF THE CEGHIX IN THE 2021–2023 PERIOD



SOURCES: PLINOVODI, CEGH

Virtual Point members did not advertise their offers or enquiries on the bulletin board. The TSO occasionally advertised on the bulletin board, offering its gas volumes for trading on the trading platform on six occasions and requesting gas volumes on two occasions.

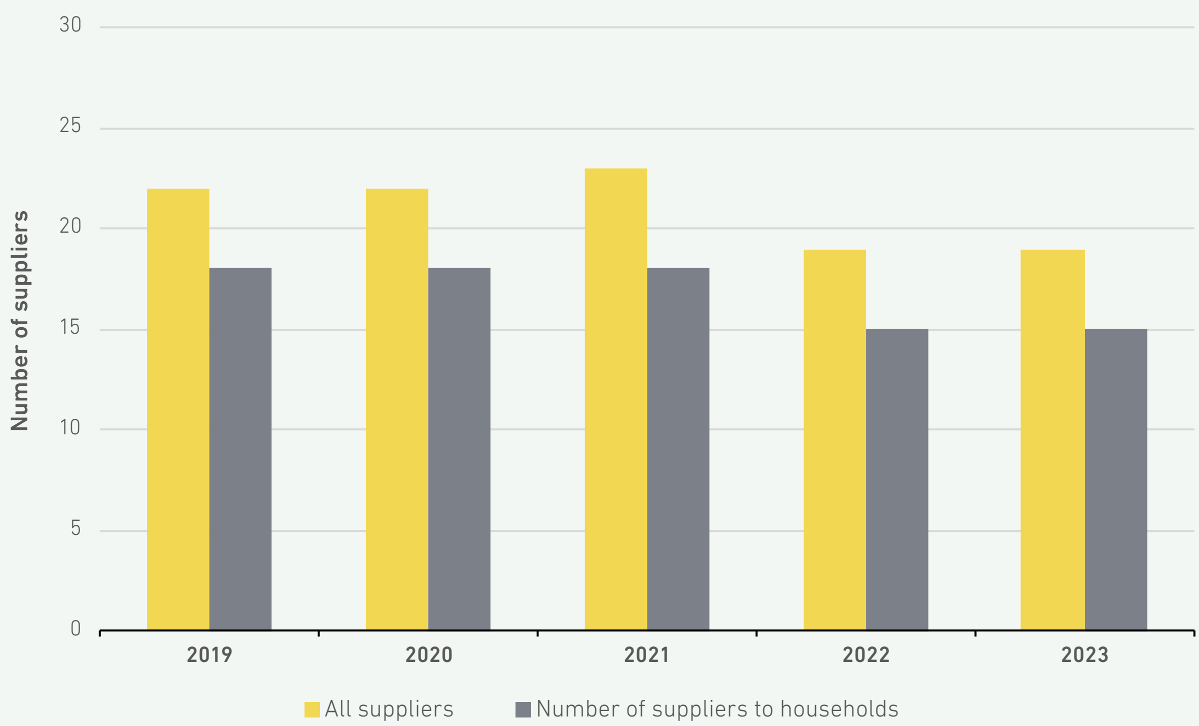
Retail Market

At the end of 2023, 19[143] natural gas suppliers were active in the Slovenian retail market. Of these, 15 suppliers supplied natural gas to household consumers connected to the distribution systems based on contracts, and 19 provided natural gas to business consumers connected to the distribution and transmission systems. There were no new entrants to the retail market in 2023, although gas prices on the exchange decreased significantly compared to the previous year, thus offering the potential for new suppliers to enter the market and offer substantially lower gas prices to consumers.

No change in the number of suppliers in the retail market in 2023

Consumers can choose from all the suppliers offering natural gas in their local community. Individual natural gas suppliers, smaller in terms of annual supply volumes, only supply natural gas to consumers in the local communities where they also carry out natural gas distribution activities under the same company umbrella. Consumers pay for the natural gas supplied every month on the basis of the actual quantity consumed as measured by the metering device or on the basis of the estimated amount consumed[144] if the operator does not have a reading from the metering device.

FIGURE 201: NUMBER OF SUPPLIERS ON THE RETAIL MARKET IN SLOVENIA IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

143 The Energy Agency considered as suppliers those companies that are members of the balance group or balance sub-group.
144 Calculated on the basis of the provisions of the Methodology for the prognosis of non-daily metered off-takes of users of the natural gas network.

Over the five years under consideration, the number of suppliers decreased significantly in 2022, when wholesale natural gas prices were very high and access to gas at affordable prices for suppliers and individual consumers was difficult. In the last year, prices have stabilised and remained stable even as we enter the 2023/2024 heating season, which resulted in no major pressure on the suppliers' operating economics and no new exits. The maintenance of the number of natural gas suppliers has also been helped by the compensation mechanism for suppliers that might have suffered losses by selling gas at a regulated price below the purchase price.

In the first quarter of 2023, all suppliers supplying gas to household customers offered a supply of natural gas at the regulated price or based on a regular price list[145], or a basic supply, where there is no time commitment required for the period of supply or other conditions to be met. The consumer can switch suppliers at any time without paying a contractual penalty. Even though natural gas prices on wholesale markets have been declining in 2023, falling in some months by more than 50%, this has not been significantly reflected in the gas supply offers to residential and small business consumers. By November 2023, only one supplier had reduced its supply prices by 10%, while the rest maintained the upward-capped gas supply price. No promotional offers were available on the retail market that could have provided more favourable supply conditions, possibly limited to a specific range of consumers, tied supply to a certain period, and met other particular conditions. In October, the Government of the Republic of Slovenia set new values for the upwardly capped gas supply prices by a new Regulation on determining the price of natural gas from the gas system, which became applicable as of 1 January 2024. Only two suppliers offered to supply at the new discounted price already as of November, which was slightly lower than the price set by the Government Regulation for household consumption for the first four months of 2024.

At the end of 2023, household consumers had little chance to significantly reduce the cost of their natural gas supply by choosing a new supplier, given the time needed to complete the switch, which can be up to 21 days from the date of completing the application. In 2023, based on the available gas purchase prices, several opportunities were offered to existing and potential new natural gas suppliers. Still, they remained reluctant either because of the unstable situation and the associated risks or possibly also because of the passivity of consumers in switching suppliers due to the availability of more favourable offers. As a result, 2023 did not have the characteristics of a well-functioning competitive natural gas market that would have provided sufficient incentives for consumers to switch suppliers and thus achieve savings.

Natural Gas Prices in the Retail Market

Price monitoring in the retail market is carried out using public data and data from offers to household and small business consumers obtained from suppliers in the framework of the Energy Agency's comparison services.

Retail gas prices in supply offers during periods of stable market functioning depend mainly on price developments in the wholesale markets, the purchasing conditions secured by suppliers in trading, and the business decisions of the individual supplier. Several factors influence the level of the purchase price paid by the supplier. For example, natural gas prices depend on the geopolitical situation, the characteristics of the gas purchase contracts concluded, the evolution of oil and oil product prices, coal and emission allowances, the evolution of foreign currency exchange rates, weather effects, supply and demand on international exchanges and market competition. In 2023, the correlation between these factors and the level of the retail prices offered was relatively weak. The reasons for this are likely multiple and may vary from supplier to supplier. One of the main reasons is likely to have been that at the beginning of the year, the retail prices offered for natural gas to household and small business consumers were the same for all suppliers as a result of the provisions of the Regulation on the determination of the prices of natural gas from the gas system, which capped the maximum supply price for these consumer groups upwards. Furthermore, as the beginning of the year represents the second half of the 2022/2023 heating season, in the period of volatility and high gas prices in 2022, many suppliers were likely forced to purchase adequate volumes of gas in 2022 at high prices to supply their customers reliably. The significantly lower wholesale gas price may have been less beneficial for them in reducing their costs later on, as they did not need to purchase additional volumes for the first third of the year. The difference between the level of retail prices for natural gas supplies and the average day-ahead exchange price (CEGHIX) was still relatively small

145 After the termination of the regular price list definition under the EZ-1, these are offers that are accessible to all consumers and do not contain any requirements for meeting specific conditions (bindings, penalties, etc.).

in January 2023, but exchange prices have fallen significantly. In January, the day-ahead exchange price on the Vienna Stock Exchange was 9% below the level of the regulated household retail price; in February, already a quarter, in March and April, between 38 and 39%; and in the rest of the year, in six out of eight months, it was more than 50% lower (as much as 57% in July). In the second half of the year, the price peaked in October and November but was still 42% below the level of the regulated household retail price. Small business consumers, essential social services and individual-size groups of other business consumers with an annual consumption exceeding 100,000 kWh paid retail prices at least 8% higher than the residential price.

The maximum allowed gas price for household consumption in 2023 was 56% lower than the maximum price paid by individual consumers in 2022

Retail Price Index

As part of monitoring the relevant market, the Energy Agency determines the Retail Price Index (RPI). The RPI is based on the cheapest offer available on the market that is accessible to all consumers. This allows consumers to switch suppliers without contractual penalties for an unlimited period of time. Based on the contracts concluded, it only reflects the price potential, not the realised price.

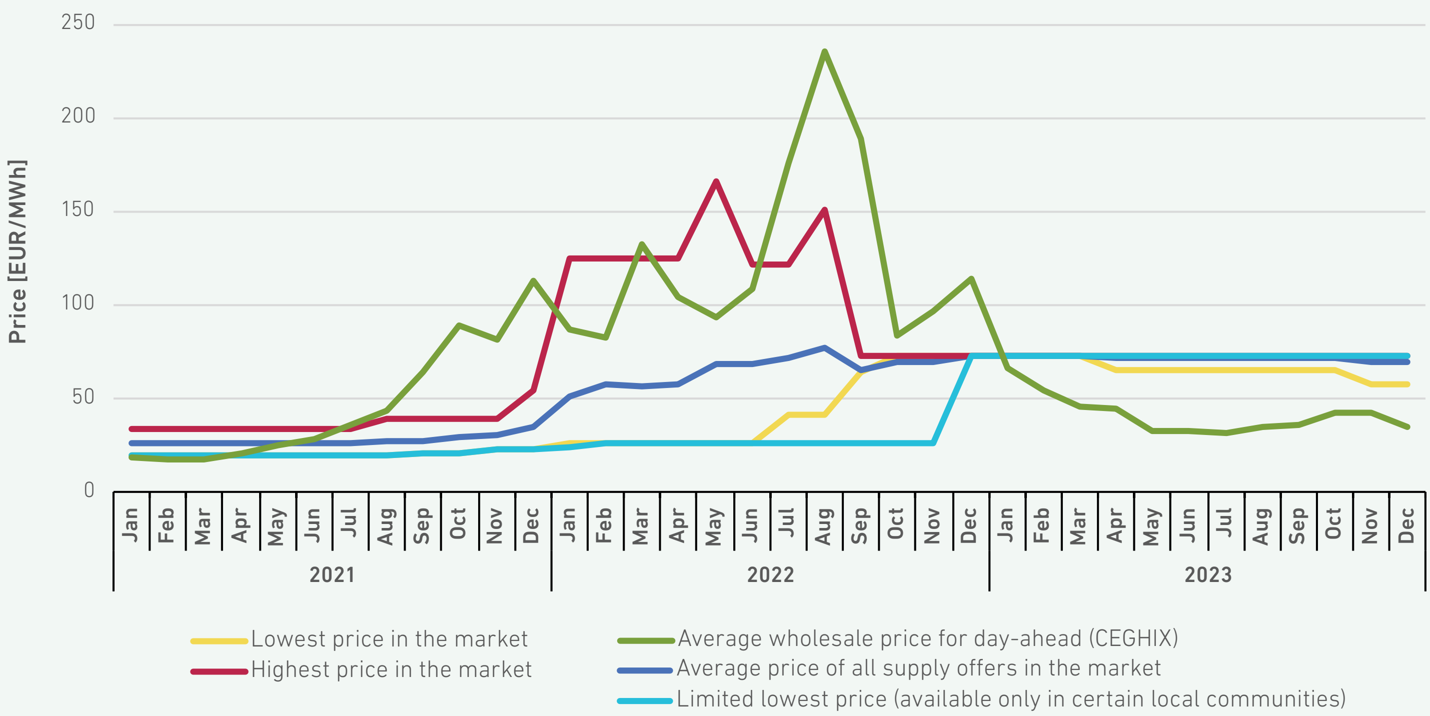
Figure 202 shows the trend in the following prices for a typical household consumer:

- limited lowest price (available only in certain local communities),
- the lowest price in the market,
- the average price of all offers in the market, and
- the highest price in the market.

In the first quarter of 2023, the lowest natural gas prices for household consumers on the retail market were on a par with the highest, as no supplier offered to supply gas to household consumers at a price below the upward price cap in the Government Regulation on the determination of the prices of natural gas from the gas system (EUR 73/MWh). As of April, Adriaplin was the first supplier to offer gas to household consumers at a price 10% below that regulated by the Government Regulation. The next price reduction took place in November, when GEN-I and Elektro energija reduced the gas price to EUR 58.4/MWh and EUR 58.5/MWh, respectively, while Adriaplin also offered a slightly higher price in a package deal for a short period. Notwithstanding the positive developments towards the availability of more favourable gas supply offers, 12 out of 15 suppliers were still offering gas to household customers at EUR 73/MWh at the end of December, while the average day-ahead price on the Vienna Stock Exchange (CEGHIX) in December was EUR 35.2/MWh. At the end of the year, the lowest market price was 20% lower than at the beginning of the year, or than the upwardly capped gas price for household consumption in 2023. The lowest supply prices offered were available in all local authorities, which, given that November and December are already part of the heating season, allowed consumers to save some of their supply costs by opting for more favourable supply conditions. Notwithstanding the market conditions, the supplier Energetika Ljubljana provided gas to all those affected by the floods in August, who were included in the list of beneficiaries under the intervention law, at a symbolic price of EUR 1/MWh.

The reduction in retail prices for the three suppliers was probably due to the recognised opportunities for each gas supplier to win new customers, increase market share and add significant value by supplying them, given the relatively large difference between the retail prices on the market and the exchange prices at the trading hubs. At the end of 2023, the day-ahead wholesale price of natural gas on the Austrian CEGH was just above EUR 30/MWh, while on 26 August 2022, it reached a record-high of EUR 312.6/MWh at the end of the trading day. Wholesale prices are usually passed on to the retail market with a lag of around six months, which is different for 2023, as most suppliers insisted on supply prices above the maximum government regulation allowed. The evolution of retail and wholesale natural gas prices in the 2021–2023 period is shown in Figure 202.

FIGURE 202: RETAIL PRICE INDEX AND SOME TYPICAL NATURAL GAS PRICES WITHOUT THE NETWORK CHARGE, DUTIES AND VAT IN THE 2021–2023 PERIOD



SOURCE: ENERGY AGENCY

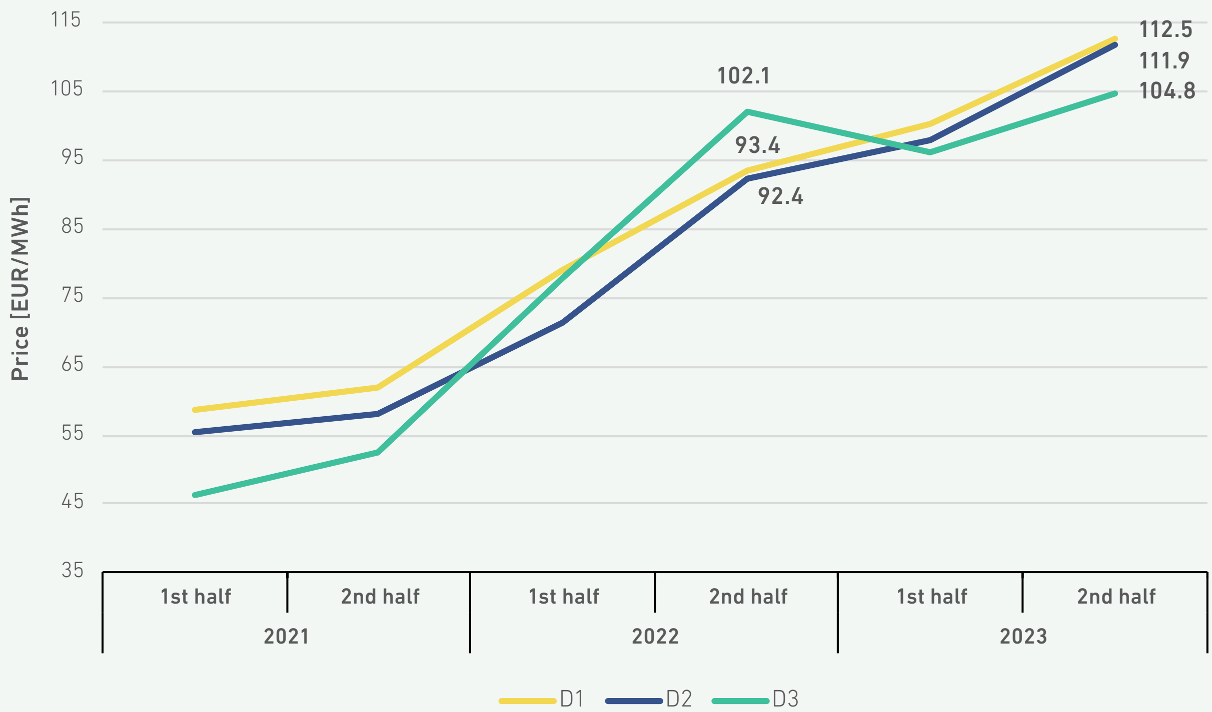
Based on all available offers on the market, the average monthly gas supply price was above the average price in 2022 for most of 2023. It was lowest in the last two months of the year when it was 3.7% lower than in December 2022. As of the end of 2023, the prices for supply to household consumers were almost entirely equal again, with the new Regulation on the determination of the price of natural gas from the gas system newly setting an upward-capped price for household consumers for the period of 1 January 2024 to 30 April 2024 (EUR 59.9/MWh), which is only 2.5% above the lowest price offered at the end of December.

The gradual decrease in the average monthly natural gas supply price, which at the end of the year was 3.7% lower than in December 2022

Final Prices of Natural Gas

The evolution of the natural gas price, including all taxes and charges for household consumers in the 2021–2023 period, is shown in Figure 203. Compared to the second half of 2022, the prices for the D1 and D2 household consumption groups increased in the first half of 2023, while prices for the D3 group decreased by just under 6%. In the second half of the year, this was followed by an increase in the final prices for all household consumption groups. For D3 and D2, prices were 8.9% and 14.2% higher, respectively, while the rise for D1 was 12.2% compared to the first half of the year. In the large household consumption group D3, which mainly concerns consumption points serving the common boiler rooms of multi-apartment buildings, the final price of natural gas in H2 2023 was 2.6% higher than in the same period a year earlier. Small and medium-sized household consumers in groups D1 and D2 received prices 20% and 21% higher in the second half of the year compared to the previous year. For these groups, D1, D2 and D3, the final price of natural gas per MWh increased by between 76% and 103% compared to 2021.

FIGURE 203: FINAL NATURAL GAS PRICES FOR HOUSEHOLD CONSUMERS IN SLOVENIA WITH ALL TAXES AND DUTIES IN THE 2021–2023 PERIOD

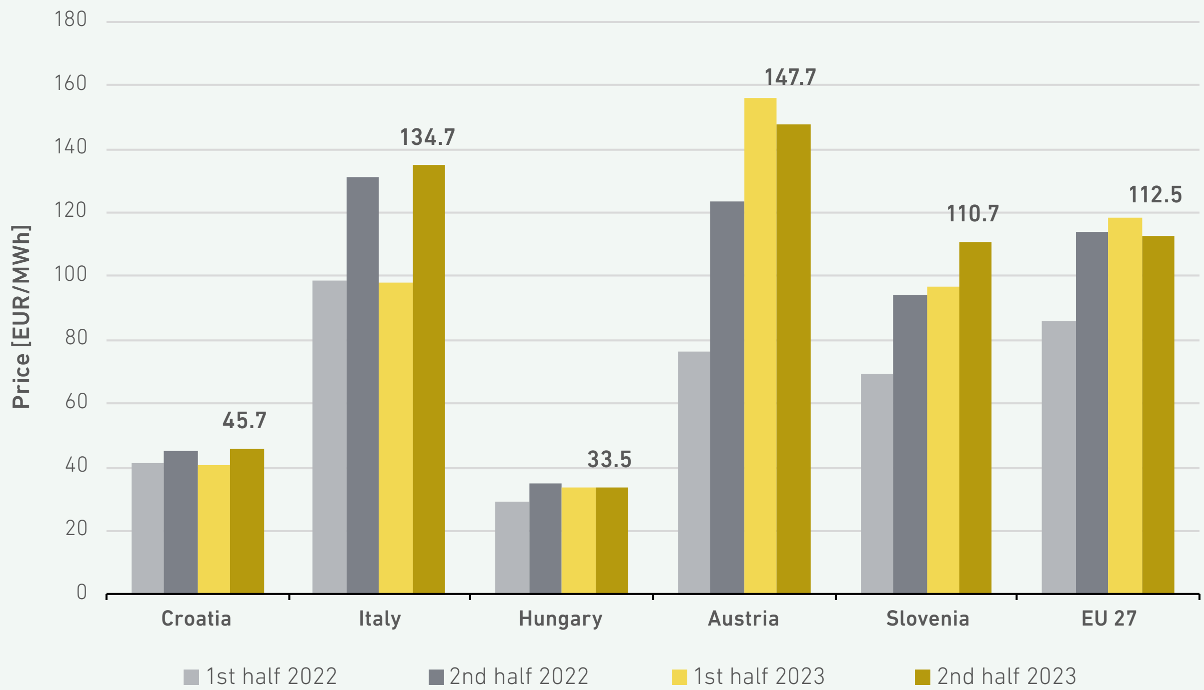


SOURCE: STATISTICAL OFFICE OF THE REPUBLIC OF SLOVENIA

Figure 204 shows the evolution of final natural gas prices with all taxes and duties in 2022 and 2023 for a typical D2 household natural gas consumer in Slovenia and neighbouring countries. Final natural gas prices in Slovenia increased by 27.3% year-on-year in 2023. A semi-annual view reveals that the final natural gas prices increased by a good 3% in the first half of the year compared to the second half of 2022, while the final natural gas prices increased by 14% in the second half of the year compared to the first half of 2023. The final natural gas prices for typical household consumers in Slovenia remain below the EU average. As in Slovenia, natural gas prices have increased on an annual basis in all neighbouring countries. The highest price increase was recorded in Austria, with a 51.7% annual increase compared to 2022, while the lowest increase was recorded in Croatia, with 0.6%. As in 2022, natural gas end-use prices also differed to a slightly larger extent between EU countries in 2023, also due to the different measures taken by EU Member States to mitigate the energy price increases.

The final price of natural gas for a typical household consumer remains below the average EU-27 prices

FIGURE 204: FINAL PRICES OF NATURAL GAS FOR TYPICAL D2 HOUSEHOLD CONSUMERS, INCLUDING TAXES AND LEVIES, IN SLOVENIA AND IN NEIGHBOURING COUNTRIES IN 2022 AND 2023



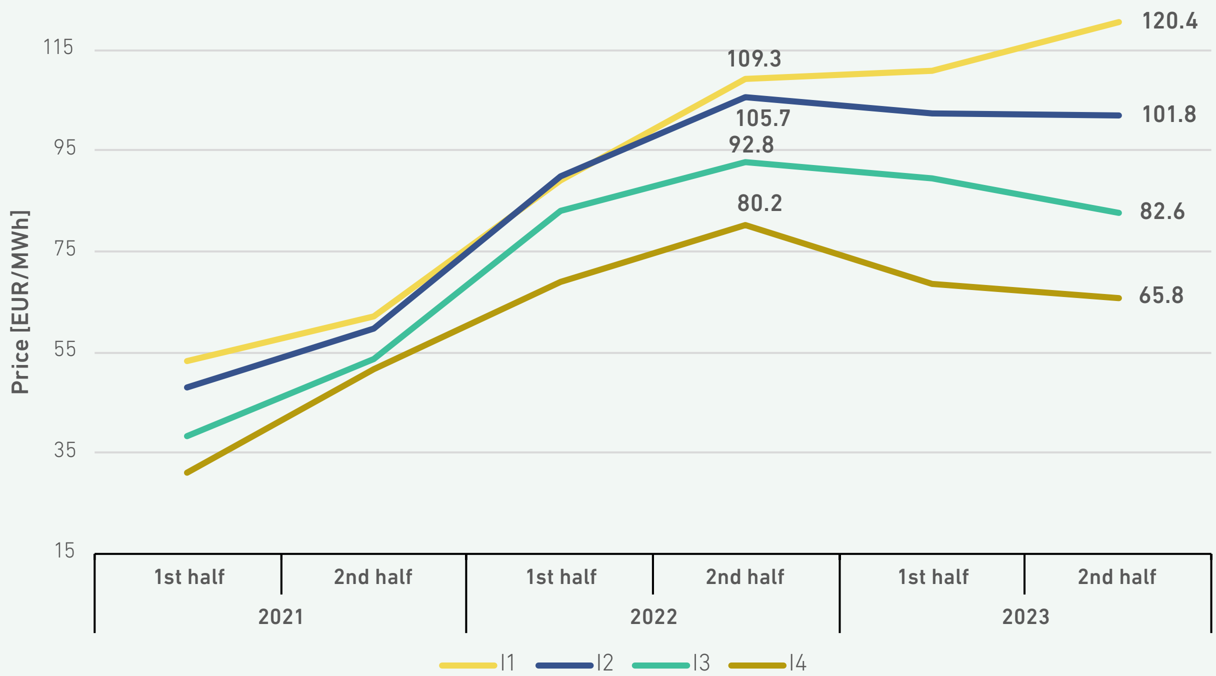
SOURCES: EUROSTAT

While the final gas prices for business consumers in Slovenia increased significantly in 2022 compared to the previous period, the final gas prices for business consumers also decreased for some groups in 2023. Only the smallest business consumers in group I1 saw an increase of 10.1% in their final natural gas price in the second half of 2023 compared to the second half of 2022. For the remaining groups, the final price of natural gas decreased in the second half of 2023 compared to the second half of 2022, by 3.7%, 11.0% and 18% for groups I2, I3 and I4 respectively. From the above, it can be concluded that the final price of natural gas for larger business consumers is much more in line with the market developments.

10.1% increase in the final gas price in the second half of the year for the smallest business consumers in group I1; for other business consumers prices decreased

The evolution of the final price of natural gas, including all taxes and charges, for business consumers in the 2021–2023 period is shown in Figure 205.

FIGURE 205: FINAL PRICES OF NATURAL GAS FOR BUSINESS CONSUMERS IN SLOVENIA, INCLUDING TAXES AND LEVIES, IN THE 2021–2023 PERIOD

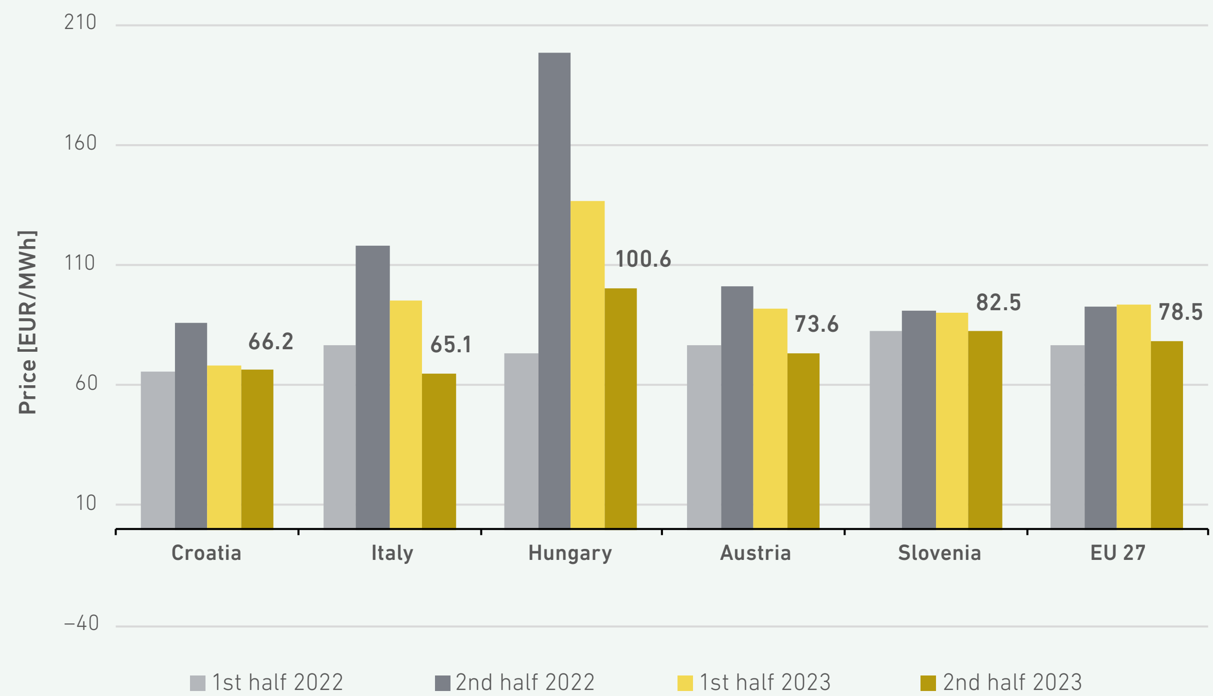


SOURCE: STATISTICAL OFFICE OF THE REPUBLIC OF SLOVENIA

Figure 206 shows the final gas prices for typical business consumers of I3 natural gas in Slovenia and neighbouring countries. For these consumers, the final price of natural gas in Slovenia decreased by 0.7% annually, while the half-year price decrease in the second half of the year compared to the first half was 9.4%. The final price of natural gas for typical business consumers was 0.5% above the EU average. Final prices were also lower in all neighbouring countries compared to a year earlier. Natural gas final prices fell the most in Italy annually, by 17.8%, the highest half-yearly price decrease; final prices fell by 31.7% in the second half of the year compared to the first half. However, it was business customers in Slovenia who experienced the smallest price decreases among all neighbouring countries.

The final gas price for business consumers was 0.5% above the EU-27 average

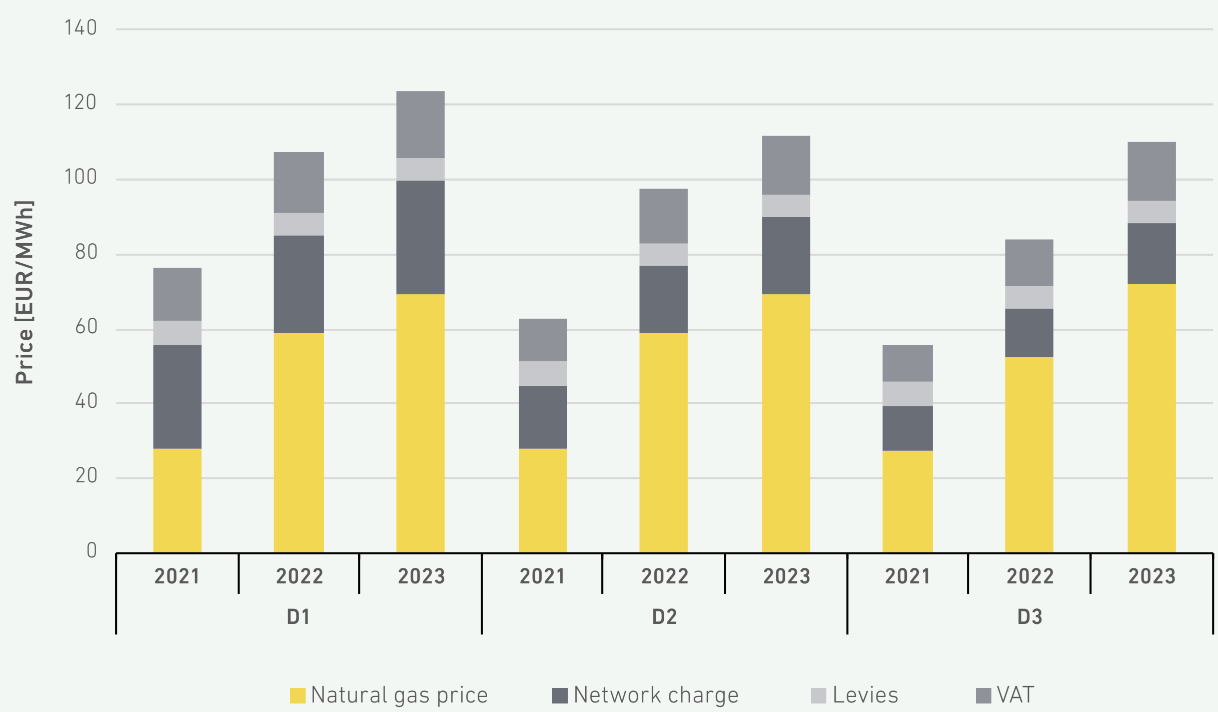
FIGURE 206: FINAL PRICES OF NATURAL GAS FOR TYPICAL I3 BUSINESS CONSUMERS, INCLUDING TAXES AND LEVIES, IN SLOVENIA AND IN NEIGHBOURING COUNTRIES IN 2022 AND 2023



SOURCE: EUROSTAT

Figures 207 and 208 show the structure of the final price for typical household and business consumers connected to the distribution systems in the 2021–2023 period.

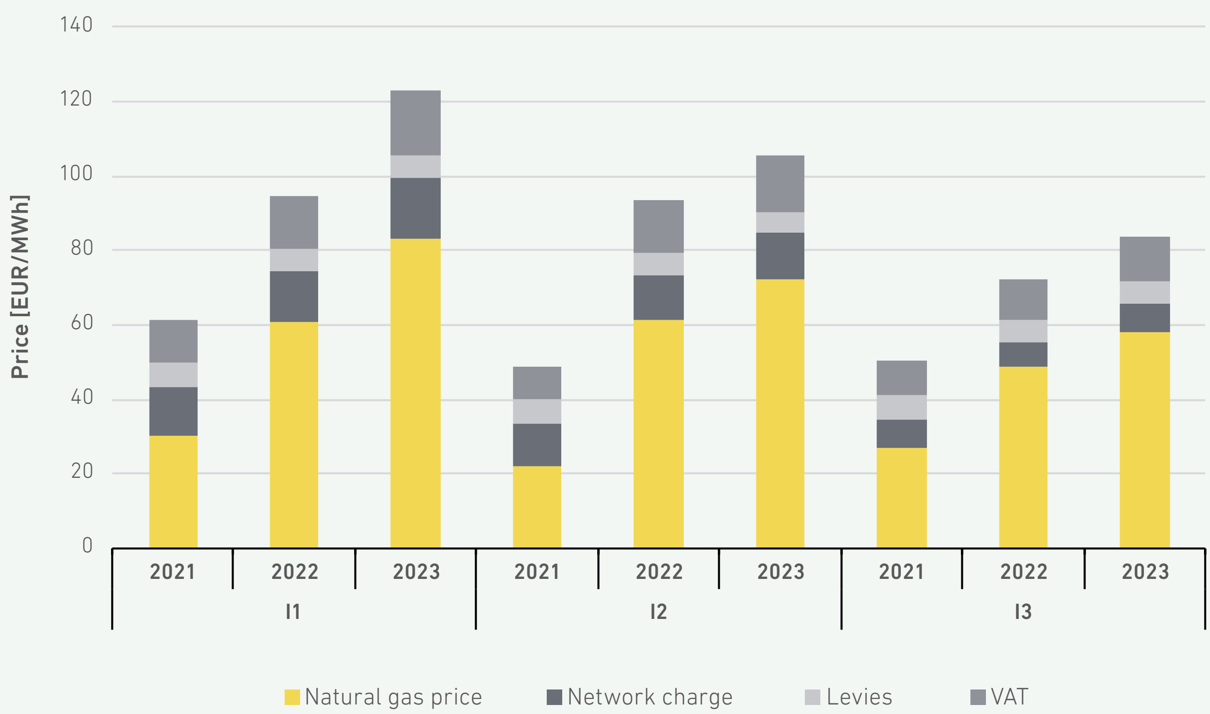
FIGURE 207: STRUCTURE OF THE FINAL NATURAL GAS PRICE FOR HOUSEHOLD CONSUMERS IN THE 2021–2023 PERIOD



SOURCES: SUPPLIERS

In the structure of the final price of natural gas for household consumers, the percentage of the energy price component in 2023 has increased for the second year compared to the previous year in all consumption groups. The increase was most substantial in group D3, amounting to 3.3 percentage points, while the rise was smallest in group D1, amounting to one percentage point. In groups D1 and D2, the percentage of the network component of the final price increased by half a percentage point, while in group D3, it decreased by 0.9 percentage points. All the groups also observed a change in the share of the levy component in the final price. In consumption group D3, the share of levies in the final price of natural gas decreased by 1.7 percentage points, while in groups D2 and D1, it decreased by 0.8 percentage points. The VAT share also decreased by around 0.7 percentage points in all groups. Notwithstanding the reduced VAT rate of 9.5% applicable until 31 May 2023 and the slightly lower share of VAT in the final price, the VAT amounts in the supply cost of the typical groups were much higher than in the previous two years. The VAT on the gas supply cost increased by 9% and 24% compared to last year and between 29% and 57% compared to 2021 due to the significantly higher prices.

FIGURE 208: STRUCTURE OF THE FINAL NATURAL GAS PRICES FOR BUSINESS CONSUMERS IN THE 2021–2023 PERIOD



SOURCES: SUPPLIERS

In the structure of the final price of natural gas for business consumers, the percentage of the energy price component increased in 2023 compared to the previous year for all consumption groups. On the other hand, the share of network charges in the structure of the final price of natural gas for business consumers for consumption groups I1 and I2 decreased compared to the previous year, with a decrease of 1.5 percentage points for consumption group I1, 1.4 percentage points for I2 and an increase of 0.2 percentage points for I3. In the structure of the final price of natural gas for business consumers, the share of charges in the final price also decreased. The reductions were 1.5 percentage points for consumption group I1, 1.8 for I2 and 1.2 for I3. The VAT share also decreased by 0.7 percentage points for all consumption groups. At the reduced rate (9.5%), the VAT on the cost of gas supply has increased by between 7% and 23% by 1 June 2023 compared to the previous year and by between 32% and 73% by 2021 compared to last year, due to higher retail gas prices.

The energy cost share of the final price of natural gas supply has increased in all consumption groups of household and business consumers, which has significantly increased the final natural gas prices for the second year in a row.

A comparison of the final prices in EUR/MWh charged to each customer group in 2023 shows a year-on-year increase of 15% in customer groups D1 and D2 and 31% in customer group D3. A comparison with 2021 shows price increases of 62% in customer group D1, 78% in D2 and 96% in D3. Similar increases were also observed in the business customer segment. Compared to 2022, gas supply prices increased in customer group I1 by 30%, in I2 by 13% and in I3 by 16%. Compared to 2021, the prices were higher in the I1 customer group by 102%, in I2 by 117% and in I3 by 66%.

Market Transparency

The results of monitoring the efficiency and competitiveness of the retail natural gas market presented below are based on the continuous processing of data submitted to the Energy Agency by the liable parties (suppliers).

Financial Transparency of Suppliers, Transparency of Invoices and Obligation of Public Price Quotes

Under the Companies Act (ZGD-1), natural gas suppliers must prepare annual reports to ensure adequate financial transparency in their natural gas supply activities. The consolidated yearly reports must give an accurate and fair view of the company's financial position and profit or loss. They are audited by independent auditors and submitted to the AJPES for public publication. The applicable legislation regulates the accounts' transparency in a systemic manner. The invoice for natural gas supplied thus separately shows the amounts for natural gas consumed, the network charge (distribution amount and metering amount), the energy efficiency contribution, the RES and CHP contribution, the environmental levy (CO_2 tax), the excise duty and the VAT. In the absence of innovative offers on the retail natural gas market, the current legislation ensures adequate transparency in the cost of supply accounting.

The Obligation to Publish Supply Offers

Suppliers must transparently inform household and small business consumers about their offers to supply natural gas, the applicable price lists, and the general contract terms and conditions for the supply service.

The Energy Agency's Activities for Providing Transparency

The Energy Agency regularly monitors the functioning of the natural gas retail market, including the number and characteristics of published offers, focusing on prompt action on identifying controversial practices. The obliged parties provide data on current offers and any changes in the characteristics of these offers to the Energy Agency every month. They are used by the Energy Agency for electronic services in the framework of the single contact point, in accordance with the legislation. To ensure transparency in the natural gas retail market, the Energy Agency's website provides users with comparative e-services, including the online application for comparing natural gas supply costs (cost comparator). This application enables the calculation and comparison of the natural gas supply amount for each consumption profile based on the offers entered into the web application by suppliers. The Energy Agency also provides an e-Invoice Check service, which allows users to check the correctness of the bill for the gas supplied according to the selected offer and consumption profile. The monthly calculation is displayed separately by the billing component. Users of the comparison services had access to all the price lists or basic information on all the suppliers' offers. Users of the cost comparator can, among other things, quickly access individual price lists and the suppliers' general contract terms and conditions.

A more detailed analysis of the use of comparison services in natural gas supply is presented in the section Ensuring Transparency in the Retail Electricity Market. The study of the number of comparisons and invoice verifications confirms a marked decrease in consumer interest in the choice of supplier or supply product, with a 91% decrease in the

The lowest number of natural gas supply cost comparisons since full market opening in 2007

number of comparisons performed compared to 2022 and an 87% decrease in the number of consumers performing comparisons. A comparable decrease in interest is observed for the e-service that allows the verification of invoices.

Market Effectiveness

The Market Shares and HHI of the Natural Gas Retail Market

Supply of Natural Gas to Final Consumers

Table 42 shows the market shares of suppliers to all final consumers in the natural gas retail market in Slovenia in 2023.

TABLE 42: MARKET SHARES AND HHI OF SUPPLIERS TO ALL FINAL CONSUMERS IN THE NATURAL GAS RETAIL MARKET

Supplier	Delivered energy [GWh]	Market share
Geoplin	4,014	45.8%
Energetika Ljubljana	1,187	13.5%
Petrol	1,164	13.3%
GEN-I	826	9.4%
Adriaplin	669	7.6%
Plinarna Maribor	292	3.3%
Goodyear Slovenija	142	1.6%
ECE	123	1.4%
Energija plus	92	1.0%
Enos	89	1.0%
Other small suppliers	170	1.9%
Total	**8,768**	**100.0%**[146]
HHI of the retail market		**2,624**

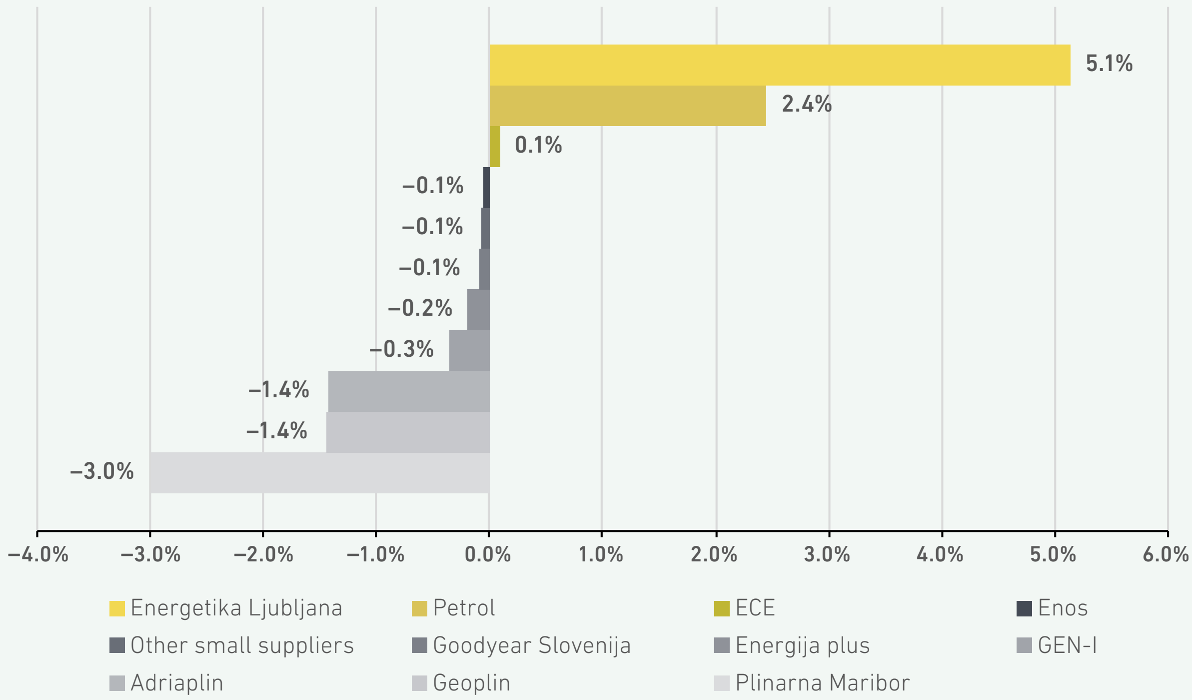
SOURCE: ENERGY AGENCY

The HHI value shows that the retail market remains highly concentrated (HHI of more than 2,000) and that the HHI value has decreased by only 23 compared to 2022, indicating a more or less unchanged market situation and, thus, a continuation of the relatively low competitiveness of the retail market. Looking at the volumes supplied to all consumers, Energetika Ljubljana and Petrol increased their market share the most in 2023, while Adriaplin, Geoplin and Plinarna Maribor lost the most. The year-on-year changes in the suppliers' market shares to final consumers are shown in the following figure.

The natural gas retail market remains highly concentrated

146 The difference between the total and the individual supplier totals is due to rounding to one decimal place.

FIGURE 209: CHANGES IN THE MARKET SHARES IN THE FINAL CONSUMERS MARKET IN 2023 IN COMPARISON TO 2022[147]



SOURCE: ENERGY AGENCY

A minor surprise is the reduction in the market share of Adriaplin, which was the only supplier to offer retail consumers a price that was 10% below the government-regulated price as of April. It then offered to supply gas to the same group of consumers at a price 20% below the regulated price from November, while GEN-I and Elektro energija also offered to do so. However, the lower prices of these suppliers in the last two months of the year were not the main reason for the change in supply market shares, as the main supply is to business consumers for whom the gas price was not regulated. The retail market situation in 2023 was far from a well-functioning competitive market. The crisis with the risk of gas supply shortages and the unstable international wholesale market, where gas prices started to rise in the second half of 2021, were the reasons for the record-high gas prices. This has regulated natural gas prices for households and other vulnerable customer groups. However, with regulated prices, the opportunity for consumers to make significant savings by switching was more limited, hence the modest number of switches in 2023. Some more opportunities may have been available to business consumers with unregulated prices. Some may have taken the risk or even been forced to take a contract for less than a year. In these cases, they also had more flexibility to find a more favourable supply in 2023, when wholesale prices had already fallen considerably. For offers to larger commercial consumers, it is more difficult to assess the available competition in the market on the basis of different prices, as these offers are, in most cases, not publicly announced, and supply prices may also be negotiated and possibly linked to a wholesale price index. The market shares of individual suppliers at the end of 2023 reflect, to a large extent, the reduced (weaker) competition between suppliers due to the lack of attractive offers.

147 Changes in market shares are rounded to one decimal place.

The Supply of Natural Gas to Business Consumers

The market shares of the natural gas suppliers in the retail market for business consumers in 2023 are presented in Table 43.

TABLE 43: MARKET SHARES AND HHI OF SUPPLIERS TO ALL BUSINESS CONSUMERS IN THE NATURAL GAS RETAIL MARKET

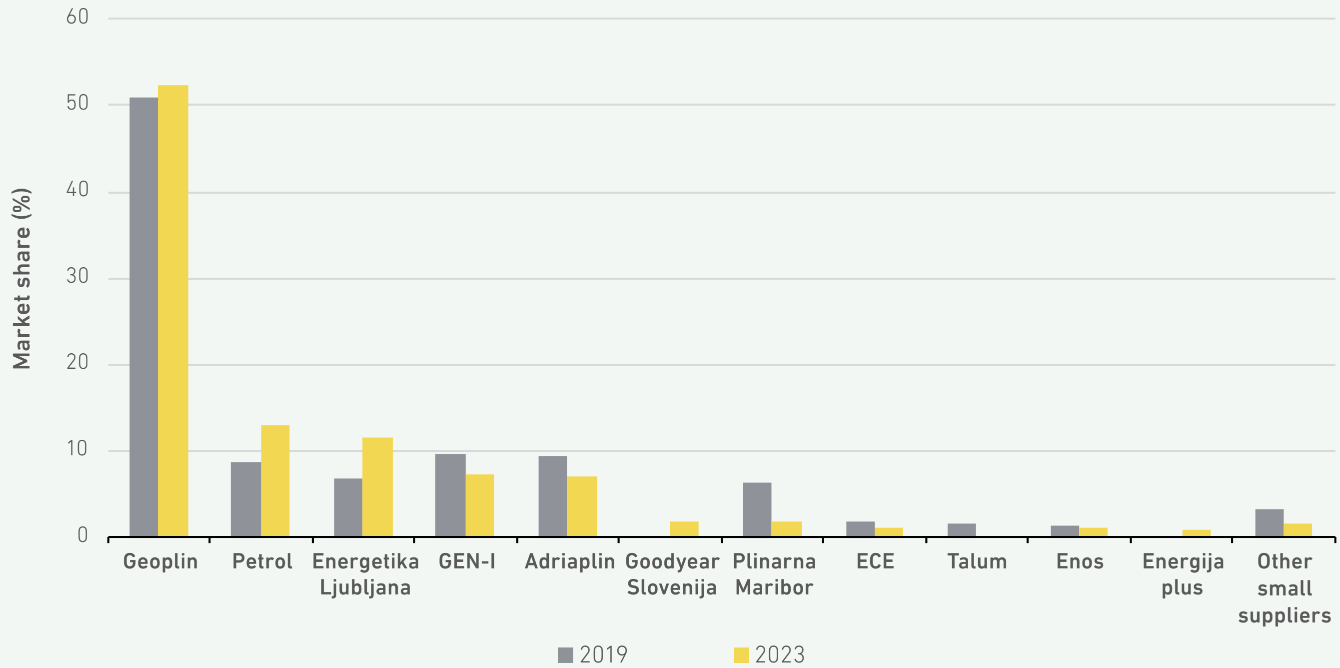
Supplier	Delivered energy [GWh]	Market share
Geoplin	4,014	52.5%
Petrol	997	13.0%
Energetika Ljubljana	881	11.5%
GEN-I	559	7.3%
Adriaplin	545	7.1%
Goodyear Slovenija	142	1.9%
Plinarna Maribor	133	1.7%
ECE	92	1.2%
Enos	89	1.2%
Energija plus	79	1.0%
Other small suppliers	120	1.6%
Total	**7,651**	**100.0%**
HHI of the retail market		**3,171**

SOURCE: ENERGY AGENCY

The year-on-year change in the HHI was relatively small. In 2023, the HHI decreased by only 88 to 3,171, indicating that the retail market remained highly concentrated (an HHI of more than 2,000). In the market for supplies to business consumers, similarly to the segment for supplies to all consumers, Energetika Ljubljana and Petrol gained the largest share, which is to be expected given that supplies to business consumers account for 87.3% of the total consumption. Energetika Ljubljana increased its market share by 5.8 percentage points, while Petrol increased its market share by 2.7 percentage points. The remaining suppliers lost market shares. Plinarna Maribor lost the largest market share at –3.7%, Adriaplin –1.8% and Geoplin 1.7%. A comparison of the market shares of suppliers to business customers in 2019 and 2023, shown in Figure 210, shows that the market share increased for Energetika Ljubljana (+4.7 percentage points), Petrol (+4.4 percentage points), Geoplin (+1, 6 percentage points) and Energija plus (+1 percentage point), while the decrease was most pronounced for Plinarna Maribor (–4.7 percentage points), Adriaplin (–2.4 percentage points), GEN-I (–2.2 percentage points) and a group of smaller suppliers (–1.7 percentage points). The shares of natural gas supplies to business consumers point to a decrease in the competitiveness of the market for consumers, as the three largest suppliers in terms of volumes of supply strengthened their shares from a combined 70% to 77%. The hesitancy of the smaller suppliers to enter into supply contracts with new consumers is likely to have continued to have an impact on the development, given the poor market experience of the previous year, when the market situation was unstable and natural gas prices were highly volatile. One of the major barriers to a more competitive market is the significantly higher financial risk on the part of smaller suppliers, which are much more exposed in times of uncertainty and consumers consequently seek security and reliability of supply from larger and more established suppliers.

The largest suppliers to business consumers further increased their overall market share

FIGURE 210: COMPARISON OF THE SUPPLIERS' MARKET SHARES TO BUSINESS CONSUMERS IN 2019 AND 2023



SOURCE: ENERGY AGENCY

The Supply of Natural Gas to Household Consumers

The market shares of the natural gas suppliers in the retail market for household consumers in 2022 are presented in Table 44.

TABLE 44: MARKET SHARES AND HHI OF SUPPLIERS TO ALL HOUSEHOLD CONSUMERS IN THE NATURAL GAS RETAIL MARKET

Supplier	**Delivered energy [GWh]**	**Market share**
Energetika Ljubljana	307	27.5%
Gen-I	266	23.9%
Petrol	167	15.0%
Plinarna Maribor	159	14.2%
Adriaplin	124	11.1%
ECE	31	2.7%
Istrabenz plini	25	2.2%
Energija plus	13	1.1%
Others small suppliers	26	2.3%
Total	**1,117**[148]	**100%**
HHI of the retail market		**1,892**

SOURCE: ENERGY AGENCY

148 The difference between the total and the individual supplier totals is due to rounding to one decimal place.

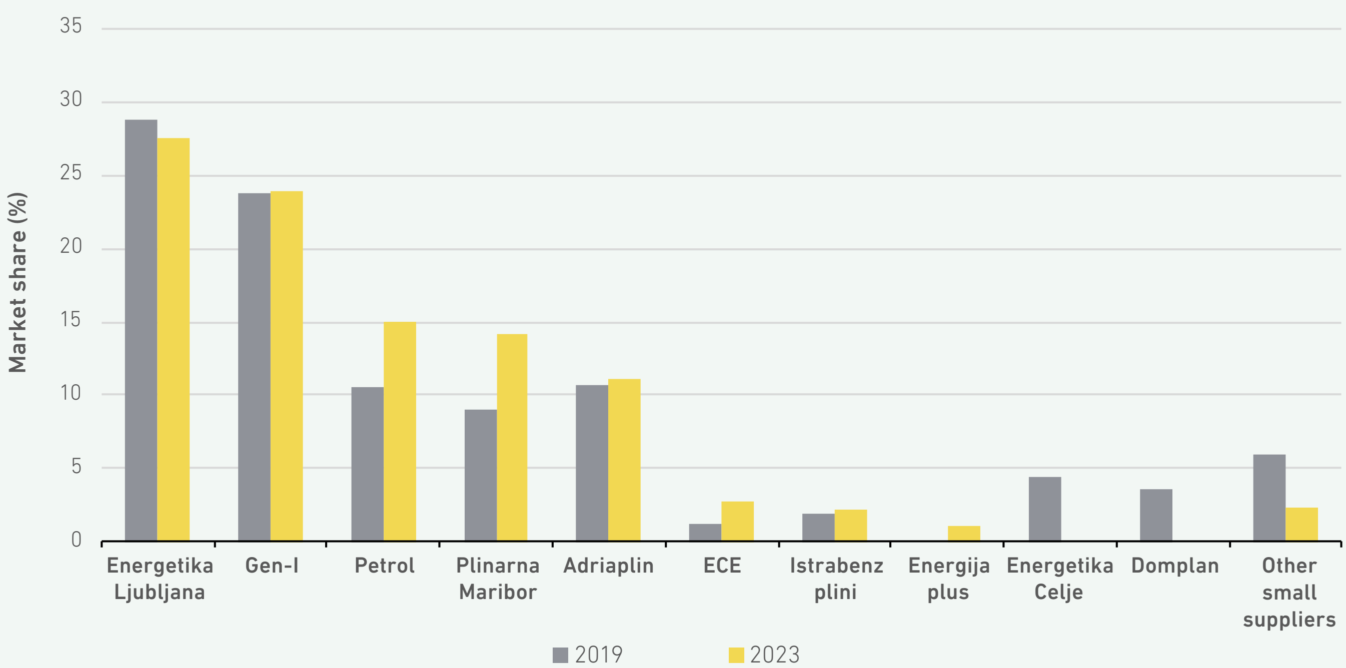
The HHI value shows that the retail market for supply to household consumers remained moderately concentrated (an HHI of less than 2,000), although the HHI value increased for the second year. Compared to 2021 and 2022, when the HHI was 1,657 and 1,731, the HHI increased by 161 in 2023. The market share of the three largest suppliers (CR3) was just over 66.3%, up 2.2% from the previous year. Among the remaining suppliers with a share of supply above one percent of the total volumes supplied to household consumers, Domplan, which ceased its supply activity, and Energetika Celje, which initially intended to cease its supply activity but then remained on the market with a significantly lower share of supply, were eliminated. The supply shares of Domplan and Energetika Celje resulted in changes in the shares of the remaining suppliers.

In 2023, Plinarnia Maribor managed to increase its market share by 2.2 percentage points, Adriaplin by 1.3 percentage points and GEN-I by one percentage point compared to the previous year. Petrol, ECE and Energetika Ljubljana also increased their market shares by 0.7%, 0.6% and 0.4%, respectively. On the other hand, Domplan, which ceased supply in 2022, and Energetika Celje, which, when announcing the cessation of supply, reduced its share of the volumes supplied by 86% compared to 2022, were responsible for the largest decrease in market share in the household segment. The share of supply also decreased for Energija plus, Istrabenz gas and other smaller suppliers. The former two saw a 0.3 percentage points decrease, while the market share of other smaller suppliers decreased by 1.2 percentage points. The reasons for the above changes in market shares are mixed, ranging from the termination or announcement of the termination of supply of each supplier already mentioned to the unwillingness of individual suppliers to conclude new supply contracts due to the still unpredictable gas market conditions.

The retail market for supply to household consumers remains moderately concentrated

The changes in the suppliers' market shares to household consumers over the five-year period are shown in Figure 211. Plinarna Maribor (+5.2 percentage points) and Petrol (4.4 percentage points) recorded the most significant increases in market shares. On the other hand, the largest decreases in market shares over the years were recorded by Energetika Celje (–4.5 percentage points), Energetika Ljubljana (–1.3 percentage points) and other smaller suppliers (–3.7 percentage points).

FIGURE 211: COMPARISON OF THE SUPPLIERS' MARKET SHARES TO HOUSEHOLD CONSUMERS IN 2019 AND 2023

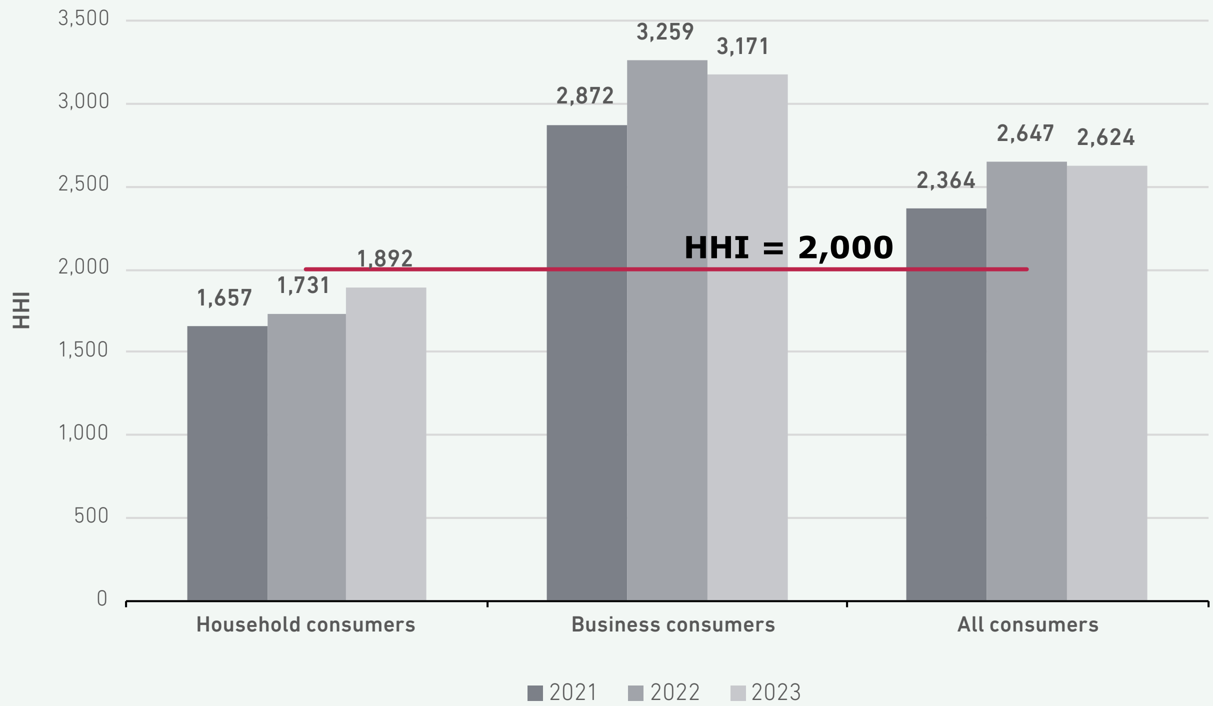


SOURCE: ENERGY AGENCY

Comparison of Concentrations on the Relevant Markets

In 2023, the HHI increased in the retail market supply for household consumers, while a slight decrease was recorded for business consumers. A smaller reduction in the HHI value was also observed in the observed segment of all consumers. The HHI values for the three years are shown in Figure 212. The current state of the retail market does not reflect the desired state of a competitive market. The household consumer segment remains the only observed market with low concentration, but it has approached the threshold over the last three years. The business consumer market is highly concentrated in terms of HHI value, with no significant improvement observed.

FIGURE 212: MOVEMENT OF THE HHI IN THE RETAIL MARKET IN THE 2021–2023 PERIOD

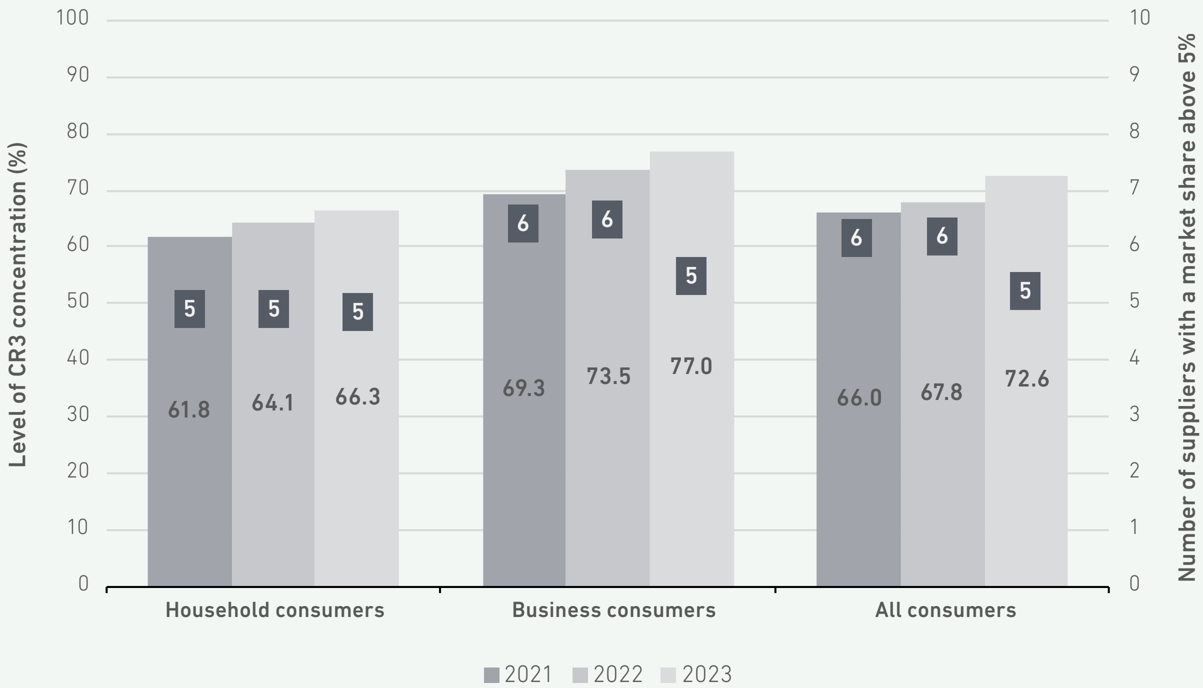


SOURCES: SUPPLIERS

Figure 213 shows the concentration index of the CR3[149] in each market segment over the last three years. The CR3 values in the segments supply to business consumers and all consumers exceeded the high concentration threshold (70%) in 2023. A negative trend of increasing concentration in 2023 compared to 2021 and 2022 can be observed for supply to both household and business consumers. The negative trends mainly reflect the tight and unstable natural gas market, which led four suppliers to stop supplying natural gas in 2022, while suppliers remained rather reserved in 2023 and, on the basis of significantly lower wholesale gas prices, did not offer significantly lower prices than the regulated prices to most of their consumer customers.

149 Total market share of the three largest suppliers on the market.

FIGURE 213: LEVEL OF CONCENTRATION OF CR3 AND THE NUMBER OF SUPPLIERS WITH A MARKET SHARE ABOVE 5% IN THE 2021–2023 PERIOD



SOURCES: SUPPLIERS

Switching Supplier

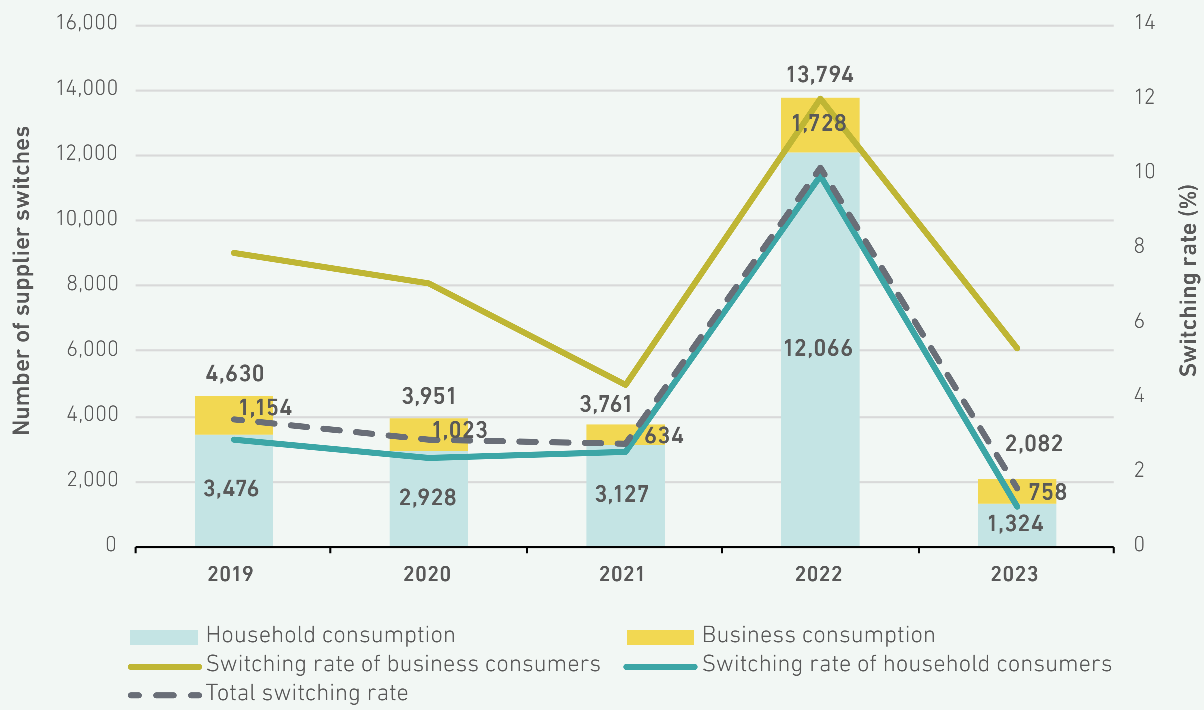
The number of switches is one of the key indicators of a well-functioning retail market. In 2023, it was difficult to speak of a well-functioning market because the period was characterised by gas supplies with a regulated upward price cap to protect households and other vulnerable customer groups, and consumers needed a wider variety of offers. At the beginning of the year, all suppliers offered to supply gas at the same price, subject to an upward price cap imposed by the Government's Regulation on determining prices for natural gas from the gas system. From April to November, when the cost of heating was not a significant concern for most household consumers due to the end of the heating season and lower consumption, only one supplier offered a supply price 10% below the regulated price. As of November, three suppliers offered to supply at around 20% below the regulated price. However, given the reaction time of consumers and the time needed to switch a supplier, the number of switches made was low. The reason for this was very likely also due to the Government's action at the end of October, using a regulation to re-set the gas price for the period from 1 January 2024 to 30 April 2024 at a value almost equal to the offers of the three most favourable suppliers for the last two months of 2023. Consequently, all household consumers were switched back to a single regulated price. Based on the recorded number of supplier switches, many consumers who were actively seeking better offers in the past have not been particularly active. Among the remaining consumers, many are still unaware of the possibility of switching.

The lowest number of switches since the opening of the natural gas market

Based on the above, the natural gas retail market was relatively static in 2023, as can be seen from the switching statistics. The number of switches was by far the lowest in the period since 2012 when the retail natural gas market took off with the entry of the then-new supplier GEN-I. Only 2,082 consumers connected to the distribution network switched their natural gas supplier, 1,324 residential and 758 business consumers. For household consumers, a higher number of switches was observed in the first three quarters of the year, which is probably partly due to the termination of the natural gas distribution activities of the Vrhnika Utilities Company and the announcement of the cessation of supply. A second wave of increased intensity occurred in June and July, which could be a response to the lower price offered by the supplier Adriaplin, and a third upward deviation happened at the end of the year, at its strongest in December. Several switches were observed in the first three quarters of the year, which is probably partly due to the termination of the natural gas distribution activities of the Vrhnika Komunalno Podjtje and the announcement of the cessation of supply. A second wave of increased intensity occurred in June and July, which could be a response to the lower price offered by the supplier Adriaplin, and a third upward deviation happened at the end of the year, at most in December. Compared to 2022, the number of switches dropped by 85%, 89% for households and 56% for business consumers. Excluding 2022, when the number of switches was high due to switching to another supplier as a result of going out of business, there has been a downward trend in the number of switches since 2015. The number of switches in 2023 was 75% lower than in 2015 or almost 70% lower than the average for 2012–2022.

The trend in the total number of switches and the share of switches by type of consumption in the 2019–2023 period is shown in Figure 214.

FIGURE 214: NUMBER OF SUPPLIER SWITCHES IN THE 2019–2023 PERIOD



SOURCE: ENERGY AGENCY

The switching rate for household consumers in 2023 is only a good percentage, which reflects the inactivity of consumers, which is, among other things, a consequence of the supply conditions mentioned above, which are more or less equal for all suppliers. The higher switching rate can be seen as a result of increased interest in seeking more favourable supply terms from customers who were paying record-high prices for gas supplies in 2022, while the reduction in wholesale prices in 2023 has already offered the possibility of concluding new supply contracts at lower prices to certain groups of larger customers who were not contractually bound for a longer term.

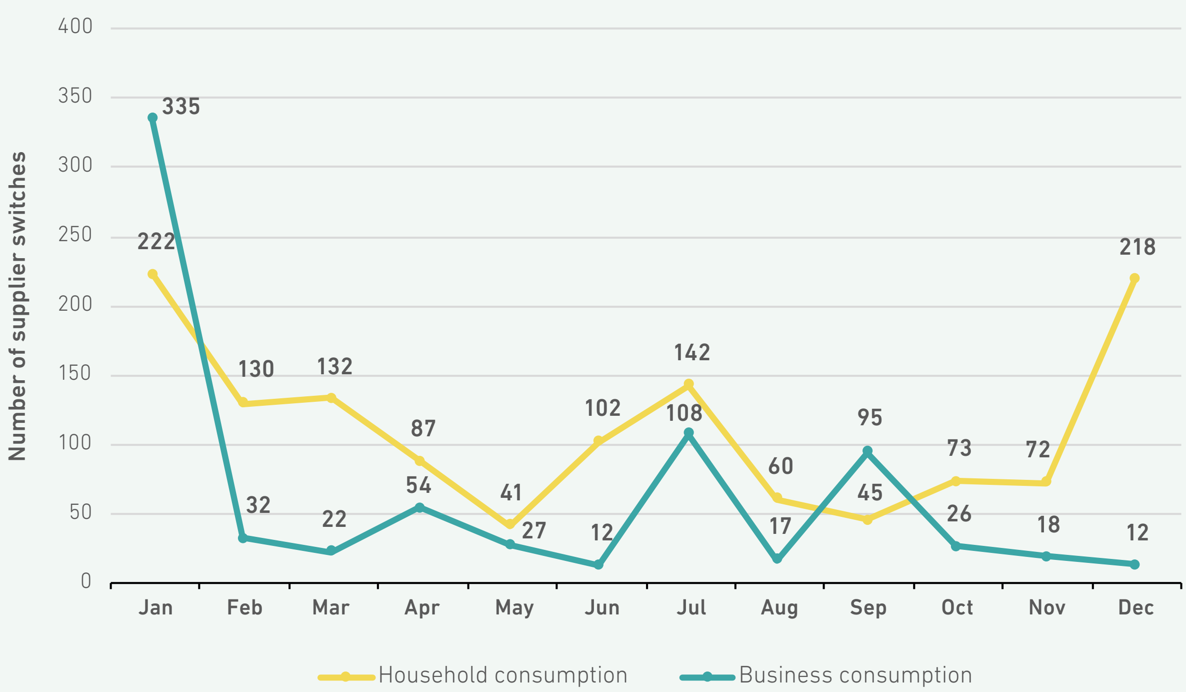
Household consumers of natural gas reacted little to a lower gas price than the regulated price

In recent years, the Netherlands and Belgium have recorded the highest share of switching[150] in the EU based on metering points, with more than 26%. These two countries are the only ones above 20% annually, the limit of the most developed or active markets.

The highest number of switches by business consumers, 44.2%, took place in January 2023

In 2023, business consumers saw an increase in switches at the beginning of the year, usually due to the expiry of fixed-term supply contracts, often concluded for a calendar year. Further, there was an increase in the number of switches in July and September, when wholesale prices reached levels close to the 2023 lows. Business consumers made more than 44% of all switches in January, while the highest switching months of January, July and September accounted for 71% of the total switches made in the year.

FIGURE 215: DYNAMICS OF THE NUMBER OF SUPPLIER SWITCHES DEPENDING ON THE TYPE OF CONSUMPTION

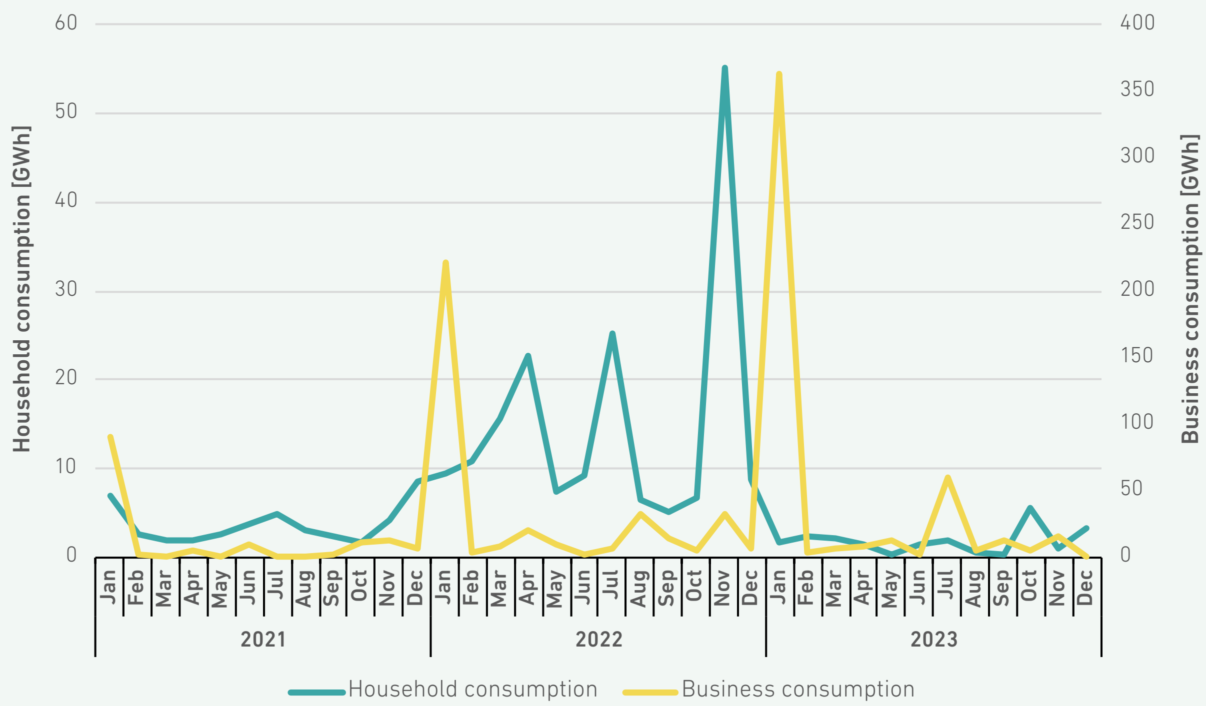


SOURCE: ENERGY AGENCY

Switched energy is the estimated annual natural gas consumption of consumers who switch suppliers. For business consumers, a yearly growth of 36% was recorded. In January alone, the switchers' projected annual gas consumption was practically equal to the amount of energy switched in 2022. The situation was quite different for household consumers, where the amount of energy switched in 2023 decreased by 88%. The trend in the amount of natural gas switched by month in the 2021-2023 period is shown in Figure 216.

150 ACER/CEER Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2021 – Energy Retail and Consumer Protection Volume, October 2022, Figure 17.

FIGURE 216: QUANTITIES OF EXCHANGED GAS WITH RESPECT TO THE TYPE OF CONSUMPTION



SOURCE: ENERGY AGENCY

The quantities of gas exchanged in the residential segment peaked in October before the start of the heating season, with a share of almost 45% of the annual volume exchanged in the last three months of the year. In the commercial segment, the quantities of natural gas exchanged peaked in January, when just over 73% of the annual volume was exchanged. A higher switching share was also recorded in July when the share was just over 12%. The change in the pattern is mainly due to the relatively static conditions of the retail market for household consumers. In contrast, business consumers have already had more opportunities to switch to more favourable supply conditions.

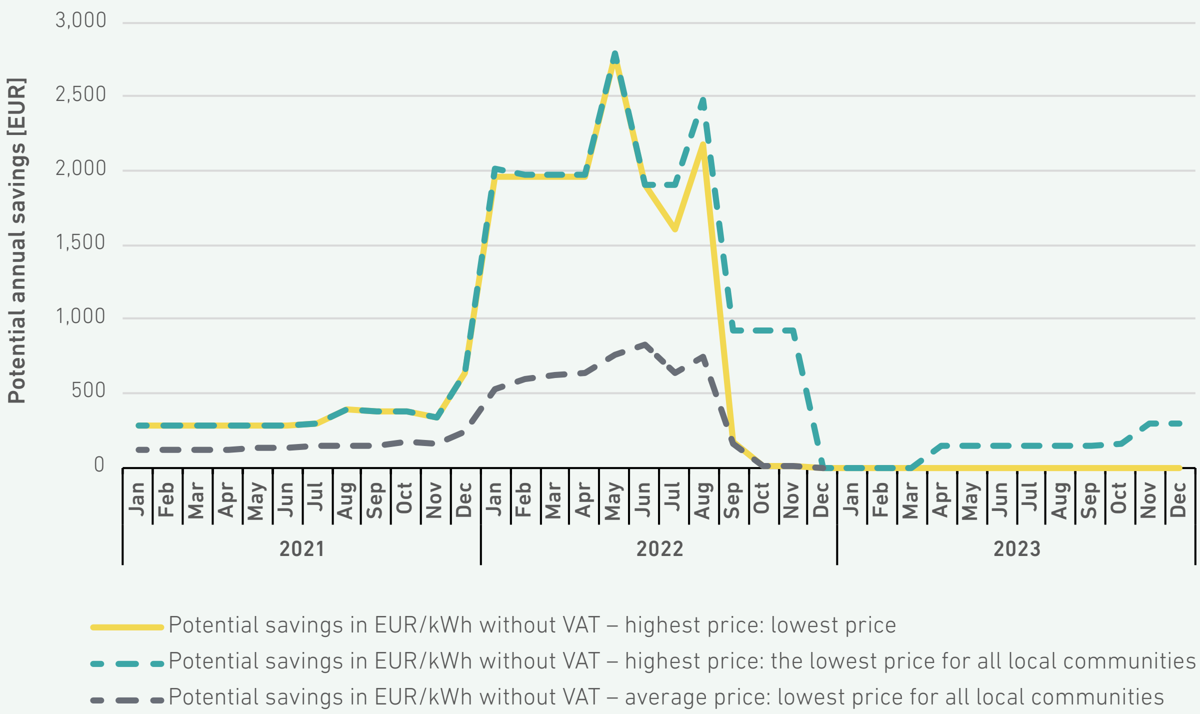
Estimating the Potential Benefits of Switching Supplier

A well-functioning retail market is characterised by a variety of supply offers, offering consumers the possibility to be supplied with a variety of terms and conditions, as well as the opportunity to make savings by keeping up-to-date with the suppliers' offers and choosing the most favourable ones for them. By switching supplier, any household or legal entity can reduce its annual cost of natural gas supply, influence the payment terms and other provisions of its contractual relationship with the supplier or obtain additional benefits linked to a particular offer, but only if there is sufficient competition in the market to attract new customers and increase the share of supply. Unfortunately, all this does not reflect the characteristics of the Slovenian retail market in 2023, when upwardly capped regulated prices were in place for household and individual groups of non-household consumers. The monthly consumption of natural gas for most household consumers is linked to the heating season, so during the colder months, when consumption is typically highest, consumers have the opportunity to make savings if they are supplied on the basis of the most cost-effective offers.

Potential switching savings were not sufficiently encouraging for more switches

The potential savings for a typical household consumer with an annual consumption of 20,000 kWh are shown in Figure 217.

FIGURE 217: POTENTIAL SAVINGS IN THE CASE OF SWITCHING NATURAL GAS SUPPLIER FOR A TYPICAL HOUSEHOLD CONSUMER IN THE 2021–2023 PERIOD



SOURCE: ENERGY AGENCY

The potential savings in each month from switching from the supplier with the highest supply price to the supplier with the lowest supply price are calculated assuming a continuous 12-month supply under unchanged conditions. Given the highly volatile gas supply conditions on international markets since mid-2021, unchanging supply conditions in the longer term are less likely and the EUR 292 potential savings shown are purely theoretical. The 2023 potential savings figure for the difference between the average price and the minimum price of gas for all local authorities is meaningless because it is difficult to talk about average prices when the majority of consumers are on a regulated price and a smaller proportion are on a slightly reduced price offer, so this figure is excluded in 2023.

In the first three months of the year, all household consumers only had access to offers at the single regulated price of EUR 0.073/kWh and there was no opportunity for savings in case of switching. Later in the year, the supplier Adriaplin was the only one to offer a supply at 10% below the regulated price until November. By taking up this offer, household consumers were able to save just under one euro per kWh of gas consumed on a monthly basis. If this price difference could be used for the whole 12-month period, they could save around EUR 178 if they consumed 20,000 kWh. Given the availability of supply during the period of lower consumption, this saving was significantly lower. In November and December, three suppliers offered supply at a price slightly below the new regulated price for the period from 1 January 2024 to 30 April 2024. In November and December, the consumption of a household consumer who uses gas for, among other things, space heating, represents around 30% of the consumer's annual consumption. Taking this into account, consumers could have saved up to EUR 87 in these two months if they were able to switch supplier quickly enough and if they were supplied by the new supplier at the new lower price from 1 November 2023 onwards. At the end of the year and the beginning of 2024 respectively, the supply prices for household consumers were almost unified again, with the application of the provisions of the Regulation on the determination of the price of natural gas from the gas system (Official Journal of the RS, No. 107/23), which set the maximum permitted retail price of natural gas for the substitute and basic supply of natural gas to household and common household customers at EUR 0.05990/kWh, which again deprived customers of the chance to make savings by seeking more favourable offers and switching suppliers.

Measures to Promote Competition

The Energy Agency monitors the retail natural gas market. It cooperates with the regulatory and supervisory authorities at the national level, such as the Market Inspectorate of the Republic of Slovenia, the Public Agency for the Protection of Competition of the Republic of Slovenia and, where appropriate, independent and non-profit consumer organisations. The Energy Agency's actions are multifaceted and are based on the Energy Agency's internal analyses, bilateral actions and the results of public consultations. The Energy Agency ensures that relevant information on market developments is kept up-to-date through its online single contact point.

In Slovenia, a maximum retail price for natural gas was set in 2023 for household and small business consumers and consumers using gas in shared boiler rooms (multi-apartment buildings, kindergartens, schools, primary social services, etc.). The maximum permitted retail price of natural gas for household and joint household consumers was EUR 0.073/kWh, and for other customers, EUR 0.079/kWh. The Government of the Republic of Slovenia has also set the maximum permitted retail price of natural gas for households and other consumers requiring gas for the production of heat for households at EUR 0.0599/kWh from 1 January 2024 to 30 April 2024.

In the natural gas market, activities to harmonise the most important data exchange processes at the national and regional levels are continuing.

In Slovenia, the transmission system operator continued the development of the unified information system (EIS), which was established in the previous year based on the Act on Amendments and Additions to the Act on Gas Supply (ZOP-A). In 2023, the EIS implemented the standardised labelling of metering points in Slovenia's natural gas distribution systems under the Act on identifying entities in the electronic exchange of data between participants in the electricity and natural gas markets. The EIS has also been upgraded with new functionalities to better support the exchange of data for the security of supply. The EIS thus supports a more accurate classification of customer sites in part related to essential social services. In addition, the EIS supports the efficient exchange of customer data for market operation, which will be increasingly important in the future development and integration of the electricity and natural gas markets.

The Security of the Natural Gas Supply

After a rapid and radical change in the natural gas supply situation in 2022, it stabilised in 2023. Security of supply in 2023 was not threatened in Slovenia or other EU Member States. During the year, intensive cooperation between Member States' competent authorities, regulators, the European Commission and associations within the European Commission's Gas Coordination Group continued. This cooperation included regular exchanges of information between the group members, who were also ready to take coordinated action if necessary. At the Slovenian level, a crisis group met regularly, in which representatives of the Ministry, the Energy Agency, the transmission system operator and suppliers closely monitored the supply situation and would coordinate action at the Slovenian level if necessary. All these activities have contributed significantly to the resilience of the whole gas system and the high security of supply in the EU and the Member States.

Due to the changed situation, a voluntary reduction of the gas consumption cap was in place throughout 2023 (until the end of March 2024). It was already introduced in 2022 by Regulation (EU) 2022/1369[151] on the coordinated reduction of gas consumption, extended and supplemented by Regulation (EU) 2023/706[152]. The target level was a 15% reduction in consumption compared to the average consumption between 1 April 2017 and 31 March 2022. According to the European Commission, EU-level gas consumption decreased by around 18% between August 2022 and December 2023. In Slovenia, gas consumption decreased by 10.7% between the beginning of April 2023 and the end of March 2024. Consumers in Slovenia and other EU Member States partially reduced their energy consumption while shifting part of their energy needs to other sources.

9.3% reduction in gas consumption compared to the average consumption of the reference period (1 April 2017 - 31 March 2022)

The gas supply situation stabilised, supply was uninterrupted, and coordination and preparedness for possible action continues

Storage is the most important source of flexibility for gas supply in the EU. On 1 November 2023, they were 99% full at the EU level, which exceeds the required 90%. In the 2023/24 winter season, when temperatures were above-average in most EU Member States, gas consumption from storage was very low, and the level of storage capacity at the end of the winter season on 1 April 2024 was as high as 59%, the highest ever.

Updated risk assessments at the regional level and in Slovenia

As part of the EU-wide effort to achieve supply security, the European Commission has also renewed its risk assessments for several regions (risk groups). It was clear from these assessments that the most important action was a voluntary 15% reduction in consumption, which could also become binding if the situation required it. In addition to the new risk assessments at the regional level, the Energy Agency has renewed its evaluation of the risks affecting the security of the gas supply in Slovenia. This assessment also showed that most risks can be managed without supply interruptions if consumption is voluntarily reduced by at least 15%, as mentioned above. Slovenia does not have its own gas resources or storage facilities. Therefore, it is exposed to changes in the gas market and the security of supply, especially in the event of unilateral or otherwise uncoordinated measures.

151 Council Regulation (EU) 2022/1369 of 5 August 2022 on coordinated demand-reduction measures for gas.
152 Council Regulation (EU) 2023/706 of 30 March 2023 amending Regulation (EU) 2022/1369 as regards prolonging the demand-reduction period for demand-reduction measures for gas and reinforcing the reporting and monitoring of their implementation.

In the event of a major gas shortage affecting protected consumers, the country could ask for solidarity assistance from neighbouring countries. Such assistance is provided in the 2022 Inter-State Agreements with Italy and the 2023 Inter-State Agreement with Croatia.

With the amendment of the Gas Supply Act, the Ministry responsible for energy became the competent authority on 1 May 2023 following 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. From that date, the Energy Agency performed all support tasks and provided the Ministry with the necessary basis and information for decision-making; the changed status was also followed by adjustments to the Emergency Plan and the Preventive Measures Plan, which the Ministry issued in the form of Orders. There were few substantive changes to the Emergency Plan, as it had been substantially renewed a year earlier. The Preventive Action Plan considered the new risk assessment and was otherwise updated.

Obligation of suppliers to meet the supply standard

The competent authorities of eleven Member States had already declared the first of the three crisis levels, the early warning level, in 2022, including Slovenia in July 2022. One Member State declared the second crisis level, the alert level. In 2023, the situation remained unchanged, with no additional Member States declaring a level of crisis and none withdrawing a level already declared, as the reasons for declaring a level of crisis have not been resolved.

Updated Emergency Plan and Preventive Action Plan

The Gas Supply Preventive Action Plan Order requires suppliers to meet a supply standard each year. This means they must provide gas to supply protected customers in three cases. The quantities of gas needed to meet the supply standard for the period from 1 October 2023 to 30 September 2024 are as follows:

(a) during the seven-day minimum temperature period: 13,575 MWh/day;
(b) during the 30-day period with exceptionally high demand: total 30-day quantities of 266,246 MWh or an average of 8,875 MWh/day;
(c) during a 30-day period with an interruption on each major infrastructure: 9,713 MWh/day.

Suppliers to protected customers must be able to provide the above gas quantities for case (a) for seven consecutive days and cases (b) and (c) for 30 consecutive days. The suppliers have provided gas from different sources and through various transmission routes. Slovenia has sufficient transmission capacity for the indicated quantities.

The suppliers also ensure the security of supply for the protected customers by diversifying their gas sources. A large Slovenian supplier supplies gas from Algeria, with volumes exceeding the consumption of the protected customers. The supply contract is from 1 January 2023 to 31 December 2025, and an additional agreement almost doubles the volumes under the contract from the beginning of 2024. The natural gas is transported via pipelines from Algeria through Tunisia, under the Mediterranean Sea, and then through the Italian transmission system. It enters the Slovenian transmission system at the Gorica-Šempeter Point.

CONSUMER PROTECTION

UNINTERRUPTED SUPPLY TO PROTECTED CONSUMER GROUPS:

NO BENEFICIARIES OF ELECTRICITY OR NATURAL GAS EMERGENCY SUPPLY

111 ELECTRICITY CONSUMERS SUPPLIED UNDER LAST RESORT SUPPLY CONDITIONS IN DECEMBER 2023

NO NATURAL GAS CONSUMERS ON SUBSTITUTE SUPPLY

The right to reliable, good quality and affordable energy

THE MOST COMMON REASON FOR DISCONNECTING ELECTRICITY IS NON-PAYMENT, AND FOR DISCONNECTING NATURAL GAS IT IS A REQUIREMENT OF THE FINAL CONSUMER

7.6% MORE

DISCONNECTIONS OF ELECTRICITY

9.2% FEWER

DISCONNECTIONS OF NATURAL GAS

47,990

APPLICATIONS FOR CONNECTION OF SELF-SUPPLY INSTALLATIONS RECEIVED ELECTRICITY DISTRIBUTION COMPANIES

22,066 CONNECTION CONSENTS ISSUED

8,334 APPLICATIONS REJECTED

19,443 APPLICATIONS PENDING

*31.12.2023

1,177 OF TOTAL COMPLAINTS

AGAINST DECISIONS OF ELECTRICITY OPERATORS - ALMOST ALL BECAUSE OF REFUSAL OF CONNECTION CONSENTS FOR SOLAR POWER PLANTS

15% REDUCTION IN COMPLAINTS FROM HOUSEHOLD ELECTRICITY CONSUMERS TO SUPPLIERS

9.6% INCREASE IN COMPLAINTS FROM HOUSEHOLD NATURAL GAS CONSUMERS TO SUPPLIERS

MOST COMPLAINTS FROM HOUSEHOLD CONSUMERS TO SUPPLIERS WERE UNJUSTIFIED

CONSUMER PROTECTION

In 2023, the situation in the energy markets started to settle down. However, the final prices of electricity and natural gas for households and some other consumer groups were still capped by the regulations of the Government of the Republic of Slovenia. Energy supply is in the public interest and, in addition to the right to a reliable, secure, high-quality and sustainable supply, the legislation in force guarantees consumers other rights, such as:

- the right to emergency electricity and a substitute and a basic supply of natural gas,
- the right to last resort supply,
- the right to complain to suppliers and out-of-court dispute resolution,
- the right to the protection of rights in administrative proceedings,
- the right to safe and reliable operation of the system and a quality supply of electricity or natural gas at a reasonable price.

The Right to be Informed

Consumers are informed about their rights, the applicable rules and general acts for exercising public powers, and the methods for handling complaints regarding the supply of electricity and natural gas through the Single Contact Point on the Energy Agency's website, where all the necessary information for consumers is published. The website also provides access to a comparator covering all offers for household and small business consumers on the electricity and natural gas market managed by the Energy Agency and a network charge cost comparator for the calculation of the network charge for the electricity transmission and distribution system has been introduced, which calculates the network charge for 2024 according to the current and new methodologies. Also, in 2023, the Energy Agency kept up-to-date with news on developments in the retail market. It informed users on an additional website (www.uro.si) about all the new developments relating to the new way of calculating the network charge. Consumers were also able to ask questions on the subject online.

An important means of informing consumers is through invoices and information on invoices issued by suppliers, operators or other electricity and gas undertakings. They must provide consumers with regular (periodic) access to transparent, complete and understandable information on their consumption and costs, the origin of the electricity supplied and the characteristics of their consumption on the bills issued to enable them to control their consumption and the cost of the energy consumed and thus to be motivated to save. They must also provide consumers, upon request and free of charge, with an explanation of how their bill or final account is prepared in relation to their actual consumption. On both the bills and the suppliers' websites, consumers should be provided with clear and understandable information on how complaints are handled and how and where to send a complaint.

All suppliers must also inform consumers of electricity and natural gas about their general terms and conditions of supply before concluding a supply contract, which must be consumer-friendly and unambiguous, at least by publishing them on their website. Household and small business consumers of natural gas and household consumers of electricity must be informed in a transparent and comprehensible manner about any changes to the general terms and conditions of supply relating to the performance of the contract, including changes to prices, which may entail an increase in the supply charge, in good time, i.e. at least one month before they come into force, and other electricity consumers at least two weeks before they come into force, in accordance with the ZOEE. As a consequence of a change in the General Terms and Conditions of Supply, household or small business consumers may withdraw from the supply contract within one month after the General Terms and Conditions enter into force without notice or the obligation to pay a contractual penalty and must be specifically informed of this right by the supplier in the notice of the change in the General Terms and Conditions. The notice shall be sent free of charge to the household consumer in the manner specified in the supply contract.

End-users must also be given effective access to consumption data by electricity and natural gas distribution system operators. They must inform consumers before they are connected to the system that they can choose their supplier freely on the market. The Energy Agency's website includes a cost of supply comparator, which provides information on package and promotional offers from electricity and natural gas suppliers and price lists to facilitate choosing the supplier. The comparator is aimed at household and small business customers. It allows them to check their monthly billing for electricity or natural gas supplied and calculate the network's cost. It also describes the step-by-step process of switching suppliers. The Energy Agency's website also publishes a list of natural gas substitute suppliers by individual natural gas distribution systems, which are provided to consumers eligible for substitute supply by one of the five suppliers identified until 31 August 2024.

In accordance with its competences, in 2023, the Energy Agency verified, among others, the adequacy of the supplier's responsiveness in preparing the new contract, the charging of fixed operating costs for common delivery points, and the invoicing of suppliers and found no infringements of the provisions of the applicable legislation.

The Right to Last Resort, Substitute, Basic and Emergency Supply

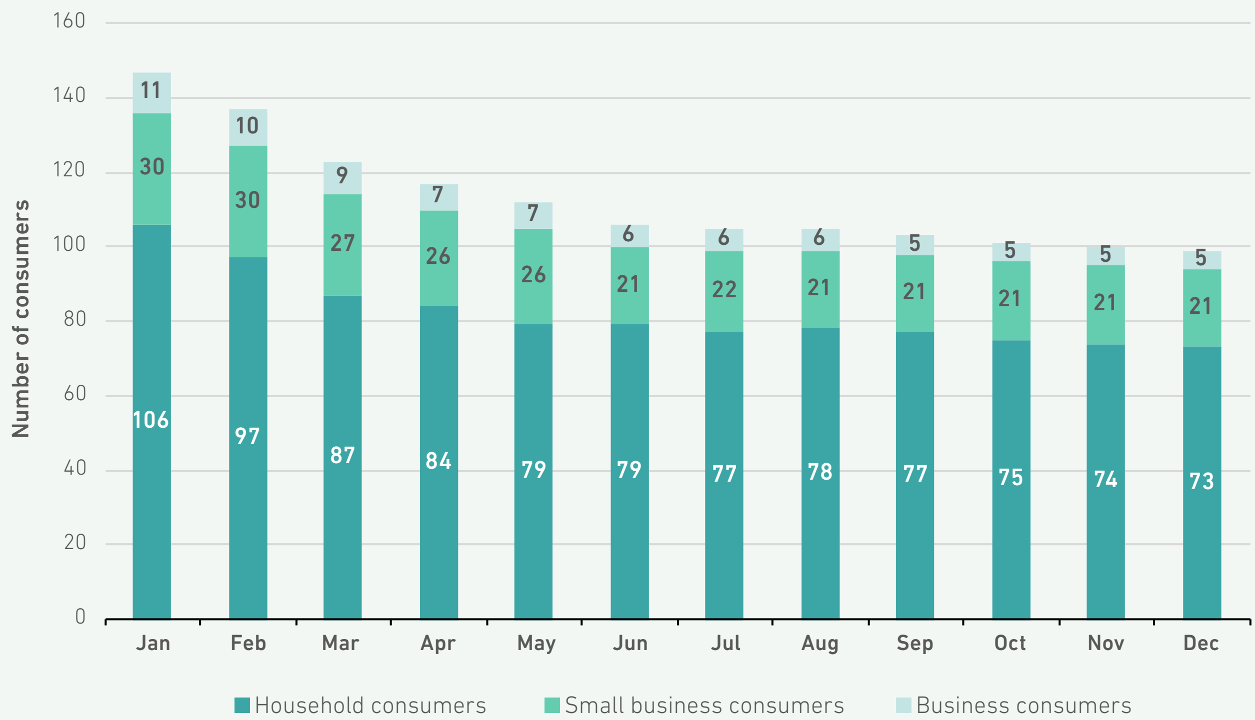
The Right to Last Resort for Electricity Consumers

Last resort supply is provided by the DSO when the supply contract of a household or small business consumer is terminated as a result of measures resulting from the insolvency or illiquidity of the supplier or if the supplier loses its status as a member of the balancing scheme, or at the explicit request of a household or small business consumer of electricity, of which they must be informed. The EA does not limit the duration of last resort supply. Still, last resort supply at the request of household and small business electricity consumers may be provided for an indefinite period in accordance with the SONDSEE, provided that all outstanding obligations under the last resort supply have been settled. As the last resort supply of electricity is carried out by an electricity DSO that is not otherwise engaged in supplying electricity, the price for last resort supply is regulated. The price of electricity for last resort supply is set by the DSO based on the provisions of the ZOEE and is publicly announced. The price must be higher than the market price for supply to a comparable consumer but may not exceed it by more than 25%. In addition to protecting the rights of consumers, this also ensures that they are active in finding a new supplier more quickly and securing more favourable conditions for their electricity supply.

Thus, in December 2023, 73 household consumers, 21 small business and five business consumers were supplied under conditions of last resort supply for reasons caused by the supplier, and five household and seven small business consumers were provided on request, for a total of 111 final consumers. The figures below show the number of consumers supplied under last resort supply conditions for reasons attributable to the supplier by month in 2023 and a comparison of the supply of household consumers with the previous year.

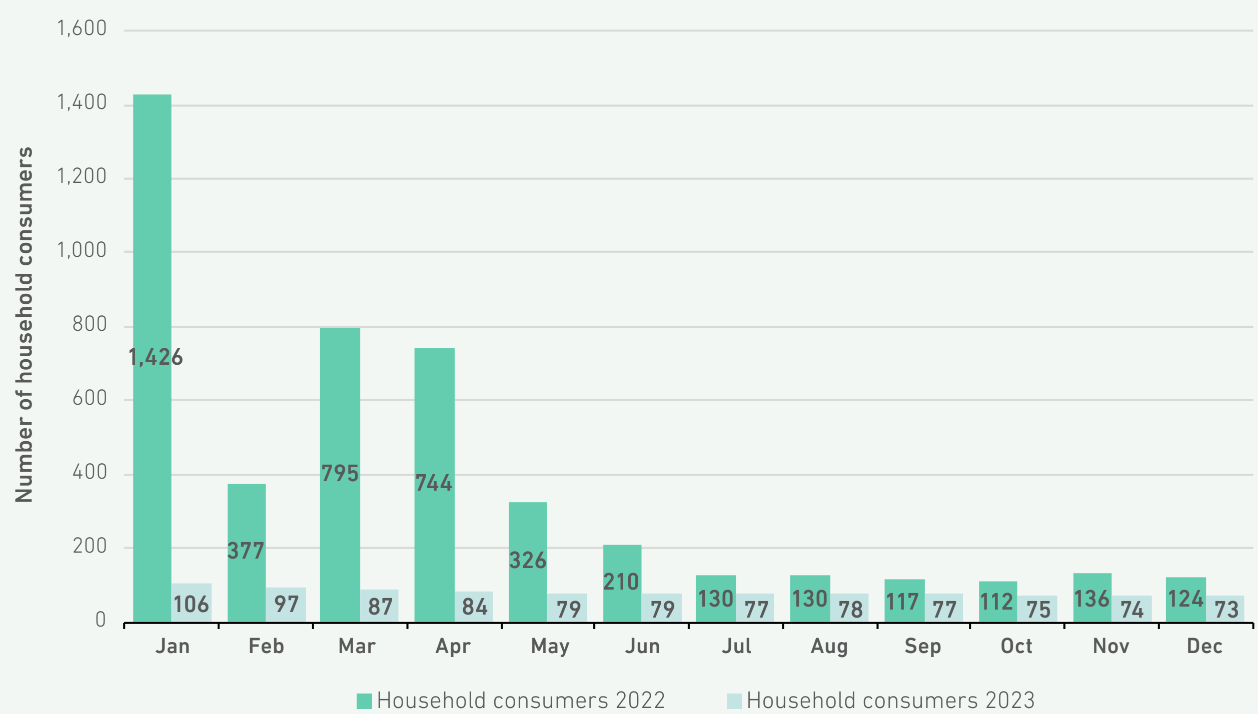
111 end-consumers on last resort supply in December 2023

FIGURE 218: LAST RESORT SUPPLY DUE TO REASONS ATTRIBUTABLE TO THE SUPPLIER IN 2023



SOURCES: ENERGY AGENCY, ELECTRICITY DISTRIBUTION COMPANIES

FIGURE 219: NUMBER OF HOUSEHOLD CONSUMERS SUPPLIED UNDER LAST RESORT SUPPLY CONDITIONS FOR REASONS ATTRIBUTABLE TO THE SUPPLIER IN EACH MONTH OF THE PREVIOUS TWO YEARS

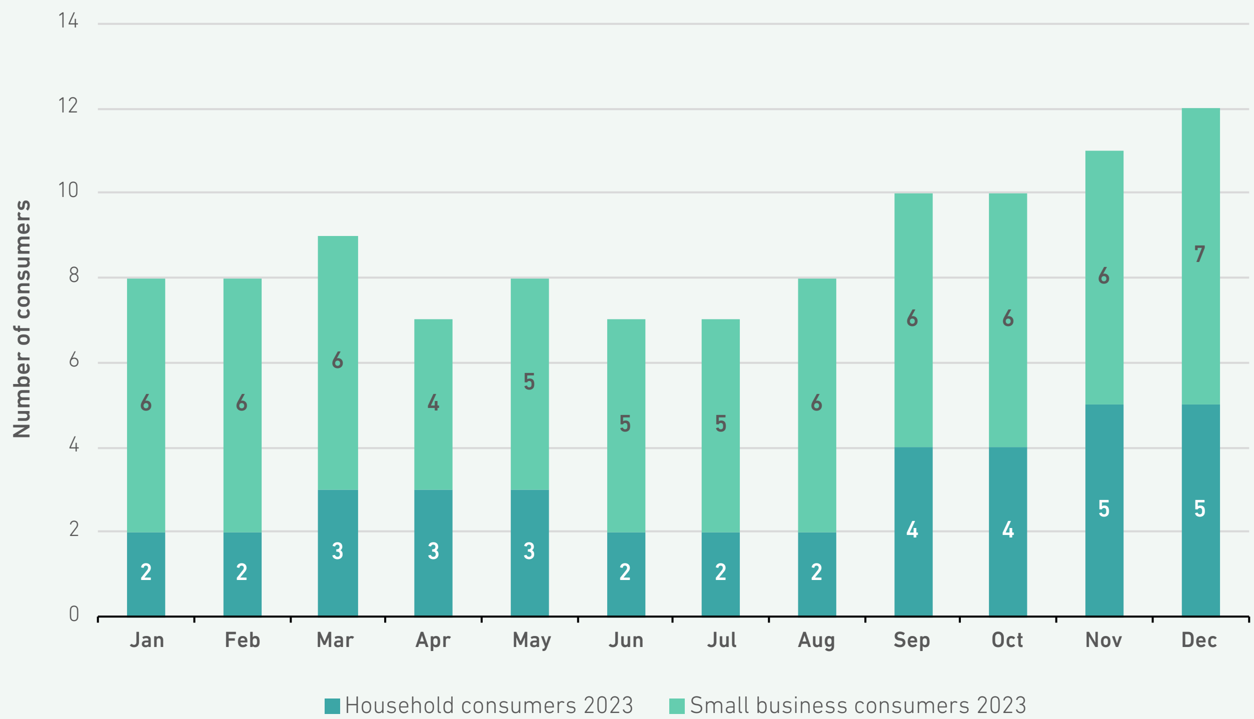


SOURCES: ENERGY AGENCY, ELECTRICITY DISTRIBUTION COMPANIES

At the explicit request of household and small business electricity consumers, the electricity DSO continued to supply household and small business electricity consumers in 2023.

The last resort supply at consumer request by month in 2023 can be seen in the following figure.

FIGURE 220: THE LAST RESORT SUPPLY AT CONSUMER REQUEST IN 2023



SOURCE: ENERGY AGENCY, ELECTRICITY DISTRIBUTION COMPANIES

The Right to a Substitute Gas Supply

While the electricity distribution system operator carries out the last resort supply of electricity, natural gas substitute supply is carried out by gas suppliers appointed by the Energy Agency. Household consumers, small business consumers, joint household consumers and protected consumers[153] connected to the distribution system are eligible for this supply if their natural gas supply contract is terminated as a result of measures resulting from the insolvency or illiquidity of the supplier or if the supplier loses its status as a member of the balancing scheme for any other reason.

The price of natural gas for substitute supply may be higher than the market price for the supply of natural gas to a comparable consumer. Still, it may not exceed the marginal purchase price for natural gas on the balancing market published by the natural gas transmission system operator, plus 25%. The supplier of the substitute supply determines the price of natural gas for the substitute supply, which must be published at least on the supplier's website and notified to the Energy Agency.

153 In addition to household consumers, common household consumers, kindergartens, primary schools and health centres connected to the distribution system, the definition of protected consumer include the following:
- distributors of district heating in installations that cannot switch to a fuel or heat source other than gas, to the extent that they supply heat to households and basic social services other than educational or public administration services;
- basic social services connected to a distribution or transmission system other than educational or public services.

The suppliers of substitute supply designated by the Agency in 2022 (Adriaplin, Energetika Ljubljana, GEN-I, Petrol, and Plinarna Maribor) are obliged to provide a substitute supply until 31 August 2024. To protect all consumers of this energy product, the Government has capped the price of the substitute supply at the maximum allowed retail price until 1 August 2023 and then until 31 December 2023.

According to the gas suppliers, no substitution was carried out in 2023.

No substitute supply was in place

The Right to a Basic Gas Supply

All natural gas suppliers are obliged to provide a gas supply to consumers without a supply contract upon request or they must not refuse to conclude a contract. The price of the basic supply is determined by the suppliers, whereby the price of natural gas for the basic supply may be higher than the market price of natural gas for comparable new suppliers, up to a maximum of EUR 20/MWh. If consumers who have entered into a supply contract under the Basic Supply Conditions breach the provisions of this contract or the Supply Conditions (e.g. outstanding obligations), the Supplier may terminate their supply contract under the published General Supply Conditions and the supply contracts entered into. If consumers who have entered into a supply contract under the Basic Supply Conditions breach the provisions of this contract or the Supply Conditions (e.g. unsettled obligations), the supplier may terminate their supply contract under the published General Supply Conditions and the supply contracts entered into.

The price of natural gas in 2023 for household consumers, for final consumers of natural gas who supply heat to several households through a common heating installation owned or co-owned by these households (from now on referred to as joint household consumer), for basic social services as defined in the second indent of the first paragraph of Article 117(1)(b) of the ZOP, and for kindergartens, primary schools, health centres that are connected to the distribution system, consumers who, on the date of entry into force of this regulation, are small business consumers, as defined by the ZOP, for providers of service of general economic interest of heat distribution that carry out heat distribution in accordance with the provisions of the ZOTDS, and for other heat producers for the share of natural gas for heat production for household consumers, basic social services, kindergartens, primary schools and medical centres limited by government Regulations on setting natural gas prices from the gas system.[154] The Regulations also applied to substitute and basic gas supply.

In 2023, four natural gas suppliers supplied their consumers under basic supply conditions, with three suppliers supplying household consumers, four supplying small business consumers, one supplying joint household consumers, and two supplying protected customers under these conditions. A total of 8,315 customers (6,732 household consumers, 1,347 small business consumers, 120 joint household consumers and 116 protected consumers) were served under the basic supply in 2023.

154 Regulation on determining the prices of natural gas from the gas system (Official Gazette of the RS, no. 98/22, 138/22 and 12/23, limit until 31 August 2023) and Regulation on determining the prices of natural gas from the gas system (Official Gazette of the RS, No. 45/23, limitation until 12/31/2023).

The Right to Supply

If a consumer is unable to pay the costs of the electricity and natural gas supply due to poor financial circumstances and their life and health or the lives and health of persons living with them are endangered due to special circumstances, e.g., time of year, temperature, place of residence, state of health and other similar circumstances, they may apply for a postponement of the disconnection and exercise the right to an emergency supply.

Vulnerable consumers, as defined in the ZOEE and ZOP, are household consumers who, due to their financial situation, the share of their energy expenditure in their disposable income and other social circumstances, are unable to provide themselves with an alternative source of energy for household use or heating, which would cause them to incur the same or lower costs for essential household use or the heating of their dwelling. The household consumer can prove their vulnerable consumer status and thus their eligibility for emergency supply with a certified statement from the Centre for Social Work (CSD), which must show that the household consumer has applied for regular social assistance before receiving the notification from the electricity or natural gas distribution system operator of the intended disconnection and that the decision procedure has not yet been completed with the CSD.

All DSOs must inform household consumers of their right to an emergency supply, the conditions under which it is possible and the deadlines for submitting evidence before disconnection.

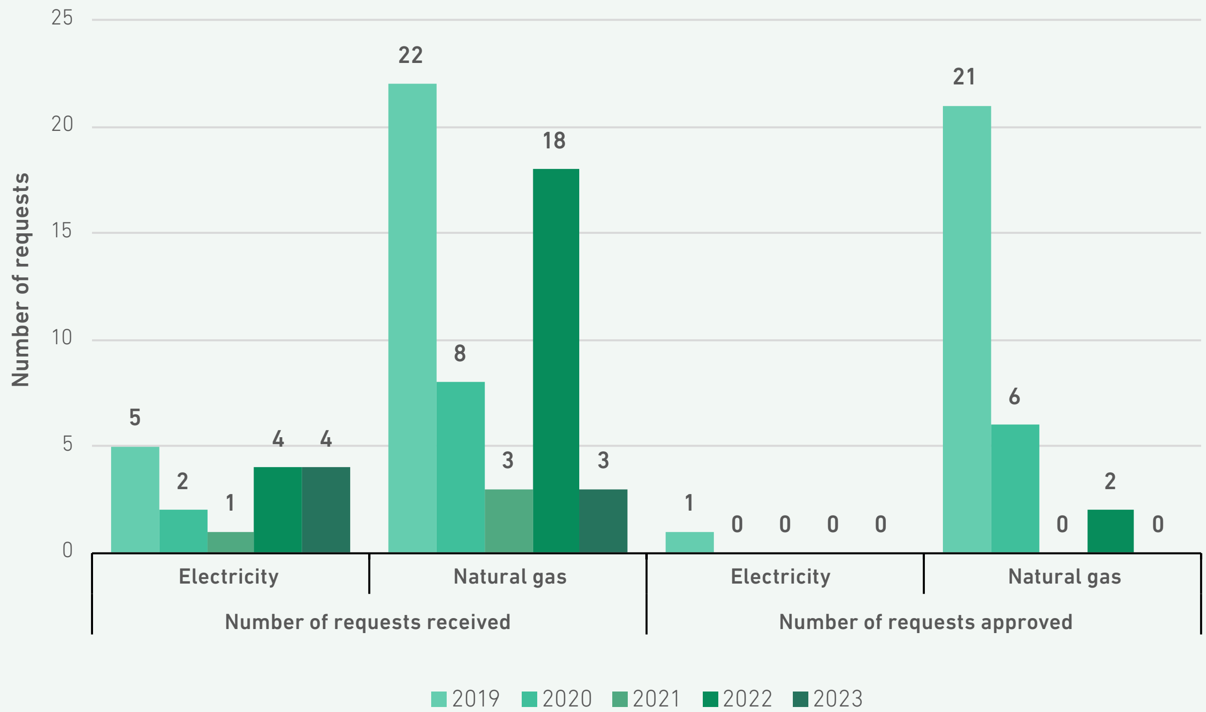
No beneficiaries of emergency electricity or natural gas supply in 2023

The costs of an emergency supply of electricity to vulnerable consumers are eligible costs of the electricity DSO, while in the case of the supply of natural gas, the costs of the emergency supply are borne by the natural gas DSO until the vulnerable consumer pays them.

Eligibility for emergency supply is assessed by the electricity DSO in accordance with the procedure laid down in the System Operating Instructions for the Electricity Distribution System and with the rules and criteria established by the Energy Agency in the Legal Act on the Criteria and Rules for Providing an Emergency Supply of Electricity, and gas DSOs according to the procedure laid down in their system operating instructions.

In 2023, as in the previous year, the electricity distribution system operator received four requests for emergency supply that were not granted. One of the applicants for emergency supply was actually disconnected in 2023. In the field of natural gas, in 2023, only one natural gas DSO received a total of three requests, which were not granted, but these consumers were still connected. A comparison of the requests made and granted for postponing disconnection and exercising the right to emergency supply over the last five years is shown in the following figure.

FIGURE 221: COMPARISON OF REQUESTS RECEIVED AND GRANTED FOR THE POSTPONEMENT OF DISCONNECTIONS AND EXERCISE OF THE RIGHT TO EMERGENCY SUPPLY



SOURCES: ENERGY AGENCY, OPERATORS

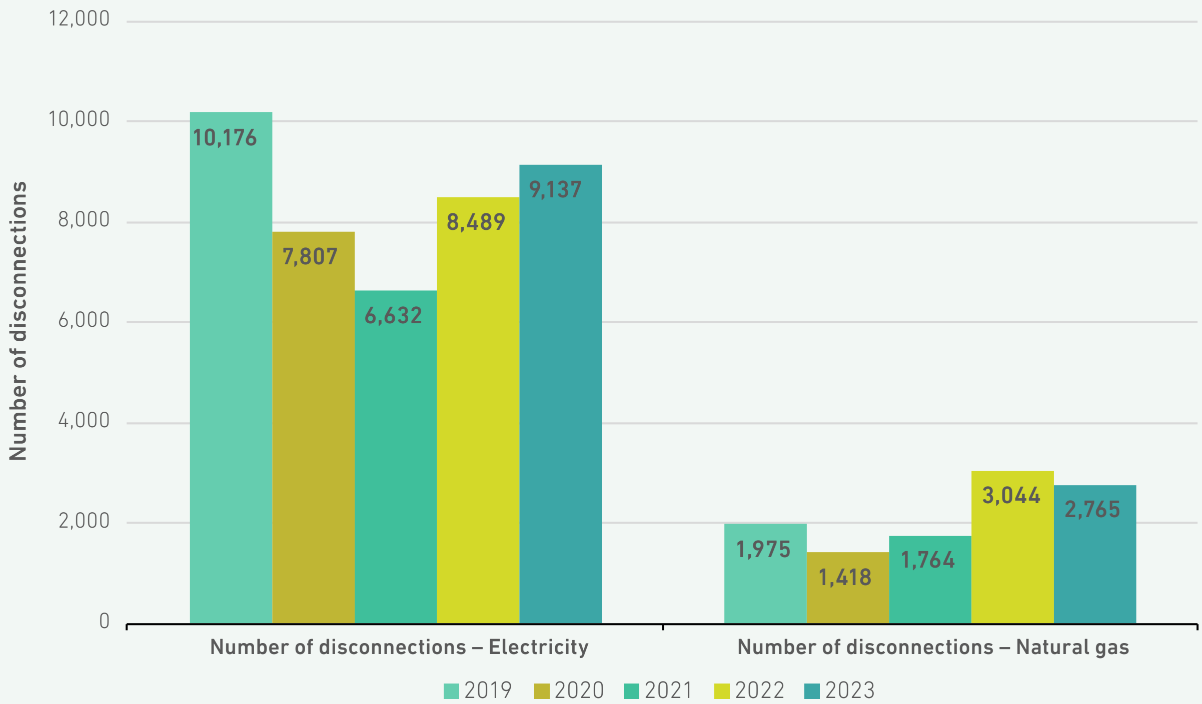
If the application for an emergency supply is not approved and a consumer fails to pay the energy supply bill, disconnection follows. Given that the cost of an emergency supply is paid by all the other electricity consumers through the network charge, the eligibility criteria for an emergency supply are very strict. This is in line with the guidance in the European legislation that Member States should ensure that measures to protect vulnerable consumers are primarily provided through general social policy measures and other measures that do not merely involve the deferral or non-payment of electricity bills.

Disconnections of Consumers

The disconnection of a consumer is one of the last resort methods of correcting infringements caused by the consumer's behaviour. The electricity or natural gas DSO may disconnect a consumer due to the termination of a supply contract by the energy supplier (most often due to non-payment) or for other reasons (infringements), which are listed in the ZOEE and the ZOP. Depending on the type of infringement, the disconnection procedure may be carried out with or without prior notice and a consumer may also be disconnected at their request.

The number of electricity disconnections increased slightly in 2023 (9,137 or 7.6% more disconnections) but did not reach the number in 2019. There is a slight decrease in natural gas disconnections in 2023 compared to the previous year (2,765 or 9.2% fewer). In electricity and natural gas, disconnections of household consumers are still the most frequent (6,968 in electricity and 2,430 in natural gas). A comparison of the number of disconnections of all final consumers over the last five years is shown in the following figure.

FIGURE 222: COMPARISON OF THE NUMBER OF DISCONNECTIONS OF FINAL CONSUMERS



SOURCES: ENERGY AGENCY, OPERATORS

The most common reason for disconnecting an electricity consumer is non-payment, which terminates the supply contract (disconnection after prior notice, 5,706). In the natural gas field, most disconnections were made at the request of the final consumer (2,453).

The most common reason for disconnecting electricity is non-payment, and for disconnecting natural gas, the consumer request

Under the ZOEE and the ZOP, electricity and natural gas distribution system operators are obliged to inform the household consumer of the intended disconnection with a prior warning at least 10 days before the intended disconnection and the business consumer at least eight days before the intended disconnection. During this period, consumers may eliminate the reasons why they are threatened with disconnection, and household consumers may exercise any right to emergency supplies. In this case, household and small business electricity consumers may also request the electricity distribution system operator to provide them with an emergency supply.

The table below shows the numerical distribution of the individual end-user disconnection procedures.

TABLE 45: DISCONNECTIONS OF FINAL CONSUMERS

	EL	NG
Disconnection without prior notice	209	17
Disconnection upon prior notice	5,706	295
Disconnection at the consumer's request	3,222	2,453
All disconnections	**9,137**	**2,765**

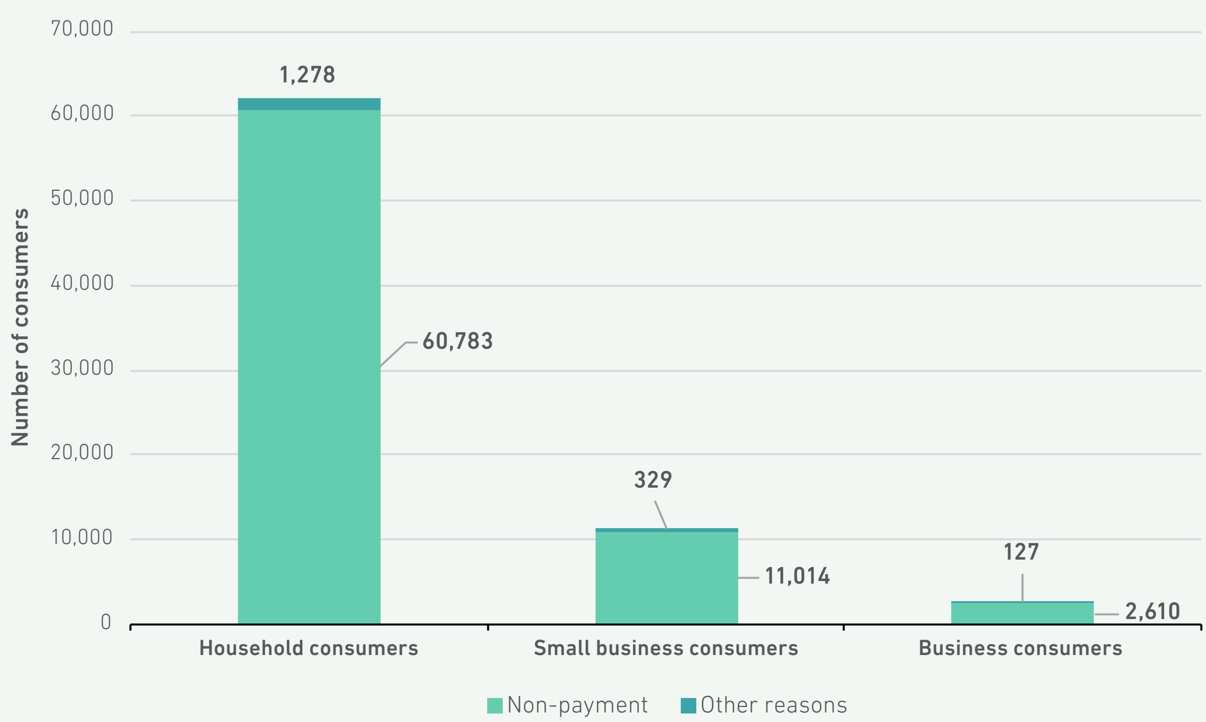
SOURCES: ENERGY AGENCY, OPERATORS, SUPPLIERS

In 2023, 90% of all terminations of electricity supply contracts for household consumers were cancelled due to immediate debt payment, while in the case of natural gas, 75.3% of consumers paid their obligations immediately.

If the consumer fails to pay the debt, disconnection follows. In 2023, 5,706 final consumers were disconnected from the electricity system and 295 final consumers were disconnected from the natural gas system due to non-payment through notice procedures.

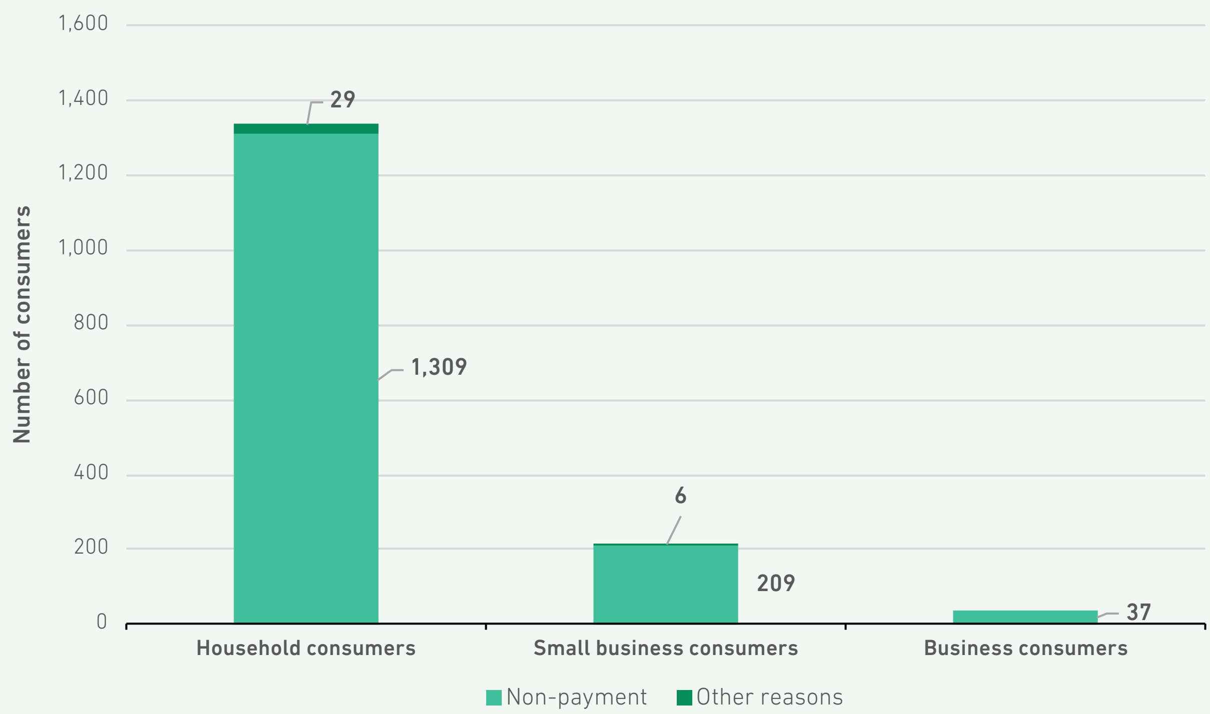
The following two figures show the number of cancellations of electricity or natural gas supply contracts by consumer size and the reason for the disconnection.

FIGURE 223: NUMBER OF CANCELLATIONS OF ELECTRICITY SUPPLY CONTRACTS BY REASON



SOURCES: ENERGY AGENCY, SUPPLIERS

FIGURE 224: NUMBER OF CANCELLATIONS OF GAS SUPPLY CONTRACTS BY REASON



SOURCE: ENERGY AGENCY, SUPPLIERS

There were no disconnections on closed distribution systems in 2023. One of the operators of a closed electricity distribution system issued one notice of intended disconnection, based on which an agreement was reached with these small business consumers on how to repay the debt, which was settled. Therefore, no actual disconnection took place.

The Right of Complaint and the Out-of-Court Settlement of Consumer Disputes with Suppliers

Complaints and Out-of-Court Consumer Dispute Settlements with Energy Suppliers

All consumers have the right to complain to their energy supplier. Disputes between small or large business consumers on the one hand and energy suppliers on the other are settled first with the individual supplier and then before the competent court. For electricity end-users other than household consumers, the complaints procedure is provided for in an out-of-court procedure in accordance with the Mediation in Civil and Commercial Matters Act, and for household consumers, the out-of-court settlement of disputes with energy suppliers is also specifically provided for in the legislation.

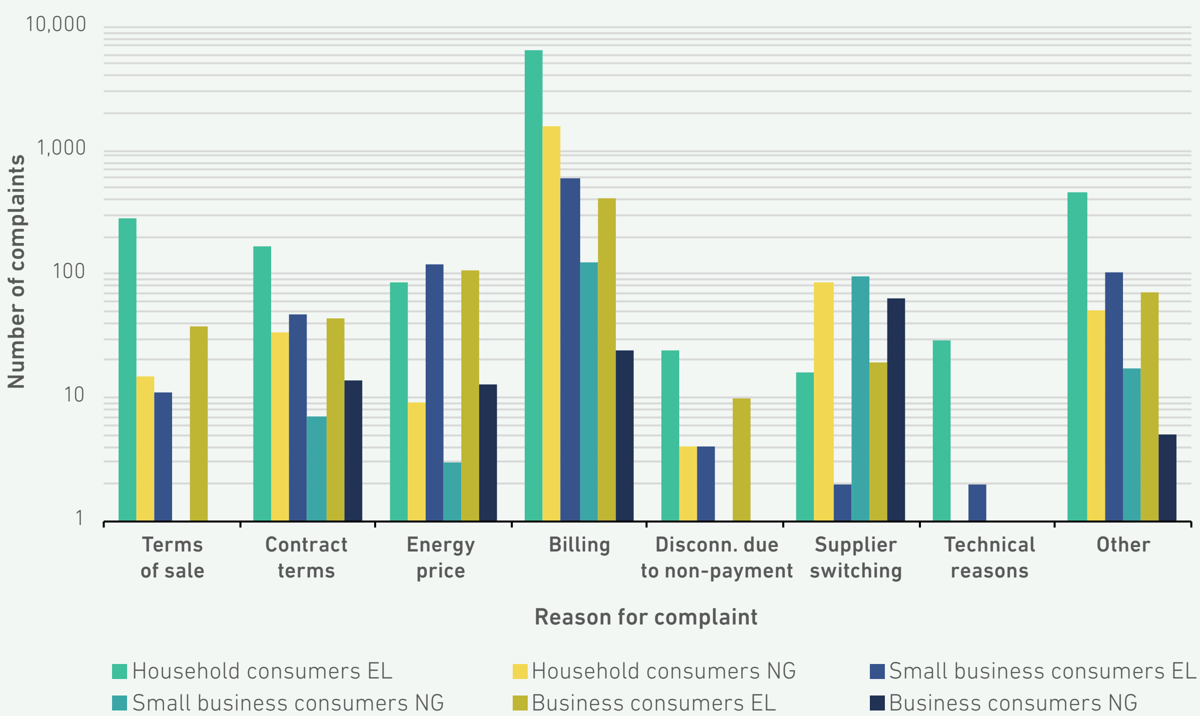
Complaints from household electricity and natural gas consumers decreased by 15% compared to the previous year, with a total of 7,458 complaints in the electricity sector and 9.6% in the natural gas sector, with a total of 1,761 complaints.

The majority of complaints were again submitted by household consumers, with 0.86% of household consumers complaining about electricity and 1.47% of household consumers complaining about natural gas; as a proportion of all household consumers – the majority of all consumer complaints related to the content of the energy supplier's invoices. Thus, out of 7,458 complaints from household electricity consumers, 6,400 (85.8%) were related to invoicing and out of 1,761 complaints from household natural gas consumers, 1,562 (88.7%) were related to invoicing.

The following figure shows the number of complaints by electricity and natural gas consumers against energy suppliers in 2023, organised by reason.

15% fewer complaints from household electricity consumers

FIGURE 225: CONSUMER COMPLAINTS AGAINST SUPPLIERS BY REASONS

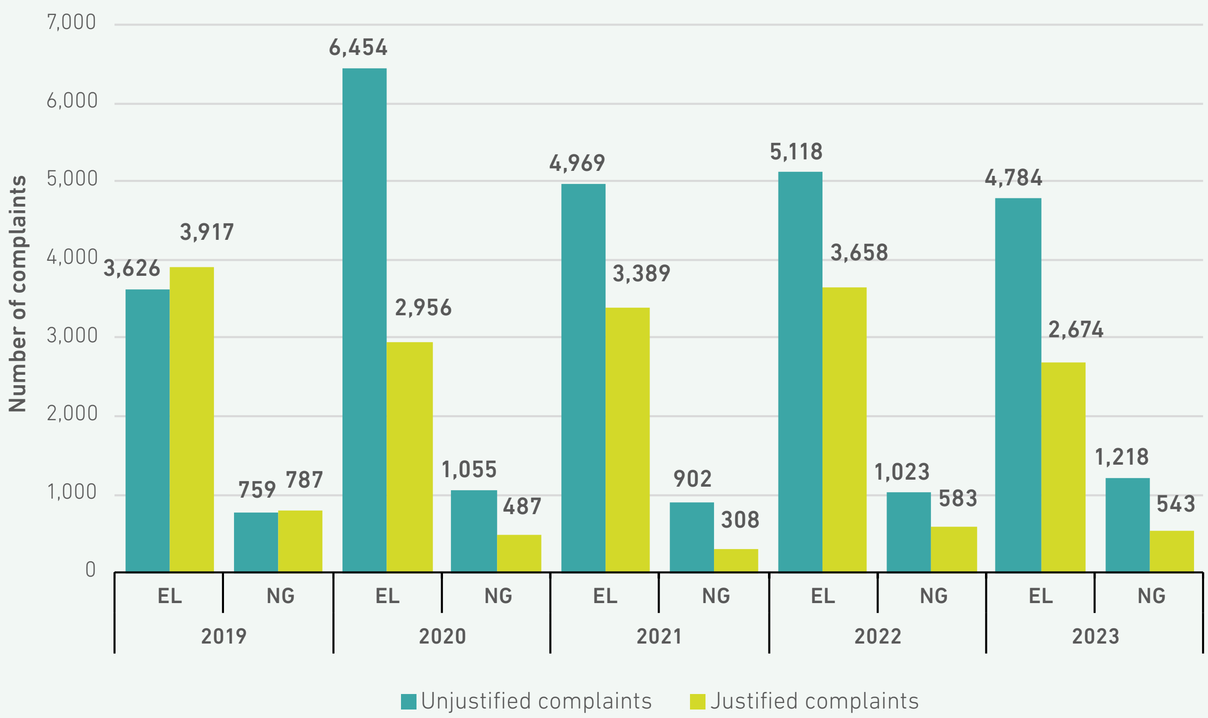


SOURCES: ENERGY AGENCY, SUPPLIERS

In electricity, 64.1% of all complaints received were unjustified, and in natural gas, 69.2% were unjustified. The following figure shows the decisions of energy suppliers on complaints from household electricity and natural gas consumers according to the eligibility of the complaint.

More than 60% of complaints from household consumers were unjustified

FIGURE 226: SUPPLIERS' DECISIONS ON THE ELIGIBILITY OF COMPLAINTS BY HOUSEHOLD CONSUMERS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY, SUPPLIERS

According to electricity and natural gas suppliers, household electricity and gas consumers did not continue their complaint procedures with the out-of-court consumer dispute resolution provider in 2023. Although electricity and natural gas consumers are aware of this dispute resolution option, they do not use it despite the high proportion of rejected claims.

The Energy Agency monitors unfair commercial practices under the provisions of the ZOEE and the ZOP, which relate to:

Household consumers did not pursue their complaints with the out-of-court consumer dispute resolution provider

- false or misleading representation of the company, which the person addressing the final consumer represents, or in the name and on behalf of which they act;
- misrepresentation of the supplier's offer to final consumers;
- giving untrue reasons for visiting final consumers;
- false or misleading claims relating to contracts.

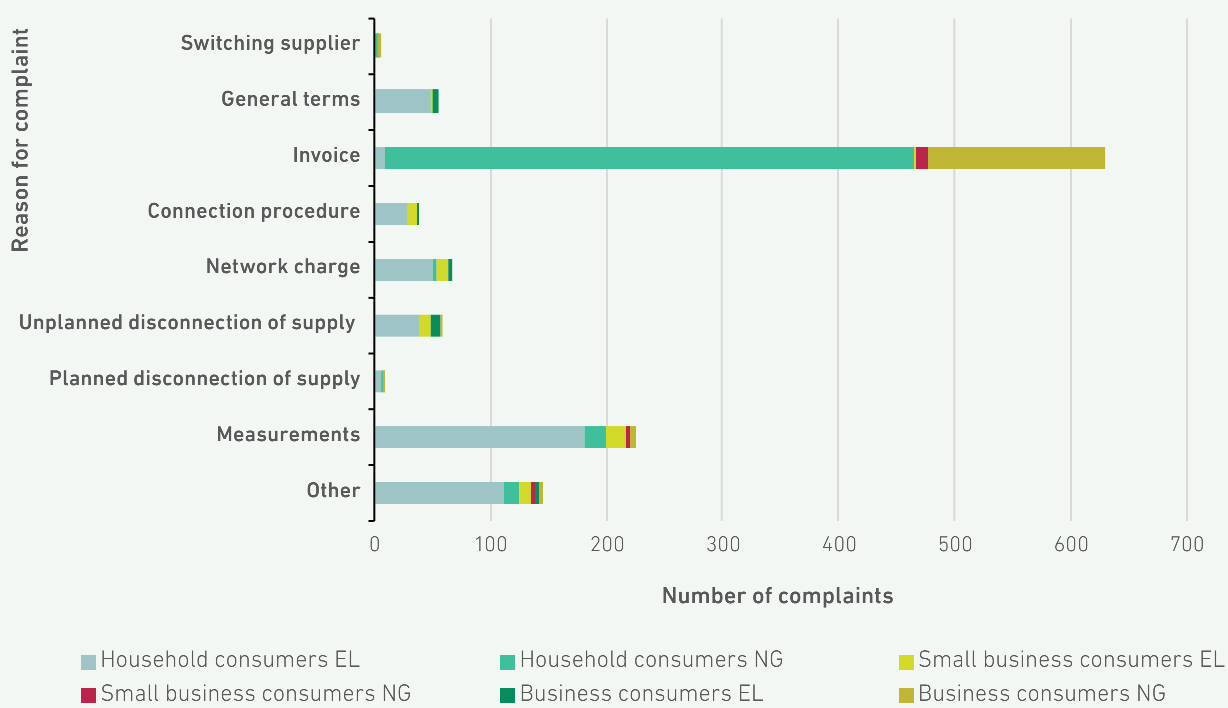
The Market Inspectorate also monitors and sanctions possible breaches of the general consumer protection rules in Slovenia. With the adoption of the ZSROVE and ZURE, certain areas (metering and billing of energy consumed, provision of information on metering and consumption) are also monitored by the Inspectorate of the Environment and Energy, the Energy Inspectorate.

Consumer Complaints to Electricity and Natural Gas Distribution System Operators

If consumers disagree with the operator regarding billing, metering, network charges, supply interruptions, connection procedures, switching supplier, etc., they also have the right to lodge a complaint directly with the electricity or natural gas distribution system operator. If consumers fail to resolve their complaints directly with the electricity or natural gas distribution system operators, disputes are settled by the Energy Agency using the procedures described in the following chapter.

In 2023, 554 complaints from electricity consumers (69 more than in the previous year) were lodged directly with the electricity DSO and 678 complaints (167 fewer than in 2022) with natural gas DSOs. Most of the complaints to electricity and natural gas DSOs were made by household consumers (472 electricity and 493 natural gas), with the majority of complaints in 2023 relating to metering in the electricity sector and billing in the natural gas sector.

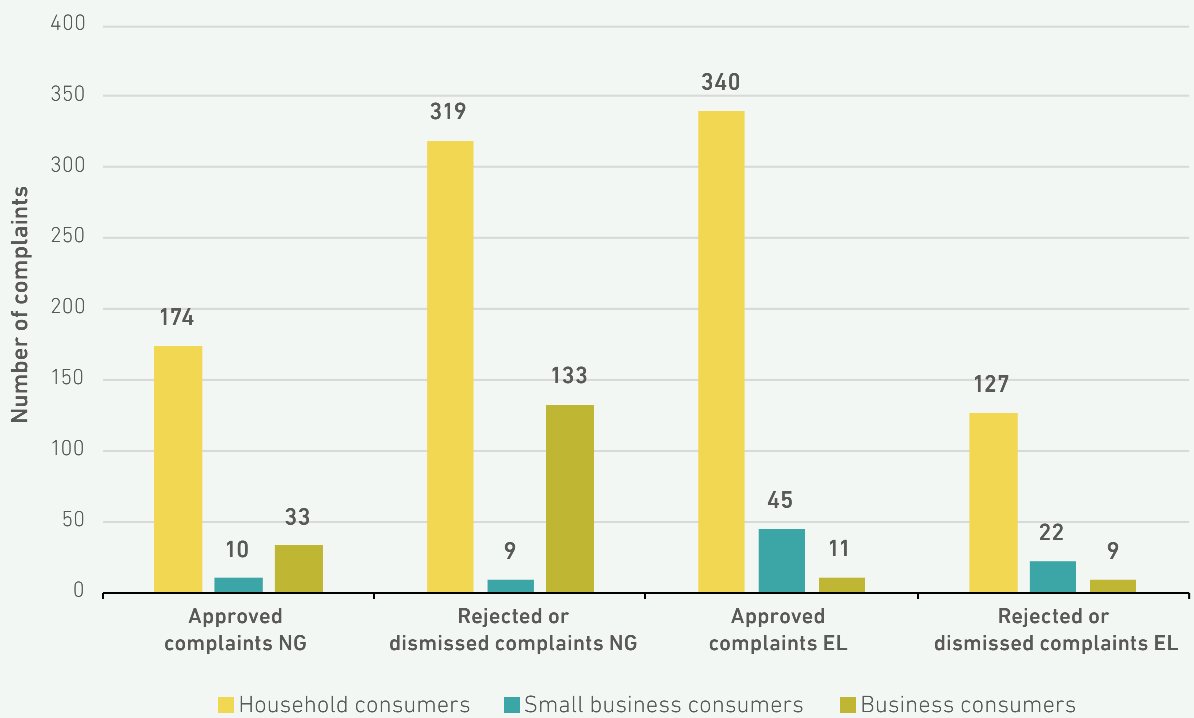
FIGURE 227: NUMBER OF CONSUMER COMPLAINTS TO OPERATORS BY CONTENT



SOURCES: ENERGY AGENCY, OPERATORS

The following figure shows approved and rejected complaints against electricity and natural gas distribution system operators. Of the total of 554 complaints lodged by all electricity consumers, 71.5% or 396 were approved; the rest were rejected or dismissed (158). In the field of natural gas, the reverse trend is again observed—the majority of complaints were rejected or dismissed. The operators only approved 32% of the complaints lodged, or 217; the rest were rejected or not dealt with (461).

FIGURE 228: NUMBER OF COMPLAINTS DEALT WITH BY OPERATORS



SOURCES: ENERGY AGENCY, OPERATORS

In 2023, the operators of closed electricity and natural gas distribution systems did not receive any complaints.

The Right to the Protection of Rights in Administrative Procedures

In addition to electricity and natural gas consumers, electricity and natural gas suppliers may also submit a request for dispute settlement before the Energy Agency. These are disputes brought before the Energy Agency by eligible entities in relation to electricity and natural gas transmission system operators, electricity and natural gas distribution system operators, or electricity market operators. They must first follow the procedure set out in the EZ-1 before submitting a request for a decision to the agency.

The Energy Agency shall primarily decide on disputes arising from access to the system, the amounts charged for the use of the system, disputes relating to violations of the system operating instructions, disputes relating to established deviations and the amounts to cover the costs of balancing deviations and violations of the general acts governing deviations and their balancing, disputes relating to breaches of the rules in the field of self-supply and the right to compensation for violations of the guaranteed standard of quality of electricity.

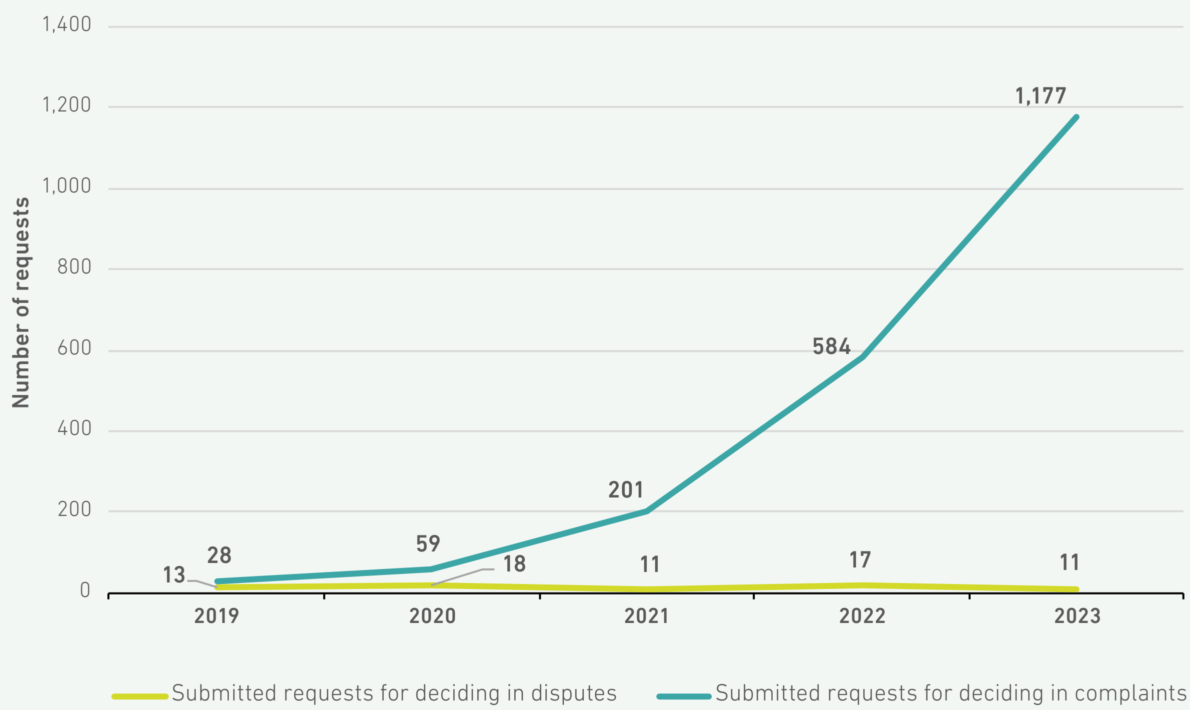
1,177 complaints against decisions of electricity operators – almost all related to refusals of consent for the connection of solar power plants

Administrative proceedings before the Energy Agency are fast and free of charge. Dispute settlement requests shall be decided on within two to four months.

In 2023, the Energy Agency handled 1,188 individual cases, 11 in the first instance and 1,177 in the second instance.

The number of appeals regarding connection consents granted has increased almost 20-fold since 2020, as shown in the figure below. The majority of the appeals related to the refusal to grant consent for connecting a self-supply installation to the electricity distribution system.

FIGURE 229: ENERGY AGENCY DECISIONS IN DISPUTES AND APPEALS IN THE 2019–2023 PERIOD



SOURCES: ENERGY AGENCY

Since 2021, the number of complaints received has significantly increased, with a further sharp increase in 2023 due to many refusals to grant consent for the connection of self-supply installations. This number of appeals is due to a sharp increase in applications from final consumers for consent to connect self-supply installations subject to annual electricity billing.

Under the provisions of the EZ-1, only final consumers who had applied to the connection of a self-supply installation by 31 December 2023 were still eligible to join the annual net-metering scheme for electricity produced and consumed. Due to the expiry of the deadline for applying consent for connecting self-supply installations, 11,909 applications for connecting a self-supply installation were addressed to electricity distribution companies in December 2023 alone. In total, 47,990 applications for connecting self-supply facilities were received by electricity distribution companies in 2023, most of them in the Elektro Ljubljana area. In 2023, a total of 22,066 connection consents were granted, and 8,334 applications were refused, with the highest proportion of refused applications in the area of Elektro Ljubljana (39% of applications refused compared to the number of applications for which the processing was completed). As of 31 December 2023, 19,443 applications for connection consents for self-supply installations were pending with the electricity distribution companies.

The ZSROVE provides for a special right to connect a self-supply installation. The procedure for granting a connection consent must be expeditious and the procedure for amending the connection consent, which is necessary in the case of a change at an existing delivery point, must be completed within 15 days and, where a specific determination procedure is needed, within 30 days at the latest. If the distribution operator does not reject the application for the connection of a self-supply installation of up to 20 kW within one month, the self-supply shall be deemed to have given the final consumers the right to be connected to the system user's network behind the meter. The connection of a self-supply installation of up to 20 kW may be made by the criteria in the system operating instructions or the rules laying down the technical and other conditions for connection to the distribution system.

For larger self-supply installations (from 20 to 50 kW), the ZSROVE stipulates that they must obtain consent for connection within two months. Otherwise, they are also deemed to have acquired the right to connect to the consumer's behind-the-meter network.

The Right to the Safe and Reliable Operation of the System and the Quality of Supply

All consumers have the right to the safe and reliable operation of the system and to a quality supply of electricity and natural gas provided by the electricity and natural gas system operators in accordance with the system operating instructions to which the Energy Agency gives its consent.

At the system level, the quality of the supply regulation seeks to improve or maintain the level already achieved at the optimum cost. Various activities are carried out to ensure the quality of the electricity supply, such as monitoring, reporting and data analysis of the following: continuity of supply, commercial quality and voltage quality. In addition to the above, the Energy Agency regulates the quality of supply by publishing data and analyses, which are made public in the Quality of the Electricity Supply Report. For more information, see the section on voltage quality in the electricity sector.

In 2022, the natural gas system operators continued to ensure reliable and safe operations for a smooth and quality supply by carrying out regular and emergency maintenance.

The chapters on the quality of the electricity supply, safe and secure operation, and the quality of the natural gas supply provide more details.

ENERGY EFFICIENCY

Lower costs, less pollution, more reliable energy supply

2,845 GWh
OF SAVINGS ACHIEVED

THROUGH ENERGY EFFICIENCY MEASURES

MANDATORY SAVINGS

2,296 GWh
OF ENERGY SAVINGS

WERE ACHIEVED BY ENERGY SUPPLIERS, WHICH IS 1,984 GWh MORE THAN IN 2022

ALTERNATIVE MEASURE

549 GWh
SAVINGS ACHIEVED

UNDER THE ECO FUND'S ENERGY EFFICIENCY ACTION PROGRAMME

REDUCED ANNUAL CO_2 EMISSIONS BY

381,147 TONNES

- MOSTLY IN THE ENERGY CONVERSION, DISTRIBUTION, AND TRANSMISSION SECTOR

510 GWh
OF SAVINGS

ACHIEVED THROUGH THE AWARD OF GRANTS - MAXIMUM THROUGH CO-FINANCING OF THE PURCHASE OF HEAT PUMPS FOR SELF-SUPPLY

2,023.9 GWh
OF TOTAL ENERGY SAVINGS

ACHIEVED THROUGH THE CHP MEASURE

97.7%
OF ALL LARGE COMPANIES

COMPLY WITH THE ENERGY AUDITS OBLIGATION

THROUGHOUT THE REPORTING PERIOD, THE HIGHEST ENERGY SAVINGS WERE ACHIEVED IN INDUSTRY, WHILE THE LOWEST SAVINGS WERE ACHIEVED IN THE PRIVATE AND PUBLIC SECTORS.

ENERGY EFFICIENCY

Energy efficiency is one of the key measures in the development and energy policy, which increases both the competitiveness and the decarbonisation of Slovenian industry and society. Energy efficiency is based on improving the quality of energy services at a lower energy input. It is one of the cornerstones of the transition to a climate-neutral society as it reduces dependence on energy imports and, at the same time, increases the reliability of the energy supply. Energy efficiency is also one of the key measures of the development and energy policy, which increases the competitiveness and the decarbonisation of Slovenian industry and society.

According to the updated NEPN, Slovenia's final energy consumption should not exceed 51 TWh (4,426 ktoe) by 2030 if the adopted policies and measures are systematically implemented. This means that Slovenia is committed to a primary energy consumption not exceeding 70 TWh (6,026 ktoe) compared to the 2007 baseline scenario, with a consequent increase in energy efficiency of at least 35%. At the EU level, the target is set at an increase of 32.5%.

Slovenia is implementing the energy efficiency policy objectives through measures to promote energy efficiency in all end-use sectors, as well as in the energy conversion, distribution, and transmission sectors, including efficient district heating and cooling networks.

Most of Slovenia's energy savings to meet its energy efficiency targets are achieved by implementing measures under the mandatory energy savings scheme, which binds energy suppliers to end-users, and under an alternative programme, the Energy Efficiency Measures Programme, implemented by the EcoFund.

The Energy Savings Obligation Scheme and Alternative Measure

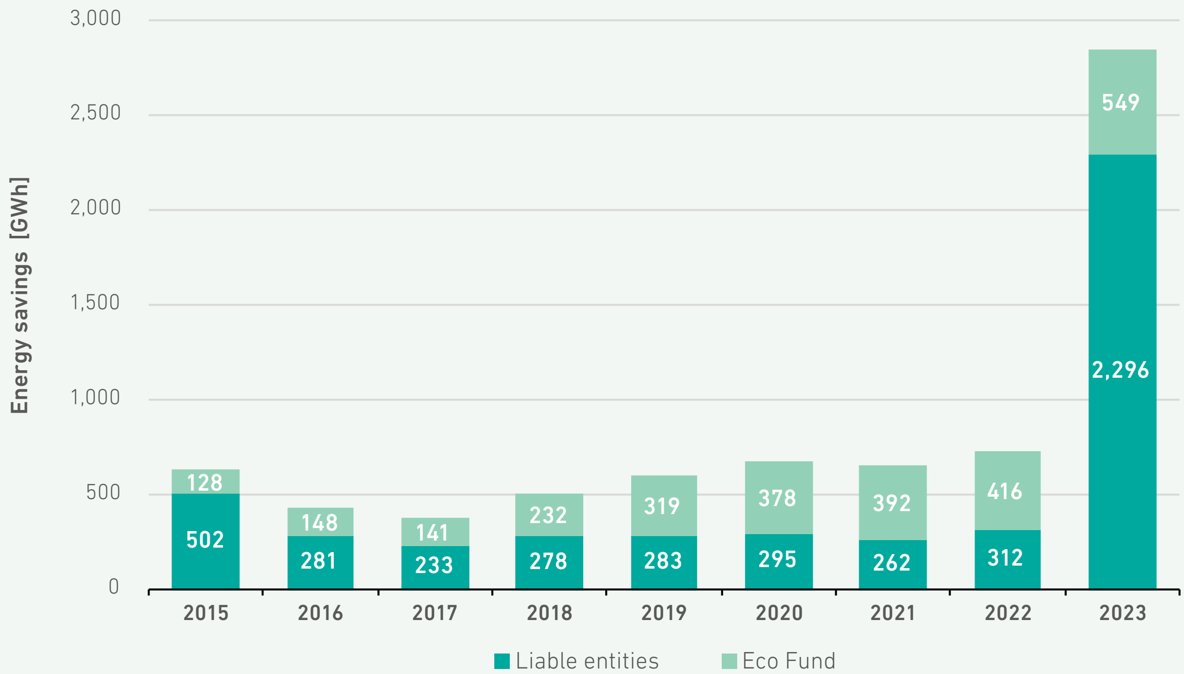
Under the mandatory energy savings target, Slovenia must achieve 0.8% annual savings in final energy consumption. By taking advantage of a transitional period, liquid fuel suppliers can gradually increase their annual savings until 2026, when they will also have to achieve final yearly energy consumption savings of 0.8% on the previous year's sales volume. In 2023, they have to achieve savings of 0.5% of the energy sales in 2022.

An alternative measure that also achieves energy savings in Slovenia is implemented under the Eco Fund's Energy Efficiency Programme, financed through the Energy Efficiency contributions collected from energy product end-users.

These two measures together generate 2,845 GWh of savings for Slovenia in 2023, which is 2,117 GWh more than the savings achieved in 2022. The significant increase in savings is due to a major project by a liable entity, which generated 1,863.9 GWh of savings in 2023 through the construction of a gas-fired combined heat and power plant, which was shared between seven liable entities. Of the 2,845 GWh of savings, 2,296 GWh were realised through the mandatory savings scheme, an increase of 1,984 GWh compared to the previous year, while 549 GWh of savings were realised through financial transfers to the Eco Fund, an increase of 133 GWh compared to 2022.

2,845 GWh of savings achieved with energy efficiency measures in 2023

FIGURE 230: ENERGY SAVINGS IN THE 2015–2023 PERIOD



SOURCES: ENERGY AGENCY, ECO FUND

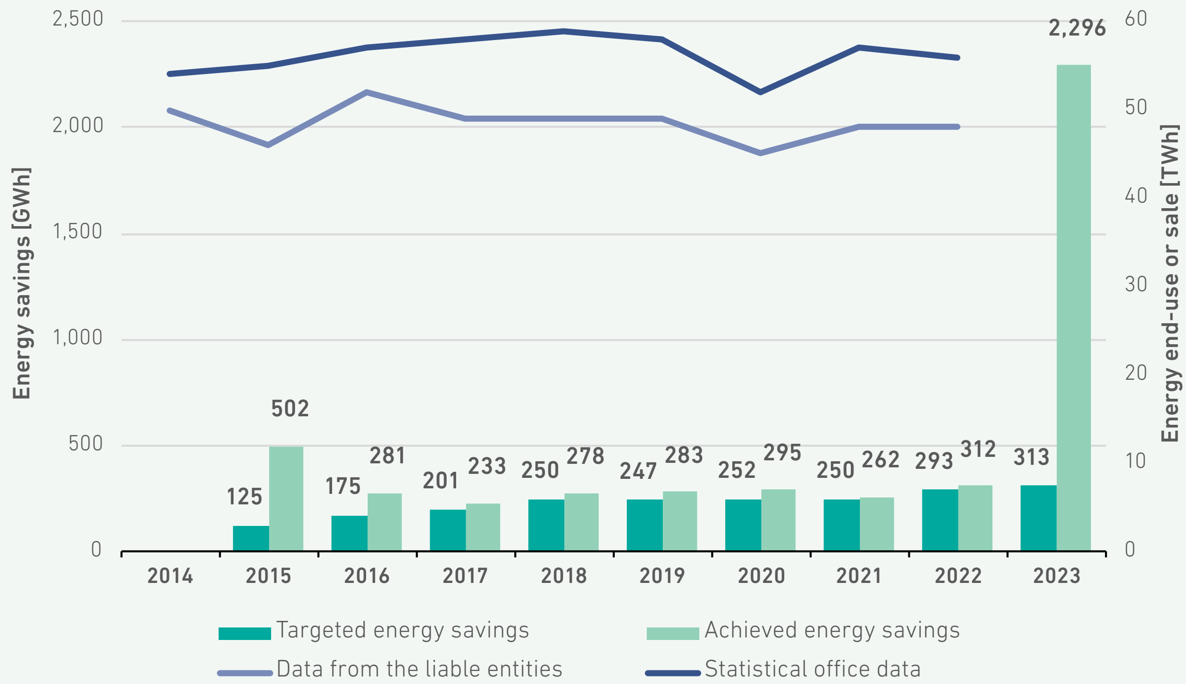
Target Energy Savings of the Liable Entities

Slovenia's energy efficiency policy includes suppliers of electricity, heat, natural gas and liquid and solid fuels to final consumers among those obliged to achieve energy savings. They were required to achieve annual energy savings of 0.8% of the energy sold to final consumers in 2022 through various energy-saving methods in 2023. Exempted from this obligation are suppliers of liquid fuels, who were required to achieve annual energy savings of 0.5% of petrol and diesel sold in 2023. However, suppliers of solid fuels to final consumers who supply less than 100 MWh of energy per year (there were 23 such entities in 2023) are exempted from the mandatory savings scheme as of 2020.

According to the reported data, energy suppliers sold 47,723 GWh of energy to final consumers in 2022. Of this, 23,096 GWh of gasoline and diesel were sold. Therefore, the 0.5% savings target for 2023 from the sale of liquid fuels was set at 116 GWh. The 0.8% savings target for 2023 from the sale of electricity, heat, natural gas and liquid and solid fuels to final consumers (24,627 GWh) was set at 197 GWh for 2023. The total savings target 2023 is thus 313 GWh, which is 20 GWh more than the savings target for 2022. The increase in the savings target compared to the previous year is due to an increase in the sales of energy products by 71 GWh and an increase in the share of the savings target for liquid fuels from 0.4% in 2022 to 0.5% in 2023.

Figure 231 shows the volumes of energy sold to final consumers and a comparison with SURS data on final energy consumption, as well as the targeted and achieved energy savings over the 2015–2023 period.

FIGURE 231: COMPARISON OF THE FINAL ENERGY CONSUMPTION AND SOLD ENERGY DATA FROM THE LIABLE ENTITIES AND STAT IN THE 2014–2022 PERIOD AND THE TARGETED AND ACHIEVED SAVINGS IN THE 2015–2023 PERIOD



SOURCES: ENERGY AGENCY, STAT

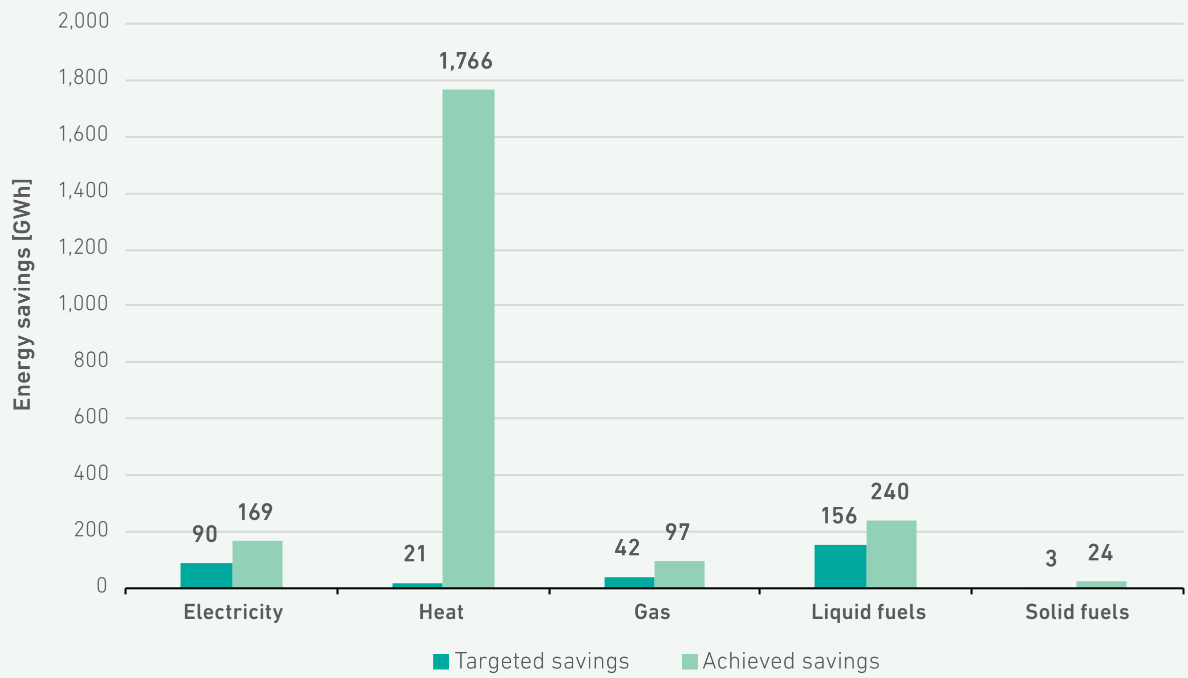
The suppliers' contribution to implementing energy efficiency measures resulted in energy savings of 2,296 GWh in 2023. The significant increase in the energy savings achieved in 2023 is due to the implementation of the measure by the liable entity, which achieved 1,863.9 GWh of energy savings through the construction of a gas-fired steam unit for a combined heat and power plant, which was then shared with six other liable entities. The remaining 238 liable entities achieved a total of 432 GWh of savings. Thus, in 2023, as in previous years, the energy savings target was exceeded with several energy efficiency measures implemented.

Activities of Suppliers to Achieve the Target Energy Savings

Most suppliers have contributed to the implementation of efficiency measures in 2023 (through co-financing, their contribution to the implementation of measures, etc.), which exceeds the 2023 savings target. Suppliers who fail to achieve the target energy savings through their contribution to implementing energy efficiency measures may fulfil their obligation to pay financial compensation to the Eco Fund for each megawatt-hour of energy savings not achieved. The amount of the financial compensation is set by the Eco Fund and for 2023, it is EUR 190.80/MWh.

Figure 232 shows that the largest savings were made by the heat suppliers, who achieved 1,766 GWh of savings as a result of the construction of the gas-fired steam unit of the CHP plant. Liquid fuel suppliers achieved a significant saving of 240 GWh, followed by electricity suppliers with 169 GWh of savings. Gas suppliers achieved 97 GWh of savings, and solid fuel suppliers 24 GWh of savings. In 2023, all the liable entities exceeded their savings targets.

FIGURE 232: TARGETED AND ACHIEVED ENERGY SAVINGS BY THE TYPE OF ENERGY SUPPLIER



SOURCE: ENERGY AGENCY

Energy Savings Achieved by Individual Measures

Suppliers achieved energy savings by participating in and implementing measures with end-users in the public, service and industrial sectors. They can also achieve savings through additional measures in the residential, energy conversion, distribution and transmission sectors. The savings achieved are calculated using the measure-specific savings calculation methodologies set out in the Regulation on methods for determining energy savings. Liable entities may also achieve savings through measures not defined in the methodology. Still, they must be demonstrated by an energy audit, in which the savings achieved for each measure are evaluated.

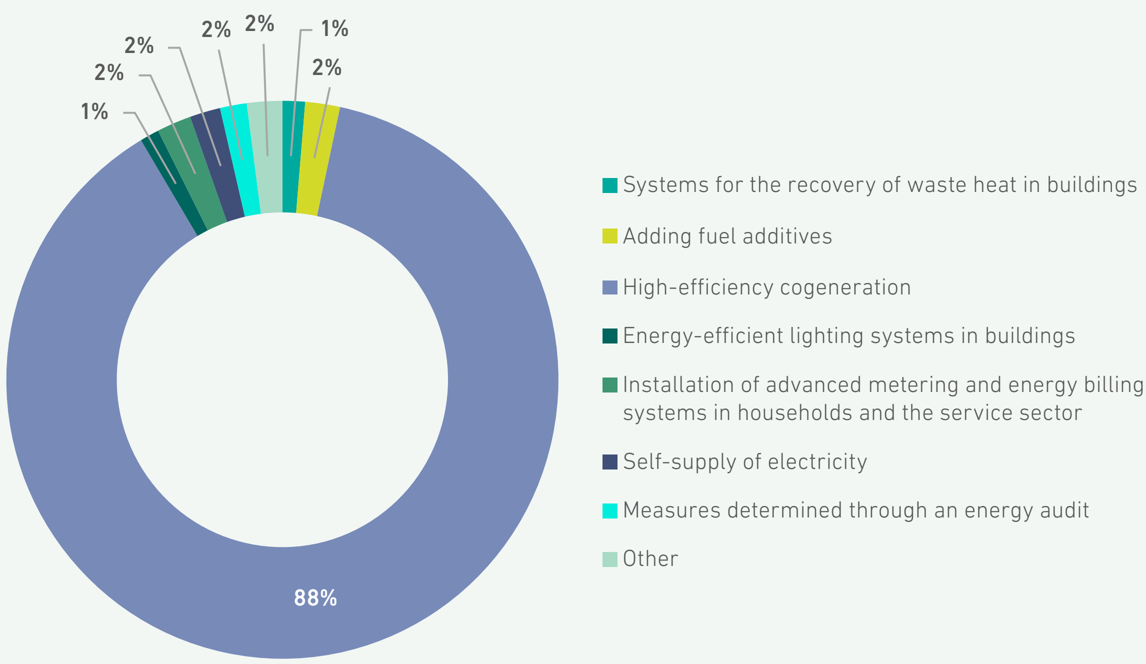
TABLE 46: ENERGY SAVINGS BY INDIVIDUAL MEASURES IN THE 2015–2023 PERIOD

Measure	2015 [GWh]	2016 [GWh]	2017 [GWh]	2018 [GWh]	2019 [GWh]	2020 [GWh]	2021 [GWh]	2022 [GWh]	2023 [GWh]
Complete renovation of buildings	0,0	0,6	0,1	15,9	7,0	7,7	4,0	3,4	5,8
Replacement of boilers using all types of fuels with new high-efficiency boilers using gas	7,6	13,6	20,8	14,8	13,5	15,6	16,8	9,9	7,7
Replacement of boilers using all types of fuels with new high-efficiency boilers using woody biomass	1,6	2,4	0,8	1,5	2,9	20,5	5,6	6,8	1,8
Installation of advanced metering and energy billing systems in households and the service sector	0,0	0,0	0,0	0,0	0,0	0,0	0,0	26,0	45,9
Installation of heat pumps for heating	2,7	0,3	1,7	3,5	6,1	2,8	9,7	4,1	16,4
Comprehensive renovation of heat stations	73,6	3,1	0,8	1,7	0,5	1,9	2,7	1,8	0,4
Connecting a building to district heating	2,3	4,7	5,8	2,6	2,2	2,3	1,3	2,2	2,4
Renewal of the district heating distribution network	3,9	4,4	2,9	4,5	3,8	1,6	3,0	1,9	2,5
Systems for the recovery of waste heat in buildings	0,0	9,2	2,0	0,6	0,0	0,9	7,9	0,0	30,2
Optimisation of the technological processes, which is based on implemented energy audits in small and medium-sized enterprises	15,3	9,7	3,9	4,8	12,1	2,4	6,0	4,4	1,2
Adding fuel additives	195,6	99,2	41,2	53,4	33,3	27,8	41,9	51,4	46,4
High-efficiency cogeneration	37,7	9,8	11,9	62,2	78,9	62,2	34,0	92,0	2023,9
Energy-efficient lighting systems in buildings	14,5	15,5	22,9	42,5	56,8	55,0	44,2	33,6	25,7
Implementation of energy management systems	98,3	92,9	93,8	9,7	29,5	3,4	5,4	2,0	2,7
Excess heat recovery in industry and the service sector	0,0	0,0	6,0	22,6	0,3	0,0	0,6	3,7	0,4
Self-supply of electricity	0,0	0,0	0,0	0,0	5,0	4,6	24,5	33,1	40,9
Measures determined through energy audits	44,9	12,3	7,5	27,1	27,6	75,4	48,0	30,5	35,9
Other	9,8	11,9	19,9	17,8	9,9	14,3	10,5	8,9	5,8

SOURCE: ENERGY AGENCY

In 2023, the highest savings, 88% of the total, were achieved through the CHP systems in the energy conversion, distribution and transmission sector measure, as shown in Table 46 and Figure 233. This is due to the construction and trial operation of the gas-to-steam unit in TE-TOL, which achieved 81% (1,863.9 GWh) of the total savings in 2023, followed by the transport sector through adding fuel additives, the industry sector through the self-supply of electricity and measures where an energy audit is to be carried out, and in the private sector, the highest savings were achieved through waste heat recovery systems in buildings. For households, most savings were realised through installing advanced metering systems and energy billing in the household and service sectors.

FIGURE 233: SHARES OF ENERGY SAVINGS ACHIEVED THROUGH INDIVIDUAL MEASURES



SOURCE: ENERGY AGENCY

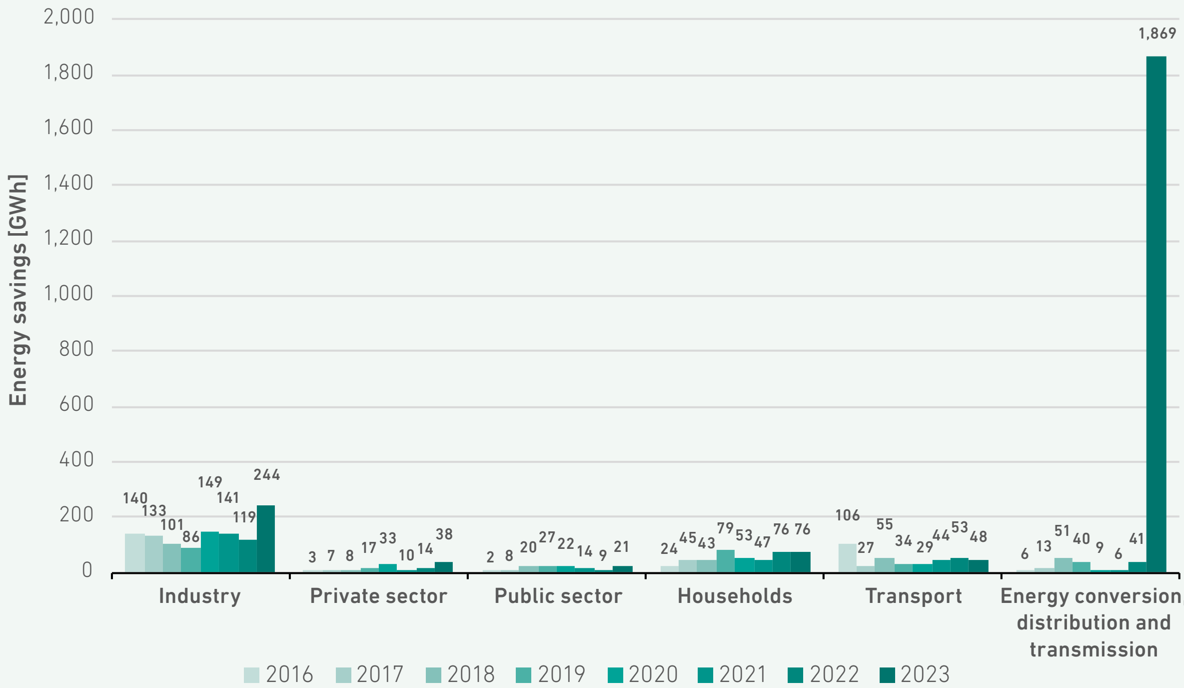
Based on the methodologically determined calculations of CO_2 emission reductions for each type of measure, the measures under the Energy Efficiency Obligation scheme reduced the annual CO_2 emissions by 381,147 tonnes, with the highest reductions in the energy conversion, distribution and transmission sectors, which also achieved the highest savings in relation to the sectors, as a result of the previously mentioned construction of the heating plant.

Energy Savings by Sector

In 2023, the most significant savings were generated in the energy conversion, distribution and transmission sector, with 1,869 GWh, 81% of the total. This situation results from the construction and trial operation of the CHP-TOL gas-to-steam unit, which accounted for the majority (1,863.9 GWh) of the total savings realised in 2023. More savings than in previous years were also realised in all sectors, with the smallest year-on-year difference in the transport sector, where realised energy savings increased by only 4 GWh from 2022, with savings of 48 GWh.

Over the whole reporting period, the highest energy savings were achieved in the industrial sector, while the lowest were achieved in the private and public sectors. Ignoring that in 2023, only one measure attained the most energy savings in the energy conversion, distribution, and transmission sectors, this sector also recorded the lowest amount of energy savings achieved in recent years.

FIGURE 234: ENERGY SAVINGS BY SECTORS IN THE PERIOD 2016–2023



SOURCE: ENERGY AGENCY

Energy Savings Under the Alternative Measure

An alternative measure under the combined scheme to achieve the target share of final energy savings is implemented by the Eco Fund under the Energy Efficiency Improvement Programme.

The Eco Fund achieves energy savings through three systems as shown in Table 47, namely investment loans for energy-efficiency measures, awarding grants for the implementation of efficiency measures, and providing energy advice to citizens through a network of advisory offices called Ensvet. In this context, most savings are achieved through measures implemented with the help of financial incentives – grants awarded under Eco Fund calls for tenders. In 2023, there were a total of 510 GWh of energy savings, while with the Eco Fund measures together 549 GWh of savings were achieved in 2023.

TABLE 47: ENERGY SAVINGS IN THE ECO FUND PROGRAMME FOR IMPROVING ENERGY EFFICIENCY IN THE 2015–2023 PERIOD

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Investment loans [GWh]	5	8	11	24	23	39	44	29	15
Non-refundable grants [GWh]	123	127	117	190	272	314	323	358	510
Energy advisory service for the public [GWh]	0	14	14	18	23	25	25	29	24

SOURCES: ECO FUND ANNUAL REPORTS

Most of the savings by the Eco Fund are achieved through measures implemented by individual investors in households and businesses, partly financed by grants awarded through Eco Fund calls for tenders. In 2023, the most savings were achieved through the following two measures: installation of heat pumps (214.2 GWh) and self-supply – net-metering (107 GWh). From the non-refundable grants, 510 GWh of savings were achieved, which is 93% of all the Eco Funds' savings. Since 2018, two measures, the installation of heat pumps and self-supply, have been the main drivers of savings, resulting in year-on-year energy savings by the Eco Fund.

TABLE 48: ENERGY SAVINGS BY MEASURES FOR THE 2018–2023 PERIOD, PARTLY FINANCED BY ECO FUND GRANTS

	2018 [GWh]	2019 [GWh]	2020 [GWh]	2021 [GWh]	2022 [GWh]	2023 [GWh]
Biomass boilers	18,3	30,6	27,2	26,5	32,4	35,8
Heat pumps	63,1	102,7	103,8	99,0	126,8	214,2
Self-supply – net metering	10,0	16,3	30,9	58,0	62,4	107,0
Installation of joinery	2,9	3,3	4,1	3,6	3,1	4,2
Facade thermal insulation	49,9	55,0	48,9	43,2	42,0	45,0
Roof thermal insulation	18,0	15,2	13,6	13,5	9,0	8,1
Heat recovery ventilation	0,0	2,1	4,2	4,0	4,0	6,1
Natural gas condensing boilers	10,9	31,7	39,4	33,2	42,5	6,4
sNES Public buildings (almost zero-energy building)	3,7	1,9	1,3	4,8	7,4	9,5
Energy audits	3,3	1,3	4,1	0,4	1,8	4,4
Environmentally friendly passenger cars	3,2	2,5	3,8	5,0	3,3	4,6
Replacement of lighting	0,0	1,6	4,9	8,9	4,7	4,4
Excess heat recovery	0,0	0,1	3,8	2,9	0,0	11,5
Energy optimisation	0,0	2,0	11,1	8,0	1,1	23,4
Tyres	0,0	0,0	7,9	7,8	8,6	18,1
Other measures	6,8	6,1	5,0	4,2	8,9	8,0

SOURCES: ECO FUNDS ANNUAL REPORTS

Energy Audits

Another well-established national energy efficiency measure is the mandatory energy audits in large companies, which identify possible measures to improve energy efficiency and consequently reduce energy consumption while helping to reduce energy costs. Under the ZURA, large companies must carry out an energy audit every four years and report on the audit to the Agency. An energy audit is a systematic review and analysis of energy consumption in all segments of a company's operations, including energy consumption for buildings, processes, transport and human activities, to identify energy flows and opportunities for improving energy efficiency. The minimum requirement of an energy audit is a detailed review of the energy use of buildings, technological processes or industrial plants, transport and a set of possible measures to improve energy efficiency. The energy audit shall be based on actual, measured, verifiable and operational data on energy consumption for all energy sources.

Large companies are companies that have exceeded two of the following criteria in the last two financial years at the balance sheet cut-off date:

- employ on average more than 250 workers,
- have assets in excess of EUR 20 million and
- net operating income exceeds EUR 40 million.

97.7% of all large companies comply with the energy audits obligation

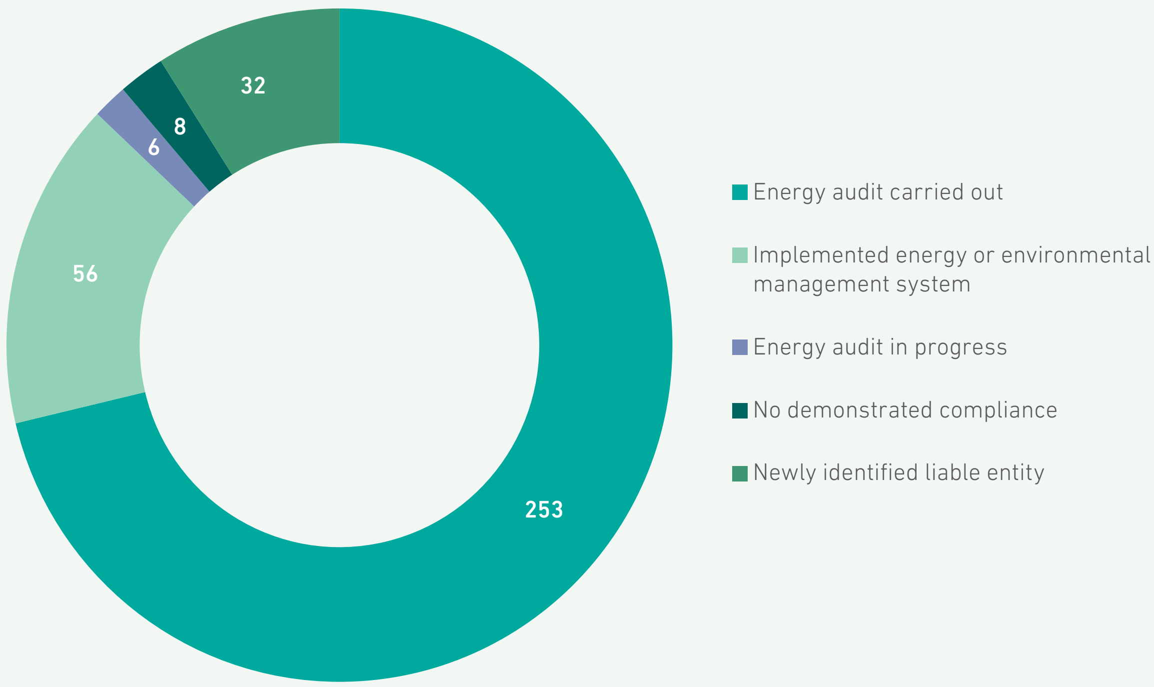
Based on data from the Business Register of Slovenia, the Energy Agency has identified 355 large companies registered in Slovenia in the register of large companies for 2023. Eight companies were removed from the register and 36 were newly included in the register compared to the situation at the end of 2022.

Large companies can comply with the obligation to carry out an energy audit:

- by carrying out an energy audit in accordance with SIST ISO 50002 or the SIST EN 16 247 series of standards (SIST EN 16 247-1, SIST EN 16 247-2, SIST EN 16 247-3 and SIST EN 16 247-4);
- with an energy management certificate in accordance with SIST EN ISO 50001 or an environmental management system in accordance with SIST EN ISO 14001, which shall also be subject to a minimum inspection in accordance with Annex A, point A.3 of SIST ISO 50002, to be carried out every four years.

At the end of 2023, out of a total of 355 large companies, 309 companies had complied with the energy audit obligation, 253 had completed an energy audit, and 56 companies had a certified energy or environmental management system in place under European or international standards and have been certified by an Agency decision to have complied with the energy audit obligation. Six of the remaining 46 companies are in the process of carrying out an energy audit, and eight are currently in non-compliance. Of these companies, five have reached the end of the validity period of their energy audit and have yet to notify the Agency of the possible resumption of the energy audit. Three companies have yet to show that they have carried out an energy audit or have yet to demonstrate that they are in the process of carrying out an energy audit. Of the 36 companies newly identified as large companies, four have already complied with their obligation, while the remaining companies have one year to carry out an energy audit.

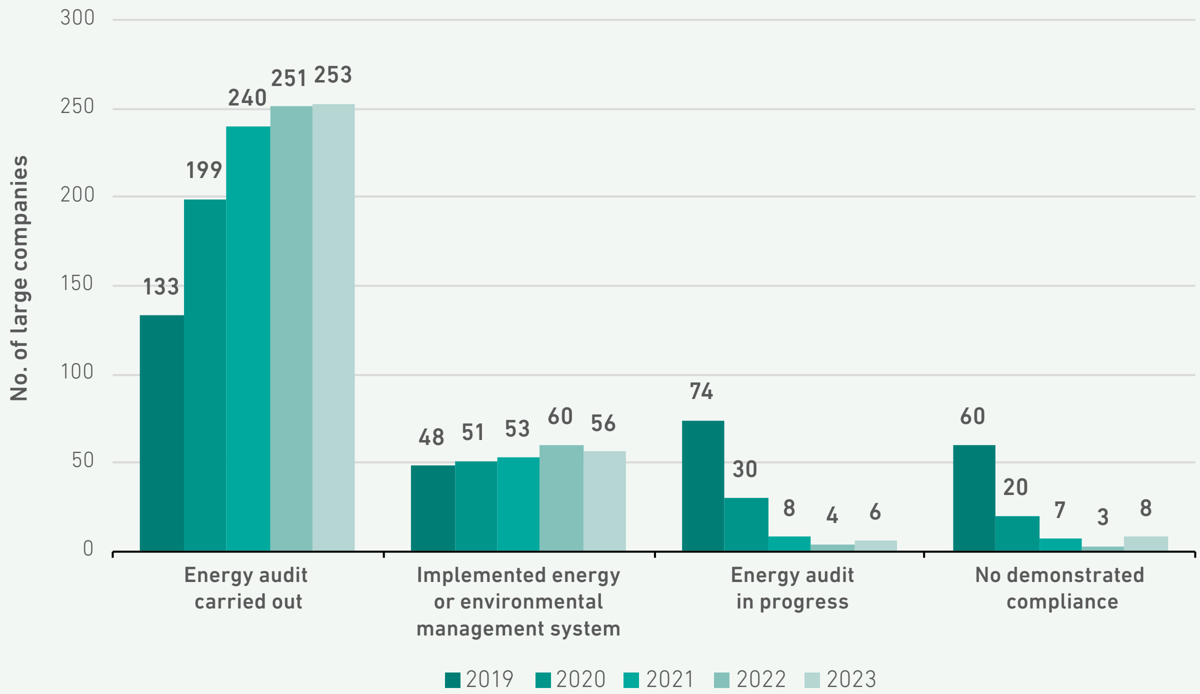
FIGURE 235: ENERGY AUDITS OF LARGE COMPANIES



SOURCE: ENERGY AGENCY

Figure 236 presents the compliance with the obligation to carry out an energy audit of large companies in 2019, 2020, 2021, 2022 and 2023. It continues to show a slight increase in the number of energy audits carried out and a stagnation in the number of large companies with an energy or environmental management system in place. Compared to the previous year, slightly more companies in 2023 do not show compliance or for which the energy audit has expired.

FIGURE 236: ENERGY AUDITS IN LARGE COMPANIES DURING THE YEARS 2019 AND 2023



SOURCE: ENERGY AGENCY

A review of the comparison of the compliance of large companies over the years continues to show a low level of non-compliance, with eight large companies currently in non-compliance in 2023, representing 2.25% of the liable entities, and it should be noted that only three of these companies have not shown that they have carried out an energy audit.

HEAT

HEAT WAS SUPPLIED FROM
110 DISTRIBUTION SYSTEMS
IN 67 MUNICIPALITIES

10.3%
LOWER HEAT
CONSUMPTION

Energy in the form of warm water, hot water, steam or cold

10.1%
HIGHER

AVERAGE MONTHLY
RETAIL PRICE
OF HEAT FOR
HOUSEHOLD
CONSUMERS
IN 2023

131.47 EUR/MWh
AVERAGE RETAIL PRICE OF HEAT FOR
HOUSEHOLD CONSUMERS

36.2% OF HEAT PRODUCED FROM COAL

40.3% OF HEAT PRODUCED FROM NATURAL GAS

23% OF HEAT PRODUCED FROM RES

61.8% OF DISTRIBUTION SYSTEMS ARE ENERGY EFFICIENT

8.8% LOWER CONSUMPTION OF PRIMARY FUELS FOR HEAT PRODUCTION, OF WHICH:

24.2% INCREASE IN NATURAL GAS CONSUMPTION

28.5% DECREASE IN COAL CONSUMPTION

75.9% REDUCTION IN CONSUMPTION OF PETROLEUM PRODUCTS

15.7% OF DISTRIBUTED HEAT PRODUCED IN CHP

THE **5** LARGEST HEAT DISTRIBUTORS SUPPLIED **79.3%** OF THE HEAT

FROM 1 JANUARY TO 30 APRIL HEAT PRICES WERE CAPPED

INTEGRATION OF A 2 MW HEAT PUMP THAT USES THE GEOTHERMAL ENERGY OF THE RIVER FOR HEAT PRODUCTION

HEAT

Supply of Heat

In Slovenia, in 2023, 50 heat distributors provided heat from district heating. Distribution was carried out in 67 municipalities using 110 distribution systems.

Heat distributors supplied 2,038.7 GWh of heat for the heating of buildings, domestic hot water and industrial steam processes, delivering 1,655.0 GWh of heat to 153,505 consumers. The difference is distribution losses amounted to 383.7 GWh.

The difference is heat distribution losses of 383.7 GWh. The heat consumption of consumers from the registered distribution systems was 10.3% lower than the previous year[155] and 20.5% lower compared to 2021. The downward trend in heat consumption by final consumers can be attributed to lower annual temperature deficits and high heat prices. Relatively warm periods within the heating season have also led to lower heat consumption from district heating systems, as some end-users have also compensated for daily temperature deficits by using inverter air-conditioners.

20.5% lower consumption of heat compared to 2021

10.4% lower consumption of heat compared to 2022

The number of heat consumers increased by 41.1% compared to the previous year due to several years of incorrect records of household consumers in multi-apartment buildings kept by some major heat distributors.

155 Due to the later receipt of corrections to the data for the 2022 calendar year from the reporting agents, the annual comparisons may differ slightly from last year's published data for 2022.

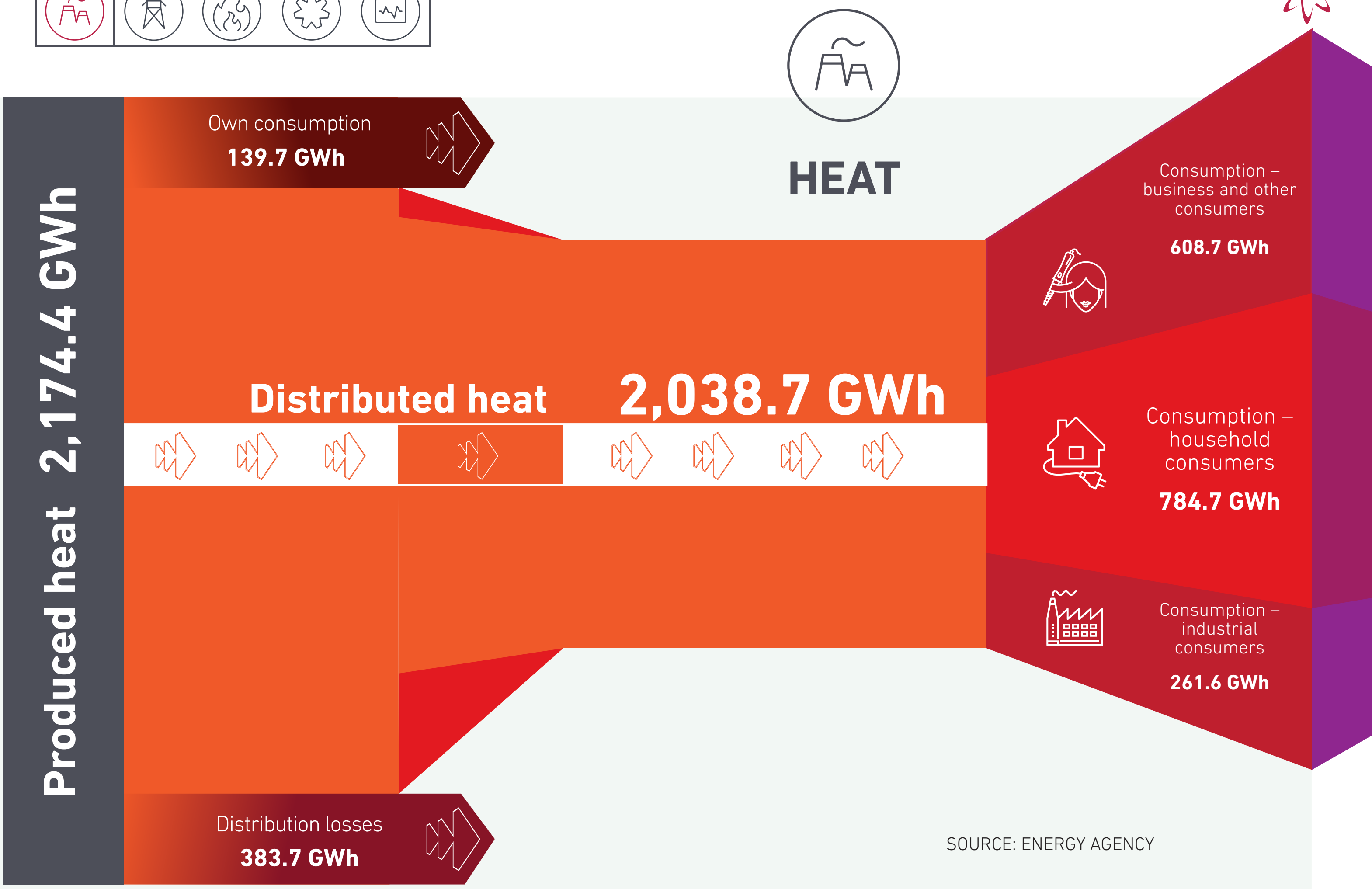


FIGURE 237: BASIC DATA ON PRODUCED AND DISTRIBUTED HEAT FOR CONSUMERS OF HEAT CONNECTED TO THE DISTRIBUTION SYSTEMS

In 2023, two larger district cooling distribution systems with a total installed capacity of 3.88 MW of refrigeration units were in operation, primarily supplying business consumers in Velenje and industrial consumers in Kranj.

Heat distributors with their own production and heat producers supplying distribution systems have produced 2178.3 GWh of useful heat for heating, the preparation of sanitary hot water, the supply of industrial processes and their own needs. At the same time, 662.1 GWh of electricity or 580.3 GWh of electricity were produced at the threshold of the cogeneration processes.

The heat produced through cogeneration accounted for 74.1% of all the useful heat produced (for own use and the distribution systems). The remaining 25.9% of the heat was produced in other technological processes (woody biomass boilers, natural gas, liquefied petroleum gas, heat recovery processes from geothermal wells, waste heat from industrial processes, incineration plants, etc.). In the share of heat for supplying distribution systems, heat from cogeneration sources covered 67.6%, which is 8.4% less than the year before.

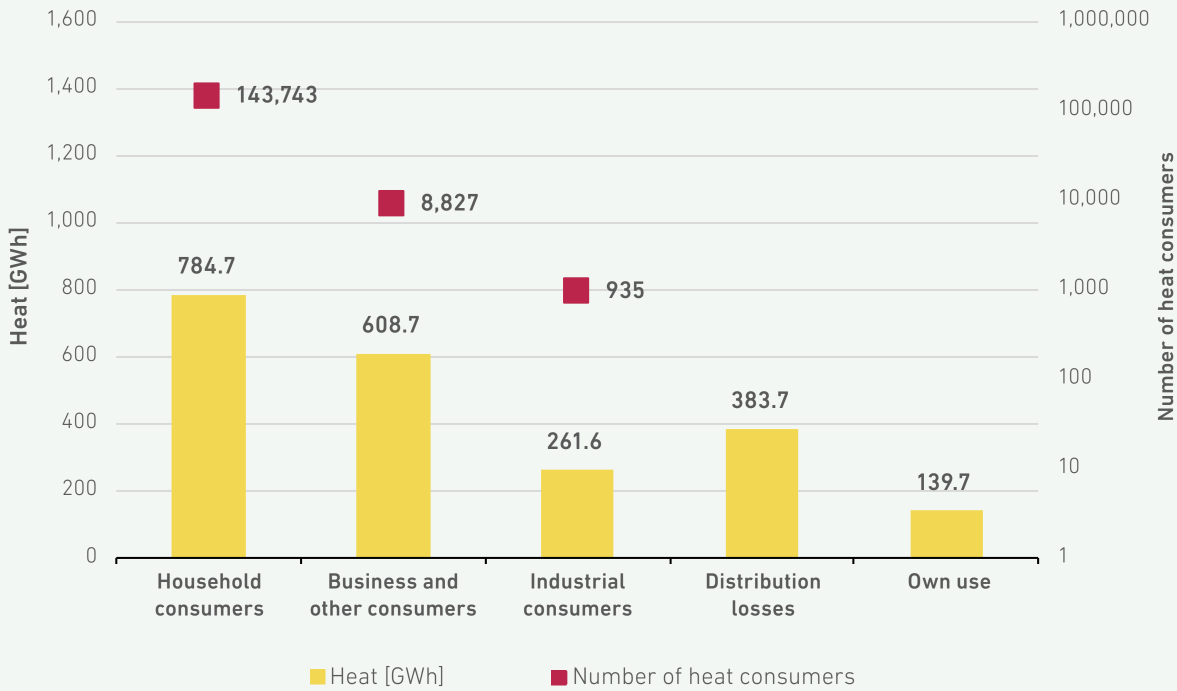
67.6% of distributed heat was produced in cogeneration units

The largest share of the total useful heat produced, 36%, was used to supply 143,743 household consumers, while 27.9% of the heat was consumed by 8827 business consumers and 12% of the heat was used by 935 industrial consumers. Heat producers or distributors used 6.4% of the heat for their own needs (own use for industrial processes, heating and domestic hot water), while the remaining 17.6% is accounted for by the total annual distribution losses[156].

The consumption of useful produced heat in production processes supplying distribution systems, by type of consumers and their number, is shown in Figure 238.

156 The total distribution losses also include the distribution losses of the internal distribution systems of the heat producers. Due to the rounding of shares, the sum of the shares may not add up to 100%.

FIGURE 238: HEAT CONSUMPTION BY THE TYPE OF CONSUMER AND THEIR NUMBER



SOURCE: ENERGY AGENCY

In 2023, 12.2 PJ of primary energy sources were used to supply the distribution systems. Due to the lower demand for heat by final consumers, the consumption of primary fuels was down by around 8.8% compared to the previous year.

Natural gas became the primary energy source

Natural gas took over as the primary energy source for heat generation in 2023 with a share of 40.30%, followed by coal with 36.24% and other primary energy sources with 23.46%. The share of natural gas increased by around 24.22% compared to 2022, which is due to the trial operation of two new gas turbines, which are part of a new gas-steam unit operated by Energetika Ljubljana, the largest heat distributor in Slovenia. Because of that, heat production at Energetika Ljubljana shifted from the primary energy source, coal, to natural gas to a greater extent.

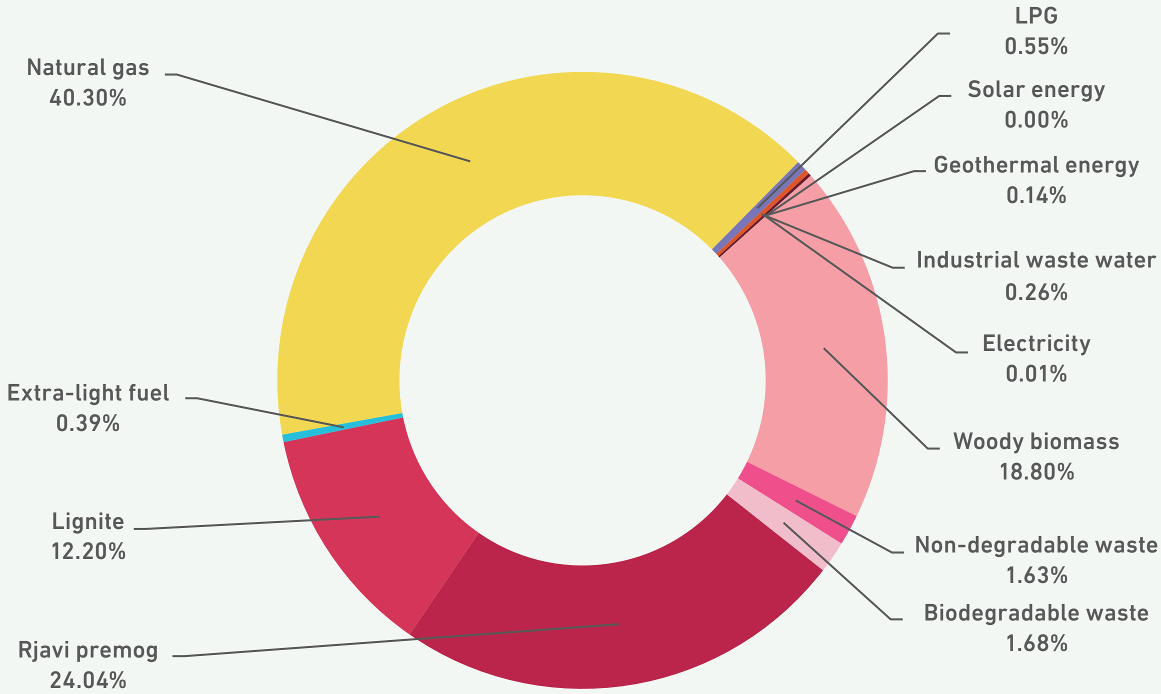
Oil and oil products as primary energy sources accounted for 0.94%, renewable sources (wood biomass, geothermal energy) for 18.95%, municipal waste for 3.30%, industrial waste heat for 0.26% and electricity for 0.01%.

An 8.8% decrease in primary fuel consumption

Heat from municipal waste to supply district heating systems was only produced at the municipal waste incineration plant in Celje. In contrast, excess heat from industrial processes was produced at the Ravne Ironworks (SIJ Metal Ravne) and the Novartis Ljubljana pharmaceutical plant. Given the rising prices of other primary energy sources, the use of excess heat from production processes to supply district heating systems is becoming increasingly important in achieving affordable heat supply for consumers.

Figure 239 shows a more detailed structure of the primary energy sources used for heat production in 2023.

FIGURE 239: STRUCTURE OF THE PRIMARY ENERGY PRODUCTS FOR HEAT PRODUCTION



SOURCE: ENERGY AGENCY

A 28.51% decrease in coal consumption

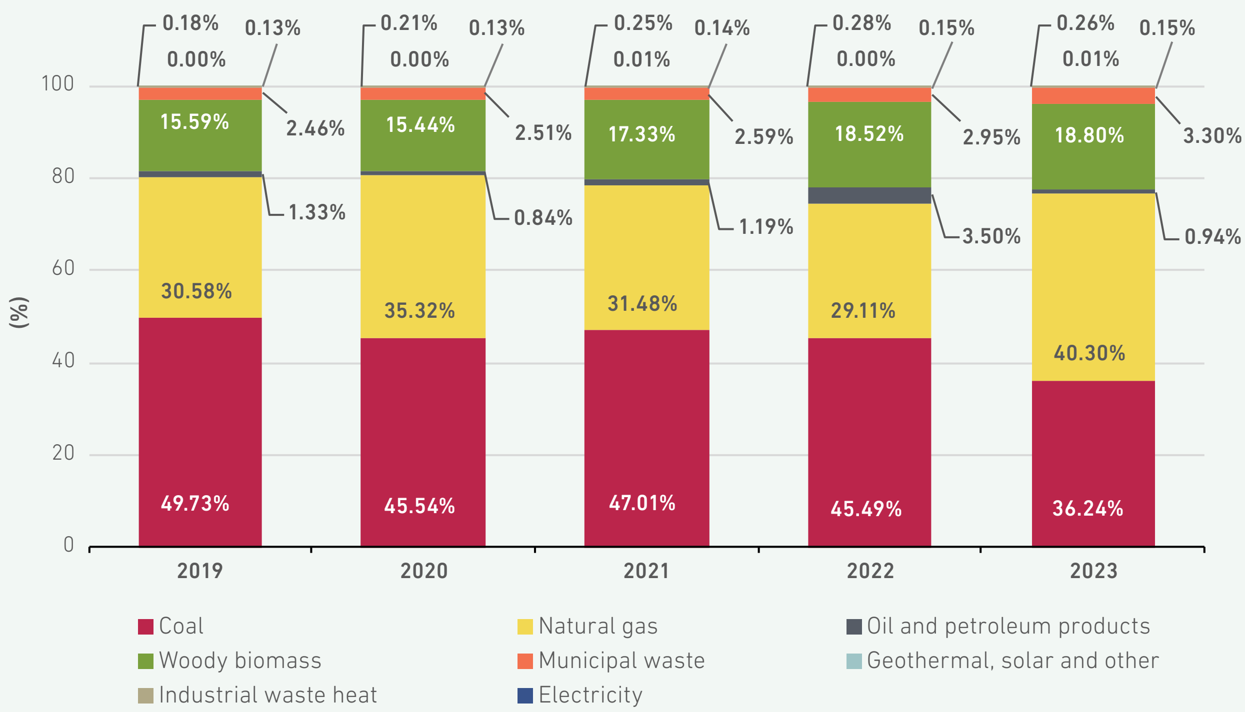
A 24.22% increase in natural gas consumption

In the primary energy mix, the main changes compared to the previous year were in the shares of coal, natural gas, fuel oil and electricity (Figure 240). The lower consumption of coal is mainly due to the start of the trial operation of the aforementioned gas-steam unit at the beginning of the summer. The gas-steam unit consists of two gas turbines and a steam turbine, with a total rated thermal output of 148 MW, which, when put into trial operation, resulted in lower production in the existing coal-fired steam turbines and a 28.51% lower coal consumption and a 24.22% higher natural gas consumption as a structural share of primary fuels. In terms of the structural share of primary fuels, these two energy sources account for 76.54% of the total energy value of the fuels used to supply district heating systems.

The consumption of petroleum products, which are an alternative fuel to natural gas in certain production installations and represent only 0.94% of the annual structural share of primary fuels, decreased by 75.91% compared to the previous year. Electricity consumption (representing 0.01% of the annual structural share of primary fuels) also increased significantly, mainly due to the increasing integration of heat pumps as a heat generation source. Towards the end of October 2023, the heat distributor Energetika Maribor integrated a 2.0 MW high-temperature heat pump at Pristan, which uses geothermal energy from the Drava River, into the heat supply of the district heating system of the city of Maribor. The relatively low share of electricity in recent years has led to its largest change, an annual increase by a factor of 2.44.

In 2023, the price of heat from district heating systems was also significantly affected by the high price of CO_2 emission allowances. According to the European Energy Exchange, their average monthly offer price on the stock markets was EUR 83.6 / tonne CO_2 in 2023, a 5.23% increase compared to the previous year. The average monthly bid prices for emission allowances in 2023 thus ranged between EUR 69.2/tonne CO_2 and EUR 91.7/tonne CO_2, while the highest daily bid price in the third quarter of 2023 was EUR 130.0/tonne CO_2.

FIGURE 240: STRUCTURE OF THE PRIMARY ENERGY PRODUCTS IN THE 2019–2023 PERIOD

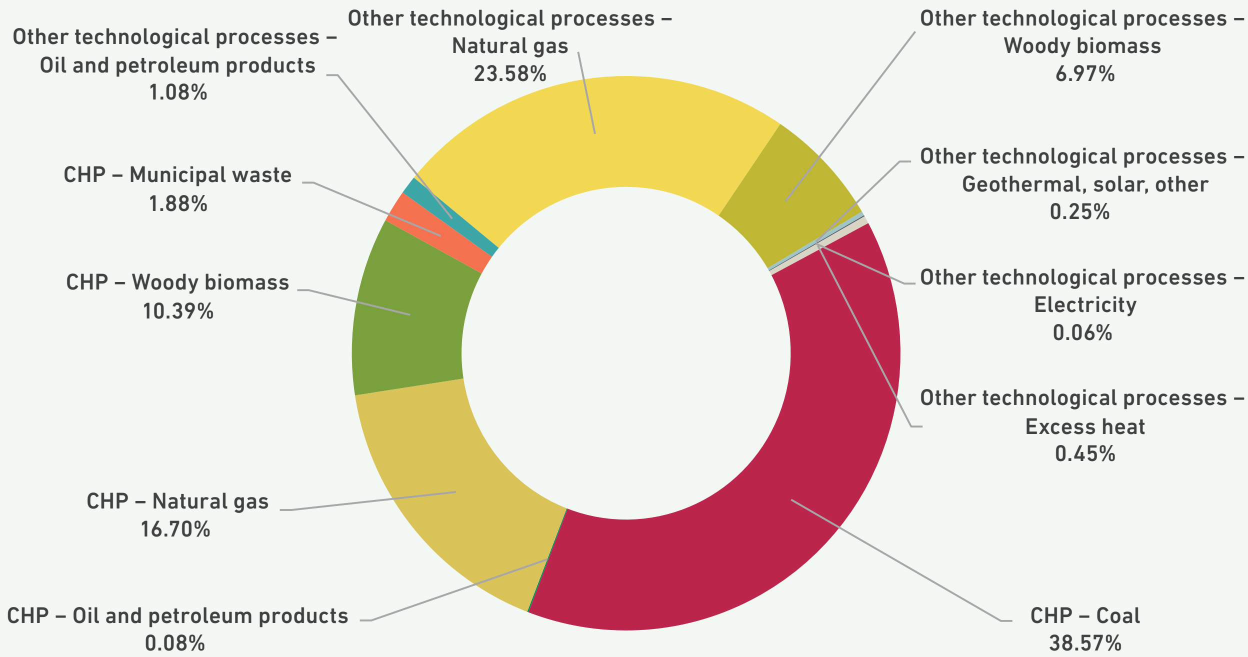


SOURCE: ENERGY AGENCY

Coal as a primary source was only used in cogeneration processes, with 377.5 GWh of gross electricity and 1,089.5 GWh of gross heat produced in cogeneration to supply heat distribution systems. Other cogeneration and other technological processes used natural gas as the primary energy source to a greater extent (400.9 GWh of gross electricity and 1,285.3 GWh of heat produced). Renewable sources produced 117.6 GWh of gross electricity and 545.4 GWh of heat. The structural share of primary energy consumed in relation to the method of heat generation for the supply of distribution systems is shown in Figure 241.

23% of heat produced from RES

FIGURE 241: STRUCTURE OF PRIMARY ENERGY SOURCES FOR HEAT PRODUCTION FOR DISTRIBUTION SYSTEMS[157]



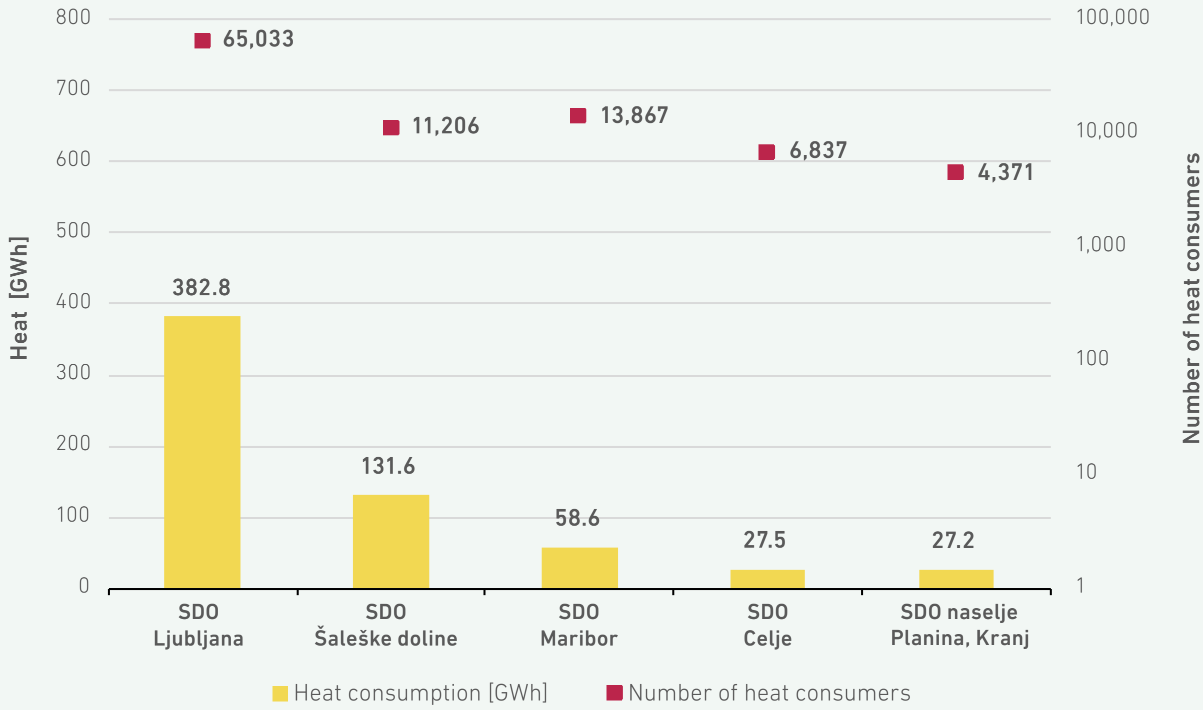
SOURCE: ENERGY AGENCY

In 2023, the five largest heat distributors[158] in terms of volumes of heat delivered to final consumers supplied as much as 79.3% of all the delivered heat from distribution systems. In doing so, 71.0%% of all district heating consumers were provided for. Heat for space heating and domestic hot water was distributed from 108 distribution systems.

The five largest distributors to household consumers supplied 70.5% of these consumers and delivered 80% to them. In this respect, 85 distribution systems in 58 Slovenian municipalities supplied household consumers. This is illustrated in the figure 242.

157 Due to rounding values (shares) to two decimal places, there may be discrepancies in the total value of the shares.
158 Due to the intended use of steam systems (supplying only industrial processes), they are excluded from the comparison.

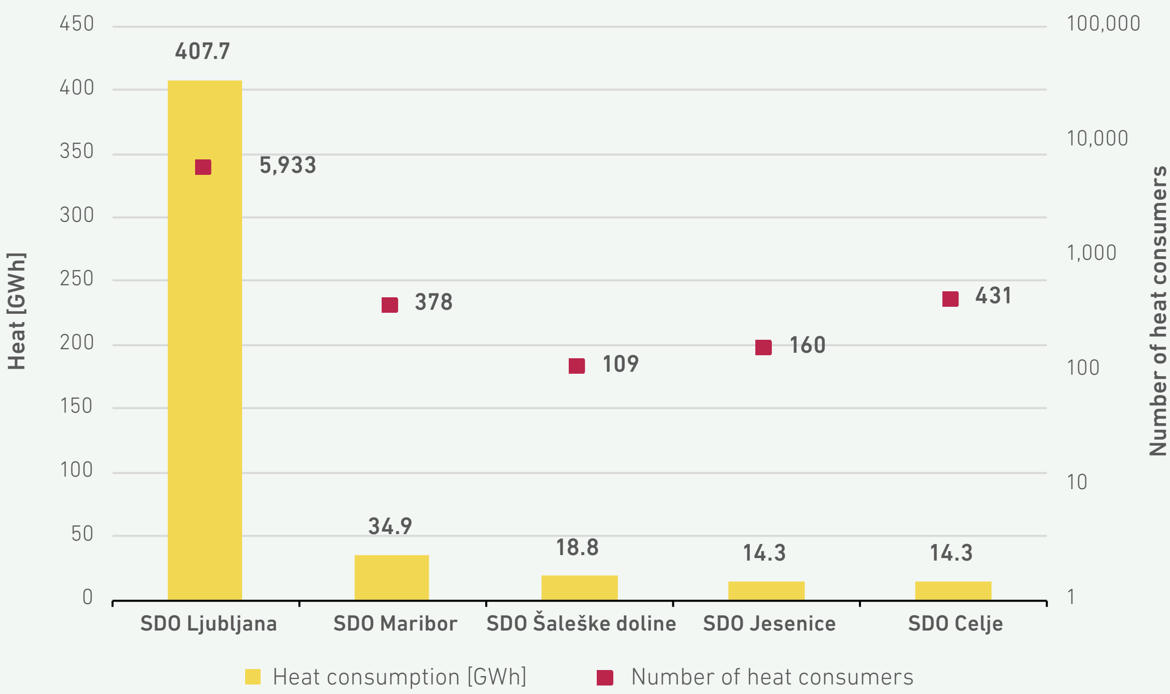
FIGURE 242: HEAT CONSUMPTION AND THE NUMBER OF HOUSEHOLD CONSUMERS OF THE FIVE LARGEST HEAT DISTRIBUTORS[159]



SOURCE: ENERGY AGENCY

The five largest distribution systems, which supply heat for space heating and domestic hot water to business and other heat consumers, provided 79.4% of these consumers and delivered 80.5% of all heat. In 2023, business and other heat consumers were supplied from 78 distribution systems in 59 Slovenian municipalities (Figure 243).

FIGURE 243: HEAT CONSUMPTION AND THE NUMBER OF BUSINESS AND OTHER CONSUMERS OF THE LARGEST HEAT DISTRIBUTORS

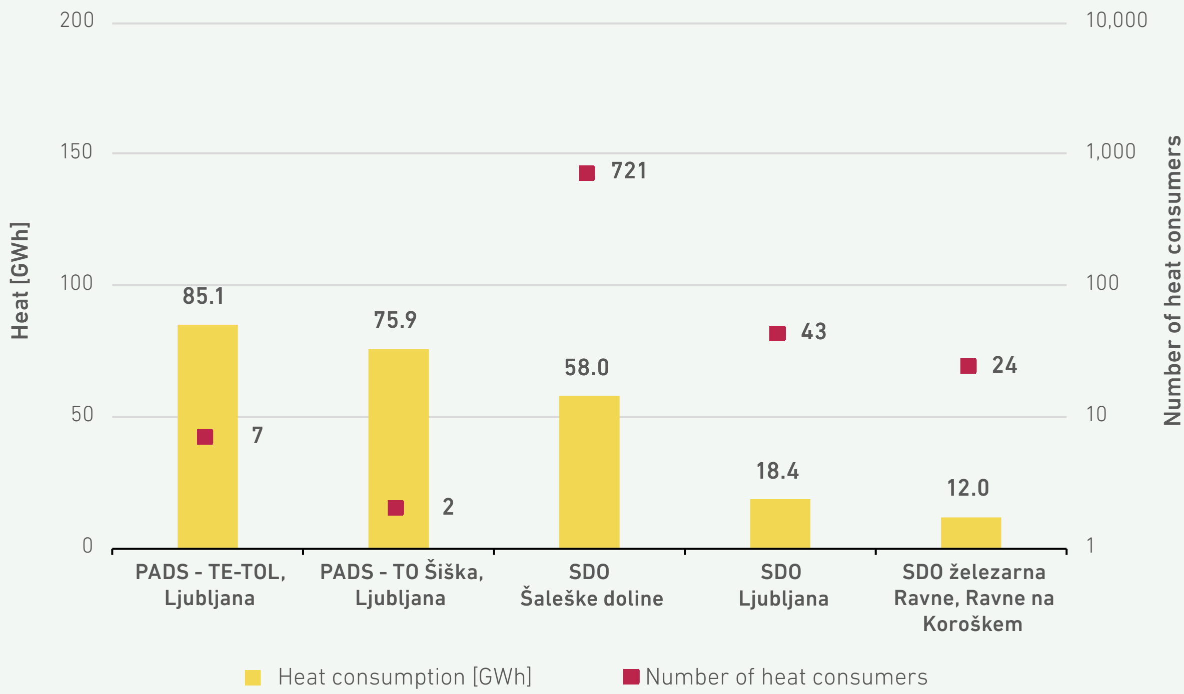


SOURCE: ENERGY AGENCY

159 SDO – abbreviation used for district heating system (DHS).

The five largest heat distributors supplying heat for industrial processes and heating to industrial consumers supplied 85.2% of these consumers and delivered 95.3% of the heat for industrial consumers (Figure 244). In 2023, industrial consumers were supplied from 23 distribution systems in 20 Slovenian municipalities.

FIGURE 244: HEAT CONSUMPTION AND THE NUMBER OF INDUSTRIAL CONSUMERS OF THE FIVE LARGEST DISTRIBUTORS[160]



SOURCE: ENERGY AGENCY

Heat Distribution Systems

According to the Agency's records, heat supply from heat distribution systems[161] in 2023 was provided from 110 distribution systems (61 as a service of general economic interest, 17 commercial and 32 private) in 67 Slovenian municipalities. The total length of the distribution system was 910.5 kilometres. As an optional local GJS, heat supply was provided by 61 distribution systems operated by 34 distributors in 51 Slovenian municipalities. In 12 municipalities, heat supply was carried out as a commercial activity and in 16 municipalities as a supply from private distribution systems. The private distribution systems in Kranj, Koper, Maribor, Žalec and Mežica are among the larger distribution systems for supplying household and commercial consumers. The 11 private distribution systems in these municipalities supplied 12,621 consumers, of which 10,538 were households.

The distribution systems whose heat distribution activity was carried out as an optional local GJS provided heat to 91.1% of the heat consumers, and the share of heat transferred from these systems was 93.4% of the total heat transferred from the distribution systems.

The only major district cooling distribution systems remain in the municipalities of Velenje and Kranj, with a total network length of 1.5 km.

The municipalities with distribution systems and the quantities of heat distributed in 2023 are shown in Figure 245.

160 PADS – abbreviation used for a steam distribution system.
161 Distribution systems do not include the internal distribution systems of heat producers.

FIGURE 245: QUANTITIES OF DISTRIBUTED HEAT BY SLOVENIAN MUNICIPALITIES

SOURCE: ENERGY AGENCY

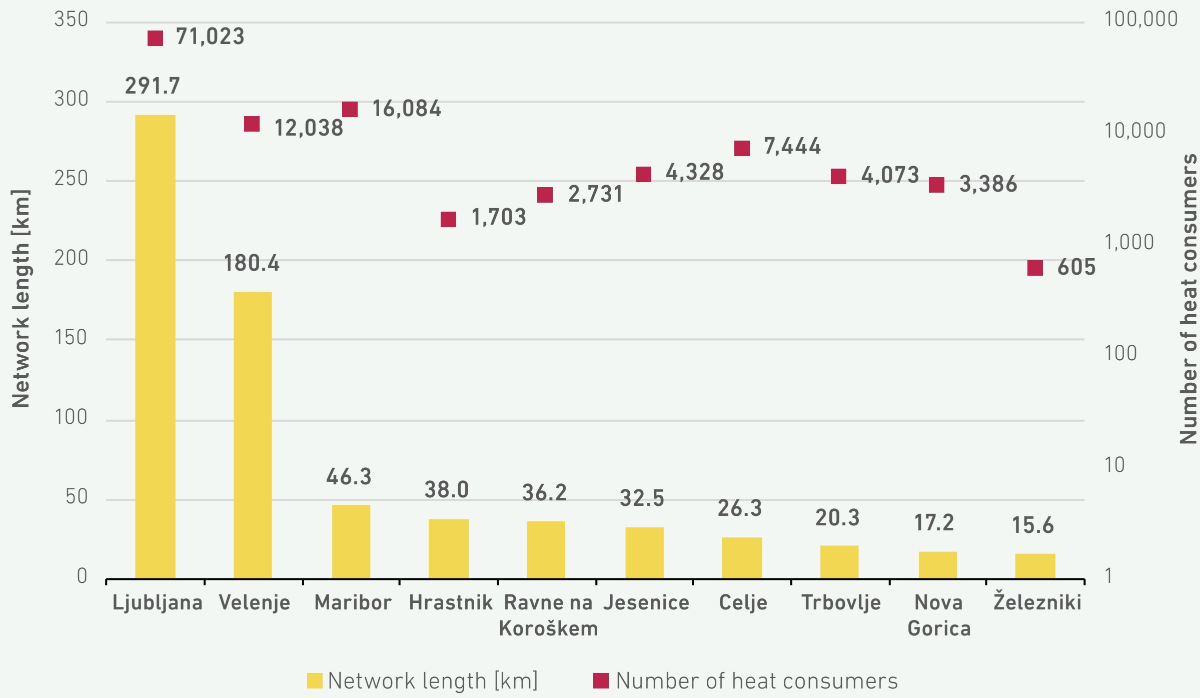
Concerning the temperature regime of the operations of the individual systems, the systems are divided into warm-water systems, hot water systems, steam distribution systems and district cooling systems. The lengths of the warm water and hot water distribution systems account for 98.8% of the entire length of the distribution systems, steam distribution systems 1%, and district cooling systems slightly less than 0.2% of the total length of the distribution systems. The most extended distribution systems are still in Ljubljana (a 282.2-km-long warm-water distribution system) and Velenje with Šoštanj (a 180.1-km-long warm-water distribution system). The average length of the heat distribution systems was 8.2 kilometres and the distribution systems recorded average annual heat distribution losses of 15.7% of the total heat distributed.

FIGURE 246: LENGTH OF THE HEAT DISTRIBUTION SYSTEMS IN THE SLOVENIAN MUNICIPALITIES

SOURCE: ENERGY AGENCY

Figure 247 shows the first ten municipalities in terms of the total length of registered heat distribution systems and the number of heat consumers in 2023.

FIGURE 247: LENGTH OF THE HEAT DISTRIBUTION SYSTEMS AND NUMBER OF CONNECTED CONSUMERS IN INDIVIDUAL MUNICIPALITIES



SOURCE: ENERGY AGENCY

CASE STUDY

Losses in Heat Distribution Systems

This case study presents losses in heat distribution systems designed to supply heat to consumers for space heating and domestic hot water. The study is based on data from the heat distributors' annual reports.

Distribution losses affect the efficiency of heat transfer from the source to the end-users and mainly depend on the following factors:

- quality of pipe insulation: heat losses through the pipe walls depend primarily on the insulation material, the insulation's thickness and the installation's quality. Poorly insulated pipes lead to higher heat losses;
- supply and return line temperature: higher temperatures in the system lead to higher heat losses as the difference between the temperature of the water in the pipes and the ambient temperature is greater. Optimal management of the temperature regimes of the distribution system can reduce distribution losses;
- length, diameter and age of the network: more extended networks tend to have higher heat losses than shorter ones. Similarly, older networks with ageing infrastructure have higher heat losses due to poorer insulation and more frequent leaks;
- the density of consumption: a higher density of users in a given area means lower losses per unit of heat transferred, as the distances between the source and the users are shorter;
- temperature deficit: external temperatures, humidity and wind can affect heat losses through pipes;
- heating water flow velocity: higher water flow velocities can reduce heat losses as it takes less time for the water to pass through the network. However, high flow velocities can increase hydraulic losses and the wear and tear on distribution system components;

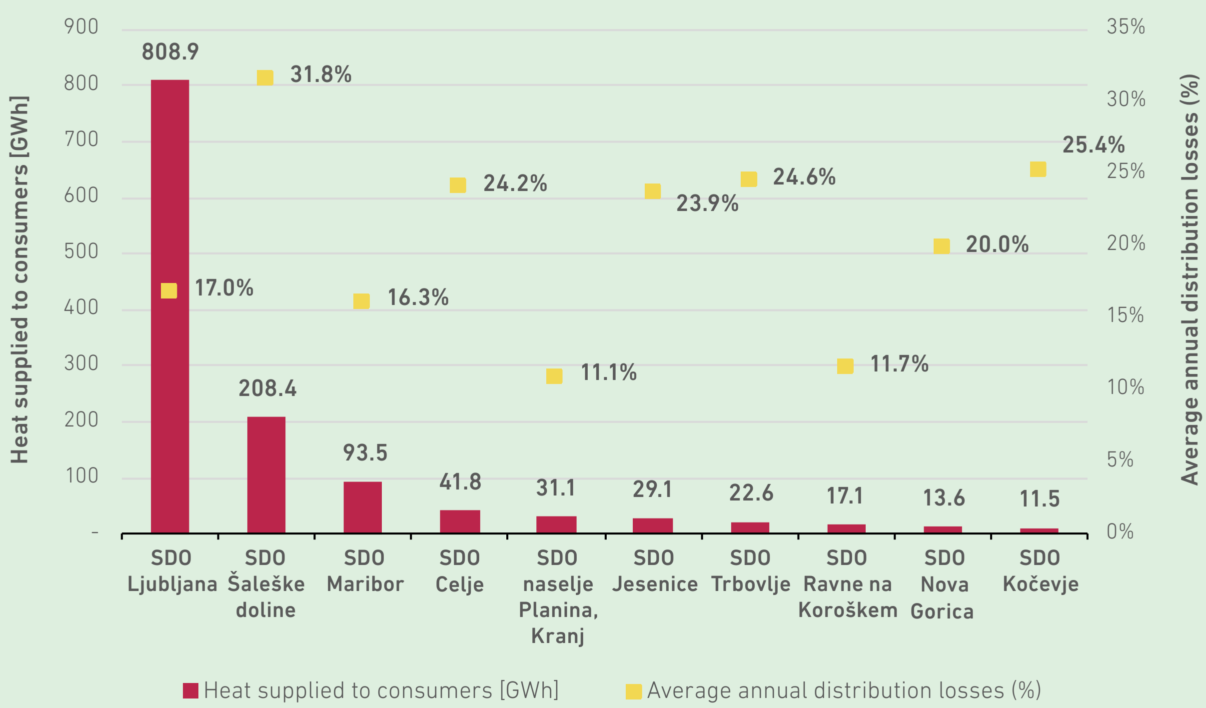
- pressure losses in the system: pressure losses due to friction and other pipe obstructions can affect heat transfer efficiency. More efficient systems have fewer pressure losses or the pipe diameters are sized accordingly;
- hydraulic balance of the system: a well-balanced system ensures a steady flow and reduces heat losses. Poor balance leads to uneven heat distribution and higher losses;
- maintenance and control: regular maintenance of the network and control of the system operation can reduce losses due to leaks, corrosion and other problems that may occur over time.

Losses on heat distribution systems are established as a percentage of volume losses and determined on the basis of the differences between the quantities of heat supplied to consumers and the quantities of heat delivered to the heat distribution system. Losses on heat distribution systems are in the following ranges:

- modern and well-maintained networks: in modern systems with high-quality insulation and good management, distribution losses are typically between 5 and 10%. This includes newer networks where advanced technologies and materials have been used to reduce both thermal and hydraulic losses;
- older and less maintained networks: in older systems that have been built with less efficient insulation and where maintenance has not been optimal, distribution losses can be between 10 and 20%. These systems are often more susceptible to leaks and other problems that increase heat losses;
- very old or poorly maintained networks: in very old or poorly maintained networks, where the infrastructure has not been significantly upgraded, distribution losses can exceed 20% and, in some cases, can reach up to 30% or more.

The average value of heat losses in district heating in Europe is around 10 to 15%, while in Slovenia, the average for the last three years is 16.2%, and in 2023, it is around 15.8%. This average includes both newer and older systems. In countries with more modern heat distribution systems, such as Scandinavian countries, losses are often lower, while losses can be higher in countries with less modern systems. The following figure shows the average annual distribution losses of the 10 largest distribution systems in Slovenia in 2023 in relation to the amount of heat supplied to final consumers. Distribution losses are higher for those systems where the heat distributor provides heating and domestic hot water throughout the year.

FIGURE 248: AVERAGE DISTRIBUTION LOSSES AND HEAT SUPPLIED TO FINAL CONSUMERS IN THE LARGEST DISTRIBUTION SYSTEMS[162] IN 2023

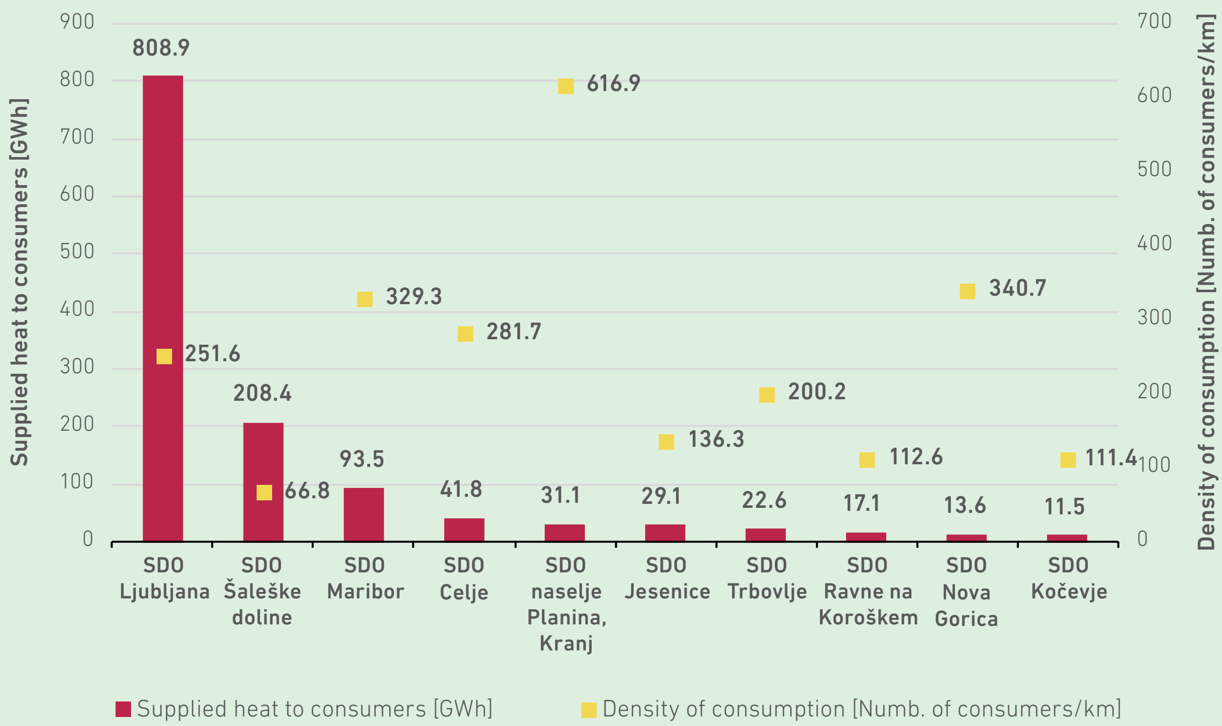


SOURCE: ENERGY AGENCY

162 All of the distribution systems presented, with the exception of SDO Ravne na Koroškem, also operate outside the heating season.

One of the most important factors influencing distribution losses is the density of consumption, i.e. the number of consumers per network length. The following graph shows the density of consumption for the SDOs mentioned above.

FIGURE 249: DENSITY OF CONSUMPTION IN RELATION TO THE AMOUNT OF HEAT SUPPLIED TO FINAL CONSUMERS IN 2023



SOURCE: ENERGY AGENCY

Distribution heat losses depend on several factors, including the quality of the pipe insulation, the length and age of the network, the temperature deficit, the density of demand, and the temperature regime of the distribution system. The average annual distribution losses in the larger distribution systems in Slovenia indicate that they are older networks with low load density and high-temperature operating regimes. The larger systems also predominantly provide domestic hot water to consumers outside the heating season, which increases their average annual heat losses due to the relatively low demand.

The efficient design and management of distribution systems, the effective management of temperature regimes, switching to low-temperature systems and improving system insulation are key measures to reduce heat losses and improve the efficiency of heat distribution systems and their competitive advantage compared to other heating methods, especially in urban environments.

Energy-Efficient District Heating Systems

District heating and cooling systems are energy-efficient if the heat distributor ensures an annual level of heat by using at least one of the following sources:

- at least 50% of the heat produced directly or indirectly from renewable energy sources (RES);
- at least 75% of heat from cogeneration; or
- at least 50% of waste heat;
- at least 50% of a combination of the heat referred to in the above two indents.

The Energy Agency monitors which heat distribution systems meet the criteria each year and publishes a list of energy-efficient heat distribution systems on its website (www.agen-rs.si/izvajalci/toplota/ucinkoviti-distribucijski-sistemi).

According to these criteria, in 2023, out of 110 registered heat distribution systems where heat distribution is carried out as an optional local service of general economic interest, a commercial activity or as a private distribution system, 68 were energy-efficient (i.e. they fulfilled at least one of the criteria, some of them more). The largest number of distribution systems, 53, met the energy efficiency criterion in that at least 50% of the distributed heat was produced directly or indirectly from RES. Ten distribution systems met the energy efficiency criterion: at least 75% of the distributed heat was produced from cogeneration. However, the distribution system must still meet the criterion that at least 50% of the distributed heat is produced from excess heat.

61.8% of distribution systems are energy-efficient

A heat distribution system can also be energy-efficient if the amount of heat distributed is produced from at least 50% of a combination of heat from at least two of the above sources. 14 distribution systems met this criterion.

The Price of Heat

A 10.1% higher average retail price

The average retail price of heat in nine selected Slovenian municipalities with heat distribution systems is calculated as the average monthly retail price of heat for residential heating and sanitary hot water based on the publicly announced price lists of heat distributors for 2023 for a typical household heat consumer in a multi-dwelling residential building with an annual capacity of 7 kW and an average annual consumption of 6.21 MWh.

In 2023, distribution systems in the selected municipalities supplied 78.4% of all household consumers, while their acquired heat was 86.2% of all the heat delivered to these consumers.

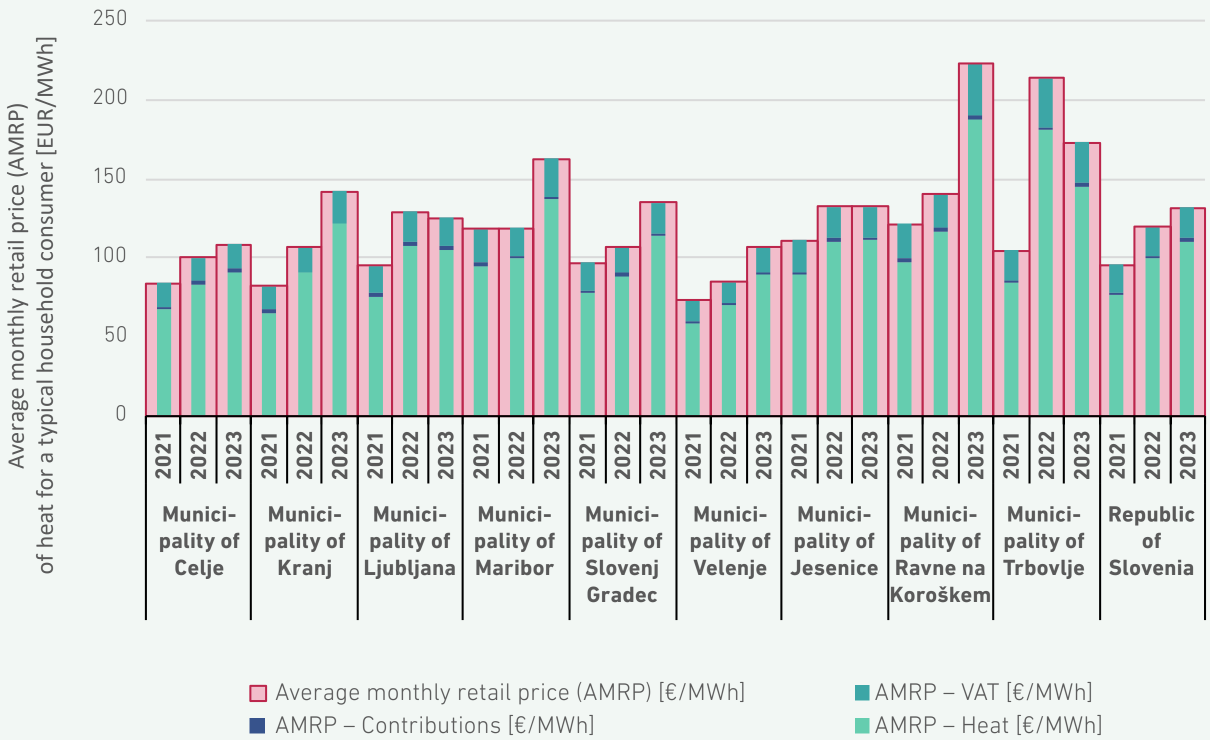
The average retail prices for heat in the selected municipalities are shown in Figure 250. They are calculated as the weighted average monthly retail prices for a typical household heat consumer living in a multi-dwelling residential building in each selected municipality, and the average monthly retail price of heat for the entire territory of Slovenia is also shown, weighted by the number of household consumers supplied

The average monthly retail price of heat for household consumers increased on average by 10.1% in all of the mentioned municipalities in comparison with the previous year, and was EUR 131.47/MWh in 2023.

The average retail heat prices rose by almost 12% on average in the variable part of the price of heat at the end of April, following the end of the government's heat price cap measures. The highest increase in heat prices for household consumers was in the municipality of Ravne na Koroškem at EUR 222.32/MWh (58.7%), where the average retail price was also the highest among the selected municipalities. The district heating distribution system of Šaleška Dolina provided the lowest annual average heat retail price at EUR 106.6/MWh.

In recent years, it can be observed that the average billing power and the average annual consumption of a household consumer in single- and multi-apartment buildings in individual Slovenian municipalities have been decreasing due to the increasing number of energy renovation measures implemented in buildings and the decreasing annual temperature deficit. Given the above, the Agency will, for a comparative analysis of district heating and cooling prices in the territory of the Republic of Slovenia, determine new consumption characteristics of a typical Slovenian heat consumer using available statistical data obtained from distributors.

FIGURE 250: CHANGES IN THE AVERAGE RETAIL PRICE OF HEAT FOR HOUSEHOLD CONSUMERS IN INDIVIDUAL SLOVENIAN CITIES IN THE 2021–2023 PERIOD



SOURCE: ENERGY AGENCY

Regulating the Price of Heat for District Heating

The Energy Agency regulates the price of heat for district heating on the basis of the current Act on the Heat Supply Pricing Methodology. Entities subject to regulation are heat distributors performing an optional service of general economic interest using distribution systems to which more than 500 household consumers are connected. Heat producers supplying heat to such systems are also subject to regulation.

The regulated entities must obtain the Energy Agency's consent to the first determined heat price for a particular distribution system or heat supply and to any change in the starting heat price. However, these entities must only notify the regulatory authority about the adjustment of the individual elements of the starting heat price due to changes in eligible costs. In all cases, the starting price for heat has to be established in accordance with the criteria and references set out in the abovementioned Act.

For the period from 1 January 2023 to 30 April 2023, under the Regulation on the pricing of district heating (Official Gazette of the RS, No 9/23) that was adopted on the basis of the Act on Emergency Intervention to Address High Energy Prices (Official Gazette of the RS, No 158/22), the following tariffs were capped:

- the tariff for the variable part of the district heating price for household consumers (as defined by the Act on the supply of heat from distribution systems, Official Gazette of the Republic of Slovenia, No 44/22) who receive heat from a distribution system where the distributor performs an economic public service;
- the tariff for the fixed part of the district heating price for all consumers who receive heat from the distribution system where the distributor performs the economic public service.

The final price of heat was also indirectly influenced by the Regulation on the determination of prices for natural gas from the gas system (Official Journal of the RS, No 138/22 and 12/23) and the Regulation on the determination of prices for natural gas from the gas system (Official Journal of the RS, No 45/23), which set the maximum retail price of natural gas for services of general economic interest performing heat distribution and other heat producers for gas used to produce heat for household consumers, basic social services, kindergartens, primary schools and health centres. In addition to the abovementioned regulations, heat distributors had to comply with the Act on Energy Crisis Management Measures, which required heat distributors to reflect the capped gas prices in the heat price list, resulting in different heat prices for different consumer groups.

In 2023, the Energy Agency decided on the eligibility of heat distributors for financial compensation to cover eligible costs and on the amount of compensation by the Regulation on the determination of the compensation of distributors of heat from district heating systems (Official Journal of the RS, No 74/23). The Regulation mentioned above was issued based on the Act on Emergency Intervention to Address High Energy Prices (Official Journal of the RS, No 158/22 and 49/23).

It dealt with requests for consent to the starting price of heat from the obliged entities, which were received to meet the criteria for making a new request under the Act on the methodology for setting the price of district heating. The changes to the starting prices were due to technological changes.

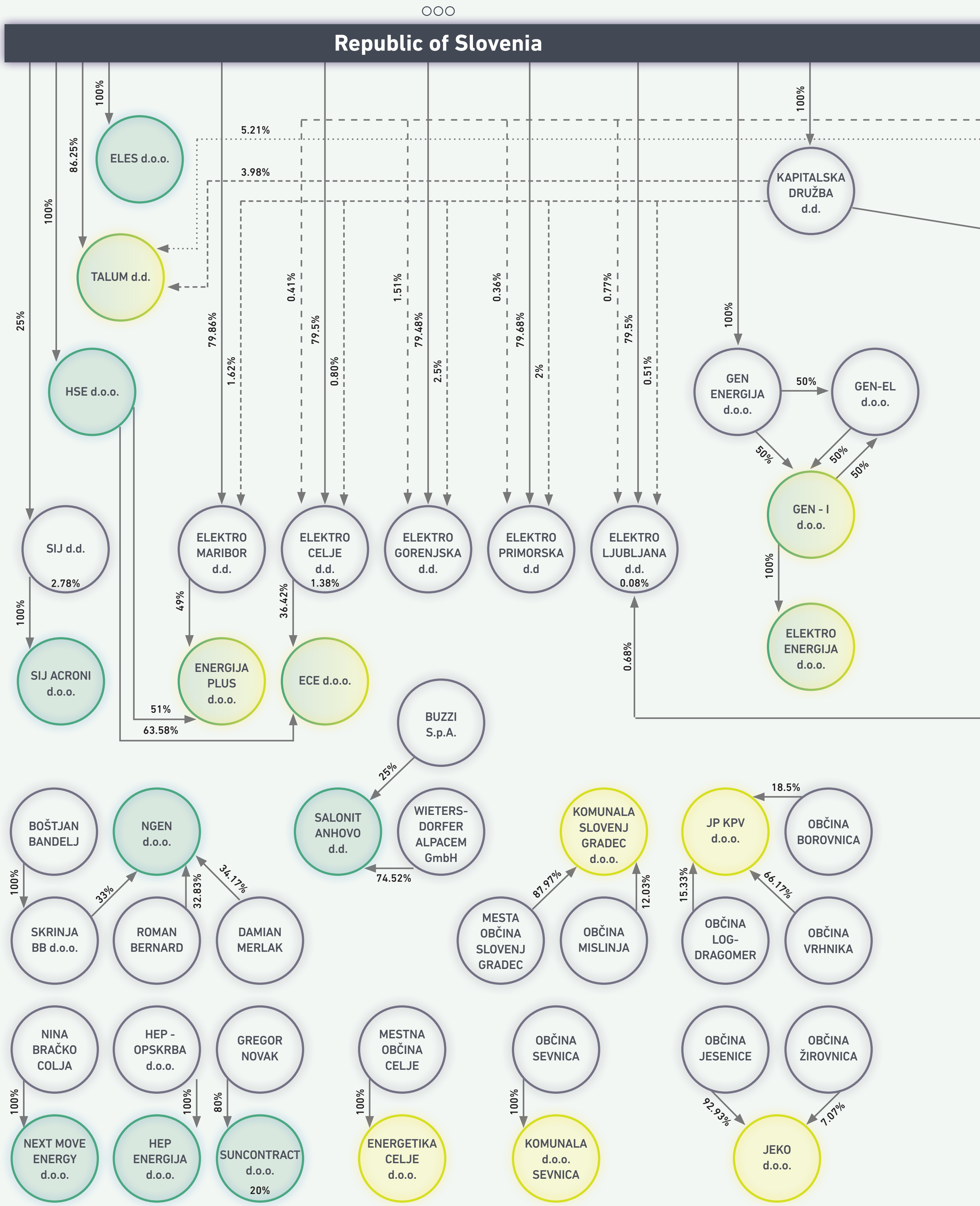
It also monitored and analysed the adjustments of the starting heat prices due to changes in eligible costs, the way heat is charged, and the publication of the heat tariff rates. In 2023, it dealt with 118 notifications of adjustments to the variable part of the starting heat price and 15 notifications of adjustments to the fixed part of the starting heat price.

Unbundling

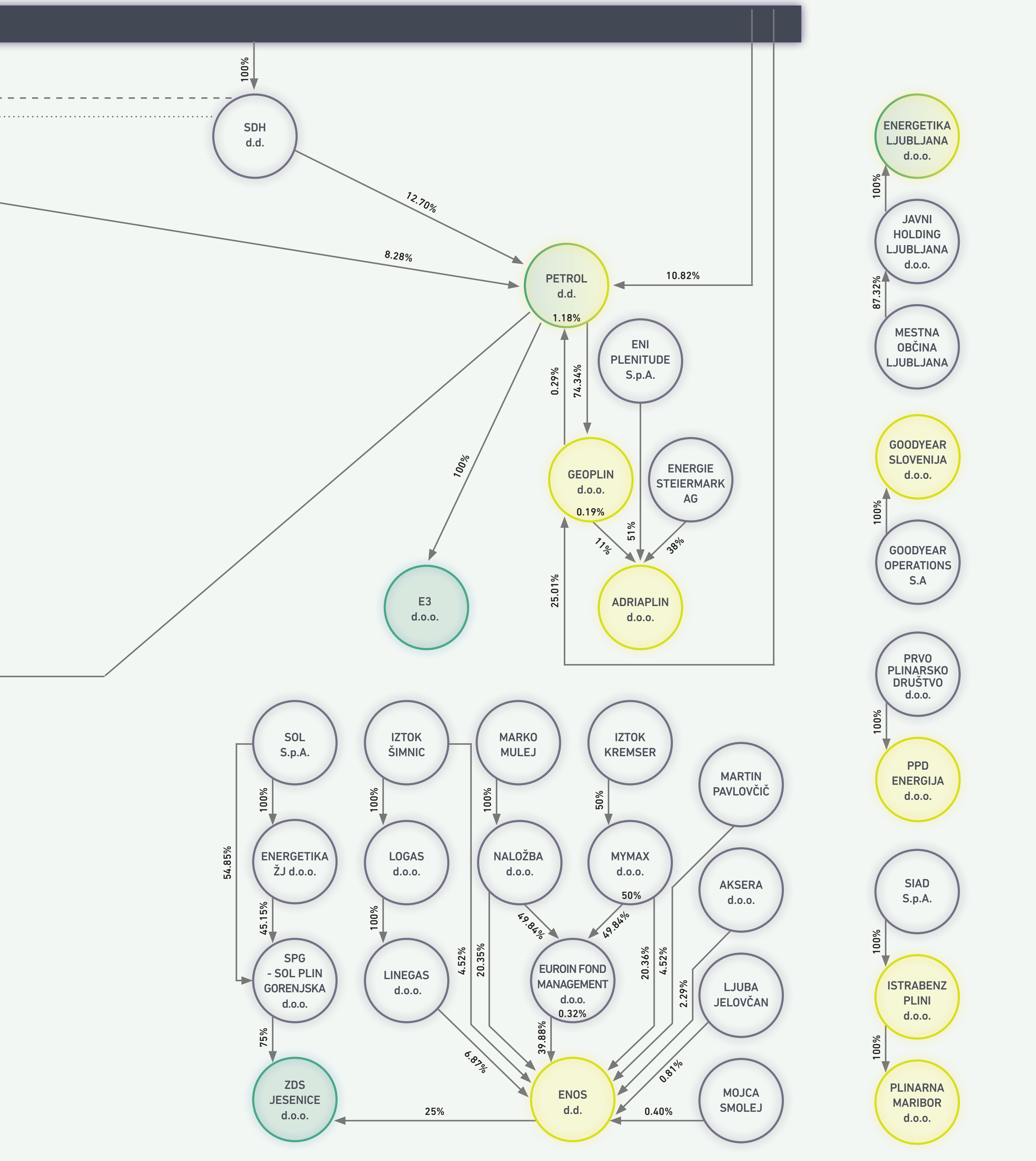
Distributors performing services of general economic interest and carrying out activities other than heat distribution should keep separate accounts in accordance with the accounting standards and disclose separate accounts in the notes on the financial statements for heat distribution, heat production and other activities.

To this end, they should define in their internal acts the criteria for allocating assets and liabilities, costs and expenditures, and revenues, taking into account the management of accounts and the preparation of separate accounts. They must also be disclosed in full in the notes on the financial statements. The adequacy and correctness of the application of judgements should be audited annually by an auditor, who must produce a special report.

FIGURE 251: OWNERSHIP STRUCTURE OF ELECTRICITY AND NATURAL GAS SUPPLIERS – ON 31 DECEMBER 2023

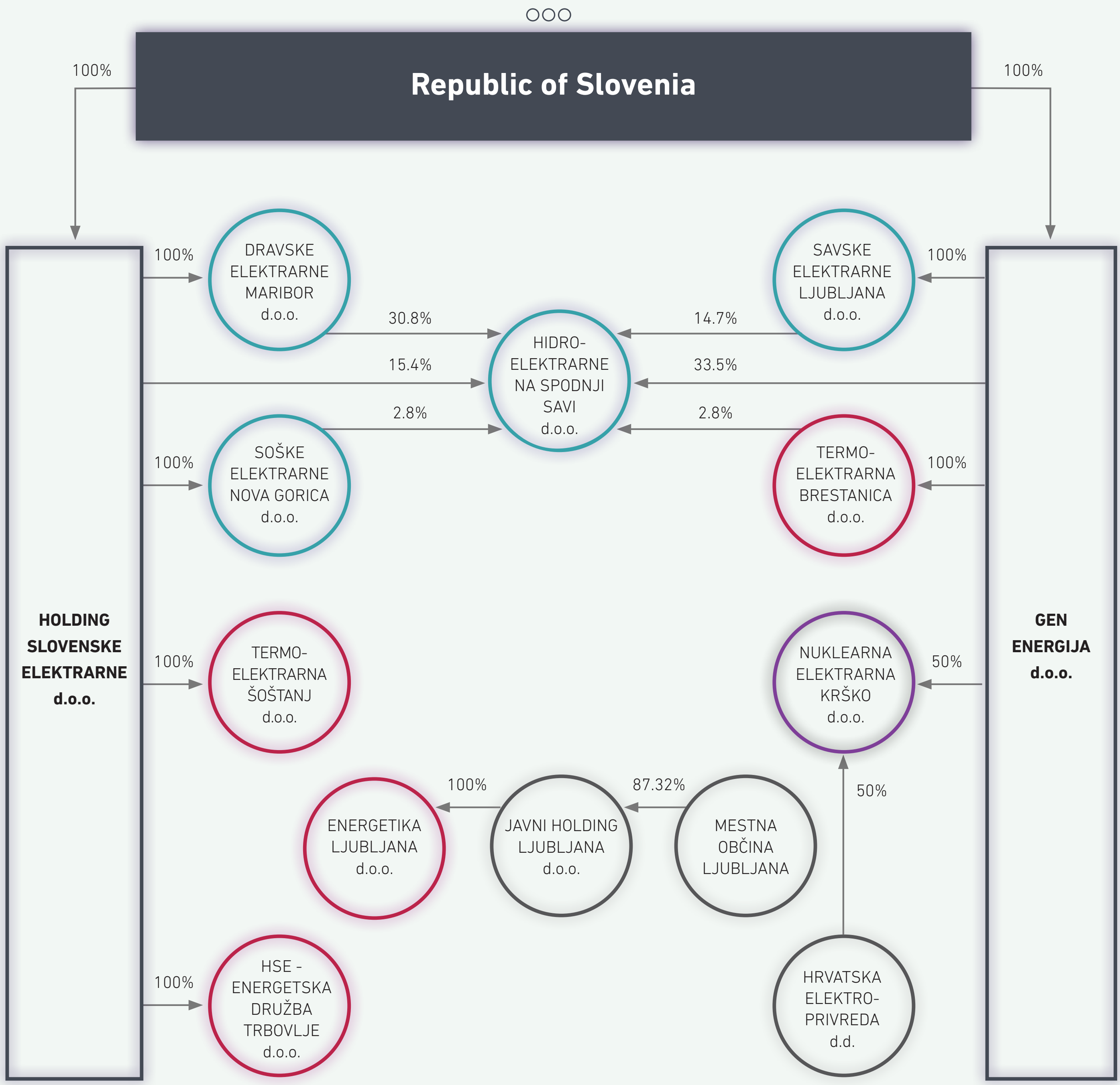


■ Electricity supplier ■ Natural gas supplier ■ Electricity and natural gas supplier



SOURCE: GVIN.COM

FIGURE 252: OWNERSHIP STRUCTURE OF ELECTRICITY PRODUCERS WITH AN INSTALLED CAPACITY OF MORE THAN 10 MW – ON 31 DECEMBER 2023



SOURCE: GVIN.COM

LIST OF ABBREVIATIONS AND ACRONYMS

ACER	Agency for the Cooperation of Energy Regulators
ADMS	Advanced Distribution Management System
aFRR	automatic Frequency Restoration Reserve
AIB	Association of Issuing Bodies
AJPES	Agency of the Republic of Slovenia for Public Legal Records and Related Services
AM	Amortisation
AMRP	Average monthly retail price
AMS	Advanced Metering System
ATC	Available Transfer Capacities
B2B	Business to Business
B2C	Business to Consumer
BEV	Battery Electric Vehicle
BG	Balance Group
Borzen	BORZEN, operater trga z elektriko, d.o.o. /Market operator
BSP	BSP, Regional Energy Exchange, Southpool
BSP	Balancing service provider
CDS /ZDS	Closed distribution system
CEEPS	Central Electricity Portal of Slovenia
CEER	Council of European Energy Regulators
CEER CS WS	CEER Cyber Security Workstream
CEGH	Central European Gas Hub AG Vienna
CEGHIX	Central European Gas Hub AG Vienna Index
CEP	Clean Energy Package
CERT-EU	The Computer Emergency Response Team for the EU institutions, bodies and agencies
CfD	Contracts for Difference
CHP	Combined Heat and Power
CIM	Common Information Model (IEC 61970-3XX)
C_{neg} and C_{pos}	Basic Imbalance Prices
CNG	Compressed Natural Gas
CONE	Cost of New Entry
CROPEX	Croatian Power Exchange
CSD/CSW	Centre for Social Work
CUO	Cost of the use of the electricity network

CZP	Cross-zonal capacity
DSO / OPS	Distribution system operator
DTR	Dynamic Thermal Rating
EAFO	European Alternative Fuels Observatory
ebIX	European Forum for Energy Business Information eXchange
EC	European Commission
ECCO-sp	National data services platform
EDC	Electricity distribution company
EENS	Expected energy non-served
EEX	European Energy Exchange AG, Leipzig
E-ISAC (HU)	Hungarian Energy Information Sharing and Analysis Centre
EL	Electricity
EMS	Energy Management System
ENISA	The European Union Agency for Cybersecurity
ENTSO-E	European Network of Transmission System Operators for Electricity
EPOS-G2	E-Reporting of energy service providers
EU	European Union
EU DSO	DSO Entity
EVT	Single entry point
EVT/Portal CEEPS	A hub providing data exchange between electricity distributors and suppliers, end-users and their proxies; a central data hub for the exchange of electricity market data
EXAA	Energy Exchange Austria
EZ-1	Energy Act, Official Gazette of the Republic of Slovenia, No. 60/19 – uradno prečiščeno besedilo, 65/20, 158/20 – ZURE, 121/21 – ZSROVE, 172/21 – ZOEE, 204/21 – ZOP, 44/22 – ZOTDS in 38/24 – EZ-2
EZ-2	Energy Act, Official Gazette of the Republic of Slovenia, No. 38/24
FB	Flow-Based
GISO	Government Information Security Office
GIZ	Economic Interest Grouping
GIZ DEE	Economic Interest Grouping for Natural Gas Distribution
GJS	Service of general economic interest
GME	Gestore Mercati Energetici, italijanska borza
HC	Household consumer
HEP	Hrvatska elektroprivreda d.d.
HESS	Hidroelektrarne na Spodnji Savi, d.o.o.
HHI	Herfindahl-Hirschmanov index
HOPS	Hrvatski operator prijenosnog sustava d.o.o
HPPP	Hydroelectric Power Plant
HSE	Holding slovenske elektrarne d.o.o.
HT	High Tariff
HTLS	High-Temperature Low-Sag Conductors
HUPX	Hungarian Power Exchange

HV	High Voltage
ICS-CERT	Industrial Control Systems Cyber Emergency Response Team
ICT	Information and Communications Technology
IGCC	International Grid Control Cooperation
IoT	Internet of Things (Internet stvari)
IOTEE / NEMO	Nominated Electricity Market Operator
IPET	Energy Market Data Exchange (IPET Section)
IT	Information Technology (Business Informatics)
JAO	Joint Allocation Office
KPI	Key Performance Indicator
LNG	Liquefied Natural gas
LOLE	Loss of Load Expectation
LT	Low tariff
LV	Low voltage
MAIFI	Momentary Average Interruption Frequency Index
MDPP	Measurement data processing platform
mFRR	Manual Frequency Restoration Reserve
MID	Measuring Instruments Directive (Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments)
MMRP	Border measuring and control station
MRP	Metering and Regulating Station
MS-ISAC	Multi-State Information Sharing and Analysis Centre
MV	Middle Voltage
NEK	Nuklearna elektrarna Krško d.o.o., Nuclear Power Plant Krško
NEPN	National energy and climate plan
NOKI	National Cyber Incident Response Plan
OBA	Operational Balancing Agreement
OT	Operational technology
P	Power
PADS	Steam distribution system
PCI	Projects of Common Interest
PHEV	Plug-in hybrid electric vehicles
PSHPP	Pumped-Storage Hydroelectric Power Plant
Q	Quality of Supply
REMIT	Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency)
REMIT II	Regulation (EU) 2024/1106 of the European Parliament and of the Council of 11 April 2024 amending Regulations (EU) No 1227/2011 and (EU) 2019/942 as regards improving the Union's protection against market manipulation on the wholesale energy market
RES	Renewable energy sources
RF	Regulatory Framework

RI	Research and Innovations
RISIG	REMIT Information Security Implementation Group
RROA	Regulated Return on Assets
S	Incentives
S(E)	Incentives for successful smart grid investments
SAFA	Synchronous Area Framework Agreement for Continental Europe
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SDO	District heating system
SDV	Operation and maintenance costs
SEEI	Costs of network losses
SENG	SOŠKE ELEKTRARNE NOVA GORICA d.o.o.
SEVF	Slovenian Energy Security Forum
SGTF-EG2	Smart Grid Task Force Expert Group 2
SHB	Slovenia, Croatia, Bosnia and Herzegovina (block SHB)
SI-CERT	Slovenian Computer Emergency Response Team
SIPX	Slovenian Price Index
SO GL	System Operation Guideline – Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation
SONDSEE	System operating instructions for the electricity distribution system
SONPO-E	System operating instructions for the electricity transmission system of the Republic of Slovenia, OG of the RS, No. 29/16
SURS / STAT	Statistical Office of the Republic of Slovenia
TEŠ	TERMOELEKTRARNA ŠOŠTANJ d.o.o.
TPP/TE-TOL	Thermoelectric Power Plant
US-CERT	United States Computer Emergency Readiness Team
USEF	Usef Energy – Universal Smart Energy Framework
VOLL	Value of Lost Load
WELMEC	Western European Legal Metrology Cooperation (WELMEC is a body set up to promote European cooperation in the field of legal metrology)
ZGD-1	Companies Act
ZIAG	The Act on infrastructure for alternative fuels and promotion of the transition to alternative fuels in transport
ZOEE	Electricity Supply Act
ZOP	Gas Supply Act
ZOTDS	Act on the heat supply from distribution systems
ZP / NG	Natural Gas
ZSROVE	Act on the promotion of the use of renewable energy sources
ZUOKPOE	Act on Measures for the Management of Crisis Conditions in the Field of Energy Supply
ZURE	Act on Energy Efficiency

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