ENERGY AGENCY
OF THE REPUBLIC OF SERBIA

2022

2022 ENERGY AGENCY ANNUAL REPORT

ENERGY AGENCY
OF THE REPUBLIC OF SERBIA

2022 ENERGY AGENCY ANNUAL REPORT

Serbian Energy Sector Report

*

Annual and Financial Report

Belgrade, May 2023

CONTENTS

INTRODUCTORY REMARKS 0
1. ENERGY DEMAND IN SERBIA 4
2. ELECTRICITY AND NATURAL GAS MARKET IN 2022 6
2.1 LEGAL AND REGULATORY FRAMEWORK 6
2.2 ELECTRICITY MARKET DEVELOPMENT 6
2.3 NATURAL GAS MARKET DEVELOPMENT 8
3. ELECTRICITY 11
3.1 SECTOR STRUCTURE AND CAPACITIES 11
3.1.1 Organisational and ownership structure of the sector 11
3.1.2 Production, transmission and distribution capacities 12
3.1.2.1 Production 12
3.1.2.2 Transmission 14
3.1.2.3 Distribution 14
3.2 CONSUMPTION AND GENERATION 15
3.3 REGULATION OF THE TRANSMISSION SYSTEM OPERATOR 17
3.3.1 Unbundling of the Transmission System Operator 17
3.3.2 Price regulation 18
3.3.2.1 Costs of connection to the system 18
3.3.2.2 Use-of-system charge 19
3.3.2.3 Prices of secondary and tertiary control reserve 20
3.3.2.4 Prices of ancillary services 21
3.3.3 Access to cross-border capacities 21
3.3.3.1 Cross-border capacity allocation and combustion management 21
3.3.3.2 Annual exchange within and across the borders of control areas 24
3.3.3.3 Use of revenue arising from the cross-border capacity allocation 24
3.3.4 Transmitted electricity quantities 25
3.4 REGULATION OF THE DISTRIBUTION SYSTEM OPERATOR 25
3.4.1 Unbundling of DSO 26
3.4.2 Price regulation 27
3.4.2.1 System connection costs 27
3.4.2.2 Use-of-system charges 27
3.4.3 Distributed electricity quantities 29
3.5 CLOSED DISTRIBUTION SYSTEMS 30
3.6 ELECTRICITY MARKET 32
3.6.1 Bilateral electricity market 32
3.6.1.1 Wholesale market 33
3.6.1.2 Retail market 38
3.6.1.2.1 Electricity quantities delivered to final customers 38
3.6.1.2.2 Sale of electricity to final customers 39
3.6.1.2.3 Electricity sale in the regulated market 40
3.6.1.2.4 Electricity sale in the open market 46
3.6.1.2.5 Supplier switching 50
3.6.2 Guarantee of origin 51
3.6.3 Electricity balancing market 51
3.6.4 Organised electricity market 52
3.6.5 Transparency 52
3.6.6 Regional coupling 53
3.7 MONITORING AND REGULATION OF THE QUALITY OF DELIVERY AND SUPPLY 55
3.7.1 Continuity of electricity delivery 55

3.7.1.1 Transmission network continuity of delivery 55
3.7.1.2 Distribution network continuity of delivery 58
3.7.2 Quality of electricity 59
3.7.3 Commercial quality 59
3.7.3.1 Connection, loadshedding and disconnection 59
3.7.3.2 Metering and calculation 60
3.7.3.3 Removal of technical disturbances in delivery 61
3.7.3.4 Customer services 61
3.8 SECURITY OF ELECTRICITY SUPPLY 61
3.8.1 Consumption forecast 61
3.8.2 Generation adequacy/prospects 61
3.8.3 Use of renewable energy sources 62
3.8.4 Construction of new transmission capacities 65
3.8.5 Distribution system operator's investment activities 67
3.8.6 Reduction of losses within the distribution network 68
3.8.7 Smart metering systems 69
4. NATURAL GAS 71
4.1 SECTOR STRUCTURE AND CAPACITIES 71
4.1.1 Organisational and ownership structure 71
4.1.2 Production, transmission, distribution and storage capacities 72
4.1.2.1 Production 72
4.1.2.2 Transmission 72
4.1.2.3 Distribution 75
4.1.2.4 Storage 76
4.2 NATURAL GAS CONSUMPTION AND SUPPLY SOURCES 76
4.3 REGULATION OF THE TRANSMISSION SYSTEM OPERATOR 78
4.3.1 Unbundling of the Transmission System Operator 78
4.3.2 Price regulation 80
4.3.2.1 System connection costs 80
4.3.2.2 Use-of-system charges 80
4.3.2.3 Prices of Non-Standard Services 81
4.3.3 Access to cross-border capacities 81
4.3.3.1 Capacity allocation on interconnection points and congestion management 81
4.3.4 Transmitted natural gas quantities 82
4.3.5 Balancing 82
4.4 REGULATION OF THE DISTRIBUTION SYSTEM OPERATOR 83
4.4.1 Unbundling of Distribution System Operator 83
4.4.2 Price regulation 84
4.4.2.1 System connection costs 84
4.4.2.2 Use-of-System Charges 84
4.4.2.3 Prices of Non-Standarad Services 85
4.4.3 Distributed natural gas quantities 85
4.5 NATURAL GAS MARKET 86
4.5.1 Wholesale market 88
4.5.1.1 Supply of public suppliers 88
4.5.1.2 Regional coupling 88
4.5.2 Retail market 88
4.5.2.1 Sale of natural gas on regulated market 91
4.5.2.2 Supplier switching 97
4.6 MONITORING AND REGULATION OF QUALITY OF DELIVERY AND SUPPLY 97
4.6.1 Continuity of delivery 97
4.6.1.1 Continuity of delivery from transmission systems 97
4.6.1.2 Continuity of delivery from distribution systems 98

4.6.2 Commercial quality 99
4.6.2.1 Connection, disruption and disconnection 99
4.6.2.2 Access to the system 99
4.6.2.3 Metering and billing 100
4.6.2.4 Call center 100
4.7 SECURITY OF NATURAL GAS SUPPLY 100
4.7.1 Natural gas consumption forecast 100
4.7.2 Projects aimed at the increase of security of supply 101
5. CRUDE OIL, OIL DERIVATIVES, BIOFUELS, BIOLIQUIDS, COMPRESSED NATURAL GAS, LIQUIFIED NATURAL GAS AND HYDROGEN 102
5.1 SECTOR STRUCTURE 102
5.1.1 Organisational and ownership structure of the oil sector 102
5.2 PRODUCTION AND TRANSPORT CAPACITIES 103
5.2.1 Production of oil, oil derivatives, biofuels, bioliquids and hydrogen 103
5.2.2 Oil and oil derivatives transport 105
5.3 REGULATION OF ENERGY ENTITY FOR TRANSPORT OF OIL AND OIL DERIVATIVES 106
5.3.1 Unbundling of energy entity for transport of oil and oil derivatives 106
5.3.2 Access to the system for oil and oil derivatives transport 106
5.3.3 Use-of-system charge 107
5.4 OIL, OIL DERIVATIVES, BIOFUELS, BIOLIQUIDS, COMPRESSED NATURAL GAS, LIQUEFIED NATURAL GAS AND HYDROGEN MARKET 107
5.4.1 Wholesale market 109
5.4.2 Retail market 110
6. ACTIVITIES OF GENERAL INTEREST AND CUSTOMERS PROTECTION 113
6.1 ACTIVITIES OF GENERAL INTEREST 113
6.2 CUSTOMER PROTECTION 113
6.2.1 Regulation of price of supply of households and small-scale customers 113
6.2.2 Rights of final customer to access to data on one's own consumption 114
6.2.3 Supplier switch 114
6.2.4 General terms and quality of delivery and supply 115
6.2.5 Settling complaints and assistance in mediation procedure 115
6.2.6 Special modes of protection of most energy-wise vulnerable customers 115
ANNUAL AND FINANCIAL REPORT 120
7. AGENCY ANNUAL REPORT 122
7.1 BASIC DATA ABOUT THE AGENCY 122
7.1.1 Establishment of and the scope of work of the Agency 122
7.1.2 Organisation of the Agency 124
7.1.3 Independence and responsibility 125
7.2 ACTIVITIES OF THE AGENCY IN 2022 127
7.2.1 Licensing energy entities 127
7.2.2 Price regulation 128
7.2.3 Monitoring electricity and natural gas market 130
7.2.4 Deciding upon appeals 133
7.2.5 International activities 134
7.2.5.1 The Athens process and the Energy Community Regulatory Board (ECRB) 134
7.2.5.2 Berlin Process – initiative “Western Balkans 6” (WB6) 139
7.2.5.3 CESEC (Central and South Eastern Europe Gas Connectivity) Initiative 139
7.2.5.4 Participation in energy regulators’ associations 139
7.2.5.5 European integration 140
8. AGENCY’S FINANCIAL REPORT 141

Contents of tables 146
Contents of figures 147
Abbreviations and foreign phrases 149
Conversion factors for energy equivalents 149

INTRODUCTORY REMARKS

In line with the provisions of the Energy Law of the Republic of Serbia ("Official Gazette of RS", No. 145/14, 95/18 other laws and 40/21), the Council president and members of the Energy Agency of the Republic of Serbia are accountable for their work and the work of the Agency to the National Assembly of the Republic of Serbia. They submit the report to the National Assembly once a year. Apart from the annual report and financial report, this document also includes the report on the situation in the energy sector of the Republic of Serbia in areas under the Agency's jurisdiction.

The report on the Serbian energy sector includes the review on the situation and activities in electricity and natural gas markets and partly in oil and oil derivatives market, security of electricity and natural gas supply, activities of general interest and electricity and natural gas customer protection. In terms of its structure and its content, the Report is also in line with the recommendations of the Council of European Energy Regulators – CEER.

The Council of the Energy Agency of the Republic of Serbia was elected on March 22, 2018 on the session of the National Assembly of the Republic of Serbia ("Official Gazette of RS", No. 23/18) upon a vacancy invitation in line with the Energy Law. During 2022, 50 sessions of the Council of the Energy Agency of the Republic of Serbia were held in total (46 ordinary ones and 4 extraordinary ones). In line with the Law, all decisions within the scope of the Agency's work are adopted by the Council of the Agency. During the sessions of the Council of the Energy Agency of the Republic of Serbia, decisions, approvals, certificates, conclusions and other acts in the field of price regulation, energy market establishment and monitoring, license issuance and withdrawal and methods of organisation of the Agency and other issues within the jurisdiction of the Council were adopted. In 2022, the Energy Agency of the Republic of Serbia was fulfilling its obligations arising from the Law which are relevant for the enforcement of the law, and Serbian energy market functioning. By expressing its views, the Agency also played an important role in the work of Energy Community (EnC) institutions and also offered expert support to other national institutions in their activities.

The security of electricity, natural gas and oil derivatives supply in 2022 was on the satisfactory level. Electricity consumption of final customers in 2022 was 0.8% lower than in 2021. Households consumption decreased by 3.6% and the consumption of other customers connected to low voltage increased by 0.8%. Customers connected to medium voltage increased their consumption by 1.3% while the consumption of customers connected to high voltage increased by even 7.5%. The consumption for generation purposes in thermal power plants and hydro power plants decreased by 11.4%. Total power generation in 2022 was by 7.1% lower than in 2021 (with by around 0.6% higher generation in coal-fired thermal power plants, by 67.9% higher generation of combined heat and power production plants and with by 23.3% lower power production in hydro power plants connected to the transmission system due to unfavourable hydrological conditions, with 12.7% less electricity originating from wind power plants connected to the transmission system and with by 2.9% lower power production in power plants connected to the distribution system). In 2022, electricity import was by 2,813 GWh, i.e., 83% higher than the export volume. Natural gas consumption decreased by 3.6% in 2022 in comparison to 2021. Natural gas consumption decreased in district heating companies by 16.9%, increased in households by 3% and decreased by 0.7% in industry and other with other customers. Consumption growth in households indicates that natural gas is a competitive energy source and that the household gasification rate is increasing.

In 2022, out of the total sales scale, in the open market, at market prices, 51.2% of electricity (50.1% in 2021) and 81.3% of natural gas (82.9% in 2021) were sold. Households exercised their right to select their supplier and purchase electricity in the open market to a negligible extent (about 3,700 metering points) and most of them were supplied at regulated prices.

Electricity guaranteed supply prices were modified in September 2022 while electricity transmission and distribution use-of-system charges were not modified in 2022.

The Energy Sector Development Strategy until 2025 forecast electricity consumption of less than 1% annually. In that period, this consumption should be covered by the extension of the lifetime and increased capacities in existing power plants and by the construction of new ones. The third block in TPP Kostolac B is the most significant project which and the realisation of it was initiated. There were no new wind power plants connected to the transmission network during 2022 which is why at the end of the year the installed capacity of wind power plants connected to the transmission system remained the same and amounted to 373 MW. On the other hand, there were 373 small power plants with installed capacity of 254 MW were connected to the distribution network at the end of 2022. In 2022, electricity quantities produced from renewable energy sources connected to the transmission and distribution systems amounted to 10,422 GWh which accounts for 30% of gross power consumption.

The Preliminary National Plan of the Republic of Serbia for Emission Reduction envisaged the operation of some of the oldest thermal units by 2026 where, due to old-fashioned technology, the implementation of measures for the reduction of emission of sulphur and nitrogen oxides was not planned. These units will gradually stop operating and their production will be replaced by the above-mentioned new capacities. Long-term energy stability also requires prudential adjustment of the energy sector of Serbia to global and EU requirements related to the protection of the Planet in line with the results of the UN Climate Change Conference taking national interests into account. In the future, this may have a significant impact on the costs of electricity production in thermal power plants and to its further development.

In line with the approved Act on Exemption of New Natural Gas Interconnector *Gastrans* LLC Novi Sad, the Energy Agency of the Republic of Serbia continuously examined the work of this company in 2022. To this end, the Report on Measures

Taken for the Realisation of Non-Discriminatory Treatment Programme for 2021 which was submitted by the Compliance Officer in April 2022 was analysed and considered although there is no legal obligation to approve this document.

Niš – Sofia gas pipeline is the project which is supported by the EU institutions. In 2019, Energy permit was obtained, expertise control of the feasibility study and preliminary design were completed, construction permit was obtained and the main design was completed. The construction of this gas pipeline was initiated in 2022. It is expected to be completed in December 2023.

Natural gas is the most common energy source in district heating systems which are dominant heating method in urban areas. Relatively low level of gasification of households (around 12.3% of the total number) indicates that there is a potential for a bigger growth in this sector which implies the development of gas infrastructure.

Natural gas prices for public supply for all public suppliers and natural gas distribution use-of-system charges changed in August 2022 while the natural gas transmission and distribution use-of-system charge were not changed. All regulated natural gas prices have been indicated in new units (kWh instead of m^3) since October 2022.

Adequate long-term policy of regulated prices, predictable for both customers and investors is very important for the sustainable development of energy systems which is also the current trend in the EU countries. An obligatory prerequisite for the change in regulated electricity prices for households is an increase in the number of protected socially vulnerable customers because the number of protected customers in 2022 who exercised the right to bill reduction amounted to around 63,000 while the number of them who could exercise this rights amounts to more than 300,000 according to the assessment of competent institutions.

While approving regulated prices, the Council of the Energy Agency of the Republic of Serbia insists on rationalisation in the operations of energy companies and on the acknowledgement of justified costs only. High electricity losses in the distribution network represent one of the highest costs and these are regularly acknowledged by the Agency on the level lower than the actual one, in line with the plan for loss reduction. In 2022, distribution network losses decreased by 0.50% in comparison to 2021 and they amounted to 11.23% of electricity withdrawn into the distribution system which is very high in comparison to the losses justified on the technical ground. It is also necessary to intensify investments in the electricity distribution network, transfer of metering devices and of connection lines and to have more efficient replacement of metering devices.

In 2022, *EMS* JSC continued their activities aiming at system development and strengthening cross-border capacities and participation in coordinated cross-border capacity auctions. In 2022, the scale of trade in the organised market SEEPEX – electricity exchange was decreased by 3%. Activities continued to be taken so as to develop regional electricity market. The integration into the EU market also requires adequate participation of the institutions of the Republic of Serbia (regulatory ones as well) in the relevant EU institutions so as the interests of the country would be protected adequately.

In 2022, indicators of for unplanned interruptions of electricity delivery in the transmission and distribution systems upgraded slightly in comparison to 2021 but the delivery continuity indicators remained on the five-year average level and are worse than the European average.

The collection of data on natural gas delivery quality was organized in 2022 as well and all energy entities provided and submitted required data to the Agency. There were no unplanned interruptions within the transmission systems in 2022 while the greatest number of unplanned interruptions within distribution systems was due to third party actions.

In 2022, 363 files in total were submitted to the Agency. The files mostly referred to the operation and proceedings of energy entities in different fields of their operation. The Agency processed all the received appeals and submitted replies to the file applicants. If necessary, the files were forwarded to competent state bodies for further steps to be taken. The activities of the Agency in terms of market monitoring regarding the treatment of customers and system users by energy entities and of protection of energy customers' rights and interests are expanding.

Council of the Energy Agency of the Republic of Serbia

May 2023

SERBIAN ENERGY SECTOR REPORT

1. ENERGY DEMAND IN SERBIA

This chapter indicates the latest available data on the total consumption of primary and final energy and other energy-related important data (mainly for 2021) and comparisons with the European Union.

Primary energy consumption in Serbia without the Autonomous Province of Kosovo and Metohija (APKM[1]) in 2021 amounted to around 16.23 million tons of oil equivalent (mtoe). It is characteristic of Serbia to have a high share of coal, primarily lignite with low calorific value in the total primary energy (around 43%) which is dominantly used for electricity generation. A great share of local lignite enables a relatively high energy independence of the country, in comparison to other countries and relatively lower and more stable costs of electricity production. On the other hand, the use of lignite in power production increases the negative effect on environment. From the long-term standpoint, this fact also increases the risk of increase in carbon dioxide, i.e. greenhouse gases emission costs.

The energy net import dependence of Serbia recorded 34.8% in 2021, which is lower than in the vast majority of European countries (the European Union 55.5%). The import dependence of Serbia was increased in comparison to the previous year (when it amounted to 30.2%) since the import of all energy sources increased, primarily of electricity, coal and natural gas.

Table 1-1: Energy sector of Serbia (without APKM) – some indicators for 2017 - 2021

	Measurement unit	Year				
		2017	2018	2019	2020	2021
Population number, in the beginning of the year	thousands	7,021	6,983	6,964	6,927	6,647
GDP per capita, per spending power parity	Fixed $ from 2017	15,289	16,035	12,637	18,210	19,831
Primary energy consumption	Mtoe	15.93	15.37	15.42	15.76	16.23
Final energy consumption	Mtoe	8.70	8.47	8.36	8.68	9.26
Import dependence	%	34.4	34.8	35.6	30.2	34.8

Data: RZS, World Bank, EUROSTAT, MRE

Compared to the European Union (Figure 1-1), gross domestic product of Serbia per citizen was calculated in line with the purchasing power parity (which reflects the level of development and standard in a more realistic manner) in 2021 was on the level of 44%, consumption of total primary energy per capita – 75% and final electricity consumption – 79%.

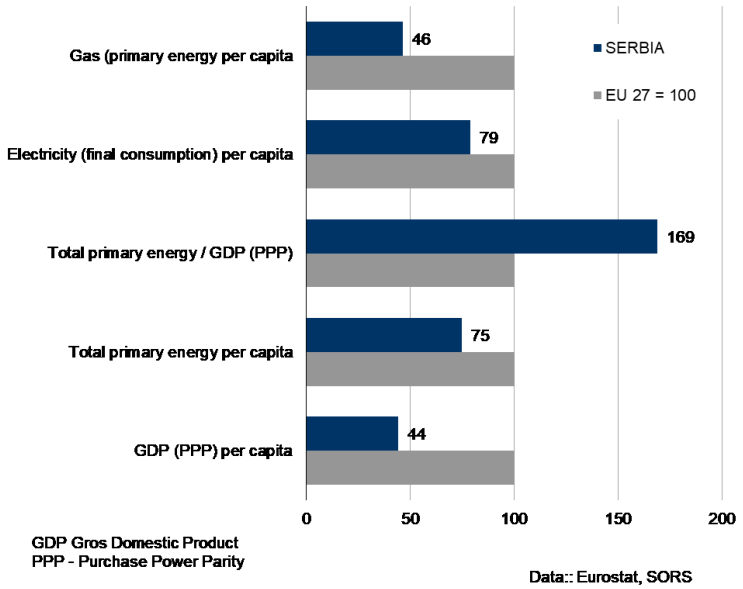

Figure 1-1: Comparative indicators of Serbia and the European Union in 2021

Energy intensity, i.e. total primary energy consumption per domestic product unit (per purchase power parity) was 1.69 times higher than the European average. Greater energy intensity is partly a consequence of inevitable technical losses in the process of transformation of lignite into electricity (two thirds of electricity is produced from lignite). However, it is primarily due to irrationality, i.e. low efficiency in consumption in households, industry, due to low rate of capacity use and old technology, as well as in other sectors. Primary gas consumption per capita amounts to around 46% of the EU and therefore, this sector has a high growth potential.

[1] Treatment of energy data for the territory of the Autonomous Province of Kosovo and Metohija (APKM) in this Report depends on their availability, reliability and necessity to indicate them if they relate to a unique function on the whole territory (unique regulation area), while bearing in mind the United Nations Security Council Resolution No. 1244 of 10/06/1999.

An important difference in the final energy consumption structure in comparison to the European Union lies in the high consumption share in households in Serbia and twice as high energy consumption share in agriculture in the EU. Figure 1-2 indicates the structure of final energy consumption in 2021 in Serbia and in the EU according to EUROSTAT data.

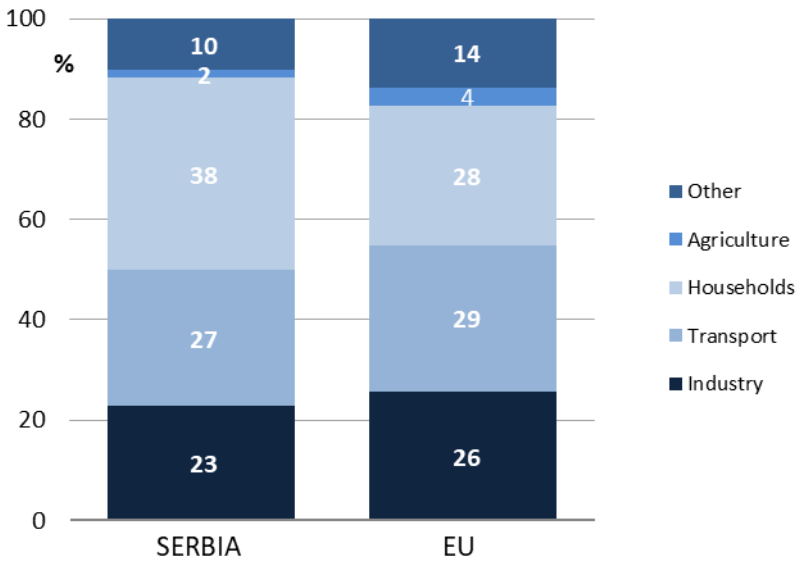

Figure 1-2: Final consumption structure (without non-energy consumption) in 2021

2. ELECTRICITY AND NATURAL GAS MARKET IN 2022

2.1 Legal and regulatory framework

The legal and regulatory framework for the development of electricity and natural gas market in the Republic of Serbia was established by the Energy Law ("Official Gazette of RS", No. 145/14, 95/18 –other law and 40/21, hereafter: the Law), The Law on Renewable Energy Source Use ("Official Gazette of RS", No. 40/21 and 35/23) and Law on Energy Efficiency and Rational Use of Energy ("Official Gazette of RS" No. 40/21) and by-laws which are harmonised with the Third EU Energy Regulations Package.

Electricity and natural gas markets are largely regulated by separate by-laws which acknowledge the specificity of each market, such as general conditions of delivery, electricity market codes, transmission and distribution network codes, methodologies for setting use-of-system charges, price of regulated supply of households and small-scale customers and connection costs. Some regulations which relate to the protection of final customers and their rights are common for electricity and natural gas, as well as the legal acts regulating: switch of suppliers of final customers who have signed a contract on full supply; monitoring technical and commercial indicators and regulating quality of delivery and supply; exercising the right of a final customer to access the data on his/her consumption; proceedings and imposing measures and keeping records of imposed measures; prohibition of market abuse and registration of wholesale players. The regulation on the method, procedure and deadlines for keeping accounting records, implementing unbundling of accounts for each activity and submission of data and documentation for regulation purposes. In addition, the regulatory framework in terms of renewable energy sources and energy efficiency which was defined in 2021 also includes bylaws adopted by the Agency for setting maximum market premia or maximum purchase electricity prices as well as for setting feed-in tariffs for electricity.

In 2022, in line with the given regulations and indicated demand, the Agency adopted and amended regulations from its jurisdiction in order to have more efficient market functioning, better protection of final customers and other market participants.

2.2 Electricity market development

Unbundling of the operator

The unbundling of the electricity transmission and distribution system operator, as natural monopolies, from energy entities performing production and supply as market activities is one of the most important tasks in the market reform of the sector. Equal right of access to network systems is thereby provided for all market participants.

The following entities are appointed to perform electricity transmission and distribution on the territory of the Republic of Serbia:

- *Elektromreža Srbije* JSC, Belgrade (*EMS* JSC), for electricity transmission and transmission system operation, 100% state-owned, corporatized since 2016 and operates as closed joint stock company and
- *Elektrodistribucija Srbije* LLC *Belgrade (Elektrodistribucija Srbije*), for electricity distribution and distribution system operation is 100% state-owned. Until March 31, 2021, this activity was performed by PE *EPS Distribucija* LLC, Belgrade.

EMS JSC is the Transmission System Operator (TSO) since it is licenced for transmission and transmission system operation, while *Elektrodistribucija Srbije* is the Distribution System Operator (DSO) since it holds a licence for distribution and distribution system operation.

The compliance with the conditions regarding the transmission system ownership unbundling model which is prescribed by the Law is established within the certification procedure executed by the Agency. The ruling legal solution implies that only after a legal person is certified as a transmission system operator, the person may submit an application for the issuance of an energy licence for transmission and transmission system operation. In line with the Law, this legal person is appointed as the electricity transmission system operator by the issuance of the licence.

In line with the certification procedure prescribed by the Law, *EMS* JSC was awarded with the final certificate as the electricity transmission system operator issued by the adoption of a Decision of the Agency Council following the preliminary certification and the Opinion of the Energy Community Secretariat.

Elektrodistribucija Srbije was awarded with the licence for distribution and distribution system operation and they perform this activity since April 1, 2021.

EMS JSC and *Elektrodistribucija Srbije* became the owners of the system within which they perform their activities. *EMS* JSC and *Elektrodistribucija Srbije* proved within the certification procedure and licence issuance procedure, i.e. licence issuance that there is a legal ground for them to use power facilities which serve for this energy activity.

Electricity consumption

In 2022, 33.11 TWh of electricity were produced in Serbia, while gross electricity consumption amounted to 34.79 TWh. Final customers consumption amounted to 30.24 TWh, while the remaining quantities were used for the power plants

operations, pumping within the pumped-storage hydro power plant and pumping facility and for recovery of electricity losses in electricity transmission and distribution networks.

According to the data provided by electricity suppliers, 6.2 TWh were imported in 2022 which is by 0.8 TWh more than last year. 3.4 TWh were exported which is by 1.4 TWh less than in 2021. As a consequence of an accident in the biggest thermal power plant in the system at the end of 2021 and insufficient quantities of good-quality coal, the import was the highest in the first quarter of 2022. The export was extensive in the last quarter of the year due to favourable hydrological circumstances and mild winter.

The highest daily gross consumption in Serbia without APKM of 130179 MWh was reached on January 25, 2022, while the maximum hourly load amounted to 5,935 MW on the same day at 10 a.m.

Wholesale

In 2022, suppliers mainly traded between themselves in the wholesale electricity market because there are no big independent producers who would offer electricity since big wind parks as privileged producers sell electricity to PE *EPS* which is obliged to purchase this energy at feed-in tariffs as the guaranteed supplier. The suppliers' activity in the open market is the most intensive in the field of cross-border exchange, mostly with the purpose of transit via Serbia which is dominant due to central geographic position of the power system of Serbia in the region. In 2022, it amounted to around 14.7 TWh. The right to nominate working schedules based on a relevant contract signed with *EMS* JSC in 2022 was awarded to 66 electricity market players. There were 44 active market players and 4 suppliers dealing with final customers supply in the open market.

The Republic of Serbia borders eight countries and considerable electricity quantities are transferred from north-east to south-west which is why there are combustions on cross-border overhead lines and why new overhead lines are planned to be constructed with the most important project which involves the plan to connect eastern and western Europe over the territory of Serbia by the construction of 400 kV line (TransBalkans Corridor project which was initiated by the construction of a section Pančevo 2 – Rešica which was completed up to the border with Romania).

Organised day-ahead market

Organised day-ahead market/power exchange in Serbia – *SEEPEX a.d.* (JSC) Beograd (South-eastern European power exchange) was established on the basis of partnership between *EMS* JSC and EPEX SPOT – France as a joint stock company with the majority ownership of the Serbian side. It is licenced for organized electricity market operation. There were 28 participants registered in 2022 on an organized day-ahead electricity market/power exchange which is four participants more than in 2021. 23 participants were actively involved in the trade which is two participants more than last year.

The total electricity quantity traded in 2022 on SEEPEX amounted to 6,410 GWh which is around 200 GWh more than in 2020. In 2022, the greatest monthly scale of trade in the exchange amounted to 294,352 MWh was recorded in May, while the daily maximum was recorded on April 24 with the trade scale of 15,849 MWh. The lowest trade scale was recorded in October and it amounted to 230,000 MWh. The highest hourly price was reached on August 30 at 8 p.m. and it amounted to 889.52 €/MWh. Average basic price on the annual level amounted to 272.9 €/MWh.

The trade scale and the growth of the number of registered and active SEEPEX members increases the liquidity of the exchange and thereby facilitates the establishment of a referent wholesale price both in Serbia and in the region.

Retail

The Law enabled all final customers in Serbia to purchase electricity in the open market. Only households and small customers are entitled to guaranteed supply, i.e. supply at regulated prices. 49.9% of final customers' consumption is supplied at regulated prices to which households and small customers' are entitled.

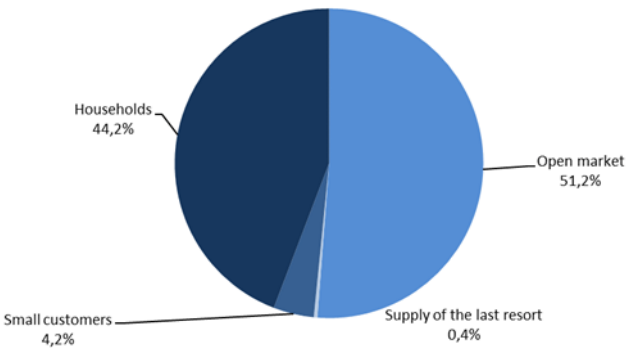

Figure 2-1: Electricity sales in the open and regulated markets in 2022

Only those customers who are not entitled to guaranteed supply purchase electricity in the open market and 51.2% of electricity consumed by final customers in total was sold during 2022. Out of the amount, 0.4% of electricity was consumed within the supply of the last resort regime by customers who failed to select a supplier and who used their legal right to the supply of the last resort.

At the end of 2022, there were 66 energy entities licenced for electricity supply in the open market. Out of the number, only 4 were active. PE *EPS* is still the dominant supplier in the open market with the share of 99.84% of electricity sold to final customers in the open market and 96.92% of the total final customers' consumption (both in the open and regulated markets).

In 2022, a supplier was switched on 13.7 thousand metering points (0.37% of the total number of metering points) with consumption of 320.7 GWh which amounts to 1.07% of the total final customers' consumption.

Security of supply

In 2022, the security of supply was on the satisfactory level. Investments within several years into revitalization and modernisation of production, transmission and partly distribution capacities increase the reliability and efficiency of the power system operations.

In 2022, in terms of the transmission system, quality indicators of electricity delivery continuity were worse than during the previous year as well as in case of the distribution system, the indicators were slightly better but they remained on the five-year average level.

The Strategy of the Energy Sector Development of the Republic of Serbia until 2025 with forecast until 2030 envisages average increase in electricity consumption of below 1% on the annual level. Considering the age and efficiency of existing production capacities and the fact than some of them will stop operating, it is necessary to construction new capacities. In 2022, the combined heat and power plant Pančevo of 196 MW in condensed regime (the investors are *Naftna industrija Srbije a.d*. and Gasprom energoholding, Russia) commenced its operation. The construction of a new thermal clock B3 in TPP Kostolac B with 350 MW capacity was continued as well. In 2022, drafting a new energy sector development strategy and an integrated climate plan was initiated and these documents will envisage considerable construction of capacities based on renewable energy sources so as the indicated goals for the increase of the renewables share could be met to meet the electricity demand. There were no new generation capacities connected to the transmission system during 2022 while there were new 7 MW (from renewable and conventional sources) connected to the distribution system. At the end of 2022, there were 373 small power plants with total installed capacity of 254 MW connected to the distribution system.

2.3 Natural gas market development

Unbundling of the operator

In 2022, natural gas transmission was performed by three energy entities on the territory of Serbia: *Transportgas d.o.o*., Novi Sad, *Yugorosgaz-Transport*, LLC Niš and *Gastrans*, LLC, Novi Sad. *Gastrans,* LLC started operating as a new transmission system operator in Serbia on 01/01/2021.

With the consent of the Government of the Republic of Serbia, PE *Srbijagas* established companies *Transportgas Srbija* LLC and *Distribucijagas* Srbija LLC which are registered in the company register as active companies. By the Conclusion of December 23, 2016, the Government of the Republic of Serbia enabled PE *Srbijagas* to continue performing the activity of general interest – transmission and transmission system operation, either independently or through the company *Transportgas Srbija* LLC until the licence is obtained. The Government also recommended to *Transportgas Srbija* LLC to take all necessary activities meant to provide the licence as soon as possible. At the end of 2019, *Transportgas Srbija* LLC started performing some of its activities as well as during most of 2020 which is why natural gas transmission was still performed by its founder PE *Srbijagas* in that period. Since October 2020, transmission system operator *Transportgas Srbija* LLC started fully performing natural gas transmission and transmission system operation but they did not obtain the licence for the performance of this activity in 2022 either. *Distribucijagas* Srbija LLC has not started operating in 2022.

In November 2018, *Transportgas Srbija* LLC submitted a certification application in line with an independent transmission operator model. In February 2019, the Agency denied this application since this company did not submit the prescribed documentation and did not prove the compliance with the prescribed certification conditions within the legal deadline. In May 2019, *Transportgas Srbija* LLC refiled the certification application in line with ITO model, but this application was denied by the Agency in September 2019 for the same reasons. In 2021, upon the request of *Transportgas Srbija* LLC for certification in line with independent system operator model, the Council of the Agency adopted a decision No. 311.01-1/2021-C-I of March 3, 2022 on the suspension of the procedure due to the withdrawal of the file applicant.

Yugorosgaz-Transport, LLC *Niš* was certified as an independent system operator by the decision of the Agency Council from June 2017 with an obligation to harmonise its organization and operation in a manner providing for the compliance with the conditions related to the independence and an obligation to submit the compliance programme to the Agency as well as an evidence on the procurement of natural gas for loss recovery purposes. The deadline for the compliance with the obligation was one year long and, in case of failure, the certificate would have been revoked. From all the above given conditions, the first condition is beyond the jurisdiction of the Agency and the compliance with it depends exclusively from competent state bodies. By the Decision of the Energy Agency Council, in July 2018, *Yugorosgaz-Transport*, LLC *Niš* obtained a one-year extension of the deadline in order to comply with the certification conditions in line with independent system operator model with an obligation to inform the Agency twice a month on the activities taken to that end. Since

Yugorosgaz-Transport, LLC *Niš* did not submit all the evidence on the compliance with the conditions prescribed by the Final Certification Decision until the end of the given deadline, in July 2019, the Agency Council adopted a decision on the revocation of the certificate from *Yugorosgaz-Transport*, LLC *Niš*. In 2022, *Yugorosgaz-Transport*, LLC did not file an application for certification either.

Acting in line with the Energy Law and with the Decision of the Energy Agency of the Republic of Serbia on the Exemption of New Natural Gas Interconnector, in June 2019, *Gastrans d.o.o.* (LLC) *Novi Sad* filed a certification application. In August 2019, by the Preliminary Decision, the Agency Council certified *Gastrans d.o.o.* (ad hoc ITO model) with conditions prescribed, with an obligation to submit all occupancy permits or to register ownership rights over transmission system facilities as well as to submit evidence proving its independent operation and independent operation over the constructed transmission system. The deadline for the compliance with the prescribed conditions was six months. Otherwise, the certificate would be revoked. On December 22, 2019, the competent body in line with obligations arising from ratified international treaties (Energy Community Secretariat) submitted its Opinion on the Preliminary Decision on Certification of *Gastrans d.o.o.* Following this, the Council of the Agency adopted the final decision thereby issuing a certificate to *Gastrans d.o.o*. as to an independent natural gas transmission operator within legal deadline on February 21, 2020. Basically, Preliminary Decision of August 2019 was confirmed by this final decision and the same obligation prescribed in the Preliminary Decision was established for *Gastrans* d.o.o in the final decision. In March 2022, *Gastrans* LLC submitted evidence to the Agency based on which the Agency adopted a decision confirming that *Gastrans* LLC complies with the certification requirements set in the act of the Agency of February 21, 2020.

In 2022, gross natural gas consumption amounted to 28,208 GWh, by 3.7% lower than in 2021. The consumption in industry decreased slightly by 0.3%, in district heating companies by 16.8% due to warmer winter and it increased in households by 2.9%. Local production covered only 7.4% of the natural gas demand which is less than 7.9% which was the level in 2021, while the remaining gas quantities were provided from import.

Wholesale

Wholesale was dealt with only by two companies as natural gas traders which are licenced for natural gas supply - PE *Srbijagas* and natural gas producer *Naftna industrija Srbije a.d.* ((Petroleum Industry of Serbia) JSC, hereafter: NIS) as well as one supplier of public suppliers which sold natural gas to public suppliers. The fact that the transmission system operator *Transportgas Srbija* still does not enforce Transmission Network Code, which regulates the access to cross-border capacities based on non-discrimination and transparency principles, represents a significant constraint for wholesale market. Therefore, capacity allocation in line with the Transmission Network Code was not realised even in 2022. Activation of the new direction of supply from Bulgaria via the gas pipeline which is operated by the transmission system operator *Gastrans* LLC should enable the diversification of the source of supply. As of 01/01/2021, this gas pipeline accounted for the transmission of the natural gas meant to cover the demand in Serbia and only after the connection with the transmission system of Hungary, this gas pipeline became fully operable as of October 1, 2021 which is the moment when natural gas started also being transmitted from Bulgaria for the purpose of natural gas transit with Bulgaria up to the border with Hungary. In 2022, this gas pipeline was used by system users who concluded long-term contracts as well as the users with short-term capacity allocation.

The Law prescribes that the Government of the Republic of Serbia appoints the supplier of public suppliers until a competitive market is established. The supplier of public suppliers has to offer natural gas to all public suppliers (including the one within the same legal entity as the supplier itself) under the same conditions and at the same price. In 2022, PE *Srbijagas* was the supplier of public suppliers.

Retail

Total final customers' natural gas consumption to 26,183 GWh. In addition, NIS consumed 2,019 GWh from their own production quantities and, therefore, these quantities were not subject to trade in the Serbian natural gas market in 2022. There were 23 suppliers in the open market (out of 61 licensed suppliers) who dealt with retail, i.e. with the supply of final customers in 2021 while there were 31 public suppliers who also acted as natural gas distributers. Trade in the open market was dominant in the retail sphere. The natural gas sale in the open and regulated markets (households and small-scale customers are entitled to regulated prices) is indicated in Figure 2-2 and it does not include natural gas volumes produced by *NIS* to cover their own demand.

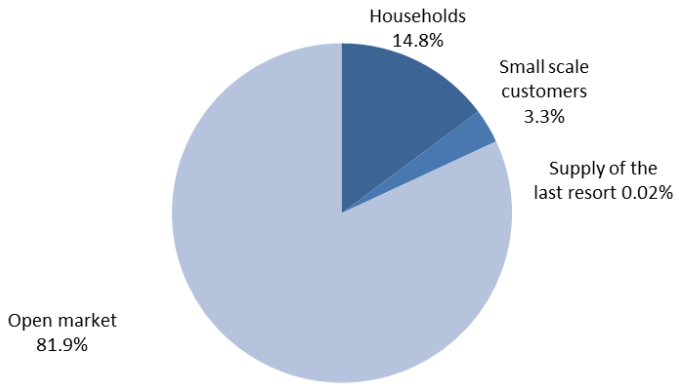

Figure 2-2: Sale of natural gas in the open and regulated markets in 2022

In 2022, around 81.9% of the total natural gas quantities which were sold to final customers were sold in the open market. The Law prescribed that the final customer who is not entitled to regulated supply can be supplied temporarily by the supplier of the last resort, if a customer loses his supplier. The Government appoints the supplier of the last resort, and, in case of 2022, the supplier of the last resort was PE *Srbijagas*. In 2022, the supply of the last resort was exercised by 1 customer with 4.1 GWh delivered to them in total, i.e. 0.02% of the total natural gas consumption in the market (without *NIS* consumption from its own production).

In 2022, the switching of supplier occurred only with 7 out of 31 distribution systems, on 20 metering points in total, with the consumption of 23.6 GWh, which amounts to 0.09% of natural gas quantities consumed in total in the market (without *NIS* consumption from its own production).

Households and small customers (with annual natural gas consumption of up to 100,000 m³ with all their facilities connected to the natural gas distribution system) are entitled to be supplied by the public supplier at regulated prices if they do not select a supplier in the open market. Households and small customers have a small share in the final consumption of only 4,730 GWh i.e. around 18.1% of the total gas quantities consumed in the market (without *NIS* consumption from its own production).

Security of supply

In 2022, the security of natural gas supply was on a satisfactory level. There were sufficient quantities of natural gas to cover the whole demand of customers.

Efforts are made in Serbia in order to provide alternative supply directions. Since 2021, via the commissioning of the interconnector from the Bulgarian-Serbian border to the Serbian-Hungarian border, the security of supply was increased since the infrastructure supply standard N-1 in the Republic of Serbia was complied with since it increased from the level of 33.8% to 114%.

Based on the Agreement on Construction of Gas Pipeline Nis – Dimitrovgrad – Sofija, the construction of this interconnector which will increase the security of supply additionally was continued in 2022. This gas pipeline is expected to become operable as of December 1, 2023 and its capacity amounts to 1.8 billion m^3 of natural gas annually.

In addition, so as to increase the security of supply, it would be useful to connect with gas pipelines in other neighbouring countries, first of all, with Romania and Croatia since these countries have a developed gas infrastructure and additional options for natural gas procurement.

3. ELECTRICITY

3.1 Sector structure and capacities

3.1.1 Organisational and ownership structure of the sector

Since the adoption of the first Energy Law ("Official Gazette of RS", No. 84/04) which established basic principles for the development of electricity and natural gas markets, the organisational structure of the power sector has been constantly harmonized with the needs of the electricity market development in line with the principles of non-discrimination, efficient competition and transparency. The transformation was initiated in 2005 by unbundling a joint vertically-integrated PE *EPS* which included: electricity production, transmission, distribution and trade into a separate company PE *Elektromreža Srbije* (which was corporatized in 2016 and has been functioning as a closed joint stock company – *EMS AD*) which was established for electricity transmission and into a vertically-integrated PE *EPS* which was established for electricity production, wholesale supply and retail supply (of final customers). On July 14, 2015, *EMS* JSC established *SEEPEX* JSC Belgrade – power exchange. It was established on the basis of partnership with EPEX SPOT. According to the Energy Law, SEEPEX has an obligation to organise and administer organised electricity market and to connect it with organised electricity markets of other countries.

The structure of the power sector at the end of 2022 is indicated in Figure 3-1.

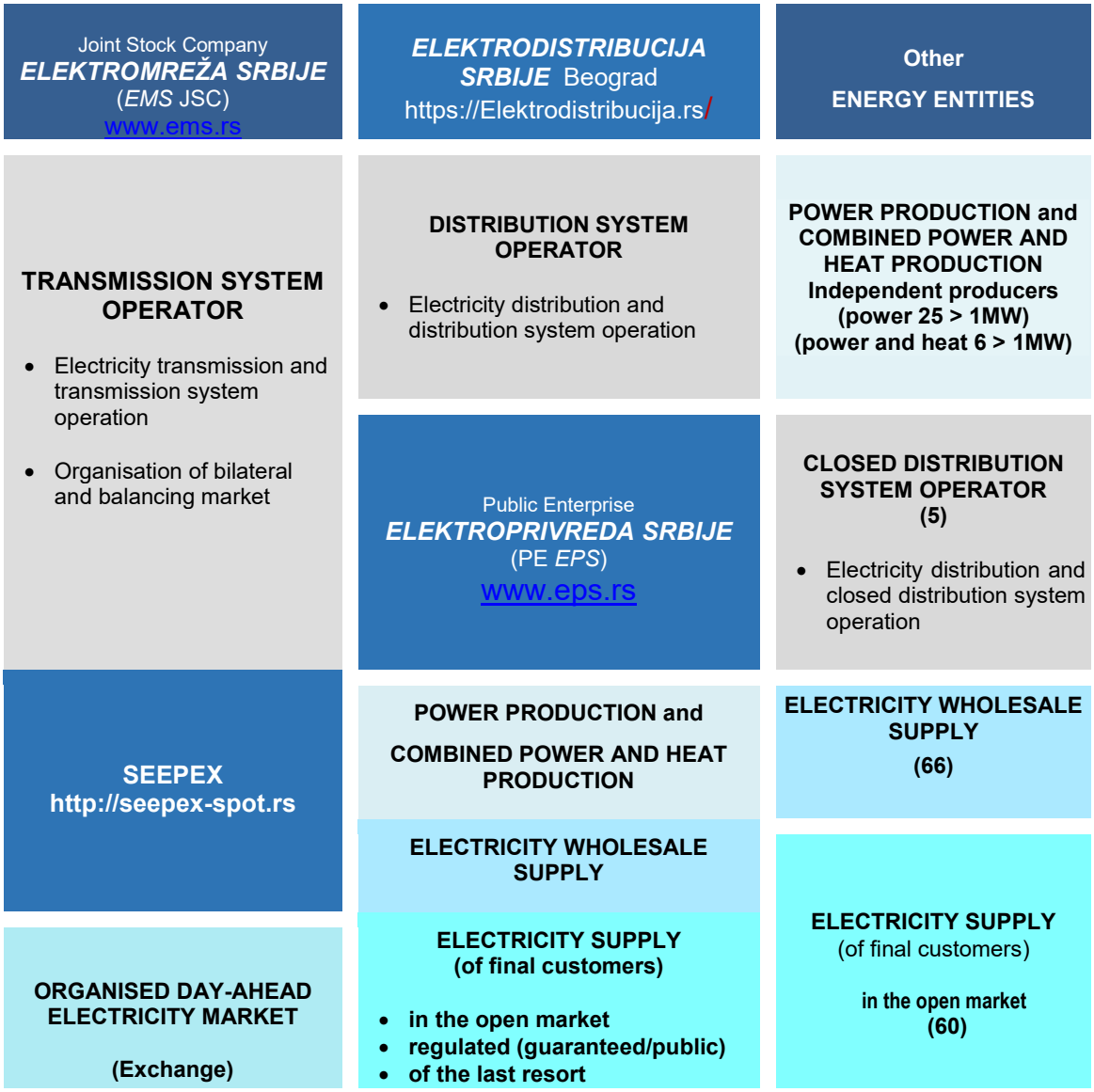

Figure 3-1: Organisational structure of the power sector at the end of 2022

Public Enterprise PE *EPS* and the joint stock company *EMS* JSC are 100% owned by the Republic of Serbia.

PE *EPS* performs the following activities: power production and combined power and heat production, electricity wholesale and retail supply. As of 2021, PE *EPS* does not perform electricity distribution any more. PE *EPS* is the biggest producer (90.9% of the total installed capacity in Serbia) and it is the dominant electricity market player. Apart from selling and purchasing in the open market, PE *EPS* is also appointed as the supplier of the last resort and the guaranteed supplier of households and small customers it supplies at regulated prices. Out of total 30.2 TWh of final customers' consumption, PE *EPS* sells 99.9% of electricity (all under regulated supply regime and over 99.8% in the open market without consumption within vertically integrated companies).

In partnership with EPEX SPOT, France, *EMS* JSC established an organised day-ahead electricity market (exchange) SEEPEX (*EMS* JSC holds 75% of the shares while EPEX SPOT holds 25%).

In line with the Law, following the receipt of an opinion of the Agency, the Government of the Republic of Serbia appointed SEEPEX JSC as the Nominated Electricity Market Operator (NEMO) in June 2022. The NEMO is appointed in the Republic of Serbia in order to implement the coupling of the day-ahead and intraday organized electricity market with neighbouring electricity markets.

In December 2022, SEEPEX JSC power exchange and BSP Southpool corporatively merged by establishing Alpine-Adriatic Danube Power Exchange – ADEX as the first regional power exchange aiming at the expansion of operation to the Central and Southeast Europe. The founders of "ADEX" are the following: transmission system operator in Slovenia (ELES), transmission system operator in the Republic of Serbia (EMS) and the exchange partner EPEX SPOT. The headquarters of "ADEX" are in Ljubljana with offices both in Belgrade and in Ljubljana.

In 2022, distribution and distribution system operation on the whole territory of the Republic of Serbia was performed by the distribution system operator "*Elektrodistribucija* Srbije" LLC Beograd (DSO) which used to operate as *EPS* Distribucija LLC within PE *EPS* prior to this (until 2020). At the end of 2020, the process of harmonization of the operation of the company with the Law was completed by transferring ownership shares of PE *EPS* within "*EPS* Distribucija LLC Beograd" to the Republic of Serbia. Thereby, the conditions for this company, which is the distribution system operator, to operate independently from the vertically integrated company PE *EPS* under a new business title "*Elektrodistribucija* Srbije" LLC Beograd were created.

The independence of the DSO is extremely important since only in such a manner a DSO can offer the distribution service to all market participants in a transparent way under the same conditions without favouring PE *EPS* which performs production and/or supply and without favouring companies associated with it.

At the end of 2022, 373 small power plants with total capacity of 254 MW (out of the number, 18 of them are owned by PE *EPS* with the capacity of 39 MW and 355 of them are owned by independent power producers with the capacity of 215 MW) were connected to the distribution system. In addition to PE *EPS*, the licence for power production was held by additional 33 energy entities while 9 energy entities (PE *EPS* included) with available production facilities of capacity exceeding 1MW held the licence for combined power and heat production.

At the end of 2022, energy licence for electricity distribution and for closed distribution system operation were held by six energy entities – "BELGRADE AIRPORT" d.o.o. Beograd, Company for Exploration, Production, Processing and Trade in Oil and Oil Derivatives and Exploration and Production of Natural Gas *Naftna Industrija Srbije* (Petroleum Industry of Serbia), JSC, Novi Sad and "Limited Liability Company for Energy and Fluids Production and Distribution Service Provision "ENERGETIKA", Kragujevac and "*ELIXIR PRAHOVO*" INDUSTRY OF CHEMICAL PRODUCTS LLC PRAHOVO, EI – Company for Energy Production and Distribution and Services *ELMAG d.o.o.* Niš and Limited Liability Company for construction, maintenance and services "*MIND REAL ESTATE*" Lužnice. There is a great number of electricity suppliers licenced in Serbia. At the end of 2022, there were 66 licenced suppliers entitled to deal in wholesale and retail supply and 74 suppliers entitled only for wholesale trade. Out of the number, 44 of them were active, while there were 4 suppliers who dealt in final customers' supply in the open market.

Since 1999, a part of the power system of Serbia which is located on the territory of the Autonomous Province of Kosovo and Metohija (APKM) is under the administration of UNMIK in line with the United Nations Security Council Regulation 1244.

3.1.2 Production, transmission and distribution capacities

3.1.2.1 Production

The total net installed capacity of power plants in Serbia amounts to 8,522, without power plants on the territory of APKM, including power plants of independent producers (Table 3-1). Within PE *EPS*, which is the dominant electricity producer, 4,429 MW are installed in lignite-fuelled thermal power plants, 2,941 in hydro power plants, 330 MW in combined heat and power plants fuelled by natural gas or mazoute and 39 MW in 18 small hydro power plants connected to the distribution system. Lignite for all thermal power plants is produced in open pit mines within PE *EPS*.

Apart from the production capacities of PE *EPS*, production capacities of independent producers are connected to the transmission and distribution networks. During 2022, no new power plants were connected to the transmission network. Therefore, at the end of the year, the total installed capacity of independent producers connected to the transmission network remained the same as in 2021, i.e. it amounted to 373 MW in wind pharms and 196 MW in combined heat and power

production plants. At the end of 2022, 355 small power plants which are owned by other legal and natural persons with total installed capacity of 214 MW were connected to the distribution network.

Table 3-1: Electricity production capacities in 2022 (without APKM)

Technology	Installed capacity MW
Hydro power plants	2,941
Thermal power plants (coal)	4,429
Combined heat and power plants (gas, fuel oil)	526
Gas fired power plants	-
Nuclear power plants	-
Wind power plants – independent producers	373
Other sources – small PE *EPS* power plants	39
Small power plants – independent producers	214
TOTAL INSTALLED CAPACITY	**8,522**

The structure of production capacities, excluding the power plants on the territory of APKM is given in Figure 3-2. The share of the capacities within thermal power plants (TPP) and combined heat and power plants (CHPs) amounts to 58.1%, while the hydro power plants (HPPs) connected to the transmission system cover 34% (one of them is a pumped-storage HPP with 2x307 MW capacity, which is very important for system operation, apart from covering an important energy share). The share of wind power plants connected to the transmission system amounts to 4.4%. 3.0% of installed capacities are covered by small power plants connected to the distribution system.

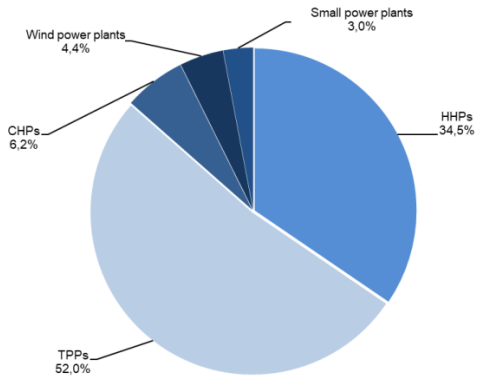

Figure 3-2: Production capacity structure in 2022 (without APKM)

At the end of 2022, apart from PE *EPS* which is the biggest and the dominant electricity producer, the licence for the production of electricity is also held by 33 energy entities, 34 entities in total, while the licence for combined heat and power production is also held by 8 energy entities (independent electricity producers), 9 in total, which own small production facilities connected to the distribution network.

Table 3-2: Power production capacities connected to the transmission system in 2022 (without APKM)

Power plant type	Number of power plants	Installed capacity MW	Delivered to network MWh
Hydro power plants	14	2,941	8,893,157
Run-of-river hydro power plants	5	1,980	7,732,353
Storage hydro power plants	8	347	534,916
Pumped-storage hydro power plants	1	614	625,888
Thermal power plants	7	4,429	21,413,202
CHPs	3	526	1,058,351
Wind power plants	4	373	876,007
Solar power plants	0	0	0
Other power plants	0	0	0
TOTAL	**28**	**8,269**	**32,240,717**

Table 3-3: Power production capacities connected to the distribution system in 2022 (without APKM)

Power plant type	Number of power plants	Installed capacity MW	Delivered to network MWh
Small hydro power plants	156	128	326,773
Biomass-fired power plants	1	2	20,633
Biogas-fired power plants	41	43	229,432
Power plants fired by landfill gas and gas from plants for treatment of public utility waste water	0	0	0
Wind-fired power plants	4	25	61,276
Solar power plants	154	13	14,630
Solar power plants on ground	18	7	8,658
Solar power plants on facilities	136	7	5,972
Geothermal energy-fired power plants	0	0	0
Combined production fossil fuels-fired power plants	15	39	210,323
Waste-fired power plants	0	0	0
Other power plants	2	3	8,792
TOTAL	**373**	**254**	**871,858**

Out of all licenced independent producers, the biggest ones include "*ELECTRAWINDS K-WIND" d.o.o.* with a wind park *Kovačica* of 104.5 MW, "*MK-FINTEL WIND" AD* with wind park *Košava* of 69 MW, "Elicio Ali VE*" d*.o.o. with a wind park *Alibunar* of 42 MW, "*Naftna industrija Srbije*" JSC with 11.94 MW in 9 facilities, "*Vetropark Kula d.o.o."* (Windfarm Kula) with 9.9 MW, "*Novosadska toplana"* (Novi Sad District Heating Company) with combined production of 9.98 MW and "*ELICIO MALI WF" d.o.o.* with a wind power plant in *Alibunar* of 8 MW.

3.1.2.2 Transmission

The transmission system, without a part of it on APKM, includes 36 transformer stations (TS) of voltage level of 400/x and 220/x kV/kV with total installed capacity of 16,985 MVA (28 of them with total installed capacity of 15,931 MVA owned by *EMS* JSC), 23 switching stations of voltage 400, 220 and 110 kV (15 of them owned by *EMS* JSC) and lines of voltage 400, 220 and 110 kV with total length of 10,175 km (10,006 km of lines owned by *EMS* JSC). In comparison to 2021, capacities within the transmission system of *EMS* JSC were increased by around 400 MVA. A transformer was installed in TS Kraljevo 3 and thus the capacity was increased on the 400 kV level. In addition, four TSs with voltage level of 110/x kV/kV are owned by *EMS* AD: TS 110/35 kV/kV Beograd 4, which will become a part of TS 220/110/35 kV/kV/kV Beograd 17 within the reconstruction process, 400/220 kV/kV in Obrenovac, TS 110/35 kV/kV Sevojno and TS 110/6 kV/kV Obrenovac which serves to cover its own demand and the demand of TENT A thermal power plant.

The process of transfer of overhead lines and cables of 110 kV between *EMS* JSC and PE *EPS* which was initiated in line with the Law in 2013 is still ongoing. The procedure of taking over remaining overhead lines and cables of 110 kV voltage level which are still owned by DSO is continued and it is expected to be completed in 2023.

The transmission system of *EMS* JSC is connected with neighbouring power systems via 23 interconnectors of 400, 220 and 110 kV and 22 of them are active.

Table 3-4: Data on the transmission system of *EMS* JSC at the end of 2022 (without APKM)

Transmission system element	Unit	
Network length, total	km	9,952
400 kV – network length	km	1,871
220 kV – network length	km	1,769
110 kV – network length	km	6,312
Number of transformers (including TS 110/x kV/kV owned by *EMS* JSC)		76
Number of transformer stations and switchgear plants (including 110 kV voltage level - owned by *EMS* JSC)		47
Number of (active) interconnections		23 (22)

3.1.2.3 Distribution

The independent distribution system operator *Elektrodistribucija Srbije* LLC performed electricity distribution and distribution system operation on the territory of the Republic of Serbia without APKM since April 1, 2021 when it was established. The distribution system, without the territory of APKM, includes 37,947 transformer stations with total installed capacity of 35,168 MVA and 172,789 km of distribution lines of voltage level of 110, 35, 20, 10 and 0.4 kV, via which electricity is distributed to final customers.

There are 36,485 transformer stations owned by DSO with total installed capacity of 33,641 MVA and 166,176 km of distribution lines of all voltage levels. Their structure is indicated in Table 3-5. In line with the legal obligation, transformer stations of 110/x kV/kV were taken over from *EMS* JSC. As far as the lines of 110 kV, there is only the remaining overhead lines and cables to be transferred to *EMS* JSC.

Table 3-5: Length of lines owned by DSO at the end of 2022 (without APKM)

km

Voltage level	Data for distribution areas					Total DSO
	Novi Sad	Beograd	Kraljevo	Niš	Kragujevac	
110 kV	0.00	5.8	0.0	0.0	2.0	8
35 kV	1,032.20	979.3	2,347.0	1,821.3	775.0	6,955
20 kV	9,031.50	0.0	1,758.8	0.0	0.0	10,790
10 kV	390.10	7,082.6	12,812.3	9,631.8	4,262.1	34,179
0.4 kV	14,289.40	17,988.1	48,262.2	21,257.3	12,447.1	114,244
Total	**24,743**	**26,056**	**65,180**	**32,710**	**17,486**	**166,176**

3.2 Consumption and generation

Final customers' electricity consumption (without power plants' demand for production purposes) amounted to 30.2 tWh which is by 0.3 TWh lower than in 2021.

In the last ten years, as the dominant producer, PE *EPS* reached maximum power production level of 37.5 TWh in 2013. In 2022, in PE *EPS* production facilities, around 31 TWh of power were produced which is by even 3 TWh less than in 2021. Production in coal-fired thermal power plants amounted to 21.43 TWh which is by 0.11 TWh, i.e. 0.6 % lower than last year. Generation in hydro power plants was by 2.7 TW, i.e. 23% lower than in 2021. Combined heat and power production plants of PE *EPS* operated both during wintertime and in April, June, September and October 2022 and they produced 753 GWh which is by 20% more electricity than in 2021. 18 small power plant owned by PE *EPS* were connected to the distribution network and they produced 71 GWh in total which is by 10% less than in 2021.

Generation of other producers has been increasing year by year. Other producers include small power plants connected to the distribution network and there were 355 of them in 2022 where around 801 GWh of power were produced in total. Along with small power plants connected to the distribution network, other producers also include four wind power plants connected to the transmission network and the combined heat and power production plant Pančevo, also connected to the transmission network. These four wind power plants produced around 876 GWh of power which is by around 12% less than in 2021. Combined heat and power plant Pančevo started operating in 2021 and produced around 305 GWh in 2022.

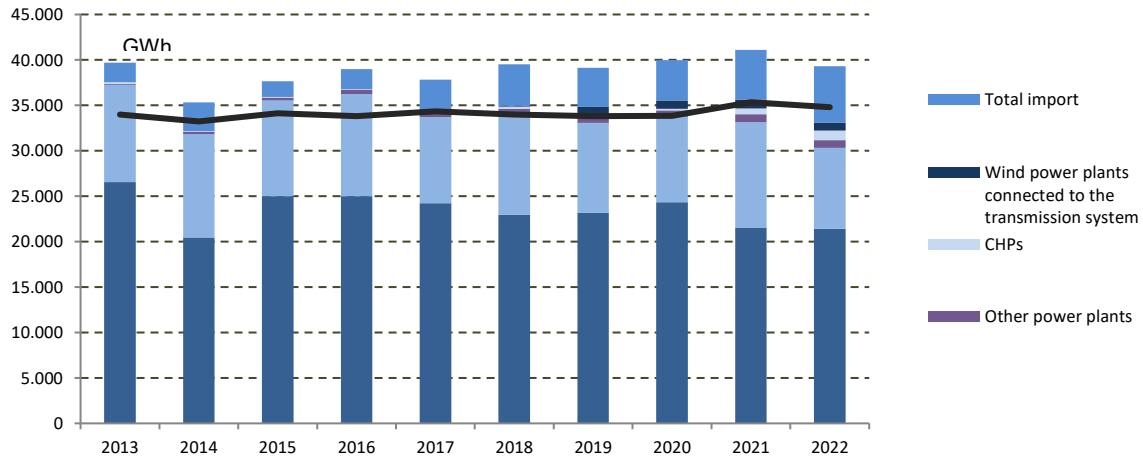

Figure 3-3: Production, import and gross consumption in Serbia in 2022 (without APKM)

In 2022, 33,112 GWh were produced in total in power plants in the Republic of Serbia. Out of that number, coal-fired thermal power plants produced 64.7%, hydro power plants connected to the transmission system 26.9%, combined heat and power plants 3.2%, wind power plants connected to the transmission system – 2.6% while other power plants (small power plants connected to the distribution system) produced 2.6% of the total electricity production.

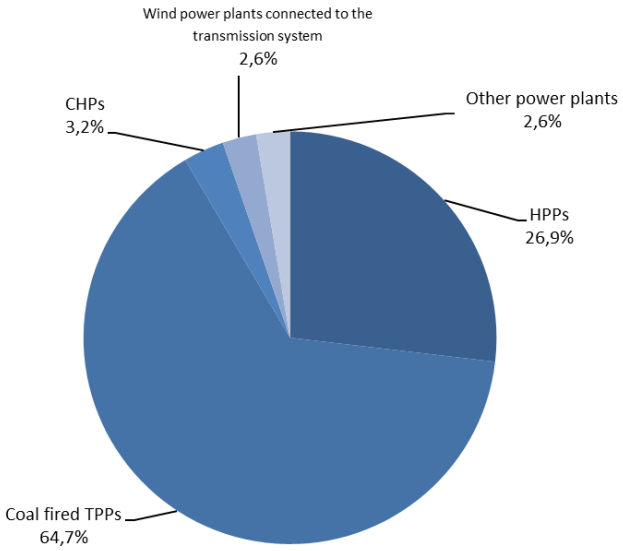

Figure 3-4: Generation structure in 2022 (without APKM)

Table 3-6: Electricity production and consumption in 2013 – 2022 (without APKM)

GWh

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
GENERATION										
Hydro power plants	10,729	11,366	10,529	11,227	9,477	11,031	9,884	9,419	11,587	8,893
Coal fired thermal power plants	26,537	20,455	25,017	25,016	24,240	22,954	23,169	24,331	21,537	21,413
Combined heat and power plants	167	63	45	90	185	238	337	192	630	1,058
Wind PPs connected to trans.sys.						85	830	905	1,004	876
Other power plants	104	267	321	448	538	642	612	693	898	872
Total generation	**37,537**	**32,151**	**35,912**	**36,781**	**34,441**	**34,950**	**34,832**	**35,540**	**35,656**	**33,112**
Other (UNMIK)	0	0	15	69	143	94	12	3	0	11
EPS' and of suppliers' import for the purpose of trade in Serbia	2,148	3,180	1,732	2,225	3,397	4,582	4,280	4,444	5,444	6,198
TOTAL AVAILABLE QUANTITY	**39,685**	**35,331**	**37,659**	**39,075**	**37,981**	**39,626**	**39,124**	**39,987**	**41,100**	**39,321**
EPS' and suppliers' export – of power produced and purchased in Serbia	4,475	1,021	2,142	3,578	2,186	4,246	3,940	4,708	4,792	3,385
Pumping	1,007	902	1,102	1,034	944	1,070	1,102	1,082	961	1,077
Other (UNMIK)	207	180	300	445	458	313	275	337	52	47
Gross consumption	**34,000**	**33,228**	**34,115**	**34,018**	**34,320**	**33,997**	**33,807**	**33,853**	**35,217**	**34,789**
Transmission network losses	1,013	948	932	892	852	868	806	798	845	802
Distribution network losses	4,482	4,215	4,236	3,917	3,953	3,664	3,527	3,587	3,636	3,383
Total losses	**5,499**	**5,163**	**5,168**	**4,808**	**4,805**	**4,532**	**4,333**	**4,385**	**4,481**	**4,185**
Losses to gross consumption ratio	16.2%	15.5%	15.4	14.1%	13.9%	13.3%	12.8%	13.0%	12.7	12.0%
Final consumption *	**28,501**	**28,065**	**28,947**	**29,210**	**29,515**	**29,465**	**29,474**	**29,468**	**30,862**	**30,604**

** In comparison to final consumption given in the balance sheet of the Statistical Office of the Republic of Serbia, final consumption in this Report also includes electricity consumption in all energy sectors, including energy purchased by power plants for production purposes.*

3.3 Regulation of the transmission system operator

The joint stock company *EMS* JSC is the transmission system operator (TSO) in the Republic of Serbia. It is responsible for electricity transmission and transmission system operation as well as for organisation and administration of electricity bilateral and balancing market. The responsibilities of the transmission system operator are regulated by the Law in detail, i.e. the transmission system operator is obliged to provide: safe, reliable and secure operation of the transmission system, transmission system development, adequate transmission capacity for the purpose of security of supply, quality of electricity delivery; non-discriminatory and transparent access to the system, system balancing, accuracy and reliability of electricity metering on points of delivery into and from the transmission system, etc.

The most important activities of the transmission system operator in 2022 included the following:

- drafting three-year transmission system investment plan;
- drafting amendments to the Transmission Network Code, drafting Rules on Connection to Transmission System and Procedures for Connection to Transmission System in order to harmonise it with the Law and an obligation to implement European network codes which was assumed under the Energy Community;
- adoption of Rules on Electricity Market Operations which are harmonised with the Law;
- adoption of the rules for the cross-border transmission capacities allocation in 2023, bilateral rules with the transmission system operators of Hungary, Romania, Bulgaria, Macedonia, Bosnia and Herzegovina, Croatia and Montenegro;
- procurement of energy for the recovery of transmission network losses;
- system services contracting;
- monitoring security of supply and submission of the data which are to be incorporated into the report on security of energy supply to the ministry in charge of energy;
- setting electricity prices for the purpose of system balancing, in line with the Electricity Market Rules and regular publication of the data on active balancing energy and the settlement price;
- collecting and publishing the data and information related to electricity market transparency and monitoring;
- exchanging information necessary for safe and secure operations of the system with other system operators;
- activities related to the issuance of guarantees of origin;
- activities related to the transfer of remaining transformer station 110/x kV/kV to the distribution system operator *EPS Distribucija* and takeover of remaining 110 kV overhead lines and cable lines;
- submission of the data and documentation necessary for monitoring transmission system operator's operations and price regulation to the Agency and
- other activities which improve the security, efficiency and transparency in the operations of the transmission system and market functioning.

Transmission Network Code

Transmission Network Code regulates technical aspects of transmission network operations and relations between *EMS* JSC as the transmission system operator and system users. The Code is available on websites of both *EMS* JSC and the Agency. The enforcement of the Network Code began in May 2008, upon the approval of the Council of the Agency of the first draft of the Code. Upon an amendment in December 2011, Code was adopted in July 2014. Following the adoption of the new Energy Law that year, on the session held on November 3, 2015, the Agency Council adopted a decision on the approval of the Transmission Network Code harmonised with this Law. During 2017, basic amendments were made to the Code due to corporatisation of the public enterprise and its transfer into closed joint stock company. Id mid December 2017, the Agency Council approved the new Code. Simultaneously, amendments to the Code were in preparation in order to harmonise it with European network codes, guidelines and instructions. In the first half of 2018, *EMS* JSC prepared a Code draft which was under public consultation from June 4 till June 29, 2018. Taking into account comments from the public consultation, *EMS* JSC prepared a new Code draft which was adopted by the *EMS* JSC Assembly on the session held on December 27, 2018. The draft was submitted to the Agency for approval purposes. Upon the analysis of the submitted Code draft, the Agency Council adopted a decision to require certain Code amendments. Only after amendments were made, the proposed Code was approved. In April 2020, the Council of the Agency approved a new draft of the Code which was prepared by *EMS* AD in order to harmonise it with technical requirements arising from European network connection codes, with requirements for system operation under regular and emergency circumstances with mandatory technical acts of ENTSO-E Association (European Network of Transmission System Operators for Electricity) and with a new concept of technical operation system of *EMS* JSC. Following the adoption of amendments to the Energy Law in May 2021, in 2022, a decree regulating electricity delivery and supply was being drafted. In addition, decrees for connection of facilities to the transmission system were adopted and thereby conditions were created for EMS JSC to start drafting Rules for Connection of Facilities to Transmission System as well as drafting new version of the Transmission Network Code which will be harmonised with these acts and that will be adopted in 2023.

3.3.1 Unbundling of the Transmission System Operator

A very important element of market reforms was achieved by unbundling network activity – electricity transmission as natural monopoly from production and supply which are market activities.

Since 2005, the transmission system operator - PE *Elektromreža Srbije* has been an independent legal entity, legally and functionally unbundled from energy entities operating in the field of power production and supply. In 2016, this public enterprise was corporativised and since that moment, it has been functioning as a closed joint stock company.

In line with the EU regulations, the 2014 Law established the model of the so-called ownership unbundling of the transmission system operator and the deadlines for its implementation. In line with the prescribed model, the independence of the transmission system operator is realised by not having the same person or persons authorised to exercise direct or indirect control over energy entities performing production or supply and over the transmissions system operator at the same time. In addition, this(ese) person(s) is(are) not simultaneously authorised to be a member(s) or to appoint the members of the management body within the transmission system operator and energy entities dealing in electricity production or supply. In case when this person is actually the Republic of Serbia or a state body, the control over the transmission system operator and over energy entities in charge of production and supply, the control over the transmission system operator and over entities in charge of production and supply cannot be exercised by the same state body. When separate state bodies exercise the control, these bodies cannot be controlled by the same third party.

The compliance with the conditions for the implementation of the ownership model of unbundling of the transmission system operator which is prescribed by the law is examined within the certification procedure which is implemented by the Agency.

The ruling legal ground imposes that only after a legal person is certified as a transmission system operator, the person may submit an application for the issuance of an energy licence for transmission and transmission system operation to the Agency. In line with the Law, this legal person is appointed as an electricity transmission system operator by the issuance of the licence.

Acting within a deadline prescribed by the law, in October 2016, *EMS* JSC submitted a certification application to the Agency. Following the certification procedure which implies the adoption of a preliminary decision on certification in the first place (by the Decision of the Agency Council of January 26, 2017, when *EMS* JSC was preliminarily certified as an electricity transmission system operator), obtaining the opinion of the Energy Community Secretariat (the Energy Community Secretariat submitted its opinion to the Agency on June 16, 2017), by the Decision of the Agency Council of August 4, 2017, in line with the Energy Law and the Rulebook for Energy Licence and Certification, a final certificate was issued to the Joint Stock Company “Elektromreža Srbije” Beograd as to an electricity transmission system operator.

Following the adoption of the certification decision, on December 8, 2017, the Agency Council issued a licence to the Joint Stock Company “Elektromreža Srbije” Beograd for the performance of electricity transmission and transmission system operation. Acting in line with the jurisdiction arising from the Energy Law, on September 20, 2017, the Energy Community Secretariat submitted a request for the initiation of a certification procedure to assess the compliance of *EMS* JSC with the unbundling criteria again.

Considering the given request, following the issuance of an opinion of the Ministry of Mining and Energy, Ministry of Economy, Ministry of State Administration and Local Self-Government and the Republic Legislation Secretariat stating that the ministries are independent in their activities and working within the Constitution of the Republic of Serbia and based on it, based on the law and other regulations and general acts and stating that one ministry cannot supervise the work of another ministry, on April 26, 2018, the Agency informed the Energy Community Secretariat that the Agency considered the final decision valid and that the request for the initiation of a new certification procedure for *EMS* JSC was not justified. It was not justified since there is neither mutual influence in the work of the ministry in charge of economic affairs and the ministry in charge of energy issues, nor the Government over the work of ministries, and therefore, there is no unique control over the transmission system operator on one hand and over energy entities operating in the field of electricity production and supply on the other hand.

3.3.2 Price regulation

3.3.2.1 Costs of connection to the system

The costs of connection to the system are set by the TSO on the basis of elements given in the connection application and the Methodology for Setting Costs of Connection to the Electricity Transmission and Distribution Systems (“Official Gazette of RS”, No. 109/15; valid as of 01/03/2016) which is adopted by the Agency. The Methodology defines types of costs: collection of documentation, procurement and instalment of equipment and material, works, the manner of calculation of all costs. In addition, the TSO is obliged to adopt certain standards and to use market prices, i.e. prices of work and services when setting costs of connection in their decision on connection.

Since connections to the transmission system cannot be standardized and since each of them is a project of its own, TSO is obliged to comply with principles of transparency and non-discrimination and to inform the applicant, upon his/her request, on the documents which serve as the basis for setting the level of connection costs and the method for setting these costs.

Except for paying for the construction of the connection, the applicant is obliged to pay defined set of costs arising from the connection of the applicant’s facility to the system.

TSO is the investor, i.e. the owner of the constructed facility (of the connection line, metering equipment and other equipment, up to the metering point within the customer’s facility).

In line with the Law, *EMS* JSC also adopted the Procedure for Connection of Facilities to Transmission System which was approved by the Agency. This procedure regulates the schedule of TSO's activities and the connection applicant in more detail and the deadlines in the procedure of facility connection to the transmission system.

3.3.2.2 Use-of-system charge

Upon the positive assessment of the Council of the Agency and the approval of the Government of the Republic of Serbia, regulated electricity transmission use-of-system charges were applied on January 1, 2008 for the first time. Since then, they have been modified eight times. The last time they were modified was on October 1, 2021. In 2022, charges were not modified. The trend of the annual level of approved electricity transmission use-of-system charges (VAT and duties free) are given in the table below:

Table 3-7: Trend of annual level of average approved transmission use-of-system charges[2]

RSD/kWh

	Annual level of approved charge				
	as of 01/03/2013	**as of 01/03/2017**	**as of 01/112019**	**as of 01/02/2021**	**as of 01/10/2021**
Total electricity transmission use-of-system charge	0.44	0.49	0.50	0.56	0.62
Net electricity transmission use-of-system charge *	0.18	0.28	0.29	0.34	0.35

** Net electricity transmission use-of-system charge is calculated by reducing the total maximum allowed revenue by system services costs and loss recoveries in the transmission grid and dividing it with the total annual delivered electricity quantities.*

The charges which were valid in 2022 are listed in Table 3-8.

Table 3-8: Transmission use-of-system charges which were valid in 2022

RSD

Tariff element	Calculation element	Unit	Charge as of 01/10/2021
Power	Accounting power	kW	59.3603
	Extra power	kW	237.4412
Active energy	Higher day-time	kWh	0.4742
	Lower day-time	kWh	0.2371
Reactive energy	Reactive energy	kvarh	0.2863
	Extra reactive energy	kvarh	0.5727

During 2022, the Agency Council adopted a decision on amendment to the Methodology for Setting Electricity Transmission Use-of-System Charge which introduced modification of calculation of tariffs for the tariff element "active capacity" and modification of calculation of tariff for the tariff element "reactive energy", i.e. these tariffs are now calculated by taking into account excessive active capacity and excessive reactive energy. In addition, the application of regulations on method of calculation of approved active capacity was postponed and it customers became entitled to require the calculation of approved capacity after the end of 2022 until February 28, 2023, regardless of the timing when they requested the reduction of capacity.

The current transmission use-of-system charge is available on the Agency website (www.aers.rs).

In 2022, by the application of ruling charges to actual tariff elements, average transmission use-of-system charge (VAT and duties free) was realised. It amounted to 0.62 RSD/kWh.

Table 3-9: Average transmission use-of-system charges

RSD /kWh

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Realised transmission use-of-system charges	0.35	0.42	0.43	0.43	0.43	0.48	0.49	0.49	0.50	0.56	0.62

[2] Terms related to prices used in the Report include the annual price level and average price. The annual price level represents the quotient of the revenue arising by the application of ruling tariffs on a certain date to annual quantities and other tariff elements used in the process of tariff approval. The average price represents the quotient of the realized revenue and realized quantities over a period of one year. If there were no changes in prices over a one-year period, these two prices should be similar, i.e. there should be only small difference between realized quantities and tariff elements compared to the planned ones which are used in the process of price approval.

Transmission use-of-system charges (VAT and duties free) in European countries and their structure are given in line with 2021 ENTSO-E data (ENTSO-E will not draft a 2022 report) in the Figure 3-5.

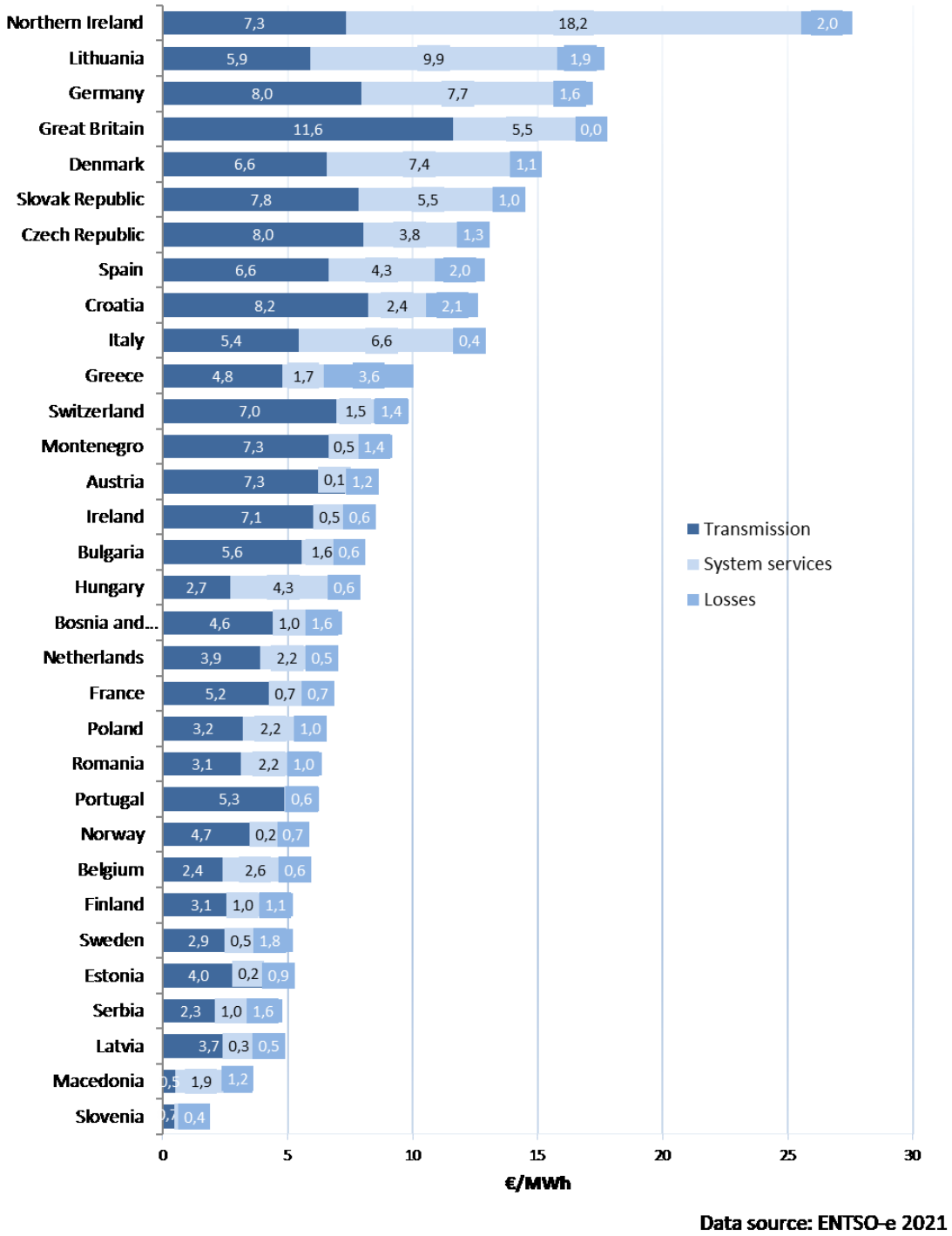

Figure 3-5: Transmission use-of-system charge (€/MWh) in 2021

3.3.2.3 Prices of secondary and tertiary control reserve

The Electricity Transmission Network Code defines that the level of capacity which has to be reserved for the purpose of system service - primary control is set in line with Rules on interconnection operations, that the range of secondary control capacity amounts to 160 MW and that tertiary control capacity amounts to 300 MW for positive and 150 MW for negative reserve. It also defines that the whole reserved capacity has to be provided from production units connected to the local transmission system.

The Electricity Transmission Network Code defines the manner how production units connected to the local transmission system provide these services as well as the ability of the system operator to engage the missing capacity or procure energy for system services purposes from other electricity market participants (suppliers and wholesale suppliers) or from the operator of another transmission system.

Usually, the Agency adopts Decision on Prices of Capacity Reserve for System Services of Secondary and Tertiary Control at the end of each calendar year. The price of these system services for 2022 were set in line with the mechanism for setting total annual cost of provision of secondary and tertiary control service which is based on setting total annual costs of construction and maintenance of replacement capacity which would be used only for the provision of these services.

The prices of 2022 capacity reserve for the purpose of secondary control were set on the level of 1,041 RSD/MW and of tertiary control of 447 RSD/MW in case capacity was supposed to be increased. The service of tertiary control in case capacity is supposed to be reduced and primary control are free of charge.

3.3.2.4 Prices of ancillary services

Beside setting prices of system services, the Agency also sets the prices of ancillary services (voltage regulation and reactive power control and black start) which are provided to the transmission system operator by producers whose facilities are connected to the power system. For 2022, prices of ancillary services for the voltage regulation and reactive power were set in thermal power plants and combined heat and power plants amounting to 14,312 RSD/Mvar inductively and 15,585 RSD/Mvar capacitively and in hydro power plants amounting to 32,236 RSD/Mvar inductively and 30,407 RSD/Mvar capacitively. Prices for black start operation are set on the annual level as the lump sum based on total annual cost of equipment for black start in power plants used for these purposes. For 2022, they were set to the amount of RSD 9,005,000. They are billed in equal monthly instalments set as one twelfth of the given amount.

Total allowed annual levels for the provision of system and ancillary services in the last 5 years are indicated in Table 3-10.

Table 3-10: Total annual level for the provision of system and ancillary services

000 RSD

Year	2018	2019	2020	2021	2022
Total annual value	2,822,709	3,583,388	3,707,962	3,782,748	3,886,051

3.3.2.5 Prices of Non-Standard Services

The Law prescribes that in addition to providing services to customers and system users which are charged via use-of-system charge or via connection costs, upon a customer's, i.e. system user's request, the transmission system operator also provides services which are not included in the above stated prices. In addition, the operator provides services when necessary in order to remove the consequences arising from a customer's or system user's acts which are contrary to regulations. Since these services are individual and occurring from occasionally upon a customer's or system user's request, they are called non-standard services. In order to compensate the costs arising from the provision of these services, *EMS* JSC established a price list for non-standard services which was approved by the Agency Council in August 2017. The list classifies non-standard services and establishes unit prices. These prices have not been modified and, for this reason, they were applied in 2022 as well.

3.3.3 Access to cross-border capacities

3.3.3.1 Cross-border capacity allocation and combustion management

The Republic of Serbia borders with eight countries and there are twelve interconnection overhead lines (400kV and 220kV) where *EMS* JSC allocates the rights to use transmission capacities. On the Serbian-Hungarian border since 2011, Serbian-Romanian border since 2013, Serbian-Bulgarian and Serbian-Croatian since 2014, on Serbian-Bosnian and Herzegovinian border since 2014, on Serbian – North Macedonian border since 2017 and on Serbian-Montenegrin border since 2020, joint explicit auctions have been organised for the allocation of 100% of available capacity. There was no transmission capacity allocation on the border with Albania in 2022. Since 2018, Joint Auction Office S.A. from Luxembourg has been organizing coordinated cross-border capacity allocation on the Serbian – Croatian border. Since 2019, this has been the case with the Serbian – Bulgarian border as well.

Rules for the cross-border transmission capacity allocation

Being the TSO, *EMS* JSC is responsible for the allocation of rights to use available cross-border transmission capacities on interconnection lines of the Serbian power system. The mechanism for the allocation of rights to use available cross-border transmission capacities is defined by the Transmission Network Code, the agreements between the transmission system operator of the Republic of Serbia and the transmission system operators of Hungary, Romania, Bulgaria, Bosnia and Herzegovina, Croatia, North Macedonia and Montenegro on the procedure and method of allocation of cross-border capacities and access to cross-border transmission capacities and general Rules for Available Cross-Border Transfer Capacities Allocation on Borders of Control Area of Republic of Serbia. The Agency Council approved the rules and agreements which were applicable in 2022 at the end of 2021.

Cross-border capacity allocation

Being the TSO, *EMS* JSC is responsible for the calculation, allocation and use of cross-border transmission capacities on all borders of the control area of the Republic of Serbia. More details on the cross-border capacity allocation are available on the website of the Transmission System Operator (www.ems.rs). The right to participate on cross-border capacity allocation auctions is held by market players holding licence for electricity wholesale supply or electricity supply and having a contract signed with *EMS* JSC on balancing responsibility.

Tables 3-11 and 3-12 indicate average monthly amounts of net cross-border transmission capacities (NTC) on all borders in both directions.

Table 3-11: Average monthly level of NTS for entry into Serbia in 2022

MW

Border/months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Hun---> Ser	700	700	700	700	694	443	203	694	527	526	678	700
Rom---> Ser	400	496	450	490	405	335	408	458	402	411	443	500
Bul ---> Ser	400	350	350	350	389	343	348	350	291	332	350	350
N.Mac---> Ser	400	350	250	250	453	511	540	600	531	500	600	500
Mon---> Ser	200	200	200	200	271	295	300	300	300	300	300	300
BosHer--- Ser	600	600	600	560	250	265	250	250	320	450	600	550
Cro---> Ser	300	300	300	240	200	200	200	200	200	200	200	200

Table 3-12: Average monthly level of NTS for exit from Serbia in 2022

MW

Border/months	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Ser --->Hun	800	800	800	800	790	507	232	800	800	533	733	800
Ser --->Rom	500	250	352	513	540	448	548	452	523	629	500	500
Ser --->Bul	400	350	350	350	389	350	348	350	291	332	350	350
Ser --->N.Mac	400	500	400	400	577	556	541	495	367	500	500	600
Ser --->Mon	300	300	300	300	271	295	300	300	300	300	300	300
Ser --->BosHer	600	600	600	450	400	253	500	500	410	508	600	400
Ser --->Cro	300	300	300	240	300	300	239	300	300	300	300	300

In 2022, *EMS* JSC organised explicit auctions on cross-border transmission capacities on all borders and in all directions of the control area of the Republic of Serbia.

In 2022, *EMS* JSC organised daily explicit auctions for the allocation of 100% available capacity on the Serbian-Hungarian border charging in line with the last successful price ("marginal price") as well as intraday auctions by the application of the method „first come-first served". The Hungarian transmission system operator MAVIR ZRt. realised the allocation of available capacity on annual and monthly level, charging in line with the last successful price ("marginal price"). There were 31 participants on all auctions organised by *EMS* JSC while there were 39 of them entitled to participate.

For the allocation of 100% of available capacity on Serbian-Romanian border, *EMS* JSC organised explicit auctions charging in line with the last successful price ("marginal price"), while the Romanian transmission system operator CNTEE Transelectrica S.A. realised the allocation of the available annual and monthly capacity on daily level charging in line with the last successful price ("marginal price"), as well as on the intraday level, by organizing explicit auctions (6 4-hour sessions). There were 20 participants on all auctions organised by *EMS* JSC, while there were 37 of them entitled to participate.

In 2022, Joint Auction Office JAO S.A. was responsible for the organisation of annual, monthly and daily explicit auctions on Serbian – Croatian and Serbian – Bulgarian border applying the "marginal price" charging method. *EMS* JSC organised available capacity allocation on intraday level on Serbian – Croatian border (no participants out of 30 registered participants) and on the Serbian – Bulgarian border (no participants out of 31 registered participants in total) by using the method „first come-first served".

In 2022, *EMS* JSC organised annual and monthly explicit auctions for the allocation of 100% of available. by method "first come-first served" capacity on Serbian-Bosnian and Herzegovinian border charging in line with the last successful price ("marginal price"), and the same method was used by the Bosnia and Herzegovina transmission system operator (NOSBIH) which organised daily explicit auctions. NOSBIH also organised intraday auctions by using the method „first come-first served". There were 18 participants in the auctions organised by *EMS* JSC while there were 35 of them entitled to participate.

The North Macedonian Transmission System Operator M*EPSO* organised annual and monthly explicit auctions for the allocation of 100% of available capacity on the North Macedonian border in line with the "marginal price" charging method. *EMS* JSC organised the allocation of available capacity on daily level in line with the "marginal price" charging method and on intraday level in line with "first come-first served" charging method. There were 22 participants involved in the capacity allocation organised by *EMS* JSC out of 33 entitled participants.

In 2022, *EMS* JSC organised annual and monthly explicit auctions for the 100% available capacity allocation on Serbian-Montenegrin border by using the method of "marginal price", while, using the same method the transmission system operator of Montenegro (CGES) organised daily explicit auctions and organised intraday capacity allocation by using the method "first come-first served". There were 21 participants involved in the auctions organised by *EMS* JSC out of 38 entitled participants.

The data on the joint annual auctions for 2022 are given in Table 3-13.

Table 3-13: Data on joint annual auctions for the allocation of cross-border transmission capacities in 2022

Border – direction	Available Cross-Border Capacity - ATC (MW)	Number of auction participants entitled to capacity	Marginal price (EUR/MWh)
Hungary – Serbia*	200	11	1.03
Serbia – Hungary*	200	10	0.95
Romania – Serbia*	250	6	0.74
Serbia – Romania	250	7	0.60
Bulgaria – Serbia**	150	11	3.17
Serbia – Bulgaria**	150	8	0.52
Croatia – Serbia**	150	10	0.51
Serbia – Croatia**	150	10	0.70
BiH - Serbia	100	4	0.86
Serbia - BiH	100	4	0.16
North Macedonia – Serbia*	200	11	1.03
Serbia – North Macedonia*	200	10	0.95
Montenegro - Serbia	150	8	1.78
Serbia – Montenegro	150	9	2.86

** Data gathered from the neighbouring transmission system operator*

*** Data gathered from the JAO S.A.*

The data on joint monthly auctions in 2022 are given in Table 3-15.

Table 3-14: Data on joint monthly auctions for the allocation of cross-border transmission capacities in 2022

Border – direction	No. of days with "0" capacity	Number of congestions/total number of auctions	Number of participants in auctions entitled to capacity (min.-max.)	Range of marginal prices in case of congestion EUR/MWh
Hungary – Serbia*	33	12 / 12	13 – 18	0.72 – 3.15
Serbia – Hungary*	33	12 / 12	10 – 18	0.33 – 3.29
Romania – Serbia*	5	48 / 51	3 – 14	0.00 – 20.00
Serbia – Romania*	5	47 / 49	3 – 11	0.00 – 1.02
Bulgaria – Serbia**	10	12 / 12	10 – 21	6.33 – 30.55
Serbia – Bulgaria**	10	12 / 12	4 – 13	0.30 – 1.21
Croatia – Serbia**	9	12 / 12	5 – 15	0.63 – 2.10
Serbia – Croatia**	9	12 / 12	5 – 17	0.74 – 3.11
BiH - Serbia	0	23 / 23	3 – 12	0.20 – 3.07
Serbia - BiH	0	19 / 25	6 – 13	0.00 – 0.56
North Macedonia – Serbia*	33	12 / 12	13 – 18	0.72 – 3.15
Serbia – North Macedonia*	33	12 / 12	10 – 18	0.33 – 3.29
Montenegro - Serbia	0	12 / 12	4 – 12	0.68 – 7.99
Serbia – Montenegro	0	16 / 16	3 – 13	1.79 – 15.00

** Data gathered from the neighbouring transmission system operator*

*** Data gathered from the JAO S.A.*

At the end of 2022, *EMS* JSC concluded agreements on the organization of common allocation/auctions for 2023 with those neighbouring transmission system operators that had them organized in 2022 as well. The Council of the Agency approved all these agreements by the end of 2022.

3.3.3.2 Annual exchange within and across the borders of control areas

The total scale of cross-border transactions in 2022 amounted to 16,361 GWh – entrance, i.e. 13,548 GWh – exit from the market area of Serbia. The scale of internal transactions[3] amounted to 18,517 GWh. Table 3-15 indicates the scale of nominated and confirmed internal and cross-border transactions in the period 2013-2022.

Table 3-15: Cross-border and internal transactions in the market area of Serbia 2013 - 2022

GWh

Year	Cross-border transactions – entry	Cross-border transactions – exit	Internal transactions
2013	10,094	13,939	11,711
2014	16,637	14,416	11,574
2015	16,165	16,910	9,835
2016	15,526	17,844	15,633
2017	19,133	17,822	15,865
2018	17,350	16,837	20,536
2019	17,331	16,868	20,788
2020	17,971	18,815	26,272
2021	17,043	16,382	22,493
2022	16,361	13,548	18,517

In comparison to the previous year, in 2022, the scale of cross-border transactions decreased by around 4% in the entrance and by around 17% in the exit direction. The scale of internal transactions was decreased by around 17.5% in comparison to last year. Apart from the transactions indicated in Table 3-16, a segment of cross-border exchange was realised via island operations of distribution system of Serbia and Bosnia and Herzegovina, amounting to 5.1 GWh in direction from Serbia towards Bosnia and Herzegovina and 1.2 GWh in the opposite direction.

Table 3-16 indicates the scale of cross-border transactions for each border for 2022.

Table 3-16: Entry and exit nominated cross-border transactions for each border for 2022

GWh

Border with	Entry into Serbia	Exit from Serbia
Romania	2,434	618
Bulgaria	2,803	525
North Macedonia	1,963	2,570
Montenegro	1,136	2,383
BiH	2,065	1,678
Croatia	1,626	2,162
Hungary	4,334	3,612
On all borders	**16,361**	**13,548**

3.3.3.3 Use of revenue arising from the cross-border capacity allocation

In 2022, *EMS* JSC generated revenue from capacity allocation amounting to around €48.5 million in line with the following structure:

Table 3-17: Revenue from cross-border capacity allocation in 2022

Allocation	Revenue (€)
Annual	11,072,459
Monthly	22,306,642
Daily	15,180,491
Total	48,559,592

[3] Bilateral trade between two balancing responsible parties in Serbia

In line with the Regulation (EU) 714/2009, revenues of TSO arising from the cross-border capacity allocation are a part of the total revenue. Therefore, they were used for financing investments in the transmission system as one of sources of funds in order to maintain and increase cross-border transmission capacities in order to reduce congestion.

3.3.4 Transmitted electricity quantities

Table 3-18 indicates the transmitted electricity quantities and transmission system losses in 2022 in comparison to the quantities planned for 2022 in the balance sheet. In comparison the balance sheet planned data, transmitted energy quantities were by around 1% lower while the losses were around 3.7% lower than the planned ones.

Table 3-18: Basic indicators of transmission plan realisation (without APKM)

	2022		
	Balance	Realised	Real./Bal.
Entry (GWh)	41,146	40,708	98.93
Losses (GWh)	833	802	96.28
Losses (%)	2.02%	1.97%	97.52
Exit (GWh)	40,313	39,905	98.99

Realised physical electricity transit in 2022, calculated as a lower value of average hourly electricity which was withdrew into or out of the transmission system via interconnection overhead lines amounted to 5,640 GWh. The physical transit per month is indicated in table 3-19.

Table 3-19: Electricity transit by months of 2022 (physical flows)

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Transit (GWh)	333	299	454	443	387	499	527	537	563	437	499	662

On a part of the system without APKM, 40,708 GWh of electricity were withdrawn in total. Out of the number, 31,365 GWh were withdrawn from hydro power plants, thermal power plants and combined heat and power production plants connected to the transmission system, 876 GWh were withdrawn from wind power plants connected to the transmission system 8,446 GWh were withdrawn from neighbouring systems. Because of the production of power plants connected to the distribution system which exceeded the demand in these parts of the distribution system, around 21.3 GWh of electricity was withdrawn from the distribution system. The greatest share of energy which was withdrawn was delivered to electricity distribution systems, final customers, neighbouring system and pumped-storage plants for pumping purposes respectively.

Table 3-20: Transmitted energy, maximum load and losses (without APKM)

	Unit	2021	2022.	2022/2021
Transmitted electricity	GWh	41,752	40,708	97.50
Maximum daily gross consumption	GWh	125.52	130,179	103.72
Maximum hourly load	MW	5,620	5,935	105.60
Transmission system losses	GWh	845	802	94.91
Transmission system losses (as % of transmitted electricity)	%	2.02	1.97	97.52

In 2022, without APKM, electricity losses in the transmission system of Serbia amounted to 802 GWh, which represents 1.97% of electricity withdrawn into the transmission system. The Transmission System Operator (*EMS* JSC) purchased electricity to cover losses on the bilateral market in line with the contract on full supply.

Electricity consumption in Serbia, but in the region as well, depends on the season. Therefore, maximum consumption is seen in wintertime at lowest temperatures or on days prior to holidays. During the first and last quarter of 2022, in Serbia, without APKM, average daily consumption which greatly depends on the average daily temperature amounted to 102,286 MWh. The highest daily gross consumption amounted to 130,179 MWh on January 25, 2022. On January 25, at 10 a.m., maximum 2022 hourly load was reached – 5,935 MW.

3.4 Regulation of the distribution system operator

On July 1, 2015, by the reorganization of PE *EPS*, a specific daughter company Distribution System Operator "*EPS Distribucija*" was established and it performed the activity of electricity distribution and distribution system operation on the territory of Serbia without APKM. As of April 1, 2021, this activity is performed by the company *"Elektrodistribucija Srbije"* LLC, (DSO). The Law regulated in detail the DSO responsibility to provide: safe and reliable distribution system operations and the quality of electricity delivery, distribution system development, non-discriminatory and transparent access to the distribution system, support to efficient market functioning, accuracy and reliability of electricity measurements on delivery points from and into the distribution system and quality of electricity delivery.

The most important activities of the distribution system operator in 2022 which provided the compliance of its work with the commitments arising from the Law and electricity market functioning were as follows:

- organisational changes in order to provide for efficient operation of a single distribution system operator;
- drafting three-year investment plan and harmonisation with the investment plans and applications for the connection of facilities of producers and customers;
- activities on metering points and accompanying equipment (connections) transfer;
- cooperation with *EMS* JSC and suppliers on the provision of data related to market functioning and balancing responsibility;
- submission of the data and documents necessary for monitoring operator's work and for the analysis of the data necessary for price regulation to the Agency;
- submission of the data which are to be incorporated into the report on security of energy supply to the ministry in charge of energy;
- takeover of transformer stations 110/x kV/kV from *EMS* JSC and transferring the lines 110kV to *EMS* JSC;
- procurement of energy meant for distribution grid loss recovery and
- other activities which improve the security, efficiency and transparency of the distribution system operations as well as market functioning.

The DSO had an obligation prescribed by the Law to take over metering devices, switchboards, connection lines, installations and equipment in the switchboard and other devices within the connection in the facilities of existing customers or producers since these devices and equipment are part of the distribution system by the end of 2020 but they did not comply with it. Since these devices and equipment are a part of the distribution system, amendments to the Energy Law of May 2021 prescribed that this transfer should be realised by the end of 2024.

Distribution Network Code

The Distribution Network Code regulates technical conditions for connection of customers to the system, technical and other conditions for safe operation of the distribution system and for the provision of reliable and continuous delivery of electricity to customers, procedures in case of crisis, rules on third party access to the distribution system, functional requirements and the category of measuring devices, electricity measuring method and other issues important for the operation of the distribution system. Following its establishment in the second half of 2015, The DSO started drafting the Code in the second half of 2015. In the period between July 2016 and July 2017, working teams of the DSO and the Agency were harmonizing the Code text, public consultations were organized on the Code. On the session held on July 19, 2017, the Agency Council approved the Code and it came into force on August 1, 2017. In 2018, amendments to the Code which served to remove noticed technical errors were prepared. In the beginning of 2019, the amendments were submitted to the Agency for approval. On the session held on March 1, 2019, the Agency Council approved the proposed amendments. Since then, there were no activities on the amendments to this Code but following the adoption of amendments to the energy law in May 2021 and following the adoption of decrees which regulate the connection to the distribution system which were adopted in 2022, a decree regulating electricity delivery and supply is expected to be adopted that will create conditions for the DSO to prepare new Network Code which will be harmonised with these acts.

3.4.1 Unbundling of DSO

By unbundling of network activity – electricity distribution as a natural monopoly from production and supply which are market activities, a very important element of market reforms is reached.

In 2020, electricity distribution on the territory of the Republic of Serbia was performed by one subsidiary company Distribution System Operator *EPS* Distribucija d.o.o. Beograd as a part of a vertically-integrated company PE *EPS*. Since the Distribution System Operator which is a part of a vertically integrated company has to be independent in terms of the legal form, organization and decision-making process from other activities which are not connected to the electricity distribution activity, via the transfer of shares of PE *EPS* to the Republic of Serbia at the end of 2020 and via the registration of a new company in early 2021, DSO started performing the activity independently without the control of PE *EPS* and this is the moment when it also starts operating under a new business title "*Elektrodistribucija* Srbije" LLC.

In line with the Law (Article 131), the independence of the distribution system operator is provided by having persons responsible for the management of the distribution system operator restricted from participation in management bodies of the vertically-integrated company which are directly or indirectly responsible for electricity production, transmission or supply, as well as by taking measures which ensure that the persons responsible for the management of the distribution system operator act in a professional manner in order to provide for their independence during work. In addition, the distribution system operator is supposed to adopt decisions independently from the vertically-integrated company if these relate to funds necessary for the network operation, maintenance and development, as well as to current operation, i.e. decisions on the construction or upgrade within the distribution network if they comply with the approved financial plan.

Pursuant to the Law (Article 132), a Distribution System Operator which is a part of a vertically-integrated company is obliged to adopt the Compliance Programme for Non-Discriminatory Treatment which includes measures for the prevention of

discriminatory behaviour, the method of monitoring the implementation of these measures and obligations of employees to achieve set goals. The Agency Council approved the DSO Compliance Programme by its decision from June 2016, the Council of the Agency approved the Compliance Programme of the Distribution System Operator by their decision of June 2016. Following the transfer of shares to the Republic of Serbia and the establishment of "*Elektrodistribucija* Srbije" LLC, this company submitted a new Compliance Programme to the Agency at the end of 2021 which was approved by the Agency in February 2022 in line with the Law.

Having in mind that the Distribution System Operator is obliged to appoint a Compliance Programme Officer, The Agency Council approved conditions for the appointment and duration of term of a compliance monitoring officer, as well as the approval of the appointment decision which was adopted previously in June 2016. At the end of 2021, "*Elektrodistribucija* Srbije" LLC submitted a request for approval of decision on appointment of compliance officer in "*Elektrodistribucija* Srbije" LLC to the Agency which was approved by the Agency in June 2022 in line with the Law.

3.4.2 Price regulation

3.4.2.1 System connection costs

The DSO establishes distribution system connection costs on the basis of connection application and the Methodology for setting costs of connection to electricity transmission and distribution system which is adopted by the Agency ("Official Gazette of RS", No. 109/15; valid as of 01/03/2016). The Methodology sets the types of costs: provision of documentation, procurement and instalment of equipment and material, works as well as the method of calculation of all costs. In addition, the operator is obliged to adopt adequate standards and to use market prices, i.e. prices of work and services when setting connection costs in the connection decision. The DSO is obliged to comply with the principles of transparency and non-discrimination and, upon an applicant's request, to give the applicant an insight into acts which serve as the basis for the establishment of connection costs and the manner of setting these costs. In the Methodology, connections are grouped into kinds and types and therefore, depending on the distance between a facility and the system, on technical conditions and methods of connection, we recognize standard and individual connections.

With standard connections, depending on the number of metering devices, we recognize individual and group standard connections. A DSO's legal act on the level of connection costs for standard connections also includes the level of:

- cost of construction of standard connection for each subkind and subtype of standard connections depending on the location where metering switchboards are installed;
- unit variable cost and
- cost of a part of the system which is set by the operator in line with the Methodology.

If, based on submitted data as well as on the data which may be demanded in line with the Law, the Agency concludes that the DSO has not adopted legal acts on the level of connection costs in line with the Methodology, the Agency will ask the DSO to submit a new legal act, fully harmonised with the Methodology within 30 days since the day the Agency's written request is submitted.

The act on prices of costs of connection to the electricity distribution system which was adopted by the DSO in June 2016 was applied in 2022 as well.

The DSO is obliged to provide the data on the number of new metering points connected to the distribution system, collected revenue and money flow based on issued decisions on connection to the distribution system for each connection type as well as on the connection costs which arose. The DSO provides these data regularly to the Agency in line with the info-tables established by the Agency.

In 2022, the DSO submitted data on the number of newly-connected metering points within the distribution system, collected revenues and money flow arising from the issued decisions on the approval of connection to the distribution system for each connection type as well as on arising connection costs.

3.4.2.2 Use-of-system charges

Distribution companies started applying regulated distribution use-of-system charges on March 1, 2010 for the first time following a favourable opinion of the Agency on price proposals given by 5 distribution companies and following the approval of the Government of the Republic of Serbia. Afterwards, distribution use-of-system charges were changed on April 1, 2011, August 1, 2013 and these were valid for customers entitled to guaranteed supply until February 2016. In the meantime, the Government of the Republic of Serbia adopted a Decree on Method and Conditions of Setting Balanced Distribution Use-of-System Charges. This Decree entered into force on January 1, 2014 and it was applicable for customers who were not entitled to regulated supply. Balancing the distribution use-of-system charges, customers belonging to the same customer category and group were allowed to purchase electricity from suppliers in the open market under the same conditions on the whole territory of the Republic of Serbia.

There was a change of status of July 1, 2015 and one DSO was established for the whole territory of the Republic of Serbia. Therefore, on March 1, 2016, with the Agency's approval, the DSO adopted a uniform distribution use-of-system charge for all customers with facilities connected to the distribution system. The charge was applied until November 8, 2016 when a new distribution use-of-system charge entered into force. During the whole 2020, the price established on November 8, 2019 was applicable. During 2022, distribution use-of-system charges of November 8, 2019, February 1, 2021 and October 1, 2021 were valid. The distribution use-of-system charge which was valid as of October 1, 2021 was valid during 2022.

Table 3-21: Trend of annual level of average approved distribution use-of-system charges – total Serbia (without APKM)

RSD/kWh

Consumption category	Annual level of approved charge				
	As of 01/08/2013	As of 01/03/2016	As of 08/11/2019	As of 01/02/2021	As of 01/10/2021
Medium voltage - total	1.56	1.32	1.26	1.33	1.47
Low voltage (0.4 kV I grade)	3.53	3.58	3.40	3.64	4.05
Mass consumption - total	3.27	3.46	3.61	3.86	4.28
- 0.4 kV II grade	3.75	3.87	3.93	4.20	4.68
- households	3.20	3.40	3.56	3.80	4.22
Public lighting	3.06	2.82	2.81	3.22	3.61
AVERAGE	2.93	2.93	2.92	3.11	3.43

The average distribution use-of-system charge (VAT and duties free) in 2022 for all customers amounted to 3.20 RSD/kWh (Table 3-22).

Table 3-22: Applied average distribution use-of-system charges

RSD/kWh

Consumption category	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
35 kV	1.46	1.32	1.28	1.25	1.24	1.25	1.24	1.20	1.27	1.39
10 kV	1.53	1.59	1.50	1.46	1.38	1.39	1.40	1.41	1.45	1.57
Low voltage (0.4 kV I grade)	3.68	4.22	4.12	3.95	3.86	3.81	3.79	3.84	3.90	4.20
- 0.4 kV II grade	3.16	3.75	3.71	3.81	3.82	3.82	3.84	4.02	4.28	4.66
- households	2.86	3.29	3.27	3.38	3.42	3.45	3.48	3.55	3.86	4.23
Public lighting	2.48	3.10	3.08	2.86	2.82	2.82	2.81	2.81	3.29	3.61
AVERAGE	2.66	3.01	2.96	2.98	2.96	2.95	2.95	3.00	3.20	3.48

Figure 3-6 indicates realized average electricity distribution use-of-system charges (VAT and duties free) for Serbia (without APKM) per customer category in 2022.

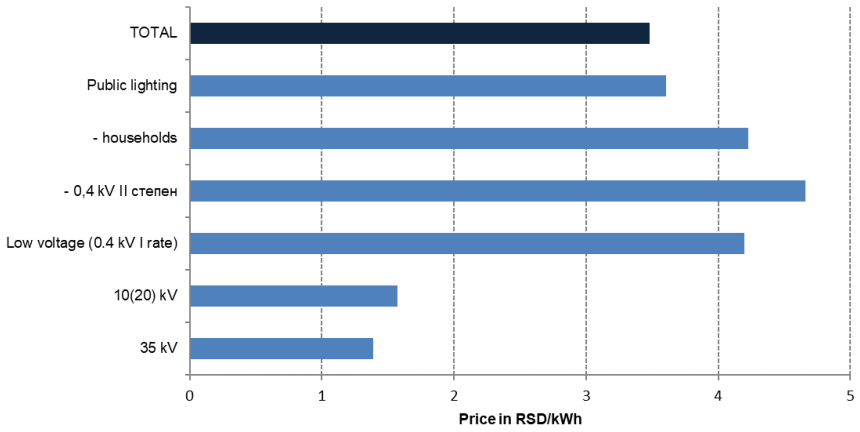

Figure 3-6: Average applied annual distribution use-of-system charge in 2022

In 2022, the Council of the Agency adopted a decision on the amendment to the Methodology for Setting Distribution Use-of-System Charge which amended the method of calculation of tariffs for the tariff element "active capacity" and the calculation of tariffs for the tariff element "reactive energy", i.e. these tariffs are now calculated by taking into account excessive active capacity and excessive reactive energy. In addition, the method of calculation of access to the distribution system for energy entities producing electricity, for electricity delivered from the electricity distribution system for the purpose of electricity generation, was presented in detail. The period during which users with capacity metering have a possibility to have their capacity calculated as lower than the approved one was extended until the end of 2024. In the same chapter, until the end of 2024, users from the Category – Mass Consumption – Customers Group "Households", for facilities with three phase connection with approved capacity of 11.04 kW but not exceeding 17.25 kW were enabled to have their capacity

calculated at the level of 11.04 kW and if the monthly consumption of active energy in the facility amounts to up to 350 kWh, approved capacity for that calendar month will be calculated for 6.90 kW.

Valid distribution use-of-system charge is available on the Agency website (www.aers.rs).

3.4.2.3 Price of Non-Standard Services

The Law prescribes that in addition to providing services to customers and system users which are charged via use-of-system charge or via connection costs, upon a customer's, i.e. system user's request, the distribution system operator also provides services which are not included in the above stated prices. In addition, the operator provides services when necessary in order to remove the consequences arising from a customer's or system user's acts which are contrary to regulations. Since these services are individual and occurring from occasionally upon a customer's or system user's request, they are called non-standard services. In order to compensate the costs arising from the provision of these services, DSO established a price list for non-standard services which was approved by the Agency Council in January 2019. The list includes three segments: 1) technical services to DSO system users, 2) services related to setting design and connection conditions and 3) services related to issuance of an opinion on conditions for power plants connection. These prices did not change and they were valid in 2022 as well.

3.4.3 Distributed electricity quantities

The electricity delivered to customers through the distribution system was mainly withdrawn from the electricity transmission system. A smaller portion of energy is provided from the power plants connected to the distribution system and this portion is increasing year by year. The energy withdrawn from the power plants connected to the distribution system in 2022 amounted to by 2.9% less than in 2021. Because of production in power plants connected to the distribution system in areas with low electricity consumption, around 21 GWh of electricity were delivered from the distribution system into the transmission system which is by even 11 GWh more than in 2021. In 2022, prosumers were connected to the distribution system and therefore, low quantities of electricity are withdrawn from their facilities as well. Those quantities amounted to around 1 GWh in 2022.

Table 3-23: Electricity quantities distributed in 2013 – 2023

GWh, %

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Distributed - Total electricity withdrawn by the distribution system	**30,068**	**29,351**	**30,131**	**30,162**	**30,503**	**30,040**	**30,002**	**30,027**	**31,004**	**30,133**
Withdrawn from the transmission network (without customers connected to 110 kV)	29,965	29,078	29,778	29,712	29,964	29,397	29,389	29,333	30,105	**29,259**
Withdrawn from neighbouring distribution systems	0.1	6.4	32.2	2.0	1.0	1.0	1.0	1.0	1.0	**1.0**
Production within power plants connected to DS	104	267	321	448	538	642	612	693	898	**872**
Production of prosumers connected to the DS										**1.0**
Total delivered electricity quantities from the distribution system	**25,584**	**25,136**	**25,894**	**26,246**	**26,549**	**26,376**	**26,476**	**26,440**	**27,368**	**26,750**
Delivered to final customers (without customers connected to 110 kV)	25,586	25,130	25,863	26,147	26,425	26,240	26,358	26,374	27,298	**26,670**
Delivered to neighbouring distribution systems	0.5	27.4	32.3	98.6	121	128	113	54	60	**53**
Delivered to the transmission system					3	8	5	12	10	**21**
Delivered into closed distribution systems										**6**
Losses in the distribution system	**4,482**	**4,215**	**4,236**	**3,917**	**3,953**	**3,664**	**3,527**	**3,587**	**3,636**	**3,383**
Losses in the distribution system (as % of total withdrawn energy)	**14.91**	**14.36**	**14.06**	**12.98**	**12.96**	**12.20**	**11.75**	**11.95**	**11.73**	**11.23**

Electricity losses within the distribution system were lower in 2022 in percentages in comparison to 2021 but they still exceed technically-justified ones. A higher level of losses in comparison to the EU countries can only partially be justified by inevitable technical losses due to a high share of low voltage consumption in comparison to most EU countries. However, high losses were also due to a great number of unauthorised connections to the distribution network and unauthorised withdrawal (theft) of electricity. In addition, losses are increased due to long-term low investments into the distribution network. Another problem includes a big delay in terms of replacement of meters and transfer of metering points and connection lines. This is proved by the data on minimum activities on control and transfer of the metering devices, connection lines and equipment which is a prerequisite of bringing these into technically valid state and of elimination of electricity theft. These activities are expected to be more intensive in the future. When giving approval of distribution use-of-system charges

and when assessing justified level of losses within the network, all relevant data from previous years will be taken into account as well as the level of losses and planned activities for loss reduction.

3.5 Closed distribution systems

At the end of 2022, there were six energy entities holding a licence for electricity distribution and closed distribution system operation – the closed distribution system operator:

1. closed distribution system operator “BELGRADE AIRPORT” d.o.o. Beograd (BELGRADE AIRPORT),
2. closed distribution system operator – Company for Exploration, Production, Processing and Trade in Oil and Oil Derivatives and Exploration and Production of Natural Gas *Naftna Industrija Srbije* (Petroleum Industry of Serbia), JSC, Novi Sad (NIS),
3. closed distribution system operator “Limited Liability Company for Energy and Fluids Production and Distribution and Service Provision “ENERGETIKA”, Kragujevac, (ENERGETIKA),
4. closed distribution system operator "ELIXIR PRAHOVO" INDUSTRIJA HEMIJSKIH PROIZVODA LLC PRAHOVO (ELIXIR PRAHOVO),
5. closed distribution system operator Društvo sa ograničenom odgovornošću za građevinarstvo, održavanje i usluge "MIND REAL ESTATE" Lužnice - Kragujevac (MIND REAL ESTATE) and
6. оператор затвореног дистрибутивног система "ЕИ - предузеће за производњу и дистрибуцију енергетике и пружање услуга ЕЛМАГ д.о.о, Ниш (ЕЛМАГ).

1. Closed distribution system which is operated by the closed distribution system operator “BELGRADE AIRPORT” Beograd is connected to the distribution system of ODS Elektrodistribucija Srbije to 35kV voltage level. It includes:

- 1 transformer station of 35/10 kV/kV with two transformers with total installed capacity of 16 MVA,
- 6 transformer stations of 10/0.4 kV/kV with 10 transformers with total installed capacity of 852 MVA and
- 11 km of cables of 10 kV voltage level.

In 2022, in total, the closed distribution system “BELGRADE AIRPORT” did not start operating.

2. Closed distribution system which is operated by the closed distribution system operator NIS is connected to the transmission system to 220 kV voltage level. This closed distribution system includes:

- 1 transformer station of 220/6 kV/kV with two transformers with total installed capacity of 63 MVA,
- 1 transformer station 35/6 kV/kV without a transformer since it keeps only 6 kV voltage level,
- 0.15 km of overhead lines of 220 kV voltage level and
- 8.4 km of cables of 6 kV voltage level.

Closed distribution system NIS started operating on August 1, 2021.

In 2022, 261.9 GWh of electricity were withdrawn from the transmission system into the closed distribution system NIS out of which 0.2 GWh were delivered to customers connected to closed distribution system while 261.4 GWh were consumed to cover the demand of the system. Losses within the closed distribution system amounted to 0.3 GWh of electricity.

3. Closed distribution system which is operated by the closed distribution system operator “ENERGETIKA” is connected to the transmission system to 110 kV voltage level. It includes:

- 1 transformer station of 110/35 kV/kV with two transformers with total installed capacity of 126 MVA,
- 1 transformer station 35/6 kV/kV with installed capacity of 36 MVA,
- 18 transformer stations of 6/0.4 kV/kV with total installed capacity of 55.7 MVA,
- 2.4 km of overhead lines of 35 kV voltage level,
- 19 km of cables of 35 kV of voltage level,
- 42 km of overhead lines of 6 kV voltage level and
- 30 km of power cables of 6 kV voltage level.

“ENERGETIKA” closed distribution system started operating on March 1, 2021.

In 2022, 40.1 GWh of electricity were withdrawn from the transmission system into the distribution system ENERGETIKA out of which 36.3 GWh were delivered to customers connected to the closed distribution system and 0.5 GWh were delivered into the distribution system. Losses within the closed distribution system amounted to 3.30 GWh of electricity.

4. Closed distribution system operated by the closed distribution system operator ELIXIR PRAHOVO is connected to the transmission system of Serbia on the 110 kV voltage level and it includes:

- 1 transformer station 110/10 kV/kV with two transformers with total installed capacity of 63 MVA,
- 1 transformer station 35/10 kV/kV without a transformer since only 10 kV voltage level remained there,
- 2 transformer stations 10/0,4 kV/kV with 5 transformers in total with total installed capacity of 8.3 MVA and
- 2,995 km of cables with voltage level of 10 kV.

The closed distribution system ELIXIR PRAHOVO did not start operating in 2022.

5. Closed distribution system operated by the closed distribution system operator MIND REAL ESTATE is connected to the distribution system of DSO *Elektrodistribucija Srbije* to the voltage level of 10 kV. This closed distribution system includes:

- 5 transformer stations 10/0.4 kV/kV with 10 transformers in total with total installed capacity of 10.07 MVA,
- 7.8 km of cables of 10 kV voltage level and
- 10 km of cables of 0.4 kV voltage level.

The closed distribution system MIND REAL ESTATE started operating on April 1, 2022.

In 2022, 3.8 GWh of electricity was withdrawn from the distribution system into the closed distribution system MIND REAL ESTATE out of which 2.6 GWh were delivered to customers connected to the closed distribution system while 1.1 GWh were consumed for self-consumption. Losses within the closed distribution system amounted to 0.1 GWh of electricity.

6. The closed distribution system operated by the distribution system operator ELMAG is connected to the distribution system DSO *Elektrodistribucija Srbije* to the 10 kV voltage level. This closed distribution system includes:

- 6 transformer stations of 10/0.4 kV/kV with total installed capacity of 8.29 MVA,
- 1 switchgear of 10 kV voltage level,
- switchgears of 0.4 kV voltage level,
- 9 km of cables of 10 kV voltage level and
- 15 km of cables of 0.4 kV voltage level.

The closed distribution system ELMAG started operating on September 1, 2022.

In 2022, 2.2 GWh of electricity was withdrawn from the distribution system into the closed distribution system ELMAG.

In line with Chapter XII of the Methodology for Setting Electricity Distribution Use-of-System Charge, closed distribution use-of-system charge is set as medium value between established and applied tariffs for tariff elements “active power”, “active energy” and tariff element “reactive energy” of all energy entities performing electricity distribution and distribution system operation for the relevant category, i.e. system user group.

The closed electricity distribution use-of-system charge is set in a manner referred to in paragraph 1 of the chapter XII of the Methodology regardless of the fact whether that system is connected to the electricity transmission system or to the electricity distribution system.

Closed distribution system operator indicates closed distribution use-of-system charges per each tariff for tariff elements and according to categories and system users groups and charges the closed distribution use-of-system charges by applying provisions of the chapters V, VI, IX and X of the given methodology.

3.6 Electricity market

Electricity market in Serbia includes:

- bilateral electricity market;
- balanced electricity market and
- organised electricity market.

The scheme of electricity market at the end of 2022 is given in figure 3-7.

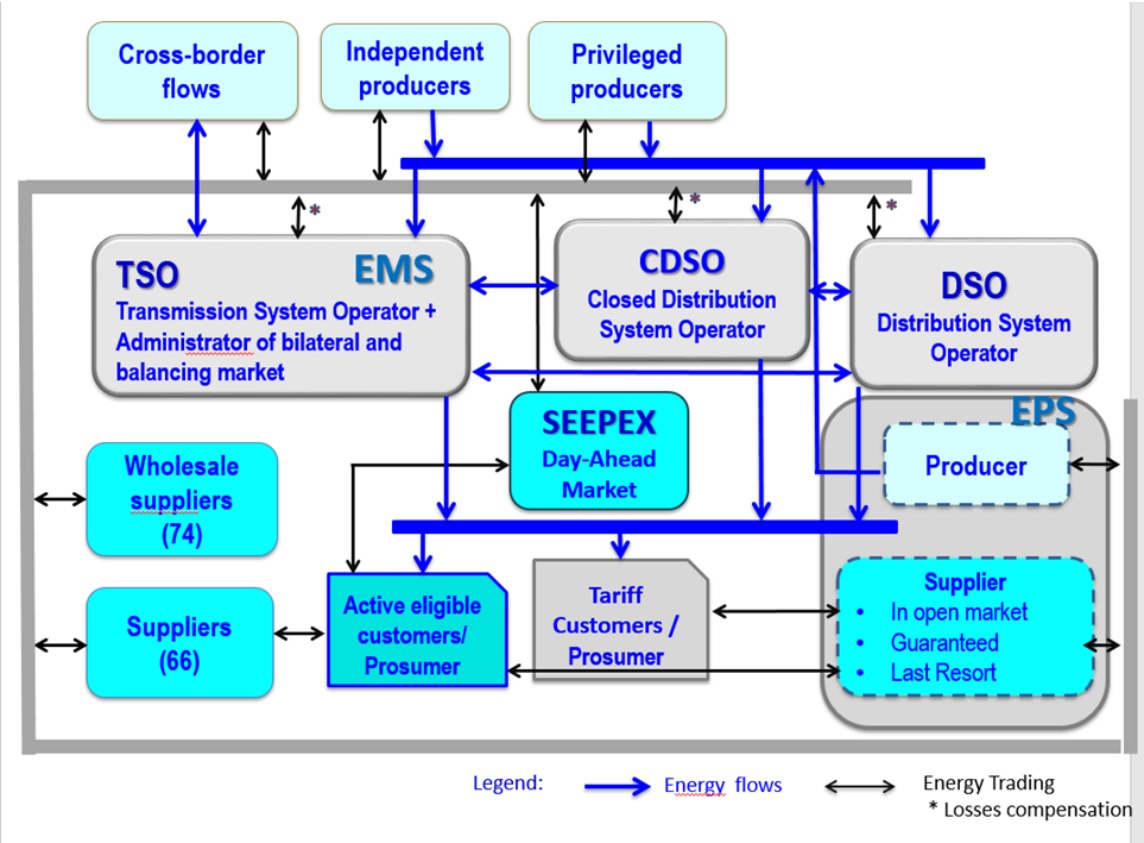

Figure 3-7: Electricity market scheme in 2022

Electricity market players are the following:

- electricity producer;
- electricity supplier;
- wholesale electricity supplier;
- final customer;
- aggregator[4];
- prosumer;
- transmission system operator in case of provision of system services, system balancing, provision of the safe system operations and electricity purchase for loss recovery within the transmission system;
- distribution system operator in case of electricity purchase for loss recovery within the distribution system;
- electricity closed distribution system operator and
- market operator.

3.6.1 Bilateral electricity market

Both electricity purchase and sales are organised on the bilateral market directly between market players, while on the wholesale bilateral market, the players traded in electricity at open market prices, while on the retail bilateral market, supply was organised at open market prices and regulated prices due to the fact that since 2014, all customers except for households and small customers have been obliged to purchase electricity in the open market. Since 2015, households and small customers have an option to select a supplier in the open market and they could always switch back to the guaranteed supplier.

[4] Aggregator was recognised in the Energy Law as a market player but their role should be defined in bylaws. In 2022, there were no aggregators in the Republic of Serbia.

3.6.1.1 Wholesale market

In 2022, wholesale electricity market was based on trade between suppliers since, except for CHP Pančevo and wind plants which are privileged producers, there are almost no big independent electricity producers at all. The activities of the suppliers in the open market are mostly concerned with the field of cross-border exchange, mostly for transit through Serbia which is dominant due to the central geographic position of the power system of Serbia in the region with 8 existing borders, as well as for the purpose of export and import. In comparison to 2021, bilateral trade between suppliers dropped by approximately by 40% in 2022. When analysing this datum, one should take into account radical changes which affected the European energy source market during 2022. A considerable growth of electricity prices resulted in having some of traders in whole Europe face losing liquidity which endangered traders' trust into bilateral market and thereby, it reduced the scope of trade in this market. In 2022, electricity import in Serbia was by 80% higher than export. In the first quarter of the year, export was dominant and it was three times higher than import. Export was dominant in the last quarter of 2022 and it was then on the same level of import in the same quarter.

Electricity quantities which were sold and purchased in the organised market were lower by around 3 percents in comparison to the previous year. The total volume of electricity which was traded within the organized market in the purchase direction and in sales direction amounted to 3,205 GWh.

There were 44 active market participants which was 10 fewer than in 2021. Out of the number, there were 4 suppliers operating in the field of final customers' supply.

Figure 3-8 indicates electricity quantities for each of suppliers' activities in 2021 and 2022[5] but the data on the sale in the open market do not include electricity sold to cover one's own demand in the vertically-integrated supplier company.

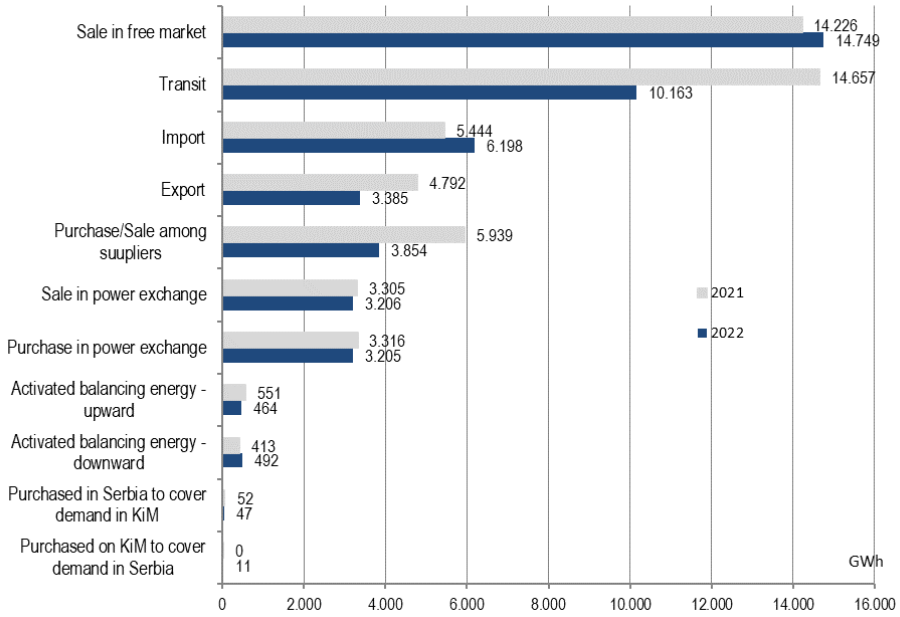

Figure 3-8: Electricity quantities for each supplier activity in 2021 and 2022

This is the list of suppliers which sold energy to other suppliers in the bilateral electricity market (some of the names of companies are given in Cyrillic letter since this is their official name in the licence):

1. *"ENERGY FINANCING TEAM (SWITZERLAND) AG", St. Gallen, Švajcarska*
2. *"HSE BALKAN ENERGY" д.о.о. Друштво за инжењеринг и трговину*
3. *Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије" а.д. Нови Сад*
4. *ПЕТРОЛ, Словенска енергетска дружба, д.д., Љубљана*
5. *ALPIQ ENERGY SE, Prag*
6. *"ENER TRADE SHPK", (Тирана) Албанија*
7. *„DANSKE COMMODITIES A/S", Архус, Данска*
8. *АХРО друштво са ограниченом одговорношћу, Београд*
9. *"MVM Partner Energiakereskedelmi Zártkörűen Működő Részvénytársaság", Budimpešta, Mađarska*
10. *Мјешовити холдинг "ЕЛЕКТРОПРИВРЕДА РЕПУБЛИКЕ СРПСКЕ", Требиње*

[5] All the data given in tables were submitted until February 15, 2022 and are entitled to modification in line with the Electricity Market Rules.

11. *"TINMAR ENERGY S.A.", Bukurešt*
12. *ИНТЕРЕНЕРГО доо, Љубљана*
13. *Јавно предузеће "Електропривреда Србије" Београд*
14. *"NOMAD ENERGY COMPANY LTD", Софија, Бугарска*
15. *Привредно друштво "SCM POWER" д.о.о. Београд*
16. *"TWINFIN TESLA" доо, Београд*
17. *"AXPO BULGARIA EAD", Софија, Бугарска*
18. *"FREEPOINT COMMODITIES EUROPE LLP", Рединг, Велика Британија*
19. *"ENERGI DANMARK A/S", Архус, Данска*
20. *"MET SRB" д.о.о. Београд*
21. *Привредно друштво "TERNA ENERGY TRADING" доо, Нови Београд*
22. *“RESTART ENERGY" доо Београд-Нови Београд*
23. *AXPO SOLUTIONS AG", Baden, Švajcarska*
24. *"GRAND ENERGY DISTRIBUTION", Софија, Бугарска*
25. *ХРВАТСКА ЕЛЕКТРОПРИВРЕДА д.д., Загреб*
26. *EFT TRADE д.о.о., Београд*
27. *“NOVA COMMODITIES“ друштво са ограниченом одговорношћу, Београд*
28. *"AYEN ENERGY TRADING" доо Београд-Врачар*
29. *Привредно друштво "GREEN BALANCING GROUP" доо, Београд*
30. *ЕЛЕКТРОПРИВРЕДА ЦРНЕ ГОРЕ АД - НИКШИЋ, НИКШИЋ*
31. *"L-NRG Energiakereskedelmi ZRt", Будимпешта, Мађарска*
32. *Предузеће "ENERGY DELIVERY SOLUTIONS" д.о.о., Београд*
33. *ДРУШТВО ЗА ТРГОВИНУ "HEP-ENERGIJA" ДОО БЕОГРАД*
34. *"CENTRICA ENERGY TRADING A/S", Данска.*

This is the list of suppliers which purchased energy from other suppliers in the bilateral electricity market:

1. *Јавно предузеће "Електропривреда Србије" Београд*
2. *Привредно друштво "SCM POWER" д.о.о. Београд*
3. *"ENERGY FINANCING TEAM (SWITZERLAND) AG", St. Gallen, Швајцарска*
4. *"HSE BALKAN ENERGY" д.о.о. Друштво за инжењеринг и трговину*
5. *"GEN-I", trgovanje in prodaja električne energije, d.o.o., Krško, Slovenija*
6. *AXPO SOLUTIONS AG", Baden, Švajcarska*
7. *Мјешовити холдинг "ЕЛЕКТРОПРИВРЕДА РЕПУБЛИКЕ СРПСКЕ", Требиње*
8. *"ENER TRADE SHPK", (Тирана) Албанија*
9. *„RESTART ENERGY" доо Београд-Нови Београд*
10. *"MVM Partner Energiakereskedelmi Zártkörűen Működő Részvénytársaság", Будимпешта, Мађарска*
11. *AXPO друштво са ограниченом одговорношћу,Београд*
12. *"AXPO BULGARIA EAD", Софија, Бугарска*
13. *ДРУШТВО ЗА ТРГОВИНУ "HEP-ENERGIJA" ДОО БЕОГРАД*
14. *EFT TRADE д.о.о., Београд*
15. *Предузеће "ENERGY DELIVERY SOLUTIONS" д.о.о., Београд*
16. *"FREEPOINT COMMODITIES EUROPE LLP", Рединг, Велика Британија*
17. *ИНТЕРЕНЕРГО доо, Љубљана*
18. *ЕЛЕКТРОПРИВРЕДА ЦРНЕ ГОРЕ АД - НИКШИЋ, НИКШИЋ*
19. *"L-NRG Energiakereskedelmi ZRt", Будимпешта, Мађарска*
20. *Привредно друштво „ЕПЦГ“ д.о.о. Београд*
21. *DANSKE COMMODITIES A/S", Архус, Данска*
22. *ХРВАТСКА ЕЛЕКТРОПРИВРЕДА д.д., Загреб*
23. *Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије" а.д. Нови Сад*
24. *Привредно друштво "TERNA ENERGY TRADING" доо, Нови Београд*
25. *“NOVA COMMODITIES“ друштво са ограниченом одговорношћу, Београд*
26. *EVN Trading д.о.о. Београд*
27. *ПЕТРОЛ, Словенска енергетска дружба, д.д., Љубљана*
28. *"AYEN ENERGY TRADING" доо Београд-Врачар*
29. *ПЕТРОЛ друштво за трговину нафтом и нафтним дериватима д.о.о. Београд*
30. *Привредно друштво "GREEN BALANCING GROUP" доо, Београд.*

This is the list of suppliers which imported electricity:

1. *ALPIQ ENERGY SE, Праг*
2. *Привредно друштво "TERNA ENERGY TRADING" доо, Нови Београд*
3. *"HSE BALKAN ENERGY" д.о.о. Друштво за инжењеринг и трговину*
4. *Мјешовити холдинг "ЕЛЕКТРОПРИВРЕДА РЕПУБЛИКЕ СРПСКЕ", Требиње*
5. *"ENERGY FINANCING TEAM (SWITZERLAND) AG", St. Gallen, Швајцарска*
6. *"MFT Energy" A/S, Aarhus C., Kraljevina Danska*
7. *DANSKE COMMODITIES A/S", Архус, Данска*
8. *Јавно предузеће "Електропривреда Србије" Београд*
9. *ENERGI DANMARK A/S", Архус, Данска*
10. *ПЕТРОЛ, Словенска енергетска дружба, д.д., Љубљана*
11. *ХРВАТСКА ЕЛЕКТРОПРИВРЕДА д.д., Загреб*
12. *"ENER TRADE SHPK", (Тирана) Албанија*
13. *"MVM Partner Energiakereskedelmi Zártkörűen Működő Részvénytársaság", Будимпешта, Мађарска*
14. *"AXPO BULGARIA EAD", Софија, Бугарска*
15. *ИНТЕРЕНЕРГО доо, Љубљана*
16. *"NOMAD ENERGY COMPANY LTD", Софија, Бугарска*
17. *" Привредно друштво "ELMAKO-ENERGY" доо, Београд*
18. *GEN-I друштво са ограниченом одговорношћу Београд*
19. *Привредно друштво "EDF TRADING LIMITED", Лондон, Велика Британија*
20. *"FREEPOINT COMMODITIES EUROPE LLP", Рединг, Велика Британија*
21. *"TINMAR ENERGY S.A.", Bukurešt*
22. *"CENTRICA ENERGY TRADING A/S", Данска*
23. *ЕЛЕКТРОПРИВРЕДА ЦРНЕ ГОРЕ АД - НИКШИЋ, НИКШИЋ*
24. *AXPO друштво са ограниченом одговорношћу,Београд*
25. *Привредно друштво "ENERGOVIA EOOD", Софија, Бугарска*
26. *"MET SRB" д.о.о. Београд*
27. *"STATKRAFT MARKETS Gmbh", Дизелдорф*
28. *AXPO SOLUTIONS AG", Baden, Švajcarska*
29. *"GRAND ENERGY DISTRIBUTION", Софија, Бугарска*
30. *"AYEN ENERGY TRADING" доо Београд-Врачар*
31. *“NOVA COMMODITIES“ друштво са ограниченом одговорношћу, Београд*
32. *Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије" а.д. Нови Сад*
33. *Привредно друштво "SENTRADE RS" доо, Београд*
34. *"L-NRG Energiakereskedelmi ZRt", Будимпешта, Мађарска*
35. *Предузеће "ENERGY DELIVERY SOLUTIONS" д.о.о., Београд*
36. *Друштво са ограниченом одговорношћу за трговину и услуге MVM PARTNER SERBIA д.о.о., Београд*
37. *ČEZ A.S", Праг, Чешка Република*
38. *Привредно друштво "EDF TRADING LIMITED", Лондон, Велика Британија*
39. *ENERJISA EUROPE KORLATOLT FELELOSSEGU TARSASAG, Mađarska.*

This is the list of suppliers which exported electricity:

1. *Привредно друштво "TERNA ENERGY TRADING" доо, Нови Београд*
2. *ХРВАТСКА ЕЛЕКТРОПРИВРЕДА д.д., Загреб*
3. *"MFT Energy" A/S, Aarhus C., Kraljevina Danska*
4. *"HSE BALKAN ENERGY" д.о.о. Друштво за инжењеринг и трговину*
5. *"ENERGI DANMARK A/S", Архус, Данска*
6. *Привредно друштво "SCM POWER" д.о.о. Београд*
7. *DANSKE COMMODITIES A/S", Архус, Данска*
8. *"STATKRAFT MARKETS Gmbh", Дизелдорф*
9. *Мјешовити холдинг "ЕЛЕКТРОПРИВРЕДА РЕПУБЛИКЕ СРПСКЕ", Требиње*
10. *ALPIQ ENERGY SE, Prag*
11. *AXPO SOLUTIONS AG", Баден, Швајцарска*
12. *"FREEPOINT COMMODITIES EUROPE LLP", Рединг, Велика Британија*
13. *ИНТЕРЕНЕРГО доо, Љубљана*
14. *"MVM Partner Energiakereskedelmi Zártkörűen Működő Részvénytársaság", Будимпешта, Мађарска*
15. *ЕЛЕКТРОПРИВРЕДА ЦРНЕ ГОРЕ АД - НИКШИЋ, НИКШИЋ*
16. *"CENTRICA ENERGY TRADING A/S", Данска*
17. *Јавно предузеће "Електропривреда Србије" Београд*
18. *"AXPO BULGARIA EAD", Софија, Бугарска*
19. *Привредно друштво "ENERGOVIA EOOD", Софија, Бугарска*

20. *"ENER TRADE SHPK", (Тирана) Албанија*
21. *Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије"а.д. Нови Сад*
22. *Привредно друштво "SENTRADE RS" доо, Београд*
23. *Предузеће "ENERGY DELIVERY SOLUTIONS" д.о.о., Београд*
24. *ПЕТРОЛ, Словенска енергетска дружба, д.д., Љубљана*
25. *"L-NRG Energiakereskedelmi ZRt", Будимпешта, Мађарска*
26. *Друштво са ограниченом одговорношћу за трговину и услуге MVM PARTNER SERBIA д.о.о., Београд*
27. *АХРО друштво са ограниченом одговорношћу,Београд*
28. *"NOVA COMMODITIES" друштво са ограниченом одговорношћу, Београд*
29. *EVN Trading д.о.о. Београд*
30. *ČEZ A.S", Праг, Чешка Република*
31. *"AYEN ENERGY TRADING" доо Београд-Врачар*
32. *ENERJISA EUROPE KORLATOLT FELELOSSEGU TARSASAG, Мађарска*
33. *"TINMAR ENERGY S.A.", Bukurešt.*

This is the list of suppliers which operated in the field of electricity transit:

1. *DANSKE COMMODITIES A/S", Архус, Данска*
2. *"ENERGY FINANCING TEAM (SWITZERLAND) AG", St. Gallen, Швајцарска*
3. *EFT TRADE д.о.о., Београд*
4. *"ENERGI DANMARK A/S", Архус, Данска*
5. *ИНТЕРЕНЕРГО доо, Љубљана*
6. *"MVM Partner Energiakereskedelmi Zártkörűen Működő Részvénytársaság", Будимпешта, Мађарска*
7. *"AYEN ENERGY TRADING" доо Београд-Врачар*
8. *EVN Trading д.о.о. Београд*
9. *ХРВАТСКА ЕЛЕКТРОПРИВРЕДА д.д., Загреб*
10. *"NOMAD ENERGY COMPANY LTD", Софија, Бугарска*
11. *"STATKRAFT MARKETS Gmbh", Дизелдорф*
12. *АХРО друштво са ограниченом одговорношћу,Београд*
13. *"ENER TRADE SHPK", (Тирана) Албанија*
14. *Предузеће "ENERGY DELIVERY SOLUTIONS" д.о.о., Београд*
15. *"АХРО BULGARIA EAD", Софија, Бугарска*
16. *ПЕТРОЛ, Словенска енергетска дружба, д.д., Љубљана*
17. *Привредно друштво "ENERGOVIA EOOD", Софија, Бугарска*
18. *"MET SRB" д.о.о. Београд*
19. *Привредно друштво „ЕПЦГ" д.о.о. Београд*
20. *"FREEPOINT COMMODITIES EUROPE LLP", Рединг, Велика Британија*
21. *Друштво са ограниченом одговорношћу за трговину и услуге MVM PARTNER SERBIA д.о.о., Београд*
22. *"NOVA COMMODITIES" друштво са ограниченом одговорношћу, Београд*
23. *"CENTRICA ENERGY TRADING A/S", Данска*
24. *Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије"а.д. Нови Сад*
25. *Привредно друштво "SENTRADE RS" доо, Београд.*

In 2022, based on the data submitted by electricity suppliers (commercial data), transit decreased by 31%, export increased by 13% while the export dropped by 30% in comparison to the previous year. Export was meaningful in the last quarter of the year thanks to favourable hydrological circumstances and mild winter. The export was the highest in the first quarter of the year and it was due to the lack of good-quality coal and the accident which occurred at the end of 2021 in the biggest thermal power plant in Obrenovac.

The scale of import, export and transit realised by suppliers for each month of 2022 is indicated in Figure 3-9.

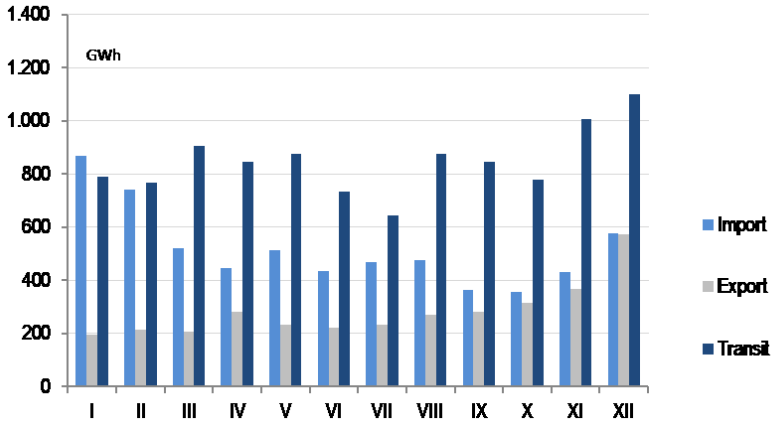

Figure 3-9: Import, export and transit of suppliers in 2022

Figure 3-10 indicates electricity purchase/sale between suppliers, purchase of PE *EPS* from other suppliers and sales of PE *EPS* to other suppliers. In the first quarter of 2022, PE *EPS* purchased considerable electricity quantities from other suppliers. During the whole year, PE *EPS*' sale of electricity to other suppliers was negligible. Bearing in mind the crisis which affected the electricity sector in 2022, PE *EPS* has not been selling electricity to other suppliers since April. Produced electricity was used for the supply of customers in Serbia. The trade between other suppliers was present during the whole year and the highest scope of it was recorded in January, February and December.

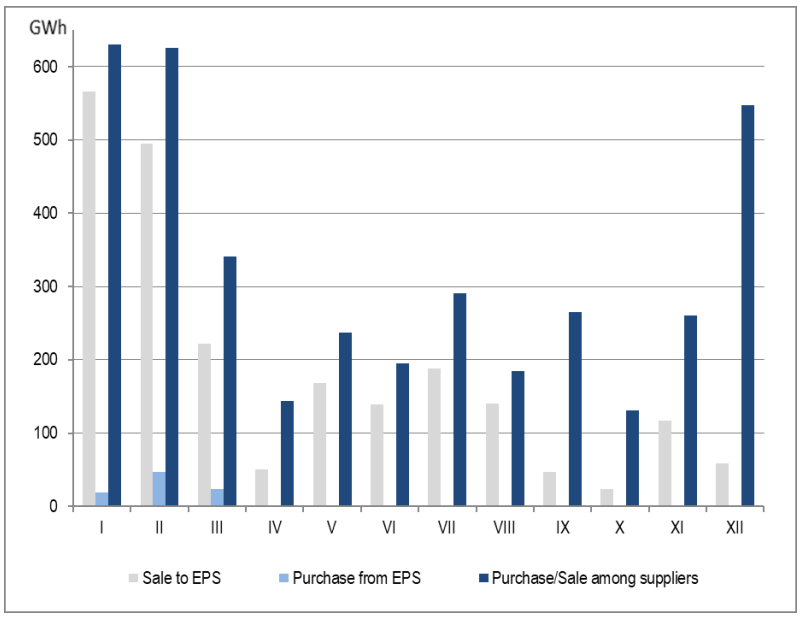

Figure 3-10: Purchase/sales between suppliers, i.e. between suppliers and PE *EPS* in 2022

Relevant indicators of development level and electricity market concentration in Serbia (without APKM) in 2022 are given in Table 3-24. The following data are given for each of indicated supplier's activities:

- total electricity quantity;
- electricity share traded by three suppliers with the biggest scale of trade activities in total electricity quantity per each activity;
- value of Herfindahl-Hirschman Index (HHI), indicating realised level of market concentration[6] and
- evaluation of market concentration level per individual activities[7].

[6] Herfindahl-Hirschman Index is defined as the sum of squares of share of a single company in the market. The lower the value, the more developed is market competition.

[7] Market concentration limits are the following:
HHI < 1000 – not concentrated
1001 < HHI < 2000 - moderately concentrated
HHI >2001 - highly concentrated market

Table 3-24: Electricity market concentration level in Serbia in 2022

Supplier's activity in 2022	Electricity quantity (GWh)	Share of three suppliers with the greatest trading scale [%]		Herfindahl-Hirschman Index - HHI	Market concentration level
	(GWh)	(%)	(GWh)		
Trade in organised market (exchange)					
Sale	3,205	40	1,292	833	Low
Purchase	3,205	46	1,496	1,084	Moderately concentrated
Trade between suppliers in bilateral market					
Sale	3,853	30	1,099	568	Low
Purchase	3,853	75	2,725	3,895	High

In 2022, trade in organized market, power exchange, is on the same level as last year (when it amounted to 3,305 GWh) which indicates that the market is more stable in contrast to big changes in the scale of trade during the first two years of power exchange operation. The trade in bilateral market was half the size of the one last year (when it amounted to 5,939 GWh). Retail market concentration is very high with a visible growth in comparison to the previous year which is a consequence of the dominant position of PE *EPS* in the retail market.

3.6.1.2 Retail market

3.6.1.2.1 Electricity quantities delivered to final customers

In 2022, 30,242 GWh were sold and delivered to final customers (without the power plants consumption meant for production), which is by around 216 GWh less than the total quantities delivered in 2021 when the greatest quantity of electricity was delivered in the past ten years. Table 3-25 indicates electricity consumption in Serbia (without APKM) in the period 2013-2022, including electricity producers withdrawn from the transmission system in order to meet their own demand.

Table 3-25: Electricity consumption structure in the period 2013-2022

GWh

Consumption category	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2022/ 2021
Households	14,147	13,802	14,062	13,931	13,815	13,415	13,340	13,718	13,877	13,379	**96.4**
Other customers connected to low	5,580	5,322	5,546	5,665	5,746	5,756	5,707	5,376	5,740	5,696	**99.2**
Customers connected to low voltage in total	**19,727**	**19,124**	**19,608**	**19,596**	**19,561**	**19,171**	**19,047**	**19,094**	**19,617**	**19,075**	**97.2**
Customers connected to medium voltage (10,	5,856	5,985	6,254	6,550	6,865	7,069	7,311	7,280	7,807	7,905	**101.3**
Customers connected to high voltage (110 kV)	2,415	2,555	2,669	2,673	2,695	2,798	2,649	2,665	3,034	3,262	**107.5**
Electricity delivered to final customers	**27,998**	**27,664**	**28,531**	**28,819**	**29,121**	**29,038**	**29,007**	**29,039**	**30,458**	**30,242**	**99.3**
TPP and HPP consumption to cover	503	401	416	391	394	427	467	429	404	362	**89.6**
Total consumption	**28,457**	**28,501**	**28,065**	**28,947**	**29,210**	**29,515**	**29,465**	**29,474**	**30,862**	**30,604**	**99.2**

In comparison to 2021, final customers consumption (without the consumption of power plants for production purposes) in 2022 was lower by 0.7%. The consumption of households by 3.6% (498 GWh) and of other customers connected to the low voltage by 0.8% (44 GWh). On the other hand, high voltage customers consumption increased by 1.3% (228 GWh) and medium voltage customers consumption increased by 7.5% (228 GWh). Temperatures during winter months were low and this had an impact on the reduction of consumption in the winter season in comparison to 2021 when electricity is consumed for heating purposes in households. Producers withdrew 11.4% less electricity to cover their own demand (consumption of power plants for production purposes) than last year. When analyzing the data during the surveyed ten-year period, one would take into account the fact that there was a large number of interruptions in the supply of customers in 2014 due to weather disasters – floods and icy rain which some of the regions in the Republic of Serbia faced several times during 2014.

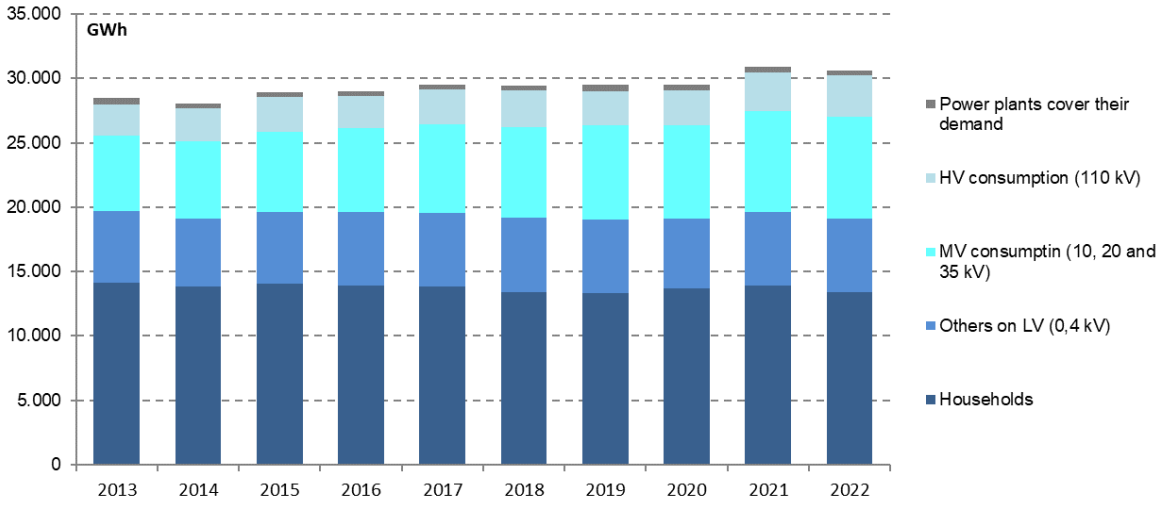

Figure 3-11: Electricity consumption structure in Serbia in the period 2013-2022 (without APKM)

The total number of delivery points for customers' delivery in the Republic of Serbia without APKM (without metering points of facilities within Železnice Srbije/Serbian Railroad – there are 42 of them on the transmission system) at the end of 2022 amounted to 3,761,153. Compared to 2021, the number was increased by 1.0%.

Table 3-26: Number of metering points in 2021 and 2022

Consumption category	2021	2022	Index 2022/2021
Households	3,306,173	3,333,214	100.8%
Other customers connected to low voltage (0.4 kV)	413,902	422,231	102.0%
Customers connected to medium voltage (10, 20 and 35 kV)	5,454	5,656	103.7%
Customers connected to high voltage (110 kV)	51	52	102.0%
Total number of metering points	**3,725,580**	**3,761,153**	**101.0%**

3.6.1.2.2 Sale of electricity to final customers

The total electricity sale to final customers (without consumption of power plants for production purposes) amounted to 30,242 GWh in 2022. In comparison to 2021, it decreased by 0.7% (216 GWh).

Since 2014, all customers except for households and small customers (that, in order to be awarded with a small customer status, in addition to the requirement related to the annual income and the number of employees, also have a limit of 30,000 kWh of consumption in the previous calendar year and a requirement imposing that all their facilities have to be connected to the network of less than 1 kV voltage) have been obliged to purchase electricity in the open market. The market was fully open in 2015 when households and small customers, in addition to being entitled to guaranteed supply, have an option to select a supplier in the open market and they could always switch back to the guaranteed supply at regulated electricity prices.

Table 3-27: Electricity sale in retail market in 2019-2022

GWh

	2019	2020	2021	2022	Индекс 2022/2021.
Regulated market	14,637	14,935	15,207	14,641	96.3%
Open market	14,370	14,104	15,251	15,601	102.3%
Supply at open prices	14,261	14,032	15,041	15,487	103.0%
Supply of the last resort	109	72	210	114	54.3%
Total sale	**29,007**	**29,039**	**30,458**	**30,242**	99.3%

On the regulated market, 3.7% (566 GWh) less electricity was sold while 2.3% (350 GWh) more electricity was sold in the open market in comparison to 2021 (out of the number, 961 GWh less electricity was sold via the supply of the last resort in comparison to 2020).

3.6.1.2.3 Electricity sale in the regulated market

In 2022, electricity was purchased in the regulated market only by households and small scale customers. The established legal limit had a dominant effect to the reduction of supply in the regulated market until 2022 during which 48.4% of electricity which was consumed by final customers in total were delivered in the regulated market, which is 1.8% less than in 2021 (in 2021, 1.5% less energy was delivered in the regulated market in comparison to 2020). Electricity quantities delivered in the regulated market for each consumption category for the period 2018-2022 are indicated in Table 3-30. At the end of 2022, electricity was delivered to final customers at regulated prices to over 3.5 million metering points.

Pursuant to the 2004 Energy Law, regulated electricity prices for final customers were applied on January 1, 2008 for the first time, upon the positive opinion of the Energy Agency on the PE *EPS* proposal and the approval given by the Government of the Republic of Serbia. In 2022, the prices for guaranteed supply of final customers which were approved February 1, 2021 and of September 2022 were applicable.

The current regulated electricity prices for final customers are available on the Agency's website (www.aers.rs).

In 2022, reached average base price on SEEPEX power exchange which does not contain transmission and distribution costs amounted to 272.9 €/MWh on the annual level. Wholesale price for the procurement of electricity, which serves as the base for setting the price for guaranteed supply of final customers when the approval is given to the price on September 1, 2022, amounted to 3.27 RSD/kWh, i.e. 27.84 €/MWh, calculated with the average € exchange rate for 2022.

Table 3-28: Electricity quantities delivered in the regulated market

Consumption category	Electricity quantities delivered in the regulated market (GWh)				
	2018	2019	2020	2021	2022.
Low voltage (0.4 kV I grade)	321	247	231	261	232
- 0.4 kV II grade	1,101	1,048	990	1,078	1,042
- households	13,401	13,326	13,701	13,856	13,356
Public lighting	28	16	13	12	10
TOTAL guaranteed supply	**14,851**	**14,637**	**14,935**	**15,207**	**14,640**

Table 3-29 represents the trend of average realised annual prices for customers entitled to guaranteed (public) supply, i.e. to electricity being purchased at regulated prices. The level and trend of given average prices (VAT and duties free) for each year separately depend primarily from the dynamics and electricity quantities consumed by certain customers' categories and groups during the year and on the date of application of approved prices.

Table 3-29: Average annual regulated prices for final customers (VAT and duties free)

RSD/kWh

Consumption category	Realised average annual price				
	2018	2019	2020	2021	2022
Low voltage (0.4 kV I grade)	11.31	11.43	12.21	11.57	11.72
- 0.4 kV II grade	8.91	8.96	9.39	9.67	9.97
- households	6.84	6.88	7.14	7.37	7.60
Public lighting	6.53	6.56	6.80	7.01	7.21
Total low voltage	7.09	7.10	7.36	7.60	7.83
TOTAL AVERAGE guaranteed supply (as universal service)	**7.09**	**7.10**	**7.36**	**7.60**	**7.83**

Based on consumption of this category achieved in 2022, 65% of energy spent in the green zone, 33% in the blue zone and 2% in the red zone.

Table 3-30: Prices for mass consumption customer category for each consumption zone

Customer category		Consumed active energy	Tariffs*	
			Since 01/12/2021	Since 01/09/2022
Mass consumption		**(MWh)**	**(RSD/kWh)**	**(RSD/kWh)**
Public supplier's expenditure			142.62	141.77
Calculation power			52,158	54,258
Active energy				
HT green	up to 350 kWh	4,899,523	6,408	6,896
LT green	up to 350 kWh	2,461,967	1,602	1,724
ST green	up to 350 kWh	1,936,394	5,607	6,034
HT blue	351-1600 kWh	2,495,287	9,612	10,344
LT blue	351-1600 kWh	1,544,072	2,403	2,586
ST blue	351-1600 kWh	743,102	8,410	9,051
HT red	over 1600 kWh	175,560	19,224	20,688
LT red	over 1600 kWh	95,913	4,806	5,172
ST red	over 1600 kWh	43,989	16,821	18,102
Total		14,395,806		

*Prices are given without VAT (20%) and duty (7.5%)
HT (High Tariff)
LT (Low Tariff)
ST (Single Tariff)

Figures 3-12 and 3-15 indicate the comparison of electricity prices for reference customers from two categories -households and industry in Serbia, EU countries and the region. The prices were applied in the second half of 2022 and calculated in line EUROSTAT methodology and given in their reports. One should bear in mind that the reference average annual electricity consumption in households which is used in EUROSTAT methodologies between 2,500 and 5,000 kWh and that it is in line with the European average and standards, while the average annual consumption in households in Serbia is higher. The prices in Serbia indicated for reference customers from the household category are the lowest, if considered without VAT and duties. The prices in Serbia are not only the lowest in comparison to developed European countries but also in comparison to the countries in the region. The prices for reference customers from the household category with VAT and duties are only lower in Turkey, to a great extent due to the given datum from the first half of 2022, devaluation of the Turkish lira during previous years as well as well as bearing in mind the fact that VAT for electricity in Serbia amounts to 20% while the excise amounts to 7.5%.

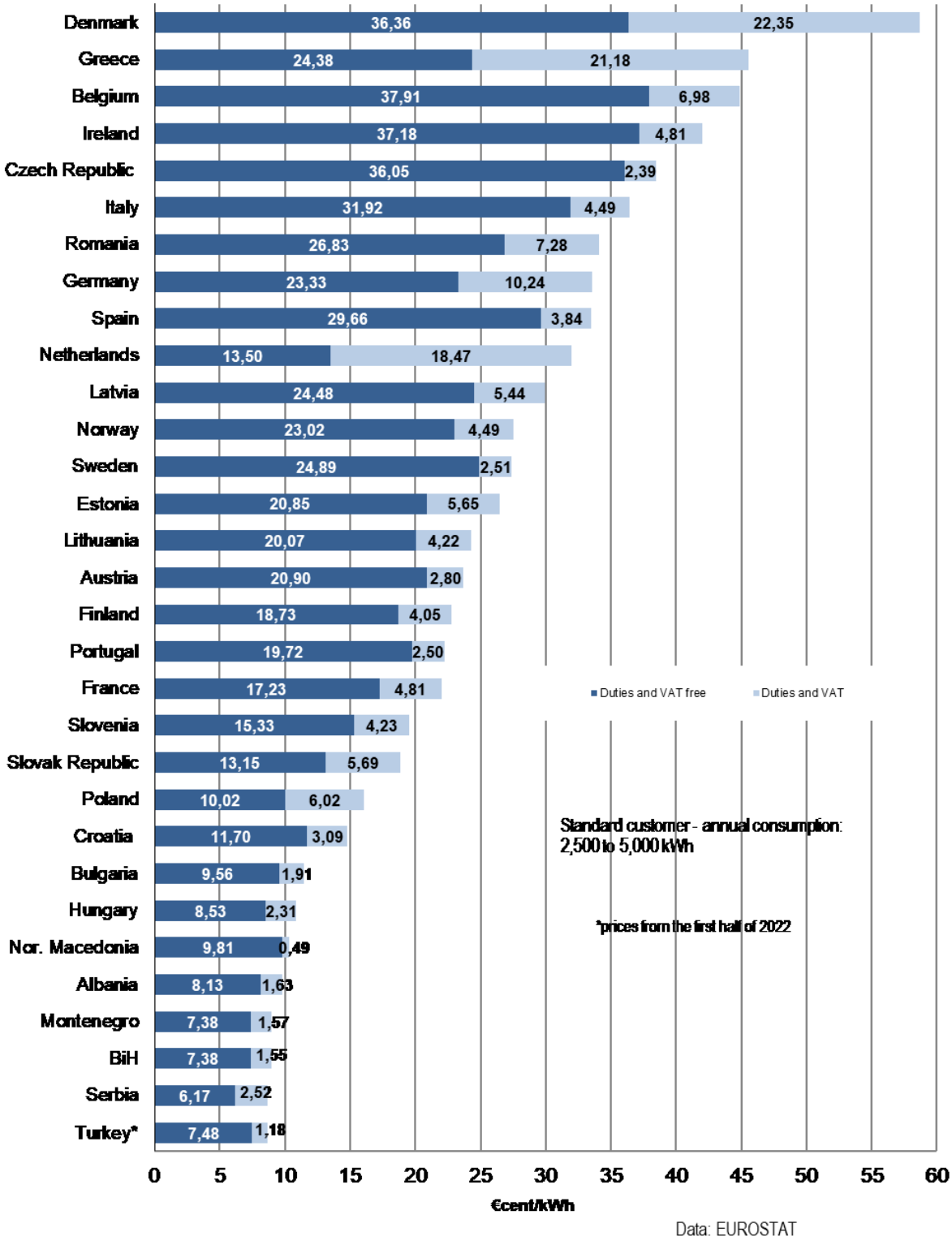

Figure 3-12: Electricity prices for households – second half of 2022

Figure 3-13 indicates a more detailed structure of retail electricity price for households in some of European capitals in December 2022. The data indicate that the energy price in Belgrade is low (the one in Budapest is the only one lower than in Belgrade) while the (transmission and distribution) use-of-system charges recorded in Belgrade are among the lowest ones (the charges in Lisbon, Copenhagen and Athens are lower).

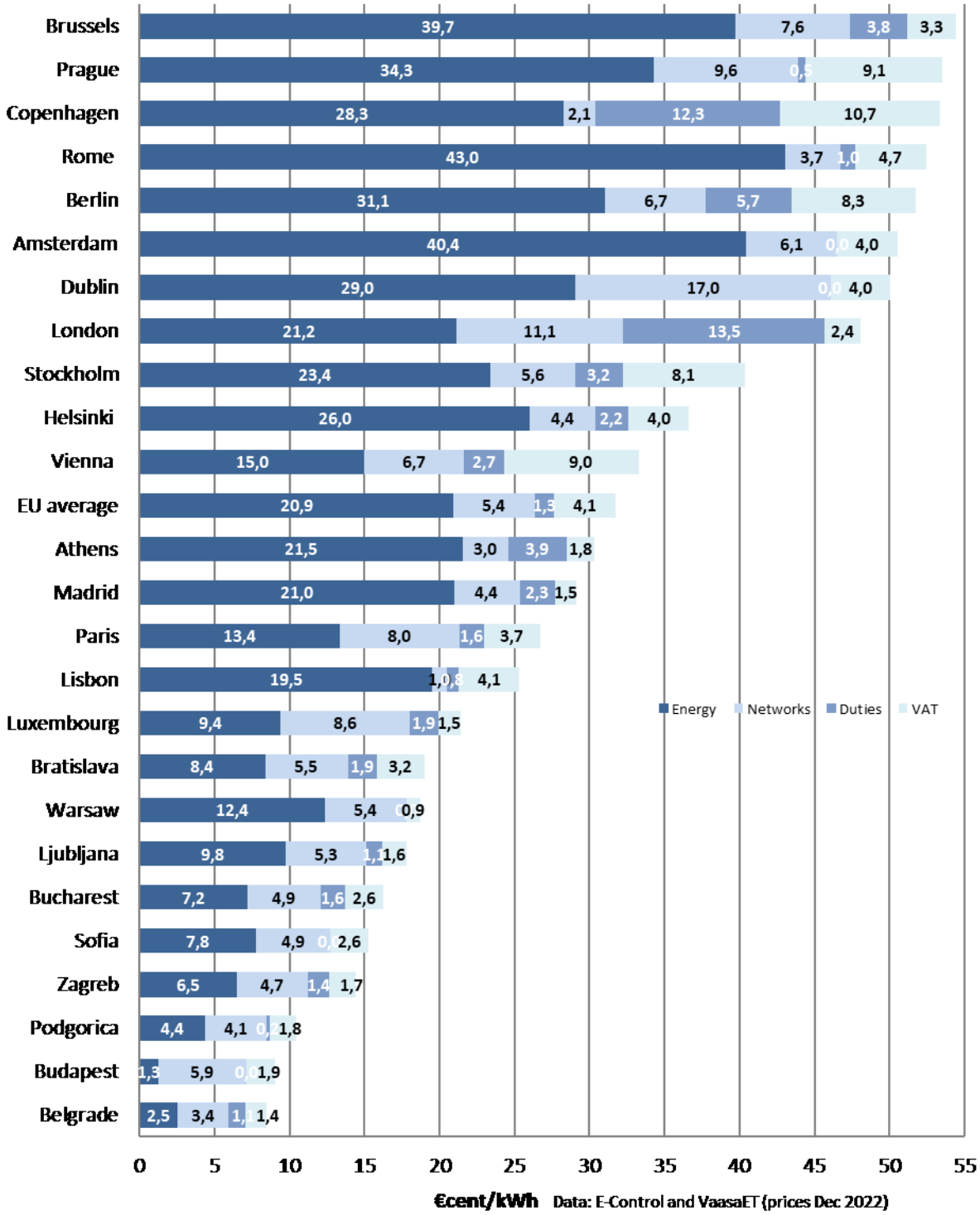

Figure 3-13: Structure of retail electricity price for households in some of European capitals in December 2022

So as to make a better comparison between electricity household prices, figure 3-14 indicates the structure of electricity final price for households at purchase power parity in come of European capitals in December 2022. In such a way, the differences in living standards which exist between different European countries were taken into account. In this case as well, electricity household prices in Belgrade were the lowest ones.

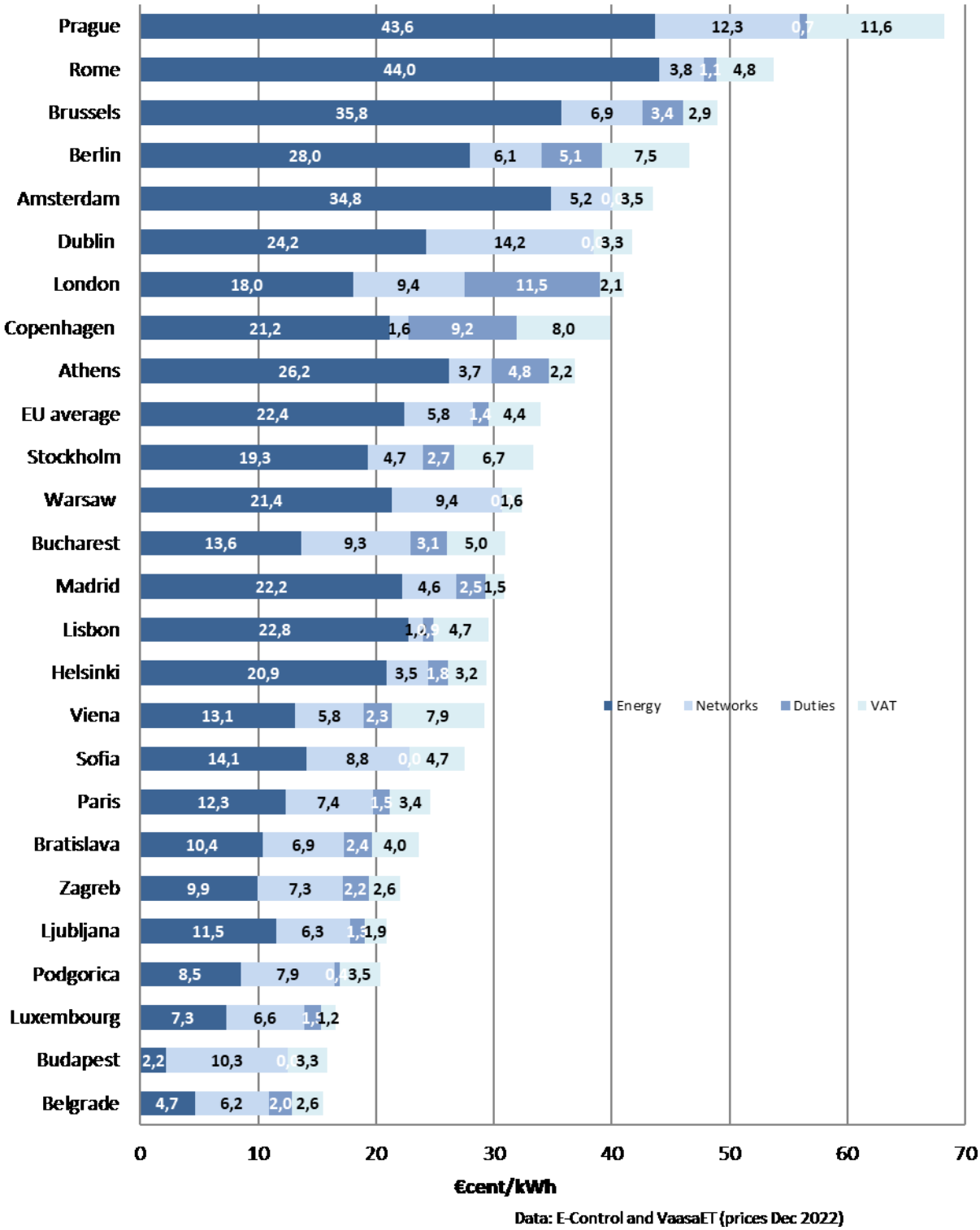

Figure 3-14: Electricity final price structure for households in some European capitals in December 2022 at purchase power parity

In 2022, the given prices in Serbia for reference customers for industry are higher in comparison to some of the countries in the region (Montenegro, Bosnia and Herzegovina and Albania) and Turkey.

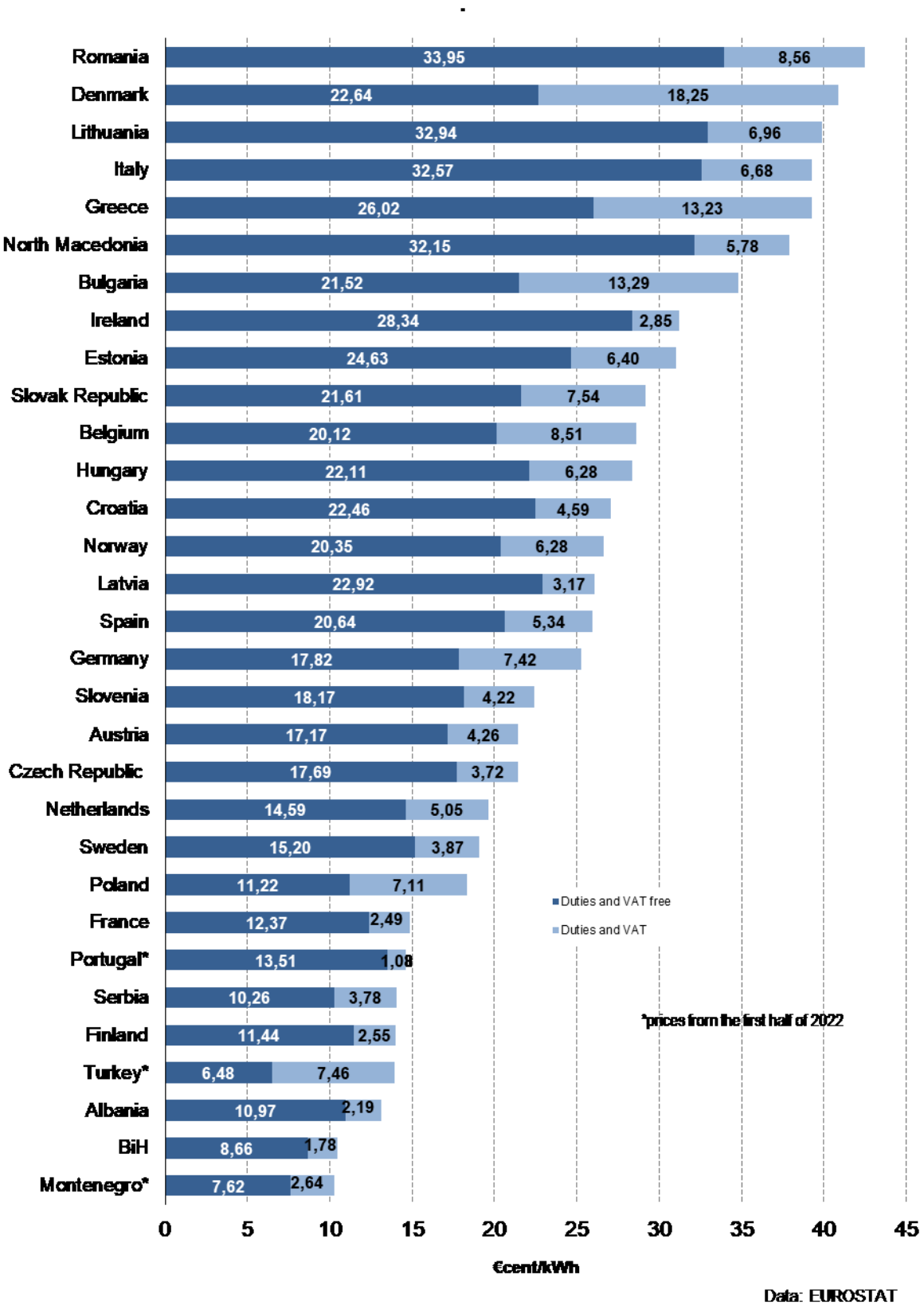

Figure 3-15: Electricity prices for industry – second half of 2022

3.6.1.2.4 Electricity sale in the open market

Since 2015, all final customers are entitled to purchase electricity in the open market. In 2022, 15,661 GWh of electricity were delivered in the open market, excluding the energy delivered via supply of the last resort, which amounts to 51.2% of final customers' consumption. To customers in the open market, electricity was delivered to 155 thousands metering points among which households account for 3.7 thousands (apartments owned by companies which purchase electricity in the open market).

Table 3-31: Electricity quantities delivered in the open market

Consumption category	Electricity quantities delivered in the open market (GWh)				
	2018	2019	2020	2021	2022
High voltage (110 kV)	2,798	2,637	2,653	3,019	3,262
35 kV	1,006	1,101	1,148	1,144	1,002
10 kV	6,022	6,176	6,105	6,560	6,860
Total high and medium voltage	**9,826**	**9,914**	**9,906**	**10,723**	**11,124**
Low voltage (0.4 kV I grade)	2,788	2,863	2,680	2,819	2,849
- 0.4 kV II grade	918	979	951	1,018	1,071
- households	13	14	17	20	22
Public lighting	472	491	478	461	422
Total low voltage	**4,191**	**4,374**	**4,126**	**4,318**	**4,364**
TOTAL open supply	**14,017**	**14,261**	**14,032**	**15,041**	**15,488**

Out of 66 energy entities which were licenced for electricity supply at the end of 2022, 4 of them were active in the open retail market.

The sale of electricity to final customers in the open market increased by 2.3% in 2022 in comparison to 2021.

Out of 44 active market participants, 4 of them supplied final customers in the open market, i.e. 7 market participants fewer than last year.

Table 3-32: Number of market players entitled for scheduling 2014 - 2022

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Number of market players	7	8	14	19	18	13	11	11	4

Suppliers who supply final customers in the open market:

1. *Јавно предузеће "Електропривреда Србије", Београд*
2. *Друштво за трговину "HEP-ENERGIJA" доо. Београд*
3. *Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије" а.д. Нови Сад*
4. *ПЕТРОЛ друштво за трговину нафтом и нафтним дериватима доо, Београд*

Table 3-33: Open market concentration level in 2022

Suppliers' activity in 2022	Electricity quantity	Share of three suppliers with the biggest scope of trade		Herfindahl–Hirschman index HHI	Market concentration level
	(GWh)	(%)	(GWh)		
Sale of electricity to final customers in the open market					
Sale	14,749	100	14,749	9,968	High

Open market concentration level remained on the same level as last year. The quantity of electricity sold in the open market slightly increased in comparison to 2021 when 14,226 GWh were sold. Herfindahl–Hirschman Index (HHI) amounted to 9,968 and it increased in comparison to last year when it amounted to 9,255 which indicates and increase in the market concentration level in 2022.

Table 3-34: Electricity quantities sold to final customers in the open market - for each supplier in 2022

Supplier	Quantity (GWh)	Share (%)
Јавно предузеће "Електропривреда Србије" Београд	14,726	99.84
ДРУШТВО ЗА ТРГОВИНУ "НЕР-ENERGIJA" ДОО БЕОГРАД	23	0.16
Друштво за истраживање, производњу, прераду, дистрибуцију и промет нафте и нафтних деривата и истраживање и производњу природног гаса "Нафтна индустрија Србије"а.д. Нови Сад	0.2	<0.01
ПЕТРОЛ друштво за трговину нафтом и нафтним дериватима д.о.о. Београд	0.1	<0.01

PE *EPS* remained the dominant supplier with a share of 99.84% of the total electricity sold to final customers in the open market (without energy sold within vertically integrated company) and with the share of the total PE EPS sale (guaranteed, of-the-last resort and open market) of 96.92% of the total final consumption.

Table 3-35: Average annual retail prices in the open market for final customers (VAT and duties free)

RSD/kWh

Consumption category	Average annual price				
	2018	2019	2020	2021	2022
High voltage (110kV)	5.69	6.05	6.43	6.93	9.16
35 kV	6.52	8.87	6.94	8.02	10.11
10 (20) kV	6.91	7.44	7.97	8.10	10.55
Total high and medium voltage	6.56	7.29	7.50	7.82	10.16
Low voltage (0/4 kV I grade)	9.30	10.24	10.24	10.66	13.50
- 0.4 kV II grade	9.02	9.94	10.15	10.77	13.47
- households	8,97	9.86	10.19	10.84	13.77
Public lighting	7.51	8.14	7.98	9.12	11.62
Total low voltage	9.03	9.93	9.95	10.52	13.31
TOTAL AVERAGE	7.33	8.13	8.25	8.63	11.09

The structure of retail prices in the open market in 2022 is given in the table below.

Table 3-36: Structure of realised average annual retail price in the open market for final customers

Elements	Price RSD/kWh
HIGH VOLTAGE - (110 kV) on transmission	
Total price	9.2
Transmission price	0.7
Electricity price	8.5
MEDIUM VOLTAGE (35 kV + 10 (20)kV)	
Total price	10.5
Distribution price	1.5
Electricity price	9.0
MEDIUM VOLTAGE - (35 kV)	
Total price	10.1
Distribution price	1.4
Electricity price	8.7
MEDIUM VOLTAGE - (10/20 kV)	
Total price	10.6
Distribution price	1.5
Electricity price	9.0
LOW VOLTAGE (0.4 kV I rate)	
Total price	13.5
Distribution price	4.0
Electricity price	9.5
MASS CONSUMPTION	
Total price	13.5
Distribution price	4.0
Electricity price	9.5
MC (Mass c.) – Commercial and other (0.4 kV II rate)	
Total price	13.5
Distribution price	4.0
Electricity price	9.4
MC - household	
Total price	13.8
Distribution price	3.8
Electricity price	9.9
PUBLIC LIGHTING	
Total price	11.6
Distribution price	3.6
Electricity price	8.0
TOTAL SALE ON DISTRIBUTION NETWORK	
Total price	11.5
Distribution price	2.4
Electricity price	9.1
TOTAL ON TRANSMISSION AND DISTRIBUTION NETWORK	
Total price	11.1
Network price	2.1
Electricity price	9.0

Being the supplier of the last resort, PE *EPS* delivered 114 GWh of electricity to customers, i.e. 0.4% of the total electricity delivered to final customers. Electricity quantities delivered within the supply of the last resort regime for each consumption category for the period 2018-2022 are given in Table 3-37.

Table 3-37: Electricity quantities delivered under the supply of the resort regime

Consumption category	Electricity quantities delivered under the supply of the resort regime (GWh)				
	2018	2019	2020	2021	2022
High voltage (110kV)	0	12	12	15	0
35 kV	0	0	0	2	0
10 (20) kV	40	34	27	100	43
Total high and medium voltage	**40**	**46**	**39**	**118**	**43**
Low voltage (0/4 kV I grade)	54	31	18	54	32
- 0.4 kV II grade	25	15	4	29	23
- households	0	0	0	1	1
Public lighting	50	17	11	9	14
Total low voltage	**129**	**63**	**33**	**93**	**70**
TOTAL SUPPLY OF THE LAST RESORT	**169**	**109**	**72**	**210**	**113**

The structure of the realised average price of supply of the last resort for each voltage level separately and for customer categories and groups is given in the table below:

Table 3-38: Average annual price of the supplier of the last resort for final customers (VAT and duties free)

RSD/kWh

Consumption category	Average annual price				
	2018	2019	2020	2021	2022
High voltage (110kV)	-	9.12	9.01	9.04	12.29
35 kV	8.48	10.47	-	10.04	-
10 (20) kV	8.70	10.17	9.96	9.79	14.14
Total high and medium voltage	8.69	9.91	9.65	9.71	13.95
Low voltage (0/4 kV I grade)	10.76	12.40	11.95	12.33	17.49
- 0.4 kV II grade	10.50	12.17	12.38	11.97	17.52
- households	10.79	12.11	12.63	11.86	18.46
Public lighting	9.63	11.20	11.16	11.56	16.71
Total low voltage	10.31	12.02	11.75	12.13	17.33
TOTAL AVERAGE	9.88	11.12	10.55	10.70	16.67

The total realised average electricity price in the retail market in Serbia which relates to all types of trade in electricity amounts to 9.49 RSD/kWh or 8.07 €c/kWh, if calculated in line with the average Euro exchange rate for 2022. The structure of this total average price for each voltage level, customer category and group separately is given in the table below:

Table 3-39: Total average annual prices for regulated market, open market and supply of the last resort (VAT and duties free)

RSD/kWh

Consumption category	Average annual price				
	2018	2019	2020	2021	2022
High voltage (110kV)	5.69	6.07	6.45	6.94	9.16
35 kV	6.52	8.87	6.94	8.03	10.11
10 kV	6.92	7.45	7.98	8.13	10.56
Total high and medium voltage	6.57	7.31	7.50	7.84	10.17
Low voltage (0/4 kV I grade)	9.53	10.36	10.41	10.76	13.39
- 0.4 kV II grade	8.98	9.45	9.77	10.22	11.77
- households	6.84	6.88	7.14	7.37	7.61
Public lighting	7.60	8.19	8.01	9.12	11.66
Total low voltage	7.53	7.76	7.92	8.26	9.11
TOTAL AVERAGE	7.22	7.61	7.79	8.12	9.49

Except for the electricity meant to meet the demand of final customers, open market also provided for the energy meant for the recovery of losses in the transmission network.

The table below reviews all the realised average annual electricity prices for each activity in the electricity market in Serbia separately.

Table 3-40: Review of realised average annual prices for each activity in 2022

Activity	Structure	Price
		RSD/MWh
Wholesale market	Sale to other suppliers	27.55
	Sale on the exchange	30.73
	Export	44.23
	Total wholesale price	33.87
Transmission	Access to the transmission network	0.32
	Losses in the transmission network	0.19
	Ancillary services and capacity reserve	0.11
	Transmission – total	0.62
Distribution	Access to the distribution network	2.49
	Losses in the distribution network	0.99
	Distribution – total	3.48
Retail	Public supply at regulated prices	7.83
	Supply of the last resort	16.67
	Supply of eligible customers at market prices	11.09
	Retail – total	9.49
Other	Additional costs (taxes and duties)	3,803
Final customers – average (with additional costs and duties)		13.29
- industrial customers (out of the total number)		15.30
- households (out of the total number)		10.87

3.6.1.2.5 Supplier switching

Supplier switching procedure implies any voluntary switch of the final customer with the selected supplier in line with the Law and Rules on Supplier Switching. The procedure when final customers had to quit regulated public supplier “by the rule of the law” and select a supplier is not considered to be a supplier switching procedure since customers had to switch to the supply of the last resort before they selected their supplier.

Table 3-41: Supplier switching for metering points separately in 2022

Consumption category	Number of metering points			Electricity delivered (MWh, %)		
	Total	With the supplier switch	%	Total	At metering points with new supplier	%
High voltage	52	0	0	3,329,000	0	0
Medium voltage (35 kV)	136	0	0	1,002,165	0	0
Medium voltage (10 and 20 kV)	5,520	118	2.14%	6,627,190	136,910	2.07
Low voltage - (0.4kV I grade)	42,440	1,887	4.45%	3,085,457	91,738	2.97
Mass consumption – Commercial and other (0.4kV II grade)	356,198	8,476	2.38%	2,136,772	62,815	2.94
Public lighting	23,593	2,321	9.84%	445,636	27,161	6.09
Households	3,333,214	970	0.37%	13,379,205	2,077	0.02
Total	3,761,153	13,772	0.37%	30,005,425	320,730	1.07

The legal deadline for the completion of the supplier switching procedure amounts to 21 days as defined by the Rules on Supplier Switching. For those customers with facilities connected to the distribution system, for the supplier switching

procedure, it practically took the whole legal deadline of twenty-one days to complete the supplier switching procedure. In comparison to 2021, the total number of supplier switching procedures per delivery point increased and amounted to 0.07%, while the percentage of the share of electricity quantity which was subject to supplier switching decreased from 4.03% to 1.07%. In 2022, there was no supplier switching with customers with facilities connected to the transmission system (110 kV voltage level). There was a significant decrease in supplier switching on the distribution level with almost all customer categories except in the public lighting category.

3.6.2 Guarantee of origin

Guarantees of origin are electronic documents which have an exclusive function to provide evidence to a final customer that the given share or energy quantity which was delivered by a supplier was produced from the renewable sources. They include the piece of information on the characteristics of production for MWh of electricity and they are used for determination of the structure of sources which are used to provide the consumed electricity. Guarantees of origin provide electricity customers to express their interest for "green" energy and to stimulate power generation which contributes to power system development under environment-friendly conditions from their side.

In 2017, the Decree on Guarantees of Origin entered into force and a Rulebook on Method of Calculation and Presentation of Share of All Energy Sources in Electricity Sale was adopted. In December 2017, *EMS* AD Beograd adopted Rules on Issuance of Guarantees of Origin for the Republic of Serbia. On December 22, 2017, the Council of the Energy Agency of the Republic of Serbia approved the Decision on Fee for Issuance, Transfer and Cease of Validity of Guarantee of Origin which created all conditions for the beginning of a new market process – Issuance and Administration of Guarantees of Origin for Electricity in Control Area of the Republic of Serbia. During the General Assembly of the members of the Association of Issuing Bodies (AIB) which was held on September 27, 2019 in Reykjavik, *EMS* AD was awarded with the full-member status in AIB. In November 2020, after complying with all the conditions for full membership and following the provision of necessary insurance, *EMS* AD was connected to the AIB system (AIB HUB) and, thereby, both the export of guarantees of origin from Serbia into the countries which are the Association members and the import of the guarantees of origin into Serbia were enabled. Hereby, Serbia became the first Energy Community Contracting Party which became the member of the Association of Issuing Bodies.

Thereby power producers in Serbia were given an opportunity to sell the guarantees of origin all around Europe while, on the other hand, suppliers, who are obliged to provide insight into data on the share of all types of energy sources and on the data on total electricity quantities which were sold to a final customer, can provide guarantees of origin abroad, too.

EMS AD Beograd registers participants in the system of guarantees of origin and organizes informative presentations in order to provide all necessary pieces of information to interested parties and to make them familiar with new market process. The current structure of registered participants in the Registry of Guarantees of Origin reads:

- Eligible producer, supplier and wholesale supplier – 2
- Supplier and wholesale supplier – 7
- Wholesale supplier - 1
- Eligible producer – 4

The total number of issued guarantees of origin in the period from the first issued guarantee of origin (November 2018) until the end of December 2022 amounted to 2,441,386, while there were 1,461,093 guarantees of origin issued only in 2022 which is almost 2 times more than in 2022. The number of imported guarantees of origin in the period since import was enabled via AIB until the end of 2022 amounted to 272,647 out of which 11,812 of them were imported in 2022. There have been no exported guarantees of origin so far.

3.6.3 Electricity balancing market

The Energy Law and relevant amendments to the Rulebook on Energy Licensing and Certification, foreign companies were also allowed to obtain electricity wholesale licence and thereby gain the right to be registered as a balancing responsible party. In 2022, the Agency approved the adoption of new Electricity Market Network Code to EMS JSC. The Code amended segments related to electricity market participants, communication with market participants; registration of balancing responsible parties was optimised, an article defining the content of the Contract on Balancing Responsibility was regulated in more detail; the calculation of the level of risk in case of failure to act was amended. In addition, the segment related to explicit bids of market participants was amended as well as the segment related to the calculation of financial settlements of balancing responsible parties. At the end of 2022, there were 48 electricity market participants that had a Contract on Balancing Responsibility signed with the transmission system operator (*EMS* JSC) and that were awarded thereby with the status of a balancing responsible party (*BOS*). In 2022, the balancing group members were modified 53 times which was initiated by contracts on full supply between final customers and suppliers, contracts on transfer of balancing responsibility between suppliers and final customer and contracts on transfer of balancing responsibility between *BOS* and suppliers.

In 2022, in line with the Contract on Ancillary Services and the Contract on Participation in Balancing Mechanism which *EMS* JSC signed with PE *EPS*, *EMS* JSC engaged balancing entities for secondary and tertiary control within its control area in order to maintain balance between total production, consumption and nominated electricity block exchange. In addition, they calculated deviations between balancing groups which served for financial settlement between *EMS* JSC and balancing responsible parties on monthly level. In addition, in 2022, *EMS* JSC worked on the so-called cross-border balancing by engaging balancing energy in order to balance its control area in line with contracts on the exchange of cross-border tertiary control energy (*PTRE*) with neighbouring transmission system operators which included the engagement of

manual cross-border frequency restoration reserve (emergency energy) and engagement of balancing reserve within settlement accounting period based on contracts with the transmission system operators of Montenegro (CGES) and Bosnia and Herzegovina (NOSBiH) on purchase and sale of tertiary control energy for system balancing purposes. In 2022, the Transmission System Operator *EMS* JSC was actively involved in regional and European initiatives on the organized electricity market coupling, cross-border electricity balancing market (observer in MARI project) as well as of the European project of single intraday electricity market. In October 2022, *EMS* JSC became an operable member of a common European exchange - deviations netting platform (IGCC). In line with a new Contract on CMM (Serbia, Montenegro and North Macedonia) Block Operation which was signed in late 2020 and harmonized with the latest European regulations, as of December 2021, an unwanted deviations netting mechanism of control areas within CMM Control Block (CMM GCC - Grid Control Cooperation) started operating and the Serbian TSO and CGES as the Montenegrin TSO participated in the exchange.

In 2022, total engaged balancing energy during all calculation periods amounted to 955.3 GWh[8], for which the total weighted settlement price amounted to 278.7 €/MWh. It amounts to 159.9 €/MWh more than last year. Bearing in mind the direction of activated balancing entities, the weighted settlement price amounted to 326.5 €/MWh for upward activation and 194.7 €/MWh for downward activation.

In 2022, a new energy registry of electricity market participants was developed – NERA (New Energy Registry for Applicants). It was successfully commissioned on 23/11/2022 and, in the future, NERA will be used for the administration of balancing responsibility and of balancing groups team.

3.6.4 Organised electricity market

Pursuant to the Energy Law, organised market is an institutionally regulated relation between the supply and the demand between electricity market participants with standardised products and physical delivery determined in advance within the day-ahead and intraday time framework. On July 14, 2015, *EMS* JSC established SEEPEX JSC Belgrade – power exchange. It was established on the basis of partnership with EPEX SPOT. It was decided that in the beginning of operation SEEPEX would operate the organised market with standardized products in the “day-ahead” market.

The organised market (exchange) started operating in February 2016 and the review of the activities in this market is available on the website www.seepex-spot.com. In 2022, there were 28 participants registered in the power exchange which means that there were four more participants than in 2021. 23 participants were active in the trade, which is two more than in 2021. Day-ahead auctions product is available on the exchange and there are two methods for bidding: individual and block bid. Individual bid includes up to 256 price/quantity combinations for each individual hour of the following day, where prices have to be between 0.0 €/MWh and 3,000 €/MWh. Block bid, which was introduced on SEEPEX on March 22, 2017, is the bid which connects several hours in line with the principle “all or nothing” which means that the bid is either accepted for all the hours or it is completely rejected. It is possible to insert different electricity quantities for each block hour while there is one price offered for the whole block. With the introduction of curtailable blocks on 15/12/2021, the options of block offers were expanded in a manner that “all or nothing” rule is relaxed by the definition of Minimum Acceptance Ration of the offer the applicant is ready to accept.

Since 2018, *EMS* JSC has been purchasing electricity for loss recovery via auctions which are organized by *EMS* JSC on the electronic platform i.e. so-called Auction Platform. Missing quantities are purchased on organized day-ahead electricity market in Serbia – SEEPEX exchange. Auction participants are companies licenced for electricity supply which complied with conditions prescribed by *EMS* JSC beforehand and which had a framework contract concluded with *EMS* JSC. In addition, during some periods, in line with the Law, due to lower loss levels than expected, *EMS* JSC sold extra electricity meant for loss recovery which was purchased via auction platform on the power exchange – SEEPEX.

The total electricity volume which was subject to trade on SEEPEX in 2022 amounted to 3,205,501 MWh which is by 3% less than in 2021. The share of electricity which was traded on the power exchange in comparison to the electricity volume which was delivered to all final electricity customers was 10.5% while 20.5% is the exchange share in comparison to electricity volume delivered to final customers supplied in the open market (open retail market without energy sold to system operators for system losses). In 2022, the greatest monthly scale of trade was recorded in April – 316,224 MWh. The maximum daily scale was reached on April 24 with the trade scale of 15,846 MWh. The lowest monthly trade scale was recorded in August and it amounted to 231,926 MWh which is by 12% higher than in the minimum month of the last year. The maximum hourly price was recorded on August 20, at 8 p.m. and it amounted to 889.5 €/MWh. Average base price on the annual level amounted to 272.9 €/MWh.

3.6.5 Transparency

In line with the Treaty establishing the Energy Community and with the decision of the Permanent High Level Group Ministerial Council of June 24, 2015, the Republic of Serbia assumed an obligation to transpose the EU Transparency Regulation 543/2013 into national legislation. This Regulation defines the data and deadlines within which these data should be published in order to increase the electricity market transparency. In line with the Energy Law, this Regulation is transposed into our legal framework by having the Assembly of the Joint Stock Company “*Elektromreza Srbije*” Beograd adopted Rules on Publication of Key Market Data which were approved by the Agency Council on the session held on December 9, 2016. These rules establish obligations of the electricity transmission system operator, electricity distribution system operator, closed electricity distribution system operator, electricity producer and final customer related to the

[8] Data received until February 15, 2022 and subject to modification in line with Electricity Market Rules.

publication of all relevant data on consumption, transmission, production and balancing market. All key market data, except for those defined in transitory and final provisions are published on the ENTSO-E transparency platform (EMFIP – Electricity Market Fundamental Information Platform on the website https://transparency.entsoe.eu) in line with deadlines defined by these Rules. In 2022, *EMS* JSC submitted 99% of the total number of data defined by the EU Regulation 543/2013 on transparency on the EMFIP platform. As of September 1, 2019, Rules on the Publication of Key Market Data which are harmonized with amendments to guidelines for the implementation of the EU Regulation 543/2013 which were adopted by ENTSO-E are applicable. In line with the Law on Amendments to the Energy Law adopted on 22/04/2021, in late 2021, the Agency approved amendments to the Rules which were submitted by EMS JSC and which related to the publication of data on production realised in each production unit, on electricity production from solar and wind and the forecast of production of electricity from solar and wind for day ahead. These Rules entered into force as of 23/03/2022. Within the Energy Community Regulatory Board (ECRB), in 2022, the compliance with the requirements of the EU Regulation 543/2013 on data publication which is valid for the Energy Community Contracting Parties was monitored via automatized platform within the website of the Energy Community Secretariat. The platform began operating in 2022 and it facilitated the data update procedure as well as the access of interested parties to these pieces of information.

3.6.6 Regional coupling

A set of activities relevant for the whole region are organised within the Energy Community (EnC), with active participation of the Agency representatives.

Wholesale market

In 2022, together with the European Commission and Acer, the Energy Community Secretariat drafted adapted versions of directives and regulations (network codes) of the EU for Energy Community Contracting Parties so as to enable market coupling with neighbouring markets. In the draft, the role and jurisdiction of the European Commission was replaced by the Energy Community Secretariat and the competences of the ACER were expanded to the Energy Community Contracting Parties by the adoption of a separate Procedural Act without amendments to the Treaty Establishing the Energy Community. The decisions of the Energy Community Ministerial Council 2021/13/MC-EnC of 30/11/2022 and 2022/03/MC-EnC of 15/12/2022 enabled adaptation of the EU regulations in the electricity field which created the obligation for the Republic of Serbia to transpose these regulations into national legislation until the end of 2023. The adoption of adapted EU Directives and Regulations, particularly of those representing the so-called network codes which are important for the electricity market functioning and for the operational work of power systems is aimed at the creation of conditions for more accelerated integration of electricity market in the Western Balkans into a common Pan-European electricity market of the EU as well as for the harmonisation of procedures in the field of system operation and balancing. This regulatory package includes: Procedural Act on Regional Market Integration 2022/PA/01/MC; Directive (EU) 2019/944 common rules of internal electricity market; Regulation (EU) 943/2019 on electricity; Regulation on ACER 942/2019; Regulation (EU) 2019/941 on risk-preparedness in the electricity sector; Regulation/Network Code (EU) 2016/1719 (FCA) on capacity allocation; Regulation/Network Code (EU) 2015/1222 (CACM) on capacity allocation and congestion management; Regulation/Guidelines (EU) 2017/2195 (GLEB) for balancing; Regulation/Guidelines (EU) 2017/1485 (SOGL) on transmission system operation; Regulation/Network Code (EU) 2017/2196 on emergencies and the transmission system re-establishment.

The project on the establishment of the Coordinated Auction Office in the SEE, aimed at harmonisation of the allocation rules and nomination of rights for the use of cross-border capacity on both long-term and short-term level in the eighth region[9] was developed since 2008 in several phases. The Office was established in April 2014 in Podgorica and it gathers founders – transmission system operators from BiH (NOS BiH), Croatia, (HOPS), Montenegro (CGES), Kosovo* (KOSTT), Albania (OST), North Macedonia (M*EPSO*), Greece (IPTO) and Turkey (TEIAS). The Office covers cross-border capacity allocation on seven borders. The Transmission System Operator of Serbia (*EMS*, JSC) did not participate in the establishment of the Office.

The Transmission System Operator *EMS* JSC concluded contracts on the exchange of emergency energy or the exchange of cross-border tertiary control energy (*PTRE*) in cases when the safety of operations of the power system and/or supply of customers in the country is endangered, on natural exchange basis or on commercial basis. *EMS* JSC concluded multiannual contracts on emergency energy exchange on commercial basis with transmission system operators of Hungary (MAVIR) in 2019, Croatia (HEP-OPS) in 2018 and Romania (Transelectrica) in 2017. The contract on emergency energy exchange signed on natural basis for indefinite period of time between *EMS* JSC and the Bulgarian transmission system operator was valid. Contracts on the exchange of cross-border tertiary control energy between *EMS* JSC signed with Montenegro (CGES), North Macedonia (MEPSO) and Bosnia and Herzegovina (NOS BiH) were valid. These contracts imply a possibility to have five-minute energy activation within an hour for the control in both directions with a price which depends on the bids within the national balancing mechanism.

In 2020, *EMS* JSC concluded one-year agreements on cross-border transmission capacity related to the calculation method, harmonization and mutual cross-border transmission capacity allocation with all neighbouring transmission system operators. The harmonization of cross-border electricity exchange within transmission system operation planning and calculation of exchanged electricity became a narrow expert field which is regulated by separate agreements (Scheduling Agreement and Accounting Agreement). As of 2020, the Scheduling Agreement with transmission system operators of Montenegro (CGES)

[9] One of 8 European regions within which regional electricity markets are developed which are being integrated in the EU market. The region includes Albania, Bosnia and Herzegovina, Serbia, Montenegro, Kosovo*, Macedonia, Slovenia, Croatia, Hungary, Romania, Bulgaria, Greece and Italy with the future undersea cable.

and North Macedonia (MEPSO) have been in force. Since 2021, the Scheduling Agreement with the transmission system operator of Hungary (MAVIR) has been in force. In 2022, new “Accounting Agreements” were signed between the transmission system operators EMS – MEPSO, EMS – NOSBIH (Bosnia and Herzegovina and EMS – TransnetBW (from Germany).

Market monitoring

Within the Energy Community, great attention is paid to the development of tools and databases for electricity and natural gas market monitoring. As early as in 2015, there were negotiations between ACER and EnC Secretariat on the types of cooperation between ACER and ECRB working groups in order to follow the activities in the EU more easily and implement the EU mechanisms in the Energy Community Contracting Parties. The Memorandum of Understanding between ACER and Energy Community Secretariat was signed in 2016 and according to it, electricity wholesale and retail market monitoring in Contracting Parties would be a part of the ACER report but ACER abandoned an idea to include the data on wholesale market from Energy Community Contracting Parties in their report. For this reason, in the period from 2016 to 2020, ECRB Working Groups for electricity, customers and retail market performed market monitoring within their activities in line with the indicators used for market monitoring which are used by ACER in the EU to the extent which is currently applicable to all Energy Community Contracting Parties but in line with different level of market development in comparison to the EU member States with ECRB publishing an annual report. In 2020, an agreement was reached between the ECRB and ACER on having data from Contracting Parties on the electricity wholesale market monitoring included in the ACER report on market monitoring in the agreed scale and structure. This is why the ACER 2020 report on market monitoring included the report on Energy Community Contracting Parties in November 2021 as an annex to it. ACER decided not to publish the report on market monitoring for 2021-22 in the format as it used to which is why the data for Energy Community Contracting Parties were not published either, although all necessary data for 2021-22 will be collected within the ECRB Electricity Working Group.

In April 2022, the ECRB Electricity Working Group drafted an updated report on the effects of high wholesale prices on national markets and on measures taken in each Energy Community Contracting Party in order to have timely information-flow between market participants.

Based on the Guidelines for Regulatory SEE Market Monitoring which were approved by the ECRB in 2014, during 2022, there were periodical assessments on whether the market was functioning in line with the adopted rules and on the basis of transparency and non-discrimination principles in terms of calculation of available cross-border capacity and organised allocation procedures. The implementation of these Guidelines aims at the establishment of a harmonised approach to regulatory tasks and an introduction of a possibility for regional market monitoring. However, the Guidelines are not legally binding. The Guidelines also include recommendations to regulators from the region for the collection of necessary data for monitoring use of cross-border capacities.

In terms of electricity market monitoring in the SEE region, within ECRB activities, the use of software on the Internet platform SEEAMMS continued in order to detect deviations of indicators related to the calculation of available cross-border capacity and realized allocations in line with Guidelines for Regulatory SEE Market Monitoring and to draft the annual report. In 2022, the rotation of Contracting Parties as SEEAMMS platform administrators was organised each two months. The Agency played its role in May 2022.

In 2022, within the ECRB Working Group for Customers and Retail Market, data were collected and a report was made on retail electricity market monitoring based on data from 2021. In 2022, there was a follow-up in the work of the joint working group between the representatives of the ECRB and the CEER on drafting a report on result of monitoring electricity and natural gas delivery quality in the EU countries and in the EnC Contracting Parties. The report was completed and published at the end of 2022.

By the adoption of the Regulation 1227/2011 on Integrity and Transparency of Wholesale Energy Market (“Light REMIT”), by the Decision of the Energy Community Ministerial Council in November 2018, ECRB established a new working group. The main tasks of the group imply the preparation of regulators for new jurisdiction both on the national level and on the Energy Community level in line with the “Light REMIT” Regulation. In 2020, three REMIT working group meetings were held. A Procedural Act was drafted by the working group, i.e. regulatory recommendation was drafted and the Energy Community Regulatory Board adopted it on August 7, 2020. The purpose of this regulatory recommendation is to: 1) establish the ground for the coordination of national regulatory bodies of the Contracting Parties in the field of their tasks arising from the “Light REMIT” Regulation; define the cooperation process via ECRB; 3) harmonise formats used by regulators; 4) make a draft of actions to be taken by the ECRB and 5) settle issues of confidentiality related to the data and information exchange. On the session held on October 28, 2021, the Council of the Energy Agency of the Republic of Serbia adopted Rules on Prevention of Abuse on Electricity and Natural Gas Markets. These rules regulate conditions for the registration of wholesale electricity and natural gas market participants – conditions for publication of inside information, prohibition of trade in inside information, prohibition of market manipulation, type, content, form, manner and deadlines for the creation and publication of data, data protection, professional secret, operational responsibility and obligations of the person who regulates transactions as a professional. The rules were adopted in line with commitments of the Republic of Serbia assumed by ratified international treaties and by the law regulating the energy field.

3.7 Monitoring and regulation of the quality of delivery and supply

The Council of the Agency adopted Rules on Monitoring Technical and Commercial Indicators and on Regulating Quality of Electricity and Natural Gas Delivery and Supply (Rules on Quality) in 2013. Rules on Quality were adopted on the basis of the gathered experience in data collection and monitoring electricity delivery and supply quality indicators as well as of international practice in the quality monitoring of services provided by energy entities. The Rules are established in order to define more closely the indicators of technical and commercial quality of delivery and commercial quality of electricity supply, the method of registering data and calculation of indicators, method and deadlines for the submission of data and reports to the Agency, harmonisation the method of data registering and calculation of quality indicators which enables the establishment of a base of complete, reliable and comparable data and calculated indicators in order to compare and regulate them. The collected data and calculated indicators should provide the prescription of the method of setting required values of certain indicators as well as the method of assessing results achieved by monitoring the reached results in comparison to the required indicators values of quality in future amendments of the Rules on Quality. Upon that, the procedure in case of deviation from demanded indicators' values will be also defined afterwards as it is defined in the Energy Law. In 2022, the data on quality of delivery and supply which were submitted by energy entities during previous years which will be used as the basis for the amendment of the Rules and their harmonisation with the Law. The collection of data on delivery and supply quality was established in line with the Rules on Quality by defining the type, scale and format of the data and indicators on technical and commercial aspects of quality as well as the deadlines for the submission of them by energy entities to the Agency. As is was the case in the past when the practice and infrastructure necessary for registering data, indicators calculation and reporting on quality was improved, in 2022, the distribution system operator continued with these activities, especially in the field of registering continuity of delivery.

3.7.1 Continuity of electricity delivery

Electricity transmission and distribution system operators monitor the continuity of electricity delivery regularly and these data indicate the number and duration of planned and unplanned delivery interruption. The entities submit monthly reports for all interruptions in the transmission and distribution network longer than 3 minutes. These reports are submitted to the Agency and the data on interruptions present the basis for the calculation of annual interruption indicators from the transmission and distribution network, for planned and unplanned interruptions and in total in the 2011-2022 period.

3.7.1.1 Transmission network continuity of delivery

Indicators of discontinuity of delivery from the transmission network which are monitored and calculated are the following:

- Power failure – undelivered power [MW] – total failed power on all measuring points where supply was interrupted;
- ENS [MWh] – total undelivered electricity;
- ENS [%] – a share of undelivered electricity in total delivered electricity;
- AIT [min] – average interruption duration in minutes, a quotient of undelivered electricity and average power.

In comparison to 2021, indicators of for unplanned interruptions slightly improved in 2022, both in terms of undelivered electricity and in terms of power outage but they are still on the level of five-year average figures. The analysis of the submitted data on the causes of interruption, it is noticeable that vis major had a negligible share in 2022. The impact of interruptions caused by another energy entity was the dominant cause of unplanned interruptions within the transmission system last year, but, in contrast to 2021 when the share of these interruptions within the total number of unplanned interruptions amounted to 42%, this share grew to 62% in 2022. Unplanned interruptions which were caused by an interruption within the transmission system, i.e. caused by the transmission system operator themselves decreased from 51% in 2021 to 25% in 2022.

The indicators for power failure and undelivered electricity for planned and unplanned interruptions in the last ten-year period are given in table 3-42.

Table 3-42: Indicators of discontinuity in delivery within the transmission network in the period 2013 - 2022

Interruptions		Power failure – undelivered power	ENS	ENS
		MW	MWh	%
2013				
	Planned	161	618	0.0020
	Unplanned	1,770	747	0.0020
	Total	1,931	1,365	0.0040
2014				
	Planned	115	110	0.0003
	Unplanned	1,905	3,496	0.0104
	Total	2,020	3,605	0.0107
2015				
	Planned	359	1,543	0.0046
	Unplanned	2,292	1,659	0.0049
	Total	2,351	3,202	0.0095
2016				
	Planned	167	547	0.0016
	Unplanned	1,693	1,317	0.0039
	Total	1,860	1,864	0.0055
2017				
	Planned	306	1,496	0.0044
	Unplanned	1,980	1,418	0.0042
	Total	2,286	2,914	0.0086
2018				
	Planned	350	1,552	0.0024
	Unplanned	1,059	826	0.0013
	Total	1,409	2,378	0.0037
2019				
	Planned	429	1,065	0.0032
	Unplanned	832	595	0.0017
	Total	1,261	1,660	0.0049
2020				
	Planned	676	1,162	0.0035
	Unplanned	2,856	978	0.0029
	Total	3,535	2140	0.0064
2021				
	Planned	495	1,340	0.0039
	Unplanned	1,147	1,403	0.0041
	Total	1,642	2,743	0.0080
2022				
	Planned	925	1,034	0.0030
	Unplanned	791	819	0.0024
	Total	1,716	1,853	0.0054

In 2021, there was an increase in the average duration of planned interruptions from 18.22 minutes to 20.34 minutes. Average duration of unplanned interruption was considerably higher than last year and it amounts to 21.29 minutes which is 1.65 times longer than 15.34 minutes which was the case last year.

Figure 3-16 indicates all the causes of unplanned interruptions and their share in the quantities of energy which was not delivered to all transmission system users in 2022. Unplanned interruptions which were caused by transmission system operator were considerably fewer than last year.

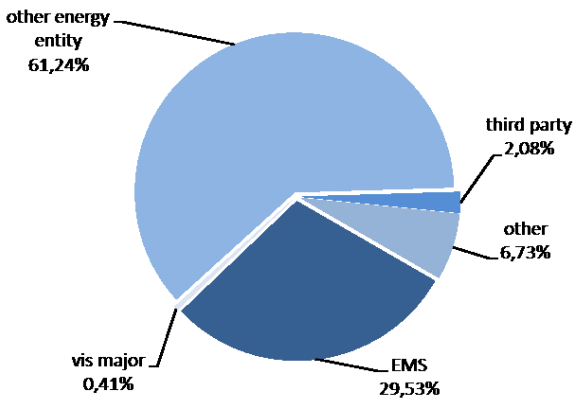

Figure 3-16: Causes of unplanned interruptions and their share in undelivered energy for all transmission system users in 2022

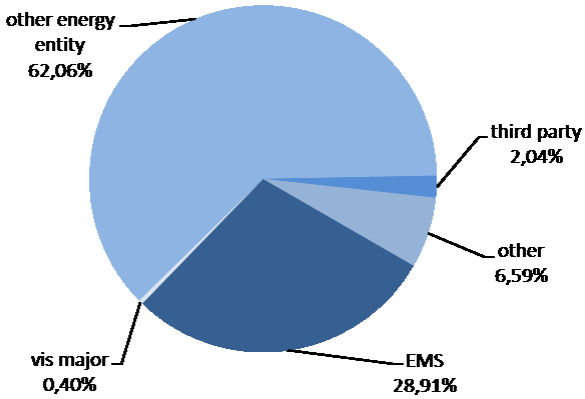

Figure 3-17: Causes of unplanned interruptions and their share in undelivered energy for transmission system users (excluding pumped-storage hydro power plants, storages and pumped-storage facilities) in 2022

The values of the most frequent indicator of discontinuity within the transmission network AIT are given in Figure 3-18, separately for planned and unplanned interruptions and in total.

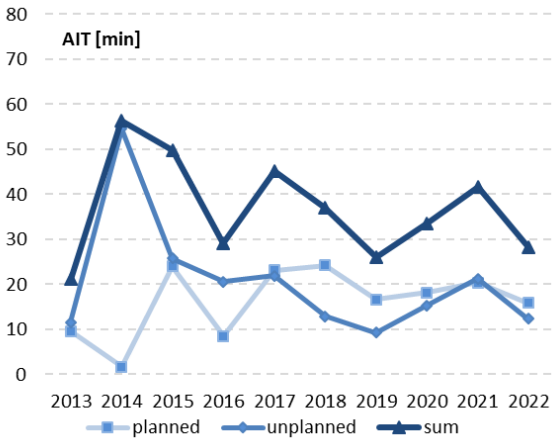

Figure 3-18: Average duration of supply interruption

In 2022, in comparison to 2021, there was a decrease in the average duration of planned interruptions from 20.34 minutes to 15.86 minutes. Average duration of unplanned interruption was considerably lower than last year and it amounts to 12.31 minutes which is almost half the 21.29 minutes which was the case last year.

3.7.1.2 Distribution network continuity of delivery

The indicators for the estimation of discontinuity of delivery from the distribution network are the following:

- SAIFI[10] – average frequency of interruptions per each user, and
- SAIDI[11] – average duration of interruptions in minutes per user.

The indicators of continuity of delivery in the distribution network for the period 2018-2022, separately for planned and unplanned interruptions and jointly are given in Figure 3-19.

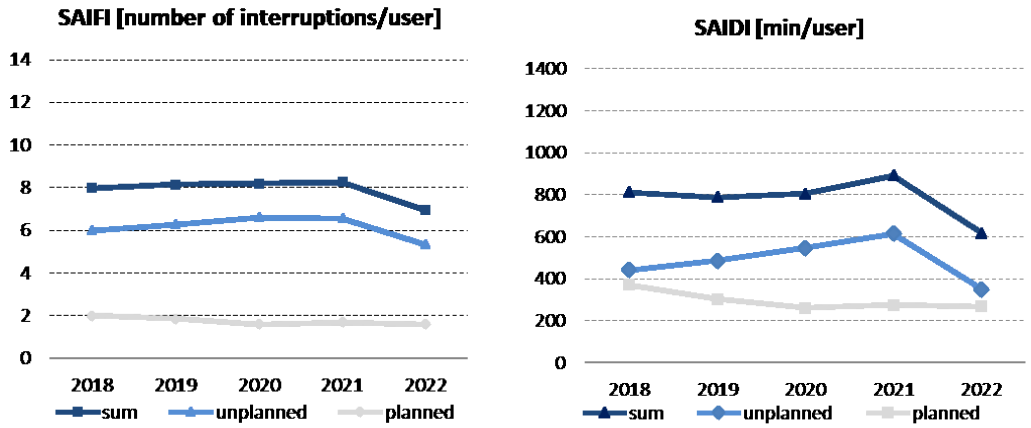

Figure 3-19: SAIFI and SAIDI for the period 2018 - 2022

There was an improvement both with continuity indicators for unplanned interruptions in the distribution network in Serbia in 2022 in terms of indicators of average duration of interruption as well as with indicators of average frequency of interruptions. Average frequency of unplanned interruptions was decreased from 6.57 to 5.33 interruptions per user, while average duration of unplanned interruptions per user decreased by 266 minutes, from 615 to 348 minutes. Average frequency of planned interruptions decreased from 1.7 to 1.6 interruptions per user while the average duration of planned interruptions per user decreased by 7 minutes, from 275 to 268 minutes. Indicators values are on the level of last five years which is significantly higher than in the EU countries[12]. This indicates that it is necessary to analyse the reasons for such situation in the distribution level more seriously. In line with the results of such an analysis, necessary measures aiming and the reduction of the number and of the duration of supply interruptions should be implemented. The causes of unplanned interruptions and their share in the total number and duration of interruptions are indicated in Figure 3-20.

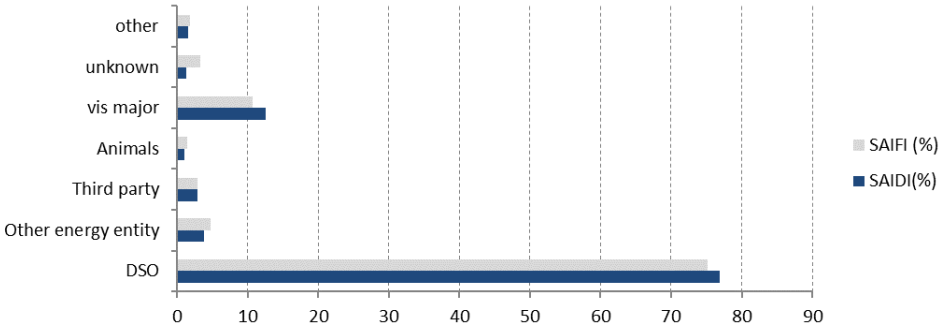

Figure 3-20: Share of causes of unplanned interruptions in SAIFI and SAIDI for 2022

The share of certain causes of interruptions in the number and duration of unplanned interruptions differs slightly in comparison to 2021. The share of unplanned interruptions which DSO could not have had influence on, i.e. caused by vis major was slightly smaller than last year while the number of interruptions caused by another energy entity was slightly bigger than last year. The number of unplanned interruptions caused by the DSO increased slightly in terms of indicators of frequency of interruption while it slightly decreased in terms of indicators of duration of interruption. A share of causes defined as “unknown” and “other” is still considerable, although it is smaller than in 2021. It indicates that the identification

[10] calculated as a quotient of the cumulative number of interruptions and total number of users [number of interruptions/user]

[11] calculated as a quotient of cumulative duration of interruption and total number of users [min/user]

[12] 6th CEER Benchmarking Report on the Quality of Electricity and Gas 2016.

of the causes of interruptions is improved but a more efficient identification is still necessary which is a prerequisite for the implementation of more adequate measures for the removal of causes of interruptions and for the reduction of their number and duration.

3.7.2 Quality of electricity

The Rules on Monitoring Technical and Commercial Indicators and Regulation of Quality of Electricity Delivery and Supply defined the obligation of the system operators to record disruptions in the operations which cause the voltage and frequency to exceed the limits prescribed by the Decree on Electricity Delivery and Supply Conditions and Transmission, i.e. Distribution Network Code. In practice hitherto, system operators did not submit the reports on bad voltage conditions within the grid to the Agency, except in terms of users' appeals which are being monitored within commercial quality area.

3.7.3 Commercial quality

Rules on Monitoring Quality Indicators define the data which system operators, i.e. suppliers register so as to enable commercial quality monitoring, i.e. monitoring compliance with the prescribed obligations as regards an energy entity's obligations towards customers, i.e. services users.

Based on Agency's request, energy entities submitted reports on commercial aspects of quality to the Agency regularly. That has provided the data for the calculation of some indicators of commercial quality on national level since 2009. After the market was opened in 2013 for customers connected to the transmission system and in 2014 for all customers, except households and small customers, there has been significant change in the necessity of monitoring commercial quality since the data on commercial quality are submitted to the Agency by all suppliers who supply final customers apart from by the system operator. In 2022, for the purpose of commercial quality monitoring, Distribution System Operator, electricity suppliers and guaranteed/public supplier submitted quarterly reports and final annual report with available data to the Agency.

In terms of commercial quality monitoring, Distribution System Operator has improved the method of data recording considerably, but, even so, recording data on commercial quality has not still reached the expected level of reliability and accuracy which could provide a relevant analysis of the indicators in the national and international framework, especially in the field of data on call centres and metering device control. By having a greater number of customers entering the market, a necessity to monitor commercial quality introduced with licensed electricity suppliers as well was recognized. Further improvement of quality monitoring is also necessary with electricity suppliers, in particular with reference to customer care and the establishment of call centres.

For analytical purposes, the collected data were grouped in four main categories of biggest importance for customers which describe commercial quality. They include:

1) connection, load shedding and disconnection;
2) metering and billing;
3) removal of technical obstacles in delivery and
4) customer services.

The given data, especially those on average time for the performance of certain obligation are of indicative character since they were calculated on the basis of the available sets of data submitted by the distribution system operator. The analysis of these data proved that they do not include the whole territory of the distribution system since the data on the time of settling or removal of some of problems for certain segments of the distribution system are not available.

3.7.3.1 Connection, load shedding and disconnection

The Distribution System Operator data on applications for connection to the system in 2022 are given in Table 3-43 for different voltage levels, for medium voltage (MV), low voltage (LV) separately and in total.

Table 3-43: Connection applications by voltage levels and in total in 2022

Connection applications			MV	LV	Total
Number	of submitted applications		731	3,770	31,501
	of settled applications	Connection application approved	510	20,758	21,268
		Connection application denied	4	218	222
		Settled otherwise	98	6,254	6,352
		Total	612	27,230	27,842
		Within deadline (8 days for final customers, 15 days for producers)	362	15,475	15,837
%	Settled applications in comparison to the submitted ones		84	89	88
	Applications approving connection in comparison to the number of settled ones		70	67	68
	Settled applications within deadline (8 days for final customers, 15 days for producers)		59	57	57
Average time	Necessary for settlement upon application Given in days (final customers/producers)		23/67	22/57	22/61

In comparison to 2021, the number of submitted applications for connection was by 77% higher for connections to the medium voltage network while it was by 6% lower for the low voltage network. The number of decisions approving the connection was by 47% higher than in 2021 for connections to the medium voltage network while it was by 5% lower for connections to the low voltage network in comparison to the last year.

Average time necessary for settling applications for connection for final customers amounts to between 22 and 23 days depending on the voltage level stated in the application which is considerably beyond the legal deadline for settling connection applications for final customers which amounts to 15 days.

Table 3-44: Connection of facilities/metering points by voltage levels in 2022

Connection		MV	LV	Total
Number	of connected facilities/metering points	177	43,597	43,774
	of facilities connected/metering points within 8 days' period	157	30,556	30,713
%	of facilities connected/metering points within 8 days' period	89	70	70
Average time – given in days	Necessary for connection since the day all the conditions are met	5	8	8

In 2022, 4,611 facilities/metering points more were connected than in 2021. Indicators describing connection of facilities/metering points (Table 3-44) considerably deteriorated on medium voltage. 89% of connections were performed while the average time necessary for connection since the day conditions are met was 2 days shorter than last year and it amounted to 5 days. On low voltage, indicators describing connection of facilities/metering points were on the same level as last year and, therefore, 70% of connections were performed within 15 days. The average time necessary for connection since the day conditions are met amounts to 8 days.

In 2022, there were 28,423 disruptions upon suppliers' request, registered due to unsettled liabilities as regards electricity in the prescribed deadline, which is by 3% less than in 2021. The average time of reconnection upon the removal of causes of disruption/disconnection amounted to 2 days, i.e. upon unjustified disruption/disconnection, it amounted to 1.75 days on the level of the distribution system operator, while in different areas which correspond geographically to prior electricity distribution companies, it amounted to between 1 and 4 days and it is corresponds to the values in the previous year.

3.7.3.2 Metering and calculation

Regular control of meters were planned for 3,748,376 meters in 2022 (which accounts for 99.62% out of total 3,762,624 of metering devices) and 171,828 of them were checked, i.e. 5% of the planned checks. Out of the number, with 15,242 meters, i.e. 9% of them, irregularities were recorded. 183,051 extraordinary checks of metering points were requested by customers and energy entities. The checks were performed for 178,425 metering points (which represents around 97% of requested checks, while a certain number of checks was performed based on last year requests). Out of the number of extraordinary checks of 234,313 metering points, irregularities were notices on 14% of them, i.e. on 26,882 metering points and irregularities were removed in 25,316 cases. These indicators are alarming. There is a high percentage of noticed irregularities per metering points. The distribution system operator still does not comply with their obligation to organize regular checks of all metering devices once a year. The control of metering devices should be improved significantly and the number of noticed irregularities confirms the necessity of their urgent replacement.

Upon registering the disappearance, restraints or damage of meters, in 86% of cases, proper metering was provided within 2 days upon registration. Average time necessary to provide proper metering since the moment of occurrence, restraints or damage of meters within the categories of high, medium and low voltage (metering points where active energy, reactive energy and maximum active power are metered) amounted to between 1.8 and 3 days, depending on the voltage level.

In 2022, out of total number of bills issued regularly – 44,982,445, 0.63% of them were revised. 60% of revised bills were due to improper reading. Average time necessary for complaints settlement amounted to 3 days. The reasons for bill corrections and their share in the total number of revised bills are given in Figure 3-21.

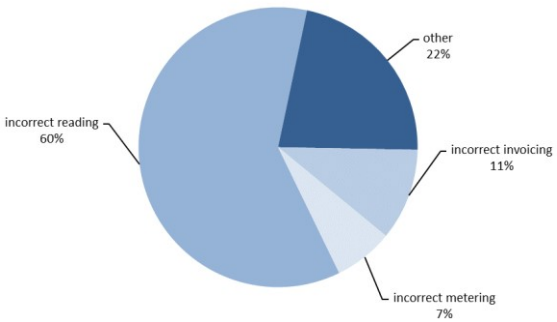

Figure 3-21: Reasons for bills corrections and their share in the total number of revised bills in 2022

3.7.3.3 Removal of technical disturbances in delivery

In 2022, there were 801 customers' requests for the removal of voltage disruptions which repeat in a longer time period. 76%, i.e. 611 requests were justified. Voltage disruptions were removed in 515, i.e. 84% of cases when the request was justified.

Average timeframe from the moment a request is filed until voltage is checked on the spot and until a customer is informed amounts to 5.65 days while the average timeframe from the moment voltage disruptions are acknowledged until they are removed amounts to 10.93 days.

3.7.3.4 Customer services

Despite the progress that has been made on the improvement in providing services to customers in customers' and contact centres (call centres), data which could serve for the assessment of the quality of services in these centres are still unavailable in most cases due to the lack of adequate information support for data monitoring and registration. In their future activities on customer services quality monitoring, all energy entities, especially suppliers licenced for the supply of final customers as well, will have to start registering, i.e. improving the registration of these data. Since 2017, the distribution system operator has been submitting the data on the work of call centres. In 2022, the total number of registered calls addressed to the call centre of the distribution system operator was 279,434 which is by 36% lower than last year. Out of the total number of calls addressed to the call centre, 75% (92,647 calls) were made by phone. Average time spent waiting for the operator was 7 minutes which is the same as last year. The number of phone calls addressed to services on call for failure registration amounted to 205,176.

3.8 Security of electricity supply

The reliability and efficiency of the power system in the Republic of Serbia have been increased by investments into revitalization and modernisation of production, transmission and partly distribution capacities for several years. Even without new production capacities, the security of electricity supply was considerably higher. Regular investments in the construction of new transmission and distribution capacity units will further increase the security of electricity supply in the Republic of Serbia.

3.8.1 Consumption forecast

In line with the Energy Sector Development Strategy until 2025, with projections until 2030, annual increase of less than 1% in electricity consumption is expected. Such expectations are based on GDP projections and the consumption increase in the industrial sector, as well as on the implementation of energy efficiency measures in all consumption sectors.

3.8.2 Generation adequacy/prospects

Out of the total electricity production in the Republic of Serbia, under average hydrological circumstances, around 2/3 of electricity is produced in coal-fired thermal power plants and 1/3 from hydro potential. At the end of 2018, considerable wind plants capacities started to be connected to the transmission system. Their share in the total electricity production becomes more and more considerable and it amounted to around 2.6% in 2022.

The Energy Sector Development Strategy until 2025 with projections until 2030 and the National Action Plan for Use of Renewable Energy Sources of the Republic of Serbia indicate the plan to have considerable increase in renewable energy sources. The Program for the Realisation of the Energy Sector Development Strategy of the Republic of Serbia until 2025 with projections until 2030 envisages that further realisation of the projects in the field of renewable energy sources in the period 2021-2030 will increase the contribution of renewable energy sources in the greenhouse gas emission and that it will be possible to estimate the final share of renewable energy sources in gross final consumption and projected greenhouse gas emission reduction only after the adoption of new action plans in this sector.

All thermal units in PE *EMS* are subject to the requirements of the Large Combustion Plants Directive 2001/80/EC (Large Combustion Plants Directive - LCPD) and the Industrial Emission Directive 2010/75/EU Industrial Emissions Directive - IED to the extent of limitation of the emission of polluting substances in the air – sulphur dioxide (SO_2), nitrogen oxides (NO_x) and powder substances. On October 24, 2013, the Energy Community Ministerial Council adopted decisions D/2013/05/MC-EnC and D/2013/06/MC-EnC which include rules for operation of large combustion plants which impose for PE *EPS* to reduce the emission of polluting substances into the air from existing combustion plants as of January 1, 2018 and by December 31, 2027 at the latest.

The National Emission Reduction Plan (NERP) was adopted by the Government of the Republic of Serbia in February 2020. By this plan, the Republic of Serbia was obliged to make significant moves in terms of reduction of emissions of polluting matters from large power plants. Its implementation aims at having emissions from large combustion plants harmonised with limit levels of emissions defined by the Directive on Industrial Emissions 2010/75/EU by December 31, 2027. NERP prescribes maximum allowed emissions of polluting matter (sulphur dioxide, nitrogen oxides and powder matter) from big thermal power plants on the annual level. According to NERP, it is planned to have gradual withdrawal of the oldest and the least energy-efficient thermal units until the end of 2027 due to old technology, high production costs and environment protection. In February 2019, the construction of desulphurisation plant in the Nikola Tesla A Thermal Power Plant in four units (A3, A4, A5 and A6) was initiated. Thereby, the emission of sulphur gases will be reduced nine times. In 2022, the works on this plant were continued and it is expected to make it functional until May 2023. It is planned to also work on the

construction of the desulphurisation plant for the remaining two blocks within the Thermal Power Plant Nikola Tesla A (A1 and A2), too. In addition, in 2022, there was a follow-up of the work on the construction of a desulphurisation of steam gases for the Thermal Power Plant Nikola Tesla B which was initiated at the end of 2020. In 2022, the trial operation of the plant for desulphurisation of flue gases in the Thermal Power Plant Kostolac B completed. It is planned to work on the construction of the desulphurisation plant in the Thermal Power Plant Kostolac A.

In the previous years, activities were taken to reduce pollution also by the reconstruction of electric filters in all thermal power plants and thereby, the emissions of powder matter, i.e. PM (Particulate Matter) particles were considerably lower. In addition, the emission of nitrogen oxides within units A3, A4 and A5 was reduced in the Nikola Tesla A Thermal Power Plant and in the unit B1 in the Nikola Tesla B Thermal Power Plant and in Unit B2 in the Thermal Power Plant Kostolac B.

At the same time, within PE *EPS* which is the dominant power producer in the Republic of Serbia, activities on revitalization and modernization of existing power plants are permanently realized. This will enable the increase both in terms of energy efficiency and installed capacity.

The most important activities during 2022 are the following:

- Follow-up of works on the construction of new thermal unit B3 in TPP Kostolac B with 350 MW capacity, fuelled by Kostolac lignite (PE *EPS* is the investor);
- Construction of the first wind park owned by PE *EPS* with 66 MW in Kostolac;
- Completion of the "Green Project" in the Mining Basin Kolubara which would enable the instalment of new equipment which secures safe supply of thermal power plants in lignite and compliance with regulations in the field of environment protection;
- The initiation of works on project "green ring" which envisages planting trees around Thermal Power Plant Nikola Tesla 1 and the mining pit Radljevo which will form green ring;
- Activities on revitalization and modernization of the hydro power plant Đerdap 1 – in November 2019 were continued. Since 2009, five generators have been revitalised. In 2022, the revitalisation of the sixth generator – the last one was initiated. The completion of works is expected at the end of 2023. Upon the completion of works, the hydro power plant Đerdap 1 will have 180 MW higher installed capacity for the production of clean electricity and
- Preparation activities for revitalisation of HPP Potpeć, HPP Bistrica, HPP Vlasinske and HPP Đerdap 2.

3.8.3 Use of renewable energy sources

The Law on Use of Renewable Energy Sources ("Official Gazette of RS", No. 40/21) was adopted in 2021 and it prescribed that the Agency adopts methodologies which set maximum purchase electricity prices and feed-in-tariffs for electricity produced from renewable energy sources.

Acting in line with new jurisdiction from this law, the Agency adopted Methodology for Setting Maximum Purchase Electricity Price ("Official Gazette of RS", No. 103/21) and Methodology for Setting Maximum Feed-in Tariff for Electricity ("Official Gazette of RS", No. 103/21) the adoption of which created conditions for the implementation of this law the initiation of the auctions for electricity produced from renewable energy sources.

Based on this Law, the given methodology for setting maximum purchase electricity price and the Decree of the Government of the Republic of Serbia on quota in the market premia system for wind parks ("Official Gazette of RS", No. 107/21), in 2021, the Agency adopted a decision on setting maximum purchase price for auctions for electricity from wind parks. Maximum purchase price for electricity produced in wind parks of approved power exceeding 3 MW was set on the level of 5.57 €c/kWh.

A Law on Energy Efficiency and Rational Use of Energy ("Official Gazette of RS", No. 40/21) was adopted in 2021, too. In line with new jurisdiction arising from this law, the Agency adopted a Methodology for Setting Market Premia – Highly Efficient Cogeneration ("Official Gazette of RS", No. 106/2021) and Methodology for Setting Feed-in Tariff – Micro and Small Cogeneration ("Official Gazette of RS", No. 106/2021) within the prescribed deadline. Both methodologies apply to power producers in highly efficient cogeneration, small cogeneration and micro-cogeneration units.

Since the adoption of the above given laws enabled the cease of validity of the Decree on Incentive Measures for Electricity Production from Renewable Energy Sources and Highly Efficient Combined Heat and Power Production ("Official Gazette of RS", No. 56/2016, 60/2017 and 91/2018) which prescribed incentive measures for the use of renewable energy sources in line with the type of the power plant and installed capacity and purchase price for the power produced thereby (feed-in tariff), the purchase price for privileged power producers was not set in 2021 and in 2022. Historical review of these prices for each year is indicated in Table 3-45.

Table 3-45: Final prices for privileged electricity producers

No.	Type of power plant	Installed capacity (MW)	Incentive price (c€/kWh)				
			2016	2017	2018	2019	2020
1	Hydro power plants						
1.1		Up to 0.2	12.60	12.74	12.92	13.132	13.30
1.2		from 0.2 to 0.5	13.933 – 6.667*P	14.086 – 6.740*P	14.283 – 6.6834*P	14.512 – 6.943*P	14.701 – 7.033*P
1.3		from 0.5 to 1	10.6	10.72	10.87	11.04	11.18
1.4		from 1 to 10	10.944 – 0.344*P	11.064 – 0.348*P	11.219 – 0.353*P	11.399 – 0.359*P	11.547 – 0.364*P
1.5		from 10 to 30	7.50	7.58	7.69	7.81	7.91
1.6	With the existing infrastructure	Up to 30	6.00	6.07	6.15	6.25	6.33
2	Biomass-fired power plants						
2.1		Up to 1	13.26	13.41	13.60	13.82	14.00
2.2		From 1 MW to 10 MW	13.82 – 0.56*P	13.97 – 0.57*P	14.17 – 0.58*P	14.40 – 0.59*P	14.59 – 0.60*P
2.3		Over 10	8.22	8.31	8.43	8.56	8.67
3.	Biogas-fired power plants						
3.1		From 0 - 2	18.333 – 1.111*P	18.535 – 1.123*P	18.794 – 1.139*P	19.095 – 1.157*P	19.343 – 1.172*P
3.2		from 2 to 5	16.85 – 0.370*P	17.035 – 0.374*P	17.273 – 0.379*P	17.549 – 0.385*P	17.777 – 0.390*P
3.3		Over 5	15.00	15.165	15.377	15.62	15.82
4.	Power plants fired by landfill gas and gas from plants for treatment of public utility waste water		8.44	8.53	8.65	8.79	8.90
5.	Wind powered power plants		9.20	9.30	9.43	9.58	9.70
6.	Solar power plants						
6.1	Roof-mounted	Up to 0.03	14.60 - 80*P	14.76 – 80.88*P	14.97 – 82.01*P	15.21 – 83.32*P	15.41 – 84.40*P
6.2	Roof-mounted	From 0.03 to 0.05	12.404 – 6.809*P	12.540 – 6.884*P	12.716 – 6.980*P	12.919 – 7.092*P	13.087 – 7.184*P
6.3	Ground-mounted		9.00	9.10	9.23	9.38	9.50
6.4		from 0.2 to 2	9.00	9.10	9.23	9.38	9.50
6.5		from 2 to 10	9.00	9.10	9.23	9.38	9.50
7.	Geothermal power plants						
7.1		Up to 1	8.2	8.29	8.41	8.54	8.65
7.2		from 1 to 5	8.2	8.29	8.41	8.54	8.65
7.3		Over 5	8.2	8.29	8.41	8.54	8.65
8.	Waste fired power plants		8.57	8.66	8.78	8.92	9.04
9.	Natural gas-fired combined cycle power plants						
9.1		Up to 0.5	8.20	8.29	8.41	8.54	8.65
9.2		from 0.5 to 2	8.447 – 0,493*P	8.540 – 0.498*P	8.660 – 0.505*P	8.799 – 0.513*P	8.913 – 0.520*P
9.3		from 2 to 10	7.46	7.54	7.65	8.77	7.87

Table 3-46: Structure of prices and applied prices (VAT and duties free) of electricity withdrawn from privileged producers in 2022

Privileged producers category		Quantity	Amount	Price
		MWh	000 RSD	RSD/MWh
1	Small hydro power plants	299,815	3,529,018	11.77
2	Biogas-fired power plants	252,699	5,187,632	20.53
3	Wind-fired power plants	950,210	11,128,985	11.71
4	Solar power plants	10,899	281,324	25.81
4.1	Ground-mounted solar power plants	7,137	184,849	25.90
4.2	Roof-mounted solar power plants	3,762	96,475	25.65
5	Fossil fuel-fired combined heat and power plants	187,756	1,888,651	10.06
5.1	Gas-fired power plants	186,604	1,877,063	10.06
5.2	Coal-fired power plants	1,152	11,588	10.06
6	TOTAL	1,701,378	22,015,611	12.94

*Average purchase price of electricity sold by solar power plants is higher than the latest price prescribed by the Decree on Incentive Measures for Power Production from Renewable Energy Sources and Highly Efficient Combined Power and Heat Production ("Official Gazette of RS", No. 56/2016, 60/2017 and 91/2018), since most of privileged producers producing electricity in these power plants concluded contracts until 2016 when the purchase price amounted to more than 20 c€ / kWh.

In 2022, according to the Decree on Level of Separate Incentive Fee for Privileged Power Producers ("Official Gazette of RS", No. 83/2022), final electricity customers paid a separate fee for stimulating privileged electricity producers in the amount of 0.801 RSD/kWh.

Table 3-47: Incentive fee for privileged electricity producers 2017 – 2022

RSD/kWh

	2017	2018	2019	2020	2021	2022
RES incentive fee	0.093	0.093	0.093	0.093	0.437	0.801

Table 3-48: Level of collected privileged producers' incentive fee in 2022

	Collected (000 RSD, VAT free)
Revenue from electricity sale at acknowledged price	5,817,035
Revenue based on invoiced fee	16,065,088
- *EPS Snabdevanje*	15,406,665
- Other suppliers	658,423
Revenues from financial securities activation	1,570
Reduction of revenue for acknowledged recovery of 2%	-437,642
Total	21,446,050

Table 3-49: Electricity withdrawn from privileged producers 2018 - 2022

MWh

Renewable energy source/ Fuel for combined production	2018	2019	2020	2021	2022
Water flow	265,917	230,298	221,283	323,941	299,815
Fossil fuels (coal, heating oil (mazoute) and natural gas) – combined production	105,814	91,501	100,062	198,349	187,756
Biogas	95,494	136,070	179,897	244,143	252,699
Solar energy	10,521	10,941	9,043	10,494	10,899
Other	150,419	892,994	835,168	1,070,731	950,210
TOTAL	**628,165**	**1,361,804**	**1,345,454**	**1,847,658**	**1,701,378**

3.8.4 Construction of new transmission capacities

In 2022, activities on regular maintenance and overhaul of existing facilities of the transmission system operator *EMS* AD were performed. On the other hand, basic investment activities in 2022 related to the construction of new facilities as well as to the reconstruction and modernization of existing facilities. In addition, investment activities included the realization of projects on connection to the transmission system.

In 2022, *EMS* AD participated in the activities related to the construction of sections 2, 3 and 4 of the first phase of the TransBalkans Corridor.

The construction of Section 1 of the first phase of TransBalkans Corridor (double-circuit) overhead line 400 kV TS Pančevo 2 – border with Romania) was completed in 2017. Since the works on the construction of the overhead line on the Romanian side are not completed, one system of the overhead line temporarily operates under 110 kV from the direction TS Pančevo 2 and it was used to provide supply for the area of south Banat ("SouthBanat knot") while the other system operates 400 kV but it is not connected to the Romanian system until the border with Romania. The construction of this overhead line represents the beginning of the project of connecting eastern and western Europe via the territory of the Republic of Serbia by 400 kV lines which will additionally increase the security of customers' supply in the Republic of Serbia.

Within the Section 2 (overhead line 400 kV TS Kragujevac 2 – TS Kraljevo 3, with an increase of the voltage level in TS Kraljevo 3 to 400 kV), works were completed in December 2021 and the overhead line was commissioned (idle running) from the direction of TS Kragujevac 2 in January 2022. Works on the upgrade and reconstruction of TS 400/220/110 kV Kraljevo 3 were completed and this transformer station started its trial operation in June 2022.

For the Section 3 (overhead line 2x400 kV TS Obrenovac – TS Bajina Bašta, with an increase of the voltage level in TS Bajina Bašta to 400 kV), an application was filed for additional investment grant within the 7th round of WBIF invitation for OHL 2x400 kV TS Bajina Bašta – TS Obrenovac in 2022. The construction permit was awarded for OHL 400kV Obrenovac - Bajina Basta.

Within the Section 4 (Interconnector overhead line 2x400 kV between Serbia, BiH and Montenegro), for the segment of the overhead line on the territory of the Republic of Serbia, construction permit was awarded in October 2022. Overall project and technical documentation was completed and adopted. In September 2022, the procedure of settling ownership issues was initiated.

In addition to the works on the construction of TransBalkans Corridor as a project of national and strategic interest, in 2022, *EMS* JSC also worked on the construction of another important capital project – project BeoGrid2025 which includes the construction of TS Beograd 50 with accompanying overhead lines of 400 kV and 110 kV voltage level as well as on the construction of the overhead line OHL 2x400 kV TS Belgrade 50 – connection switching station Čibuk 1. A procedure of drafting urban construction projects was initiated as well as drafting technical documentation such as conceptual solution, elaborates for settling ownership and legal issues and project for construction permit.

In 2022, works on the project Increase in Transmission Capacity of Bor Region were also initiated. The Government of the Republic of Serbia adopted a decision that this is a project of particular interest for the Republic of Serbia. This project includes the construction of TS 400/110 kV Bor 6 and the construction of 400 kV overhead line.

The most important investment work in high-voltage facilities (transformer stations and switching stations) in 2022 included: reconstruction in TS 400/110 kV/kV Pancevo 2, TS 400/110 kV/kV Bor 2, TS 400/220/110 kV/kV Nis 2, TS 400/220/110 kV/kV Kraljevo 3, TS 220/110 kV/kV Belgrade 3, TS 400/110 kV/kV Srbobran and switchgear 400 kV Djerdap 1.

The most important investment works on overhead lines in 2022 included: completion of works on the construction of overhead line 110 kV and 220 kV near TS Bistrica, completion of works on OHL 110 kV No. 107/2 Tamnava Zapadno polje – Valjevo 3, entrance into TS Ub, completion of works on OHL 110 kV No. 104A/3 and 104B/3 TS Belgrade 5 – TS Stara Pazova, entrance into TS Belgrade 5, completion of works on OHL 110 kV No.1206+154/3 Nis 2 – Pirot 2, entrance into TS Nis 5, completion of works on OHL 110kV No. 1184 Novi Pazar 1 – Tutin, reconstruction and entrance of OHL 110kV into TS N. Pazar and TS Tutin, completion of works on cable 110 kV Novi Sad 5 – Novi Sad 7 and completion of works on cable 110 kV TS Belgrade 1 – TS Belgrade 6. In addition to seven projects which were completed in 2022, activities on the works on additional nine overhead lines were performed intensively.

In 2022, *EMS* AD issued numerous acts for the purpose of connection and coupling of facilities to the transmission system. Out of the projects on connection of energy entities to the transmission system, the most important was the realization of connection of distribution transformer stations with the transmission system, i.e.: reconstructed TS 110/35 kV/kV Belgrade 6, new TS 110/35 kV/kV Ub and new TS 110/35/10 kV Tutin.

The Law prescribes that the transmission system operator is obliged to adopt a transmission system development plan once in two years for the following 10-year period and to adopt a plan on investments into the transmission system for the following three-year period. The Agency approves these plans. The transmission system development plan is based on the amended version of the former one, in line with new requirements, bearing in mind the experience in transmission network operation and maintenance. The plan is being harmonised with the plans of neighbouring distribution system operators and plans of

transmission system operators. Since the transmission System Operator of the Republic of Serbia belongs to the a synchronised area of "Continental Europe", their active participation in the preparation of a Ten Years Network Development Plan as well as the Regional Investment Plan which are drafted within ENTSO-E is mandatory. The goal of Pan-European ten-year development plan is to provide transparency related to transmission network development as well as the support to decision-making process on regional and European level which may happen in the future.

Since EMS JSC submitted the Action Plan of Transmission System Development of the Republic of Serbia for 2021-2030 in 2021 which was approved by the Agency as well as since the transmission system development plan is drafted every second year, the ten-year transmission system development plan was not submitted by EMS JSC in 2022.

Analysing the state of play in the transmission network within the Transmission System Development Plan, taking into consideration consumption forecast and expected commission of new generation units, within the Transmission System Development Plan for 2021 - 2030, *EMS* JSC planned the construction of new transmission network facilities, i.e. rehabilitation or upgrade of existing ones. Thereby, existing and expected congestions could be removed and the efficiency of transmission system operations could be increased.

As far as the 400 kV voltage level transmission network is concerned, the Transmission System Development Plan for 2021 – 2030 defined interconnection projects and internal network projects. These projects are of regional and Pan-European importance for electricity transmission and they contribute directly to the long-term energy security of the Republic of Serbia.

- The most important planned project of new interconnection within the Transmission System Development Plan for 2021 – 2030 is the interconnection between the Republic of Serbia, Bosnia and Herzegovina and Montenegro, which represents Section 4 of the first phase of the Trans Balkans Corridor.

The following planned projects for internal 400 kV network may be highlighted:

- construction of new overhead line 400 kV TS Kragujevac 2 – TS Kraljevo 3 with the reconstruction of TS Kragujevac which represents Section 2 of the first phase of the Trans Balkans Corridor;
- in the western Serbia region, the upgrade of 220 kV network to 400 kV voltage level which implies the upgrade of hub Bajina Bašta to 400 kV voltage level and construction of new double-circuit 400 kV overhead line between TS Obrenovac and TS Bajina Bašta which represents Section 3 of the first phase of the Trans Balkans Corridor;
- BeoGrid2025 project which includes the construction of TS Belgrade 50 with accompanying overhead lines of 400 kV and 110 kV voltage level, as well as the construction of the overhead line OHL 2x400kV TS Belgrade 50 – connection switching station Čibuk 1;
- construction of 400 kV facility instead of 220 kV in TS Srbobran and construction of lines for connection of TS Srbobran;
- new TS 400/110 kV/kV in the south Banat region and
- reconstruction of TS Kragujevac 2, TS Pančevo 2, TS Bor 2, switching station for Đerdap 1.

All new projects will contribute to the security of supply and reliability of the operations of the whole power system of the Republic of Serbia and the realization of planned projects will also depend on financing conditions, especially as far as the construction of the section of Trans Balkans Corridor which relates to the interconnection between Serbia, Montenegro and Bosnia and Herzegovina is concerned.

In terms of the transmission network of 220 kV voltage level, the *EMS* JSC has a strategic plan to withdraw this network gradually, i.e. to increase its voltage level to 400 kV which will be performed to a great extent within the Trans Balkans Corridor Project.

In terms of the development of the 110 kV transmission network, the Transmission System Development Plan for 2021 – 2030 offers solutions for the existing areas with insufficient security of electricity supply, first of all, for the area of Raška and south Banat, as well as for radially supplied areas. The 110 kV development is particularly important in order to harmonise with the distribution system development plan in order to enable the realisation of projects on connection between facilities of the transmission and distribution system.

In June 10, 2022, EMS JSC submitted a draft of the Transmission System Investment Plan of the Republic of Serbia for 2022-2024 which was amended upon the comments of the Agency and submitted to the Agency on December 23, 2022 and approved by the Agency. The Transmission System Investment Plan for 2022-2024 was harmonized with the Distribution System Investment Plan for 2022-2024.

The Investment Plan for the three-year period gives a review of investments for each year and describes investment demand from national, regional and European aspect. The realization of these investments considerably influences the increase of transmission capacities in the regional transmission network and, thereby, the electricity market development in Europe. From the national aspect, the Plan reviews the necessity to construction power infrastructure which will enable the increase in transmission capacity, market development on the national level, increase in transmission system reliability and increase in the security of customers' supply as well as the increased possibility to connect new conventional and renewable electricity sources.

The Energy Law defines that the Agency observes and assesses the realization of theTen-Year Transmission System Development Plan and includes the assessment of realized investment in the annual report. The Agency executed the observation process for 2022.

Table 3-50 indicates the total planned and realized level of investments of the transmission system operator classified into different types of activities for 2021 in line with adopted Investment Plan.

Table 3-50: Planned and achieved level of investments into transmission network development for different types of activities for 2022

(000 RSD)

Type of activity	Planned level	Achieved level	Index
Construction of a new facility	2,549,063	1,263,058	50
Reconstruction, adaptation and upgrade	3,188,766	2,281,177	72
Other investments into the transmission system	213,026	130,945	61
Total	**5,950,855**	**3,675,181**	**62**

Table 3-51 indicates total planned and achieved level of investments of the transmission system operator for different voltage levels for 2022 in line with the adopted Investment Plan.

Table 3-51: Planned and achieved level of investments into transmission network development for different voltage levels for 2022

(000 RSD)

Voltage level	Planned level	Achieved level	Index
110 kV	3,410,879	1,710,085	50
220 kV	361,668	367,313	102
400 kV	1,968,079	1,468,748	75
35 kV	80	83	104
All voltage levels – implementation of remote control	210,149	128,952	61
Total	**5,950,855**	**3,675,181**	**62**

3.8.5 Distribution system operator's investment activities

In 2022, activities on regular maintenance and overhaul of existing facilities of the distribution system operator *Elektrodistribucija Srbije* were performed. On the other hand, main investment activities in 2022 were related to the construction of new facilities as well as to the reconstruction and modernization of existing facilities. In addition to the above mentioned, investment activities also included the realization of projects on connections to the distribution system.

Within the distribution system, the following works were either completed or initiated in 2022:

- On transformer stations:

  Expansion and reconstruction of existing transformer stations. The construction of new transformer stations was completed: TS 110/20 kV/kV Arandjelovac 2, TS 110/35/10 kV/kV/kV Tutin, TS 110/35 kV/kV Uzice 2, TS 35/10 kV/kV Divcibare and TS 35/10 kV/kV Gornji Orah. The following transformer stations were reconstructed: TS 110/10 kV/kV Belgrade 15 (Slavija), TS 110/10 kV/kV Belgrade 14 (Kalemegdan), TS 110/10 kV/kV Belgrade 28 (Pionir) and TS 35/10 kV/kV Mladenovac 5, TS 35/10 kV/kV Feldspat and TS 35/10 kV/kV Smederevska Palanka.
- on distribution lines:

  Construction and reconstruction of a set of distribution lines within the distribution medium voltage network;

  Construction of low voltage network, in line with the local growth in electricity consumption and transmission capacities development as well as with the need to upgrade quality of supply;
- metering and management:

  Upgrade of metering devices and further development of remote reading system was performed but not to the planned scale.

The Law prescribes that the distribution system operator is obliged to adopt the distribution system development plan once in two years for the following 10-year period and to adopt a plan on investments into the distribution system for the following three-year period. The Agency approves these plans. The distribution system development plan is based on the amended version of the former one, in line with new requirements, bearing in mind the experience in distribution network operation and maintenance. The plan is being harmonised with the transmission system development plan.

Since *Elektrodistribucija Srbije* submitted the Distribution System Development Plan of the Republic of Serbia for 2021-2030 to the Agency and the Agency approved it and since the distribution system development plan is drafted every second year, the ten-year distribution system plan was not submitted by Elektrodistribucija Srbije in 2022.

The DSO analysed of the situation within the distribution network and took into account the consumption forecast and expected commissioning of new production units and therefore, within the Distribution System Development Plan, they planned the construction of new distribution network facilities as well as the adaptation and reconstruction of existing distribution network facilities which would remove existing and expected congestion and increase distribution system operations efficiency. The Distribution System Development Plan for 2021 - 2030 is harmonized with the Transmission System Development Plan for 2021 - 2030.

Based on identified demand for network development, individual distribution network development plans were made for each of five distribution areas (*DP*) (*DP Kraljevo, DP Nis, DP Kragujevac, DP Belgrade and DP Novi Sad).* For each DP, a list of projects with facilities which should be constructed or reconstructed in the next 10-year period was made. All projects were separated in following categories: construction of TS 110/x kV/kV, reconstruction of TS 110/x kV/kV, construction of TS 35/x kV/kV, reconstruction of TS 35/x kV/kV and construction and reconstruction of 10 (20) kV and 0.4 kV network. On July 5, 2022, *Elektrodistribucija Srbije* submitted the draft of Distribution System Investment Plan of the Republic of Serbia for 2022-2024 to the Agency and, following the comments of the Agency, it was amended. On December 6, 2022, it was submitted to the Agency and approved by it. The Distribution System Investment Plan for 2022-2024 was harmonized with the transmission system investment plan for 2022-2024.

The Agency observed the implementation of the Investment Plan for 2022. Table 3-52 indicates the total planned and realized level of investments of the distribution system operator classified into different types of activities for 2022.

Table 3-52: Planned and achieved level of investments into distribution network development for different types of activities for 2022

(000 RSD)

Type of activity	Planned level	Achieved level	Index
Construction of a new facility	8,441,823	9,987,099	118
Reconstruction, adaptation and upgrade	3,711,224	1,435,362	24
Other investments into the transmission system	4,216,970	1,014,715	39
Total	**16,370,017**	**12,437,176**	**76**

Table 3-53 indicates total planned and achieved level of investments of the distribution system operator for different voltage levels for 2022.

Table 3-53: Planned and achieved level of investments into distribution network development for different voltage levels for 2022

(000 RSD)

Voltage level	Planned level	Achieved level	Index
110 kV	3,662,269	1,637,232	45
220 kV	2,842,810	824,967	29
400 kV	5,647,968	8,960,962	159
All voltage levels – implementation of remote control	4,216,970	1,014,715	24
Total	**16,370,017**	**12,437,176**	**76**

The Law prescribes that, in addition to the Distribution System Development Plan and Distribution System Investment Plan, the DSO is obliged to adopt and submit the plan of transfer of metering devices, metering and switching boards, installation and equipment in metering and switching boards, connection lines and other devices which are within the connection of customers' facilities, i.e. producers' facilities to the Agency for approval. The DSO complied with this obligation and on September 13, 2021, the DSO submitted the Plan for Transfer of Metering Devices for 2021-2024 to the Agency. On September 24, 2021, the Agency approved this plan.

3.8.6 Reduction of losses within the distribution network

In 2022, there was a decrease in losses in the distribution network which decreased by 0.5% in comparison to 2021 losses and they amount to 11.23% of electricity withdrawn into the distribution system. The activities on the reduction of losses have to be intensified in the future since it is necessary to bring losses to technically acceptable level. Regular activities on the metering devices checks and on the transfer of metering devices and connection lines have to be performed in line with legal obligations and adopted plans. In 2022, checks were made only on 5% of planned metering devices.

In the future, it is necessary to implement measures which should contribute to loss reduction and which are also envisaged by the DSO loss reduction plan and which include:

- construction of new network facilities, overhead lines and transformer stations;
- transfer of metering devices, switchboards, connection lines, installation and equipment in the switchboard and other devices within the connection in the facilities of existing customers and their operation in line with technical regulations and distribution system code;
- procurement and installation of new meters with most of customers;
- modernisation of the remote measuring system and consumption management;
- improvement of technical and business system for calculation and collection of electricity bills;
- activating existing devices and construction of new ones for reactive power compensation and
- improvement of cooperation with state bodies as regards electricity theft prevention.

3.8.7 Smart metering systems

The Law prescribes that the transmission system operator and the distribution system operator draft a plan for the implementation of economically justified types of advanced metering systems and they submit it to the Agency for the purpose of issuance of an opinion.

Since the transmission system operator has smart meters installed on all delivery points, they did not draft this plan and submit it to the Agency.

Table 3-54 indicates the total number of meters owned by the transmission system operator in 2022. All meters are smart with following functionalities: remote reading by the TSO, remote reading by a user via adequate application, two-direction metering (production and consumption), tariff management and data preservation.

Table 3-54: Smart meters within the transmission system

Voltage level	400kV	220kV	110kV
Number of meters installed at customers' facilities	0	6	94
Number of meters installed at producers' facilities	11	11	36
Number of meters installed at the TSO and closed DS	0	0	451
Number of meters installed on interconnectors	8	5	13
Total	**19**	**22**	**594**

In 2022, the distribution system operator did not submit the plan for the implementation of economically justified types of advanced metering systems to the Agency.

Table 3-55 indicates the total number of meters owned by the distribution system operator. The total percentage of smart meters installed at customers' facilities amounts to 4.19% (for all voltage levels), while the total percentage of smart meters installed at producers' facilities amounts to 97.87% (for all voltage levels).

Table 3-55: Smart meters within the distribution system in 2022

	Voltage level	35, 20, 10kV	0.4kV		Households	Public lighting	Total
			Customers whose capacity is metered	Customers whose capacity is not metered			
Meters installed at electricity customers' facilities	Electromechanical	5,382	635	204,528	2,319,898	15,527	2,545,970
	Digital	46	42,104	142,080	1,023,733	7,737	1,215,700
	Total	5,428	42,739	346,608	3,343,631	23,264	3,761,670
	Smart meters	5,035	21,876	17,949	110,910	1,683	157,453
	Percentage of digital meters in comparison to the total number	92.76%	51.19%	5.18%	3.32%	7.23%	4.19%
Meters installed at electricity producers' facilities	**Voltage level**	**35kV**	**20kV**	**10kV**	**0.4kV**		
	Electromechanical	0	0	3	0		3
	Digital	34	49	115	175		373
	Total	34	49	118	175		376
	Smart meters	34	49	115	170		368
	Percentage of digital meters in comparison to the total number	100.00%	100.00%	97.46%	97.14%		97.87%

In case of customers' facilities, most smart meters can only provide remote reading by the DSO and such meters account for 2.63% of the total number of meters installed at customers' facilities. Out of the total number of meters installed at customers' facilities 1.18% include all the three functionalities, while only 0.37% of meters include seven functionalities (remote reading by the DSO, remote reading by a customer (buyer), remote turn on/off, remote consumption control, tariff management, house display and data preservation).

In case of producers, the greatest number of smart meters include three functionalities and such meters account for 45.48% out of the total number of all meters installed at producers' facilities. 33.51% of the total number of all installed meters for producers include only remote reading by the DSO. 1.8% of meters include only remote reading by customers (producers) while 17.29% of meters includes five functionalities (remote reading by the DSO, remote reading by a customer (producer), remote turn on/off, two-direction metering and data preservation).

It is essential that the distribution system operator complies with the given legal obligation in the future and to adopt the plan for the implementation of economically justified types of advanced metering systems. Advanced metering systems and advanced networks will enable higher reliability and quality of electricity delivery. They will also stimulate better consumption management and more dynamic market and thereby reduce technical and commercial electricity losses to a great extent.

4. NATURAL GAS

4.1 Sector structure and capacities

4.1.1 Organisational and ownership structure

Gas sector organisational structure at the end of 2022 is given in Figure 4-1. *Naftna industrija Srbije* (Petroleum Industry of Serbia) JSC, Novi Sad (hereafter NIS JSC) is the only natural gas producer. Natural gas production is not a regulated activity.

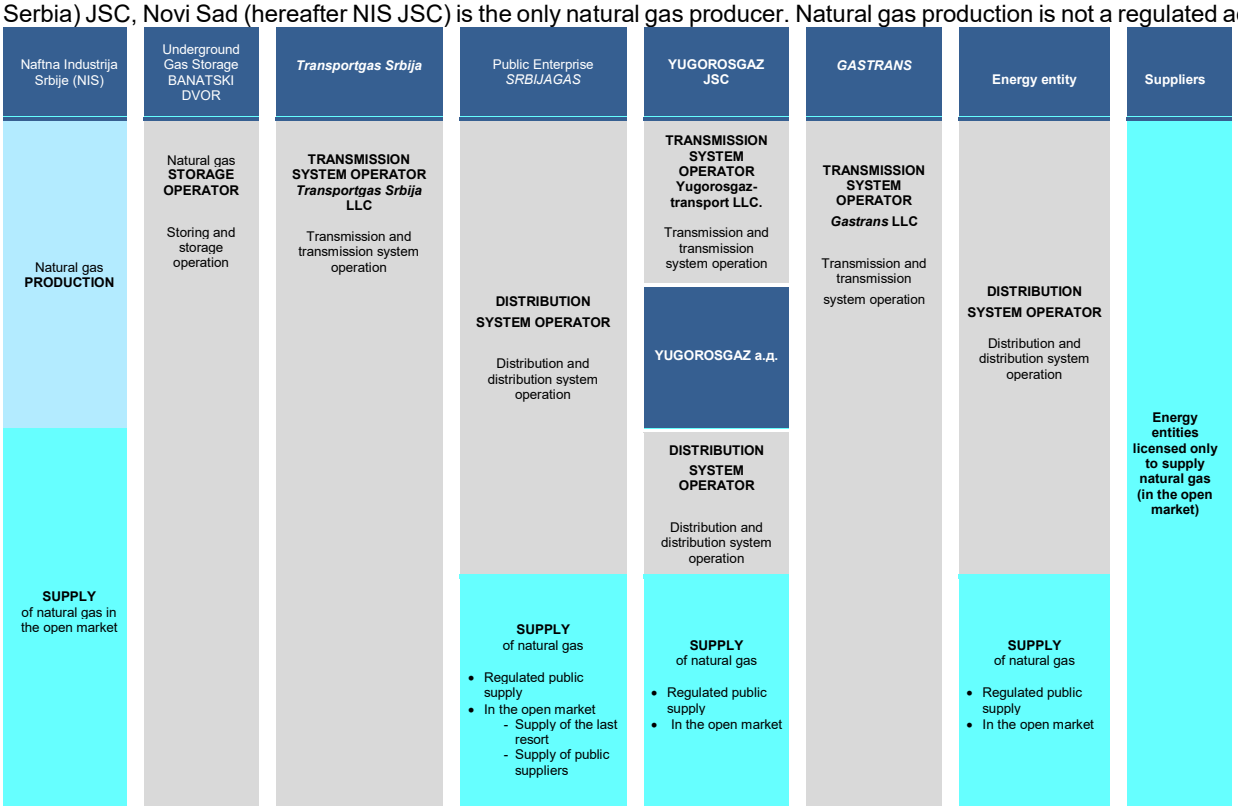

Figure 4-1: Organisational structure of the natural gas sector at the end of 2022

In Serbia, natural gas transmission and transmission system operation are performed by three transmission system operators (TSO): *Transportgas Srbija* LLC, Yugorosgaz-Transport LLC, Niš and *Gastrans* LLC, Novi Sad. In 2015, TSO Yugorosgaz-Transport LLC completed legal unbundling from a vertically integrated company „Yugorosgaz" JSC Belgrade. The functional unbundling asked for prior amendment of the interstate treaty. In PE *Srbijagas*, decisions on legal and functional unbundling of TSO – *Transportgas Srbija* LLC from the parent company were adopted. Since 2021, *Transportgas Srbija* LLC has been performing natural gas transmission and transmission system operation.

On June 9, 2021, the single member of the company - PE *Srbijagas* was deleted from the Serbian Business Registers Agency. Instead, the Republic of Serbia was registered as the only member of the company "*Transportgas Srbija*" LLC with 100% of shares. In October 2021, the Government approved the Decision on Amendments to the Decision on Foundation of Company "*Transportgas Srbija*" LLC which created conditions for *Transportgas Srbija* LLC to operate independently from PE *Srbijagas* which continued operating in the field of natural gas supply and natural gas public supply.

Within the exemption procedure, the Agency approved the exemption from ownership unbundling, third party access and regulated prices for 20 years period to *Gastrans* LLC company. In 2019 and 2020, *Gastrans* LLC constructed gas interconnector (Zajecar – Horgos) in order to initiate natural gas transmission in 2021. Following the connection to the transmission system of Hungary, this gas interconnector became fully operational starting from October 1, 2021 when natural gas started being transmitted from Bulgaria direction in order to cover the demand in the Republic of Serbia and in order to enable natural gas transit from the border with Bulgaria up to the border with Hungary.

Distribution and distribution system operation are performed by 31 distribution system operators (DSOs) as it was the case last year. In addition to PE *Srbijagas*, and *Yugorosgaz* JSC, natural gas distribution and distribution system operation are performed by other 29 companies among which most of them are owned by municipalities and towns, some of them are with miscellaneous ownership and some of them are private. One energy entity holding a valid licence does not perform this activity. All DSOs, except for DSO – PE *Srbijagas*, in addition to performing natural gas distribution, within the same legal person, they can also perform natural gas supply at regulated prices and supply in the open market since they have less than 100,000 connected final customers which is why they are not obliged to execute legal unbundling between distribution and supply.

At the end of 2022, there were 61 energy entities holding licence for natural gas supply in total and 23 of them were active. Natural gas public supply of final customers at regulated prices was performed by 31 public suppliers which also perform natural gas distribution.

In line with the law, the Government of the Republic of Serbia appointed PE *Srbijagas* to be the supplier of public suppliers and the natural gas supplier of the last resort for 2022 as well.

Storage operator performs natural gas storage and storage operation. There is only one storage, Natural Gas Underground Storage Banatski Dvor, LLC, founded and owned by PE *Srbijagas* (49%) and Gazprom Germania (51%). This was defined on the basis of the Agreement of the Republic of Serbia and the Government of the Russian Federation on Cooperation in Oil and Gas Industry concluded in January 2008 (Law on Confirmation of the Agreement of the Republic of Serbia and the Government of the Russian Federation on Cooperation in Oil and Gas Industry "Official Gazette of RS – International Agreements, No. 83/08).

4.1.2 Production, transmission, distribution and storage capacities

4.1.2.1 Production

Natural gas production in Serbia is realized in Vojvodina area and the only natural gas producer is NIS. After preparation process which makes produced gas applicable to final customers, produced gas is delivered to 9 points into the transmission system while much smaller quantities (around 2.6% of produced volume) are delivered to 4 points into the distribution system. The total annual production which was delivered to the transmission and distribution system in 2022 amounted to 2,070 GWh which is 12.0% less than last year production volume. After significant growth in 2011 and 2012, natural gas production has been decreasing year after year since 2013.

Table 4-1: Natural gas production in Serbia in period 2013 – 2022 in GWh

Production/Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Delivered to transmission system	4,627	4,648	4,330	3,981	3,755	3,355	2,913	2,627	2,226	2,016
Delivered to distribution system	174	144	103	113	72	82	92	92	92	54
Total production (million m^3)	4,801	4,792	4,433	4,094	3,827	3,437	3,005	2,719	2,318	2,070
Variation in comparison to (n-1) year		-0.2	-7.5	-7.6	-6.5	-10.2	-12.5	-9.6	- 14.7	-12.0

Out of the total volume delivered into the transmission and distribution system in 2022, 50 GWh (2.4%) of natural gas was sold to other suppliers, while the remaining quantity of natural gas was spent by NIS to cover its own demand, mostly in Pančevo oil refinery. So as to cover their own natural gas demand of 3,682 GWh, NIS purchased 1,734 GWh of natural gas from PE *Srbijagas* in 2022.

4.1.2.2 Transmission

At the end of 2022, the length of the transmission system where *Transportgas Srbija* LLC performs the activity amounted to 2,501 km in north and central Serbia, while the length of the Yugorosgaz transport LLC transmission system amounted to 125 km in southeast Serbia. *Gastrans* LLC performs the transmission activity within 402 km of gas pipeline from the border with Bulgaria up to the border with Hungary as of January 1, 2021. If one considers the length of transmission gas pipelines in km as the criterion, *Transportgas Srbija* LLC operates 82.6% of the transmission gas pipeline network in Serbia, *Gastrans* LLC 13.3% and Yugorosgaz-transport LLC remaining 4.1%. The total length of transmission gas pipelines in Serbia is indicated in Table 4-2).

Table 4-2: Length of the transmission gas pipelines in Serbia in 2013 - 2022

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Network length, km	2,398	2,423	2,423	2,423	2,459	2,464	2,464	2,539	3,005	3,028

Over 70% of population in Serbia live in areas with constructed transmission gas pipelines which represent the precondition for further gas system development, i.e. for the construction of distribution gas pipelines and natural gas consumption growth.

Table 4-3: Important technical characteristics of the transmission system

Main technical characteristics of the transmission system	*Gastrans* LLC	*Transportgas Srbija* LLC	Yugorosgaz-transport LLC
Capacity (GWh/day)	≈ 355	≈ 185	≈ 23
Pressure (bar)	66-75	16 - 75	16 - 55
Length (km)	402	2,501	125
Diameter	DN 1200	DN 150 - DN 750	DN 168 - DN 530
Compressor station, power (MW)	19,287	4.4	-
Number of entries into the transmission system	1	14	1
From another transmission system	1	4	1
From production fields – local gas	0	9	-
From the storage	0	1	
Number of exits from the transmission system	4	251	6
Metering and regulating stations on transmission system exit	0	246	6
Overtaking stations	4	2	-
Entry into Yugorosgaz transmission system	0	1	-
Interconnector towards BiH	0	3	-
Exit into Transportgas Srbija transmission system	3	0	0
Interconnector towards Hungary	1	0	0
Natural gas storage	0	1	0

Table 4-3 indicates the most important technical characteristics of the transmission systems managed by *Transportgas Srbija* LLC, *Gastrans* LLC and Yugorosgaz transport LLC.

Transmission system operators were obliged as early as of 2011 to provide automatic collection and processing of the data on natural gas flows with collection interval of 24 hours or shorter for all delivery points from the transmission system. Such metering and data acquisition equipment is necessary for market functioning and development and it has been installed in all exits on the system which is operated by *Yugorosgas-transport* LLC and on 67% of the total number of exits transmission system operated by *Gastrans* LLC and *Transportgas Srbija* LLC and on 88% of the total number of exits from the PE *Srbijagas* transmission system. The percentage of natural gas quantities which are delivered from exits from the transmission system with daily metering in comparison to the total quantity of natural gas is even higher since adequate metering equipment is installed first on exits where greater natural gas quantities are delivered.

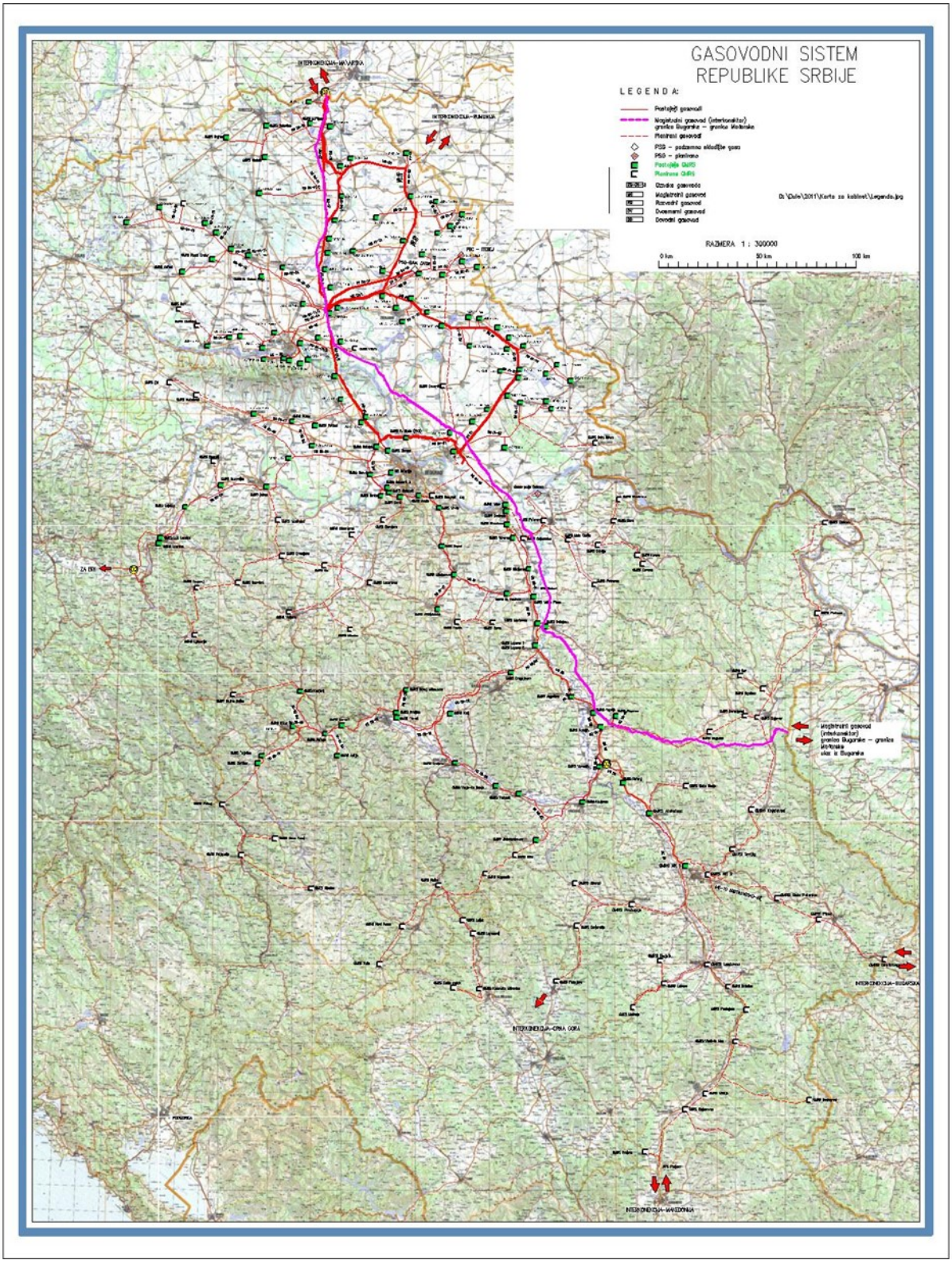

Figure 4-2: Natural gas transmission system of the Republic of Serbia

4.1.2.3 Distribution

In the beginning of 2022, 31 distribution system operators performed natural gas distribution and distribution system operation. There is one more licenced distribution system operator but it has not started performing the activity yet. The length of the distribution network in Serbia has increased from 2014 till the end of 2022 by 35.50%, i.e. to 22,172 km (without connections) thus creating the conditions for the connection of new customers. In comparison to 2021, the network was extended by 1,240 km which amounts to 5.92% increase. The greatest percentage of increase in distribution network length in 2022 was recorded by the DSO *Srbijagas* which performs the activity on 60.74% of the total distribution network in Serbia. The increase of the length amounted to 8.87%. The second largest increase in the length of the distribution network was realised with the DSO Sigas and it amounted to 7.62%. The third largest extension of the distribution network was realized with DSO Yugorosgaz and it amounted to 7.17% while the fourth largest extension was recorded with the DSO Beogas and it amounted to 7.03%. With 14 DSOs, there were no changes in the length of the distribution network in comparison to 2021.

Table 4-4: Length of the distribution network in Serbia in 2014 - 2022

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Length of the distribution network	16,363	16,532	16,653	16,961	18,422	19,286	19,883	20,831	22,172

The number of active connections (delivery points) within distribution networks amounts to 324,925. In comparison to the previous year, it has been increased by 18,110 connections (i.e. by 5.90%).

Table 4-5: Length of distribution network and number of delivery points at the end of 2022

No.	Natural gas distributor	Distribution grid length, m	Number of active connections
1	7. Oktobar, Novi Kneževac	55,200	1,621
2	Beogas, Belgrade	516,344	13,532
3	Beogradske elektrane, Novi Beograd	335,990	4,936
4	Boss construction, Trstenik	9,733	84
5	Čoka, Čoka	27,195	834
6	Drugi oktobar, Vršac	200,843	13,261
7	Elgas, Senta	65,380	2,152
8	Gas – Feromont, Stara Pazova	507,810	17,194
9	Gas – Ruma, Ruma	573,985	9,083
10	Gas, Bečej	198,197	2,327
11	Gas, Temerin	266,500	7,334
12	Graditelj, Srbobran	150,200	2,575
13	Ingas, Inđija	374,174	11,269
14	Interklima, Vrnjačka Banja	109,075	1,333
15	Komunalac, Novi Bečej	121,158	2,598
16	Kovin – Gas, Kovin	333,694	4,500
17	Loznica - Gas, Loznica	188,543	3,132
18	Novi Sad – Gas,Novi Sad	2,417,147	50,559
19	Polet, Plandište	239,300	3,568
20	Resava Gas, Svilajnac	66,015	580
21	Cyrus energy, Belgrade	22,078	2,118
22	Sigas, Požega	67,017	514
23	Sombor – Gas, Sombor	179,000	2,902
24	*Srbijagas*, Novi Sad	13,468,054	135,660
25	Srem - Gas, Sremska Mitrovica	293,340	6,666
26	Standard, Ada	43,280	1,201
27	Suboticagas, Subotica	438,658	12,781
28	Toplana – Šabac, Šabac	170,381	3,473
29	Užice – gas, Užice	198,961	3,000
30	Vrbas – Gas, Vrbas	189,158	2,136
31	Yugorosgaz, Beograd	345,422	2,002
	TOTAL	**22,171,832**	**324,925**

Plan for the transfer of metering devices, i.e. metering and regulation stations

The 2014 Energy Law ("Official Gazette of RS", No. 145/14) Article 261, item 9) prescribed the obligation of a DSO to adopt a plan for transfer of metering devices, i.e. metering and regulation stations (MU/MRS) in the facilities of current customers, i.e. producers and to report to the Ministry of Mining and Energy and the Agency twice a year on planned and taken activities on the realisation of the transfer plan. The goal is to transfer (take over) all MD/MRS until December 31, 2020.

At the moment of the entry into force of the Law, out of 33 DSOs, all MD/MRS in 17 of them are owned by the operator. In the remaining 16 DSOs, around 48% of MU/MRS (around 92,000 out of 195,000) were not owned by DSOs. One DSO was under bankruptcy and it did not perform DSO activity, and therefore, 15 of them submitted their transfer plans which were approved by the Agency.

Following the expiry of the legal deadline, out of the planned 92,641 MD/MRS, 54,839 of them or 59.20% of them were transferred. Only 3 DSOs complied with their legal obligation and took over all planned devices, i.e. Sombor-Gas, Ingas and Loznica-Gas.

The Law on Amendments to the Energy Law ("Official Gazette of RS", No. 40/21) which was adopted in 2021 prescribes that the natural gas distribution system operators are obliged to take over all metering devices, i.e. metring-regulation stations until December 31, 2024 at the latest (Article 152 of the Law).

In line with the Law provisions, the plans for the transfer (which include the annual dinamics for the transfer of metering devices for the period until the end of 2024) which were approved by the Agency were submitted by eight DSOs (Coka-Coka, Gas Ruma-Ruma, Gas Becej- Becej, Gas Temerin – Temerin, Graditelj – Srbobran, Ingas – Indjija, Kovin Gas – Kovin and Polet – Plandiste) while six DSOs did not comply with their obligation (Gas Feromont – Stara Pazova, Komunalac – Novi Becej, Novi Sad Gas – Novi Sad, Srbijagas – Novi Sad, Srem Gas – Sremska Mitrovica and Vrbas Gas – Vrbas).

Until the end of the legal deadline, DSOs are obliged to inform the Agency on the realization of the plans.

4.1.2.4 Storage

Underground gas storage Banatski Dvor is very important for the security of natural gas supply. It is located on the depleted gas deposit with total volume of 3.3 billion m3 of natural gas. Total area of the storage amounts to around 54 km^2. The operational volume of the storage amounts to 4,617 GWh of natural gas while the maximum storage withdrawal capacity amounts to 51.3 GWh/day.

Banatski Dvor storage was commissioned in November 2011. Bidirectional gas pipeline Gospođinci – Banatski Dvor enables unhindered and full connection of the underground gas storage with the transmission system of *Transportgas Srbija*. The basic data on this gas pipeline are the following:

- length 42.5 km
- nominal diameter DN 500
- maximum working pressure: pmax=75 bar
- maximum gas flow:
  - withdrawal from UGS B. Dvor Q=102.6 GWh/day and
  - injection into UGS B.Dvor Q=51.3 GWh/day).

After the second development phase, the operational storage volume will be increased to 8,208 GWh of natural gas. The underground storage is connected by two gas pipelines to the gas pipeline junction point in Elemir.

In 2022, maximum technical capacity of injection was 27,702 GWh/day and maximum withdrawal capacity (from the storage) was 51,300 GWh/day. Maximum daily injection quantities in 2022 amounted to 27,702 GWh/day and maximum daily withdrawn quantities recorded 51,300 GWh/day.

In 2022, the cushion gas quantity in the storage did not change and it amounted to 5,432 GWh.

In 2022, less natural gas was withdrawn from the storage than injected into it. In the beginning of 2022, there were 1,972 GWh of commercial gas. 5,273 GWh of gas was injected from the transmission system into the storage, out of which 75 GWh were spent to cover the storage demand. The remaining 5,197 GWh of commercial gas were injected for commercial purposes. Users withdrew from the storage 1,197 GWh from the storage, and this is also the volume injected into the transmission system. At the end of 2022, 5,971,978 GWh of commercial gas were stored in the storage.

4.2 Natural gas consumption and supply sources

In 2022, 36,158 GWh of natural gas were available from: import, local production and underground storage. 2 million m^3 in total were available for consumption and 28,203 GWh of natural gas were consumed.

Most of natural gas quantities are provided through import from the Russian Federation based on the long-term contract. The company Yugorosgas JSC (shareholders: Gazprom 50%, PE *Srbijagas* 25% and Central ME Energy and Gas, Vienna 25%) procures natural gas from Gazprom for customers in Serbia.

In 2022, natural gas import from the Russian Federation in line with a long-term contract amounted to 23,786 GWh and it was realised from the transmission system of Bulgaria. In 2022, except for import in line with long-term contracts and other contracts for the natural gas import from the Russian Federation, PE *Srbijagas* imported natural gas from another four suppliers and that volume was withdrawn from the Hungarian transmission system and from another supplier from the direction of Bulgaria.

In 2022, local production of 2,069 GWh could meet only 7.3% of the demand which represents a decrease in comparison to last year when 7.9% of the demand could be met. Gas was not exported in 2022.

Table 4-6: Natural gas supply sources and consumption in 2021 and 2022

	2021 GWh	2022 GWh	2022./2021 Index
Local production	**2,319**	**2,070**	**89.3**
Import from the Russian Federation – via long-term contract	23,536	23,786	101.1
Import from other sources – via other contracts	1,539	8,041	522.5
Total import	**25,075**	**31,827**	**126.9**
Quantities withdrawn from the underground storage	4,463	2,262	50.7
TOTAL AVAILABLE QUANTITIES	**31,857**	**36,159**	**113.5**
Injected into the storage	2,257	7,559	334.9
Gross consumption	29,600	28,600	96.6
Difference between quantities purchased and sold from transmission system operators for losses, balancing and self-consumption	21	143	681.0
Distribution network losses and demand within the legal person	287	249	86.8
Export	**21**	**0**	**0.0**
For final consumption	**29,272**	**28,208**	**96.4**

The number of delivery points in 2022 increased by 18,112 in comparison to 2021. At the end of 2022, it amounted to 324,991. There were 66 of them on the transmission system and 324,925 delivery points on the distribution system. Out of the number, households accounted for 309,176 or 95%.

Table 4-7: Number of delivery points at the end of 2021 and 2022

Consumption category	2021	2022	Variation 2022-2021
Households	291,536	309,176	17,640
District heating companies	153	162	9
Industry and other	15,190	15,653	463
Total	**306,879**	**324,991**	**18,112**

In 2022, 28,203 GWh of natural gas was consumed. It amounts to 4% less than in 2021. Consumption in households increased by 3%. In district heating companies, it decreased by 17% due to extremely mild winter, while in industry, it remained on approximately the same level as last year.

Consumption structure for different categories is given in Table 4-8.

Table 4-8: Consumption structure in 2021 and 2022

Consumption category	2021 GWh	2022 GWh	2022/2021 Index
Households	3,765	3,876	102.9
District heating companies	6,649	5,530	83.2
Industry and other	18,858	18,797	99.7
Total	**29,272**	**28,203**	**96.3**

Households consumption accounts for 15% of final natural gas consumption in 2022. District heating companies consumption accounted for 21%, while industry and other customers covered 64% (this consumption includes the quantities purchased in the market and the quantities NIS spent from its local production).

The structure of the final natural gas consumption in 2022 is given in Figure 4-3.

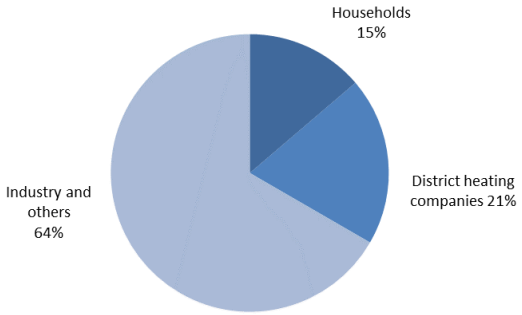

Figure 4-3: Structure of natural gas consumption in Serbia in 2022

Average annual natural gas consumption per connected household amounted to 12,536 kWh in 2022 (including active delivery points for households which did not consume gas during 2021) which amounts to 3% less than in 2021. If one only takes into account the households which consumed natural gas during 2022 (there were 287,662 of them), average annual consumption per household amounted to 13,474 kWh.

4.3 Regulation of the transmission system operator

Transportgas Srbija LLC is a company which, at the end of 2019 and during 2020 to a great extent, started taking over the activities on natural gas transmission. Since October 2020, the company fully took over natural gas transmission and transmission system operation.

In June 2021, shares of PE *Srbijagas* in the daughter company *Transportgas Srbija* LLC were transferred to the Republic of Serbia which became the only member of *Transportgas Srbija* LLC with 100% of shares. In line with the change of ownership, in October 2021, the Government amended the Foundation Act of *Transportgas Srbija* LLC in such a manner that the transmission system operator *Transportgas Srbija* continued performing natural gas transmission and transmission system operation while it ceased to be a part of a vertically integrated company PE *Srbijagas*. In such a manner, legal bases for non-discriminatory operation of the system operator *Transportgas Srbija* LLC and independent operation from all other market participants performing natural gas supply and public supply were created.

In 2013, "Yugorosgaz-transport" LLC is the transmission system operation which completed legal unbundling from its founder - the vertically integrated company "Yugorosgaz" JSC and obtained the licence for transmission and transmission system operation in line with the law regulating the energy sector at that time. Following the adoption of the 2014 Energy Law, Yugorosgaz-transport LLC was obliged to secure functional unbundling from the vertically integrated company Yugorosgaz JSC as a part of it.

Gastrans LLC is the transmission system operator which started its commercial operation on January 1, 2021 and all gas pipeline capacities were in function as of October 1, 2021 when cross-border natural gas transmission to Hungary was initiated.

The transmission system operator *Transportgas Srbija* LLC did not submit the Transmission Network Code to the Agency for approval in 2021. *Transportgas Srbija* LLC regulated their relations with system users via commercial contracts and partly by PE *Srbijagas* Code, which was adopted and published in the Official Gazette of RS in August 2013.

"*Yugorosgaz*" JSC submitted a draft of the Natural Gas Transmission Network Code in December 2014. The Agency approved the Code in January 2015 and the Code is in force. The Code should be harmonised with the Law and the Code of *Transportgas Srbija* LLC once it is adopted.

The transmission system operator "*Gastrans*" LLC submitted the Transmission Network Code which regulates the conditions for the access to available transmission capacity and conditions for the use of gas transmission service. The Council of the Agency approved the Code on the session held on May 15, 2020.

4.3.1 Unbundling of the Transmission System Operator

At the end of 2014, the Government of the Republic of Serbia adopted a Conclusion on Grounds for Restructuring of PE *Srbijagas* which defined that the transmission and distribution system operators should be legally unbundled entities from PE *Srbijagas* while owned by PE *Srbijagas*. The Plan was also harmonized with the Energy Community thereby representing a feedback to the invitation of the Energy Community Ministerial Council sent to Serbia in September 2014 asking from Serbia to comply with its obligations arising from the Treaty establishing the Energy Community regarding the unbundling of the transmission system operator.

PE *Srbijagas* Supervisory Board adopted a decision on the establishment of *Transportgas Srbija* LLC as well as the decision on the establishment of Distribucijagas Srbija LLC on June 22, 2015. On the session held on June 27, 2015, the Government of the Republic of Serbia approved these decisions. These companies were established on August 22, 2015 and registered in the registry of companies as active companies but they did not start operating.

By the Decision of November 19, 2015, the Government of the Republic of Serbia enabled the companies *Transportgas Srbija* LLC and Distribucija Srbija LLC to perform the activities of general interest, transmission and transmission system operator and distribution and distribution system operation under PE *Srbijagas* licence until the licence validity period expires. The Government also recommended that all necessary activities are taken in order to obtain relevant licences as soon as possible.

In addition, by the Conclusion of December 23, 2016, the Government of the Republic of Serbia enabled PE *Srbijagas* to continue performing the activity of general interest – transmission and transmission system operation either independently or via the company *Transportgas Srbija* LLC until the licence for the performance of this activity is obtained. The Government recommended to *Transportgas Srbija* LLC to take all necessary actions in order to obtain this licence as soon as possible.

In line with the EU regulations, the 2014 Energy Law defined three models of organization, i.e. unbundling of the transmission system, i.e. as transmission system operator in line with ownership unbundling model, independent system operator and independent transmission operator.

On November 22, 2018, *Transportgas Srbija* LLC submitted an application for certification according to the independent transmission operator (ITO model) model, but this application was denied by the Agency in February 2019 since the company did not submit the prescribed documentation in the legal time framework and did not thereby prove the compliance with the conditions prescribed for certification according to ITO model. *Transportgas Srbija* LLC resubmitted the ITO model certification application on May 31, 2019 but this application was also denied for the same reasons by the Agency on September 20, 2019.

After *Transportgas Srbija* LLC ceased to be a part of the vertically-integrated company PE *Srbijagas* in 2021, *Transportgas Srbija* LLC submitted a new application for the certification in line with Independent System Operator (ISO) model on November 5, 2021 but they withdraw their application which is why, in March 2022, the Agency adopted a decision on the suspension of the certification procedure which was initiated upon file applicant's request.

The Transmission System Operator *Yugorosgaz-Transport* LLC was legally unbundled from the vertically integrated company *Yugorosgaz* JSC which is the owner of it. On September 2013, *Yugorosgaz-Transport* LLC obtained licence for natural gas transmission and transmission system operation. By the adoption of the Law at the end of 2014, conditions were created for the execution of certification procedure upon the request of this operator in line with the Law.

Acting within the timeframe for certification prescribed by the Law, in August 2016, Yugorosgaz-Transport LLC submitted an application for certification according to the Independent System Operator (ISO model) model to the Agency. Bearing in mind the ownership structure of this company and its mother company, this application was also treated as an application for the certification of a transmission system operator related to third countries.

By adopting a decision in December 2016, the Agency certified Yugorosgaz – Transport LLC Niš as an independent system operator but under the condition that within a year the company should harmonise its organisation and operation in a way providing for the compliance with prescribed conditions related to the independence of the system operation in line with the given model. Otherwise, the certificate will be withdrawn. The harmonisation implies the harmonisation of ratified international treaties concluded with the Russian Federation and the EU, i.e. the countries of the Southeastern Europe which should be done beforehand. In addition, the system operator is instructed to submit the ten-year transmission system development plan, the programme for non-discriminatory treatment and an act signed with the transmission system owner which provides for the guarantees which will enable financing of the transmission system development within the same deadline.

The final certification decision was adopted following a procedure prescribed by the Law, with the participation of a competent body which is authorised to issue their opinion on the decision of the Agency on certification in line with the obligations arising from ratified international treaties. By this final Decision of the Agency Council of June 2017, Yugorosgaz-Transport LLC was certified as an Independent System Operator with an obligation to harmonise its organization and operation in a manner providing for the compliance with conditions related to independence. They were also obliged to submit the compliance programme and evidence on natural gas procurement meant for recovery of losses within the transmission system. The deadline for the compliance with the conditions was one year. Otherwise, the certificate would be withdrawn. From all the above given, the first condition is beyond the jurisdiction of the Agency and its compliance depends exclusively from competent state authorities.

In line with the Decision adopted by the Agency Council of July 13, 2018, Yugorosgaz-Transport LLC was awarded with an additional one-year period for the compliance with the certification conditions according to the Independent System Operator model with an obligation to inform the Agency once in two months on the activities taken to that end. Since Yugorosgaz-Transport LLC did not submit all the evidence on the compliance with the conditions set in the Final Certification Decision to the Agency after the prescribed deadline, on July 15, 2019, the Agency Council adopted a decision on the withdrawal of the certificate issued by the Final Certification Decision of June 2017 to Yugorosgaz-Transport LLC. In 2022, Yugorosgaz-Transport did not file an application for certification since in May 2021, the Government of the Republic of Serbia adopted Action Plan which implied a plan to perform necessary activities in order to harmonise ratified international treaties concluded with the Russian Federation with the Energy Law which should remove all obstacles to the certification of Yugorosgaz-Transport LLC.

Acting in line with the 2014 Law and the Decision of the Energy Agency of the Republic of Serbia on Exemption of New Natural Gas Interconnector ("Official Gazette of RS", No. 15/19), the Limited Liability Company *GASTRANS* LLC, Novi Sad submitted a certification application on June 25, 2019.

By the decision of August 15, 2019 (Preliminary Decision), the Agency Council certified *GASTRANS* LLC conditionally as an Independent Transmission Operator to the extent it is in compliance with the approved exemption (ad hoc ITO model) with an obligation to submit all occupancy permits to the Agency or to register ownership rights over the transmission system facilities and to submit evidence confirming its independent operation and operation over the built transmission system. The deadline for the compliance was 6 months. Otherwise, the certificate would be withdrawn.

The body competent in line with obligations arising from ratified international treaties (Energy Community Secretariat) submitted their Opinion on the Preliminary Decision on Certification of *GASTRANS* LLC on December 22, 2019. Following this, within the legal timeframe, on February 21, 2020, the Council of the Agency adopted the final decision by which *GASTRANS* llc is awarded with a certificate as to an independent natural gas transmission operator. Basically, by this decision, the Preliminary Decision of August 2019 was confirmed since the Agency prescribed the same obligations to *GASTRANS* llc as it was the case in the Preliminary Decision.

In early October 2021, *Gastrans* LLC started performing transmission within the whole gas interconnector (Zajecar – Horgos) and this is the moment when the 6-month deadline became effective as it was set in the final decision on conditional certification of February 22, 2020 on the submission of evidence confirming the compliance with certification conditions. Following the expiry of this deadline, *Gastrans* LLC submitted evidence based on which Agency established that Gastrans LLC complied with requirements defined by the final decision on certification of February 20, 2020. The decision by which the compliance with requirements defined in the final act on the certification is confirmed was adopted by the Agency Council in March 2022.

4.3.2 Price regulation

4.3.2.1 System connection costs

Transmission system connection costs are set by TSO on the basis of elements from the connection application and on the Methodology for Setting Costs of Connection to Natural Gas Transmission and Distribution System ("Official Gazette of RS", No. 42/16 and 140/22) which is adopted by the Agency. The Methodology sets types of costs: design and collection of necessary documentation, procurement of devices, equipment and material, execution of works, as well as the method of calculation of all costs. After connection costs are set in the connection decision, the TSO is obliged to use market prices of goods, works and services.

The applicant for connection bears the costs of connection to the transmission system. Connection service costs are set by the TSO in line with true costs of individual connection and prescribed segment of cost which was caused by the connection of an applicant's facility to the system.

Since connections on the transmission system cannot be standardized and since each of them is a project of its own, the TSO is obliged to comply with the principles with publicity and non-discrimination and to give the applicant, upon his/her request, insight into the documents which serve as the basis for setting the level of connection costs and for the method of calculation of these costs. The applicant has to cover true connection costs and a part of costs for system development which arose from this connection which depend on characteristics of that connection.

4.3.2.2 Use-of-system charges

Decision on Amendments to Methodology for Setting Natural Gas Transmission use-of-system charge ("Official Gazette of RS", No. 78/2022) entered into force on October 1, 2022. By this Decision, tariffs for "capacity" are indicated in "RSD/kWh/day/year" and tariffs for "commodity" in "RSD/kWh". Amendments to the Methodology are a consequence of a modification of the method of metering of delivered natural gas and the introduction of kWh instead of m^3 as the measurement unit of delivered energy in line with the Decree on Conditions for Natural Gas Delivery and Supply ("Official Gazette of RS", No. 49/2022).

The ground for the establishment of natural gas transmission use-of-system charge are the ruling tariffs divided by figure 10.26. The modification of the method of indication of natural gas transmission use-of-system charge had no economic-financial effects to the level of tariffs and average natural gas transmission use-of-system charges.

Table 4-9: Average approved natural gas transmission use-of-system charge[13]

RSD/kWh

Transmission system operator	31/12/2021	31/12/2022
Srbijagas/Transportgas Srbija	0.148	0.148
Yugorosgaz-Transport	0.074	0.074

Current charges and chronological review of the natural gas transmission use-of-system charges are available on the website of the Agency (www.aers.rs).

[13] Average approved charge is the quotient of the maximum approved revenue and approved natural gas quantities

4.3.2.3 Prices of Non-Standard Services

The Law prescribes that in addition to providing services to customers and system users which are charged via use-of-system charge or via connection costs, upon a customer's, i.e. system user's request, the transmission system operator also provides services which are not included in the above stated prices. In addition, the operator provides services when necessary in order to remove the consequences arising from a customer's or system user's acts which are contrary to regulations. Since these services are individual and occurring from occasionally upon a customer's or system user's request, they are called non-standard services.

4.3.3 Access to cross-border capacities

Serbia has four interconnections with gas pipeline systems of neighbouring countries - two entry and two exit points:

Transportgas Srbija LLC has interconnections:

- Hungary – Serbia (Kiskundorozsma) – entry point and
- Serbia – Bosnia and Herzegovina (Zvornik) – exit point.

Gasrans LLC has interconnections:

- Bulgaria – Serbia (Zaječar) – entry point and
- Serbia – Hungary (Kiskundorozsma) – exit point.

Both interconnections are a part of the transmission system operated by *Transportgas Srbija* LLC, while there are no gas pipelines connected with the transmission systems of neighbouring countries within the transmission system operated by the *Yugorosgaz transport* LLC.

In line with PE *Srbijagas* Transmission Network Code which was adopted in 2013 and which is still applied by *Transportgas Srbija* LLC in certain segments, the first annual capacity allocation was supposed to be organized in early 2014 for the gas year starting in July 2014. Upon PE *Srbijagas* request, the first capacity allocation was postponed for 2015, and afterwards for 2016. Cross-border capacity allocation has not been organized by the system operator *Transportgas Srbija* LLC so far except for transit purposes.

In line with the Network Code, in 2022, in auctions via RBP platform, *Gastrans* LLC started offering short-term capacity which make 10% of the gas pipeline capacity. Quarter capacity was offered since the beginning of gas year 2022/2023, i.e. since October 1, 2022. Monthly capacity were contracted for the first time for January 2022 but *Gastrans* LLC published the information on the allocation of monthly capacity on their website in June for monthly capacity for August 2022. Daily capacity has been offered since September 1, while intradaily capacity has been offered since December 1, 2022.

Gastrans LLC offered commercial backhaul annual and quarterly capacity from the beginning of gas year 2022/2023, commercial backhaul monthly capacity since August 2022 and commercial backhaul daily capacity since December 2022.

In line with the Network Code, Gastrans LLC is obliged to offer daily backhaul capacity for days when 100% of technical capacity of gas pipeline is contracted in the amount which represents the difference between contracted capacity and announced capacity for that day. Daily backhaul capacity in 2022 were not offered for allocation.

4.3.3.1 Capacity allocation on interconnection points and congestion management

As it is mentioned, *Transportgas Srbija* LLC applies certain segments of the PE *Srbijagas* Code. The Code defines the rules for the allocation of all transmission capacity, cross-border capacity included as well as the rules for congestion management. However, *Transportgas Srbija* LLC did not organise the cross-border capacity allocation to all interested parties in 2022 either, either based on the Network Code of PE *Srbijagas* or in another manner, except for transit purposes.

Gas pipeline capacity which is operated by *Transportgas Srbija* LLC in 2022 on the entry point Hungary – Serbia (Kiskundorozma) was used by PE *Srbijagas* while the exit capacity on the interconnector towards Bosnia and Herzegovina was used by *Gazprom Export* for the delivery into BiH and PE *Srbijagas* only for to cover the demand of the district heating company in Zvornik and in Serbia.

Firm capacity on the entry point Hungary – Serbia was used in the period January – May and November – December 2022 as additional import of natural gas in order to cover increased natural gas consumption in Serbia during winter months. Maximum daily quantities in 2022 amounted to 111.99 GWh/day which is 83.96% of maximum technical capacity of this interconnector of 133.38 GWh/day. Average annual utility rate of the interconnector amounted to 9.73% in 2022 (which represents an increase of 98% in comparison to 4.91% in 2021), which is low since the construction of the gas pipeline *Gastrans* LLC made the direction from Bulgaria the main natural gas supply direction for Serbia and Bosnia and Herzegovina.

Maximum daily quantities on the exit point Serbia – Bosnia and Herzegovina in 2022 amounted to 14.67 GWh/day which represents 71.49% of maximum technical capacity of 20.52 GWh/day. Average annual utility rate of this interconnector amounted to 34.52% in 2022 which is slightly lower than 35.83% in 2021. One cannot expect considerable increase in the utility rate of this interconnector since Bosnia and Herzegovina has a considerably higher natural gas consumption in the winter period than in the summer period and since there is no underground storage in Bosnia and Herzegovina.

Gas pipeline *Gastrans* LLC capacity was used during 2022 on the entry point Bulgaria – Serbia and on the exit point Serbia – Hungary by shareholders of *Gastrans* LLC: *Gazprom Export* and PE *Srbijagas* and other three suppliers. The exit point

Serbia were used by PE *Srbijagas* to cover the demand in Serbia and *Gazprom Export* for transit into Bosnia and Herzegovina and both used it to inject natural gas into the underground storage Banatski Dvor.

Maximum daily quantity on the entry point Bulgaria – Serbia in 2022 amounted to 312.36 GWh/day which represents 85.18% of maximum technical capacity of 366.72 GWh/day. Average annual utility rate of this interconnector amounted to 60.23% in 2022.

Maximum daily quantity on exit point Serbia – Hungary in 2022 amounted to 245.65 GWh/day which is 99.96% of maximum technical capacity of 245.76 GWh/day. Average annual utility rate of this interconnector amounted to 58.47% in 2022.

Firm capacity on the exit point Serbia into the transmission system of Transportgas Srbija LLC amounted to 120.96 GWh/day and maximum daily quantity in 2022 amounted to 145.68% GWh/day. Maximum daily quantity was higher than the capacity on the exit point Serbia during four months of 2022. Average annual utility rate of this interconnector amounted to 63.82% in 2022.

In September 2022, on the exit point Serbia – Hungary, total monthly capacity demand of two users was higher than the offer. There were four auction steps taken and the realized auction price was higher than the initial one by 11%.

In December 2022, on the exit point Bulgaria – Serbia, total monthly capacity demand of three users was higher than the offer. Four auction steps were taken and the realized auction price was higher than the initial one by 12%.

In January, February, March, November and December 2022, on the exit point Serbia into the transmission system *Transportgas Srbija*, monthly capacity was 100% contracted while offered and contracted monthly capacity in December 2022 was higher than the technical capacity. On the exit point Serbia in November 2022, daily capacity was offered and contracted although short-term capacity during that month was 100% contracted as monthly capacity.

4.3.4 Transmitted natural gas quantities

In 2022, 80,932 GWh of natural gas were withdrawn into *Gastrans* LLC transmission system. These quantities were transmitted for the purpose of: transit for Hungary amounting to 52,454 GWh, delivery into transmission system of *Transportgas Srbija* LLC amounting to 28,316 GWh, while *Gastrans* LLC consumed 161 GWh to cover their own demand.

36,272 GWh were withdrawn into the transmission system *Transportgas Srbija* LLC in 2022. These quantities were transmitted so as to meet the demand on the side: customers in Serbia, transit for Bosnia and Herzegovina, storage, transmission and distribution systems for gas losses recovery and compressor operations.

885 GWh of natural gas were withdrawn into the transmission system *Yugorosgas-transport* LLC in 2022. These quantities were transmitted to cover the demand of customers in Serbia.

Table 4-10: Transmitted natural gas quantities in 2018 - 2022

Transmitted volumes	2018 GWh	2019 GWh	2020 GWh	2021 GWh	2022 GWh	2022/2021 index
Gastrans for Serbia	0	0	0	22,603	25,731	113.8
Gastrans for BiH	0	0	0	1,785	2,585	144.8
From Hungary for Serbia	22,018	23,157	21,997	1,518	4,737	312.1
From Hungary for BiH	3,119	2,493	2,268	862	0	0.0
Production on the transmission system	3,355	2,913	2,627	2,226	2,016	90.6
Total	28,492	28,563	26,892	28,994	35,069	121.0
From storage	3,057	1,149	3,068	5,222	1,197	22.9
Total	**31,549**	**29,712**	**29,960**	**34,216**	**36,266**	106.0

4.3.5 Balancing

According to the Law, the transmission system operator is in charge of natural gas system balancing in the Republic of Serbia and they are also responsible for natural gas market setup and administration. This is the operator with the greatest number of exits from the transmission system, i.e. *Transportgas Srbija* LLC. That operator is obliged to procure gas for balancing purposes and so as to provide secure system operation and recover losses in the transmission system, in line with the principles of minimum costs, transparency and non-discrimination.

Transmission system users are obliged to transfer into the system and withdraw from it the same natural gas volume on daily level. Being natural gas market participants, they are obliged to regulate their balancing responsibility by concluding

the contract on transmission which regulates the financial responsibility for the variation between the natural gas volume delivered on entries into the transmission system and withdrawn on exits from the transmission system.

Natural gas transmission system operator is responsible for the establishment and realisation of balancing responsibility of market players and for keeping balancing responsibility registry, in line with the Transmission Network Code and Supplier Switching rules. The Transmission Network Code prescribes the TSO's obligation to conclude a contract with a supplier who will provide the natural gas for balancing purpose when there is lack of it in the system, i.e. who will withdraw extra gas when there is a surplus of it in the system. Balancing responsibility for transmission system users with financial consequences became applicable as of October 1, 2020. Prior to this, during 2017, 2018, 2019 and during the first nine months of 2020, the transmission system operator calculated imbalance per system user, calculated it financially and informed system users but system users did not bear financial consequences of their imbalance.

Based on data from *Transportgas Srbija* LLC, in the period between January 1 and December 31, 2022, the operator took following activities for balancing purposes: based on the annual balancing contract, they purchased 314,217 GWh and sold 382,602 GWh. On daily level, they sold 382,602 GWh (273,713 GWh first level imbalance, 102,560 GWh second level imbalance and 6,328 GWh third level imbalance) to system users whose natural gas quantities were lower than on exits. For the same period, based on the annual contract, they sold 305,542 GWh for balancing. On daily level, they purchased 368,445 GWh (243,342 GWh first level imbalance, 125,103 GWh second level imbalance; there was no third level imbalance) from system users whose natural gas quantities were higher on entries than on exits.

The total volume of system users' imbalance amounted to around 2.07% of transmitted quantities. Out of the total imbalance, 68.84% of the volume accounts for the imbalance of the first level, 30.31% accounts for the second level and 0.85% for the third level.

4.4 Regulation of the distribution system operator

In early 2022, 31 distribution system operators performed natural gas distribution and distribution system operation. The license is also held by another company which has not started operating.

Natural gas distribution sector has one dominant feature, i.e. great fragmentation. For this reason, there is no economy of scale and therefore, charges for the use of these networks are higher. Generally speaking, the initiative that would lead to enlargement is not strong enough.

The Methodology for Setting Natural Gas Distribution use-of-system charge and Methodology for Setting Natural Gas Transmission and Distribution System Connection Costs are applied. These two methodologies were amended by the Agency in 2022 in order to harmonise them with the Decree on Conditions for Natural Gas Delivery ("Official Gazette of RS", No. 47/06, 3/10, 48/10 and 49/22).

4.4.1 Unbundling of Distribution System Operator

Distribution companies in Serbia have their natural gas distribution activities and distribution system operation unbundled in terms of accounting from supply and other energy related and non-energy related activities. Except in accounting terms, the Distribution System Operator which is a part of a vertically integrated company has to be independent from other activities which are not related to distribution and distribution system operation in terms of legal form, organization and decision-making process.

In line with the Law (Article 257), the independence of the Distribution System Operator is ensured by having persons responsible for the Distribution System Operator management cannot participate in management bodies of vertically-integrated company which are directly or indirectly responsible for natural gas production, transport or supply in order to secure that persons responsible for the Distribution System Operator management act professionally and independently in operation. In addition, Distribution System Operator should adopt decisions independently from vertically integrated company in terms of funds necessary for operation, network maintenance and development if these are within the limits of the approved financial plan. Also, the Distribution System Operator which is a part of a vertically-integrated company is obliged to adopt the Compliance Programme for Non-Discriminatory Behaviour which includes measures for the prevention of discriminatory behaviour, the method of monitoring the implementation of these measures and obligations of employees aiming at the achievement of set goals. In line with Article 259 of the Law, the given provisions do not apply to distribution system operators with less than 100,000 final customers connected to the system.

At the end of 2021, there were 31 distribution system operators performing distribution and distribution system operation. Apart from the distribution system operators PE *Srbijagas* and Yugorosgaz JSC, this activity was performed by 29 companies among which most of them are owned by municipalities and cities, some of them are partly owned by private and public owners and some of them are private companies. Except for PE *Srbijagas*, all distribution system operators have less than 100,000 connected final customers which is why they are also entitled to deal in supply in both regulated and open market and they are not obliged to unbundle the Distribution System Operator and supplier legally (in line with Article 259 of the Law). PE *Srbijagas* had 135,594 delivery points at the end of 2022. 134,320 of them were for public supply and the remaining 1,162 were supplied at unregulated prices. In 2015, PE *Srbijagas* adopted a decision on the establishment of a daughter company for natural gas distribution – Distribucijagas Srbija LLC Novi Sad which did not start operating which is why natural gas distribution is still performed by PE *Srbijagas*.

4.4.2 Price regulation

4.4.2.1 System connection costs

Distribution system connection costs are set by DSO on the basis of elements from the connection application and on the Methodology for Setting Costs of Connection to Natural Gas Transmission and Distribution System ("Official Gazette of RS", No. 42/16) which is adopted by the Agency. The Methodology sets types of costs: design and collection of necessary documentation, procurement of devices, equipment and material, execution of works, as well as the method of calculation of all costs. In addition, the DSO is obliged to use market prices of goods, works and services when setting connection costs in the connection decision. The DSO is obliged to comply with the principles with publicity and non-discrimination and to give the applicant, upon his/her request, insight into the documents which serve as the basis for setting the level of connection costs and for the method of calculation of these costs.

The applicant for connection bears the costs of connection to the distribution system. Connection service costs are set by the DSO and they correspond to average costs of construction of standard connection (i.e. to true costs of construction of other types of connections) and prescribed segment of cost which was caused by the connection of an applicant's facility to the system.

The connections on low pressure are grouped into different types in the Methodology and therefore the DSO document on the level of costs of connection of standard connections also includes the level of:

cost of construction of standard connection for each category of standard connection;

cost of construction of connection in case of simultaneous construction of network and standard connection for each category of standard connection;

unit variable cost and

cost of part of the system.

In line with the Law on amendments to the Energy Law ("Official Gazette of RS", No. 40/21), the Agency approves the legal act of the natural gas distribution system operator which establishes the level of costs connection via standard connections in line with the Methodology.

4.4.2.2 Use-of-System Charges

Decision on Amendments to Methodology for Setting Natural Gas Distribution use-of-system charge ("Official Gazette of RS", No. 78/2022) entered into force on October 1, 2022. By this Decision, tariffs for "capacity" are indicated in RSD/kWh/day/year" and tariffs for "commodity" are indicated in "RSD/kWh". Amendments to the Methodology are driven by the modification of method of metering delivered natural gas and by the introduction of kWh instead of m^3 as calculation using for delivered energy in line with the Decree on Conditions for Natural Gas Delivery and Supply ("Official Gazette of RS", No. 49/2022). The ground for the establishment of natural gas distribution use-of-system charges are the ruling tariffs divided by figure 10.26. The modification of the method of indication of natural gas distribution use-of-system charge had no economic and financial effect to the level of tariffs and average natural gas distribution use-of-system charges. Average weighted approved distribution use-of-system charge for all distribution networks in Serbia on 31/12/2022 amounted to 0.42 RSD/kWh. The variation in distribution use-of-system charges with different DSOs is the result of the size and features of the distribution systems, the structure and number of customers, the age of the distribution system and other factors.

Table 4-11: Average approved natural gas distribution use-of-system charge[14]

RSD/kWh

No.	Distribution system operator	31/12/2021	31/12/2022
1	*7 Oktobar, Novi Kneževac*	0.99	0.99
2	*Beogas, Belgrade*	0.69	0.69
3	*Beogradske elektrane, Novi Beograd*	0.55	0.55
4	*Cyrus Energy, Belgrade*	0.69	0.69
5	*Čoka, Čoka*	0.67	0.67
6	*Drugi oktobar, Vršac*	0.67	0.67
7	*Elgas, Senta*	0.71	0.71
8	*Gas – Feromont, Stara Pazova*	0.55	0.55
9	*Gas – Ruma, Ruma*	0.61	0.61
10	*Gas, Bečej*	1.10	1.10
11	*Gas, Temerin*	0.85	0.85
12	*Graditelj, Srbobran*	0.61	0.61
13	*Ingas, Inđija*	0.58	0.58
14	*Interklima, Vrnjačka banja*	0.69	0.69
15	*Komunalac, Novi Bečej*	0.70	0.70
16	*Kovin – Gas, Kovin*	0.47	0.47
17	*Loznica – Gas, Loznica*	0.88	0.88
18	*Novi Gas – Gas, Novi Sad*	0.60	0.60
19	*Polet, Plandište*	0.73	0.73
20	*Resava Gas, Svilajnac*	0.63	0.63
21	*Sigas, Požega*	1.22	1.22
22	*Sombor – Gas, Sombor*	0.57	0.57
23	*Srbijagas, Novi Sad*	0.37	0.37
24	*Srem – Gas, Sremska Mitrovica*	0.49	0.49
25	*Standard, Ada*	0.86	0.86
26	*Suboticagas, Subotica*	0.59	0.59
27	*Toplana – Šabac, Šabac*	0.63	0.63
28	*Užice – gas, Užice*	0.57	0.57
29	*Vrbas – Gas, Vrbas*	0.51	0.51
30	*Yugorosgaz, Belgade*	0.22	0.22
	AVERAGE	0.42	0,42

The current natural gas distribution system use-of-system charges and the chronological review of these charges are available on the Agency's website (www.aers.rs).

4.4.2.3 Prices of Non-Standarad Services

The Energy Law prescribes that in addition to providing services to customers and system users which are charged via use-of-system charge or via connection costs, upon a customer's, i.e. system user's request, the transmission system operator also provides services which are not included in the above stated prices. In addition, the operator provides services when necessary in order to remove the consequences arising from a customer's or system user's acts which are contrary to regulations. Since these services are individual and occurring from occasionally upon a customer's or system user's request, they are called non-standard services. In 2021, PE Ingas, Indija and Sombor-gas LLC, Sombor adopted decisions on prices of non-standard services which define types of non-standard services and their prices. The Council of the Agency approved the decisions.

4.4.3 Distributed natural gas quantities

Natural gas quantities are withdrawn into the distribution systems mostly from the natural gas transmission system. Some distribution systems withdraw natural gas from another distribution system, too. Only small natural gas quantities are provided from natural gas production facilities connected to the distribution system. In 2022, only PE *Srbijagas* withdraw gas

[14] In 2022, BOSS Construction, Stari Trstenik applies natural gas distribution use-of-system charges on the same level as of *Srbijagas*, Novi Sad.

directly from production facilities. Table 4-12 indicates natural gas quantities withdrawn into natural gas distribution systems and distributed in 2018-2022.

Table 4-12: Distributed natural gas quantities in 2018-2022

	2018 GWh	2019 GWh	2020 GWh	2021 GWh	2022 GWh
Total distributed quantities	15,452	14,959	16,426	18,622	18,016
withdrawn from the transmission system	14,323	13,820	15,400	17,186	16,950
withdrawn from distribution systems	1,047	1,047	934	1,344	1,162
withdrawn from production facilities	82	92	92	92	54
losses	144	133	154	226	151
	0.93%	0.89%	0.94%	1.21%	0.83%

4.5 Natural gas market

In the natural gas sector, only bilateral market is developed. Market players include:

- producer (1);
- suppliers (61);
- public suppliers (31);
- final customers (321,572 using regulated supply and 1,302 in the open market);
- TSOs (3);
- DSOs (32), one of them does not perform the activity and
- storage operator (1).

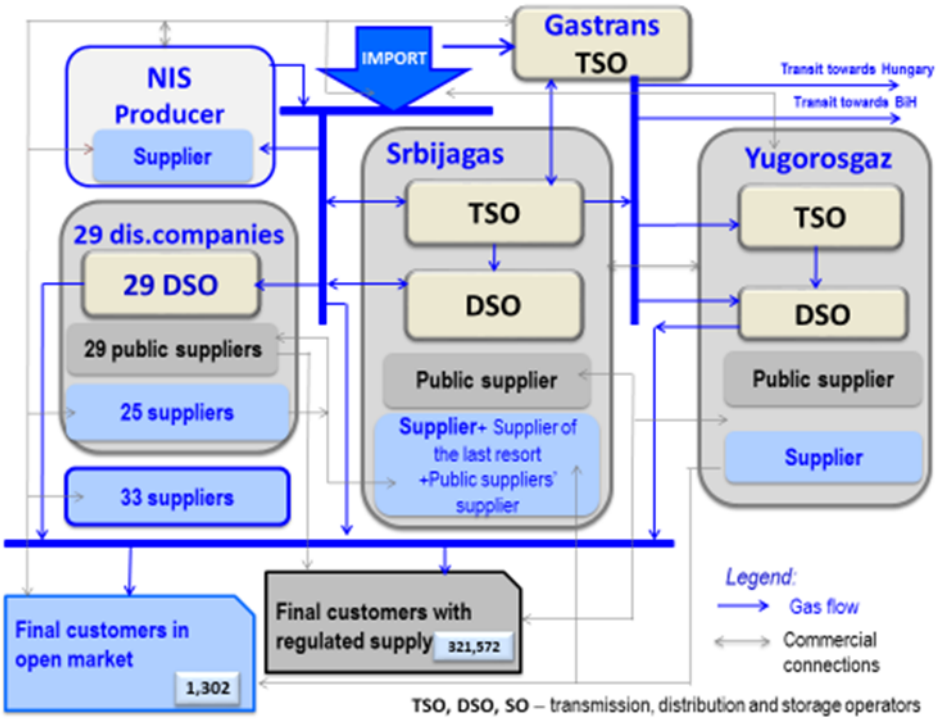

Figure 4-4: Natural gas market scheme at the end of 2022

Being a supplier in the open market, PE *Srbijagas* was also defined as the supplier of public supplier and the supplier of the last resort in line with the Law. On the wholesale market, participants traded in natural gas at free prices, while on retail market, supply was organized at free and regulated prices since all customers except households and small customers had to procure natural gas in the open market in 2021. Households and small customers had an option to select a supplier in the open market although they can always return to the public supplier.

By Decisions of December 11, 2020 and of July 2, 2021, September 3, 2021 and September 16, 2022, the Government of the Republic of Serbia appointed PE *Srbijagas* to be the supplier of natural gas public suppliers in 2022 and PE *Srbijagas* was obliged to supply all the public suppliers demanding it including the public supplier PE *Srbijagas* with natural gas under the same conditions and at the same price. The method for modification of this price was set by the Government of the Republic of Serbia. PE *Srbijagas* will have the same role until October 2023 based on the decision of the Government of the Republic of Serbia of September 16, 2022.

If one reviews each distribution system in Serbia, Table 4-13 indicates the ratio between the regulated and open market depending on the number of delivery points which are supplied either on the open market or on the regulated one.

Table 4-13 Ratio between regulated and open markets for each distribution system depending on the number of delivery points

No.	Natural gas distributer	% of delivery points in the open market	% of delivery points in the regulated market
1	*7. Oktobar, Novi Kneževac*	0.56%	99.44%
2	*Beogas, Belgrade* (with merged *Rodgas)*	0.67%	99.33%
3	*Beogradske elektrane, Novi Beograd*	0.08%	99.92%
4	*Boss construction, Trstenik*	20.24%	79.76%
5	*Čoka, Čoka*	0.72%	99.28%
6	*Drugi oktobar, Vršac*	0.45%	99.55%
7	*Elgas, Senta*	0.19%	99.81%
8	*Gas – Feromont, Stara Pazova*	0.37%	99.63%
9	*Gas – Ruma, Ruma*	0.50%	99.50%
10	*Gas, Bečej*	1.16%	98.84%
11	*Gas, Temerin*	0.11%	99.89%
12	*Graditelj, Srbobran*	0.35%	99.65%
13	*Ingas, Inđija*	0.23%	99.77%
14	*Interklima, Vrnjačka banja*	2.18%	97.82%
15	*Komunalac, Novi Bečej*	0.19%	99.81%
16	*Kovin – Gas, Kovin*	0.58%	99.42%
17	*Loznica – Gas, Loznica*	5.20%	94.80%
18	*Novi Sad – Gas, Novi Sad*	0.52%	99.48%
19	*Polet, Plandište*	0.84%	99.16%
20	*Resava Gas, Svilajnac*	0.69%	99.31%
21	*Cyrus energy, Belgrade*	0.00%	100.00%
22	*Sigas, Požega*	0.78%	99.22%
23	*Sombor – Gas, Sombor*	0.79%	99.21%
24	*Srbijagas, Novi Sad*	0.92%	99.08%
25	*Srem – Gas, Sremska Mitrovica*	0.45%	99.55%
26	*Standard, Ada*	0.92%	99.08%
27	*Suboticagas, Subotica*	0.85%	99.15%
28	*Toplana - Šabac, Šabac*	0.12%	99.88%
29	*Užice-gas, Užice*	0.40%	99.60%
30	*Vrbas – Gas, Vrbas*	0.98%	99.02%
31	*Yugorosgaz, Belgrade*	7.04%	92.96%

According to the data on the percentage of delivery points in the open and regulated markets for each distribution system, it is evident that there is still a small number of delivery points where natural gas is delivered at free, market prices. Since households account for 95% of the total number of delivery points and since they are entitled to supply at regulated prices, such high shares of public supply on the distribution system are expected. In comparison to last year, these percentages have not changed much which contributes to the trend that there is no incentive for households to switch from public supply.

If one reviews delivered quantities, Figure 4-5 indicates the ratio between regulated and open market for each distribution system depending on the level of delivered quantities for delivery points which are supplied either in the open or regulated market.

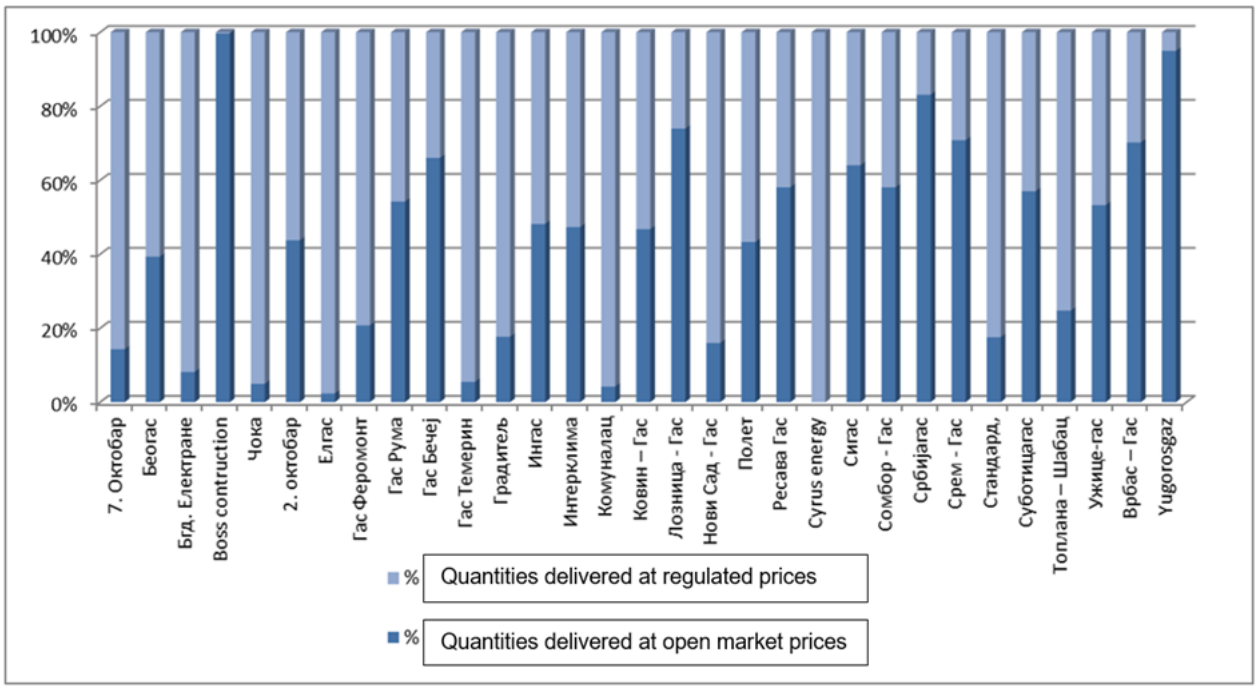

Figure 4-5: Ratio between regulated and open market for each distribution system depending on the level of delivered quantities

4.5.1 Wholesale market

In the wholesale natural gas market, purchase and sale are performed directly between market participants. In 2022, wholesale natural gas market was based on trade among natural gas suppliers and natural gas suppliers and natural gas producers. In this market, in 2022, only one supplier and NIS as the producer sold natural gas to other suppliers and only PE *Srbijagas* as the public suppliers' supplier sold natural gas to all public suppliers.

4.5.1.1 Supply of public suppliers

Except for gas purchase for public suppliers' sake, the wholesale natural gas market was based on bilateral contracts between suppliers themselves and between producers and suppliers. In 2022, there were three companies and a producer in the wholesale market which sold natural gas to suppliers and to public suppliers in order to meet the final customers' demand. The average weighted wholesale price at which natural gas was sold by suppliers to other suppliers in 2022 amounted to 3.44 RSD/kWh. It is by 24.6% higher than the one last year. Out of it, average weighted wholesale price at which suppliers sold natural gas to public suppliers in 2022 amounted to 3.16 RSD/kWh. It is by 18.8% higher than the price last year.

4.5.1.2 Regional coupling

The Transmission System Operator from Hungary developed a platform for capacity allocation and booking on interconnectors and this platform is also used by the Transmission System Operators in Romania, Bulgaria and Greece for all their interconnectors, while Austria and Croatia uses it for interconnectors towards Hungary. *Gastrans* LLC is the only Transmission System Operator in Serbia which uses the platform for capacity allocation and booking on interconnectors which was developed by the Hungarian Transmission System Operator.

4.5.2 Retail market

In 2022, final customers procured and spent 26,183 GWh of natural gas in the market. In addition, NIS also spent 2,019 GWh of gas they produced and this quantity was not placed in the market. 1,302 customers procured gas in the open market, while 1 of them were also using supply of the last resort. In total, 21,453 GWh were delivered to customers in the open market (supply of the last resort covered 4 GWh), i.e. 81.93% of the total gas volume delivered to final customers. 23 suppliers were selling gas to them (PE *Srbijagas* with the greatest share – 88.88%). In 2022, households and small customers with annual consumption lower than 100,000 m^3 and with all facilities connected to the distribution system were entitled to regulated public supply. 4,730 GWh were delivered to them.

The natural gas volumes delivered in order to provide supply in the open market and in the regulated market are presented in Table 4-14.

Table 4-14: Total natural gas consumption (in open and regulated markets)

	2021 GWh	2022 GWh	2022/2021 index
Consumed in the open market	22,408	21,453	95.7
Consumed in the regulated market	4,679	4,730	101.1
Total in the market	**27,086**	**26,183**	96.7

Based on the data provided by natural gas suppliers and public suppliers, average weighted retail price in the open market in 2022, including transmission and distribution use-of-system charges amounted to 4.02 RSD/kWh. In was by 28.8% higher than the price last year. The average weighted retail price in the regulated market amounted to 3.46 RSD/kWh. It was by 2.7% higher than last year. For customers from the small consumption group which also includes households, the price amounted to 3.48 RSD/kWh and it was by 3.3% higher than last year.

PE *Srbijagas* was the supplier of the last resort selected by the Government of the Republic of Serbia in line with the Law for the supply of the last resort of final customers who are not entitled to public supply. Average realised retail price of the supply of the last resort amounted to 4.56 RSD/kWh. It was by 31.8% higher than last year.

In 2022, only 8 DSOs delivered more than 300 GWh to customers, while 11 of them delivered less than 5 GWh.

The greatest share of natural gas, i.e. 20,960 GWh (80%) of total quantities was sold to customers by PE *Srbijagas* in 2022. The second greatest share was sold by *Novi Sad Gas* sold 981 GWh of gas, i.e. around 3.75% and *Yugorosgaz* JSC with 890 GWh, i.e. 3.4% of total consumed quantities in 2022. Individual share of other suppliers amounts to below 2% of total quantities.

Natural gas volumes sold to final customers by suppliers (excluding the gas both produced and consumed by NIS) in 2021 and 2022 are given in Table 4-15.

Table 4-15: Natural gas sale to final customers in 2021 and 2022

No.	Supplier	2021 (MWh)				2022 (MWh)				2022/2021			
		Househ.	DHC	Industry and others	Total	Househ.	DHC	Industry and others	Total	House h	DHC	Industry and others	Total
1	*7. Октобар, Нови Кнежевац*	13.574	0	3.827	17.401	13.449	0	3.304	16.753	99	0	86	96
2	*Београс, Београд*	187.573	26.235	154.587	368.396	187.991	3.940	178.013	369.944	100	15	115	100
3	*Београдске електране, Нови Београд*	46.067	0	8.249	54.316	49.078	0	7.585	56.663	107	0	92	104
4	*Босс петрол, Трстеник*	554	0	1.693	2.247	33	0	191	224	6	0	11	10
5	*Чока, Чока*	5.263	0	2.709	7.972	5.425	0	2.051	7.476	103	0	76	94
6	*Други октобар, Вршац*	125.552	0	122.289	247.841	128.062	0	112.936	240.998	102	0	92	97
7	*Елгас, Сента*	20.818	0	6.772	27.589	21.567	0	6.034	27.601	104	0	89	100
8	*Гас - Феромонт, Стара Пазова*	224.273	0	121.612	345.885	217.754	0	122.586	340.340	97	0	101	98
9	*Гас - Рума, Рума*	97.408	16.703	156.609	270.720	97.676	14.213	150.457	262.347	100	85	96	97
10	*Гас, Бечеј*	23.649	0	21.638	45.288	26.518	0	20.657	47.175	112	0	95	104
11	*Гас, Темерин*	95.757	0	23.998	119.755	92.921	0	21.115	114.036	97	0	88	95
12	*Градитељ, Србобран*	22.090	0	8.557	30.647	23.142	0	7.685	30.827	105	0	90	101
13	*Ингас, Инђија*	133.729	0	166.704	300.433	127.605	0	178.632	306.237	95	0	107	102
14	*Интерклима, Врњачка бања*	12.835	0	17.811	30.647	14.040	0	18.383	32.423	109	0	103	106
15	*Комуналац, Нови Бечеј*	22.346	0	9.788	32.134	23.460	0	7.992	31.451	105	0	82	98
16	*Ковин – Гас, Ковин*	56.451	12.158	32.370	100.979	59.245	10.073	38.387	107.705	105	83	119	107
17	*Лозница - Гас, Лозница*	30.113	38.639	52.583	121.335	34.541	32.974	62.350	129.865	115	85	119	107
18	*Нафтна Индустрија Србије, Нови Сад*	0	0	43.759	43.759	0	0	0	0	0	0	0	0
19	*Нови Сад - Гас, Нови Сад*	683.265	10.896	302.824	996.985	668.526	11.104	302.097	981.727	98	102	100	98
20	*Полет, Пландиште*	25.127	0	28.400	53.526	25.024	0	26.968	51.992	100	0	95	97
21	*Ресава Гас, Свилајнац*	7.008	0	15.482	22.490	7.538	0	21.667	29.205	108	0	140	130
22	*Сајрус енерџи*	29.159	0	4.607	33.766	26.318	0	4.307	30.625	90	0	93	91
23	*Сигас, Пожега*	4.217	0	3.140	7.356	5.244	0	3.367	8.611	124	0	107	117
24	*Сомбор - Гас, Сомбор*	33.191	0	50.674	83.865	35.206	0	50.697	85.903	106	0	100	102
25	*Србијагас, Нови Сад*	1.490.511	6.128.441	14.292.992	21.911.943	1.607.663	5.093.752	14.258.695	20.960.110	108	83	100	96
26	*Срем - Гас, Сремска Митровица*	89.960	10.219	224.581	324.760	88.752	8.208	245.400	342.360	99	80	109	105
27	*Стандард, Ада*	12.107	0	15.626	27.733	12.231	0	13.608	25.839	101	0	87	93
28	*Суботицагас, Суботица*	138.797	0	142.522	281.319	134.502	0	143.092	277.594	97	0	100	99
29	*Топлана – Шабац, Шабац*	46.149	0	8.321	54.470	44.667	0	10.002	54.669	97	0	120	100
30	*Ужице-гас, Ужице*	36.341	54.860	22.182	113.383	41.378	48.119	21.027	110.524	114	88	95	97
31	*Врбас – Гас, Врбас*	29.405	0	8.157	37.562	29.818	0	6.838	36.656	101	0	84	98
32	*Yugorosgaz, Београд*	19.699	328.022	450.937	798.659	26.431	283.865	580.503	890.799	134	87	129	112
33	*Цестор Векс, Крушевац*	0	27.035	124.372	151.407		23.659	108.660	132.319	0	88	87	87
34	*King gas, Београд*	0	0	23.824	23.824	0	0	42.733	42.733	0	0	179	179
	Total:	**3.762.988**	**6.653.209**	**16.674.194**	**27.090.391**	**3.875.805**	**5.529.907**	**16.778.019**	**26.183.731**	**103**	**83**	**106**	**97**

4.5.2.1 Sale of natural gas on regulated market

In 2022, natural gas public supply prices were amended in August due to the modification of natural gas procurement price for public supply. The Agency Council approved the decisions on natural gas public supply price to all public suppliers (31) which are valid as of October 1, 2022 and which are the result of the enforcement of the Decision on Amendments to Methodology for Setting Natural Gas Public Supply Price ("Official Gazette of RS", No. 78/2022) by which charges for "capacity" are indicated in "RSD/kWh/day/year" and charges for "commodity" are indicated in "RSD/kWh". Amendments to the Methodology are driven by the modification of method of metering delivered natural gas and by the introduction of kWh instead of m3 as calculation using for delivered energy in line with the Decree on Conditions for Natural Gas Delivery and Supply ("Official Gazette of RS", No. 49/2022). The ground for the establishment of natural gas public supply are the ruling tariffs divided by figure 10.26. The modification of the method of indication of natural gas public supply price had no economic and financial effect to the level of tariffs and average natural gas public supply prices. Average weighted approved natural gas price for all customers entitled to public supply in Serbia on 31/12/2022 amounted to 3.39 RSD/kWh while, for small consumption group which also includes households, it amounted to 3.71 RSD/kWh.

Table 0-1: Average approved natural gas public supply price[15]

RSD/kWh

No.	Natural gas public supplier	All customers		Small customers	
		31/12/2021	31/12/2022	31/12/2021	31/12/2022
1	*7 Oktobar, Novi Kneževac*	3.81	4.08	3.86	4.14
2	*Beogas, Belgrade*	3.60	3.95	3.64	3.99
3	*Beogradske elektrane, Novi Beograd*	3.26	3.54	3.33	3.61
4	*Cyrus Energy, Belgrade*	3.47	3.74	3.47	3.75
5	*Čoka, Čoka*	3.54	3.82	3.79	4.07
6	*Drugi oktobar, Vršac*	3.40	3.68	3.62	3.90
7	*Elgas, Senta*	3.49	3.76	3.50	3.77
8	*Gas – Feromont, Stara Pazova*	3.27	3.55	3.35	3.63
9	*Gas – Ruma, Ruma*	3.69	3.96	3.77	4.04
10	*Gas, Bečej*	4.07	4.34	4.09	4.37
11	*Gas, Temerin*	3.52	3.80	3.54	3.82
12	*Graditelj, Srbobran*	3.42	3.69	3.57	3.85
13	*Ingas, Inđija*	3.25	3.53	3.41	3.69
14	*Interklima, Vrnjačka banja*	3.30	3.57	3.41	3.69
15	*Komunalac, Novi Bečej*	3.47	3.74	3.54	3.82
16	*Kovin – Gas, Kovin*	3.21	3.48	3.51	3.79
17	*Loznica – Gas, Loznica*	3.88	4.16	3.88	4.16
18	*Novi Sad – Gas, Novi Sad*	3.32	3.59	3.41	3.69
19	*Polet, Plandište*	3.51	3.79	3.74	4.01
20	*Resava Gas, Svilajnac*	3.55	3.82	3.60	3.88
21	*Sigas, Požega*	4.38	4.65	4.40	4.67
22	*Sombor – Gas, Sombor*	3.58	3.86	3.62	3.90
23	*Srbijagas, Novi Sad*	3.06	3.34	3.35	3.63
24	*Srem – Gas, SrEMSka Mitrovica*	3.16	3.43	3.33	3.61
25	*Standard, Ada*	3.67	3.94	3.76	4.04
26	*Suboticagas, Subotica*	3.25	3.52	3.38	3.66
27	*Toplana – Šabac, Šabac*	3.30	3.58	3.31	3.59
28	*Užice – gas, Užice*	3.34	3.61	3.41	3.68
29	*Vrbas – Gas, Vrbas*	3.20	3.47	3.40	3.68
30	*Yugorosgaz, Belgade*	2.79	3.06	3.01	3.28
	AVERAGE	**3.11**	**3.39**	**3.44**	**3.71**

The current natural gas public supply prices and the chronological review of these charges are available on the Agency's website (www.aers.rs).

[15] In 2022, Boss Construction, Stari Trstenik applied natural gas public supply prices on the level of those of *Srbijagas*, Novi Sad.

Figure 4-6 indicates the change of average approved natural gas price for all customers entitled to public supply and for small consumption which also includes households separately.

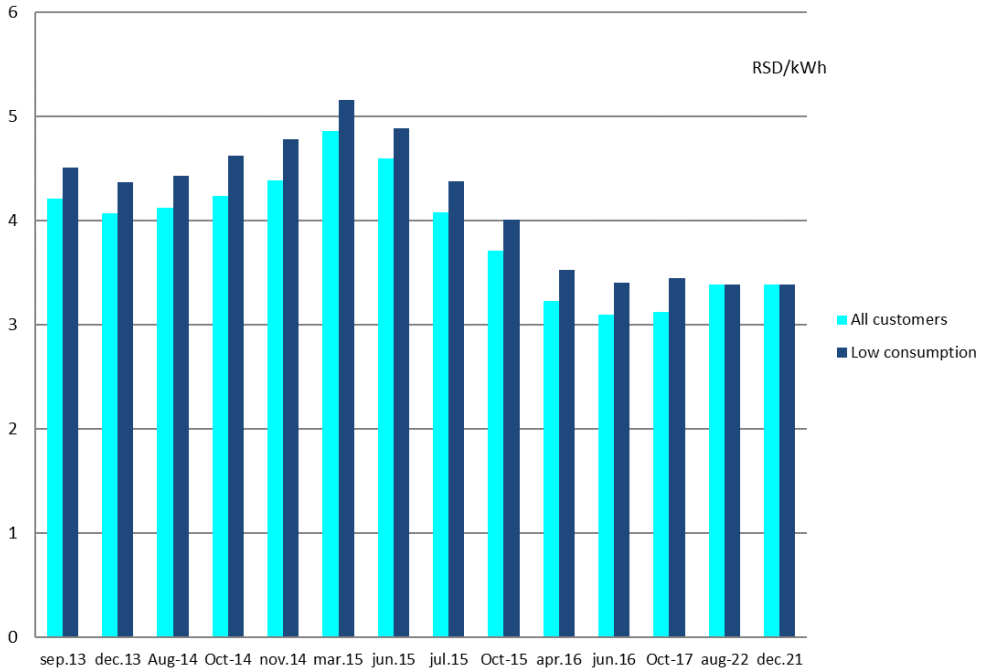

Figure 0-1: Change of average approved public supply natural gas price

The costs of natural gas purchase represent the dominant share within natural gas public supply tariff with all public suppliers. On December 31, 2022, the costs of natural gas procurement account for around 84% of the total average approved price of public suppliers. Figure 4-7 indicates the structure of average regulated natural gas public supply tariff of PE *Srbijagas* of 3.34 RSD/kWh which was applied on December 31, 2022.

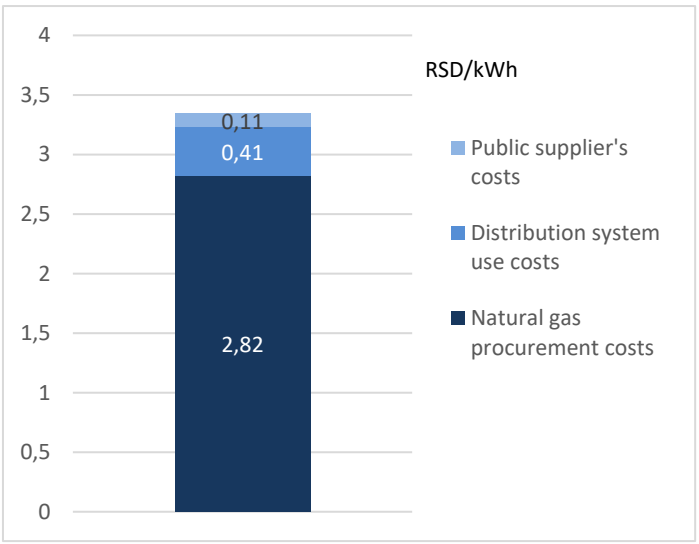

Figure 0-2: Structure of average approved natural gas public supply price of PE *Srbijagas* on 31/12/2022

Figure 4-8 indicates the comparison between natural gas prices in Serbia and in other EU countries and in the region for reference customers from the household category.

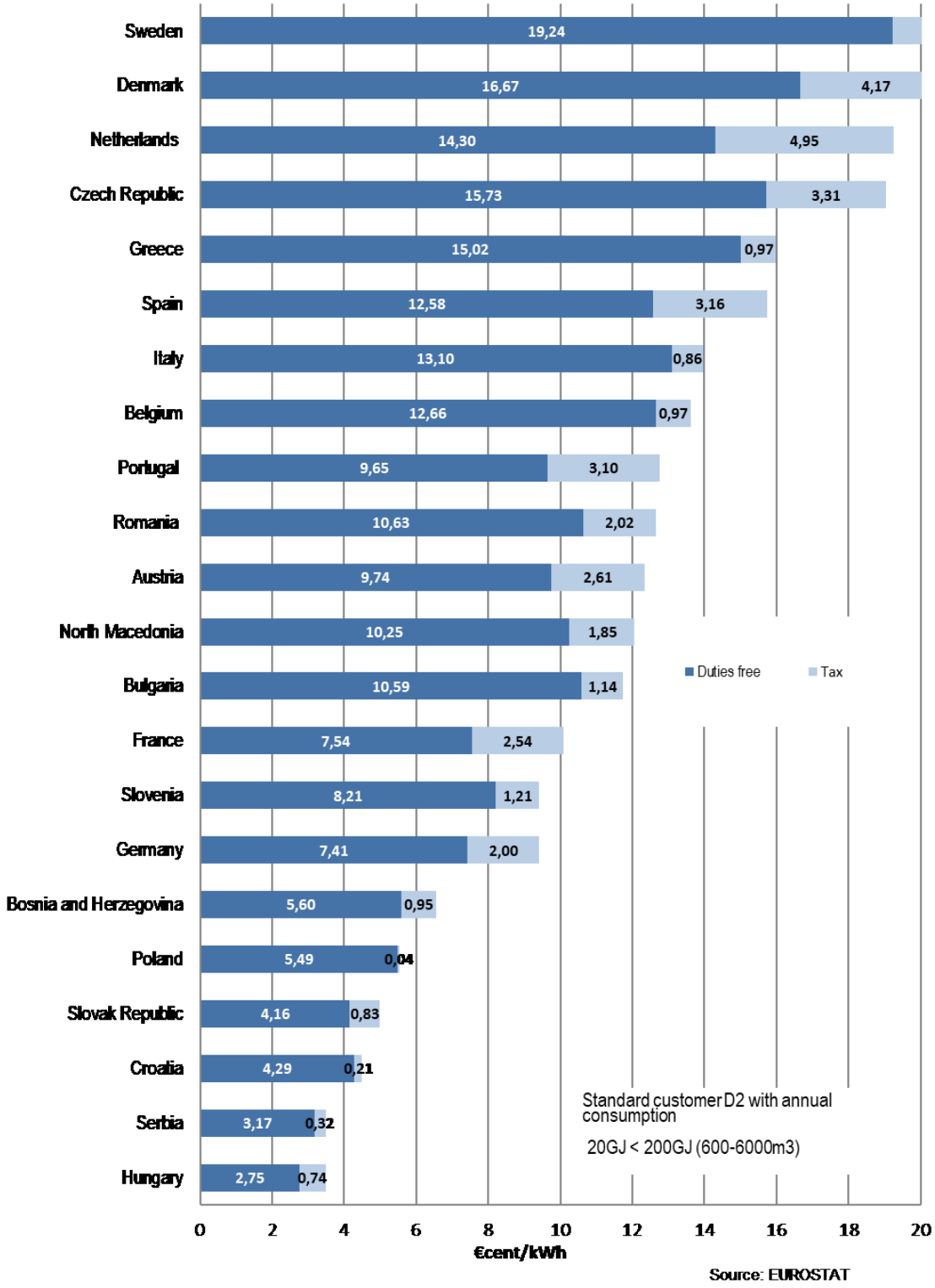

Figure 0-3: Natural gas prices for households – second half of 2022

Figure 4-9 indicates a more detailed structure of elements of the natural gas household prices in some of European capitals in December 2022.

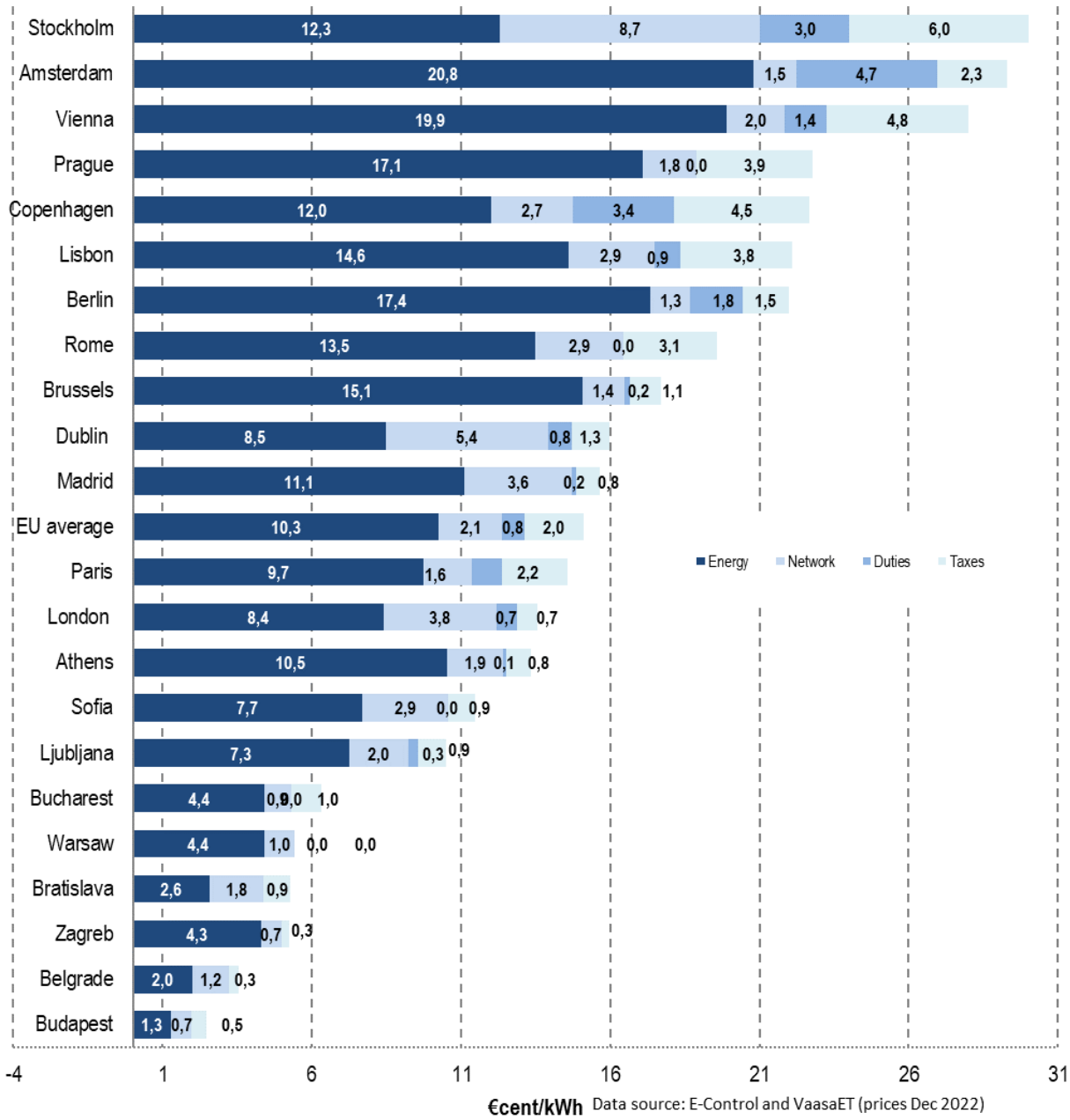

Figure 0-4: Structure of natural gas household prices in some of European capitals in December 2022

Figure 4-10 indicates the structure of the final natural gas price for households in some European capitals in December 2022 given in purchase power parity. Thereby, when comparing prices, one also took into consideration the differences in salaries, living standard and wealth between European countries. In this case, natural gas prices for households in Belgrade are slightly lower in comparison to the average price in other European capitals, which is primarily the result of a different living standard in European countries.

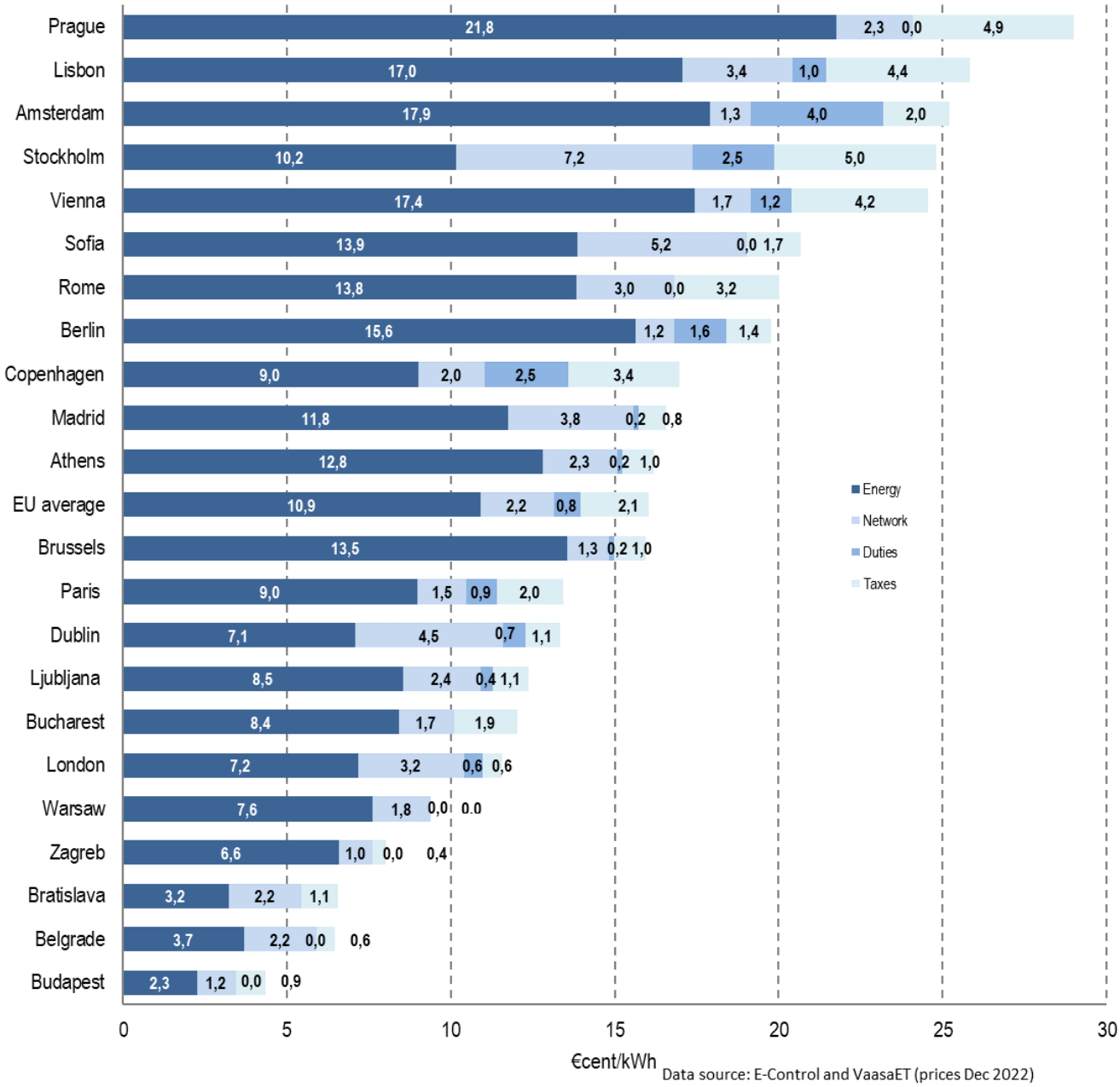

Figure 0-5: Structure of natural gas household prices in some of European capitals in December 2022 given in purchase power parity

Figure 4-11 indicates the comparison between the natural gas prices for a reference customer from the category – industry in Serbia and in other countries, either from the EU or from the region, in the second half of 2022. The variation between prices is greatly influenced by different tax policy, i.e. different duties and taxes borne by industrial consumers.

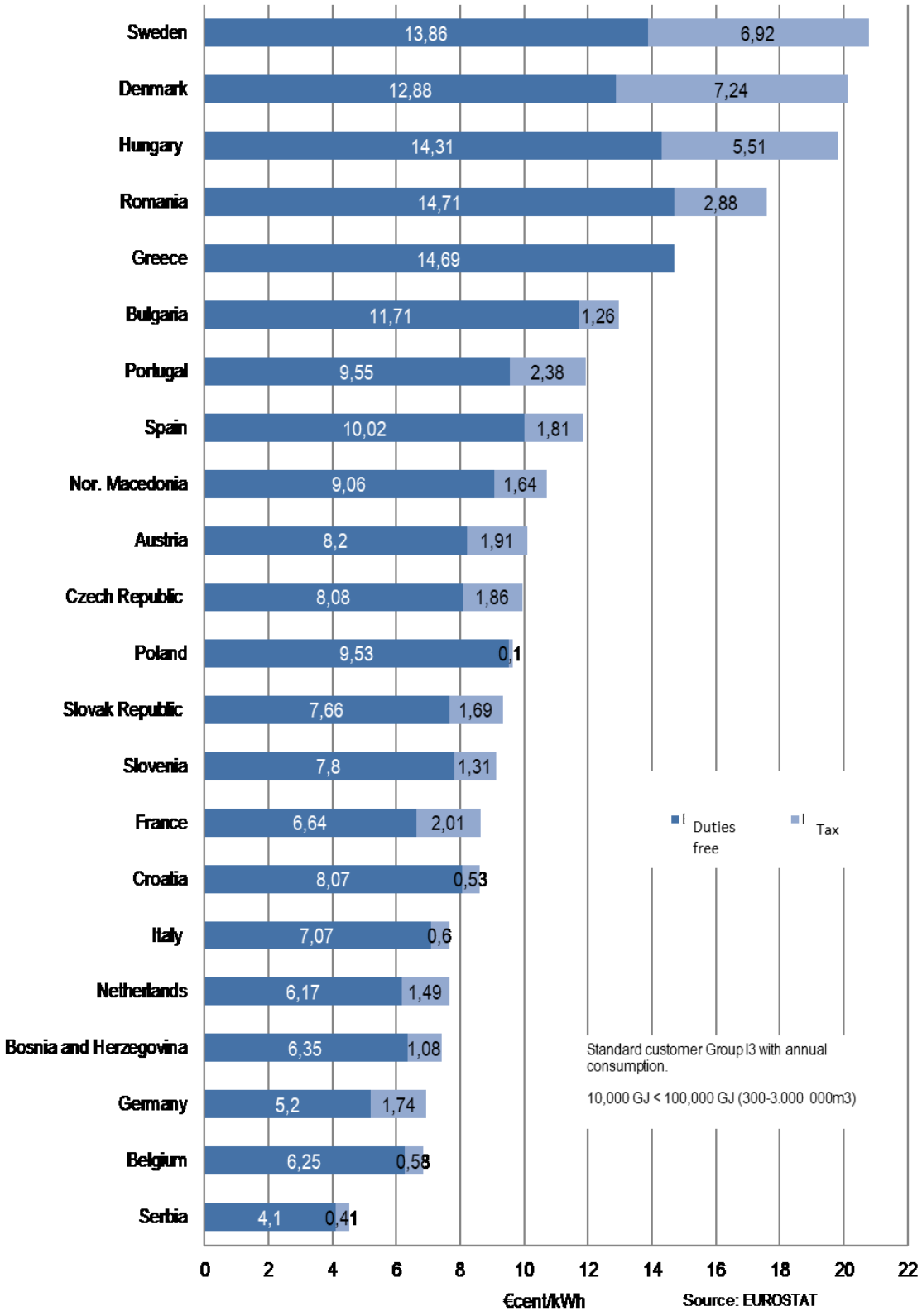

Figure 0-6: Natural gas prices for industry – second half of 2022

4.5.2.2 Supplier switching

Rules on Supplier Switching were adopted in July 2015. Based on experience in the enforcement, amendments of the Rules were prepared in 2016 and adopted in early 2017. These Rules regulate conditions and procedure for the switch of a supplier supplying final customers in line with the contract on full natural gas supply. In order to monitor this procedure, the Agency collected data on supplier switching from TSO and DSO in 2016, too and analysed difficulties suppliers and customers faced in realisation. The data on supplier switching on the transmission system relate to the metering systems which are within the system of *Transportgas Srbija* and of *Yugorosgaz-transport* LLC, since there are no final customers connected to the transmission system of *Gastrans* LLC.

Within the transmission system, out of 65 metering points for final customers, no suppliers were switched on any of metering points in 2022.

With 7 DSOs, there was supplier switch within their systems in 2022. On the distribution level, the total number of delivery points for final customers at the end of 2022 amounted to 324,925. Out of that number, suppliers were switched on 25 metering points, where 23.6 GWh were delivered. It amounts to 0.13% of natural gas quantities out of total 18,453 GWh delivered from distribution systems, i.e. 0.09% of 26,183 GWh of natural gas which was spent in the market (without consumption of NIS from their own production).

In total, in 2022, suppliers were switched on 25 of total 324,990 metering points for final customers within both transmission and distribution system. Out of total consumption in the market (without consumption of NIS covered from quantities from their own production which were not in the market), 0.09% of natural gas quantities were subject to gas supplier switch.

4.6 Monitoring and regulation of quality of delivery and supply

As the Law prescribes, the Agency adopts the Rules on Monitoring Technical and Commercial Indicators and on Regulating Quality of Electricity and Natural Gas Delivery and Supply. The Agency Council adopted these rules in December 2013 and they entered into force in early 2014. The Rules prescribe the method and deadlines for the collection of data from energy entities operating in the field of natural gas transmission, distribution and supply, in order to establish the system of delivery and supply quality regulation.

Reliability of system operations and natural gas quality are defined as technical indicators of quality, while timely compliance with prescribed obligations which affect the quality of natural gas delivery and supply were set as commercial indicators of quality.

These rules define that the energy entities gather the data on the indicators of natural gas delivery and supply in a systematic and the same way and inform the Agency on this once a year.

Data collection is performed on annual level. It was initiated in 2015 in order to enable the Agency to monitor the quality of delivery and supply and compare the results of energy entities which perform the same energy activity based on submitted data and reports.

4.6.1 Continuity of delivery

The continuity of natural gas delivery is set on the basis of the number and duration of interruptions in natural gas delivery and it is monitored both on the transmission and distribution system. The data on continuity of delivery on the distribution system were submitted by 31 DSOs. Based on the submitted data, annual indicators of continuity of delivery were calculated.

4.6.1.1 Continuity of delivery from transmission systems

The data on the continuity of delivery within transmission systems which are monitored are the following:

- number of planned and unplanned interruptions;
- duration of interruptions and
- time of announcement of planned interruptions.

Table 0-2: Interruptions within transmission systems indicated per different causes

TSO	Interruption causes					
	planned interruptions		unplanned interruptions		vis major	
	number of interruptions	total duration (min)	number of interruptions	total duration (min)	number of interruptions	duration
Transportgas Srbija	55	42,660	0	0	0	0
Yugorosgaz-Transport	0	0	0	0	0	0

In 2022, natural gas transmission system operators submitted data on the number and duration of planned and unplanned interruptions in line with the causes of interruptions and these data are given in Table 4-17.

Within the transmission system of *Transportgas Srbija*, there were 55 planned interruptions which lasted 42,660 minutes and, in line with the rules, planned works on the gas pipeline which were activities of the system operator are stated as the cause in 54 cases while, in one case, there was administrative interruption – relocation of the gas pipeline due to highway construction activities. There were neither unplanned interruptions nor vis major cases in 2022. This scale of planned works on gas pipeline facilities maintenance as well as their duration were approximately the same as last year when there were 48 planned interruptions with the total duration of 42,630 minutes. There were no events causing natural gas delivery interruptions within the transmission system of *Yugorosgaz-Transport*.

4.6.1.2 Continuity of delivery from distribution systems

Natural gas distribution system operators submitted data on the number and duration of interruptions for 2022 according to the causes which led to interruptions longer than 60 minutes, and these served for the calculation of delivery continuity indicators SAIFI[16] and SAIDI[17] both for planned and unplanned interruptions. The data were given in total for all distribution system and maximum and minimum SAIFI and SAIDI realised in single distribution system. Summary data on the continuity of delivery from distribution system refer to 324,925 delivery points, i.e. on 100% delivery points.

Table 0-3: Summary indicators of continuity of distribution systems for unplanned interruptions

Interruption cause	Unplanned interruptions				
	Number of interruptions	SAIFI (number of interruptions/user)	SAIDI (min/user)	Maximum reached SAIFI	Maximum reached SAIDI
Delivery reduction from upstream system	0	0.00	0.00	0.00	0.00
Gas leak	22	0.01	4.18	0.21	264.32
Third party	402	0.03	15.94	0.71	85.71
Inadequate network capacity	0	0.00	0.00	0.00	0.00
Other reasons	1	0.00	0.00	0.04	4.29
Total	**425**	**0.04**	**20.12**	**0.96**	**354.32**

As it was the case in 2021, the data show that there were no unplanned interruptions caused by inadequate network capacity and the greatest number of unplanned interruptions in 2022 was caused by the third party operation. Summary indicators of continuity of distribution systems for unplanned interruptions

Table 0-4: Summary indicators of continuity of distribution systems for planned interruptions

Interruption cause	Planned interruptions				
	Number of interruptions	SAIFI (number of interruptions/user)	SAIDI (min/user)	Maximum reached SAIFI	Maximum reached SAIDI
Cause within a system connected to it	41	0.08	79.58	2.00	990.00
Administrative interruption	1	0.04	42.48	1.00	1,080.00
Operator's interruption	72	0.1	21.18	1.88	360.00
Uncategorized interruption	2	0.00	0.17	0.02	6.14
Total	**116**	**0.21**	**143.42**	**4.90**	**2,436.14**

When continuity indicators SAIFI and SAIDI for planned interruptions are analysed, calculated based on available data, in terms of interruption duration per user, as it was the case during previous years, interruptions caused by distribution system operator's activities and interruptions with a cause on a connected system had the greatest impact on customers. Summary indicators of continuity of distribution systems for planned interruptions

Summary data on delivery continuity within all distribution systems for which data were submitted both in terms of planned and unplanned interruptions are given in Table 4-20.

[16] SAIFI (number of interruptions/delivery point) - average frequence of interruptions per each user; it is calculated as a quotient of the cumulative number of interruptions and total number of users

[17] SAIDI (min/user) - average duration of interruptions in minutes per user and it is calculated as a quotient of cumulative duration of interruption and total number of users

Table 0-5: Summary continuity indicators of distribution systems

Type of interruptions	Summary continuity indicators		
	Number of interruptions	SAIFI (number of interruptions/user)	SAIDI (min/user)
Planned interruptions	116	0.21	143.42
Unplanned interruptions	425	0.04	20.12
Total	**541**	**0.25**	**163.54**

4.6.2 Commercial quality

Rules on monitoring quality also define the data which system operators and suppliers have to register in order to enable monitoring commercial quality.

The data which are collected are grouped in four areas which describe commercial quality:

1) connection, suspension and disconnection;
2) access to the system;
3) metering and charging and
4) customer service.

In 2022, the data on commercial quality were collected on the annual level and it still takes time for them to achieve adequate level of reliability and accuracy. Out of 31 DSOs which performed the activity in 2022, data were submitted by all distributers.

4.6.2.1 Connection, disruption and disconnection

The data related to settling applications for connection are given in total in Table 4-21. Application for connection

Table 0-6: Application for connection

Applications for connection			
Number	of filed applications		12,331
	of settled applications	approving connection	12,149
		denying connection	29
		settled otherwise	128
		Total	12,316
		within 15 days	11,729
%	of settled applications in comparison to the number of filed ones		99.8
	of applications approving connection in comparison to the number of settled ones		98.6
	of settled applications within 15-day deadline		95.6
Average time	necessary for settling an application – days		9

After the connection is constructed and all conditions for connection are met, operators have a 15-day deadline to connect the facility to the distribution system. The data on the connection of facilities are given in total in Table 4-22. The data indicate a decrease in the number of connection applications as well as an increase in the quality of service related to connection application settlement since the average time needed to settle the application is twice as long as in 2021 while the number of applications did not decrease to that extent in comparison to 2021. As far as the very connection is concerned, the number of facilities connected within the prescribed deadline of 15 days increased considerably from 81% last year to 99.83% in 2022 while the average time necessary for the connection decreased from 20 to 9 days.

Table 0-7: Connection of facilities

Connection		
Number	of connected facilities	12,071
	of facilities connected within a 15-day deadline	12,051
%	of facilities connected within a 15-day deadline	99.83
Average time - days	Necessary for connection since the day all conditions are met	9

4.6.2.2 Access to the system

Since natural gas market has become open for all customers since the beginning of 2015, one could expect that customers' suppliers which entered the market will be submitting applications for the access to the systems to which

the facilities of these customers are connected. Although the supplier switch is still not that common, there was not DSO appealing against an act of the system operator on the access to the system.

4.6.2.3 Metering and billing

7,319 objections were submitted against billing in 2022. Justified objections which were submitted against billings included the following causes: inaccurate reading 80.05%, inaccurate billing (energy section) 7.21%, inaccurate invoicing 1.85%, inaccurate metering 8.92%, and other 1.98%. In 2022, time necessary for settling objections to billing lasted between 1 and 6 days depending on the distribution system operator. As well as it was the case in previous years, one may notice that among objections against billing the greatest number of them relate to inaccurate reading while there is a significantly smaller number of inaccurate metering. There was a slightly lower percentage of objections to energy data in the calculation in comparison to objections to metering in 2022. The number of other reasons for objections against billing is very low.

The total number of filed applications filed by users – final customers for extraordinary check of metering equipment in 2022 amounted to 126 and 110 checks were performed. During these checks, there were 12 noticed irregularities (10.9% of checks made) and all of 12 irregularities were removed. The number of extraordinary checks of metering equipment which were done within the prescribed deadline of 10 days amounted to 14 (12.73%). In 2022, the number of applications for extraordinary check of meters was close to the one last year and a relatively low number of irregularities was noticed.

4.6.2.4 Call centre

Although efforts were made in order to organise data collection on this aspect of commercial quality as well, the data on call centres are still not available.

4.7 Security of natural gas supply

So as to provide long-term security of natural gas supply, it is extremely important to plan the system development adequately and this is realised by transmission system operators via the elaboration of ten-year development plans.

As transmission system operators, *Transportgas Srbija* LLC and *Yugorosgaz-transport* LLC were obliged to draft and submit ten-year transmission system development plans to the Agency for approval every year. *Gastrans* LLC is not obliged to do so, but they have to organise market test for the construction of new capacities of the upgrade of existing capacities within their gas pipeline every second year.

Transmission System Development Plans were not approved in 2022 to the transmission system operators *Transportgas Srbija* LLC and *Yugorosgaz-transport* LLC.

The initiation of the commercial operation of the gas pipeline of *Gastrans* LLC on January 1, 2021, the second supply direction became available for Serbia and this is how, the infrastructure supply standard N-1 in the Republic of Serbia was met since it increased from 33.8% to 114%. In 2022, infrastructure supply standard N-1 did not change in the Republic of Serbia.

4.7.1 Natural gas consumption forecast

Natural gas consumption in Serbia in 2022 was lower by 3.6% in comparison to 2021 when it was the highest one in the last 30 years. Higher air temperatures in winter months lead to the reduction of natural gas consumption for heating purposes. In comparison to 2021, natural gas consumption in district heating companies reduced by 17% in 2022. Total households consumption increased by 3% but due to the increase in the number of delivery points by 6%, natural gas consumption per household decreased by 3%. In industry, natural gas consumption was on the same level as in 2021.

Natural gas consumption forecast in the future is uncertain since there are important elements which may both lead to the increase and to the decrease in the natural gas consumption:

- natural gas consumption in existing combined heat and power plants which will be engaged bot for the production of heat for heating purposes and for power production, depending on the energy market price trend;
- uncertain work of industrial plants which represent important natural gas consumers;
- replacement of coal-fired and oil derivatives-fired boilers with natural gas-fired boilers in state institutions or connection of state institutions to district heating companies in order to reduce air pollution;
- connection of new natural gas consumers to existing distribution networks;
- gasification dynamics in Serbia via the construction of new transmission gas pipelines and distribution networks;
- energy efficiency measures which lead to the reduction of unit energy consumption both in the industry and in residential construction;
- use of renewable energy sources for heating;
- natural gas price.

4.7.2 Projects aimed at the increase of security of supply

The security of natural gas supply is increased by commissioning the operation in the underground storage Banatski Dvor with maximum withdrawal capacity amounting to 5.1 million m3/day. Out of the total volume of commercial gas from the underground storage of 450 million m3, 49% belong to PE *Srbijagas*, i.e. around 220.5 million m3 which is less than 10% of the annual natural gas consumption in Serbia. The increase of the commercial gas volume to the level of around 25% of the annual consumption which is the average level in the EU countries would increase the security of natural gas supply in Serbia considerably.

There is ongoing construction of a interconnector with Bulgaria. It is planned on the basis of the Agreement on the Construction of Gas Pipeline Niš-Dimitrovgrad-Sofia and it will increase the security of supply additionally, enable supply source diversification and thereby reduce the dependence from one dominant supplier. The Agreement was signed in 2012 while the Memorandum of Understanding between the Government of the Republic of Serbia and the Government of the Republic of Bulgaria was signed in January 2017. The length of the gas pipeline through Serbia should amount to around 109 km and the capacity should amount to 1.8 billion m^3 annually. A grant from EU IPA funds amounting to 49.6 million € was provided for the construction of the gas pipeline section in the Republic of Serbia. The gas pipeline is expected to be operable from December 1, 2023.

Connections with gas pipeline systems with other neighbouring countries can be also important for the increase in the security of supply, especially with those countries which have a more developed gas infrastructure and additional options for natural gas provision, such as Romania and Croatia.

5. CRUDE OIL, OIL DERIVATIVES, BIOFUELS, BIOLIQUIDS, COMPRESSED NATURAL GAS, LIQUIFIED NATURAL GAS AND HYDROGEN

5.1 Sector structure

The amendments to the Energy Law in 2021 established the legal and institutional framework for the implementation of necessary activities aimed at adjustments and harmonization of the oil sector of the Republic of Serbia with the acquis communautaire of the EU in the energy field, the deficiencies of the 2014 Law were removed and the implementation of regulations became more efficient. Among other things, amendments introduced new energy activities and licences in the sector which includes production and/or trade in crude oil, oil derivatives, biofuels, bioliquids, hydrogen as well as compressed and liquefied natural gas while some existing activities, i.e. licences expanded their scope; the mandatory stock obligation was elaborated and types of oil derivatives which certain energy entities should keep were defined and thereby, preconditions were created for the upgrade of energy safety level; the jurisdiction of inspectors within inspection monitoring were defined precisely; the issue of strategic energy projects in the oil field was regulated, etc. In addition, some of the provisions of this law were harmonized with the law regulating facilities legalization, with regulations regulating planning and construction and with the law regulating sale and ports in internal water flow in the segment related to trade of fuels for watercraft.

In line with the Law, licenced energy activities in the field of oil, oil derivatives, biofuels, bioliquids, hydrogen, compressed and liquefied natural gas include:

- oil derivatives production;
- oil transport through oil pipelines;
- oil derivatives transport through product lines;
- trade in oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquified natural gas and hydrogen;
- trade in motor fuels and other types of fuels on petrol stations;
- storage of oil, oil derivatives and biofuels;
- biofuels production;
- bioliquids production;
- trade in fuels outside petrol stations;
- filling vessels for liquid petroleum gas, compressed and liquified natural gas;
- trade in fuels meant for vessels
- blending biofuels with fuels of oil origin
- blending bioliquids with fuels of oil origin and
- hydrogen production.

Oil transport via oil pipeline and oil derivatives transport via product line are the activities of general interest in line with a separate law and there is a regulated use-of-system charge while other licenced activities are performed in line with market principles.

5.1.1 Organisational and ownership structure of the oil sector

The Company for Exploration, Production, Processing, Distribution and Trade of Oil and Oil Derivatives *Naftna industrija Srbije* JSC (hereinafter: *NIS*) is the dominant oil and oil derivatives market player in Serbia. Vertically integrated company *NIS* has been on the stock exchange since 2010. After its privatisation, in the initial ownership structure, the Russian company "Gazprom neft" had 51%, while the Republic of Serbia had 49%. Out of the shares owned by the Republic of Serbia, shares were allocated to former workers and other citizens. In the years that followed, the Russian shareholder purchased shares from small shareholders and, thereby, until the beginning of 2022, the Russian shareholder held around 56% of the ownership shares. Due to emergency situation in international relations, there was a disruption in the crude oil of Russian origin supply in the European markets in 2022. "*Gazprom neft*" which used to the major shareholder in *NIS r*educed its share in the main capital of NIS from 56.15% to 50% in May 2022 and by this transaction, "*Gazprom*" company acquired 6.15% of shares of this company. The Republic of Serbia holds slightly less than 30%, while around 14% are owned by a great number of small shareholders. The modification of ownership structure created conditions for unhindered operations of *NIS* in the market in 2022. *NIS* deals in refinery processing of crude oil, owns the greatest retail network and the greatest storage capacities for all motor fuels and crude oil. The companies with the highest share in the oil and oil derivatives market include international companies *Lukoil, OMV, MOL Serbia, ECO-Serbia, Petrol*, as well as local companies *Knez Petrol*, *business system Mihajlovic*, *Europetrol, Art Petrol and Radun AVIA*. A great number of these companies operated in wholesale mostly with reservoirs lent from third parties, i.e. from storage owners. In contrast to this, in the field of retail, a great number of companies either fully or mainly perform their activities on petrol stations owned by them.

Joint Stock Company for Oil Transport via Oil Pipelines and Oil Derivatives Transport via Product Lines *Transnafta* Pančevo (hereafter *Transnafta*) transports oil through oil pipelines and was awarded with the licence for the performance of this activity for the second ten-year period in 2016. In 2019, status change of the that company occurred, i.e. it ceased to be a public company and it became a closed joint stock company 100% owned by the Republic of Serbia.

In the Republic of Serbia, there is no infrastructure for public transport of oil products through product lines except in those companies which use this means of transport for their own purposes.

5.2 Production and transport capacities

5.2.1 Production of oil, oil derivatives, biofuels, bioliquids and hydrogen

Production of oil derivatives also includes all other technological processes which result in standardized products with prescribed quality apart from the process of production of oil derivatives by refining crude oil, by degasification or by separation of light liquefied hydrocarbons.

Until the end of 2022, there were six energy entities licensed for oil derivatives production: *NIS* which obtained the licence for this activity in 2016 for the second ten-year period, as well as *Standard gas* from Novi Sad, *Petrol LPG* from Belgrade, *VML* from Jakovo, *Euro gas* from Subotica and *Hipol* from Odžaci. In addition, the Law defined biofuels production as a separate activity and, therefore, licenced activity – biofuels production now includes the processes of obtaining standardized motor fuels meant for vehicles, while the licenced activity – bio liquids production includes processes of obtaining standardized energy fuels of bio origin meant for heating and cooling.

The right to blend biofuels with fuels of oil origin is given to those energy entities owning specific energy facilities for homogenisation of these fluids and which were awarded with a licence for the performance of this activity. In the same way, amendments to the Law from 2021 introduced blending bioliquids with fuels of oil origin as an activity. Filling vessels with liquid oil gases which are used for energy purposes, such as propane, butane and propane-butane blend as well as filling vessels with compressed, i.e. liquifed natural gas is also an energy activity and that licence was held by 25 energy entities by the end of 2022.

The only *Best Lubricants* from Tomislavci energy entity was licenced by the end of 2022 for the performance of biofuel production and bioliquids production. *NIS* is the only entity licensed for biofuel blending with fuels of oil origin while there are no licenced energy entities for blending bioliquids with fuels of oil origin.

The adjustment of the local legal and institutional framework with the European Union acquis communautaire in the energy field was also performed by the introduction of energy activity – production of hydrogen as motor fuel which may be traded further either in terms of wholesale or retail. The Rulebook on Energy Licence and Certification envisages that hydrogen can be produced by electrolysis, reforming or pyrolysis, via the use of biogas and other renewable energy sources as well as via the use of natural gas and other fossil fuels. In such a manner, the licencing of production of green, grey and blue hydrogen was enabled, and thereby, the use of hydrogen regardless of the origin and method of production was enabled until full switch to green hydrogen production and consumption solely. No licence was issued until the end of 2022 for the performance of this activity.

In line with the Law, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen which are placed in the market have to comply with conditions defined by regulations on quality, regulations on environment protection, regulations on protection from fire and explosion as well as technical regulations and other regulations which refer to motor and energy fuels trade. Crude oil production, import and refinery processing in Serbia are performed exclusively by *NIS*. Oil exploitation is performed on 67 oil fields with 839 wells. In addition to these, additional 43 development wells and 2 exploratory wells were drilled in 2022.

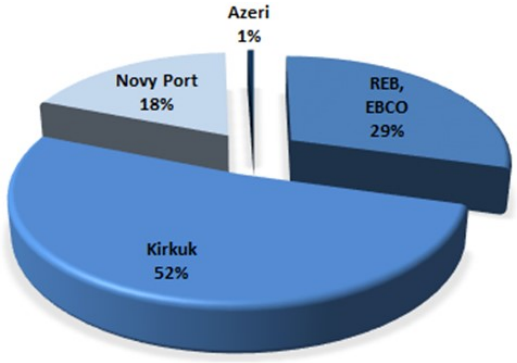

Figure 5-1: Types of imported crude oil in 2022

Total crude oil and semi-products consumption from local production, import and reserves in 2022 in Serbia amounted to 4.087 million tons which is by 3.6% more than in 2021. In 2022, around 0.824 million tons of crude oil (20.2% of the total consumption) were produced in Serbia and 3.263 million tons (79.8% of total consumption) were provided from import, with around 52% of crude oil originating from Iraq (oil type Kirkuk) and the rest from Russia (oil types REB and Novy Port) as well as small scale quantities from Azerbaijan (Azeri). The growth of the Russian oil share in the total value of imported crude oil from 23% in 2021 to 47% in 2022 is due to the introduction of the VI package of sanctions to the Russian Federation in May 2022 which were designed to ban the use of European infrastructure for the transport and processing of crude oil of Russian origin after December 5, 2022 which is why there was intensive import of Russian oil in the meantime.

Crude oil processing is performed in the oil refinery in Pančevo where modernisation began in 2009 and the first cycle of modernisation was completed in 2013 (light hydrocracking and hydro processing modules and production of motor fuels with "Euro 5" quality exclusively). In November 2020, the deep processing plant with delayed coking was commissioned. The construction of the plant began in 2018. The successful completion of this project enables NIS to have an increased production of fuels which are highly valorised in the market – diesel, petrol and liquid oil gas as well as to start producing oil coke. In addition, energy efficiency of the refinery was improved and local oil coke started to be produced. The Deep Processing Project also created ecological benefits, first of all the cease of production of heating oil (mazoute) with a high content of sulphur. In such a manner, the quality of all produced motor and energy fuels is harmonised with the EP Directive 2016/802 which is how conditions were created for amendments in the local legislation and, in 2020, a new Rulebook on Technical Requirements and Other Requirements for Liquid Fuels of Oil Origin ("Official Gazette of RS", No. 150/20) was adopted and it included as an annex the Rulebook which is harmonised with amendments in the local legislation in 2021 and 2022 ("Official Gazette of RS", No. 127/2021 and 128/2022). In addition, the emission of sulphur and nitrogen oxides as well as powder particles were reduced largely which improves the ecological sphere additionally. In 2021, the reconstruction of the facility for catalytic cracking, i.e. FCC (Fluid Catalytic Cracking) Facility commenced as well as the construction of a new facility for high oktan petrol components high-octane petrol components (*ETBE*). Works on the reconstruction of FCC and on the construction of the ETBE facility were continued in 2022, too. Following the completion of works, the reconstructed FCC will have greater flexibility and optimization of technological process, i.e. a possibility of operation in petrol and polypropylene regime depending on market demand as well as it will have significant ecological benefits. In addition, the production of euro diesel with biocomponent was initiated in 2021 and continued in 2022.

After 2020 which was affected by the crisis caused by pandemia, 2021 was a year of stabilization and, in 2022, there was a significant growth in motor fuels consumption of 7.9% in comparison to last year. Despite the growth of average price of oil type Brent by 43% in comparison to 2021, as well as the growth of 70% in 2021 in comparison to 2020, the highest annual scale of processing was recorded in 2022 in the last 13 years (4,421 million tons which is 12% more than last year. For comparison reasons, refinery processing in 2022 was by 94% higher than in 2012.).

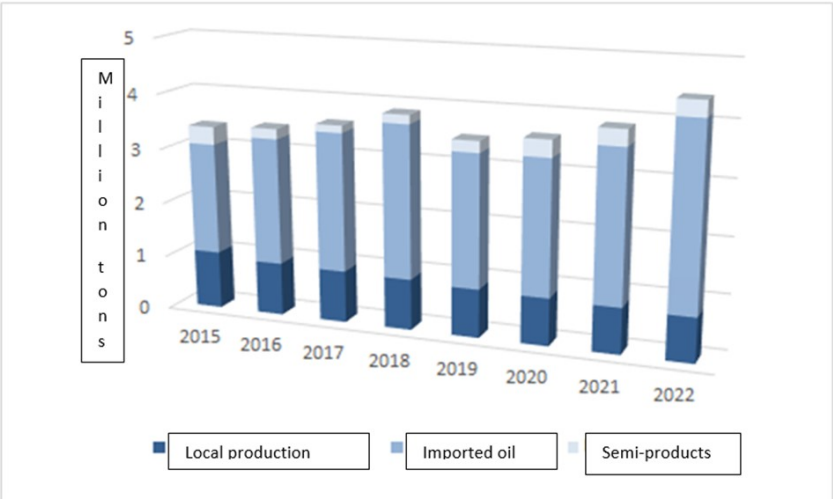

Figure 5-2: Crude oil refinery processing in Serbia in 2015 - 2022

Local crude oil production reached its maximum in 2013. In comparison to that year, in 2022, crude oil production was lower by around 34.4% which represents a follow-up of the decrease in the production of local crude oil trend nominally by around 3.1% in comparison to last year. On the other hand, the import of crude oil and semi products in 2022 was

by around 21.3% higher than last year. The share of local crude oil in total refinery processing amounted to 18.6% in 2008, around 49.5% in 2012 and 19.6% in 2022 which is 3.8% less than last year.

In Serbia, apart from production in Pančevo refinery, oil derivatives in the specific part of production and liquid oil gases are produced in *NIS* factory for stabilization, i.e. preparation of natural gas for transport in Elemir (propane and gas condensate) as well as in the facilities of the energy entity Standard Gas and Hipol (propane as well as pentane-hexane fraction, i.e.), where imported gas condensate, a wide light hydrocarbons fraction is used as raw material. The production of propane-butane blend and autogas, based on blending components is performed by Petrol LPG in their plant in Smederevo, by company VML in their plant in Jakovo and by company Euro gas in their plant in Subotica.

Oil derivatives, as final products, except from refinery processing are also provided from import and from reserves. In 2022, around 0.9 million tons of derivatives was imported which is approximately the same as in 2021. Euro diesel (with quality harmonised with SRPS EN 590) and LPG were predominantly imported as well as low volumes of unleaded petrol (with quality harmonised with SRPS EN 228). In 2022, 0.65 million tons of derivatives were exported which is by significant 30% more than last year.

In comparison to 2020, retail in oil derivatives increased by 11.9%. Positive retail trend was recorded with petrol and diesel not with autogas where we notice a negative trend.

Total motor fuels consumption in 2022 amounted to around 2.8 million tons which is around 8% more than last year. Within the structure of total consumption of motor fuels, petrol types accounted for 16.5%, gas oils for 79.1%, LPG-autogas for 5.2%. The total petrol consumption increased by 4.4% in comparison to 2021. The consumption of gas oil euro diesel was by 10.2% higher. In addition, the consumption of extra lights euro L gas oil is by 3.5 % higher while the total consumption of liquid oil gases including autogas was lower by even 11%.

This is the tenth year in a row with autogas consumption drop, which is a consequence of abandonment of use of this alternative fuel in vehicles, due to relatively high price of this fuel in comparison to other fuels as well as due to higher costs of the issuance of certification of validity of the vehicle machinery using autogas - every five years. The use of this fuel is cost-reflective only for vehicles which are driven for a large number of kilometres annually. The consumption of compressed natural gas for running vehicles is growing but there are no precise statistical data on this. Small quantities of liquefied natural gas which can be used as energy fuel or as motor fuel and for the drive of vehicles were imported. There is one vehicles supply station for this energy carrier in the Republic of Serbia.

According to the data available to the public, there are 2.893 million vehicles registered in the Republic of Serbia. 2.8 million Vehicles which use petrol, eurodiesel, LNG-autogas, compressed natural gas as drive fuel or are electricity-fuelled which represents a 4.3% growth in comparison to 2021. The total number of electricity-fuelled vehicles or hybrid-fuelled vehicles is still small which is why it does not affect the structure of the total motor fuel consumption largely but the relative increase of the number of such vehicles which are registered is big and it amounts to 72%. A similar conclusion is made with vehicles using compressed natural gas – the number of those vehicles which were registered increased by 37.8% in comparison to last year. The drop of the number of vehicles using autogas which were registered kept dropping by 7.3% in comparison to 2021, i.e. by 35% in comparison to 2016 and this is followed by resulting drop of consumption of this energy carrier for the given reasons.

Requirements in terms of quality of oil derivatives which are in the market, as well as the procedure for assessment of harmonisation of quality with the prescribed one are regulated in the Rules on Technical Requirements and Other Requirements for Liquid Fuels of Oil Origin (“Official Gazette of RS”, No. 150/20, 127/21 and 129/2022), i.e. in the Rules on Technical Requirements and Other Requirements for Liquid Petroleum Gas (“Official Gazette of RS”, No. 97/10, 123/12 and 63/13). These Rules also define labelling of installations used for oil derivatives trade.

The Decree on Oil Derivatives Authentication (“Official Gazette of RS”, No.51/15, 5/17 and 115/2022) closely prescribes the conditions, methods and procedure of authentication of oil derivatives which are traded within the market. Amendments to this Decree from 2022 introduced authentication of heating oil which is now among oil derivatives which have been authenticated such as lead-free petrol, gas oil EURO DIESEL, diesel fuel GAS OIL 0.1 and liquid oil gas.

5.2.2 Oil and oil derivatives transport

Oil is transported mainly through the oil pipeline between the Adriatic Sea port Omisalj through Sotin in the Republic of Croatia. The connection point of the pipeline in Serbia is in Bačko Novo Selo on the River Danube and it goes to the refinery in Pančevo through Novi Sad. Oil pipeline from Omišalj to Pančevo was commissioned as a unique functional whole in 1979. A part of it in the Republic of Croatia is operated by the company Janaf, while a part of it in the Republic of Serbia is operated by Transnafta. In addition to the branch Sotin-Novi Sad with nominal transport capacity of 9 million tons annually and the branch Novi Sad- Pančevo with nominal transport capacity of 6 million tons of crude oil annually. Novi Sad terminal is also an integral part of this system, equipped with the pump and metering station and with technological tanks which are used as crude oil storage, primarily with a purpose of storing mandatory reserves.

Transnafta is the company licensed for oil transport through oil pipelines which is a regulated energy activity. A smaller scale of imported crude oil is transported by barges by the River Danube, while the local oil is also transported by road tankers from the exploitation fields to oil refineries (these types of transport are not licensed energy activities).

Since 2005, when PE *Transnafta* was established, until the end of 2021, around 49 million tons of oil was transported in total. Transport of imported oil was lower during the period of the first refinery modernisation cycle in 2011 and 2012. In 2022, 0.728 million tons of local oil and 3.364 million tons of imported oil were transported. It represents a decrease of local oil transport of 2.44% and an increase of imported oil transport by even 23.09% in comparison to last year. In the past ten years, the highest local oil transport was recorded in 2013 when it was by 36% higher than in 2022. The lowest imported oil transport was recorded in 2012 when it was by around 65% lower than in 2022.

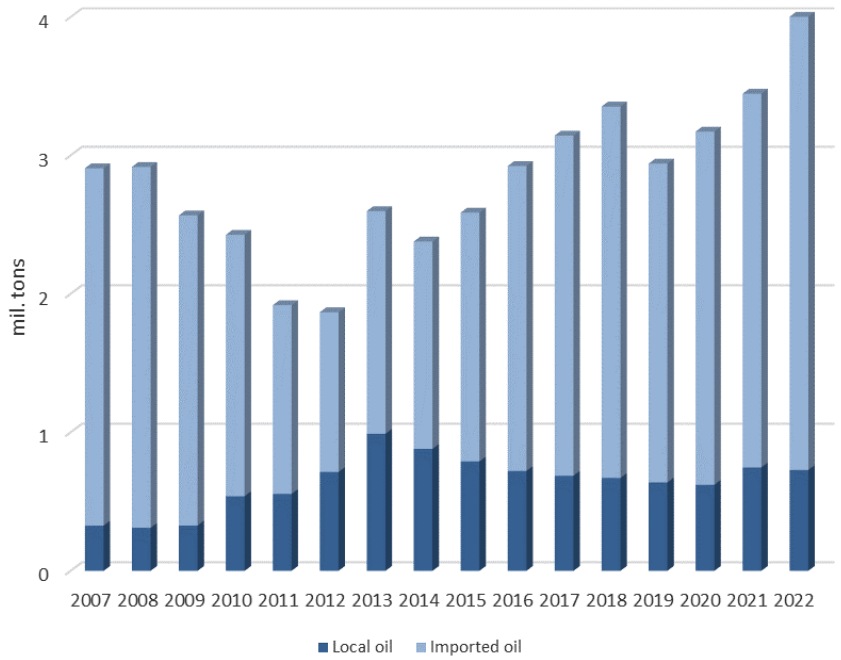

Figure 5-3: Crude oil quantities transported by oil pipeline of "Transnafta" in the period 2007 – 2022

17.56% more crude oil was transported in 2022 than last year which is primarily a consequence of greater volumes of processed crude oil which is primarily a consequence of more intensive crude oil processing due to increased consumption of motor fuels in comparison to last year as well as to higher stocks due to uncertainties caused by energy crisis. If one reviews the time period since regulation was introduced for this activity (Figure 5-3), one may notices that in comparison to 2012 when there was the lowest transport of crude oil via oil pipeline, crude oil transport in 2022 was higher by almost 117%.

5.3 Regulation of energy entity for transport of oil and oil derivatives

5.3.1 Unbundling of energy entity for transport of oil and oil derivatives

Transport of oil via oil pipelines as regulated activity of general interest is performed by *Transnafta* at regulated prices and under prescribed and publicly announced conditions in line with principles of non-discrimination, separately from other energy-related and non-energy-related activities.

Legal unbundling is not legally binding in case of pipeline transport of oil. In case of *Transnafta*, there was unbundling in terms of accounting between crude oil transport and other activities for which this energy entity is licensed (activity -trade in oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen and activity – storing oil, oil derivatives and biofuels).

5.3.2 Access to the system for oil and oil derivatives transport

The access to the system for oil pipeline transport is prescribed by the Law. The rights and obligations of the entity performing oil transport via oil pipeline as well as the rights and obligations of system users are regulated in more detail by the Oil Transport Network Code. The same code also prescribed physical-chemical characteristics of crude oil which may be transported via pipeline system, technical conditions for safe system functioning; payment security instruments, rules of procedure in case of emergency; metering method, functional requests and meter accuracy

classes. In 2010, with the approval of the Agency, *Transnafta* adopted Oil Transport Network Code. Due to the change of the legal form of *Transnafta* which transformed from the public entity into joint stock company, to amendments to the Energy Law as well as to regulations in the field of pipeline transport, environment protection, fire protection, meteology and other regulations regulating this field, the representatives of *Transnafta* and of the Agency worked on the harmonisation of the text of Rules in 2022 and they are expected to be adopted in the beginning of 2023. Since there are still no product lines publicly used, the conditions were not created for the adoption of the relevant code.

In line with the Law, energy entities performing oil transport via oil pipelines or oil derivatives transport via product lines are obliged to set the dynamics of construction of new transport capacities and of reconstruction of existing ones, the sources of funds and other conditions for the development of the system for oil transport via oil pipelines within the development plan. In addition, they should set the programmes and measures for the reduction of losses within this system and they are responsible for the realization of the development plan. The Agency approves the development plan of the system for transport of oil via oil pipelines and oil derivatives via product lines. *Transnafta* made a draft of the Oil Transport Development Plan for 2021-2025 in 2020 which is still being harmonised with the Agency.

5.3.3 Use-of-system charge

In 2022, the oil transport use-of-system charge of *Transnafta* JSC did not change.

Table 5-1: Use-of-system charges

Transnafta	**Oil pipeline branch**	**31/12/2021**	**31/12/2022**
Tariff "energy source" (RSD/t/100 km)	Sotin – Novi Sad	149.69	149.69
	Novi Sad – Pančevo	125.11	125.11

The current charges and chronological review of oil pipeline use-of-system charges are available on the website of the Agency (www.aers.rs).

5.4 Oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen market

Energy trading activities in the field of oil derivatives and biofuels were primarily regulated by the regulations in the field of trade and in the field of energy. Apart from traditional trade in motor fuels and other fuels on petrol stations, the Energy Law recognises trade in fuels out of petrol station as retail in fuels, i.e. fuels which are not used for vehicles, except for sport planes. In such a way, the supply of sport planes with jet fuels and direct supply of final customers with fuels for heating and cooling, such as heating oil, heating bio oil, propane, butane, propane butane blend, hydrogen, etc. is also defined as retail trade. The same regulations regulate the trade in oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen as a traditional wholesale activity which, in case of some fuels, except for general qualitative conditions prescribed, also has quantifying conditions defined, i.e. certain storage capacities which are used in order to trade in these fuels. Energy entities holding his licence are entitled to perform trade on the local and foreign level and they complied with minimum technical conditions for this. The trade in fuels meant for vessels is defined as specific wholesale category and it is regulated also by regulations in the field of fire protection as well as in the field of trade. The status of an energy entity which performs this activity can be awarded to companies which were awarded with the status of an operator of port activities exclusively in line with the regulations which regulate port activities and sale in national waters (considerable amendments to the Law on Sale and Ports in National Waters entered into force in 2018 while additional amendments were also made in 2019, 2020 and 2021). Thereby, the supply of big ships for local cruise and technical vessels in ports and water flows in the Republic of Serbia was regulated by the law.

In the regulations in the field of trade, the storage of oil, oil derivatives and biofuels are not recognised as trade services, but they are still licensed activities. Energy entities holding this licence are entitled to offer the service of storing fuels owned by traders, final customers, the Energy Reserves Authority – appointed to establish mandatory oil and oil derivatives reserves. They store fuels in adequate tanks.

The Law defines the competences of the energy inspector who, among other things, has a task to check if energy entities which perform energy activities comply with prescribed conditions for the performance of these activities upon the award of the licence, i.e. the inspector has a task to monitor energy activities performance in line with the Law and to monitor facilities for oil, oil derivatives and biofuels storage and consumption. Energy inspection was established and started working in mid-2021.

There is free import of oil derivatives, biofuels and bioliquids and the volume, as well as the necessary structure of storage capacities for each of oil derivatives and biofuels type which are imported or traded within the Serbian market by traders are defined by regulations which arise from the law regulating trade (Rulebook on Minimum Technical

Conditions for Oil Derivatives and Biofuels Trade (“Official Gazette of RS”, No. 68/13 and 81/15). These regulations also regulate minimum technical conditions for the trade in motor fuels and other fuels on petrol stations (stations for the supply of vehicles, trade in fuels meant for vessels and trade in fuels out of petrol stations).

There is full liberalisation of all energy activities in Serbia but due to the emergency situation in international relations in 2022, the Government of the Republic of Serbia adopted a set of measures by which they led to the mitigation of the impact of price growth in the global market and, at the same time, although there was an increased demand, they provided for full supply of the local market with oil derivatives at acceptable prices. The first measure which was implemented by the Government based on regulation regulating the trade was the adoption of a Decree on Oil Derivatives Price Limit (“Off.Gazette of RS”, No. 17/2022) which established a fixed price for Euro diesel and Euro premium BMB 95 and which was in force from February 12, 2022. As early as on March 11, 2022, this Decree was replaced by a new one (“Off. Gazette of RS”. No. 33/2022) which regulated the method of establishment of retail oil derivatives price except for registered agricultural households for which a fixed price is established. Retail prices of Euro diesel and Euro premium BMB 95 are related to average wholesale prices. A fixed fee is established in correlation with the wholesale price and the dynamics of retail price modification is established. In most cases, the Decree was being adopted for a period of one month time. Therefore, there were more amendments due to the extension of the validity period. A new Decree was adopted after the termination of a six-month period due to its harmonisation with the Law on Trade. Thereby, retail price limit was extended during the whole 2022. Fixed fee for the highest retail price in comparison to the average wholesale price was amended two times more during the year. In 2022, in line with the Decree on Oil Derivatives Price Limit, the ministry in charge of energy issues adopted the Rulebook on Calculation of Average Wholesale Oil Derivatives Price – Euro diesel and Euro premium BMB 95 (“Off.Gazette of RS”, No. 33/2022, 48/2022 and 98/2022). This act established average wholesale price of the given oil derivatives on defined parity with calculated all dependant costs.

Another measure implemented by the Government was the adoption of a Decision on Temporary Reduction of the Level of Excise Duty for Oil Derivatives from Article 9, paragraph 1, item 1),2) and 3) of the Law on Excise Duty (“Off. Gazette of RS”, No. 33/2022') as of 11/03/2022. Due to the growth of the crude oil price in the global market which has a negative effect on the macroeconomic stability of the country, the Government reduced the level of excise duties for petrols and gas oils temporarily by this decision. The Decision was amended during the year in order to extend the duration of its validity period, i.e. it was replaced by a new one when the level of excise duty was changed (April 29, July 1, August 1 and August 12, 2022).

Due to emergency situation in international relations, along with the measures related to the pricing policy, based on regulations regulating foreign trade operation, in order to provide security of energy supply, the Government also adopted measures of limitation of Euro diesel and natural gas export. The decision on temporary prohibition of export of Euro diesel EN 590 (“Off.Gazette of RS”, No. 73/2022) was in force since 30/06/2022 and limited for a 7-day period. It was also amended in order to extend its validity period several times for the same limitation period until 29/09/2022. Following this, the same prohibition was also valid in the period between October 14 and October 31,2022. Since 17/11/2022, the decision on the prohibition of export of Euro diesel En 590 was extended to heating oil as well. In the second half of 2022, there was a significant growth of the export of compressed natural gas from the Republic of Serbia to neighbouring markets which is why the Government adopted a Decision on Temporary Prohibition of Export and Flow out of Natural Gas (“Official Gazette of RS”, No. 115/2022) which bans the export of natural gas in gaseous, compressed and liquefied form except on the market of the Republic of North Macedonia.

The development of oil and oil derivatives market was greatly influenced by the new Law on Commodity Reserves (“Official Gazette of RS”, No. 104/13, 145/14 and 95/2018) and enabled the implementation of the Directive 2009/119/EP in the local legislation. This Directive refers to the provision of minimum mandatory oil and oil derivatives reserves. Based on this Law, the Government of the Republic of Serbia adopted a Decree on Setting Programme of Measures in Case of Endangered Security of Energy and Energy Sources Supply – Crisis Plan (“Official Gazette of RS”, No. 63/2019). Crisis Plan includes procedures and criteria for the definition of disturbances in the supply and procedures for normalization of market supply in the Republic of Serbia. The Programme also includes procedures in case a decision on the release of mandatory reserves into the market is adopted on the international level. In mid-2021, the Government adopted a Decree on Amendments to Decree on Plan and Criteria for Establishment of Mandatory Oil and Oil Derivatives Stock (“Official Gazette of RS”, No. 48/2021) which defines that crude oil is purchased for the purpose of mandatory stock with the quality with parameters complying with conditions set by Rules on Operation of System for Oil Transport via Oil Pipeline which is adopted by Transnafta and approved by the Agency. The Decree also defines that mandatory stock may be refilled by replacement, sale and procurement. A Rulebook on Establishment of Annual Programme for Mandatory Oil Stock Establishment and Keeping used to be adopted for each year from 2015 to 2021 but such a Rulebook was not adopted for 2022.

The Directive (EP) 2009/28 which refers to renewable energy sources aiming at the reduction of greenhouse gases, in its segment related to the mandatory content of biofuels in motor fuels is implemented in the local legislation as of 2019 since the following documents were adopted: Decree on Biofuel Market Share (“Official Gazette of RS”, No. 71/2019), Rulebook on Technical and Other Requirements for Biofuels and Bioliquids (“Official Gazette of RS”, No. 73/2019) and Decree on Biofuels Sustainability Criterion (“Official Gazette of RS”, No. 89/2019). A Rulebook on Calculation of Renewable Energy Sources Share (“Official Gazette of RS”, No. 37/2020) was adopted in 2020. Among other things, the Rulebook prescribes in more detail the energy content of fuel in transport sector and the manner of

calculation of the impact of biofuels and bioliquids and their comparable fossil fuels on the emission of greenhouse gases. By the Action Plan for Construction of New Renewable Energy Sources – Based Capacities, the obligation to reach 10% of biofuels share in motor fuels until 2020 was assumed but the biofuel share in the oil derivatives market in 2021 was still negligible. The Law on Use of Renewable Energy Sources ("Official Gazette of RS", No. 40/21) was adopted in 2021. Among other things, the Law transposed certain provisions from the existing Energy Law which regulate the use of biofuels and expanded them. At the same time, the Law envisaged the adoption of relevant bylaws which will regulate this area in more detail.

In 2019, the Rulebook on Immobile Tanks ("Official Gazette of RS", No. 50/2019) entered into force and it, among other things, sets technical requirements and method of labelling of these facilities, equipment characteristics and the compliance with these requirements as well as the conditions for immobile tanks verification.

5.4.1 Wholesale market

Until and including 2022, the licence for trade in oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen was held by 60 energy entities, i.e. 10% more than last year as it is indicated in figure 5-4. In the period after 2014, the main reasons for the reduction of the number of licenced energy entities for this energy were stricter regulations in the field of trade which regulate the minimum technical requirements for this activity in 2011 and in 2013, as well as the full implementation of these regulations in 2014, when licenses were withdrawn most often for these reasons upon the proposal of market inspectors. In the second phase which includes 2015 and 2016, there was a follow-up of slight annual trend of reduction of number of licenced entities for trade and then there was a slight growth from 2017 until 2022 which is a result of natural fluctuation of the number of wholesale traders present in the oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen market under set conditions. Since 2015, the number of market participants is relatively stable. In the period from the adoption of the previous Energy Law in 2014, after the adoption of the amendments to Law and including 2021, 212 licences for the performance of this activity were permanently revoked which is a relevant indicator of market consolidation. The reduction of the number of wholesalers facilitates monitoring and control both of market players and of quality of motor and energy fuels which are placed on that market.

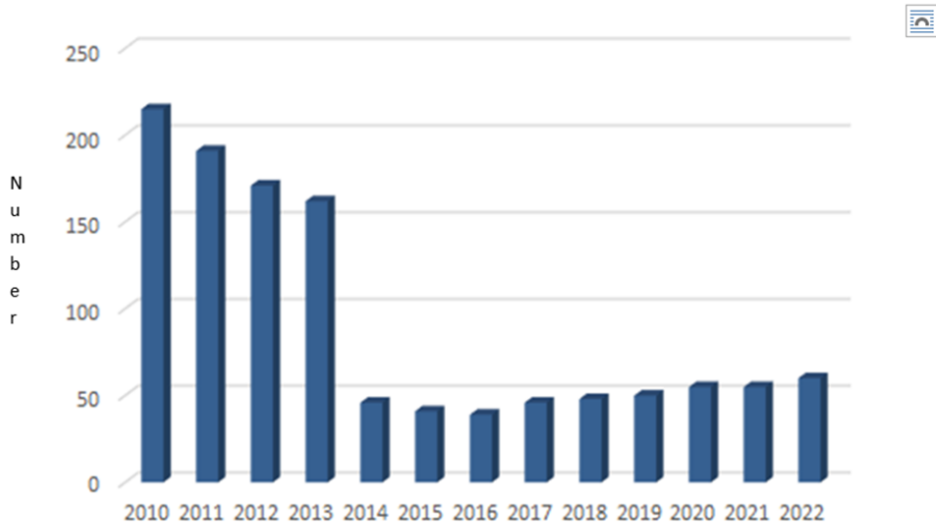

Figure 5-4: Number of active licenses for trade in oil, oil derivatives, biofuels, bioliquids, CNG, LNG and hydrogen in 2010-2022

In 2022, 60 energy entities held a licence for trade in oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen. Table 5-2 indicates the number of energy entities hold a licence for wholsale in different energy sources in 2022.

Table 5-2: Number of energy entities holding licence for different energy sources in 2022

Type of energy source	Number of energy entities	Type of energy source	Number of energy entities
Crude oil	2	Lead-free motor fuels (*BMB*)	6
LNG - autogas	10	Airplane fuels	1
LPG – propan-butan blend (*PBS*)	6	Jet fuels	1
LPG - propan	6	Gas oil Euro diesel	18
LPG - butan	3	Gas oil extra light Euro EL	5
Compressed natural gas (CNG)	22	Heating oils	19
Liquefied natural gas (LNG)	4	Biofuels	0
Hydrogen	0	Bioliquids	0

One may conclude from the Table 5-2 that the biggest competitiveness potential in the trade in the local market is in the wholesale in compressed natural gas, heating oils and gas oils. There is also a solid competitiveness potential in the trade in liquid oil gases and lead-free motor petrols. In addition, it is indicated that biofuels, bioliquids, hydrogen, airplane fuels and jet fuels market practically did not exist in Serbia in 2022. For the trade in motor fuel gas oil 0.1 which is used for running machines and tractors, prescribed minimum technical conditions were only complied by NIS for years in the past. At the end of 2020, upon NIS request the licence was amended and from that moment no energy entity complies with necessary requirements for the wholesale of this type of motor fuel in the market of the Republic of Serbia.

The Law on Sail and Ports within Local Waters ("Official Gazette of RS", No. 73/10, 121/12, 18/15, 96/15 – other law, 92/16, 104/16 – other law, 41/18, 95/18 – other law and 37/19 – other law, 9/2020 and 52/2021) envisages that shippers, port operators and Directorate for Water Flows should harmonise their activities with the provisions of that Law until December 31, 2018 at the latest. Until the end of 2022, most companies storing oil derivatives in tanks within river terminals harmonised their activities with ruling regulations in an adequate manner. The licence for trade in oil for watercrafts was held by the company *Siber Invest* from Požarevac and by *NIS*. *NIS* has bunker stations in Prahovo and in Veliko Gradište on the River Danube where *Siber Invest* also has a station for vessels fuel supply.

The number of energy entities licensed for the storage of oil, oil derivatives and biofuels amounted to 24 until 2021 and including 2022. *NIS* has the largest storage capacities out of 25 licence holders. The second, third and fourth largest storage holders include *Transnafta*, PE *EPS*, Mitan oil, *MOL Serbia*, *Naftachem* and *VML Energy*.

5.4.2 Retail market

The amendments to the Energy Law in 2021 implied that apart from oil derivatives, the fuels such as biofuels, gas oils, compressed natural gas, liquefied natural gas and hydrogen are included in the term motor fuels. Apart from encompassing road vehicles, the term vehicles also includes small vessels. The sale of heating oils on petrol stations is forbidden as of early 2015. The Rulebook on technical norms for the security against fire and explosion in fuel stations for vehicles, small watercrafts, small agricultural and sport planes ("Official Gazette of RS", No. 54/2017, 34/2019 and 92/2021) defined technical norms for safe instalment as well as for the security against fire and explosion for the construction of new facilities and for upgrade, adaptation, reconstruction and sanation of existing stations for the supply in fuels of vehicles, in road transportation, small watercrafts, small agricultural and sports planes. It also defined procedures and technical norms for devices, installation and equipment for safe fuel storing and cross-feed on these stations. There were 370 energy entities licensed for retail by the end of 2011. The highest number of them was recorded at the end of 2016 – 470 of them, while there were 430 of them holding that licence at the end of 2022 which is 21 licences less than in 2021. The increase in the number entities licensed for the performance of this activity in the period 2011 - 2016 is to a small extent the result of construction of new petrol stations as well as to sporadic transformation of internal stations into public stations, and to a larger extent due to follow-up of a several-year trend of the lease of a greater number of petrol stations from *NIS* and Lukoil system to leaseholders. Thereby, the number of market players was increased by using practically the same number of petrol stations, i.e. slightly higher number of petrol stations, as well as due to intensified activities of the ministry's control department which is authorized for trade. As a result of an intensified inspection, most of participants in this market applied for the license, even those who used to operate illegally. On the other hand, the dominant reason affecting the reduction of the number of participants in retail market is the revocation of licences from companies performing this activity on one station or on a small number of stations for vehicle supply upon their request due to lack of cost-effectiveness. Following the change of legal basis of their use, in most cases, energy entities performing this activity on a larger number of stations continued performing this activity on these stations. Therefore, operational cost optimization is the cause of market consolidation. It is confirmed by the fact that the number of licenced entities dropped by around 4% in the period 2016-

2021. A considerable reduction of the number of licenced energy entities in 2022 by additional 4.7% is a consequence of the introduction of maximum retail prices of oil derivatives due to the energy crisis which resulted in the reduction of trading margins in this area which is why a number of small-scale traders withdrew from the market, primarily those traders who leased petrol stations.

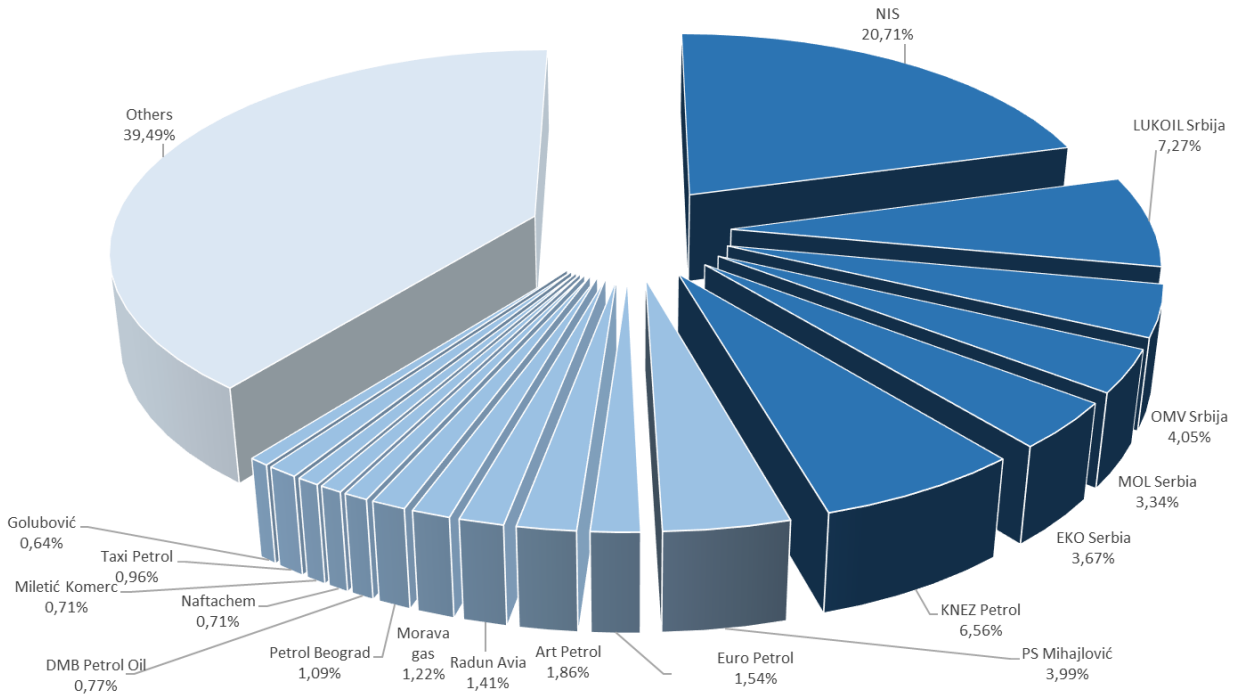

Figure 5-5: Share of companies in retail motor fuel market according to the number of stations in 2022

Figure 5-5 indicates the share of the biggest companies in retail motor fuel market in 2021. The given data do not refer to the motor fuel quantities placed on the market of the Republic of Serbia but to the relative share that oil companies hold in the market according to the number of petrol stations they use either as owners or as tenants, excluding the stations of other licenced entities using franchise trademark of these companies. In addition, the diagram has incorporated brands operating within the same business group (e.g. stations operating under brand NIS Petrol and Gazprom are incorporated in NIS section etc.) while the section "Other" includes all companies operating with than ten stations. Average number of stations per energy entity in the Republic of Serbia amounts to 3.6. However, if we exclude business group NIS performing this activity on more than 300 stations from the statistical data, this factor drops to 2.9. If we also exclude Lukoil and Knez Petrol using more than 100 stations each, the average level drops to 2.4. In the end, if we exclude all 16 energy entities which operate with ten and more than ten stations from the analysis as it is indicated in Figure 5-5, the average number of stations per energy entity amounts to 1.48. This average level refers to 96.28% of all licenced energy entities which perform motor fuel trade on over 39.5% of 1,555 of public retail facilities in the Republic of Serbia in 2022. These traders are given in Figure 5-5 in the collective category "Others" and their share in the total number of stations was reduced by around 1.5% in 2022 which confirms the thesis on the local market consolidation. The biggest increase in the number of stations in 2022 was recorded with MOL Serbia (4), NIS (3), Knez Petrol (3) and Naftachem (3) while the greatest drop in the number of stations was recorded by PS Mihajlovic (8). The total number of stations where motor fuels and other fuels were traded in 2022 dropped by 11 nominally.

The increase in the number of compressed natural gas (CNG) traders as well as of the number of petrol stations is an indicator of expansion of use of this energy source which substitutes other types of motor fuels. Until 2022 and including 2022, 16 licences were issued for retail in CNG, which is one more than at the end of last year and thereby the supply in CNG was performed on 22 stations in total. The supply of motor vehicles by CNG was performed in three ways: from the transmission or distribution gas pipeline network, from mobile storages or from liquefied natural gas. The lack of regulations and defined competence of inspectors, inability to supervise CNG consumption as of motor fuel (some CNG quantities from stations are used for industrial purposes) and the fact that this type of motor fuel has not been burdened by excise duties and taxes so far, in contrast to fuels which serve as competitive motor and energy fuels are some of the features of this energy source retail market. In 2022, the first licence for liquefied natural gas retail on petrol stations was issued.

There are six energy entities licensed for trade in fuels outside petrol stations as it was the case last year and they deal in trade in gaseous energy fuels primarily. They also trade in gas oil extra light type Euro EL.

There is still no energy entity dealing in the trade in motor fuels for sport airplanes and trade in hydrogen for motor vehicles supply.

6. ACTIVITIES OF GENERAL INTEREST AND CUSTOMERS PROTECTION

6.1 Activities of general interest

Legal framework for the performance of activities of general interest, i.e. for the provision of public service in the energy sector of Serbia is set by two laws: Energy Law and Law on Public Enterprises.

The Law on Public Enterprises ("Official Gazette of RS" No, 15/2016 and 88/2019) regulates the activities of general interest in several branches of economy, energy being one of them. On the other hand, definition of an activity of general interest in the energy field and the supply of electricity (guaranteed supply) and natural gas (public supply) is regulated by the Energy Law. Electricity production is not an activity of general interest. Guaranteed electricity supply is not a specific activity, but a public service offered by a supplier appointed by the Government of the Republic of Serbia in line with the Energy Law. The Law on Public Enterprises defines that an activity of general interest can be performed by a public enterprise. It can also be performed by corporations with a public enterprise, Republic of Serbia, autonomous province or local self-government unit as the only owner. A daughter company with such corporation as the only owner of it may also perform these activities. In addition, in line with specific laws, these activities may be performed by other corporations or entrepreneurs appointed by the competent body.

The main objective of the establishment and operation of public enterprises is to secure continuous performance and development in performance of activities of general interest and regular compliance with the demand of customers in terms of products and services, secure technical and economic harmonisation of the system and its harmonisation of its development, with adequate profit and gaining any other interest prescribed by the law.

The 2014 Energy Law defines 29 energy activities with 26 energy activities including 8 of them defined as the activities of general interest for which the Agency issues licences. In the field of electricity, they include the following: electricity transmission and transmission system operation, electricity distribution and distribution system operation. In the field of natural gas, they include: natural gas transmission and transmission system operation, natural gas storage and natural gas storage operation, natural gas distribution and distribution system operation and natural gas public supply. In the oil field, they include: oil transport by oil pipelines and oil derivatives transport by product lines.

Via the adoption of the Law on Amendments to the Energy Law ("Official Gazette of RS", No. 40/21) from April 2021, the scope of energy activities was expanded to energy activities – wholesale natural gas supply, electricity storage and hydrogen production while the title of the existing activity – trade in oil, oil derivatives, biofuels and compressed natural gas was modified, i.e. this activity was expanded and it also encompasses trade in liquefied natural gas, bioliquids and hydrogen. The given amendments to the Law, 33 energy activities were defined in the energy sector in 2021. Out of them, there are 29 energy activities for which the Agency issues licences including 8 of them which are activities of general interest.

6.2 Customer protection

The protection of electricity and natural gas customers who use the services of general economic interest in provided more generally by the Law on Customer Protection ("Official Gazette of RS", No. 88/2021) which provides protection of customers who are natural persons. In more detail, the protection of all customers is also provided by the Energy Law and bylaws adopted on the basis of this Law which regulate in more detail: general conditions for electricity and natural gas delivery and supply, regulation of price of electricity transmission and distribution, natural gas transmission and distribution and price of regulated supply of households and small customers (guaranteed electricity supply and public natural gas supply), as well as the provision of administration-legal protection of customers with administrative procedures related to the connection of facilities to the system and administrative procedure related to the approval of access to the system.

Monitoring enforcement of documents adopted by the Agency

In line with the jurisdiction set by the Energy Law, in 2022, the Agency estimated the regularity of enforcement of methodologies adopted by the Agency and the regularity of setting regulated use-of-system charges and regulated electricity and natural gas prices. It is a precondition for the Agency approval of a legal act on use-of-system charges and legal acts on prices of guaranteed and public supply. When giving approval, the Agency provided for the adoption of prices set by energy entities in line with the Energy Law within the timeframe prescribed by the law regulating customer protection and the Energy Law. Except for the implementation of general mechanisms for final customers protection, the Agency analysed the regularity of implementation of prescribed tariffs and acted upon complaints of customers and system users. In their files submitted to the Agency, they denied the regularity of stating prescribed tariffs or their amount indicated in suppliers' or system operators' bills, denied also the regularity of classifying customers in groups and categories of customers prescribed by methodologies adopted by the Agency, etc.

6.2.1 Regulation of price of supply of households and small-scale customers

One of the measures of protection of households and small-scale customers in electricity and natural gas markets is set by the Energy Law, i.e. the supplier to whom such final customers may return (universal service) is provided and the price of such supply is regulated. Electricity and natural gas market in the Republic of Serbia was opened in

several stages and only households and small electricity and natural gas customers are entitled to regulated guaranteed/public supply as of 01/01/2015. Guaranteed/public supplier is appointed by the Government of RS in a manner, within a procedure and within deadlines set by the Law.

PE *EPS* is the guaranteed electricity supplier for the whole territory of Serbia. By mid-2016, guaranteed supply was provided by "*EPS Snabdevanje*" LLC Belgrade as a daughter company established by PE *EPS* in March 2013. In June 2015, by the change of status, the company was merged with PE *EPS*. From that moment, PE *EPS* continues supplying households and small-scale customers at regulated prices. PE *EPS* has rights and obligations of the guaranteed supplier until a guaranteed supplier is appointed by the Government of the Republic of Serbia. The change of status was registered on June 1, 2016 in the Registry of economic entities.

In 2020, natural gas public supply was performed by 31 public supplier out of 32 licenced energy entities (one energy entity holds a licence but does not perform the activity). Each of them is on the territory of the natural gas distribution company which it constitutes the same legal person (natural gas distribution companies have less than 100,000 customers each). In the second half of 2012, the statute of PE *Srbijagas* was amended and a contract on the transfer of activity of natural gas public supply was signed with several companies and enterprises. This enabled the Government of RS to appoint energy entities which may perform this activity. In total, 33 energy entities complied with the conditions at the end of 2012 and in early 2013 and were licensed by the agency for the performance of natural gas public supply. However, in 2018, this number reduced to 32 public suppliers due to a merger of two energy entities. The number of public suppliers in natural gas remained the same in 2022 as well.

The prices of guaranteed and public supply are approved by the Agency in line with the Law. The content of the bill issued to final customers is prescribed in more detail by bylaws by which the Government of RS prescribed in more detail conditions of electricity, i.e. natural gas delivery and supply.

6.2.2 Rights of final customer to access to data on one's own consumption

Following market opening, a final electricity and natural gas consumer becomes interested in obtaining full data on their consumption since without these data a potential supplier with whom a customer negotiates cannot make a precise price offer. In line with the Law, a final customer is entitled to ask directly or to authorize their potential supplier to ask for and obtain all necessary data from the system operator on customer's consumption on the delivery point which the system operator is obliged to indicate in an unambiguous and timely manner. The Law prescribes that a customer may authorize any supplier (not only the current one) to ask for and obtain the data on their consumption from the operator.

The decision on the procedure for the exercise of the right of final customer to have access to the data on one's own electricity and natural gas consumption was adopted by the Agency in July 2016 in line with its jurisdiction arising from the Energy Law. A part of this decision includes the templates for indicating data on a final customer's consumption so as interested suppliers could have the same data indicated and in the same way, too.

The operator is obliged to indicate the requested data free of charge within the defined deadline using the same template, in line with the defined template and submit them to the customer and a potential supplier if the customer appoints him as a data addressee. Final customers are thus enabled to receive comparable offers from potential suppliers which are established on the basis of reliable data on the customer's consumption in the long-run (for the last 24 months). The types of data are standardized as well as their template.

This procedure is expected to be more efficient after broader implementation of advanced metering systems. Direct access to the data will be available with relevant codes for authorized persons. This is already in function with the electricity Transmission System Operator.

6.2.3 Supplier switch

The Rules on Supplier Switching ("Official Gazette of RS", No. 65/15) which were adopted in 2015 regulate conditions and procedure for supplier switching in case a final customer has a contract on full supply concluded. Acting upon complaints filed with this Agency during 2016 and 2017 directly by customers who failed to switch supplier or filed via a new supplier, the Agency asked for declarations and gave instructions in order to provide for regular implementation of these rules in each concrete case. In 2016, the Agency organized consultations with energy entities twice and based on the results of these consultations, the Agency prepared amendments to the Rules which entered into force in early 2017. In line with the jurisdiction set by the Law, the Agency also drafted templates with instructions both for customers on how to launch the procedure and for other participants in order to provide regular implementation of the Rules and more efficient procedure realization. New amendments of these Rules enabled the launch and completion of the supplier switching procedure upon a request of a customer losing their supplier even in less than 21 day. Thereby, procedure participants are urged to act urgently in settling a certain number of cases in order to reduce the number of customers who would otherwise be exposed to higher costs of supply of the last resort which is limited to 60 days at most. The adoption of a Decision on Amendments to Rules on Supplier Switching ("Official Gazette of RS", No. 10/17) enabled considerable progress in registration and organization of data bases of system operators on final customers metering points.

6.2.4 General terms and quality of delivery and supply

The Decree for Conditions of Electricity Delivery and Supply ("Official Gazette of RS", No. 63/13 and 91/18) and the Decree on Conditions for Natural Gas Delivery and Supply ("Official Gazette of RS", No. 49/22) which are adopted by the Government of the Republic of Serbia on the basis of the Energy Law serve to define: general conditions of delivery and supply in more detail. They also regulate the content of the contract, rights and obligations of market players, content of delivery bill and supply bill, depending on supply conditions, conditions under which some customers cannot be disconnected from the network in case of unsettled liabilities for the withdrawn as well as other elements prescribed by the Law.

The Agency monitors the quality of delivery and supply and the quality of electricity and natural gas in line with the Rules on Monitoring Technical and Commercial Indicators and Regulating Quality of Electricity and Natural Gas Delivery and Supply which was adopted in the beginning of 2014. The Agency collects the relevant data, analyses relevant indicators, works on the upgrade of data quality with energy entities and prepares periodical reports in line with the Law. Achieved indicators are referred to in more detail in subsections 3.7 and 4.6.

6.2.5 Settling complaints and assistance in mediation procedure

The Agency also performs entrusted activities of administrative and legal protection of final customers. In 2022, as the second-instance body, the Agency adopted decisions against appeals filed by customers against acts of system operators on denial of system connection application. In most cases, appeals were filed due to a failure of a competent energy entity to adopt decisions in the first instance within the timeframe prescribed by the Law (the so-called "administrative silence") but also due to contesting set technical requirements and costs of connection service. In 2022, final customers filed appeals mainly against acts of electricity distribution system operator's acts while there were only 10 appeals filed against natural gas distribution system operator's acts.

Acting upon filed complaints, in 2022, the Agency mostly revoked decisions of system operators adopted within the first-instance procedure upon applications for connection to the distribution system mainly due to established violation of process law and violation of material regulations. Bearing in mind that the number of complaints slightly increased in 2022 in comparison to last year, as well as that there is still a trend of revocation of a great number of decisions adopted within the first-instance procedure due to strong violations of procedure, a necessity to educate the staff working on administrative-legal issues of system connections of facilities is indicated. This is particularly important in the field of implementation of a new law on general administrative procedure. The full implementation of this law was initiated in 2017 and this is one of the reasons of an increased number of approved complaints due to strong violations of procedure in 2022 as well.

In addition to being authorised to receive appeals in the field of administrative affairs related to system connections, the Agency is also authorised to settle complaints of system users filed against acts of system operator by which they adopted decisions on system access for the purpose of using the service of electricity and natural gas transmission or distribution.

Customers and system users are also entitled to have administrative-court protection against second-instance administrative decisions of the Agency regardless of the fact whether they were adopted within an appeal procedure where the Agency settles complaints against acts on denial of connection or within an appeal procedure where the Agency settles a complaint filed against an act by which a system operator denied an application and denied access to the system.

The number of complaints to the Constitutional Court of RS filed within the second instance procedure against decisions of the Agency increased slightly in 2022 in comparison to last year.

Even in 2022, as well as in the previous years, in line with the jurisdiction, the Agency offered all necessary clarifications and issued opinions on the enforcement of the regulations adopted by the Agency. The Agency acted upon complaints of customers who deny the regularity of actions undertaken by energy entities when complying with obligations prescribed by the Energy Law. The Agency also acted upon other customers' and system users' files, regardless of the fact whether natural or legal persons file them.

In addition, in case of dispute between energy entities or between an energy entity and a system user, which is settled pursuant to the law regulating mediation, the Agency offers expertise to dispute parties as well as the available data so as necessary documentation is prepared for the mediation procedure.

In 2022, there were no mediation procedures where the Agency participated upon request of any of the parties.

6.2.6 Special modes of protection of most energy-wise vulnerable customers

The Law defines conditions and method of award of special modes of protection of energy-wise vulnerable customers from the household category (conditions for the reduction of monthly bill for final customers within this category) on the basis of criteria set by the Government of the Republic of Serbia in detail. Apart from general norms related to the protection of all electricity and natural gas customers, the Law also recognises the category of "energy (-wise) protected" customer which is a broader term than the "energy (-wise) vulnerable customer" since it covers, apart from

customers entitled to social care, customers who need not be members of this category but still may have their lives or health endangered in case of electricity or natural gas supply disruption or limitation.

Until December 17, 2022, the assistance to most energy-wise vulnerable customers in the Republic of Serbia was offered in line with the Decree on Energy-Wise Vulnerable Customer (*EUK*) which was adopted by the Government of RS on December 31, 2015 and which entered into force on January 1, 2016. In 2018, a Decree on Amendments to the Decree on Energy-Wise Vulnerable Customer was adopted and it entered into force on August 8, 2018. This amendments specifies the content of the application for the award of the status of energy-vulnerable customer. It also regulates the issue of personal data protection in the form and in the manner prescribed by that Law. It also specifies that the provisions of Article 4 of this Decree do not refer to those entitled to social care allowance or children allowance. In contrast to the former Decree, the main goal of the amendments to this Decree is to create conditions to include as high number of customers as possible and to increase the level of protection of vulnerable population categories via simplification of procedures for the award of the status of energy-wise vulnerable customer. In the end of 2022, on December 17, 2022, a new Decree on Energy Vulnerable Customer entered into force which was adopted by the Government of RS on December 8, 2022. The new Decree also enabled the reduction of bills for heating energy. The upper limit of total income of the household was increased and this is supposed to contribute to the increase in the number of households entitled to bill reduction. The right to be awarded with the status of vulnerable customer was also extended to those entitled to increased allowance for the assistance of third parties and it was enabled for village households to be awarded with a status of a vulnerable customer regardless of the area of the residential unit.

Conditions for the reward of the energy vulnerable customer status

Since the oil Decree was valid during most of 2022, i.e. during eleven and half months of 2022, the following text will refer to the Decree which entered into force in December 2015.

The Decree defines criteria and: conditions for the award of the energy vulnerable customer status, content of the application for the award of the status and evidence accompanying the application, procedure, deadlines, manner of issuance and content of decision on the award of the status, content and scale of right to reduced monthly bill, award of the status due to health condition, method of registration of these customers as well as the method of provision of funds for the protection of energy vulnerable customers.

The funds necessary for customers' protection are provided from the budget of the Republic of Serbia. The protection of the most vulnerable customers from the budget creates conditions for a prompter energy market development.

The Decree on Energy-Wise Vulnerable Customer defined that the status of energy vulnerable customer is awarded to a customer who belongs to household category (individual, family) living in one housing unit with one metering point where electricity, i.e. natural gas is metered. This customer consumes maximum electricity or natural gas quantity in line with this Decree. The status is also awarded to a household with a member who can have his health or life endangered by electricity or natural gas delivery suspension.

Only households which do not own some other housing units, except for the housing unit which corresponds to the needs of the household by its structure and space are entitled to the award of the status of energy vulnerable customer.

The main criteria for obtaining the status of the energy-wise protected customer are the following:

1) total monthly income of the household;
2) number of household members and
3) financial status.

The total monthly income of households represents the condition for the award of the status of energy vulnerable customer are harmonised with the customer price index in the last six months. It is done in line with the data provided by the Serbian Statistical Office. The table below indicates the maximum monthly income in line with the Rulebook on Setting Harmonised Level of Realised Monthly Income of Household which enables the award of the status of energy vulnerable customer.

Table 6-1: Total monthly income of a household as the condition for the award of the status of energy vulnerable customer in 2022

For a household with the following number of members	Total monthly income up to _ RSD	
	until May 31	as of June 1
1	15,690.27	16,490.47
2-3	22,844.72	24,009.80
4-5	29,994.45	31,524.17
6 and above 6	37,719.70	39,643.40

The Decree on Energy-Wise Vulnerable Customer also prescribes the content of the application for the award of the status of energy vulnerable customer as well as the evidence accompanying the application. If an applicant is a beneficiary of social care allowance and/or children allowance, the customer is automatically awarded with the energy-wise vulnerable customer status based on an act of a competent body awarding him/her one of these rights.

Rights of energy vulnerable customers

Energy vulnerable customer may be awarded with the discount for monthly bill for certain quantities of:

1) kWh of electricity for all months and
2) m³ of natural gas for the following months: January, February, March, October, November and December

as it is indicated in the table below:

Table 6-2: Maximum rights to discount for monthly bill for consumed quantities

For a household with the following number of members	Maximum rights to discount for monthly bill for consumed quantities (MPU)	
	Electricity for all months	Natural gas for: January, February, March, October, November and December
	kWh	m³
1	120	35
2-3	160	45
4-5	200	60
6 and above 6	250	75

The right to discount for monthly bill also depends on realized monthly consumption reduced to 30 days in comparison to the quantity for which a certain household has maximum right for discount (MPU) in Table 6-2 in the following manner:

Table 6-3: Right to discount for monthly bill depending on consumption

ELECTRICITY		NATURAL GAS	
Realized monthly consumption given for 30 days OMP	Bill discount based on quantity	Monthly consumption given for 30 days	Bill discount based on quantity
OMP ≤ 4 * MPU	MPU[18]	OMP ≤ 2 * MPU	MPU
4 < OMP ≤ 6.5 * MPU	0.5 * MPU	2 < OMP ≤ 2.5 * MPU	0.5 * MPU
OMP > 6.5 * MPU	0	OMP > 2.5 * MPU	0

Energy vulnerable customer is entitled to monthly bill discount for the RSD amount:

3) for electricity – multiplying quantities in kWh for which the customer is entitled to have discount by higher daily tariff from the green zone for customers from category “Mass consumption with two-tariff metering” increased by 10% from the price list on regulated electricity price for the supply of households and small scale customers to which the Council of the Energy Agency of the Republic of Serbia gave approval and which is valid at the moment.
4) for natural gas – multiplying quantities in m³ for which the customer is entitled to have discount by the tariff “energy source” for customers from the category of households which are supplied by PE Srbijagas increased by 5% from the public supply price list of PE Srbijagas to which the Council of the Energy Agency of the Republic of Serbia gave approval and which is valid at the moment.

If monthly bill is lower than the calculated discount of monthly bill from this Decree, the discount will be calculated to the level of real monthly bill.

One of new provisions of the Decree includes the introduction of the status of energy-wise vulnerable customer due to health condition. The status of energy vulnerable customer to whom health or life may be endangered because of his health condition if electricity in case of electricity delivery suspension is awarded by submitting relevant medical

[18] MPU = Maximum electricity consumption pursuant to the Decree on Energy-Wise Vulnerable Customer

documentation to the self-government units. The electricity distribution system operator cannot suspend electricity delivery if a member of a household which is energy-wise vulnerable customer uses medical equipment necessary for health preservation which requires electricity supply.

Number of energy vulnerable customers in 2022 and realized bill discounts

Based on the data provided by competent departments of the Ministry of Mining and Energy, i.e. by energy entities, the maximum monthly number of energy vulnerable customers who exercised their right to bill discount in 2022 and the annual amount of RSD allocated for these purposes from the budget was the following:

Table 6-4: Exercised right to bill discount in 2022

	Customers entitled to reduction	
	Maximum monthly number of customers	Annual amount 000 RSD
Electricity	63,099	1,115,955
Natural gas	60	340
Total	**63,159**	**1,116,295**

Maximum monthly number of customers who were exercising their right to bill discount for delivered electricity in 2022 decreased in comparison to last year by around 7.5%. If we have a look at separate months, the number of customers amounted to between 55,322 in January and 63,099 in May 2022, i.e. 61,224 customers by average exercised their right to reduced electricity bill in 2021.

The number of customers who exercised their right for bill reduction for delivered natural gas in 2022 ranged from 30 in January to 60 in November, i.e. 45 customers in average exercised their right to reduced natural gas bill in 2022.

Based on the data filed by PE "*Elektroprivreda Srbije*", the number of beneficiaries in line with the Electricity Decree for different months in 2022 amounted to the following levels:

Table 6-5: Survey of energy-wise vulnerable electricity customers during different months of 2022

2021 month		Number of energy-wise vulnerable households	Level of reduction within electricity bill RSD
January		55,322	79,428,688.21
February		58,029	84,372,395.11
March		61,401	88,793,064.26
April		62,326	91,879,427.76
May		63,099	95,763,862.38
June		61,833	93,507,627.63
July		61,738	93,458,647.50
August		62,442	94,682,565.48
September		61,767	99,539,304.09
October		62,500	99,420,597.44
November		62,280	96,290,586.72
December		61,947	98,818,286.19
TOTAL			**1,115,955,052.73**

The total amount of benefits achieved by energy-wise electricity vulnerable customers in 2022 amounted to RSD 1,115,955,052.73. This amount includes the amounts of bills for consumed electricity including excise, VAT and the fee for public broadcasting company.

The number of electricity vulnerable customers in 2022 who were awarded with the right to have discount to the bill is lower than the expected one. The analyses show that a large number of households is exposed to energy poverty

risk. Around 10% of total population in Serbia cannot provide adequate heating temperature in their apartments[19]. If one bears in mind that the average number of household members (2.7), one may conclude that over 260,000 households are not in a position to provide the heat to their homes adequately. In addition, there is a highlighted problem of undue electricity bill settlement. Delay in public utility liability settlement is present with more than 25% of the total population. In addition, around 20% of the total population lives in life space with leaking roof, damp walls or floor or with rotten window frames. Based on all these three indicators and bearing in mind the mentioned average number of household members, one may conclude that between 450 and 500,000 households are facing the energy poverty risk.

According to the latest available data from the Republic Statistical Office, in 2021, in Serbia, the poverty risk rate amounted to 21.2% and it was by 0.5% percentage points lower than in 2020. The poverty risk rate or social exclusion rate amounted to 28.5% which is by 1.3 percentage points lower than in comparison to 2020. The poverty risk rate represents the percentage of persons with available equivalent income lower than the poverty risk threshold and it does not indicate the number of persons who are truly poor but the percentage of people with equivalent available income lower than the poverty risk threshold. The poverty risk or social exclusion rate indicates the percentage of persons at risk from poverty or who are extremely materially deprived or who live in households with very low work intensity.

According to the records of the competent ministry on the number of families who are beneficiaries of social care allowance, that number amounted to 73,366 in 2022. The number of children who are beneficiaries of children allowance amounted to 206,336 in December 2022. However, if one adds people with the lowest pensions, single breadwinners, beneficiaries of custodial care and assistance as categories who are in most cases and to the greatest extent exposed to energy poverty risk to this number, the number of individuals and families would be much higher.

Table 6-6: Review of beneficiaries of social care allowance in 2022

Number of family members	Number of families	Persons in total	Amount 000 RSD
1	34,397	34,397	365,517
2	14,476	28,952	197,131
3	7,297	21,891	118,766
4	7,583	30,332	142,261
5	4,986	24,930	107,765
6 and above 6	4,627	27,762	112,622
Total	**73,366**	**168,264**	**1.044,062**

Table 6-7: Review of beneficiaries of children allowance in 2022

For a child		Number	Amount 000 RSD
First-born		83,267	325,116
Second-born		70,620	267,688
Third-born		36,045	135,505
Fourth-born		16,404	62,808
Total	**children**	**206,336**	**791,117**

19 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_mdes01&lang=en

ANNUAL AND FINANCIAL REPORT

7. AGENCY ANNUAL REPORT

7.1 Basic data about the Agency

7.1.1 Establishment of and the scope of work of the Agency

The Energy Agency of the Republic of Serbia (Agency) was established pursuant to the 2004 Energy Law, which provided for the harmonisation of our legislation with the EU regulations at that time.

The Agency was registered at the Commercial Court in Belgrade on June 16, 2005 and started working on August 1, 2005.

Pursuant to the 2011 and 2014 Energy Law, the Agency continued its work of a regulatory body, established so as to improve and guide energy and natural gas market development based on principles of non-discrimination and efficient competition, through the establishment of a stable regulatory framework, as well as so as to perform other activities stipulated by the law.

By the adoption of the 2014 Energy Law, legal norms in the energy field were harmonized with the Third energy package of regulations on internal energy market and the *acquis* of the EU. The role of the Agency was strengthened significantly and its jurisdiction was expanded.

Via the adoption of a set of energy regulations in April 2021 (Law on Amendments to the Energy Law, Law on Use of Renewable Energy Sources, Law on Energy Efficiency and Rational Use of Energy) aimed at further adjustment and harmonization with the EU *acquis communautaire* in the energy field, the jurisdiction of the Agency was further regulated and expanded.

The most important Energy Agency jurisdiction areas in 2022 divided in groups include the following:

Certification and licencing

- certification of the transmission/transport system operator and
- licence issuance and withdrawal, keeping a licence registry and adoption of a regulation on the level of costs of licence issuance.

Price regulation

- adoption of methodologies for setting:
  - energy network use-of-system charges;
  - prices of regulated electricity and natural gas supply;
  - prices connection to network systems;
  - methodologies for billing electricity which was consumed without authorisation;
  - methodologies for setting maximum feed-in tariff for electricity;
  - methodologies for setting maximum purchase price of electricity;
  - methodologies for setting feed-in tariff – micro and small cogeneration;
  - methodologies for setting market premia – highly efficient cogeneration;
  - methodologies for setting ancillary services price;
  - methodologies for setting costs, method of compensation and cost allocation between NEMO and the transmission system operator;
  - methodologies for assessment of investments in risks and strategic infrastructure projects in the field of electricity, natural gas and oil
- approval of regulated prices;
- setting maximum purchase price for auctions for electricity from wind-fuelled power plants;
- setting price of regulated ancillary services;
- monitoring the enforcement of methodologies and approved regulated prices;
- setting the level of compensation paid to a customer due to deviation from the prescribed quality of electricity and natural gas delivery and supply and
- drafting a report on the necessity of having further:
  - on the necessity of having further price regulation in the field of electricity supply of households and small customers;
  - on the necessity of having further price regulation of capacity reserve for system services – secondary and tertiary control and
  - on the necessity of having further necessity to maintain supply of the last resort.

Energy market monitoring

- adoption of rules and other documents:

- supplier switching rules;
- rules on prevention of abuse in electricity and natural gas markets;
- registration of electricity and natural gas wholesale market players and keeping registry in wholesale market;
- rules on quality of electricity and natural gas delivery and supply;
- act on manner, procedure and deadlines for keeping bookkeeping registries for regulation purposes and for the purpose of implementation of account unbundling for different energy activities;
- regulation on the level of costs of energy licence issuance;
- regulation on the method of procedure for imposing measures; keeping a registry of imposed measures;
- regulation on exemption for new interconnector overhead lines and gas infrastructure;
- procedure of customers' entitlement to access the data on one's own consumption;
- instructions for elaboration of Network Codes in the fields of electricity and natural gas;
- instructions, recommendations and guidelines for the enforcement of the regulations within the Agency jurisdiction;

• approval of rules:

- electricity transmission and distribution network code;
- natural gas transmission and distribution network code and natural gas storage code;
- electricity market rules;
- on connection of facilities to the transmission system;
- for suspension and reinitiation of market activities;
- on capacity allocation between bidding zones;
- on publication of key market data;
- harmonised network codes of system operators;

• approval of other regulations:

- multi-year development plans of transmission system, distribution system and oil derivatives transport system via product lines;
- investment plans of system operators;
- bilateral contracts for cross-border transmission capacity allocation;
- procedure for the connection to the transmission system;
- harmonisation programmes for non-discriminatory behaviour of the system operator; acts on conditions for appointment, duration of term of office and dismissal of the compliance officer for the programmes for non-discriminatory behaviour and prior approval of the appointment of a candidate nominated as the compliance officer for the programmes for non-discriminatory behaviour;
- plans for the transfer of metering devices to distribution system operators;
- regulation of a transmission system operator on the level of fee for the guarantee of origin;
- regulation of the system operator on the non-standard service prices;
- methodology adopted by the entity entitled with exemption from regulated transmission and natural gas storage use-of-system charges;
- legal act of the natural gas distribution system operator defining the level of connection costs via standard connections;

- giving opinion on plans for implementation of smart metering systems;
- drafting report with background and with the conclusion on the compliance with conditions for Nominated Electricity Market Operator (NEMO) appointment;
- drafting opinion with background on the Annual Report of the Non-Discriminatory Behaviour Programme Officer;
- approval of operational limitations within the transmission system connection procedure;
- deciding upon request for derogation within the electricity transmission connection procedure and keeping registry of all derogations;
- monitoring compliance of licenced energy entities with obligations and monitoring market functioning and
- contribution to harmonisation of procedure of the exchange of data relevant for the most important market processes in the region.

Deciding upon appeals and customer protection

- deciding upon appeals:
  - against denial of the access to the system and
  - against a decision of the system operator upon an connection application or against failure to adopt a decision on it;

- considering files submitted against the system operators' and suppliers' failure to comply with obligations;
- providing professional support and data to applicants who settle their disputes via mediation;
- imposing measures and keeping a registry of imposed measures;
- launching offence procedures and economic offence procedures;
- examining circumstances and launching procedures with competent bodies in case of competition offence and market limitation offence and
- taking measures so as to make the list of practical data on their rights available to system users and customers.

International cooperation

- The Agency cooperates with regulatory authorities from other countries, as well as with other international bodies and organisations in line with the law and ratified international agreements and the decisions of the Council aiming at:
  - development of the regional and Pan-European electricity and natural gas market;
  - encouraging operational agreements ensuring optimal network operation;
  - achievement of equal conditions for all market participants;
  - promoting coupling of organised electricity markets;
  - common transmission capacity allocation between bidding zones;
  - creating conditions for an adequate level of cross-border capacities in the region and among regions;
  - coordinated implementation of network codes and congestion management rules;
  - contribution to the compatibility of data exchange procedures and
  - improvement of its operations in line with positive international experience and standards.

The Agency provides non-discriminatory access to the systems through effective competition and efficient operations of electricity and natural gas markets.

Within its scope of work, the Agency monitors:

- efficient accounts unbundling in licenced energy entities;
- existence of cross-subsidising among energy entities which deal in different energy activities within the same energy entity;
- compliance with energy entities' obligations prescribed in line with the Law;
- application of the rules for transmission capacity allocation between bidding zones in cooperation with regulatory bodies from other states;
- application of the rules for transport capacity allocation between bidding zones in cooperation with regulatory bodies from other states;
- publishing the data on cross-border transmission capacities and on system use by transmission and transport system operator;
- enforcement of mechanisms for the removal of congestions in the transmission or transport system;
- conditions and costs for the connection of new electricity producers to the transmission or distribution system, so as objectivity, transparency and non-discrimination could be guaranteed, in particular having in mind the costs and benefits from different technologies for electricity generation from renewable energy sources and combined electricity and heat energy production;
- the time necessary for system operators to connect a facility to the system, i.e. the time necessary to remove breakdown in case of delivery disruption;
- the way reserves are used within the system;
- transparency and competition level, in cooperation with the bodies authorised for competition issues;
- functioning of an organised electricity market as well as the organised market operator's compliance with the principles of transparency and non-discrimination;
- the level of market openness and its efficiency and competence in wholesale (among suppliers) and retail (final customers supply);
- the conditions for access to the storage, linepack and use of other ancillary services in the natural gas sector;
- justifiability of costs and checks whether methodologies for setting use-of-system charges for which exemption was approved by the Agency are applied properly;
- compliance with customer protection measures defined by this law and
- Realisation of development plans and investment plans of system operators which the Agency approved.

7.1.2 Organisation of the Agency

The Energy Agency of the Republic of Serbia is independent in performing organisational activities and other activities which enable the performance of the activities stipulated by the law. Pursuant to the Law, the Council of the Energy

Agency (hereafter: the Council) adopts all the decisions on the issues under the jurisdiction of the Agency by majority of votes among Council members, except if it is otherwise stipulated by this law or Statute.

Within the Council, there is the President and four members. The Council President stands on behalf of the Agency and represents it, decides on the issues within the scope of work of the Agency as defined in Article 54of the Law, organises the activities of the Agency and manages the activities of the Agency, proposes decisions and other acts adopted by the Council and monitors their implementation, has the director's authority in activities related to exercising rights and obligations of the personnel and performs other activities in line with the law, Statute and Council authorisation.

The Council adopts the Statute which regulated internal Agency organisation and procedures, Rules of Procedure and other general acts pursuant to the law. Agency Statute is approved by the National Assembly of the Republic of Serbia.

Organisational structure of the Agency was established based on elaborate made by the consulting house KPMG and approved by the Ministry of Mining and Energy. Organisation of the Agency is set so as to comply with the requirements in terms of efficiency and rationality in its work. To that end, Agency operates through four departments with a defined scope of work, with necessary level of coordination during the performance of complex duties for which more than one department is responsible.

Basic organisational units include:

- Energy and Technical Department;
- Economics and Finance Department;
- Legal Department and
- Organisational and General Affairs Department.

7.1.3 Independence and responsibility

In the performance of its activities, the Agency is an autonomous legal entity and it is independent from the executive authorities, other state bodies and organisations and legal and natural persons dealing in energy activities. The independence of the Agency does not prejudice its cooperation between the Agency and other national bodies, the implementation of the general policy adopted by the Government of the Republic of Serbia in issues which are not related to the jurisdiction and responsibilities of the Agency.

The Council President and members are responsible for their work to the National Assembly. At least once a year, they submit the financial report and the report on the energy sector to the Assembly. The annual report includes the data on the Agency's work during the previous year, its financial operations and the situation in the energy sector of the Republic of Serbia which is within the Agency's competence.

The independence of the Agency from the executive authorities is also reflected in the fact that, in line with the Law, the president and members of the Council of the Agency are selected by the National Assembly based on a public invitation and the fact that they are selected from a group of prominent experts in the energy field. The president and members of the Council may only be persons who are citizens of the Republic of Serbia, with university degree in technical, legal or economic area and with at least 10 years of working experience in the energy field. The following list of persons shall not be selected as the president and member of the Council: MPs of the National Assembly, MPs of the Assembly of the Autonomous Province, elected members of city councils, other elected and appointed persons, as well as political party officials; owners or co-owners of energy entities, as well as persons whose spouses, children or relatives in straight line regardless of the degree of kinship, or relatives in lateral line ending with the second degree of kinship, are persons lawfully convicted for criminal offences against official duty, corruption, fraud or other criminal offences making them unfit to perform the functions they are elected.

In 2017, the selection of AERS Council President and members was initiated in line with the provisions of the new Law for the first time. The selection was completed in March 2018 and in line with this, new AERS Council members commenced their term of office in March 2018.

The Agency has its own financing sources, defined by the Law, separate from the state budget.

The Agency is financed from the revenue arising on the basis of regulation activities from the part of regulated revenues from the system access set by the methodologies adopted by the Agency, on the basis of energy license issuance, as well as from other revenues from the activities within its jurisdiction in line with the law. The Agency may also raise funds from grants, except from the grants from energy entities or persons connected to those entities.

Pursuant to the Article 61 of the Law, the Agency adopts a Financial Plan defining total revenue and expenditure, including contingency funds and elements for full insight into the compensation and employment policy which provide adequate professional personnel. The financial plan is approved by the National Assembly. The financial plan is submitted to the National Assembly at the latest by the end of October of the current year for the following year. Upon the approval of the National Assembly, it is published in the "Official Gazette of the Republic of Serbia". The Agency submits annual Financial Plan to the National Assembly regularly and within the prescribed deadline to the National Assembly.

The Agency 2022 Financial Plan was adopted by Agency Council within the prescribed timeframe on October 28, 2021 and it was submitted to the National Assembly for adoption purpose on the same day. On December 29, 2021, on the 16th meeting of the Second Regular Session, the National Assembly adopted a decision on the approval to the 2022 Financial Plan of the Energy Agency of the Republic of Serbia. The adoption of the Financial Plan of the Agency created conditions for further improvement of the Agency work and of its organizational structure and the number of employees. The Decision of the National Assembly of RS on the Approval of the AERS 2022 Financial Plan was published in the Official Gazette No. 130/21 of December 29, 2021.

Annual calculations of revenue and expenditure of the Agency are audited by an authorised auditor. The auditor's report is also submitted to the National Assembly. If one determines that the annual revenue of the Agency exceeds total expenditure, the deviation amount is transferred into the financial plan as revenue for the following year. However, the sources and the amount of revenue for the following year are harmonised with realistic expenditure of the Agency for that year approved by the National Assembly.

Full independence of the regulatory authority is also one of obligations on the accession of the Republic of Serbia to the European Union and it is subject to the European Commission in the process of accession to the European Union. Criteria of independence of the Energy Agency as regards compliance with obligations arising from the Treaty establishing the Energy Community ("Official Gazette of RS", No. 62/06), Berlin Process and CESEC Initiative is also monitored by the Energy Community Secretariat. The position and the role of the Energy Agency within the legal system of the Republic of Serbia are defined by the Energy Law which also transposes the provisions of the European energy law (the so-called Third Package of regulations on internal EU energy market) which regulate functional, personal and financial independence of the regulatory authority.

INDICATORS OF INDEPENDENCE OF ENERGY REGULATORY AUTHORITIES

The reasons for the transfer of some of jurisdiction related to economic regulation in the electricity and natural gas sectors from state bodies to independent regulatory authorities may differ, but the common idea behind this is to strive to remove the risks arising from market imperfections (natural and/or factual monopoly in the sector), to remove noted weaknesses of the centralized (state) management of the energy sector (stimulating competition) and to strengthen the credibility of the sector in the eyes of potential investors. Therefore, the objective of most energy regulators is to protect customers and investors, while the main mechanisms to achieve that is to regulate prices, prescribe rules and monitor the actions market participants.

There is mutual link between Agency goals, functions and activities with those of the EU electricity and natural gas regulatory authorities since the EU *acquis communautaire* (directives and regulations) have been implemented in the energy sector. The 2014 Energy Law also transposed the provisions strictly prescribing the regulator's independence into the legal system of the Republic of Serbia, i.e.:

- functional independence;
- personal independence and
- financial independence.

Functional independence

An independent regulatory body has to be free in the selection of instruments used to perform the duties in its jurisdiction. The regulator is not allowed to accept instructions from state institutions or energy entities (companies) and regulator's decisions cannot be subject to approval or annulment by executive authorities.

Personal independence

Personal independence of a regulatory authority is provided by:

- setting strict criteria for the appointment (expertise, lack of conflict of interest) and dismissal (e.g. legally-binding conviction for criminal act, offence against rules on the conflict of interest) of management body members (in Serbia: Council of the Agency);
- establishment of rotation between management body members, by not having all management members' mandate ending at the same time, thus providing the separation between processes of the selection of regulator's management and election cycles on political level and
- autonomy in the human resources recruiting - issues related to organisation and human resources have to be within exclusive jurisdiction of the regulator. Regulatory authority has to have autonomy in making decisions on the engagement and dismissal of employees, as well as on the number of them.

Financial independence

Financial independence of the regulatory authority is provided by:

- full independence from the state budget (as prescribed by the Energy Law) or clear independence of the regulator's budget from other budget beneficiaries within the state budget;
- autonomy in the allocation of approved funds. It implies that the regulatory authority has the exclusive right to make decisions on how the approved budget will be spent, i.e. the regulator may neither ask nor accept instructions on its budget. Namely, procedure prescribed in the Energy Law implying that the National Assembly approves the Financial Plan of the Agency does not contradict the principles of regulatory authority independence. In the opinion of the European Commission expert departments, the role of the legislature authorities (parliament) is to approve general financial allocation (not individual budgetary items) in order to enable the regulatory authority to perform the duties entrusted to it by the law in an efficient and effective way.

7.2 Activities of the Agency in 2022

In 2022, the Agency Council which manages the Agency held 50 sessions (46 regular ones and 4 extraordinary ones) during which decisions, approvals, certificates and other acts in the fields of: price regulation, issuance of energy licences, electricity and natural gas market monitoring establishment and implementation, internal organisation of the Agency and other issues within the jurisdiction of the Council were adopted.

7.2.1 Licensing energy entities

Activities which the Agency performs as entrusted ones, related to the issuance of licences of energy entities for energy activities are administrative-legal procedures which include:

- issuing licences for energy activities;
- amendments to issued licences;
- withdrawal, revoking and adoption of decision on withdrawal of the licence by virtue of law;
- monitoring the fulfilment of prescribed requirement by energy entities during the validity period of the licence and
- keeping registry of issued and withdrawn licences.

Requirements for issuance and withdrawal of licenses and keeping registry of issued licenses are prescribed by the Energy Law and the Rulebook on Energy Licence and Certification ("Official Gazette of RS", No. 87/15, 44/18 – other law and 83/21) regulating the conditions for issuing licenses for energy entities and certification and which are adopted by the ministry in charge of energy issues. These are the main regulations the Agency implements within the licence issuance procedure. The rulebook on energy licence and certification is available with prescribed forms and proofs which are necessary to be submitted along with the application for energy license on the Agency website.

The registry of issued licenses is a public document and it is both available in the written form and kept in the Agency registry and in the electronic form available on the website of the Agency (www.aers.rs).

In order to perform these duties, in line with its legal jurisdiction, the Agency adopts a regulation on the level of costs for the issuance of energy licences. The act is approved by the Ministry of Finance and published in the "Official Gazette of RS". The act defines the cost of the Agency related to the provision of this public service which implies the establishment of the compliance with the conditions for the performance of energy activities for each energy activity separately which is borne by licence applicants. The Decision on Harmonisation of the Level of Costs for Energy Licence Issuance ("Official Gazette of RS", No. 97/21) and the Decision on Harmonisation of Level of Costs of Issuance of Energy Licences ("Official Gazette of RS", No. 42/22) which was in force as of April 2022 are published on the Agency website.

The Council of the Agency adopts a decision on the issuance of a licence for the performance of an energy activity within the administrative procedure. Once the decision enters into force, the Agency includes that licence in the registry of licences.

In 2022, the Agency Council issued licences for 11 energy activities out of 28 energy activities for which they are competent to issue licences.

In 2022, the Agency received 115 licence applications. Along with 2,449 applications received in 2006-2021, it amounts to 2,564 applications in total.

In 2022, unorderly applications from previous years and applications submitted in the previous years were processed in addition to the applications filed during 2019. By the end of the year, the Agency council adopted decision on the issuance of 87 new licences. 15 files were denied, 6 of them by application denial while the procedure was suspended with 7 files. In 2022, the Agency adopted decisions on temporary withdrawal of licence in case of 6 files. In case of 5 files, the Agency adopted a decision on permanent licence withdrawal. Decisions on licence issuance were annulled in 26 cases upon energy entities' requests. 5 licences ceased to be valid by virtue of the Law. Since numerous licences were issued in the past and since licenced energy entities did not apply for the extension of their validity even after their validity period expiration, these licences were erased from the public Registry of Issued Licences which is kept by the Agency *ex officio*. At the end of 2022, there were 950 ruling licences registered.

In most cases, the applications filed with the Agency did not include all the necessary documents and therefore, they were amended in line with the law regulating administrative procedure by energy entities upon the Agency's request. After noticed inadequacies were removed and application files completed, applications were reassessed in order to check if the conditions for licence issuance are met.

As of 2008, there was a great number of applications for the amendments of the decisions on issuance of energy licenses, especially in the oil sector – for the activity: trade in motor fuels and other types of fuels on petrol stations and trade in oil, oil derivatives, biofuels and compressed natural gas. Most applications were submitted due to the change of facilities where energy activity is performed. In 2022, the Agency adopted 66 decisions on amendments on decisions mostly for the issuance of license for activities in the oil sector.

The Agency is not responsible for energy entities that did not comply with the conditions for issuing licence. In 2022, not one report of a competent inspector was submitted to the Agency that could be the ground for filing an economic offence against a legal person performing energy activity without a licence.

The number of submitted applications and of licences issued in 2022 (some applications are from 2015 and licences issued in 2022) for each activity are given in Table 7-1.

Table 7-1: Submitted applications and approved licenses in 2022 per each activity

No.	Activity	No. of applications	No. of approved licences
1	Power production	4	3
2	Combined power and heat production	0	0
3	Electricity transmission and transmission system operation	0	0
4	Electricity distribution and distribution system operation	0	0
5	Electricity distribution and closed system operation	1	1
6	Electricity supply	7	6
7	Electricity wholesale supply	13	9
8	Organised electricity market operation	0	0
9	Natural gas transmission and transmission system operation	0	0
10	Natural gas storage and storage operation	0	0
11	Natural gas distribution and distribution system operation	0	0
12	Natural gas supply	6	6
13	Natural gas wholesale supply	0	0
14	Natural gas public supply	19	4
15	Oil derivatives production	3	1
16	Oil transport through oil pipelines	0	0
17	Oil derivatives transport through product lines	0	0
18	Storage of oil, oil derivatives and biofuels	2	2
19	Trade in oil, oil derivatives, biofuels, bioliquids, compressed natural gas, liquefied natural gas and hydrogen	8	6
20	Trade in fuels outside petrol stations	0	0
21	Filling vessels for liquid petroleum gas, compressed and liquefied natural gas	3	1
22	Trade in motor fuels and other fuels on petrol stations	49	48
23	Trade in fuels meant for vessels	0	0
24	Biofuels production	0	0
25	Bio liquids production	0	0
26	Blending biofuels with fuels of oil origin	0	0
27	Blending bioliquids with fuels of oil origin	0	0
28	Hydrogen production	0	0
	Total	**115**	**87**

The updated register of licensed energy entities for each energy activity is available on the Agency's website (www.aers.rs).

7.2.2 Price regulation

In June 2022, in the field of price regulation, the Council of the Agency amended Methodology for Setting Electricity Guaranteed Supply Price in order to harmonise it with the Law by the introduction of new terms such as the prosumer, among other things.

In December 2022, the Agency Council amended all three methodologies which established regulated prices in the electricity field in line with the Law: Methodology for Setting Electricity Transmission Use-of-System Charge, Methodology for Setting Electricity Distribution Use-of-System Charge and Methodology for Setting Guaranteed

Electricity Supply Price. These amendments to methodologies were published in December 2022 in the Official Gazette of RS, No. 141/22.

In addition, in July 2022, the Agency Council amended methodologies which set regulated prices in the field of natural gas in line with the Law: Methodology for Setting Natural Gas Transmission Use-of-System Charge, Methodology for Setting Natural Gas Distribution Use-of-System Charge and Methodology for Setting Natural Gas Public Supply Price in order to harmonise them with the decree regulating conditions for natural gas delivery and supply. The amendments to methodologies were published in July 2022 in the Official Gazette of RS, No. 78/22.

In September 2022, the Agency Council amended the Methodology for Setting Price of Access to Natural Gas Storage which was amended in September 2022 and published in the Official Gazette of RS, No. 108/22.

In December 2022, by the decision of the Agency Council, the Methodology for Setting Costs of Connection to the Natural Gas Transmission and Distribution System was amended. This amendment to the methodology was published in December 2022 in the Official Gazette of RS, No. 140/22.

In October 2021, in line with new jurisdiction established by the Law on Use of Renewable Energy Sources ("Official Gazette of RS", No. 41/21), the Council of the Agency adopted Methodology for Setting Maximum Purchase Electricity Price and Methodology for Setting Maximum Feed-in Tariff for Electricity. The adoption of the given methodologies created bases for the application of this law and the launch of auctions for electricity produced from renewable energy sources.

In addition, in November 2021, in line with new jurisdiction prescribed by the Law on Energy Efficiency and Rational Use of Energy ("Official Gazette of RS", No. 41/21), the Council of the Agency adopted the Methodology for Setting Market Premia and Methodology for Setting Feed-in Tariff. These methodologies are applied to electricity producers in highly efficient cogeneration, small cogeneration and micro-cogeneration units.

Based on methodologies which were adopted and on the Decree of the Government of the Republic of Serbia on Quota in Market Premia System for Wind Power Plants, in December 2022, the Council of the Agency adopted a decision on setting maximum purchase price for the purpose of auctions for electricity from wind power plants. Maximum purchase price for electricity produced in wind power plants with approved capacity exceeding 3 MW amounts to 5.568 €c/kWh.

In January 2022, the Council of the Agency adopted a Methodology for Setting Prices of Ancillary Services and Prices of Capacity Reserve for System Services of Secondary and Tertiary Control. Upon this, in line with the Methodology, in February 2022, the Council adopted decision on prices of system and ancillary services within the power system for 2022. In addition, in December 2022, the Agency Council adopted a decision on prices of system and ancillary services in the power system for 2023. By these decisions, the Agency set the prices of capacity reservation for system services of secondary and tertiary control which are necessary so as to secure safe, reliable and stable operation of the power system, i.e. for the ability to regulate frequency and exchange capacity. The Agency also set the prices of ancillary services related to voltage regulation, i.e. reactive power and prices of unit running from black start.

In December 2022, the Agency Council also adopted reports on necessity of regulation of price of capacity reserve for system services of secondary and tertiary control, necessity of a follow-up of electricity supply of the last resort and necessity of electricity price regulation for guaranteed supply.

In 2022, the Council of the Agency approved the following decisions on prices:

- In the field of electricity:
  - Approval of decision on regulated price of electricity for guaranteed supply to PE EPS Beograd in July 2022 and in November 2022 whereby the electricity price for guaranteed supply was increased for the second time by 8%;

    Acts on prices and approvals of the Agency were published in the "Official Gazette of the Republic of Serbia" while their application was postponed for September 10, 2022, i.e. January 1, 2023.
- In the field of natural gas:
  - Approval of decisions on natural gas public supply for all 31 public suppliers in July 2022 and in November 2022;
  - Acts on prices and approval of the Agency are published in the "Official Gazette of the Republic of Serbia" while the application of these prices started as of August 1, 2022, i.e. of January 1, 2023;
  - Approval of decisions on natural gas distribution use-of-system charges for all 31 natural gas distributers in August 2022;
  - Approval of decision on natural gas transmission use-of-system charge of the transmission system operator *Transportgas Srbija* LLC Novi Sad in July 2022;
  - Approval of decision on natural gas transmission use-of-system charge of the transmission system operator Yugorosgaz-Transport LLC Nis in August 2022;
  - Approval of decision on the level of connection costs of the following distribution system operators:

- Sigas LLC Pozega, Sombor – Gas LLC Sombor, PE Srem-Gas Sremska Mitrovica and PE Vrbas-Bas Vrbas in March 2022;
- Interklima LLC Vrnjacka banja, PE Komunalac Novi Becej, Loznica-gas LLC Loznica and YUGOROSGAZ JSC Beograd in April 2022;
- PE Gas – Temerin, PE Graditelj Srbobran and Beogas LLC Beograd in May 2022;
- PE Standard Ada in June 2022;
- PE Drugi Oktobar Vrsac and PE 7.oktobar Novi Knezevac in July 2022;
- Gas Becej LLC Becej and Novi Sad – Gas Novi Sad in September 2022;
- PE Gas Ruma in November 2022.

- In line with the jurisdiction, in July 2022, the Council of the Agency adopted a legal act confirming that charges for long-term capacity and initial prices of capacity products of *Gastrans* LLC were set in line with the act on exemption and the Tariff Methodology for Setting Tariffs for Natural Gas Transmission Service of *Gastrans* LLC.
- Approval of prices of non-standard services which are performed by system operators and which are also available on the Agency website, i.e.:
- Prices of non-standard services of the natural gas distribution system operator – PE Ingas, Indjija (approval given on 14/01/2021);
- Prices of non-standard services of the natural gas distribution system operator – Sombor-gas LLC Sombor (approval given on 18/03/2021).

In April 2021, the Council of the Agency adopted a Decision on Method, Procedure and Deadline for Keeping Bookkeeping Registry for the purpose of regulation and realization of unbundling accounts for different activities.

This Decision defines in more detail the method, procedure and deadlines for keeping business books as bookkeeping registries for the purpose of regulation, of the realization of unbundling accounts of energy entities for different activities and it sets the type of data and documentation necessary for the work and for the observation of efficiency of accounts unbundling by the Agency, in line with the Law.

Permanent activities of the Agency related to price regulation include:

- Provision of professional assistance to energy entities as regards the enforcement of methodologies for setting prices and monitoring their adequate implementation;
- Monitoring the enforcement of methodologies for setting costs of connection to electricity transmission and distribution system, i.e. to natural gas transmission and distribution and deciding upon customers' appeals which provides adequate level of customer protection and directly contributes to appropriate implementation of methodologies in practice;
- Provision of professional support to energy entities as regards unbundling their funds and costs into different activities, as well as the control over unbundling;
- Monitoring and analysis of data submitted by energy entities as regards realised costs and regulated prices;
- Half-yearly monitoring and comparison of actual electricity and natural gas prices in the region and in Europe and
- Analysis of solutions and solution proposals as regards price regulation and drafting amendments and improvement of existing legislation.

7.2.3 Monitoring electricity and natural gas market

So as to create conditions for proper market functioning, the Law stipulates the adoption, i.e. harmonisation with the new Law of all the rules prescribed by the Law. In 2012, the Agency Council adopted Rules on Supplier Switching ("Official Gazette of RS", No. 93/12). In 2015, the Council adopted new Rules in order to harmonised them with the 2014 Law and the Rules were amended in 2017 ("Official Gazette of RS", No. 65/15 and 10/17).

In late 2013, the Agency Council adopted the Rules for Monitoring Technical and Commercial Indicators and Regulation of Quality of Electricity Supply. In 2022, the Council took care of their implementation.

In March 2016, the Council adopted the Rulebook on Method of Procedure and Imposing Measures and Keeping Registry of Imposed Measures which is applied to those market players who do not comply with their obligations prescribed by the Law.

In July 2016, the Agency Council adopted a Decision on Procedure of Exercising Right of Final Customer to Access Data on One's Own Electricity and Natural Gas Consumption.

Acting in line with the jurisdiction prescribed by the Law on Amendments to Energy Law from April 2021, within the legal deadline, in June 2021, the Council of the Agency adopted 8 instructions for drafting network codes in the fields

of electricity (3) and natural gas (5). These instructions provide guidelines to system operators for the preparation of bases for drafting "network codes" which regulate the connection to the electricity transmission and distribution system in the electricity field and capacity allocation, congestion management, interoperability, setting transmission use-of-system charges structure and transmission system balancing in the field of natural gas, i.e.:

- Instruction for drafting network code related to connection of production units to the network;
- Instruction for drafting network code related to connection of customers' facilities to the network;
- Instruction for drafting network code for connection of high voltage direct current systems to the network;
- Instruction for drafting network code on harmonised natural gas transmission use-of-system charges;
- Instruction for drafting network code on natural gas transmission capacity calculation and allocation;
- Instruction for drafting network code on procedure for congestion management and publication of technical data and other data and pieces of information for the access to the natural gas transmission system;
- Instruction for drafting network code on cooperation between operators of connected transmission systems and rules on data exchange;
- Instruction for drafting network code on rules for natural gas balancing in transmission.

In August and September 2021, the Council of the Agency approved the text of all 8 network codes which were prepared by system operators in line with given instructions which confirmed the compliance of the Adapted Texts of Electricity and Natural Gas Network Codes for the purpose of adoption of legal acts of network codes which are adopted by the Government upon the proposal of the Ministry of Mining and Energy in line with the Law. In September and October 2022, the Government of the Republic of Serbia adopted all eight network codes in the fields of electricity and natural gas.

In October 2021, the Council of the Agency adopted Rules on Prevention of Abuse in Electricity and Natural Gas Markets (REMIT Rules). These rules specify conditions for the registration of wholesale electricity and natural gas markets participants in line with obligations of the Republic of Serbia assumed by ratified international treaties and the law regulating the energy field (the so-called light REMIT). In March 2022, the Agency Council adopted Instruction for Registration Procedure, Keeping Registry and Wholesale Market Players Monitoring.

In line with REMIT rules and this Instruction, as of April 1, 2022, the Agency initiated the registration of wholesale electricity and natural gas market players. Acting upon submitted registration applications of players intending to perform wholesale transactions by placing trading orders, by the end of 2022, the Agency registered 42 electricity and natural gas wholesale market players in Serbia. The registry of all wholesale market players who applied is available on the website of the Agency as well as all necessary information relevant for monitoring their behaviour in the market as well as formats which are used by players for filing the application, format for notification of misuse in the market and the notification on the delay in the publication of insider information which are published in line with the commitments arising from ratified international treaties (Law on Establishing Energy Community).

The remaining rules are adopted by energy companies, upon the Agency's approval.

In November 2022, the Council of the Agency approved the following rules:

- Rules for Transmission Capacity Allocation between Trading Zones of the Republic of Serbia and Hungary (Rules for Long-Term Transmission Capacity Allocation on Border between Trading Zones of *EMS* JSC Belgrade and *MAVIR ZRt* for 2022 – Rules for Long-Term Capacity Allocation; Rules for Daily Auctions for Transmission Capacity Allocation on the Border between Trading Zones of *EMS* JSC Beograd end *MAVIR ZRt* for 2022 – Rules for Daily Auctions and Rules for Intraday Transmission Capacity Allocation on Border between Trading Zones of *MAVIR ZRt* and *EMS* JSC Belgrade – Rules for Intraday Auctions);
- Rules for Transmission Capacity Allocation between Trading Zones of the Republic of Serbia and Romania (Rules for Annual and Monthly Transmission Capacity Allocation on Border between Trading Zones *C.N.T.E.E TRANSELECTRICA S.A*. and *EMS* JSC Belgrade for 2022; Rules for Daily Auctions for Interzonal Capacity Allocation on Border between Trading Zones of *EMS* JSC Belgrade and *C.N.T.E.E. TRANSELECTRICA S.A.* for 2022 and Rules for Intraday Transmission Capacity Allocation on Border between Trading Zones *C.N.T.E.E. TRANSELECTRICA S.A*. and *EMS* JSC Belgrade for 2022);
- Rules for Transmission Capacity Allocation between Trading Zones of the Republic of Serbia and the Republic of North Macedonia (Rules for Annual and Monthly Auctions for Transmission Capacity Allocation on Border between Trading Zones of *EMS* JSC Belgrade and *AD MEPSO* for 2022; Rules for Daily Auctions for Transmission Capacity Allocation on Border between Trading Zone of *EMS* JSC Belgrade and *AD MEPSO* for 2022 and Rules for Intraday Transmission Capacity Allocation on Border between Trading Zones of *EMS* JSC Belgrade and *AD MEPSO* for 2022) and
- Rules for Transmission Capacity Allocation between Trading Zones of the Republic of Serbia and Montenegro, Rules for Daily Auctions for Transmission Capacity Allocation on Border between Trading Zones of *EMS* JSC Belgrade and *Crnogorskog elektroprenosnog sistema AD – Podgorica ("CGES")* and Rules for Intraday Transmission Capacity Allocation on Border between Trading Zones of *Crnogorskog elektroprenosnog sistema AD – Podgorica ("CGES")* and *EMS* JSC Belgrade.

In addition, in June 2022, the Agency Council adopted the Report on the Assessment of Compliance with Prescribed Conditions for Nomination of SEEPEX JSC as an independent organized electricity market operator in the Republic of Serbia (NEMO) which is a condition for NEMO appointment by the Government of RS in line with the Law.

In 2022, the Agency monitored the enforcement of formerly adopted rules by analysing needs and initiatives for amendments of these rules also by participating in the work of commissions appointed to monitor their enforcement.

As an observer, one representative of the Agency participates in all the commissions which have been established so far.

In 2022, the Agency Council approved the following acts:

- Electricity Market Network Code of EMS JSC in December 2022;
- Decision on Amendments to Rules on Publication of Key Market Data of EMS JSC in March 2022;
- Transmission System Development Plan for 2021-2030 and Transmission System Investment Plan for 2021-2030 of EMS JSC in March 2022;
- Transmission System Investment Plan for 2022-2024 of EMS JSC in December 2022;
- Distribution System Investment Plan for 2022-2024 of "Elektrodistribucija Srbije" LLC Beograd in December 2022;
- Development Plan with Natural Gas Distribution System Investment Plan of DSO "INTERKLIMA" Vrnjacka Banja for 2022-2026 in April 2022;
- Natural Gas Distribution System Development Plan with Investment Plan for 2022-2026 of the Limited Liability Company "Sombor-Gas" in June 2022;
- Plan for Transfer of Metering-Regulation Stations and Gas Connections in Customers' Facilities for 2022-2026 of PE Graditelj, Srbobran, Plan for Transfer of Metering-Regulation Stations within the Distribution System for 2022-2026 of PE Polet Plandiste and Plan for Transfer of Metering-Regulation Stations within the Distribution System for 2022-2026 of PE Ingas Indjija in June 2022;
- Plan for Transfer of Metering Devices within the Distribution System of PE Gas Temerin, Plan for Transfer of Metering Devices and Metering – Regulation Stations within the Distribution System of PE Kovin – Gas, Kovin, Gas Becej LLC, PE Coka and PE Gas Ruma in July 2022;
- Natural Gas Distribution System Development Plan with Investment Plan of Public and Utility Company "7.oktobar" Novi Knezevac for 2022-2026 in July 2020;
- Natural Gas Distribution System Development Plan with Investment Plan of Public and Utility Company "Standard" Ada for 2022-2026 in September 2022;
- Transmission System Development Plan of Yugorosgaz-Transport LLC Nis for 2021-2030 in July 2022.

Programmes for non-discriminatory treatment, which, in line with the law, distribution system operators which are a part of a vertically integrated company are supposed to adopt are important for energy market monitoring. These programmes are approved by the Agency. In June 2016, the Council of the Agency approved the Compliance Programme for Non-Discriminatory Behaviour of Distribution System *EPS Distribucija* LLC Belgrade. The Council also approved conditions for the appointment and duration of term of the distribution system operator compliance officer. In July 2017, the Agency Council approved the Annual Report on Implementation of Compliance Programme for Non-Discrimination Behaviour for 2016 which was submitted by the compliance officer. By the decision of September 2019, the Agency Council did not approve the Annual Report on Implementation of Compliance Programme for Non-Discrimination Behaviour for 2018. At the end of 2020, the Government of the Republic of Serbia started activities in order to perform adequate unbundling of the distribution system operator from the vertically integrated company PE *EPS* (separation of *Elektrodistribucija Srbija d.o.o. Belgrade*) which was finalized in early 2021. In January 2021, the Council of the Agency adopted a decision on the disapproval of the Annual Report on Non-Discriminatory Compliance Programme for 2019. In October 2021, the Council adopted a Justified Opinion on Annual Report on Compliance Program Implementation for 2020 where the deficiencies in terms of unbundling within the given period were indicated, too.

In February 2022, the Agency Council approved the new Compliance Programme for Provision of Non-Discriminatory Behaviour of the Electricity Distribution System Operator which was adopted by "Elektrodistribucija Srbije" LLC Beograd following the completion of reorganization. In addition, in June 2022, the Agency Council approved the conditions for the appointment of the Compliance Officers. The Agency also gave prior consent to the appointment of the Compliance Officer within the "Elektrodistribucija Srbije" LLC Beograd.

Acting upon the request of the company *GASTRANS* LLC Novi Sad in March 2019, the Agency Council adopted a Final Decision on New Natural Gas Interconnector Exemption which enabled exemption to the company *GASTRANS* LLC from the obligation of ownership unbundling, third party access rules and application of regulated natural gas transmission prices for 20 years. In March 2019, the Agency also approved the following legal acts in order to implement the mandatory long-term transmission capacity allocation:

- Tariff Methodology for Calculation of Natural gas Transmission Use-of-System Charges;

- Model of long-term contract on natural gas transmission which is concluded between *GASTRANS* LLC and participants of mandatory phase of long-term capacity allocation for which there is an exemption from third party access approved;
- Non-Discrimination Behaviour Compliance Programme of *GASTRANS* LLC;
- Decision on Conditions for Appointment of the Non-Discrimination Behaviour Compliance Programme Officer and
- Act on Appointment of Non-Discrimination Behaviour Compliance Programme Officer.

Following this, as early as in February 2020, the Agency certified *Gastrans d.o.o.* as a project company since at that moment the construction of the gas interconnector was ongoing. An obligation was prescribed to *Gastrans* to submit evidence on the compliance of all the requirements for independent and non-discriminatory performance of natural gas transmission to the Agency following the expiration of the prescribed deadline and once the commercial operation begins. Within the deadline set in the Certification Act, Gastrans submitted evidence to the Agency based on which the Agency adopted a decision in 2022 on confirming that Gastrans LLC complied with all the conditions set by the Agency within the Certification Act which was adopted in February 2020.

In May 2020, the Agency approved Transmission Network Code of *Gastrans d.o.o*.

In December 2020, the Agency issued a licence for natural gas transmission and transmission system operation to *Gastrans* company. During the same month, the Agency approved transmission system use-of-system charges of *Gastrans d.o.o.*

7.2.4 Deciding upon appeals

Pursuant to the Law, deciding upon appeals (second instance administrative procedure) which is performed as entrusted activities includes deciding upon the following appeals against:

- operator's acts which represents a decision upon an application for connection to the system, i.e. upon appeals filed when the system operator does not adopt a decision upon application for connection to the system in line with the timeframe prescribed by the Law;
- operator's acts on dismissal of access to the system, i.e. appeals filed due to failure to act upon filed request for access to the system within the timeframe prescribed by the Law and
- acts of energy entities dealing in oil transport through oil pipelines or energy entity dealing in oil derivatives transport through product lines on dismissal of access to the system as well as appeals filed due to failure to settle a request for access to the system within the timeframe prescribed by the Law.

Within the procedure of deciding upon appeals of customers, i.e. system users, the Agency tends to provide the protection of their rights via the provision of legality of decisions adopted by system operators.

In 2022, there were 363 files submitted and they mainly dealt with the activities and behaviour of energy entities in different areas of their operations. 255 of them are appeals settled by the Agency in the administrative procedure as entrusted activities, while 108 of them are different petitions and complaints submitted by natural and legal persons or requests related to the issuance of opinion on the enforcement of regulations within the competence of the Agency.

The Agency processed all the submitted complaints and submitted responses to the applicants while forwarding the issues to responsible state bodies for further procedure, when necessary.

As far as the appeals for which the Agency is responsible within the second instance procedure are concerned, all 255 appeals submitted for reasons stipulated by the Law were processed in 2022. The appeals were submitted:

- against failure of a responsible energy entity within the first instance procedure upon application on connection of the facility of the customer or producer to electricity or natural gas distribution system (the so called "administrative silence");
- against decision of electricity or natural gas distribution system operator dismissing application on connection to the system and
- against electricity distribution system operator's decision approving connection to the system, but customers complain against connection costs, technical conditions for connection, or against procedural decision of energy entities dealing in electricity distribution on suspension of procedure or dismissal of application.

245 appeals in total were filed against decisions of electricity distribution system operators, while there were 10 appeals filed against a decision adopted by natural gas distribution system operator.

So as to reduce the number of appeals and harmonise the practice of electricity distribution system operator in procedures implying applications on connection of facilities of both legal and natural persons to the power grid, the Agency made an analysis of all appeals submitted to it and of the most common reasons for annulment of decisions on connection within the procedure related to the appeal. In 2022, so as to reduce the number of unlawful decisions adopted by electricity distribution company, the Agency indicated the most common breaches of procedural and material regulations which lead to adoption of unlawful decisions and stressed legally binding commitments of energy

entities within connection procedure. In 2022, there were 255 appeals which is slightly fewer than in 2021 (251) but the Agency will continue working with experts employed with electricity and natural gas distribution operators and who decide on applications on connection to the system will be continued in the years to come.

Since the establishment of the Agency, with 2022 inclusive, there were 109 appeals to the Administrative Court of the Republic of Serbia against the decisions of the Agency within the second-instance procedure (Table 7-2):

Table 7-2: Number of appeals submitted to the Supreme/Administrative Court of RS against the Agency's decisions adopted within the second-instance procedure 2008-2022

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Number	4	2	9	12	7	4	8	7	6	11	5	14	7	5	8	109

In 2021, a dispute was initiated at the Trade Court in Belgrade against the Agency as the Defendant 2 (Defendant 1 is the Ministry of Mining and Energy) upon a complaint for indemnity due to licence withdrawal which is being processed.

7.2.5 International activities

Pursuant to the Energy Law, ratified international agreements and Council decisions, the Energy Agency of the Republic of Serbia cooperates with regulatory authorities from other countries, as well as with other international bodies and organisations.

7.2.5.1 The Athens process and the Energy Community Regulatory Board (ECRB)

Signing and ratifying the "Treaty establishing the Energy Community" on October 25, 2005 in Athens which entered into force on 01/07/2006, the Southeast Europe countries (and UNMIK for APKM) and the EU initiated the process of creation of the Energy Community aiming at the expansion of the common EU energy market to the Southeast Europe region. The Treaty was signed for a period of 10 years, while the Ministerial Council decision of 24/10/2013 extended its validity period until 2026. In addition, based on Ministerial Council decisions, via the implementation of the Third Energy Package in the Energy Law, certain competences of the Energy Community Secretariat were introduced in the regulation of the national energy sector.

The Treaty establishing the Energy Community also defined the institutional framework for Energy Community functioning: Ministerial Council, Permanent High Level Group, Energy Community Regulatory Board, Energy Community Secretariat, Electricity Forum and Gas Forum. Subsequently, Oil Forum (2008), Legal Forum (2017), Sustainable Development Forum (2017) and Dispute Settlement Forum (2018) were founded.

Figure 7-1: Energy Community institutions

Pursuant to the commitments arising from the Treaty establishing the Energy Community, the Energy Agency of the Republic of Serbia participates actively in the work of Energy Community institutions[20], at the same time taking into account customer interests protection, as well as the position and goals of both power and gas economy of the Republic of Serbia. Cooperation is developed in coordination with state bodies within the competence of the Energy Agency of the Republic of Serbia defined by the Law. The Energy Agency of the Republic of Serbia participates in the work of the Energy Community Regulatory Board (which is an advisory body to the Energy Community Ministerial Council with possible executive functions), as well as of the Electricity Forum and Gas Forum.

The Energy Agency of the Republic of Serbia has considerably contributed to the development of organisation and procedures for the functioning of regional and Pan-European electricity and natural gas markets through an active participation in the work of Energy Community institutions and their expert teams. A representative of the Energy Agency of the Republic of Serbia was the chairman of the Energy Community Regulatory Board Working Group for Electricity (ECRB EWG) 2007-2018, while several representatives of the Energy Agency of the Republic of Serbia chair some ECRB sub-groups. The efficiency of the work of these bodies could be improved by more prompt preparation and more timely submission of material for their sessions.

[20] Costs of participation of Agency representatives within the Energy Community institutions are compensated by the Energy Community Secretariat

In 2022, the Energy Agency of the Republic of Serbia participated in the following activities of the Energy Community Regulatory Board (ECRB):

Strategic and joint activities

- Issuance of opinion on Preliminary Decisions on Transmission System Operators Certification in line with Article 9 of the Energy Community Ministerial Council Decision D/2011/02/MC-EnC on Implementation of Third Energy Package of Regulations on Internal Energy Market in the European Union;
- cooperation with associations of regulatory bodies in the energy field - Agency for Cooperation of Energy Regulators - ACER, Council of European Energy Regulators - CEER, Energy Regulators Regional Association – ERRA and Mediterranean Regulators – MedReg.

Electricity (Electricity Working Group)

The ECRB Electricity Working Group monitors activities on integration of electricity market in southeastern Europe and its functional integration into Pan-European electricity market. An integral part of this activity includes: regular monitoring of current affairs and processes related to electricity market integration in the EU; common workshops for ACER And ECRB on the EU CACM and FCA Regulation; harmonised regulatory survey of rules of the Coordinated Auction Office for Cross-Border Transmission Capacity Allocation on Interconnectors (SEE CAO) and preparation of joint draft rules for the adoption within ECRB; method of appointment of Nominated Electricity Market Operator in Contracting Parties as Precondition for Electricity Market Coupling of Contracting Parties with the EU Markets – SDAC (Single Day-Ahead Coupling) within "early" implementation of the EU Regulation 1222/2015 in the Energy Community Contracting Parties which were drafted by the Energy Community Secretariat with cooperation with the European Commission and ACER.

- In 2022, the ECRB Electricity Working Group observed regularly activities of Contracting Parties on the manner of application of recommendations for the appointment of a Nominated Electricity Market Operator (NEMO) within the Energy Community Contracting Parties were observed regularly within early implementation of Regulation 1222/2015 (CACM), which were drafted by the Energy Community Secretariat's ECRB Section. In line with the Law on Amendments to the Energy Law, the Agency participated in the process of drafting Regulation on Organised Electricity Market Coupling which transposed necessary provisions of the Regulation 1222/2015 EU in order to provide for market coupling and appointment of NEMO in the Republic of Serbia. With reference to this, the Government of the Republic of Serbia adopted a Decree on Coupling Organised Day-Ahead and Intraday Electricity Markets on 20/01/2022. On 16/06/2022, the Government adopted a Decision on Appointment of Nominated Electricity Market Operator (NEMO).

In 2022, the ECRB Electricity Working Group observed the activities of the Energy Community Secretariat which made a draft of adapted versions of directives and regulations (network codes) of the EU for Energy Community Contracting Parties together with the European Commission and ACER aiming at market coupling with neighbouring markets – the role and competence of the European Commission was replaced by the Energy Community Secretariat and the competences of the ACER were expanded to the Energy Community Contracting Parties by the adoption of a separate Procedural Act without amendments to the Treaty establishing the Energy Community. With reference to this, a technical meeting was held on the implementation of the Clean Energy Package in the Energy Community Contracting Parties on 05/05/2022 virtually where a draft of the Procedural Act on Energy Community regional market integration was presented as well as six drafts of adapted network codes in the electricity field. By the decisions of the Energy Community Ministerial Council 2021/13/MC-EnC of 30/112022 and 2022/03/MC-EnC of 15/12/2022, the EU regulations in the electricity field were adapted and this created an obligation for the Republic of Serbia to transpose those regulations into the national legislation by the end of 2023. The adoption of adapted EU directives and regulations, especially of those representing the so-called network codes which are important for electricity market functioning and for the operational work of Energy Community power systems is aimed at the creation of conditions for a more accelerated integration of electricity market in the Western Balkans into a common Pan-European European Union electricity market and the harmonisation of procedures in the field of system operation and balancing. This regulatory package in which is adapted by the Energy Community as of December 2022 includes: Procedural Act on Regional Market Integration 2022/PA/01/MC; Directive (EU) 2019/944 on Common Rules for Internal Electricity Market; Regulation (EU) 943/2019 on Electricity; Regulation on ACER 942/2019; Regulation (EU) 2019/941 on Risk Preparedness in the Electricity Sector; Regulation/Network Code (EU) 2016/1719 (FCA) on Capacity Allocation; Regulation/Network Code (EU) 2015/1222 (CACM) on Capacity Allocation and Congestion Management; Regulation/Guidelines (EU) 2017/2195 (GLEB) for Balancing; Regulation/Guidelines (EU) 2017/1485 (SOGL) on Transmission System Operation; Regulation/Network Code (EU) 2017/2196 on Emergencies and Transmission System Reestablishment. The Electricity Working Group meetings and workshops were organized both alive and virtually via internet application Webex and organized by the Energy Community Secretariat.

- On June 1-2, 2022, the Energy Community Secretariat organised a 27th Electricity Forum in Athens which was focussed on the following topics: The growth of wholesale electricity prices and the effect on electricity sector decarbonisation; How to accelerate energy transition in a most cost-reflective manner;

Synchronisation of Ukraine and Moldova – heading towards market integration; Impact of market development on the integration of renewable energy sources and flexibility demand. There were panel discussions organised on the following topics: synchronisation of Ukraine and Moldova with the continental Europe; support to investments into renewable sources in the Energy Community; acceleration of decarbonisation or return to regulation as a response against the energy crisis; Contracting Parties electricity market coupling within a common European market; integration of a great number of renewable energy sources with a question whether the transmission network is prepared for that.

- A joint workshop on support mechanisms for the integration of renewable energy sources and mechanisms for flexibility and innovative technologies was organised by the Energy Community Secretariat and the Mediterranean Regulatory Association (MEDREG) on October 18, 2022 in Lisbon. During the workshop, experience was exchanged among regulatory authorities of the Energy Community (ECRB) and of the Mediterranean countries (MEDREG). The workshop was organised within two sessions: Integration of renewable sources and support mechanisms and Mechanisms for electricity market flexibility as the support to integration of renewable energy sources.
- The traditional joint ECRB and ACER workshop on market issues was not organised in 2022 since ACER was busy with internal affairs and it was agreed that it would be held in 2023 and to dedicate it to the transition of the Regulations CACM and FCA into the Energy Community after their adoption on the Ministerial Council meeting on 15/12/2022;
- Within the working sub-group which addresses the integration of renewable energy sources and flexibility, a draft of the report on the development of the regulatory framework for renewable sources and flexibility based on questionnaires completed by the Contracting Parties was drafted in 2022.
- Within the working subgroup which addresses the assessment of the status of the implementation of Guidelines for Transmission System Operation in the Energy Community Contracting Parties, in 2022, a draft of the report was drafted. The draft presents a review of the transmission system network code of each Contracting Party and it identifies the provisions from the System Operation Guidelines (SOGL) which were voluntarily applied in the Transmission Network Code of each Contracting Party and based on the questionnaire which was based on Transmission System Operation Guidelines (SOGL) and based on which comparison was made with the provisions of the Transmission System Network Code of the Energy Community Contracting Parties.
- Within the working subgroup addressing the assessment of the regulatory legal framework for the regulation of voltage and reactive capacity management which are performed by the TSOs in the Energy Community Contracting Parties, in 2022, a draft of a report was made in order to check whether there is a regulatory framework for that. The draft was based on the questionnaire which was focussed on system services (voltage regulation and reactive capacity), regulatory framework and investments which were approved by regulatory authorities in order to eliminate these problems.
- Within the working group for the wholesale market integration, in 2022, a report was drafted on the assessment of intraday electricity markets including the cross-border balancing, based on a questionnaire completed by the Contracting Parties.

Within the working subgroup for monitoring cross-border electricity trade in the southeastern Europe, in line with the ECRB Guidelines for market monitoring in the southeastern Europe by using the data base for market monitoring and web interface platform (SEEAMMS) the administration of which is organised under the rotation regime among working group members. The Agency played the role of the administrator in May 2022.

- In 2022, instead of the report on the compliance of Contracting Parties with requirements arising from the EU Regulation on Transparency 543/2013, the ECRB Electricity Working Group observed the level of transparency reached by Energy Community Contracting Parties via the Energy Community Secretariat website where the data related to the publication of data on the ENTSO-E (EMFIP) transparency platform are continually updated;
- A report on electricity wholesale market monitoring used to be drafted in line with the EU practice (use of ACER indicators for the assessment of the situation in the electricity wholesale market) in the previous years by the Working Group. However, it was not drafted for 2021-2022 within the Annex to the ACER report since ACER decided not to publish the annual report on market monitoring the the former format and content for this period. Instead, due to the crisis caused by Covid-19 and high electricity prices due to enormous growth of natural gas prices, ACER decided to draft a report where they indicated a specific assessment of the market related to the crisis caused by high prices and the general situation in the EU markets. Still, the Working Group continued collecting the data for 2021-2022 in order to archive them until a moment comes for the ACER to decide to make a report for 2022.
- In April 2022, the Electricity Working Group drafted an updated report on impacts of high wholesale prices on national markets and measures taken in the Energy Community Contracting Parties. Contracting Parties National Regulatory Authorities participated in the drafting process without prior approval of the ECRB with an intention to update and publish such a report regularly in order to provide

timely information flow for market participants on the situation in the electricity market in the Energy Community.

- with an intention to have such a concept published.

Natural gas (Natural Gas Working Group)

- data were collected on natural gas wholesale market monitoring within the Energy Community for 2022 within regular activities of the Working Group on wholesale market monitoring which are organized in line with the Working Plan for 2022;
- in addition, data on wholesale were collected and submitted aiming at the drafting procedure for the ACER wholesale market monitoring report;
- in terms of market rules application monitoring, data were collected and reports were drafted and adopted on the application of the network code on harmonized transmission use-of-system charges and on the capacity allocation;
- data were collected, a report on metan emissions in the Energy Community was drafted and adopted;
- participation in the work of the Gas Regional Initiative South South-East; GRI SS of the European Union with the most significant topics such as diversification of natural gas sources and directions of supply and decarbonisation.

Retail Electricity and Natural Gas Market and Customers Protection Working Group

- drafting report on electricity and natural gas retail markets functioning in the Energy Community;
- cooperation was continued with the CEER working group which worked on the preparation of the report on quality of electricity and natural gas delivery and supply which included the survey of achieved commercial quality indicators. The report was completed and published at the end of 2022;
- in 2022, cooperation of working groups for retail market and customers protection within ECRB, CEER and MedReg was continued via the organisation of joint workshop where the issues related to further retail market development, implementation of the Clean Energy Package for All Europeans and energy sector decarbonisation were considered;
- a report was made on the legal aspect of customers protection and
- a report which addressed the methods of communication of national regulators in the Energy Community Contracting Parties with the public was drafted.

REMIT Working Group (EC Regulation on Energy Market Integrity and Transparency)

In 2019, under the auspices of the Energy Community Regulatory Board, a REMIT Working Group was established and it monitors the implementation of the adapted EC Regulation on Energy Market Integrity and Transparency 1227/2011 (hereafter: Regulation). The Group members include the representatives of national regulatory authorities of the Energy Community Contracting Parties. The aim of this Working Group is to give recommendations and monitor the implementation of the adapted Regulation "REMIT" which was adopted by the Ministerial Council Decision on November 29, 2018. The Energy Community Regulatory Board adopted the Procedural Act on the work of the REMIT Working Group on August 7, 2020 where a method of cooperation and coordination of activities of Contracting Parties regulatory authorities within REMIT Regulation implementation was regulated. This Procedural Act established: 1) basis for coordination of Contracting Parties national regulatory authorities in performing their tasks in line with REMIT Regulation; 2) cooperation within the Energy Community Regulatory Board (ECRB) and REMIT Working Group; 3) format used by regulations within the procedure of registration of market participants and registry keeping; 4) basis for activities taken by the ECRB in the REMIT Regulation implementation and 5) obligation to protect the confidentiality of data and information exchanged between national regulatory authorities.

In line with the ECRB decision on the establishment of the REMIT Working Group, the working programme of the Group was presented by the programme of five working subgroups:

- "Regulatory guidance on REMIT" – The objective of this subgroup is to prepare documents that will include clarifications necessary for the implementation of adapted REMIT Regulation within the Energy Community as well as the assessment of options to have the guidelines adopted by the Agency for Cooperation of European Regulators in the EU implemented in the Energy Community.
- "Central Registry" – It is estimated that within this working groups subgroups consider IT and other options for the establishment of the Central Registry of Contracting Parties wholesale markets participants that would be administered by the Energy Community Regulatory Board Section as well as the options to have automatized collection;
- "Inside information platform"– It is envisaged that this subgroup will consider and assess the need to establish a centralised platform for the publication of insider information by wholesale market participants since the implementation of REMIT Regulation requires that such information are published in a timely and effective

manner; “Implementation of REMIT” – it is envisaged that in this working subgroup Contracting Parties will exchange experience in the implementation of adapted REMIT Regulation as well as inform regularly the Energy Community Regulatory Board Section on the activities taken by Contracting Parties on the establishment of trust and transparency in the electricity and natural gas market functioning. Within this subgroup, it is envisaged that national regulatory authorities report on the violation of prohibitions established by the REMIT Regulation as well as on procedures launched by the national regulatory authority.

- „Penalty regime“ – It is envisaged that this subgroup should consider the adequacy of the implementation of assumed obligations of the Contracting Parties in terms of penalty methods since REMIT Regulation envisages the obligation of Contracting Parties to make penalties which are imposed to wholesale market players proportional to the damage arising as the consequence of illegal behaviour.
- „Coordination of investigations“ - It is envisaged that this subgroup should consider the cases of breach of REMIT Regulation and exchange experience. Interested Contracting Parties may coordinate investigations within this group in case the breach of REMIT Regulation has a cross-border effect.

  In 2022, 4 meetings of the REMIT Working Group were held in total.

Energy Community Coordination Group for Cyber Security and Critical Infrastructure (CyberCG Coordination Group)

Energy Community Coordination Group for Cybersecurity and Critical Infrastructure has an aim to support and facilitate the cooperation between Energy Community Contracting Parties in the provision of safety during data exchange, i.e. in reaching a high level of security of information systems which serve for data exchange. In line with this, the main task of Cyber CG is to define “critical infrastructure” which represents information infrastructure which is most liable to cyber-attacks. In addition, a sum of most important data which are exchanged and which are of great importance for the energy sector will be defined within this coordination group. The aim is to protect these data.

Within Cyber CG, it is envisaged to work on the following activities:

- Identification of all energy entities which exchange data (transmission system operator, distribution system operator, suppliers, producers, national regulatory authorities, ministries in charge of energy…), identification of data and of critical infrastructure, etc.;
- Definition of strategic guidelines and giving instructions for data protection;
- Exchange of experience between Energy Community Contracting Parties and other interested parties related to data protection during the exchange of them;
- Provision of assistance to Energy Community Contracting Parties in capacity building in terms of provision of data safety and critical infrastructure protection etc.;

Each Energy Community Contracting Party has their representatives within Cyber CG. CyberCG members include: representatives of the ministries in charge of energy and national regulatory bodies of Contracting Parties, of the Energy Community Secretariat, European Commission, European Union Agency for Network and Information Security – ENISA), etc.

One meeting of the CyberCG Coordination groups were held in 2022 where work on the new network code for cyber security in the energy sector which is under preparation was discussed. They also discussed working on amendments of NIS Regulation (*Directive 2016/1148 concerning measures for a high common level of security of network and information systems across the Union*), working on draft of Directive on resistance of critical infrastructure which is being prepared and on obligations of coordination group for the following year.

Infrastructure

The representatives of the Energy Agency of the Republic of Serbia participate in the activities of working groups for Project of Common Interest for the Energy Community (PECI/PMI groups for electricity, natural gas and oil) which are established in line with provisions of the decision of the Energy Community Ministerial Council on the adoption of the EU Regulation on TransEuropean Energy Networks[21] (Regulation 347/2013 – the so-called TEN-E Regulation) which is aimed at drafting the list of priority gas and power infrastructure projects (the so-called PECI/PMI list). This list is drafted every second year. The procedure is executed by the Energy Community Secretariat. Following the adoption of the list by the Ministerial Council, these projects are qualified for benefits in terms of permit issuance, as well as for regulatory and financial incentives (to the extent to which TEN-E Regulation are transposed into local legislation). The members of the working groups for electricity, natural gas and oil are the representatives of the Energy Community Contracting Parties, representatives of ministries in charge of energy, representatives of the regulatory authorities of the Energy Community Contracting Parties and project promoters (electricity transmission system operators, natural gas transmission systems operators, natural gas storage operators, oil transport systems operators and representatives of smart grid projects).

[21] Decision No. D/2015/09/MC-EnC of 16/10/2016

In 2022, the procedure for drafting PECI/PMI list was not executed in 2021 and, in line with this, meetings of these working groups were not held in 2022. The last procedure was executed in 2020.

The latest adopted PECI/PMI list from 2020[22] in the electricity field includes the project of TransBalkans Corridor – 400 kV interconnector with sections:

- 400 kV interconnector Bajina Bašta (RS) – Višegrad (BiH) – Pljevlja (MNE) (PECI project);
- 400 kV interconnector Pljevlja (MNE) – Lašva (MNE) (PECI project);

In the field of natural gas, the following projects are on the PECI/PMI list for 2020:

- Interconnector Serbia – North Macedonia (PECI Project);
- Interconnector Bulgaria – Serbia (PECI);
- Interconnector Serbia – Croatia (phase 1, PMI Project).

7.2.5.2 Berlin Process – initiative "Western Balkans 6" (WB6)

Activities related to the energy sector regarding financing priority regional infrastructure projects through IPA multi-beneficiary program, as well as the implementation of reform measures (so-called "soft measures") which stimulate the development of the regional electricity market represent a constituent part of the so-called Berlin Process, initiated on the Western Balkans Summit in August 2014. The most important reform targets of this initiative is the integration of daily (spot) electricity markets (the so-called "market coupling"), integration of balancing markets and maximization of benefits of the existing coordinated auction office (transmission capacities on interconnectors) of the southeastern Europe.

Within its jurisdiction, the Energy Agency of the Republic of Serbia contributes to the realization of the activities defined by this initiative such as: functional unbundling of the distribution system operators, certification of transmission system operators, cooperation with the Agency for Cooperation of Energy Regulators (ACER), coupling daily (spot) electricity markets ("market coupling") with neighbouring markets, etc.

In 2022, there were activities of the Programme Steering Committees for Cross-Border Balancing and for Daily Market Integration.

7.2.5.3 CESEC (Central and South Eastern Europe Gas Connectivity) Initiative

CESEC Initiative was launched by a Memorandum of Understanding between signatories from the Western Balkans, Black Sea region and the EU so as to coordinate support to cross-border trans-European gas infrastructure projects (which provide for the diversification of the natural gas supply in the region) and for the harmonisation of the relevant legislation. Since 2017, the field of operation of CESEC initiative was also extended to the field of electricity, energy efficiency and renewable energy sources.

The activities of CESEC are steered by CESEC High Level Group, HLG, which aims at the acceleration of the completion of the projects on the construction of interconnection lines which are facing difficulties in realization, identification and support to the construction of a limited number of infrastructure projects in central and southeastern Europe, identification of obstacles in the realization of these projects (e.g. obstacles of regulatory nature, permit issuance regime, technical and financial obstacles) as well as the realization of the action plan which includes project-specific technical, financial and regulatory measures in order to remove those obstacles.

Within its competence, the Energy Agency of the Republic of Serbia contributes to the realization of the activities defined within this initiative such as: certification of transmission system operator, operationalisation of mechanisms for capacity allocation on interconnection points and congestion management mechanisms, cooperation with the Agency for Cooperation of Energy Regulators (ACER), regional gas market integration, etc.

7.2.5.4 Participation in energy regulators' associations

The Energy Agency of the Republic of Serbia is a member of the Council of European Energy Regulators – CEER – a body with a mission to contribute to the establishment of a unique, competitive and efficient energy market in the European Union via the cooperation between independent energy regulators. The CEER General Assembly accepted the Energy Agency of the Republic of Serbia as an Observer within this body on the session held on December 12, 2018 in Brussels.

The Energy Agency of the Republic of Serbia is a full member of ERRA (Energy Regulators Regional Association), an expert association of regulators aiming at the improvement of cooperation, exchange of experience and capacity building in member states. ERRA links the regulators from Southeast and East Europe, from former USSR, NARUC – USA regulators association, as well as the regulators of certain countries in Asia and Africa. So as to build capacity and exchange experience with other national regulatory bodies in several fields of regulation theory and practice (price regulation, competition and energy market, licensing, etc.) and to have insight into options for their implementation in Serbia. In 2022. the representatives of the Energy Agency of the Republic of Serbia participated in the activities of

22 The ruling list of priority infrastructure projects was adopted by the Ministerial Council Decision No. D/2020/04/MC-EnC of 29/12/2020.

ERRA Chairmen Committee, Natural Gas Market and Economic Regulation Committee, Electricity Market and Economic Regulation Committee and Renewable Energy Committee.

The Energy Agency of the Republic of Serbia is a member and one of founders of the Permanent Advisory Forum of National Regulatory Authorities of Balkans Countries (Advisory BAF Forum). The Advisory BAF Forum which includes the Energy and Water Regulatory Commission of the Republic of Bulgaria (EWRC), the Regulatory Authority for Energy of the Republic of Greece (RAE), the Energy Agency of the Republic of Serbia (AERS), the Energy Regulatory Commission of Macedonia (ERC), the Energy Regulatory Agency of Montenegro (REGAGEN), the Albanian Energy Regulatory Authority (ERE) and the Energy Regulatory Commission of the Republic of Srpska (RERS) will via the Board of Regulators or via ad hoc groups, within their jurisdiction, provide a framework for discussions, exchange of experience, and, when possible, for the drafting of common positions and recommendations on regulatory issues in the field of electricity, natural gas, water and waste water markets in the region. In 2022, the electricity working group within BAF was not active.

In 2022, the BAF Working Group for natural gas market liberalization was not active.

Upon the initiative of the Italian regulatory authority ARERA, on December 16, 2022, the Balkan Energy School (BES) was formally established under their leadership. The members of the School are regulatory authorities from the Western Balkans. The Agency holds the status of an Observer.

7.2.5.5 European integration

The representatives of the Energy Agency of the Republic of Serbia participated in the work of the Board for the implementation of the Stabilisation and Association Agreement – sub board for transport, energy, environment protection, climate changes and regional development where they presented the level of implementation of commitments within its competence, related to regulatory issues in the energy sector and regional integration.

The representatives of the Energy Agency of the Republic of Serbia also participated within the subgroup for energy of the Expert group of the coordination body for the preparation and negotiations on Serbia's accession to the European Union (SG 15 – Energy).

8. AGENCY'S FINANCIAL REPORT

Financial operations of the Agency in 2022 were in line with the 2022 financial plan which was approved by the National Assembly ("Official Gazette of RS", No.130 of 29/12/2021).

The plan defines total revenues and expenditures of the Agency and contingency reserves as well as the elements for comprehensive insight into the income and employment policy. In October 2021, in line with the obligations arising from the Energy Law, the Agency submitted its 2022 Financial Plan to the National Assembly for approval and it was approved and adopted in December 2021.

This report illustrates planned and actual utilisation of funds per each purpose from the revenue which, in line with the Energy Law and Financial Plan arises from: the costs for the license issuance, part of use-of-system charge – regulatory fee and financial revenues and other revenues.

Table 8-1: Total Agency's revenues in 2022

RSD

No.	Revenues	Realised 2021	Plan 2022	Realised 2022
1	Revenue from licenses	14,546,588	12,420,281	16,876,924
2	Revenue from regulatory fee	209,417,045	208,836,020	210,593,514
3	Transferred extra revenue from last year	0	12,594,259	0
4	Revenue from grants and reimbursements	0	1,500,000	691,411
5	Financial revenues and other revenues	266,356	260,000	813,983
6	Collected corrected liabilities	12,434,027	0	0
	TOTAL REVENUE	**236,664,016**	**235,610,560**	**228,975,832**

NOTES ON REVENUES:

In 2022, **the revenue from licence fee** was calculated in line with the Decision on Harmonisation of Level of Costs for Energy Licence Issuance ("Official Gazette of RS", No. 97/21 which was applicable as of 23/10/2021) and the Decision on the Level of Costs for Energy Licence Issuance ("Official Gazette of RS" No. 42/22 which was applicable as of 09/04/2022). These Decisions set the level of fee for licence issuance for certain energy activities as well as the level of fee for amendments to the decision on licencing.

The fee covering costs of licence issuance is set upon the moment an application is filed by an energy entity and it covers the whole period of licence validity of 10 years, i.e. 30 years. The fee is charged in advance or at the moment of the application submission.

In line with this, the revenues arising from the fee covering costs of new licence issuance in the amount of RSD 14,145,408 and for amendments to decisions for 2022 amounting to RSD 1,731,516 amounted to the total RSD 16,876,924. There were 131 fees charged upon filed applications for licence issuance or for amendments to formerly issued decisions in the period 01/01-31/12/2022.

In 2022, the revenue arising from fees covering costs of licence issuance was by 16% higher in comparison to the level of realisation in 2021 and by 36% higher in comparison to the planned level. Analysing the trend of revenues on this basis one records the reduction of the number of submitted applications for licence issuance and for amendments of existing decisions in the period 2016-2022, and thereby there was a reduced number of issued licences.

The total revenue arising from licence fee reduced in 2022 in comparison to 2016 by 42%.

The revenue arising from the regulatory fee in 2022, i.e. from the part of tariff for access to and use of electricity and natural gas transmission system amounting to RSD 210,593,514 which amounts to 92% of the total revenue of the Agency (in 2021, it amounted to 88%), i.e. to 92.3% of the total operational revenues in 2022 (in 2021, it amounted to 94%). It is calculated quarterly in line with the Methodology and defined procedures and it depends on the amount of maximum allowed revenue of energy entities and the date when approved energy entities' decisions on transmission and transport fees are enforced.

The calculated level of regulatory fee in 2022 recorded a growth of 1% in comparison to the level in 2021 and the planned level in 2022 (quarterly increase in the absolute amount amounts to RSD 294,117).

The revenues from reimbursements are set to the level of proven costs of business trips abroad and they are reimbursed by the Energy Community Secretariat from Vienna.

Financial revenues amounting to RSD 716,614 account for revenues arising from the a vista interest rate for deposits in the business bank BANCA INTESA JSC which is calculated on monthly level for RSD funds on the Agency account.

Other unoperational and extraordinary revenues amounted to RSD 97,369 in total.

Table 8-2: Total Agency expenditure in 2022

RSD

No.	EXPENDITURE	Realised 2021	Planned 2022	Realised 2022
1	**Material, fuel and energy costs**	**3,800,294**	**4,782,946**	**4,113,573**
1.1	- material (operating cost)	1,820,445	1,921,024	1,606,777
1.2	- fuel and energy	1,979,849	2,861,922	2,506,795
2	**Salaries, allowances and other expenditure**	**164,037,084**	**180,536,760**	**178,214,147**
2.1	- salaries and allowances (gross)	135,598,103	146,840,927	146,924,559
2.2	- levies paid by employer	21,888,752	23,214,460	23,189,596
2.3	- fees in line with other contracts	1,077,407	1,389,659	1,226,421
2.4	- other personal expenditure and fees	5,472,822	9,091,713	6,873,571
3	**Production services**	**26,162,597**	**29,728,852**	**26,727,472**
3.1	- transport	1,532,755	2,242,805	1,621,310
3.2	- maintenance	3,208,866	4,257,063	3,400,038
3.3	- lease	18,080,900	19,401,264	18,556,977
3.4	- marketing and advertising material	239,214	259,457	258,460
3.5	- other services	3,100,862	3,568,263	2,890,686
4	**Depreciation and reserves for unplanned expenditure (IPA PROJECT 2020-2021)**	**6,630,922**	**7,538,853**	**7,217,804**
5	**Non-material expenditure**	**6,286,864**	**7,787,397**	**6,942,827**
5.1	- non-production services	3,594,543	3,043,436	2,978,885
5.2	- costs of representation	391,157	474,978	468,289
5.3	- insurance premium	582,822	2,401,040	1,638,379
5.4	- payment operations	196,252	235,385	235,280
5.5	- membership	888,838	907,200	888,913
5.6	- taxes and fees	633,252	682,046	717,812
5.7	- other non-material expenditure	0	43,312	15,270
	OPERATIONAL EXPENDITURE	**206,917,762**	**235,610,560**	**223,215,822**
6	**Financial expenditure, corrections of liabilities and other expenditure**	**127,028**	**0**	**37,334**
	TOTAL EXPENDITURE	**207,044,789**	**235,610.560**	**223,253,156**
7	**Financial result – extra revenues**	**29,619,227**	**0**	**5,722,676**

NOTE ON EXPENDITURE:

In 2022, total expenditure amounted to RSD 223,253,156 which is in comparison to the total planned expenditure of RSD 235,610,560 lower by RSD 12,357,404 or by 5%.

Total realized expenditure in 2022 was realised in line with the following:

Expenditure arising from material, fuel and energy in 2022 was lower by RSD 669,373, i.e. by 24% in comparison to the planned ones. If analysed, costs fuel and electricity were lower by RSD 355,127 than the planned ones while the costs of office, material, overhead material and other material were lower by RSD 314,246.

Expenditure related to gross salary, employers allowances, contracts on temporary services and other personal expenditure and fees are approximately on the same level as the planned ones. The deviation in the total amount in comparison to the plan amounts to only 1%, i.e. the expenditure was lower by RSD 2,322,613:

- Expenditure related to gross salary and allowances as well as the employer's allowances amounted to RSD 170,114,155 which is 100% realisation of the planned level;
- Allowances for other contracts were lower than the planned ones by RSD 163,238 which amounts to 88% of the planned level.
- Other personal expenditure and allowances were lower than the planned ones by 24%, in total by RSD 2,218,142.

In the group – other personal employee expenditure and allowances (costs of business trips locally and abroad, commuting, assistance and other allowances offered to employees, abundancy funds and jubilee credits), the biggest deviations from the planned level were recorded with costs of accommodation abroad, per diem payments and costs of transport abroad due to a smaller scale of business trips in 2022 than the planned ones.

One of the biggest problems the Agency has been facing for several years is the lack of highly-qualified personnel (in total, 11 employees have left the Agency since its establishment) and slower new employment procedures which are crucial. For certain, this is due to multiannual fairly slow salaries growth in the Agency in comparison to the public and private sector in the energy field. This fact, along with the limited employment procedures, also has a negative effect to the dynamics of activities within the competence of the Agency.

So as to overcome the obstacles due to an increased scope of work and a low number of employees and in order to improve the age structure of staff in 2022, temporary contracts were concluded with 2 highly-educated trainees.

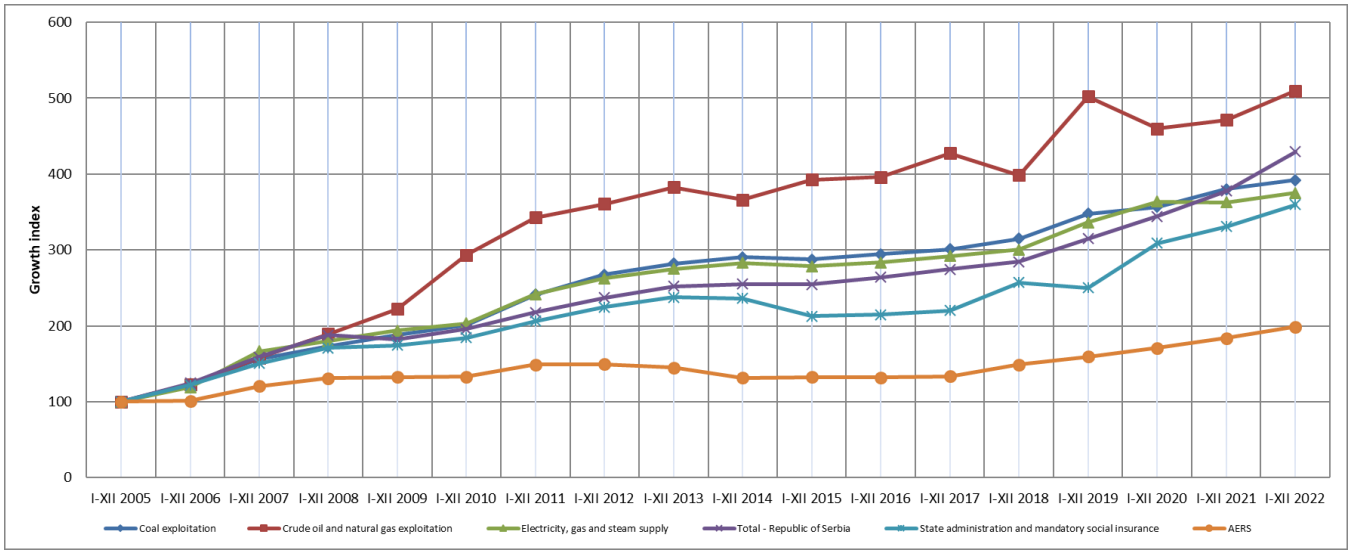

Figure 8-1: Base index of average annual net salary trend 2005.=100

At the end of 2022, there were 48 employees in total in the Agency, members of the Council included. Out of the number, 46 of them are permanently employed. It is expected that the above-mentioned trainees will sign a permanent contract in the beginning of next year.

Table 8-3: Qualification structure of permanent employees

Professional qualification	31/12/2021		Plan 2022		31/12/2022	
	No.	Share in %	No.	Share in %	No.	Share in %
PhD (A Doctor of Philosophy)	5	8.7	4	8.3	4	8.7
Master	1	2.2	1	2.1	1	2.2
BSc/BA (Bachelor of Science/Arts)	36	78.2	38	79.2	36	78.2
College degree	0	0	0	0	0	0
Secondary school degree	4	8.7	4	8.3	4	8.7
Primary school degree	1	2.2	1	2.1	1	2.2
Total	46	100	48	100	46	100

In addition to high qualification structure, there is higher average age of employees in the Agency. Therefore, the length of service on December 31, 2022 for 69.6% of employees amounted to over 20 years. To the extent to which such age structure of employees is expected, bearing in mind highly-specialised activities of the Agency as well as the relevant demand in experience when a vacancy is announced, this age structure also indicates that there is a need to reduce the age level in the future so as to secure the continuity of the Agency operations.

Table 8-4: Structure of employees in terms of length of service

Length of service	31/12/2021		Plan 2022		31/12/2022	
	No.	Share in %	No.	Share in %	No.	Share in %
up to 5 yrs	2	4.3	1	2.1	1	2.2
from 6 - 10 yrs	2	4.3	5	10.4	3	6.5
from 11 - 15 yrs	3	6.5	2	4.2	2	4.3
from 16 - 20 yrs	10	21.7	8	16.7	8	17.4
from 21 - 25 yrs	9	19.6	11	22.8	11	23.9
from 26 - 30 yrs	10	21.7	10	20.8	10	21.8
from 31 - 35 yrs	4	8.7	3	6.3	3	6.5
> 35 yrs	6	13.0	8	16.7	8	17.4

Costs of production services are lower than the planned ones for 2022 by 10%, i.e. by RSD 3,001,380. If one analysis this, such expenditure trend was affected mostly by costs of transport services which were reduced by 28%, i.e. by RSD 621,495. In addition, costs of leas of business space were lower than the planned ones by 4%, i.e. by RSD 844,287 in absolute amount. Maintenance services were of the lower scale than the planned ones by 11.6%, i.e. in the absolute amount of RSD 857,025. Other services which include public utility services, publishing services, ads publication services and others were lower by 19%, i.e. in the absolute amount by RSD 677,577 than the planned ones in total.

Depreciation and reserves were calculated in line with adequate accounting policy and ruling rates and they were lower than the planned ones by 4%, i.e. by RSD 321,049 in total.

The discrepancy between planned and achieved depreciation arose due to different dynamics of the equipment and immaterial property procurement, i.e. due to realization of some planned procurement of capital assets at the end of business year which finally implied the beginning of calculation of depreciation in the following year.

Non-material costs were lower for the whole group of expenditure than the planned ones by RSD 844,570, i.e. by 11%. If analysed per different costs from this group, it is evident that the realisation was in line with planned level in line with the following:

Non-production services which include audit costs, consultant services, seminars and membership fees, bookkeeping program costs, costs of professional education and professional reading material, other non-production services were on the level of the planned ones i.e. the total deviation amounts to only 2% which amounts to RSD 64,551.

Representation services, payment transactions and membership fees were also on the level of the planned ones, i.e. the deviation amounts to RSD 25,081.

Insurance premia costs were by RSD 762,661 lower than the planned ones or by 32% lower since the insurance of equipment and collective mandatory insurance and voluntary health insurance of employees was contracted at more favourable conditions than those which were expected and planned.

Costs of taxes and fees were by RSD 35,776 higher than the planned ones due to small deviations of costs of allowances for disabled people and utility fee for company logo.

Other material costs (currency, equipment costs) amount to RSD 15,270 which is 35% of the planned amount.

Other non-operational costs on 31/12/2022 were realised on the level of RSD 37,334.

Operational result:

On 31/12/2022, there was an extra revenue in comparison to expenditure of RSD 5,722,676 out of which 50% of realised revenue amounting to RSD 2,861,338 is transferred to the financial plan for next year.

In order to provide continuous and reliable operation of the Agency, the accumulated amount of realized extra revenue from previous years as well as from 2022 represent an adequate reserve in operationally available funds and it is the only for the balance item “Capital”. Thereby, certain security in the operation of the Agency is provided while in the given legal framework there are no financial sources that could be dependable for the operations of the Agency.

Investments in equipment and software. The Agency does not own real estate while the movables include: computer equipment and software, office furniture, technical equipment, other equipment and low-scale inventory. The EAR concluded a contract on their procurement.

The Agency procured equipment from its own funds in the period 2007 – 2022 as indicated in Table 8-5. Procurements were always realised in line with the procurement plan and the Law on Public Procurement. This was done mainly so as to replace a part of fixed assets which were written down, first of all computer equipment.

Table 8-5: Purchase of different equipment and software in the Agency

RSD

Procurement	2007-2014	2015	2016	2017	2018	2019	2020	2021	2022
Cars	13,418	0	0	0	2,694	4,535	0	0	0
Computer equipment, software, network	41,298	2,877	3,637	4,149	2,890	6,662	4,726	4,670	4,912
Office furniture and different equipment	6,460	0	887	321	585	462	840	843	99
Telephone devices, telephone switchboard, access control	3,697	287	400	302	207	454	531	291	599
Video surveillance, network	1,060	0	0	0	0	0	0	0	0
Total	**65,934**	**3,165**	**4,924**	**4,772**	**6,376**	**12,113**	**6,097**	**5,804**	**5,610**

Unwritten off – current level of material and non-material assets on December 31, 2022 amounts to RSD 18,732,917.13. The given value includes 49% of active assets, i.e. out of total 1002 items of equipment and software which are used, 505 are items of assets which are written of in bookkeeping terms. The given fact indicates a high level of writing off and depreciation of assets and it also indicates the need to examine the utility rate of equipment regularly and assess the necessity of its replacement.

In line with the legal obligation, in line with the Energy Law, the audit of the 2022 financial report by an authorised auditor was completed. In the opinion of the auditor, the financial report represents the financial positions of the Energy Agency on December 31, 2022 in a true and fair manner, for all materially-relevant aspects as their financial success for the year completed on that date in line with accounting regulations applicable in the Republic of Serbia.

Contents of tables

Table 1-1: Energy sector of Serbia (without APKM) – some indicators for 2017 - 2021 4
Table 3-1: Electricity production capacities in 2022 (without APKM) 13
Table 3-2: Power production capacities connected to the transmission system in 2022 (without APKM) 13
Table 3-3: Power production capacities connected to the distribution system in 2022 (without APKM) 14
Table 3-4: Data on the transmission system of *EMS* JSC at the end of 2022 (without APKM) 14
Table 3-5: Length of lines owned by DSO at the end of 2022 (without APKM) 15
Table 3-6: Electricity production and consumption in 2013 – 2022 (without APKM) 16
Table 3-7: Trend of annual level of average approved transmission use-of-system charges 19
Table 3-8: Transmission use-of-system charges which were valid in 2022 19
Table 3-9: Average transmission use-of-system charges 19
Table 3-10: Total annual level for the provision of system and ancillary services 21
Table 3-11: Average monthly level of NTS for entry into Serbia in 2022 22
Table 3-12: Average monthly level of NTS for exit from Serbia in 2022 22
Table 3-13: Data on joint annual auctions for the allocation of cross-border transmission capacities in 2022 23
Table 3-14: Data on joint monthly auctions for the allocation of cross-border transmission capacities in 2022 23
Table 3-15: Cross-border and internal transactions in the market area of Serbia 2013 - 2022 24
Table 3-16: Entry and exit nominated cross-border transactions for each border for 2022 24
Table 3-17: Revenue from cross-border capacity allocation in 2022 24
Table 3-18: Basic indicators of transmission plan realisation (without APKM) 25
Table 3-19: Electricity transit by months of 2022 (physical flows) 25
Table 3-20: Transmitted energy, maximum load and losses (without APKM) 25
Table 3-21: Trend of annual level of average approved distribution use-of-system charges – total Serbia (without APKM) 28
Table 3-22: Applied average distribution use-of-system charges 28
Table 3-23: Electricity quantities distributed in 2013 – 2023 29
Table 3-24: Electricity market concentration level in Serbia in 2022 38
Table 3-25: Electricity consumption structure in the period 2013-2022 38
Table 3-26: Number of metering points in 2021 and 2022 39
Table 3-27: Electricity sale in retail market in 2019-2022 39
Table 3-28: Electricity quantities delivered in the regulated market 40
Table 3-29: Average annual regulated prices for final customers (VAT and duties free) 40
Table 3-30: Prices for mass consumption customer category for each consumption zone 41
Table 3-31: Electricity quantities delivered in the open market 46
Table 3-32: Number of market players entitled for scheduling 2014 - 2022 46
Table 3-33: Open market concentration level in 2022 46
Table 3-34: Electricity quantities sold to final customers in the open market - for each supplier in 2022 47
Table 3-35: Average annual retail prices in the open market for final customers (VAT and duties free) 47
Table 3-36: Structure of realised average annual retail price in the open market for final customers 48
Table 3-37: Electricity quantities delivered under the supply of the resort regime 49
Table 3-38: Average annual price of the supplier of the last resort for final customers (VAT and duties free) 49
Table 3-39: Total average annual prices for regulated market, open market and supply of the last resort (VAT and duties free) 49
Table 3-40: Review of realised average annual prices for each activity in 2022 50
Table 3-41: Supplier switching for metering points separately in 2022 50
Table 3-42: Indicators of discontinuity in delivery within the transmission network in the period 2013 - 2022 56
Table 3-43: Connection applications by voltage levels and in total in 2022 59
Table 3-44: Connection of facilities/metering points by voltage levels in 2022 60
Table 3-45: Final prices for privileged electricity producers 63
Table 3-46: Structure of prices and applied prices (VAT and duties free) of electricity withdrawn from privileged producers in 2022 64
Table 3-47: Incentive fee for privileged electricity producers 2017 – 2022 64
Table 3-48: Level of collected privileged producers' incentive fee in 2022 64
Table 3-49: Electricity withdrawn from privileged producers 2018 - 2022 64
Table 3-50: Planned and achieved level of investments into transmission network development for different types of activities for 2022 67
Table 3-51: Planned and achieved level of investments into transmission network development for different voltage levels for 2022 67
Table 3-52: Planned and achieved level of investments into distribution network development for different types of activities for 2022 68
Table 3-53: Planned and achieved level of investments into distribution network development for different voltage levels for 2022 68
Table 3-54: Smart meters within the transmission system 69
Table 3-55: Smart meters within the distribution system in 2022 69
Table 4-1: Natural gas production in Serbia in period 2013 – 2022 in GWh 72
Table 4-2: Length of the transmission gas pipelines in Serbia in 2013 - 2022 72
Table 4-3: Important technical characteristics of the transmission system 73
Table 4-4: Length of the distribution network in Serbia in 2014 - 2022 75
Table 4-5: Length of distribution network and number of delivery points at the end of 2022 75
Table 4-6: Natural gas supply sources and consumption in 2021 and 2022 77
Table 4-7: Number of delivery points at the end of 2021 and 2022 77
Table 4-8: Consumption structure in 2021 and 2022 77
Table 4-9: Average approved natural gas transmission use-of-system charge 80
Table 4-10: Transmitted natural gas quantities in 2018 - 2022 82
Table 4-11: Average approved natural gas distribution use-of-system charge 85
Table 4-12: Distributed natural gas quantities in 2018-2022 86
Table 4-13 Ratio between regulated and open markets for each distribution system depending on the number of delivery points 87
Table 4-14: Total natural gas consumption (in open and regulated markets) 89
Table 4-15: Natural gas sale to final customers in 2021 and 2022 90

Table 4-16: Average approved natural gas public supply price 91
Table 4-17: Interruptions within transmission systems indicated per different causes 97
Table 4-18: Summary indicators of continuity of distribution systems for unplanned interruptions 98
Table 4-19: Summary indicators of continuity of distribution systems for planned interruptions 98
Table 4-20: Summary continuity indicators of distribution systems....99
Table 4-21: Application for connection....99
Table 4-22: Connection of facilities....99
Table 5-1: Use-of-system charges....107
Table 5-2: Number of energy entities holding licence for different energy sources in 2022 110
Table 6-1: Total monthly income of a household as the condition for the award of the status of energy vulnerable customer in 2022 116
Table 6-2: Maximum rights to discount for monthly bill for consumed quantities....117
Table 6-3: Right to discount for monthly bill depending on consumption....117
Table 6-4: Exercised right to bill discount in 2022 118
Table 6-5: Survey of energy-wise vulnerable electricity customers during different months of 2022....118
Table 6-6: Review of beneficiaries of social care allowance in 2022 119
Table 6-7: Review of beneficiaries of children allowance in 2022....119
Table 7-1: Submitted applications and approved licenses in 2022 per each activity....128
Table 7-2: Number of appeals submitted to the Supreme/Administrative Court of RS against the Agency's decisions adopted within the second-instance procedure 2008-2022....134
Table 8-1: Total Agency's revenues in 2022 141
Table 8-2: Total Agency expenditure in 2022....142
Table 8-3: Qualification structure of permanent employees....144
Table 8-4: Structure of employees in terms of length of service 144
Table 8-5: Purchase of different equipment and software in the Agency....145

Contents of figures

Figure 1-1: Comparative indicators of Serbia and the European Union in 2021....4
Figure 1-2: Final consumption structure (without non-energy consumption) in 2021 5
Figure 2-1: Electricity sales in the open and regulated markets in 2022....7
Figure 2-2: Sale of natural gas in the open and regulated markets in 2022 10
Figure 3-1: Organisational structure of the power sector at the end of 2022....11
Figure 3-2: Production capacity structure in 2022 (without APKM)....13
Figure 3-3: Production, import and gross consumption in Serbia in 2022 (without APKM) 15
Figure 3-4: Generation structure in 2022 (without APKM)....16
Figure 3-5: Transmission use-of-system charge (€/MWh) in 2021 20
Figure 3-6: Average applied annual distribution use-of-system charge in 2022 28
Figure 3-7: Electricity market scheme in 2022....32
Figure 3-8: Electricity quantities for each supplier activity in 2021 and 2022....33
Figure 3-9: Import, export and transit of suppliers in 2022....37
Figure 3-10: Purchase/sales between suppliers, i.e. between suppliers and PE *EPS* in 2022 37
Figure 3-11: Electricity consumption structure in Serbia in the period 2013-2022 (without APKM) 39
Figure 3-12: Electricity prices for households – second half of 2022....42
Figure 3-13: Structure of retail electricity price for households in some of European capitals in December 2022 43
Figure 3-14: Electricity final price structure for households in some European capitals in December 2022 at purchase power parity 44
Figure 3-15: Electricity prices for industry – second half of 2022....45
Figure 3-16: Causes of unplanned interruptions and their share in undelivered energy for all transmission system users in 2022 57
Figure 3-17: Causes of unplanned interruptions and their share in undelivered energy for transmission system users (excluding pumped-storage hudro power plants, storages and pumped-storage facilities) in 2022 57
Figure 3-18: Average duration of supply interruption 57
Figure 3-19: SAIFI and SAIDI for the period 2018 - 2022 58
Figure 3-20: Share of causes of unplanned interruptions in SAIFI and SAIDI for 2022....58
Figure 3-21: Reasons for bills corrections and their share in the total number of revised bills in 2022....60
Figure 4-1: Organisational structure of the natural gas sector at the end of 2022....71
Figure 4-2: Natural gas transmission system of the Republic of Serbia 74
Figure 4-3: Structure of natural gas consumption in Serbia in 2022 78
Figure 4-4: Natural gas market scheme at the end of 2022 86
Figure 4-5: Ratio between regulated and open market for each distribution system depending on the level of delivered quantities....88
Figure 4-6: Change of average approved public supply natural gas price....92
Figure 4-7: Structure of average approved natural gas public supply price of PE *Srbijagas* on 31/12/2022 92
Figure 4-8: Natural gas prices for households – second half of 2022....93
Figure 4-9: Structure of natural gas household prices in some of European capitals in December 2022....94
Figure 4-10: Structure of natural gas household prices in some of European capitals in December 2022 given in purchase power parity 95
Figure 4-11: Natural gas prices for industry – second half of 2022....96
Figure 5-1: Types of imported crude oil in 2022 103
Figure 5-2: Crude oil refinery processing in Serbia in 2015 - 2022....104
Figure 5-3: Crude oil quantities transported by oil pipeline of "Transnafta" in the period 2007 – 2022 106
Figure 5-4: Number of active licenses for trade in oil, oil derivatives, biofuels, bioliquids, CNG, LNG and hydrogen in 2010-2022 109
Figure 5-5: Share of companies in retail motor fuel market according to the number of stations in 2022....111
Figure 7-1: Energy Community institutions....134
Figure 8-1: Base index of average annual net salary trend 2005.=100 143

Abbreviations and foreign phrases

ACER	Agency for the Cooperation of Energy Regulators
APKM	Autonomous Province of Kosovo and Metohija
Benchmarking	Comparative analysis of similar (indicators, companies, activities, etc.)
CEER	Council of European Energy Regulators
BiH	Bosnia and Herzegovina
DS	Distribution system
EnC	Energy Community
ECRB	EnC Regulatory Board
HHI	Herfindahl-Hirschman Index – indicator of market concentration level
ITC Agreement	Multi-year Pan-European agreement between transmission system operators on compensation of costs for the utilisation of neighbouring transmission networks
SEE	South-eastern Europe
EMS JSC	*Elektromreža Srbije*, Joint Stock Company
PE *EPS*	Public Enterprise *Elektroprivreda Srbije* (Electric Power Industry of Serbia)
mtoe	Million tons of equivalent oil
NTC	Net Transfer Capacities
REMIT	Regulation on wholesale energy market integrity and transparency, No. 1227/2011, adopted by the European Parliament and the European Council of Ministers
MRE	Ministry of Mining and Energy
NIS	Company for Exploration, Production, Processing, Distribution and Trade in Oil, Oil Derivatives and for Exploration and Production of Natural Gas *Naftna industrija Srbije* (Petroleum Industry of Serbia), JSC
RS	Republic of Serbia
UNMIK	United Nations Interim Administration Mission in Kosovo, established by the Security Council by Resolution 1244 (1999)

Conversion factors for energy equivalents

	kJ	kcal	kWh	kg oe*
1 kJ	1	0.2388	0.000278	0.000024
1 kcal	4.1868	1	0.001163	0.0001
1 kWh	3,600	860	1	0.086
1 kg oe	41,868	10,000	11.63	1

* kilograms of equivalent oil

11000 Belgrade
Terazije 5/V
Tel: + 381 11 6350130;
Fax: + 381 11 6350180
E mail: aers@aers.rs
URL: www.aers.rs