Republic of Croatia

Croatian Energy Regulatory Agency

ANNUAL REPORT

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CROATIAN ENERGY REGULATORY AGENCY
ANNUAL REPORT 2018

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1 INTRODUCTION

Dear readers,

It is my pleasure to present the *Annual Report on the Activities of the Croatian Energy Regulatory Agency for 2018*, which is submitted to the Croatian Parliament pursuant to the Act on the Regulation of Energy Activities together with the *Report on the Execution of the Budget of the Croatian Energy Regulatory Agency*.

The Croatian Energy Regulatory Agency (HERA) is the national regulator of energy activities in the Republic of Croatia. In line with the provisions of Croatian and EU law, it was established as an independent regulatory body acting under a public mandate. Its core task is the regulation of energy activities in Croatia in conformity with obligations specified in the national legislative framework. HERA is also one of the 28 national regulators of the EU Member States, whose rights and obligations (both in the national and European contexts) are based on the principles and basic acts of European energy legislation.

The fundamental principle applicable to the activities of all national energy regulators in the EU is the autonomy in decision-making guaranteed by law, both in relation to the executive government and the interests of economic operators in the energy sector. Therefore, energy regulators act at an equal distance between energy consumers/users and energy systems, energy entities and the executive government. This legal position of the regulator does not call into question the cooperation with other relevant national authorities and the government, who are in charge of establishing general energy policy guidelines. In addition to the autonomy of regulators guaranteed by law, the law also obliges the regulator to comply with its legal obligations, and ensure accountability and transparency in the regulation of the energy sector. Along with regular consultations with participants in the energy market and representatives of competent executive authorities, the requirement to submit reports on its activities to the national parliament is one of the backbones of the regulator's public accountability.

The principal regulatory tasks performed by HERA include regulating natural monopolies (by establishing tariffs and fees for the performance of regulated energy activities), monitoring and promoting the development of energy markets, and implementing applicable EU legislation. The primary focus of the energy regulator certainly includes the interests of energy consumers and users of energy infrastructure systems (networks), not only with regard to their protection, but also by ensuring an optimum balance between the regulated components and market mechanisms.

HERA's annual report presents an overview of the legal obligations fulfilled by the regulator, the results and statistical indicators concerning the activities of regulated entities in the Croatian energy sector, and assessments, observations, and regulatory recommendations related to the development of Croatia's energy markets, their coupling and organisation in accordance with the rules of the European internal energy market.

The structure of the report is compliant with the latest recommendations of the Council of European Energy Regulators (CEER), and its content and design have been developed in line with good regulatory reporting practice used by the EU and the Agency for the Cooperation of Energy Regulators (ACER).

Although it is difficult to single out any components of the (energy) system, which functions as an integrated whole by its very definition, one of the most important events that marked the year 2018 in the Croatian energy sector (at least in the segments within the competence of the energy regulator) is certainly a complete revision of implementing provisions in the gas sector as a consequence of the adoption of the new Gas Market Act, with particular emphasis on acts and decisions in the context of preparation for the final investment decision on the construction of the liquefied natural gas terminal on the island of Krk. Also worth underlining is the coupling of the Croatian and Slovenian day-ahead electricity markets, i.e. indirect coupling with the MRC market, and the consequent increase of volumes traded on the Croatian Power Exchange CROPEX.

Another element of regulatory practice to be highlighted includes HERA's efforts to recognise the importance of efficient system use through timely reviews of energy infrastructure tariffs, as well as to accept the dynamics of important market parameters, in order to transfer the benefits from the market and market conduct to end consumers.

In 2018, the regulated Croatian energy systems were in essence stable and reliable, security of supply was satisfactory, and the quality of energy services was acceptable.

Wholesale energy prices in Croatia and in associated regional markets in 2018 have generally increased. Following several years of declining prices, the trend also affected unregulated energy prices, primarily for economic operators. This has once again shown that the market principles should be applied without hesitation.

Therefore, one of the regulatory tasks is the completion of current processes required for the implementation of market mechanisms in practice, not only in theory. The Croatian wholesale energy markets are headed in the right direction, as they are well equipped with mechanisms and platforms increasingly integrated in the European practice. However, the development of the retail electricity and gas markets is stagnating, partly even regressing, which could objectively slow down or delay the transfer of benefits that an open market can offer to its end consumers.

At the EU level, 2018 was marked by the completion of the legislative package called "Clean energy for all Europeans package" (*Clean Energy Package, CEP*) – a comprehensive set of eight legislative acts (guidelines and regulations) adopted in the second half of 2018 and in the first half of 2019. It is a thorough revision of the energy policy framework aimed at facilitating the EU's energy transition towards cleaner forms of energy and at meeting the goal of reduced greenhouse gas emissions. Important changes introduced in energy practices by this set of provisions should derive substantial benefits both for energy consumers and in terms of environmental protection and overall economic activities. The ambitious nature of this package is proven by the fact that its final target is the European Union, which aims to achieve carbon neutrality by 2050.

After the adoption of the package (its focus being on electricity, energy efficiency and renewable sources of energy), EU member states will have one to two years to transpose the new guidelines into national law. Even if the upcoming process of drafting and adopting a similar package of provisions in the field of gas at the EU level is disregarded for the moment, the adoption and implementation of CEP in 2019 and 2020 will pose a great challenge for all Croatian energy stakeholders, including HERA.

From the regulatory point of view, the implementation of CEP will require reviewing and probably modifying current regulatory models, whereby current processes or topics which have not yet been adequately addressed in the context of our energy market will need to be further harmonised with the new energy paradigms. HERA, as the national regulator, will find particularly challenging its obligation to ensure that all energy consumers and system users are treated equally in relation to the application of new concepts and technologies in the new energy transition. It will be necessary to

simultaneously and consistently promote a fair energy market and to respect new incentive models.

In doing so it will rely on frameworks to be defined by the new national energy strategy, of which HERA expects to, inter alia, formulate the requirements for a (regulatory desirable) concept of a "cost-effective decarbonisation".

The climate-related context of the future energy sector is by no means the only new challenge the regulators are facing. New stakeholders and new entities on the energy market, new – and partly disruptive – technologies affecting the energy sector, are just some of the examples. The recent changes to the Croatian legal framework have addressed the issues related to the new models of renewable energy sources integration, self-generation of energy, and prosumers. On the other hand, introduction of smart metering devices and e-mobility are just some of the issues that the Croatian energy sector needs to address in a systematic and cost-effective manner. In the near future it will also be faced with almost exotic issues such as peer-to-peer energy exchange and micro-networks independent of the main systems. Each of these questions entails regulatory consequences.

In line with the position of the community of European energy regulators, the Croatian energy regulator promotes a rational approach to new concepts, which calls for a completion of the current processes required for the full implementation of functional and connected (national) markets, the creation of all necessary prerequisites for the introduction of "smart" technologies and the selection of the most cost-efficient solutions.

By its very nature, energy regulation is a process which never ends, but can only invest continuous efforts to approach the optimal solutions. Bearing in mind the central role of energy consumers and energy systems users in the mission of energy regulation and being aware of all outstanding issues in the current practice of the Croatian energy sector, as well as the "brave new world" of the European energy sector, the Croatian Energy Regulatory Agency is confident that it can rise to any current or future challenges.

Tomislav Jureković
President of the Board of Commissioners
Croatian Energy Regulatory Agency

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2 OVERVIEW OF THE ENERGY SECTOR

2.1 Electricity

In 2018, the total consumption of electricity in Croatia amounted to 18,352 GWh, which is a 0.9% increase by 0.9% compared to 2017 and the highest level recorded by HERA (measured since 2000). The majority of electricity consumption in Croatia in 2018 was covered by Croatian power plants (12,192 GWh, 66.4%), and the remaining part was covered by imports (6,160 GWh, 33.6%). Hydrological conditions were favourable in 2018, which resulted in lower net electricity imports and reduced electricity production from thermal power plants.

Total electricity sold to end consumers amounted to 16.4 TWh, which is a 1.5% increase compared to 2017. In 2018, the share of households in total electricity sold to end consumers was 37.8%, while the share of electricity sold to industrial end consumers was 62.2%, which is a slight increase compared to 2017.

In 2018, 21 new facilities using renewable energy sources with a total capacity of 76 MW were connected to the electricity system. The incentives system thus had 1,335 facilities at the end of the year, with a total installed capacity of 829 MW. The total capacity of all power plants in Croatia amounted to 5,010 MW at the end of 2018. Hrvatska elektroprivreda – dioničko društvo (hereinafter: HEP d.d.) is still the dominant electricity producer, accounting for 86% of Croatia's production capacity and 83% of generated electricity.Over the last five years, the proportion of production in facilities connected to the distribution network (distributed electricity sources) has significantly increased. In 2018, the supply of electricity from distributed energy sources doubled compared to 2014. The proportion of electricity supplied from distributed energy sources in the total consumption of the electricity system in 2018 amounted to 5.75%, while the proportion of electricity generated in plants which participate in the incentives system was 12.6% (2,483 GWh). Around HRK 2.2 billion in incentives were paid for electricity generated within the system in 2018. The average incentivised price amounted to HRK 0.88/kWh. The highest incentivised price (HRK 1.93/kWh) was paid for electricity from solar power plants, while the electricity from power plants fuelled by landfill gas was paid the lowest incentivised price of HRK 0.44/kWh. The average incentivised price paid for electricity from wind power plants amounted to HRK 0.75/kWh.

The amendments to the **Electricity Market Act** from July 2018 enabled electricity producers to purchase electricity for the pumping work of reversible hydroelectric power plants on the wholesale market. Electricity producers at the billing metering point of a reversible hydroelectric power plant for the needs of pumping work are not considered to be consumers. Energy used for pumping work is subject to a fee for the use of transmission and/or distribution network. Furthermore, the suppliers' obligation to issue a single invoice for electricity and network use to low-voltage industrial consumers has been repealed.

The reports and data that Hrvatski operator prijenosnog sustava d.o.o. (HOPS) and HEP-Operator distribucijskog sustava d.o.o. (HEP ODS) submit to HERA suggest that the level of security of electricity supply in the Croatian electricity system is satisfactory, considering the existing cross-zonal capacities (transfer capacities between two trading zones) which are sufficient to meet the requirements of the Croatian electricity system.

Between 2017 and 2018, the number and the duration of supply interruptions in the transmission network declined, as well as the estimated amount of energy not supplied.

The difference between the amount of electricity taken up by the transmission network and the electricity supplied from the transmission network in 2018, which occurs due to electricity losses in network elements (power losses in the transmission network), amounted to 534 GWh or 2.2% of total transmitted electricity. The electricity to cover

losses in the transmission network in 2018 was purchased according to market principles by a long-term contract concluded following a public auction. The estimated total cost of electricity to cover the losses in the distribution network, including the cost of imbalance, amounted to approximately HRK 215 million, which yields a unit cost of electricity to cover losses in 2018 of HRK 403/MWh.

The power losses in the distribution network in 2018 totalled 1,288 GWh or 7.7% of electricity taken up by the distribution network. The procurement of necessary quantities of energy to cover losses in the distribution network was carried out by a public auction. The estimated total cost of 1,287.6 GWh of electricity to cover the losses in the distribution network amounted to approximately HRK 536 million, which yields the unit cost of electricity to cover losses in 2018 of HRK 416/MWh. This also includes the cost of imbalance. The share of non-technical losses in the distribution network (the amount of electricity consumed, but not calculated due to deficiencies in the measurement/readout/calculation of electricity consumption or due to electricity theft) is estimated at 49% of the total losses. Non-technical losses can be reduced through more frequent controls of billing metering points or by installing smart meters and smart meter roll-out systems.

The ten-year development plans for transmission and distribution networks, with detailed investments, provide information for HERA and the electricity market participants about the parts of the main infrastructure that should be built or improved in the following ten-year period. The planned values of financial investments in the development of the transmission and distribution networks for the upcoming ten-year period (2019–2028) are approximately HRK 6.6 billion and HRK 10 billion respectively. The planned investments in the transmission and distribution networks are similar to those in the previous years.

The total selling price of electricity is comprised of a market-based portion of the price and of a regulated part in the form of a fee for the use of transmission and/or distribution network and other fees, such as the fee for promoting electricity production from renewable sources and high-efficiency cogeneration, excise duties for industrial consumers, solidarity fee for household consumers and value added tax.

The 2018 tariffs for the use of the transmission and distribution networks did not change in comparison to 2017. Hence, in 2018 average transmission charges amounted to HRK 0.085/kWh, while average distribution network charges amounted to HRK 0.222/kWh. Compared to 2017, in 2018 electricity prices on the Croatian retail electricity market, not including network charges and other fees, increased by HRK 0.01/kWh as a consequence of higher wholesale electricity prices, which are freely formed based on supply and demand. Electricity prices in Croatia have been fully deregulated – this includes the price of electricity under the universal service.

The average total selling price of electricity in 2018 for household end consumers amounted to HRK 1/kWh. The proportion of taxes and charges in the total selling price was 22%, the proportion of electricity price with supply costs was 45%, and the proportion of network charges was 33%.

In early November 2018, HERA launched an independent procedure of setting tariffs for transmission and distribution network usage for 2019. HERA reduced the tariffs for high-voltage industrial end consumers by 10%, for medium-voltage industrial end consumers by 15%, and for low-voltage industrial end consumers using tariff model Red by 15%. The application of new tariffs resulted in the reduction of fees for the use of the transmission and distribution networks for end consumers from the above categories and models in the Republic of Croatia, placing them at the level of average fees in EU Member States.

The Croatian Government adopted the *Regulation on issuing energy approvals and establishing the conditions and deadlines for connecting to the electricity network*, which entered into force on 1 April 2018. Given that the *Methodology* and the *Regulation* had to be harmonised, HERA adopted the *Amendments to the Methodology for setting*

electricity grid connection charges for new users and for increasing the connection capacity for existing users, which entered into force on 9 April 2018. HERA also approved HOPS's *Rules on connection to the transmission network* and HEP ODS's *Rules on connection to the distribution network*, which also entered into force on 9 April 2018. Having obtained HERA's prior approval, HEP ODS adopted the *Network Code for the Distribution System* in August 2018.

In 2018, the three biggest suppliers had a 99% market share in household end consumer supply, which represents an increase in concentration on the retail market compared to 2017, when the share was 98%. Further, the three biggest suppliers had a 94% market share in industrial end-consumer supply, which is an even more substantial increase in concentration compared to 2017, when the share was 83%. In addition to HEP-Elektra, there were 11 other market suppliers on the retail market in 2018. The number of supplier switches decreased from 89,038 in 2017 to 85,732 in 2018. The supplier switch rate was 3.51%, which is less than in the previous year when the rate was 3.64%. From the total number of switches, 31,384 were in the industrial category and 54,348 were in the household category. All things considered, it can be concluded that the retail electricity market in Croatia is stagnating.

Due to a significant increase in the prices on the wholesale market in the last quarter of 2018, suppliers offered higher prices of electricity. For example, 2018 saw an increase in baseload electricity prices for 2019 at the Hungarian futures exchange (HUDEX), from the starting EUR 42/MWh at the beginning of the year to EUR 61/MWh at the end of the year. As the **Electricity Market Act** stipulates that the guaranteed supply prices must be higher than the average prices on the retail electricity market, HERA adopted the new *Methodology for setting tariffs for guaranteed electricity supply*. Given that the *Methodology* takes into account expected price changes in the retail electricity market, its implementation will result in tariffs that yield a higher average price for guaranteed supply than the one on the retail electricity market. Based on that *Methodology*, on 8 March 2019 HERA adopted new tariffs for guaranteed supply, which became applicable as of 1 April 2019. In 2018, the public service of guaranteed supply was provided by HEP Elektra d.o.o.

The quality of electricity supply is defined and monitored in terms of continuity of supply, voltage quality and service quality. HEP ODS's general scores for the quality of connection services, which include the proportion of timely resolved applications for a report on the optimal technical solution for grid connection in the given year, the proportion of timely resolved applications for grid connection approvals, and the proportion of timely connections in case of simple connections of buildings in the given year, are below the required general standard of service quality and should be improved. Since the *Amendments to the Requirements for the quality of electricity supply* entered into force, a total of 48 written complaints concerning voltage quality in the distribution network were filed from 9 April 2018 to 31 December 2018, of which 38 were resolved in a timely manner. Also, a total of 37 requests for measuring voltage quality were filed, of which 15 were founded and resolved in favour of the complainant.

On 31 December 2018, there were 54 valid licences for electricity generation, 16 licences for electricity supply and 31 licences for electricity trade in Croatia. In 2018, the Croatian electricity exchange (hereinafter: CROPEX) day-ahead market had 17 registered members, who purchased 2,381.9 GWh of electricity from CROPEX. The intraday market had nine registered members, who purchased 78.3 GWh of electricity from CROPEX. The day-ahead coupling of the Croatian and Slovenian market, which started in June, was the most significant improvement on the electricity market in 2018. In this way, the Croatian market was connected to the European market via Multi-Regional Coupling (MRC), which resulted in a multiple increase in the volume of day-ahead electricity trading on CROPEX.

A stable operation of the electricity system requires constant balancing between electricity consumption and generation. Imbalance during the operation of the system

occur for many reasons and must be addressed as close to real time as possible. Possible causes are errors in predicting consumption and production, and malfunctions and breakdowns of individual parts in the electric power system. Hence, the transmission system operator is responsible for system balancing.

HEP-Proizvodnja d.o.o. is so far the only provider of balancing services from secondary and tertiary balancing power reserves. Entities outside HEP d.d. also provided the tertiary reserve services for system security. In view of the above, the requirements for liberalisation of the electricity balancing market and the ancillary services market have not yet been met. In 2018, HOPS's total costs for the balancing service were HRK 68 million, as compared to 2017 when the costs amounted to HRK 57 million.

For system balancing, the transmission system operator needs to have at his disposal sufficient balancing power reserves. The ancillary services used for electricity system balancing include power reserves of automatic secondary frequency control and power exchange, power reserves of tertiary control for system balancing, and power reserves of tertiary control for system security. Further, ancillary services also include compensation operation for the needs of voltage and reactive power regulation, availability of a generating unit launched without relying on the external electric power transmission network (black start), and availability of a generating unit for island operation.

The total costs of providing ancillary services in 2018 were HRK 294 million, of which 84% were related to power reserves for system balancing.

In 2018, the total amount of settled imbalances calculated the first time by HOPS was HRK 165 million, of which HOPS charged the balance group responsible parties a total of HRK 41.5 million. The remaining HRK 123.5 million were not charged by HOPS given that the amount of HRK 96.5 million concerns production imbalance in the incentives system, which had been assigned to HOPS before the EKO balance group was established, and the amount of HRK 27 million concerns the loss imbalance in the transmission network.

In 2018, the settlement of imbalances was frequently recalculated due to errors in the calculation of realisations in the distribution network and frequent complaints regarding the calculations of realisations and the settlement of imbalances.

HOPS allocates cross-zonal capacities in all time frames under market principles. In 2018, HOPS's total net income for capacity allocation was HRK 62.5 million. Compared to 2017, there was a significant increase in revenues from the allocation of capacities in annual auctions (from HRK 22.55 million to 42.45 million), and also a decrease in revenues from the allocation of capacities in daily auctions (from HRK 65.65 million to 39.51 million). Progress was achieved on the border with Hungary, where intraday allocations of capacity started to take place for both trading directions in late March. Furthermore, a very significant change occurred on the border with Serbia, where the capacities for 2018 are now allocated to JAO's auction office in annual, monthly and daily auctions.

By 31 December 2015, project operators who met the requirements for participation in the incentives system for electricity generation from renewable energy sources and cogeneration concluded with HROTE long-term contracts on electricity buy-off from such facilities at a guaranteed price. The incentivised price for each group of facilities is defined in corresponding tariff systems for electricity generation from renewable energy sources and cogeneration.

In 2018 HERA issued 30 decisions on eligible electricity producer status.

Croatian electricity market is organised in balance groups, whose members must be participants on the wholesale electricity market. The purpose of balance groups is to regulate the reporting of contractual schedules of balance responsible parties to the electricity market operator and the settling of imbalances. The EKO balance group is a special balance group run by the electricity market operator, whose members are eligible electricity producers in the incentives system.

The **Regulation on amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** was adopted in late December 2017, extending the mandatory takeover of electricity from the incentives system by the suppliers by another year and shifting the deadline for the initiation of the EKO balance group's operations. However, it was not until the adoption of the amendments to the **Renewable Energy Sources and High-Efficiency Cogeneration Act** in December 2018 that the launching of the EKO balance group's operations as of 1 January 2019 was finally confirmed. In addition, the amendments to the **Renewable Energy Sources and High-Efficiency Cogeneration Act** of December 2018 define, *inter alia*, users of self-supply installations, stipulate the sale of a part of electricity from the incentives system in the electricity market, and specify by-laws which will regulate issues related to the classification of production plants, methodology for establishing the share of energy from renewable energy sources in total immediate consumption, issues related to the status of eligible electricity producer from renewable energy sources, as well as fees for members of the EKO balance group. In 2019 electricity suppliers will take up 70% of net electricity delivered to HROTE by eligible electricity producers participating in the incentives system, whereas the remaining electricity produced by the EKO balance group will be sold by HROTE on the electricity market.

2.2 Natural gas

As in the previous years, the natural gas sector in 2018 was characterised by continued market opening and further improvement of existing by-laws. In 2018, the gas market was characterised by the following:

- moderate level of competition on the wholesale gas market, dominated by several major suppliers,
- liberalisation of the market for household consumers,
- following a multi-annual downward trend in gas prices initiated by practical market liberalisation in 2011, in 2018, compared to 2017, the prices of gas increased by 21% on the wholesale gas market and by 15% on the retail gas market for industrial consumers[1],
- compared to 2017, 2018 saw a slight increase (0.8% on average) in the gas sale price for household end consumers using the public gas supply service,
- the provisions of the **Gas Market Act (Official Gazette No. 18/18)** were implemented with the adoption of by-laws and selection of the wholesale gas market supplier and the guaranteed supplier via public tendering procedures,
- important preconditions have been met for the realisation of the strategic project involving construction of a terminal for the reception and dispatch of liquefied natural gas on the island of Krk (hereinafter: LNG terminal) and the related gas transmission infrastructure,
- further implementation of *Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas (hereinafter: Regulation 2017/460)* including final consultation on and adoption of the *Decision on the elements of the methodology for setting the reference price for gas transmission services*, as well as consultation on and adoption of the *Decision on discounts, multipliers and seasonal factors*,
- completed implementation of *Commission Regulation (EU) 2017/459 of 16 March 2017 establishing a network code on capacity allocation mechanisms in gas transmission systems and repealing Regulation (EU) No 984/2013*,
- further determination of incentives and compensation for gas supply quality pursuant to *General terms and conditions of gas supply (Official Gazette No. 50/18)*,

1 *Industrial consumers are all end consumers which are not household consumers. Pursuant to the Gas Market Act (Official Gazette No. 18/18), an end consumer that is not a household is defined as a consumer buying gas not intended for use in own household.*

- decreased number of complaints related to supplier switching procedures compared to 2017, but with a significantly lower number of supplier switches compared to 2017.

In 2018, the quantity of delivered natural gas totalled 25,438 GWh, which represents a decrease by 8.5% compared to 2017.

The largest share in sold quantities of gas at the wholesale market in 2018 was held by HEP-Trgovina d.o.o. with 31.2%, followed by HEP d.d. with 27.4%, INA d.d. with 15.4% and PRVO PLINARSKO DRUŠTVO d.o.o. with 12.2%. The remaining 13.8% share of the wholesale market was distributed among 10 balance responsible parties.

In 2018, 14 balance responsible parties traded a total of 22,382 GWh of gas at the virtual trading point (VTP[2]) (36.4% more than in 2017). In addition to trading at the VTP, transactions on the wholesale market in 2018 were also carried out at the trading platform. With the implementation of *Commission Regulation (EU) No 312/2014 of March 2014 establishing a Network Code on Gas Balancing of Transmission Networks*, a trading platform[3] was established where all balance responsible parties and the transmission system operator may trade short term standardised products.

On the retail gas market, some gas suppliers continued offering market-based (unregulated) gas supply contracts to households.

In order to eliminate obstacles to the development of the retail market, HERA implemented a number of measures. The most important were enhancing HROTE's supplier switch IT system in collaboration with HROTE, informing market participants of their rights and obligations, improvement of by-laws regulating the supplier switching procedure, collecting opinions and recommendations from the interested public and energy entities participants via a prior consultation and a public consultation in the process of adoption of the *Network Code for the gas distribution system* and the *General terms and conditions of gas supply*.

In 2018, gas was actively supplied by 45 out of 54 licensed energy entities.

On the wholesale market, the average gas sale price without VAT in 2018 was HRK 0.1987/kWh, which represents an increase of 20.6% as compared to 2017, when it was HRK 0.1647/kWh.

In 2018, the average retail gas sale price for industrial end consumers amounted to HRK 0.2227/kWh (net of VAT), which represents an increase of 15% as compared to 2017.

Despite the increase in price, the final gas price for industrial end consumers excluding taxes in Croatia in 2018 was 2.8% lower than the EU average (it was 4.5% lower in 2017), while the final gas price including taxes for industrial consumers was 9% lower than the EU average.

The final gas price for households using the public service in Croatia increased on average by 0.8% compared to 2017, due to an increase in the cost of gas distribution pursuant to the *Decision on gas distribution tariff amounts* issued by HERA in December 2017 after the regular revision of the allowed revenues of gas distribution system operators.

In 2018, the final gas price for households excluding taxes in Croatia was lower than the EU average by as much as 36.9% (compared to 2017 when it was -35.4%), while the final gas price for households including taxes was 42.3% below EU average.

In 2018, as well as in the previous years, public service suppliers were able to buy gas from wholesale market suppliers for household end consumers under regulated conditions, and this regulation principle will be retained until 31 March 2021. More specifically, in line with the provisions of the **Gas Market Act**, which entered into force on 3 March 2018, the

2 *VTP is a location for gas trading between the entry and exit points of the transmission system, including the gas storage system, where balance responsible parties may trade in gas. Transactions are agreed bilaterally and confirmed and carried out via a system provided by HROTE.*

3 *The trading platform is an electronic platform provided and managed by HROTE, where a balance responsible party and the transmission system operator may trade products.*

energy entity HEP d.d. was selected as the wholesale gas market supplier for the period from 1 April 2018 to 31 July 2018, and was obliged to sell gas to public service suppliers supplying household consumers with gas at the price of HRK 0.1809/kWh, specified in the *Decision on the gas price at which the wholesale market gas supplier is obliged to sell gas to public service gas suppliers for household consumers (Official Gazette No. 18/17)* of the Croatian Government.

Further, in July 2018, HERA held a first public call for tenders to select a wholesale market supplier for the period from 1 August 2018 to 31 March 2019. Based on the transparent criteria from the tender documentation, HEP d.d. was appointed wholesale market supplier obliged to sell gas to public service suppliers over the defined period at the reference price of HRK 0.1809/kWh.

With regard to the previous *Decision on appointing the wholesale gas market supplier for the period from 1 August 2018 to 31 March 2019*, on 8 February 2019 HERA adopted the new *Decision on appointing a wholesale gas market supplier for the period from 1 April 2019 to 31 March 2020*, by which HEP d.d. was once again selected as the wholesale gas market supplier obliged to sell gas to public service suppliers over the defined period at the defined price of HRK 0.1985/kWh (a 9.7% increase compared to the previous period).

The final price of gas for households using the public service as of 1 April 2019 is specified in the *Decision on tariffs for gas supply as a public service for the period from 1 April to 31 December 2019 and for the period from 1 January to 31 March 2020 (Official Gazette No. 15/19)*, and is higher than the previously applicable price by 6.9% on average. The reason for this is the 9.7% increase in the wholesale component of the final gas price, i.e. the reference gas price.

Following public calls for tenders to select the wholesale market supplier, in response to which no tenders were submitted, it could be inferred that none of the gas suppliers and gas traders in 2018 and during 2019 were interested in assuming the role of the wholesale market supplier. Hence, taking into account an opinion of the Ministry of Environment and Energy, HERA selected the wholesale market supplier for shorter periods of one regulatory year instead of three, i.e. until 31 March 2021.

In July 2018, HERA organised the first public call for tenders to select a guaranteed supplier. The highest ranked tenderer was the energy entity GRADSKA PLINARA ZAGREB - OPSKRBA d.o.o., which was thus appointed as guaranteed gas supplier in Croatia for the period from 1 October 2018 to 30 September 2021. During that period, the guaranteed supplier will, under regulated circumstances, provide public gas supply service to end consumers left without a supplier under specific conditions.

The average tariff amounts for gas transmission in 2018 have not changed significantly as compared to 2017 (1.6% decrease). At the same time, the average realised unit fee for the use of the transmission system[4] in 2018 was HRK 0.0172/kWh, which is 11.3% less than in 2017. This is a result of a decrease in the realised capacity lease of the transmission system by transmission system users compared to the capacities planned when tariffs for the second regulatory period 2017–2021 were determined. Further, in December 2018 HERA conducted a regular revision of allowed revenues of the gas transmission system operator (PLINACRO d.o.o.) for the second regulatory period, and adopted the *Decision on tariff amounts for gas transmission in the second regulatory period 2019–2021 (Official Gazette No. 111/18)*. In this process, HERA analysed the economic efficiency of the operator's existing assets, establishing the justified value of the gas pipeline and, accordingly, the justified value of regulated assets, depreciation and the return on the operator's regulated assets as elements of the revised allowed revenue. Further, the coefficient for the calculation of the annual capacity was decreased, which cumulatively

4 *The ratio of total calculated fees for the use of the transmission system in 2018 and of the total transported quantity of gas.*

resulted in a 23.2% average decrease of the gas transmission tariffs in 2019 as compared to 2018.

In order to facilitate timely realisation of the LNG terminal project, in June 2018 HERA adopted indicative tariffs for the reception and dispatch of liquefied natural gas for LNG HRVATSKA d.o.o. and indicative tariffs for gas transmission for PLINACRO d.o.o., with regard to the implementation of the formal capacity lease procedure (hereinafter: open season procedure) for the liquefied natural gas terminal and for the gas transmission system.

From 18 December 2018 to 18 February 2019, HERA carried out the *Final consultation on the proposed methodology for setting the reference price in line with Article 26 of the Commission Regulation (EU) 2017/460* and the *Consultation on discounts, multipliers and seasonal factors in line with Article 28 of the Commission Regulation (EU) 2017/460*, based on which on 23 May 2019 it adopted the *Decision on the elements of the methodology for setting the reference price for gas transmission services* and the *Decision on discounts, multipliers and seasonal factors*. In accordance with these decisions, amendments to the *Methodology for setting tariffs for gas transmission* will be adopted.

In terms of monitoring the quality of supply, HERA has been collecting data on guaranteed gas supply quality standards since October 2014. The adoption of new *General terms and conditions for gas supply* in 2018 introduced a compensation for inadequate service quality applicable to guaranteed standards. HERA will continue collecting data in order to determine incentives and compensation for inadequate service quality for the remaining guaranteed standards in the upcoming period.

Further, after the adoption of the new *General terms and conditions for gas supply*, an improved IT system for supplier switching hosted by HROTE has simplified the supplier switching procedure, significantly shortening the deadline for supplier switching to 4 business days.

All of the above shows that the Croatian gas market is facing new changes in the upcoming years in terms of market development and competitive gas prices, protection of end gas consumers, improved service quality, and enhanced gas supply security.

2.3 Oil, petroleum products, and biofuels

In 2018, the oil, petroleum products, and biofuel sector was marked by a slight increase in the production of petroleum products, a continued increase in petroleum product imports, and a continued growth in transported quantities of crude oil via the oil pipeline system.

The total demand for crude oil in 2018 was 3.58 million tonnes, which is an increase of 3.1% compared to 2017. The volume of imported crude oil in 2018 was 2.97 million tonnes, 5.8% more than in 2017. Domestic production of crude oil amounted to 610 000 tonnes in 2018, which is a relative decrease of 8.6% compared to 2017, when the domestic production of crude oil was 667 000 tonnes.

The production of petroleum products in 2018 amounted to 3.8 million tonnes, which is a relative increase of 5.6% compared to 2017. The total production of liquefied petroleum gas in 2018 amounted to 254,000 tonnes, 5% more than in 2017.

The production of biofuels in 2018 amounted to 415 tonnes, which is an increase of 13.1% as compared to the 367 tonnes produced in 2017. Despite a mild increase in the production of biofuels in 2018, the years before 2018 had been marked by a strong downward trend in the production of biofuels, and the increase in 2018 cannot be considered as a significant recovery of biofuel production. The peak production of 39,476 tonnes of biofuels was recorded in 2012. In the years from 2013 to 2016, the production of biofuels was 33,400 t, 35,300 t, 17,400 t and 6,031 t respectively. The production in 2017 sharply decreased by 93.9% compared to 2016.The decrease in the

production of biofuels in 2017 compared to 2016 was a sharp 93.9%. The decrease in biofuel production is probably a result of adverse market trends, first caused by the termination of incentives for the production of biofuels for transport paid to biofuel producers.

2.4 Thermal energy

Even though the **Thermal Energy Market Act (Official Gazette No. 80/13)** adopted in 2013 introduced substantial changes to the regulation, organisation and functioning of the thermal energy sector, it did not lead to increased competition in thermal energy supply and thermal energy buyer activities, as had been expected. In centralised and closed heating systems, the thermal energy buyer activity and all energy activities related to the thermal energy sector are performed by the same vertically integrated energy entities, with no other thermal energy suppliers or buyers who would perform the supply and delivery of thermal energy. For independent heating systems, the thermal energy buyer activity is most often performed by energy entities performing energy activities in the thermal energy sector in a specific area, with other thermal energy buyers operating in some towns. In 2018, the register of thermal energy buyers, which is managed by HERA, contained 39 entities, 59% of which actively performed the thermal energy buyer activity. Four new businesses were recorded in the register of thermal energy buyers in 2018.

HERA issued four new licences for thermal energy production and two new licences for thermal energy supply. The new licences issued in 2018 are primarily a result of the construction of cogeneration facilities participating in the incentives system for promoting electricity production from renewable energy sources and cogeneration.

In 2018 HERA issued 15 decisions granting eligible electricity producer status for new cogeneration facilities using biogas and biomass. The majority of cogeneration facilities participating in the incentives system for promoting electricity production from renewable energy sources and cogeneration use produced thermal energy for their own needs or supply it to an energy entity (wood processing company or farm). A significant portion of thermal energy used for own needs pertains to the preparation of the primary energy source (wood chip drying or production of biogas). Such use of produced thermal energy is a consequence of minimal total annual efficiency requirements for incentivised prices of electricity delivered from biomass or biogas facilities. For high-efficiency cogeneration facilities using natural gas, the requirements for incentivised prices of delivered electricity are linked to primary energy savings. Despite the improving trend of thermal energy usage in cogeneration facilities with eligible electricity producer status, such facilities are usually constructed in order to produce electricity in locations without any significant demand for thermal energy.

Nevertheless, the use of renewable energy sources for thermal energy production is on the rise, and in 2018 first cogeneration facilities using biomass were connected to centralised heating systems. More precisely, in 2018 HERA granted decisions on eligible electricity producer status to HEP-Proizvodnja d.o.o. for cogeneration facilities using biomass in Osijek and Sisak (3 MW_{el} and 10 MW_{therm} in both facilities), thus ensuring that thermal energy produced from renewable energy sources is used in centralised heating systems of these two cities.

Apart from the construction of cogeneration facilities participating in the incentives system for promoting electricity production from renewable energy sources and high-efficiency cogeneration, there have been no major changes in terms of the development of thermal systems, i.e. the total number of end consumers of thermal energy, network length, as well as the installed capacity of production facilities of the existing energy entities, remained almost unchanged.

In 2018, there were changes in the prices of natural gas used for the public service of gas supply. In centralised heating systems where natural gas is used as an energy source for thermal energy production, there were no changes in tariff amounts for energy supplied to households, but the tariff was increased by an average of 23% for commercial consumers in Karlovac, Slavonski Brod and Vukovar compared to 2017. The tariff amount for energy in the centralised heating system Vojak (Rijeka), where fuel oil is used for thermal energy production, was not changed in 2018. The total price of thermal energy in the cities of Zagreb, Osijek, Sisak, Velika Gorica, Samobor, and Zaprešić, where HEP-Toplinarstvo d.o.o. provides thermal energy services remained the same in 2018.

In 2018, HERA resolved 57 cases in the thermal energy sector, including appeals, complaints, inquiries and other submissions by thermal energy end consumers, authorised representatives of co-owners, energy entities, thermal energy buyers, institutions and other parties. Compared to the previous period, and especially 2015 and 2016, which were marked by requests of end consumers and other legal and natural persons for opinions and interpretations of legislation, the submissions received in 2018 show a significant decline in the number of requests for interpretation of legislation and complaints in general. Instead, complaints and appeals primarily related to actions of energy entities and thermal energy buyers.

With regard to the allocation and calculation of costs for supplied thermal energy, the volume of work related to the installation of heat exchangers, heat cost allocators (dividers), and thermal energy meters (calorimeter thermometers) has significantly decreased in 2017 and 2018 compared to the period before the deadline for installation of this equipment (31 December 2016). This is due to several factors, including the upcoming amendments to the **Thermal Energy Market Act** announced by the ministry competent for energy.

In August 2018, the Croatian Government adopted the **Regulation on the Amendment to the Thermal Energy Market Act (Official Gazette No. 76/18)** in order to ensure that the gas price used for the production of thermal energy for household end consumers would be the same as the price used for gas household end consumers in the transitional period until 31 March 2021.

The **Act on Amendments to the Energy Efficiency Act (Official Gazette No. 116/18)** and the **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act (Official Gazette No. 111/18)** entered into force in late 2018. The most significant change introduced by the **Act on Amendments to the Energy Efficiency Act** relevant to energy activities is the modification of the required energy savings scheme specified by *Directive 2012/27/EC on energy efficiency*, which obliges energy suppliers to implement energy efficiency measures, and which could lead to higher energy prices for end consumers in the upcoming period. The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** and the adopted *Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration (Official Gazette No. 116/18)* specify the manner and conditions for the implementation of new incentive models consisting of market premiums and buy-off at a guaranteed price. The *Regulation*, however, does not provide for incentives for high-efficiency cogeneration using natural gas.

3 HERA'S ORGANISATIONAL STRUCTURE, POWERS AND ACTIVITIES

HERA is an independent, autonomous, non-profit legal entity which acts as a public authority competent for the regulation of energy-related activities. It was established in 2004 pursuant to the **Act on the Regulation of Energy Activities (Official Gazette No. 177/04)**.

HERA's activities are carried out in the interest of the Republic of Croatia and in accordance with its official authority.

HERA's work is public and all of its activities are conducted according to the principles of transparency, objectivity, and impartiality.

3.1 Organisation

HERA's structure is defined by the **Act on the Regulation of Energy Activities (Official Gazette No. 120/12)** and *HERA's Statutes* of 16 October 2013.

HERA consists of a Board of Commissioners, Office of the President of the Board of Commissioners, Independent Internal Audit Department, core operations divisions, administrative and support services.

HERA is governed by its Board of Commissioners, which is responsible for its professional work.

The President of the Board of Commissioners manages the board's work and represents HERA, he represents HERA in all proceedings before courts, administrative and other state authorities, and before legal entities vested with official authority. The President of the Board of Commissioners also takes all legal actions on behalf of and for the account of HERA, organises and manages HERA's operations, and is accountable for legal compliance of HERA's operations. The President of the Board of Commissioners has a deputy.

The divisions and services are in charge of HERA's core operations, and provision of administrative and support services.

The main organisational units are as follows:

- Electricity Division,
- Gas and Oil Division,
- Thermal Energy Division,
- Legal Affairs and Human Resources, and
- Support Services.

HERA's organisational chart is shown in Figure 3.1.1.

The divisions and services are managed by directors who are appointed by the President of the Board of Commissioners in accordance with public calls for applications. The directors are appointed to a term of four years with the possibility of re-appointment.

The directors of divisions and services manage the professional operations of the divisions, and are accountable to the President of the Board of Commissioners.

Pursuant to the *Decision of the Croatian Government on the fees charged for the regulation of energy-related activities (Official Gazette Nos. 155/08, 50/09, 103/09 and 21/12)*, HERA's operations are funded from the following sources:

- a fee calculated as 0.05% of the total annual revenue generated in the previous year by energy entities from the sale of goods and/or services resulting from their energy-related activities for which they hold valid licences, and

- fees charged for granting licences for energy-related activities, fees charged for approving the eligible producer status, and fees charged for the settling of appeals, complaints and requests.

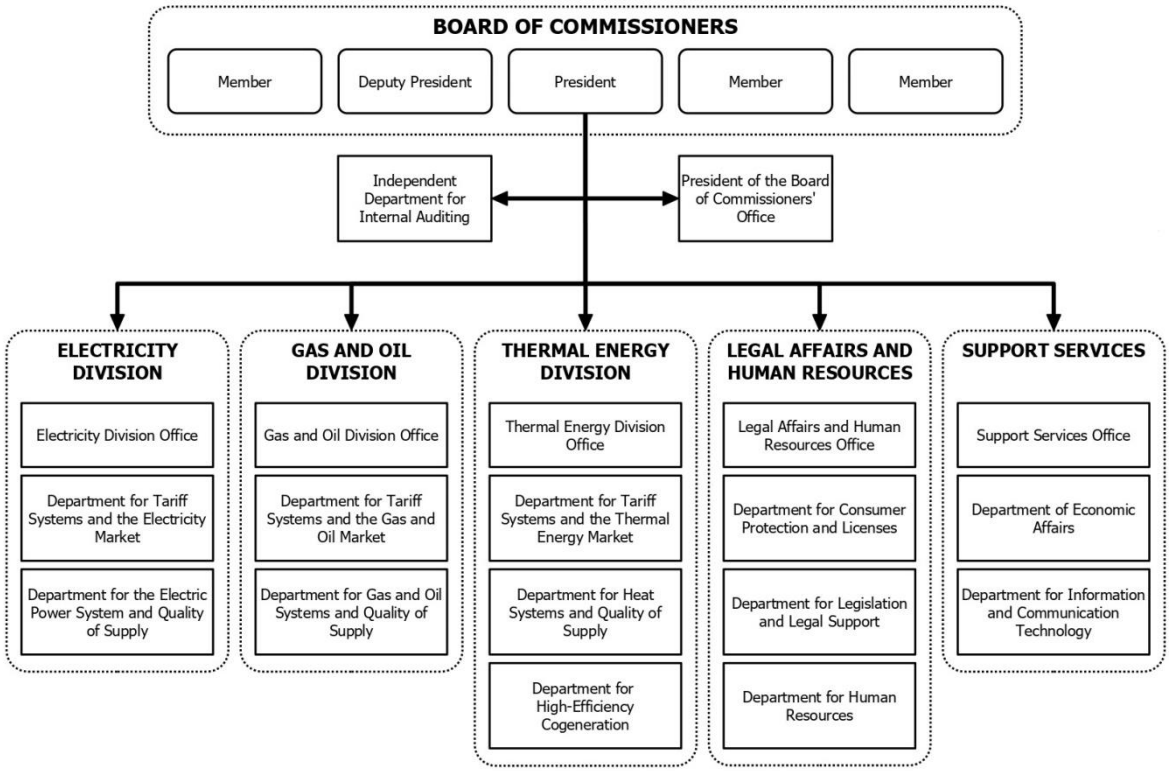


Figure 3.1.1 HERA organisational chart

Pursuant to the provisions of Article 8 of the **Act on the Regulation of Energy Activities**, HERA is accountable to Croatian Parliament for its operations.

The legality of HERA's operations, its general and individual acts is supervised by the ministry.

HERA's financial operations are supervised by a central state administration body, i.e. a legal entity vested with official authority for that purpose.

3.2 Legal framework

The legal framework regulating activities within HERA's area of competence includes of the following regulations:

- **Act on the Regulation of Energy Activities (Official Gazette Nos. 120/12 and 68/18)**,
- **Energy Act (Official Gazette Nos. 120/12, 14/14, 102/15 and 68/18)**,
- **Electricity Market Act (Official Gazette Nos. 22/13, 102/15 and 68/18)**,
- **Gas Market Act (Official Gazette No. 18/18)**,
- **Thermal Energy Market Act (Official Gazette Nos. 80/13, 14/14 and 76/18)**,
- **Oil and Petroleum Products Market Act (Official Gazette Nos. 19/14 and 73/17)**,

- **Act on Biofuels for Transportation (Official Gazette Nos. 65/09, 145/10, 26/11, 144/12, 14/14 and 94/18)**,
- **Renewable Energy Sources and High-Efficiency Cogeneration Act (Official Gazette Nos. 100/15 and 111/18)**,
- **Energy Efficiency Act (Official Gazette Nos. 127/14 and 116/18)**,
- **Act on Alternative Fuel Infrastructure Deployment (Official Gazette No. 120/16),**
- **Act on the Ratification of the Energy Community Treaty (Official Gazette – International Agreements Nos. 6/06 and 9/06),**
- **General Administrative Procedure Act (Official Gazette No. 47/09),**
- *Ordinance on Licences for Performing Energy-Related Activities and Maintaining Registers of Granted and Revoked Licences for the Performance of Energy-Related Activities (Official Gazette Nos. 88/15, 114/15 and 66/18),*
- *Decision on Fees Charged for the Regulation of Energy-Related Activities (Official Gazette Nos. 155/08, 50/09, 103/09 and 21/12)*, and
- other by-laws adopted pursuant to the **Energy Act** and other legislation regulating particular energy markets.

In July 2018, the Croatian Parliament adopted the **Decision Promulgating the Act on the Amendments to the Act on the Regulation of Energy Activities**, containing, *inter alia*, amended provisions concerning HERA's powers and obligations in terms of supervision over energy entities. This **Act** also obliges all natural and/or legal persons to respond to HERA's requests and submit all requested data, reports and other documents specified in HERA's request within a deadline set by HERA. HERA is obliged to respond to any written requests submitted by natural and/or legal persons concerning the matters in HERA's area of competence within 15 days. Some of the most important obligations arising from European legislation are derived from *Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency*, charging the national regulatory authorities with additional tasks relative to monitoring transparency and functioning of the European energy market. The amendments to the **Act on the Regulation of Energy Activities** from 2018 have provided HERA with powers necessary to perform these tasks.

3.3 Activities

HERA's activities are listed in the **Act on the Regulation of Energy Activities** (hereinafter: the **Act**), and include the following:

- granting, renewing, and transferring licences for the performance of energy-related activities, and revoking and suspending of licences,
- supervision of energy entities in their performance of energy-related activities,
- supervision of the implementation of provisions on unbundling pursuant to the law governing the energy sector and the laws governing the performance of particular energy-related activities,
- supervision of the keeping of separate accounts, as provided by the law governing the energy sector and other laws governing specific energy markets,
- supervision of compliance with the provisions ensuring that there are no cross-subsidies between energy-related activities pursuant to laws governing specific energy markets,

- supervision of compliance with the principles of transparency, objectivity, and impartiality in the work of energy market operators,
- approval of general acts that organise the electricity market and general acts that organise the natural gas market,
- adoption of decisions on eligible producer status and the suspension and revocation of eligible producer status,
- adoption of methodologies and tariff systems in accordance with this **Act**, the act governing the energy sector and other laws governing specific energy markets,
- setting or approving prices, tariffs and fees in accordance with the methodologies and tariff systems under Article 11, paragraph 1, item 9 of the **Act**,
- approval of investment, development and construction plans for energy systems pursuant to the laws governing specific energy markets,
- supervision of the compliance of investment, development, and construction plans of transmission system and transport system operators with ENTSO-E and ENTSOG development plans,
- supervision of transmission, transport, and distribution system operators (system owners), other energy entities or system users with respect to their compliance with the obligations laid down in the **Act**, the law governing the energy sector, and other laws governing specific energy markets, as well as with *Regulation (EC) No 714/2009 of the European Parliament and of the Council on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 (hereinafter: Regulation No 714/2009)* and *Regulation (EC) No 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005 (hereinafter: Regulation No 715/2009),*
- cooperation with the regulatory authorities of EU member states and the neighbouring countries, and with the Agency for the Cooperation of Energy Regulators (hereinafter: ACER),
- cooperation with the regulatory authorities and other authorities in the Energy Community pursuant to the **Act on the Ratification of the Energy Community Treaty**,
- implementation of the legally binding decisions of ACER and the European Commission,
- submission of annual reports to the Croatian Parliament containing information on activities undertaken and results achieved in relation to the scope of activities under Article 11, Paragraph 1, Items 1 to 8 of the **Act**,
- reporting to other competent national authorities, ACER, the European Commission, and other bodies of the European Union, including the submission of annual reports to ACER and the European Commission containing information on activities undertaken and results achieved in relation to the scope of activities under Article 11, Paragraph 1, Items 1 to 8 of the **Act**,
- laying down the requirements for the quality of energy supply in accordance with applicable regulations governing specific energy-related activities,
- laying down general requirements for energy supply,
- specifying and supervising the methodology for setting network/system connection fees for new consumers and for increasing the connection power/capacity for energy entities and end consumers,

- conducting cost-benefit analyses and obtaining opinions from representatives of consumer protection bodies with respect to introduction of advanced metering devices for end consumers,
- supervision of the quality of energy supply pursuant to applicable regulations governing specific energy markets,
- supervision of the transparency of the energy market,
- supervision of the level of openness, competition, and misuse on the energy market and in consumer supply,
- supervision of restrictive contracts, especially those restricting the number of suppliers, and informing the national competition regulator when required,
- supervision of free contracting in terms of supply contracts with the possibility of termination and long-term contracts, provided that they comply with EU legislation and policies,
- supervision of the time needed by transmission, transport, and distribution system operators for connection and repair works,
- providing assistance, together with other relevant authorities, to ensure the implementation of efficient and prescribed consumer protection measures,
- adopting recommendations related to the pricing of energy supply performed as a public service, at least once per year,
- providing consumers with the right to access information on their energy consumption, i.e. designing a format for presenting consumers with consumption data that is easy to understand and standardised at the national level, and establishing procedures by which consumers and suppliers may exercise their right to access consumption data such that consumers can enable the registered suppliers to obtain access to data on their consumption, whereas the parties responsible for managing their own consumption data shall provide such data to the suppliers; all these services shall be free of charge for consumers,
- supervision of the confidentiality of consumer energy consumption data,
- monitoring investments in electricity generation facilities with regard to supply security,
- issuing certificates to transmission and transport system operators in accordance with the provisions of the law governing the electricity market and the law governing the natural gas market,
- supervision of the application of the requirements for access to the gas storage system,
- monitoring the implementation of measures stipulated by the Croatian government for emergency situations pursuant to the provisions of the law governing the energy sector,
- encouraging the harmonisation of data exchange in the most important market processes at the regional level, and
- other activities.

In 2018, the Board of Commissioners held 32 meetings with a total of 379 agenda items discussed.

All decisions of the Board of Commissioners are published on HERA's website.

3.4 A general overview of HERA's activities and operations in 2018

3.4.1 Consumer protection

Within the area of its competence, HERA actively participates in consumer protection in a number of ways:

- by supervising energy entities and the quality of their services, and by collecting and processing data related to energy entities' activities in the field of consumer protection pursuant to the provisions of the **Energy Act** and the laws governing the performance of specific energy-related activities, as well as by cooperating with ministries and relevant inspectorates pursuant to the provisions of relevant laws, and
- by resolving individual consumer appeals and complaints by virtue of its official authority pursuant to the **Act on the Regulation of Energy-Related Activities** and other laws and regulations governing specific energy markets.

In order to protect their rights, energy consumers may submit to HERA appeals, complaints and other submissions related to energy entities in the fields of electricity, thermal energy, natural gas and oil.

In 2018, HERA received a total of 354 submissions from energy consumers, which included both energy consumer inquiries (45) and energy consumer appeals and complaints (309). A total of 8 court proceedings were initiated against HERA's actions in 2018 before the competent administrative court.

HERA was also actively involved in the work of the National Consumer Protection Council, with the aim to familiarize consumers in the energy sector with their rights and obligations and to introduce HERA as an authority that can be contacted in case any of their rights, that are guaranteed by regulations governing the energy sectors, have been violated.

In 2018, HERA closely cooperated with the Ministry of Economy, Entrepreneurship and Crafts and participated in *Trainings for consumer associations* (HERA participated in four rounds of trainings in 2018), and in the development and updating of the *Central Consumer Portal.* HERA also closely cooperated with other public and legal entities, as well as various consumer protection associations. HERA will continue this cooperation in the future, and maintain its contact with consumers in the form of direct answers to their inquiries, resolving matters relative to consumer rights and protection, etc.

3.4.2 Electricity

In 2018, HERA's activities in the electricity sector mainly involved the following:

- drafting and adopting by-laws governing the electricity market,
- implementing European Union regulations,
- issuing decisions on tariff amounts based on the methodology applicable to energy entities performing electricity-related activities as a public service,
- approving and monitoring the implementation of ten-year development plans for transmission and distribution networks,
- monitoring power losses in the transmission and distribution networks, and participating in the drafting of reports by the Council of European Energy Regulators (hereinafter CEER) on power losses,
- regular monitoring of the implementation of the rules for management and allocation of interconnection capacities and of compliance of the capacity allocation regime with *Regulation No 714/2009,*

- regular monitoring of balancing energy settlements and imbalance settlements in order to improve the regulations concerning balancing energy settlements and imbalance settlements, including the implementation of standard load profiles,
- collecting and processing data on the quality of electricity supply and participating in the drafting of CEER reports on the quality of electricity supply,
- implementing *Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (REMIT Regulation)* in order to prevent insider trading and market manipulation in cooperation with ACER,
- monitoring the separation of energy-related operations and unbundling of accounts for entities performing electricity-related activities as a public service (HEP ODS),
- granting 12 licences for the performance of energy-related activities (seven licences for electricity generation, one licence for electricity supply, and four licences for electricity trade),
- extending 18 licences for the performance of energy-related activities (11 licences for electricity production, one licence for electricity transmission, one licence for electricity distribution, two licences for electricity supply, and three licences for electricity trade),
- issuing decisions related to eligible electricity producer status: three decisions altering a preliminary decision, two decisions to change the project operator in a decision, 17 decisions extending a preliminary decision, 30 decisions on granting eligible electricity producer status, and
- resolving 266 appeals, complaints and inquiries from end consumers.

After consultation with the concerned stakeholders, HERA adopted the following by-laws in 2018:

- *Amendments to the Methodology for Setting Fees for the Connection to the Electric Power Network for New Network Users and for Increasing the Connection Capacity for Existing Network Users* (Official Gazette No. 31/18).
- *Amendments to the Requirements for the Quality of Electricity Supply* (Official Gazette No. 31/18),

HERA issued the following decisions on tariff amounts:

- *Decision on Tariffs for Guaranteed Electricity Supply* (Official Gazette No. 50/18) (for the period from 1 July to 31 December 2018),
- *Decision on Tariffs for Electricity Transmission* (Official Gazette No. 112/18),
- *Decision on Tariffs for Electricity Distribution* (Official Gazette No. 112/18),
- *Decision on Tariffs for Guaranteed Electricity Supply* (Official Gazette No. 102/18) (for the period from 1 January to 30 June 2019).

HERA adopted the following opinions and approvals:

- Opinion on the *Draft proposal for the Regulation on the Share of Net Electricity Delivered by Eligible Producers that Electricity Suppliers are Obliged to Take up from the Electricity Market Operator*,
- Opinion on the *Draft proposal for the Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration*,
- Opinion on the *Final proposal of the Act on Amendments to the Energy Efficiency Act*,
- Opinion on the *Draft final proposal of the Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act*,
- Opinion on the *Draft proposal of the Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act*,
- Opinion on the *Final proposal of the Act on Amendments to the Electricity Market Act*,

- Opinion on the *Final proposal of the Act on Amendments to the Act on the Regulation of Energy Activities*,
- Opinion on the *Proposal of the Ordinance on the Amendments to the Ordinance on Licences for Performing Energy-Related Activities and Maintaining Registers of Granted and Revoked Licences for the Performance of Energy-Related Activities*,
- Opinion on the *Draft final proposal of the Act on Amendments to the Electricity Market Act*,
- Opinion on the *Draft final proposal of the Act on Amendments to the Act on the Regulation of Energy Activities,*,
- Approval of the *Annual Energy Procurement Plan to cover losses in the transmission network for 2019* of Hrvatski operator prijenosnog sustava d.o.o.,
- Approval of the *Proposal of Rules on Amendments to the Rules for Non-standard Services* with its Annex: *Rates of non-standard services by Hrvatski operator prijenosnog sustava d.o.o.*,
- Approval of proposals for an Electricity delivery agreement to cover losses in the transmission network of Hrvatski operator prijenosnog sustava d.o.o.,
- Approval of commencement of implicit allocation of cross-zonal capacities for the day-ahead trading between Slovenian and Croatian bidding zones by Hrvatski operator prijenosnog sustava d.o.o.,
- Approval of the proposal of Annex I to the Business premises lease agreement of Hrvatski operator prijenosnog sustava d.o.o.,
- Denied approval of the proposal of the Agreement on the use of the network of the Velebit No. 60/18 reversible hydropower plant of Hrvatski operator prijenosnog sustava d.o.o.,
- Approval of the proposal of Annex I to the Business premises lease agreement of Hrvatski operator prijenosnog sustava d.o.o.,
- Denied prior approval of the proposals of agreements on the use of network of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of the proposal of the Agreement on mutual relations in relation to the calculation and collection of the transmission network usage fee of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of the proposal for an Electricity delivery agreement to cover losses in the transmission network in 2019 of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of proposals for contracts related to the procurement of ancillary services for 2019 of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of the *Proposal for rules for intraday capacity allocation between the Bidding Zones of Hrvatski operator prijenosnog sustava d.o.o. ("HOPS") and EMS AS Beograd ("EMS")* of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of the proposal of the Electricity Supply Agreement for a period of one year of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of the *Proposal for a network code for the distribution system* of HEP-Operator distribucijskog sustava d.o.o.,
- Prior approval of the *Annual report on the security of supply in the distribution system for 2017* of HEP-Operator distribucijskog sustava d.o.o.,
- Prior approval of the *Annual report on the security of supply of the Croatian electricity system for 2017* of Hrvatski operator prijenosnog sustava d.o.o.,
- Prior approval of the *Rules for alternative capacity allocation* of Hrvatski operator prijenosnog sustava d.o.o.,

- Prior approval of the *Proposal for Rules for non-standard services of distribution system operators* of HEP-Operator distribucijskog sustava d.o.o.,
- Prior approval of the *Proposal for the Amendments to the Rules on electricity market organisation* of HRVATSKI OPERATOR TRŽIŠTA ENERGIJE d.o.o.,

and the following decisions:

- Decision approving the *Proposal for a decision on determining national maximum capacity thresholds for power-generating modules type A, B, C and D, and the requirements for general application of all types of power-generating modules* of Hrvatski operator prijenosnog sustava d.o.o.,
- Decision approving the *Proposal for contributions to costs of establishment, changes and operation of single day-ahead and intraday coupling* of Hrvatski operator prijenosnog sustava d.o.o.,
- Decision approving the common p*roposal of all transmission system operators for the determination of LFC blocks in Continental Europe synchronous area developed in accordance with Article 141(2) of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation*,
- Decision approving the *Proposal for rules for physical transmission rights nomination for the borders between the trading zones of Austria, Croatia, Czech Republic, Germany, Hungary, Poland, Slovakia and Slovenia in accordance with Article 36 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation*,
- Decision approving the *proposal of all transmission system operators for a common grid model methodology developed in accordance with Article 6 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation*,
- Decision approving the *proposal of transmission system operators of the core region for amendment to the regional design of long-term transmission rights in accordance with Article 4(12) of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation*,
- Decision approving the *proposal of all transmission system operators for a common grid model methodology in accordance with Article 18 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation*,
- Decision on the proposal of a memo pertaining to the case: Common request for additional explicit intraday capacity allocation between the trading zones of Croatia and Slovenia,
- Decision on the prior approval of the *Proposal for rules on connection to the transmission network* of Hrvatski operator prijenosnog sustava d.o.o.,
- Decision approving the *Proposal for contributions to costs of establishment, changes and operation of single day-ahead and intraday coupling* of Hrvatski operator prijenosnog sustava d.o.o.,
- Decision on the prior approval of the *Proposal for rules on connection to the distribution network* of Hrvatski operator prijenosnog sustava d.o.o.,
- Decision on electricity prices for low voltage end consumers and electricity prices for high and medium voltage end consumers in accordance with Article 62(2) and (3) of the *Requirements for the Quality of Electricity Supply* (Official Gazette Nos. 37/17 and 47/17),
- Decision on denying the prior approval of the *Proposal for rules on connection to the transmission network* of Hrvatski operator prijenosnog sustava d.o.o.,

- Decision on the prior approval of the *Proposal for rules on connection to the distribution network* of HEP-Operator distribucijskog sustava d.o.o.,
- Decision approving the *Proposal for products that can be taken into consideration in the procedure of single intraday coupling* of Hrvatska burza električne energije d.o.o.,
- Decision approving the *Proposal for products that can be taken into consideration in the procedure of single day-ahead coupling* of Hrvatska burza električne energije d.o.o.,
- Decision approving the *Proposal for a methodology of back-up procedures* of Hrvatska burza električne energije d.o.o.

3.4.3 Natural gas

HERA's activities in the gas sector in 2018 were aimed at fulfilling the obligations in line with the provisions of the **Gas Market Act.** After public consultations in 2018 and in early 2019, HERA adopted the following by-laws:

- *General terms and conditions of gas supply (Official Gazette No. 50/18),*
- *Network Code for the gas distribution system (Official Gazette No. 50/18)*,
- *Methodology for setting tariffs for gas supply and guaranteed supply as public services (Official Gazette No. 34/18),*
- *Methodology for setting tariffs for gas transmission (Official Gazette Nos. 48/18 and 58/18),*
- *Methodology for setting tariffs for gas distribution (Official Gazette No. 48/18),*
- *Methodology for setting tariffs for gas storage (Official Gazette No. 48/18),*
- *Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 48/18),*
- *Methodology for calculating the fee for connection to the gas distribution or transmission system and for the connection capacity increase (Official Gazette No. 48/18), and*
- *Methodology for setting the price of non-standard services for gas transmission, distribution, storage, the reception and dispatch of liquefied natural gas, and public service gas supply (Official Gazette Nos. 48/18 and 25/19).*

approved the following by-laws:

- *Network Code for the Transmission System (Official Gazette Nos. 50/18 and 31/19),*
- *Gas Market Code (Official Gazette No. 50/18),*
- *Storage Code (Official Gazette No. 50/18), and*
- *Rules of operation of the liquefied natural gas terminal (Official Gazette No. 60/18).*

adopted the following decisions:

- *Decision on indicative tariffs for gas transmission (Official Gazette No. 56/18),*
- *Decision on indicative tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 56/18),*
- *Decision on tariffs for gas transmission (Official Gazette No. 111/18),*
- *Decision on tariffs for gas supply as a public service for the period from 1 April to 31 July 2018 for 34 public service gas suppliers (Official Gazette No. 23/18),*
- *Decision on appointing the wholesale gas market supplier for the period from 1 August 2018 to 31 March 2019 (HERA 6/18),*
- *Decision on tariffs for gas supply as a public service for the period from 1 August to 31 December 2018 and for the period from 1 January to 31 March 2019 for 34 public service gas suppliers (Official Gazette Nos. 60/18 and 61/18),*

- *Decision on appointing the wholesale gas market supplier for the period from 1 April 2019 to 31 March 2020 (HERA 2/2019),*
- *Decision on tariffs for gas supply as a public service for the period from 1 April to 31 December 2019 and for the period from 1 January to 31 March 2020 for 34 public service gas suppliers (Official Gazette No. 15/19),*
- *Decision on appointing the guaranteed gas supplier for the period from 1 October 2018 to 30 September 2021 (HERA 7/18),*
- *Decision approving the Proposal of the Terms of the guaranteed gas supply contract for GRADSKA PLINARA ZAGREB - OPSKRBA d.o.o., Zagreb end consumer (HERA 9/18),*
- *Decision granting approval for the prolongation of the concession period for the construction of a gas distribution system and for gas distribution activities for the Split-Dalmatia county (HERA 12/2018)*,
- *Decision granting approval for the prolongation of the concession period for the construction of a gas distribution system and for gas distribution activities for the Šibenik-Knin county (HERA 12/2018),*
- *Decision on the elements of the methodology for setting the reference price for gas transmission services in accordance with Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas (HERA 5/2019), and*
- *Decision on discounts, multipliers and seasonal factors in accordance with Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas (HERA 5/2019).*

HERA also:

- approved the *Auction Premium Allocation Agreement for the Dravszerdahely interconnection point,* concluded between PLINACRO d.o.o. Zagreb, the Croatian transmission system operator, and FGSZ Földgázszállitó Zrt., the Hungarian transmission system operator (HERA 3/2018).
- approved the *List of specific areas and specific points in the transmission system for a continuous determination of gas quality and corresponding connections in the area* developed by PLINACRO d.o.o., transmission system operator, (HERA 3/2018),
- approved the construction and commissioning of direct gas pipelines MRS Slobodnica – border with Bosnia and Herzegovina for the energy entity CRODUX PLIN d.o.o., Zagreb (HERA 4/2018),
- approved the *List of specific areas, specific points and corresponding connections in the transmission system area* developed by PLINACRO d.o.o.(HERA 12/2018),
- carried out the *Final consultation on the proposed methodology for setting the reference price in line with Article 26 of Commission Regulation (EU) 2017/460 establishing a network code on harmonised transmission tariff structures for gas* from 18 December 2018 to 18 February 2019,
- carried out the *Consultation on discounts, multipliers and seasonal factors in line with Article 28 of the Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas* from 18 December 2018 to 18 February 2019,
- issued three licences for gas trading activities,
- extended 13 licences for gas supply activities,
- extended one licence for gas transmission activities,
- extended one licence for gas storage activities,
- extended five licences for gas distribution activities, and
- resolved 47 appeals, complaints and inquiries from end consumers.

3.4.4 Oil and petroleum products

In 2018, HERA's carried out the following activities in the oil and petroleum products sector:

- issued 12 licences for energy-related activities (eight licences for the wholesale trade in petroleum products, one licence for the wholesale trade in liquefied petroleum gas, and three licences for the storage of liquefied petroleum gas), and
- extended 17 licences for energy-related activities (one licence for the transport of oil through pipelines, one licence for the production of petroleum products, two licences for the storage of oil and petroleum products, four licences for wholesale trade in liquefied petroleum gas, and nine licences for wholesale trade in petroleum products).

3.4.5 Biofuels

In 2018, HERA carried out the following activities related to the biofuel sector:

- issued one licence for wholesale trade in biofuels, and
- extended three licences for wholesale trade in biofuels.

3.4.6 Thermal energy

In 2018, HERA carried out the following activities in the thermal energy sector:

- issued six licences for energy-related activities (four licences for thermal energy production and two licences for thermal energy supply),
- extended 11 licences for energy-related activities (four licences for thermal energy production, two licences for thermal energy distribution and five licences for thermal energy supply),
- recorded four new entities in the Register of thermal energy consumers and updated the Records on thermal energy consumers, containing information relevant for monitoring thermal energy consumption submitted by thermal energy consumers,
- in line with Article 20 of the Thermal Energy Market Act and upon request of the Osijek City Council, HERA provided its opinion in relation to the offer from HEP-Toplinarstvo d.o.o. in the procedure for granting a thermal energy distribution concession for a centralised heating system in the City of Osijek,
- in line with Article 20 of the Thermal Energy Market Act and upon request of the Sisak City Council, HERA provided its opinion in relation to the offer from HEP-Toplinarstvo d.o.o. in the procedure for granting a thermal energy distribution concession for a centralised heating system in the City of Sisak,
- issued decisions related to eligible electricity producer status for cogeneration facilities: 15 decisions on eligible producer status for cogeneration using biogas and biomass, three decisions altering preliminary decisions on granting eligible electricity producer status, one decision altering a decision on granting eligible electricity producer status and 13 decisions extending a preliminary decision on granting eligible electricity producer status.
- supervised eligible electricity producers in terms of defined energy efficiency requirements, issuing 15 decisions determining primary energy savings for high-efficiency cogeneration using natural gas, 26 decisions determining the total annual facility efficiency for facilities using biomass and biogas, and one decision instructing the removal of identified deficiencies in order to achieve the defined total annual energy efficiency,
- carried out two inspections of energy entities due to complaints received from thermal energy end consumers,

- resolved 57 cases – appeals, complaints and inquiries – from thermal energy end consumers, authorised representatives of co-owners, energy entities, thermal energy consumers, institutions and other parties.

In relation to legislation applied in the thermal energy sector, HERA issued the following opinions:

- Opinion on the **Draft Regulation on Amendments to the Thermal Energy Act**,
- Opinion on the **Draft proposal of the Act on Amendments to the Thermal Energy Market Act**,
- Opinion on the **Final proposal of the Act on Amendments to the Energy Efficiency Act**,
- Opinion on the **Draft final proposal of the Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act**,
- Opinion on the **Draft proposal of the Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act**,
- Opinion on the **Final proposal of the Act on Amendments to the Act on the Regulation of Energy Activities**,
- Opinion on the **Draft final proposal of the Act on Amendments to the Act on the Regulation of Energy Activities,**,
- Opinion on the *Draft proposal of the Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration*, and
- Opinion on the *Proposal of the Ordinance on the Amendments to the Ordinance on Licences for Performing Energy-Related Activities and Maintaining Registers of Granted and Revoked Licences for the Performance of Energy-Related Activities*.

Energy entities engaged in thermal energy production and thermal energy distribution in centralised heating systems did not submit any requests to determine tariff amounts for thermal energy production and thermal energy distribution in 2018. However, the *Methodology for Setting Tariffs for Thermal Energy Production (Official Gazette No. 56/14)* provides for a simplified procedure for changing the tariffs in case of changes in the price of fuel used for thermal energy production. Out of six such requests to change tariffs for energy, submitted by four energy entities in 2018, in five cases HERA allowed for a publication and application of new tariffs, whereas in one case HERA issued a notification that the conditions for changing the tariffs have not been fulfilled, and therefore cannot be published and applied.

3.4.7 International cooperation

A significant portion of HERA's operations, pursuant to the **Act on the Regulation of Energy-Related Activities** and relevant EU legislation, concerns cooperation with national energy regulatory authorities in EU Member States and ACER as an official body of the European Union. Furthermore, HERA also cooperates with regulatory authorities from the neighbouring countries that are not EU member states, as well as with bodies within the Energy Community. HERA adequately provides information about its operations to ACER, the Commission, and other bodies when necessary.

In addition to taking part in working groups and task forces within ACER, HERA actively collaborates with European national regulators under CEER, which is a trade association of European regulatory authorities both from EU Member States and non-EU countries. The President of HERA's Board of Commissioners was one of the vice presidents of CEER's Board of Directors in the previous period.

At the level of the European Union, HERA participates in the activities of working groups established by the European Commission, which are tasked with improving physical connections and organisation of the internal energy market. HERA also participates in the activities of regional initiatives, such as the European Commission's CESEC (*Central and*

South Eastern Europe Gas Connectivity), whose initial aim was to improve and accelerate the development and integration of gas systems in this part of Europe. In 2017, the initiative was extended to cover electrical energy, renewable energy and energy efficiency sectors. Another initiative within ACER, the Gas Regional Initiative South South East (GRI SSE), aims for swifter implementation of network codes and market integration.

At the regional level, HERA is a member of the Mediterranean Energy Regulators (MEDREG), the Energy Regulatory Regional Association (ERRA), and the working bodies of the Energy Community.

In 2015, the European Commission published "A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy", which represents the European Union's new energy strategy. Mr Jean-Claude Juncker, president of the European Commission, has emphasised that the creation of the Energy Union is one of the European Union's political priorities.

The aim in creating the Energy Union is to significantly decrease European dependence on fossil fuels by removing barriers to the free flow of energy in a fully integrated energy system at the level of the entire European Union. In order to have a fully integrated energy market, it is necessary to continue with the cross-border coupling of electric power and gas systems, to implement and upgrade the management model of the internal energy market, to improve regional cooperation in a common European Union framework, and to provide new benefits and consumer protection, particularly with respect to vulnerable groups.

In order to achieve the outlined goals, on 30 November 2016 the Commission presented draft amendments to existing legislative framework concerning electricity, renewable energy sources, energy efficiency, eco-design, consumer protection, and Energy Union governance, jointly referred to as "Clean Energy For All Europeans". All of the proposed regulations have since been adopted. The Commission also announced amendments to the legislative framework for the gas sector. However, this will be a task for the new Commission assuming office in 2019.

Together with other regulators in ACER and CEER working groups, HERA was involved in the process of drafting amendment proposals to documents prepared by the Commission, and thus played an active role in the process of adopting new legislation at the EU level. At the national level and within its area of competence, HERA cooperated with the Ministry of Environment and Energy.

In addition to consumer protection, national energy regulatory authorities play an important role in the creation of an integrated common internal energy market through the implementation and monitoring of a common network code, both in the electrical energy and gas sectors. HERA cooperates with ACER and other national regulatory authorities in the implementation of a European network code and the organisation of a single European energy market in order to develop efficient competition and improve the security of supply, free of discrimination among suppliers from various Member States of the European Union and the Energy Community.

Energy is traded at regional and inter-regional energy exchanges. HERA primarily cooperates with ACER in order to ensure the harmonisation of regulatory frameworks among regions with the goal of establishing a competitive electricity and natural gas market.

A significant set of obligations under EU legislation arises from *Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (REMIT Regulation*) (hereinafter: *REMIT* or *REMIT Regulation*), which tasks national regulators with the monitoring of transparency and functioning of the European energy market. The 2018 amendments to the **Act on the Regulation of Energy Activities** have given HERA powers necessary to perform these tasks.

3.4.8 REMIT

On 25 October 2011, the European Parliament and the Council of the European Union adopted the REMIT Regulation introducing a harmonised framework for monitoring the wholesale electricity and natural gas markets in the European Union. Based on the *REMIT Regulation*, *Commission Implementing Regulation (EU) No 1348/2014 of 17 December 2014 on data reporting implementing Article 8(2) and Article 8(6) of Regulation (EU) No 1227/2011 of the European Parliament and of the Council on wholesale energy market integrity and transparency* (hereinafter: *the Implementing Regulation*) was adopted.

Before submitting data on transactions and orders to trade in wholesale markets, all wholesale market participants must register in the Centralised European Register of Energy Market Participants (CEREMP).

Roughly 100 participants in the electricity and/or natural gas markets were registered with CEREMP by the end of 2018.

ACER plays a central role in the implementation of the *REMIT Regulation*, as it collects information related to network status and allocations of cross-zonal capacities from transmission and transport system operators, as well as information on transactions and transaction orders from market participants or directly from organised markets as defined by REMIT. Based on such information relating to the entire European Union, ACER performs analyses and discovers potential misconduct on the energy market in the European Union, reports to national regulatory authorities, which are responsible for further investigation and possible sanctioning of market participants.

In order to provide timely information to relevant market participants, in 2018 HERA published its "REMIT HERA newsletter", which serves to inform market participants by electronic means.

In addition, HERA updated its website to allow market participants to report suspect transactions on wholesale markets, apply for exceptions to the prohibition of insider trading, and to report subsequent disclosures of inside information.

HERA continuously cooperates with the regulators in Austria, Slovenia, Hungary, and the Czech Republic, primarily in terms of exchange of experiences in the implementation of the *REMIT Regulation*. In 2018, Poland also joined this regional initiative.

In 2017, HERA and the regulatory authorities in Slovenia and Hungary were informed via the notification platform of a potential violation of the provisions of the *REMIT Regulation* in the natural gas sector. ACER coordinates this process, which has not yet been completed due to its complexity and involvement of several countries.

3.4.9 Council for Regulatory Affairs and Consumer Protection

Pursuant to HERA's Statutes and the *Rules of operation of HERA's Council for Regulatory Affairs and Consumer Protection,* HERA has established a Council for Regulatory Affairs and Consumer Protection (hereinafter: the Council), with the following responsibilities:

- providing opinions on regulations and methodologies adopted by HERA,
- providing opinions to HERA on proposals for legislation and other public policies relevant to the energy sector, upon request from the President of the Board of Commissioners,
- monitoring the implementation of regulations and methodologies adopted by HERA and proposing changes to the Board of Commissioners, and
- providing opinions to the Board of Commissioners on reviewed matters of significance to the energy sector in accordance with HERA's powers and responsibilities.

The Council held one session in 2018 to discuss the legislative proposal of the European Commission entitled the New Deal for Consumers package from April 2018.

4 ELECTRICITY

4.1 Significant events on the electricity market

Events in Croatia

In December 2017, HERA provided HEP ODS with a prior approval for the *Rules on the implementation of standard load profiles*, introducing multiple monthly loss coefficients as opposed to the single monthly loss coefficient, thereby compensating for the consequences of the difference in electricity charged via equal advance payments and the households' actual consumption.

In January 2018, the Croatian Government adopted the *Regulation on issuing energy approvals and establishing the conditions and deadlines for connecting to the electricity network,* which entered into force on 1 April 2018.

In March 2018, HERA adopted the *Amendments to the Methodology for setting electricity grid connection charges for new users and for increasing the connection capacity for existing users*, which entered into force on 9 April 2018.

In March 2018, HERA adopted the *Amendments to the Requirements for the quality of electricity supply* in order to harmonise them with the *Regulation on issuing energy approvals and establishing the conditions and deadlines for connecting to the electricity network*.

As of late March 2018, HOPS started allocating intraday capacities in both directions on the border with Hungary.

In May 2018, HROTE adopted the *Amendments to the Rules on electricity market organisation,* regulating the procedure of the suppliers' exit from the electricity market.

June 2018 marked the commencement of the coupling of the day-ahead markets of Croatia and Slovenia, which resulted in a multiple increase in the volume of day-ahead electricity trading on CROPEX.

In June 2018, HEP ODS adopted the *Rules for non-standard services for distribution system operators*.

In July 2018, the Croatian Parliament adopted the **Decision Promulgating the Act on the Amendments to the Act on the Regulation of Energy Activities**, containing, *inter alia*, amended provisions concerning HERA's powers and obligations in terms of supervision over energy entities.

In July 2018, the Croatian Parliament adopted the **Decision Promulgating the Act on the Amendments to the Electricity Market Act**, which enables electricity producers to obtain electricity for the pumping work of the reversible hydroelectric power plant on the wholesale market. Electricity producers at the billing metering point of a reversible hydroelectric power plant for the needs of pumping work are not considered to be end consumers. Energy used for pumping work is subject to a fee for the use of transmission and/or distribution network. Furthermore, the suppliers' obligation to issue a single invoice for electricity and network use to low-voltage industrial consumers has been repealed.

In July 2018, the Croatian Parliament adopted the **Decision Promulgating the Act on the Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** which, *inter alia*, defines users of self-supply installations, stipulates the launching of the EKO balance group's operations, sale of a part of electricity from the incentives system in the electricity market, and the by-laws which will regulate issues related to the classification of production plants, methodology for establishing the share of energy from renewable energy sources in the total immediate consumption, issues related to the

status of eligible electricity producer from renewable energy sources, as well as fees for members of the EKO balance group.

In July 2018, HEP ODS adopted the *Network Code for the Distribution System*, regulating the technical conditions of connecting distribution network users to the electricity distribution network, planning of network development, network operation and management and network usage.

In December 2018, HERA adopted the *Decision on electricity transmission tariffs* and the *Decision on electricity distribution tariffs* whereby the tariffs for electricity transmission and distribution were reduced for certain end consumer categories/models. For high-voltage industrial end consumers, the tariffs were reduced by 10%, for medium-voltage industrial end consumers by 15%, and for low-voltage industrial end consumers using tariff model Red, the tariffs were reduced by 15%.

In December 2018, HOPS adopted the *Rules on amendments to the Rules for non-standard services of the Croatian Transmission System Operator,* repealing the fee for issuing conditions for connecting to the electricity network and increasing the approved connection capacity.

In December 2018, the Croatian Government adopted the *Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration,* which elaborates in detail the method and conditions for the implementation of the new incentives model by granting a market premium or paying the guaranteed buy-off price, setting the maximum reference values, setting the maximum guaranteed buy-off prices, contracting procedures and setting incentives quotas.

In December 2018, the Croatian Government adopted the *Regulation on the share of net electricity delivered by eligible producers that electricity suppliers are obliged to take up from the electricity market operator,* stipulating that electricity suppliers are obliged to take up from electricity market operators 70% of net delivered electricity of eligible producers from the incentives system.

In February 2019, HERA adopted the *Methodology for setting tariffs for guaranteed electricity supply,* which takes into account expected price changes in the retail electricity market and whose implementation will result in tariffs that provide a higher average price for guaranteed supply than the one on the retail electricity market.

In March 2019, HERA adopted new tariffs for guaranteed electricity supply which are implemented as of 1 April 2019.

International events

The European Union has been very active in terms of developing a package of documents on *Clean Energy for All Europeans*, aimed at increasing the share of renewable energy sources and increasing energy efficiency. The following documents were published in 2018:

- *Directive* (EU) *2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency*,
- *Directive(EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources,*
- *Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency,*
- *Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council*

Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council.

The remaining documents are expected to be published in mid-2019, which will transform the existing wholesale and retail markets in all EU Member States, namely *Directive on common rules for the internal market in electricity (recast), Regulation on the internal market for electricity (recast), Regulation establishing a European Union Agency for the Cooperation of Energy Regulators (recast),* and *Regulation on risk-preparedness in the electricity sector.*

Since June 2018, CROPEX has completed the project of coupling the Croatian and Slovenian day-ahead markets through the MRC project, which represents a significant step forward in terms of efficiency of using cross-zonal capacities and creating a reliable reference hourly price of electricity in the Republic of Croatia.

In 2018, HERA approved several methodologies at the pan-European and regional levels, whose adoption had been foreseen by any one of the eight European regulations from the Network Codes and Guidelines package, aimed at creating a functional single electricity market in the entire EU.

Thus, in accordance with the *Commission Regulation establishing a Guideline on Capacity Allocation and Congestion Management* (CACM) (hereinafter: *CACM Regulation*), HERA approved the following acts that will be enforced throughout the EU, namely the methodology of back-up procedures, products that can be taken into account in the procedure of single day-ahead coupling and products that can be taken into account in the procedure of single intraday coupling.

Given the lack of agreement by all national EU regulatory agencies regarding the approval of the acts, in accordance with the *CACM Regulation*, in 2018 ACER adopted *Decision no. 04/2018 on intraday cross-zonal gate opening and closure times* and *Decision no. 8/2018 on the price coupling algorithm and on the continuous trading matching algorithm*.

In addition, at the level of the CORE region for the calculation of capacities, in accordance with the *CACM Regulation* ACER adopted *Decision no*. *10/2018 on fallback procedures for capacity allocation.*

With regard to the *Commission Regulation establishing a guideline on forward capacity allocation (FCA)* (hereinafter: *FCA Regulation)*, HERA approved the common grid model methodology which will be applied throughout the EU, as well as the rules of nomination of physical rights of transmission for the borders between the trading zones of Austria, Croatia, the Czech Republic, Germany, Hungary, Poland, Slovakia and Slovenia.

At the CORE region level, in accordance with the FCA Regulation, HERA approved an alteration to the regional concept of long-term transmission rights.

In accordance with the *Commission Regulation establishing a network code on requirements for grid connection of generators Requirements for Generators – RfG)* (hereinafter: *RfG Regulation),* HERA approved HOPS's proposal for the approval of national maximum capacity thresholds and general application requirements for all types of production modules which will be applied for connecting new producers to the transmission or distribution networks.

These connection requirements, as well as additional requirements for the connection of more significant end consumers in accordance with the *Commission Regulation (EU) establishing a network code on demand connection (*hereinafter: *DCC Regulation)* and the high voltage direct current systems and direct current-connected power park modules in accordance with the *Commission Regulation (EU) establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules* (hereinafter: *HVDC Regulation)* will have a major influence on the connection procedures of all new network users and will give rise to amendments to several by-laws.

Thus, in accordance with the *Commission Regulation establishing a guideline on electricity transmission system operation* (*System Operational Guideline – SOGL)* (hereinafter: *SOGL Regulation),* HERA approved the proposal of a common grid model methodology which will be applied in the EU.

In October 2018, the common trading zone between Germany, Luxembourg and Austria ceased to exist after Austria left the trading zone following ACER's conclusion that such a large zone causes significant unreported and unforeseen flows in Central Europe.

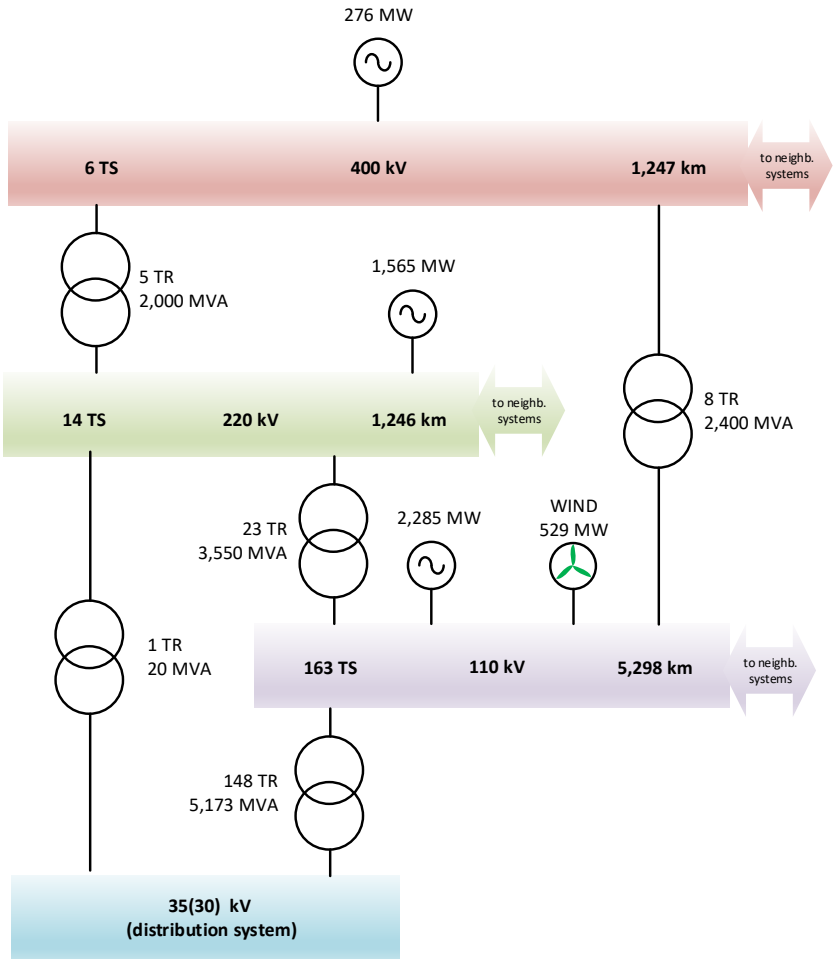
4.2 Regulated network activities in the electricity sector

4.2.1 Transmission and distribution system

Electricity transmission and distribution are regulated energy activities performed as public services.

In Croatia, HOPS provides the public service of electricity transmission and is responsible for the operation, management, maintenance, development, and construction of the transmission network and cross-zonal transmission lines, as well as for ensuring the long-term capability of the network to satisfy reasonable requirements for the transmission of electricity.

Figure 4.2.1 shows basic information on the number of transformer substations (TS) and transformer ratings (TR), length of lines, and the power of connected power plants in the transmission system.

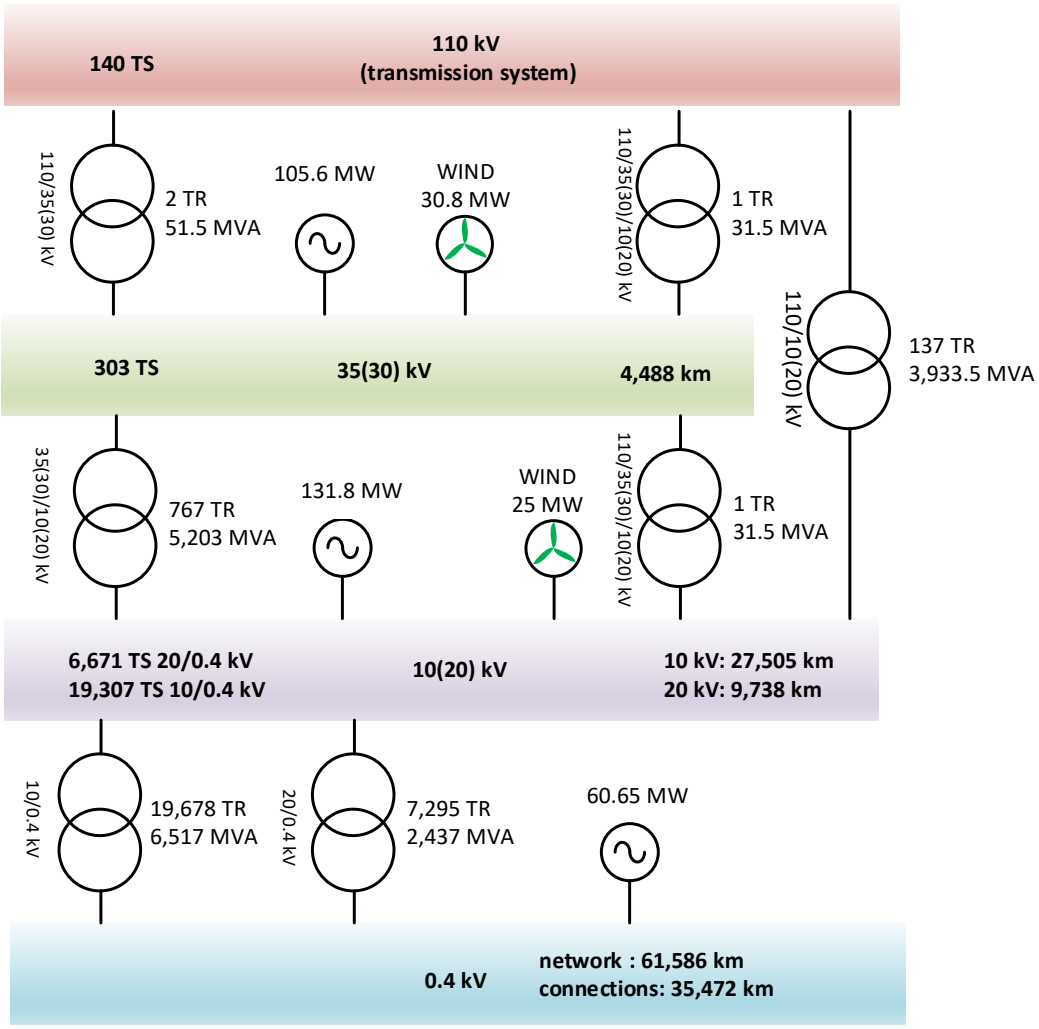


Source: HOPS

Figure 4.2.1 Basic information about the transmission system as of 31 December 2018

In Croatia, HEP ODS provides the public service of electricity distribution, and is responsible for the operation, management, maintenance, development and construction of the distribution network, as well as for ensuring the long-term capability of the network to satisfy reasonable requirements for the distribution of electricity.

Figure 4.2.2 shows basic information on the number of transformer substations (TS) and transformer ratings (TR), length of lines, and the power of connected power plants in the distribution system.



Source: HEP ODS

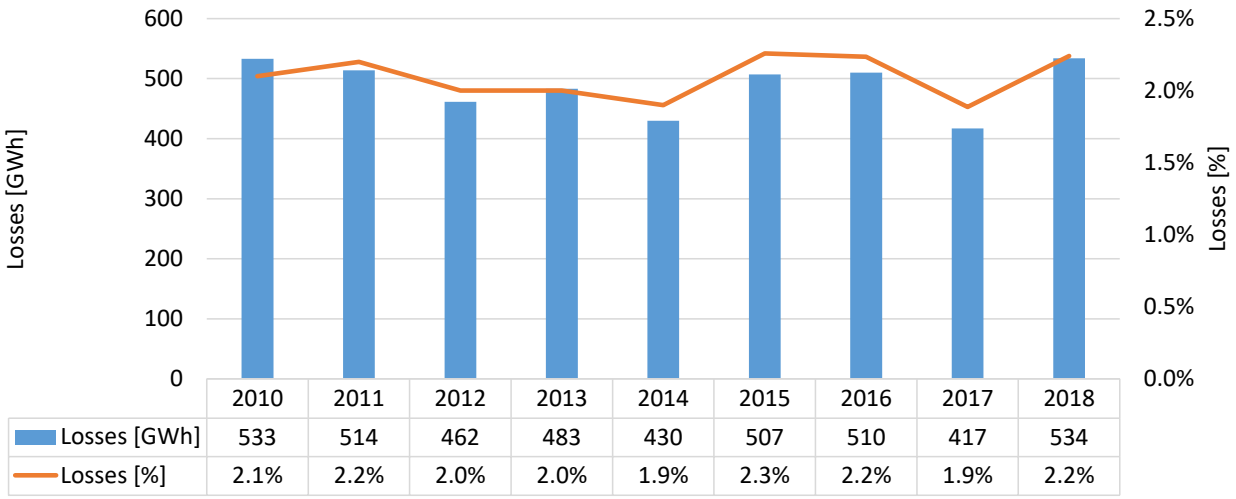
Figure 4.2.2 Basic information about the distribution system as of 31 December 2018

4.2.2 Losses in the transmission and distribution networks

Losses in the transmission network in 2018

Power losses in the transmission network in 2018 amounted to 534 GWh, or 2.2% of total transmitted electricity.

Figure 4.2.3 shows losses in the transmission network from 2010 to 2018.



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Losses [GWh]	533	514	462	483	430	507	510	417	534
Losses [%]	2.1%	2.2%	2.0%	2.0%	1.9%	2.3%	2.2%	1.9%	2.2%

Source: HOPS

Figure 4.2.3 Power losses in the transmission network from 2010 to 2018

The electricity to cover losses in the transmission network in 2018 was purchased on market principles by a long-term contract concluded based on a public auction with given quantities and the lowest price criterion, where HEP d.d. was selected as the most favourable bidder, and by short-term trading on CROPEX.

For short-term purchase of electricity to cover the losses, HOPS used reconciliation of the volume of electricity surpluses or deficits to cover the losses, which would otherwise have been traded on CROPEX, with expected imbalances arising from the incentives system. In this way HOPS reduced the volume of electricity that would otherwise have to be purchased in the short-term to cover the losses. The volume in question is 33.4 GWh.

Given the above, the total cost of electricity purchased to cover losses in the transmission network for 2018 was HRK 204 million.

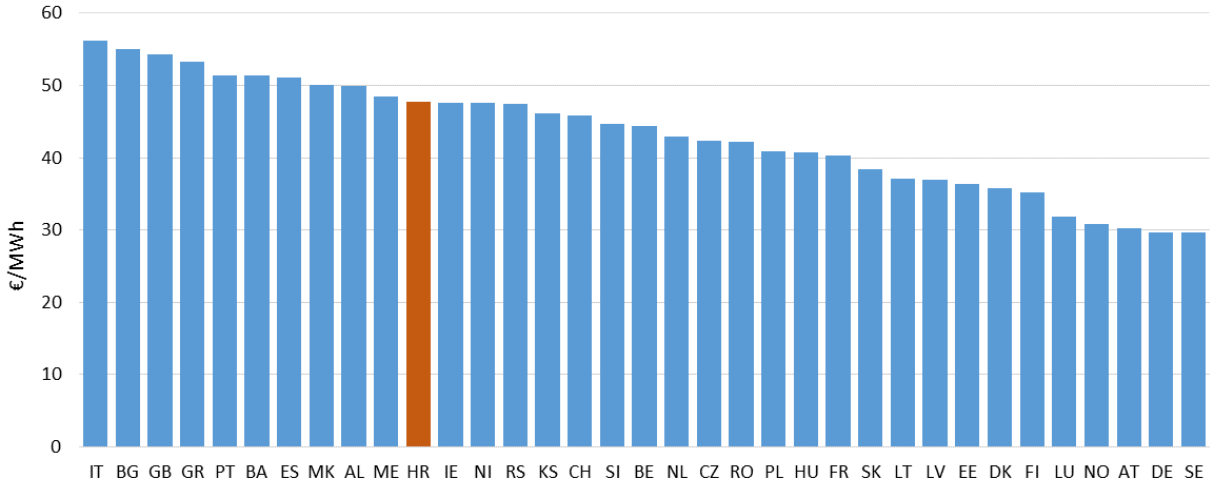
In order to compare the unit costs of losses of HOPS and HEP ODS, the estimated value of the reconciled electricity should be taken into account. Once the reconciled electricity is included, the estimated total cost of electricity purchased to cover losses in the transmission network amounted to around HRK 214 million, which yields the unit cost of losses in 2018 of 402 kn/MWh, as shown in Table 4.2.1.

Table 4.2.1 Costs and revenues from purchase of electricity to cover losses in the transmission network in 2018

Item	Volume [GWh]	Cost [HRK mil.]	Unit cost [HRK/MWh]	Unit cost [€/MWh][5]	Proportion of the volume [%]	Proportion of the volume [%]
Long-term contract	-350.4	-125.46	358	48	66%	58%
Short-term purchase on CROPEX	-136.7	-51.81	379	51	26%	24%
Short-term sale on CROPEX	0.7	0.2	286	38	0%	0%
Reconciliation with EES balancing energy	-33.4	-12.12	363	51	6%	6%
Imbalance in the first settlement of imbalances	-17.7	-27.00	1,523	204	3%	13%
Imbalance in the second settlement of imbalances	3.8	1.82	477	64	-1%	-1%
Incurred losses	**-533.7**	**-214.38**	**402**	**54**	**100%**	**100%**

[5] *€ 1 = HRK 7.45*

Figure 4.2.4 provides a price comparison for the ITC agreement, in accordance with *Commission Regulation (EU) no. 838/2010 of 23 September 2010 on laying down guidelines relating to the inter-transmission system operator compensation mechanism and a common regulatory approach to transmission charging,* for 2018 between individual countries.



Source: ENTSO-E

Figure 4.2.4 Unit prices for covering losses for 2018 for the needs of the ITC mechanism

Observations on losses in the transmission network for 2018

In 2018, HOPS divided long-term purchase of electricity for covering losses into two products, one for a one-year period (2018, 35 MWh/h basic), at the price of HRK 359.43/MWh, and another for a two-year period (2018 and 2019, 5 MWh/h basic), at the price of HRK 348.38/MWh.

In 2018 HOPS also carried out two public auctions for the purchase of electricity for covering losses - in April/May for 2019, 2020 and 2021 (10 MWh/h basic, with prices set at HRK 370.28/MWh, HRK 368.14/MWh and HRK 357.87/MWh, respectively), and in November for 2019 (20 MWh/h basic, with the price of HRK 467.24/MWh).

Based on the above, three basic products were purchased for 2019 to cover losses.

In 2018, HERA approved the 2019 procurement plan for losses, which anticipates losses in the amount of 465 GWh. In that plan, HOPS anticipated the procurement of about 70% of planned electricity on an annual level (basic) in a public auction and the remaining 30% by purchase on CROPEX on the day-ahead and intraday markets. The planned purchase price is HRK 427.99/MWh.

The absolute and relative value of power losses in the transmission network in 2018 was the lowest in the observed period of nine years, Figure 4.2.3. It deviates significantly (by 34 GWh) from the volume of losses planned for 2018 (500 GWh). According to HOPS, this was a result of low temperatures, increased hydrology and significantly increased transits of electricity, especially in early 2018.

However, the difference also arises from the fact that the planned value is based on average incurred losses in the transmission network from the previous years, not taking into account a number of other factors that influence the load and, consequently, power losses.

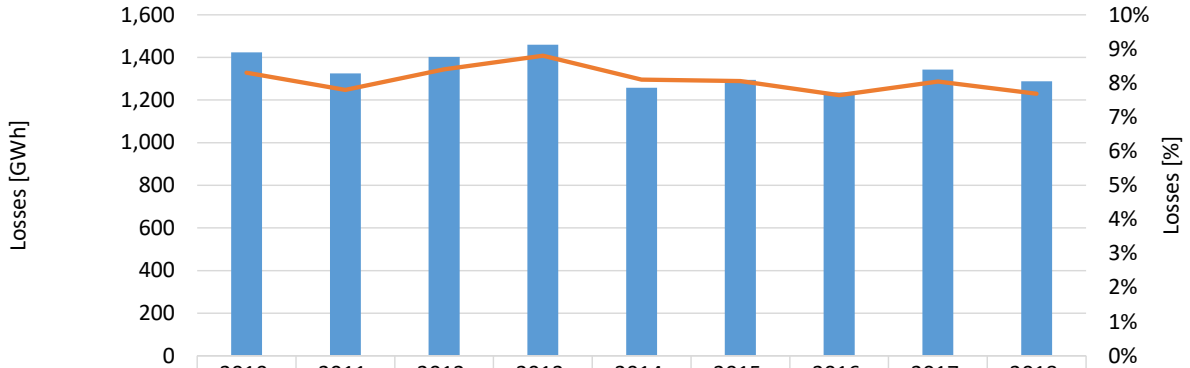
The approved purchase price of electricity to cover losses for 2018 was HRK 359.93/MWh, while the estimated unit cost of losses was HRK 402/MWh. Taking into account only the share procured in the market, the prices are approximately the same. However, the cost of balancing was neither estimated nor calculated in the planned price, and it accounts for as much as 12% of the total cost of losses.

In 2019, HOPS and CROPEX intend to organise an auction for the supply of electricity to cover losses in 2020, 2021 and 2022, via the trading platform on CROPEX.

Losses in the distribution network in 2018

The power losses in the distribution network in 2018 amounted to 1,288 GWh or 7.7% of electricity taken up by the distribution network.

Figure 4.2.5 shows losses in the distribution network from 2010 to 2018.



	2010.	2011.	2012.	2013.	2014.	2015.	2016.	2017.	2018.
Losses [GWh]	1,424	1,325	1,402	1,459	1,257	1,295	1,235	1,343	1,288
Losses [%]	8.3%	7.8%	8.4%	8.8%	8.1%	8.1%	7.6%	8.0%	7.7%

Source: HEP ODS

Figure 4.2.5. Power losses in the distribution network from 2010 to 2018

The procurement of necessary quantities of energy to cover losses in the distribution network was carried out by a public auction in the form of two long-term products - basic and variable. The volume of basic electricity is a constant value of electricity for every hour in a month, while the variable part is the difference between incurred losses in the first calculation of realisations in a month and the volume of basic electricity. The estimated total cost of 1,287.6 GWh of electricity to cover the losses in the distribution network amounted to approximately HRK 536 million, which yields the unit cost of electricity to cover losses in 2018 of HRK 416/MWh, Table 4.2.2.

This also includes the cost of imbalance as, under the concluded procurement agreement, the supplier covers the cost of imbalances and incorporates it into the price offered in the bid.

Table 4.2.2 Costs and revenues from the purchase of electricity to cover losses in the distribution network in 2018

Item	Volume [GWh]	Cost [HRK mil.]	Unit cost [HRK/MWh]	Unit cost [€/MWh]	Proportion of the volume [%]	Proportion of the volume [%]
Basic electricity	-914.0	-394.77	432	58	71%	74%
Variable energy	-422.4	-162.19	384	52	33%	30%
Imbalance in the second settlement of imbalances	48.8	21.07	432	58	-4%	-4%
Incurred losses	-1,287.6	-535.90	416	56	100%	100%

Observations on losses in the distribution network for 2018

In 2019, HERA approved the electricity procurement plan for the coverage of losses for 2019, which anticipates losses in the amount of 1,308 GWh, at the price of HRK 521.10/MWh. The approval procedure was prolonged due to non-compliance of certain HEP ODS data and slow responses to HERA's requests to submit additional data.

In December 2018, HEP ODS carried out a public auction for the procurement of electricity to cover the losses for the first six months of 2019, in the form of a single long-term product. The approximate contracted volume was 614 GWh at the price of HRK 563.57/MWh.

However, even though a public auction is carried out for the procurement of electricity to cover the losses in the distribution system, there is always just one bidder applying in such auctions - HEP d.d.

Furthermore, the use of equal anticipated monthly consumption amounts for end consumers with semi-annual billing period results in unrealistic monthly coefficients of power losses in the distribution system. Also, the losses in the second settlement of imbalances are considered as the difference in electricity delivered (measured) to the distribution system and the electricity calculated for end consumers (issued invoices based on measured energy and based on advance payments).

As these monthly coefficients are used to plan the purchase of losses, this also causes significant differences between planned and incurred losses. The planned volume to cover losses for 2018 was 1,343 GWh, which represents a difference of approximately 55 GWh.

There is also a difference between the planned (HRK 388/MWh) and factual (HRK 416/MWh) purchase price of electricity for covering losses for 2018. HEP ODS planned the price using the baseload price at the Hungarian Power Exchange HUPX by quarters *(Physical Futures market - PhF*), with the added estimate of supplier costs.

Although HEP ODS purchases over 2.5 times more electricity to cover losses than the volume purchased by HOPS, HEP ODS's unit cost of electricity to cover losses was higher by about HRK 14/MWh. This difference is a result of the fact that HEP ODS purchases larger quantities of electricity to cover losses than actually necessary in the months when electricity is most expensive, which makes the suppliers' position easier, as it purchases a part of electricity for their end consumers, which increases the unit cost of electricity to cover losses. Moreover, HOPS itself plans and assumes the costs of imbalances, while HEP ODS transfers them to the supplier.

HEP ODS has notified HERA that it is working on an experimental hourly plan of day ahead electricity purchase, which it compares to the corresponding supplier's plan. Although the current purchase method is still more cost-efficient, HEP ODS intends to start with independent purchase of electricity to cover losses.

The share of non-technical losses in the distribution network is estimated at 49% of the total losses, and comprises losses caused by electricity theft, and deficiencies in the measurement/readout/calculation of electricity consumption. HEP ODS reported that is has appointed a Working Group to monitor and improve connections and billing metering points The Group adopted new guidelines and instructions with the aim of reducing non-technical losses. In the coming period, HEP ODS intends to take additional measures and activities to reduce losses and increase energy efficiency.

In accordance with the above, HERA has invited HEP ODS to present, by the end of May, a proposal for an enhanced method of calculating the necessary volumes of electricity to cover the losses in the distribution network, as well as an enhanced model for the purchase of electricity to cover losses for 2020 and 2021.

4.2.3 Development plans for transmission and distribution networks

Ten-year development plan for the transmission network (2019 – 2028)

In September 2018, HOPS submitted for HERA's approval the *Ten-year development plan for the transmission network (2019 - 2028), with a detailed elaboration for the initial three- and one-year periods,* which is functionally harmonised with the 2016 ten-year development plan for the EU transmission network (hereinafter: TYNDP 2016).

Total planned financial investments in the development of the transmission network for the ten-year period (2019 - 2028) amount to approximately HRK 6.6 billion, of which investments conditional on connecting new users to the network and increasing the connection capacity of existing users amount to approximately HRK 246 million. HOPS plans to co-finance the investments through EU grants in the amount of around HRK 434 million.

Table 4.2.3 shows realised annual investments in the HOPS network from 2014 to 2018.

Table 4.2.3 Realised annual investments in the transmission network from 2014 to 2018 in million HRK

Type of investment	2014	2015	2016	2017	2018
Investment preparation	7.9	8.4	12.6	8.9	12.3
Replacements and reconstruction	201.2	189.2	166.2	159.6	161.6
Revitalisations	49.9	61.5	59.0	72.5	72.0
New facilities	85.8	90.3	71.1	85.9	97.1
Other investments	35.1	37.9	34.9	55.3	60.7
Electric power grid conditions and connections	43.8	64.2	33.7	61.1	18.8
Total	**423.7**	**451.5**	**377.5**	**443.3**	**422.5**

Source: HOPS

Ten-year development plan for the distribution network (2019 - 2028)

In October 2018, HEP ODS submitted for HERA's prior approval the *Ten-year (2019 - 2028) development plan for the HEP ODS distribution network with a detailed elaboration for the initial three- and one-year periods*.

Total planned financial investments in the development of the distribution network for the ten-year period (2019 - 2028) amount to approximately HRK 10 billion, of which investments conditional on connecting new users to the network and increasing the connection capacity of existing users amount to approximately HRK 3.5 billion.

Table 4.2.4 shows realised annual investments in the HEP ODS network from 2014 to 2018. There is a noticeable reduction in total investments in 2018, partly due to protracted public procurement procedures and project issues related to property rights, as well as changes in the legislative framework pertaining to the construction sector.

Table 4.2.4 Realised annual investments in the distribution network from 2014 to 2018 in million HRK

Type of investment	2014	2015	2016	2017	2018
Investment preparation	17.8	10.7	20.0	27.9	11.1
Replacements and reconstruction	276.8	268.6	268.9	228.0	206.1
Revitalisations	19.3	16.8	21.9	19.2	23.3
Repairs and renovations	1.5	0.8	0.4	0.1	2.3
New facilities	210.4	146.6	153.2	126.9	138.2
Other investments and development	133.8	225.2	191.3	208.2	191.6
Electric power grid conditions and connections	219.5	250.0	301.1	313.3	305.0
Total	**879.1**	**918.7**	**956.8**	**923.5**	**877.6**

Source: HEP ODS

Observations on the development plans for transmission and distribution networks

The ten-year development plan creates preconditions for an efficient preparation of construction, timely planning and ensuring financing, as well as harmonisation of timelines and competences in the construction of joint facilities of transmission and distribution system operators. HOPS and HEP ODS continued the good practice of harmonised their plans in terms of construction dynamic and financing of joint facilities (TS 110/x kV).

In the ten-year plan for the transmission network, all projects specified in TYNDP 2016 were considered on an equal basis as other HOPS investments. With regard to the

construction of new cross-zonal lines, HERA considers the existing cross-zonal capacities to be sufficient, given that the sum of average Net Transfer Capacities (hereinafter: NTC) on all borders is 4.000 MW for both the incoming and outgoing directions. In terms of their significance and sources of investment, the SINCRO.GRID project and replacement of all submarine cables stand out.

SINCRO.GRID was declared as a PCI project of common interest for the European Union and 51% of the project value was financed through CEF grants.

The project of replacing all 110 kV submarine cables, also eligible for EU funding, aims at increasing the continuity of electricity supply on the islands.

HEP ODS has also focused on measures to reduce losses in the distribution electricity grid as part of its efforts to increase energy efficiency. In 2018, HEP ODS initiated the implementation of the Smart grid pilot project, co-financed from EU funds.

In general, planned investments in the transmission and distribution network were similar to those in previous years. Based on the plans submitted, HERA is of the opinion that the planned total income of HOPS and HEP ODS is sufficient to cover the annual investments in the next three-year period.

4.2.4 Tariffs for transmission and distribution network usage and connection charges

Average network charges

Table 4.2.5 shows average transmission network charges, while Table 4.2.6 shows average distribution network charges in the period 2014 – 2018 for different end consumer categories.

Average transmission and distribution charges are determined according to the realised income by end consumer category, calculated by applying appropriate tariffs from the tariff systems for the transmission and distribution of electricity.

Table 4.2.5 Average transmission charges for the period 2014 – 2018

End consumer category	2014 [lp/kWh]	2015 [lp/kWh]	2016 [lp/kWh]	2017 [lp/kWh]	2018 [lp/kWh]
Industrial – high-voltage	7.0	7.1	6.6	6.7	7.2
Industrial – medium voltage	7.9	7.8	7.7	7.6	7.6
Industrial – low-voltage	8.9	8.9	8.9	8.9	9.0
Households	8.9	8.9	8.9	8.9	8.9
Average for all categories	**8.5**	**8.5**	**8.5**	**8.4**	**8.5**

Table 4.2.6 Average distribution charges for the period 2014–2018

End consumer category	2014 [lp/kWh]	2015 [lp/kWh]	2016 [lp/kWh]	2017 [lp/kWh]	2018 [lp/kWh]
Industrial – high-voltage	-	-	-	-	-
Industrial – medium voltage	14.0	13.9	13.7	13.7	13.7
Industrial – low-voltage	26.3	26.3	26.5	26.7	26.8
Households	24.6	24.4	24.5	24.5	24.6
Average for all categories	**22.5**	**22.3**	**22.4**	**22.2**	**22.2**

Transmission and distribution network connection charges

Consumers connecting to the transmission or distribution network or increasing connection capacity pay a connection charge. The purpose of the connection charge is to finance new connections, creation of technical conditions in the network and network development.

For end consumers with a connection capacity of up to 20 kW (inclusive) who are connecting to the low voltage network within a radius of up to 400 metres (inclusive) from the existing transformer substation, the connection charge or the charge for increasing connection capacity is HRK 1,350/kW excluding VAT, except in the city of Zagreb, where the charge is HRK 1,700/kW. However, for other end consumers, in case planned connection costs exceed the funds collected from the charges by 20% or more, the consumer pays the actual costs of the connection. Electricity producers always pay the actual connection costs.

Observations on transmission and distribution charges and connection charges

In terms of the breakdown of revenues from transmission network charges and distribution network charges in 2018, the proportions of individual categories are shown in Figure 4.2.6. Figure 4.2.7 shows the proportions of individual tariff components in the revenues from transmission network charges and distribution network charges in 2018.

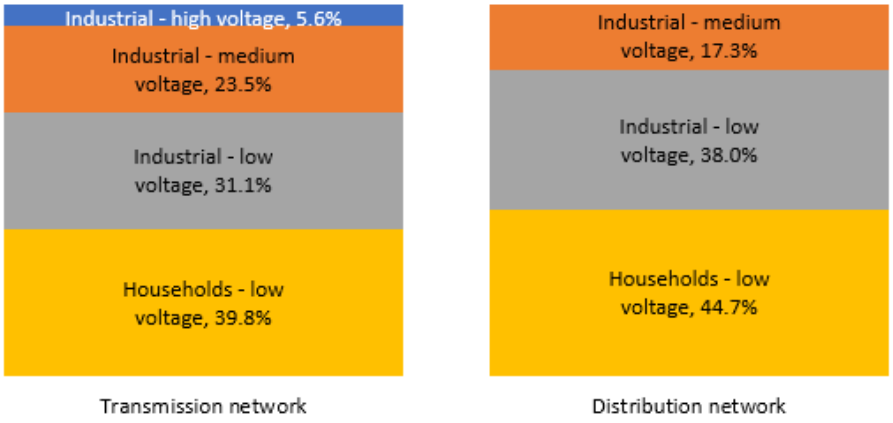


Figure 4.2.6 Breakdown of revenues from transmission network and distribution network charges in 2018

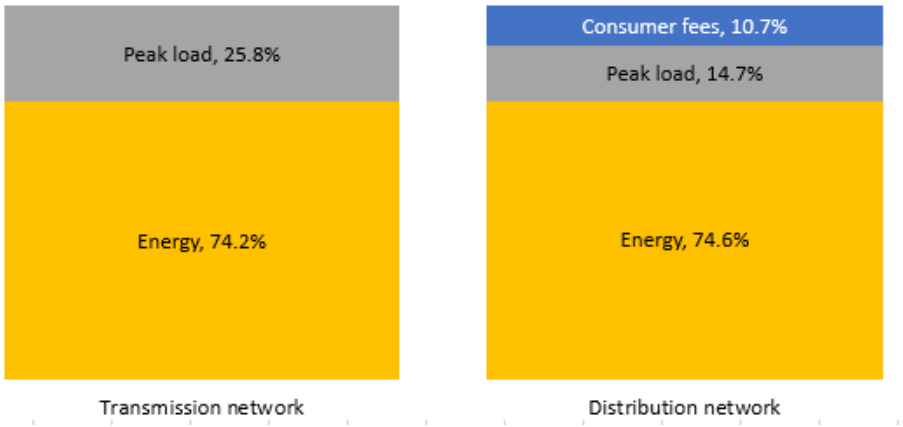


Figure 4.2.7 Proportions of tariff components in 2018

In early November 2018, pursuant to the *Methodology for setting tariffs for electricity transmission* and the *Methodology for setting tariffs for electricity distribution*, HERA initiated an independent procedure of setting tariffs for 2019, of which it informed HOPS and HEP ODS. HERA took into account the necessity of maintaining the level of financing necessary for regular execution of the operators' business and investment activities.

The decision of 13 December 2018 resulted in reducing the tariffs for electricity transmission and distribution for individual end consumer categories/models. For high-voltage industrial end consumers, the tariffs were reduced by 10%, for medium-voltage industrial end consumers by 15%, and for low-voltage industrial end consumers using tariff model Red, the tariffs were reduced by 15%.

The application of new tariffs resulted in the reduction of fees for the use of the transmission and distribution networks for end consumers from the above categories and models in the Republic of Croatia, placing them at the level of average fees in EU Member States.

In 2017, HERA adopted a new *Methodology for setting electricity grid connection charges for new users and for increasing the connection capacity for existing users*. Given that the Croatian Government adopted the *Regulation on issuing energy approvals and establishing the conditions and deadlines for connecting to the electricity network,* in order to harmonise the above *Methodology* with the *Regulation,* HERA adopted the *Amendments to the Methodology for setting electricity grid connection charges for new users and for increasing the connection capacity for existing users,* which entered into force on 9 April 2018.

4.2.5 Unbundling of activities

Transmission system operator

On 22 February 2016, having obtained an opinion from the European Commission, HERA adopted the *Decision on the certificate issued to HOPS* under the Independent Transmission Operator (ITO) model.

Pursuant to Article 19(3) of the **Electricity Market Act**, the commercial and financial relations between the vertically integrated entity and HOPS must comply with market conditions. Pursuant to Article 19(4) of the **Electricity Market Act**, HOPS is obliged to submit all commercial and financial contracts with the vertically integrated entity for approval. HERA is obliged to verify whether the contracts are market-oriented under impartial conditions.

The description of measures taken for the purpose of harmonisation with the requirements and intermediate dates determined in the decision on the certificate issued to HOPS as an independent transmission operator

The requirements fulfilled by HOPS, as the independent transmission operator, pursuant to HERA's decision on the certificate issued to HOPS in 2018 were as follows:

- ***Separation of business premises*:** As at 31 December 2018, HOPS was the owner of all business premises in its use. The seat of the Transmission Area Osijek was relocated to a commercial building owned by HOPS, in May 2018. The building under lease in Opatija, owned by Hrvatska elektroprivreda d.d., which hosted the seat of the Transmission Area Rijeka, was handed over to the owner on 10 September 2018, following HOPS's relocation to a new commercial building in Matulji. On 10 October 2018, the use permit for the new business premises became final, and on 17 October 2018 a temporary handover of commercial buildings was concluded with the contractor.
- ***Independence of the IT system*:** During 2018, HOPS independently performed all activities related IT maintenance and upgrading in accordance with the national and European legislation, with the first line of support for users being provided by the employees of the Process and Business IT and Telecommunications Department, and larger maintenance interventions and further development of the IT system carried out by external contractors pursuant to valid framework agreements and contracts. The year 2018 saw the drafting of the *Rules on HOPS information system security* in accordance with the requirements of ISO 27001 (Information Security Management System Standard) and the guidelines and recommendations of ISO 27002 (Code of Practice for Information System Controls).
- ***Separation of the telecommunication system*:** The implementation of separation of the telecommunication system in the HEP group continued in 2018, through a set of agreements between HOPS and HEP-Telekomunikacije, which were in force in 2017

and 2018. In the last quarter of 2018, the above companies worked on drafting new agreements for 2019 and 2020, defining mutual rights and obligations: Agreement on mutual relations, Service agreement for the lease of telecommunication capacities (HEP-Telekomunikacije as lessor, HOPS as lessee), Agreement on the lease of radio connection telecommunication capacities (HOPS as lessor, HEP-Telekomunikacije as lessee), Agreement on the lease of telecommunication fibre optic infrastructure, Agreement on telecommunication system maintenance.

- ***Procurement of electricity to cover losses*:** HOPS purchased the entire amount of electricity to cover losses in 2018 under market procurement principles.
- ***Procurement of ancillary services*:** For the needs of ancillary supply services in 2018, HOPS and HEP Proizvodnja d.o.o. concluded six ancillary service agreements in December 2017.
- ***Electric power system balancing*:** HOPS applied the *Rules on electric power system balancing,* thereby providing for the implementation of the balancing mechanism. HOPS assumed the costs of imbalances caused by facilities in the incentives system. In 2018, HOPS carried out electric power system balancing in a transparent and non-discriminatory manner, under the conditions specified in the legislative framework.
- ***Financial and other commercial relationships between HOPS and other companies from the vertically integrated entity*:** Special conditions and requirements are implemented in the procurement of services related to IT systems and equipment, secure access systems and audit services for HOPS accounts.

After a public auction carried out for one-year electricity supply, pursuant to the **Public Procurement Act**, and the prior approval obtained from HERA, HOPS concluded an Agreement on end consumer supply for a one-year period with HEP-Opskrba d.o.o.

Following HERA's prior approval, HOPS concluded an Agreement on cross-border redispatching for the period from 1 September 2017 to 31 December 2018.

On 1 March 2019, HEP-Proizvodnja and HOPS concluded a new agreement on cross-border redispatching, which will enter into force on 31 December 2019.

Subsequent to the ancillary services agreements for 2018, upon adoption of the *Methodology for establishing prices for the provision of ancillary services* (July 2016), on 12 December 2018, having obtained HERA's prior approval, HOPS concluded six ancillary services agreements (purchase of ancillary services and balancing energy in 2019) with the dominant service provider HEP-Proizvodnja d.o.o.

In 2018, HOPS concluded new network usage agreements with HEP-Proizvodnja d.o.o. for the following facilities: Velebit Reversible Hydroelectric Power Plant, Osijek Thermal Power-Heating Plant, Zagreb Thermal Power-Heating Plant, Zakučac Hydroelectric Power Plant, Sisak Thermal Power-Heating Plant, Zagreb Electric Power-Heating Plant, Jertovec Combined Thermal Power Plant, Plomin Thermal Power Plant, Rijeka Thermal Power Plant, Varaždin Hydroelectric Power Plant, Čakovec Hydroelectric Power Plant, Dubrava Hydroelectric Power Plant, Gojak Hydroelectric Power Plant, Lešće Hydroelectric Power Plant, Vinodol Hydroelectric Power Plant, Rijeka Hydroelectric Power Plant, Senj Hydroelectric Power Plant, Dale Hydroelectric Power Plant, Peruća Hydroelectric Power Plant, Dubrovnik Hydroelectric Power Plant, Orlovac Hydroelectric Power Plant, Kraljevac Hydroelectric Power Plant. The main change in the Network usage agreement pertains to the calculation of the network usage fee, i.e. transition from the so called complex billing metering points to billing metering points.

Agreements on the responsibility for imbalances with the balance responsible parties are concluded for an indefinite period of time, pursuant to the *Rules on electric power system balancing*. All procedures are implemented transparently, in accordance with the forms published on HOPS's website. In 2018, ten agreements were terminated, of which four with suppliers, and seven new agreements were concluded.

Distribution system operator

Pursuant to the ***Electricity Market Act***, HEP ODS is responsible for monitoring the implementation of all its tasks, and especially in terms of compliance with the principles of transparency, objectivity and impartiality, and is obliged to publish annual reports in accordance with HERA's prior approval.

On 01 April 2019, HERA received a report from HEP ODS for 2018 on compliance with the principles of transparency, objectivity and impartiality, according to the adopted compliance programme of HEP ODS.

In 2018, HEP ODS submitted to HERA its 2017 Annual Financial Statement together with an Independent Auditor's Report. Further financial reports and financial documents for 2017 were also submitted, pursuant to the obligations from the *Decision on the manner and procedure for keeping separate accounts of energy entities* and the *Methodology for setting tariffs for electricity distribution*.

In 2018, HEP ODS submitted to HERA its 2019 Operating Plan, pursuant to the obligations from the *Methodology for setting tariffs for electricity distribution*.

In 2018, the realisation percentage of the investment plan was 96.9%. The financial resources for the operation, maintenance, development and construction of the distribution network were available in accordance with the operating plans of the parent company HEP d.d.

In 2018, HEP ODS generated the *Annual report on the security of supply in the distribution system for 2017*, and published it on its website. The distribution network was operated in accordance with the *Network Code for the Electricity System,* and network users were informed of electricity supply interruptions pursuant to the *General terms and conditions for network use and electricity supply.* Network and facilities maintenance followed the *Rules for the maintenance of facilities and equipment of energy structures in the distribution network.*

Electricity consumers whose metering points are read via remote reading can check the collected metering data online.

HEP ODS is obliged to have an impartial relationship with all electricity market participants, and is in particular obliged to ensure impartiality with regard to affiliated entities within the vertically integrated entity, pursuant to relevant regulations. With regard to its organisation and its relation to HEP d.d. as its parent company, HEP ODS is a subsidiary company, which is independent from HEP d.d. in terms of its legal form, organisation and structure, as well as from other companies within the HEP Group. HEP ODS has concluded a model agreement on mutual relations with all electricity suppliers, including the suppliers within the HEP group (HEP Elektra and HEP-Opskrba). HEP ODS has concluded a special agreement on mutual relations with HEP d.d., regulating mutual relations between HEP ODS and the sectors of HEP d.d., including the methodology for calculating the costs of services provided to HEP ODS.

The services/tasks which HEP d.d. performs for HEP ODS pursuant to the Agreement are**:**

- Defining the general principles and guidelines for the preparation of operating plans,
- Determining the financial policy and the organisation of a centralised treasury,
- Establishing a general risk management policy,
- Internal audits,
- Establishing accounting policies and performing a part of accounting tasks,
- Determining the human resource management strategy and performing a part of those tasks,
- Performing a part of the legal tasks,
- Corporate communications,

- Support in monitoring and participation in the process of preparing and adopting regulations,
- Support in monitoring and participation in EU projects,
- Developing a corporate security strategy and performing a part of the respective tasks,
- Performing a part of the tasks related to ICT, and
- Developing a procurement strategy and performing a part of the respective tasks.

In June 2018, HERA requested from HEP ODS to provide its opinion with regard to the enforcement of Article 36(3) of the **Electricity Market Act**, which prohibits taking advantage of a vertically integrated structure in order to distort competition, and identity misuse. HEP ODS has declared that, in coordination with the parent company HEP d.d., it will change its company name as soon as possible, i.e. change the name of the company under which it currently operates and participates in legal transactions, and resolve the issue of physical separation from HEP-Opskrba and HEP Elektra, as well as the issue of its own communication strategy.

With regard to that opinion, on 03 December 2018 the Management Board of HEP d.d. adopted a Decision number: 50-3.1/2018 on the visual identity and new Company name ("Hrvatska elektrodistribucija", HED). With regard to the physical separation of HEP Elektra and HEP-Opskrba, HEP's Management Board adopted a Decision number: 53-10.1/2018 of 20 December 2018, on launching the project of building business premises on the location Žajina-Petračićeva-Kučerina in Zagreb, for the needs of HEP ODS. Also, most functions from HEP ODS's headquarters were relocated from Ulica grada Vukovara 37 to the new location Vrbani 4.

4.3 Wholesale electricity market

4.3.1 Development of the wholesale electricity market

Electricity balance in Croatia

According to Table 4.3.1, the majority of total electricity consumption in Croatia in 2018 (18,352 GWh) is covered by Croatian power plants (12,192 GWh, 66.4%), while the rest is covered by physical net imports (6,160 GWh, 33.6%).

Table 4.3.1 Croatia's electricity balance in 2017 and 2018 in GWh

No.	Electricity balance	2017	2018
1	Total production	10,818	12,192
2	Imports to Croatia	12,157	12,692
3	**Total supply (1+2)**	**22,975**	**24,884**
4	Exports from Croatia	4,778	6,532
5	**Physical net imports (2-4)**	**7,379**	**6,160**
6	**Total consumption (3-4)**	**18,197**	**18,352**
7	Direct supply in the distribution network	877	1,055
8	Losses in the transmission network	417	534
9	**Transmission consumption (6-7-8)**	**16,903**	**16,764**
10	Delivery to end consumers in the transmission network	801	931
11	Pumping work of the Reversible Hydroelectric Power Plant and wind power plants' own consumption	284	129
12	**Delivery to the distribution network from the transmission network (9-10-11)**	**15,818**	**15,704**

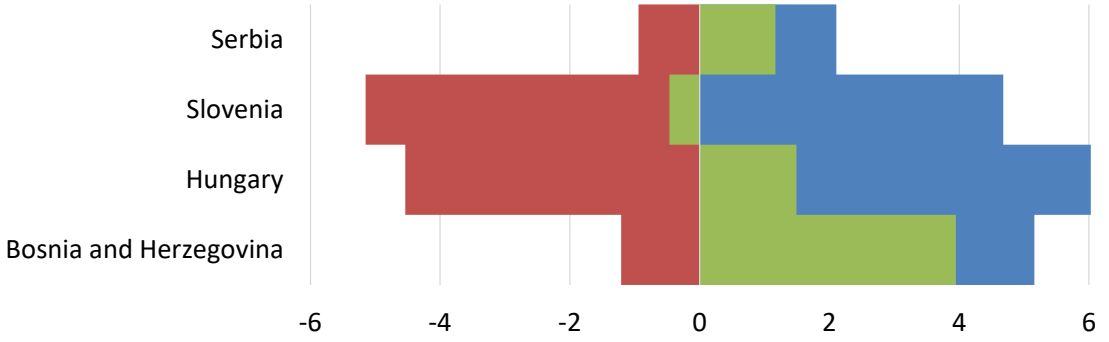
Source: HOPS, HEP ODS

Trade at Croatian borders

Figure 4.3.1 shows the volumes of cross-zonal trading with the neighbouring countries in 2018 (imports, exports and net exchange) at Croatian borders according to volumes from contractual schedules. Net imports exist at all borders, except the border with Slovenia.

Imports from Slovenia include electricity from NPP Krško (2.8 TWh) for HEP d.d. The total (trade) net imports, including electricity from NPP Krško, amounted to 6.2 TWh.

In terms of intraday trading, imports to Croatia at cross-zonal transmission capacities amounted to 868 GWh, while exports amounted to 789 GWh.



	Bosnia and Herzegovina	Hungary	Slovenia	Serbia
Net exchange	3.9 TWh	1.5 TWh	-0.5 TWh	1.2 TWh
Exports	-1.2 TWh	-4.5 TWh	-5.1 TWh	-0.9 TWh
Imports	5.2 TWh	6.0 TWh	4.7 TWh	2.1 TWh

Source: HROTE

Figure 4.3.1 Cross-zonal trade on borders between Croatia and the neighbouring countries in 2018 by volumes from contractual schedules of energy entities

CROPEX (Hrvatska burza električne energije d.o.o.)

In 2018, there were 17 registered members on CROPEX 's day-ahead market, who purchased 2,381.9 GWh of electricity from CROPEX. The intraday market had nine registered members, who purchased 78.3 GWh of electricity from CROPEX.

On 19 June 2018, CROPEX was connected to the European MRC market via Slovenia.

In a letter to the Energy Community Secretariat from early 2018, CROPEX expressed its interest in launching the day-ahead MRC project of coupling the Croatian electricity market with that of Bosnia and Herzegovina. Also, in cooperation with CROPEX, in July 2018 HOPS offered NOS BiH the possibility of establishing an import-export trading zone on the border between Croatia and Bosnia and Herzegovina until the establishment of a power exchange in Bosnia and Herzegovina.

In late 2018, the Serbian power exchange SEEPEX offered a trilateral project of connecting the day-ahead electricity markets of Croatia, Serbia and Bulgaria. In February 2019, transmission system operators (HOPS, EMS and ESO EAD), power exchanges (CROPEX, SEEPEX and IBEX) and energy regulatory agencies (HERA, AERS and EWRC) confirmed their joint commitment to the project in order to ensure its feasibility and implementation, with the ultimate goal of coupling the respective markets within the MRC framework.

In 2018, CROPEX became a full member of the CORE FB MC project, aimed at coupling markets using the flow-based method to calculate cross-border capacities in the CORE region, whose realisation is expected in 2020.

The deadline to launch the XBID project of intraday coupling of the Croatian trading zone across the borders with Hungary and Slovenia is November 2019.

In 2019, HROTE started trading on the CROPEX day-ahead and intraday markets.

HOPS discussed with CROPEX the possibility of organising auctions to purchase HOPS's losses on CROPEX. The first auctions for 2020, 2021 and 2022 are expected to take place in April 2019.

Electricity market concentration indicators

Table 4.3.2 shows the shares of energy entities in production capacities and electricity generated by power plants in Croatia in 2018. HEP d.d. has the largest share, amounting to 86% of production capacities and 83% of generated electricity.

Table 4.3.2 Shares of energy entities in production capacities and electricity generated by power plants in Croatia in 2018

Energy entity	Production capacities	Generated electricity
HEP d.d.	86%	83%
RES in the incentives system (without HEP d.d.)	14%	17%

On 31 December 2018, there were 54 valid licences for electricity generation, 16 licences for electricity supply and 31 licences for electricity trade in Croatia.

According to the data from contractual schedules, in 2018 HEP d.d. participated on the Croatian wholesale market with 40.2 TWh (75% of total sales).

Observations on the development of the wholesale market

Amendments to the Rules on electricity market organisation, harmonised with regard to terminology with the *CACM Regulation*, were adopted in May 2018. The amendments regulate market coupling and uncoupling, pumping work of the reversible hydroelectric power plant as a separate category, trading for ancillary services with network users, transition from balance responsible party to balance group member, repeal the possibility of submitting altered plans of supply to end consumers and electricity generation plans after the period to which the alteration pertains.

Pursuant to the **Amendments to Renewable Energy Sources and High-Efficiency Cogeneration Act** of 07 December 2018, the EKO balance group became operational on 01 January 2019. HROTE was thus enabled to sell 30% of electricity of the EKO balance group on the market (including on CROPEX). The development of the wholesale market would be facilitated by a full termination of regulated sale of electricity from the incentives system directly to suppliers.

In 2018, baseload energy prices for 2019 at HUDEX (Hungarian Derivative Energy Exchange) increased from approximately EUR 42/MWh at the beginning of the year to EUR 61/MWh at the end of the year[6].

Given the trade volume, values of purchase and sale bids, number and share of market participants in purchases and sales, and the prices that were similar to the prices in the neighbouring exchanges, it is evident that CROPEX played an important role in the development of market competition.

In late March 2018 intraday trading was enabled on the border with Hungary, which contributed to the development of the electricity wholesale market.

As regards the promotion of market competition, transparency in data publication is necessary. In that regard, it is necessary to provide for the implementation of *Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council* in order to increase the transparency of the electricity wholesale market, and thus also improve the operations of the market, by publishing all

6 *source: https://hudex.hu/uploads/riportok/HUDEX%20Power%20Annual%20Report%20Year%202018%20Public.pdf, accessed on 2 April 2019.*

the necessary data on the central platform for information transparency. HOPS has not yet fulfilled its obligations from the above *Regulation*.

The website http://remit.hep.hr/ publishes data on the availability of generating units in the territory of Croatia that are owned by HEP d.d., thereby increasing transparency.

4.3.2 Allocation of cross-zonal capacities and congestion management

Cross-zonal capacity allocation regimes in 2018

Pursuant to the **Act on the Regulation of Energy Activities**, and in co-operation with the regulatory authorities of the neighbouring countries with whose electricity systems Croatia is connected, HERA monitors the allocation and use of connection line capacities and the system to address congestion within the national transmission network. The supervision of the allocation of cross-zonal capacities is one of the regulator's duties as provided by EU legislation, especially by *Regulation (EC) 714/2009*.

Table 4.3.3 Cross-zonal capacity allocation regimes and offices on borders between Croatia and the neighbouring countries in 2018

Border	Yearly auction	Monthly auctions	Daily auctions	Intraday allocations
Slovenia	JAO	JAO	JAO/CROPEX	ELES
Hungary	JAO	JAO	JAO	HOPS
Serbia	JAO	JAO	JAO	EMS
Bosnia and Herzegovina	SEE CAO	SEE CAO	SEE CAO	HOPS

Legend:
Coordinated
Bilateral

Table 4.3.3 shows that Croatia's allocation of cross-zonal capacities in all time frames functions under market principles. In late March 2018, HOPS began allocating intraday capacities in both directions on the border with Hungary. HOPS carries out bilateral allocation of total intraday capacities in both directions and on the border with Bosnia and Herzegovina, while the neighbouring transmission system operators are in charge of organising intraday allocations on the borders with Slovenia and Serbia.

On the border with Bosnia and Herzegovina, the SEE CAO auction office organises annual, monthly and daily auctions.

Table 4.3.4 shows offered and allocated cross-zonal capacities and HOPS's income from annual auctions per border.

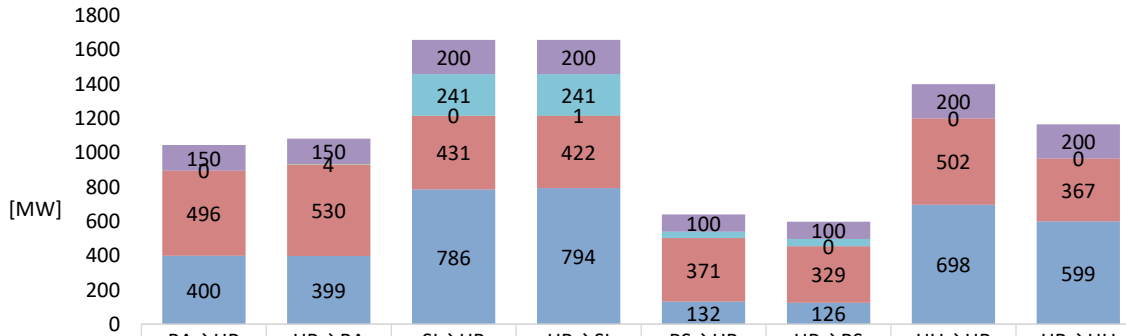
Table 4.3.4 Offered and allocated cross-zonal capacities, and HOPS income from yearly auctions per border for 2018

Direction[7]			Offered capacity [MW]	Number of participants	Number of participants with accepted offers	Allocated [MW]	HOPS income [HRK million]
BA	→	HR	400	13	6	400	3.00
HR	→	BA	400	9	6	399	0.39
SI	→	HR	800	25	10	800	16.91
HR	→	SI	800	22	14	800	1.82
RS	→	HR	150	12	7	150	0.76
HR	→	RS	150	13	6	150	0.93
HU	→	HR	700	24	12	700	11.61
HR	→	HU	600	22	12	600	7.03
							42.45

7 *The tables use two-letter ISO codes for countries: HR (Republic of Croatia), SI (Republic of Slovenia), HU (Republic of Hungary), BA (Bosnia and Herzegovina) and RS (Republic of Serbia).*

Source: HOPS

Figure 4.3.2. shows already allocated capacities (AAC) on an annual basis that have been reported for use, capacities allocated on a monthly basis ("Allocated"), capacities specifically intended for allocation on a daily basis after additional analyses ("Intended for daily"), transmission reliability margin (TRM), and the capacity not allocated at monthly auctions ("Unallocated"). Time periods of reduced capacity due to planned maintenance of parts of the network were taken into account when calculating the average capacities.



	BA→HR	HR→BA	SI→HR	HR→SI	RS→HR	HR→RS	HU→HR	HR→HU
TRM	150	150	200	200	100	100	200	200
Intended for daily	0	0	241	241	37	43	0	0
Unallocated	0	4	0	1	0	0	0	0
Allocated	496	530	431	422	371	329	502	367
AAC	400	399	786	794	132	126	698	599

Source: HOPS

Figure 4.3.2 Average monthly cross-zonal capacities per border in 2018

Capacity unallocated at monthly auction, which is intended for daily auctions, as well as capacity not reported for use, is offered at daily auctions. Leftover capacity from daily auctions, taking into account transactions in the opposite direction, was allocated without a fee in the day of delivery on all borders, in the order in which requests were received.

Breakdown of HOPS's income and costs from auctions for the allocation of cross-zonal capacities can be seen in Table 4.3.5.

Table 4.3.5 Breakdown of HOPS income and costs from auctions for the allocation of cross-zonal capacities in 2018

Income/cost	Amount [million HRK]
Yearly auctions	42.45
Monthly auctions	29.87
Daily auctions	39.51
Resale of capacities	-33.08
JAO and SEE CAO costs	-2.56
Corporate income tax	-13.71
Total	**62.48**

Observations on the allocation of cross-zonal capacities and congestion management

Compared to 2017, there was a significant increase in income from the allocation of capacities in annual auctions, and also a decrease in income from the allocation of capacities in daily auctions, with imports on the border between Croatia and Slovenia particularly standing out. This is a direct consequence of the day-ahead coupling of neighbouring electricity markets in June 2018, which terminated the allocation of capacities on that border. Following the establishment of an implicit allocation of capacities on the border with Slovenia, HOPS generates revenues from the allocation of

capacities only in the hours when there is a difference between prices on the Croatian and Slovenian markets (market spread).

The greatest progress was achieved on the border with Hungary, where intraday allocations of capacity started to take place for both trading directions in late March. Upon agreement with the Hungarian regulator, HERA provided its prior approval for the rules regulating the allocation of capacities.

In June 2018, the long-prepared project of coupling the day-ahead markets in Croatia and Slovenia was. HERA's active participation resulted in its decisions that approved the mechanisms for a transition to implicit allocation regimes for day-ahead capacities on the border in question.

Furthermore, a very significant change occurred on the border with Serbia, where the capacities for 2018 are now allocated to JAO's auction office in annual, monthly and daily auctions.

In January 2018, together with other national regulators HERA approved two acts generated by all NEMOs related to the identification of products that can be taken into consideration in the procedure of single day-ahead and intraday coupling.

In January 2018, HERA and other national regulators approved the all NEMOs' methodology of back-up procedures to be used in situations in which the price coupling process cannot yield results and it is necessary to establish alternative solutions to provide for the allocation of capacity, with a detailed description and characteristics of back-up procedures for the coupling of day-ahead and intraday markets.

As the implementation of the harmonised intraday allocation of capacities at the regional level for the calculation of capacities in accordance with the *CACM Regulation* will be time consuming, EU has initiated activities regarding the implementation of projects on a smaller geographic scale (Local Implementation Project – LIP). Croatian borders with Slovenia and Hungary are included in LIP 15, and market coupling is expected to be realised in 2019.

In April 2018, HERA allowed HOPS to cover all CROPEX's justified costs with regard to the coupling of Croatian day-ahead and intraday markets with other EU Member States.

In April, ACER adopted *Decision no. 04/2018* in which it set the beginning of trading at the single EU intraday market at 15:00 hours on the day before the initiation of electricity supply.

In July 2018, ACER adopted *Decision no. 08/2018* defining pan-European algorithms for the day-ahead (EUPHEMIA) and intraday markets (XBID).

Pursuant to the *FCA Regulation,* in July 2018 HERA approved the draft common grid model methodology, which represents one of the main preconditions for a coordinated calculation of long-term capacities.

Pursuant to the same *Regulation,* in August 2018 HERA approved the proposed rules of nomination of physical rights of transmission for several borders in Central Europe, including Croatian borders with Slovenia and Hungary. This served to additionally harmonise the use of long-term capacities by market participants.

Moreover, in July 2018, pursuant to the above *Regulation,* HERA approved an alteration to the regional concept of long-term transmission rights in the Core region for the calculation of capacities in such a way that the long-term transmission rights for annual and monthly periods will be allocated on the border between Austria and the common zone composed of Germany and Luxembourg using the financial transmission rights — options, as well as on the border between the Czech Republic and Slovakia, where physical transmission rights will be used taking into account the "use-it-or-sell-it" principle.

4.3.3 Electric power system balancing and ancillary services

Settlement of imbalances for imbalance responsible parties

The new *Rules on the implementation of standard load profiles* changed the way in which realised consumption and losses in the distribution network are allocated by introducing monthly coefficients for losses instead of a single annual coefficient for losses.

Pursuant to the latest **Amendments to Renewable Energy Sources and High-Efficiency Cogeneration Act**, the EKO balance group became operational on 1 January 2019.

Figure 4.3.3 shows the average monthly prices of positive and negative imbalances in 2018. The highest average weighted monthly price for negative imbalances P_n was achieved in November (EUR 105/MWh), while the highest average weighted monthly price for positive imbalances P_p was achieved in December (EUR 45/MWh).

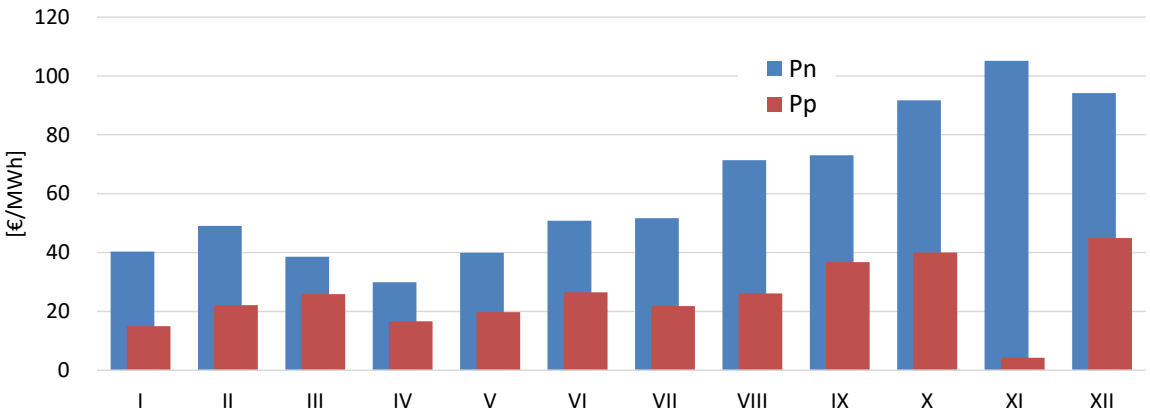


Figure 4.3.3 Average monthly prices of positive and negative imbalances in 2018

Figure 4.3.4 shows a monthly breakdown of imbalance amounts invoiced by HOPS in 2018 (A_{tot} – total amount, A_n – amount of negative imbalances, A_p – amount of positive imbalances). For all months of 2018, the total amount of settled imbalances calculated by HOPS was HRK 165 million, of which HRK 96.5 million pertain to contractual schedules and imbalances of eligible producers in the incentives system assigned to HOPS, while HRK 27.0 million pertain to HOPS's losses in the transmission network.

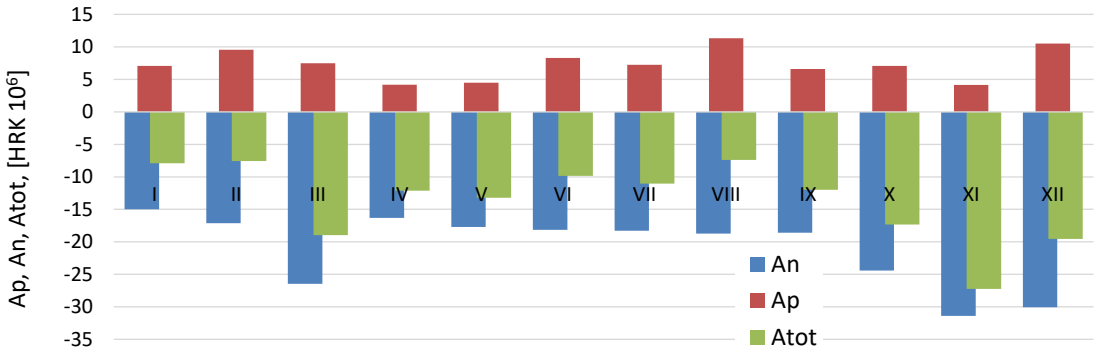


Figure 4.3.4 Invoiced imbalance amounts in 2018

Provision of balancing services

In 2018, the price of electricity for the purpose of electricity system balancing was calculated for HEP-Proizvodnja d.o.o. according to the *Methodology for establishing prices for the provision of balancing services*.

HEP-Proizvodnja d.o.o. is so far the only provider of balancing services from secondary and tertiary balancing power reserves. Entities outside HEP d.d. also provided the tertiary reserve services for system security. A total of 209 GWh of balancing energy was activated for increase and 156 GWh for decrease. Also, in the imbalance netting cooperation, 74 GWh were exchanged for increases and 59 GWh for decreases.

In 2018, HOPS's total costs for the balancing service were HRK 68 million. This amount does not include the cost of the compensation exchange plan for 5 GWh, nor the amount for the imbalances exchange procedure of HRK 5.6 million.

On 1 February 2019, HOPS and ELES started exchanging imbalances of national energy systems within the IGCC project together with Germany, Denmark, the Netherlands, Switzerland, the Czech Republic, Belgium, Austria and France.

Ancillary services

HOPS and HEP-Proizvodnja d.o.o. have concluded agreements for the provision of ancillary services based on the *Methodology for establishing prices for the provision of ancillary services*.

The need for power reserves of automatic secondary frequency control and exchange power amounted to ±56.8 MW per hour. The needs for power reserves of tertiary control for system balancing amounted to ±120 MW, and the needs for tertiary control for system security were +150 MW per hour. A portion of the tertiary reserves for system security was procured by HOPS from two entities outside HEP d.d. HOPS also used primary reserves in the amount of ±10 MW, which it did not pay.

Ancillary services and balancing energy were paid for based on unit prices and realised quantities. The total costs of providing ancillary services were HRK 294 million, of which 84% were related to power reserves for system balancing.

Observations on electricity system balancing

With the establishment of the EKO balance group, HROTE has become financially liable for its imbalance, which it can reduce by trading on the wholesale market, as specified by the *Rules for the sale of electricity* and the *Rules for managing the EKO balance group,* adopted by HROTE in 2018.

In 2018, pursuant to Article 18 of the *Commission Regulation (EU) 2017/2195 establishing a guideline on electricity balancing* (hereinafter: *GLEB Regulation)*, HOPS submitted to HERA a proposal of the terms and conditions of balancing service providers and the terms and conditions for balance responsible entities, in which it was required to propose harmonisation of the national legal framework with the *GLEB Regulation*. In February 2019, HERA found the proposal to be unsatisfactory and requested HOPS to submit a revised proposal.

The *GLEB Regulation* and *SOGL Regulation* stipulate the provision of HERA's approval for the rules and methodologies regulating the balancing mechanism.

HOPS will be involved in the operation of three EU EES balancing platforms: IN platform, aFRR platform and mFRR platform. In 2018, HOPS submitted for HERA's approval the EU documents that should regulate the operation of the platforms.

In order to plan consumption and production, HEP ODS and HOPS must establish an efficient mechanism for submitting historical data for billing metering points as soon as possible (e.g. day by day). This would provide for better planning of balance groups, reserve capacity demands would decrease, and the ability to accept renewable energy sources would increase.

In 2018, settlement of imbalances was frequently recalculated due to errors in the calculation of realisations in the distribution network and frequent complaints regarding the calculations of realisations and the settlement of imbalances.

So far the method of calculating the prices of imbalances was determined by HERA, namely in the *Methodology for establishing balancing energy prices*. Under the *GLEB Regulation*, this obligation is transferred to HOPS.

4.4 Retail electricity market

4.4.1 Basic features of electricity consumption

Sale of electricity in 2018

Table 4.4.1 shows data on the number of billing metering points (BMP), sale, average sale of electricity by billing metering point, and the share of individual consumption categories in total electricity sales.

Table 4.4.1 Number of metering points and the sale, average sale and share in the sale of electricity to end consumers by consumption category in Croatia in 2018

Consumption category	Number of BMPs	Sale [MWh]	Sale per BMP [kWh]	Share in total sale [%]	Change in sale 2018/2017 [%]
High voltage-110 kV[8]	144	1,084,306		6.6	14.3
Medium voltage	2,288	4,300,609	1,880,037	26.2	2.8
Total high and medium voltage	**2,432**	**5,384,915**		**32.8**	**4.9**
Low voltage – industrial users (blue)	42,251	216,184	5,117	1.3	-3.3
Low voltage – industrial users (white)	125,768	1,175,472	9,346	7.2	-1.2
Low voltage – industrial users (red)	26,147	3,026,939	115,768	18.4	2.9
Low voltage – public lighting (yellow)	21,715	405,719	18,684	2.5	0.0
Total low voltage – industrial	**215,881**	**4,824,314**		**29.4**	**1.4**
Low voltage – households (blue)	717,179	1,445,101	2,015	8.8	-2.8
Low voltage – households (white)	1,472,061	4,721,299	3,207	28.8	-0.7
Low voltage – households (black)	2,978	6,408	2,152	0.04	-8.7
Low voltage – households (red)	1,140	25,439	22,320	0.16	46.0
Total low voltage – households	**2,193,357**	**6,198,248**	2,826	**37.8**	**-1.1**
Total low voltage	**2,409,239**	**11,022,561**		**67.2**	**-0.1**
Overall total	**2,411,670**	**16,407,476**		**100.0**	**1.5**

Source: HEP ODS, HOPS

Table 4.4.2 shows the sale of electricity to end consumers from 2009 to 2018.

Table 4.4.2 Sale of electricity to end consumers in the period from 2009 to 2018

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Consumption [GWh]	15,514	15,721	15,602	15,353	15,187	14,932	15,485	15,570	16,158	16,407

Distribution by EUROSTAT consumption bands

Since 2007, the European statistical office EUROSTAT has been monitoring average electricity prices using consumption bands for household and non-household (industrial) end consumer categories.

8 *High voltage connections include 12 end consumers from industry and the transport sector (Croatian railways electro-traction), and 40 power plants which are in this case end consumers (own consumption), with 144 BMPs in total.*

Table 4.4.3 shows the consumption and billing metering points for household end consumers per EUROSTAT consumption band.

Table 4.4.3 Consumption and billing metering points for household end consumers in Croatia per EUROSTAT consumption band in 2018

Consumption band	Minimum consumption [kWh/year]	Maximum consumption [kWh/year]	Consumption [%]	Number of BMPs [%]
Da – very small households	1	< 1,000	3.7	30.3
Db – small households	1,000	< 2,500	16.6	26.7
Dc – medium households	2,500	< 5,000	35.3	27.3
Dd – large households	5,000	< 15,000	39.8	15.1
De – very large households	≥ 15,000		4.6	0.6

Source: EUROSTAT and HEP ODS

The largest share of electricity sold falls in bands Dd (large households) and Dc (medium households), while the largest share in the number of billing metering points falls in bands Dc (medium households) and Da (very small households).

Table 4.4.4 shows electricity consumption bands and indicative peak loads for industrial end consumers according to EUROSTAT, and Table 4.4.5 a breakdown of consumption and billing metering points for low, medium and high voltage industrial end consumers by EUROSTAT consumption band.

Table 4.4.4 Electricity consumption bands and indicative peak loads for industrial end consumers according to EUROSTAT

Consumption band	Minimum consumption [MWh/year]	Maximum consumption [MWh/year]	Lower value [kW]	Upper value [kW]
Ia		< 20	5	20
Ib	20	< 500	10	350
Ic	500	< 2,000	200	1,500
Id	2,000	< 20,000	800	10,000
Ie	20,000	< 70,000	5,000	25,000
If	70,000	≤ 150,000	15,000	50,000

Source: EUROSTAT

Table 4.4.5 Breakdown of consumption and billing metering points for low, medium and high voltage industrial end consumers in Croatia by EUROSTAT consumption band in 2018

Consumption band	Industrial – low voltage		Industrial – medium voltage		Industrial – high voltage		Total	
	Consumption [%]	BMP [%]	Consumption [%]	BMP [%]	Consumption [%]	BMP [%]	Consumption [%]	BMP [%]
Ia	8.5	78.1	0.0	0.0	0.0	0.0	8.5	78.1
Ib	28.0	20.3	0.2	0.2	0.0	0.0	28.2	20.5
Ic	9.7	0.5	1.5	0.2	0.1	0.0	11.3	0.7
Id	1.6	0.0	18.4	0.5	0.3	0.0	20.4	0.5
Ie	0.0	0.0	16.0	0.1	2.7	0.0	18.6	0.1
If	0.0	0.0	5.3	0.0	7.7	0.0	13.0	0.0
> 150,000 MWh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All bands	**47.8**	**98.9**	**41.4**	**1.0**	**10.8**	**0.0**	**100.0**	**100.0**

Source: HEP ODS and HOPS

In the low voltage category of industrial end consumers, the largest share of electricity sold was in the Ib consumption band, whereas the share of end consumers in the exceptionally small industry band (Ia) is by far the highest.

In the medium voltage category of industrial end consumers, the most electricity was sold in the Id consumption band, which also includes the largest number of end consumers (in terms of metering points). In the category of high voltage end consumers, the most electricity was sold in the If category.

Observations on the main characteristics of electricity sales in 2018

Electricity sales in 2018 were 1.5% higher compared to 2017. The increase in total consumption was particularly influenced by industrial consumers.

The share of households in total electricity sold to end consumers was 37.8%, while the share of electricity sold to industrial end consumers was 62.2%, which is a slight increase compared to 2017.

Table 4.4.2 shows that the past ten-year period has seen a moderate increase in electricity sales to end consumers. Data on electricity sales during this ten-year period was compared to forecast electricity sales in the sustainable development scenario from the *Energy Development Strategy of the Republic of Croatia* (October 2009). This document forecast a 3.7% average annual increase in electricity sales from 2006 to 2020. Had the sales increased at that annual rate in the past ten-year period, electricity sales in 2018 would have reached 22,880 GWh, or 39.4% more than the actual sales.

4.4.2 Development of the retail electricity market

Public service of electricity supply

In order to protect end consumers of electricity in Croatia, two categories have been established: universal service supplier (for households) and guaranteed supplier (for industrial consumers). The guaranteed supply backstop measure is activated when an electricity supplier ceases operation, ensuring that its consumers have a continuous supply of electricity. Only industrial consumers are entitled to guaranteed electricity supply in case their supplier leaves the electricity market. The **Electricity Market Act** provides that the guaranteed supply tariff for each category of industrial consumers is higher than the average price on the electricity market for the relevant industrial consumer category.

In 2013, HERA adopted the first *Methodology for setting tariffs for guaranteed electricity supply*. The tariffs set pursuant to the Methodology complied with the legal requirements in that they were higher than the average prices on the retail electricity market. However, in 2018 there was a rapid increase in the prices of electricity on the wholesale market with the tariffs, calculated pursuant to the applicable methodology, lower than the prices on the market in the second half of 2018. Given the new circumstances on the electricity market, HERA drafted a new methodology proposal and, after consultation with the concerned stakeholders, it adopted the *Methodology for setting tariffs for guaranteed electricity supply*, which takes into consideration the anticipated price shifts on the retail electricity market and whose application will result in tariffs yielding a higher average price of guaranteed supply than the price on the retail electricity market.

Based on the *Methodology*, on 8 March 2019 HERA adopted new tariffs for guaranteed supply, which entered into force on 1 April 2019. In 2018, the public service of guaranteed supply was provided by HEP Elektra d.o.o.

Retail market in 2018

Of the total electricity sold to households in 2018, 12% was sold outside the universal service (market), while the share of supply outside the guaranteed supply for industrial consumers amounted to 90%, as shown in Figure 4.1.1. The share of suppliers from HEP d.d. (HEP-Opskrba d.o.o. and HEP-Elektra d.o.o.) in the supply of all consumers was 91%, which represents a 5% increase compared to 2017.

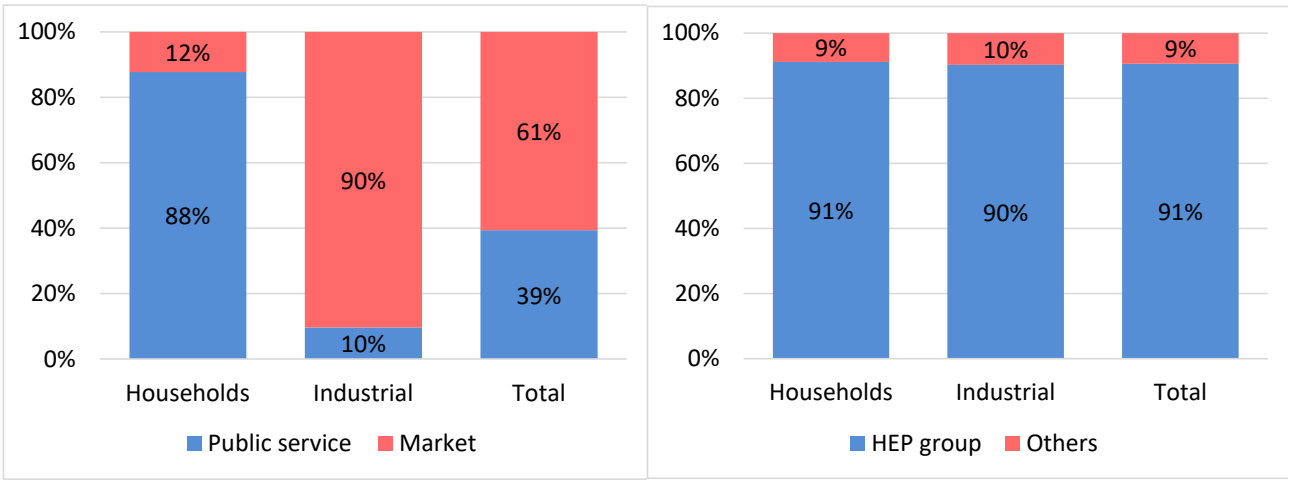


Figure 4.4.1 Proportions of energy sold to household and industrial end consumer categories in 2018

In December 2018, the proportion of BMPs under guaranteed supply was 38.5% of the total number of BMPs in the industrial category. Guaranteed supply is mostly used by end consumers under the measurement threshold (up to 20 kW). HERA instructed the guaranteed supplier to inform the end users using guaranteed supply of the negative aspects of guaranteed supply and of the right to choose their market supplier.

Observations on the development of the retail market in 2018

In 2018, the three largest suppliers had a 99% market share in household end consumer supply, which represents an increase in concentration compared to 2017, when the share was 98%.

Further, the three largest suppliers had a 94% market share in industrial end consumer supply, which represents an increase in concentration compared to 2017, when the share was 83%.

In addition to HEP-Elektra, there were 11 other market suppliers on the retail market in 2018. RWE ENERGIJA d.o.o. took over the end consumer portfolio of i-energija d.o.o. and 220V d.o.o., which partly explains the increase in concentration on the retail electricity market.

The number of supplier switches decreased from 89,038 in 2017 to 85,732 in 2018. The supplier switch rate was 3.51%, which is less than in the previous year when the rate was 3.64%. Of the total number of switches, 31,384 were in the industrial category and 54,348 were in the household category. Despite the decrease in the total number of supplier switches among industrial consumers, the rate is 15.7%, which represents a small increase compared to the previous year.

All things considered, it can be concluded that the retail electricity market in Croatia is stagnating.

The key reasons behind the stagnation are insufficient savings resulting from supplier switches, lack of trust in new suppliers on the part of end consumers, end consumer loyalty to their current suppliers and unstable operating conditions of suppliers.

Insufficient savings are a result, inter alia, of the fact that of the total sales price of 1 kuna for 1 kWh charged to average household consumers, only HRK 0.448 pertains to the costs of electricity and supply. The remaining amount are the regulated network charges (33%), and taxes and fees (22%).

The unstable operating conditions of suppliers include suppliers' obligation to buy off produced electricity from the incentives system at a regulated price, the obligation to collect the solidarity fee from household end consumers, and frequent modifications of the legal framework. Further, under the **Energy Efficiency Act**, suppliers have additional

obligations related to the improvement of energy efficiency measures and unforeseeable costs arising therefrom.

In order to stimulate the retail market for household end consumers, a tariff calculator for household electricity is available on HERA's website to enable a comparison between different electricity suppliers' offers based on annual consumption of households, in accordance with CEER's recommendations.

4.4.3 Electricity prices for end consumers

Electricity prices in Croatia in 2018

The average total selling prices for end consumers[9] by tariff category and voltage from 2013 to 2018 are shown in Table 4.4.6. The prices are calculated based on tariffs items for regulated energy activities from 2013 to 2018 and according to supplier data (for the first half of the year under consideration). Table 4.4.7 shows average electricity prices (excluding the network usage charge, other charges and taxes) for end consumers on the electricity market (industrial consumers) and for end consumers within the universal supply (households) from 2013 to 2018.

Table 4.4.6 Average total selling prices of electricity for end consumers from 2013 to 2018 [HRK/kWh]

End consumer category	2013	2014	2015	2016	2017	2018
Medium voltage consumers	**0.60**	**0.58**	**0.57**	**0.55**	**0.52**	**0.54**
Low voltage consumers – industrial	0.78	0.75	0.74	0.73	0.68	0.70
Low voltage consumers – households	0.82	0.79	0.79	0.78	0.78	0.78
Low voltage consumers	**0.80**	**0.78**	**0.77**	**0.76**	**0.76**	**0.76**

Source: HEP ODS, market suppliers

Table 4.4.7 Average prices of electricity for end consumers on the market (outside public service) and within the universal service (households) in the period from 2013 to 2018 [HRK/kWh]

Type of supply	2013	2014	2015	2016	2017	2018
Market (high and medium voltage)	0.37	0.36	0.34	0.33	0.31	0.32
Market (low voltage, industrial)	0.42	0.40	0.38	0.37	0.34	0.35
Universal service (households)	0.49	0.46	0.45	0.45	0.45	0.45

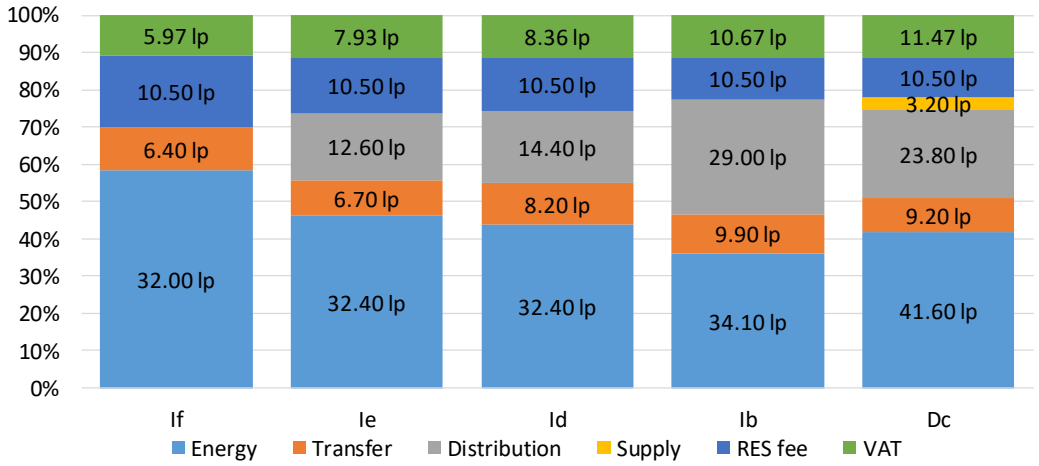
Source: Suppliers on the market (suppliers who are not under the public service obligation)

Table 4.4.8 shows the characteristics of typical end consumers in Croatia by EUROSTAT consumption band in 2018, while Figure 4.4.2 shows the structure of the total electricity price for end consumers, including all charges and taxes, for different consumption bands according to EUROSTAT.

9 *Total selling price includes the transmission and distribution network charges and the price of energy.*

Table 4.4.8 Characteristics of typical electricity end consumers in Croatia in 2018

End consumer type	Consumption band	Consumption [MWh/year]	Peak load [MW]	Consumption ratio day/night	Tariff system category
Very large industrial	If	100,000	15.00	60/40	Industrial consumers – high voltage, HV
Large industrial	Ie	24,000	4.00	60/40	Industrial consumers – medium voltage, MV (35 kV)
Medium industrial	Id	2,000	0.50	65/35	Industrial consumers – medium voltage, MV (10 kV)
Small industrial	Ib	150	0.05	70/30	Industrial consumers – low voltage, LV (red)
Medium households	Dc	3.5		70/30	Households (white)

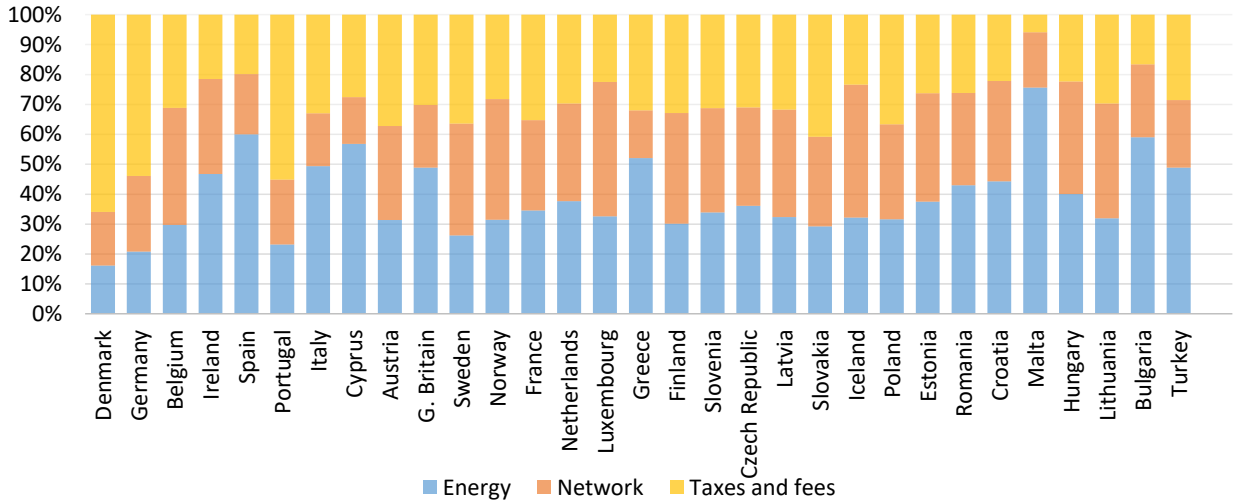


Source: HEP ODS, market suppliers

Figure 4.4.2 Structure of the total selling price of 1 kWh of electricity for end consumers in Croatia according to EUROSTAT consumption bands in 2018

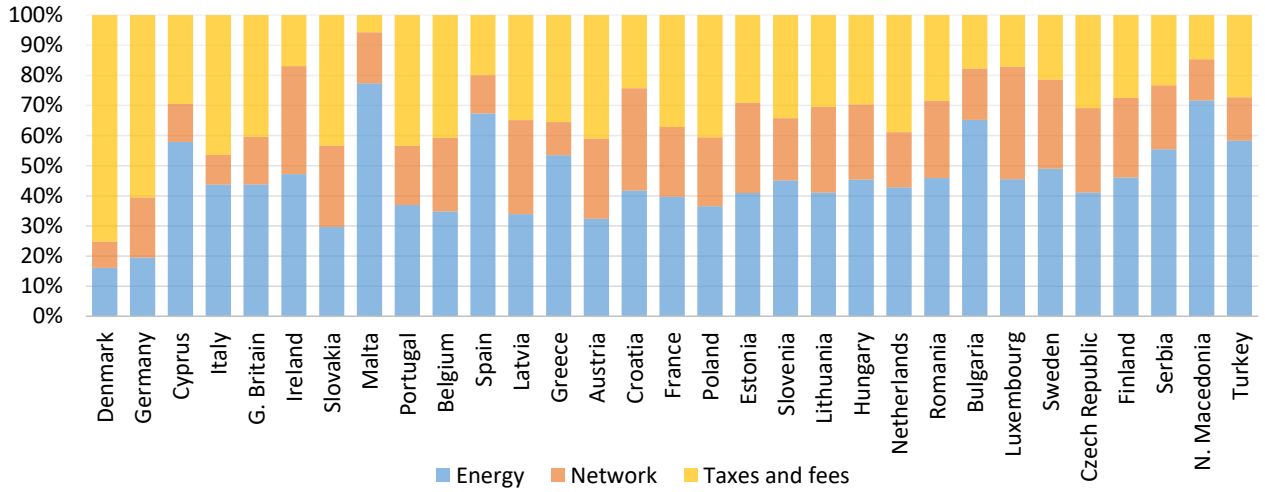
Electricity prices in European countries in 2018

Figures 4.4.3 and 4.4.4 show the structure of total electricity prices in EU Member States and in some other countries for which EUROSTAT keeps records, for end consumers in Dc and Ic band in the second half of 2018.



Source: EUROSTAT

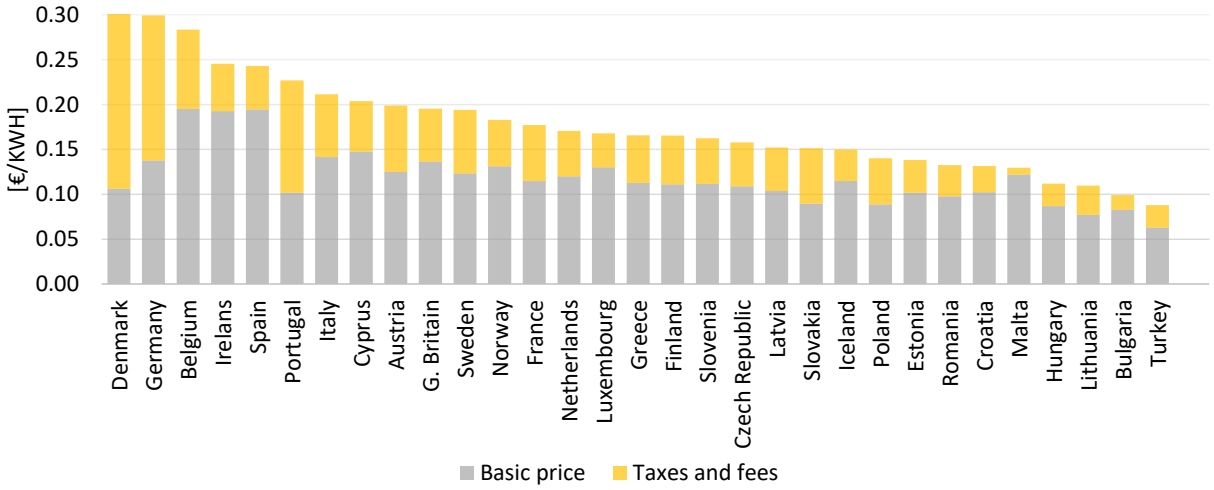
Figure 4.4.3 Overview of the structure of total electricity prices in European countries for household end consumers in the Dc consumption band in the second half of 2018



Source: EUROSTAT

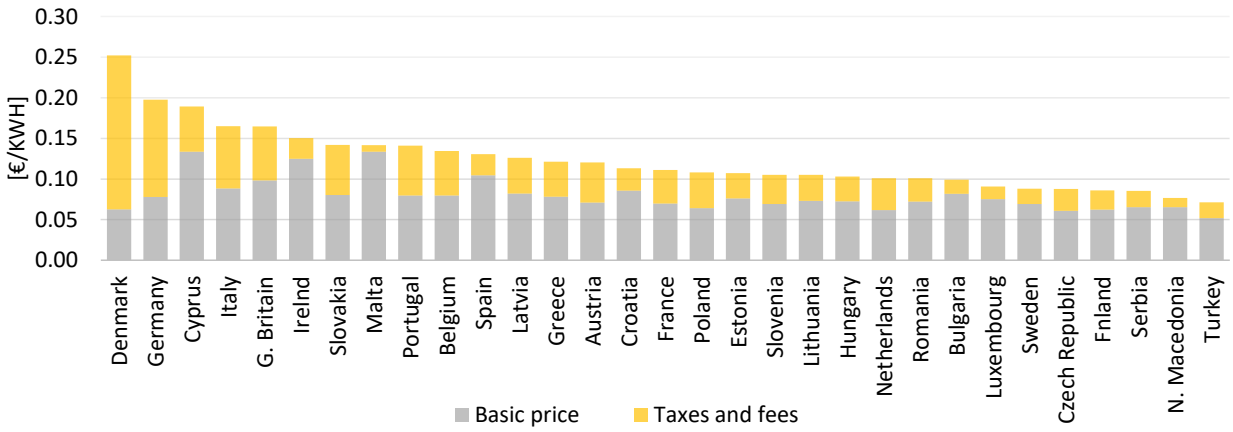
Figure 4.4.4 Overview of the structure of total electricity prices for industrial consumers in the Ic consumption band in the second half of 2018

Figures 4.4.5 and 4.4.6 show the total prices of electricity for Dc and Ic bands in EU Member States, Norway, Iceland, and Turkey in the second half of 2018.



Source: EUROSTAT

Figure 4.4.5 Total electricity prices for household consumers in the Dc consumption band, including charges and taxes, in the second half of 2018



Source: EUROSTAT

Figure 4.4.6 Total electricity prices for industrial consumers in the Ic consumption band, including charges and taxes, in the second half of 2018

Observations on electricity prices for end consumers in 2018

Compared to 2017, in 2018 electricity prices on the Croatian retail electricity market increased as a consequence of higher wholesale prices. Electricity prices in Croatia have been fully deregulated, including the price of electricity under the universal service.

In order to facilitate the selection of electricity supplier for end consumers, HERA prepared a new version of its tariff calculator, which shows parallel tariff models and prices of electricity offered by different electricity suppliers to consumers from the household category. The tariff calculator provides a better overview of individual suppliers' basic tariff models, indicative prices, and additional information on the pricing, price composition and other information. The calculation serves for informational purposes and does not include any possible additional discounts.

There is currently no unified product in Croatia which would encompass both electricity and natural gas supply.

4.4.4 Quality of electricity supply

The quality of electricity supply is defined and monitored in terms of continuity of supply, voltage quality and service quality.

In the *Requirements for the quality of electricity supply*, HERA determined, among other things, electricity supply quality indicators, the method of measuring, collecting and publishing electricity supply quality indicators, the method, frequency and scope of reporting and submitting information about the quality of electricity supply to HERA. Further, the *Requirements for the quality of electricity supply* stipulate a gradual introduction of general, minimum and guaranteed standards of quality of electricity supply and a gradual introduction of financial compensation to consumers following the introduction of guaranteed quality standards for electricity supply.

A group of regulations, adopted in 2017 and 2018, including the *Network Code for the transmission system*, *Network Code for the distribution system*, *Rules on connection to the transmission network* and *Rules on connection to the distribution network*, provide technical requirements and parameters to be fulfilled by the facilities to be connected to the electricity network in order to ensure the safe operation and optimal functioning of the system.

For the first time, operators and suppliers were obliged to submit a report on the quality of electricity supply and the quality of services pursuant to the *Requirements for the quality of electricity supply*. Some of the data was submitted for the period from 9 April

to 31 December 2018 due to the modifications of the above-mentioned requirements after the adoption of the *Regulation on connection procedure*.

Continuity of supply in 2018

Continuity of supply is measured by the number and duration of supply interruptions. The quality of continuity is inversely proportional to the number of supply interruptions and the duration of such interruptions. A supply interruption is considered a planned supply interruption if it is announced in the manner and within the time frame defined in the *General terms and conditions for network use and electricity supply*; otherwise it is considered an unplanned supply interruption.

The *Requirements for the quality of electricity supply* stipulate general standards of continuity of supply for the transmission network: energy not supplied (ENS) in the amount of 700 MWh and an average long-term interruption time (AIT) of 17 minutes. The transmission system operator monitors the number and the duration of supply interruptions in the transmission network, and estimates the volume of electricity not supplied during the interruption (Table 4.4.9). In 2018, ENS was 572 MWh, which is within the general standard, while AIT was 17.37 minutes, which is 2% above the allowed general standard .

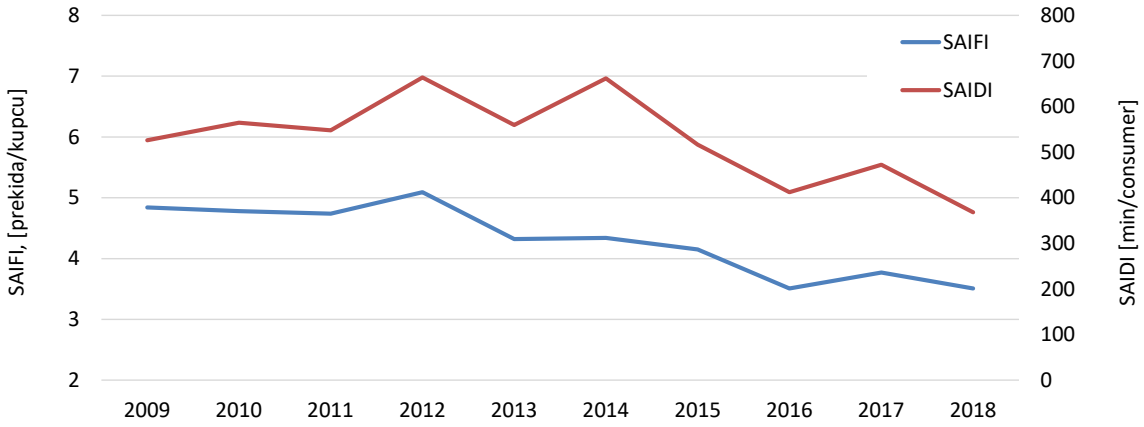
Table 4.4.9 Supply interruptions in the HOPS network from 2009 to 2018

Year	Number of supply interruptions	Duration of supply interruptions [min]	Estimated undelivered electricity [MWh]
2009	144	7,676	1,840
2010	109	4,916	867
2011	115	3,587	256
2012	200	11,855	1,056
2013	51	2,908	329
2014	40	2,410	485
2015	54	3,522	470
2016	80	4,651	366
2017	147	10,448	949
2018	111	6,124	572

Source: HOPS

Supply continuity indicators, which are systematically monitored in the distribution network, show the average annual number of interruptions per consumer (SAIFI), and the average total annual duration of interruption per consumer (SAIDI).

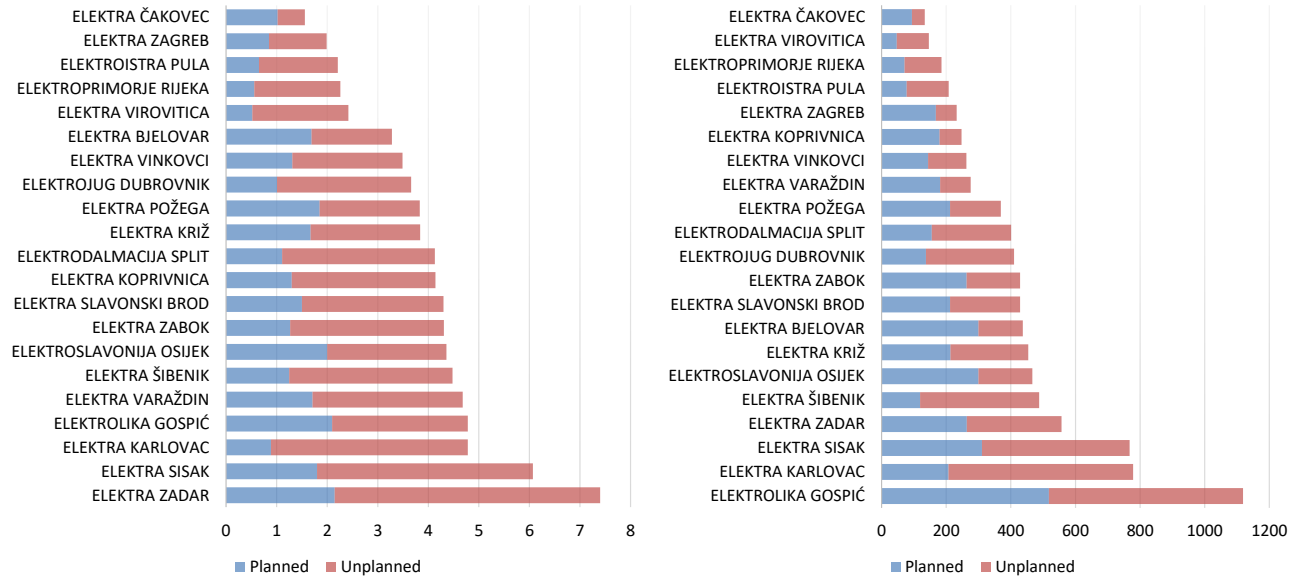
In 2018, SAIFI was 3.51 supply interruptions per consumer in the HEP ODS network, of which 34% were planned interruptions. SAIDI was 368 minutes per consumer, of which 49% were planned interruptions. SAIFI and SAIDI indices show that the continuity of supply in HEP ODS network has improved (Figure 4.4.7).



Source: HEP ODS

Figure 4.4.7 Indicators of continuity of supply in HEP ODS network from 2009 to 2018

In terms of distribution areas, DP Elektra Čakovec had the best SAIFI and SAIDI scores in 2018, while Elektra Zadar had the worst SAIFI score, as shown in Figure 4.4.8. DP Elektrolika Gospić has a lower SAIDI score because of harsh weather conditions in that area and specific network characteristics (long overhead lines). DP Elektra Karlovac and DP Elektra Sisak are also among distribution areas with poor SAIDI and SAIFI indices. A total of 86 written complaints concerning continuity of supply were filed, of which 81 were resolved in a timely manner.



Average annual number of interruptions per consumer – SAIFI

Average annual duration of interruption in minutes per consumer – SAIDI

Source: HEP ODS

Figure 4.4.8 Indicators of continuity of supply in HEP ODS network per distribution area in 2018

Voltage quality in 2018

According to the *General terms and conditions for network use and electricity supply*, voltage quality is described as the variation of measured voltage characteristics at a supply terminal from the values listed in the Croatian standard HRN EN 50160.

A network user may submit a written request once a year to HOPS or HEP ODS, depending on the used network, for a report on voltage quality at the given supply terminal.

HOPS or HEP ODS must perform measurements, prepare and deliver a report on voltage quality at the supply terminal to the network user within 30 days.

A total of 48 written complaints concerning voltage quality in the distribution network were filed from 9 April 2018 to 31 December 2018, of which 38 were resolved in a timely manner. Also, a total of 37 requests for measuring voltage quality were filed, of which 15 were founded and resolved in favour of the applicant.

Quality of service in 2018

The *Requirements for the quality of electricity supply* specify the guaranteed quality standards for network connection services: time for resolving applications for a report on the optimal technical solution for connecting to the network depending on connection capacity (from 30 to 180 days), time for resolving applications for grid connection approvals (15 days) and time foreseen for the connection of a building to the network with a simple connection (30 days).

Table 4.4.10 shows resolved applications for a report on the optimal technical solution for grid connection (EOTRP) and grid connection approvals (EES). Table 4.4.11 shows simple connections of buildings to the network for HEP ODS network end consumers, since entry into force of the *Amendments to the Requirements for the quality of electricity supply*, from 9 April 2018 to 31 December 2018.

Table 4.4.10 Resolved applications for SOTSC and EA in HEP ODS network from 09/04/2018 to 31/12/2018

	No. of decisions issued	No. of decisions issued in time	Share of decisions issued in time	General standard of service quality
EOTRP	645	351	54%	95%
EES	15,928	7,717	48%	95%

Source: HEP ODS

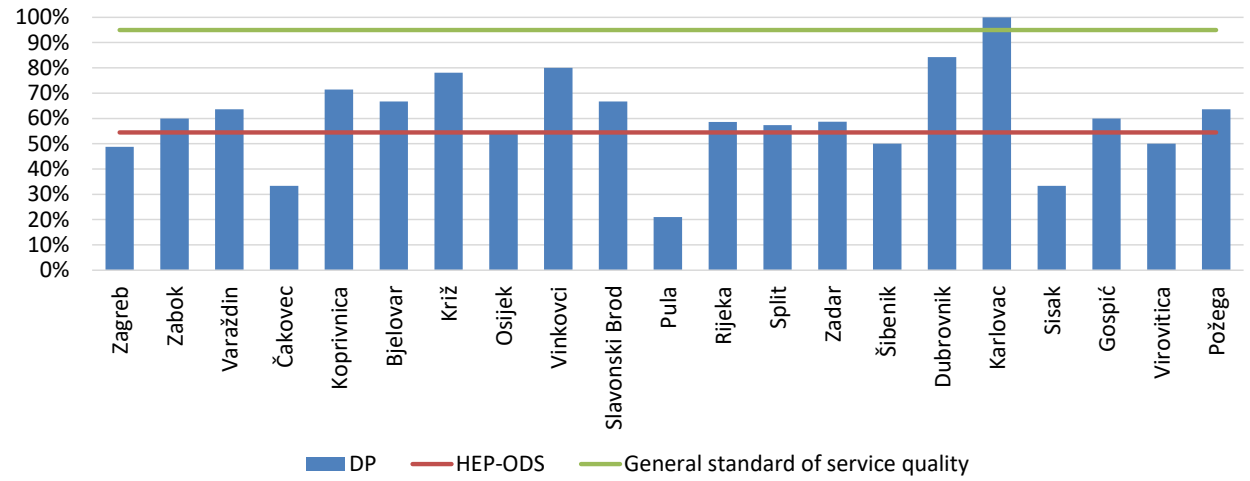
Table 4.4.11 Simple connections of buildings in HEP ODS network, from 09/04/2018 to 31/12/2018.

Number of connected consumers	Number of timely connections	Proportion of timely connections	General standard of service quality
4,834	2,595	54%	95%

Source: HEP ODS

As shown, HEP ODS scores relating to the quality of connection services are below the required general standard of service quality.

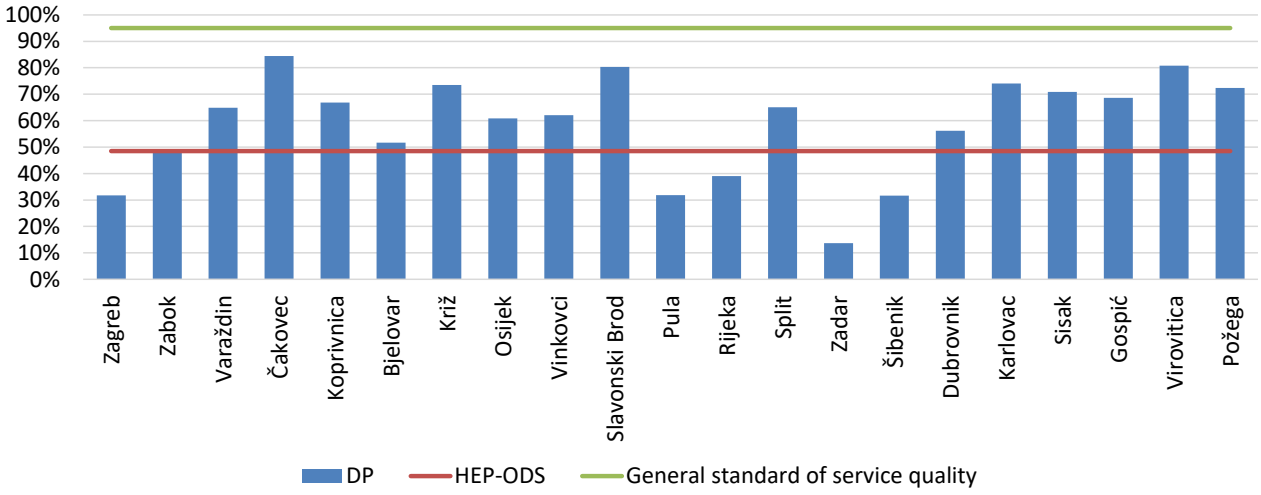
In terms of distribution areas, the proportion of timely resolved applications for EOTRP is the lowest in DP Pula (21%), and the highest in DP Karlovac (100%). Apart from DP Karlovac, no other distribution area achieved the required general standard of service quality for issuing EOTRP (Figure 4.4.9).



Source: HEP ODS

Figure 4.4.9 Proportion of timely resolved applications for SOTSC in HEP ODS network per distribution area from 09/04/2018 to 31/12/2018.

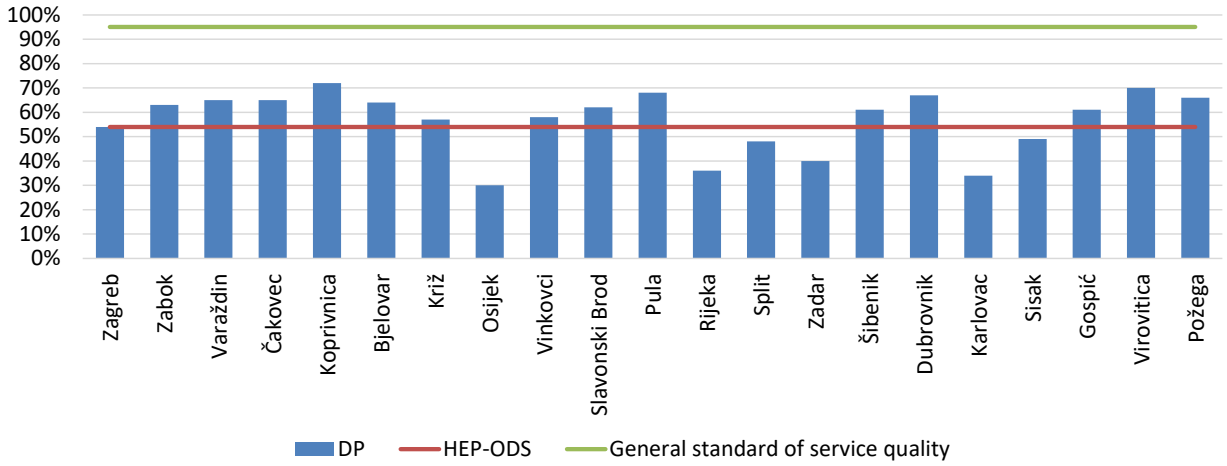
The proportion of timely resolved applications for EES is the lowest in Zadar (14%), and the highest in Čakovec (84%), but none of the distribution areas achieved the required general standard of service quality for resolving applications for EES (Figure 4.4.10).



Source: HEP ODS

Figure 4.4.10 Proportion of timely resolved applications for grid connection approvals in HEP ODS network per distribution area from 09/04/2018 to 31/12/2018.

The proportion of timely connections in case of simple connections of buildings to the network is the lowest in Osijek (30%), and the highest in Koprivnica (72%), but none of the distribution areas achieved the required general standard of service quality for simple connections (Figure 4.4.11).



Source: HEP ODS

Figure 4.4.11 Proportion of timely connections in case of simple connections of buildings by HEP ODS per distribution area from 09/04/2018 to 31/12/2018.

Observations on the quality of electricity supply in 2018

Compared to 2017, in 2018 the number and the duration of supply interruptions in the transmission network declined, as well as the estimated energy not supplied. The AIT score was slightly above the limit of the stipulated general standard, but HOPS should introduce measures to improve this index as well.

In the distribution network, the SAIDI index improved compared to 2017 and is now at the same level as in 2016. HEP ODS scores for quality of connection services are below the required general standard of service quality and should be improved. In 2018 the number of issued EAs in HEP ODS network considerably declined compared to previous years.

The poorest supply continuity SAIFI and SAIDI scores for HEP ODS were recorded at DP Elektra Zadar and DP Elektrolika Gospić. Elektra Karlovac and Elektra Sisak are also among distribution areas with poor SAIDI and SAIFI indices.

In the first quarter, a snowstorm with strong winds and salting caused an increase in the number of unplanned supply interruptions across almost all of Croatia, and the subsequent melting of snow caused flooding of the Kosinj valley and interruptions in electricity supply.

The second quarter was marked by thunderstorms, which caused an increased number of unplanned supply interruptions across almost all of Croatia.

In the third quarter, a thunderstorm hit the territories of Elektroslavonija Osijek, Elektra Sisak, Elektra Karlovac and Elektra Zagreb.

The highest number of written complaints regarding continuity of supply (59 of 61 submitted complaints) and written complaints regarding voltage quality (16 of 20 submitted complaints) resolved in time was recorded at DP Elektra Zagreb.

HEP ODS has upgraded the existing system for monitoring supply interruptions. However, in order to significantly improve the SAIDI and SAIFI indices, and in view of the above, an additional set of measures to improve the reliability of supply needs to be implemented in certain distribution areas.

4.4.5 Consumer protection

Applications in the electricity sector in 2018

Table 4.4.12 shows the classification of cases in the electricity sector processed in 2018, and Table 4.4.13 shows the data on appeals and complaints filed in the electricity sector.

Table 4.4.12 Classification of applications in the electricity sector received by HERA in 2018

Description	Number	Proportion [%]
Appeals and complaints	233	62%
Request for HERA's approval	33	9%
Request for opinion/interpretation/instruction	40	11%
Decisions	14	4%
New licences, extensions and expiry of licences	33	9%
Decisions and preliminary decisions	20	5%
TOTAL	**373**	**100%**

Table 4.4.13 Appeals and complaints in the electricity sector received by HERA in 2018

No.	Description	Number	Proportion [%]
1	**Complaints related to the calculation and use of electricity**	**48**	**21%**
1.1	Complaints regarding the calculation of electricity consumption	44	
1.2	Complaints regarding the calculation of balancing energy	0	
1.3	Complaints regarding unauthorised use of electricity	4	
2	**Complaints regarding the quality of electricity supply**	**10**	**4%**
2.1	Complaints regarding continuity of supply	8	
2.2	Complaints regarding voltage quality	2	
2.3	Complaints regarding service quality	0	
3	**Appeals regarding connection**	**28**	**12%**
3.1	Appeals regarding denied requests for PEES in the process of obtaining a location permit	0	
3.2	Appeals regarding denied requests for PEES	0	
3.3	Appeals regarding the conditions in issued PEES	8	
3.4	Appeals regarding denied requests for EES	0	
3.5	Appeals regarding the conditions in issued EES	3	
3.6	Appeals regarding the connection contract fee	1	
3.7	Appeals regarding failure to fulfil the provisions of the network connection contract – failure to connect	13	
3.8	Appeals regarding network access – other reasons	3	
4	**Appeals and complaints regarding disconnection**	**48**	**21%**
4.1	Appeals regarding disconnection from the power network	33	
4.2	Complaints regarding suspension of electricity supply	15	
5	**Complaints against suppliers**	**42**	**18%**
6	**Complaints against system operators**	**49**	**21%**
7	**Other**	**8**	**3%**
	TOTAL	**233**	**100%**

The majority of appeals and complaints received by HERA in 2018 pertained to the calculation of electricity consumption, loss of consumer status and connection to the power network.

In 2018, HERA received significantly more complaints against electricity suppliers compared to 2017. The complaints primarily referred to supplier switching.

Operator and supplier reports pursuant to the *Requirements for the quality of electricity supply*

For the first time, operators and suppliers were required to submit a report on the quality of services for 2018 pursuant to the *Requirements for the quality of electricity supply*.

Suppliers submitted the data on received complaints according to the classification proposed by HERA (Table 4.4.14), while HEP was unable to submit the data in the same format due to technological and organisational adjustments that were in progress at the time.

Table 4.4.14 Data on complaints received by electricity suppliers in 2018

Subject of complaint	Number of complaints
Connection to network	2
Meter readings	38
Quality of supply	0
Unfair commercial practice	260
Contracts and sales	1,901
Initial connection	2
Disconnection due to late payment or non-payment (suspension of electricity supply)	924
Calculation, collection and debt claim proceedings	3,813
Tariffs	12
Compensation for damage	2
Supplier switching	3
Customer service	9
TOTAL	**6,966**

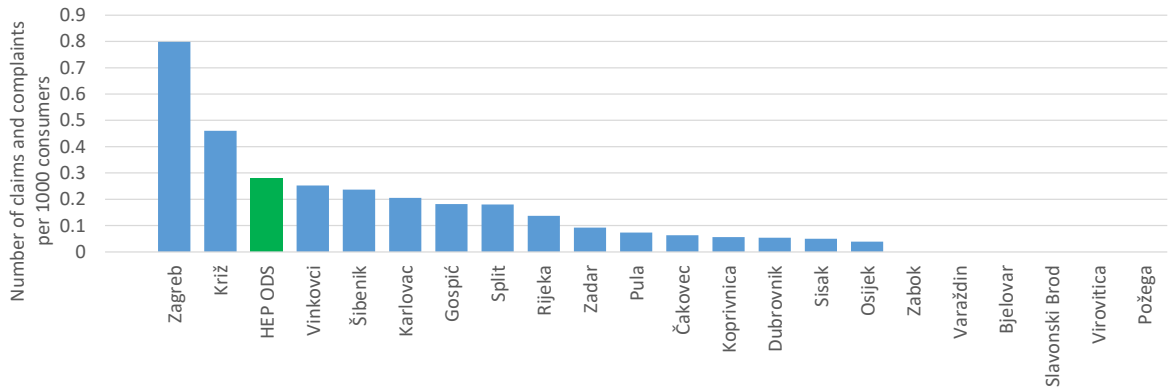
Performance of the Appeals Committee and HEP ODS appeal committees in 2018

The HEP ODS consumer appeals committees resolve complaints related to calculations of electricity consumption, meter malfunctions, connections/disconnections, voltage issues, etc. HEP ODS can receive and process queries and complaints via e-mail.

Appeals from network users regarding network access are resolved by the centralised Appeals Processing Committee of HEP ODS. This greatly standardises access to appeal resolution and the application of by-laws and regulations in all of HEP ODS distribution areas.

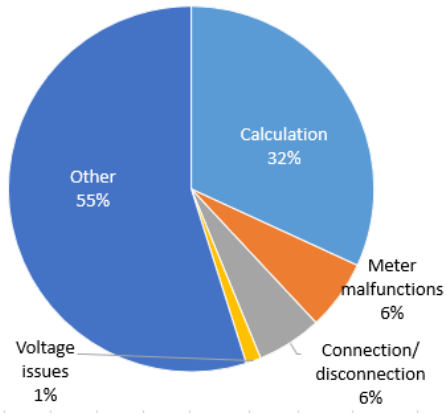
In 2018, the Committee received a total of 49 applications, of which one was withdrawn during the procedure, 15 were accepted, and 33 were considered as unfounded and forwarded to HERA for second instance proceedings. The number of applications regarding connection to the electricity network is insignificant in relation to the total number of provisional grid connection approvals, concluded connection contracts and issued grid connection approvals and network usage contracts.

Figure 4.4.12 shows the number of appeals and consumer complaints per 1,000 consumers per distribution area, and Figure 4.4.13 shows the structure of consumer appeals in HEP ODS distribution areas in 2018.



Source: HEP ODS

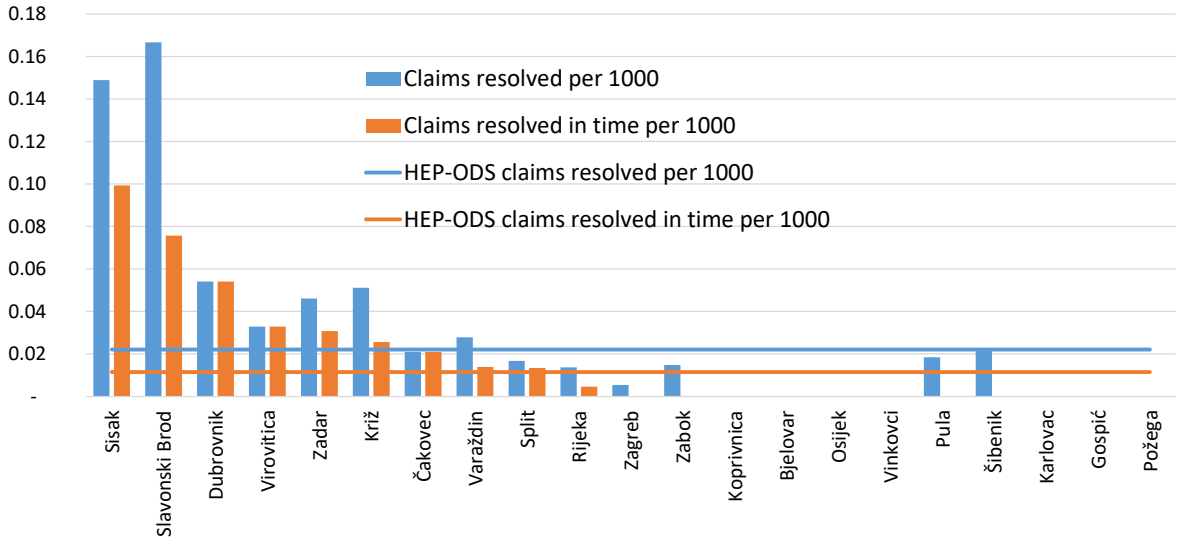
Figure 4.4.12 Number of appeals and consumer complaints per 1,000 consumers per HEP ODS distribution area in 2018



Source: HEP ODS

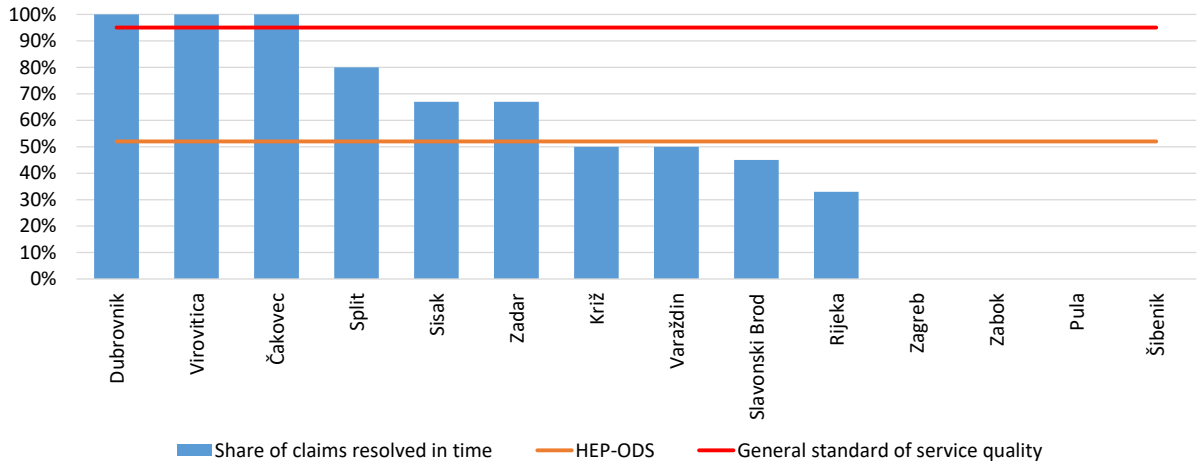
Figure 4.4.13 Types of appeals processed by consumer appeals committees of HEP ODS distribution areas in 2018

Regarding the provisions of the *Requirements for the quality of electricity supply*, Figure 4.4.14 shows the number of resolved appeals and the number of timely resolved appeals per 1,000 consumers, while Figure 4.4.15 shows the proportion of timely resolved appeals in relation to the required general standard of service for distribution areas with resolved complaints in 2018.



Source: HEP ODS

Figure 4.4.14 Number of resolved appeals and timely resolved appeals per 1,000 consumers per HEP ODS distribution area in 2018, for distribution areas with resolved appeals



Source: HEP ODS

Figure 4.4.15 Proportion of timely resolved appeals in relation to the required general standard of service per HEP ODS distribution area in 2018

The figures above show that there are significant differences in the levels of fulfilment of the required general standard of service for timely resolution of appeals across distribution areas, and that HEP ODS as a whole must improve the level of its services.

Observations on end consumer protection in 2018

Unlike previous years, when initial connection was a dominant problem, in 2018 the largest number of appeals related to calculation and collection.

From the beginning of 2019, pursuant to the provisions of the *Requirements for the quality of electricity supply*, operators and suppliers are required to annually publish on their websites, inter alia, indicators of the quality of services provided to end consumers, which enables systematic monitoring of the work of operators and suppliers in this important segment.

As a result of the implementation of the **Act on Procedures Involving Illegally Built Buildings**, a large number of buildings were legalised outside of construction areas and far from existing electricity infrastructure. Once legalised, these buildings now comply with the basic preconditions for the connection to the distribution network. Resolution of requests for connecting such buildings to the distribution network is very demanding, sometimes even impossible, as the structures are not accessible from public areas and/or they are not located in areas where spatial plans provide for the construction of structures and access roads. For these reasons, HEP ODS cannot obtain permits to build its infrastructure and/or this process is long and very expensive, as it implies the resolution of legal ownership rights with the private owners of the land on which the corresponding infrastructure should be built. This results in a number of appeals filed by owners of legalised structures regarding the conditions of PEESes or refusals to issue PEESes. A large number of such appeals is also expected in the coming years, which is why the local authorities should adopt new spatial plans that would also include the legalised structures and their infrastructure, for which access roads should be provided.

In addition to the set of energy laws and by-laws, household end consumers are also protected by the **Consumer Protection Act**. While industrial end consumers are not protected under the **Consumer Protection Act**, they enjoy protection under all other regulations.

The majority of complaints and appeals filed with HERA pertain to the work of the system operators (loss of customer status, calculation of energy). The next major group of complaints pertains to suppliers, mostly to supplier switches and misleading business practices.

An analysis of the work of the HEP ODS appeal committees in 2017 and 2018 has revealed that in 2018 the number of complaints slightly decreased and that the percentage of accepted complaints slightly increased. The number of complaints regarding the calculation of electricity consumption decreased considerably, whereas the number of well-founded and unfounded requests was almost the same. Compared to 2017, the ratio of well-founded and unfounded requests has changed, with well-founded requests making up 40% of the total number of requests, compared to 2017 when they accounted for about 20% of all requests.

4.4.6 Guarantee of origin

Development of the guarantee of origin system

The guarantee of origin system enables suppliers of electricity to offer end consumers supply contracts or tariff models with a guaranteed share of one or more electricity sources used for electricity generation. In addition, end consumers can rely on this system when choosing a tariff model, as it ensures the sale of electricity of a guaranteed structure.

The *Methodology for establishing the origin of electricity* requires electricity suppliers to submit a relevant annual report to end consumers describing the structure of the electricity supplied during the previous year, between the 1st and 31st July of the current year. Those suppliers who sent reports to their end consumers provided only a minor portion of the required data (basic data and basic structure of the electricity sold).

According to the *Methodology*, electricity suppliers base their reports to end consumers on HROTE reports:

- Annual report on the structure of total remaining electricity for the previous year, and
- Annual report on the generation of electricity under the incentives system for the previous year.

These reports are published on HROTE's website, together with the *Annual report on the origin of electricity in the Republic Croatia for 2018*, which provides an overview of the structure of the electricity produced and sold in Croatia, information on suppliers' reports regarding the origin of electricity, the use of guarantees of origin of electricity, and other related data.

A guarantee of origin, among other things, contains data on the quantity of electricity (the basic unit is 1 MWh), the date of the beginning and end of electricity generation for which the guarantee of origin is issued, the type of primary energy source, and data on the production plant, including the location of the plant and the identity of the authority that issued the guarantee of origin.

Eligible electricity producers in Croatia that are not in the electricity generation incentives system may request the issuance of a guarantee of origin. Electricity producers may sell guarantees of origin independently from the produced electricity, on a separate market of guarantees of origin, as these are used only to prove the structure of electricity.

The origin of electricity, i.e. the structure of electricity sold to the end consumer, is proven according to the *Methodology* and through the use of guarantees of origin, and excludes the use of other certificates, certificates of generation of electricity, or contracts tracing the origin of electricity.

Register of Guarantees of Origin

As the authority competent for issuing guarantees of origin in Croatia, HROTE operates a Register of Guarantees of Origin – a computer system that stores guarantees of origin, used to issue, transfer and cancel guarantees of origin as electronic documents.

The register enables the transfer of guarantees of origin from one user account to another, which is the basis for trade in guarantees of origin. HROTE is a full member of the Association of Issuing Bodies (AIB), an international association of competent authorities for guarantees of origin, and the Croatian register is connected to other registers in EU Member States via AIB's hub.

HROTE issues guarantees of origin in accordance with the *Regulation on the establishment of the Guarantees of Origin system* and the *Rules for using the Register of Guarantees of Origin*.

The register has been fully operational since 2 February 2015, and seven suppliers and three producers of electricity have created their user accounts by the end of 2018. In 2018, seven new facilities were registered in the Register, which now includes 13 production plants. Table 4.4.15 provides an overview of registrations.

Table 4.4.15 Registrations in the Register of Guarantees of Origin

Type of registration	New registrations in 2018	Total registrations
User accounts of electricity producers	1	3
User accounts of other Register users	1	7
Total user accounts	2	10
Total registered production plants	7	13

Source: HROTE

In 2018, seven registered suppliers traded in guarantees of origin, and guarantees of origin were issued for 13 production plants (HE Lešće, HE Varaždin, HE Orlovac, HE Dubrava, HE Čakovec, HE Vinodol, HE Rijeka, HE Dubrovnik HE Gojak, HE Senj, HE Golubić, Vjetroelektrana Trtar-Krtolin, Mala vjetroelektrana Ravna 1). An overview of transactions in guarantees of origin is provided in Table 4.4.16.

Table 4.4.16 Activities in the Register of Guarantees of Origin in 2018

Activity	No. of guarantees (1 guarantee = 1 MWh)
Number of issued guarantees of origin for electricity generated in Croatia in 2018	2,623,851
Number of imported guarantees of origin	31,896
Number of exported guarantees of origin	555,101
Number of cancelled guarantees of origin for consumption in 2018	1,161,039
Number of expired guarantees of origin	0

Source: HROTE

In 2018, HROTE collected HRK 1,011,278 in revenues. The cost of operating the Register and other activities in the guarantees of origin system amounted to HRK 312,647. The ratio between revenues and costs suggests that the guarantees of origin system further improved in terms of financial sustainability.

Observations on the guarantees of origin system

In 2018, a significant increase in activity was recorded compared to 2017, both in Register registrations and in the number and volume of transactions. Six hydroelectric power plants owned by HEP-Proizvodnja d.o.o. were included in the register. In addition, the Register of Guarantees of Origin also recorded the registration of Vjetroelektrana Trtar-Krtolin.

There is still a need to improve the legal framework governing the guarantee of origin system. More specifically, the **Energy Act** and the **Electricity Market Act** only stipulate the adoption of by-laws that regulate the guarantees of origin system, but fail to identify what would be regulated by these by-laws, particularly in terms of obligations. The lack of misdemeanour provisions in the **Energy Act** ensuring that suppliers comply with the provisions of the *Methodology for establishing the origin of electricity* is a particular problem.

Further registrations of users and production plants are expected in 2019, together with a more lively competition of suppliers using tariff models with a guaranteed structure of electricity. It can be assumed that HEP-Proizvodnja d.o.o. will also register other hydroelectric power plants in the Register of Guarantees of Origin and that the production plants which leave the incentives system for renewable energy sources will also be registered. Based on these expectations, a further improvement in sustainability across the whole system is expected through a larger number of transactions in the Register.

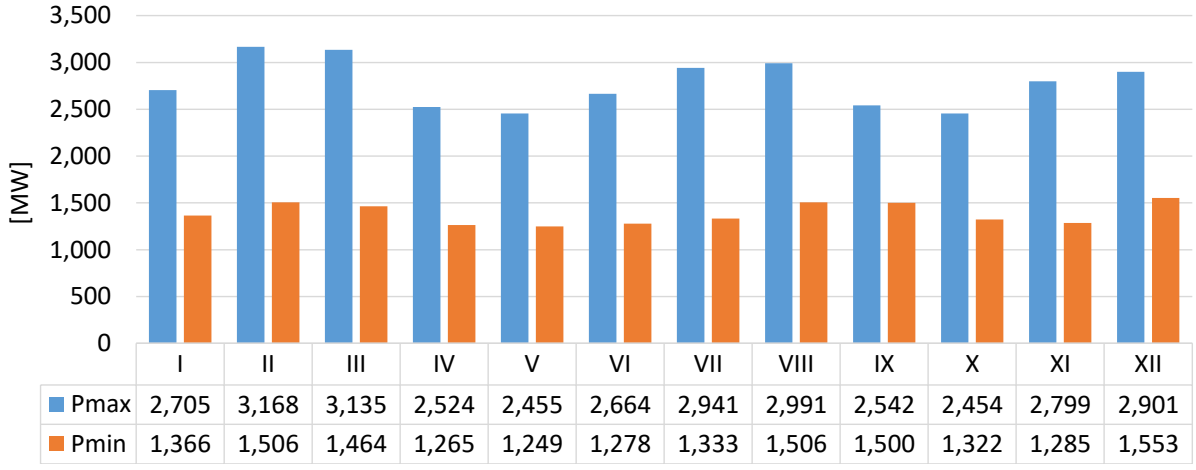
4.5 Security of electricity supply

System load characteristics

Table 4.5.1 shows the maximum and minimum loads (P_{max} and P_{min}) of the Croatian electricity system, the times when they occur, and the corresponding electricity imports and exports in the last 5 years. Figure 4.5.1 shows the maximum and minimum loads in the Croatian electricity system in 2018 per month. In 2018, the maximum system load was recorded in February due to low temperatures, after a period of three years when it occurred during the summer months.

Table 4.5.1 Maximum and minimum loads of the Croatian electricity system

Year	Maximum load				Minimum load			
	P_{max} [MW]	Date, time	Imports at P_{max} [MW]	Exports at P_{max} [MW]	P_{min} [MW]	Date, time	Imports at P_{min} [MW]	Exports at P_{min} [MW]
2014	2,974	31/12, 18:00	1,462	674	1,166	11/05, 06:00	1,181	1,070
2015	3,009	22/07, 13:00	2,296	474	1,188	22/06, 06:00	1,339	600
2016	2,869	12/07, 14:00	2,142	441	1,155	22/05, 06:00	1,022	641
2017	3,079	04/08, 14:00	1,657	270	1,305	18/09, 04:00	906	543
2018	3,168	26/02, 20:00	2,147	1,363	1,249	20/05, 06:00	1,008	606



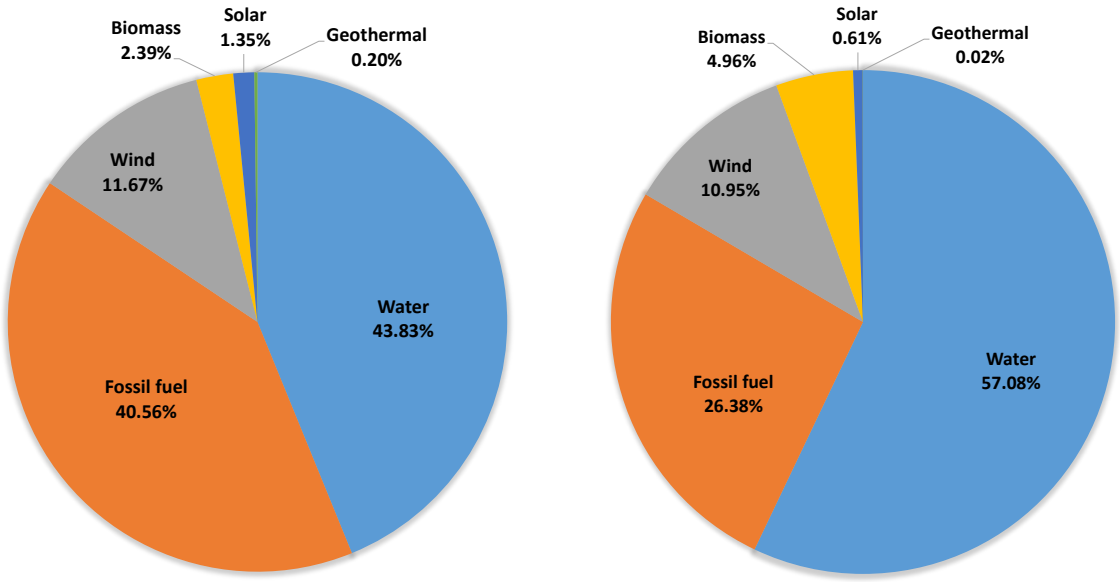
Source: HOPS

Figure 4.5.1 Maximum and minimum loads of the Croatian electricity system in 2018

Adequacy of production and imports

The total capacity of all power plants in Croatia amounted to 5,010 MW at the end of 2018. In addition, HEP d.d. is a co-owner of the Krško Nuclear Power Plant located in Slovenia, and has at its disposal 50% of its capacity, i.e. 348 MW. The ratio between the total connection capacity of power plants in Croatia and the maximum load of the Croatian electricity system in 2018 was 1.58.

Figure 4.5.2 shows a breakdown of all primary power sources in the total capacity and generated electricity of power plants located in Croatia at the end of 2019 (including power plants being tested). A significant share of renewable energy sources is evident.



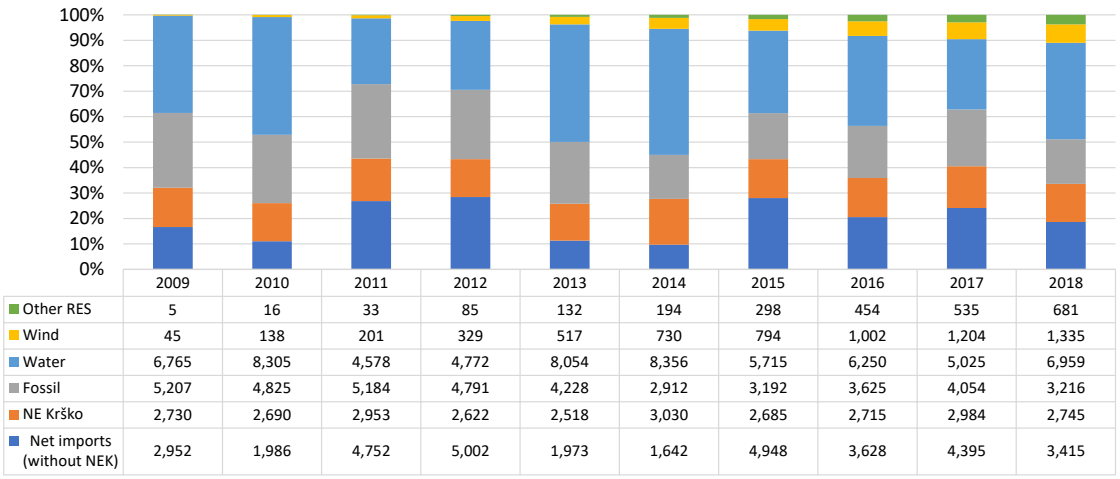
Connection capacity *Generated electricity*

Source: HOPS and HEP ODS

Figure 4.5.2 Breakdown of the total capacity and generated electricity of power plants located in Croatia by primary power source at the end of 2018

In the last five years there has been a significant increase in the share of production of distributed energy sources. In 2018, the supply of electricity from distributed energy sources increased by around 20% compared to 2017, and doubled compared to 2014. The proportion of electricity supplied from distributed energy sources in the total consumption of the electricity system (18,352 GWh) in 2018 amounted to 5.75%.

Figure 4.5.3 shows the proportions of all electricity sources procured for the requirements of the Croatian electricity system. The amount produced by the Krško Nuclear Power Plant for HEP d.d. is presented separately from net imports.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Other RES	5	16	33	85	132	194	298	454	535	681
Wind	45	138	201	329	517	730	794	1,002	1,204	1,335
Water	6,765	8,305	4,578	4,772	8,054	8,356	5,715	6,250	5,025	6,959
Fossil	5,207	4,825	5,184	4,791	4,228	2,912	3,192	3,625	4,054	3,216
NE Krško	2,730	2,690	2,953	2,622	2,518	3,030	2,685	2,715	2,984	2,745
Net imports (without NEK)	2,952	1,986	4,752	5,002	1,973	1,642	4,948	3,628	4,395	3,415

Figure 4.5.3 Proportions of electricity sources (GWh) procured for the requirements of the Croatian electricity system from 2009 to 2018

In the period from 2010 to 2014, electricity consumption in Croatia had a declining trend. However, consumption has increased since 2015, including in 2018, when it grew by 0.9% compared to 2017 and reached the highest level recorded by HERA (measured since 2000)

The hydrological conditions were favourable in 2018, which resulted in lower net electricity imports and reduced electricity production from thermal power plants.

Moreover, due to significant electricity transits through the Croatian electricity system (the highest since 2013), there were more losses in the transmission network.

Figure 4.5.4 shows net electricity imports into the Croatian electricity system over the past 10 years, including electricity generated at Krško Nuclear Power Plant for HEP d.d.

Net electricity imports in 2018 amounted to 34% of the total consumption of the Croatian electricity system (the lowest in the last four years).

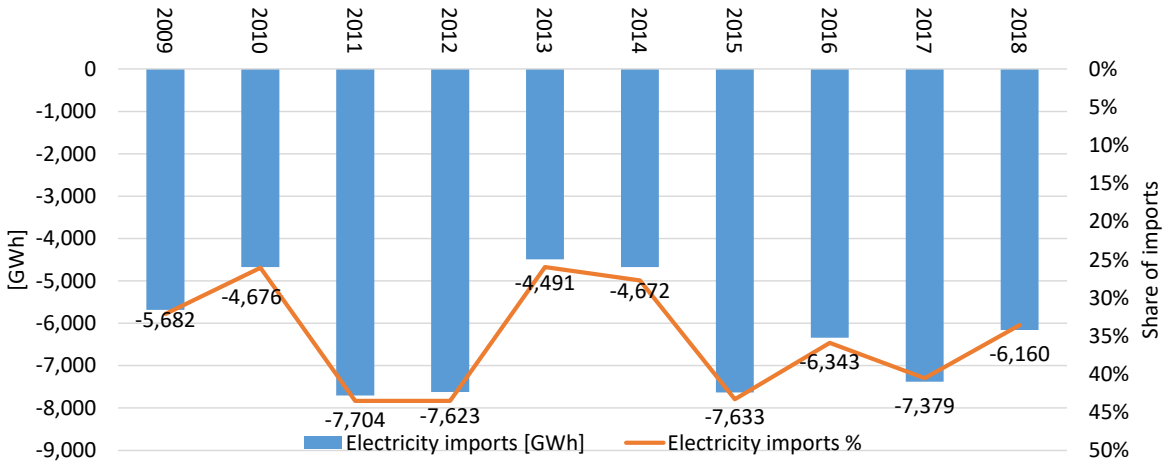


Figure 4.5.4 Net electricity imports required for domestic consumption and share of imports in the total consumption in Croatia

Observations on the security of electricity supply

Pursuant to *Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration (NCER Regulation)*, in 2018 HOPS developed a new System Defence Plan and a new System Restoration Plan. HEP ODS took an active role in the preparation of the System Defence Plan. HERA was notified of both plans.

In line with the *NCER Regulation*, HOPS also submitted some elements of the plan for HERA's approval.

HERA granted its prior approval for reports on monitoring the security of supply in 2018, prepared by HOPS and HEP ODS. These reports and the currently available data supplied to HERA by HOPS and HEP ODS suggest that the level of security of electricity supply in the Croatian electricity system is satisfactory, provided that there are sufficient electricity imports.

ENTSO-E's latest document on long-term security of supply, *Mid-term Adequacy Forecast 2018 Edition*[10], developed on the basis of data submitted by European transmission system operators, highlights Croatia's heavy dependence on electricity imports. However, when the conditions in the neighbouring countries are favourable, the existing cross-zonal capacities are sufficient to meet system requirements at all times. This situation is expected to improve once new production facilities are constructed, and no difficulties in relation to adequacy are expected by 2025.

4.6 Incentives for electricity production from renewable sources and cogeneration

Eligible electricity producers

When a suitable facility that uses renewable energy sources or high-efficiency cogeneration is constructed, HERA issues a decision granting the facility the eligible electricity producer status for a period of 25 years.

In case of facilities which are considered as simple structures according to regulations on spatial planning and construction (currently only in the case of solar power plants on existing buildings), project operators for such facilities are not required to obtain a decision. Instead, pursuant to the **Renewable Energy Sources and High-Efficiency Cogeneration Act**, they are granted eligible producer status based on evidence that the electricity producer has been granted the right to permanent connection to the electricity network for a generation facility that uses renewable energy sources or high-efficiency cogeneration.

Table 4.6.1 shows the number of decisions on eligible electricity producer status granted by HERA in 2018.

Table 4.6.1 Decisions on eligible electricity producer status granted by HERA in 2018

Type of facility / primary energy source	No. of decisions issued[11]	Plant capacity [MW]
Solar power plants	3	0.9
Hydroelectric power plants	10	838.609
Wind power plants	2	59.2
Biomass power plants	10	21.88
Geothermal power plants	0	0
Power plants fuelled by biogas	5	3.998
Cogeneration	0	0
Other plants using renewable sources	0	0
Total	**30**	**924.587**

In 2018, HERA also issued three decisions altering the preliminary decision, two decisions to change the project operator in a decision, and 17 decisions extending preliminary

10 *ENTSO-E Mid-term Adequacy Forecast 2018 Edition, https://www.entsoe.eu/outlooks/midterm/*

11 *Including decisions on guarantee of origin.*

decisions. Table 4.6.2 gives an overview of the decisions granting eligible electricity producer status issued by HERA from 2007 to 2018[12].

Table 4.6.2 Decisions granting eligible electricity producer status issued by HERA from 2007 to 2018

Type of facility / primary energy source	Number of facilities	Total capacity [MW]
Solar power plants	229	23.39
Hydroelectric power plants	31	1,379.28
Wind power plants	26	587.80
Biomass power plants	28	58.33
Power plants fuelled by biogas	38	43.46
Power plants fuelled by landfill gas and gas from wastewater treatment plants	1	2.50
Cogeneration	6	112.94
Total	**359**	2,207.71

In addition to securing priority rights in the delivery of electricity into the electricity system, eligible producer status was one of the requirements for incentives in accordance with the tariff systems for electricity generation from renewable energy sources and cogeneration, and is one of the requirements for the incentives system from the **Renewable Energy Sources and High-Efficiency Cogeneration Act**. However, the eligible producer status does not imply the right to incentivised prices for delivered electricity, but is only one of the conditions to qualify for incentives.

If eligible electricity producers did not meet the conditions to qualify for incentives, they may participate in the guarantee of origin system pursuant to the *Regulation on the Establishment of the Guarantees of Origin System*. Power plants cannot participate in the incentives system and simultaneously sell guarantees of origin of electricity.

However, the **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** introduced the possibility for HROTE to issue and sell guarantees of origin for delivered energy from the incentives system and from the guaranteed buy-off system. The revenues from the sale of such guarantees of origin are then added to the funds for the disbursement of incentives.

Incentives for the production of electricity from renewable energy sources and cogeneration

The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** entered into force in late 2018. Pursuant to this Act, the Croatian Government adopted the *Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration*, which elaborates in detail the method and conditions for the implementation of new incentive models consisting of market premiums and buy-offs at a guaranteed price, setting maximum reference values and maximum guaranteed buy-off prices, contracting procedures, and setting incentive quotas. In line with the **Act**, the Croatian Government also adopted the *Regulation on the share of net electricity delivered by eligible producers that electricity suppliers are obliged to take up from the electricity market operator*, stipulating that 70% of net electricity that electricity suppliers take up from the electricity market operator must be delivered by eligible electricity producers.

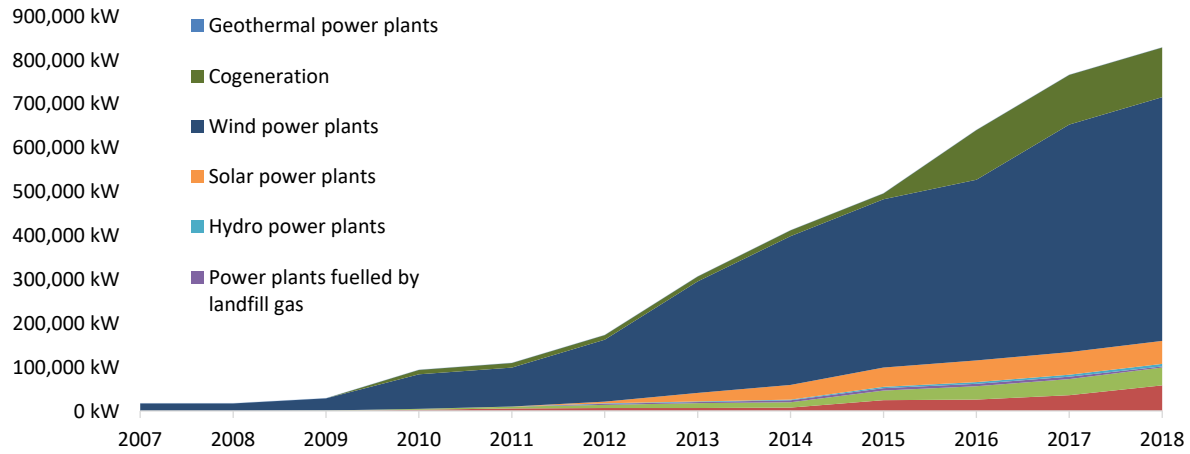
The *Regulation on promoting* establishes new procedures applied by HROTE for concluding contracts on electricity buy-off from renewable sources and cogeneration, i.e. by organising public calls for tenders for market premium allocations and concluding contracts on buy-off at a guaranteed price pursuant to a decision on the selection of the lowest bidder. Since the by-laws foreseen in the **Renewable Energy Sources and High-**

12 *The data refers to decisions issued by HERA, and therefore the number and the total capacity of facilities do not necessarily match the number of facilities in the incentives system (e.g. eligible producers who are not in the incentives system, integrated solar power plants which are not require to apply for a decision by HERA, etc.).*

Efficiency Cogeneration Act (regulation on quotas for promoting electricity production from renewable sources and cogeneration, and state aid programme) were not adopted in 2018 as planned, HROTE was not able to conclude any new contracts on electricity buy-off from renewable sources and cogeneration.

In 2018, 21 electricity buy-off contracts were activated, i.e. 21 facilities with a total connection capacity of 76.327 MW became operational and were included in the incentives system. Contracts with nine facilities were terminated, and two contracts expired.

Figure 4.6.1 shows the gradual entry of generation facilities into the incentives system since its introduction in 2007, and Table 4.6.3 shows the basic indicators related to the incentives system.



Source: HROTE

Figure 4.6.1 Installed capacity of facilities in the incentives system from 2007 to 2018 by type of facility

Table 4.6.3 Generation and paid incentives to eligible producers in 2018 by type of facility

Type of facility / primary energy source	Number of facilities	Installed capacity [MW]	Electricity generation [MWh]	Share in generation [%]	Paid incentives (VAT excluded) [in mil. HRK]	Share in disbursements [%]
Solar power plants	1229	52.43	69,196	2.79%	133.44	6.13%
Hydroelectric power plants	13	5.79	24,621	0.99%	21.03	0.97%
Wind power plants	21	555.80	1,345,467	54.20%	1,015.71	46.67%
Biomass power plants	28	58.33	291,871	11.76%	367.74	16.90%
Geothermal power plants	0	0.00	0	0.00%	0.00	0.00%
Power plants fuelled by biogas	37	40.73	316,415	12.75%	407.07	18.70%
Power plants fuelled by landfill gas and gas from wastewater treatment plants	1	2.50	126	0.01%	0.06	0.00%
Cogeneration	6	113.29	434,837	17.52%	231.27	10.63%
Total	**1,335**	**828.87**	**2,482,533**	**-**	**2,176.32**	**-**

Source: HROTE

In 2018, the share of energy generated in plants which participated in the incentives system corresponded to 12.6% of total electricity consumption in Croatia (18.35 TWh).

Figure 4.6.2 shows average incentivised prices for delivered electricity by plant type in the incentives system as compared to the annual average price of electricity on the day-ahead market on the Croatian electricity exchange in 2018 (HRK 0.39/kWh). The average incentivised price amounted to HRK 0.88/kWh. The highest incentivised price

(HRK 1.93/kWh) was paid for electricity from solar power plants, while the electricity from power plants fuelled by landfill gas was paid the lowest incentivised price of HRK 0.44/kWh. The average incentivised price paid for electricity from wind power plants amounted to HRK 0.75/kWh.

Although it is important to compare incentivised prices with the actual electricity market price from the point of view of market efficiency, it should be noted that incentivised prices should reflect the average cost of electricity production (levelized cost of electricity – LCOE), which includes the cost of building technologies which are not yet competitive, costs connected with project financing, revenue generated from the sale of thermal energy from cogeneration facilities, etc.

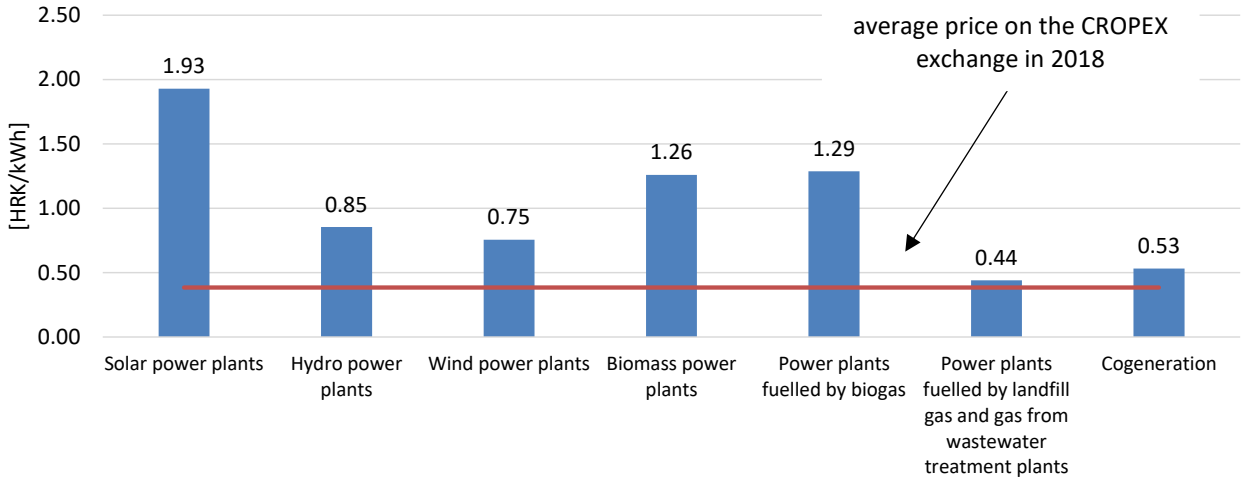


Figure 4.6.2 Weighted average buy-off price of electricity in the incentives system by facility type in 2018

HROTE buys off electricity from eligible producers in the incentives system using funds collected on a twofold basis:

- all end consumers of electricity in Croatia pay a fee of HRK 0.105/kWh for promoting renewable energy sources and cogeneration (RES&C fee). This fee is HRK 0.005/kWh for consumers required to obtain greenhouse gas emission permits.
- All suppliers must buy off electricity generated in the incentives system at the regulated price of HRK 0.42/kWh in the amount proportional to their share in total electricity delivered to consumers. Electricity generated in eligible producer facilities is allocated to suppliers in two ways:
  - by allocating realised quantities of electricity from the previous period via buy-off schedules (with a time shift of 3 months) for all other suppliers, and (exceptionally)
  - by allocating planned day-ahead values for HEP Elektra d.o.o. and HEP-Opskrba d.o.o.

Table 4.6.4 shows an increase in HROTE's expenses in 2018, resulting from new generation plants being added to the incentives system. HROTE has settled a part of its liabilities using unallocated funds from previous periods and using funds collected from the increased fee for promoting electricity production from renewable sources and cogeneration introduced on 1 September 2018.

Table 4.6.4 Cash flows in the incentives system [HRK mil.]

Income/expenses	2015	2016	2017	2018
Incentives system income				
Income from end consumers of electricity (from RES&C fees)	524.92	514.70	890.73	1,602.34
Income from the sale of electricity from the incentives system to suppliers	579.78	724.89	956.47	1,042.66
Incentives system expenses				
Cost of electricity bought from eligible producers	1,038.74	1,546.55	1,912.79	2,176.32
Costs of financing HROTE's activities in the RES&C incentives system	6.00	9.00	12.45	11.10
Balancing energy costs	-	-	-	-
Cost of special supplier fees	-	-	-	-
Annual difference	**59.96**	**- 315.96**	**- 78.02**	**457.58**

Register of renewable energy sources and cogeneration, and eligible producers

Register of renewable energy sources and cogeneration, and eligible producers (hereinafter: the Register) is a comprehensive record with information on projects involving renewable energy sources and high-efficiency cogeneration, production facilities using renewable energy sources, high-efficiency cogeneration facilities and eligible producers operating in Croatia. It is established and maintained by the Ministry of Environment and Energy (hereinafter: the Ministry) in order to monitor and supervise the implementation of projects involving renewable energy sources and high-efficiency cogeneration and to provide administrative support to project operators, and public and legal entities.

Pursuant to the **Renewable Energy Sources and High-Efficiency Cogeneration Act**, the entities authorised to enter data and related documents into the Register are the Ministry, HERA, HROTE, HOPS and HEP ODS. However, project operators and facilities should first be entered by the Ministry.

The Register is published on the Ministry's website, along with an interactive map of Croatia containing the locations of all facilities entered into the Register.

In accordance with the **Act**, the Ministry should adopt an ordinance regulating the structure and management of the Register, data entry, contents (information, data, certificates and documents entered into and stored in the Register), obligations of all competent authorities tasked with data entry and modification, as well as the procedure and deadlines for entry into the Register. HERA issued its opinion on the proposed ordinance in March 2019, and the proposal underwent online consultations from 13 March to 11 April 2019.

Table 4.6.5 shows an overview of projects from the publicly available section of the Register on 31 May 2019. The table shows planned projects and constructed production facilities.

Table 4.6.5 Overview of projects entered into the Register of renewable energy sources and cogeneration, and eligible producers

Type of facility / primary energy source	Number of facilities	Installed capacity [MW]
Solar power plants	499	95.54
Hydro power plants	49	1,676.35
Wind power plants	45	1,835.95
Biomass power plants	115	214.32
Geothermal power plants	2	20.00
Power plants fuelled by biogas	61	65.50
Power plants fuelled by landfill gas and gas from wastewater treatment plants	7	9.60
Cogeneration	12	1,068.99
Other	1	1.00
Total	**791**	**4,987.26**

Source: Ministry of Environment and Energy

Activities of the EKO balance group

Establishment of the EKO balance group is regulated under the **Renewable Energy Sources and High-Efficiency Cogeneration Act**. It includes electricity producers and other entities performing electricity production activities with the right to incentivised prices pursuant to a concluded contract on electricity buy-off (eligible producers).

The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** was adopted on 28 December 2017, postponing the full establishment of the EKO balance group to 1 January 2019. After being postponed twice by regulations issued by the Croatian Government, the Amendments to the **Renewable Energy Sources and High-Efficiency Cogeneration Act** from December 2018 finally confirmed 1 January 2019 as the start of operations of the EKO balance group. The *Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration* (hereinafter: *Regulation on promoting*), and the *Regulation on the Share of Net Electricity Delivered by Eligible Producers that Electricity Suppliers are Obliged to Take up from the Electricity Market Operator* (hereinafter: *Regulation on the share*) were also adopted in December 2018. The *Regulation on promoting* defines the fees for balancing energy costs in the amount of HRK 0.015/kWh for wind power plants, HRK 0.01/kWh for solar power plants, and HRK 0.003/kWh for all other facilities. In line with the *Regulation on the share*, in 2019 electricity suppliers should take up 70% of net electricity delivered to HROTE by eligible electricity producers participating in the incentives system, whereas the remaining electricity produced by the EKO balance group is sold by HROTE on the electricity market. *Rules for the sale of electricity* (hereinafter: *Sale Rules*), developed by HROTE, entered into force in late 2018. The *Sale Rules* provide for a combination of long-term and short-term electricity sale via three sales models: sale at auctions, sale on the electricity exchange and sale pursuant to framework agreements.

In case the production of the EKO balance group deviates from planned production, HROTE is obliged to reimburse HOPS for the balancing energy costs incurred by the EKO balance group from the funds collected within the incentives system for the production of electricity from renewable energy sources and cogeneration, except the costs which can be covered from the monthly fee paid by members of the EKO balance group.

Self-supply installation user

The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** introduced the definition of a self-supply installation user as a household end consumer with a connected a self-supply installation generating own electricity from renewable energy sources or high-efficiency cogeneration, whose energy surpluses can be taken over within a billing period by a supplier or market participant under a relevant contract, provided that the total volume of electricity delivered to the network in a calendar year is less than or equal to the electricity taken from the network.

Upon request of an end consumer from that category, suppliers delivering electricity are obliged to conclude a supply contract with the end consumer containing provisions on take-up of the surplus electricity generated in such installations. The difference between the taken and delivered energy within a billing period (one month) is taken into consideration when calculating electricity consumption, network charges and the fee for renewable energy sources and high-efficiency cogeneration applicable to self-supply installation users.

In its opinions on the proposals for the **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act**, HERA warned the Ministry that granting concessions to a specific group of network users may lead to an increase in network charges for other network users and to unauthorised cross-subsidies, and suggested that network charges should remain in effect for all electricity taken from the network. This comment was not taken into consideration.

Observations on incentives for electricity production from renewable sources and cogeneration

The weighted average price of electricity paid in 2018 to eligible producers taking part in the incentives system (HRK 0.88/kWh) is more than double of the annual average electricity price on the day-ahead market on the CROPEX electricity exchange (HRK 0.39/kWh).

In 2018, 21 new facilities using renewable energy sources with a total capacity of 76 MW were connected to the electricity system. There was an increase in the production of electricity from renewable energy sources and cogeneration within the incentives system despite a reduced share of cogeneration compared to the previous year due to overhaul works at the combined cogeneration block in the Zagreb Thermal Power Plant – Heating Plant (TE-TO).

Among several new facilities that became operational in 2018, the most important in terms of installed capacity is the Lukovac Wind Power Plant (23 MW).

Because HOPS is obliged to connect all wind power plants that have concluded a delivered electricity buy-off contract with HROTE, the total capacity of wind power plants in the incentive system with guaranteed buy-off is expected to reach 738 MW. Following the construction of the remaining wind power plants that have signed contracts with HROTE and their entry into the incentives system (Krš-Pađene, Krš-Pađene extension, Kom-Orjak-Greda and Jasenice wind power plants with a total capacity of 162 MW), there will be a further increase in the quantity of electricity generated by wind power plants, and a resulting increase in the funds required for the disbursement of incentives.

Even though the latest amendments to the **Renewable Energy Sources and High-Efficiency Cogeneration Act** contributed to balancing out the revenues and expenses in order to promote the production of electricity from renewable energy sources, the expected increase in the amount of energy generated within the incentives system and the new obligation to reimburse the balancing energy costs applicable to the EKO balance group may lead to a further increase of the fee for promoting electricity production from renewable sources and cogeneration paid by all end consumers. In addition, once suppliers are fully relieved of the obligation to purchase electricity from the incentives system at a regulated price, supplier procurement costs will be reduced and fees for promoting electricity production from renewable sources and cogeneration will increase, provided that market prices remain lower than regulated prices. The increase will depend on successful sales and the price that HROTE will be able to set for electricity from the incentives system.

The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** increased the capacity limit of facilities eligible to join the incentives system with buy-off at a guaranteed from 30 kW to 500 kW. In its opinion on the proposal for the **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** HERA warned the Ministry that the new limit would significantly increase the number of facilities joining the new incentives system, which is not much different than the old *feed-in* system, and which may constitute a step back in market development. The proposal to reinstate the 30 kW threshold was not accepted.

In line with the regulations governing the incentives system, HERA issued 17 decisions extending preliminary decisions in 2018, thereby extending the deadline for the construction of facilities in which generated electricity will be bought off at an incentivised price for additional two years. Since the key document for the extension is a notarised statement that 50% of the funds have been spent on the construction of the facility, HERA carried out checks to verify the statements during the extension granting procedure.

In line with the regulations governing the incentives system, the right of the facilities generating electricity from biomass or biogas to incentivised prices for delivered electricity is conditioned upon achieving a minimum total annual facility efficiency. For the high-efficiency cogeneration facilities, the right to incentivised prices for delivered

electricity is linked to primary energy savings. In 2018, HERA issued 26 decisions on total annual efficiency of such facilities, and nine decisions on required primary energy savings. To determine the total annual efficiency and the required amount of primary energy savings applicable to a generation facility, inspections were conducted in seven cogeneration facilities in 2018.

For facilities using biomass, the incentivised price for the current year is adjusted against the total annual efficiency achieved in the previous year. Out of seven biomass facilities which were issued decisions determining the total annual efficiency in 2017, the annual efficiency of six facilities led to an increase in incentivised price by 20% in 2018, whereas the annual efficiency of one facility resulted in the reduction of the incentivised price by 10%. Since the latter facility had not achieved the required minimum annual efficiency, this requirement was set for 2018 as per HERA's decision.

In practice, in some cases eligible producers deliver electricity exceeding the capacity approved in the decision granting them eligible electricity producer status. As this is considered to be irregular use of the production facility under the **Renewable Energy Sources and High-Efficiency Cogeneration Act**, HERA will all issue a decision determining a deadline for the eligible electricity producer to correct any such irregularities. In order to apply a clear and uniform procedure for correcting irregularities in connection with exceeded capacity, on 24 February 2017 HERA adopted the *Operating rules in cases of exceeded load on the part of eligible electricity producers*, which are available on its website. In line with these rules, HERA issued decisions requesting the correction of irregularities for two facilities that exceeded the approved capacities in 2018.

4.7 Energy efficiency in the electricity sector

Energy efficiency in the electricity infrastructure

Pursuant to Article 16(1) of the **Energy Efficiency Act**, in performing its regulatory activities in line with legislation governing electricity and gas markets, HERA must take into account energy efficiency when adopting decisions on the operation of electricity and gas infrastructure.

Pursuant to Article 16(4) of the **Energy Efficiency Act**, HERA should:

- ensure that the potential for increasing energy efficiency of gas and electricity infrastructure is assessed, in particular related to transmission/transport, distribution, load management, interoperability and connection of facilities for energy generation, including access for energy microgenerators, and
- determine specific measures and investments for introducing cost-effective energy efficiency improvements into the network infrastructure, including deployment target dates.

The term "energy efficiency of electricity infrastructure" refers to the reduction of technical losses in the transmission and distribution networks resulting from the operation of the transmission and distribution systems. Technical loses are classified as permanent (load independent – losses in transformer cores, losses due to corona and leakage current over insulators in transmission lines, dielectric losses of cables and capacitors, losses in low-voltage coils of electricity meters) and variable (proportional to the square of the current – losses in overhead lines and underground cables, losses in transformer windings).

In order to implement these tasks, HERA commissioned a study entitled *An Assessment of the Potential for Increasing the Energy Efficiency of the Electricity Infrastructure*.

The potential for decreasing electricity losses is calculated as the difference between future losses without the implementation of measures and future losses with implemented energy efficiency measures.

The study analysed measures affecting technical losses (decreases and increases) from the ten-year development plans for the transmission and distribution systems for the period from 2016 to 2025, with a detailed elaboration for the initial three- and one-year periods. Such measures are also necessary for increasing the safety of operation and compliance with technical regulations; otherwise, the investments would be too high to be justified solely by savings from loss reduction.

The study also considered specific measures and investments that would affect losses in the transmission and distribution networks.

The target deployment dates for the considered measures are established by ten-year development plans for transmission and distribution networks, with a detailed elaboration for the initial three- and one-year periods, which HERA approves each year, taking into account cost-effective improvements to the network infrastructure.

Once preconditions are met for the introduction of advanced technologies, such as load management technologies, HERA will revise the assessed potential for increases in energy efficiency of the electricity infrastructure and set target deployment dates for the introduction of advanced measures.

The approved *Ten-year development plan for the transmission network from 2018 to 2027 with a detailed elaboration of the initial three- and one-year periods* contains measures for investments into the network, such as the replacement of old power transformers with new units which would lead to fewer losses, revitalisation of old overhead lines and conductor replacement, use of high-temperature low-sag (HTLS) conductors with a larger aluminium clad cross-section for fewer losses, replacement of deteriorated submarine cables, construction of new lines, installation of reactive power compensation devices, and replacement of overhead lines with cables. It also proposes measures for electricity system management.

The approved Plan also sets other measures for investments in the network, such as reconstruction of network portions with small conductor cross-section and long line sections, upgrade of voltage level for some portions of the network from 10 kV to 20 kV, replacement of old power transformers with new units which would lead to fewer losses, further implementation of reactive power compensation. In addition, it proposes measures for electricity system management, for example optimisation of network reconnect status, automatic voltage regulation, etc.

Introduction of smart meters

According to the **Energy Act**, HEP ODS sets out the technical requirements and determines the costs of introducing smart meters and mass roll-out of smart metering systems, and communicates these requirements to HERA. HERA then performs a cost-benefit analysis and obtains the opinion of the representatives of consumer protection bodies. The minister responsible for energy in turn sets out a programme of measures for introducing smart meters for end consumers.

At its Board of Commissioners meeting held on 21 July 2017 and based on study results, HERA adopted the *Cost-benefit analysis of smart meters and smart meter roll-out systems*, which was submitted to the Ministry of Environment and Energy for further processing in line with Article 38(3) of the **Energy Act**. Based on the Analysis, the minister will set out a plan of measures for the installation of smart meters for end consumers.

Observations on energy efficiency in electricity consumption

Currently, electricity suppliers are not publicly offering end consumers any models with tariff elements that would be different from the tariff systems for the transmission and distribution of electricity. In other words, despite the fact that some end consumers have installed meters capable of monitoring consumption in shorter intervals or in several tariff periods, the offer of electricity suppliers does not include special products targeting

specific groups of end consumers and their consumption patterns (e.g. tariff models adapted to vacation homes).

Although electricity suppliers provide advice on the efficient use of energy through their communication channels with current and future end consumers, it should be ensured that electricity suppliers provide more information regarding electricity consumption in personal communication, which would enable end consumers to save energy, change their behaviour, or make better decisions and purchase energy efficient devices.

In terms of consumption management, end consumers should be enabled simple access to their own data on electricity consumption in sufficiently short intervals in order to manage their consumption and build up savings or earn additional income.

In addition, 2018 has seen continued implementation of the provisions from the *General terms and conditions for network use and electricity supply*, which classify end consumers, including households with connection capacity above 20 kW, into tariff models for network use which take into account the calculation of peak loads. The calculation of peak loads (maximum power used in the higher daily tariff period over a billing period) used as one of the tariff elements directly encourages end consumers to monitor and decide when and how they use their devices and how they use major energy consuming devices. Increased electricity requirements by end consumers require a stronger electricity network, but also lead to more losses.

5 NATURAL GAS

5.1 Legal framework for natural gas

The legal framework of the gas sector and gas market in the Republic of Croatia includes the **Energy Act**, **Gas Market Act**, **Act on the Liquefied Natural Gas Terminal**, **Act on the Regulation of Energy Activities** , and by-laws adopted pursuant to these laws.

In February 2018, the Croatian Parliament, pursuant to Article 89 of the Constitution of the Republic of Croatia, adopted a new **Gas Market Act (Official Gazette No. 18/18)**. The **Gas Market Act** stipulates, inter alia, HERA's obligation to select a wholesale gas market supplier through a public call for tenders for the period from 1 August 2018 to 31 March 2021, after which the function of the wholesale gas market supplier will be abolished. In the transitional period of three gas years, the wholesale gas market supplier can sell gas under regulated conditions to public service suppliers who decide to buy gas for public service household supply from the wholesale gas market supplier. After 31 March 2021, HERA will select public service gas suppliers through public calls for tenders. This has enabled the public service gas suppliers to survive even after the transitional period of three gas years in order to protect consumers in the household category and to enable household supply under regulated conditions. Further, the **Gas Market Act** stipulates the procedure for selecting a guaranteed supplier on the market who is required to deliver gas to end consumers connected to the distribution system who are left without a supplier under certain circumstances.

Based on the stated provisions of the **Gas Market Act**, HERA held a public tendering procedure to select a wholesale gas market supplier in May and June 2018. As no tenders were received in response to the call, upon consultation with the Ministry of Environment and Energy, HERA decided to allocate the public service obligation for a period of time shorter than that stipulated by the **Act**. Hence, the *Decision on appointing a wholesale gas market supplier for the period from 1 August 2018 to 31 March 2019* was adopted, and the energy entity HEP d.d. was selected as the wholesale gas market supplier. Further, in the period from 25 January 2019 to 5 February 2019, HERA held a public tendering procedure to select a wholesale gas market supplier for the period from 1 April 2019 to 31 March 2021, and, due to lack of interest for the call for tenders, it adopted the *Decision on appointing a wholesale gas market supplier for the period from 1 April 2019 to 31 March 2020*, by which HEP d.d. was once again selected as the wholesale gas market supplier for a period of one regulatory year. Both decisions on appointing a wholesale gas market supplier we issued by HERA based on transparent criteria, which were specified in the previously published tender documentation.

In addition, in July 2018, HERA held a tendering procedure to select a guaranteed supplier, based on which it adopted the *Decision on appointing a guaranteed gas supplier for the period from 1 October 2018 to 30 September 2021.* Based on the tender documentation criteria for selecting a guaranteed supplier, the highest ranked tenderer was the energy entity GRADSKA PLINARA ZAGREB - OPSKRBA d.o.o., which was thus appointed as guaranteed gas supplier in the Republic of Croatia for the period from 1 October 2018 to 30 September 2021.

In June 2018, the Croatian Parliament adopted the **Act on the Liquefied Natural Gas Terminal (Official Gazette No. 57/18)**. The **Act on the LNG Terminal** regulates the infrastructure of the LNG terminal, which is of strategic interest for the Republic of Croatia, the rules and measures for the realisation of the LNG terminal in order to increase the security of natural gas supply, the procedure of issuing a concession on the maritime domain and the accompanying infrastructure, and the framework for expropriation of immovable property. In addition, it regulates the fee for maritime domain concessions, which is paid in favour of local (regional) self-government units and the state budget. As

the realization of the LNG terminal has been recognised as the main measure for the diversification of natural gas routes and sources of supply, the **Act on the LNG Terminal** foresees the possibility for HERA to determine, by way of a decision, the amount and the method of collecting the annual security of supply fee.

HERA would set the fee based on a request of the transmission system operator and upon proposal of the LNG terminal operator in the case that less LNG terminal capacity is leased than planned, or if there is a shortfall in anticipated revenue of the LNG terminal operator in relation to the planned allowed revenue set by HERA's decision on tariffs for the reception and dispatch of liquefied natural gas.

5.1.1 By-laws adopted for natural gas

In May 2018, HERA adopted seven new methodologies to harmonise and improve incentivised price regulation in Croatia as follows:

- *Methodology for setting tariffs for gas distribution,*
- *Methodology for setting tariffs for gas transmission,*
- *Methodology for setting tariffs for gas storage,*
- *Methodology for setting tariffs for the reception and dispatch of liquefied natural gas,*
- *Methodology for calculating the fee for connection to the gas distribution or transmission system and for connection capacity increase,*
- *Methodology for setting the price of non-standard services for gas transmission, distribution, and storage, the reception and dispatch of liquefied natural gas, and public service gas supply, and*
- *Methodology for setting tariffs for gas supply and guaranteed supply as public services.*

The mechanism of incentivised price regulation was introduced in Croatia back in 2013, when changes in the gas market influenced the adoption of new methodologies for setting tariffs based on the method of incentivised regulation, i.e. on the method of maximum allowed revenue.

According to tariff methodologies for gas infrastructure activities, such as gas transmission, gas storage, management of liquefied natural gas terminal, and gas distribution, allowed operating expenses are set by applying incentive mechanisms (efficiency coefficients and allocation of actual savings), while allowed capital costs are determined based on the allowed depreciation of regulated assets and the allowed rate of return on regulated assets. The regulated asset value for a regulatory period is projected by an *ex- ante* approach as part of approving investment plans, as well as by an *ex-post* review of realised investments. Upon the expiry of a regulatory period, allowed revenues are revised, including operating and capital costs, and the realised revenues are compared based on tariffs with the revised allowed revenues. Possible imbalances are included in the calculation of allowed revenues for the following regulatory period.

According to the methodologies, a regulatory period is defined as a multi-annual period for which allowed revenues and tariffs are determined independently for each regulatory year. The duration of the first regulatory period was three years (from 1 January 2014 to 31 December 2016), while the second (from 1 January 2017 to 31 January 2021) and the subsequent regulatory periods will last for five years.

The methodologies were adopted in May 2018 in order to improve certain provisions and to harmonise the regulatory elements in all the methodologies. The most important changes include improved and harmonised regular revisions of allowed revenues, determination of the reference interest rate, identification of unjustified operating costs, treatment of regulated assets, determination of the weighted average cost of capital, definition of preconditions for establishing a regulatory account, and moving the deadline for submission of annual data and tariff requests. In order to improve tariff

methodologies, HERA has specified an incentive mechanism used to determine the allowed revenue of an operator based on asset efficiency. This incentive measure constitutes a significant change compared to previously applicable provisions of tariff methodologies.

Methodology for setting tariffs for public service gas supply and guaranteed supply (Official Gazette No. 34/18)

Pursuant to the provisions of the **Gas Market Act**, on 6 April 2018, HERA issued a new *Methodology for setting tariffs for public service gas supply and guaranteed supply*. The *Methodology* provides a method of determining the final gas supply price over two periods – in the transitional period from 1 August 2018 to 31 March 2021 (transitional provisions) and in the period after 31 March 2021 (regular provisions). Further, the *Methodology* determines the formula and the method for setting the reference price of gas, which is the highest price at which the wholesale market gas supplier can sell gas to public service suppliers for household end consumers in the transitional period.

Given that one of the basic aims of the *Methodology* is to move towards full market-based pricing of gas supply, in accordance with the provisions of the **Gas Market Act**, the method for determining components of the final price of gas supply has been amended. In the transitional period from 1 August 2018 to 31 March 2021, the same final price structure will be retained as in the current period, and the reference price of gas will be introduced. The reference price of gas for the transitional period from 1 August 2018 to 31 March 2021 is determined as the sum of the purchase price of gas reflecting the unit cost of gas purchase on the reference spot market, and it is calculated based on the prices of futures on the Dutch spot market Title Transfer Facility (hereinafter: TTF) and of the premium as the fixed part of the reference price of gas, which is intended for covering operating costs of the wholesale market supplier.

For the period after 31 March 2021, the final price of gas supply will be composed of the cost of gas purchase and the cost of gas distribution. The method of determining the cost of gas distribution remains unchanged, while the cost of gas purchase is intended to cover all justified operating costs of the public service gas supplier (costs of gas purchase, costs of use of the transmission system and of the gas storage system, costs of gas market organisation and costs based on the calculations stipulated by the provisions of the *Gas Market Code*, and the remaining operating costs). In the period after 31 March 2021, the criterion for the selection of the public service gas supplier via public call for tenders organised by HERA will be the lowest cost of gas purchase. Further, an important change in the *Methodology* is the repeal of the fixed monthly gas supply fee. Thus, the fixed monthly gas supply fee no longer exists as a separate component, but will become a part of the total cost of gas supply in the period after 31 March 2021. An important element of the *Methodology* is the mechanism of ensuring end customer protection regarding greater fluctuations of the final price, which could be caused by changes in the wholesale gas market.

General terms and conditions of gas supply (Official Gazette No. 50/18)

Pursuant to the provisions of the **Gas Market Act**, on 29 May 2018 HERA adopted the new *General terms and conditions of gas supply*. HERA held a consultation from 19 to 24 April 2018 in an early phase of drafting of the *General terms* in order to enable active participation of stakeholders in the energy sector. HERA adopted the *General terms* for the purpose of harmonisation with the provisions of the **Gas Market Act**, and to further improve certain elements. In that sense, the supplier switching procedure has been simplified and the duration of the procedure has been shortened from fifteen to four working days, while, for the first time, the processing of notifications about suppliers in difficulties and the register of billing metering points have been regulated in detail.

Network Code for the gas distribution system (Official Gazette No. 50/18)

Pursuant to the provisions of the **Gas Market Act**, on 29 May 2018 HERA adopted the new *Network Code for the distribution system*. HERA held a consultation from 18 to 24 April 2018 in an early phase of drafting the new *Network Code* in order to enable active participation of stakeholders in the energy sector. The purpose of this *Network Code* is harmonisation with the provisions of the **Gas Market Act** and further improvement of the metering code, of the procedure of identification and calculation of unauthorised gas consumption, and more detailed specification of obligations of the closed distribution system organiser.

Rules of operation of the liquefied natural gas terminal (Official Gazette No. 60/18)

On 2 July 2018, upon HERA's approval, LNG HRVATSKA d.o.o. issued the *Rules of operation of the liquefied natural gas terminal*, which regulate the description of the LNG terminal, the development, construction and maintenance of the LNG terminal, LNG terminal management, contractual relationships and general terms and conditions of use of the LNG terminal, booking and use of LNG terminal capacities, metering code and rules of allocation, data disclosure and information exchange, indemnification of damages, rules for the sale of liquefied natural gas or natural gas to LNG terminal users in the Open Season procedure, the general terms and conditions of use of the LNG terminal and the allocation policy for natural gas.

Storage Code (Official Gazette No. 50/18)

On 29 May 2018, PODZEMNO SKLADIŠTE PLINA d.o.o., upon HERA's approval, issued the *Storage Code* for the purpose of harmonisation with the new **Gas Market Act**. The *Code* redefined the concept of interim re-nomination, improved the description of the technical storage capacity and operative procedures related to the possibility of interim changes in storage work cycles. Also, the deadline for confirmation of information on the interruption of storage services due to planned works on the gas storage system was extended. The deadlines were changed for booking and contracting lease services for standard bundled units (hereinafter: SBUs), and for contracting short-term, i.e. individual continued services for the upcoming storage year. Offering SBUs or continued individual services outside the set deadlines was enabled in case of exceptional circumstances or situations in which the system operator has available uncontracted SBUs or continued individual services. Further, a partial assignment of the storage contract was enabled, as well as its assignment to another user of the gas storage system or a third party and for a period of time shorter than the duration of the contract. The reference gas price as the initial lowest per-unit price of gas in the first round of the procedure of sale of non-withdrawn gas upon the expiry or termination of the Contract was replaced by the average applicable price of gas published for the previous month.

Network Code for the gas transmission system (Official Gazette No. 50/18 and 31/19)

On 29 May 2018, PLINACRO d.o.o., upon HERA's approval, adopted the new *Network Code for the transmission system* for the purpose of harmonisation with the **Gas Market Act**. The *Network Code* established the incremental capacity process pursuant to *Commission Regulation (EU) 2017/459* and improved the content of contracts concluded by operators of interconnected parts of the gas system. In addition, the provisions on liability for damage in case of delivery of non-standard quality gas into the transmission system were added, the provisions on actions in case of a crisis situation were further harmonised with *Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 (*hereinafter: *Regulation 2017/1938)*, the procedure of contracting the balancing service was amended, the conditions for access to auctions were laid out in more detail, and a provision regulating the consequences of using the gas transmission service without contracted capacity was added. Further, the *Network Code*

enabled natural gas producers and end consumers connected to the transmission system to perform allocation by themselves according to the rules agreed with their gas suppliers and balance responsible parties; further harmonisation was carried out with the rules for congestion management pursuant to *Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005*, and more detailed rules were described for the surrender of contracted firm capacity, withdrawal of long-term contracted unused firm capacity, additional firm capacity offering and buy-back of contracted firm capacity, as well as for the firm day-ahead use-it-or-lose-it mechanism.

On 22 March 2019, PLINACRO d.o.o., upon HERA's approval, adopted the *Amendments to the Network Code for the transmission system* in order to shift the deadline for use of non-standard service for interruptible capacity on the Croatian-Hungarian interconnection from Croatia to Hungary from 1 April 2019 to 1 January 2020.

Gas Market Code (Official Gazette No. 50/18)

On 29 May 2018, HROTE, upon HERA's approval, adopted the new *Gas Market Code* for the purpose of harmonisation with the **Gas Market Act**. The *Code* has aligned the times of reconciliation of notified transactions at the virtual trading point (VTP) for day-ahead and intraday transactions with the *Network Code for the gas transmission system*, pursuant to which it is no longer necessary to harmonise transaction nominations at the VTP. Further, as the **Gas Market Act** stipulates that the *Code* shall repeal the *Methodology for establishing the price of balancing energy*, which defines the reference price of gas and was also used as a parameter for the calculation of the nomination imbalance, an average applicable price was defined instead. In addition, the *Code* specifies that the calculation of nomination imbalance takes into account the nominated and measured quantity of gas taken from the transmission system only for the end buyer connected to the transmission system, i.e. the nominated and measured quantity of gas fed into the transmission system from gas generation, which contributes to a better quality assessment of the imbalance of all users and, consequently, enables better balancing of the transmission system.

Implementation of the Commission Regulation (EU) 2017/460 establishing a network code on harmonised transmission tariff structures for gas

Regulation 2017/460, as a binding legislative act transposing the European Union acquis into the Croatian regulatory system for gas transmission, lays down the requirements based on which HERA, the national regulatory authority, issued the *Decision on the elements of the methodology for setting the reference price for gas transmission services* and the *Decision on discounts, multipliers and seasonal factors* (hereinafter: *Decisions)* on 23 May 2019.

Prior to the adoption of the Decisions, a final consultation was held in the period from 18 December 2018 to 18 February 2019 on the proposed elements of the methodology and on discounts, multipliers and seasonal factors. The final consultation was held in relation to the methodology setting the reference price for standard capacity products for annual firm capacity and the method of allocating allowed revenue and calculation tariffs for annual capacity lease at entry and exit points of the gas transmission system in the Republic of Croatia. It encompassed the period from 2021 to 2026, with the year 2021 marking the start of a new tariff period with regard to the applicable *Decision on tariff amounts for gas transmission in the second regulation period 2019–2021* and the planned start of operation of the LNG terminal on 1 January 2021.

The consultation on discounts, multipliers and seasonal factors, which included not only the interested public, but also national regulatory authorities of the neighbouring Member States connected via an interconnector with Croatia, was held in relation to the proposed discount levels at entry and exit points of the transmission system, multiplier

levels and levels of seasonal factors used to calculate lease fees for short-term capacities of the transmission system on a quarterly, monthly, daily and intraday basis, as well as the calculation of the reserved prices of standard capacity products for interruptible capacity.

Within the specified period of one month following the end of the consultation, HERA published a summary of submissions received in the final consultation forwarded the consultation documents to the Agency for the Cooperation of Energy Regulators (ACER) for analysis in accordance with Article 27 of *Regulation 2017/460*.

ACER's analysis, submitted to HERA and published on 17 April 2019, showed that the proposed methodology elements were fully consistent with the provisions in force, that the elements complied with the requirements set out in Articles 4 and 7 of *Regulation 2017/460*, and that all the relevant information from Article 26 paragraph 1 of the *Regulation 2017/460* was published.

In accordance with the elements adopted in these *Decisions*, in the upcoming period amendments to the *Methodology for setting tariffs for gas transmission* will be adopted, based on which a new *Decision on tariffs for gas transmission* will be issued. Its entry into force is planned for 1 January 2021, simultaneously with the planned start of operation of the LNG Terminal.

Compared to the applicable *Methodology for setting tariffs for gas transmission*, the key changes are the following:

- repeal of the tariff for gas quantity at exits from the transmission system – allowed revenue of the transmission system operator is allocated solely to tariffs for contracted capacity,
- new allocation ratio of the total allowed revenue at entry and exit points of the transmission system of 60:40 compared to the previous 70:30 ratio,
- repeal of the security coefficients for entry from production and for exit in Croatia, as these are not allowed under *Regulation 2017/460*,
- increased discounts for entry points from LNG facilities, and retained current discount levels at entry points from and exit points to the gas storage system, as the only discounts specified by *Regulation 2017/460*, and
- decreased prices of short-term capacity lease of the transmission system on a quarterly, monthly, daily and intraday basis.

5.2 Regulated activities in the natural gas sector

5.2.1 Gas transmission

Gas transmission is a regulated energy activity performed as a public service. The state-owned energy entity PLINACRO d.o.o. is Croatia's transmission system operator.

PLINACRO d.o.o. manages the network of main and regional gas pipelines which transmit natural gas produced in Croatia (the northern part of continental Croatia and the Northern Adriatic) or imported via interconnections with Slovenia (Rogatec-Zabok) and Hungary (Donji Miholjac–Dravaszerdahely) to exit measuring-reduction stations where the gas is delivered to gas distribution systems and to end (industrial) consumers directly connected to the transmission system. The Croatian gas transmission system is shown in Figure 5.2.1.

Figure 5.2.1 Croatian gas transmission system

The total length of the Croatian gas transmission system at the end of 2018 was 2,693 km, of which 952 km were gas pipelines with an operating pressure of 75 bar, and 1,741 km were gas pipelines with an operating pressure of 50 bar.

Gas is received into the transmission system from nine connection points at entry measuring stations, six of which are used to receive gas from production fields in Croatia, two connection points are international connection points and are used to receive gas from import routes, while one is used to withdraw gas from the Okoli underground gas storage facility (UGSF Okoli).

Gas from the transmission system is delivered to 195 connection points (157 exit pressure reducing metering stations), 36 of which are used to deliver gas to industrial consumers connected to the transmission system, 158 connection points are used to deliver gas to distribution systems operated by 35 distribution system operators, and one connection point is used to inject gas into the Okoli underground gas storage facility.

With regard to investments realised in 2018, the transmission system operator PLINACRO d.o.o. actively worked on the preparation of projects related to new import routes for natural gas and gas pipeline projects, pressure reducing metering stations, gas knots, and compression stations in order to increase the regional security of gas supply.

Preparatory activities continued in 2018 in order to meet the requirements for the construction of the Omišalj – Zlobin, Donji Miholjac – Osijek and Donji Miholjac – Belišće gas pipelines.

Further, the following investments were realised in 2018:

- construction of pressure reducing metering stations Dugo Selo, Slavonski Brod, Dubrovčan, Poljana and Marijanci,
- reconstruction of the gas node Zabok to enable a two-way gas flow with Slovenia, and of the gas node Kozarac to connect the 50-bar system with the 75-bar system,
- design of the KS1 compression station in Velika Ludina and obtaining a construction permit for the project, after which the contracting activities for the procurement of

equipment and construction works were completed and construction started in August 2018,
- revitalisation of the SCADA system and network equipment of the optical communication system in all facilities of parts III and IV of the gas pipeline system in the regions of Lika and Dalmatia,
- implementation of the technical security system in certain power facilities of the gas transmission system.

In 2018, 49 gas suppliers associated in 14 balance groups used the gas transmission service.

In 2018, a total of 1,357 applications for yearly, quarterly, monthly, daily, and intraday capacity bookings were received via the capacity management system (SUKAP) and auctions on online platforms for capacity lease and trade (PRISMA and RBP).

In 2018, annual capacity reservations at transmission system entries did not change compared to 2017. Regarding short-term capacity products, there were shifts in the dynamics of reservations throughout the year, with a similar total quantity at the annual level. Daily capacity products at entries to the transmission system are used more intensively in January and February, mainly at interconnections, in order to meet the demands for increased quantities of gas due to low temperatures. In addition to such increased reservations of short-term capacity products at exits from the transmission system in January and February, there is a notable decrease in capacity reservations in summer months due to favourable hydrological conditions and subsequent reduced needs of thermo-energetic facilities.

Transmission system balancing was managed in accordance with the *Gas Market Code*. Capacity booking, allocation, and contracting procedures are identical for all connections, regardless of the location and direction of gas flow (entry/exit). Further activities were carried out related to the implementation of the *Commission Regulation (EU) No. 312/2014 establishing a Network Code on Gas Balancing of Transmission Networks* on balancing rules.

There are daily exchanges of data with the neighbouring transmission system operators at interconnection points with Hungary (*Donji Miholjac – Dravaszerdahely*) and Slovenia (*Zabok – Rogatec*) on the process of matching gas quantities nominated by both operators, as well as data on measured gas quantities, gas content, and other obligations under mutually agreed rules.

In 2018, the number of transmission system users by category was as follows:

- 10 users using entries to the transmission system at interconnections,
- 1 user using an entry to the transmission system from an upstream pipeline network,
- 45 users using exits from the transmission system to distribution systems,
- 12 users using exits from the transmission system to end consumers.

According to data submitted to HERA by the energy entity PLINACRO d.o.o., the total quantity of gas transported in Croatia in 2018 was 29,540,799,809 kWh, which represents a 8.7% decrease as compared to the total transported quantity in 2017. Total losses and imbalances in gas metering in 2018 were 0.35%. The largest quantity of gas for end consumption transported in a single day[13] was 156,937,895 kWh/day, which represents a 0.5% decrease as compared to 2017. The total technical capacity of all entries to the transmission system on 31 December 2018 was 8,673,872 kWh/h. According to data submitted by PLINACRO d.o.o., technical capacities were determined for nine entries to the transmission system, the largest being the following: Dravaszerdahely – 2,938,501 kWh/h; UGSF Okoli – 2,273,923 kWh/h; and Rogatec – 2,016,000 kWh/h. In 2018, the maximum hourly used capacity at all transmission system entries amounted to

[13] *Exits to distribution systems and exits to consumers directly connected to the transmission system*

7,517,691 kWh/h, whereas the maximum used capacity at a single transmission system entry point was recorded at Dravaszerdahely and amounted to 2,935,171 kWh/h. The quantities of transported gas by transmission system entry groups per month in 2018 are shown in Figure 5.2.2.

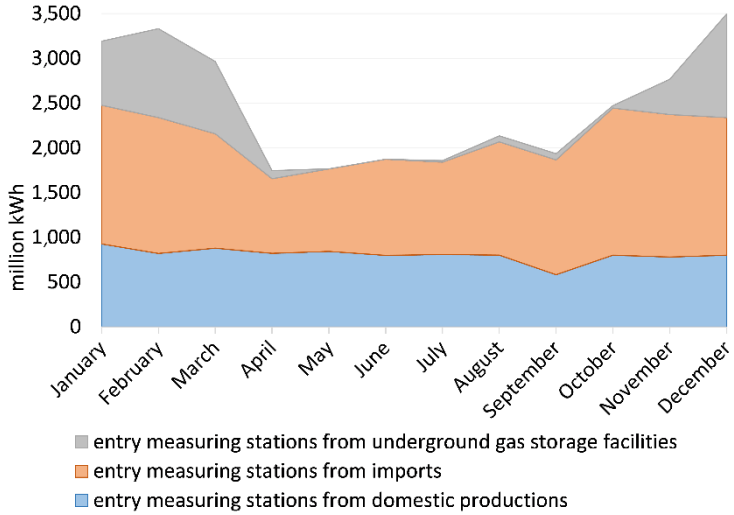


Figure 5.2.2 Quantities of transported gas by transmission system entry groups per month in 2018

The total technical capacity of exits from the transmission system on 31 December 2018 was 19,537,170 kWh/h. Of that amount, the total technical capacity of exits to distribution systems amounted to 11,751,409 kWh/h, the total technical capacity of exits to end consumers directly connected to the transmission system was 6,080,321 kWh/h, and the technical capacity of the exit to UGSF Okoli was 1,705,440 kWh/h. The maximum hourly used capacity at all transmission system exits in 2018 amounted to 8,214,811 kWh/h, whereas the maximum used capacity by type of transmission system exit point was recorded at the exit to distribution systems in the amount of 4,072,504 kWh/h. The quantities of transported gas by transmission system exit groups per month in 2018 are shown in Figure 5.2.3. The total annual quantities of transported gas per consumer group are shown in Figure 5.2.4.

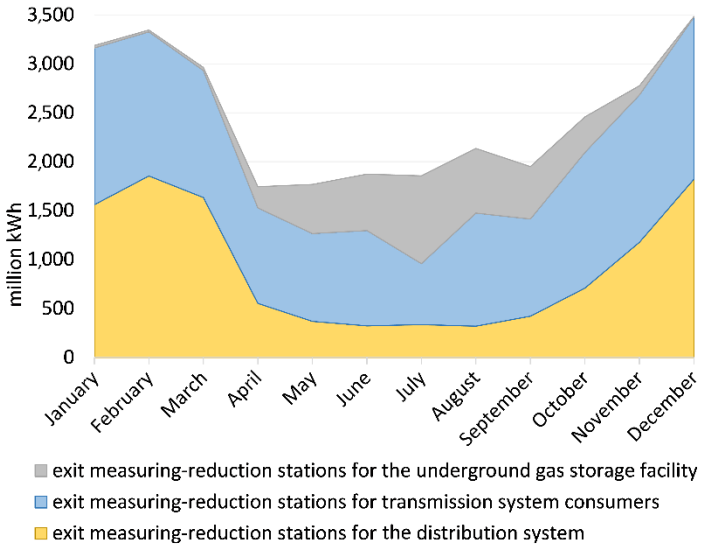


Figure 5.2.3 Quantities of transported gas by transmission system exit groups per month in 2018

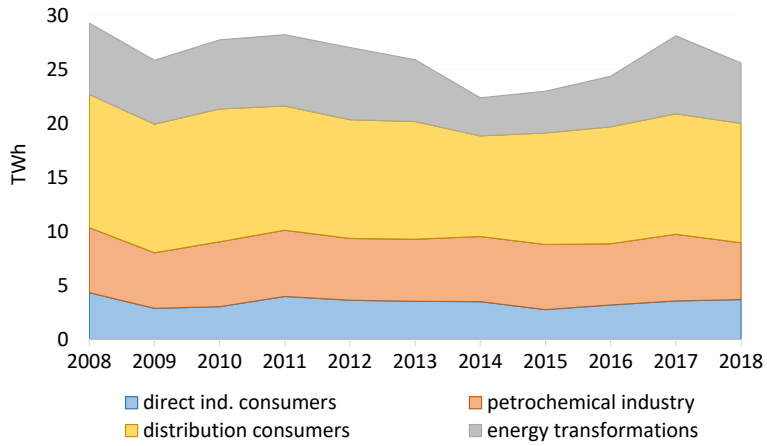


Figure 5.2.4 Total annual quantities of transported gas per consumer group in the distribution and transmission systems

As of January 2019, in addition to the current firm physical capacity for gas transmission from Slovenia to Croatia, firm physical capacity for gas transmission from Croatia to Slovenia has been enabled at the Zabok – Rogatec interconnection in the quantity of 280,253 kWh/h.

At the Donji Miholjac – Dravaszerdahely interconnection, in addition to the firm physical capacity for gas transmission from Hungary to Croatia, the non-standard interruptible capacity use service of decreased interruptibility has been enabled for gas transmission from Croatia to Hungary, which will, according to the transmission system operator, be replaced by a firm physical capacity service as of 1 January 2020, after the construction of the compression station in Velika Ludina.

Gas transmission price

In 2018, the price of gas transmission was established based on the *Methodology for setting tariffs for gas transmission*. Pursuant to the *Methodology*, gas transmission tariffs are set by HERA and they are the same for all users of the transmission system.

The *Methodology* provides for eight tariff items, categorized in the following groups: tariff items for annual contracted firm capacity for entries into the transmission system, tariff items for annual contracted firm capacity for exits from the transmission system, and one tariff item for gas quantities at exits from the transmission system.

In December 2017, pursuant to the *Methodology*, HERA performed a regular revision of tariffs for gas transmission and issued the *Decision on tariff amounts for gas transmission (Official Gazette No. 127/17)* setting the tariff amounts for gas transmission in the second regulation period 2018–2021.

Further, in December 2018, upon request of the transmission system operator PLINACRO d.o.o., HERA performed an interim revision of tariffs for gas transmission pursuant to the *Methodology* and issued the *Decision on tariff amounts for gas transmission (Official Gazette No. 111/18)*, setting new tariff amounts for gas transmission in the second regulation period 2019–2021. In this process, HERA analysed the economic efficiency of the operator's existing assets, establishing the justified value of the gas pipeline and, accordingly, the justified value of regulated assets, depreciation and the return on the operator's regulated assets as elements of the revised allowed revenue. Further, the coefficient for the calculation of the annual capacity was decreased, which cumulatively resulted in a 23.2% average decrease of the gas transmission price in Croatia in 2019 as compared to 2018.

Figure 5.2.5 shows tariff amounts excluding VAT for gas transmission pursuant to decisions on tariff amounts for gas transmission issued by HERA for the first and second regulatory periods.

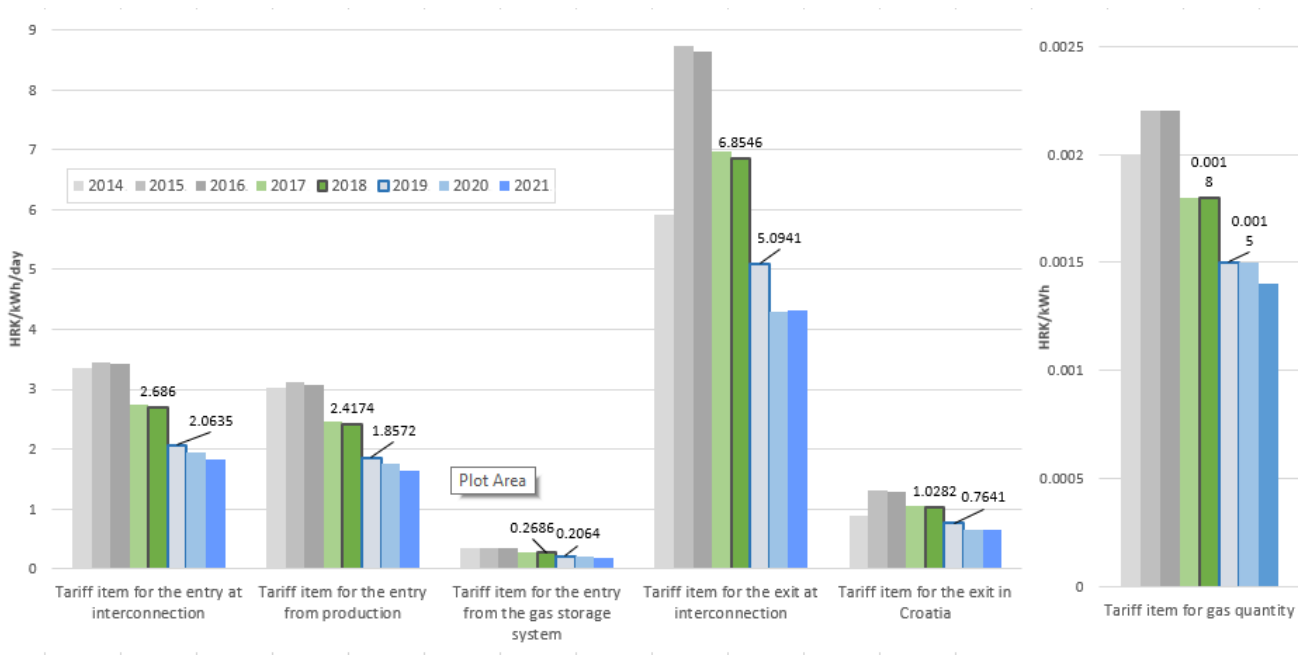


Figure 5.2.5 Tariff amounts excluding VAT for gas transmission for the first and second regulatory periods 2014–2021

The total average price of gas transmission[14] in 2018 for all transmission system users amounted to HRK 0.0172 HRK/kWh, which was a decrease of 11.3% as compared to the total average gas transmission price in 2017.

5.2.2 Management of the liquefied natural gas terminal

In 2018, activities related to the realisation of the construction of the terminal for liquefied natural gas continued. In June 2018, HERA issued the *Decision on indicative tariffs for the reception and dispatch of liquefied natural gas* for LNG HRVATSKA d.o.o., for the period 2021–2040.

From 22 June 2018 to 20 December 2018, LNG HRVATSKA d.o.o., the LNG terminal operator, held a second round of receiving binding offers for contracting capacities at the LNG terminal in the Open Season procedure. In a coordinated procedure and in cooperation with the Hungarian transmission system operator FGSZ Ltd, the transmission system operator PLINACRO d.o.o. conducted a second round of receiving binding offers for contracting firm capacities at the LNG terminal in the Open Season procedure.

In the Open Season procedure, the offers received for a binding lease of LNG terminal capacities amounted to 0.52 billion m^3/year for the period 2021–2030, and 0.1 billion m^3/year for the period 2031–2040. At the same time, binding offers were received at the entry to the gas transmission system from the LNG terminal, and at exits to Croatia, which amounted to 13,650,411 kWh/day for the period 2021–2030, and 2,603,836 kWh/day for the period 2031–2040, and which represent a gas transmission capacity equivalent to the offers for LNG terminal capacity lease.

After the receipt of the binding offers, the final investment decision on the realisation of the floating LNG terminal on the island of Krk was made on 31 January 2019.

As the document on the *Final consultation on the elements of the methodology for setting the reference price for gas transmission services* contained indicative tariffs, after the Open Season procedure HERA calculated new indicative tariffs for the connected points of the transmission system, which are contained in the *Decision on the elements of the*

14 *The ratio of total calculated fees for the use of the transmission system in 2018 and of the total transported quantity of gas.*

methodology for setting the reference price for gas transmission services in accordance with Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas.

5.2.3 Gas storage

Gas storage is a regulated energy activity performed as a public service. The function of the Croatian gas storage system operator is performed by the energy entity PODZEMNO SKLADIŠTE PLINA d.o.o., which uses UGSF Okoli for natural gas storage. The geographical position of the facility is shown in Figure 5.2.1.

UGSF Okoli consists of underground gas reservoirs (geological formations), operating and control wells, and the overground part of the plant with well platforms, connection pipelines, regulation station, gas drying station, measuring station, compression station and ancillary facilities. As a rule, natural gas is injected into the underground reservoir from 1 April to 31 September and withdrawn from 1 October to 31 March.

The technical capacity of the operating volume[15] amounts to 5,050,000 MWh, the technical withdrawal capacity amounts to 2,274 MWh/h (54,576 MWh/day), while the technical injection capacity amounts to 1,705 MWh/h (40,920 MWh/day).

In 2018, a total of 3,587,559 MWh of natural gas were injected into UGSF Okoli and 4,021,088 MWh of natural gas were withdrawn. There were several operating cycles in UGSF Okoli in 2018: five periods of gas withdrawal, four stand-by periods, and two periods of gas injection. The day marking the end of the natural gas withdrawal cycle and the beginning of the injection cycle, as determined according to the minimum gas quantity in the storage facility for the calendar year, was 10 April 2018, when the operating volume was 1,355,707 MWh. The final gas withdrawal cycle started on 12 November 2018, when the operating volume was 4,738,086 MWh, which was also the highest operating volume of UGSF Okoli. Natural gas stocks at UGSF Okoli on specific dates in 2018 are shown in Figure 5.2.6. The largest gas withdrawal capacity achieved in 2018 was 2,230 MWh/h, while the largest gas injection capacity achieved was 1,691 MWh/h.

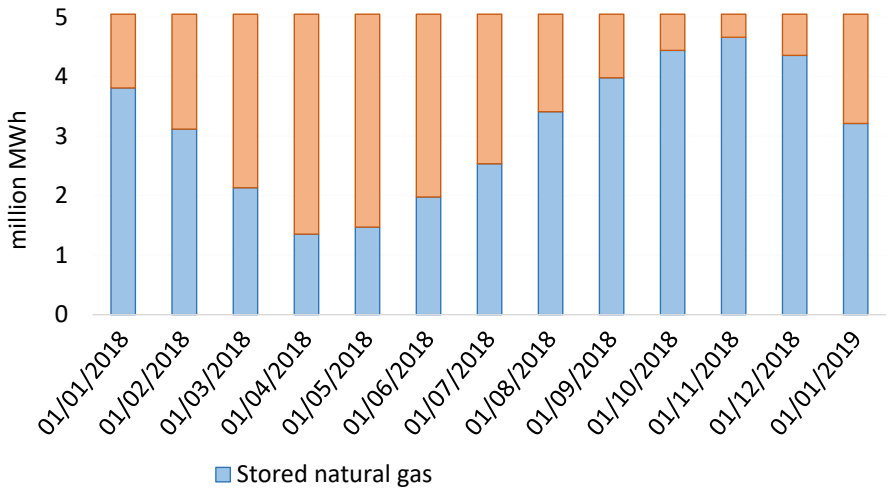


Figure 5.2.6 Natural gas stocks at UGSF Okoli on specific dates in 2018

The following investments were started and realised in 2018:

- upgrade of the compression station at UGSF Okoli continued with the installation of new compression units MK-1N and MK-2N powered by gas engines and a trial run

15 *Technical capacity is the total capacity of the gas storage system which the gas storage system operator can offer to system users, taking into account the integrity and technical capabilities of the gas storage system.*

starting in May 2018 and ending with the completion of gas injection into the storage facility. With this project the maximum capacity of gas injection at UGSF Okoli will increase from 160,000 m³/h to 180,000 m³/h;
- replacement of the entry/exit separator at UGSF Okoli, which separates the liquid phase potentially present in natural gas (the old separator had a flow capacity of 160,000 m^3/h, and the capacity of the new separator will be 240,000 m^3/h of gas;
- the project of connecting UGSF Okoli to the public access network by optical fibre cables was launched for the purpose of ensuring a steady and reliable connection for the needs of the command room, installation of a server at UGSF Okoli and a dispatch centre, and for the purpose of communication with the energy entity PLINACRO d.o.o;
- additional exploration works at the location "Grubišno polje" hydrocarbon production field to explore the possibility of gas storage in geological formations;
- mining works in order to test the Gr-1z and Gr-2z wells, including hydrodynamic and electrical logging;
- natural gas was procured to ensure that the technological conditions at UGSF Okoli are met by adding cushion gas in the amount of 100,000 MWh.

The market role and the significance of gas storage are directly related to other gas market components, particularly in the context of market liberalisation. In this sense, the operations of the gas storage system operator were marked by several phases – up to 31 March 2014, when the storage system was used by only one user; from 1 April 2014 to 31 March 2017, when the storage system was used by a number of users for the first time (four gas suppliers and the transmission system operator); and from 1 April 2017 and during 2018, when the gas storage service was used by 10 users (nine gas suppliers and the transmission system operator). The gas storage system operator was obliged[16] to reserve a portion of gas storage system capacity, i.e. SBUs, for priority allocation to the supplier on the wholesale market. Thus, from 1 April 2014 to 31 March 2017, the wholesale market supplier was allocated 70% of the total available number of standard bundled units, and this share was reduced to 60% of the total available number of standard bundled units after 1 April 2017 and in 2018. The allocation of standard bundled units (SBUs) during those periods is shown in Figure 5.2.7. To adapt to market demands and the new balancing rules, the gas storage system operator enabled gas storage system users a number of renominations for the use of storage capacities in a gas day, the reversal of nominations, and changing of storage operating cycles.

16 *Decision of the Republic of Croatia on determining priorities in implementing the procedure for gas storage system capacity allocation for suppliers participating in the wholesale gas market (Official Gazette No. 29/14), Article 31, paragraph 2 of the Act on Amendments to the Gas Market Act (Official Gazette No. 16/17) and Article 114 of the Gas Market Act (Official Gazette No. 18/18)*

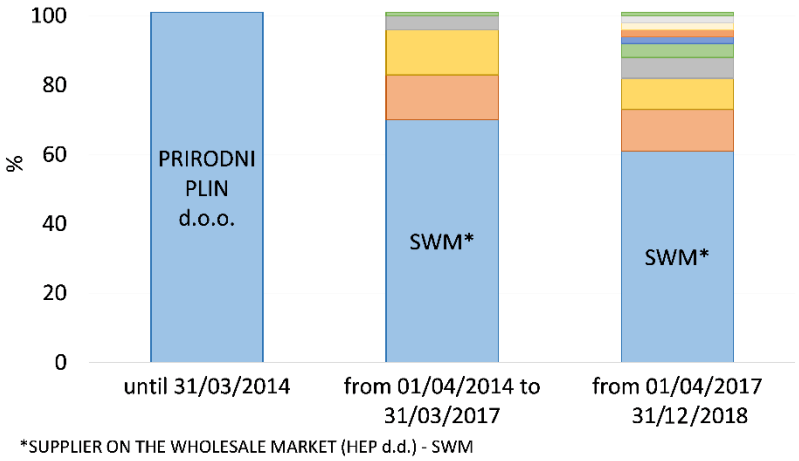


Figure 5.2.7 Allocation of UGSF Okoli gas storage capacities (standard bundled units)

Gas storage price

In December 2016, pursuant to the *Methodology for setting tariffs for gas storage*, HERA issued the *Decision on tariff amounts for gas storage (Official Gazette No. 122/16)*, which sets out tariffs for gas storage in the second regulatory period 2017–2021. Pursuant to that *Decision*, the average tariff amounts for gas storage in 2018 have not changed significantly as compared to 2017 (1.1% decrease). Figure 5.2.8 shows tariff amounts excluding VAT for contracted annual standard bundled units (SBUs) pursuant to decisions on tariff amounts for gas storage issued by HERA for the first and second regulatory periods.

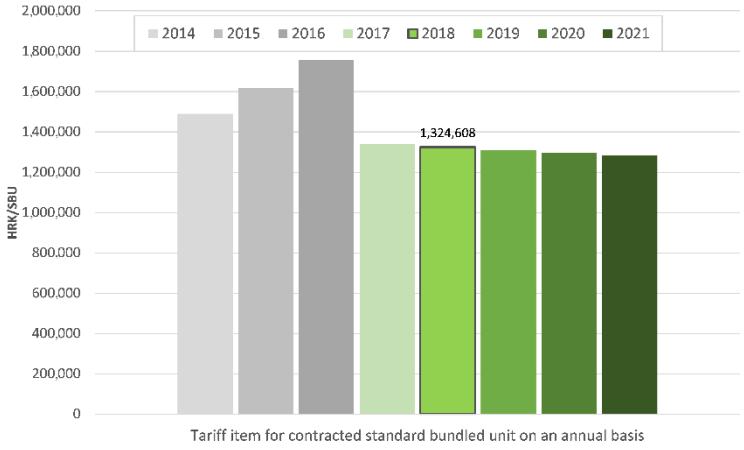


Figure 5.2.8 Tariff amounts excluding VAT for contracted annual SBUs for the first and second regulatory periods 2014–2021

The total calculated amount of the fee based on the tariff item for the contracted annual SBU accounted for 99.3% of the total gas storage fees in 2018 charged to users by the gas storage system operator, while the remaining 0.7% referred to individual interruptible daily services and to non-standard services.

5.2.4 Gas distribution

Gas distribution is a regulated energy activity performed as a public service. In 2018, gas distribution in Croatia was performed by 35 energy entities.

According to data collected by HERA from 35 distribution system operators, the total quantity of gas distributed [17]in Croatia in 2018 amounted to 11,071 million kWh, which was a 0.9% decrease in comparison to the total distributed quantity in 2017.

The largest quantities were distributed to TM2 (4,048 million kWh), TM5 (1,317 million kWh), and TM3 (1,234 million kWh) tariff model users.

The total number of billing metering points for end consumers connected to the distribution system amounted to 671,715 in 2018, which was an increase of 1% as compared to the total number of billing metering points in 2017. Out of that number, in 2018 665,545 billing metering points were under TM1-TM4 tariff models (with annual consumption up to 100,000 kWh), and 6,170 were under TM5-TM12 tariff models (with annual consumption exceeding 100,000 kWh).

The total length of all gas distribution systems in Croatia was 19,448 km at the end of 2018, which represents a 1.9% increase compared to 2017, according to data collected from distribution system operators. In the total length of distribution systems, low-pressure gas pipelines accounted for 16.2%, medium-pressure gas pipelines accounted for 77.1%, and high-pressure gas pipelines accounted for 6.7%. In terms of material type, 16.9% of the total distribution system at the end of 2018 was made of steel pipes, 82.8% was made of polyethylene pipes, and 0.3% was made of other materials. Compared to 2017, there is a noticeable increase in the share of polyethylene pipes (from 72.15% in 2017), which points to a continuous improvement of the distribution systems based on the realised reconstructions of gas distribution networks. There were 126 odourisation stations in all distribution systems at the end of 2018. A comparison of the length of distribution systems, total technical capacity of entries into distribution systems, and gas losses by distribution system operators in Croatia in 2018 is shown in Figure 5.2.9. The geographical layout of the distribution system operators' distribution areas in 2018 is shown in Figure 5.2.10.

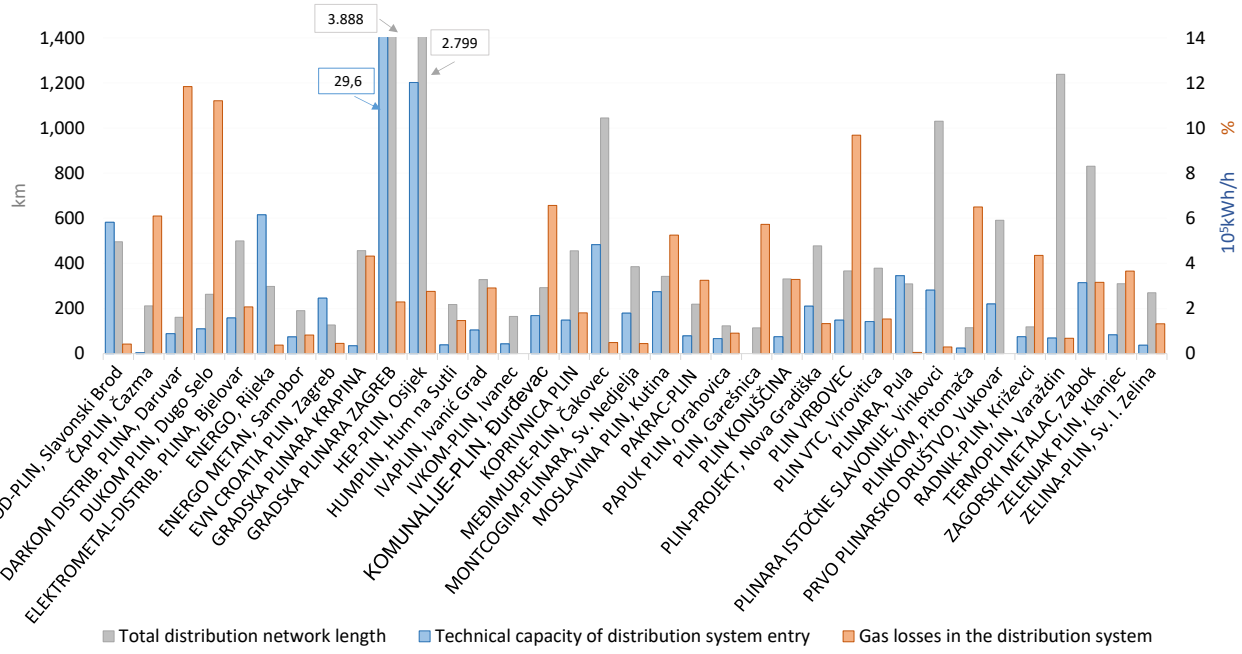


Figure 5.2.9 Comparison of the length of distribution systems, total technical capacity of entries into distribution systems, and gas losses by distribution system operators in Croatia in 2018

[17] *Natural gas and non-standard gas*

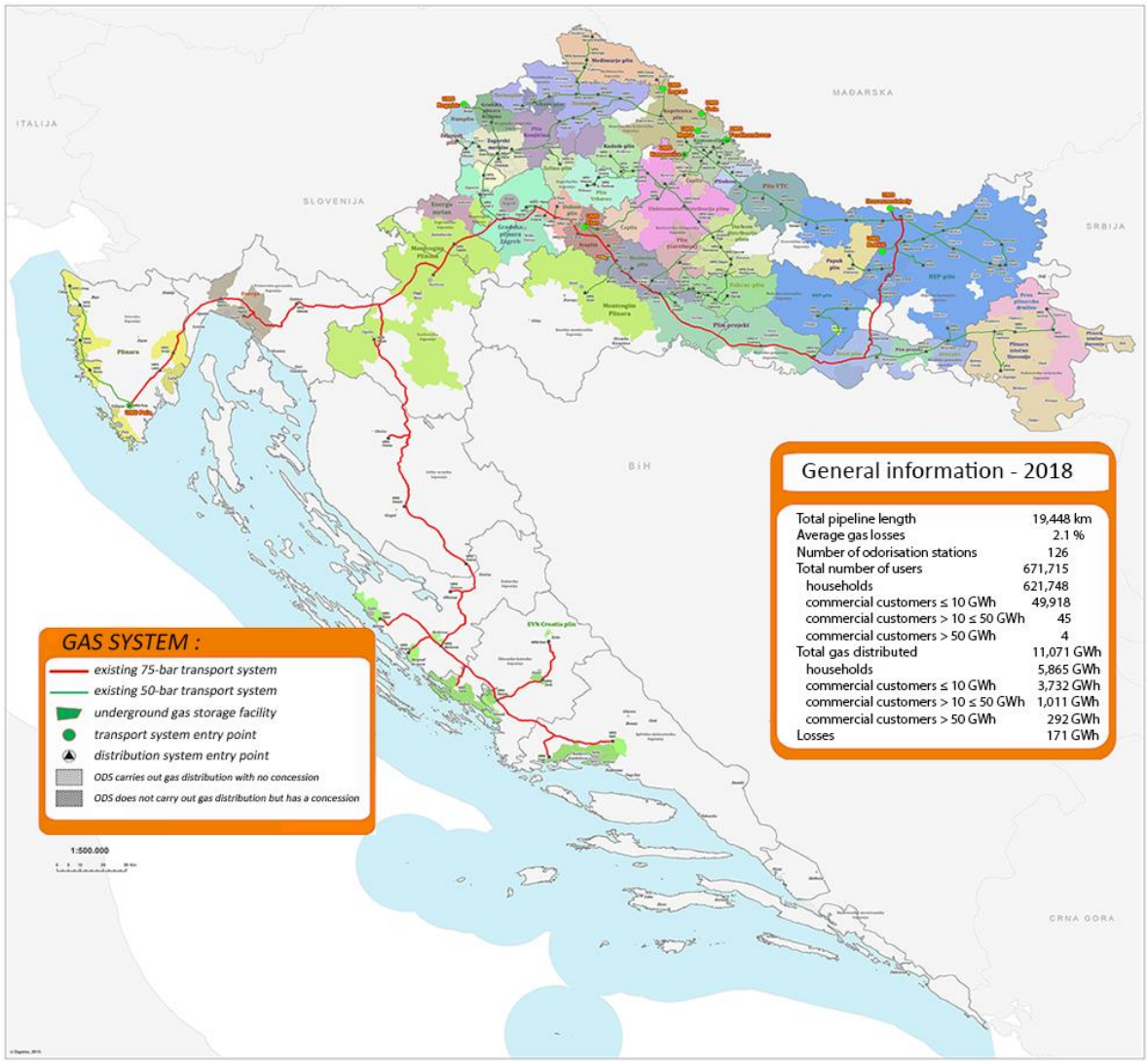


Figure 5.2.10 Distribution system operators' distribution areas and basic information on gas distribution activities in Croatia in 2018

Gas distribution price

In 2018, the price of gas distribution was established based on the *Methodology for setting tariffs for gas distribution*. The *Methodology* classifies billing metering points into 12 tariff models according to annual gas consumption. The gas distribution price consists of tariff item Ts1 for the distributed quantity of gas, which is established independently for each distribution system operator, and tariff item Ts2, representing a fixed monthly fee that is equal for all operators for a particular tariff model. The gas distribution tariffs for the period from 1 January to 31 December 2018 were established in the *Decision on gas distribution tariff amounts (Official Gazette No. 127/17)*. The *Decision on gas distribution tariff amounts* applies to the second regulatory period 2018–2021, and was adopted by HERA after the regular revision of the allowed revenues of gas distribution system operators for the first regulatory period 2014–2016.

The total average weighted price of gas distribution in the period from 1 January to 31 December 2018 of all distribution system operators in Croatia was HRK 0.0485 kWh, which represents an increase of 2.4% compared to the total average weighted price of gas distribution in 2017. Average gas distribution tariffs excluding VAT for the period 2016–2018 per distribution system operator in Croatia are shown in Figure 5.2.11.

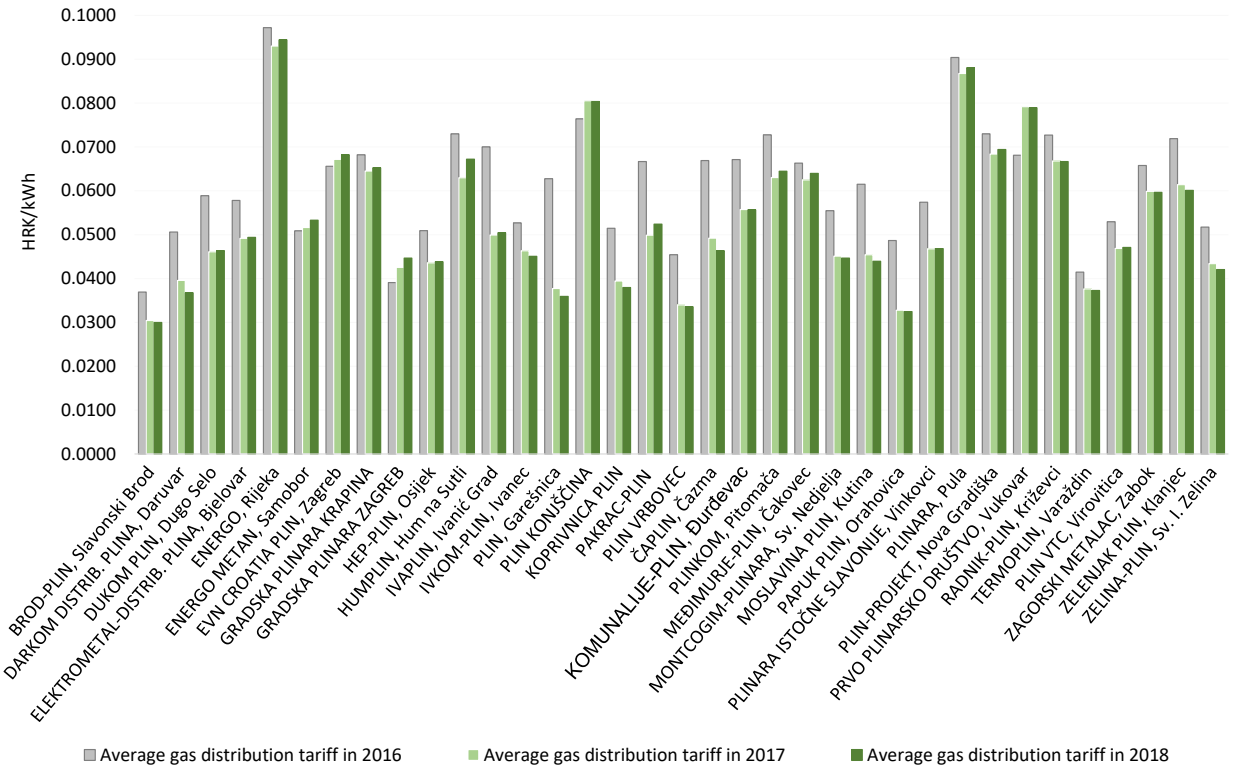


Figure 5.2.11 Average gas distribution tariffs excluding VAT in 2018 compared to 2017 and 2016 per distribution system operator in Croatia

5.2.5 Public service in the gas sector

Performance of energy-related activities as a public service is regulated by the **Energy Act**. A public service is defined as a service available at all times to end consumers and energy entities at a regulated price and/or under regulated conditions for access to and use of the energy service, which has to be available, sufficient, and sustainable, taking into account the safety, regularity, and quality of service, environmental protection, efficiency of energy utilisation, and climate protection, and which is performed according to the principles of transparency and impartiality and supervised by competent authorities.

Regulated energy activities performed as public services are as follows:

- gas transmission, gas distribution, gas storage, LNG terminal management,
- wholesale market supplier activity[18],
- public service gas supply, guaranteed supply, and
- gas market organisation.

Public service supply represents a protective measure for household end consumers by regulating gas supply conditions. The public service supplier must charge the delivered gas pursuant to the applicable tariffs for public gas supply service set out in the *Methodology for setting tariffs for public service gas supply and guaranteed supply* issued by HERA, and to ensure gas quality and quality of service pursuant to the *General terms and conditions of gas supply*.

The public service supplier has at its disposal mechanisms for ensuring the availability of gas for the needs of consumers using the public service supply. The gas supply chain for public service consumers is regulated in the following manner:

[18] *According to Article 113 of the Gas Market Act (Official Gazette No. 18/18), a wholesale market gas supplier shall carry out public service supply for those public service suppliers who have selected it.*

- the supplier on the wholesale gas market sells gas to public service suppliers of household consumers (under regulated conditions), or
- public service suppliers of household consumers purchase gas under market conditions (an option introduced as of 1 April 2017).

The gas storage system operator is obliged to provide priority allocation to the supplier on the wholesale gas market in the procedure of allocating gas storage system capacities (60% of working volume as of 1 April 2018).

In addition, the **Gas Market Act** also provides for a protective measure applicable to all end consumers related to the right to guaranteed supply. The role of a guaranteed supplier is to provide public gas supply service to end consumers left without a supplier under specific conditions, over a limited period and under regulated circumstances. The period during which this service is to be provided and the relevant conditions of guaranteed supply are stipulated in the *Methodology for setting tariffs for public service gas supply and guaranteed supply*. The tariffs for guaranteed supply are established as follows:

a) for end consumers purchasing gas under market conditions:
   - for the first month from the start date of guaranteed supply – in an amount equal to the tariffs for public gas supply service pursuant to the provisions of the *Methodology* issued by HERA for the public service gas supplier in a given distribution area,
   - for the subsequent two months (up to a total of three months from the start date of guaranteed supply) – in an amount 10% higher than the tariffs for public gas supply service pursuant to the provisions of the *Methodology* issued by HERA for the public service gas supplier in a given distribution area, and
   - upon the expiry of three months from the start date of guaranteed supply – in an amount 30% higher than the tariffs for public gas supply service pursuant to the provisions of the *Methodology* issued by HERA for the public service gas supplier in a given distribution area.

b) for end consumers using the public gas supply service:
   - in an amount equal to the tariffs for public gas supply service set by the Agency for the public service gas supplier in a given distribution area, which are applied until a new public service supplier is selected for a given distribution area.

Having applied the criteria from the tender documentation for the period from 1 October 2018 to 30 September 2021, HERA appointed the energy entity GRADSKA PLINARA ZAGREB - OPSKRBA d.o.o. as the guaranteed supplier in Croatia.

5.2.6 Energy entities in the gas sector and energy activities

Pursuant to the provisions of the **Gas Market Act** on the unbundling of energy activities, activities of the transmission system operator, distribution system operators, gas storage system operator, and LNG system operator, including operators that are part of a vertically integrated energy entity, must be organised into independent legal entities independently of other activities in the gas sector.

In 2018, gas was transported by the energy entity PLINACRO d.o.o., while gas storage was handled by the energy entity PODZEMNO SKLADIŠTE PLINA d.o.o.

In 2018, gas was distributed by 35 energy entities and actively supplied by 45 out of 54 licensed energy entities. Twelve distribution system operators were organised as independent legal engaged only in gas distribution, whereas 23 energy entities were organised as vertically integrated legal entities with fewer than 100,000 customers, and were active both in gas distribution and gas supply. The structure of energy entities in the

gas sector on 1 May 2019, with respect to their energy activities and unbundling requirements pursuant to the **Gas Market Act**, is shown in Figure 5.2.12.

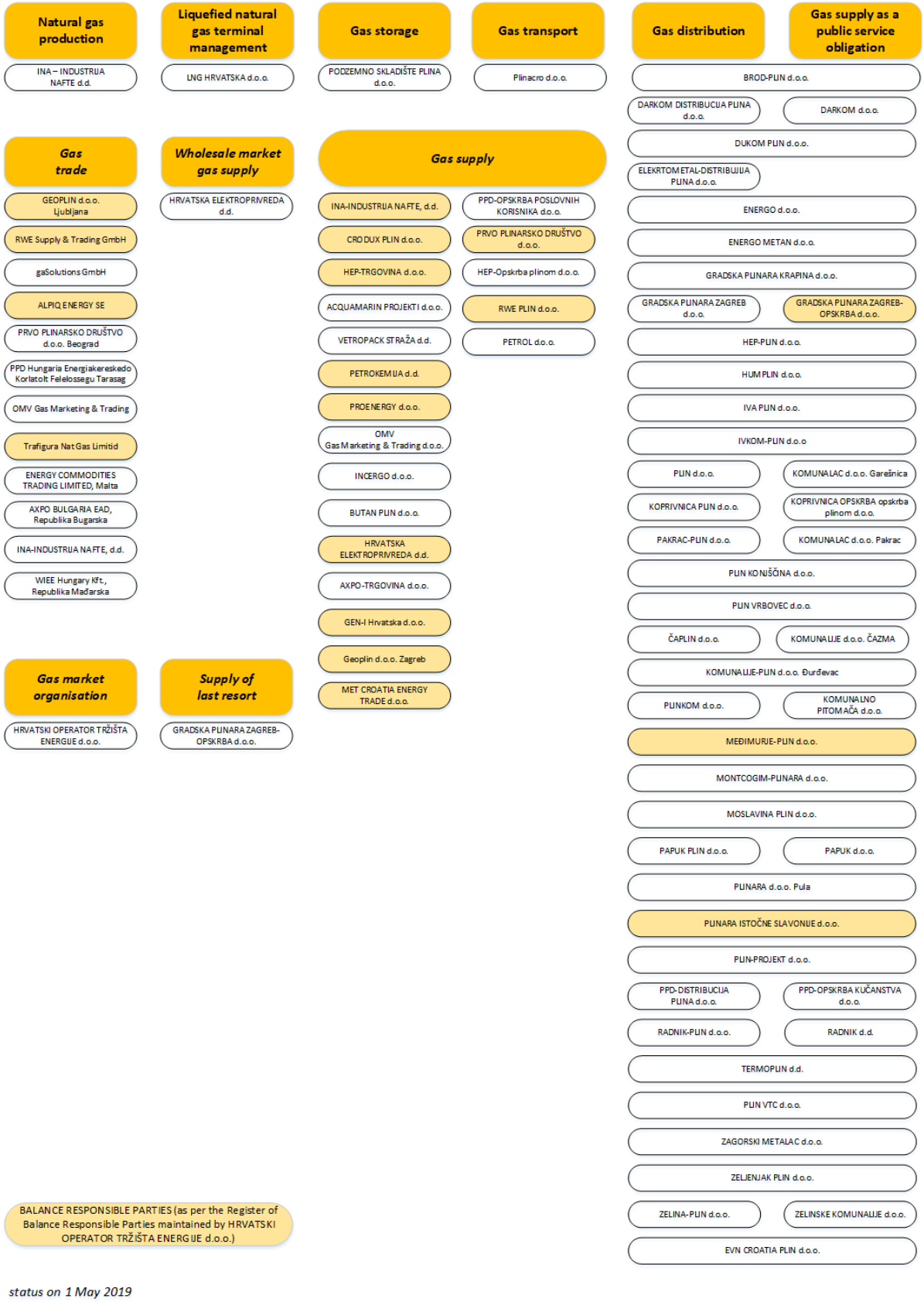


Figure 5.2.12 Structure of energy entities by their role in the Croatian gas market

Certification of the energy entity PLINACRO d.o.o. is a process based on the principles of the European Union single internal electricity and gas market, through which HERA, as the national energy regulator, confirms the conformity of the transmission system operator with the provisions of the **Gas Market Act**, which govern the unbundling, independence, and organisational structure of the gas transmission system operator. The **Gas Market Act** lays down three possible models according to which the operator can be certified:

- as a transmission system operator unbundled in terms of ownership,
- as an independent system operator, or
- as an independent transmission operator.

In May 2013, PLINACRO d.o.o. submitted an application for certification as a gas transmission system operator to HERA, according to the model of an operator unbundled in terms of ownership, and it met the majority of requirements. PLINACRO d.o.o. withdrew the application in April 2015, only to resubmit it in June 2015 according to the same model. Certification has not yet been completed because the final requirement has not been fulfilled – the unbundling of public authorities that simultaneously control PLINACRO d.o.o. and some entities engaged in the production, trade, and supply of electricity, as well as natural gas production. HERA continuously cooperates with PLINACRO d.o.o. and with relevant Croatian institutions in order to finalise the certification process of the Croatian transmission system operator as soon as possible.

5.3 Natural gas market

5.3.1 Wholesale natural gas market

Natural gas balance

In 2018, the total natural gas quantity which entered the transmission system amounted to 29,541 million kWh, which was 8.7% less than in 2017. Of the total quantity, 9,664 million kWh or 32.7% of natural gas came from domestic production, which is 13.7% less than in the previous year; 15,535 million kWh or 52.6% of the total transported quantity of natural gas entered the transmission system from imports, which is 13.5% less than in 2017; and 4,342 million kWh of natural gas entered the transmission system from UGSF Okoli, or 14.7% of the total transported quantity, which is 35.7% more than in 2017 (Figure 5.3.1).

Also, the total gas quantity that exited the transmission system in 2018 amounted to 29,540 million kWh, which is 8.7% less than in 2017. Out of these quantities, end consumers directly connected to the transmission system received 14,538 million kWh or 49.2% of the total quantity of natural gas, which is 14.3% less than in the previous year due to decreased gas consumption HEP-proizvodnja d.o.o.'s thermal power plants and the overhaul of Petrokemija d.d.'s facilities; 11,071 million kWh or 37.5% of natural gas were delivered to consumers connected to the distribution system, and 3,932 million kWh of natural gas were delivered to UGSF Okoli, which is 13.3% of the total quantity, or 6.6% less than in 2017.

According to the data obtained from gas suppliers in the Republic of Croatia, a total of 10,900 million kWh of natural gas was delivered to end consumers in 2018 from the distribution systems, of which 5,865 million kWh (53.8%) were delivered to households and 5,035 million kWh (46.2%) were delivered to industrial consumers.

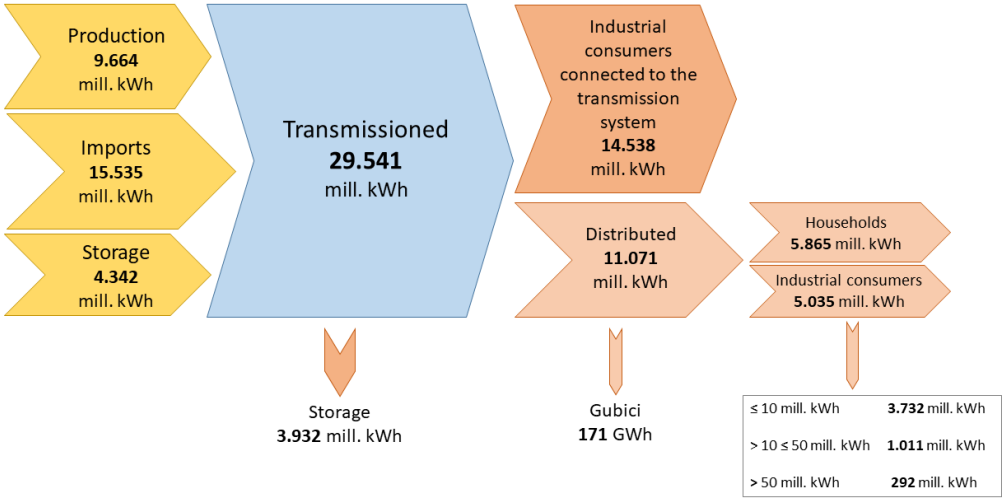


Figure 5.3.1 Natural gas balance in Croatia in 2018

Indicators of wholesale market development

The wholesale gas market in Croatia is organised according to the balance group model, representing an interest group of participants on the gas market, organised on a commercial basis, primarily for the purpose of balancing and optimising balancing costs, for which the balance responsible party is responsible.

In 2018, requests for transmission system capacity booking were submitted by 49 transmission system users, i.e. gas suppliers associated in 14 balance groups. According to the shares of individual balance groups in the quantity of gas transported by transmission system exit groups, the balance responsible party HEP Trgovina d.o.o. took over 31.2% of gas from the transmission system, the balance responsible party HEP d.d. took over 27.4% of gas, the balance responsible party INA d.d. took over 15.4%, and the balance responsible party PRVO PLINARSKO DRUŠTVO d.o.o. took over 12.2% of gas, while the remaining ten balance groups took over 13.8% of gas. The shares of individual balance groups in total natural gas quantities delivered by the transmission system in 2018 are shown in Figure 5.3.2.

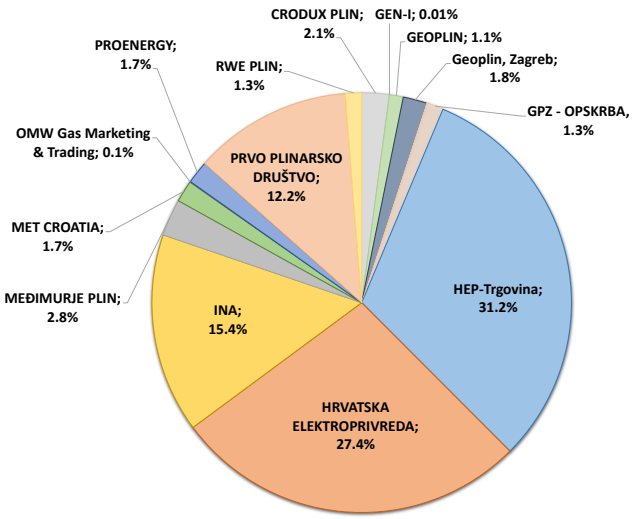


Figure 5.3.2 The share of balance groups in total natural gas quantities taken over from the transmission system in 2018

Performance indicators of the wholesale market are reflected in the diversity of gas supply sources, concentration of gas suppliers and the market's potential to meet its demand for gas without its largest supplier. Therefore, the Herfindahl-Hirschman Index (HHI), the number of gas supply sources and the Residual Supply Index (RSI) are the most important measures applicable to the Croatian market. These three closely related and interdependent measures indicate whether there is healthy market competition.

HHI measures the level of market concentration and is the most commonly used indicator for determining the concentration of market power. Higher HHI indicates greater concentration and measures the market share held by a few of the largest suppliers. HHI value below 2,000 indicates that a market is competitive and that none of the participants has a dominant influence. According to HERA's data for 2018, the HHI value for the Croatian wholesale gas market (excluding sales for public service supply) was 2,942 compared to 2,926 for 2017, which is an indicator of the relative dominance of a few suppliers on the gas market. The HHI trend for the Croatian wholesale gas market in the period from 2011 to 2018 is shown in Figure 5.3.3.

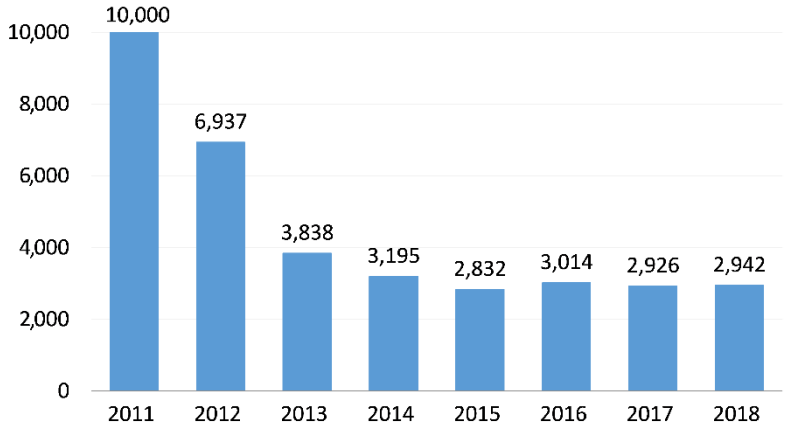


Figure 5.3.3 HHI trend for the Croatian wholesale gas market in the period 2011–2018

The number or the diversity of gas supply sources is another indicator of the wholesale market development. According to ACER's report (*ACER Market Monitoring Report – Gas Wholesale Market Volume*) for 2017 and data collected by HERA from its gas suppliers and traders in 2018, in the Republic of Croatia gas was mostly purchased from three sources – from domestic production, imports from Russia, and imported gas bought on the Austrian gas exchange, which is an indicator of healthy competition and security of supply.

Another indicator used to evaluate the development of a wholesale market is RSI, a measure determining the relation between the sum of supply capacities of all but the largest supplier, and total market demand. RSI equal to or greater than 100% indicates that the market can survive without its largest supplier. According to ACER's report, in 2017 RSI in Croatia was 115%, the same as in the previous years for which data was collected (2013, 2015 and 2016), which indicates that the market does not rely on its largest gas supplier.

A significant component of Croatia's wholesale gas market is gas trade carried out at the virtual trading point. VTP is a location for gas trading between the entry and exit points of the transmission system, including the gas storage system, where balance responsible parties may trade in gas. Transactions are agreed bilaterally and confirmed and carried out via a system provided by the gas market operator – HROTE d.o.o. In 2018, there were 14 active balance responsible parties at the VTP which traded a total of 22,382 GWh of gas (36.4% more than in 2017), as shown in Figure 5.3.4.

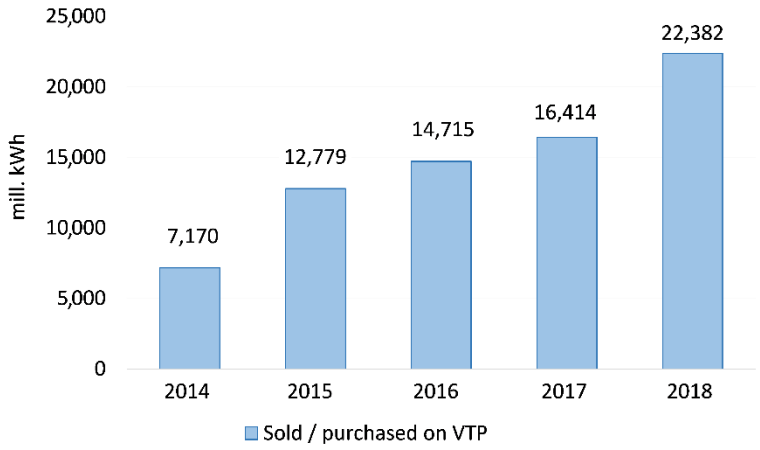


Figure 5.3.4 Gas quantities traded at the virtual trading point (VTP) in the period 2014–2018

In addition to trading at the VTP, transactions on the wholesale market in Croatia are also carried out made at the trading platform. With the implementation of the *Commission Regulation (EU) No 312/2014 of 26 March 2014 establishing a Network Code on Gas Balancing of Transmission Networks*, an electronic gas trading platform was established, where all balance responsible parties and the transmission system operator may trade short term standardised products. Title products and locational products can be traded daily, and products can be offered and used within on a within day or day ahead basis. A product is the amount of gas available for trading by the participants on the trading platform.

The trading platform enables transparent, non-discriminatory and anonymous trading, and is managed by HROTE d.o.o. Since the establishment of the trading platform, i.e. since the full implementation of *Regulation 312/2014*, the costs of balancing energy have been significantly reduced due to a more efficient model and a more balanced transmission system, as well as a more favourable unit price achieved through transparent market competition. Given sufficient liquidity of the balancing market, in 2018 the transmission system operator did not use the balancing service, which was contracted until 1 April 2018.

5.3.2 Retail natural gas market

Quantities delivered to end consumers

Transactions associated with the delivery of gas to consumers, for the purpose of consumption by end consumers, are made on the retail gas market. Gas supply is regulated by a contract between an end consumer and a gas supplier, and gas is delivered at billing metering points.

According to the data collected by HERA from gas suppliers, the gas supply structure in 2018 was as follows:

- 5,865 million kWh were delivered to household end consumers[19] connected to the transmission system *(hereinafter: household end consumers)*, which makes 23% of the total gas quantity delivered,
- 5,035 million kWh were delivered to industrial end consumers connected to the distribution system *(hereinafter: end consumers connected to the distribution system)*, which makes 20% of the total gas quantity delivered, and

19 *The household category includes household end consumers using the public supply service and household end consumers purchasing gas under market conditions*

- 14,538 million kWh were delivered to industrial end consumers directly connected to the transmission system *(hereinafter: end consumers connected to the transmission system)*, which makes 57% of the total gas quantity delivered.

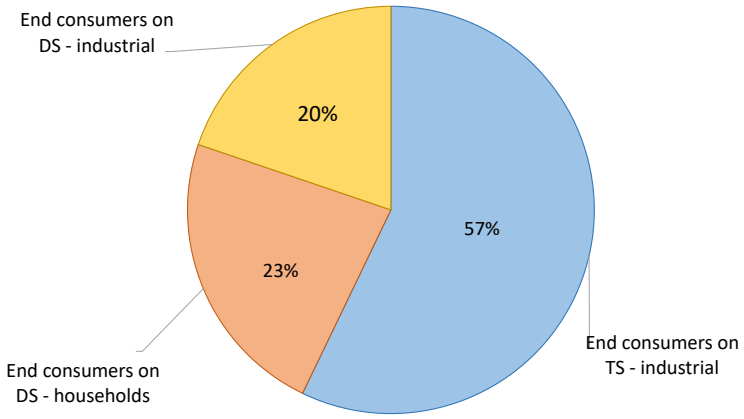


Figure 5.3.5 Structure of natural gas delivery from the transmission system in 2018

In 2018, the total gas quantity which gas suppliers delivered to end consumers connected to the distribution system amounted to 10,900 million kWh, of which 5,865 million kWh of gas were delivered to household end consumers, which is a decrease of 2.5% as compared to 2017. A total of 5,035 million kWh of gas were delivered to industrial end consumers connected to the distribution system, which is an increase of 4.4% as compared to 2017. A total of 14,538 million kWh of gas were delivered to end consumers connected to the transmission system, which is a decrease of 14.3% as compared to 2017.

The total number of end consumers on the gas market at the end of 2018 was 671,736, of which 621,748 were household end consumers, 49,967 were end consumers supplied under market conditions in the distribution system, and 21 were end consumers supplied under market conditions in the transmission system.

Indicators of retail gas market development

The 2018 market concentration indicator (HHI) for industrial consumers on the retail market, just like in the previous year, was higher than 2,000 and was recorded at 2,608, which indicates a still significant share of a smaller number of suppliers in the total gas trade on the retail market. The HHI trend for the Croatian retail gas market in the industrial consumer segment in the period from 2011 to 2018 is shown in Figure 5.3.6.

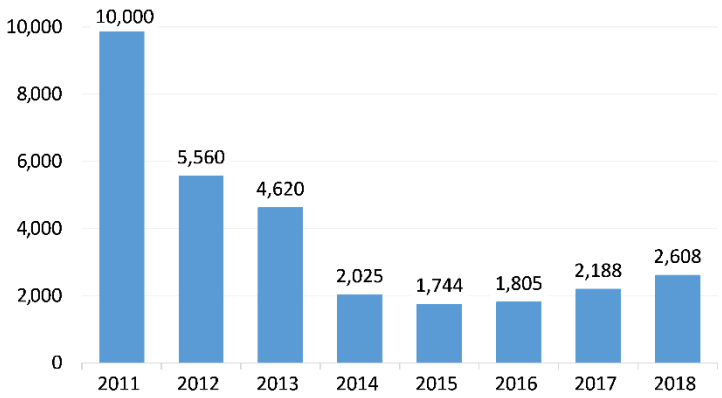


Figure 5.3.6 Overview of HHI on the Croatian retail gas market in the period 2011–2018

In addition to the concentration of market power, another important indicator of retail market development and effective retail market competition includes the existence of conditions for fast and simple gas supplier switching. In this sense HERA implements the following measures:

- issues rules for supplier switching (*General terms and conditions of gas supply*) and opinions or binding interpretations of the rules,
- continuously improves the IT system for the implementation of supplier switches, in cooperation with the gas market operator, which organises and maintains the system, and
- acts on complaints received by supervising actions taken by energy entities during supplier switches and issues decisions on handling complaints (binding decisions, non-binding proposals for action, opinions).

Supplier switching and the awareness of end consumers about the possibility of switching is one of the most important indicators of retail market development, especially in the household category. The indicator can be observed through internal and external supplier switching. Internal switching refers to modifying existing contracts with the current supplier, while external switching refers to changing suppliers at the request of end consumers.

According to the data on external supplier switching collected by HERA, in the second half of 2016 there was an evident increase in the rate of supplier switching, which continued in 2017. However, 2018 saw a decrease of 48% in supplier switching compared to 2017.

The proportion of gas distributed to consumers who switched gas suppliers in 2018 was 6.5% (705 million kWh) of the total distributed quantity of gas (10,900 million kWh), while the number of successful supplier switches (7,074) accounts for 1.1% of the total number of billing metering points (671,715) (Figure 5.3.7).

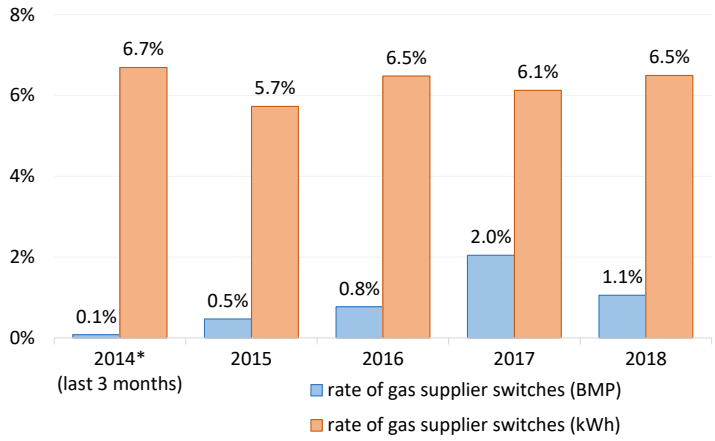


Figure 5.3.7 Rates of gas supplier switches with regard to the number of billing metering points (BMPs) and distributed gas quantities (kWh) since the beginning of retail market liberalisation in Croatia

In 2018, further retail market liberalisation was marked by a significant number of terminated supplier switching procedures (6,746 procedures), as well as complaints concerning the behaviour of market participants. The reasons for termination of supplier switching procedures and for complaints concerning actions of energy entities were mostly related to outstanding bills owed to current suppliers, incorrect customer information, and withdrawals from supplier switching procedures. An overview of completed and terminated gas supplier switches since the start of retail market liberalisation in Croatia is shown in Figure 5.3.8.

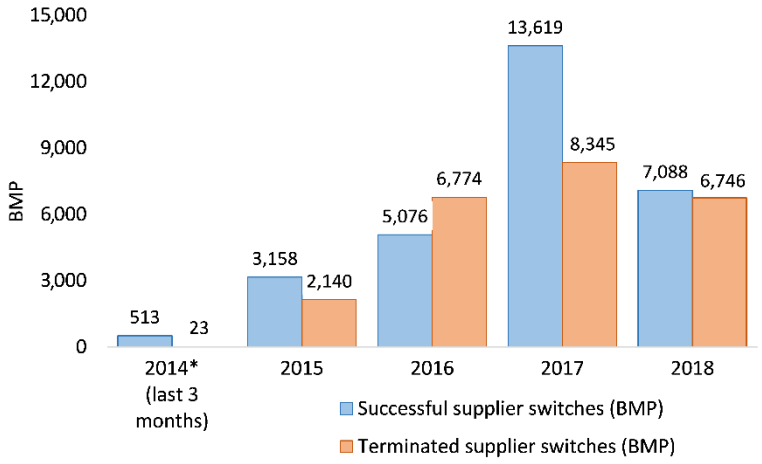


Figure 5.3.8 Number of completed and terminated gas supplier switches since the start of retail market liberalisation in Croatia

In consultation with HERA, HROTE has put in place security mechanisms to eliminate observed deficiencies and improve the functioning of the software within the gas market operator's information system. Further, on 1 October 2018, HROTE established a Register of billing metering points (hereinafter: RBMP), which it maintains based on the *General terms and conditions of gas supply*. RBMP is a unique electronic database of end consumer billing metering points for all distribution system operators, transmission system operators and closed distribution system organisers in Croatia, with the purpose of monitoring and improving business processes on the gas market, better and faster implementation of the supplier switching procedure and allocations of gas energy received at the distribution system entry point. In addition, on 1 October 2018, based on the *General terms and conditions of gas supply*, additional preconditions were set to continue with retail market liberalisation, as follows:

- the procedure of supplier switching has been simplified and shortened, which was made possible by improving the IT system used for the supplier switching procedure, developed and managed by HROTE, which is linked to RBMP, and
- the desired start date of supply has been introduced, which is agreed between the buyer and the new supplier, meaning that the procedure of supplier switching and concluding a gas supply contract can be carried out months before the beginning of gas supply by the new supplier.

Another precondition for effective competition is the availability of information for market participants. It is particularly important to make information on gas consumption available to end consumers, and in this sense HERA establishes relevant rules (*General terms and conditions of gas supply*):

- on mandatory content of invoices for delivered gas, and
- on gas suppliers' obligation to periodically inform consumers on past gas consumption in the previous year and on estimated gas consumption in the current year (by 1 March each year).

HERA also informs customers of their rights and obligations:

- by regularly publishing information on HERA's official website,
- by supervising information published on energy entities' websites,
- by responding to consumer inquiries, and
- via the tariff calculator (iPlin) for consumers who use public service supply.

In addition, the development of an informative application is planned that would objectively and clearly present a comparison of tariff models and gas prices, and standardised gas offers by individual gas suppliers. Based on the provisions of the *General terms and conditions of gas supply* and with the aim of promoting competition, HERA is obliged to establish an appropriate gas price comparison tool to make it easier for end

consumers to select a gas supplier, compare gas prices and gas supply conditions, and to make gas supplier contact information more accessible.

5.3.3 Prices of natural gas

Regulated gas prices

In the period from 1 January to 31 December 2018, the wholesale gas price for all end consumers using the public service was regulated and established in the decisions on the gas price at which the wholesale market supplier was obliged to sell gas to public service gas suppliers for household consumers, which was set at HRK 0.1809/kWh.

The regulated retail gas price, applied to end users using the public service, is established pursuant to the *Methodology for setting tariffs for gas supply and guaranteed supply as public services*.

The tariffs for public service gas supply and guaranteed supply for the twelve tariff models for all public service gas suppliers in Croatia for the period from 1 January to 31 December 2018 were established in the relevant decisions on tariffs for gas supply as a public service.

In 2018, the average gas sale price for household[20] end consumers using the public gas supply service in Croatia was HRK 0.2544/kWh (net of VAT), which represents a 0.8% increase of the average price compared to 2017.

Pursuant to the *Methodology for setting tariffs for public service gas supply and guaranteed supply*, the gas price for end consumers using the public service consists of the reference gas price, the cost of gas distribution, and the cost of gas supply. The reference price of gas is the highest price at which the wholesale market supplier can sell gas to public service suppliers for household end consumers, and is determined as the sum of the purchase price and the premium as the fixed part of the reference price of gas. The share of the reference price of gas in 2018 averaged 71% of the total regulated final price of gas excluding VAT. Further, the share of the cost of gas distribution in the average final gas price in 2018 was 25% excluding VAT, while the gross supply margin of public service suppliers was 4%. The structure of the final gas price for households in Croatia in 2018 is shown in Figure 5.3.9.

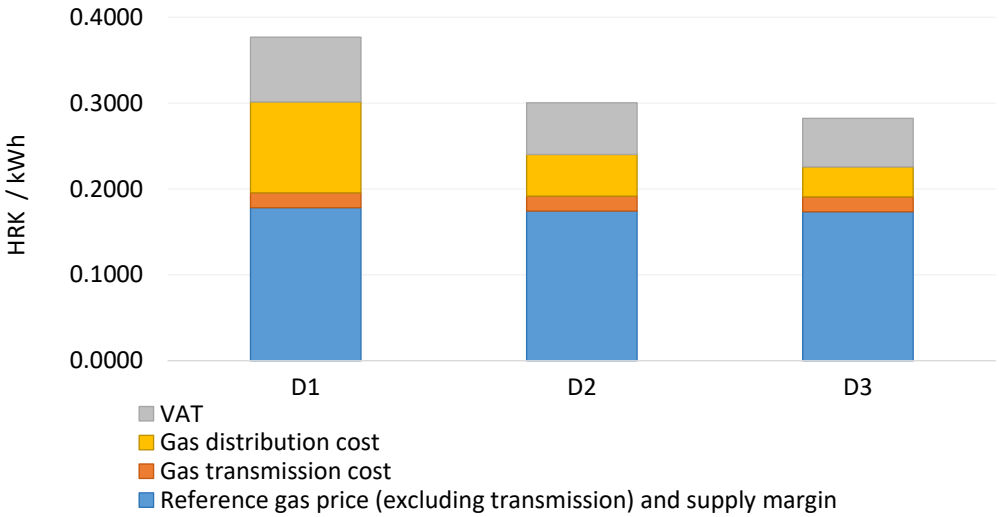


Figure 5.3.9 The structure of the final gas price for households in Croatia in 2018 – consumer categories D1–D3 (according to EUROSTAT).

[20] *The weighted average by delivered gas quantities for household end consumers using the public service, for each respective public service gas supplier.*

Market gas prices

In 2018, HERA's questionnaire on gas supply and trade was again used to collect quarterly data from gas suppliers and traders in Croatia. The purpose of the questionnaire was to gather data on gas purchase and sale, such as the quantity and prices of gas purchased and sold (delivered) to end consumers.

The average gas purchase price excluding VAT on the market in 2018 (purchase under bilateral agreements, at a virtual trading point on the trading platform, and from imports) was HRK 0.1978/kWh, which represents an increase of 24.9% as compared to 2017, when it was HRK 0.1584/kWh. In 2018, the average purchase price of gas on the market was the highest in Q4, when it was HRK 0.2228/kWh, and the lowest in Q1, when it was HRK 0.1787/kWh.

The average gas sale price excluding VAT on the wholesale market in 2018 (sale under bilateral agreements, including trading at virtual trading points and sale on the trading platform, and exports from Croatia) was HRK 0.1987/kWh, which represents an increase of 20.6% as compared to 2017, when the average price was HRK 0.1647/kWh.

In 2018, a total of 13 suppliers sold gas on the wholesale market. The highest average wholesale gas price, including exports from Croatia, was HRK 0.2577/kWh, while the lowest price was HRK 0.1726/kWh.

In 2018, the average gas sale price in Croatia for end consumers connected to the distribution system[21] was HRK 0.2443 /kWh (net of VAT), or 4.6% more than in 2017. The lowest and highest prices were recorded in Q2 (HRK 0.2207/kWh) and Q4 (HRK 0.2753/kWh), respectively.

In 2018, the average gas sale price in Croatia for end consumers connected to the transmission system[22] was HRK 0.2139/kWh (net of VAT), or 18.5% more than in 2017. The lowest and the highest prices were recorded in Q1 (HRK 0.1979/kWh) and Q4 (HRK 0.2353/kWh), respectively.

Table 5.3.1 shows average gas sale prices excluding VAT in Croatia in 2018 for end consumers on the market according to HERA's categorisation, separately for end consumers connected to the transmission system and end consumers connected to the distribution system, as well as the total average sale prices of gas for all end consumers on the market in Croatia.

21 *The weighted average by delivered gas quantity for end consumers on the market connected to the distribution system, for each gas supplier.*

22 *The weighted average by delivered gas quantity for end consumers on the market connected to the transmission system, for each gas supplier.*

Table 5.3.1 Average gas sale price for end consumers on the market in Croatia in 2018, net of VAT

Band (by annual consumption in kWh)		*End consumers connected to the TRANSMISSION system (HRK/kWh)*	*End consumers connected to the DISTRIBUTION system (HRK/kWh)*	*TOTAL (HRK/kWh)*
I1-1	≤ 100,000	-	0.3014	0.3014
I1-2	100,001–250,000	*	0.2636	0.2635
I2	250,001–2,500,000	*	0.2512	0.2512
I3-1	2,500,001–10,000,000	0.2008	0.2247	0.2237
I3-2	10,000,001–25,000,000	*	0.2150	0.2177
I4-1	25,000,001–50,000,000	0.2030	0.2084	0.2070
I4-2	50,000,001–250,000,000	*	0.2075	0.2084
I5	250,000,001–1,000,000,000	0.1940	-	0.1940
I6	> 1,000,000,001	0.2157	-	0.2157
TOTAL		**0.2139**	**0.2443**	**0.2227**

** The average price for this category is not published for reasons of confidentiality, as there were less than three end consumers in this category in 2018*

HERA also analyses the structure of the final gas price for industrial consumers. In 2018, the cost of goods, which includes the cost of gas purchase and the supply margin, accounted for 70% of the total average gas price for all end consumer categories on the market (net of VAT). The cost of gas transmission and the cost of gas distribution accounted for 7% and 13%, respectively. Figure 5.3.10 shows the structure of the final gas price in 2018 for industrial market consumers in Croatia according to EUROSTAT's categorisation.

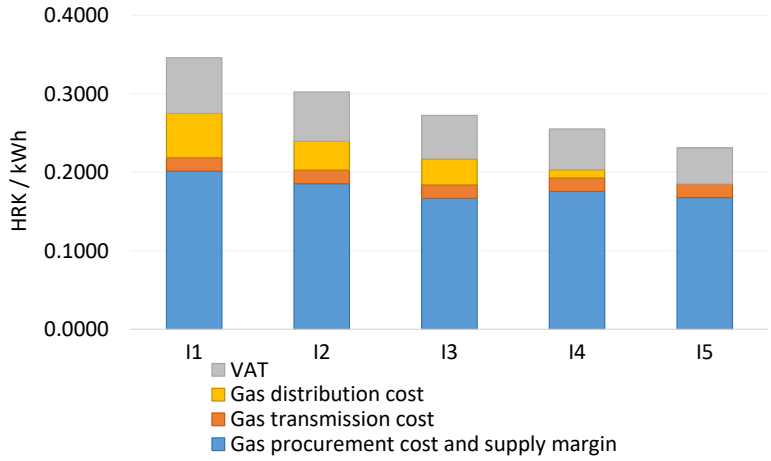


Figure 5.3.10 The structure of the final gas price for industrial consumers in Croatia in 2018 – consumer categories I1–I6 (according to EUROSTAT).

The quarterly trends of average retail gas prices in 2018 for end consumers on the market according to HERA's categorisation are shown in Figure 5.3.11. In 2018, the total average retail price of gas for all consumer bands was HRK 0.2227/kWh (net of VAT), which is a 15% increase compared to 2017.

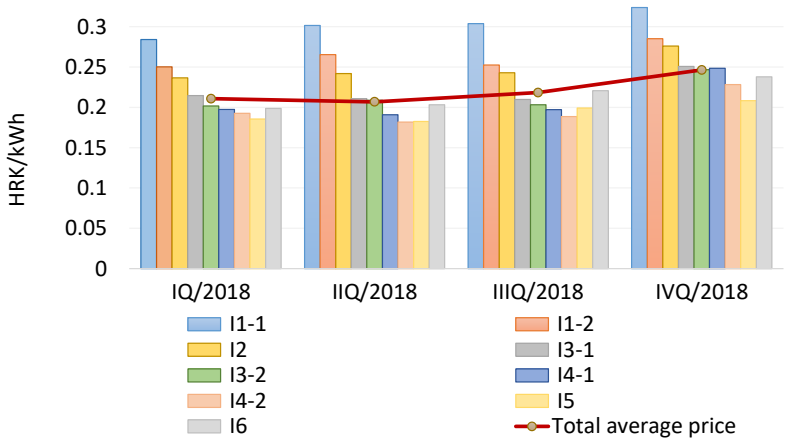


Figure 5.3.11 Average retail market gas prices excluding VAT for end consumer categories on the market in Croatia in 2018, by quarter

HERA's end consumer categorisation complies with *Directive 2012/27/EC*, *Commission Regulation (EU) 2016/1952* and EUROSTAT's Methodology, as well as with its previous categorisation (three bands) to enable continuous monitoring of prices and comparing of past gas prices.

Average retail market gas prices in Croatia for three gas consumption groups by quarter from 2012 to 2018 are shown in Figure 5.3.12.

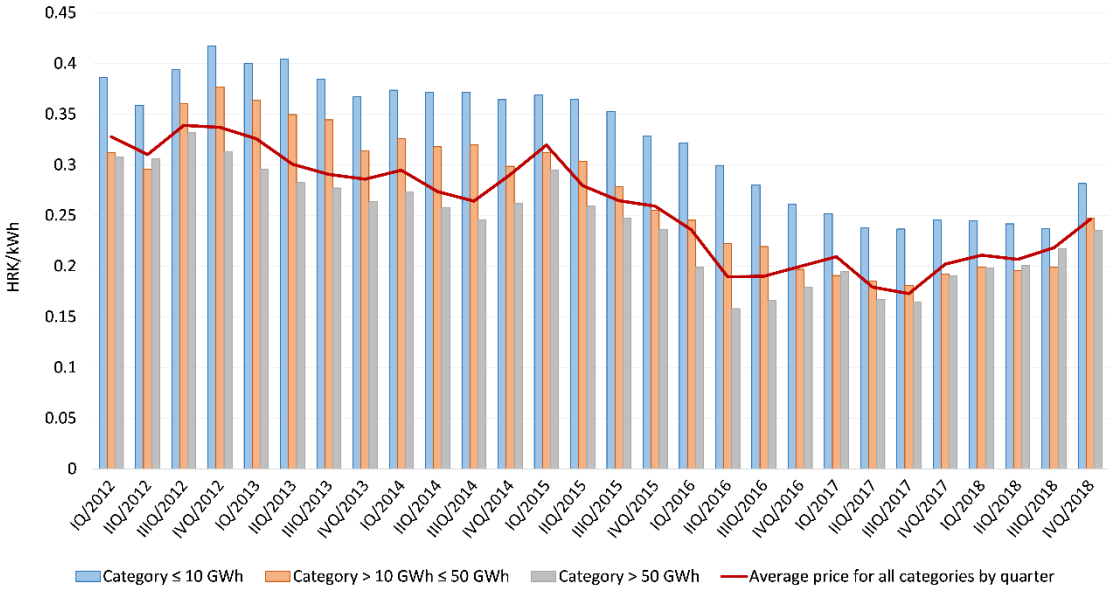


Figure 5.3.12 Average retail gas prices excluding VAT for end consumer categories on the market in Croatia by quarter for the period 2012–2018

A comparison of annual retail and wholesale market prices of gas in 2018 shows that the average retail price was 12.1% higher than the average wholesale price of gas. Average gas prices on the retail market compared with the average wholesale price of gas on the market, as well as the trend of the regulated wholesale price (wholesale market supplier–public service supplier) excluding VAT from 2012 to 2018 are shown in Figure 5.3.13.

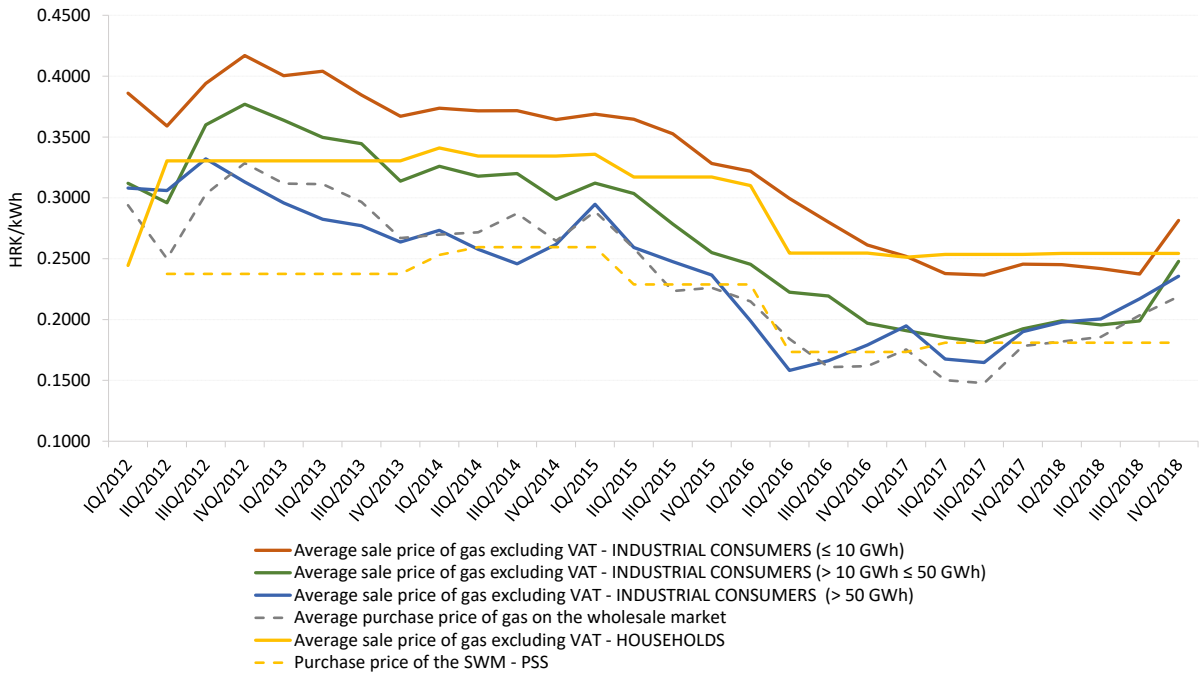


Figure 5.3.13 Average retail gas prices for end consumer categories on the market compared with the average wholesale price of gas on the market and the regulated wholesale gas price for the period 2012–2018

Natural gas prices for end consumers in European countries – households

Natural gas prices for household end consumers in most European countries were continuously on the rise from 2010 to 2012. The prices were steady in 2013, but from 2014 to 2017 the price of natural gas for households decreased in most European countries. In 2018 compared to 2017, the prices of natural gas for household end consumers increased slightly in most European countries. According to EUROSTAT, the prices of natural gas (excluding taxes) for household end consumers in the European Union increased on average by 2.8% in 2018 compared to 2017. Despite these changes, the price of natural gas excluding taxes for households in Croatia was still significantly below the European average in 2018 (-36.9%).

Figure 5.3.14 shows how natural gas retail prices in some European countries changed for households in the D_2 consumption band, whose annual natural gas consumption ranges from 20 to 200 GJ, which approximately corresponds to natural gas consumption of 600 to 6,000 m^3/year, from 2002 to[23] 2018.

In 2018, the average natural gas sale price including taxes for households in the D_2 band was the highest in Sweden (EUR 32.68/GJ), Denmark (EUR 24.79/GJ), and the Netherlands (EUR 23.28/GJ), and the lowest in Romania (EUR 9.37/GJ), Hungary (EUR 9.80/GJ) and Croatia (EUR 10.1/GJ). The price of natural gas in Croatia in 2018 was 42.3% lower than the European average.

The share of taxes in the total price of natural gas for this consumer category varied greatly and was the highest in Denmark (55.2%), the Netherlands (52.6%), Sweden (43.1%), and Italy (35.2%), and the lowest in the UK (9.5%), Luxembourg (10.1%), and Greece (13.7%). In Croatia, the share of taxes in the total price for this consumer category was 20%.

23 *The prices are calculated as average retail prices from the relevant years.*

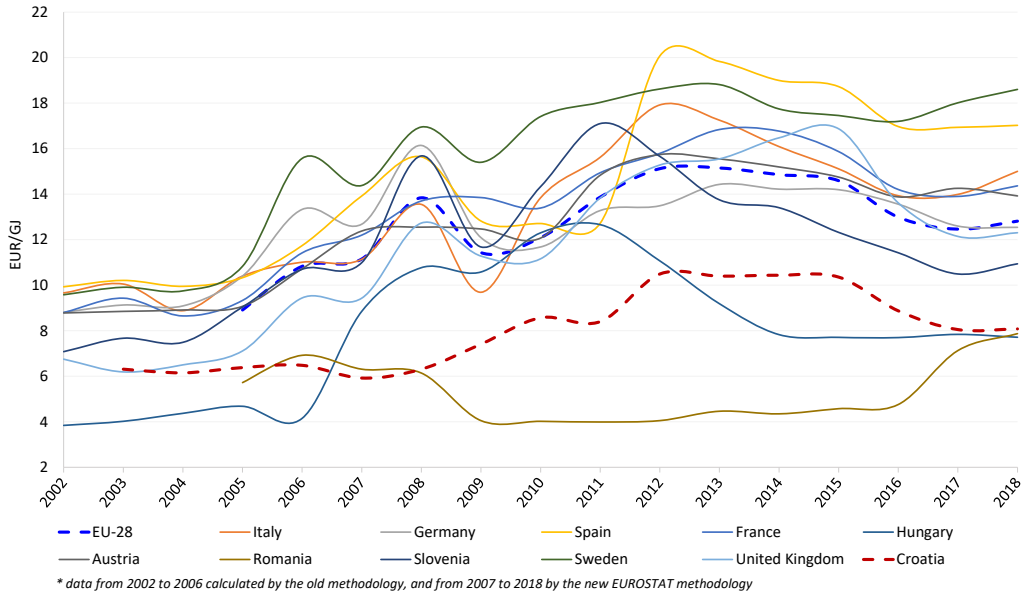


Figure 5.3.14 Changes in the retail prices of natural gas for households in the D_2 band in some European countries from 2002 to 2018 (excluding taxes)

Figure 5.3.15 shows average natural gas prices for households in the D_2 consumer band in 2018, including and excluding taxes.

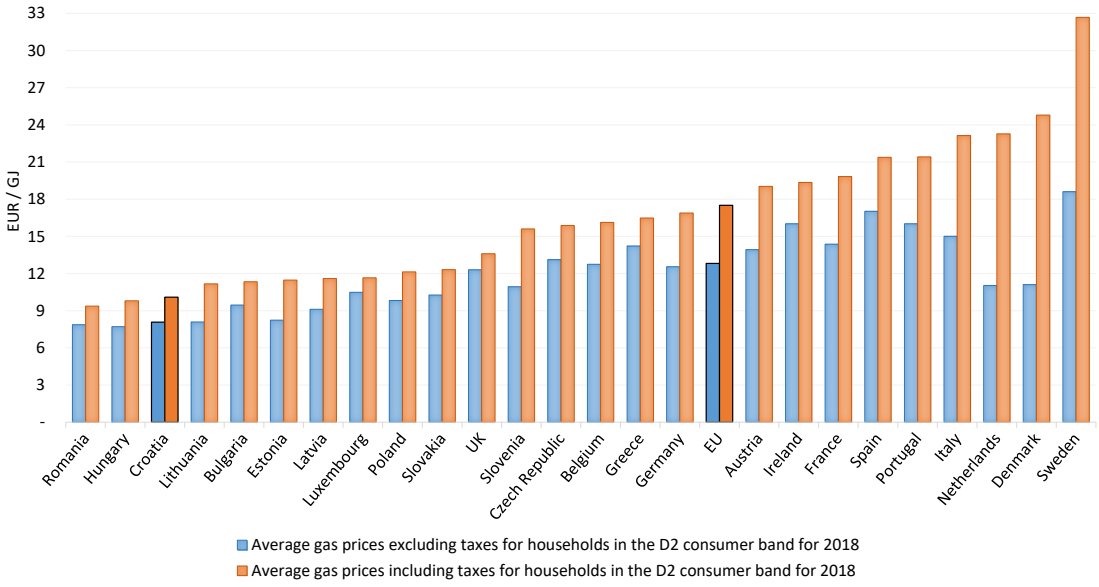


Figure 5.3.15 Average natural gas prices for households in the D_2 consumer band in 2018 (including and excluding taxes)

Further, if the price of natural gas for households in the D2 consumer band is expressed using the international PPS/GJ unit in order to eliminate differences in the prices of goods/services across countries[24], in 2018 the price was the highest in Sweden (26.81 PPS/GJ), and the lowest in Luxembourg (9.52 PPS/GJ). Considering the purchasing power standard expressed with the PPS unit, in 2018 the final price of gas including taxes for households in the D2 consumer band in Croatia was 15.63 PPS/GJ, which is 16.6% less than the European average. Figure 5.3.16 shows a comparison of European natural gas retail prices including taxes for households in the D2 consumer band for 2017 and 2018.

24 *PPS (purchasing power standard) is a unit that equalises the purchasing power of different countries.*

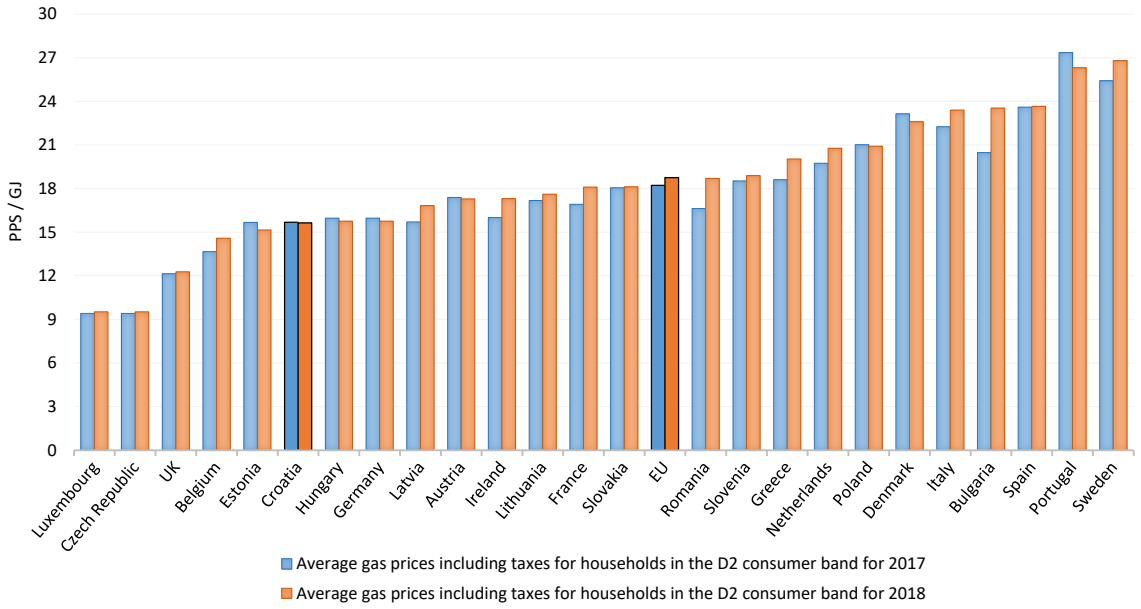


Figure 5.3.16 Natural gas prices for households in the D2 consumer band in relation to the price of goods/services in the European countries (including taxes) for 2017 and 2018

Natural gas prices for end consumers in European countries – industrial

According to EUROSTAT's data, in 2018 compared with 2017, natural gas prices excluding taxes in the EU increased by 7% for I_3 industrial consumers, with annual natural gas consumption between 10,000 and 100,000 GJ, which approximately corresponds to natural gas consumption of 300,000 to 3,000,000 m^3/year. Figure 5.3.17 shows average natural gas prices for I_3 industrial consumers in the European countries for 2018, including and excluding taxes.

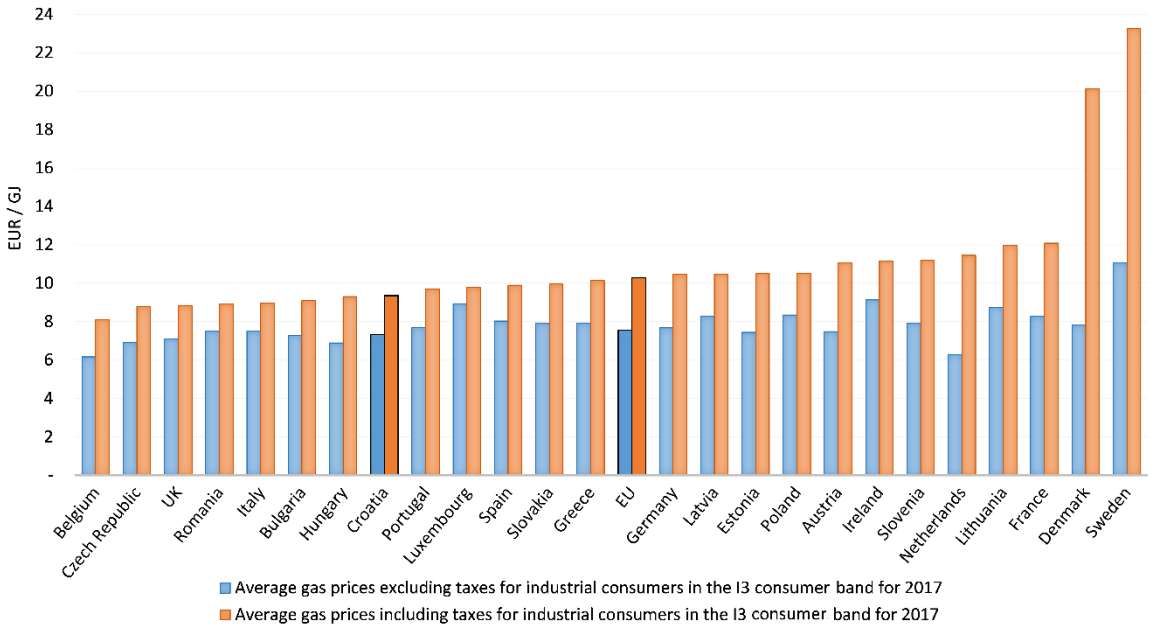


Figure 5.3.17 Average natural gas prices for industrial consumers in the I_3 consumer band for 2018 (including and excluding taxes)

In 2018, the average natural gas sale price including taxes for industrial consumers in the I_3 consumer band was the highest in Sweden (EUR 23.26/GJ) and Denmark (EUR 20.12/GJ), and the lowest in Belgium (EUR 8.11/GJ), the Czech Republic (EUR 8.79/GJ) and the UK (EUR 8.85/GJ). In Croatia, the average natural gas sale price

including taxes for industrial consumers in the I_3 consumer band in 2018 was EUR 9.36/GJ, which is 9% less than the European average.

The share of taxes in the total price of natural gas for this consumer category varied greatly and was the highest in Denmark (61.2%), Sweden (52.4%), and the Netherlands (45.1%), and the lowest in Luxembourg (8.6%), Romania (16%), and Italy (16.3%). In Croatia the share of taxes in the total price for this consumer category in 2018 was 21.6%.

If the price of natural gas for industrial consumers in the I_3 category is expressed in PPS/GJ, in 2018 Sweden had the highest price of gas (19.07 PPS/GJ), while the price was lowest in Belgium (7.34 PPS/GJ). Considering the purchasing power standard expressed with the PPS unit, in 2018 the final price of gas including taxes for industrial consumers in the I_3 consumer band in Croatia was 14.49 PPS/GJ, which is 10.1% more than the European average. Figure 5.3.18 shows a comparison of European natural gas average prices with taxes for industrial consumers in the I_3 consumer band for 2017 and 2018, expressed in PPS/GJ.

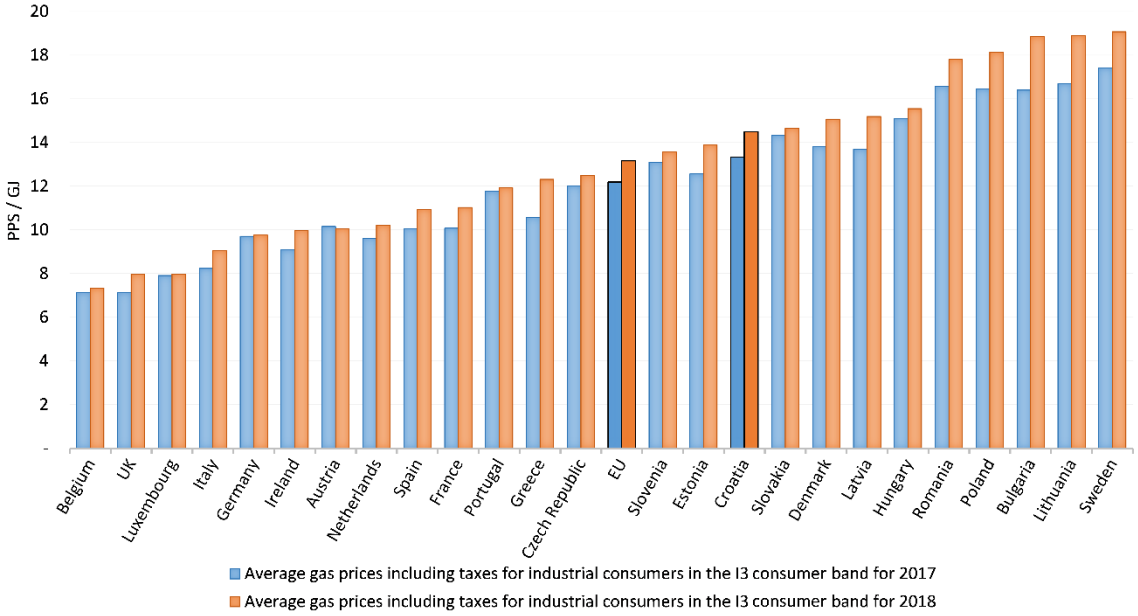


Figure 5.3.18 Natural gas prices for industrial consumers in the I3 consumption band in relation to the price of goods/services in the European countries (including taxes) for 2017 and 2018

5.3.4 Quality of gas supply

The **Gas Market Act** sets out the obligations of gas producers, closed distribution system organiser, and transmission, distribution, storage and LNG system operators, as well as the obligations of gas suppliers, with regard to the disclosure and maintenance of agreed gas supply quality parameters. The quality of gas supply comprises quality of service, reliability of delivery, and quality of gas.

The framework for ensuring the quality of gas provided by transmission, distribution, and gas storage system operators, closed distribution system organiser, as well as by gas suppliers, is set out in the *General terms and conditions of gas supply*. Thus, the quality of service encompasses the commercial requirements of gas supply quality, which, when observed by the system operator or gas supplier, ensure a satisfactory level of services provided to system users or end consumers. The reliability of delivery implies the continuity of gas delivery from the transmission or distribution system in a period of time, and is expressed in the number of delivery interruptions and their duration. Gas quality implies that the parameters of gas delivered into the gas system are in line with standard gas quality as described in Annex 2 to the *General terms and conditions of gas supply*. Gas

producers, suppliers, and traders are obliged to ensure the standard quality of the gas that they deliver into the transmission or distribution systems.

Further, the transmission system operator, the distribution system operator, the closed distribution system organiser, the gas storage system operator, and the gas supplier are also obliged to establish a system of data collection concerning the quality of gas supply and to publish digitised annual reports on the quality of gas supply. In this way, data on the fulfilment of general and guaranteed standards of quality of supply is monitored and collected. The general standards of supply quality serve to measure the general level of gas supply quality of individual system operators or gas suppliers, whereas guaranteed standards of supply quality determine the minimum level of gas supply quality they are obliged to provide to individual system users or end consumers.

System operators, closed distribution system organisers and suppliers are obliged to provide HERA with data on indicators of supply quality for guaranteed standards of supply quality, no later than 30 days after the end of the relevant quarter. Further, gas system operators and suppliers are obliged to provide HERA with annual reports on the quality of gas supply for the previous year by 1 March of the current year, and to publish them on their websites.

In this way, HERA collects data on the indicators of gas supply quality in order to monitor:

- general standards of supply quality: reliability of delivery (monitoring delivery interruptions, gas system leak tests, odourisation of gas, emergency responses), quality of service (connection to the system, resolution of complaints and inquiries from end consumers, correction of gas supply invoices), and gas quality (gas quality control), and
- guaranteed standards of supply quality: reliability of delivery (planned delivery interruptions) and quality of service (connection to the gas system, intervention by an authorised person, submission of readings to the supplier, supplier's order to suspend gas delivery, resumption of gas supply on the order of the supplier, correction of gas supply invoices, order for resumption of gas supply after settlement of obligations).

With respect to system operators, HERA collects data on the quality of gas supply in order to monitor:

- general standards of supply quality: reliability of delivery (monitoring delivery interruptions, system leak tests, odourisation of gas, emergency responses), quality of service (connection to the distribution system), and gas quality (gas quality control), and
- guaranteed standards of supply quality: reliability of delivery (planned delivery interruptions) and quality of service (connection to the distribution system, intervention by an authorised person, submission of readings to the supplier, supplier's order to suspend gas delivery, resumption of gas supply on the order of the supplier).

With respect to gas suppliers, HERA collects data on the quality of gas supply in order to monitor:

- general standards of supply quality: quality of service (resolution of complaints and inquiries from end consumers, correction of gas supply invoices), and
- guaranteed standards of supply quality: quality of service (correction of gas supply invoices, resumption of gas supply after settlement of obligations).

As of June 2018, fees for three services rendered beyond the guaranteed standard apply to the following services: submission of readings to the supplier and suspension of gas supply on the order of the supplier (the distribution system operator is obliged to enforce both standards, and the gas supplier is entitled to compensation), and the correction of gas supply invoices (the gas supplier is obliged to enforce the standard, and the end consumer is entitled to compensation).

Incentives and reimbursements for services rendered beyond the guaranteed standard are planned for the upcoming periods; by that time, values and criteria for the adjustment of general standards of gas supply quality must be established, including reimbursement amounts for respective guaranteed standards of gas supply quality.

In 2018, the transmission system operator recorded 11 planned interruptions in gas delivery in the gas transmission system. The total duration of all delivery interruptions in 2018 was 783 hours.

In 2018, distribution system operators recorded an average of nine planned gas delivery interruptions and 14 unplanned delivery interruptions with an average duration of 131 and 30 hours, respectively.

5.3.5 Consumer protection

In 2018, HERA received a total of 46 applications from natural and legal persons within its area of competence in the gas sector, as shown in Table 5.3.2.

Table 5.3.2 Consumer applications by type in 2018

Type of case	*Number*	*Proportion [%]*
Appeals	2	4
Complaints and other consumer applications	33	72
Inquiries	11	24
Total	**46**	**100**

Of the 33 complaints and other consumer applications, 23 were submitted by citizens (natural persons). Table 5.3.3 shows the most common reasons for complaints from natural persons.

Table 5.3.3 Complaints from natural persons in 2018

Complaints from natural persons	*Number*	*Proportion [%]*
Connection requirements	6	26
Calculation of gas consumption	6	26
Non-standard service fees and provision	4	17
Suspension of gas delivery	2	9
Other	5	22
Total	**23**	**100%**

In addition to the applications shown in Table 5.3.2, in 2018 HERA received 196 other end consumer applications, inquiries, and requests for opinion or interpretation of provisions.

The end consumer protection framework in the gas sector is laid down in *Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC*, and Annex I, Measures on Consumer Protection. Provisions of the *Directive* and Annex I were transposed into our legal system through the following acts and by-laws:

- **Energy Act** (in force as of 26 September 2015),
- **Gas Market Act** (in force as of 3 March 2018),
- **Act on the Regulation of Energy Activities** (in force as of 8 November 2012),
- **Consumer Protection Act** (in force as of 21 October 2015),

- *General terms and conditions of gas supply* (in force as of 9 June 2018).

The measure protecting gas consumers and gas system users against actions of gas system operators and suppliers, pursuant to Article 88 of the **Gas Market Act**, stipulates that an end consumer dissatisfied with an act or failure to act on the part of the transmission system operator, distribution system operator, gas storage operator, LNG terminal operator, gas market operator, or supplier, may initiate an administrative dispute. The procedure before the administrative court will be heard urgently.

In addition, the measure protecting gas consumers against actions of the gas supplier, pursuant to Article 24 of the *General terms and conditions of gas supply*, stipulates that end consumers dissatisfied with an act or failure to act on the part of the supplier may file a written complaint with the supplier.

Complaints may be filed in particular against the following:

- failure to comply with the obligation to inform end consumers of modifications to the contract terms and the right to terminate the gas supply contract,
- failure to comply with the obligation to provide timely information to household end consumers about the termination of the concluded gas supply contract,
- the content of an invoice issued for delivered gas,
- non-fulfilment of the provisions of the public service gas supply contract,
- failure to re-establish gas delivery within the defined time frames, upon payment of overdue amounts from the warning letter, due to which gas delivery was suspended, and
- supplier switching not carried out pursuant to the *General terms and conditions of gas supply*.

On the basis of the complaint, HERA may take the following measures:

- reach a binding decision on how to handle the complaint,
- instruct on how to handle the complaint, or
- issue an opinion on a complaint.

5.4 Security of natural gas supply

The basic framework on the security of natural gas supply in Croatia is laid down in *Regulation (EU) 2017/1938*, which entered into force on 1 November 2017. The objective of *Regulation 2017/1938* is to boost solidarity and trust between the Member States and put in place measures needed to achieve these aims.

In addition, pursuant to the provisions of the **Gas Market Act**, market participants are responsible for the security of gas supply within the scope of their activities. The competent authority in charge of implementing measures under *Regulation 2017/1938* is the ministry competent for energy. Together with regional self-government units, it is responsible for implementing measures ensuring the security of supply.

In order to establish a preventive action plan containing measures needed to mitigate identified risks in accordance with the risk assessment undertaken pursuant to Article 9 of *Regulation (EU) No. 994/2010*, and to establish an emergency plan containing measures to be taken to mitigate the impact of gas supply disruptions pursuant to Article 10 of *Regulation (EU) No 994/2010*, in July 2014 the Croatian Government adopted the *Emergency plan concerning measures to safeguard the security of gas supply in Croatia*.

In order to establish criteria for acquiring the status of a protected consumer and measures to safeguard reliable supply of protected consumers, in 2015 the Croatian Government adopted the *Regulation on the criteria for acquiring the status of a protected consumer in gas supply crisis situations*.

The preventive action plans and the emergency plans drawn up pursuant to *Regulation (EU) No. 994/2010* will remain in force until new preventive action plans and emergency plans drawn up pursuant to *Regulation 2017/1938* are first adopted.

6 OIL AND PETROLEUM PRODUCTS

6.1 Legal framework for oil and petroleum products

The oil and petroleum product market and energy activities in the oil and petroleum product sector are governed by the **Energy Act**, the **Act on the Regulation of Energy Activities**, the **Oil and Petroleum Products Market Act *(Official Gazette Nos. 19/14 and 73/17)***, and by-laws adopted on the basis of these acts.

In addition, the framework for determining and monitoring liquid petroleum fuel quality is laid down in the *Regulation on Liquid Petroleum Fuel Quality, Monitoring and Reporting Methods, and Calculation Methods for Greenhouse Gas Emissions in the Life Cycle of Supplied Fuel and Energy (Official Gazette No. 57/17)*, based on the **Air Protection Act *(Official Gazette Nos. 130/11, 47/14, 61/17 and 118/18)***.

The *Programme for Monitoring Liquid Petroleum Fuel Quality for 2018 (Official Gazette No. 130/17)* lays down the method of sampling liquid petroleum fuel (especially for service stations and storage facilities), the number and frequency of samples, sampling locations depending on the quantity of liquid petroleum fuel placed on the national market or used for personal needs by the supplier, and laboratory analyses of liquid petroleum fuel samples.

The requirements for wholesale and foreign trade in petroleum products are governed by the *Regulation on Requirements for Wholesale Trade and Trade with Third Countries in Certain Goods (Official Gazette Nos. 47/14 and 62/15)*.

6.2 Oil transportation through pipelines

In Croatia, oil transportation through pipelines is performed by Jadranski naftovod d.d. *(hereinafter: JANAF d.d.).* Pursuant to the **Oil and Petroleum Products Market Act**, JANAF d.d. is obliged to provide legal and natural persons with access to the transport system in an impartial and transparent manner.

Oil is imported by tanker ships via the offshore terminal in Omišalj on the island of Krk, and then further transported through JANAF's oil pipeline system to oil refineries in Rijeka and Sisak, as well as for the needs of refineries in Bosnia and Herzegovina, Serbia, Slovenia and Hungary, as shown in Figure 6.2.1. In addition, the system can also be used for oil imports by land.

Figure 6.2.1 JANAF d.d. oil pipeline system

In 2018, a total of 8.6 million tonnes of crude oil was transported through the oil pipeline system, which represents an increase of 11.7% compared to the previous year. The oil quantities transported from 2005 to 2018 and the quantities planned for 2019 are shown in Figure 6.2.2.

Figure 6.2.2 JANAF's oil pipeline system – transported quantities [in millions of tonnes]

Concerning the development of the oil pipeline system in 2018, particularly important activities undertaken by JANAF were investments in the pipeline system, investments in the security and environmental protection system, investments in the electricity system, investments in other modernisation facilities, investments in business IT systems and software, etc.

Ever since the **Oil and Petroleum Products Market Act** entered into force in February 2014, the price of oil transport is established by internal decisions on the price of oil

transport through the oil pipeline system, which are adopted based on internal rules on the establishment of the price of oil transport through JANAF's oil pipeline system.

6.3 Development of the oil and petroleum products market

6.3.1 Storage of oil and petroleum products

In 2018, oil and petroleum products were stored by 21 energy entities, while the storage of liquefied petroleum gas was provided by five energy entities. The storage of oil and petroleum products involves storage in special facilities for own needs (producers, consumers, and transport companies), and storage for the purpose of supply security and/or for the purpose of trade. As the price of storage of oil and petroleum products is not regulated, it is determined by market principles. According to data furnished by the energy entities, total available storage capacities amounted to 2.91[25] million m^3 in 2018, compared to a total of 2.56 million m^3 of available capacity in 2017 (excluding storage capacities within INA's refineries). The increase in storage capacities is attributed to the newly built storage capacities for crude oil and petroleum products at the Omišalj Terminal. The geographical locations of the most important oil and petroleum products storage facilities in Croatia, according to the type of goods stored, are shown in Figure 6.3.1.

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Figure 6.3.1 Geographical locations of oil and petroleum products storage facilities according to the type of goods stored, and total storage capacities in 2018

25 *The above data on total available storage capacities is incomplete given that the requested data required for the preparation of this Annual Report was not submitted by the following energy entities: ZAGREBAČKI PROMETNI ZAVOD d.o.o., Ljubljanska avenija 1, 10000 Zagreb and BDM d.o.o. for trade and services, Ante Starčevića 54, 35000 Slavonski Brod.*

6.3.2 Production of crude oil and petroleum products; trade in petroleum products

Production of crude oil

Even though it is not considered an energy activity, the production of crude oil is a significant factor for energy security in every country, including Croatia. In Croatia, crude oil is produced by INA d.d. at hydrocarbon production fields in the continental part of Croatia. Domestic production of crude oil amounted to 610,000 tonnes in 2018, which is a decrease of 8.5% compared to 2017. In addition to domestic production, Croatia also covers its demand for crude oil with imports, primarily from Iraq, Iran, Azerbaijan, Russia, Libya and Kazakhstan, which amounted to 2.97 million tonnes in 2018, an increase of 5.8% compared to 2017. A comparison of imported and locally produced crude oil from 2006 to 2018 is shown in Figure 6.3.2.

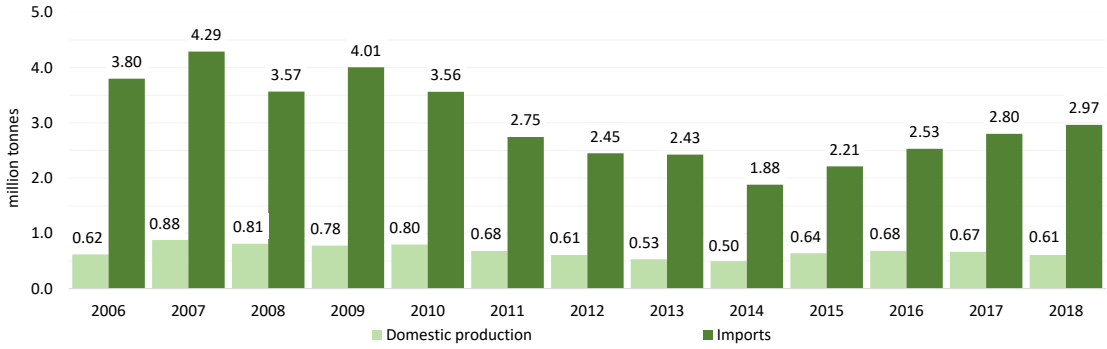


Figure 6.3.2 Crude oil quantities from domestic production and imports from 2006 to 2018 [in millions of tonnes]

Production of petroleum products

Petroleum Products are produced by INA d.d. The petroleum products produced in the Rijeka oil refinery, as well as in the Etan ethane facility in Ivanić Grad, include both engine fuels and industrial and household fuels. Raw materials used in the production of petroleum products include imported crude oil and crude oil and condensates produced in Croatian oil and gas fields. The shares of raw materials used for refinery processing in 2018 are shown in Figure 6.3.3.

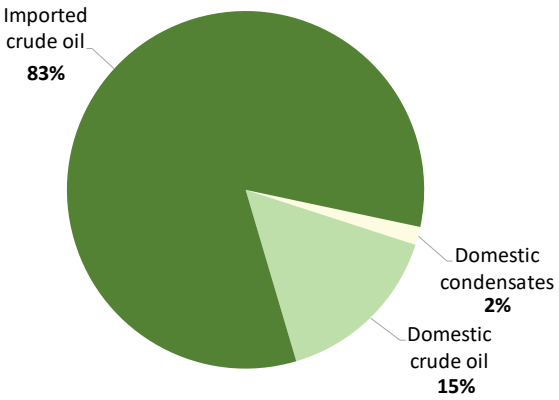


Figure 6.3.3 The shares of raw materials used for refinery processing in 2018

The total production of petroleum products in 2018 amounted to 3.8 million tonnes, which is a 5.6% increase compared to 2017. The total quantities of petroleum products produced from 2006 to 2018 are shown in Figure 6.3.4.

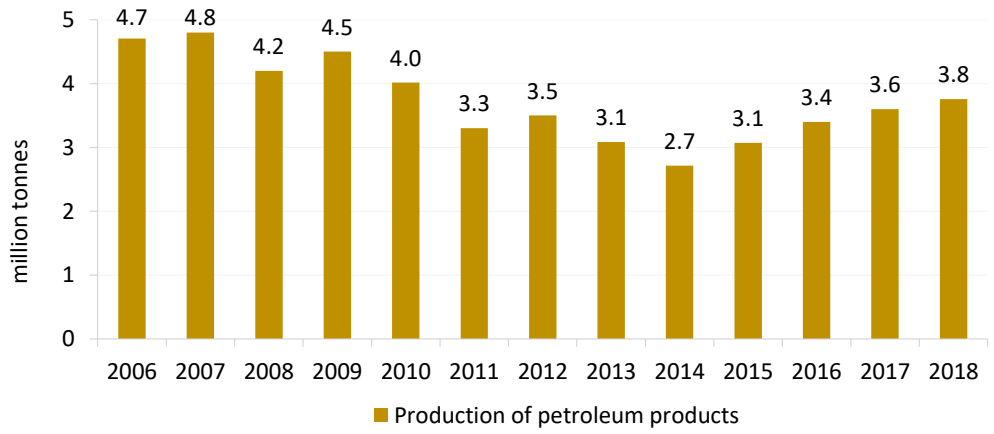


Figure 6.3.4 Quantities of petroleum products produced from 2006 to 2018 [in millions of tonnes]

In 2018, INA d.d. continued to produce high-quality petrol and diesel fuels pursuant to the *Regulation on Liquid Petroleum Fuel Quality*, which is harmonized with European directives and standards establishing quality requirements for liquid petroleum fuels.

The total production of liquefied petroleum gas in 2018 amounted to 254,000 tonnes, which is an increase of 5% compared to 2017. The quantities of liquefied petroleum gas (LPG) produced from 2006 to 2018 are shown in Figure 6.3.5.

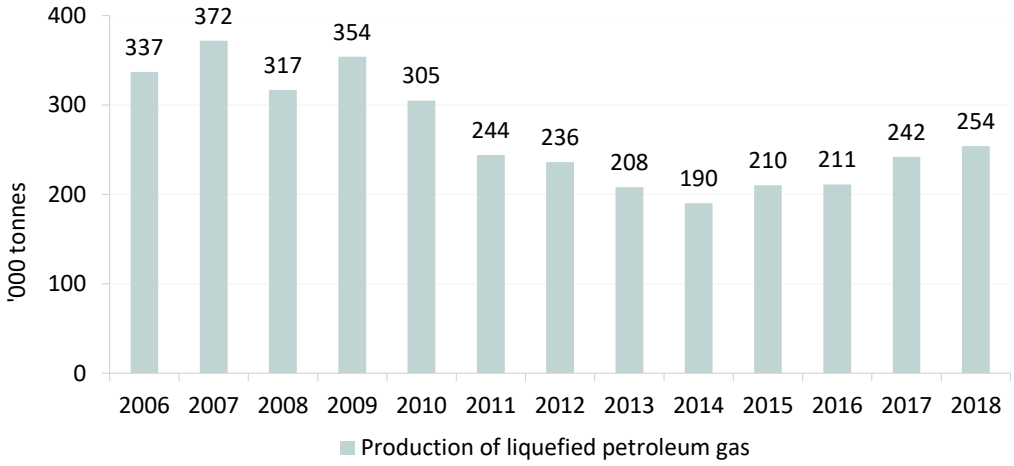


Figure 6.3.5 Quantities of LPG produced from 2006 to 2018 [in thousands of tonnes]

Trade in petroleum products

Petroleum products trading covers the following energy activities:

- wholesale trade in petroleum products,
- retail trade in petroleum products,
- wholesale trade in LPG, and
- retail trade in LPG.

Wholesale trade in petroleum products and LPG are subject to licensing by HERA. In addition, approval of the ministry is also required for these activities pursuant to the *Regulation on Requirements for Wholesale Trade and Trade with Third Countries in Certain Goods*.

In 2018, wholesale trade in petroleum products was carried out by 61 energy entities, while wholesale trade in liquefied petroleum gas (LPG) was carried out by 13 energy entities.

As the price of petroleum products is not regulated, it is determined by market principles. In addition to petroleum products from domestic production, imported petroleum products account for a significant share on the Croatian market. According to data supplied to HERA by the energy entities, a total of 1.49[26] million tonnes of petroleum products were imported in 2018. The quantities of petroleum products imported from 2006 to 2018 are shown in Figure 6.3.6.

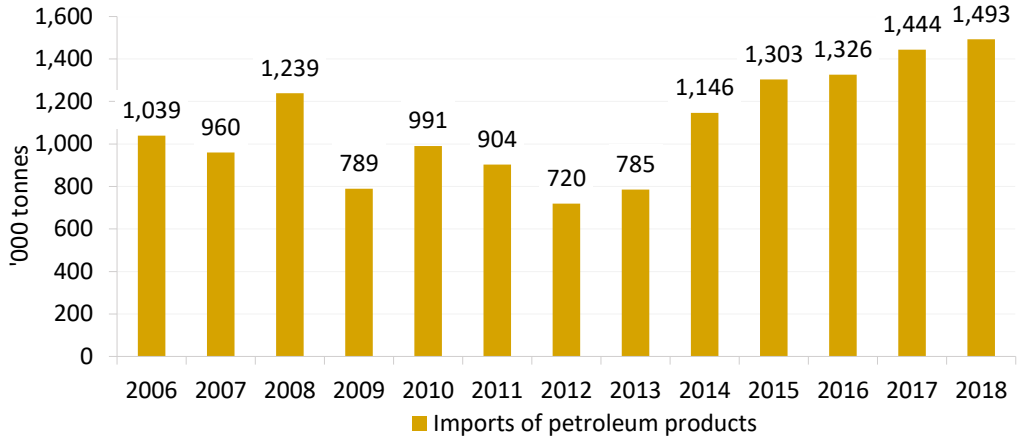


Figure 6.3.6 Imports of petroleum products from 2006 to 2018 [in thousands of tonnes]

6.4 Secure supply of oil and petroleum products

The requirements for a secure supply of oil and petroleum products on the Croatian market are laid down in the **Oil and Petroleum Products Market Act**, transposing the *Council Directive 2009/119/EC of 14 September 2009* imposing an obligation on member states to maintain minimum stocks of crude oil and/or petroleum products. In accordance with the **Act on Amendments to the Act on the establishment of the Croatian Hydrocarbon Agency *(Official Gazette No. 73/17)*** and the **Act on Amendments to the Oil and Petroleum Products Market Act *(Official Gazette No. 73/17)***, the Croatian Compulsory Oil and Petroleum Product Stocks Agency (HANDA) was merged with the Croatian Hydrocarbon Agency (CHA) on 1 September 2017. The CHA is therefore the central authority in Croatia for compulsory oil and petroleum product stocks, and it is a single authority authorised to form, maintain and sell compulsory stocks.

In this context, the competent ministry establishes the necessary conditions and monitors the secure, regular, and quality supply of the oil and petroleum products market in Croatia, and is responsible for coordination and cooperation with the European Commission and the International Energy Agency, while expert assistance to the ministry is provided by the CHA.

A representative of HERA takes part in an expert committee for monitoring the regular market supply of oil and petroleum products. The committee puts into action the *Emergency Plan in Case of Unexpected Supply Disruption in the Oil and Petroleum Products Market (Official Gazette No. 111/12)*. The emergency plan lays down the procedures and criteria for identifying unexpected disruptions, as well as competencies and responsibilities in the event of a disruption in supply and procedures for the normalisation

26 *The above data on total quantities of imported petroleum products is incomplete because the requested data required for the preparation of this Annual Report was not submitted by the following energy entities: TEHNOPETROL d.o.o. for transport, trade and services, Gornja Trebinja 5, 47000 Karlovac; LE-ENERGIJA d.o.o., Dužice 17, 10000 Zagreb; MK Group d.o.o., Riva 16, 51000 Rijeka; BENZIN PERIĆ, d.o.o., Trogirska cesta 1/a, 21220 Trogir; BDM d.o.o., Ante Starčevića 54, 35000 Slavonski Brod; ORA-FORM ZAGREB d.o.o., Oporovečki vinogradi 12 C, 10000 Zagreb; DRAGO BENZ j.d.o.o. for trade and services, Greda 17, 10340 Vrbovec; RI-BENZ d.o.o. for trade and transport of oil and petroleum products, Martinkovac 143/3, 51000 Rijeka; EZIS d.o.o. for trade and services, Meksička 3, 10000 Zagreb.*

of supply in the oil and petroleum products market. These involve measures to reduce the consumption of petroleum products, as well as conditions for the consumption and renewal of compulsory oil and petroleum product stocks. The expert committee for monitoring the regular market supply of oil and petroleum products did not meet in 2018.

The CHA is obliged to determine compulsory oil and petroleum product stocks equal to 90-day average consumption. Pursuant to the provisions of the **Oil and Petroleum Products Market Act**, the CHA issues a decision determining the quantity and shares of compulsory stocks for each year. No decision has been issued by the CHA regarding the quantity and shares of compulsory oil and petroleum product stocks for 2018.

7 BIOFUELS

7.1 Legal framework for biofuels

The biofuels market and corresponding energy activities related to biofuels are governed by the **Energy Act**, the **Act on the Regulation of Energy Activities**, the **Act on Biofuels for Transportation *(Official Gazette Nos. 65/09, 145/10, 26/11, 144/12, 14/14 and 94/18)***, and by-laws adopted on the basis of these acts.

The **Act on Biofuels for Transportation** governs the production, trade and storage of biofuels, the use of biofuels for transport, and the adoption of programmes, plans, and measures promoting the production and use of biofuels for transport.

7.2 Development of the biofuels market

The segment of biofuels comprises the following energy activities:

- production of biofuels,
- storage of biofuels,
- wholesale trade in biofuels, and
- retail trade in biofuels.

These energy-related activities are subject to a licence issued by HERA, except in the case of biofuel produced exclusively for own needs or if less than 1 TJ is produced annually, retail trade in biofuels and storage of biofuel exclusively for own needs. In addition to HERA's licence, approval of the ministry is also required for the wholesale trade in biodiesel pursuant to the *Regulation on Requirements for Wholesale Trade and Trade with Third Countries in Certain Goods*.

Licences for these energy activities have been obtained by four energy entities. In 2018, they produced a total of 415 tonnes[27] of biodiesel, which is an increase in production of 13.1% compared to 2017. However, this cannot be considered a significant recovery of biofuel production as the amount of biofuels produced in 2018 represents only a minor fraction of the record production from 2012, which amounted to as many as 39,476 tonnes. The quantities of biofuel produced from 2009 to 2018 are shown in Figure 7.2.1.

The assumed cause of the decrease in biofuel production are adverse market trends, which started in the second half of 2014 by the termination of cash incentives for the production of biofuels for transportation paid to biofuel producers by the Croatian Energy Market Operator (HROTE).

The energy entities have a total of 1,800 m^3 of storage capacity. In 2018, the total capacity of biofuel production was 184 tonnes per day, with waste edible oil being the only raw material used to produce biofuel.

27 *The above data on total quantities of produced biofuels is incomplete because the requested data required for the preparation of this Annual Report was not submitted by the energy entity MEBU d.o.o. for production, trade and services, Josipa Završnika 7, Rijeka.*

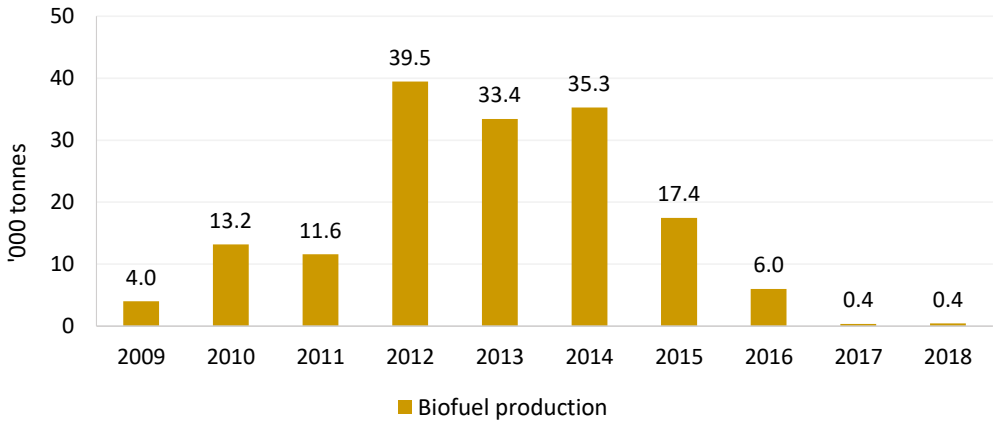


Figure 7.2.1 Quantities of biofuel produced from 2009 to 2018 [in thousands of tonnes]

Biofuels as a supplement or substitute for diesel or petrol for transport purposes

The **Oil and Petroleum Products Market Act** recognises the utilisation of biofuels as a supplement to petroleum products provided that they meet the legal requirements regarding the quality of biofuels.

The *Regulation on the Quality of Biofuels (Official Gazette Nos. 141/05 and 33/11)* sets out threshold values for the quality of biofuels intended for use as a supplement or substitute for diesel or petrol for transport purposes.

The **Act on Biofuels for Transportation** provides for incentives for the production and consumption of biofuels in Croatia, particularly in terms of promoting the utilisation of biofuels and other renewable fuels for transport, thus aligning Croatian legislation with European Union acquis.

The *Regulation on the Incentives for the Production of Biofuels for Transportation (Official Gazette No. 1/2014)* sets out how incentives are provided for the production of biofuels for transportation, the methodology used to calculate the highest selling price for biodiesel and bioethanol, methods used to calculate cash incentives and the share in revenue from excise duties earmarked for biofuel production, and the use of revenue from excise duties earmarked for biofuel production, as well as the powers, obligations, and responsibilities of the ministry in charge of energy issues, the ministry in charge of finances, and HROTE with regard to the management of funds from the share in revenue from excise duties earmarked for biofuel production.

8 THERMAL ENERGY

8.1 Legal framework for thermal energy

Basic information on the legal framework for thermal energy

The thermal energy sector and thermal energy production, distribution, and supply activities in Croatia are regulated based on the **Energy Act**, the **Act on the Regulation of Energy Activities**, the **Thermal Energy Market Act**, and by-laws adopted pursuant to these acts.

The *Ordinance on the Method of Allocating and Calculating the Costs of Supplied Thermal Energy (Official Gazette Nos. 99/14, 27/15 and 124/15)*, adopted by the ministry competent for energy, is especially important for the end consumers of thermal energy. The majority of received inquiries and complaints pertain to that *Ordinance*.

The key by-laws governing specific activities in more detail, which were adopted by HERA, include the *General Requirements for Thermal Energy Supply (Official Gazette No. 35/14)*, the *General Requirements for Thermal Energy Delivery (Official Gazette No. 35/14 and 129/15)* and the *Network Codes for Thermal Energy Distribution (Official Gazette No. 35/14)*.

Pursuant to the **Thermal Energy Market Act**, in independent heating systems and closed heating systems, the prices of thermal energy delivered to thermal energy buyers and end consumers are formed freely in accordance with market conditions.

HERA sets tariffs for thermal energy production and thermal energy distribution, which are then applied by thermal energy producers and thermal energy distributors in centralised heating systems. However, the price of thermal energy supply and the fee for performing thermal energy buyer activities are contracted freely, i.e. the final price of thermal energy in centralised heating systems is only partially regulated by methodologies adopted by HERA. By way of exception, in cases when the end consumer is not a household and the thermal energy is mostly used for commercial purposes, the prices of all energy activities in centralised heating system are determined and contracted freely.

The *Methodology for Setting Tariffs for Thermal Energy Production (Official Gazette No. 56/14)* and the *Methodology for Setting Tariffs for Thermal Energy Distribution (Official Gazette No. 56/14)* are applied in relation to prices in centralised heating systems. Furthermore, HERA also adopted the *Methodology for Calculating the Fee for Connection to the Thermal Distribution Network and for Increase in the Connection Capacity (Official Gazette No. 42/16)*.

Changes in the legal framework in 2018

The 2013 **Thermal Energy Market Act (Official Gazette No. 80/13)** introduced significant changes to the regulation, organisation and functioning of the thermal energy sector, as well as to the position of energy entities, thermal energy buyers, thermal energy end consumers and relevant institutions, compared to the previously applicable **Act on Thermal Energy Production, Distribution and Supply (Official Gazette Nos. 42/05 and 20/10).**

In order to resolve the difficulties connected with the implementation of the **Thermal Energy Market Act (Official Gazette Nos. 80/13 and 14/14)**, the Croatian Government announced the drafting of a new **Thermal Energy Market Act** in its *Legislation Activities Plan for 2018*. Consequently, in July 2018 HERA received from the Ministry of Environment and Energy a **Draft Proposal of the Act on Amendments to the Thermal Energy Market Act** and subsequently it provided its opinion.

In order to ensure that the gas price used for the production of thermal energy for household end consumers is the same as the price used for gas household end consumers

in the transitional period until 31 March 2021, pursuant to the provisions of the **Gas Market Act** and in line with the powers set out in the **Act Providing the Government of the Republic of Croatia with the Power to Regulate Certain Matters from the Competencies of the Croatian Parliament by Issuing Regulations**, in August 2018 the Croatian Government adopted the **Regulation on the Amendment to the Thermal Energy Market Act (Official Gazette No. 76/18)**, before the Croatian Parliament continued with its regular sessions. In short, the **Regulation** ensured that the thermal energy producers who purchase gas for the production of thermal energy intended for household end consumers have the right to procure gas under regulated conditions until the gas market has been fully liberalised, i.e. by 31 March 2021.

When the **Regulation on the Amendment to the Thermal Energy Market Act** was adopted, it was announced that its provisions would also applied to the amendments to the Thermal Energy Market Act. However, the public consultation on the above draft did not start before late May 2019.

In 2018, several by-laws applicable to the thermal energy sector were amended. HERA adopted the *Decision on the manner and procedure for keeping separate accounts of energy entities (Official Gazette No. 111/18)* clarifying that the energy entities engaged in thermal energy production in centralised heating systems and/or thermal energy distribution are obliged to keep separate accounts and generate separate financial reports for each centralised heating system.

The **Act on Amendments to the Energy Efficiency Act** entered into force in late 2018. The most significant changes introduced by this **Act** relevant to energy activities are the following:

- comprehensive modification of the required energy savings scheme,
- changes introduced by the adoption and implementation of the **Act on Repealing the Act on the Centre for Monitoring Business Activities in the Energy Sector and Investments (Official Gazette No. 46/18)**, including among others: changed competences for the drafting of the **National Energy Efficiency Action Plan** and related reporting, changes regarding the National Energy Efficiency Authority (now a separate unit within the ministry in charge of energy), changes in systematic monitoring of the implementation of energy efficiency measures through the System for Measuring and Verifying Energy Savings (SMiV), etc.

The following important changes in the required energy savings scheme have been made:

- the scheme is now applied to energy suppliers, whereas it was previously applied to energy distributors,
- the Act foresees a gradual implementation of the schemes in the period from 2019 to 2021 (in 2019 the scheme is applied to energy suppliers and their connected legal persons, which in 2017 supplied a total of more than 300 GWh of energy; this limit is reduced to 100 GWh in 2020, and to 50 GWh in 2021), and
- by 30 June of the current year, the ministry in charge of energy must adopt an ex officio decision determining the required savings in kWh for the following calendar year.

As required for the implementation of the required energy savings scheme and upon request of the Ministry of Environment and Energy, HERA submitted the data on the amount of energy supplied by the energy suppliers (obligated parties) in 2017.

The *Ordinance on the Required Energy Efficiency System (Official Gazette No. 41/19)*, regulating the implementation of the required energy savings scheme, entered into force in early May 2019. However, the decisions on the required savings for 2019 applicable to individual obligated parties have not been issued by the end of May 2019.

Given that the provisions of the **Energy Efficiency Act** pertaining to the required energy savings schemes, as well as the provisions of the *Ordinance on the Required Energy Efficiency System*, are not completely unambiguous, the consequences produced by this

system, which was introduced in line with the obligations from the *Directive 2012/27/EU on energy efficiency*, may only be assessed following its implementation. In any case, it is expected that the suppliers will increase prices and thus impose an additional, financially demanding obligation on the end consumers of all energy sources, including thermal energy end consumers.

The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** also entered into force in late 2018. The changes introduced by this **Act**, including information on by-laws to be adopted on the basis of the Act, are presented in detail in Chapter 4.6.

However, in this regard, the following points need to be mentioned:

- based on the above **Act**, in late 2018 the Croatian Government adopted the *Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration (Official Gazette No. 116/18)*, outlining in detail the manner and conditions for the implementation of new incentive models consisting of market premiums and buy-off at a guaranteed price. The *Regulation*, however, does not provide for incentives for high-efficiency cogeneration using natural gas,
- unlike the previous incentives system for promoting electricity production in the form of tariff systems for electricity generation from renewable energy sources and cogeneration introduced in 2007, 2012 and 2013, which had prescribed the minimum total annual facility efficiency or primary energy savings for cogeneration facilities, as well as price corrections for such facilities, the *Regulation on Promoting Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration* does not contain such conditions. However, another regulation is to be adopted (in line with Article 25 of the above **Act**), which would lay down the conditions for energy efficiency applicable to eligible electricity producers. In other words, no special benefits will apply to cogeneration facilities connected to centralised or closed heating systems.

In 2018, three directives from the *Clean Energy For All Europeans* package were adopted that will significantly impact the changes in legislation applicable to the thermal energy sector.

Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency introduces, *inter alia*, new, more refined provisions on measuring thermal energy consumption in multi-apartment buildings, as well as new provisions related to thermal energy billing. This *Directive* also introduced changes relative to the required energy savings schemes. The deadline for the harmonisation of the national legislation with the above *Directive* is 25 June 2020 (exceptionally, 25 October 2020 for some provisions).

Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources introduces targets for the increase of the share of renewable energy in heating and cooling. The *Directive* also regulates the issue of disconnection of thermal energy end consumers from thermal systems (i.e. disconnection of consumers from centralised heating or cooling systems, according to the terminology from the *Directive*). Moreover, it regulates the connection of production facilities using renewable energy sources to existing thermal systems. The deadline for the harmonisation of the national legislation with the above *Directive* is 30 June 2020.

Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency introduces the obligation to establish long-term strategies for the renovation of the national stock of residential and non-residential buildings, both public and private, in order to ensure a highly energy-efficient and decarbonised building stock, and facilitate the cost-effective transformation of existing buildings into nearly zero-energy buildings. The *Directive* also improves the requirements

applicable to new buildings, the requirements concerning the technical building systems and improves the inspections of heating systems and air-conditioning systems. Harmonisation with this *Directive* is to be achieved by 10 March 2020.

8.2 Thermal energy sector: organisation, activities, and indicators

8.2.1 Thermal system characteristics

Energy entities for the production, distribution, and supply of thermal energy in Croatia provide the services of space heating and preparation of sanitary hot water for 156,000 end consumers, of which 95% fall under the category of households.

Thermal energy used for space heating and the preparation of sanitary hot water is produced in co-generation thermal power plants, as well as in local heating plants, i.e. separate boiler rooms.

In 2018, energy entities supplied more than 1.99 TWh of thermal energy to households and industrial consumers (Figure 8.2.1). The total length of the distribution network and external installations is 425 kilometres.

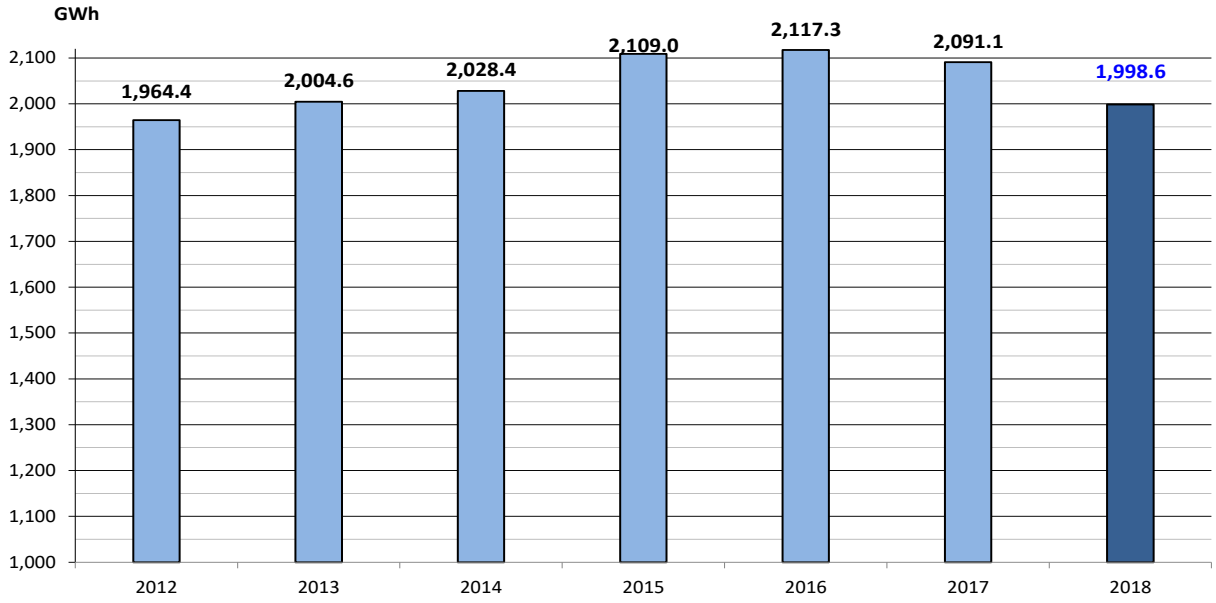


Figure 8.2.1 Supplied thermal energy in Croatia from 2012 to 2018

Table 8.2.1 contains data about the energy entities supplying thermal energy to households, industrial and commercial consumers; Figures 8.2.2, 8.2.3 and 8.2.4 show the thermal energy they supplied, number of end consumers, installed capacity of the thermal energy production facility, and contracted capacity in 2018. However, Table 8.2.1 does not include data pertaining to energy entities supplying thermal energy exclusively to industrial and commercial consumers, nor the data for energy entities who were not involved in this activity in 2018.

Average losses in thermal energy production and distribution for thermal systems, i.e. energy entities from Table 8.2.1 amounted to 22% in 2018.

Average losses in distribution networks in 2018 were 18.8%. In 2017, the average losses in distribution networks were 14.3%.

Table 8.2.1 Data on energy entities in the thermal energy sector in 2018

ENERGY ENTITY	Number of end consumers	Network length	Total installed capacity	Generated thermal energy	Supplied thermal energy	Surface area	Fuel*
		km	MWt	GWh/year	GWh/year	m2	
HEP-Proizvodnja d.o.o.			1,568.10	2,120.34			NG, FO
Zagreb			1,288.10	1,774.82			NG, FO
Osijek			200.00	241.44			NG, FO, biomass
Sisak			80.00	104.08			NG, biomass
HEP-Toplinarstvo d.o.o.	127,396	381.99	313.02	1,908.86	1,822.85	10,021,204	NG, FOEL, LFO
Zagreb	101,839	279.76	63.80	48.40	1,451.91	8,090,071	NG, FOEL
Osijek	11,758	56.59	140.50	4.52	216.61	1,113,106	NG, FOEL, LFO
Sisak	4,144	29.95	0.00	0.00	79.24	295,982	NG
Velika Gorica	5,901	10.22	69.61	52.10	48.70	334,434	NG, FOEL, LFO
Samobor	1,382	3.10	18.75	12.91	11.67	78,807	NG, FOEL
Zaprešić	2,372	2.37	20.36	16.11	14.72	108,803	NG, FOEL
Energo d.o.o., Rijeka	9,594	1.67	102.16	63.88	53.13	563,702	NG, FOEL, FO
Gradska toplana d.o.o., Karlovac	7,938	21.20	88.63	66.10	53.33	509,134	NG
Brod-plin d.o.o., Slavonski Brod	3,723	7.05	33.91	35.54	31.85	195,915	NG
Tehnostan d.o.o., Vukovar	3,746	7.22	37.99	20.47	17.45	207,986	NG, FO
Vartop d.o.o., Varaždin	926	1.57	25.13	5.86	5.86	48,250	NG
GTG Vinkovci d.o.o., Vinkovci	1626	1.60	17.83	8.16	8.14	88,317	NG, FO
Poslovni park Virovitica d.o.o., VT	402	0.90	4.08	3.04	3.04	28,311	NG
Komunalac Požega d.o.o., Požega	417	0.61	4.00	1.95	1.95	19,839	NG
SKG d.o.o., Ogulin	82	0.58	4.40	0.96	0.96	5,869	LFO
TOTAL	**155,850**	**424.39**	**2,199.24**	**2,460.34**	**1,998.57**	**11,688,528**	

** NG - natural gas, FO - fuel oil, FOEL - fuel oil extra light, LFO - light fuel oil*

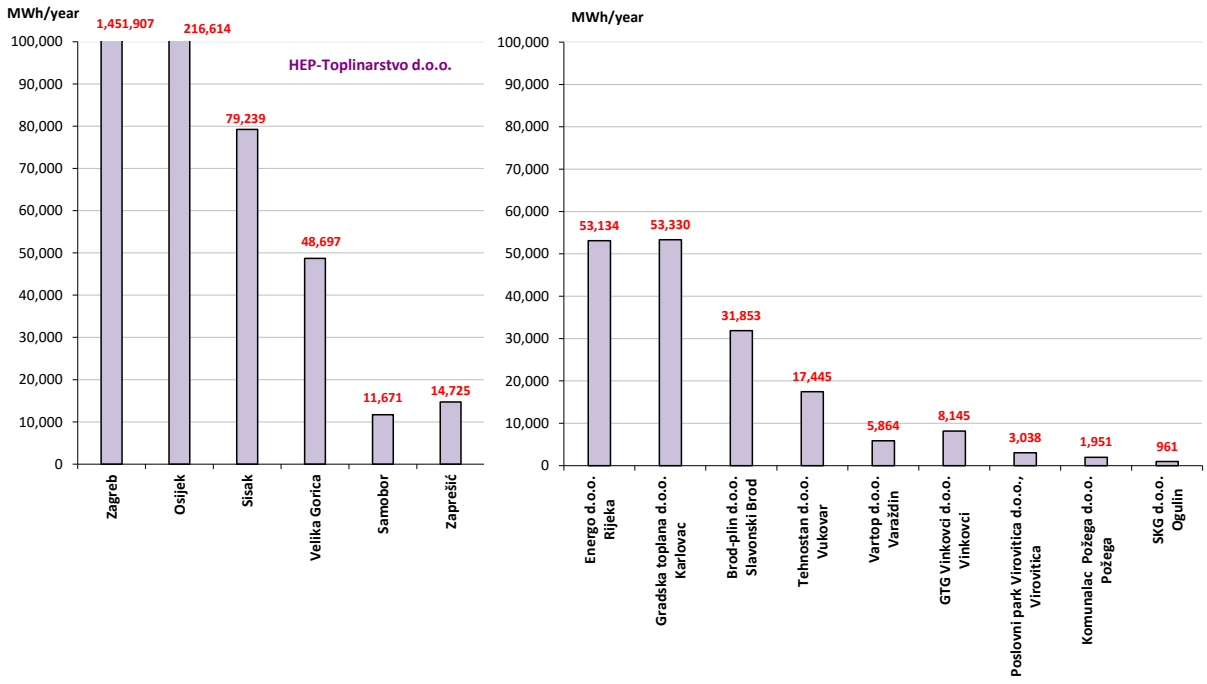


Figure 8.2.2 Supplied thermal energy in 2018

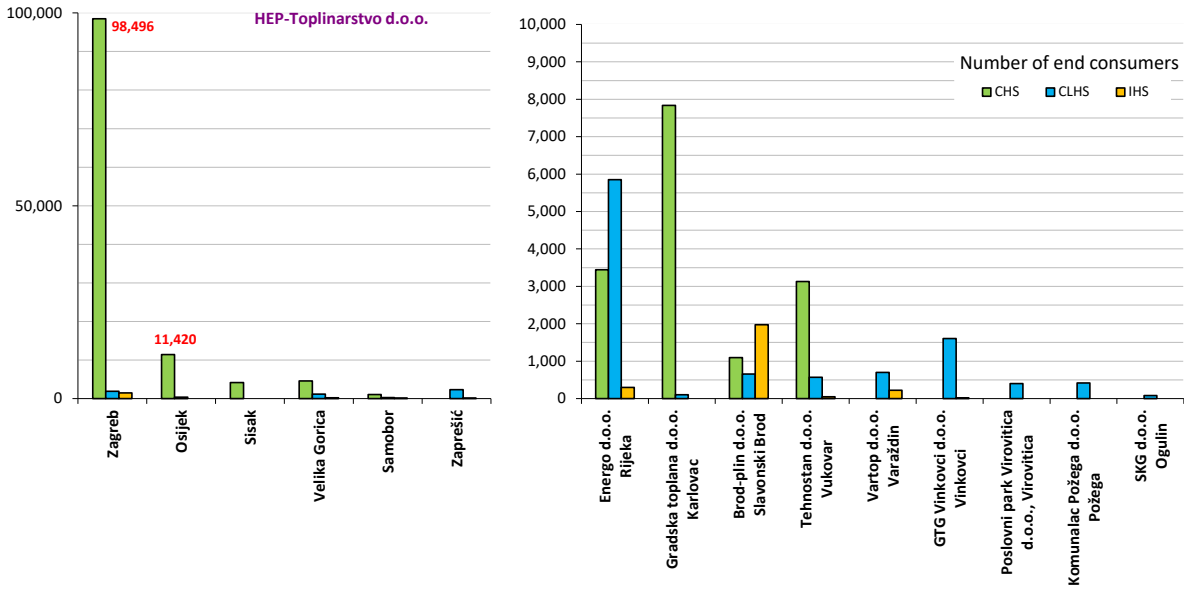


Figure 8.2.3 Number of end consumers in 2018

The majority of energy entities in the thermal energy sector have a considerable installed capacity reserve in relation to the connection capacity. Only a small portion of supplied thermal energy is generated by HEP-Toplinarstvo d.o.o. in its own plants, and the remainder is purchased or taken over from HEP-Proizvodnja d.o.o., a producer of thermal energy. In 2018, HEP-Proizvodnja d.o.o. delivered 2,120.34 GWh of thermal energy to HEP-Toplinarstvo d.o.o.

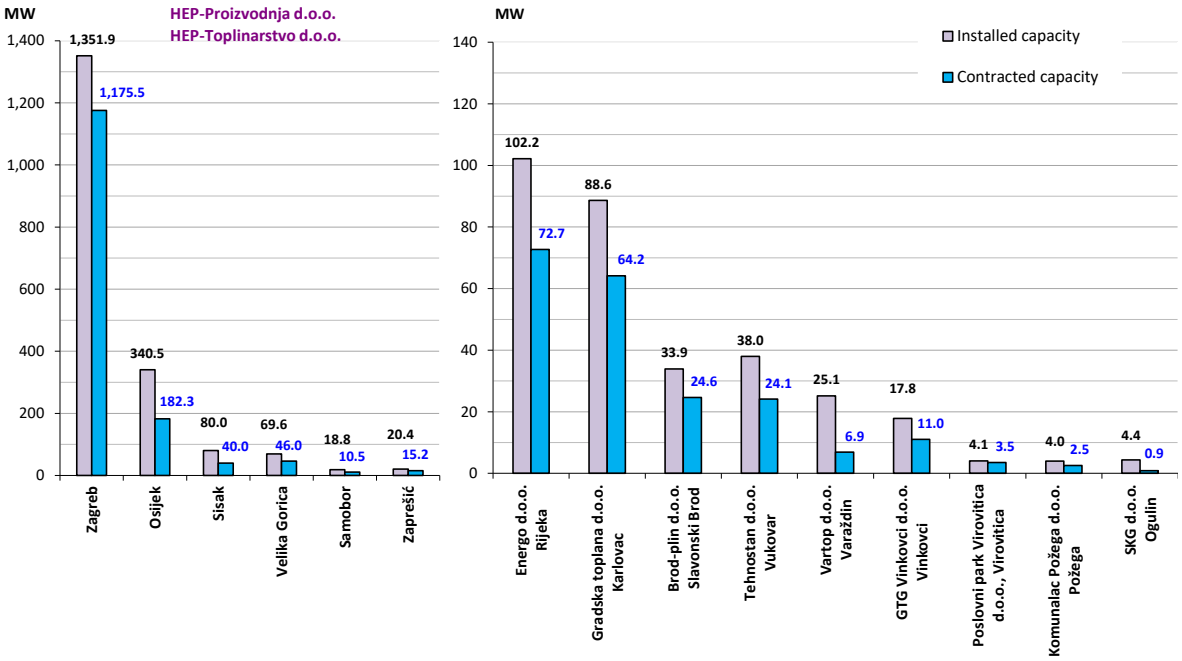


Figure 8.2.4 Installed capacity of thermal energy production facilities and contracted capacity in 2018

The majority of energy entities engaged in thermal energy production, distribution and supply are mostly owned by local government units or the state, while a smaller portion of energy entities are partially privately owned. In addition to thermal energy, the activities of these energy entities most frequently include gas distribution, public utilities, and building management.

Out of all heating systems listed in Table 8.2.1, centralised heating systems in Zagreb, Osijek, Sisak, Samobor, Velika Gorica, Rijeka, Karlovac, Slavonski Brod and Vukovar account for almost 87% of end-consumer connections, 90% of surface area and 93% of supplied thermal energy, as shown in Figure 8.2.5.

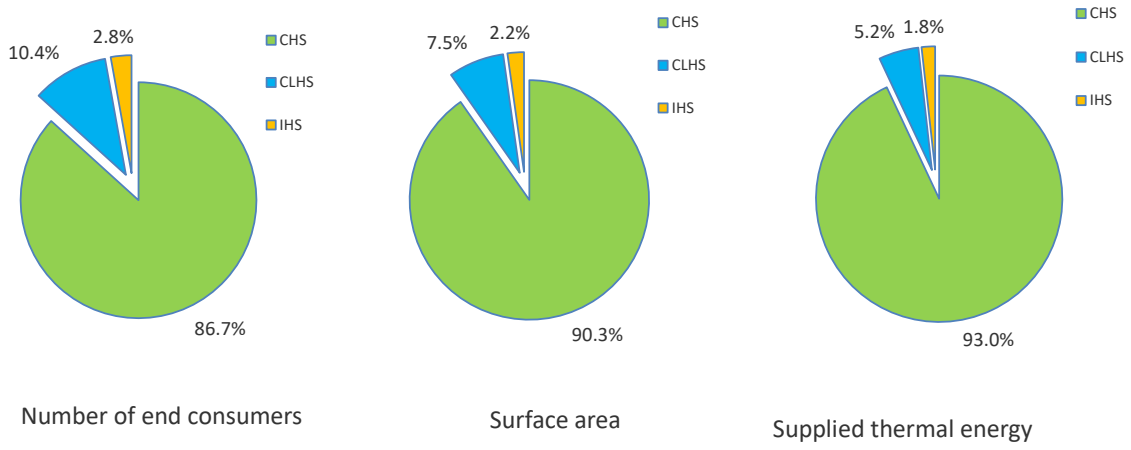


Figure 8.2.5 Share of end consumers, surface area, and supplied thermal energy per heating system

8.2.2 Development of energy activities in the thermal energy sector

Six licences for the performance of energy-related activities were issued in 2018:

- four licences for thermal energy production (ĐAKOVO HRAST d.o.o., Đakovo; BIOMASS TO ENERGY BENKOVAC d.o.o., Vrbovsko; RESALTA d.o.o., Zagreb; ENERGY 9 d.o.o., Slatina), and
- two licences for thermal energy supply (ELEMENT ENERGETIKA, d.o.o., Zagreb; RESALTA d.o.o., Zagreb).

In 2018, 11 licences for the performance of energy-related activities were extended:

- four licences for thermal energy production (ENERGO d.o.o., Rijeka; HEP-Proizvodnja d.o.o., Zagreb; HEP-Toplinarstvo d.o.o., Zagreb; INA-INDUSTRIJA NAFTE d.d., Zagreb),
- two licences for thermal energy distribution (ENERGO d.o.o., Rijeka; HEP-Toplinarstvo d.o.o., Zagreb), and
- five licences for thermal energy supply (STAMBENO KOMUNALNO GOSPODARSTVO d.o.o., Ogulin; SPIN VALIS INERNACIONAL d.o.o, Požega; DRVNI CENTAR GLINA d.o.o., Glina; ENERGO d.o.o., Rijeka; HEP-Toplinarstvo d.o.o., Zagreb),

The licence for thermal energy supply expired for SENSE ESCO BELIŠĆE d.o.o., Zagreb in 2018.

On 31 December 2018, the number of licences in the thermal energy sector was as follows:

- production of thermal energy 29,
- distribution of thermal energy 9, and
- supply of thermal energy 22.

Pursuant to the **Thermal Energy Market Act**, HERA manages the register of thermal energy buyers available on its website. In 2018, four new business entities were recorded in the register of thermal energy buyers, which contained a total of 39 business entities (legal and natural persons) on 31 December 2018. In addition to this register, HERA also manages the records on thermal energy buyers, containing the data relevant for monitoring thermal energy consumption and used for resolving claims and complaints relative to thermal energy supply in buildings and structures.

Regarding the incentives system for promoting electricity production from renewable energy sources, which is described in detail in Chapter 4.6, in 2018 15 decisions were issued on eligible producer status for cogeneration using biogas and biomass, three decisions altering the preliminary decision on granting eligible electricity producer status, one decision altering the decision on granting eligible electricity producer status and 13 decisions extending a preliminary decision on granting eligible electricity producer status.

In addition, in line with the regulations governing the incentives system, the facilities generating electricity from biomass or biogas are entitled to incentivised prices for delivered electricity if they **achieve minimum total annual facility efficiency**. For the high-efficiency cogeneration facilities using fossil fuels, the right to incentivised prices for delivered electricity is conditioned by primary energy savings. In 2018, HERA issued 26 decisions on total annual efficiency of such facilities (23 decisions for 2017 and three decisions for previous years) and 15 decisions on required primary energy savings (six decisions for 2017 and the remaining decisions for previous years).

8.2.3 Thermal energy tariffs

Pursuant to the provisions of the **Thermal Energy Market Act**, and based on the *Methodology for Setting Tariffs for Thermal Energy Production* and the *Methodology for Setting Tariffs for Thermal Energy Distribution*, HERA is responsible for calculating tariffs for thermal energy production and tariffs for thermal energy distribution only for centralised heating systems.

Energy entities engaged in thermal energy production and thermal energy distribution in centralised heating systems did not submit any requests to set tariff amounts for thermal energy production and thermal energy distribution in 2018. However, the *Methodology for Setting Tariffs for Thermal Energy Production (Official Gazette No. 56/14)* provides for a simplified procedure for changing the tariffs in case of changes in the price of fuel used for thermal energy production. Out of a total of six such requests to change energy tariffs, submitted by four energy entities in 2018, in five cases HERA allowed for a publication and application of new tariffs (one application for GRADSKA TOPLANA d.o.o, Karlovac, two applications for BROD-PLIN d.o.o., Slavonski Brod and two applications for TEHNOSTAN d.o.o., Vukovar), whereas in one case (ENERGO d.o.o., Rijeka) HERA issued a notification that the conditions for changing the tariffs had not been fulfilled and that the tariffs cannot be published and applied.

In 2018, there were changes in the prices of natural gas used for the public service of gas supply. In centralised heating systems where natural gas is used as an energy source for thermal energy production, there were no changes in tariff amounts for energy supplied to households, but the tariff was increased by an average of 23% for commercial consumers in Karlovac, Slavonski Brod and Vukovar compared to 2017. The tariff amount for energy in the centralised heating system Vojak (Rijeka), where fuel oil is used for thermal energy production, was not changed in 2018. The total price of thermal energy in cities where HEP-Toplinarstvo d.o.o. provides thermal energy services remained the same in 2018 (Zagreb, Osijek, Sisak, Velika Gorica, Samobor, and Zaprešić).

Table 8.2.2 shows tariff amounts for thermal energy production and thermal energy distribution for centralised heating systems on 31 December 2018. They represent the regulated portion of the thermal energy price, whereas the fees for thermal energy supply and fees for thermal energy buyer activities are contracted freely pursuant to the provisions of the **Thermal Energy Market Act**. Therefore, the final price of thermal energy in centralised heating systems, in addition to the regulated portion, consists of the fees for thermal energy supply and for performing thermal energy buyer activities, which make up the market component of thermal energy prices and which are contracted freely.

Table 8.2.2 Tariff amounts for thermal energy production and thermal energy distribution for centralised heating systems on 31 December 2018. (VAT excluded)

ENERGY ENTITY	CENTRALISED HEATING SYSTEM	TARIFF GROUPS (Tg)*	TARIFF MODELS (TM)**	Tariff amounts - 31 December 2018					
				GENERATION		DISTRIBUTION		GEN + DISTRIB	
				Energy [kn/kWh] *[kn/t]*	Capacity [kn/kW] *[k/t/h]*	Energy [kn/kWh] *[kn/t]*	Capacity [kn/kW] *[k/t/h]*	Energy [kn/kWh] *[kn/t]*	Capacity [kn/kW] *[k/t/h]*
Energo d.o.o. Rijeka	GORNJA VEŽICA	Tg1	TM1	0.2772	9.50	0.0500	4.00	0.3272	13.50
		Tg2	TM2	0.2772	9.50	0.0500	4.00	0.3272	13.50
	VOJAK	Tg1	TM1	0.2912	11.00	0.0500	5.50	0.3412	16.50
		Tg2	TM2	0.2912	11.00	0.0500	5.50	0.3412	16.50
Gradska toplana d.o.o. Karlovac	TINA UJEVIĆA	Tg1	TM1	0.2464	11.60	0.0400	4.40	0.2864	16.00
		Tg2	TM2	0.3669	12.60	0.0400	4.40	0.4069	17.00
Brod-plin d.o.o. Slavonski Brod	SLAVONIJA	Tg1	TM1	0.2353	11.60	0.0500	5.20	0.2853	16.80
		Tg2	TM2	0.3096	11.60	0.0500	5.20	0.3596	16.80
Tehnostan d.o.o. Vukovar	BOROVO NASELJE	Tg1	TM1	0.2686	9.50	0.0470	5.00	0.3156	14.50
		Tg2	TM2	0.3921	9.50	0.0470	5.00	0.4391	14.50
	OLAJNICA	Tg1	TM1	0.2696	9.50	0.0470	5.00	0.3166	14.50
		Tg2	TM2	0.3929	9.50	0.0470	5.00	0.4399	14.50
HEP-Toplinarstvo d.o.o. Zagreb	SAMOBOR	Tg1	TM1	0.2605	7.24	0.0395	3.73	0.3000	10.97
		Tg2	TM2	0.2952	7.69	0.0448	3.97	0.3400	11.66
	VELIKA GORICA	Tg1	TM1	0.2760	7.88	0.0240	3.27	0.3000	11.15
		Tg2	TM2	0.3128	8.97	0.0272	3.73	0.3400	12.70
	DUBRAVA	Tg1	TM1	0.1569	3.96	0.0131	2.64	0.1700	6.60
		Tg2	TM2	0.3137	7.36	0.0263	4.90	0.3400	12.26
HEP-Proizvodnja d.o.o. Zagreb HEP-Toplinarstvo d.o.o. Zagreb	ZAGREB	Tg1	TM1	0.1525	2.30	0.0175	3.45	0.1700	5.75
		Tg2	TM2	0.3050	5.86	0.0350	6.17	0.3400	12.03
			TM3	*232.5521*	*3,980.57*	*55.7079*	*4,194.64*	*288.2600*	*8,175.21*
	OSIJEK	Tg1	TM1	0.1492	4.32	0.0108	4.11	0.1600	8.43
		Tg2	TM2	0.2891	7.01	0.0209	6.20	0.3100	13.21
			TM3	*207.2821*	*3,222.26*	*58.2879*	*4,953.16*	*265.5700*	*8,175.42*
	SISAK	Tg1	TM1	0.1089	3.44	0.0711	4.11	0.1800	7.55
		Tg2	TM2	0.2058	5.65	0.1342	6.61	0.3400	12.26
			TM3	*174.4590*	*5,233.29*	*113.8010*	*8,905.09*	*288.2600*	*14,138.38*

(Tg)* Tg1 – Households; Tg2 – Industry and commercial
(TM)** TM1 – Hot/warm water; TM2 – Hot/warm water; *TM3 – Technological steam*

A chart showing the average shares of individual components in the total price of thermal energy for household end consumers for centralised heating systems in Croatia is given in Figure 8.2.6. Shares of different thermal energy price components were calculated based on the data on supplied thermal energy, connection capacity, surface area, and number of end consumers for each centralised heating system in 2018, tariffs for the production and distribution of thermal energy, fees for thermal energy supply, and fees for thermal energy buyers.

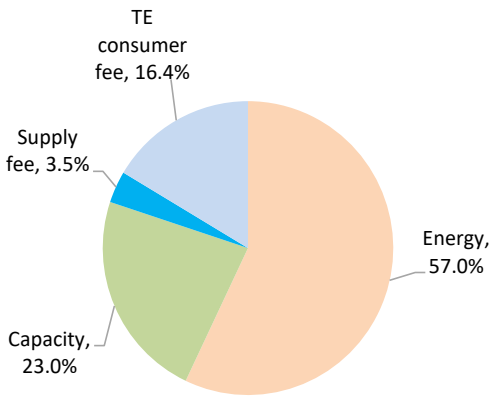
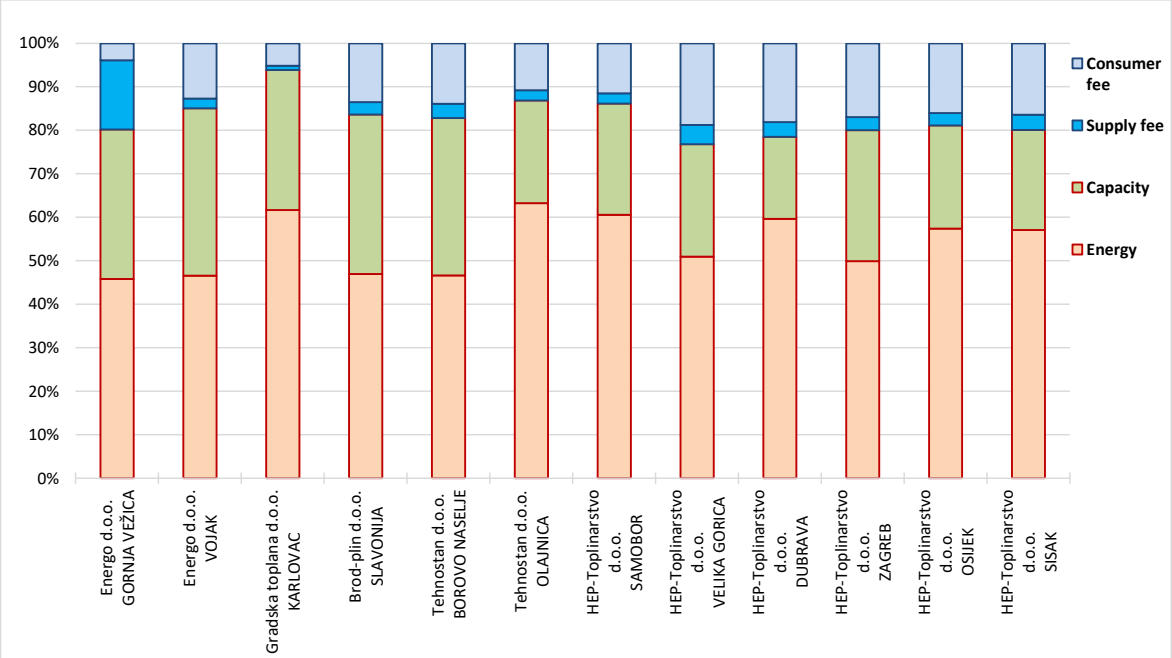


Figure 8.2.6 Average shares of individual components in the total price of thermal energy for household end consumers for all centralised heating systems

Figure 8.2.6 shows that the average regulated portion of the thermal energy price for all centralised heating systems amounts to around 80%.

Figure 8.2.7 gives a more detailed breakdown of the total price of thermal energy and its different components for household end consumers across centralised heating systems in Croatia in 2018.



TE consumer fee	3.9%	12.7%	5.2%	13.5%	13.9%	10.8%	11.5%	18.8%	18.1%	17.0%	16.0%	16.4%	Market share
Supply fee	15.9%	2.2%	1.0%	2.9%	3.3%	2.4%	2.4%	4.4%	3.4%	3.0%	2.9%	3.5%	
Capacity	34.3%	38.5%	32.2%	36.6%	36.1%	23.6%	25.5%	25.8%	18.9%	30.1%	23.7%	23.0%	Regulated share
Energy	45.8%	46.6%	61.7%	47.0%	46.7%	63.2%	60.6%	50.9%	59.6%	49.9%	57.4%	57.0%	

Figure 8.2.7 Breakdown of the total price of thermal energy for household end consumers across centralised heating systems in 2018

Pursuant to the **Thermal Energy Market Act**, in independent heating systems and closed heating systems, the prices of thermal energy delivered to thermal energy buyers and end consumers are formed freely in accordance with market conditions. Given that none of the components of thermal energy prices for closed and independent heating systems are

set by HERA, Table 8.2.2 does not show prices for those systems and Figure 8.2.7 does not show the price structure in such systems.

8.2.4 Consumer protection

In 2018, HERA resolved 57 cases in the thermal energy sector, including various appeals, complaints, inquiries and other submissions by thermal energy end consumers, authorised representatives of co-owners, energy entities, thermal energy buyers, institutions and other parties. Table 8.2.3 provides a classification of all resolved cases.

Table 8.2.3 Inquiries, complaints, appeals and submissions received in 2018

Description	Number	Proportion
Complaints related to thermal energy invoices	13	23%
Complaints related to payment of the fixed part of the thermal energy price	19	33%
Inquiries regarding disconnection from the thermal energy system	1	2%
Complaints related to the transparency of invoices	2	4%
Complaints related to the work of the thermal energy buyer	3	5%
Appeals related to heat cost allocators and heating quality	7	12%
Requests for HERA's opinion/interpretation/instruction	9	16%
Other	3	5%
Total	**57**	100%

Compared to the previous period, and especially 2015 and 2016, which were marked by requests of end consumers and other legal and natural persons for opinions and interpretations of the **Thermal Energy Market Act** and by-laws, the submissions received in 2018 show a significant decline in the number of requests for interpretation of legislation and complaints in general. Instead, complaints and appeals primarily related to specific cases relative to actions of energy entities and thermal energy buyers. In comparison with the previous year, there was a 27% reduction in the total number of cases.

In 2018, HERA carried out two inspections of energy entities due to complaints received from thermal energy end consumers:

- In early 2018, HERA carried out an inspection of ENERGO d.o.o., Rijeka, in relation to the application of the *Network codes for thermal energy distribution* and the *General requirements for thermal energy supply*, more precisely regarding a decrease in connection capacity, changes in the operating regime and calculation of thermal energy consumption by end consumers. Based on inspection results, requests made by end consumers were granted.
- In late 2018, for the first time in line with the new framework for the inspection procedure defined in the **Act on the Amendments to the Act on the Regulation of Energy Activities,** HERA started the inspection of TEHNOSTAN d.o.o., Vukovar, which was completed on 8 April 2019 with the Decision on the conducted inspection of the energy entity TEHNOSTAN d.o.o. More specifically, HERA had received complaints from a large number of end consumers who had been disconnected from a common heating system, as well as complaints from owners of independent heating units who were not clients of TEHNOSTAN d.o.o. as end consumers, but who had first received notifications from the above energy entity in October 2017, which were followed by decisions in May 2018, and finally invoices for fixed costs and accompanying costs for energy from common consumption. Given that TEHNOSTAN d.o.o. did not proceed in

line with HERA's opinion on the above notifications and decisions, HERA launched the inspection. HERA established that the energy entity TEHNOSTAN d.o.o. in the previously mentioned cases did not act in compliance with Article 45 of the **Thermal Energy Market Act** and Article 18 of the *General requirements for thermal energy supply*, and consequently issued a decision instructing the energy entity TEHNOSTAN d.o.o. to re-examine its actions by determining the actual situation for each individual case and apply all relevant provisions taking into consideration HERA's opinion. This decision was published on HERA's website.

The majority of complaints related to allocating and calculating costs of supplied thermal energy, as well as obligations imposed on thermal energy buyers, authorised representatives of co-owners of independent heating units within a building/structure and persons in charge of reading heat cost allocators (dividers), were not within the framework of powers, jurisdiction and responsibilities of HERA, as prescribed by laws and by-laws governing the energy sector. In this regard, 2018 saw the adoption of the new **State Inspectorate Act (Official Gazette No. 115/18)** organising, *inter alia*, inspectorates in the thermal energy and gas sectors. The **Act** entered into force on 1 April 2019 and defines inspection activities in the thermal energy sector.

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10 ABBREVIATIONS AND ACRONYMS

4MMC	and/or 4MMC Project - Four Markets Market Coupling Project
AAC	Already Allocated Capacity
ACER	Agency for the Cooperation of Energy Regulators
aFRR	Automatic Frequency Restoration Reserve
AIB	Association of Issuing Bodies
AIT	Average Interruption Time
ARIS	ACER REMIT Information system
BI	Business Intelligence
BMP	Billing metering point
CACM	Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management
CEER	Council of European Energy Regulators
CEF	Connecting Europe Facility
CEGHIX	Central European Gas Hub AG Spot Index
CEP	Clean Energy Package - Clean Energy for All
CEREMP	Centralised European Register of Energy Market Participants
CESEC	Central and South Eastern Europe Connectivity
CHA	Croatian Hydrocarbon Agency
CHP	Cogeneration through combined heat and power
CHS	Central heating system
CLHS	Closed heating system
Commission	European Commission
CORE	Core Capacity Calculation Region
CROPEX	Hrvatska burza električne energije d.o.o. (Croatian Electricity Exchange)
DCC	Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection
EC	European Commission
EEA	European Economic Area
EES	Grid connection authorisation
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSOG	European Network of Transmission System Operators for
EQS TF	Electricity Quality of Supply Task Force
ERRA	Energy Regulatory Regional Association
EU	European Union
EUPHEMIA	Pan-European Hybrid Electricity Market Integration Algorithm for the calculation of day-ahead electricity prices across Europe
EUROSTAT	Statistical Office of the European Union
FCA GL	and/or FCA Regulation - Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation / FCA GL Guideline on Forward Capacity Allocation
FCA	Forward Capacity Allocation
FGSZ Ltd.	Hungarian transmission system operator
GLEB	Commission Regulation (EU) 2017/2195 establishing a guideline on electricity balancing

GRI SSE	Gas Regional Initiative South South East
HANDA	Croatian Compulsory Oil Stocks Agency
HAR	Harmonised Allocation Rules
HEP d.d.	Hrvatska elektroprivreda – joint stock company
HEP ODS	HEP-Operator distribucijskog sustava d.o.o. (Distribution system operator)
HERA	Croatian Energy Regulatory Agency
HHI	Herfindahl-Hirschman Index
HOPS	Hrvatski operator prijenosnog sustava d.o.o. (Croatian transmission system operator)
HROTE	Hrvatski operator tržišta energije d.o.o. (Croatian energy market operator)
HTLS	High-temperature low-sag
HUDEX	Hungarian Derivative Energy Exchange
HUPEX	Hungarian electricity exchange
HV	High voltage
HVDC	Commission Regulation (EU) 2016/1447 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules
IBWT	Italian Borders Working Table
IGCC	International Grid Control Cooperation
IHS	Independent heating system
IN	Imbalance Netting
INA d.d.	Industrija nafte d.d.
iPLIN	Application available on HERA's website – calculator for household gas consumers using gas supply as a public service
IT	Information Technology
ITC	Inter-TSO Compensation for transit
ITO	Independent Transmission Operator
JANAF	Jadranski naftovod d.d.
JAO	Joint Allocation Office
LCOE	Levelized Cost of Electricity
LIP	Local Implementation Project
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
LV	Low voltage
MARI	Manually Activated Reserves Initiative
MC	Market Coupling
MEDREG	Mediterranean Energy
mFRR	Manual Frequency Restoration Reserve
MRC	Multi-Regional Coupling
MV	Medium voltage
NCER	Commission Regulation (EU) 2017/2196 establishing a network code on electricity emergency and restoration
NEMO	Nominated Electricity Market Operator
NTC	Net Transfer Capacity
PCI	Projects of Common Interest
PCR	Price Coupling of Regions

PEES	Provisional grid connection authorisation
PhF	Physical Futures Market
PICASSO	Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation
PPS	Purchasing Power Standards
PRISMA	Joint capacity booking platform of major European transmission system operators
PSS	Public service supplier
RBP	Regional Booking platform
REMIT	Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency
RES	Renewable energy sources
RFG	RFG Regulation – Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SBU	Standard bundled unit
SCADA	Supervisory Control and Data Acquisition
SEE	South East Europe
SEE-CAO	South East Europe Coordinated Auction Office
SINCRO.GRID	Project financed through CEF – The aim of the project is to improve voltage quality in the electricity system and increase the capacities of existing transmission lines through the use of advanced technical systems and algorithms
SMTA	Short and Medium Term Adequacy
SOGL	Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation
SUKAP	Yearly, quarterly, monthly, daily and intraday capacity management system
TERRE	Trans European Replacement Reserves Exchange
TM	Tariff model
TR	Transformer rating
TRM	Transmission Reliability Margin
TS	Transformer substation
TSC	Transmission System Operator Security Cooperation
TTF	Title Transfer Facility
TYNDP 2016	Ten-Year Network Development 2016
UGSF Okoli	Underground storage facility Okoli
VTP	Virtual trading point
XBID	Cross Border Intraday

11 APPENDIX – LICENCES TO PERFORM ENERGY-RELATED ACTIVITIES

List of licences issued from 01/01/2018 to 31/12/2018	No. of issued licences
Electricity production	**7**
ĐAKOVO HRAST d.o.o. – furniture manufacturing Petra Preradovića 217 31400 Đakovo	
T&H invest d.o.o. – for manufacturing, research and services Adolfa Wisserta 3/a 42000 Varaždin	
VJETROELEKTRANA LUKOVAC d.o.o. – for electricity production Radnička cesta 80 10000 Zagreb	
BIOMASS TO ENERGY BENKOVAC d.o.o. – for energy production Radnička 30 51326 Vrbovsko	
BIOENERGIJA KLISA d.o.o. – for electricity production, distribution and trade Đakovština 3 31000 Osijek	
VDM ENERGIJA d.o.o. – for electricity production Gregurovec 23 48260 Križevci	
ENERGY 9 d.o.o. – for manufacturing and trade Trg sv. Josipa 10 33520 Slatina	
Electricity supply	**1**
i-energija d.o.o. – for energy supply Capraška ulica 6 10000 Zagreb	
Electricity trade	**4**
Yesilyurt Energy Trading d.o.o. – for electricity trade Josipa Stadlera 76 10000 Zagreb	
Pow-en a.s. Prievozská 4B 82109 Bratislava Slovakia	
AXPO BULGARIA EAD 5 Lachezar Stanchev, building B, floor 8 1756 Sofia Bulgaria	
HRVATSKI OPERATOR TRŽIŠTA ENERGIJE d.o.o. – for electricity and gas market organisation Ulica grada Vukovara 284 10000 Zagreb	
Gas trade	**3**
ENERGY COMMODITIES TRADING LIMITED 53, Office 2, Sir Adrian Dingli Street Sliema SLM 1902 Malta	
AXPO BULGARIA EAD 5 Lachezar Stanchev, building B, floor 8 1756 Sofia Bulgaria	

List of licences issued from 01/01/2018 to 31/12/2018	No. of issued licences
INA-INDUSTRIJA NAFTE d.d. Avenija V. Holjevca 10 10000 Zagreb	
Thermal energy production	**4**
ĐAKOVO HRAST d.o.o. – furniture manufacturing Petra Preradovića 217 31400 Đakovo	
BIOMASS TO ENERGY BENKOVAC d.o.o. – for energy production Radnička 30 51326 Vrbovsko	
RESALTA d.o.o. – consulting and services Zagrebačka avenija 104 10000 Zagreb	
ENERGY 9 d.o.o. – for manufacturing and trade Trg sv. Josipa 10 33520 Slatina	
Thermal energy supply	**2**
ELEMENT ENERGETIKA d.o.o. – for services and trade Šetalište Nikole Fallera 14 10000 Zagreb	
RESALTA d.o.o. – consulting and services Zagrebačka avenija 104 10000 Zagreb	
Wholesale trade in biofuels	**2**
ADRIA OIL d.o.o. – for sale of petroleum products Spinčići 38 51215 Kastav	
RIJEKA TRANS d.o.o. – for real estate trade and management Kukuljanovo 337 51227 Kukuljanovo	
Wholesale trade in petroleum products	**8**
D.M. INVENTUM d.o.o. Lisičina 51 10000 Zagreb	
DREZGA d.o.o. Obrtnička 2 10437 Rakitje	
AUTOPRIJEVOZNIK KLJAJIĆ d.o.o. Ježdovečka 118 B 10250 Ježdovec	
EZIS d.o.o. – for trade and services Meksička 3 10000 Zagreb	
IRA GRAD d.o.o. – for trade and hospitality Davora Zbiljskog 26 10000 Zagreb	
DRAGO BENZ j.d.o.o. – for trade and services Greda 17 10340 Vrbovec	
TROMILJA BENZIN d.o.o. – for trade and services Tromilja 1/a 22221 Lozovac	

List of licences issued from 01/01/2018 to 31/12/2018	No. of issued licences
RI-BENZ d.o.o. – for trade and transport of oil and petroleum products Martinkovac 143/3 51000 Rijeka	
Storage of liquefied petroleum gas	**3**
ZAMAX PLIN d.o.o. – for gas supply IV. Trnjanski nasip 18 10000 Zagreb	
BRALA d.o.o. – for trade and services Ulica braće Dežmalj 26 23242 Posedarje	
G.S. PLIN d.o.o. – for gas refilling and distribution Bast 10 A 21320 Baška Voda	
Wholesale trade in liquefied petroleum gas	**1**
ZAMAX PLIN d.o.o. – for gas supply IV. Trnjanski nasip 18 10000 Zagreb	
TOTAL	**35**

List of licences extended from 01/01/2018 to 31/12/2018	No. of licences extended
Electricity production	**11**
HEP-Proizvodnja d.o.o. – for electricity and thermal energy production Ulica grada Vukovara 37 10000 Zagreb	
INA-INDUSTRIJA NAFTE d.d. Avenija V. Holjevca 10 10000 Zagreb	
Vjetroelektrana Trtar-Krtolin d.o.o. – for energy production Bože Peričića 30 22000 Šibenik	
EUCON d.o.o. – for intermediation, trade and services Većeslava Kolara 13 10430 Samobor	
Energija Gradec d.o.o. – for electricity production, distribution and trade Trg Dražena Petrovića 3 10000 Zagreb	
VJETROELEKTRANA PONIKVE d.o.o. – for electricity production Ante Starčevića 45 20000 Dubrovnik	
VJETROELEKTRANA JELINAK d.o.o. – for research and development of renewable energy sources Zrinsko-Frankopanska 64 21000 Split	
OŠTRA STINA d.o.o. – for services Jurišićeva 1/a 10000 Zagreb	
HIDRO-WATT d.o.o. – for electricity production and distribution Ožujska 21 10000 Zagreb	
EKO ZADAR DVA d.o.o. – for services Knezova Šubića Bribirskih 15/B 23420 Benkovac	
GUMIIMPEX - GUMI RECIKLAŽA I PROIZVODNJA d.o.o. Pavleka Miškine 64/c 42000 Varaždin	
Electricity transmission	**1**
Hrvatski operator prijenosnog sustava d.o.o. Kupska 4 10000 Zagreb	
Electricity distribution	**1**
HEP-Operator distribucijskog sustava d.o.o. Ulica grada Vukovara 37 10000 Zagreb	
Electricity supply	**2**
GEN-I Hrvatska d.o.o. – for electricity trade and sale Radnička cesta 54 10000 Zagreb	
Axpo Trgovina d.o.o. – for trade and services Bosutska 30 10000 Zagreb	
Electricity trade	**3**
HRVATSKA ELEKTROPRIVREDA d.d. Ulica grada Vukovara 37 10000 Zagreb	

List of licences extended from 01/01/2018 to 31/12/2018	No. of licences extended
JAS Energy d.o.o. – for trade and services Štefanovečka 10 10000 Zagreb	
HOLDING SLOVENSKE ELEKTRARNE d.o.o. Koprska ulica 92 1000 Ljubljana Slovenia	
Gas transport	**1**
Plinacro d.o.o. – for natural gas transport Savska cesta 88/a 10000 Zagreb	
Gas storage	**1**
Podzemno skladište plina d.o.o. – for gas storage Veslačka 2-4 10000 Zagreb	
Gas distribution	**5**
TERMOPLIN d.d. Vjekoslava Špinčića 78 42000 Varaždin	
HEP-PLIN d.o.o. Cara Hadrijana 7 31000 Osijek	
RADNIK-PLIN d.o.o. – for gas supply and distribution Ulica kralja Tomislava 45 48260 Križevci	
ELEKTROMETAL - DISTRIBUCIJA PLINA d.o.o. – for gas distribution Ferde Rusana 21 43000 Bjelovar	
ZELINA-PLIN d.o.o. Katarine Krizmanić 1 10380 Sveti Ivan Zelina	
Gas supply	**13**
ENERGO d.o.o. – for thermal energy and gas production and distribution Dolac 14 51000 Rijeka	
Komunalije d.o.o. – for public utilities management Svetog Andrije 14 43240 Čazma	
Komunalac d.o.o. – for public utilities Mate Lovraka 30 43280 Garešnica	
PRVO PLINARSKO DRUŠTVO d.o.o. – for gas import, supply and trade Gospodarska zona 13 32000 Vukovar	
ENERGO METAN d.o.o. – for gas distribution and supply Ulica Vlade Gotovca 2 10430 Samobor	
KOMUNALNO PITOMAČA d.o.o. – for water and gas supply, upkeep of marketplaces, cemeteries and public surfaces, retail and wholesale trade, and civil engineering Vinogradska 41 33405 Pitomača	
KOMUNALIJE-PLIN d.o.o. – for gas distribution and supply Radnička cesta 61 48350 Đurđevac	

List of licences extended from 01/01/2018 to 31/12/2018	No. of licences extended
CRODUX PLIN d.o.o. – for trade and services Savska Opatovina 36 10000 Zagreb	
DUKOM PLIN d.o.o. – for gas distribution Slavka Kolara 4 10370 Dugo Selo	
PETROKEMIJA d.d. – for fertiliser production Aleja Vukovar 4 44320 Kutina	
HEP-Opskrba plinom d.o.o. – for trade and services Ulica grada Vukovara 37 10000 Zagreb	
PETROL d.o.o. – for trade and transport of oil and petroleum products Oreškovićeva 6/H 10000 Zagreb	
Axpo Trgovina d.o.o. – for trade and services Bosutska 30 10000 Zagreb	
Thermal energy production	**4**
HEP-Proizvodnja d.o.o. – for electricity and thermal energy production Ulica grada Vukovara 37 10000 Zagreb	
HEP-Toplinarstvo d.o.o. – for thermal energy production and distribution Miševečka 15/a 10000 Zagreb	
ENERGO d.o.o. – for thermal energy and gas production and distribution Dolac 14 51000 Rijeka	
INA-INDUSTRIJA NAFTE d.d. Avenija V. Holjevca 10 10000 Zagreb	
Thermal energy supply	**5**
ENERGO d.o.o. – for thermal energy and gas production and distribution Dolac 14 51000 Rijeka	
HEP-Toplinarstvo d.o.o. – for thermal energy production and distribution Miševečka 15/a 10000 Zagreb	
STAMBENO KOMUNALNO GOSPODARSTVO d.o.o. – for public utilities, building management and real estate Ivana Gorana Kovačića 8 47300 Ogulin	
SPIN VALIS INTERNACIONAL d.o.o. – for manufacturing and services Industrijska 24 34000 Požega	
DRVNI CENTAR GLINA d.o.o. – for manufacturing, trade and services Žrtava Domovinskog rata 71 44400 Glina	
Thermal energy distribution	**2**
ENERGO d.o.o. – for thermal energy and gas production and distribution Dolac 14 51000 Rijeka	
HEP-Toplinarstvo d.o.o. – for thermal energy production and distribution Miševečka 15/a 10000 Zagreb	

List of licences extended from 01/01/2018 to 31/12/2018	No. of licences extended
Wholesale trade in biofuels	**3**
VITREX d.o.o. – for manufacturing and trade Zbora Narodne Garde 3 33000 Virovitica	
BIOTRON d.o.o. – for biofuel production Karlovačka cesta 124 47280 Ozalj	
APIOS d.o.o. – for trade in petroleum products and gas Budmanijeva 5 10000 Zagreb	
Production of petroleum products	**1**
INA-INDUSTRIJA NAFTE d.d. Avenija V. Holjevca 10 10000 Zagreb	
Transportation of oil through pipelines	**1**
JADRANSKI NAFTOVOD d.d. Miramarska 24 10000 Zagreb	
Wholesale trade in petroleum products	**9**
INA-INDUSTRIJA NAFTE d.d. Avenija V. Holjevca 10 10000 Zagreb	
BHG Bitumen Adria d.o.o. – for construction Ulica Petra Hektorovića 2 10000 Zagreb	
BIOTRON d.o.o. – for biofuel production Karlovačka cesta 124 47280 Ozalj	
DP OIL ENERGY d.o.o. – for services Osječka 73 51000 Rijeka	
Air BP Croatia d.o.o. – for trade in oil and petroleum products Petrinjska 2 10000 Zagreb	
UNIJA-TRADE d.o.o. – for business services in trade and business Pavičini 604 52208 Krnica	
VELOX VENUM d.o.o. – for trade and services E. Vidovića 13 10360 Sesvete	
BRALA d.o.o. – for trade and services Ulica braće Dežmalj 26 23242 Posedarje	
INVEST SEDLIĆ d.o.o. – for manufacturing, trade and services I. V. Trnskog 9/E 43000 Bjelovar	
Storage of oil and petroleum products	**2**
TANKERKOMERC d.d. Obala Kneza Trpimira 2 23000 Zadar	
JADRANSKI NAFTOVOD d.d. Miramarska 24 10000 Zagreb	

List of licences extended from 01/01/2018 to 31/12/2018	No. of licences extended
Wholesale trade in liquefied petroleum gas	**4**
EURO GAS d.o.o. – for trade and services Alojzija Stepinca 36 35400 Nova Gradiška	
APIOS d.o.o. – for trade in petroleum products and gas Budmanijeva 5 10000 Zagreb	
ADRIA OIL d.o.o. – for sale of petroleum products Spinčići 38 51215 Kastav	
INA-INDUSTRIJA NAFTE d.d. Avenija V. Holjevca 10 10000 Zagreb	
TOTAL	**69**

Energy-related activities	Issued licences – as at 31/12/2018
Electricity production	54
Electricity transmission	1
Electricity distribution	1
Electricity market organisation	1
Electricity supply	16
Electricity trade	31
Gas production	1
Natural gas production	1
Gas transport	1
Gas storage	1
Management of liquefied natural gas terminals	33
Gas distribution	1
Gas market organisation	11
Gas trade	54
Gas supply	0
Thermal energy production	29
Thermal energy supply	22
Thermal energy distribution	9
Production of biofuels	4
Wholesale trade in biofuels	7
Storage of biofuels	4
Production of petroleum products	1
Transportation of oil through pipelines	1
Transportation of petroleum products through product pipelines	0
Wholesale trade in petroleum products	48
Storage of oil and petroleum products	21
Storage of liquefied petroleum gas	5
Wholesale trade in liquefied petroleum gas	13
Licences to perform energy activities issued under the Energy Act (Official Gazette Nos. 68/01, 177/04, 76/07, 152/08, 127/10):	
Transportation of oil through pipelines and other modes of transport not elsewhere specified, under Article 15 paragraph 1 item 22 of the Energy Act	1
Transportation of petroleum products through product pipelines and other means of transportation not elsewhere specified, under Article 15 paragraph 1 item 22 of the Energy Act	1
Transportation of oil, petroleum products and biofuels by road vehicles	0
Trade, intermediation, and representation on the energy market	0
Retail and wholesale trade in liquefied petroleum gas	0
TOTAL:	373

On 31 December 2018 HERA issued a total of: 373 licences.

Licences rejected:

- *wholesale trade in petroleum products, pursuant to a decision on rejection:*
  - INTERRITUS USLUGE d.o.o. – for services, Zagreb.

Licences denied:

- *wholesale trade in petroleum products, pursuant to a decision on denial:*
  - RUBIKON SHIPPING s.r.o., Bratislava, Slovakia
  - RASTA BENZ d.o.o., Zagreb.

Licences expired:

- *electricity production, due to expired validity period of the licence:*
  - AGROKOR-ENERGIJA d.o.o. – for electricity production, distribution and trade, Zagreb,
- *electricity supply, due to expired validity period of the licence:*
  - EL-EN SOLUTIONS d.o.o. – for trade and services, Zagreb,
  - EFT HRVATSKA d.o.o. – for trade and services, Zagreb,
- *electricity trade, due to expired validity period of the licence*:
  - JWM Energia Sp. z o.o., Katowice, Poland,
  - HSE Adria d.o.o. – for energy-related activities, Zagreb,
- *electricity trade, pursuant to decision on expiration:*
  - PETROL d.o.o. – for trade and transport of oil and petroleum products, Zagreb,
  - Enel Trade d.o.o. – for electricity trade, Zagreb,
- *thermal energy supply, due to expired validity period of the licence:*
  - SENSE ESCO BELIŠĆE d.o.o., Zagreb,
- *wholesale trade in biofuels, due to expired validity period of the licence:*
  - LEBLON d.o.o. – for trade and services, Rijeka,
  - SIROVINA BENZ TRANSPORT d.o.o. – for transport, Knin,
- *wholesale trade in petroleum products, due to expired validity period of the licence:*
  - MASSILIA d.o.o. – for trade and services, Osijek,
  - TERMINAL DUNAV d.o.o. – for transhipment and storage of petroleum products, Vukovar,
  - OCEANCONNECT MARINE d.o.o. – for trade in oil and petroleum products, and services, Split,
  - TROMILJA BENZIN d.o.o. – for trade and services, Lozovac,
  - GRAĐEVINARSTVO I PROIZVODNJA KRK d.d., Krk,
  - TG oil d.o.o. – for trade and services, Donja Zdenčina,
  - ALDO COMMERCE d.o.o. – for crafts and related services, internal and international trade, Poreč

  SEDLIĆ d.o.o. – for manufacturing and trade, Berek.

Licence expired / licence issued:

- *licence for transportation of oil through pipelines and other modes of transport not elsewhere specified under Article 15 paragraph 1 item 22, issued pursuant to the Energy Act (Official Gazette Nos. 68/01, 177/04, 76/07, 152/08, 127/10) expired, and a licence for transportation of oil through pipelines pursuant to the Energy Act (Official Gazette Nos. 120/12, 14/14, 102/15, 68/18) was issued,*
  - JADRANSKI NAFTOVOD d.d., Zagreb.

Information on licences granted to perform energy-related activities is available in the licence register hosted by HERA: *http://www.hera.hr/hrvatski/html/dozvole.html*.