Republic of Croatia

Croatian Energy Regulatory Agency

ANNUAL REPORT

FOR 2020

Zagreb, June 2021

CROATIAN ENERGY REGULATORY AGENCY
ANNUAL REPORT FOR 2020

TABLE OF CONTENTS

1 INTRODUCTION

Dear readers,

It is my pleasure to present the *Annual Report on the Activities of the Croatian Energy Regulatory Agency for 2020*, 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 relevant principles from the Croatian and EU legal systems and relevant energy policies, HERA was established as an independent regulatory authority acting under a public mandate. Its core task is the regulation of energy activities in Croatia in conformity with the obligations specified in the national legislative framework. HERA is also one of the 27 national regulators from EU Member States, whose rights and obligations (both in the national and European contexts) are based on the principles and regulations of European energy legislation.

The fundamental principle applicable to the activities of 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. This legal position of the regulator does not call into question the cooperation with the government and other relevant national authorities, which are responsible for establishing general energy policy guidelines. In addition to its independent status and decision-making autonomy guaranteed by law, the regulatory authority is obliged by law to comply with its legal obligations and public accountability mechanisms, particularly those relating to publicity and transparency of its work. 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 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 activities of the energy regulator is placed on the interests of energy customers and users of energy infrastructure (networks), not only through the protection of their interests but through ensuring an optimal balance between the regulated components of the energy market and those fully subject to market principles.

As every year, HERA's *Annual Report* presents an overview of the legal obligations fulfilled by the regulatory authority, the results and statistical indicators on the activities of regulated entities in the Croatian energy sector, and assessments and observations related to the development of Croatia's energy markets, their coupling and organisation in accordance with the rules of the European internal energy market. Although the report officially covers only one calendar year, some of the provided data and observations concern the first part of the current year, due to the continuous nature of energy activities.

The structure of the *Annual Report* is compliant with the current recommendations of the Council of European Energy Regulators (CEER), and its content and design have been

developed in line with good regulatory reporting practice of the EU and the Agency for the Cooperation of Energy Regulators (ACER). The objective of such reporting is to increase the transparency of the regulatory authority's activities and enable a comparison of performances of national energy sectors at EU level.

Since the primary interest of all entities and participants in the energy sector is to ensure continuous and reliable energy supply, it is important to note that the regulated energy systems in Croatia were stable and reliable, the security of supply was satisfactory, and the quality of energy services was acceptable even under the specific and very demanding circumstances that dominated almost all of 2020 and the first part of 2021.

During the last year, the energy markets and systems faced new and unexpected challenges, directly or indirectly caused by the COVID-19 pandemic. In addition to the global pandemic, which impacted energy sectors across the globe, the Croatian energy systems were faced with the consequences of two strong earthquakes, which resulted primarily in technical and operational difficulties, but also had an impact on market relations.

Despite the operational difficulties and a temporary decrease in energy demands, the national energy systems have proven to be not only robust and reliable, but also capable of overcoming these challenges.

The national energy infrastructure is satisfactory; it functions at a level that ensures both operational security and stable market development. In this context, 2020 was marked by the completion of the liquefied natural gas terminal on the island of Krk and the connecting pipeline. After years of preparation, the project was completed in a very short time under complex circumstances. The full commercial use of the terminal in the first part of the current year serves as proof of a new dimension of security of gas supply and has confirmed Croatia's strategic position in the regional energy sector.

Further development of the energy infrastructure faces challenges in terms of finding adequate development mechanisms and models for monitoring the anticipated expansion of electricity production from renewable sources.

Wholesale energy markets generally followed the trends from the EU and the region, with some regional divergences due to different levels of interconnection with the neighbouring markets. The retail markets in 2020 recorded some volatility resulting from rising energy prices on the market, while the regulated components of final prices (transmission/transport and distribution) were mostly stable.

The Croatian energy sector is an integral part of the EU energy sector. In addition to the specificities of the national sector that are addressed at the domestic level, the Croatian sector is also affected by the current circumstances and dynamics of the EU energy sector.

It is necessary to recall that in the second half of 2019, the European Commission launched the *European Green Deal*, an ambitious and comprehensive strategic concept which constitutes a strategy for transforming the EU into an ecologically sustainable economy by 2050. Since this is the first model of economic growth whose objectives are not based on the depletion of natural resources but on climate neutrality and achievement of net-zero greenhouse gas emissions by 2050, the energy sector has become one of its main implementers. In 2020 and in the first part of 2021, a first tangible framework for the model was created through a series of strategic initiatives, action plans and implementing regulations.

Due to the exceptional circumstances during the COVID-19 pandemic, the European Green Deal has gained new relevance by being placed at the heart of the strategic

framework for the recovery of the EU economy. In this way, the financial dimension of the European recovery plans is (also) related to energy development objectives that are in line with the general strategic concept.

All of the above means that the Croatian energy sector, and consequently the regulation of energy activities, face a new series of complex challenges. In addition to completing the ongoing process of market reforms and its alignment with the current EU framework, HERA will continue to take part in establishing new business models and implementing new technologies in the energy sector.

Taking into account the new paradigm of energy development and climate neutrality, both the European and Croatian energy sectors are faced with unprecedented times.

Ensuring the transfer of benefits that the changes in the energy markets can offer to their final customers remains at the core of HERA's interests and endeavours, along with fulfilling its legal obligations and promoting stable energy development and cost-effective solutions.

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

2 OVERVIEW OF THE ENERGY SECTOR

2.1 Electricity

In 2020, the total electricity consumption in Croatia amounted to 17,272 GWh. After a four-year period of continuous rise in consumption (from 2015 to 2018), 2020 is the second year in a row in which consumption dropped. In 2019, the total electricity consumption was 1.0% lower than in 2018, while the consumption in 2020 was 4.9% lower than in 2019. The majority of total electricity consumption was covered by Croatian power plants (12,216 GWh or 70.7%), while the rest was covered by imports (5,056 GWh or 29.3%). The volume of imports was among the lowest in the last 10 years (net imports were somewhat lower in 2013 and 2014). Hydroelectric power plants accounted for the largest share of electricity produced in power plants in Croatia (5,361 GWh or 43.9%). In addition to the production of wind power plants and distributed energy sources[1], the rise in hydroelectric production at the end of 2020 resulted in physical net exports from Croatia in certain days. In 2020, 47% of total electricity consumption was covered by production from renewable sources. Croatia has thus continued to approach its indicative national target of 63.8% of renewable energy sources in the gross direct consumption of electricity by 2030, as set out in the Integrated national energy and climate plan for the Republic of Croatia for the period from 2021 to 2030.

The total connection capacity of all power plants in Croatia amounted to 5,306 MW at the end of 2020 (2,202 MW for hydroelectric power plants, 2,044 MW for fossil-fired plants, 795 MW for wind power plants, etc.), of which 3,262 MW (61%) related to power plants using renewable energy sources. Power plants using renewable sources produced 8,133 GWh or almost 67% of the total electricity produced in Croatia (12,216 GWh), of which 3,287 GWh were produced in the incentives system. The share of electricity produced from distributed energy sources has increased in the last few years. In 2020, the electricity supplied from distributed energy sources amounted to 1,415 GWh, which is around 5% more compared to 2019 and around 34% more compared to 2018. Approximately 94% of electricity from distributed energy sources was produced from renewable energy sources. The proportion of electricity supplied from distributed energy sources in the total consumption of the electricity system (17,272 GWh) in 2020 was 8.2%.

Hrvatska elektroprivreda d.d. (hereinafter: HEP d.d.) is still the leading electricity producer, accounting for 77.2% of Croatia's production capacities and 76.6% of generated electricity. In 2020, HEP d.d. participated in the Croatian wholesale market with 39.4 TWh, while the total trade volume amounted to 63.9 TWh.

There were 22 registered members in 2020 on the Croatian Power Exchange's (Hrvatska burza električne energije d.o.o. (hereinafter: CROPEX) day-ahead market, with the trade volume of 6,076 GWh. In 2020, CROPEX's intraday market had 14 registered members, who purchased 138.9 GWh of electricity from CROPEX. In addition, in the same year the Slovenian and Hungarian power exchanges bought from CROPEX 342.4 GWh and 502.4 GWh, respectively. The Croatian and Slovenian day-ahead markets are currently coupled under the IBWT[2] project, resulting in a high correlation between the prices on the Croatian and Slovenian day-ahead markets. The implementation of the CORE FB MC[3] project, which will couple the Croatian day-ahead market with the Slovenian and

1 *Distributed sources and/or distributed generation means energy sources (production facilities) which produce electricity or some other useful form of energy and are connected to the distribution network. They are usually located next to or near the user and point of use, and are decentralised in relation to the "larger" power grids and their "large" energy sources.*

2 *Italian Borders Working Table – an initiative which aims to implement day-ahead market coupling; Croatia is included via the border with Slovenia.*

3 *Core Flow-Based Market Coupling – market coupling based on flows inside the Core capacity calculation region.*

Hungarian markets, is expected in the first quarter of 2022. From 19 November 2019, Croatian intraday market has been coupled with the European intraday market via the Croatian, Slovenian and Hungarian power exchanges through the XBID[4] project. In 2020, CROPEX started negotiations with the European Energy Exchange (EEX) to introduce financial derivatives for the Croatian power futures market. An agreement was signed by CROPEX and EEX in January 2021, and the launch of this market is planned for 2022.

On the implicit day-ahead capacity auction (for the delivery of electricity for all hours of 14 January 2021), held on 13 January 2021, the Croatian bidding zone decoupled from the single day-ahead coupling (SADC) market at the border with Slovenia due to a technical issue at the Italian exchange. Market decoupling also occurred at the borders between Italy and Austria, Italy and France, Austria and Slovenia, and Greece and Italy. Since Croatia is currently coupled with the SDAC market only via the border with Slovenia, CROPEX recorded small volumes of trade and liquidity in isolated mode. Consequently, the day-ahead market prices achieved on CROPEX after the partial decoupling differed significantly from the usual values.

From 1 January 2020, the imbalance prices[5] are calculated in a new way in line with the *Rules on Electric Power System Balancing*. Instead of different prices, the same imbalance price now applies to all balance groups for every hour. In 2020, the total imbalance calculated by the Croatian transmission system operator (hereinafter: HOPS) was HRK 45.4 million, of which HRK 12.0 million pertained to the imbalances of the EKO balance group and HRK 4.4 million to imbalances of electricity procured to cover losses in the transmission network.

In 2020, HEP-Proizvodnja d.o.o. was the largest provider of ancillary services[6], and was the only provider of balancing services from the automatic frequency restoration reserves (aFRR) and from the manual frequency restoration reserves (mFRR). For the first time, mFRR services for system security were provided by entities outside HEP d.d. under a pilot project. A total of 136 GWh of balancing energy was activated for increases in electricity production and 122 GWh for decreases. Additionally, in the imbalance netting cooperation with other control areas, 106 GWh were exchanged for energy increases and 93 GWh for decreases. In 2020, HOPS's total costs for the system balancing service were HRK 33 million. This amount does not include the cost of the compensation exchange plan of HRK 2.1 million, nor the amount for the exchange of balancing energy of HRK 0.9 million. In 2020, the power reserve needs for aFRR amounted to an average of ±59 MW per hour. The power reserve needs for mFRR for system balancing were +120 MW and -100 MW per hour, and +130 MW per hour for mFRR for system security. HOPS also used ±15 MW of frequency containment reserve (FCR), 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 296.5 million, of which 85% were power reserves for system balancing.

Pursuant to *Commission Regulation (EU) 2017/2195 establishing a guideline on electricity balancing* (hereinafter: *EBGL Regulation)*, HOPS will procure energy via three EU energy balancing platforms in the upcoming period: IN[7] platform (for imbalance netting), aFRR platform and mFRR platform.

4 *Cross Border Intra Day – intraday market coupling.*

5 *Imbalances are energy volumes representing the difference between the volumes which balance responsible parties traded on the wholesale market and the volumes which were consumed and/or produced by their consumers and /or producers.*

6 *Ancillary services are services and products in the electricity system which are used to regulate the frequency and power of exchanges with other energy systems in order to keep the system in balance, regulate voltage and control reactive power, and restart the energy system following a power failure. They are also used to operate the system when one of its sections is functioning separately from the rest of the electricity system.*

7 *Imbalance Netting.*

The total volume of billed electricity in 2020 amounted to 15,543[8] GWh, which is a decrease of 5.8% compared to 2019. This decline is most evident in April, May and June 2020 and is a result of the limiting of economic and all other activities due to the COVID-19 pandemic. The highest drop in sales occurred in the low voltage industrial category: 14.8% for the blue tariff model and 12.9% for the white model. For households, the drop in sales was only 2%. The reason for this was that electricity consumption was billed under the advance payment regime (with a six-month billing period). Additionally, due to safety measures applied during the pandemic, fewer meter readings were conducted, and consumers were working from home.

The Croatian retail electricity market is completely open, and prices are not regulated. Final customers who did not opt for a supplier of their choice on the electricity market can be supplied through the universal service – for households, and guaranteed electricity supply– for industrial consumers. In 2020, both public supply under the universal service and guaranteed supply were provided by HEP ELEKTRA d.o.o. in accordance with the **Electricity Market Act (Official Gazette Nos. 22/13, 102/15, 68/18 and 52/19)**.

Of the total electricity sold to households in 2020, 12% was sold outside the universal service, while the share of supply outside the guaranteed supply for industrial consumers amounted to 92%. The proportion of suppliers from HEP d.d. (HEP-Opskrba d.o.o. and HEP ELEKTRA d.o.o.) in the supply of all customers was 84%. The three largest suppliers in Croatia had a 99% market share in the supply of household final customers. Further, the three largest suppliers had a 94% market share in the supply of industrial final customers, which is less than in 2019, when the share was 97%. The number of supplier switches decreased from 40,640 in 2019 to 33,476 in 2020. This constitutes a drop in the number of supplier switches in both consumer categories (households and industrial) compared to the previous year. Based on the above, it can be concluded that the retail electricity market in Croatia is stagnating, including due to the COVID-19 pandemic. A mass roll-out of advanced metering would enable faster supplier switching and open up additional options for market participation to final customers. HEP-Operator distribucijskog sustava d.o.o. (hereinafter: HEP-ODS) proceeded with the installation of advanced meters for final customers connected to the distribution network, and as of 31 December 2020, out of a total of 220,287 billing metering points for industrial final customers on low voltage (including public lighting), 125,977 (57.2%) customers had advanced meters installed, while out of a total of 2,219,224 billing metering points for household final customers, 270,818 (12.2%) had advanced meters installed.

Compared to 2019, electricity prices for high and medium voltage final customers increased from 0.39 HRK/kWh to 0.41 HRK/kWh, and from 0.42 HRK/kWh to 0.43 HRK/kWh for low voltage industrial final customers, with the exception of prices for household final customers under the universal supply service, which remained unchanged. Electricity prices in Croatia have been fully deregulated, including the price of electricity under the universal service but excluding the guaranteed supply. The average total selling prices of electricity for final customers (including the transmission and distribution network charges and the electricity price and excluding taxes and other charges) increased in 2020 compared to 2019 from 0.58 HRK/kWh to 0.60 HRK/kWh for medium voltage final customers, from 75 HRK/kWh to 0.77 HRK/kWh for low voltage industrial final customers and from 0.78 HRK/kWh to 0.79 HRK/kWh for low voltage household final customers[9]. Therefore, even though the network charges were lower, the total sale prices of electricity were higher due to an increase in the cost of energy. The proportion of energy costs in the total price of 1 kWh of electricity for medium voltage

8 *Electricity sales also include electricity for the needs of pumping and compensation at RHE Velebit (231 GWh).*

9 *The prices are calculated based on the average prices determined by application of tariffs for electricity transmission and distribution and on the suppliers' data.*

industrial final customers was around 52%, while the proportion for low voltage industrial and household final customers was around 42%.

In the first half of 2021, HOPS and HEP-ODS submitted to HERA their requests for a prior approval of reports on monitoring the security of supply in the transmission and distribution systems for 2020. These reports and the currently available data submitted to HERA by HOPS and HEP-ODS suggest that the level of security of electricity supply in the Croatian electricity system is satisfactory.

The earthquake that struck central Croatia on 29 December 2020 caused an interruption in the supply of electricity for 107,645 network users. Work on re-establishing supply was started immediately. Electricity supply was restored for approximately 75,000 network users in the first half hour after the disruption by means of the remote-control system. By the end of the day, supply was restored for approximately 99% of affected network users.

As a result of the devastating earthquake that struck the Sisak-Moslavina County on 29 December 2020, as well as of a series of aftershocks that affected central Croatia, the electricity system suffered significant damage. When the earthquake hit at 12.19, simultaneous interruptions occurred at several points in the electricity network within the radius of 50 kilometres from the epicentre as a result of damage or activation of safety relay devices. The earthquake caused outages in some production units, the most significant being the outage of the Krško Nuclear Power Plant, triggered by the activation of an automatic safety system as expected under the power plant's safety procedures. Since no damage was found, the power plant was reconnected to the network at 23.25 the next day. Work on the normalisation of the operation of the electricity system started immediately after the interruption, requiring system operators to collect information on network status, restore the affected network elements and carry out appropriate switchyards manipulations. The supply of electricity was interrupted for 136,434 network users. For approximately 85% of network users supply was restored during the day of 29 December 2020, and for most of the remaining network users supply was restored the next day. In areas where the distribution network suffered the most damage, supply was restored 48 hours after the devastating earthquake and the resulting interruptions.

On 8 January 2021, an incident separated the Continental Europe synchronous area (CE SA)[10] in two. The incident was analysed by the European Network of Transmission System Operators for Electricity (ENTSO-E). The initial event was a trip at the 400 kV substation in TS Ernestinovo caused by increased power flows. The outage in TS Ernestinovo redirected the power flows to the 400 and 220 kV transmission lines in Croatia, Serbia and Romania, causing their overload and a further trip. In less than five minutes, the synchronous area was separated in two. The system separation resulted in a deficit of power and a frequency decrease in the West area and a surplus of power, and a frequency increase in the East area. Through the activation of measures from the system defence and restoration plan and a coordinated response of HOPS and the distribution system operators in Serbia, Bosnia and Herzegovina, and Romania, the area was reconnected and resynchronized into a continuous synchronous area approximately one hour after the initial event.

Allocation of cross-zonal capacities at Croatian borders in all time frames functions under market principles. The regional auction offices – JAO for borders with Slovenia, Hungary and Serbia, and SEE CAO for the border with Bosnia and Herzegovina – organise yearly, monthly and daily auctions. At the border with Slovenia, an implicit capacity allocation regime was established by the coupling of the Croatian and Slovenian day-ahead markets. HOPS is in responsible for bilateral allocation of total intraday capacities in both directions on the border with Bosnia and Herzegovina, while the Serbian transmission system

10 *A synchronous area is a single, unique and interconnected energy system (including power plants, electricity networks, their users and consumers...) and an area with maintained default synchronous operation parameters, primarily a synchronised frequency. The synchronous area of Continental Europe covers most of the European Union and is among the largest in the world.*

operator (EMS) is in charge of organising intraday allocations on the border with Serbia. From November 2019, Croatian borders with Slovenia and Hungary are included in the intraday market coupling of EU countries through the XBID project. In 2020, HOPS collected a total net income of HRK 54.8 million from auctions for the allocation of cross-zonal capacities, roughly the same as in the previous years. In accordance with *Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity* (hereinafter: *Regulation (EU) 2019/943)*, these funds were used to guarantee cross-zonal trade.

According to *Regulation (EU) 2019/943*, transmission system operators are not allowed to limit the interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. A minimum of 70% of capacity must be ensured for cross-zonal trading. The remaining 30% can be used for reliability margins, loop flows and internal flows at each critical network element. HERA granted HOPS an exemption from this requirement for 2020 and 2021 to allow the time needed to develop the necessary tools in order to take into account the flows inside and outside of the Core region for capacity calculation, limitations in redispatching activation and network outages planned in the long term.

Quality of electricity supply is defined and monitored in relation to continuity of supply, voltage quality and service quality. Compared to 2019, in 2020 the number and the duration of supply interruptions in the transmission network increased, as well as the estimated energy not supplied. This was a result of significant damage to the power plants caused by earthquakes in the Sisak-Moslavina County and plant disconnections in the coastal area and on the islands due to isolation cleaning and maintenance related to the build-up of salt sediments. The supply continuity indicators were more favourable than in the previous years, but the indicators for service quality were poor compared to the previous year. HEP-ODS's indicators for the quality of connection services are significantly below the required general standard of service quality and should be improved. The proportion of simple connections of buildings to the network carried out in time equals one third of the required general standard of quality and is especially unsatisfactory. The number of written complaints concerning the continuity of supply in the distribution network has decreased significantly and was the highest in the distribution area Elektra Sisak. The number of written complaints concerning voltage quality in the distribution network has also decreased significantly with the highest number of written complaints received in the distribution area Elektra Bjelovar. HEP-ODS has upgraded the existing system for monitoring supply interruptions. However, in order to significantly improve the supply continuity indicators, an additional set of measures to improve the reliability of supply needs to be implemented in certain distribution areas.

In 2020, the revenue of HEP-ODS from tariffs for energy distribution amounted to HRK 3.05 billion, which is 4.8% less than in 2019. HOPS revenue from tariffs for energy distribution amounted to HRK 1.29 billion in 2020, which is 5.8% less than in 2019. As stated above, the total sale of electricity to final customers and consequently the volume of billed electricity in 2020 was 15.5 TWh, which is 5.8% less compared to 2019. The volume of billed electricity and revenues from transmission and distribution charges were significantly lower in April, May and June of 2020 compared to 2019, which is, among others, a result of restricted economic activity due to the COVID-19 pandemic. HOPS and HEP-ODS submitted to HERA the data necessary to determine planned total costs, but did not submit any requests for tariff changes.

Pursuant to the *Decision on write-off of receivables for energy delivered to household final customers from earthquake-stricken areas*, which was adopted by the Shareholders Assembly of Hrvatska elektroprivreda d.d. in line with the conclusions of the Croatian

Government[11], HOPS writes off approximately HRK 1 million of receivables per month for transmission network usage, while HEP-ODS writes off approximately HRK 3 million per month for distribution network usage. In accordance with the *Decision on write-off of receivables*, receivables are written off for the above final customers in case of transfer of connection points to the grid at temporary accommodation sites (containers, mobile homes, caravans, ancillary buildings), including the construction of a new connection point on the same location and its later transfer for the purposes of electricity supply of the reconstructed or new building.

HOPS's proposal for the *Ten-year development plan for the transmission network 2021 – 2030, with a detailed elaboration of the initial three- and one-year periods* was received by HERA in September 2020, and approved in March 2021. In the upcoming ten-year period, HOPS plans to invest approximately HRK 4.9 billion financed from its own sources, HRK 51 million from already allocated EU funds (primarily for the SINCRO.GRID project), HRK 944 million from EU funds and HRK 3.2 billion from the connection charge or EU funds. The total value of planned investments for the ten-year period amounts to HRK 9.1 billion. In September 2020, HEP-ODS submitted to HERA a proposal for the *Ten-year development plan (2021 – 2030) for the HEP-ODS distribution network with a detailed elaboration for the initial three- and one-year periods*. In March 2021, HERA granted its prior approval for the proposal. Total planned financial investments in the development of the distribution network for the ten-year period (2021 – 2030) are worth approximately HRK 12 billion, of which investments conditional on connecting new users to the network and increasing the connection capacity of existing users account for approximately HRK 4 billion.

Power losses in the distribution network in 2020 amounted to 1,355 GWh or 8.5% of electricity taken up by the distribution network from the transmission network and from the electricity producers in the distribution network (15,999[12] GWh). The total cost of energy procured to cover losses in the distribution network was HRK 589.7 million, i.e. 435.03 HRK/MWh. Power losses in the transmission network in 2020 amounted to 373 GWh, or 1.7% of total transmitted electricity (21,432 GWh). The total cost of energy to cover losses in the transmission network was HRK 145.1 million, i.e. 388.77 HRK/MWh.

Under the incentives system for electricity production from renewable energy sources and high efficiency cogeneration, HERA issues decisions on the status of eligible electricity producer for a period of 25 years, granting the producer the rights and obligations of an eligible producer for that facility. However, the eligible producer status does not imply the right to incentivised prices for delivered electricity and is only one of the requirements to qualify for incentives. Incentives for electricity production from renewable energy sources and high efficiency cogeneration are obtained based on a contract concluded with HROTE (the Croatian energy market operator) in line with the regulations on promoting electricity production from renewable sources and cogeneration. Once the facility is constructed and the status of eligible electricity producer is obtained, the production is incentivised in the period of 12 or 14 years.

At the end of 2020, the feed-in[13] incentives system included 1,357 facilities with a connection capacity of 1,035 MW, which produced around 3.3 TWh of electricity for which the eligible producers in the incentives system were paid around HRK 3 billion of

11 *On 18 January 2021, the Croatian Government adopted the Conclusion of the Government of the Republic of Croatia on write-off of receivables and fees for electricity delivered to final customers in earthquake-stricken areas, and on 25 March 2021 it adopted the Conclusion of the Government of the Republic of Croatia on the write-off of receivables and fees for electricity delivered to final customers in earthquake-stricken areas for April 2021.*

12 *Source: HEP-ODS hourly measurements.*

13 *Feed-in here refers to a system/mechanism of incentives for research, technology development and investments in the development of renewable energy sources, which is used to fully or partially socialise and cover the costs of electricity produced from renewable energy sources. It ensures the stability of prices and/or contracts for the sale of electricity under market conditions until these energy sources become competitive compared to other electricity sources on the market.*

incentives. The average incentivised price was HRK 0.92 per kWh. The yearly average electricity price on CROPEX's day-ahead market was HRK 0.29 per kWh in 2020, which is three times less than the incentivised price. The highest incentivised price (HRK 1.94 per 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 0.45 per kWh. The average incentivised price paid for electricity from wind power plants was HRK 0.76 per kWh. Wind power plants had the largest share in connection capacity (69.4%), electricity production (50.8%) and paid incentives (42.1%). Almost all of the feed-in contracts concluded by the end of 2015 were still active. HROTE collects funds for the payment of incentives from three main sources: fees for promoting electricity production from renewable sources and cogeneration which are paid by final customers, regulated sale of a portion of electricity to suppliers and commercial sale of a portion of electricity on the market. In 2020, HROTE collected HRK 372 million less than it paid to eligible producers in the incentives system. Given this lack of revenue in relation to expenditures for promoting electricity production from renewable sources in 2020, and since new incentive models have been implemented (market premiums and guaranteed purchase price), it is possible that HROTE will need additional revenue to be able to pay incentives.

As a balance responsible party of the EKO balance group[14], HROTE was able to sell 60% of electricity produced by the EKO balance group (1.97 TWh from a total of 3.3 TWh) on the market. In 2020, four auctions were held to sell electricity produced by the EKO balance group.

The *Regulation on quotas for promoting electricity production from renewable energy sources and high-efficiency cogeneration* and the *Regulation on the Amendments to the Regulation on promoting electricity production from renewable energy sources and high-efficiency cogeneration* were adopted in May 2020. The *Regulation on quotas* provides for an additional 2,265 MW of connection capacity for facilities in the new incentives systems (market premiums and guaranteed purchase price). Even though the explanatory report on the proposal of the *Regulation on quotas* states that the quotas were set in accordance with the **Energy Development Strategy of the Republic of Croatia until 2030 with an Outlook to 2050 (Official Gazette No. 25/20)** (hereinafter: **the Strategy**) and the *Integrated national energy and climate plan for the Republic of Croatia for the period 2021–2030* (hereinafter: *the NECP*), the quotas are higher than the goals for 2030 laid out in these two documents.

The *Register of renewable energy sources and cogeneration, and eligible producers* (hereinafter: *the Register*) is a comprehensive tool with information on projects involving renewable energy sources and high-efficiency cogeneration, production facilities using renewable energy sources, high-efficiency cogeneration installations and eligible producers operating in Croatia. The data from the *Register* is publicly available at https://oie-aplikacije.mzoe.hr/Pregledi/. An interactive map of Croatia showing the locations of all facilities in the *Register* is available at https://oie-aplikacije.mzoe.hr/InteraktivnaKarta/.

Along with the register and the map, HOPS's website provides a chronological list of connection projects to the distribution network https://www.hops.hr/lista-redoslijeda-projekata. The announced incentives systems have encouraged investors to submit requests for connection/increase in connection capacity of an additional 9,154 MW of capacity for 114 projects for facilities mostly using renewable sources. Considering that the current installed capacity of electricity production facilities in Croatia is 5.3 GW, the total capacity in Croatia would be significantly increased with the connection of the new facilities for which the requests have been submitted. The newly connected power plants

14 *The members of the EKO balance group are production plants using renewable energy sources and high-efficiency cogeneration, whose net electricity is supplied by the eligible producers under purchase contracts with HROTE (through incentives and guaranteed purchase prices), which is responsible for their production plan, imbalances and sale.*

would mostly be located in Dalmatia. The above list includes solar plants with a connection capacity of approximately 4 GW, wind power plants of 2.8 GW, and hybrid power plants (solar and wind power) with a capacity of 1.2 GW. Significant capacity volumes included on the list are: 950 MW for Promina Zone, 425 MW for VE Lički Medvjed and 402 MW for hybrid plants VE Lisac and SE Velika Popina. This volume of total connection capacity calls for the fulfilment of technical requirements in the 110 kV, 220 kV and 400 kV networks, whose costs are estimated at around HRK 3.2 billion, which HOPS. According to the *Ten-year development plan for the distribution network 2021–2030 with a detailed elaboration for the initial three- and one-year periods*, HOPS plans to apply for funding through the Ministry of Economy and Sustainable Development (hereinafter: the Ministry) to finance these costs from the EU funds. In that case, new network consumers would not pay for that part of the costs of fulfilling the necessary technical requirements in the network. HERA considers that the current approach to submitting requests for new connections (through a report on the optimal technical solution for grid connection), often in the same location, may not be viable. Also questionable is whether the above volume of connection capacity with expected electricity production is realistic, taking into account the necessary network reinforcements and needs for balancing reserves.

The Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act (Official Gazette No. 111/18) from 2018 introduced the definition of the user of a self-supplying facility as a household final customer with a facility for self-supply of electricity from renewable energy sources or high-efficiency cogeneration connected to its own installations. Electricity consumption, network charges and the charge for renewable energy sources and high-efficiency cogeneration applicable to self-supplying consumers are billed taking account of the difference between the taken and delivered energy within a billing period (one month). At the end of 2020, 851 final customers had the status of self-supplying consumers in the distribution network (compared to 146 in 2019), all with integrated solar power plants, with a total connection capacity of approximately 5 MW for delivery to the network (compared to 1 MW in 2019). In 2020, users of self-supplying facilities delivered 1.9 GWh of electricity to the network. However, having delivered more electricity into the network than they have withdrawn, 43 final customers have lost their status of self-supplying consumers in 2020. In terms of connection capacities for the delivery to the network by users of self-supplying facilities, connection capacities in the band from 2 kW up to 4 kW account for the highest share. This volume of installed capacity should be sufficient to cover the self-supply needs of the average household final customer whose yearly electricity consumption in Croatia averages around 2,800 kWh. However, a large number of users of self-supplying facilities have a higher connection capacity for network delivery than the sufficient volume (around 6 kW on average). As a result, some users of self-supplying facilities have delivered more electricity into the network than they have withdrawn and have therefore lost their self-supplying user status in accordance with the **Renewable Energy Sources and High Efficiency Cogeneration Act (The Official Gazette Nos. 100/15 and 111/18),** which means that the final customers' investments in self-supplying installations might not pay off.

The guarantee of origin system enables suppliers of electricity to offer final customers supply contracts or delivery models with a guaranteed share of one or more electricity sources used for electricity generation. In addition, final customers can rely on this system when choosing the delivery model, as it ensures the sale of electricity of a guaranteed structure. As the authority responsible for issuing guarantees of origin in Croatia, HROTE operates a *Register of Guarantees of Origin*, an information system that stores guarantees of origin and is used to issue, transfer and cancel guarantees of origin as electronic documents. By the end of 2020, five producers of electricity, eight suppliers and three traders have created accounts in the *Register*. In 2020, six registered suppliers traded in guarantees of origin, and guarantees of origin were issued for 20 production plants. In

2020, HROTE issued guarantees of origin for a portion of electricity of eligible producers in the incentives system, which was sold on the energy market via the EKO balance group. The guarantees of origin were then sold in auctions via CROPEX's IT trading platform.

The energy efficiency obligation scheme is regulated by the **Energy Efficiency Act (Official Gazette Nos. 127/14, 116/18 and 14/20)**. In 2019, the obligated parties were energy suppliers and their affiliated legal persons who supplied more than 300 GWh of energy in 2017 to final customers or distribution stations that sell electricity to final customers. In 2020, the obligated parties were suppliers who had delivered more than 100 GWh of energy in the year before last (in 2018). From 2021 onward, the suppliers who have delivered more than 50 GWh in the year before last will also be included in the scheme. By 30 June of the current year, the Ministry issues a decision determining the savings obligation for the following calendar year. If the unfulfilled portion of the savings obligation from the previous year exceeds 10%, the Ministry will determine the one-off payment that the obligated party must make to the Environmental Protection and Energy Efficiency Fund. The *Ordinance on the energy efficiency obligation scheme (Official Gazette No. 41/19)* defines the elements of the energy efficiency obligation scheme, regulates its implementation and the use of funds paid for unrealised savings and the conditions for exercising the right of payment in instalments. As the legal requirements were made public in 2018, those suppliers who are still not ready to fulfil the obligations or those who would not realise any savings on their own, could purchase savings on the market. The data submitted to HERA by the active suppliers under the savings obligation show that all suppliers have fulfilled their obligations and submitted their reports to the Ministry.

Currently, electricity suppliers are not offering final customers any delivery 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 final customers have installed meters capable of monitoring consumption in shorter intervals or in several tariff periods, in their public offers the electricity suppliers do not offer special products targeting specific groups of final customers and their consumption patterns (e.g. delivery models adapted to vacation homes).

2.2 Natural gas

In 2020, the natural gas sector was characterised by the start of gradual deregulation of the Croatian gas market in the household segment, a decrease in wholesale and retail prices of gas for industrial customers, and further improvements of the existing by-laws. More specifically, this refers to:

- maintaining a moderate level of competition on the wholesale gas market, dominated by several largest suppliers,
- continued retail market liberalisation for household customers,
- public consultation on the development of gas supply as a public service and adoption of the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 108/20)*, which specifies the framework for the regulation of prices for gas supply as a public service in the period after 1 April 2021,
- a public call for tenders for the selection of gas suppliers under public service obligation for household final customers for the period from 1 April 2021 to 30 September 2024,
- reduced gas prices by 21% on the wholesale gas market and by 18.6% on the retail gas market for industrial customers when compared to 2019[15],
- increase in the final price of gas for household customers using gas supply as a public service by an average of 0.6% when compared to 2019,

[15] *The industrial category refers to all non-household final customers. The Gas Market Act (Official Gazette Nos. 18/18 and 23/20) defines non-household customers as customers buying gas not intended for use in their own household.*

- significant increase in the number of supplier switches when compared to 2019, and a decrease in the number of complaints related to supplier switching procedures than in 2019,
- adoption of the new *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)* in order to complete the implementation of *Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas* (hereinafter: the *NC TAR Regulation*),
- adoption of the *Decision on tariffs for gas transmission (Official Gazette No. 147/20)* for the years of the third regulatory period 2021 – 2025,
- adoption of the *Decision on tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 144/20)* for the years of the first regulatory period 2021 – 2025 and the *Decision on establishing a regulatory account for LNG terminal management for the energy entity LNG Hrvatska d.o.o., Zagreb*, for the period 2021 – 2040, establishing a tariff for the use of the LNG terminal, which is 15.8% lower than the indicative tariff from June 2018,
- completion of the strategic project of the floating terminal for the reception and dispatch of liquefied natural gas on the island of Krk (hereinafter: LNG terminal) and the start of its commercial activity on 1 January 2021.

Out of the 51 energy entities licensed for gas supply, 41 were active on the market in 2020. A total of 25 energy entities had valid licences for gas trading, but only one entity was active on the market.

In 2020, the total quantity of natural gas delivered to final customers in Croatia amounted to 28,077 GWh, which was 6.8% more than in 2019.

The energy entity HEP-Trgovina d.o.o. holds the largest share of gas sold on the wholesale market in 2020 (27.6%), followed by PRVO PLINARSKO DRUŠTVO d.o.o. (22.2%), INA d.d. (20.2%) and HEP d.d. (10.2%). The remaining share (19.8%) is divided among seven balance responsible parties[16].

In 2020, eight balance responsible parties traded on the virtual trading point (hereinafter: VTP) with a total of 21,726 GWh of gas (6.1% less than in 2019). In addition to trading on the VTP, transactions on the wholesale market in 2020 were also carried out on the gas trading platform, where all balance responsible parties and the transmission system operator may trade in short-term standardised products. Since the establishment of the trading platform through implementation of *Commission Regulation (EU) No 312/2014 establishing a Network Code on Gas Balancing of Transmission Networks* from March 2014, the costs of balancing energy have been significantly reduced due to a more efficient model of transmission system balancing, as well as a more favourable unit price achieved through transparent market competition.

Gas suppliers on the retail market continued to offer market-based (non-regulated) gas supply contracts to household customers. Compared to 2019, a significant rise in the number of supplier switches was recorded in 2020 for final customers that are entitled to supply under the public service obligation, with 27,988 completed supplier switches for final customers from the above category, which accounts for 89% of all completed supplier switches.

In order to remove the obstacles to the development of the retail gas market, HERA introduced a number of measures, most notably the following:

- informing gas market participants about their rights and obligations,

16 *A balance responsible party is an energy entity that organises and manages the balance group, and is also responsible for the balancing of gas quantities which are delivered to and taken from the transmission system by the balance group under its management.*

- increasing the availability and accuracy of data in the Register of billing metering points in cooperation with HROTE by granting its approval of HROTE's Rules for updating and correcting the data in the Register of billing metering points,
- introducing additional incentives and compensations concerning the quality of gas supply in line with the *General terms and conditions of gas supply (Official Gazette Nos. 50/18, 88/19 and 39/20)*,
- improving the regulations governing automatic exchange of data between databases managed by gas market operators and entities in charge of entry and update of data in the Register of billing metering points (distribution system operators, closed distribution system organiser and gas suppliers), and
- gathering opinions and recommendations from the interested public and energy entities in a public consultation before the adoption of the amendments to the *Network Code for the gas distribution system (Official Gazette Nos. 50/18, 88/19 and 36/20)* and the *General terms and conditions of gas supply (Official Gazette Nos. 50/18, 88/19 and 39/20)*.

In order to monitor and analyse the functioning of the gas market, HERA on a quarterly basis collects data on gas supply and sale, including the quantity and prices of gas purchased and sold (delivered) on the wholesale and retail markets, from all suppliers and traders in Croatia.

The total average gas sale price net of VAT on the wholesale market in 2020 was HRK 0.1346 per kWh, which is a 21% decrease as compared to 2019, when the average price was HRK 0.1704 per kWh.

In 2020, the total average retail gas price net of VAT for industrial final customers amounted to HRK 0.1631 per kWh, which is 18.6% less when compared to 2019.

In 2020, the final price of gas for industrial customers net of taxes was 8.2% higher in Croatia than the EU average. When taxes are included, the final price in the same period was 1.9% lower than the European average.

The final price of gas for household customers net of taxes was still significantly lower in Croatia compared to the EU average (by 32.4%). When taxes are included, the final price for household customers in the same period was 43% lower than the European average.

For the supply of household final customers using gas supply as a public service, suppliers had the option in 2020 to purchase gas from suppliers on the wholesale market under regulated conditions, but also from suppliers and traders under market principles. Consequently, the energy entity HEP d.d., which was selected as the wholesale market supplier by HERA's decisions from February and October 2019, was obliged to sell gas to those public service gas suppliers that have selected it at a price which is not higher than the reference gas price[17] of HRK 0.1985 per kWh in the period from 1 April 2019 to 31 March 2020, and at a price which is not higher than the reference price of HRK 0.1924 per kWh in the period from 1 April 2020 to 31 March 2021 (3.1% lower than in the previous period). As the wholesale market supplier, HEP d.d. decided to charge HRK 0.1825 per kWh in the period from 1 April 2020 to 31 March 2021, which is 5.1% lower than the reference gas price set by HERA, and 8.1% lower than the reference price from the previous period.

This reduction in the reference price of gas, as a regulated wholesale component of the final gas price for households supplied under the public service obligation, together with the right of gas suppliers under public service obligation to purchase gas for their customers from suppliers or traders under market principles, resulted in a decrease of the final gas price for households as of 1 April 2020. More specifically, in line with the

[17] *The reference gas price is the highest price at which the wholesale market supplier can sell gas to public service suppliers for household final customers supplied under the public service obligation, and is determined as the sum of the unit cost of gas purchase on the reference spot market and of the premium for covering the operating costs of the wholesale market supplier.*

provisions of the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette Nos. 34/18 and 14/20)*, the final gas supply price for households using gas supply as a public service was determined by applying the principle of capping. This enabled the public service suppliers to decide on tariffs for gas supply as a public service, under the condition that the amounts are not higher than the tariffs defined by HERA as capped final gas supply prices in a specific period. Therefore, pursuant to the applicable provisions of the *Methodology*, 16 public service suppliers decided on their final prices for the period from 1 April 2020 to 31 March 2021. As a result, the final gas price for households supplied under the public service obligation in Croatia lowered by an average of 3.9% as of 1 April 2020.

In August 2020, HERA conducted an online consultation on the development of the model for gas supply as a public service in Croatia in order to present the public service model and collect ideas and proposals from the participants in the energy sector concerning the process of forming and structuring the public gas supply model for the period after 1 April 2021. The consultation covered topics such as the public call for tenders for the selection of gas suppliers under public service obligation for the period from 1 April 2021 to 30 September 2024, and the development of a plan for the deregulation of the price of gas.

Taking into account the provisions of the **Gas Market Act (Official Gazette Nos. 18/18 and 23/20)**, which stipulate that public service suppliers are determined for the period up to 31 March 2021, HERA organised a public call for tenders in the period from October to December 2020 to select suppliers under the public service obligation regime for household final customers for the period from 1 April 2021 to 30 September 2024, for all distribution areas in Croatia. Following the public call for tenders, on 11 December 2020 HERA issued the decisions to select gas suppliers under the public service obligation regime for 33 distribution areas in Croatia for the period from 1 April 2021 to 30 September 2024. As a result of the call for tenders, as of 1 April 2021 public gas supply in Croatia is performed by 14 gas suppliers, compared to 32 in the previous period.

Pursuant to the provisions of the **Gas Market Act**, the gas storage system operator was obliged to reserve a part of the storage system capacity for priority allocation to public service suppliers for household final customers supplied under the public service obligation in the period from 1 April 2018 to 31 March 2020. More specifically, in the procedure for reserving and allocating gas storage system capacities in the form of standard bundled units, the gas storage system operator was obliged to allocate a certain percentage of the total number of available standard bundled units to public service suppliers, and could only then offer the remaining capacities to any interested users. For the period from 1 April 2020 to 31 March 2021, the available standard bundled units were proportionally allocated by the gas storage system operator to public service suppliers based on historic data on delivered gas quantities.

In 2020, activities related to project implementation and construction of the terminal for liquefied natural gas continued, and this strategic project was completed by the end of 2020. The arrival of the floating storage and regasification unit (FSRU)[18] "*LNG CROATIA*" at the LNG terminal on the island of Krk at the beginning of December 2020 was followed by preparatory work required to put the terminal in service, which included testing all technical systems of the vessel and the onshore part of the LNG terminal in order for the LNG terminal to begin its commercial activities on 1 January 2021.

Pursuant to the *Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette Nos. 48/18 and 79/20)*, in December 2020 HERA issued the *Decision on tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 144/20)* for the first regulatory period 2021 – 2025 and the *Decision on establishing a regulatory account for LNG terminal management for the energy entity LNG Hrvatska*

[18] *FSRU (Floating Storage and Regasification Unit) is a floating vessel for the reception and regasification of liquefied natural gas.*

d.o.o., Zagreb, for the period 2021 – 2040, with the purpose of setting a tariff for the LNG terminal management operator LNG Hrvatska d.o.o., which is competitive compared to the cost of service of other LNG terminal operators in Croatia's vicinity and reduces the otherwise significant tariff variability as a consequence of different levels of LNG terminal capacity lease in a 20-year period. In fact, tariffs greatly depend on actual and planned annual capacity lease of the LNG terminal, which was significantly higher than the results of the previous applied binding Open Season procedure for capacity lease used for the calculation of indicative tariffs established by the *Decision on indicative tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 56/18)* in June 2018.

Pursuant to the decisions, the tariffs for the reception and dispatch of liquefied natural gas for the LNG terminal operator LNG Hrvatska d.o.o. are the same for all years of the first regulatory period 2021 – 2025 and amount to EUR 1.17 per MWh[19], which is 15.8% lower than the indicative tariff of EUR 1.39 per MWh from June 2018.

The gas transmission tariffs for the transmission system operator PLINACRO d.o.o. for 2020 were established by the *Decision on tariff amounts for gas transmission (Official Gazette No. 124/19)*, which was issued by HERA in December 2019 in line with the *Methodology for setting tariffs for gas transmission (Official Gazette Nos. 48/18 and 58/18)*. Pursuant to the above *Decision*, the total average price for gas transmission[20] in 2020 amounted to HRK 0.0122 per kWh, which is a 2.1% decrease compared to 2019.

Further, in July 2020 HERA adopted the new *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)* in order to complete the implementation of the *NC TAR Regulation*. In accordance with the new *Methodology*, a new *Decision on tariffs for gas transmission (Official Gazette No. 147/20)* was issued in December 2020, establishing the tariff amounts for gas transmission for the years of the third regulatory period 2021 – 2025. The established tariffs for the use of the transmission system in the third regulatory period are based on the calculation of the anticipated allowed revenues of the transmission system operator, which include the difference identified after the regular revision of revenues for the previous (second) regulatory period 2017- 2020, and which is to an extent influenced by the new gas transmission infrastructure that was needed to enable the dispatch of gas from the LNG terminal into the Croatian gas transmission system and further towards the EU.

In line with the above, the projected total average price for gas transmission in 2021 is 17.2% higher compared to the actual total average price in 2020.

As regards the quality of gas supply, HERA has been collecting data on achieved guaranteed standards of gas supply quality since October 2014. Following the adoption of the *General terms and conditions of gas supply (Official Gazette No. 50/18)* in 2018, compensation is applied in case of failure to meet the guaranteed standard. A new guaranteed standard was introduced by the *Amendments to the General terms and conditions of gas supply (Official Gazette No. 39/20)* in April 2020. HERA continues to collect the data necessary to define the incentives and compensations for insufficient quality of service for other guaranteed standards in the upcoming period.

The above trends on the gas market in 2020, with special emphasis on the completion of the strategic project of the construction of new gas infrastructure (LNG terminal), as well as the significant price reduction on the wholesale and retail gas markets for industrial customers and increased competition on the retail gas market, demonstrate the existence of an adequate and transparent regulatory framework, which includes rules on gas market organisation, rules on access to the gas system, and the levels of prices for the use of gas infrastructure. The public call for tenders to select the gas supplier under the public service obligation regime also contributed to the improvement and development of the

19 *This refers to the net calorific value (NCV).*

20 *The ratio between total billed fees for the use of the transmission system and total quantity of gas transported in a year.*

Croatian gas market functions as one of the steps in its gradual deregulation, provided for in the applicable **Gas Market Act**, which should benefit all final customers from the household category because it resulted in the selection of the most qualified and competitive tenderers as public service suppliers across the distribution areas. In this sense, HERA's objectives for the upcoming period will include establishing the preconditions for optimal functioning of the gas market, encouraging the development of efficient competition, and creating stable and predictable business conditions for the benefit of all market participants.

In addition to the COVID-19 pandemic, 2020 was also marked by the earthquakes that hit the City of Zagreb, and, in late 2020, the Sisak-Moslavina County and the wider region of central Croatia.

The energy entities did their best to adapt their activities to the new circumstances and the recommendations issued by the disease control centres regarding behaviour that reduces the spread of COVID-19 and protects all citizens.

Due to the epidemiological situation, energy entities in the gas sector revised their tasks and business processes, and postponed activities that do not have specific deadlines, especially where they included physical contact with customers. Customers were also instructed to communicate with the energy entities by e-mail or by phone whenever possible, and to limit visiting energy entity offices to a minimum. In cases when it was impossible to postpone the contact with final customers or system users, energy entities made sure to keep it at a minimum so as not to endanger the client.

A series of earthquakes that struck the City of Zagreb, and later in the year the Sisak-Moslavina County and the wider region of central Croatia, called for changes to the previously established work organisation due to COVID-19, because the new circumstances required priority checks of all parts of the gas distribution system that were threatened, especially those close to the epicentres.

In the first days after the earthquake, gas supply was suspended in some parts of Zagreb and interventions were organised at the requests of final customers. All segments of the gas network were checked for leaks in the wider centre of the city, including the old city centre, and none were found. No leaks were detected in the high-pressure steel pipelines that feed into pressure reducing metering stations closest to the epicentre. In the three months after the Zagreb earthquake, the distribution centre of Gradska plinara Zagreb d.o.o. received more than 14,000 calls and initiated the corresponding interventions.

According to the information received from the energy entities, numerous buildings in the Sisak-Moslavina County and central Croatia suffered significant damage, especially to flue systems. In cases of reported damage to gas installations and/or flue systems, appropriate expert checks were performed, followed by the suspension of gas supply until all gas installations and/or flue systems were repaired.

Following the repairs of gas installations or buildings, in cases when the buildings fulfilled all conditions for safe gas use and had satisfactory reports on the statics of the building, the gas installations were tested and filled with gas and the final customers were reconnected to the distribution system upon request.

In cases of residential buildings with significant damage, which are labelled as not safe for living, pressure reducing metering stations were disassembled until repairs or construction of new buildings are complete and they can be reconnected to the distribution system.

There was no direct damage from the earthquakes to the transmission system and its facilities.

2.3 Oil, petroleum products, and biofuels

In 2020, the oil, petroleum products, and biofuel sector was marked by a decrease in the production and imports of petroleum products and an increase in transported quantities of crude oil via the oil pipeline system.

The volume of production of petroleum products in 2020 was 2.5 million tonnes, which is 10.7% less compared to 2019. A total of 1.54 million tonnes of petroleum products were imported, which is 0.38 million tonnes or 19.8% less than in 2019. The decrease in imports can primarily be explained by a decline in economic activities caused by the COVID-19 pandemic.

The total volume of liquefied petroleum gas produced in 2020 was 186,000 tonnes, which is 11,000 tonnes or 5.6% less than in 2019.

The volume of biofuels produced in 2020 amounted to 171 tonnes, which is a marked decrease of 35.2% as compared to the 264 tonnes produced in 2019. This demonstrates a strong downward trend in the production of biofuels in the past few years and that this trend continued in 2020. While the peak biofuel production in the amount of 39,476 tonnes was recorded in 2012, a decreasing trend in production has been present ever since. The assumed causes of the drop in biofuel production are adverse market trends, which started as a result of the termination of payment of cash incentives for the production of biofuels for transportation paid to biofuel producers, as well as insufficient investments in the modernization of biofuel production facilities.

The business activities of energy entities on the oil and petroleum products market during the COVID-19 pandemic and after the earthquakes that hit Croatia were marked by a significant decrease in trade and, consequently, by a drop in the prices of petroleum products on the market (which only started to recover in the last quarter of 2020), resulting in poorer financial results of some energy entities. Not only did this lead to a stagnation of growth, but some planned capital investments for further business development were also postponed.

During the COVID-19 pandemic and after the earthquakes, energy entities from the oil and petroleum products sector implemented measures and activities to provide help to the earthquake-stricken areas by taking part in humanitarian actions and donating funds, hospital equipment, construction machinery, as well as by sending volunteers to clean the rubble left by the earthquake.

2.4 Thermal energy

The Thermal Energy Market Act (Official Gazette No. 80/13) introduced substantial changes to the regulation, organisation and functioning of the thermal energy sector and contributed to the development of the thermal energy market. However, it had no effects in terms of increased competition in thermal energy supply and thermal energy buyer activities as had been expected, and the entire sector suffered from problems regarding allocation and billing of thermal energy in apartment buildings.

In district and closed heating systems, the activity of thermal energy buyer and all energy activities related to the thermal energy sector are most often performed by the same vertically integrated energy entities. 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. According to the register of thermal energy buyers managed by HERA, the five largest energy entities (HEP-Toplinarstvo d.o.o., Zagreb, Gradska toplana d.o.o., Karlovac, GTG Vinkovci d.o.o., Vinkovci, BROD-PLIN d.o.o., Slavonski Brod, ENERGO d.o.o., Rijeka) performed the activity of thermal energy buyer for over 97% of final customers. In 2020, the register of thermal energy buyers included 46 legal or natural

persons, 70% of which actively performed the activity of thermal energy buyers. In 2020, five new business entities were recorded in the register, and one business entity was deleted from the register.

HERA issued five licences for thermal energy production and four licences for thermal energy supply. Much like in 2019, the licences issued in 2020 are primarily a result of the construction of cogeneration installations participating in the incentives system for promoting electricity production from renewable energy sources and high-efficiency cogeneration.

In 2020 HERA issued seven decisions granting eligible electricity producer status for new cogeneration installations using biogas and biomass. The majority of cogeneration installations 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).

Even though there are energy efficiency requirements in place for the facilities in the incentives system for the production of electricity from renewable energy sources and cogeneration, such installations are usually constructed in order to produce electricity in locations without any significant demand for thermal energy. However, there is an improving trend of a more efficient use of thermal energy in cogeneration installations with eligible electricity producer status, mostly due to the construction of drying facilities next to the installations.

Apart from the construction of cogeneration installations 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. More specifically, the total number of final customers of thermal energy, network length, as well as the installed capacity of production facilities of the existing energy entities, remained almost unchanged compared to the previous year.

The energy entities performing energy activities of thermal energy production and thermal energy distribution in district heating systems did not submit any requests in 2020 for setting tariffs for the production or distribution of thermal energy. However, the *Methodology for setting tariffs for thermal energy distribution (Official Gazette No. 56/14)* allows for a simplified change in tariff amounts for energy in case of changes in the price of fuel used for thermal energy production. In 2020, HERA received two such applications, submitted by the energy entity BROD-PLIN d.o.o. Following these applications, in 2020 tariffs were reduced in Slavonski Brod by 7.68% for the household tariff group, and by 14.41% for industrial and commercial consumers.

In order to ensure that the same price of gas is used in thermal energy production both for the final household customers of thermal energy and for the final household customers of gas, in 2019 the Croatian Government adopted the **Regulation on the amendment to the Thermal Energy Market Act (Official Gazette No. 86/19)**, which essentially continues the application of the previous **Regulation on the amendment to the Thermal Energy Market Act (Official Gazette No. 76/18)**. **The Regulation on the amendment to the Thermal Energy Market Act (Official Gazette No. 86/19)** expired at the end of 2020. However, due to a favourable situation on the gas market, in 2020 entities in the thermal energy sector already started to purchase gas for thermal energy production at prices lower than the prices for final household customers of gas.

There were no major legislative activities in the thermal energy sector in 2020.

In early 2020, the *Ordinance on the criteria for issuing energy approvals for production facilities (Official Gazette No. 5/20)* was adopted, which regulates the issuing of energy approvals for all production facilities generating electricity and/or thermal energy, including power plants, cogeneration installations and boiler stations.

As regards the incentives system for the production of electricity from renewable energy sources, the *Regulation on promoting electricity production from renewable energy sources and high-efficiency cogeneration*, adopted in late 2018, specifies the manner and conditions for the implementation of new incentive models for the production of electricity from renewable energy sources and high efficiency cogeneration. The *Regulation* does not provide for high efficiency cogeneration using natural gas. While the *Regulation on the Amendments to the Regulation on promoting electricity production from renewable energy sources and high efficiency cogeneration (Official Gazette, No. 60/20)*, adopted in 2020, brought some improvements, there were no changes to the categorisation of installations, meaning that there are still no incentives for high efficiency cogeneration using natural gas. Directly related to this, the *Regulation on quotas for promoting electricity production from renewable energy sources and high-efficiency cogeneration*, adopted in May 2020, specifies quotas for cogeneration installations using biomass and biogas, but it does not include high-efficiency cogeneration using natural gas, cogeneration installations using waste or other renewable fuels or cogeneration installations using waste heat from industrial processes, nor does it set quotas for installations using liquid fuels (which is essentially cogeneration).

In late 2020, HROTE organised its first call for tenders for the allocation of market premiums and guaranteed purchase prices for promoting renewable electricity production. With that call, the systematic allocation of state aid for production of electricity from renewable sources and cogeneration resumed after the expiry of the *Tariff system for the production of electricity from renewable energy sources and cogeneration (Official Gazette Nos. 133/13, 151/13, 20/14, 107/14 and 100/15)* at the end of 2015. Five contracts for biomass installations and five contracts for biogas installations were signed in the thermal energy sector as a result of the call for tenders.

Also, the *Regulation on the Amendments to the Regulation on promoting electricity production from renewable energy sources and high efficiency cogeneration (Official Gazette No. 60/20)* enabled further extension of previous decisions on awarding the eligible electricity producer status due to the circumstances caused by the COVID-19 pandemic. Specifically, it provided that, at the request of project promoters, previous decisions for facilities under construction may be extended for a period of no more than six months from the date of expiry of the previous decision.

As regards the eligible electricity producers, Article 25 of the **Renewable Energy Sources and High-Efficiency Cogeneration Act** provides for a regulation which determines the manner and criteria for granting and terminating the status of eligible electricity producer, as well as the technical and operational criteria for production facilities and/or generating units for which the status of eligible electricity producer is granted. This regulation is of particular significance for HERA, given the need to improve the procedure for granting the status of eligible electricity producer, clarify the technical conditions of use, address in detail the issue of determining the level of efficiency for cogenerations, and resolve other issues related to the status of eligible electricity producer.

Following the legislative activities in 2020, the **Act on Amendments to the Energy Efficiency Act (Official Gazette No. 41/21)** entered into force. Although these amendments relate primarily to the transposition of several EU directives, the changes introduced in the energy savings obligation scheme are important for energy entities in the thermal energy sector. Notably, provisions were introduced for the new cumulation period (period in which the implementation of measures is monitored), which runs from 1 January 2021 to 31 December 2030. At the same time, the *Ordinance on the energy efficiency obligation scheme (Official Gazette No. 41/19)* expired on the date of entry into force of that Act. Provisions from this ordinance have been included in the **Energy Efficiency Act** or will be included in the *Ordinance on the system for monitoring, measuring and verification of energy savings*, the proposal of which was put up for a public consultation in May 2021.

The changes in the energy savings obligation scheme that took place in late 2020 and early 2021 are part of continued efforts to eliminate the difficulties occurring in practice since 2019, which led to the adoption of the *Ordinance on the energy efficiency obligation scheme* in early May 2019, and the **Act on Amendments to the Energy Efficiency Act (Official Gazette No. 25/20)** and *Ordinance on the system for monitoring, measuring and verification of energy savings* (Official Gazette No. 33/20) in early 2020.

The energy efficiency obligation scheme obliges suppliers to implement energy efficiency measures in end use in the manner laid down in *Directive 2012/27/EU* and *Directive 2018/2002*. The **Energy Efficiency Act** provides for a gradual implementation of obligations according to which in 2019 the energy savings obligated parties were energy suppliers and their affiliates which in 2017 had supplied more than 300 GWh of energy, with the threshold being lowered to 100 GWh of energy in 2020, and finally to 50 GWh of energy in 2021. Entities in the heating sector subject to the obligation in 2020 were HEP-Toplinarstvo d.o.o., Zagreb, Brod-plin d.o.o., Slavonski Brod, and Energo d.o.o., Rijeka.

Following the earthquakes in 2020, the Croatian Government adopted the *Decision on the declaration of a state of disaster for areas affected by earthquakes (Official Gazette No. 1/21)*, which declared a state of disaster caused by the earthquakes in Sisak-Moslavina, Zagreb and Karlovac counties and adopted three resolutions for the use of heating systems in the areas affected by the earthquakes.

On 18 January 2020, the Croatian Government issued a decision instructing Hrvatska elektroprivreda d.d. to write off all receivables relating to the supply of energy and other receivables in the amount of a single bill for supplied energy together with accompanying fees for the months of January, February and March 2021, to household final customers whose properties were damaged in the series of earthquakes starting on 28 December 2020 in the areas of Sisak-Moslavina and Zagreb counties. Pursuant to that decision, the costs of HEP-Toplinarstvo in these areas were written off.

On 11 March 2020, the Croatian Government issued a decision instructing the Ministry of Economy and Sustainable Development to reimburse all buyers of thermal energy who have reported receivables for thermal energy supplied to household final customers affected by earthquakes in the areas of Sisak-Moslavina and Zagreb counties, equal to the amount of bills issued in the months of January, February and March 2021 for the purpose of repairing damages. A decision adopted on 25 March 2021 provided for the write-off and reimbursement of receivables for energy for April 2021. The costs of thermal energy will be reimbursed from the national budget.

3 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 Nos. 120/12 and 68/18)**, HERA's Statutes of 16 October 2013 and Amendments to the Statutes of 29 April 2019.

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 core operations.

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 units are organised 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 activities of the divisions related to the core operations, 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.

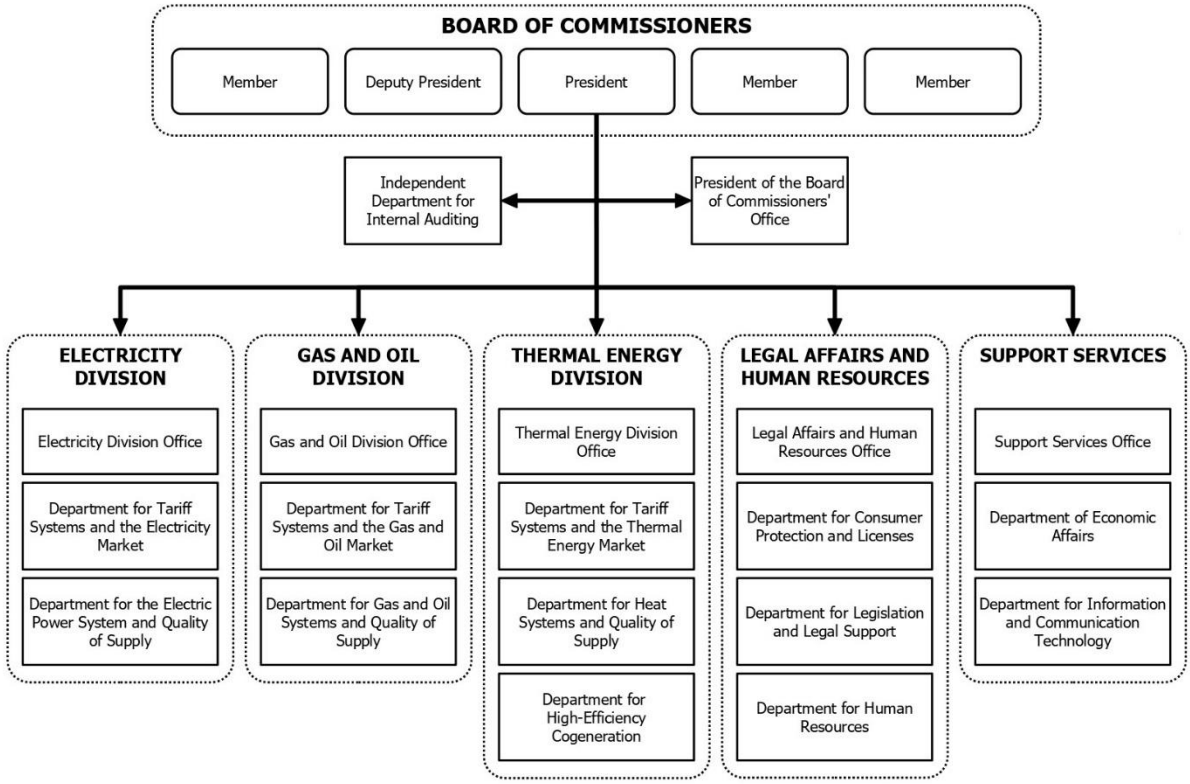

Figure 3.1.1 Organisational chart

Pursuant to the provisions of Article 8 of the **Act on the Regulation of Energy Activities (Official Gazette Nos. 120/12 and 68/18)**, HERA is accountable to the Croatian Parliament.

3.2 Legal framework

The legal framework regulating activities within HERA's area of competence includes 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, 68/18 and 52/19)**,
- **Gas Market Act (Official Gazette Nos. 18/18 and 23/20)**,
- **Thermal Energy Market Act (Official Gazette Nos. 80/13, 14/14 and 86/19)**,
- **Oil and Petroleum Products Market Act (Official Gazette Nos. 19/14, 73/17 and 96/19)**,
- **Act on Biofuels for Transportation (Official Gazette Nos. 65/09, 145/10, 26/11, 144/12, 14/14, 94/18 and 52/21)**,
- **Renewable Energy Sources and High-Efficiency Cogeneration Act (Official Gazette Nos. 100/15 and 111/18)**,

- **Energy Efficiency Act (Official Gazette Nos. 127/14, 116/18, 25/20 and 41/21)**,
- **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 specific energy markets.

In July 2018, the Croatian Parliament adopted the **Act on the Amendments to the Act on the Regulation of Energy Activities (Official Gazette No. 68/18)**, containing, *inter alia*, amended provisions concerning HERA's powers and obligations in terms of supervision over energy entities. The **Act on the Amendments to the Act on the Regulation of Energy Activities** 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. 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 (hereinafter: Regulation (EU) No 1227/2011 or REMIT Regulation*), charging the national regulatory authorities with additional tasks relative to monitoring transparency and functioning of the European energy market. The **Act on the Amendments to the Act on the Regulation of Energy Activities** from 2018 has 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**, and include the following:

- granting, renewing, and transferring licences for energy-related activities, and revoking and suspending of licences[21],
- supervision of energy entities in their performance of energy-related activities,
- supervision of the implementation of provisions on unbundling pursuant to the act governing the energy sector and the acts governing the performance of particular energy-related activities,
- supervision of the keeping of separate accounts, as provided by the act governing the energy sector and other acts governing specific energy markets,
- supervision of compliance with the provisions ensuring that there are no cross-subsidies between energy-related activities pursuant to the acts governing specific energy markets,
- supervision of compliance with the principles of transparency, objectivity, and impartiality in the work of energy market operators,

21 *Chapter "11 Appendix – Licences for energy-related activities" contains the lists of licences which were granted (58), extended (38) or have expired (34) in 2020 together with information about licences valid on 31 December 2020 (403 licences)*

- 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 the **Act on the Regulation of Energy Activities**, the act governing the energy sector and other acts 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 on the Regulation of Energy Activities**,
- approval of investment, development and construction plans for energy systems pursuant to the acts 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 on the Regulation of Energy Activities**, the act governing the energy sector, and other acts governing specific energy markets, as well as with Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 *(hereinafter: Regulation (EC) No 714/2009) and Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005 (hereinafter: Regulation (EC) 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 on the Regulation of Energy Activities,
- 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 on the Regulation of Energy Activities,
- 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 provide such data to the suppliers; all these services are 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 act 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 act governing the energy sector,
- encouraging the harmonisation of data exchange in the most important market processes at the regional level, and
- other activities.

Reports from the meetings of the Board of Commissioners and all decisions are regularly published on HERA's website.

In 2020, the Board of Commissioners held 30 meetings with a total of 377 agenda items discussed.

3.4 A general overview of HERA's activities and operations in 2020

3.4.1 Consumer protection

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

- by supervising the work of 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 special 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 acts and regulations governing specific energy markets.

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

During 2020, HERA received a total of 709 submissions from final customers, energy entities, energy customers, institutions and others, of which 24 were appeals, 383 complaints, 256 inquiries and 46 other submissions. A total of 8 court proceedings were initiated against HERA's actions in 2020 before the competent administrative court.

In addition, HERA was actively involved in the work of the National Consumer Protection Council, as well as in the development of the National Consumer Protection Programme for the period 2021 – 2024, with the aim to familiarise consumers in the energy sector with their rights and obligations and to present HERA as an authority that can be contacted in case any of their rights, that are guaranteed by regulations governing the energy sector, have been violated.

In 2020, 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 contacts with consumers by replying directly to consumer inquiries, resolving matters related to consumer rights and protection, etc.

3.4.2 Electricity

In 2020, HERA's activities in the electricity sector mainly involved the following:

- drafting and adopting by-laws governing the electricity market,
- implementing EU regulations,
- issuing decisions on tariffs based on methodologies applicable to energy entities performing electricity-related activities as a public service,
- approving and monitoring the implementation of ten-year development plans for the 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 application of rules on the management and distribution of cross-zonal transmission capacities and the compliance of capacity allocation regimes,
- regular monitoring of balancing energy settlements and imbalance settlements in order to improve the regulations on 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 the Council of 25 October 2011 on wholesale energy market integrity and transparency (hereinafter:* the *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),
- issuing 19 licences to perform energy activities (nine licences for electricity generation, two licences for electricity supply and eight licences for electricity trade),
- extending ten licences to perform energy activities (seven licences for electricity generation, one licence for electricity supply and two licences for electricity trade),
- issuing seven decisions granting eligible electricity producer status, two decisions altering the preliminary decision, ten decisions on planned changes of the conditions of the use of a production facility, one decision to extend the preliminary decision, and
- resolving 467 submissions, i.e., complaints, objections, inquiries, and other submissions in the field of electricity.

After consultation with the concerned stakeholders, HERA adopted the following regulations in 2020:

- *Amendments to the General terms and conditions for network use and electricity supply (Official Gazette No. 49/20)*,
- *General terms and conditions for network use and electricity supply (Official Gazette No. 104/20),*
- *Amendments to the Requirements for the quality of electricity supply (Official Gazette No. 16/20)*,
- *Amendments to the Methodology for setting electricity grid connection charges for new users and for increasing the connection capacity for existing users (Official Gazette No. 104/20).*

HERA issued the following decisions on tariff amounts:

- *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 28/20)* (for the period from 1 April to 30 June 2020),
- *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 68/20)* (for the period from 1 July to 30 September 2020),
- *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 98/20)* (for the period from 1 October to 31 December 2020),
- *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 131/20)* (for the period from 1 January to 31 March 2021).

HERA granted its prior approvals for the following regulations:

- prior approval for the *Proposal for Amendments to the Rules on electricity market organisation* of the energy entity Hrvatski operator tržišta energije d.o.o., Zagreb,
- prior approval for the *Proposal for Amendments to the Network Code fir the Distribution System* of the energy entity HEP-Operator distribucijskog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for Amendments to the Network Code for the Transmission System* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for the Methodology for calculating tariffs for the provision of ancillary services* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for the Rules on the application of standard load profiles* of the energy entity HEP-Operator distribucijskog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for the Rules on the allocation of intraday capacity for the border between the bidding zones of Hrvatski operator prijenosnog sustava d.o.o. (HOPS) and EMS AD Beograd (EMS)* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb.

HERA granted approvals or prior approvals for the following documents:

- approval for the *Annual energy procurement plan to cover losses in the transmission network for 2021* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- approval for the *Annual energy procurement plan to cover losses in the distribution network for 2021* of the energy entity HEP-Operator distribucijskog sustava d.o.o., Zagreb,
- prior approval for the *Annual report on the security of supply in the distribution system for 2019* of the energy entity HEP-Operator distribucijskog sustava d.o.o., Zagreb,
- prior approval for the *Annual report on the security of supply for 2019* of the energy entity Hrvatski operator prijenosnog sustava, Zagreb,
- prior approval for the *Proposal for the Ten-year (2020–2029) development plan for the HEP-ODS distribution network with a detailed elaboration of the initial three- and one-year periods* of the energy entity HEP-Operator distribucijskog sustava d.o.o., Zagreb.

HERA granted its prior approval for the following proposals for agreements and decisions:

- prior approval for the *Proposal for a long-term loan agreement No. 5/2019* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for an agreement on the use of the network for the Sklope hydropower plant No. 68/20* of the energy entity Hrvatski operator prijenosnog sustava, Zagreb,
- prior approval for the *Proposal for an agreement on electricity supply for a period of one year* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for a long-term loan agreement No. 7/2020* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for an agreement on the provision of ancillary services for 2021* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for an agreement on electricity supply to cover losses in the transmission network No. 3-00_/2020* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- prior approval for the *Proposal for a Decision on the appointment of a compliance officer* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb.

HERA issued the following decisions on issuing reports or approving the following documents:

- Decision on the adoption of the *Report on the use of revenues of Hrvatski operator prijenosnog sustava d.o.o. from the allocation of cross-zonal transmission capacities in 2019*,
- Decision approving the *Proposal for contributions to the costs of establishment, changes, and operation of single day-ahead and intraday coupling* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- Decision approving the *Common proposal of all transmission system operators for common settlement rules applicable to all intended exchanges of energy as a result of the frequency restoration process and the ramping period in accordance with Article 50(3) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- Decision approving the *Common proposal of all transmission system operators for common settlement rules applicable to all unintended exchanges of energy in accordance with Article 51(1) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,

- Decision approving the*Derogation from the obligations laid down in Article 53 of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- Decision approving the *Proposal for the third amendment to the regional design of long-term transmission rights of the Core region transmission system operators for capacity calculation in accordance with Article 4 (12) of Commission Regulation (EU) 2016/1719* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- Decision approving the *Proposal for a Methodology of the transmission system operators of the Core capacity calculation region for splitting long-term cross-zonal capacity in accordance with Article 16 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,
- Decision approving the *Proposal for a Test plan for equipment and capabilities relevant for the system defence plan and the restoration plan* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb,

Decision approving the *Derogation from the obligations laid down in Article 16(8) of Regulation (EU) 2019/943 of the European Parliament and the Council of 5 June 2019 on the internal market for electricity* of the energy entity Hrvatski operator prijenosnog sustava d.o.o., Zagreb.

3.4.3 Natural gas

Hera's activities in the gas sector in 2020 were aimed at fulfilling its obligations under the provisions of the **Gas Market Act.** More specifically, after public consultations in 2020 and in early 2021, HERA adopted the following documents:

- *Amendments to the General terms and conditions of gas supply (Official Gazette Nos. 50/18, 88/19 and 39/20),*
- *Amendments to the Network Code on the gas distribution system (Official Gazette Nos. 50/18, 88/19 and 36/20)*,
- *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20),*
- *Amendments to the Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette Nos. 48/18 and 79/20),*
- *Amendments to the Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette Nos. 34/18 and 14/20), and*
- *Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 108/20).*

and approved the following by-laws:

- *Amendments to the Network Code on the gas transmission system (Official Gazette Nos. 50/18, 31/19, 89/19 and 36/20),*
- *Amendments to the Storage Code (Official Gazette Nos. 50/18 and 26/20), and*
- *Rules on amendments to the Rules on operation of the liquefied natural gas terminal (Official Gazette Nos. 60/18, 39/20 and 136/20).*

and adopted the following decisions:

- *Decision on tariffs for gas transmission (Official Gazette No. 147/20),*
- *Decision on tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 144/20),*
- *Decision on tariffs for gas supply as a public service for the period from 1 September to 31 December 2020 and for the period from 1 January to 31 March 2021 for the energy entity HEP-PLIN d.o.o., Cara Hadrijana 7, Osijek (Official Gazette No. 94/20),*

- *Decision on tariffs for gas supply as a public service for the period from 1 November to 31 December 2020 and for the period from 1 January to 31 March 2021 for the energy entity DARKOM DISTRIBUCIJA PLINA d.o.o, Josipa Kozarca 19, Daruvar (Official Gazette No. 110/20),*
- *Decision on tariffs for gas supply as a public service for the period from 1 December to 31 December 2020 and for the period from 1 January to 31 March 2021 for energy entity E.ON Plin d.o.o., Capraška ulica 6, Zagreb (Official Gazette No. 122/20),*
- *Decision on tariffs for gas distribution for the energy entity HEP-PLIN d.o.o., Cara Hadrijana 7, Osijek (Official Gazette No. 94/20),*
- *Decision on tariffs for gas supply as a public service for the period from 1 April to 31 December 2020 and for the period from 1 January to 31 March 2021 (Official Gazette No. 16/20),*
- *Decision on tariffs for gas supply as a public service for the period from 1 April to 31 December 2021 (Official Gazette No. 28/21),*
- *Supplement to the Decision on tariffs for gas supply as a public service for the period from 1 April to 31 December 2021 (Official Gazette No. 33/21),*
- *Decision on establishing a regulatory account for the management of the liquefied natural gas terminal for the energy entity LNG Hrvatska d.o.o., Zagreb (HERA 12/20),*
- *Decision on the prices of non-standard services of liquefied natural gas terminal operators (Official Gazette No. 144/20),*
- *Decision on approval of the Ten-year development plan of the gas transmission system of the Republic of Croatia (2021–2030) of the energy entity PLINACRO d.o.o., Zagreb (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator EVN Croatia Plin d.o.o. for gas distribution, Zagrebačka avenija 104, Zagreb, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator HUMPLIN d.o.o. for gas distribution, Lastine 1, Hum na Sutli, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator DUKOM PLIN d.o.o. for gas distribution, Slavka Kolara 4, Dugo Selo, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PAKRAC-PLIN d.o.o. for gas distribution and supply, Ulica križnog puta 18, Pakrac, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator IVAPLIN d.o.o. for gas distribution and supply, Ulica Krešimira IV 10, Ivanić Grad, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator IVKOM-PLIN d.o.o. for gas distribution and supply, Vladimira Nazora 96/b, Ivanec, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the gas distribution system operator PLIN d.o.o. for gas distribution and supply, Mate Lovraka 30, Garešnica, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*

- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PAPUK PLIN d.o.o. for activities in the gas sector, Vladimira Nazora 14, Orahovica, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PLIN VRBOVEC d.o.o. for gas distribution and supply, Kolodvorska 29, Vrbovec, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator ČAPLIN d.o.o. for gas distribution, Sv. Andrije 14, Čazma, for the period from 1 April 2021 to 30 September 2024. (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator ZELENJAK PLIN d.o.o. for gas distribution and supply, Trg Antuna Mihanovića 1, Klanjec, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator ZELINA-PLIN d.o.o. za distribuciju plinom, Katarine Krizmanić 1, Sveti Ivan Zelina, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator GRADSKA PLINARA BJELOVAR d.o.o. for gas distribution, Blajburških žrtava 18, Bjelovar, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator RADNIK-PLIN d.o.o. for gas supply and distribution, Ulica kralja Tomislava 45, Križevci, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator KOMUNALIJA - PLIN d.o.o. for gas distribution and supply, Radnička cesta 61, Đurđevac, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PLINKOM d.o.o. for gas distribution, Vinogradska 41, Pitomača, for the period from 1 April 2021 to 30 September 2024. (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PLIN KONJŠČINA d.o.o. for gas distribution and supply, Bistrička cesta 1, Konjščina, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator DARKOM DISTRIBUCIJA PLINA d.o.o. for gas distribution, Josipa Kozarca 19, Daruvar, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator MEĐIMURJE-PLIN d.o.o. for gas supply, Obrtnička 4, Čakovec, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator KOPRIVNICA PLIN d.o.o. for gas*

distribution, Mosna ulica 15, Koprivnica, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),

- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator Brod-plin d.o.o. for construction and maintenance of the gas network, gas distribution and supply, thermal energy production, distribution and supply, Trg pobjede 5, Slavonski Brod, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator GRADSKA PLINARA ZAGREB d.o.o., Radnička cesta 1, Zagreb, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PLINARA d.o.o. for gas supply, Industrijska 17, Pula, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator GRADSKA PLINARA KRAPINA d.o.o. for gas distribution and supply, Frana Galovića 7 B/II, Krapina, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PLIN-PROJEKT d.o.o. for gas pipeline construction and gas distribution, Alojzija Stepinca 36, Nova Gradiška, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator ZAGORSKI METALAC d.o.o. for gas distribution and supply, Ulica Josipa Broza Tita 2/F, Zabok, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator MOSLAVINA PLIN d.o.o. for pipeline construction and gas distribution, Trg kralja Tomislava 6, Kutina, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator Montcogim - Plinara d.o.o. for distribution network construction, gas distribution and maintenance, Trg Ante Starčevića 3A, Sveta Nedelja, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator HEP-PLIN d.o.o. for gas distribution and supply, Cara Hadrijana 7, Osijek, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator ENERGO d.o.o. for the production and distribution of thermal energy and gas, Dolac 14, Rijeka, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator Termoplin dioničko društvo, Vjekoslava Špinčića 78, Varaždin, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20),*
- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator PLINARA ISTOČNE SLAVONIJE d.o.o. for gas distribution and supply, Ohridska 17, Vinkovci, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20), and*

- *Decision on selecting the gas supplier under the public service obligation for the distribution area of the distribution system operator ENERGO METAN d.o.o. for gas distribution i supply, Ulica Vlade Gotovca 2, Samobor, for the period from 1 April 2021 to 30 September 2024 (HERA 12/20).*

HERA also:

- issued an opinion on the Draft Proposal of the **Act on Amendments to the Gas Market Act** (HERA 01/2020),
- issued thirteen licences for gas trading activities,
- issued two licences for the energy activity of managing the liquefied natural and/or compressed natural gas supply points,
- extended three licences for gas trading activities,
- extended three licences for gas distribution activities,
- issued a decision on the transfer of one licence for gas supply activities, and
- resolved one complaint, 90 inquiries and 73 other submissions from final customers.

3.4.4 Oil and petroleum products

In 2020, HERA carried out the following activities in the oil and petroleum products sector:

- issued 15 licences for energy activities (12 licences for wholesale trade in petroleum products, one licence for the storage of oil and petroleum products and two licences for wholesale liquefied petroleum gas trade,) and
- extended 11 licences for energy activities (two licences for the storage of oil and petroleum products, three licences for wholesale trade in liquefied petroleum gas and six licences for wholesale in petroleum products), and
- issued a decision on the expiry of 11 licences for energy activities (eight licences for wholesale trade in petroleum products, one licence for the storage of oil and petroleum products, one licence for wholesale trade in liquefied petroleum gas and one licence for the storage of liquefied petroleum gas).

3.4.5 Biofuels

In 2020, HERA carried out the following activities in the biofuel sector:

- extended three licences for energy activities (one licence for the production of biofuels, one for wholesale trade in biofuels and one for the storage of biofuels),
- issued a decision on the expiry of two licences (one licence for the production of biofuels and one licence for the storage of biofuels).

3.4.6 Thermal energy

HERA issued the following expert opinions related to applicable legislation in the thermal energy sector:

- **Proposal of the Act on Amendments to the Energy Efficiency Act,**
- *Proposal for a Regulation on Amendments to the Regulation on promoting electricity production from renewable energy sources and high-efficiency cogeneration,*
- *Proposal for a Regulation on quotas for promoting electricity production from renewable energy sources and high-efficiency cogeneration,*

Following a public consultation on the internet portal *eSavjetovanje*, HERA communicated its expert opinions to the Ministry of Economy and Sustainable Development.

In 2020, the energy entities performing energy activities of thermal energy production and distribution in district heating systems did not submit any requests for setting tariffs

for the production or distribution of thermal energy. However, the *Methodology for setting tariffs for thermal energy production* (Official Gazette No. *56/14)* allows for a simplified change in energy tariffs in case of change in the price of the fuel used for thermal energy production. In 2020, HERA received two requests for tariff changes submitted by the energy entity BROD-PLIN d.o.o.

In addition, in 2020 HERA:

- issued nine licences for energy activities (five licences for thermal energy production and four licences for thermal energy supply),
- extended eight licences for energy activities (five licences for thermal energy production and three licences for thermal energy supply),
- registered five new entities in the Register of thermal energy buyers and updated the records on thermal energy buyers,
- issued decisions related to acquiring the eligible electricity producer status for cogeneration facilities, seven decisions on granting the eligible electricity producer status (five for biomass cogeneration and two for biogas), one decision denying the eligible electricity producer status, one decision amending the decision on granting the eligible electricity producer status and one decision refusing the transfer of rights and obligations under the decision on granting the eligible electricity producer status,
- resolved requests related to preliminary decisions granting the eligible electricity producer status for cogeneration plants, and issued nine decisions on the extension of a prior decision on granting the eligible electricity producer status, one decision denying the extension of a prior decision on granting the eligible electricity producer status and two decisions amending a prior decision on granting the eligible electricity producer status,
- issued five prior approvals for planned changes to the conditions of use of production facilities submitted by eligible electricity producers for biogas and biomass cogeneration facilities,
- issued four decisions on correcting irregularities related to the fulfilment of the conditions of use of the production facility for which a decision on granting the eligible electricity producer status was issued,
- supervised eligible electricity producers in fulfilling the energy efficiency requirements, issued five decisions on determining primary energy savings for high-efficiency cogeneration using natural gas and 48 decisions determining the total annual energy efficiency of biomass and biogas plants,
- resolved 78 submissions, of which four appeals, 29 complaints, 41 inquiries and four other submissions from final customers of thermal energy, authorised representatives of co-owners, energy entities, institutions, and other parties.

3.4.7 REMIT

The *REMIT Regulation*, which introduced a harmonised framework for monitoring the wholesale electricity and natural gas markets in the EU, was adopted by the European Parliament and the Council on 25 October 2011. Also adopted under the *REMIT Regulation* was *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*). According to the *REMIT Regulation*, a market participant means any person (natural or legal), including transmission system operators, who enters into transactions, including the placing of orders to trade, in one or more wholesale energy markets.

Under the single European framework in the wholesale electricity and natural gas markets, the *REMIT Regulation:*

- defines market abuse as market manipulation or an attempt to manipulate the market and use inside information in trading,
- introduces a clear prohibition of market abuse,
- provides that market participants have an obligation to publicly disclose inside information directly or indirectly related to wholesale energy products, which could significantly affect the prices of wholesale energy products,
- stipulates that ACER monitors wholesale markets and
- collects data at EU level.

In accordance with the *REMIT Regulation,* provisions have been incorporated into the legislative framework that give HERA the investigative and enforcement powers necessary to carry out these tasks.

Before delivering information on transactions and transaction orders on wholesale markets, participants in the wholesale energy market must register with the Centralised European Register of Energy Market Participants – CEREMP.

Market participants with business establishments in Croatia and those with business establishments outside of the European Union that are active on the wholesale market within Croatia must register with HERA unless they are already registered with a regulatory agency from another EU Member State where they are also active.

The registration of market participants in CEREMP was enabled by HERA in early 2015; by the end of 2019, around 100 participants in the electricity and/or natural gas markets were registered.

After registration, market participants must:

- publicly disclose inside information,
- submit to ACER and the national regulatory authority information on transactions carried out by electricity and natural gas producers, operators of the gas storage system or liquefied natural gas terminal operators with a sole purpose of covering current physical losses resulting from unplanned disruptions, when a market participant would not be able to meet the existing contractual obligations without such loss coverage, or if the measures are taken in agreement with the operator in question, or with the transmission system operators with a view to ensuring a secure and reliable system operation, and
- submit to ACER the records on transactions in the wholesale energy market, including orders to trade.

ACER plays a central role in the implementation of the *REMIT Regulation* by collecting data related to network status and allocations of cross-zonal capacities from transmission system operators, as well as data on transactions and transaction orders from market participants or directly from organised markets in the meaning of the *REMIT Regulation*. ACER analyses data from across the EU, detects potential abuses on the EU energy market and reports them to the competent regulatory authorities responsible for further investigation and possible sanctioning of market participants.

HERA will enable the receipt of all market-sensitive information from ACER, which will be accompanied by adequate IT and business intelligence solutions.

In order to provide timely information to relevant market participants, in 2020 HERA published a new electronic edition of its *REMIT HERA Newsletter*.

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

HERA continued to cooperate with regulatory agencies from Austria, Slovenia, Hungary, the Czech Republic and Poland, primarily with regard to exchange of experiences in the implementation of the *REMIT Regulation*.

3.4.8 Implementation of the Clean Energy for all Europeans package

The Clean Energy for all Europeans package (hereinafter: the Clean Energy Package, or CEP) aims to achieve the following EU objectives by 2030:

- the energy efficiency target has been increased to 32.5% in final energy consumption, with special emphasis on increasing efficiency in buildings as the largest energy consumer, responsible for 40% of final energy consumption and 36% of EU greenhouse gas emissions,
- the renewable energy target has been increased to at least 32% of final energy consumption from renewable energy sources,
- the greenhouse gas emissions target is to reduce emissions by at least 40%.

With their own national energy climate plans for 2021 – 2030, Member States are free to decide how to contribute to the objectives from the Clean Energy Package. The EU assess plans in order to ensure that all Member States collectively meet the commitments under the Paris Agreement.

The Clean Energy Package also aims to strengthen the rights of final customers through greater transparency of electricity bills, improved options and flexibility for supplier switches, introduction to the electricity market of active customers, aggregators[22], citizen energy communities, renewable energy communities and energy storage.

The Clean Energy Package addresses procedures for cross-border cooperation and the security of electricity supply as a response to demands for increased integration of renewable sources in the electricity system.

In March 2020, the Croatian Parliament adopted the ***Energy Development Strategy of the Republic of Croatia until 2030 with an Outlook to 2050***. The Integrated National Energy and Climate Plan, as the basic implementing document of the ***Strategy*** until 2030, specifies implementing measures to achieve the EU objectives on energy efficiency, renewable energy, and greenhouse gas emissions. The *Integrated National Energy and Climate Plan for the Republic of Croatia for the period from 2021 to 2030* is published on the Ministry's website.

Electricity sector

The most important documents in the Clean Energy Package are *Regulation (EU) 2019/943 of* the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (hereinafter: *Regulation (EU)*2019/943) and *Directive (EU) 2019/944 of the European Parliament and the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (hereinafter: Directive (EU) 2019/944)*.

Under *Regulation (EU) 2019/943*, transmission system operators are not allowed to limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing resulting from transactions internal to bidding zones. A minimum of 70% of the transmission capacity must be ensured for cross-zonal trade. The remaining 30% of the capacity can be used for reliability margins, loop flows and internal flows on each critical network element. *Regulation (EU) 2019/943* also enables the relevant regulatory

[22] *An aggregator is a natural or legal person who combines multiple consumer loads or generated electricity for sale, purchase or auction in any electricity market.*

authorities to grant a derogation (delayed application) on foreseeable grounds where necessary for maintaining operational security, at the request of the transmission system operators. After consultations with the regulators from the Core capacity calculation region[23] and at EU level, HERA granted to HOPS an exemption from this requirement for 2020 and 2021. The exemption was granted on the grounds of the time period required to develop software for capacity calculation, taking into account power flows inside and outside of the Core region, limited possibilities of redispatching potential and outages of network elements planned in the long term. *Regulation (EU) 2019/943* also stipulates that, where a derogation was granted, all relevant transmission system operators shall publish a methodology and projects providing a long-term solution to the issue that the derogation seeks to address. In March 2020, HOPS published a document on its website entitled *Methodology and projects providing long-term solutions to causes of derogations from the requirements laid down in Article 16(8) of Regulation (EU) 2019/943.*

Regulation (EU) 2019/943 provides that, by 5 January 2020, ENTSO-E shall submit to ACER a proposal specifying which transmission system operators, bidding zones, bidding zone borders, capacity calculation regions and outage coordination regions are covered by each of the system operation regions (SOR). The proposal must take into account the grid topology, including the degree of interconnection and of interdependency of the electricity system in terms of flows and the size of the region which covers at least one capacity calculation region. ACER's decision has defined five system operation regions: the Baltic SOR, the Nordic SOR, the IU SOR[24], the Central Europe SOR and the SEE SOR. The Croatian bidding zone falls under the Central Europe SOR. Further, *Regulation (EU) 2019/943* provides for the obligation to set up regional coordination centres (RCC) by 5 July 2020, including their tasks. RCCs complement the role of the transmission system operators by carrying out tasks of regional relevance assigned to them in accordance with *Regulation (EU) 2019/943*. The Central Europe SOR transmission system operators have submitted to the competent regulatory authorities a joint proposal to establish an RCC, which should be in place by 1 July 2022.

Further, *Regulation (EU) 2019/943* stipulates that by 1 January 2021, the imbalance settlement period shall be 15 minutes in all scheduling areas, unless regulatory authorities have granted a derogation or an exemption. Exemption requests are submitted for the period from 1 January 2021 to 31 December 2022, or by 1 January of the year following the fulfilment of the necessary requirements defined in the explanation of the request. In March 2020, HOPS submitted to HERA a request for an exemption from the application of the 15-minute imbalance settlement period, which it considered impossible to implement in the required time frame. In June 2020, HERA approved the request submitted by HOPS. In fact, to introduce the 15-minute imbalance settlement period, it is necessary to secure the data used by market participants to plan their operations at 15-minute intervals, adjust their IT systems, and ensure the capabilities of internal and cross-zonal electricity trade at 15-minute intervals. New *Rules on the application of standard load profiles* have been adopted (HEP-ODS, 12/2020) to apply the 15-minute imbalance settlement period. In accordance with *Regulation (EU) 2019/943*, in November 2020, ACER adopted a decision on the methodology and assumptions to be used in the bidding zone review process. The methodology is based on structural congestions which are not expected to be overcome within the following three years, taking due account of the actual progress on infrastructure development projects that are expected to be implemented within the following three years.

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23 *A region in the EU for the calculation of transmission capacities determined by cross-zonal borders and covering the following (borders marked with ISO country codes): FR-BE, BE-NL, FR-DE/LU, NL-DE/LU, BE-DE/LU, DE/LU-PL, DE/LU-CZ, AT-CZ, AT-HU, AT-SI, CZ-SK, CZ-PL, HU-SK, PL-SK, HR-SI, HR-HU, RO-HU, HU-SI, DE/LU-AT.*

24 *A SOR that takes account of the agreement regulating the relations between the United Kingdom and the European Union.*

In December 2020, in accordance with *Regulation (EU) 2019/943,* ACER decided on the approval of the methodology for the use of congestion income, proposed by all EU transmission system operators, aiming at harmonised use of such income at EU level.

The provisions of *Directive (EU) 2019/944* were to be implemented in Croatian legislation by 31 December 2020. The main novelties introduced by *Directive (EU) 2019/944* are the provisions on citizen energy communities, active customers, dynamic electricity price contracts, switching suppliers within 24 hours (no later than 2025), aggregation contracts, consumption management by aggregating consumption, a regulatory framework to incentivise flexibility in distribution networks, integration of electromobility, data management in distribution and transmission networks, and cooperation between system operators, ownership and management of energy storage facilities and devices for the provision of (balancing and non-frequency)[25] ancillary services, etc.

In 2020 ACER approved two methodologies developed by ENTSO-E in accordance with *Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC*, which is part of the Clean Energy Package. The *Methodology for identifying regional electricity crisis scenarios*, approved on 6 March 2020, defines electricity crisis scenarios in relation to system adequacy, system security and fuel security. The *Methodology for short-term and seasonal adequacy assessments*, approved on the same day, governs all short-term adequacy assessments, regardless of whether they are carried out at national, regional or EU level.

3.4.9 Council for Regulatory Affairs and Consumer Protection

In accordance with HERA's Statutes and *Rules of operation of HERA's Council for Regulatory Affairs and Consumer Protection*, the Council for Regulatory Affairs and Consumer Protection (hereinafter: the Council) is an advisory body 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 of 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 issues of significance to the energy sector in accordance with HERA's powers and responsibilities.

3.4.10 Cybersecurity

In 2015, the Croatian Government adopted the *National Cybersecurity Strategy and Action Plan for the Implementation of the Strategy (Official Gazette No. 108/15)*[26], aimed at achieving a balanced and coordinated response to security threats in the contemporary cyberspace. The term "cyberspace" means *"a virtual space in which communication between network and information systems takes place, and which includes all network and information systems, regardless of whether they are connected to the Internet"*[27].

25 *Balancing services used in Croatia include frequency containment reserve (FCR), automatic frequency restoration reserve (aFRR), manual frequency restoration reserve (mFRR) and imbalance netting (IN); non-frequency services include compensation for voltage regulation and reactive power control, fault-ride-through capability, black start, islanding capability and island operation.*

26 *Decision on the adoption of the National Cybersecurity Strategy and Action Plan for the Implementation of the Strategy (Official Gazette No. 108/15).*

27 *Act on the Cybersecurity of Essential Service Operators and Digital Service Providers (Official Gazette No. 64/18).*

Of particular significance for the energy sector is *Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information* (hereinafter: *the NIS Directive*), as well as the **Act on the Cybersecurity of Essential Service Operators and Digital Service Providers (Official Gazette No. 64/18** (hereinafter: **the Cybersecurity Act**) and the *Regulation on the cybersecurity of essential service operators and digital service providers Official Gazette No. 68/18)* (hereinafter: *Regulation on cybersecurity*), which have transposed the *NIS Directive* into Croatian legislation.

The *NIS Directive* provides for an obligation for Member States to put in place measures ensuring a high level of cybersecurity in essential service sectors, including energy (electricity, oil and gas). The above *Regulation on cyber security* defines the criteria for measuring the effect of incidents on the continuity of essential services. The criteria are as follows:

- number of users affected by an interruption of an essential service,
- duration of the incident,
- geographical extent of the incident, or
- other sector-specific criteria, such as the economic effect and dependence of other areas or activities on the service.

An operator of essential services, as defined by the **Cybersecurity Act**, is "*any public or private entity providing any of the essential services from the List in Annex I of the **Act**, where the provision of essential services by that entity depends on network and information systems, and where an incident would have a significant negative impact on the provision of the essential service.*"

The **Cybersecurity Act** specifies the procedures and measures for achieving a high common level of cybersecurity for essential service operators and digital service providers, the competences and authorities of the relevant sectoral bodies, the single national contact point, bodies responsible for incident prevention and protection (hereinafter: the CSIRTs) and the technical body for conformity assessment, the supervision of essential service operators and digital service providers in the implementation of the **Act**, and provides for penalties. The aim of the **Act** is to ensure the implementation of measures for achieving a high common level of cyber security in the provision of services that are of particular importance to essential social and economic activities, including the functioning of the digital market.

Annex I of the *Cybersecurity Regulation* sets out criteria and thresholds for assessing the negative impact of an incident for eight essential service sectors and their subsectors. The criteria and thresholds for assessing the negative impact of an incident on energy as an essential service are displayed in Table 3.4.1.

Table 3.4.1 Criteria and thresholds for assessing the negative impact of an incident on energy as an essential service

Sector	Subsector	Essential service	Criteria	Thresholds
Energy	Electricity	Production of electricity	Drop in production	60 MW
		Transmission of electricity	Interruption of transmission	No exceptions
		Distribution of electricity	Interruption in power supply	More than 20,000 billing metering points
	Oil	Transportation through pipelines	Interruption in transport	No exceptions
		Production of oil	Drop in oil field production	10,000 t/year
		Production of petroleum products	Drop in production of petroleum products	Motor gasoline: 40,000 t/year
				Diesel fuel: 40,000 t/year
				Gas oil: 20,000 t/year
		Storage of oil and petroleum products	Reduced oil storage capacity at the terminal	200,000 m^3
			Reduced storage capacity for petroleum products at a storage facility	12,000 m^3
	Gas	Distribution of gas	Interruption of distribution to final customers	More than 20,000 billing metering points
		Transportation of gas	Interruption in transport	No exceptions
		Gas storage	Reduced storage capacity	5% of gas consumption in Croatia in the preceding year
		Reception and dispatch of LNG	Drop in LNG regasification capacity in m^3/h	More than 100,000 m^3/h
		Production of natural gas	Drop in production of gas delivered to the transmission system at an entry point	20%

In accordance with the above definition, the **Cyber Security Act** distinguishes among several competent bodies for the operators of essential services, as defined in Annex lll of the **Cyber Security Act** (Table 3.4.2). These are the following:

- competent sectoral bodies (the government authority responsible for the energy sector is the Ministry of Economy and Sustainable Development),
- single national point of contact (Office of the National Security Council – UVNS),
- competent computer security incident response teams (CSIRTs) (Information Systems Security Bureau – ZSIS) and the National CERT (computer emergency response team), and
- technical body for conformity assessment (ZSIS and the National CERT).

Table 3.4.2 List of competent bodies for energy as an essential service

Essential service sector	Competent sectoral body authority	CSIRT	Technical body for conformity assessment
Energy	Government authority responsible for energy – Ministry of Environmental Protection and Energy	Information Systems Security Bureau (ZSIS)	Information Systems Security Bureau (ZSIS)

One of the obligations of the operators of essential services arising from the **Cybersecurity Act** and the *Cyber Security Regulation* is reporting to the competent CSIRT (ZSIS for the energy sector) on incidents that have a significant impact on the continuity of the services they provide. In accordance with the criteria for identifying incidents with a significant impact on the provision of an essential service, two Croatian CSIRTs (ZSIS and the National CERT) have developed *Guidelines for notifying incidents with a significant impact on*

essential service operators and digital service providers[28], including a protocol for reporting to the competent CSIRTs, criteria for defining significant impact, incident notification forms and other key information for a successful communication between the operators of essential services and the competent CSIRTs.

A comparison of data on the state of cybersecurity from the Cybersecurity Benchmark[29], published by CEER, shows that Croatia does not lag behind other Member States in terms of national cybersecurity legislation. In fact, in certain segments Croatia went a step further. Examples are the definition of an additional essential service sector, *business services for government bodies*, in addition to the mandatory seven sectors under the *NIS Directive*, and anticipation of a situation where the competent bodies required to conduct regular conformity assessments of the operators of essential services lack sufficient capacities in terms of either human resources or competences regarding cybersecurity audits, which is addressed with the term "technical body for conformity assessment", which is not provided for in the *NIS Directive*.

In June 2020, CEER published a document[30] on cybersecurity in the Clean Energy Package, highlighting that the EU has set out the priorities for addressing several cybersecurity topics in five legislative[31] acts in the framework of the CEP. The Clean Energy Package identifies all actors with a role to play in cybersecurity for the electricity sector. All actors have been provided with responsibilities and assignees that will take part in the work and in the discussions of the new branch of energy regulation. The EU has set a high priority on security for the "smart" part of the new grids and protecting the grid through good planning for crises that emerge and may become tangible risks. CEER states that while national regulatory authorities do not play an explicit role in cybersecurity topics in the CEP, they can influence the way forward, depending on their national power, by influencing financing and definition of objectives, and through CEER's involvement in the development of the *Network Code on Cybersecurity*, in agreement with other competent authorities responsible for this process.

The Second Interim Report of an informal task force for preparing guidelines for a Network Code on cybersecurity[32] highlights that the Network Code is based on five pillars, including functional security requirements, ISO/IEC 27001 certification, sharing of technical information (indicators of compromises), ensuring a product and system testing scheme, and assessment of cross-border and cross-organizational risks. The Report states that in order for all network participants to agree and accept the proposed Cybersecurity Network Code, the Code should demonstrate the following characteristics: (i) a cost-benefit ratio, where the benefits of implementing the Network Code must outweigh the costs; (ii) pragmatism, where network participants need to understand why some of the measures in the Network Code are necessary for the benefit of all; (iii) trust and awareness, where network participants need to understand that the common cross-border cybersecurity risk is the responsibility of all those connected to the grid; and (iv) a

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28 *Republic of Croatia, Information Systems Security Bureau: https://www.zsis.hr/UserDocsImages/Prijava_incidenata/Smjernice%20za%20dostavu%20obavijesti%20o%20incidentima%20sa%20znatnim%20učinkom%20operatora%20ključnih%20usluga%20i%20davatelja%20digitalnih%20usluga.pdf.*

29 *CEER Cybersecurity Work Stream (CS WS): Cybersecurity Benchmark, Ref: C19-CS-56-03, 18 December 2019, Available at: https://www.ceer.eu/documents/104400/-/-/f301a06f-2224-353f-fed9-eee50a10d78d.*

30 *CEER Cybersecurity Work Stream (CS WS): CEER Paper on Cybersecurity in the Clean Energy for All Europeans Package, Ref: C20-CS-58-03, 4 June 2020, Available at: https://www.ceer.eu/documents/104400/-/-/d70764d8-9cab-9f4a-848b-6c3a4e1bd6b0.*

31 *European Parliament and Council Directive on energy performance of buildings, 30 May 2018, Ref: 2018/844/EU; (2) European Parliament and Council Directive on energy efficiency, 11 December 2018, Ref: 2018/2002/EU; (3) European Parliament and Council Directive on common rules for the internal market in electricity, 5 June 2019, Ref: 2019/944/EU; (4) European Parliament and Council Regulation on the internal market for electricity, 5 June 2019, Ref: 2019/943/EU; (5) European Parliament and Council Regulation on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC, 5 June 2019, Ref: 2019/941/EU.*

32 *Network Code on Cybersecurity – Drafting Team: Second Interim Report – Recommendations for the European Commission on a Network Code on Cybersecurity, 31 October 2020*

risk-based approach, where a culture of risk management has been adopted in order to carry out appropriate controls to reduce new threats.

Chapter VII of *Regulation (EU) 2019/943 on the internal market for electricity* specifies the process of establishing network codes on cyber security. Since the entity of EU Distribution System Operators (EU DSO) has not yet been established, ENTSO-E is the only entity with full legal mandate to formally develop network codes. Due to the urgency of the matter and the need to equally include both distribution system operators and transmission system operators in the initial process, an informal development process was selected at first that comprised representatives of six distribution system operators and six transmission system operators. Based on current timelines, the EU DSO entity should become operational in the third quarter of 2021, when it will have a legal mandate to draft network codes, and the Network Code on Cybersecurity should be established in line with the formal adoption procedure.

4 ELECTRICITY

4.1 Legal framework for the electricity market

In February 2020, the Croatian Parliament adopted the ***Energy Development Strategy of the Republic of Croatia until 2030 with an Outlook to 2050***, which represents a step towards achieving a low carbon energy vision and enables a transition to a new energy policy ensuring an accessible, secure and quality energy supply without placing an additional burden on the state budget under state aid and incentives.

In February 2020, HERA adopted the *Amendments to the Requirements for the quality of electricity supply (Official Gazette No. 16/20)*, which improves the calculation of the average duration of supply interruption per consumer.

In March 2020, HERA adopted the *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 28/20)*, applied as of 1 April 2020.

In March 2020, HROTE, having obtained HERA's prior approval, adopted the *Amendments to the Rules on electricity market organisation (Official Gazette No. 36/20)* to enable legal and natural persons to deliver electricity to the electricity network during test runs of their facilities.

In April 2020, HERA adopted the *Amendments to the General terms and conditions for network use and electricity supply (Official Gazette No. 49/20)*, terminating penalties for excess peak loads and redefining peak load calculation during onset and termination of exceptional circumstances in order to partly alleviate the position of entrepreneurs and businesspeople – consumers of electricity – in the Republic of Croatia in the situation caused by the COVID-19 pandemic.

In April 2020, HEP-ODS, having obtained HERA's prior approval, adopted the *Amendments to the Network Code for the distribution system (Official Gazette No. 52/20)*.

In May 2020, the Croatian Government adopted the *Regulation on the criteria for the payment of a reduced renewable energy sources and high efficiency cogeneration charge (Official Gazette No. 57/20)*, specifying the obligatory contents of the application to establish eligibility for reduced charge payment for renewable energy sources and high efficiency cogeneration.

In May 2020, the Croatian Government adopted the *Regulation on quotas for promoting electricity production from renewable energy sources and high efficiency cogeneration (Official Gazette, No. 57/20*, specifying quotas for renewable electricity production and high efficiency cogeneration incentives, to be used in calls for tenders for the allocation of market premiums and guaranteed feed-in tariffs.

In May 2020, the Croatian Government adopted the *Regulation on the Amendments to the Regulation on promoting electricity production from renewable energy sources and high efficiency cogeneration* (*Official Gazette No. 60/20*), which governs incentives for innovative technologies.

In May 2020. The Croatian Government adopted the *Decision on the Amendment to the Regulation on the renewable energy sources and high efficiency cogeneration charge* (*Official Gazette No. 57/20*), which introduces exceptions for charges on renewable energy sources and cogeneration for final customers required to obtain greenhouse gas emission permits and final customers entitled to a reduced charge.

In June 2020, HERA adopted the *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 68/20)* implemented as of 1 July 2020.

In August 2020, HERA adopted the *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 98/20)* implemented as of 1 September 2020.

In September 2020, HOPS, having obtained HERA's prior approval, adopted the *Methodology for establishing prices for the provision of ancillary services* (HOPS, 6/2020) which lays down the method for the pricing of ancillary services supplied by the dominant ancillary service provider.

In September 2020, HERA adopted the *General terms and conditions for network use and electricity supply (Official Gazette No. 104/20)*, one of the fundamental by-laws in Croatia's electricity sector specifying the relationship between electricity network users and network service providers (distribution and transmission), i.e., electricity suppliers.

In September 2020, 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* (*Official Gazette No. 104/20)* for the purposes of harmonisation with the General Terms and Conditions.

In October 2020, HOPS, having obtained HERA's prior approval, adopted the *Amendments to the Network Code for the transmission system (Official Gazette No. 128/20)*.

In November 2020, HERA adopted the *Decision on tariffs for guaranteed electricity supply (Official Gazette No. 131/20)*, applied as of 1 January 2021.

In December 2020, HEP-ODS, having obtained HERA's prior approval, adopted the new *Rules on the implementation of standard load profiles (HEP-ODS, 12/2020)* which, in addition to the implementation of standard load profiles, set out the new method of determining anticipated final customer consumption for the forthcoming semi-annual billing period, anticipated monthly consumption for the forthcoming semi-annual billing period and the method for determining the loss coefficient in the distribution network.

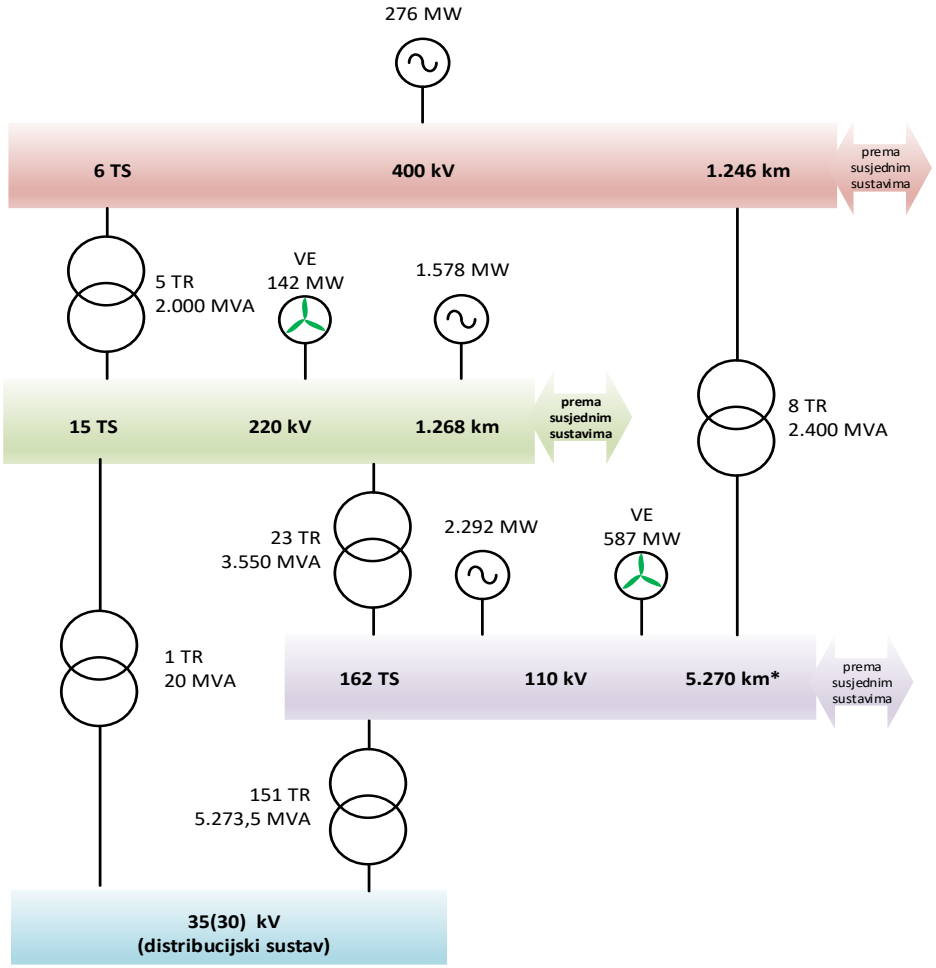
4.2 Regulated network activities and the technical features of the electricity system

4.2.1 Transmission and distribution system

Transmission and distribution of electricity 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.

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 is shown in Figure 4.2.1.



**110 kV medium voltage transmission lines are not included*

Source: HOPS

Figure 4.2.1 Basic information on the transmission system as of 31 December 2020

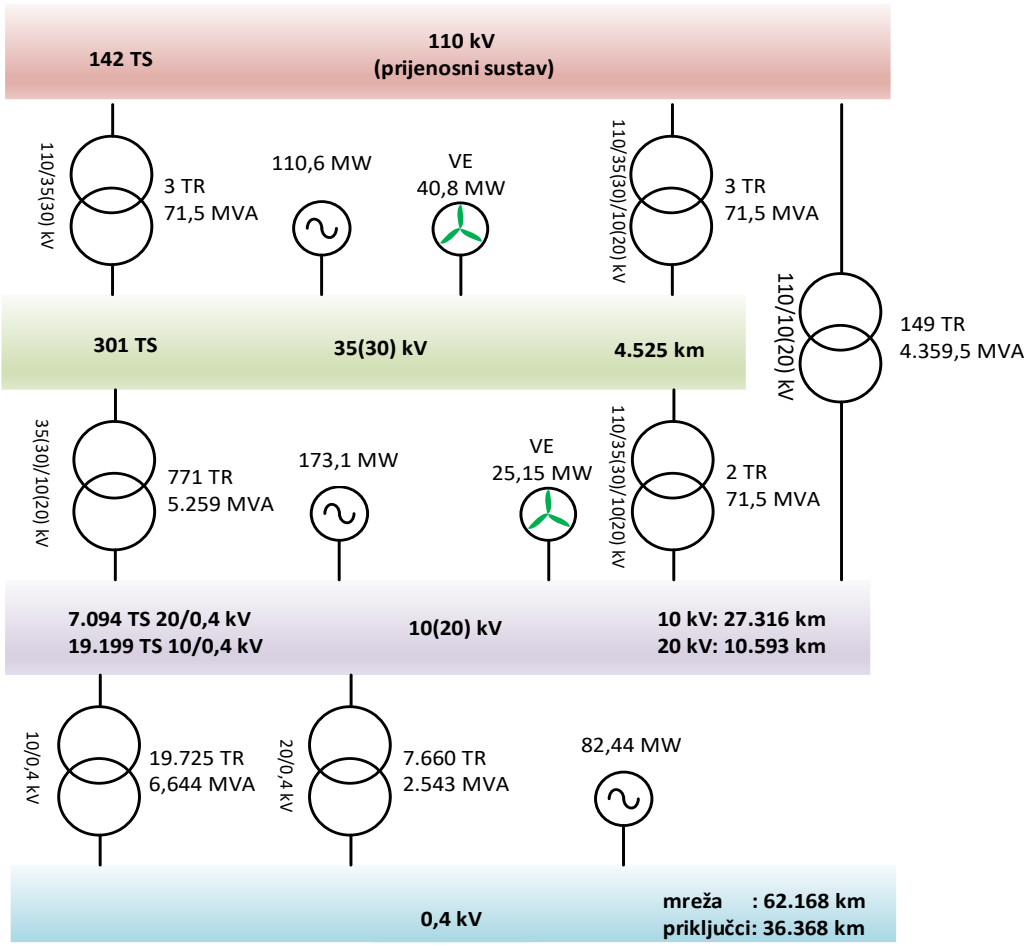
In Croatia, HEP-ODS provides the public service of electricity distribution, and is responsible for the operation, management, maintenance, development, and construction of the distribution network, as well as for ensuring the long-term capability of the network to satisfy reasonable requirements for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

Indicators for the transmission and distribution system in Croatia from 2016 to 2020 are shown in Table 4.2.1.

Table 4.2.1 Indicators for the transmission and distribution system in Croatia from 2016 to 2020

Indicator	2016	2017	2018	2019	2020
Maximum daily electricity consumption (in GWh/day)	59.0	63.1	64.6	61.4	57.3
Number of transmission system operators	1	1	1	1	1
Transmission network length (km)	7,660	7,683	7,791	7,758	7,785
Number of distribution system operators	1	1	1	1	1
Distribution network length (km)	141,345	140,436	138,789	140,067	140,969

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 is shown in Figure 4.2.2.



Source: HEP-ODS

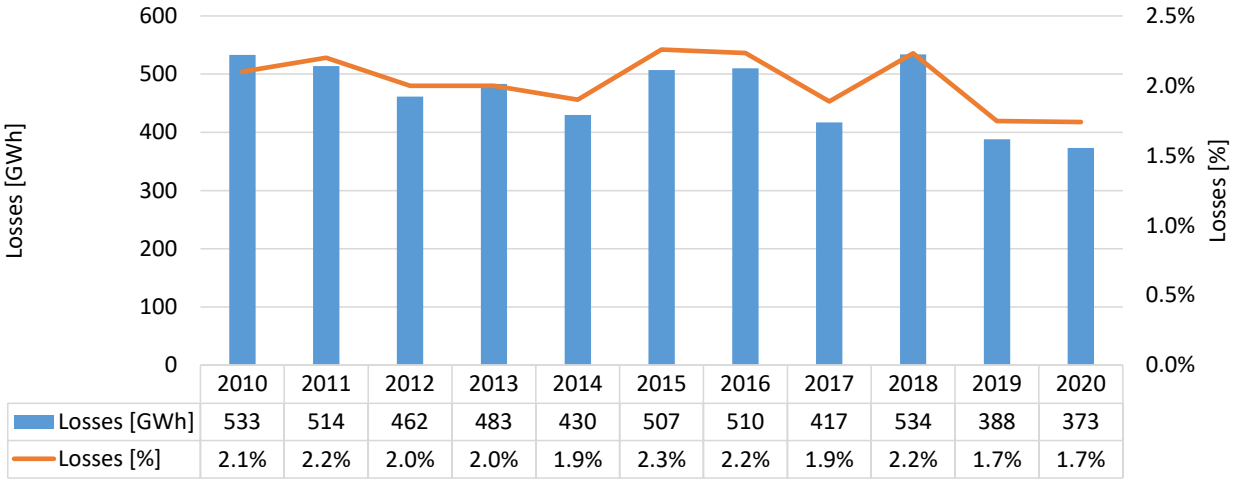
Figure 4.2.2 Basic information on the distribution system as of 31 December 2020

4.2.2 Losses in the transmission and distribution networks

Losses in the transmission network in 2020

Power losses in the transmission network in 2020 amounted to 373 GWh, or 1.7% of total transmitted electricity (21,432 GWh).

Losses in the transmission network from 2010 to 2020 are shown in Figure 4.2.3.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Losses [GWh]	533	514	462	483	430	507	510	417	534	388	373
Losses [%]	2.1%	2.2%	2.0%	2.0%	1.9%	2.3%	2.2%	1.9%	2.2%	1.7%	1.7%

Source: HOPS

Figure 4.2.3 Power losses in the transmission network from 2010 to 2020

The absolute power losses were lower in 2020 than in 2019, whereas the relative power losses remained the same. According to HOPS, this was a result of the COVID-19 pandemic, which caused a significant decline in economic activity in all sectors. Furthermore, with a lower hydroelectricity production and lower imports, the total transmitted electricity was the lowest since 2010, which resulted in low loss values.

To cover losses in the transmission network in 2020, electricity was purchased on market principles by long-term contracts concluded on the basis of a public auction with given quantities and the lowest price criterion, as well as short-term trade on CROPEX.

In the long term, in 2020 HOPS purchased energy through ten contracts divided across 16 products, concluded with energy entities HEP d.d., HOLDING SLOVENSKE ELEKTRARNE d.o.o., HROTE d.o.o., GEN-I Hrvatska d.o.o. and Danske Commodities A/S. On an annual basis, HOPS purchased 25 Mwh/h alongside 5 Mwh/h in the first quarter and 10 Mwh/h in the second quarter of 2020.

In the short term, HOPS traded on the CROPEX intraday and day-ahead markets.

Costs associated with the procurement of electricity to cover losses partly relate to the cost of imbalance in the procurement of losses.

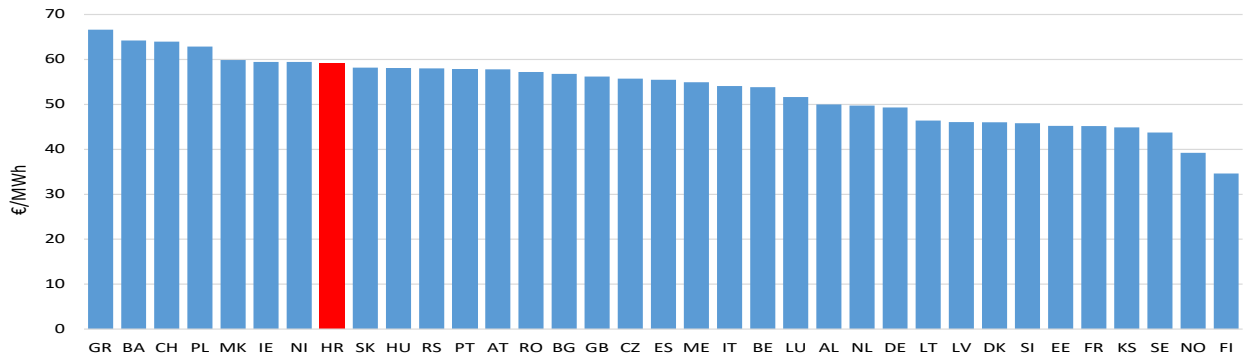
Costs associated with the procurement of electricity to cover losses in the transmission network in 2020 are shown in Table 4.2.2.

Table 4.2.2 Costs associated with the procurement of electricity to cover losses in the transmission network in 2020

Item	Volume [GWh]	Cost [HRK mil.]	Unit cost [HRK/MWh]	Unit cost [EUR/MWh]	Share in volume [%]	Share in cost [%]
Long-term contracts	252.4	105.8	419.41	55.70	67.6	73.0
Short-term trade on CROPEX	111.1	34.8	313.59	41.65	29.8	24.0
Imbalance settlement	9.7	4.4	452.58	60.10	2.6	3.0
Incurred losses	**373.1**	**145.1**	**388.77**	**51.63**	**100.0**	**100.0**

**Based on average exchange rate in 2020: 1 EUR = 7.53 HRK*

Figure 4.2.4 provides a price comparison for the ITC Agreement[33], 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 2020 across several countries.



Source: ENTSO-E

Figure 4.2.4 Unit prices to compensate for losses under the ITC mechanism in 2020

33 *ITC, ITC Agreement, ITC mechanism – European inter-transmission system operator compensation mechanism.*

Observations on losses in the transmission network for 2020

The 2020 energy procurement plan to cover losses in the transmission network anticipated 454 GWh of losses, which is significantly higher than the actually incurred losses. Over the years, HERA has repeatedly warned of the significant differences between planned and incurred losses, which have been even more prominent in the last two years (a difference of around 80 GWh between planned and incurred loss values) and has encouraged HOPS to enhance its loss planning methodology.

In addition to its request for the approval of the annual energy procurement plan to cover losses in the transmission network for 2021, HOPS has submitted the *Methodology for the development of the annual energy procurement plan to cover losses in the transmission network*. This internal document defines three scenarios (low, middle, and high). However, the values of planned losses are still calculated solely on the basis of mean historical values. This leads to inaccurate calculations of planned losses, especially in years marked by exceptional circumstances (a good example is 2020 due to the COVID-19 pandemic).

The planned total cost associated with the procurement of electricity to cover losses in the transmission network in 2020 was HRK 201 million, with a unit cost of HRK 443 per MWh. With a lower unit cost and fewer incurred losses, HOPS's total cost of losses was significantly lower (HRK 145 million).

HOPS's *Methodology* also lays down the method for calculating the planned price of electricity procured to cover losses. In addition to a few objections regarding the calculation of the short-term procurement price, HERA also pointed out that HOPS did not take into consideration the planned values from settled imbalances when calculating the planned price. Experience has shown that settled imbalances can represent a large share in the total cost of energy to cover losses.

In late 2020, HERA approved the energy procurement plan to cover losses for 2021, which anticipates losses in the amount of 455 GWh, while the planned procurement price to cover for them amounts to HRK 404 per MWh. To calculate this price on the basis of the *Methodology*, HOPS used the prices from already concluded long-term contracts for 2021 and average CROPEX prices. In its decision, HERA supported the *Methodology* and expects its improvement in the upcoming years.

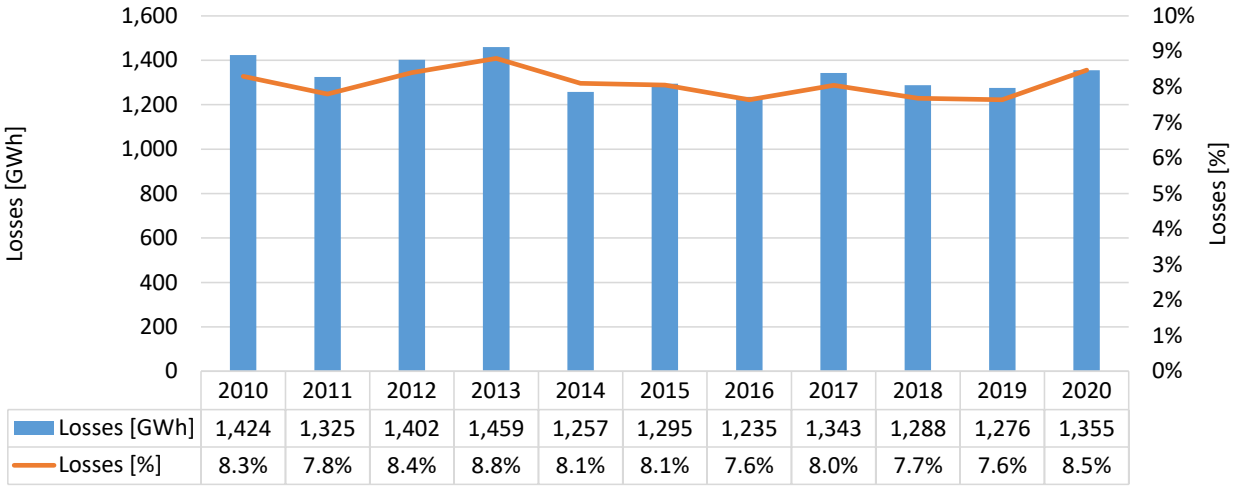
In the last two years, HOPS has improved the procurement process for energy used to cover losses (auctioning via the CROPEX platform, shortening the time required to accept bids, dividing procurement into various products, etc.), which has attracted more market participants to participate in public auctions and has resulted in a selection of bids from several market participants (five participants in 2020). One of these energy entities is HROTE, which offers energy from the incentives system (as a balance responsible party of the EKO balance group). With an increase in the number of products, HOPS has also started to procure long-term products through shorter time contracts – two contracts for the first quarter and two contracts for the second quarter of 2020. In 2020, HOPS conducted its first one-month procurement (January 2021).

The share of short-term procurement in the total procurement of energy to cover losses has increased in 2020. An increase is also planned for 2021. HOPS justifies this with lower prices on the electricity market. Table 4.2.2. also shows a lower unit cost for short-term procurement in relation to long-term procurement.

Losses in the distribution network in 2020

The power losses in the distribution network in 2020 amounted to 1,355 GWh or 8.5% of electricity taken up by the distribution network from the transmission network and from the electricity producers in the distribution network (15,999 GWh). The absolute and relative values of these losses are higher than the losses in 2019. These are also the highest losses recorded since 2013.

Losses in the distribution network from 2010 to 2020 are shown in Figure 4.2.5.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Losses [GWh]	1,424	1,325	1,402	1,459	1,257	1,295	1,235	1,343	1,288	1,276	1,355
Losses [%]	8.3%	7.8%	8.4%	8.8%	8.1%	8.1%	7.6%	8.0%	7.7%	7.6%	8.5%

Source: HEP-ODS

Figure 4.2.5 Power losses in the distribution network from 2010 to 2020

The procurement of necessary quantities of energy to cover losses in the distribution network for 2020 was carried out via a public auction in the form of a single long-term product. The quantities used in the calculation were determined at the beginning of each month and the price was calculated using 75% of the winning auction price and 25% of the price from the second provisional imbalance settlement (the sum of the product of the hourly load value of the distribution system and the hourly price on the CROPEX day-ahead market divided by the sum of the hourly load values of the distribution system).

In 2020, unlike the previous years, HEP-ODS did not pay for the market positioning services nor did it transfer the cost of imbalance to the supplier. Rather, HEP-ODS carried out its own procurement planning and bore all related costs (positive and negative financial liabilities in accordance with the *Rules on electric power system balancing*, in the first and second imbalance settlements).

The costs associated with the procurement of energy to cover losses in 2020 are shown in Table 4.2.3.

Table 4.2.3 Costs associated with the procurement of energy to cover losses in the distribution network in 2020

Item	Volume [GWh]	Cost [HRK mil.]	Unit cost [HRK per MWh]	Unit cost* [EUR per MWh]	Share in volume [%]	Share in cost [%]
Contract	1,271.8	564.67	443.99	58.96	93.8	95.8
Imbalance settlement	83.6	24.98	298.71	39.67	6.2	4.2
Incurred losses	**1,355.4**	**589.65**	**435.03**	**57.77**	**100.0%**	**100.0%**

** Based on average exchange rate in 2020: 1 EUR = 7.53 HRK*

Observations on losses in the distribution network for 2020

The absolute values of incurred losses correspond to the values provided in the plan for the procurement of energy to cover losses in the distribution network for 2020 (1,340 GWh). Relative losses were 0.5% higher due to less energy taken up by to the distribution network, which is used to calculate the share of losses.

The problem associated with unrealistic monthly loss coefficients resulting from equal (linear) anticipated monthly consumption values is still present in 2020. However, the new

Rules on the implementation of standard load profiles introduced some changes in relation to the calculation of monthly loss coefficients:

- The value of total energy charged for calendar months in 2017, 2018, 2019 and 2020 that is used to determine loss coefficients will be calculated from unequal (non-linear) anticipated monthly consumption values in those calendar months, which should render more realistic loss coefficients.
- A minimum monthly loss coefficient value of 4.3% has been introduced.
- HEP-ODS can adjust monthly loss coefficients by ±5 percentage points for the upcoming year during a force majeure event or during a transition period (not later than 31 December 2022) taking into account the minimum value of 4.3%.

The new *Rules on the implementation of standard load profiles* introduce, among other things, unequal monthly consumption values which should be applied from 1 August 2021. Because of these changes, the new monthly loss coefficients should be more realistic and significantly different from the coefficients determined using the old *Rules*. The possibility of a ±5 percentage point correction in determining monthly coefficients has been retained during the transition period in order to bring the new coefficients closer to the values from the old *Rules* and provide some relief to suppliers who still have to use equal anticipated monthly consumption values in that period.

Regarding the costs associated with the procurement of electricity to cover losses in the distribution network, the 2020 plan anticipated a total cost of HRK 671 million, with a unit cost of HRK 501 per MWh. Despite the newly introduced independent planning and the obligation to cover imbalance costs, the total cost and unit cost associated with the losses are significantly lower than expected. However, compared to HOPS, the unit cost is higher by HRK 64 per MWh. This is also due to the fact that, because it uses equal anticipated monthly consumption values[34], HEP-ODS purchases more energy to cover losses in January, when it is the most expensive.

In late 2020, HERA approved the energy procurement plan to cover losses for 2021, which anticipated losses in the amount of 1,275 GWh, while the planned procurement price to cover these losses amounts to HRK 420 per MWh. The planned amount was calculated using the *Rules on the implementation of standard load profiles* and the price was determined from already concluded long-term contracts for 2021 and the Hungarian futures exchange (HUDEX).

By bearing the costs of imbalances for energy losses, HEP-ODS aims to reduce the risk for market participants who participate in public auctioning for the procurement of electricity to cover losses in the distribution network. Procurement is divided into two products (basic and variable) and has been conducted for the three upcoming years. The amount of energy in the basic product for the upcoming three years averages almost 80 MWh/h, without the possibility to submit a tender lower than the total amount. The quantity and the price of the variable product are not known in advance. HEP-ODS notifies the supplier of the quantity of energy a day ahead. Only one tenderer submitted a tender for both products.

In the *Decision on the approval of the Annual energy procurement plan to cover losses in the distribution network for 2021*, HERA instructed HEP-ODS to organise a workshop with market participants with the goal of encouraging and enabling more tenderers to participate in the auction for the procurement of energy to cover losses.

In early 2020, on the basis of the monthly data submitted by HEP-ODS, HERA established a systematic monthly monitoring of the quantity, price and cost of the procurement of energy to cover losses in the distribution network. A similar monitoring system was established for HOPS. Such systematic monitoring will enable HERA to monitor funds used

[34] *The semi-annual billing period includes months with different average temperatures and, consequently, with different energy consumption values.*

for the procurement and quantity of the electricity to cover losses in the transmission and distribution networks on a monthly basis.

In 2020, HERA commissioned a study entitled *Guidelines for the regulatory treatment of power losses in the distribution and transmission networks in Croatia* to analyse the current treatment of costs and losses contained in the costs for setting tariffs for network use and propose improvements, which is also closely related to the planning and procurement of electricity to cover losses.

In March 2020, CEER published its second report on power losses entitled *2nd CEER Report on Power Losses*[35]. Compared to the first report from 2017, eight countries of the Energy Community have been included, increasing the number of analysed countries to 35. HERA's representatives submitted data and participated in the preparation of the report as part of CEER's Energy Quality of Supply Work Stream (EQS WS) working group.

4.2.3 Development and optimisation of the transmission and distribution networks

Ten-year development plan for the transmission network (2021 – 2030)

HERA received and approved a draft *Ten-year development plan for the transmission network 2021 - 2030, with a detailed elaboration of the initial three- and one-year periods* in September 2020 and March 2021, respectively.

In the upcoming ten-year period (2021 – 2030), HOPS plans to invest approximately HRK 4.9 billion financed from its own sources, HRK 51 billion from already allocated EU funds (primarily for the SINCRO.GRID project[36]), HRK 944 billion from EU funds and HRK 3.2 billion from the connection charge or EU funds. The total value of planned investments for the ten-year period amounts to HRK 9.1 billion. HOPS plans to apply for funding through the Ministry to finance investments in energy transition and digitalization worth approximately HRK 4 billion.

Annual investments in the HOPS network from 2016 to 2020 are shown in Table 4.2.4. In that period, investments averaged HRK 476 billion per year. In 2020, HRK 577 billion were invested in the transmission network.

Table 4.2.4 Annual investments in the transmission network from 2016 to 2020 in million HRK

Type of investment	2016	2017	2018	2019	2020
Investment preparation	12.6	8.9	12.3	18.3	16.1
Replacements and reconstruction	166.2	159.6	161.6	262.8	229.3
Revitalisations	59.0	72.5	72.0	105.5	78.0
New facilities	71.1	85.9	97.1	103.9	185.0
Other investments	34.9	55.3	60.7	31.3	38.5
Electric power grid conditions and connections	33.7	61.1	18.8	36.7	30.4
Total	**377.5**	**443.3**	**422.5**	**558.5**	**577.3**

Source: HOPS

Ten-year development plan for the distribution network (2021 – 2030)

In September 2020, HEP-ODS submitted for HERA's prior approval the *Ten-year development plan (2021 – 2030) for the HEP-ODS distribution network with a detailed*

35 *2nd CEER Report on Power Losses, 23 March 2020, https://www.ceer.eu/documents/104400/-/-/fd4178b4-ed00-6d06-5f4b-8b87d630b060.*

36 *The project is co-financed from CEF. Its aim is to improve voltage quality in the electricity system and to implement dynamic line rating through advanced technical systems and algorithms.*

elaboration for the initial three- and one-year periods. In March 2021, HERA adopted the *Decision on granting prior approval for the plan proposal*.

Total planned financial investments in the development of the distribution network for the ten-year period (2021 – 2030) are worth approximately HRK 12 billion, of which investments conditional on connecting new users to the network and increasing the connection capacity of existing users account for approximately HRK 4 billion.

Annual investments in the HEP-ODS network from 2016 to 2020 are shown in Table 4.2.5. In that period, investments averaged HRK 961 billion per year. Total investments significantly increased in 2020 as a result of an increase in replacement and reconstruction investments as well as investments in electricity (technical) network conditions and in the connection.

Table 4.2.5 Annual investments in the distribution network from 2016 to 2020 in million HRK

Type of investment	2016	2017	2018	2019	2020
Investment preparation	20.0	27.9	11.1	6.8	21.5
Replacements and reconstruction	268.9	228.0	206.1	223.4	311.7
Revitalisations	21.9	19.2	23.3	15.6	25.6
Repairs and renovations	0.4	0.1	2.3	0.5	0.1
New facilities	153.2	126.9	138.2	132.4	119.8
Other investments and development	191.3	208.2	191.6	193.5	231.8
Electric power grid conditions and connections	301.1	313.3	305.0	378.3	386.5
Total	**956.8**	**923.5**	**877.6**	**950.5**	**1,097.0**

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 harmonising their plans in terms of construction progress and financing of joint facilities (TS 110/x kV).

In the ten-year development plan for the transmission network, all projects specified in TYNDP 2020[37] were considered in the same way as other HOPS investments.

SINCRO.GRID was declared as a PCI project[38] of common interest for the European Union with 51% of the project value financed through CEF grants.

This investment into the 220 kV network in Croatia includes the deployment of three 220 kV reactive power compensation devices (VSR and SVC) in TS Konjsko, TS Melina and TS Mraclin, deployment of advanced dynamic thermal rating systems and deployment of a virtual cross-border control centre (VCBCC) for voltage optimisation in the Croatian and Slovenian transmission systems. Installation of 550 Mvar reactive power compensation devices is planned for:

- TS Konjsko, SVC technology of 250 Mvar
- TS Melina, VSR technology of 200 Mvar
- TS Mraclin, VSR technology of 100 Mvar

The approved ten-year plan for the period 2021 – 2030 takes into account Croatia's obligations and strategic priorities in the take up of renewable energy.

37 *Ten-Year Network Development Plan – 10-year development plan for EU transmission networks from 2020*

38 *PCI – Projects of Common Interest*

For the concerned ten-year period, interest has been expressed in new connections/increase in connection capacity by more than 7,000 MW of production, mostly from renewable energy sources. The newly connected power plants would mostly be located in Dalmatia. Their connection is dependent on the technical requirements in the 110 kV, 220 kV and 400 kV networks, i.e., revitalisation/increase of transmission capacity of the existing lines, construction of new lines and increase in transformation capacity, that must be met in the areas concerned.

HEP-ODS has also focused on measures to reduce losses in the distribution electricity grid as part of its efforts to increase energy efficiency. HEP-ODS began implementing the Smart Grid project[39], co-financed from EU funds, which includes a planned investment of HRK 177 billion in the development of smart grids in the upcoming ten-year period.

In general, the planned investments in the transmission and distribution networks have increased compared to previous years. Based on the plans submitted, HERA is of the opinion that the planned total revenue of HOPS and HEP-ODS is sufficient to cover the annual investments in the next three-year period.

4.2.4 Charges for transmission and distribution network use and connection charges

Average charges for network use

Average charges for transmission and distribution network use are determined on the basis of revenue realised by consumption category, which is calculated by applying appropriate tariffs for the transmission and distribution of electricity and the amount of electricity. Average charges for transmission network use are shown in Table 4.2.6. Average charges for distribution network use in the period 2016 – 2020 for different final customer categories are shown in Table 4.2.7.

Table 4.2.6 Average charges for transmission network use for the period 2016 – 2020

Final customer category	2016 [lp per kWh]	2017 [lp per kWh]	2018 [lp per kWh]	2019 [lp per kWh]	2020 [lp per kWh]
Industrial – high-voltage	8.8	7.7	8.0	7.0	6.6
Industrial – medium voltage	7.7	7.6	7.6	7.0	6.9
Industrial – low-voltage	8.9	8.9	9.0	9.1	9.1
Households	8.9	8.9	8.9	8.9	9.0
Average for all categories	**8.6**	**8.5**	**8.5**	**8.3**	**8.3**

Table 4.2.7 Average charges for distribution network use for the period 2016 – 2020

Final customer category	2016 [lp per kWh]	2017 [lp per kWh]	2018 [lp per kWh]	2019 [lp per kWh]	2020 [lp per kWh]
Industrial – high-voltage	-	-	-	-	-
Industrial – medium voltage	14.0	14.0	14.0	11.7	11.6
Industrial – low-voltage	27.5	27.7	28.1	24.7	25.0
Households	24.5	24.5	24.6	24.6	24.8
Average for all categories	**22.7**	**22.6**	**22.7**	**21.0**	**21.2**

Depending on consumption category and tariff model, Croatian final customers using the transmission and distribution networks are charged tariff items for the following tariff components:

- active energy at the high/low/single daily tariff (HRK per kWh)

39 *A smart grid is an energy network with a variety of activities and metering systems, including smart meters, smart applications, smart appliances, renewable energy sources, energy-efficient resources, and higly efficient devices.*

- calculated peak load (HRK per kW)
- excess reactive energy (HRK per kvarh)
- billing metering point (BMP) fee (HRK per month).

A breakdown of the total transmission and distribution network charge by tariff components is shown in Figure 4.2.6., while average prices by tariff component by consumption category and tariff model are shown in Figure 4.2.7.

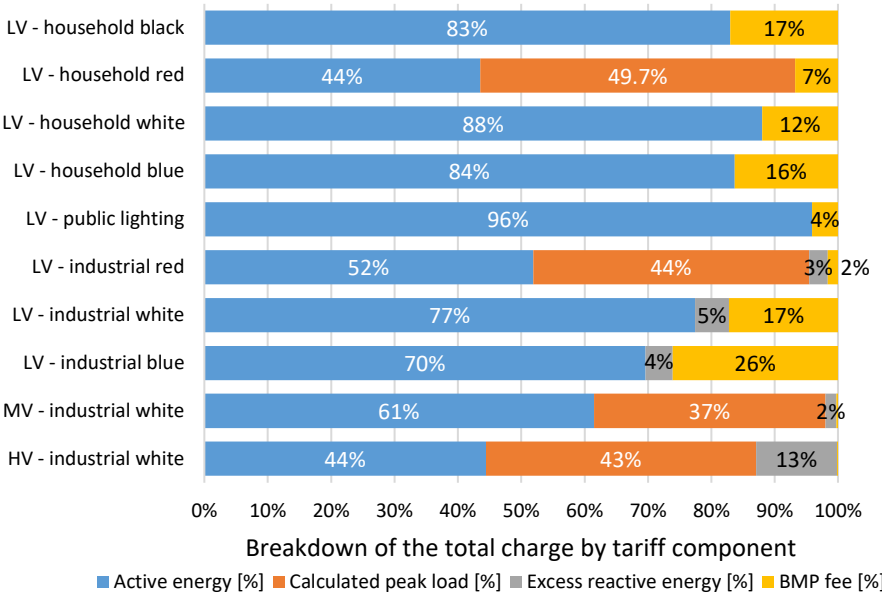


Figure 4.2.6 Breakdown of the total transmission and distribution network charge by tariff components in 2020

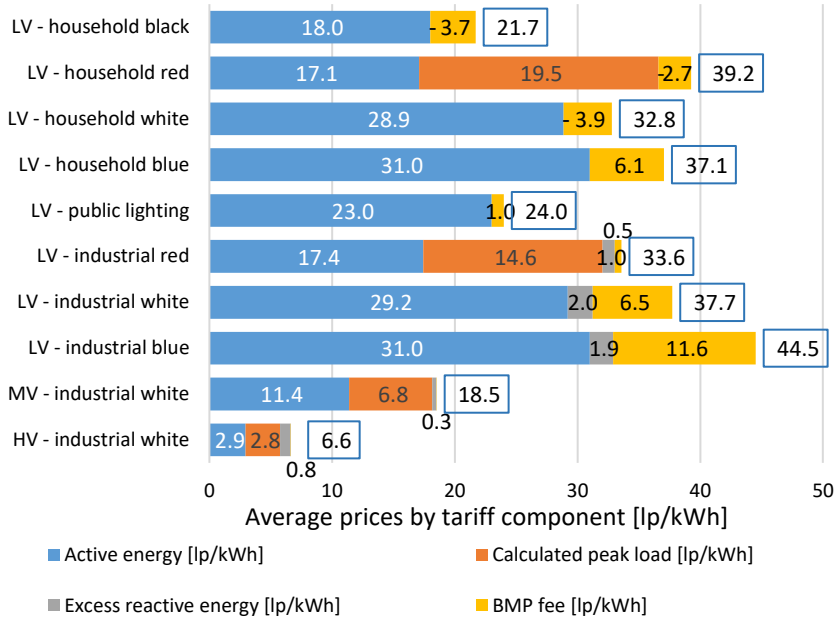
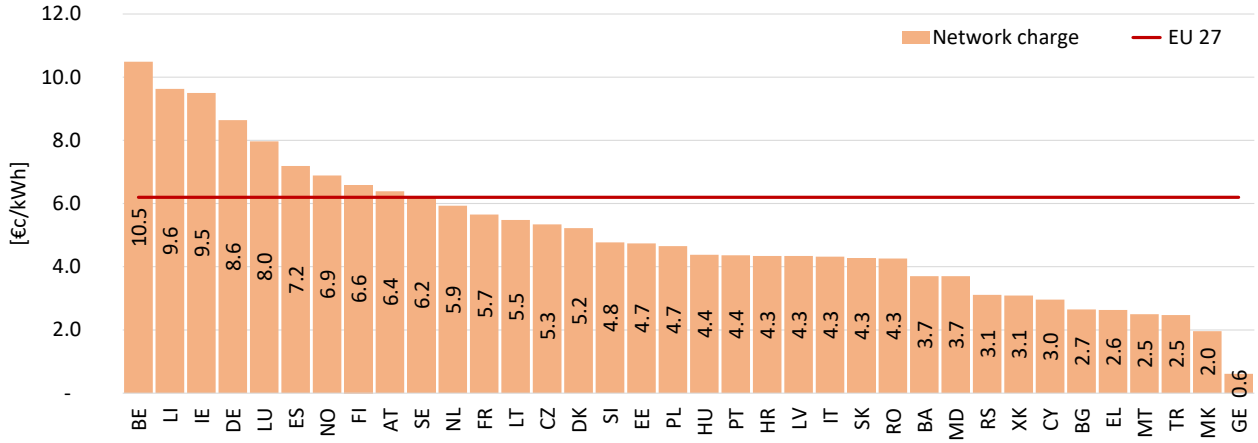


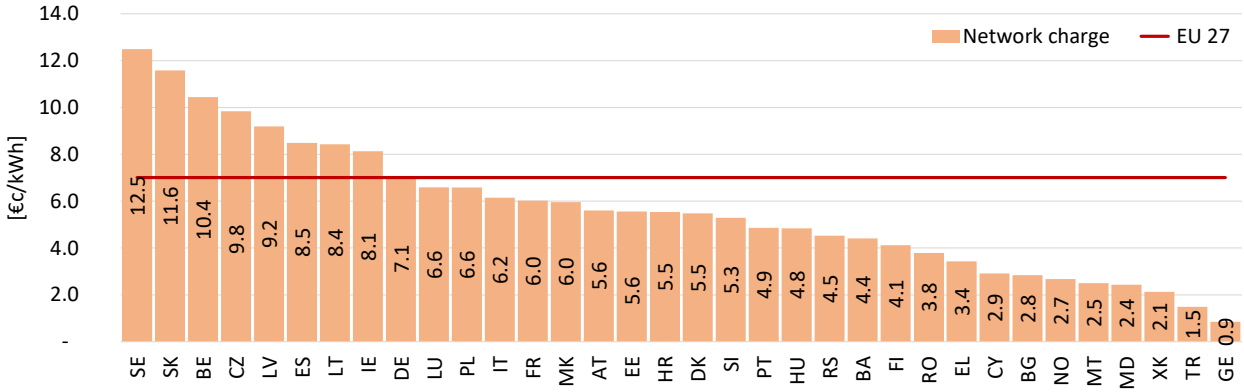
Figure 4.2.7 Average prices by tariff component by consumption category and tariff model in 2020

Average network charges in European countries for final customers in EUROSTAT consumption bands *Dc, Ia, Ib, Ic, Id, Ie* and *If*[40] in 2020 are shown in Figures 4.2.8. to 4.2.14.



Source: EUROSTAT, data processing: HERA

Figure 4.2.8 Average network charges for household final customers, consumption band Dc, in European countries, 2020[41]

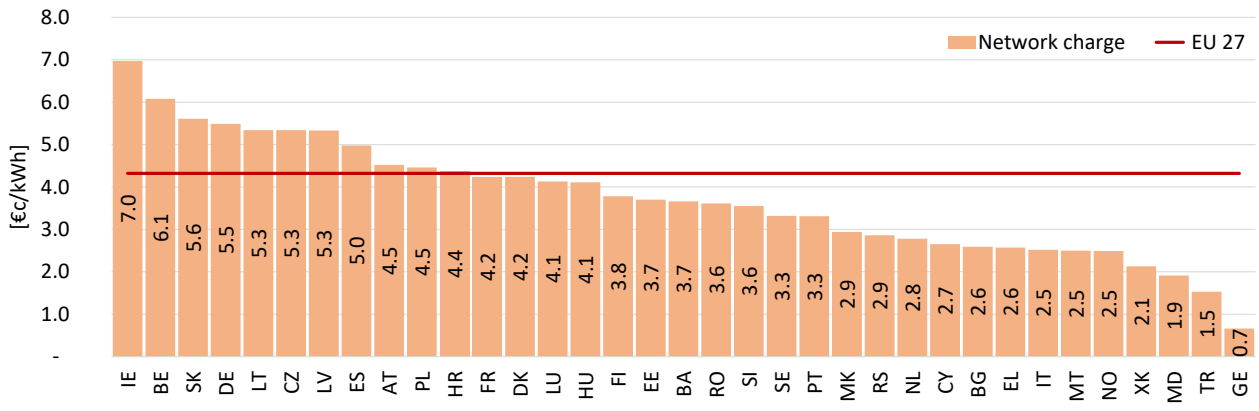


Source: EUROSTAT, data processing: HERA

Figure 4.2.9 Average network charges for industrial final customers, consumption band Ia, in European countries, 2020

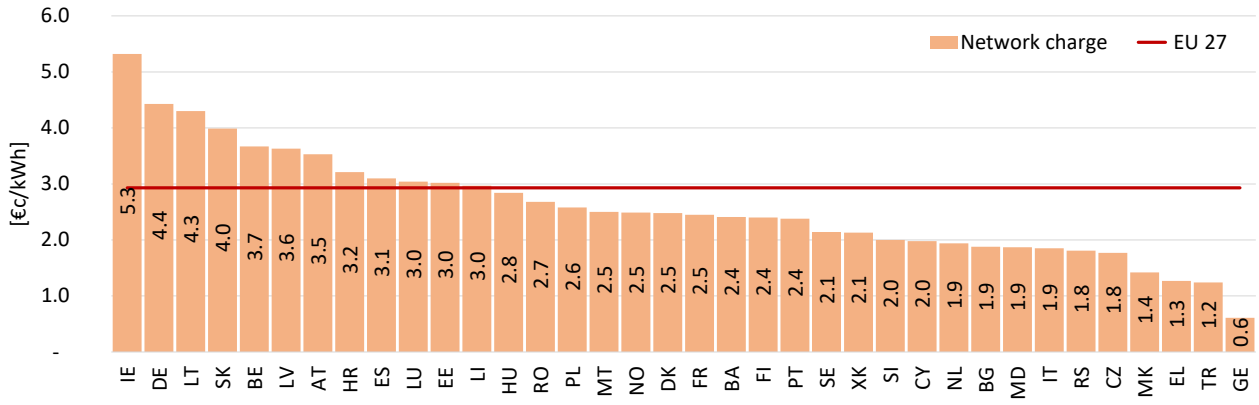
40 The consumption bands are in accordance with the classification of consumption bands and billing metering points for household final customers and industrial final customers as respectively listed in Tables 4.4.3. and 4.4.4. of this Report, with appropriate criteria.

41 ISO country codes: AL – Albania, AT – Austria, BA – Bosnia and Herzegovina, BE – Belgium, BG – Bulgaria, CY – Cyprus, CZ – Czechia, DK – Denmark, DE – Germany, EE – Estonia, GR – Greece, ES – Spain, FI – Finland, FR – France, GE – Georgia, HR – Croatia, HU – Hungary, IE – Ireland, IS – Iceland, IT – Italy, LI – Liechtenstein, LT – Lithuania, LU – Luxembourg, LV – Latvia, MD – Moldova, ME – Montenegro, MK – North Macedonia, MT – Malta, NL – Netherlands, NO – Norway, PL – Poland, PT – Portugal, RO – Romania, RS – Serbia, SE – Sweden, SI – Slovenia, SK – Slovakia, TR – Turkey, UA – Ukraine, UK – United Kingdom, XK – Kosovo.



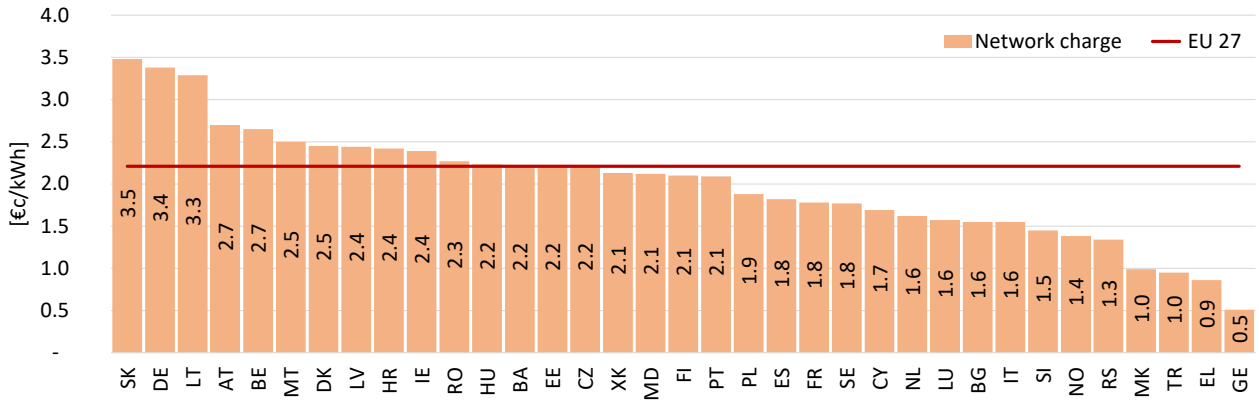
Source: EUROSTAT, data processing: HERA

Figure 4.2.10 Average network charges for industrial final customers, consumption band Ib, in European countries, 2020



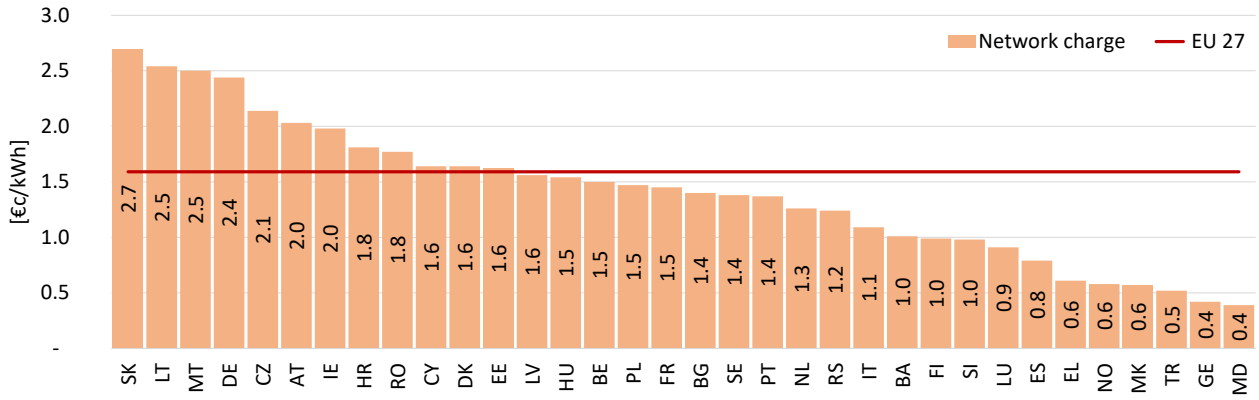
Source: EUROSTAT, data processing: HERA

Figure 4.2.11 Average network charges for industrial final customers, consumption band Ic, in European countries, 2020



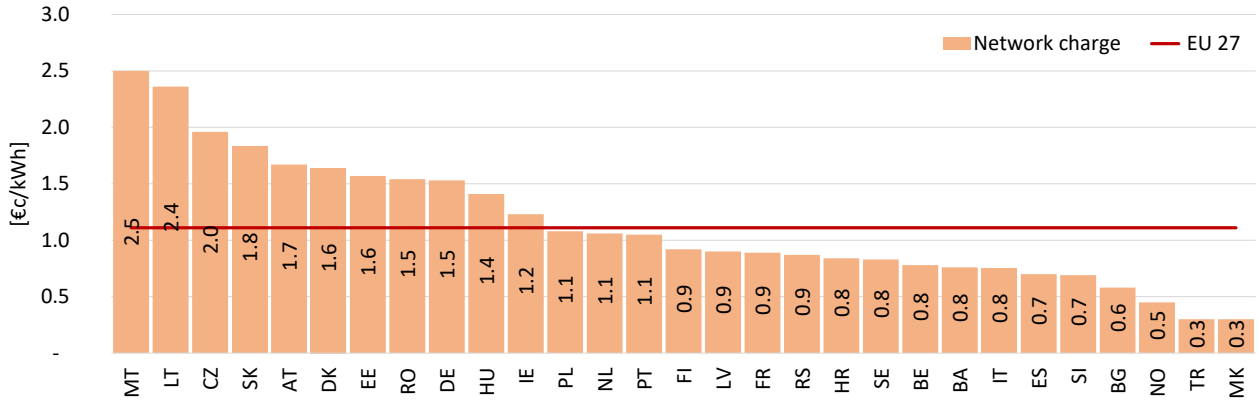
Source: EUROSTAT, data processing: HERA

Figure 4.2.12 Average network charges for industrial final customers, consumption band Id, in European countries, 2020



Source: EUROSTAT, data processing: HERA

Figure 4.2.13 Average network charges for industrial final customers, consumption band Ie, in European countries, 2020



Source: EUROSTAT, data processing: HERA

Figure 4.2.14 Average network charges for industrial final customers, consumption band If, in European countries, 2020

The shares of individual consumption categories in system operator revenues from transmission network charges and distribution network charges in 2020 are shown in Figure 4.2.15. The shares of individual tariff components in the revenues from transmission network charges and distribution network charges in 2020 are shown in Figure 4.2.16.

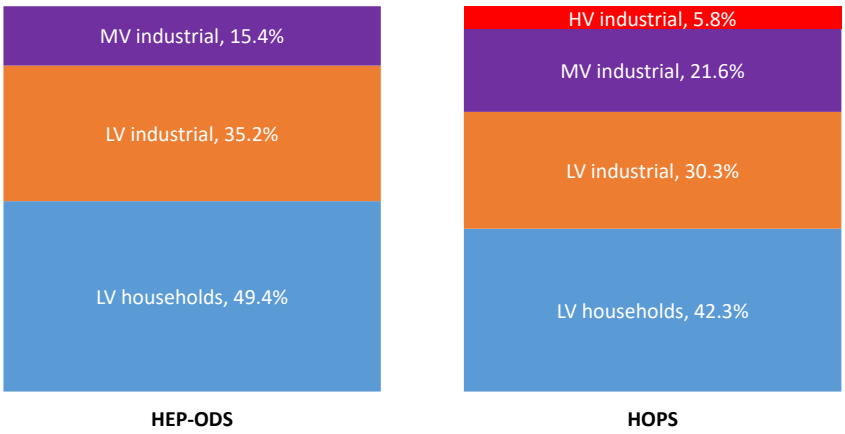


Figure 4.2.15 Shares of individual consumption categories in system operator revenues from transmission network charges and distribution network charges in 2020

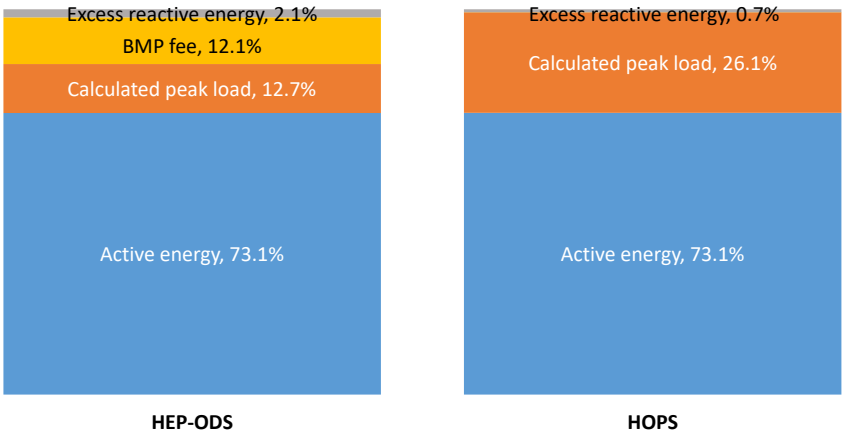


Figure 4.2.16 Shares of individual tariff components in the revenues from transmission network charges and distribution network charges in 2020

Revenues generated from tariffs

A decrease in revenues from HOPS and HEP-ODS tariffs and billed energy in 2020 compared to 2019 (expressed in percentages) is shown in Figure 4.2.17. A monthly comparison of 2019 and 2020 revenues from HOPS and ODS tariffs is shown in Figure 4.2.18.

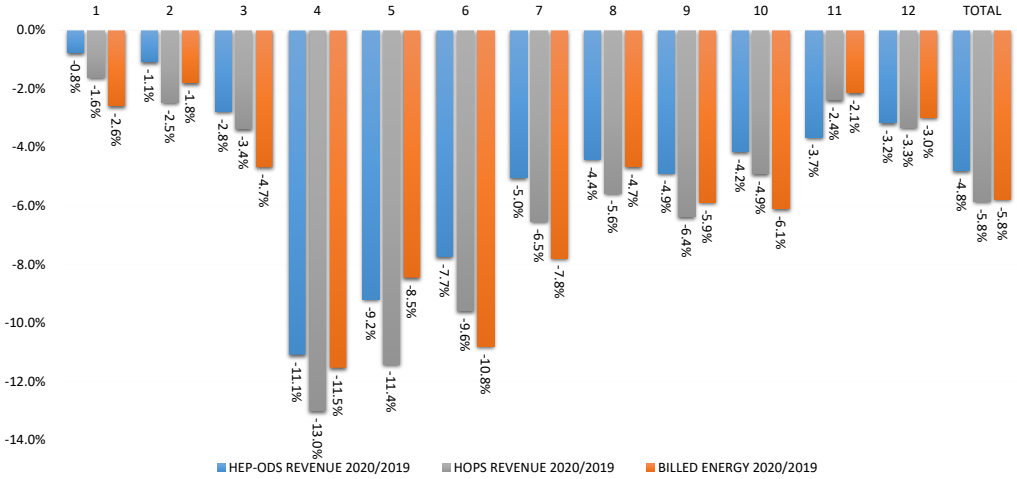


Figure 4.2.17 Decrease in revenues from HOPS and HEP-ODS tariffs and billed energy (expressed in percentages) in 2020 compared to 2019

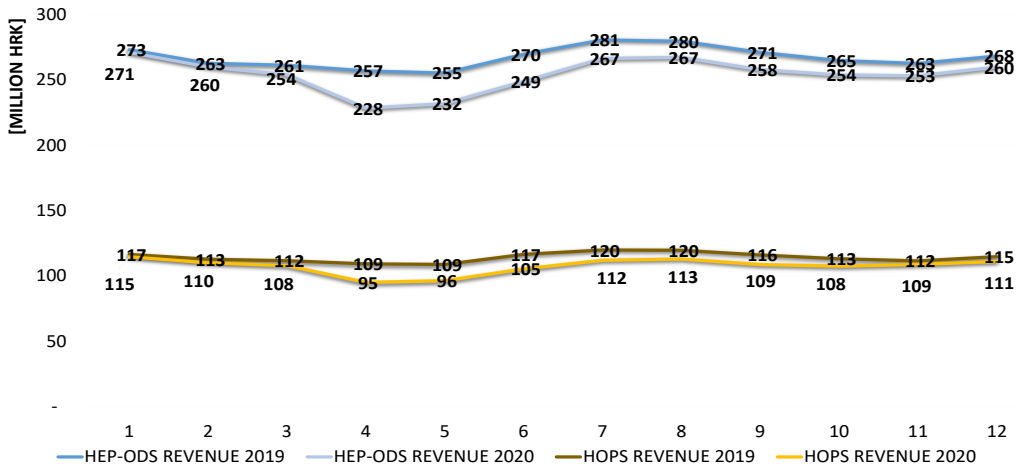


Figure 4.2.18 A monthly comparison of 2019 and 2020 revenues from HOPS and ODS tariffs

On 18 January 2021, the Croatian Government adopted the *Conclusion of the Government of the Republic of Croatia on write-off of receivables and fees for electricity delivered to final customers in earthquake-stricken areas*, and on 25 March 2021 it adopted the *Conclusion of the Government of the Republic of Croatia on the write-off of receivables and fees for electricity delivered to final customers in earthquake-stricken areas for April 2021*. Based on these conclusions, the Civil Protection Headquarters decided that all households from the municipalities and towns mentioned below will be exempt from paying for electricity costs, regardless of the degree of damage suffered. The municipalities and towns are the following: the towns of Petrinja, Glina, Sisak, Hrvatska Kostajnica and the municipalities of Lekenik, Sunja, Donji Kukuruzari, Majur, Dvor, Topusko, Gvozd, Jasenovac, Hrvatska Dubica, Martinska Ves, Pokupsko and Kravarsko. In accordance with the above conclusions, on 18 January 2021, the Shareholders' Assembly of Hrvatska elektroprivreda d.d. adopted the *Decision on write-off of receivables for energy delivered to household final customers from earthquake-stricken areas* (hereinafter: *Decision on write-off of receivables*), which was extended to April 2021. Write-off of receivables for the use of transmission and distribution networks for January, February and March 2021 based on the *Decision on write-off of receivables* is shown in Table 4.2.8. Approximately HRK 3 million is written off by HEP-ODS each month, while write-off by HOPS amount to approximately HRK 1 million.

Table 4.2.8 Write-off of receivables for transmission and distribution network usage for January, February and March 2021 based on the Decision on write-off of receivables.

Consumption category	Tariff model	Tariff component	HEP-ODS revenue [HRK]	HOPS revenue [HRK]
Households – LV	Blue	energy – single tariff	2,448,745	1,001,759
		BMP fee	752,254	-
	White	energy – higher tariff	3,962,190	1,816,004
		energy – lower tariff	1,051,174	437,989
		BMP fee	994,852	-
	Red	energy – higher tariff	20,848	6515
		energy – lower tariff	7,150	1787
		calculated peak load	18,216	11006
		BMP fee	1,785	-
	Black	energy – single tariff	3	1
		BMP fee	6	-
		Total	**9,257,221**	**3,275,061**

Transmission and distribution network connection charges

Users connecting to the transmission and distribution networks or requesting an increase of the connection capacity pay a connection charge as defined in the *Methodology for setting electricity grid connection charges for new users and for increasing the connection capacity for existing users (Official Gazette Nos. 51/17, 31/18 and 104/20)*. The purpose of the connection charge is to finance new connection points, fulfilment of technical requirements in the network, and network development. For final customers with a connection capacity of up to 20 kW who are connecting to the low voltage network within a radius of up to 400 metres from an existing transformer substation, the connection charge or the charge for increasing connection capacity is HRK 1,350 per kW net of VAT, except in the city of Zagreb, where the charge is HRK 1,700 per kW.

As far as other low voltage final customers are concerned, if planned connection costs exceed the amount that would be collected from the above charge by 20% or more, the consumer pays the actual connection costs. If HEP-ODS finds that existing and/or new final customers have a need for connection capacity and/or that there are other direct benefits for an operation and/or development of the medium and/or low voltage network(s), the low voltage final customer will pay for a share of the costs of the fulfilment of technical requirements in the network. Final customers connecting to the same transformer substation pay for a share in already fulfilled technical requirements until the

collected amount for the fulfilment of technical requirements in the medium voltage network equals their costs but no later than five years from the day on which the operating license for the transformer substation becomes valid.

Electricity producers always pay for actual connection costs.

A special zone is a geographical area in accordance with the relevant spatial plan, where multiple subjects have an interest in connecting to the network as participants of the special zone. Special zones have zone organisers who, on the basis of a contract concluded with all special zone subjects, or any other valid document, represent the participants of the special zone before the transmission or distribution system operator. The costs of fulfilling technical requirements in the network due to connecting a special zone are calculated in the same way as those for the connection of a final customer if all special zone participants are final customers, i.e., in the same way as those for the connection of a producer if all participants of the special zone are producers. If special zone participants are final customers and producers, the fulfilment of technical requirements in the network is based on a technical solution that meets the connection requirements of all its participants. Allocation of connection costs between the zone organiser and its participants is the subject of a separate contract between the zone organiser and the participants.

Observations on transmission and distribution charges, and connection charges

In 2020, the revenue of HEP-ODS from tariffs for energy distribution amounted to HRK 3.05 billion, which is 4.8% less than in 2019. HOPS revenue from tariffs for energy distribution amounted to HRK 1.29 billion in 2020, which is 5.8% less than in 2019. The volume of billed electricity in 2020 amounted to 15.5 TWh, which is a decrease of 5.8% compared to 2019. The volume of billed electricity and revenues from transmission and distribution charges were significantly lower in April, May, and June of 2020 than in 2019, which is a result of restricted economic activity due to the COVID-19 pandemic.

HOPS and HEP-ODS did not submit any requests for tariff changes for 2021. They did, however, submit the data necessary to determine planned total costs.

On the basis of the Decision on write-off of receivables, HOPS writes off approximately HRK 1 million per month for transmission network usage, while HEP-ODS writes off approximately HRK 3 million per month for distribution network usage.

In accordance with the Decision on write-off of receivables, receivables be written off for the above final customers in case of transfer of connection points to the grid at temporary accommodation sites (containers, mobile homes, caravans, ancillary buildings), including the construction of a new connection point on the same location and its later transfer for the purposes of electricity supply of the reconstructed or new building.

According to data from the *Ten-year development plan for the transmission network 2021–2030, with a detailed elaboration of the initial three- and one-year periods*, in the concerned ten-year period interest has been expressed for new connections/increase in connection capacity by more than 7,000 MW of production, mostly from renewable energy sources. The newly connected power plants would mostly be located in Dalmatia. Fulfilment of technical requirements in the 110kV, 220 kV and 400 kV networks[42] is crucial for these connections. The estimated costs are HRK 3.2 billion, of which 80% should be covered by investors whose production plants will be connected to the network[43]. HOPS has applied for EU funding for these investments through the competent ministry. If the fulfilment of technical requirements is financed from EU funds, new network consumers

[42] *The fulfilment of technical requirements means revitalisation/increase of transformation capacity of existing lines or construction of new lines as well as an increase in transformation capacity.*

[43] *In accordance with the Methodology for setting electricity grid connection charges for new users and for increasing the connection capacity for existing users.*

will not pay for that part of the fulfilment of necessary technical requirements in the network.

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.

According to the **Electricity Market Act**, commercial and financial relations between a vertically integrated entity and HOPS must comply with market conditions and HOPS is obliged to submit all commercial and financial contracts before their conclusion with a vertically integrated entity for HERA's approval. HERA is obliged to verify whether the contracts are market-oriented under impartial conditions.

Provision of vertically integrated entity services to HOPS and vice versa

In 2020, HOPS met all conditions and requirements specified by the certification procedure.

In accordance with the rules on the functional independence of HOPS as an independent transmission operator in terms of the **Electricity Market Act**, the company HEP d.d., as the owner of HOPS, and other companies affiliated with the vertically integrated entity did not exert undue influence on business decisions made by HOPS.

Separation of business premises

As at 31 December 2020, HOPS was the owner of all business premises in its use.

Independence of the IT system

During 2020, HOPS was fully independent in performing activities related to IT system maintenance and upgrading.

Rules on HOPS information system security, written in accordance with *Directive (EU) 2016/1148* and appropriate national legislation and recommendations, were adopted in November 2020. HOPS still actively participates in the activities of ENTSO-E's European Network for Cyber Security and regularly receives information on existing and possible cybersecurity threats to the IT systems of the European transmission system operators and their coordination in this respect.

In September 2020, HOPS started implementing the System for Prevention and Analysis of HOPS's Communication and Network Security Incidents – E-PASIS, a project co-financed from EU funds, under the CEF Telecom call – Cybersecurity (CEF-TC-2019-2).

During 2020, the following activities were carried out in the framework of the implementation of HOPS's Information System Investment Plan:

- a significant upgrade of network and cybersecurity infrastructure, IT monitoring tools, and additional upgrade of access security through multi-factor authentication,
- initial phase of upgrade/replacement of certain modules HOPS's ERP solution for the purposes of technological improvements,
- conclusion of contract for a strategic project for upgrading the central remote-control systems for the electricity system to a newer version for the purposes of technological improvements
- adoption of an updated version of the Risk Assessment of the SCADA system in December 2020 in accordance with the Methodology for risk management of critical (SCADA) systems in control centres that support the essential service of electricity transmission and operation of the electricity system.

Separation of the telecommunications system

In 2020, the separated use of the telecommunications system continued in accordance with the following agreements between HOPS and HEP Telekomunikacije d.o.o.:

- Agreement on mutual relations,
- Service agreement for the lease of telecommunications capacities,
- Lease agreement for radio connection telecommunication capacities,
- Agreement on the lease of premises for the storage of telecommunications equipment and fibre optic infrastructure,
- Agreement on telecommunications system maintenance.

The rights and obligations related to the lease of telecommunication capacities, telecommunications system maintenance and lease of premises for the storage of telecommunications equipment and optic fibre infrastructure are defined in the above agreements.

Procurement of electricity to cover losses

HOPS purchased the entire volume of electricity necessary to cover losses in 2020 under market principles, without discriminating market participants.

To procure energy to cover losses in 2020, HOPS carried out three public auctions which resulted in ten contracts for the delivery of electricity to cover losses in the transmission network. Four contracts were concluded with HEP d.d., while six contracts were concluded with the market participants HROTE, GEN-I Hrvatska d.o.o., HSE d.o.o. and Danske Commodities A/S.

The procurement of electricity to cover losses in the transmission network was conducted on CROPEX's day-ahead and intraday markets.

Procurement of ancillary services

For the purposes of ensuring ancillary services in 2020, HOPS and HEP Proizvodnja d.o.o. concluded six ancillary service contracts in December 2019. In September 2020, HOPS adopted the new *Methodology for establishing prices for the provision of ancillary services* as required by the relevant procedure.

HOPS concluded seven contracts valid in 2020 to ensure the availability of active power reserves and regulation reserves from tertiary control for system security. The contracts were signed with the following network users that are not members of the HEP Group:

- Cemex Hrvatska d.d.
- DS Smith Belišće Croatia d.o.o.
- Messer Croatia Plin d.o.o.
- Našicecement d.d.
- Petrokemija d.d.
- INA – Rafinerija nafte rijeka d.d
- PSP – Podzemno skladište plina d.o.o.

Electricity system balancing

In accordance with the *EBGL Regulation*, HOPS is obliged to publish a balancing report for the previous two calendar years at least once every two years. The 2018/2019 report was published on its website and includes information on the terms and provisions for balancing in the Croatian electricity system for the reported period.

Relations with transmission network users and connection of new users

HOPS must enable the connection of network user buildings. In the past years, there has been an increase in the number of requests for the connection of electricity production facilities, mostly for those that produce electricity from renewable energy sources. Requests for the connection of approximately 5,000 MW of new electricity production

facilities were received in 2020 alone. A high volume of requests for new connections constitutes a high financial risk for HOPS and calls into question HOPS's long term ability to fulfil its legal obligations.

Requests for connecting power plants exceed the technical capabilities of the existing network, creating a need for investments to fulfil the technical requirements of the network. In accordance with the legal framework, the investor pays for 80%, while HOPS pays for 20% of these costs.

Financial and other commercial relations between HOPS and other companies from the vertically integrated entity are:

- provision of services by the vertically integrated entity to HOPS and vice versa,
- implementation of special conditions and requirements in the procurement of services related to IT systems and equipment, secure access systems and auditing services,
- financing of HOPS's activities,
- implementation of HOPS's financial plan for 2020.
- contracts and/or agreements on financing (loans) and financial arrangements between HOPS and HEP d.d. (agreements on the undertaking of obligations due to issued bonds, loan agreements, etc.) active in 2020:
  - Sub-Loan Agreement No. 02/2013, HBOR/Ernestinovo and Žerjavinec, for EUR 69,152,961.62, which was repaid in full as at 31 January 2020,
  - Sub-Loan agreement No. 03/2013, HBOR/Program Split, for EUR 69.152.961,62, which was repaid in full as at 31 January 2020,
  - Agreement on the undertaking of obligations due to issued bonds No. 2/2016 for refinancing 83.37% of the bonds from 2012 in the amount of EUR 56,927,915.28 due on 23 October 2022, concluded with HERA's approval on 22 March 2016 and applied from 23 October 2015,
  - Long-Term Loan Agreement No. 5/2019 for financing investment projects in the amount of HRK 141,780,000.00, concluded with HERA's prior approval on 24 January 2020,
  - Long-Term Loan Agreement No. 8/2020 for financing investment projects in the amount of HRK 176,865,000.00, concluded with HERA's prior approval on 19 November 2020.

The financing of all HOPS's business activities ran smoothly throughout 2020. The financial resources necessary for conducting all business activities were always available to HOPS in time. In 2020, in accordance with the Agreement on Mutual Relations, HOPS initiated the process of borrowing HRK 176,865,000.00 from HEP d.d. Following HERA's decision on granting its prior approval for the draft Long-Term Loan Agreement, on 19 November 2020 HEP and HOPS concluded the Long-Term Loan Agreement No. 8/2020, which will be used by HOPS to cover insufficient resources for investment projects in 2020.

HOPS is the co-founder of CROPEX with 50% of ownership shares. HROTE is the other co-founder with an equal share in ownership.

HOPS is also co-founder of the following companies: TSCNET Services (Transmission System Operator Security Cooperations, in which HOPS holds 1/14 of ownership shares), SEE CAO (Coordinated Auction Office in Southeast Europe, in which HOPS holds 1/8 of ownership shares), and JAO (Joint Auction Office, in which HOPS holds 1/25 of ownership shares). HOPS is also co-founder of HEP Telekomunikacije d.o.o., in which it holds 13.73% of ownership shares.

By-laws and implementing acts

During 2020 and 2021, pursuant to the relevant provisions of the **Electricity Market Act** and following a public consultation and HERA's prior approval, HOPS has adopted the following acts:

- *Methodology for establishing prices for the provision of ancillary services*,
- *Pre-qualification procedure for providing black-start services and island operation services,*
- *Rules on bidding for ensuring mFRR power reserves and/or balancing energy for system security* and proposal for a template of the *Agreement on the provision of balancing services – mFRR*,
- *Rules for intraday capacity allocation between the bidding zones of HOPS and EMS*,
- *Amendments to the Network Code for the transmission system* in order to harmonise it with the relevant EU regulations relating to connection, operation and the market,
- *Instructions for plant management* for the purposes of harmonisation with the new organisation adjustments within HOPS and with the *Amendments to the Network Code for the transmission system*,
- *Rules on congestion management in the Croatian electricity system, including interconnectors*.

Implementation of special conditions and requirements in the procurement of services related to IT systems and equipment, secure access systems and auditing services

The *Rules on procurement and contracting in HOPS* regulate procurement, contracting and control procedures for contracts concluded for the procurement of goods, works and services.

During 2020, HOPS launched 92 procurement procedures for IT systems under contracts, framework contracts or order forms, and 12 procurements relating to secure access systems, to which special conditions from the **Electricity Market Act** were applied. Out of all procedures launched in that way, 81 contracts have been concluded.

Distribution system operator

Pursuant to the **Electricity Market Act,** HEP-ODS is responsible for monitoring the implementation of all its tasks, 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 26 March 2021, HEP-ODS submitted to HERA its 2020 report on compliance with the principles of transparency, objectivity, and impartiality, in accordance with the adopted compliance programme of HEP-ODS.

Financial and other commercial relations between HEP-ODS and other companies from the vertically integrated subject

HEP-ODS and HEP d.d. concluded an Agreement on Mutual Relations with the methodology for calculating the costs of services provided to HEP-ODS as its integral part.

In terms of basic resources necessary for network operation, maintenance, and development, under the approved financial framework HEP-ODS has decision-making powers independent of the parent company HEP d.d. During 2020, the Committee for monitoring the Compliance programme did not receive any written complaints for violations of the Compliance programme.

Development of an IT system for communication with users

Since 2020, the single point contact centre of HEPS-ODS, located in Knin and Vukovar, has been in charge of taking calls from customers reporting failures (for 11 distribution areas) and informing users through recorded voice messages of planned interruptions in electricity supply (for 12 distribution areas). The development of the Centre will continue in 2021, with full scope use of the ASEBA[44] application in five distribution areas as a prerequisite for full implementation. In addition to fulfilling this prerequisite, it is planned that the Centre will take on all calls relating to failures and record voice messages for all

[44] *ASEBA is an application that facilitates contact with customers and is used by the help desk.*

distribution areas. Integration of ASEBA with SAP, which is now in progress, will improve the Centre's customer service and improve records for the purposes of monitoring and obtaining indicators to measure the quality of electricity supply.

In 2020, the existing web application "Moja mreža"[45] was redesigned. It now includes services such as submission of meter readings, overview of past meter readings and electricity consumption as well as information on the planned date of the next billing and information on interruptions in electricity supply.

On its website https://www.hep.hr/ods/, HEP-ODS notifies its customers of planned works and publishes information on tariff models, instructions for connecting to the network and switching suppliers, advice on rational use of electricity, etc.

Relations with distribution network users and connection of new users

Submissions from network users regarding connection to the distribution network are resolved by the Appeals Processing Committee of HEP-ODS. This significantly standardises the implementation of all rules and regulations in the distribution areas.

In 2020, the Committee received 62 submissions, of which:

- eight submissions were considered as founded and were referred back,
- 51 submissions were considered as unfounded and were forwarded to HERA for second instance proceedings,
- for three submissions, completion of documentation was requested.

The number of submissions regarding connection to the electricity network is insignificant in relation to the number of concluded connection contracts/offers and issued grid connection approvals and network usage contracts (around 0.2%).

Customers with billing metering points for which HEP-ODS is obliged to store consumption data in 15-minute billing intervals can check the collected metering data online at http://mjerenje.hep.hr.

In 2020, HEP-ODS performed electricity distribution activities as required by the stipulated duties and obligations, and in accordance with the principles of transparency, objectivity, and impartiality.

4.2.6 Quality of electricity supply

Quality of electricity supply is defined and monitored in relation to 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. The *Requirements for the quality of electricity supply* also stipulate a gradual introduction of general, minimum, and guaranteed standards of quality of electricity supply and a gradual introduction of financial compensation to customers following the implementation of guaranteed quality standards. To this end, operators and suppliers have to provide and publish relevant forms on their websites. Starting from 2020, final customers are entitled to financial compensation if the guaranteed standard time limits for network connection and provision of technical services are exceeded and starting from 2021, customers are entitled to compensation if the guaranteed standard limits for individual long-term interruption intervals and total interruption time are exceeded in the given year (Figure 4.2.19).

[45] *https://mojamreza.hep.hr*

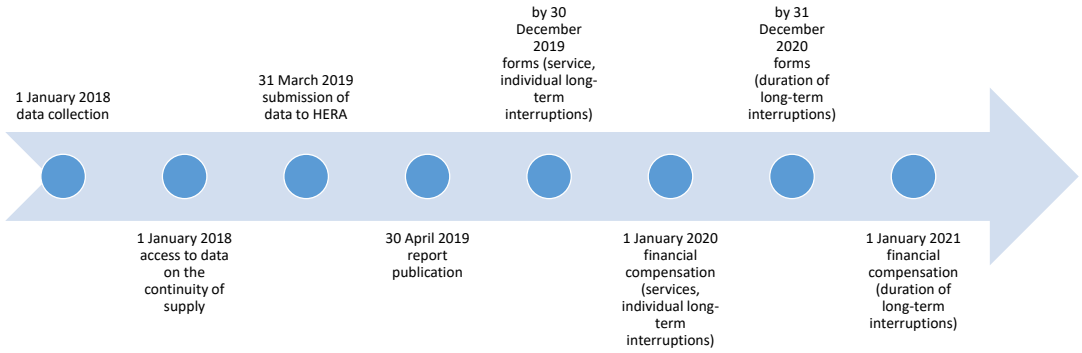


Figure 4.2.19 Activities leading to the establishment of financial compensation after the introduction of guaranteed standards in accordance with the Requirements for the quality of electricity supply

A set of regulations 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*, provides 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.

Transmission and distribution system operators and suppliers are obliged to submit an annual report on the quality of electricity supply and the quality of services pursuant to the *Requirements for the quality of electricity supply*.

Continuity of supply in 2020

Continuity of supply is measured by the number and duration of supply interruptions. Quality of continuity is inversely proportional to the number of supply interruptions and the duration of such interruptions. A supply interruption is considered as planned if it is announced in the manner and within the time frames specified in the *General terms and conditions for network use and electricity supply*; otherwise, it is considered as 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) is 700 MWh and average interruption time (AIT) for long-term interruptions is 17 minutes. The transmission system operator monitors the number and duration of supply interruptions in the transmission network, and estimates the volume of energy not supplied during the interruption (Table 4.2.9). In 2020, ENS was 874 MWh, while AIT was 21.49 minutes, which exceeds the general standards for these indicators (ENS of 700 Mwh, AIT of 17 minutes). This was caused by two earthquakes (28 and 29 December 2020), which caused significant damage to power plants, especially those in central Croatia and in the Sisak-Moslavina County, and by salt sediments in the coastal areas and on the islands, which resulted in plant disconnections due to isolation cleaning (TS Pag, TS Novalja and TS Nin).

Table 4.2.9 Supply interruptions in the HOPS network from 2010 to 2020

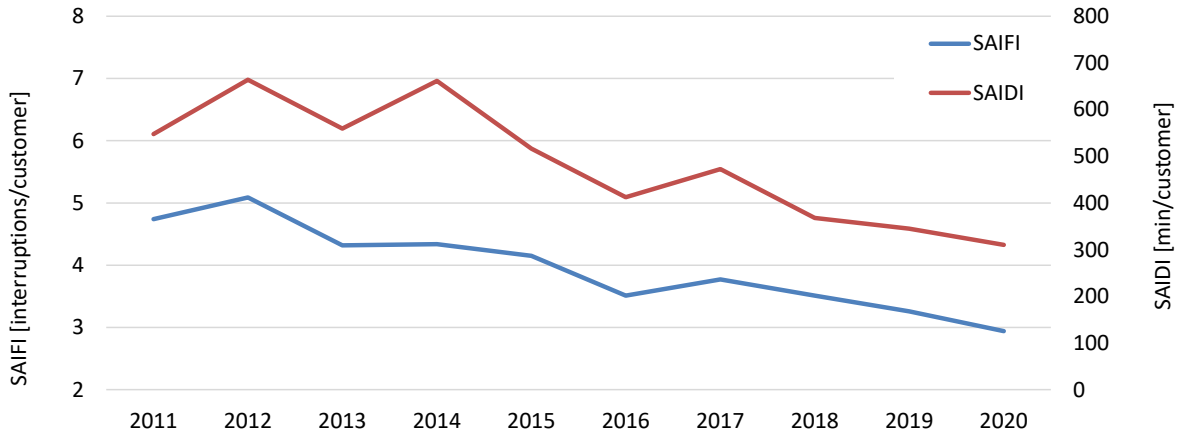
Year	Number of supply interruptions	Duration of supply interruptions [min]	Estimated energy not supplied [MWh]
2010	109	4,916	867
2011	115	3,587	256
2012	200	11,855	1,056
2013	51	2,908	329
2014	40	2,410	485

Year	Number of supply interruptions	Duration of supply interruptions [min]	Estimated energy not supplied [MWh]
2015	54	3,522	470
2016	80	4,651	366
2017	147	10,448	949
2018	111	6,124	572
2019	74	5,932	326
2020	85	5,787	874

Source: HOPS

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

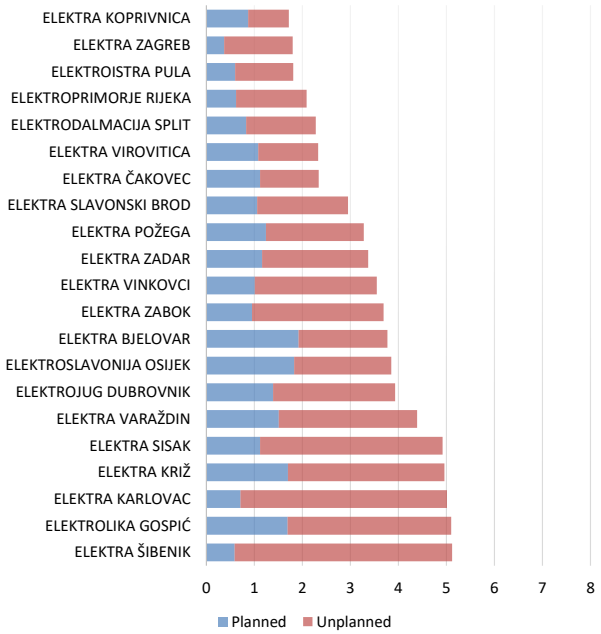
In 2020, SAIFI was 2.94 supply interruptions per customer in the HEP-ODS network, of which 31% were planned interruptions. SAIDI was 310 minutes per customer, of which 45% were planned interruptions. SAIFI and SAIDI indices show an upward trend in the continuity of supply in HEP-ODS network (Figure 4.2.20).



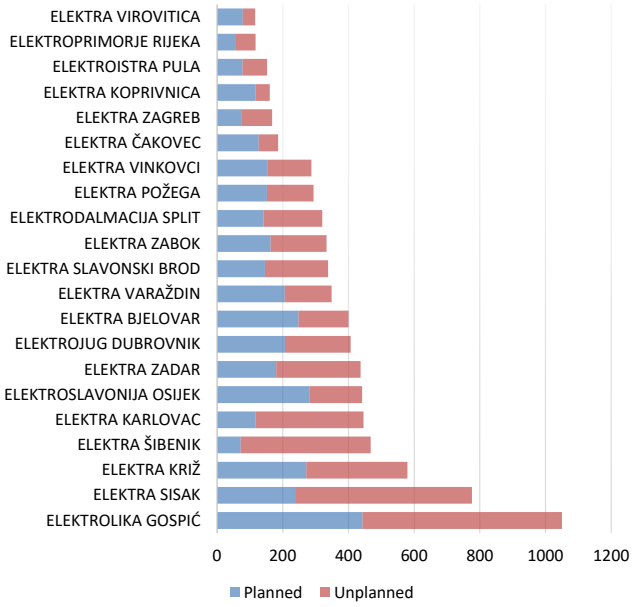
Source: HEP-ODS

Figure 4.2.20 Indicators for continuity of supply in HEP-ODS network from 2011 to 2020

In terms of distribution areas, DA Elektra Koprivnica had the highest SAIFI score in 2020, while DA Elektra Virovitica had the highest SAIDI score. DA Elektra Šibenik had the poorest SAIFI score, as shown in Figure 4.2.21. DA Elektrolika Gospić has a low SAIDI score because of harsh weather conditions in that area and specific network characteristics (long overhead lines). DA Elektra Križ, DA Elektra Karlovac and DA Elektra Sisak are also among distribution areas with poor SAIDI and SAIFI scores. A total of 24 written complaints concerning continuity of supply were filed, of which 15 were resolved in a timely manner.



Average annual number of interruptions per customer – SAIFI



Average annual duration of interruptions per customer expressed in minutes – SAIDI

Source: HEP-ODS

Figure 4.2.21 Indicators of continuity of supply in HEP-ODS network per distribution area in 2020

Voltage quality in 2020

According to the *General terms and conditions for network use and electricity supply*, voltage quality is defined as the deviation of measured voltage parameters 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/delivery 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. In 2020, HEP-ODS received a total of 83 written complaints regarding voltage quality in the distribution network. Also, a total of 58 requests for measuring voltage quality were filed, of which 37 were founded and resolved in favour of the applicant. No requests for measuring voltage quality were filed by transmission network users in 2020. Meters for measuring voltage quality have been installed on almost all billing metering points in the transmission network in accordance with the HRN EN 50160 standard.

Quality of service in 2020

The *Requirements for the quality of electricity supply* specify the guaranteed quality standards for network connection services: time for resolving requests 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 requests for grid connection approvals (15 days), and time foreseen for the connection of a building to the network with a simple connection (30 days).

The report on the quality of services in 2020, submitted to HERA by HOPS and HEP-ODS, shows that the operators' general indicator scores for the quality of connection services do not meet the general standard of service quality (Table 4.2.10). HOPS received three requests for a report on the optimal technical solution for connecting to the network (hereinafter: EOTRP) and one request for grid connection approval.

Table 4.2.10 General indicator scores for the quality of connection services of HOPS and HEP-ODS in 2020

General indicator of service quality	HOPS	HEP-ODS	General standard of service quality
Proportion of requests for EOTRP processed in time in the given year	100%	41.5%	95%
Proportion of requests for grid connection approval processed in time in the given year	100%	67%	95%
Proportion of simple procedure connections of buildings to the network carried out in time in the given year	n/a[46]	31%	95%

Source: HOPS and HEP-ODS

Processed EOTRP and grid connection requests (EES) are shown in Table 4.2.11; simple procedure connections of buildings to the network for HEP-ODS network final customers in 2020, with the total number of new connections and the number of connections carried out within time limits specified in the *Requirements for the quality of electricity supply*, are shown in Table 4.2.12.

Table 4.2.11 Processed requests for EOTRP and EES in HEP-ODS network in 2020

Type of request	No. of decisions issued	No. of decisions issued in time
EOTRP	1,556	646
EES	25,575	17,164

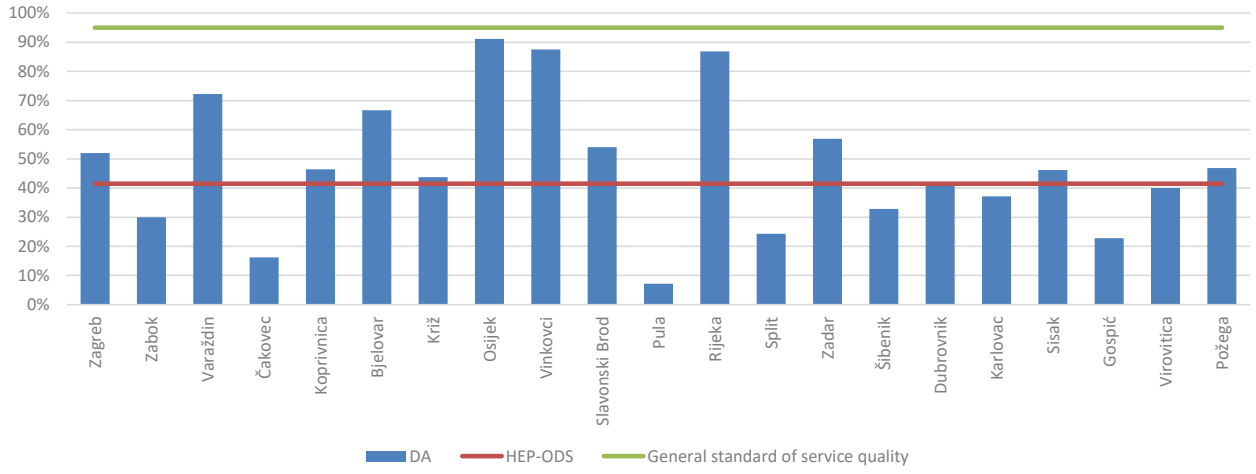
Source: HEP-ODS

Table 4.2.12 Simple connections of buildings to HEP-ODS network in 2020

Number of connected users	Number of connections carried out in time
12,639	3,937

Source: HEP-ODS

In terms of distribution areas, the proportion of requests for EOTRP processed in time is the lowest in DA Pula, and the highest in DA Osijek, but none of the distribution areas achieved the required general standard of service quality for resolving requests for EOTRP (Figure 4.2.22).

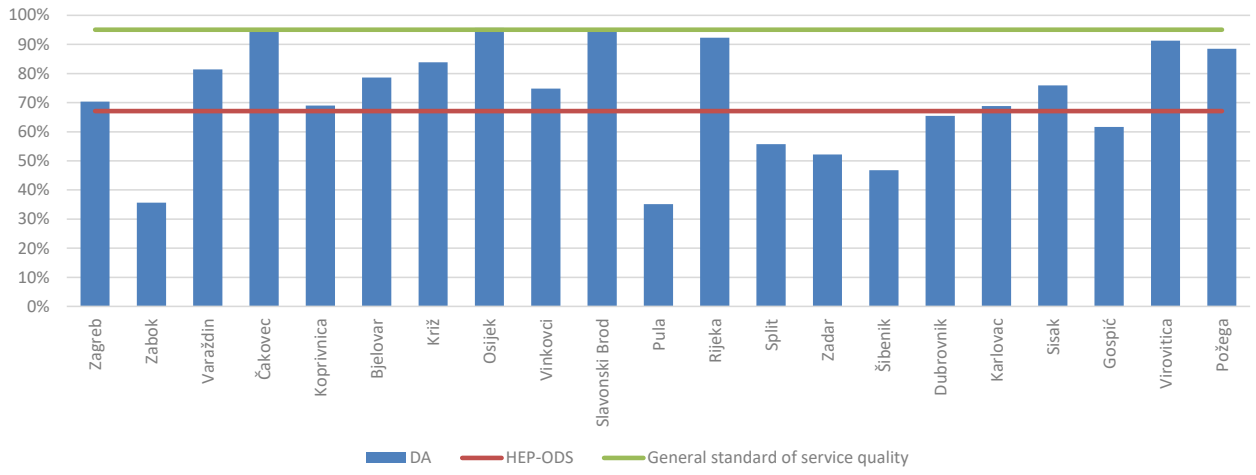


Source: HEP-ODS

Figure 4.2.22. Proportion of requests for EOTRP in HEP-ODS network per distribution area in 2020

46 *Not applicable – n/a*

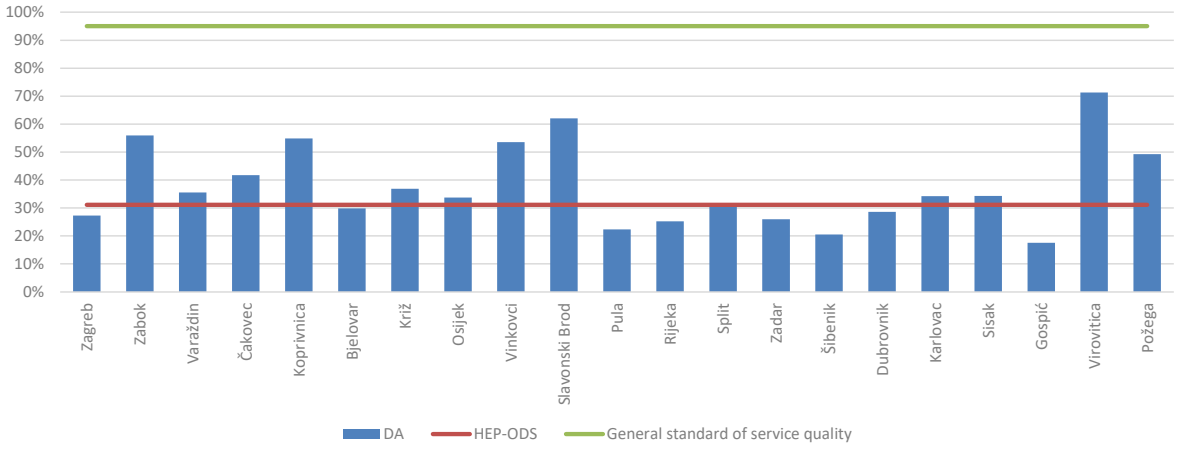
In terms of distribution areas, the proportion of requests for EES processed in time is the lowest in DA Pula, and the highest in DA Slavonski Brod. DA Slavonski Brod, DA Osijek and DA Čakovec met the required general standard of service quality for resolving requests for EES (Figure 4.2.23).



Source: HEP-ODS

Figure 4.2.23 Proportion of requests for grid connection approvals in HEP-ODS network processed in time per distribution area in 2020

The proportion of simple procedure connections of buildings to the network carried out in time is the lowest in DA Osijek and the highest in DA Koprivnica, but none of the distribution areas achieved the required general standard of service quality for simple connections (Figure 4.2.24).



Source: HEP-ODS

Figure 4.2.24 Proportion of HEP-ODS simple connections of buildings to the network carried out in time per distribution area in 2020

Earthquake in Zagreb (22 March 2020)

The earthquake that hit Zagreb on 22 March 2020 caused an interruption in the supply of electricity for 107,645 network users, which is approximately 26% of the total number of users in DA Elektra Zagreb. In accordance with the *Crisis management plan*, HEP-ODS immediately started working on system restoration and re-establishing electricity supply. Electricity supply was restored for approximately 75,000 network users in the first half hour after the disruption caused by the earthquake by means of the remote-control

system. By the end of the day, supply was restored for approximately 99% of affected network users.

Earthquakes in central Croatia (29 December 2020)

The earthquake that struck central Croatia on 29 December 2020 caused an interruption in the supply of electricity for approximately 136,000 network users: approximately 91,000 users in DA Elektra Zagreb and approximately 45,000 users in DA Elektra Sisak. DA Elektra Zagreb restored the supply for approximately 45,000 network users within two hours and for all network users by the end of the day. At first, supply of 85% of medium and low voltage transformer substations was interrupted. Since there were many damaged facilities in the distribution and transmission networks, supply was restored for approximately 85% of network users during the day, and for most of the remaining network users supply was restored the next day. In areas where medium voltage and low voltage networks suffered the most damage, supply was restored 48 hours after the interruption.

Separation of the Continental Europe synchronous area on 8 January 2021

On 8 January 2021, an incident separated the Continental Europe synchronous area (CE SA) in two. The incident is being analysed by ENTSO-E.

According to the preliminary analysis, separation was caused by cascaded trips of several transmission network elements in a very short time. The initial event was a trip at 400 kV substation in TS Ernestinovo caused by increased power flows from the South-East area to the North-West area of the CE SA (see markings in Figure 4.2.25) resulting from higher electricity consumption in the west (cold weather) and lower electricity consumption in the eastern part of the synchronous area (warm weather and public holidays). Power flows before the CE SA separation are shown in Figure 4.2.25.

Source: ENTSO-E

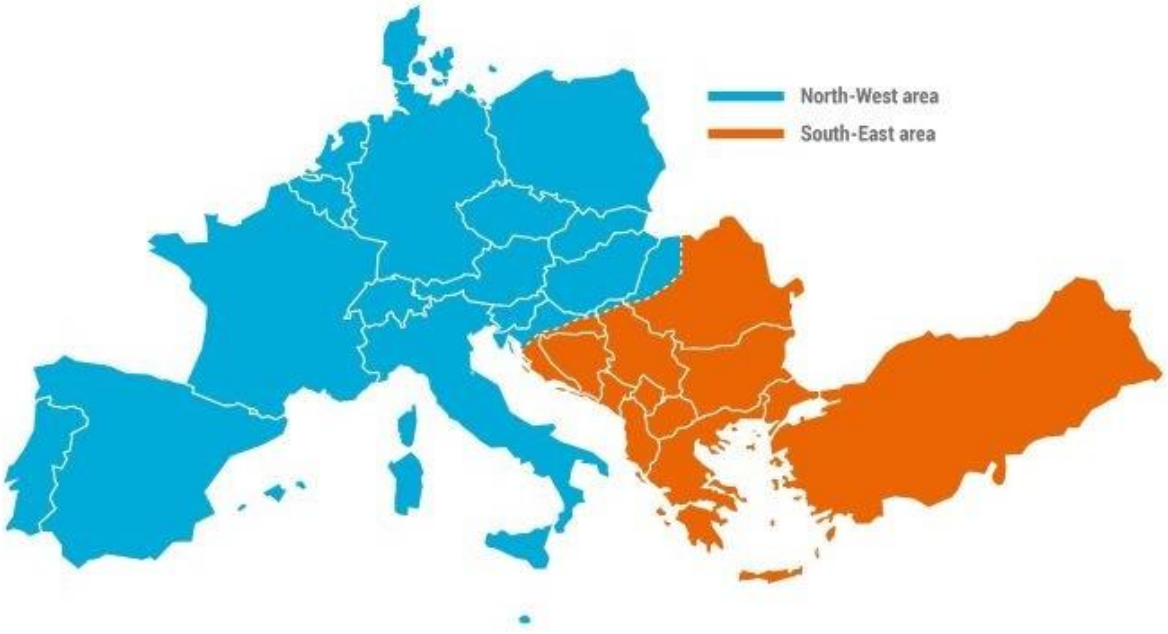
Figure 4.2.25 Power flows before the CE SA separation caused by the incident on 8 January 2021

The outage in TS Ernestinovo redirected the power flows to the transmission lines, causing their overload and a further trip (Figure 4.2.26). In less than five minutes, CE SA was separated in two.

Source: ENTSO-E

Figure 4.2.26 Transmission line outages during the incident on 8 January 2021

The separation of the synchronous area is shown in Figure 4.2.27.



Source: ENTSO-E

Figure 4.2.27 Separation of CA SE caused by the incident on 8 January 2021

The system separation resulted in a deficit of power and a frequency decrease in the North-West area and a surplus of power, and a frequency increase in the South-East area, leading to the disconnection of some users and emergency imports from neighbouring synchronous areas in the west, and a decrease in capacity of production facilities in the South-East area.

Through a coordinated response of the transmission system operators in the CE SA the situation was completely stabilised, and the synchronous area was resynchronised approximately one hour after the initial event.

It is important to note that CE SA is one of the largest international systems. This event is neither the first nor the most serious separation incident. A significantly more serious event, which lasted longer, caused larger disturbances in the system and had a higher impact on final customers, occurred in November 2006. The measures and risk

management systems established after that event made it possible to reconnect the synchronous area in such a short time and without any serious interruptions for most final customers.

Observations on the quality of electricity supply in 2020

Compared to 2019, in 2020 the number and the duration of supply interruptions in the transmission network increased, as well as the estimated energy not supplied. AIT and ENS scores did not meet the prescribed general standard limits. The underperforming scores were a result of significant damage on power plants caused by earthquakes in the Sisak-Moslavina County and plant disconnections in the coastal area and on the islands due to isolation cleaning and maintenance related to the build-up of salt sediments.

The SAIDI and SAIFI scores for the distribution network are better in relation to previous years. HEP-ODS's indicators for the quality of connection services are significantly below the required general standard of service quality and should be improved. The proportion of simple connections carried out in time for buildings, usually residential buildings with a gross surface area of up to 400 m^2 (i.e. family houses), equals a third of the required general standard of quality and is especially unsatisfactory.

The poorest SAIFI and SAIDI scores of supply continuity for HEP-ODS were recorded at DA Elektra Šibenik and DA Elektrolika Gospić.

The number of written complaints concerning the continuity of supply has significantly decreased from 83 to 24. DA Elektra Sisak received the highest number of written complaints regarding the continuity of supply (6 out of 24). The number of written complaints concerning voltage quality has significantly decreased from 144 to 83. DA Elektra Bjelovar received the highest number of written complaints concerning voltage quality (19 out of 83), of which 10 were resolved in a timely manner. HEP-ODS indicators for service quality are worse compared to the previous year.

HEP-ODS has upgraded the existing system for monitoring supply interruptions. However, in order to significantly improve the SAIDI and SAIFI scores, 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.

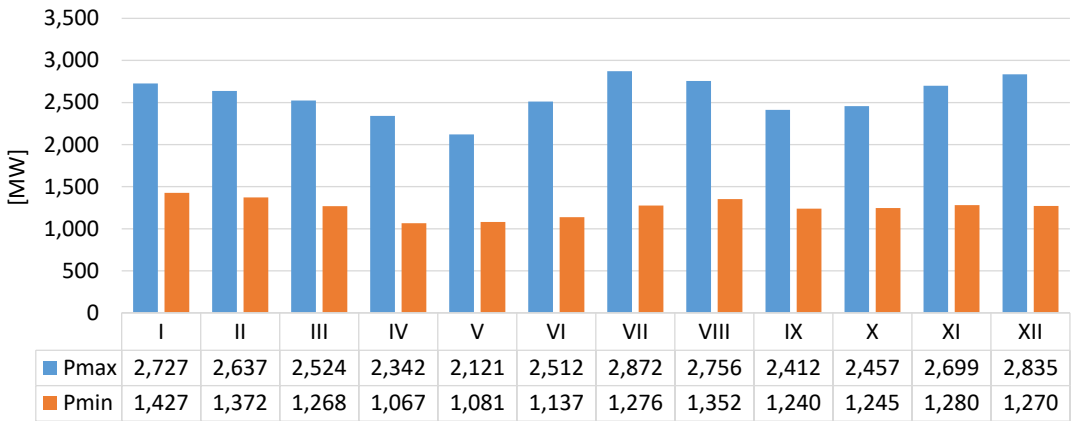
4.2.7 Monitoring production and consumption balance

System load characteristics

Important characteristics of the Croatian transmission system, such as maximum and minimum loads (P_{max} and P_{min}), the times when they occurred and the corresponding electricity imports and exports in the last five years, are shown in Table 4.2.13. The maximum and minimum loads in the Croatian transmission system for all months in 2020 are shown in Figure 4.2.28. In the previous few years, with the exception of 2018, the maximum load has been recorded in summer months due to relatively mild winters and increased consumption in the summer (air-conditioning)

Table 4.2.13 Maximum and minimum loads of the Croatian transmission 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]
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
2019	3,038	25/07, 14:00	1,973	428	1,226	22/04, 04:00	1,663	1,118
2020	2,872	31/07, 14:00	2,007	748	1,067	13/04, 05:00	1,167	359



	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Pmax	2,727	2,637	2,524	2,342	2,121	2,512	2,872	2,756	2,412	2,457	2,699	2,835
Pmin	1,427	1,372	1,268	1,067	1,081	1,137	1,276	1,352	1,240	1,245	1,280	1,270

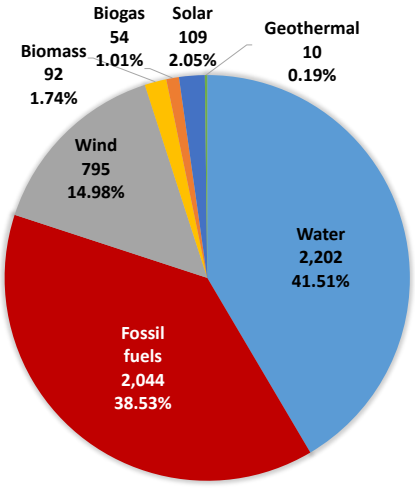
Source: HOPS

Figure 4.2.28 Maximum and minimum loads of the Croatian transmission system in 2020

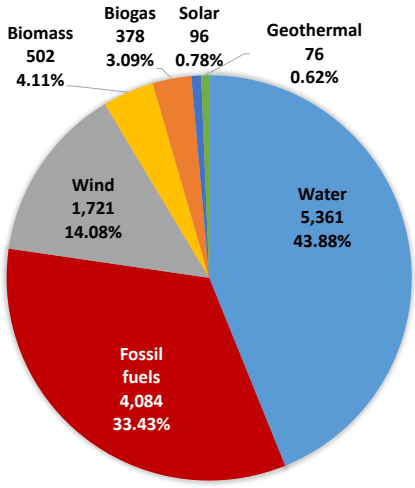
Production capacities in Croatia

The total connection capacity of all power plants in Croatia amounted to 5,306 MW at the end of 2020. In addition, HEP d.d. is a co-owner of the Krško Nuclear Power Plant located in Slovenia and has at its disposal 50% or 348 MW of its capacity. The ratio between the total connection capacity of power plants in Croatia and the maximum load of the Croatian transmission system in 2020 was 1.85.

A breakdown of the connection capacity and electricity generated by power plants located in Croatia by primary power source at the end of 2020 (including power plants being tested) is shown in Figure 4.2.29. A significant share of renewable energy sources is evident.



Connection capacity in MW

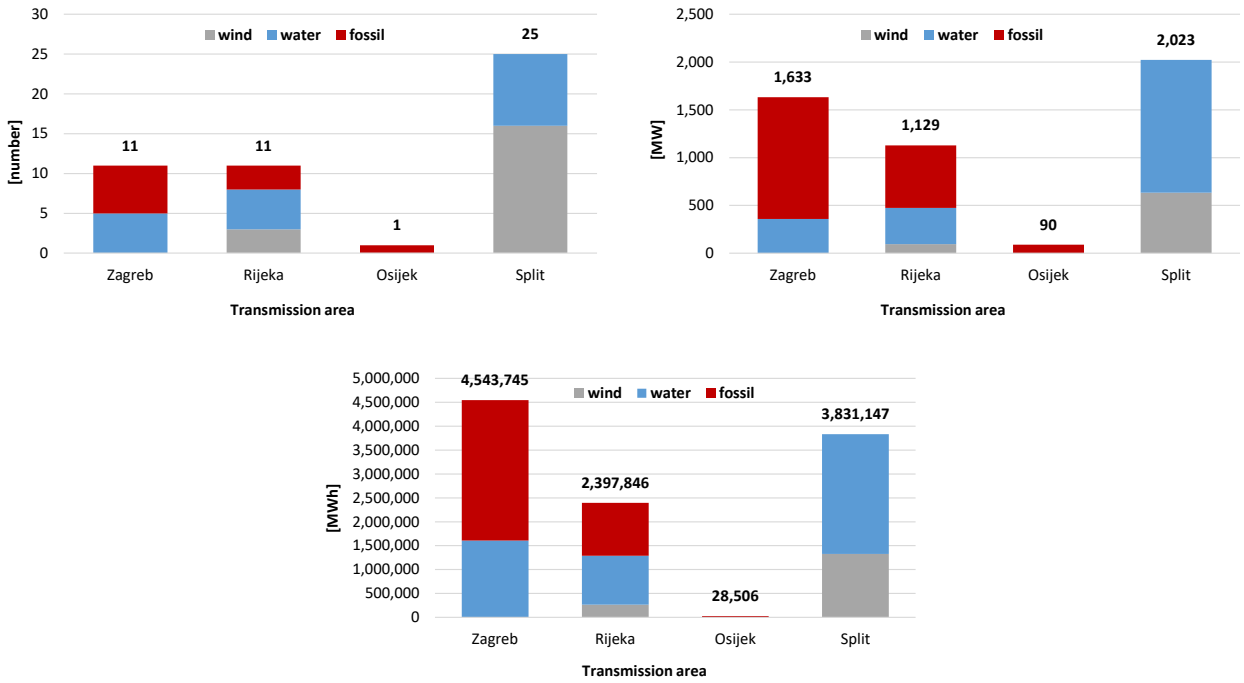


Generated electricity in GWh

Source: HOPS and HEP-ODS

Figure 4.2.29 Breakdown of the total capacity and electricity generated by power plants located in Croatia by primary power source at the end of 2020

At the end of 2020, the Croatian transmission network included connections to 10 thermal power plants with a total connection capacity of 2,019 MW, 19 hydroelectric power plants with a connection capacity of 2,127 and 19 wind power plants with a connection capacity of 729 MW. The number, connection capacity and production of power plants by transmission area are shown in Figure 4.2.30.

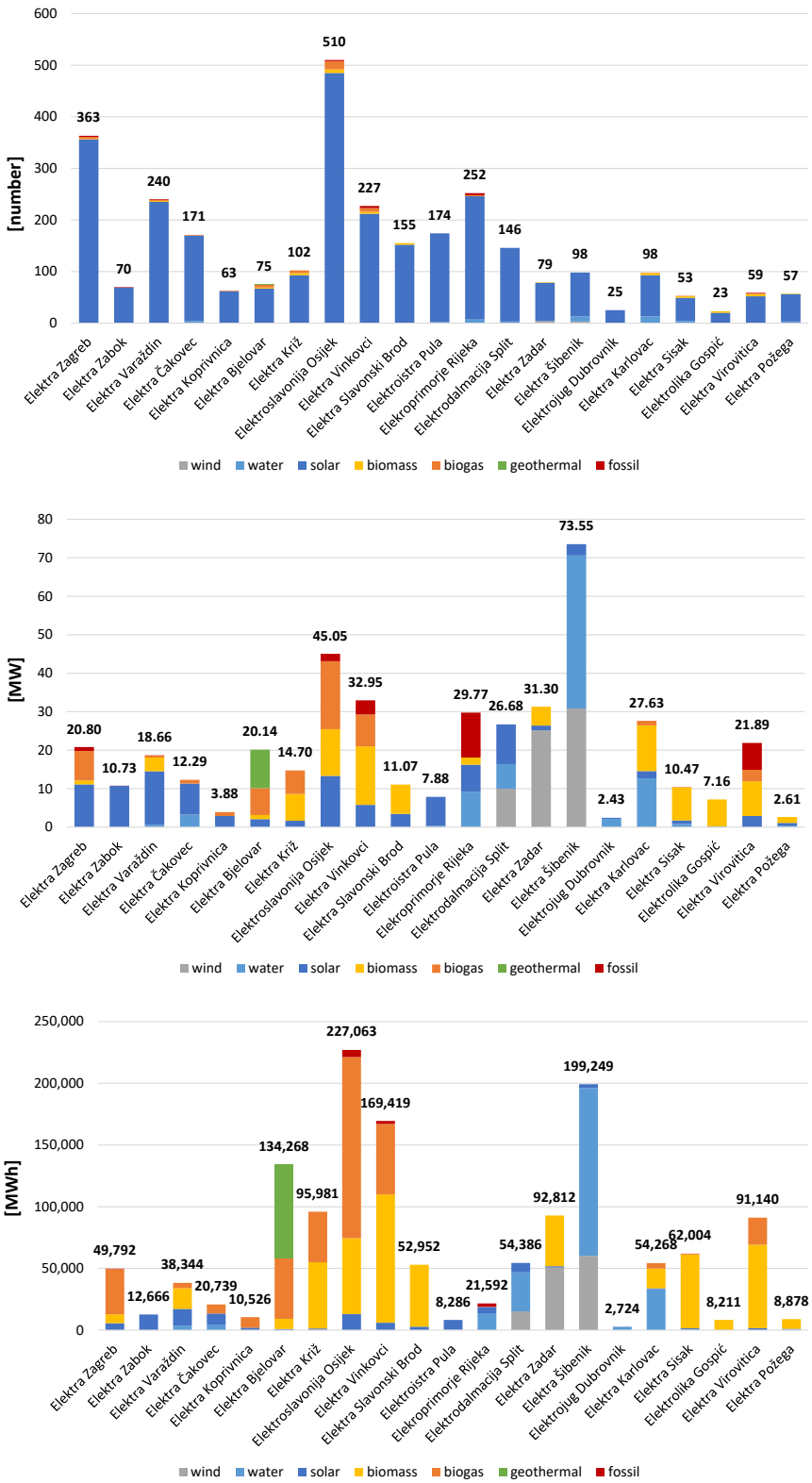


Source: HOPS

Figure 4.2.30 Number, connection capacity and production of power plants by HOPS transmission areas in 2020

The past years few years have seen an increase in the proportion of electricity generated from distributed energy sources, i.e. in facilities connected to the distribution network. In 2020, the supply of electricity from distributed energy sources amounted to 1,415 GWh, which is around 5% more compared to 2019 and around 34% more compared to 2018. Approximately 94% of electricity from distributed energy sources was produced from renewable energy sources. The proportion of electricity supplied from distributed energy sources in the total consumption of the electricity system (17,272 GWh) in 2020 was 8.2%.

The number, connection capacity and production of power plants by distribution area are shown in Figure 4.2.31.



Source: HEP-ODS

Figure 4.2.31 Number, connection capacity and production of power plants by HEP-ODS distribution areas in 2020

At the end of 2020, out of 3,040 billing metering points that can deliver electricity to the distribution network with an overall connection capacity of 432 MW, 644 were consumers with own production (prosumers), with an overall connection capacity of 79 MW (in the delivery direction). In 2020, customers with their own production facilities delivered 29 GWh of electricity to the network. In addition, 851 billing metering points have the status

of self-supplying consumers (compared to 146 in 2019), all with integrated solar power plants, with a total connection capacity of approximately 5 MW for delivery to the network (compared to 1 MW in 2020), and approximately 11 MW for withdrawal from the network (2 MW in 2019). In 2020, users of self-supplying installations delivered 1.9 GWh of electricity to the network. A significant increase is visible in comparison to 2019, when this category was introduced into Croatian legislation. In addition, 43 final customers have lost their status of self-supplying consumers in 2020.

The delivery of electricity from distributed electricity sources into the distribution network is shown in Figure 4.2.32; an example of hourly delivery of electricity from distributed electricity sources into the distribution network in the week from 20 to 26 July 2020 is shown in Figure 4.2.33. The left chart in Figure 4.2.34 shows the distribution of connection capacities for the delivery into the network, and the chart on the right shows the ratios of electricity delivered to the network and electricity withdrawn from the network by self-supplying consumers. The left chart in Figure 4.2.35 shows the distribution of connection capacities for the delivery, and the right chart shows the ratios of electricity delivered to the network and electricity withdrawn from the network by prosumers connected to the low voltage network. The connection capacities for the delivery into the network on the horizontal axes of the respective diagrams are grouped according to power intervals of the billing metering points, i.e. $(s_1, s_2]$ is the power interval from s_1 up to and including s_2. The ratios between electricity delivered to the network and electricity withdrawn from the network expressed in percentages on the horizontal axes of the respective diagrams are grouped in percentage intervals, i.e. $(p_1, p_2]$ is the percentage interval from p_1 up to and including p_2.

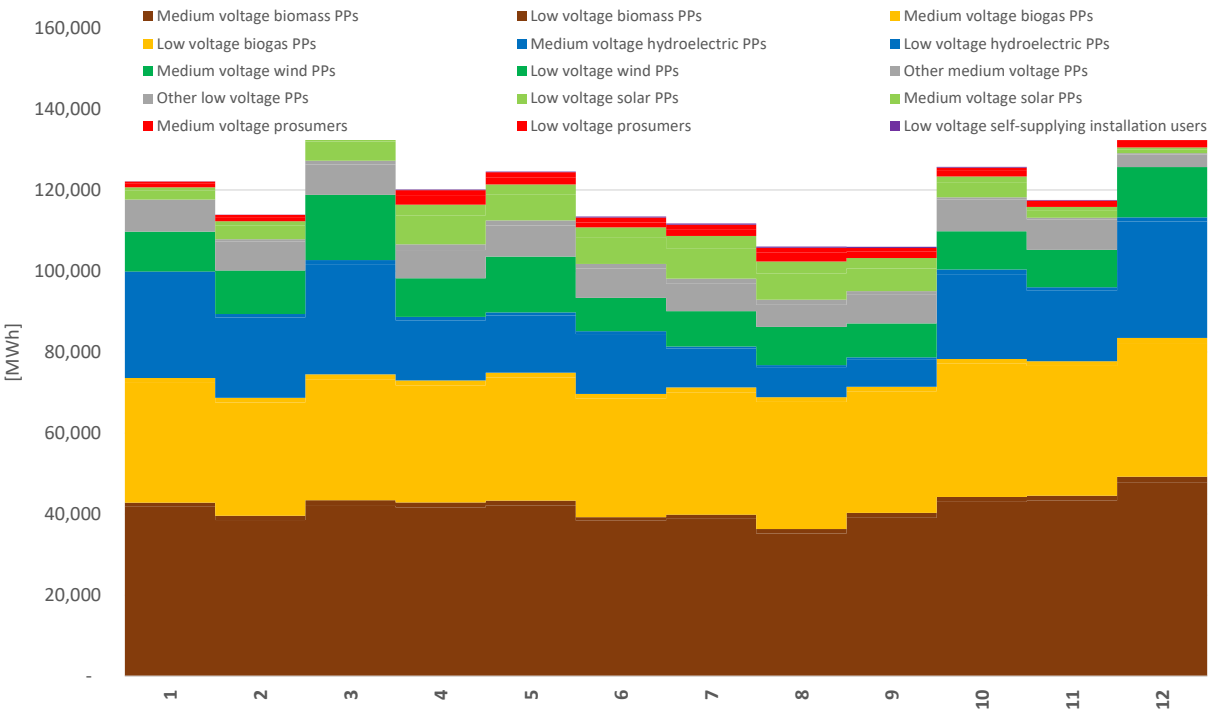


Figure 4.2.32 Monthly delivery of electricity from distributed electricity sources into the distribution network

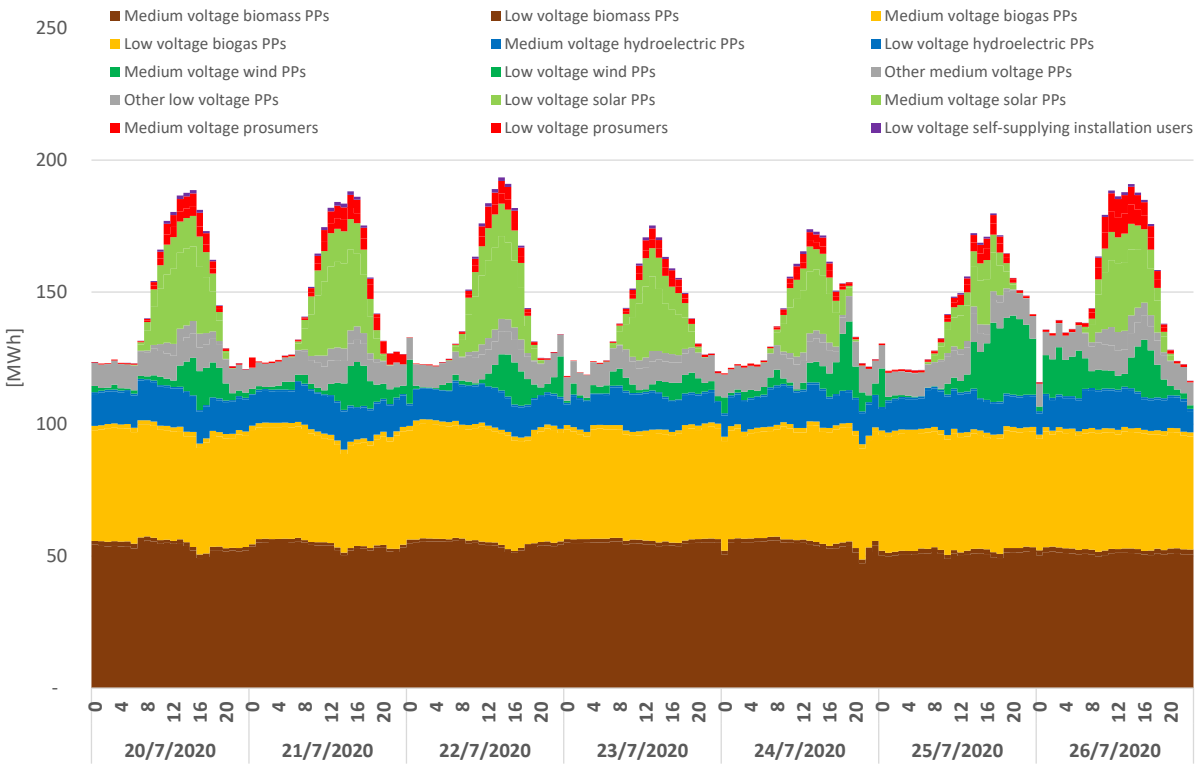
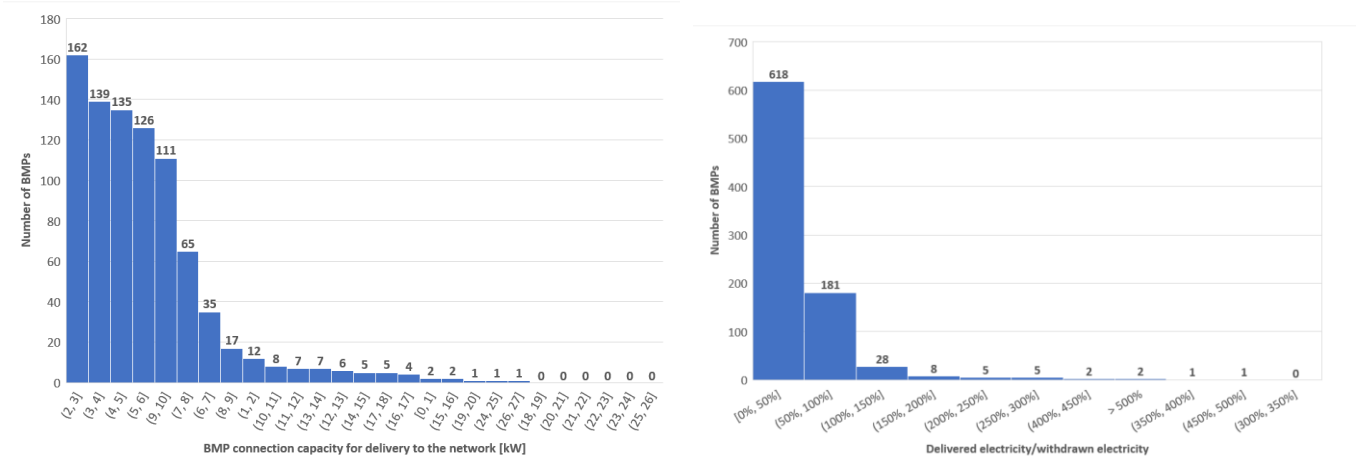
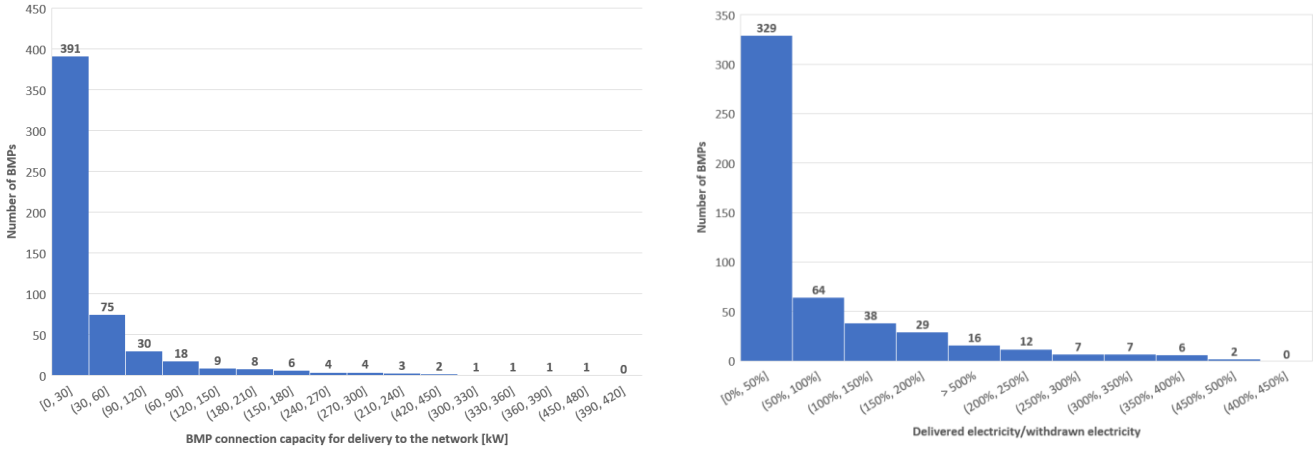


Figure 4.2.33 An example of hourly deliveries of electricity from distributed electricity sources into the distribution network



Source: HEP-ODS

Figure 4.2.34 Connection capacities for the delivery to the network and ratios of electricity delivered to the network and electricity withdrawn from the network by self-supplying consumers



Source: HEP-ODS

Figure 4.2.35 Connection capacities for the delivery to the network and ratios of electricity delivered to the network and electricity withdrawn from the network by prosumers connected to the low voltage network

Electricity balance

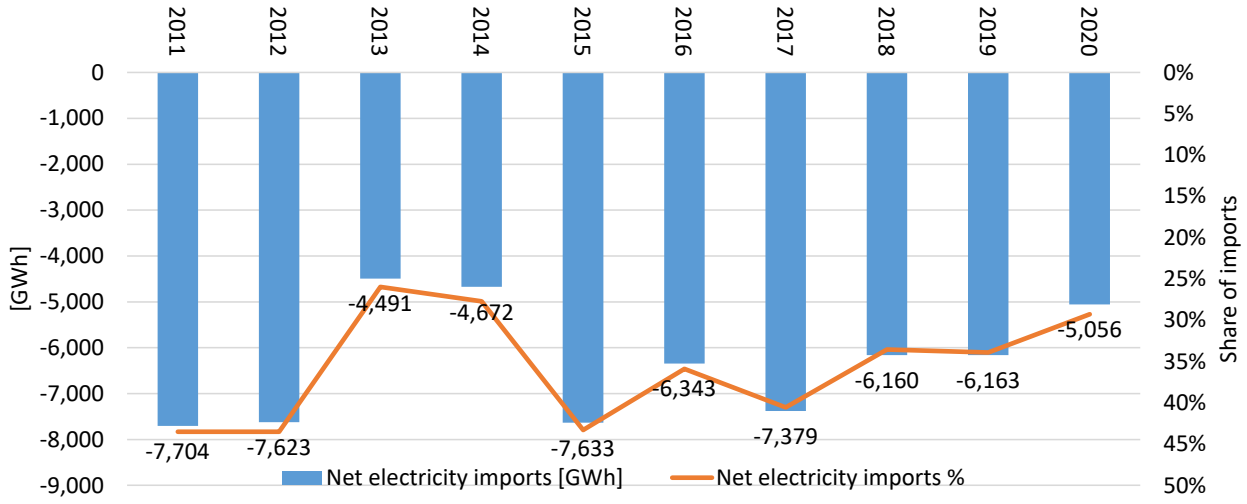
The balance of the Croatian electricity system is shown in Table 4.2.14. Most of the total electricity consumption in Croatia in 2020 (17,272 GWh) is covered by Croatian power plants (12,216 GWh, 70.7%), and the rest is covered by physical net imports (5,056 GWh, 29.3%). In 2019, the proportion of physical net imports amounted to 33.9% of the total consumption.

Table 4.2.14 Croatia's electricity balance in 2019 and 2020 in GWh

No.	Electricity balance	2019	2020
1	Total production	12,006	12,216
2	Imports to Croatia	11,400	10,490
3	**Total supply (1+2)**	**23,406**	**22,706**
4	Exports from Croatia	5,237	5,434
5	**Physical net imports (2-4)**	**6,163**	**5,056**
6	**Total consumption (3-4)**	**18,169**	**17,272**
7	Direct supply in the distribution network	1,348	1,415
8	Losses in the transmission network	388	373
9	**Transmission consumption (6-7-8)**	**16,433**	**15,484**
10	Delivery to transmission network final customers and own consumption of power plants	902	826
11	Pumping at reversible hydroelectric power plants	176	231
12	**Net delivery to the distribution network from the transmission network (9-10-11)**	**15,355**	**14,427**

Source: HOPS, HEP-ODS

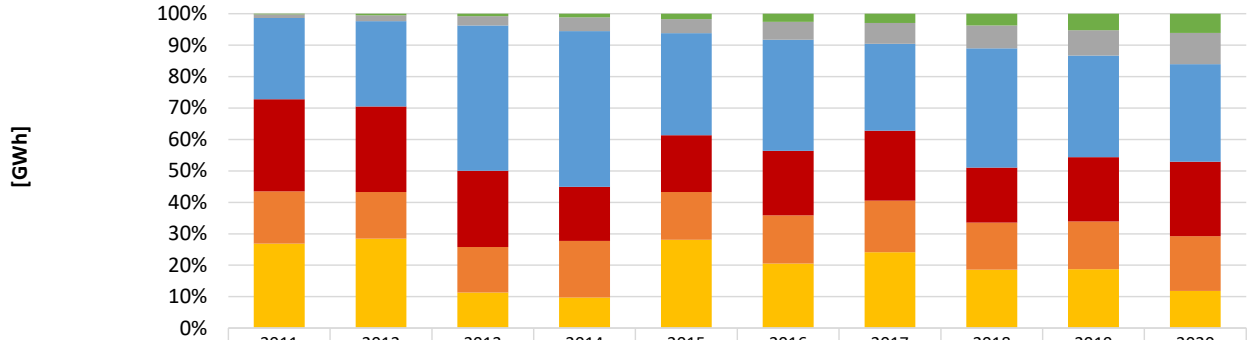
Net electricity imports into the Croatian electricity system in the last 10 years are shown in Figure 4.2.36.



Source: HOPS

Figure 4.2.36 Net electricity imports required for domestic consumption and share of net imports in the total consumption in Croatia

The proportions of all electricity sources procured for the requirements of the Croatian electricity system on an annual basis in the last 10 years are shown in Figure 4.2.37. The amount produced by the Krško Nuclear Power Plant for HEP d.d. is presented separately from net imports.

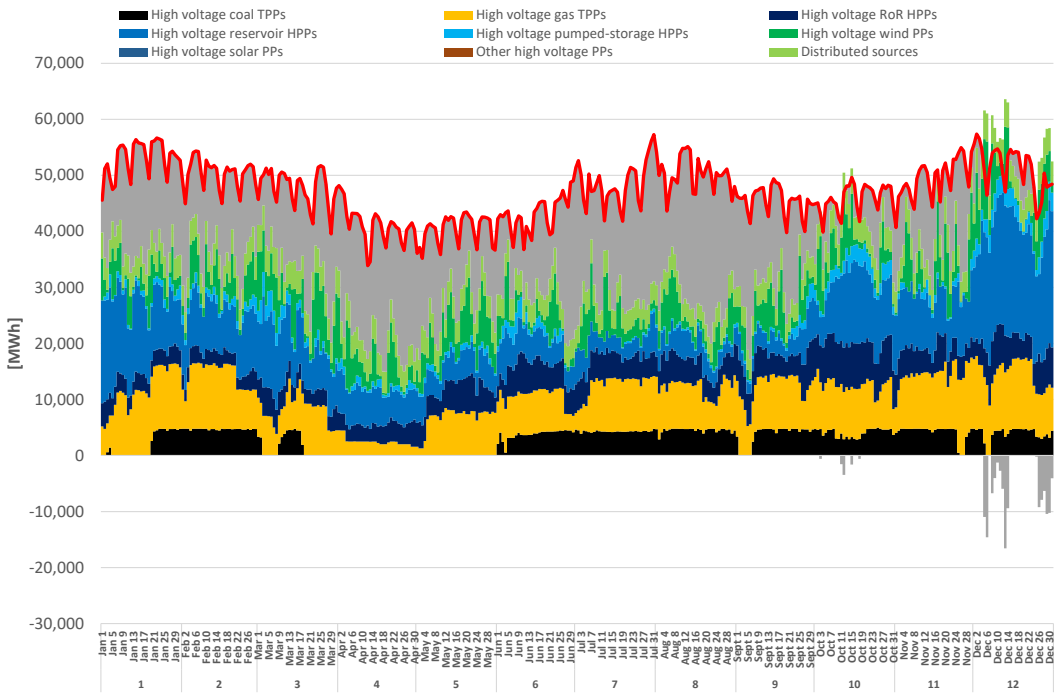


	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Other renewables	33	85	132	194	298	454	535	681	947	1,051
Wind	201	329	517	730	794	1,002	1,204	1,335	1,467	1,721
Water	4,578	4,772	8,054	8,356	5,715	6,250	5,025	6,959	5,871	5,361
Fossil fuels	5,184	4,791	4,228	2,912	3,192	3,625	4,054	3,216	3,720	4,084
NPP Krško	2,953	2,622	2,518	3,030	2,685	2,715	2,984	2,745	2,766	3,020
Net imports without NPPK	4,752	5,002	1,973	1,642	4,948	3,628	4,395	3,415	3,397	2,036

Figure 4.2.37 Proportions of electricity sources (GWh) procured for the requirements of the Croatian electricity system from 2011 to 2020

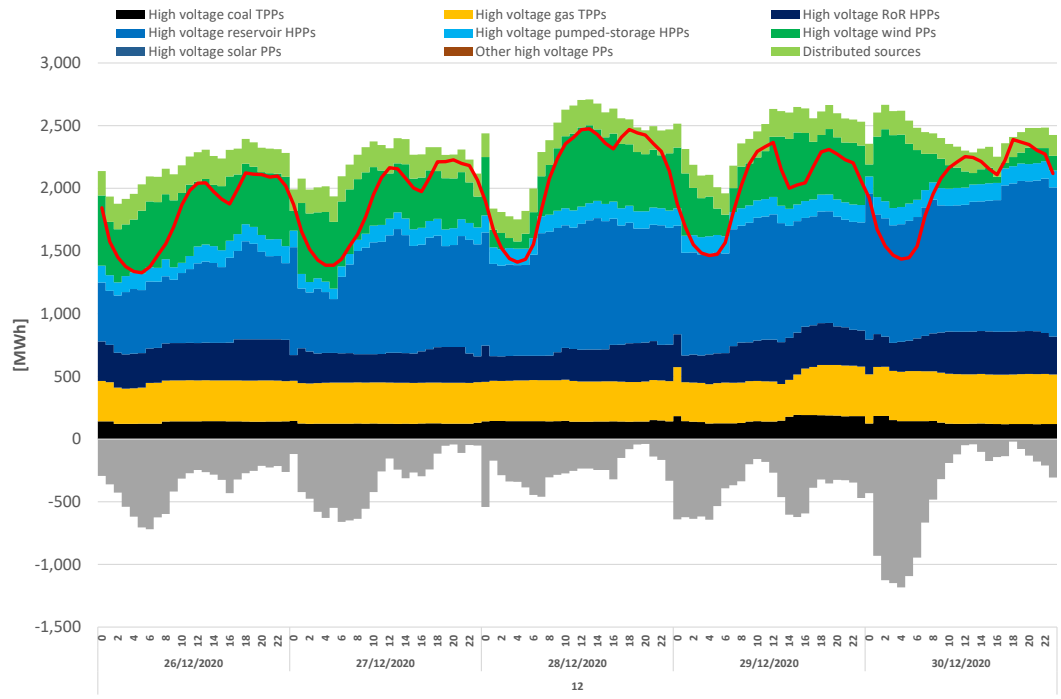
In 2020, despite lower hydroelectricity production, electricity production from power plants using other renewable energy sources has increased compared to 2019. Thermal power plant production has also increased to the highest level since 2013.

Considering the daily production and consumption values of the Croatian electricity system shown in Figure 4.2.38, the trends from 2019 are also present in 2020 – most of the consumption is covered by hydroelectricity production and imports, while thermal power plants constitute basic production. It is also visible that TE Plomin 2 did not produce electricity during the majority of the second quarter of 2020. Similarly to 2019, in addition to the production of wind power plants and power plants in the distribution network, the rise in hydroelectric production at the end of 2020 resulted in physical net exports from Croatia in certain hours (negative values in Figure 4.2.39).



Source: HOPS and HEP-ODS

Figure 4.2.38 Daily electricity production and consumption values of the Croatian electricity system in 2020



Source: HOPS and HEP-ODS

Figure 4.2.39 Example of hourly electricity production and consumption values of the Croatian electricity system in time of physical net exports in late December 2020

A significant drop of 5% occurred in the total consumption of the Croatian electricity system in 2020 compared to 2019, the highest in the last ten years, probably mostly driven by the COVID-19 pandemic. Monthly electricity consumption values in 2019 and 2020 are shown in Figure 4.2.40.

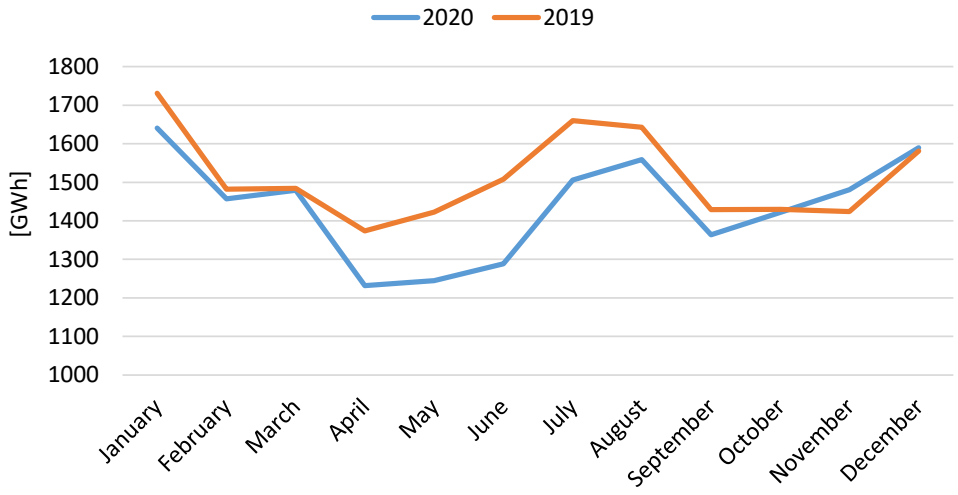
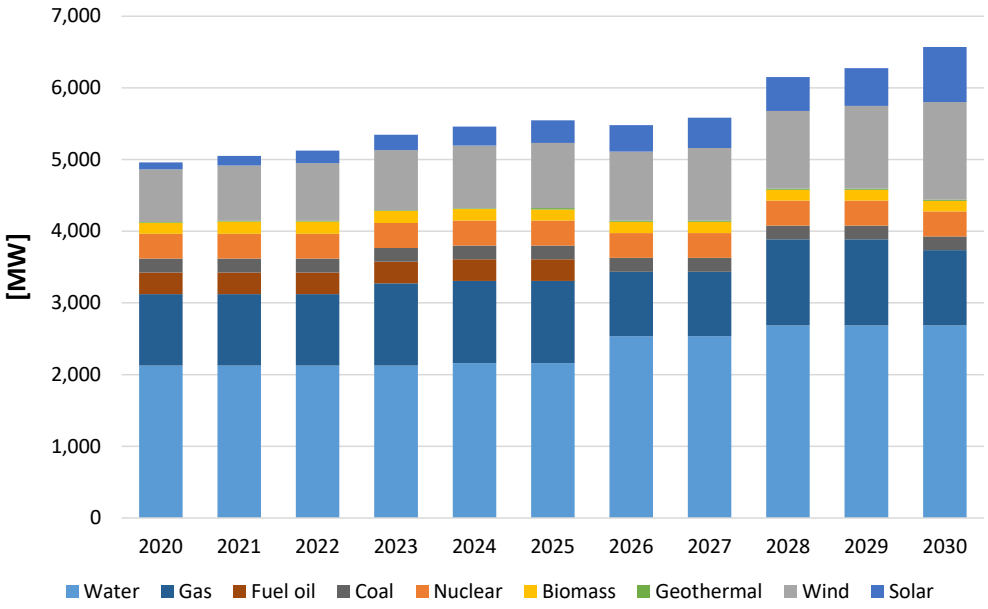


Figure 4.2.40 Comparison of monthly electricity consumption in 2019 and 2020

Energy development strategy and Integrated national energy and climate plan

In December 2019, the Ministry published the *Integrated national energy and climate plan for the Republic of Croatia for the period 2021–2030*. The **Energy Development Strategy of the Republic of Croatia until 2030 with an outlook to 2050** was published in the Official Gazette on 6 March 2020. The Strategy considers three development scenarios (S0, S1 and S2), of which S2 – Moderate energy transition scenario – was chosen as the reference scenario in the **Strategy** (and in the *NECP*, regarding electricity production).

Expected power plant capacity by 2030 according to the *NECP* is shown in Figure 4.2.41, and a comparison of expected power plant capacity in 2020 and installed capacity at the end of 2020 is shown in Figure 4.2.42.



Source: NECP

Figure 4.2.41 Expected power plant capacity by 2030 according to the NECP

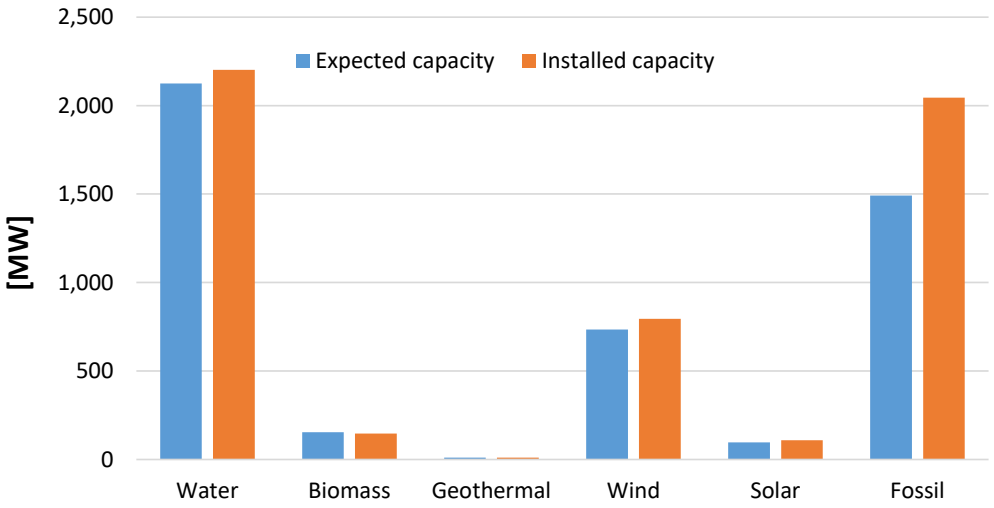


Figure 4.2.42 Comparison of expected power plant capacity according to the NECP and installed capacity per energy source at the end of 2020

Operational events in the Croatian electricity system

As a result of the devastating earthquake that struck on 29 December 2020, as well as of a series of aftershocks, the electricity system suffered significant damage. When the earthquake hit at 12.19, simultaneous interruptions occurred at several points in the electricity network within the radius of 50 kilometres from the epicentre as a result of damage or activation of safety relay devices. System state was qualified as 'local' in accordance with the definition from the *SOGL Regulation* (qualification of an alert, emergency or blackout state when there is no risk of extension of the consequences outside of the control area including interconnectors connected to this control area), and as 'emergency' in accordance with the *Network Code for the transmission system*. Market activities were not suspended during the interruption.

The earthquake caused outages in some production units, the most significant being the outage of the Krško Nuclear Power Plant, triggered by the activation of an automatic safety system as expected under the power plant's safety procedures. No damage was found, and the power plant was reconnected to the network at 23.25 the next day.

The normalisation of the operation started immediately after the interruption. System operators had to collect information on network status, restore the affected network elements and carry out appropriate switchyard manipulations. HOPS had to activate measures from the system defence plan included in the *Electricity defence plan against major interruptions* (voltage deviation management procedure and power flow management procedure). The amount of energy not supplied due to the above interruption is estimated at 281 MWh (including only the energy not supplied due to transmission network deficiencies). At the distribution level, there was an outage in 1,570 10(20)/0,4 kV transformer substations (TS) with a total capacity of 211 MW, which supply electricity to 136,434 users.

HOPS and HEP-ODS submitted reports to HERA on interruptions in the electricity system caused by the earthquake on 29 December 2020.

At the time of writing of this report, the analysis of the Continental Europe synchronous area separation incident from 8 January 2021 is ongoing. ENTSO-E has prepared a report on that interruption entitled *Continental Europe Synchronous Area Separation on 8 January 2021 – Interim Report*[47], which gives an overview of the state of the system before and during the interruption, of the resynchronisation procedure and of the

[47] *Available at https://www.entsoe.eu/news/2021/02/26/system-separation-in-the-continental-europe-synchronous-area-on-8-january-2021-interim-report/*

communication between transmission system operators and relevant authorities. In addition, on the basis of the ENTSO-E document *Incident Classification Scale*, the interruption was identified as an extensive incident for which an expert panel has been formed in accordance with the document. The task of the expert panel is to investigate the interruption and write a report by mid-July 2021 which will contain an analysis of the interruption, conclusions, and recommendations. The expert panel consists of transmission system operator representatives, national regulators as well as of HERA and ACER representatives.

Observations on the monitoring of the production and consumption balance

In the first half of 2021, HOPS and HEP-ODS submitted to HERA their requests for a prior approval of reports on monitoring the security of supply in the transmission and distribution systems for 2020. These reports and the currently available data submitted to HERA by HOPS and HEP-ODS suggest that the level of security of electricity supply in the Croatian electricity system is satisfactory. In addition to the production of wind power plants and power plants in the distribution network, the rise in hydroelectric production at the end of 2020 resulted in physical net exports from Croatia in certain hours.

Due to the COVID-19 pandemic, planned works on the transmission and distribution networks have been postponed and there was a decrease in the load of the electricity system as a whole.

Even though the devastating earthquake from 29 December 2020 caused significant damage to the transmission and distribution networks and tripping of system elements, both system operators promptly reacted to re-establish power supply as soon as possible, and thus prevented major disruptions of the electricity system.

In accordance with the *ERNC Regulation*, in late 2019 HERA received from HOPS a proposal for the *Test plan for equipment and capabilities relevant for the system defence plan and the restoration plan*. HERA approved the document on 23 July 2020.

In 2020 ACER approved two methodologies compiled by ENTSO-E in accordance with the *Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC*, which is part of the Clean energy for all Europeans package. The *Methodology for identifying regional electricity crisis scenarios* was approved on 6 March 2020 and it defines electricity crisis scenarios in relation to system adequacy, system security and fuel security. The *Methodology for short-term and seasonal adequacy assessments* applied to all short-term assessments, whether or not they are conducted on the national, regional or EU level, was adopted on the same day. ENTSO-E also carries out the seasonal adequacy assessment (winter and summer) in accordance with that *Methodology*.

In 2020, the supply of electricity from distributed energy sources amounted to 1,415 GWh, which is around 5% more compared to 2019 and around 34% more compared to 2018. The proportion of electricity supplied from distributed energy sources in the total consumption of the electricity system (17,272 GWh) in 2020 was 8.2%. In 2020, 29 GWh of electricity were delivered to the network by customers with their own production facilities, and 1.9 GWh by users of self-supplying installations. It is evident that facilities using biogas and biomass have the highest share and the most stable delivery into the distribution network out of all distributed electricity sources. In terms of connection capacities for the delivery to the network by users of self-supplying installations, connection capacities in the band from 2 kW up to 3 kW and from 3 kW up to 4 kW account for the highest share. Taking into consideration that such a power plant has an average annual peak generation time of 1,000 h, it generates approximately 3,000 kWh per year. The average BPM consumption of a household final customer is approximately 2,800 kWh, meaning that the average connection capacity for the delivery (installed capacity of a solar power plant) should range between 3 kW and 4 kW. It is evident that some self-supplying installation users have delivered more electricity into the network than they

have withdrawn and have therefore lost their self-supplying user status in accordance with the **Renewable Energy Sources and High Efficiency Cogeneration Act**.

4.2.8. Implementation of network codes and guidelines

The development of EU Commission regulations from the network code group and guidelines is a key element in the creation of a common internal energy market under the third energy package. Eight regulations have been adopted that can be divided into the following groups:

1. Market rules:

- *Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management*, (hereinafter: *CACM Regulation*)
- *Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation*, (hereinafter: *FCA Regulation*)
- *Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing*, (hereinafter: *EBGL Regulation*)

2. Network code for connection points:

- Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, (hereinafter: *RfG Regulation*)
- *Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection*, (hereinafter: *DCC Regulation*)
- *Commission Regulation (EU) 2016/1447 of 26 August 2016 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*),

3. Network code for system operation:

- *Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation*, (hereinafter: *SOGL Regulation*),
- *Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration* (hereinafter: *ERNC Regulation*).

Commission Implementing Regulation (EU) 2021/280 of 22 February 2021 amending Regulations (EU) 2015/1222, (EU) 2016/1719, (EU) 2017/2195 and (EU) 2017/1485 in order to align them with Regulation (EU) 2019/943 was primarily adopted for the process of agreeing on the terms and conditions or methodologies. The terms and conditions or methodologies that previously required the approval of all regulatory authorities are now directly adopted by ACER. Further, the Regulation stipulates that national regulatory authorities and ACER are entitled to revise and amend the proposals for terms and conditions or methodologies submitted by transmission system operators and nominated electricity market operators (NEMOs).

The *CACM, FCA, EBGL* and *SOGL* Regulations are guidelines, while the *RFG*, *DCC*, *HVDC* and *ERNC* Regulations are network codes. Guidelines and network codes are similar in that they are both legally binding and directly applicable regulations, and are subject to the same adoption procedure. The differences are reflected in the development process, legal basis for adoption, the topics addressed and activities to be performed in the implementation phase, namely the adoption of necessary by-laws at the national level (network codes are more detailed and prescribe a variety of activities on the regional and EU levels, while guidelines require the adoption of a larger number of by-laws in the implementation phase on the national level). The implementation status of individual regulations in Croatia is as follows.

The CACM Regulation

From 2015, when the *CACM Regulation* entered into force, until the end of March 2021, HERA participated in the adoption or approval of 34 methodologies or terms and conditions, including their amendments.

In accordance with the provisions of the *CACM Regulation*, HERA's role in the adoption of these documents pertained to their approval at the level of the Core capacity calculation region or the EU level. In some cases, if the national regulatory authorities were not able to reach an agreement regarding the approval of the terms and conditions or methodologies proposed by all relevant transmission system operators, ACER has adopted the concerned document.

HERA regularly participates in adoption and approval of revised or new regulations. Currently, the most important document to be adopted are the amendments to the Day-ahead capacity calculation methodology of the Core capacity calculation region.

The FCA Regulation

From 2016, when the *FCA Regulation* entered into force, until the end of March 2021, HERA participated in the approval of 18 methodologies or terms and conditions, including their amendments.

Its role pertained to their approval at the level of the Core capacity calculation region or the EU level. In some cases, if the national regulatory authorities were not able to reach an agreement regarding the approval of the terms and conditions or methodologies proposed by all relevant transmission system operators, the concerned document was adopted by ACER.

HERA regularly participates in adoption and approval of revised or new documents. Currently, the most important document to be adopted concerns determining long-term capacity calculation in the Core capacity calculation region.

The EBGL Regulation

From 18 December 2017, when the EBGL Regulation entered into force, HERA participated in the adoption of 15 regulations at EU level. In addition, HERA secured the adaptation of national regulations (rules on electricity system balancing and rules on electricity market organisation) in accordance with Article 18 of the *EBGL Regulation*.

Nine EU level documents were adopted by ACER since national regulatory authorities could not reach an agreement on their approval.

In 2020, HOPS published the national balancing report in accordance with Article 60 of the *EBGL Regulation*. The summary of the report became part of the ENTSO-E report published online, in accordance with Article 59(6) of the *EBGL Regulation*.

The RfG Regulation

From 2016, when the *RfG Regulation* entered into force, until the end of March 2021, HERA declared three power-generating modules as emerging technology, adopted the criteria for granting a derogation from the application of the *RfG Regulation* and approved national thresholds and requirements of general application of all types of power-generating modules.

Further, HERA approved the revised Network Code for the transmission system and Network Code for the distribution system, which include additional technical requirements for the connection of new power-generating units in accordance with the *RfG Regulation* and approved requirements of general application.

The DCC Regulation

From 2016, when the *DCC Regulation* entered into force, until the end of March 2020, HERA adopted the criteria for granting a derogation from the application of the *DCC*

Regulation and approved requirements of general application for the connection of consumers.

HERA participated in the implementation of the requirements arising from the *DCC Regulation* and requirements of general application by drafting the proposal for the amendments to the network codes and their approval. HERA provided its prior approval for the *Amendments to the Network Code for the distribution system* and *Amendments to the Network Code for the transmission system*.

The HVDC Regulation

From 2016, when the *HVDC Regulation* entered into force, until the end of March 2021, HERA adopted the criteria for granting a derogation from the application of the *HVDC Regulation*.

Further, HERA approved the *Amendments to the Network Code for the transmission system*, including additional technical requirements for the connection of HVDC systems and direct current-connected power park modules in accordance with the *HVDC Regulation* and the requirements of general application.

The SOGL Regulation

From 2017, when the *SOGL Regulation* entered into force, until the end of March 2021, HERA participated in the approval of 16 methodologies or terms and conditions, including their amendments.

HERA's role in the adoption of these documents was to approve them either at EU level or the level of the SHB load-frequency control block comprising of the electricity systems in Croatia, Slovenia, and Bosnia and Herzegovina. In some cases, if the national energy regulatory agencies were not able to reach an agreement regarding the approval of the documents proposed by all relevant transmission system operators, it was adopted by ACER.

HERA regularly approves revised or new regulations under the *SOGL Regulation*.

The ERNC Regulation

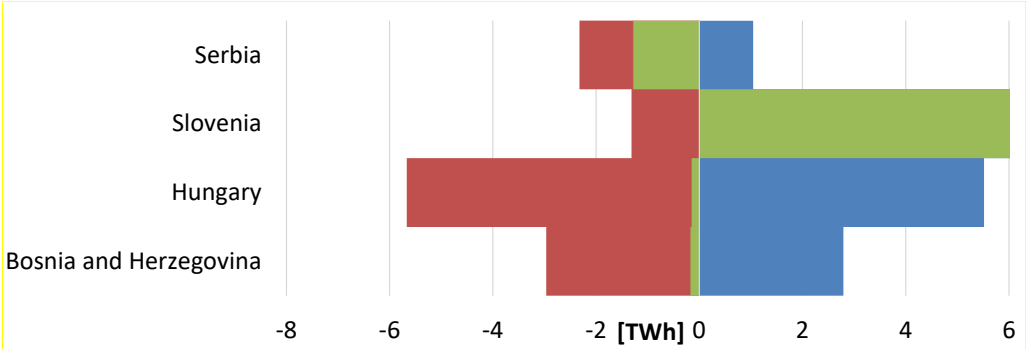
From the end of 2017, when the *ERNC Regulation* entered into force, until the end of March 2021, HERA approved six documents. In 2020, the *Test plan for the equipment and capabilities relevant for the system defence plan and the restoration plan* was approved.

4.3 Wholesale electricity market

4.3.1 Development of the wholesale electricity market

Trade at Croatian borders

Figure 4.3.1 shows the volumes of cross-zonal (cross-border) trading (imports, exports, and net exchange) with neighbouring bidding zones (countries) in 2020 at Croatian borders according to volumes from contractual schedules. Net exports exist were realised at all borders, except the border with Slovenia.



	Bosnia and Herzegovina	Hungary	Slovenia	Serbia
Net exchange	-0.2 TWh	-0.1 TWh	6.6 TWh	-1.3 TWh
Exports	-3.0 TWh	-5.7 TWh	-1.3 TWh	-2.3 TWh
Imports	2.8 TWh	5.5 TWh	8.0 TWh	1.0 TWh

Source: HROTE

Figure 4.3.1 Cross-zonal trade on borders between Croatia and the neighbouring countries in 2020 by volumes from contractual schedules of energy entities

Imports from Slovenia include electricity from NPP Krško (3.0 TWh) for HEP d.d. The total net (trade) exchange for Croatia, including electricity from NPP Krško, amounted to 5.0 TWh.

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

In 2020, there were 22 registered members on CROPEX's day-ahead market. The trade volume on the day-ahead market amounted to 6.076 GWh.

Correlation between prices on CROPEX's day-ahead market and the Hungarian (HUPX) and Slovenian (BSP) power exchanges in 2020 is shown in Figure 4.3.2. Evidently, the prices on CROPEX correlate more strongly with prices on the Slovenian exchange due to day-ahead market coupling between Croatian and Slovenian bidding zones.

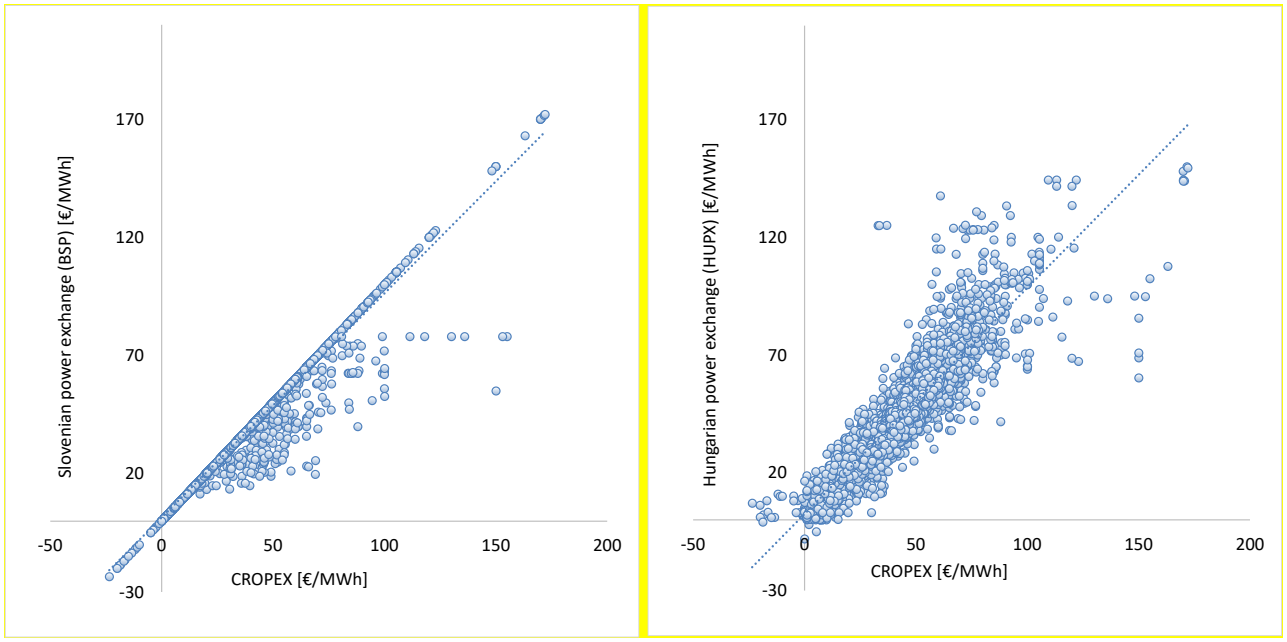


Figure 4.3.2 Correlation between prices on CROPEX's day-ahead market and prices on the Slovenian and Hungarian power exchanges in 2020

In 2020, CROPEX's intraday market had 14 registered members, who purchased 138.9 GWh of electricity from CROPEX. In addition, in the same year the Slovenian and

Hungarian power exchanges bought from CROPEX 342.4 GWh and 502.4 GWh, respectively.

The regulatory authorities of Austria, Germany, Poland and 4M market coupling countries[48] were provided with guidelines from the European Commission's DG ENER for the DE-AT-PL-4M MC Project (Interim Coupling Project), whose implementation takes priority.

Implementation of the CORE FB MC[49] project is expected in the first quarter of 2022.

In 2020, CROPEX started negotiations with the European Energy Exchange (EEX) to introduce financial derivatives for the Croatian power futures market. The agreement was signed by CROPEX and EEX in January 2021, while the introduction of this market is planned in 2022. With no physical delivery required on the power futures market, as a rule the use of energy volumes is not required when calculating the market position of balance groups.

In 2020, five auctions were held on CROPEX for the supply of electricity to cover losses in the transmission network for 2021, 2022 and 2023, one auction for additional procurement in 2021 and one for procurement in January 2021. In 2020, four auctions were held to sell electricity from the EKO balance group (HROTE).

Electricity market concentration indicators

The shares of energy entities in production capacities and electricity generated by power plants in Croatia in 2020 are shown in Figure 4.3.1. HEP d.d. has the largest share, accounting for 77.2% of production capacities and 76.6% of generated electricity.

Table 4.3.1 Shares of energy entities in production capacities and electricity generated by power plants in Croatia in 2020

Energy entity	Production capacities	Generated electricity
HEP d.d.	77.2%	76.6%
Other	22.8%	23.4%

On 31 December 2020, Croatia had 68 valid licences for electricity production, 12 licences for electricity supply, 34 licences for electricity trade, one licence for electricity transmission, one for electricity distribution and one for electricity market organisation. In 2020, HERA issued 19 licences for carrying out energy activities, extended 10 licences and suspended 12 licences in the electricity sector.

In 2020, the total volume traded on the Croatian market was 63.94 TWh (CROPEX, HROTE, HOPS and HEP-ODS volumes included), in which HEP d.d. participated with 39.39 TWh (market trade volume).

Observations on the development of the wholesale market

The wholesale market share in electricity sales from the EKO balance group (CROPEX included) increased from 30% in 2019 to 60% in 2020.

The development of the wholesale market would be boosted if the suppliers were relieved of the obligation to take up from the operator a share in net electricity delivered by eligible producers at a regulated price[50]. The electricity market operator would then offer on the market the total net amount of electricity delivered by eligible producers.

48 *4M MC and/or 4M MC Project — Four Markets Market Coupling Project, whose aim is to implement day-ahead market coupling between Hungary, Slovakia, the Czech Republic, and Romania).*

49 *Core Flow-Based Market Coupling.*

50 *The supplier's obligation to purchase 40% of the energy generated at the facility participating in the incentives system at the regulated price of 0.42 kn/kWh in accordance with 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 (Official Gazette No. 119/19).*

Transparent publication of information is key to promoting competition. Therefore, HOPS must publish data in accordance with *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*. Publishing all required data on a central information transparency platform would allow for better transparency of the wholesale electricity market and improvement in the functioning of the market. In 2020, HOPS made progress in submitting data to the platform, making available on an hourly basis the volumes of electricity generated in Croatia by technology.

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

In 2020, baseload energy prices for 2021 on HUDEX (Hungarian Derivative Energy Exchange) ranged from around EUR 45 per MWh to around EUR 56 per MWh[51]. In 2020, the baseload prices on COPEX's day-ahead market decreased from EUR 49.27 per MWh to EUR 38.03 per MWh compared to 2019.

On 13 January 2021, a partial decoupling occurred on the day-ahead market for 14 January which caused a delay in the publishing of prices on CROPEX[52]. The event is described in more detail in chapter 4.3.2.

The deadline for the transition of the Croatian electricity market from a 60-minute to a 15-minute interval is 1 January 2023.

Given the trade volume, values of purchase and sale bids, number and share of market participants in purchases and sales, and 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.

Wholesale electricity market indicators from 2015 to 2020 are shown in Table 4.3.2.

Table 4.3.2 Wholesale electricity market indicators from 2015 to 2020

Indicator	2015	2016	2017	2018	2019	2020
Electricity production [GWh]	9,999	11,331	10,818	12,192	12,006	12,216
Number of active participants on the wholesale market	27	35	35	41	35	37
Total electricity consumption [GWh]	17,632	17,674	18,197	18,352	18,169	17,272
Imports [GWh]	13,165	12,397	12,157	12,692	11,400	10,490
Exports [GWh]	5,532	6,054	4,778	6,532	5,237	5,434
Share of HEP-Proizvodnja d.o.o. in overall electricity production [%]	77%	73%	79%	83%	80%	77%
Number of active traders on the wholesale market	15	16	20	24	21	22
Energy traded on the electricity exchange [GWh]	0	258	190	2,460	5,429	7,059
Overall electricity traded [TWh]	43	47	53	67	58	64
Average electricity price on the electricity market [EUR/MWh]	n/a	n/a	52	52	49	38
Production capacities by source (GW):						
· Coal	0.34	0.34	0.34	0.34	0.34	0.34
· Natural gas/ Fuel Oil	1.79	1.79	1.79	1.85	1.70	1.70
· Nuclear	0.00	0.00	0.00	0.00	0.00	0.00

51 *Source: https://hudex.hu/uploads/riportok/2020/HUDEX%20Power%20Annual%20Report%202020.pdf, accessed on 18 February 2021*

52 *Source: https://www.cropex.hr/hr/obavijesti-o-tr%C5%BEi%C5%A1tu/744-day-ahead-further-information-on-the-partial-decoupling.html, accessed on 18 February 2021*

Indicator	2015	2016	2017	2018	2019	2020
· Hydro	2.03	2.15	2.15	2.20	2.20	2.20
· Wind	0.42	0.48	0.47	0.58	0.74	0.79
· Solar	0.05	0.06	0.06	0.07	0.08	0.11
Other	0.05	0.06	0.08	0.13	0.14	0.16
Share of electricity production on the market (%)	77%	84%	67%	79%	73%	89%
Overall connection capacity of production facilities [GW]	4.69	4.87	4.89	5.17	5.21	5.31

Source: HOPS, HEP-ODS, CROPEX, ENTSO-E

4.3.2 Allocation of cross-zonal capacities and congestion management

Cross-zonal capacity allocation regimes in 2020

Pursuant to the **Act on the Regulation of Energy Activities**, and in co-operation with the regulatory authorities of the neighbouring countries whose electricity systems are connected to the Croatian system, HERA monitors the allocation and use of connection line capacities and the mechanism 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 *Regulation (EU) 2019/943*.

Table 4.3.3 Cross-zonal capacity allocation regimes and auction offices across borders between Croatia and the neighbouring countries in 2020

Border	Yearly auction	Monthly auctions	Daily auctions	Intraday allocations
Slovenia	JAO	JAO	CROPEX[53] (SDAC)	CROPEX (XBID)[54]
Hungary	JAO	JAO	JAO	CROPEX (XBID)
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. Regional auction offices (JAO for borders with Slovenia, Hungary and Serbia, and SEE CAO for the border with Bosnia and Herzegovina) are tasked with organising yearly, monthly and daily auctions. An exception is the border with Slovenia, where an implicit capacity allocation regime was established by the coupling of the Croatian and Slovenian day-ahead markets. HOPS is in charge of bilateral allocation of total intraday capacities in both directions on the border with Bosnia and Herzegovina, while the Serbian transmission system operator is in charge of organising intraday allocations on the borders with Serbia. From November 2019, Croatian borders with Slovenia and Hungary are included in the intraday market coupling of EU countries through the XBID project.

For explicit capacity allocation, auction offices organize auctions where market participants explicitly bid (only) for the offered capacity. Market congestion occurs if market participants bid for more capacities than offered on a given auction. In that case, income is shared equally between neighbouring transmission system operators and is equal to the product of the reference price for unit capacity and the overall allocated capacity.

[53] *Implicit day-ahead capacity allocation.*

[54] *Implicit intraday capacity allocation .*

When the electricity exchanges implicitly allocate available capacity (both cross-zonal transmission capacity and energy are allocated) provided by the transmission system operator as part of the day-ahead market coupling, income is shared equally between neighbouring transmission system operators and is equal to the product of the difference between hourly prices on neighbouring day-ahead markets and electricity exchanges between neighbouring markets calculated using the EUPHEMIA algorithm[55].

Transmission system operators do not collect income from the allocation of intraday cross-zonal capacities.

Offered and allocated cross-zonal capacities and income collected by HOPS from yearly auctions per border are shown in Table 4.3.4.

Table 4.3.4 Offered and allocated cross-zonal capacities, and income collected by HOPS from yearly auctions per border for 2020

Direction[56]			Offered capacity [MW]	Number of participants	Number of participants with accepted offers	Allocated [MW]	HOPS income [HRK million]
BA	→	HR	400	16	11	400	3.3
HR	→	BA	400	16	14	399	0.5
SI	→	HR	800	26	13	798	13.4
HR	→	SI	800	28	22	799	0.8
RS	→	HR	150	20	10	150	1.4
HR	→	RS	150	21	10	150	1.4
HU	→	HR	700	30	12	700	9.7
HR	→	HU	600	29	14	600	5.4
							35.9

Source: HOPS

Figure 4.3.3 shows already allocated capacities (AAC) on an annual basis, 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"). When it comes to resale of capacities bought at yearly auctions, that capacity is returned to the auction office which then offers it on monthly auctions and the value of AAC is reduced by the value of resold capacity. Time periods of reduced capacity due to planned maintenance of parts of the network were taken into account when calculating the average capacities.

55 *Computational algorithm used to calculate electricity prices on the day-ahead market.*

56 *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).*

	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	400	400	0	0	0	0
Unallocated	1	1	1	1	1	1	0	1
Allocated	379	484	305	310	404	318	500	399
AAC	400	399	795	789	148	148	700	600

Source: HOPS

Figure 4.3.3 Average monthly cross-zonal capacities per border in 2020

Average net transfer capacity (NTC) value for electricity imports to Croatia for the summer of 2020, based on monthly NTC figures for June, July, August and September, amounted to 4,061 MW. On the other hand, the average NTC value for electricity exports from Croatia in the same period amounted to 3,729 MW.

During the winter period, covering December 2020, and January, February and March 2021, the average NTC value for electricity imports to Croatia, calculated on the basis of monthly NTC values, amounted to 4,049 MW. For the same period, the NTC value for exports from Croatia was calculated at 3,932 MW.

From 4 July 2020 up to 8 July 2020, due to the shutting down of the 400 kV Ernestinovo — Sremska Mitrovica transmission line because of scheduled maintenance, and on 9 October 2020, cross-zonal trading was unavailable in both directions at the border with Serbia since this is the only transmission line used for cross-zonal trading. As usual, the fewest capacities were offered at that border compared to other neighbouring borders.

At the border with Serbia, 150 MW were allocated in both directions at the yearly auction. However, there were several periods at this border when only reduced capacity was offered due to network maintenance, and on some days, trading was completely unavailable, rendering the average ACC value at 148 MW.

With regard to exports from Croatia to Slovenia, 10 MW of capacity were resold in all months of 2020 except November 2020, when export value was 12 MW. That capacity had been bought at the yearly auction by market participants and was then returned to the auction office that offered it on monthly auctions.

With regard to imports from Slovenia to Croatia, a resale of 40 MW of yearly capacities for a monthly auction was recorded only in March 2020. At other borders, no such capacity resale occurred.

At the border with Hungary, the offered cross-zonal capacities in both directions are relatively modest in relation to the total thermal transfer capacity of cross-zonal transmission lines.

Capacity unallocated at monthly auctions, which is intended for daily auctions, as well as capacity not reported for use, is offered at daily auctions. This capacity is increased by the long-term capacity already nominated in the opposite direction. Leftover capacity from daily auctions, taking into account transactions in the opposite direction, is allocated without a fee on the day of delivery on all borders, in the order in which applications are received.

A breakdown of income collected, and costs incurred by HOPS from auctions for the allocation of cross-zonal capacities can be seen in Table 4.3.5.

Table 4.3.5 Breakdown of income collected / costs incurred by HOPS from auctions for the allocation of cross-zonal capacities in 2020

Income/cost	Amount [million HRK]
Yearly auctions	35.9
Monthly auctions	24.1
Daily auctions	43.8
Resale of capacities	-34.3
Costs of JAO and SEE CAO	-2.7
Investment in priority projects for network development	-55.4
Total	**11.4**

Source: HOPS

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

In accordance with *Regulation (EU) 2019/943*, these funds should mainly be used to increase or guarantee cross-zonal capacities. In July 2020, HERA published the *Report on the use of HOPS income from the allocation of cross-zonal transmission capacities in 2019* and confirmed that HOPS used the funds in accordance with the *Regulation*.

In 2020, HOPS invested HRK 55.4 million in the transmission network with the aim of increasing actual availability of allocated capacity.

In December 2020, ACER adopted *Decision No 38/2020*, approving the EU transmission system operators' proposal for a methodology for the use of congestion income with the goal of harmonizing its use at EU level. In addition, in December 2020, ACER published *Recommendation No 01/2020* for energy regulators with the goal of ensuring a uniform approach to collection and reporting of data related to the use of congestion income.

Day-ahead market coupling was achieved only at the border with Slovenia. Data provided by CROPEX and HOPS suggest that the prices on CROPEX fully matched BSP prices exactly in most hours in 2020. In that case, the neighbouring transmission system operators collected no congestion income. Following the establishment of an implicit allocation of capacities on the border with Slovenia, HOPS collected income from capacity allocation only in the hours when there was a positive market spread between Croatia and Slovenia. The income amounted to HRK 14.5 million. The entirety of this income was collected on the importing towards Croatia.

On the implicit day-ahead capacity auction (for the delivery of electricity for all hours of 14 January 2021), held on 13 January 2021, the Croatian bidding zone decoupled from the SADC market at the border with Slovenia due to a technical issue at the Italian exchange (GME). Partial decoupling also occurred at the interconnectors[57] IT–AT, IT–FR, AT–SI and GR–IT.

With Croatia currently coupled with the SDAC market only via the border with Slovenia, CROPEX recorded small volumes of trade and liquidity in isolated mode. Consequently, the day-ahead market prices on CROPEX received after the partial decoupling differed significantly from the normal values and were negative for most hours. The most extreme negative price was EUR -263.31 per MWh and was recorded for hour 23. This was also the lowest price ever recorded on CROPEX's day-ahead market.

This resulted in significant differences between hourly prices on CROPEX and BSP, which are used by the transmission system operators to compensate market participants for long-term capacity not reported for use. That day, HOPS incurred HRK 11.3 million of costs

[57] *Two-letter ISO codes for countries – IT (Italy), AT (Austria), FR (France), GR (Greece).*

from the compensation of market participants for long-term capacity not reported for use. It should be noted that income from long-term capacities does not impact the tariffs for transmission system use.

In September 2019, CROPEX and HOPS successfully established an implicit intraday level allocation regime with their EU neighbours as part of XBID 2nd Wave go-live.

Along with the standard implicit allocation of intraday capacities under XBID, at the request of HERA and AGEN-RS, HOPS and ELES have also enabled explicit intraday allocation in accordance with the *CACM Regulation*. This enables traders to benefit from both implicit and explicit capacity allocation regimes, depending on the situation.

In late 2020, HERA granted its prior approval for the *Proposal for Rules for the allocation of the cross zonal intraday capacity between the bidding zones of Croatian Transmission System Operator Ltd. ("HOPS") and EMS AD Beograd.*

In 2020, no limitations of previously allocated cross-zonal capacity were recorded for market participants.

In 2020, HOPS limited the production from renewable energy sources to 0.75 GWh due to limitations in the transmission network. In March 2020, HERA approved HOPS's *Proposal for Rules on congestion management in the Croatian electricity system, including interconnectors*, providing network users with compensation for re-dispatching their production and consumption.

HOPS is currently participating in the non-compulsory multilateral cross-zonal re-dispatching activity organized by TSCNET Services[58], which can address congestion in the transmission network.

In late 2020, ACER adopted three methodologies for re-dispatching and countertrading for the Core capacity calculation region with guidelines for activation of remedial actions and determination of costs of their activation. These decisions will be implemented in a few years. Once these methodologies come into force, HOPS will address congestion at grid elements relevant to cross-zonal trading and system security in coordination with other transmission system operators.

According to *Regulation (EU) 2019/943*, transmission system operators are not allowed to limit the interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. A minimum of 70% of capacity must be ensured for cross-zonal trading. The remaining 30% can be used for reliability margins, loop flows and internal flows at each critical network element.

Because the level of reliability of minimum capacity calculations is not satisfactory due to lacking methodologies in the Core region and highly demanding minimum capacity limits, HERA approved an exemption from this requirement for HOPS for 2020.

In November 2020, HERA authorized another exemption for HOPS for 2021. The exemption was granted to allow the time needed to develop the necessary tools in order to take into account the flows inside and outside of the Core region for capacity calculation, limitations in re-dispatching activation and network outages planned in the long term.

[58] *Regional Security Coordinator (RSC) Service for the TSOs in Central and South Eastern Europe — one of regional security coordinators for the synchronous area of continental Europe.*

4.3.3 System balancing and ancillary services

Settlement of imbalances with balance responsible parties

From 1 January 2020, the imbalance prices are calculated in a new way according to the *Rules on Electric Power System Balancing*. Instead of different prices, the same imbalance price now applies to all balance groups for every hour.

The imbalance price ($P_{1,i}$) is determined in relation to the imbalance of all balance groups (ΔE_{BGi}), which can be positive, negative or zero, and in relation to activated positive ($E_{FRR+,i}$) and negative (E_{FRR-i}) balancing energy from the FFR[59]. These three states are shown in table 4.3.6. As shown in the table, depending on the state, the weighted price of positive ($P_{BE+,i}$) or negative balancing energy ($P_{BE-,i}$) in an observed hour is used. CROPEX's day-ahead market price for the same hour is used as the price limit ($C_{\mathrm{CROPEX_{DA}},i}$).

The financial neutrality coefficient (p) is the same for all hours of an observed month and cannot be less than 0 nor greater than 1, and is not applicable for negative prices. Its purpose is achieving the financial neutrality of costs incurred by HOPS for the balancing energy and imbalances paid by the balance groups to HOPS.

Table 4.3.6 Calculation of imbalance prices in three system states ($E_{imbalance,i}$ is the system imbalance and $E_{FRR,i} = E_{FRR+,i} + E_{FRR-,i}$)

State 1 $\Delta E_{BG,i} = E_{imbalance,i} + E_{FRR,i} > 0$

$$C_{1,i} = \begin{cases} (1+\mathrm{p}) \cdot \max\left\{C_{EU+,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| > 0 \\ (1-\mathrm{p}) \cdot \min\left\{C_{EU-,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| = 0 \text{ i } \left|E_{FRR-,i}\right| > 0 \\ (1+\mathrm{p}) \cdot \max\left\{C_{EU0,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| = \left|E_{FRR-,i}\right| = 0 \end{cases}$$

State 2 $\Delta E_{BG,i} = E_{imbalance,i} + E_{FRR,i} < 0$

$$C_{1,i} = \begin{cases} (1-\mathrm{p}) \cdot \max\left\{C_{EU-,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR-,i}\right| > 0 \\ (1+\mathrm{p}) \cdot \min\left\{C_{EU+,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR-,i}\right| = 0 \text{ i } \left|E_{FRR+,i}\right| > 0 \\ (1-\mathrm{p}) \cdot \max\left\{C_{EU0,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| = \left|E_{FRR-,i}\right| = 0 \end{cases}$$

State 3 $\Delta E_{BG,i} = E_{imbalance,i} + E_{FRR,i} = 0$

$$C_{1,i} = \begin{cases} (1+\mathrm{p}) \cdot \max\left\{C_{EU+,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| > 0 \; i \; \left|E_{FRR-,i}\right| = 0 \\ (1-\mathrm{p}) \cdot \min\left\{C_{EU-,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| = 0 \text{ i } \left|E_{FRR-,i}\right| > 0 \\ (1+\mathrm{p}) \cdot \max\left\{C_{EU0+,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| > 0 \text{ i } \left|E_{FRR-,i}\right| > 0 \\ \max\left\{C_{EU0,i}; C_{\mathrm{CROPEX_{DA}},i}\right\} \text{ za } \left|E_{FRR+,i}\right| = \left|E_{FRR-,i}\right| = 0 \end{cases}$$

As a result of the new way of calculating imbalance prices, the share in the cost of system balancing attributed to balance groups decreased from HRK 133 million in 2019 to HRK 45.4 million in 2020. The deficit in income from imbalance settlements to cover system balancing costs is covered from the income from tariffs for electricity transmission. In 2020, there were no complaints against calculations of imbalances.

Through HERA's decision of 9 July 2020, HOPS has been granted an exemption from the requirement outlined in Article 53 of the *EBGL* to apply a 15-minute imbalance settlement period, valid until 31 December 2021.

The average monthly prices of positive and negative imbalances in 2020 are shown in Figure 4.3.4. The highest average weighted monthly price for negative imbalances P_n was achieved in December (EUR 67 per MWh), while the highest average weighted monthly price for positive imbalances P_p was achieved in May (EUR 19 per MWh).

59 *Frequency Restoration Reserve.*

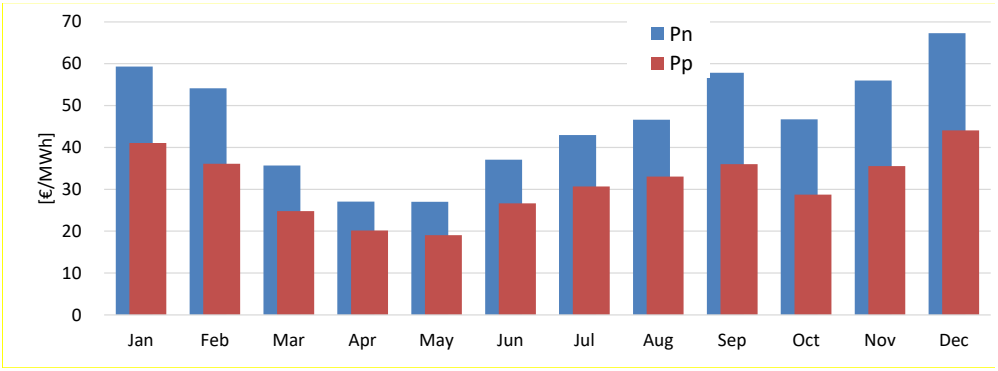


Figure 4.3.4 Monthly weighted average prices of positive and negative imbalances in 2020

The monthly breakdown of imbalance amounts calculated by HOPS in 2020 (A_{tot} — total amount, A_n — amount of negative imbalances, A_p — amount of positive imbalances) is shown in Figure 4.3.5. For all months in 2020, the total imbalance calculated by HOPS was HRK 45.4 million (VAT excluded), of which HRK 12.0 million pertained to the imbalances of EKO balance group and HRK 4.4 million to imbalances of electricity procured to cover losses in the transmission network.

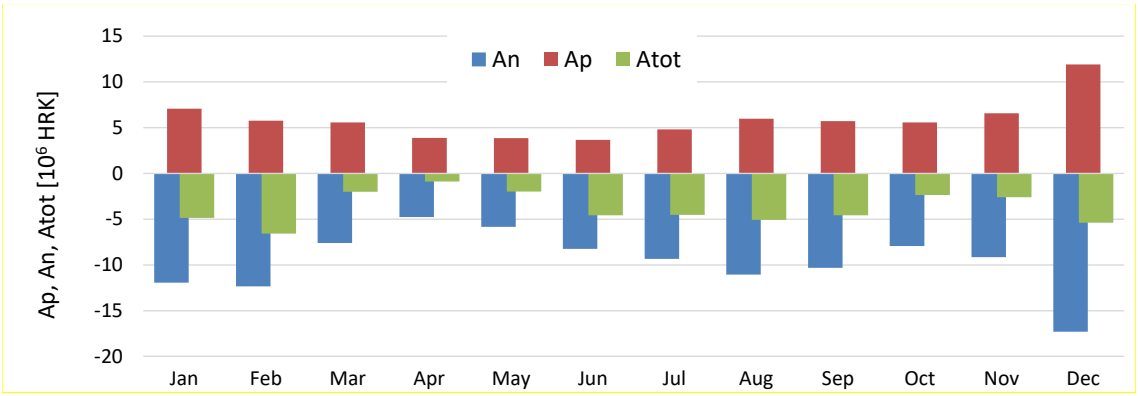


Figure 4.3.5 Invoiced imbalance amounts in 2020

On 13 January 2021, a partial decoupling occurred on the day-ahead market for 14 January 2021. As a result, the prices on CROPEX were published with a delay. In that case, the unit imbalance price was calculated according to Article 32(8) of the *Rules on Electric Power System Balancing (HOPS 11/2019)*[60] as the prices on CROPEX were temporarily unavailable.

From 1 January 2020, the energy price in the "second (yearly) imbalance settlement" was determined as the weighted price from CROPEX's day-ahead market in accordance with the *Rules on Electric Power System Balancing*. The load profile of the distribution system was used to calculate the weighted price. Before 1 January 2020, the weighted price was calculated as a simple average from the day-ahead exchanges.

Provision of balancing services

From 1 January 2020, the section of the *Rules on electric power system balancing (HOPS, 11/2019)* regulating the pricing for the provision of balancing services for HEP-Proizvodnja d.o.o. came into force.

The *Rules on Electric Power System Balancing* replaced the *Methodology for establishing prices for the provision of balancing services*, which is contained in the *Rules on Electric Power System Balancing* in an amended form. There has been a change in the reference price used in the calculation of balancing energy prices, which is now the price from

60 *source: http://www.hops.hr/vijesti/razdvajanje-cropex-dam-od-sdac-1412021, accessed on 18 February 2021.*

CROPEX, while the prices from the Hungarian and Slovenian exchanges are used if the CROPEX price is temporarily unavailable.

Provisions for the procurement of balancing energy, which includes independent aggregators, are set out in the *Rules on Electric Power System Balancing*. Network users must inform their supplier and/or purchaser and the relevant system operator before approaching an independent aggregator.

HEP-Proizvodnja d.o.o. is so far the only provider of balancing services from secondary and tertiary balancing power reserves. For the first time, tertiary reserve services for system security were provided by entities outside HEP d.d. under a pilot project. A total of 136 GWh of balancing energy was activated for increases in electricity production and 122 GWh for decreases. Additionally, in the imbalance netting cooperation with other control areas, 106 GWh were exchanged for energy increases and 93 GWh for decreases.

From 14 December 2020, HOPS has been applying a new method of procurement of mFRR[61] energy reserves and the respective balancing energy for system security through public auctions, which is a development of the previous pilot project. In 2020, the total costs which HOPS incurred for the balancing service were HRK 33 million. This amount does not include the cost of the compensation exchange plan for HRK 2.1 million, nor the amount for the imbalances exchange procedure from which HOPS incurred HRK 0.9 million of expenses.

On 13 January 2021, a partial decoupling occurred on the day-ahead market for 14 January 2021. As a result, the prices on CROPEX were published with a delay. Since the price on CROPEX was temporarily unavailable, the limit reference price of balancing energy for the dominant provider was determined in accordance with Article 2(2) of Annex 1 *Rules on Electric Power System Balancing (HOPS 11/2019)*[62] as the prices on CROPEX were temporarily unavailable.

Ancillary services

In late 2020, HERA granted its approval for an agreement on providing ancillary services between HOPS and HEP-Proizvodnja d.o.o. for 2021 pursuant to the *Rules on electric power system balancing (HOPS 11/2019)*.

On 22 September 2020, HOPS adopted the new *Methodology for establishing prices for the provision of ancillary services (HOPS 9/2020)*, according to which the prices for the aFRR[63] and mFRR are calculated separately for both directions.

The *Rules on balancing the electricity system* contain provisions regarding the procurement of power reserves.

In 2020, the power reserve needs for aFRR amounted to an average of ±59 MW per hour. The power reserve needs for mFRR for system balancing were +120 MW and -100 MW per hour, and +130 MW per hour for mFRR for system security. A portion of the mFRR for system security was procured by HOPS from two entities outside HEP d.d. HOPS also used ±15 MW of FCR[64], 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 296.5 million, of which 85% were power reserves for system balancing.

61 *Manual Frequency Restoration Reserve.*

62 *Source: http://www.hops.hr/vijesti/razdvajanje-cropex-dam-od-sdac-1412021, accessed on 18 February 2021.*

63 *Automatic Frequency Restoration Reserve.*

64 *Frequency Containment Reserve.*

Observations on system balancing

HOPS will have to procure energy via EU balancing platforms in accordance with the *EBGL*, more specifically via the IN platform[65] (for imbalance netting), aFRR platform (for activation of energy balancing from the automatic frequency restoration reserves) and mFRR platform (for activation of energy balancing from the manual frequency restoration reserves).

On 9 June 2020, HERA adopted the *Settlement rules for all unintended exchanges of energy* and *Settlement rules for all intended exchanges of energy as a result of the frequency containment process and the ramping period* pursuant to Articles 50 and 51 of the *EBGL*.

The national regulatory agencies adopted the *Settlement rules applicable to all intended exchanges of energy between synchronous areas* pursuant to Article 50(4) of the *EBGL* on 18 June 2020, and the *Settlement rules applicable to all unintended exchanges of energy between asynchronously connected transmission system operators* on 27 January 2020.

Following the failure of the national regulatory agencies to reach an agreement, in 2020 ACER adopted the following decisions pursuant to the *EBGL*: the *Implementation framework for a European platform for the exchange of balancing energy from frequency restoration reserves with manual activation* (Article 20(1)), *Implementation framework for the European platform for the exchange of balancing energy from frequency restoration reserves with automatic activation* (Article 21(1)) and *Methodology to determine prices for the balancing energy that results from the activation of balancing energy bids* (Article 30(1)) (adopted on 24 January); *Methodology for a co-optimised allocation process of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves* (Article 40(1)), *Methodology for a list of standard products for balancing capacity for frequency restoration reserves and replacement reserves* (Article 25(2)) (adopted on 17 June); *Implementation framework for a European platform for the imbalance netting process* (Article 22(1)) (adopted on 22 June); *Decision on the harmonisation of the main features of imbalance settlement* to further specify and harmonise imbalance settlement (Article 52(2)), *Methodology for classifying the activation purposes of balancing energy bids* (Article 29(3)) and *Decision on the common settlement rules applicable to all intended exchanges of energy* (Article 50(1)) (adopted on 15 July).

The *Rules on the application of standard load profiles (HEP-ODS, 12/2020),* adopted on 15 December 2020, introduce changes in calculation of balance group realisations. Instead of two load profiles for industrial final customers, a single load profile will be used. It is explicitly required that standard load profiles be used for household final customers with connection capacity of 20 kW, regardless of whether it is possible to measure the load profile. The minimum coefficient for the calculation of the loss profile is set at 4.3%. During a force majeure and in the transitional period until 31 December 2022, HEP-ODS reserves the right to change the loss coefficient by ±5 percentage points compared to the calculated coefficient. An amendment was also adopted specifying the methodology for calculating monthly electricity volumes at billing metering points that cannot measure load profiles. This is important because the volume of monthly realisations is used as the input parameter for the calculation of hourly profiles for imbalance settlement, which is reflected in the scheduling of system operations.

In May 2020, HOPS fulfilled the obligations laid down in Article 60 of the *EBGL* and published the *Report on balancing for 2018 and 2019* on its website[66]. In addition,

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65 *Imbalance Netting.*

66 *Source: https://www.hops.hr/page-file/aPQDhW2Cca6bDAlM0BzOO6/izvjesce-o-uravnotezenju-ees-a/HOPS_izvje%C5%A1%C4%87e%20o%20uravnote%C5%BEenju%202018_2019-10062020_v2.pdf, accessed on 16 February 2021*

pursuant to Article 59 of the *EBGL*, in 2020 ENTSO-E published the *Report on balancing* which included Croatia[67].

In 2020, the new method of calculating the prices of imbalances, which now depend on the price of activated balancing energy, resulted in a decrease of the total costs for balancing groups compared to 2019. In 2019, the costs of imbalance settlement included 20% of balancing power reserves, in addition to balancing energy costs.

The EKO balance group had imbalances between produced electricity and electricity sold by HROTE. As the manager of the EKO balance group, HROTE is financially liable to HOPS.

The balancing system would benefit if the suppliers were relieved of the obligation to take up from the operators a share in net electricity delivered by eligible producers at a regulated price, making the day-ahead production plan completely reliable.

In order to plan for consumption and production, HEP-ODS and HOPS should publish data from billing metering points in a timely manner, which would enable better planning for balance groups. This would lead to a reduced need for power reserves and an increase in the take-up of renewable energy sources.

In 2020, there were no complaints which would require a recalculation of imbalance settlements. In 2020, the costs of imbalance settlements were lower compared to previous years.

4.4 Retail electricity market

4.4.1 Basic features of electricity consumption

Sale of electricity in 2020

Table 4.4.1 shows data on the number of billing metering points[68] (BMP), sale, average sale of electricity per billing metering point, and the shares of individual consumption categories in total electricity sales.

Table 4.4.1 Average number of metering points and sale, average sale and share in the sale of electricity to final customers by consumption category in Croatia in 2020

Consumption category	Average number of BMPs	Sale [MWh]	Sale per BMP [kWh]	Share in total sale [%]	Change in sale 2020/2019 [%]
High voltage – 110 kV[69]	148	1,132,319	7,659,302	7.3	-6.6
Medium voltage	2,365	4,041,163	1,708,548	26.0	-6.1
Total high and medium voltage	**2,513**	**5,173,483**	**2,058,608**	**33.3**	**-6.2**
Low voltage – industrial (blue)	40,164	171,319	4,265	1.1	-14.8
Low voltage – industrial (white)	124,428	948,994	7,627	6.1	-12.9
Low voltage – industrial (red)	30,821	2,813,030	91,269	18.1	-9.2
Low voltage – public lighting (yellow)	20,153	360,512	17,888	2.3	-6.9
Total low voltage – industrial	**215,566**	**4,293,855**	**19,919**	**27.6**	**-10.1**
Low voltage – households (blue)	700,604	1,389,308	1,983	8.9	-2.4

67 *Source: https://eepublicdownloads.azureedge.net/clean-documents/Publications/Market%20Committee%20publications/ENTSO-E_Balancing_Report_2020.pdf, accessed on 17 February 2021*

68 *Average number of billed monthly fees per billing metering point.*

69 *High voltage connections include 148 BMPs for final customers in industry and the transport sector (Croatian Railways electro-traction), and power plants which are in this case final customers (with own consumption). High voltage sales also include RHE Velebit.*

Low voltage – households (white)	1,521,439	4,640,428	3,050	29.9	-2.1
Low voltage – households (red)	2,138	39,930	18,677	0.3	16.7
Low voltage – households (black)	2,925	5,519	1,887	0.0	-10.5
Total low voltage – households	**2,227,106**	**6,075,185**	**2,728**	**39.1**	**-2.0**
Total low voltage	**2,442,672**	**10,369,041**	**4,245**	**66.7**	**-5.6**
Overall total	**2,445,185**	**15,542,523**	**6,356**	**100.0**	**-5.8**

Source: HEP-ODS, HOPS

The sale of electricity to final customers from 2011 to 2020 is shown in Table 4.4.2. The table also shows electricity procured on the wholesale market, rather than from the suppliers, for the needs of pumping and compensation at RHE Velebit, in accordance with Article 10(13) of the **Electricity Market Act**.

Table 4.4.2 Sale of electricity to final customers from 2011 to 2020

Year		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Final customers	[GWh]	15,602	15,353	15,187	14,932	15,485	15,570	16,158	16,407	16,320	15,312
Change	[%]	-0.8%	-1.6%	-1.1%	-1.7%	3.7%	0.5%	3.8%	1.5%	-0.5%	-6.2%
RHE Velebit	[GWh]	227	273	152	171	236	290	284	129	176	231
Total	[GWh]	15,829	15,626	15,339	15,103	15,721	15,860	16,442	16,536	16,496	15,543

A comparison of electricity volumes for network usage billed by month in 2020 and in 2019 is shown in Figure 4.4.1.

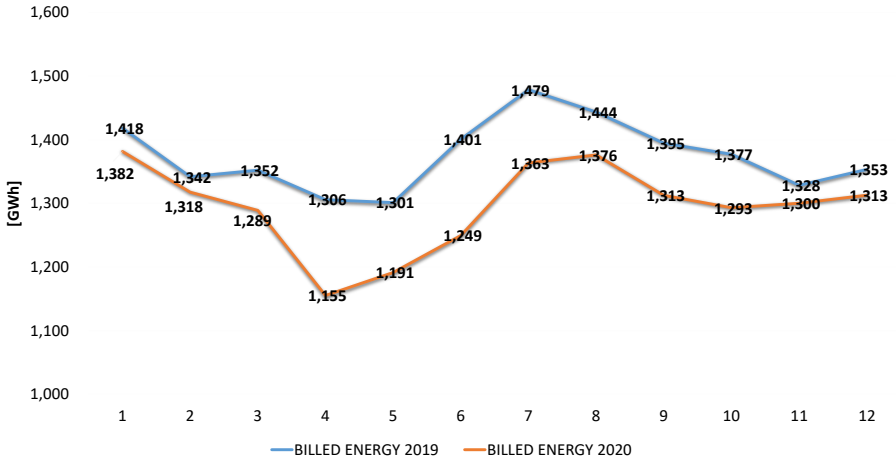


Figure 4.4.1 A comparison of electricity volumes for network usage billed by month in 2020 and in 2019

The ratio of higher (HT) and lower (LT) tariff consumptions by category and tariff model in 2020 is shown in Figure 4.4.2.

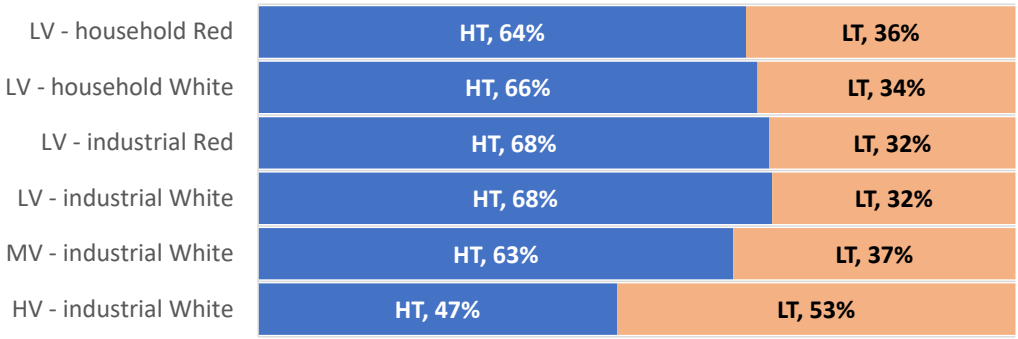


Figure 4.4.2 Ratio of higher (HT) and lower (LT) tariff consumptions by category and tariff model in 2020

Breakdown by EUROSTAT consumption bands

Table 4.4.3 shows the breakdown of consumption and billing metering points for household final customers by EUROSTAT consumption bands.

Table 4.4.3 Breakdown of consumption and billing metering points for household final customers in Croatia by EUROSTAT consumption bands in 2020

Consumption band	Minimum consumption [kWh/year]	Maximum consumption [kWh/year]	Consumption [%]	Number of BMPs [%]
Da – very small households	1	< 1,000	3.9	31.7
Db – small households	1,000	< 2,500	16.9	26.5
Dc – medium households	2,500	< 5,000	35.4	26.6
Dd – large households	5,000	< 15,000	39.3	14.6
De – very large households	≥ 15,000		4.5	0.6

Source: EUROSTAT and HEP-ODS, data processing: HERA

The largest share of electricity is consumed by households in bands *Dd* (large households) and *Dc* (medium households), while bands *Da* (very small households), *Db* (small households) and *Dc* (medium households) have the largest share of billing metering points.

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

Table 4.4.4 Electricity consumption bands and indicative peak loads for industrial final customers 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 (LV), medium (MV) and high (HV) voltage industrial final customers in Croatia by EUROSTAT consumption bands in 2020

Consumption band	Industrial – LV		Industrial – MV		Industrial – HV		Total	
	Consumption [%]	BMP [%]	Consumption [%]	BMP [%]	Consumption [%]	BMP [%]	Consumption [%]	BMP [%]
Ia	8.79	80.60	0.04	0.11	0.00	0.00	8.83	80.7
Ib	26.70	17.87	1.99	0.41	0.04	0.01	28.74	18.3
Ic	8.31	0.41	8.65	0.34	0.07	0.00	17.03	0.8
Id	1.18	0.02	24.45	0.20	0.30	0.00	25.93	0.2
Ie	0.00	0.00	6.46	0.01	3.21	0.00	9.66	0.0
If	0.00	0.00	0.75	0.00	3.29	0.00	4.04	0.0
> 150,000 MWh	0.00	0.00	0.00	0.00	5.76	0.00	5.76	0.0
All bands	**45.0**	**98.9**	**42.3**	**1.1**	**12.7**	**0.0**	**100.0**	**100.0**

Source: HEP-ODS and HOPS, data processing: HERA

In the low voltage category of industrial final customers, the largest share of electricity consumption was in the consumption band *Ib*, whereas the share of final customers is by far the highest in the exceptionally small industrial band *Ia*.

In the medium voltage category of industrial final customers, the most electricity was sold in the consumption band *Id*, which also includes the highest number of final customers (in terms of metering points). In the category of high voltage final customers, the most electricity was sold in the category *Id*.

Table 4.4.6 shows the breakdown of consumption for low (LV), medium (MV) and high (HV) voltage industrial final customers in Croatia by tariff models and EUROSTAT consumption bands in 2020. The table shows that:

- consumption band *Ia* mainly uses the *White LV* tariff model,
- consumption band *Ib* mainly uses the *Red LV* tariff model,
- consumption band *Ic* mainly uses the *Red LV and White MV* tariff model,
- consumption band *Id* mainly uses the *White MV* tariff model,
- consumption band *Ie* mainly uses the *White MV and HV* tariff model,
- consumption band *If* mainly uses the *White HV* tariff model,
- the > 150,000 MWh consumption band uses the *White HV* tariff model.

Table 4.4.6 Breakdown of consumption for low (LV), medium (MV) and high (HV) voltage industrial final customers in Croatia by tariff models and EUROSTAT consumption bands in 2020

Consumption band	HV	MV	LV	LV	LV	LV	Total
	White	White	Blue	White	Red	Yellow	
Ia	0.00002%	0.04083%	1.27547%	5.31906%	0.93826%	1.25926%	8.99380%
Ib	0.04129%	1.99447%	0.51642%	4.61522%	19.06381%	2.50724%	27.49107%
Ic	0.07160%	8.65007%	0.00000%	0.01048%	8.28540%	0.01055%	10.38362%
Id	0.30344%	24.44644%	0.00000%	0.00000%	1.18421%	0.00000%	20.12467%
Ie	3.20628%	6.45865%	0.00000%	0.00000%	0.00000%	0.00000%	18.42167%
If	3.29382%	0.74852%	0.00000%	0.00000%	0.00000%	0.00000%	8.71078%
> 150,000 MWh	5.75919%	0.00000%	0.00000%	0.00000%	0.00000%	0.00000%	5.87438%
Total	12.92918%	41.18561%	1.82773%	10.14368%	30.06118%	0.00000%	100.00000%

Observations on the main characteristics of electricity sale in 2020

The volume of sold electricity[70] was by around 5.8% lower in 2020 compared to 2019. This decline is most evident in April, May and June 2020 and is a result of the limiting of economic and all other activities due to the COVID-19 pandemic.

The highest decline in sales occurred in the low voltage industrial category: 14.8% for the blue tariff model and 12.9% for the white model.

For households, the decline in sales was only 2%. The reason for this was that electricity consumption was billed under the advance payment regime (with a six-month billing period). Additionally, due to safety measures applied during the pandemic, fewer meter readings were conducted, and consumers were working from home.

In 2020, the share of households in total electricity sold to final customers was 39.1%, while the share of electricity sold to industrial final customers was 60.9%.

In the household consumption category for the white tariff model, the consumption ratio between higher and lower tariffs was 66%/34%.

70 *Electricity sale includes electricity procured on the wholesale market, rather than from the suppliers, for the needs of pumping and compensator in RHE Velebit .*

4.4.2 Development of the retail electricity market

Public service of electricity supply

Final customers who did not opt for a supplier of their choice on the electricity market can be supplied through the universal service – for households, and guaranteed electricity supply– for industrial consumers.

Household final customers who are left without a supplier for any reason will automatically be switched to the supply under the universal service. If they wish, household final customers supplied by a market supplier can request to be switched to the universal service. The price of electricity under the universal service is not regulated and is freely determined, in accordance with the recommendations of the European Commission and practice in the majority of EU Member States.

The guaranteed supply is activated when an electricity supplier ceases operation, ensuring that its consumers have a continuous supply of electricity. The **Electricity Market Act** provides that the guaranteed supply tariff is higher than the average price on the electricity market.

In 2020, both public supply under the universal service and guaranteed supply were provided by HEP ELEKTRA d.o.o.

Retail market in 2020

The retail electricity market is completely open and there are no regulated prices, with the exception of guaranteed supply described in the previous chapter. Of the total electricity sold to households in 2020, 12% was sold outside the universal service, while the share of supply outside the guaranteed supply for industrial consumers amounted to 92%, as shown in Figure 4.4.3. The proportion of suppliers from HEP d.d. (HEP-Opskrba d.o.o. and HEP ELEKTRA d.o.o.) in the supply of all customers was 84%.

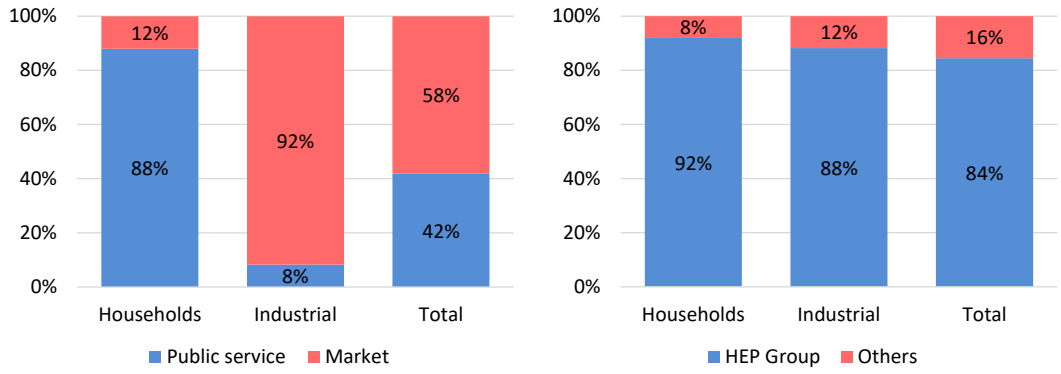


Figure 4.4.3 Proportions of energy sold to household and industrial final customer categories in 2020

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 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 final customers.

Table 4.4.7 shows the number of newly installed smart meters in the distribution network and the total number of installed smart meters as of 31 December 2020.

Table 4.4.7 The number of newly installed smart meters in the distribution network and the total number of installed smart meters as of 31 December 2020

Final customer category	Number of newly installed smart meters in 2020	Total number of installed smart meters as of 31 December 2020
Medium voltage	247	2,439
Low voltage	163,963	396,795
Industrial – blue	3,654	17,372
Industrial – white	12,400	67,783
Industrial – red	5,701	30,739
Public lighting	2,617	10,083
Households	139,591	270,818

Comparison of retail and wholesale prices in Croatia

Retail and wholesale prices in Croatia from 2017 to 2020 are shown in Table 4.4.8.

Table 4.4.8 Average prices of electricity for final customers on the market and within the universal service (households) compared to the yearly average price on CROPEX in the period from 2017 to 2020 [HRK/kWh]

Type of supply	2017	2018	2019	2020
Market (high and medium voltage)	0.31	0.32	0.39	0.41
Market (low voltage, industrial)	0.34	0.35	0.42	0.43
Universal service (households)	0.45	0.45	0.45	0.45
Base wholesale price on CROPEX	0.39	0.39	0.37	0.29

Source: Suppliers in the market (suppliers not under the public service obligation)

Observations on the development of the retail market in 2020

The three largest suppliers in Croatia had a 99% market share in the supply of household final customers, which is the same as in 2019.

Further, the three largest suppliers had a 94% market share in the supply of industrial final customers, which is a decrease in concentration compared to 2019, when the share was 97%.

There were seven active market suppliers on the retail market in 2020. Significant changes in this segment occurred when electricity supplier Petrol d.o.o. took over the final customer portfolio of Crodux plin d.o.o. and when the agreement on electricity market participation between HROTE and Proenergy d.o.o. was terminated, after which the latter company no longer participates in the Croatian electricity market.

The number of supplier switches decreased from 40,640 in 2019 to 33,476 in 2020. The supplier switch rate was 1.37%, which is less than in the previous year when the rate was 1.67%. Of the total number of switches, 18,760 were in the industrial category and 14,716 were in the household category. This constitutes a significant drop in the number of supplier switches in both consumer categories compared to the previous year.

Based on the above, it can be concluded that the retail electricity market in Croatia is stagnating, including due to the COVID-19 pandemic.

In accordance with CEER's recommendations, in order to help the final customers select a supply model, HERA published a tariff calculator for household electricity, which compares offers of different electricity suppliers based on annual consumption in households.

Table 4.4.9 shows indicators of retail market development for the household consumption category in Croatia from 2015 to 2020, and the indicators for industrial consumption category are shown in Table 4.4.10.

Table 4.4.9 Indicators of retail market development for household consumption category in Croatia from 2015 to 2020

Indicator	2016	2017	2018	2019	2020
Electricity consumption [TWh]	6.05	6.3	6.09	6.2	6.1
Average number of billing metering points	2,186,350	2,176,843	2,215,296	2,209,224	2,227,106
Number of registered electricity suppliers	18	18	16	13	12
Number of active electricity suppliers	11	11	12	9	6
Share of the three largest suppliers by BMPs [%]	98%	98%	99%	99%	99%
Number of suppliers with a market share >5%	2	2	2	2	2
Number of suppliers with a customer share >5%	1	3	2	2	2
Number of completed supplier switches	52,098	57,972	54,348	19,783	14,716
Required time limit necessary for supplier switching [days]	21	21	21	21	21
Average time necessary for supplier switching [days]	16	39	46	42	2.44
Number of consumers supplied at the regulated price	0	0	0	0	0
HHI for sales	7,990	7,982	7,774	7,792	7,749
HHI for number of BMPs	8,441	8,306	8,238	8,221	8,222
Number of temporary suspensions of electricity supply due to non-payment	25,814	17,444	12,896	33,765	22,217
Average price of electricity (universal supply) [HRK/kWh]	0.45	0.45	0.45	0.45	0.45
Share of the three largest suppliers by energy [%]	97.44	97.67	99.07	99.21	99.20

Table 4.4.10 Indicators of retail market development for industrial consumption category in Croatia from 2015 to 2020

Indicator	2016	2017	2018	2019	2020
Electricity consumption [TWh]	9.05	9.71	10.02	10.29	9.469
Number of customers	220,495	221,519	218,313	219,792	219,785
Number of registered electricity suppliers	18	18	16	13	12
Number of active electricity suppliers	11	11	12	9	7
Share of the three largest suppliers by energy [%]	84.66	87.31	94.72	97.23	93.60
Number of suppliers with a market share >5%	3	3	2	2	2
Number of suppliers with a customer share >5%	3	3	3	3	3
Number of completed supplier switches	33,817	31,066	31,384	20,857	18,760
Required time limit necessary for supplier switching [days]	21	21	21	21	21
Average time necessary for supplier switching [days]	9	5	6	4	0.57
Number of consumers supplied at the regulated price[71]	75,991	79,010	87,797	88,494	86,295
HHI for sales	5,480	5,618	6,627	7,172	6,282
HHI for number of BMPs	3,260	3,456	3,915	4,097	3,994
Number of temporary suspensions of electricity supply due to non-payment	22,512	21,655	4,364	8,313	5,457

71 *Under guaranteed electricity supply.*

4.4.3 Electricity prices for final customers

Electricity prices in Croatia in 2020

Average total selling prices for final customers[72] by consumption category and voltage from 2016 to 2020 are shown in Table 4.4.11. The prices are calculated based on the average prices determined by application of tariffs for electricity transmission and distribution and on the suppliers' data. Table 4.4.12 shows average electricity prices (excluding the network usage charge, other charges and taxes) for final customers on the electricity market (industrial consumers) and for final customers within the universal supply (households) from 2016 to 2020.

Table 4.4.11 Average total selling prices of electricity for final customers from 2016 to 2020 [HRK/kWh]

Final customer category	2016	2017	2018	2019	2020
Medium voltage customers	**0.55**	**0.52**	**0.54**	**0.58**	**0.60**
Low voltage customers – industrial	0.73	0.68	0.70	0.75	0.77
Low voltage customers – households	0.78	0.78	0.78	0.78	0.79
Low voltage customers	**0.76**	**0.76**	**0.76**	**0.77**	**0.78**

Source: HEP-ODS, market suppliers

Table 4.4.12 Average prices of electricity for final customers on the market (outside public service) and within the universal service (households) in the period from 2016 to 2020 [HRK/kWh]

Type of supply	2016	2017	2018	2019	2020
Market (high and medium voltage)	0.33	0.31	0.32	0.39	0.41
Market (low voltage, industrial)	0.37	0.34	0.35	0.42	0.43
Universal service (households)	0.45	0.45	0.45	0.45	0.45

Source: Market suppliers

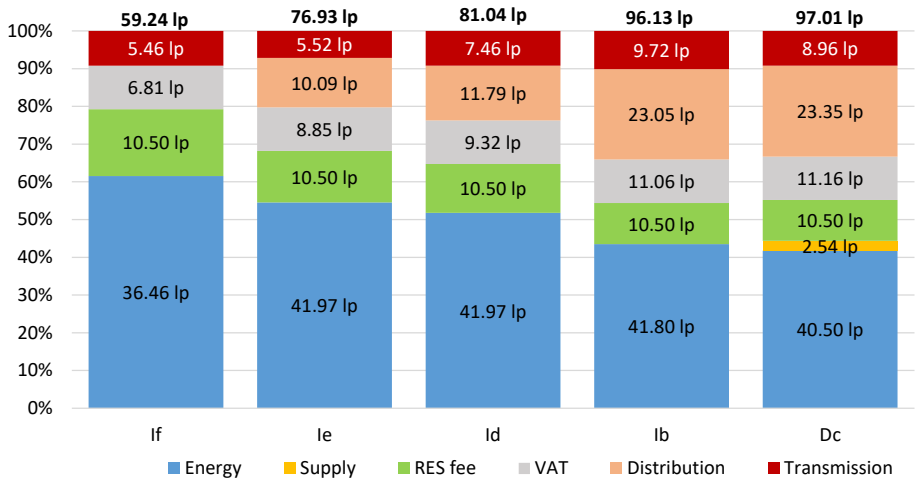
Table 4.4.13 shows the characteristics of typical final customers in Croatia by EUROSTAT consumption band, and Figure 4.4.4 shows the composition of the total electricity price for characteristic final customers, including all charges and taxes, for different consumption bands according to EUROSTAT.

Table 4.4.13 Characteristics of typical final customers in Croatia

Final customer type	Consumption band	Consumption [MWh/year]	Calculated peak load [MW]	Consumption ratio HT/LT[73] [%]	Tariff system category
Very large industrial	*If*	100,000	15.00	47/53	HV industrial consumers – White
Large industrial	*Ie*	24,000	4.00	63/37	MV (35 kV) industrial consumers – White
Medium industrial	*Id*	2,000	0.50	63/37	MV (10 kV) industrial consumers – White
Small industrial	*Ib*	150	0.05	64/36	LV industrial consumers – Red
Medium households	*Dc*	3.5		66/34	LV households – White

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

73 *Consumption ratios are taken from chapter 4.4.1 Basic features of electricity consumption.*

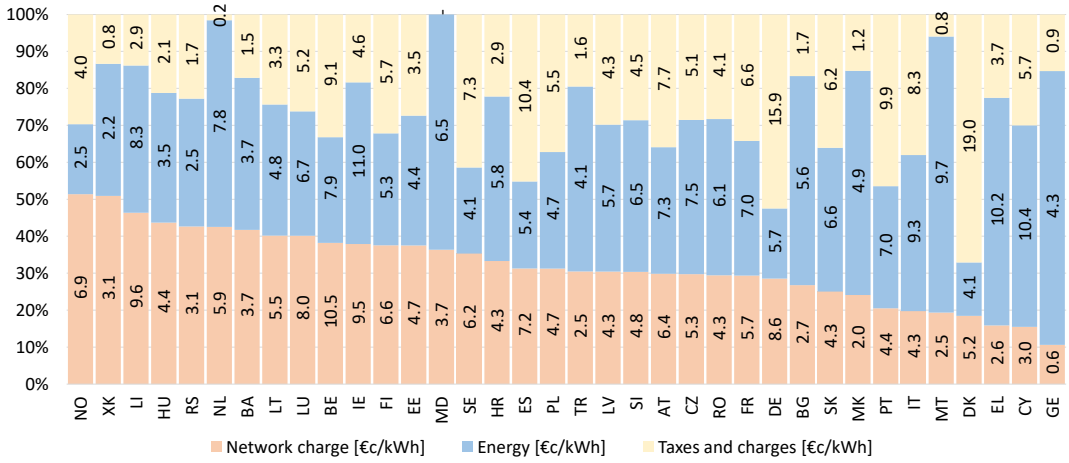


Source: HOPS, HEP-ODS, HEP ELEKTRA, market suppliers

Figure 4.4.4 Composition of the total selling price of 1 kWh of electricity for characteristic final customers in Croatia per EUROSTAT consumption bands in 2020

Electricity prices in European countries in 2020

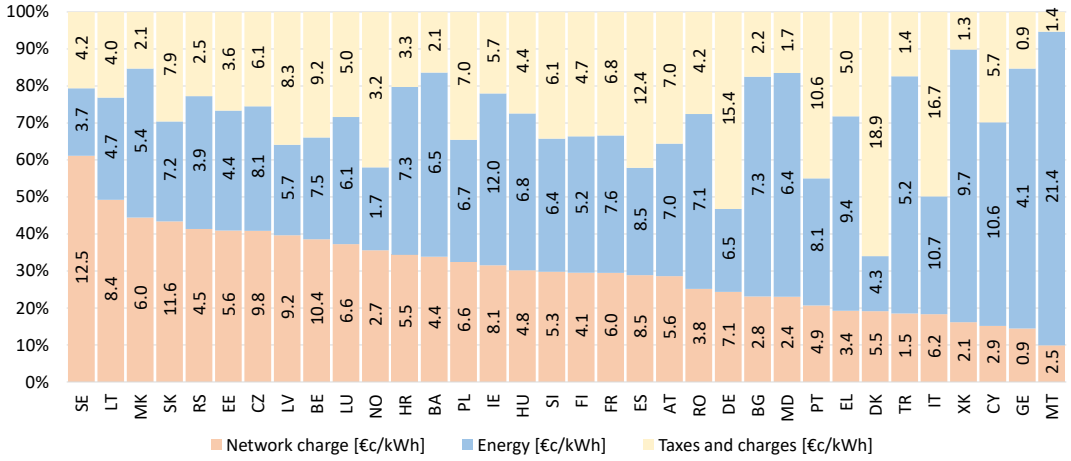
Figures 4.4.5 to 4.4.11 show the composition of the total electricity price in European countries for final customers from EUROSTAT consumption bands *Dc, Ia, Ib, Ic, Id, Ie* and *If*.



Source: EUROSTAT, data processing: HERA

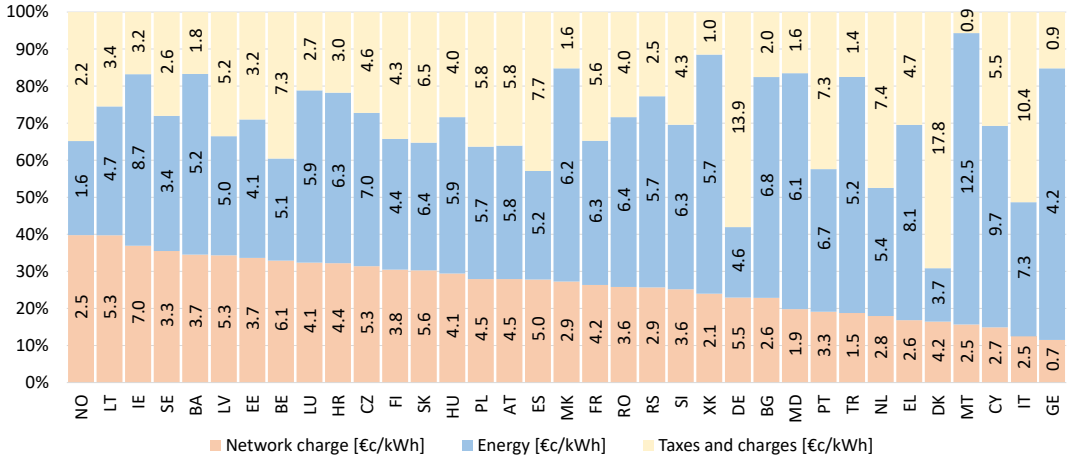
Figure 4.4.5 Composition of the total electricity price in European countries for household final customers in consumption band Dc in 202074

74 *ISO country codes: AL – Albania, AT – Austria, BA – Bosnia and Herzegovina, BE – Belgium, BG – Bulgaria, CY – Cyprus, CZ – Czech Republic, DK – Denmark, DE – Germany, EE – Estonia, EL – Greece, ES – Spain, FI – Finland, FR – France, GE – Georgia, HR – Croatia, HU – Hungary, IE – Ireland, IS – Iceland, IT – Italy, LI – Lichtenstein, LT – Lithuania, LU – Luxembourg, LV – Latvia, MD – Moldova, ME – Montenegro, MK – North Macedonia, MT – Malta, NL – Netherlands, NO – Norway, PL – Poland, PT – Portugal, RO – Romania, RS – Serbia, SE – Sweden, SI – Slovenia, SK – Slovakia, TR – Turkey, UA – Ukraine, UK – United Kingdom, XK – Kosovo.*



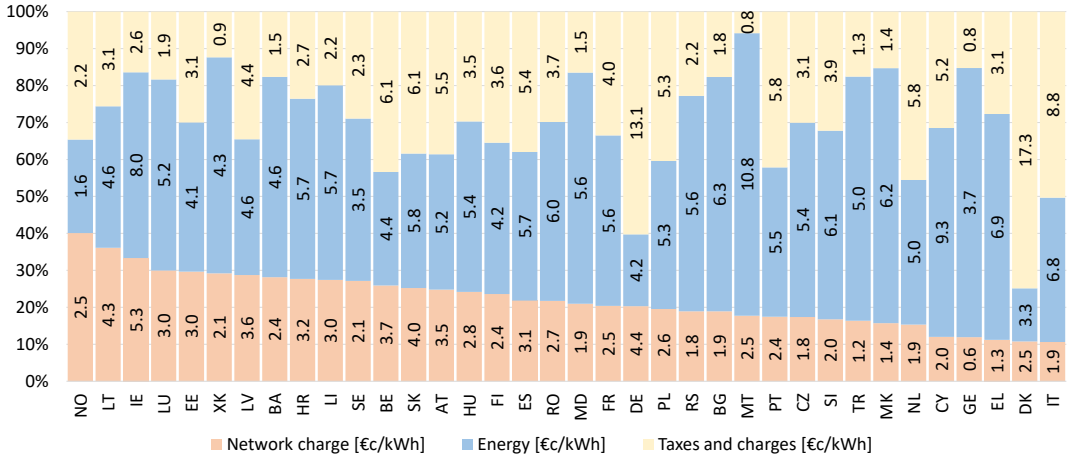
Source: EUROSTAT, data processing: HERA

Figure 4.4.6 Composition of the total electricity price in European countries for industrial final customers in consumption band Ia in 2020



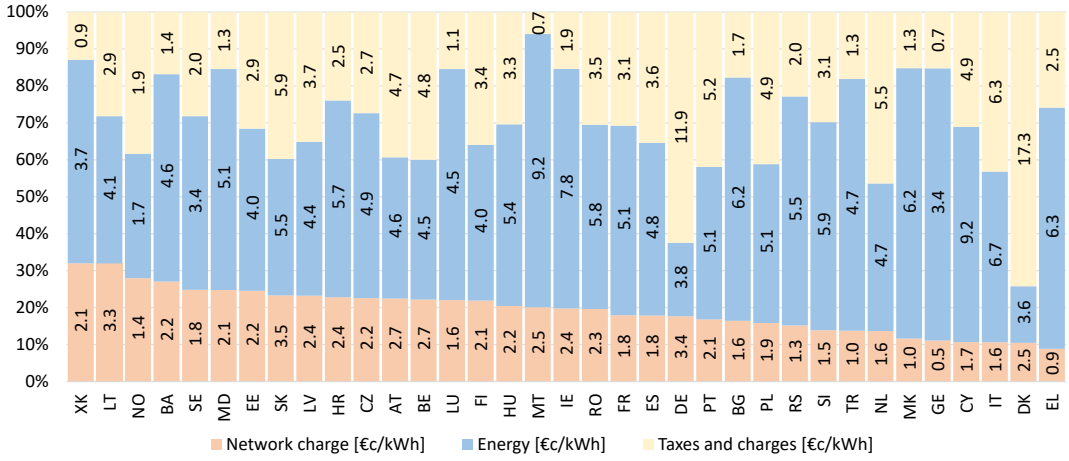
Source: EUROSTAT, data processing: HERA

Figure 4.4.7 Composition of the total electricity price in European countries for industrial final customers in consumption band Ib in 2020



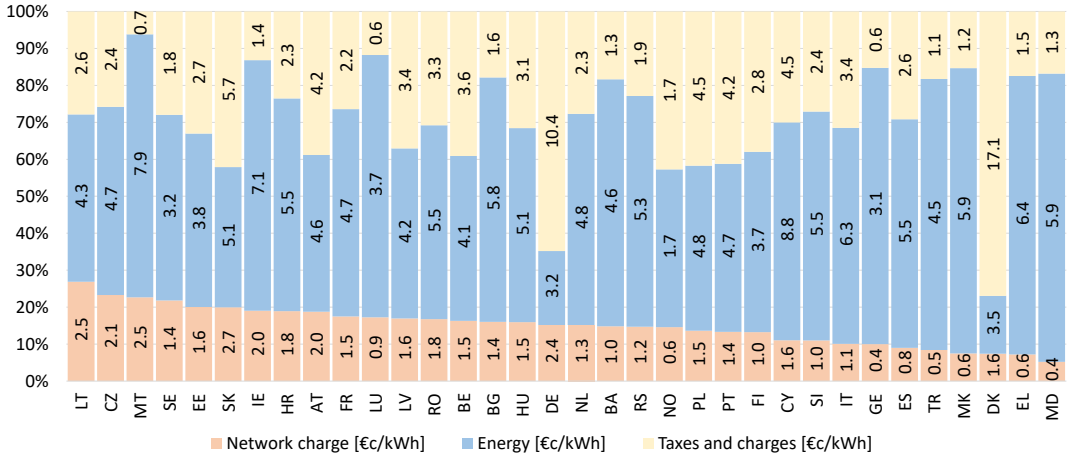
Source: EUROSTAT, data processing: HERA

Figure 4.4.8 Composition of the total electricity price in European countries for industrial final customers in consumption band Ic in 2020



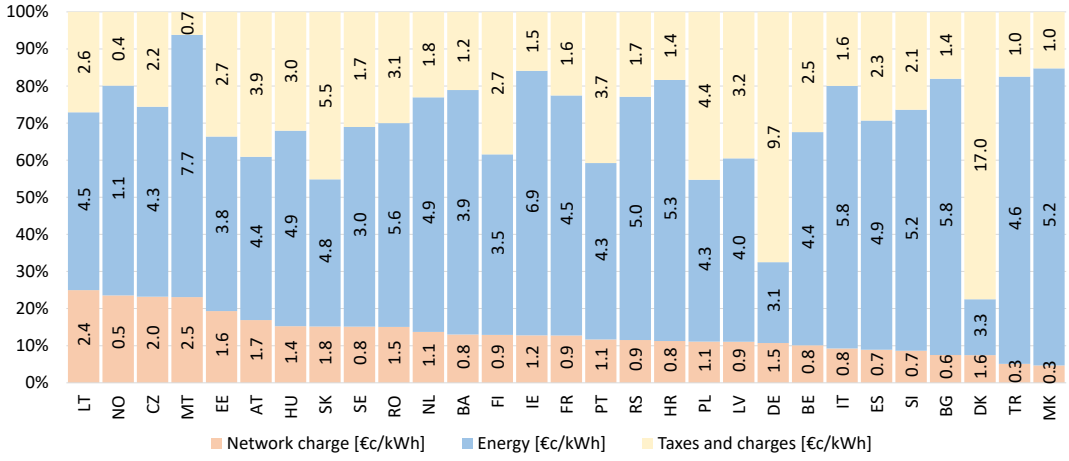
Source: EUROSTAT, data processing: HERA

Figure 4.4.9 Composition of the total electricity price in European countries for industrial final customers in consumption band Id in 2020



Source: EUROSTAT, data processing: HERA

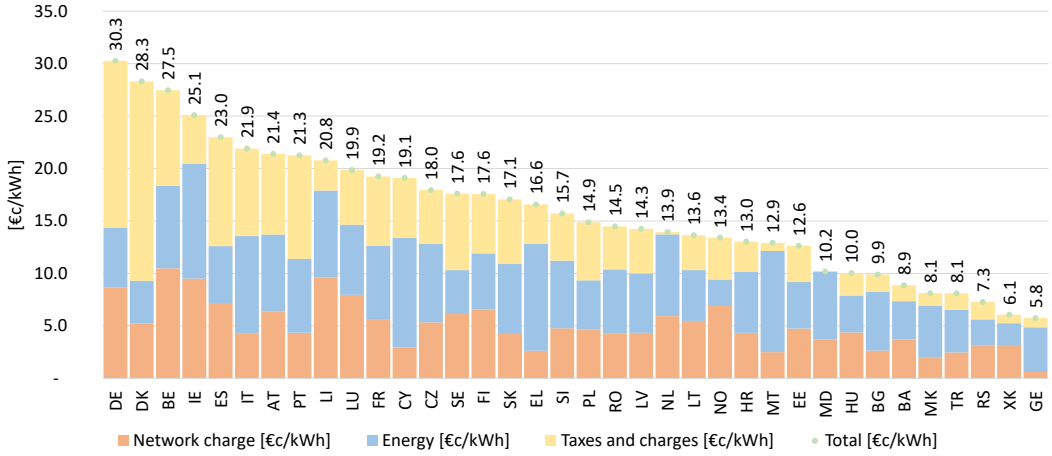
Figure 4.4.10 Composition of the total electricity price in European countries for industrial final customers in consumption band Ie (tariff model: white on medium voltage) in 2020



Source: EUROSTAT, data processing: HERA

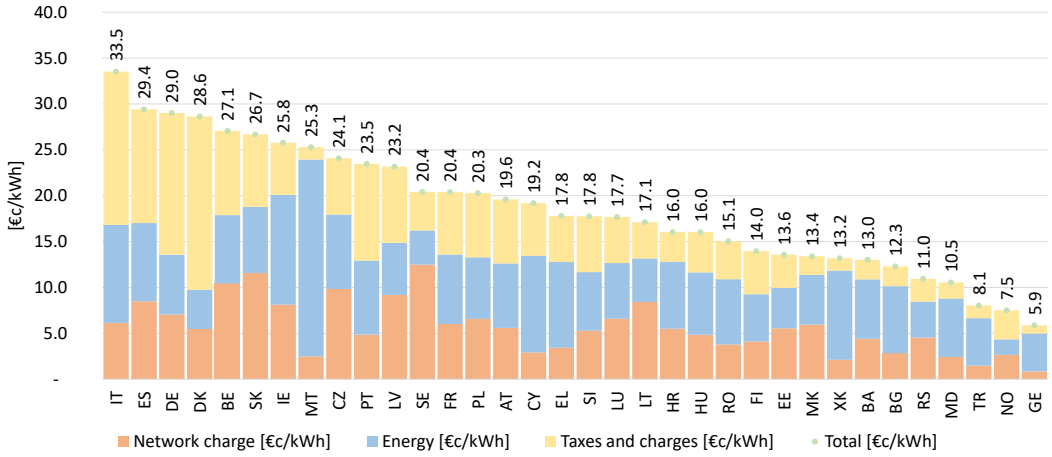
Figure 4.4.11 Composition of the total electricity price in Europe for industrial final customers in consumption band If in 2020

Figures 4.4.12 to 4.4.18 show the total electricity prices in European countries for final customers from EUROSTAT consumption bands *Dc, Ia, Ib, Ic, Id, Ie* and *If*.



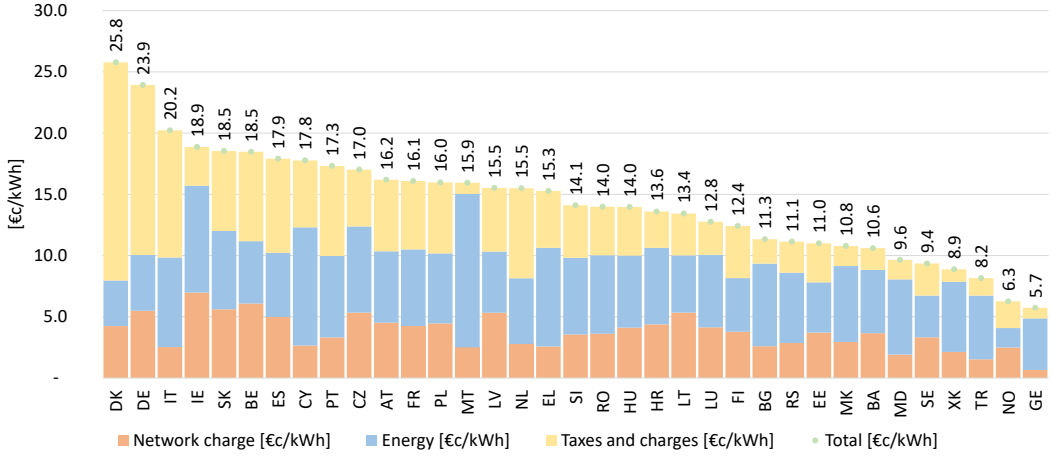
Source: EUROSTAT, data processing: HERA

Figure 4.4.12 Total electricity prices in European countries for household final customers in consumption band Dc in 2020



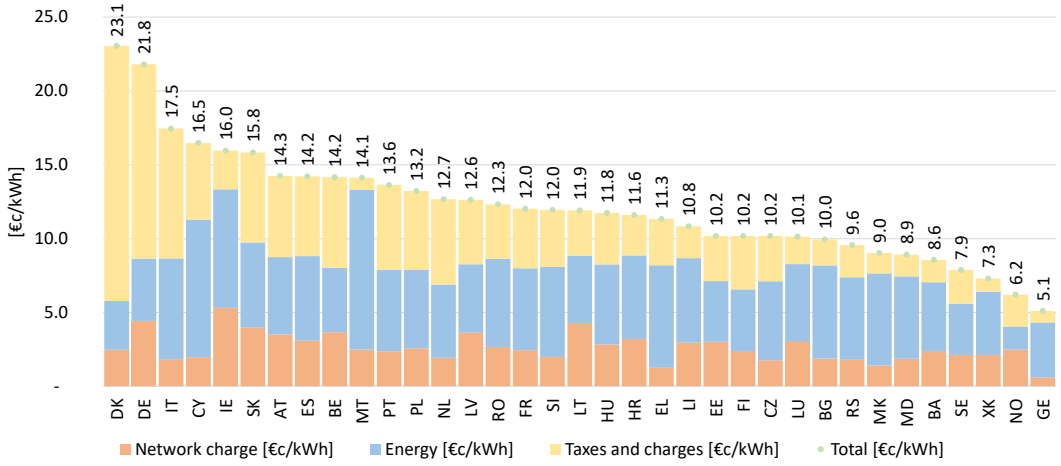
Source: EUROSTAT, data processing: HERA

Figure 4.4.13 Total electricity prices in European countries for industrial final customers in consumption band Ia in 2020



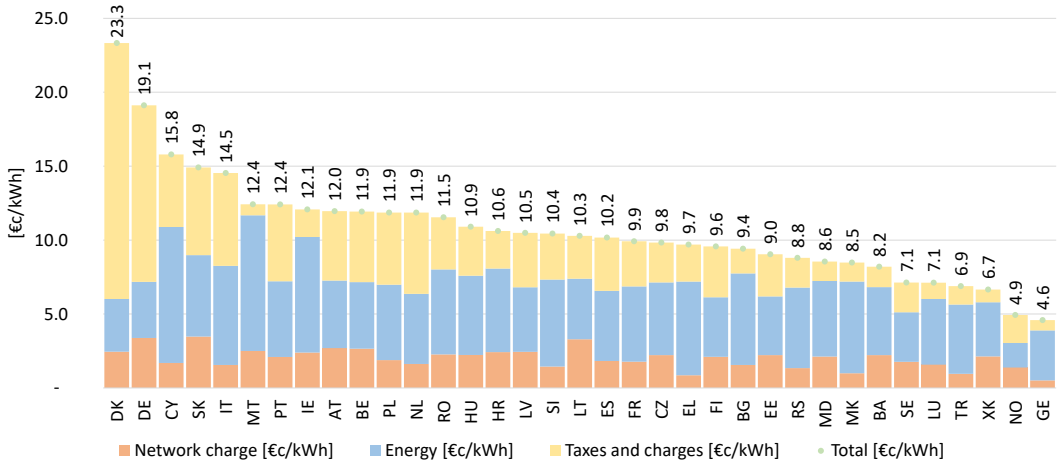
Source: EUROSTAT, data processing: HERA

Figure 4.4.14 Total electricity prices in European countries for industrial final customers in consumption band Ib in 2020



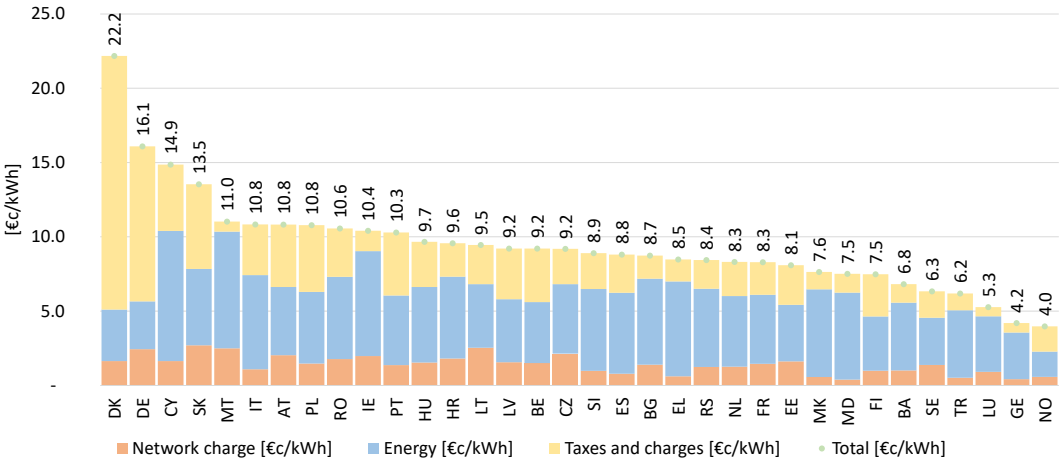
Source: EUROSTAT, data processing: HERA

Figure 4.4.15 Total electricity prices in European countries for industrial final customers in consumption band Ic in 2020



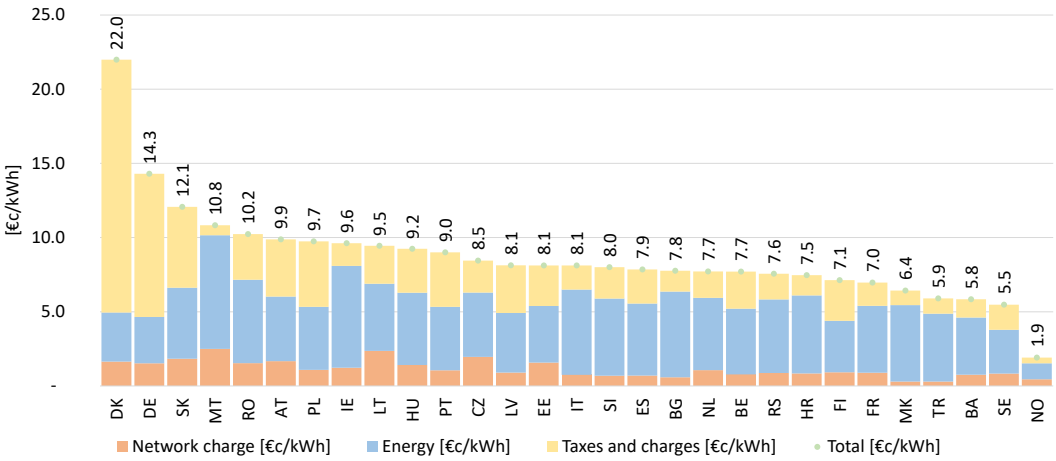
Source: EUROSTAT, data processing: HERA

Figure 4.4.16 Total electricity prices in European countries for industrial final customers in consumption band Id in 2020



Source: EUROSTAT, data processing: HERA

Figure 4.4.17 Total electricity prices in European countries for industrial final customers in consumption band Ie in 2020



Source: EUROSTAT, data processing: HERA

Figure 4.4.18 Total electricity prices in European countries for industrial final customers in consumption band If in 2020

Observations on electricity prices for final customers in 2020

The electricity prices on the Croatian retail electricity market increased in 2020 compared to 2019. Electricity prices in Croatia have been fully deregulated, including the price of electricity under the universal service.

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

According to EUROSTAT, network charges for Croatian household end customers account for around 33% of the total price, similar to Slovenia. Among the observed countries, Croatia has one of the lowest total electricity prices for household end customers.

4.4.4 Consumer protection

Processed final customer submissions in the electricity sector in 2020

Table 4.4.14 shows the classification of submissions processed by HERA in the electricity sector in 2020, and the data on the processed appeals and complaints from final customers is shown in Table 4.4.15.

Table 4.4.14 Classification of final customer submissions in the electricity sector processed by HERA in 2020

Description	Number	Share [%]
Appeals	19	4%
Complaints	295	63%
Inquiries	125	27%
Other submissions	28	6%
TOTAL	**467**	**100%**

Table 4.4.15 Data on complaints and appeals from final customers in the electricity sector processed by HERA in 2020

Description	Number	Share [%]
Records on network users / electricity customers	11	4%
Loss of customer status / right to use network	48	15%
Quality of electricity supply	13	4%
Unauthorised consumption	4	1%
Other	26	8%
Right to use property not owned by energy entities	6	2%
Assignment of contracts for electricity supply	8	3%
Connection to network	70	22%
Temporary suspension of electricity supply	39	12%
Invoicing	80	26%
Termination of supply contract and conduct of sales representatives	9	3%
TOTAL	314	100%

Most of the complaints and appeals processed by HERA in 2020 related to invoicing, connection to the network (mostly regarding connection times and charges) and loss of consumer status or the right to use the network. There were fewer complaints against suppliers (supplier switching, termination of supply contract and conduct of sales representatives) compared to last year.

Operators' and suppliers' reports pursuant to the *Requirements for the quality of electricity supply*

Pursuant to the *Requirements for the quality of electricity supply*, the transmission and distribution system operators, as well as electricity suppliers, must submit a report on the quality of services for 2020 to HERA. They are also required to annually publish the indicators of the quality of services provided to final customers on their websites. This provides for transparency and enables systematic monitoring of operators and suppliers in this important segment. Table 4.4.16 shows data on complaints received against suppliers, based on the 2020 reports on the quality of services submitted to HERA.

Table 4.4.16 Data on complaints against electricity suppliers received in 2019 and 2020

Subject of complaint	Number of complaints 2019	2020
Unfair commercial practice	101	22
Contracts and sales	1,884	1,898
Initial connection	0	0
Disconnection due to late payment or non-payment (suspension of electricity supply)	881	877
Billing, collection and debt claim proceedings	9,516	5,378
Tariffs	18	19
Compensation for damages	0	1
Supplier switching	2	7
Customer service	1,018	574
TOTAL	**13,420**	**8,776**

Source: electricity suppliers

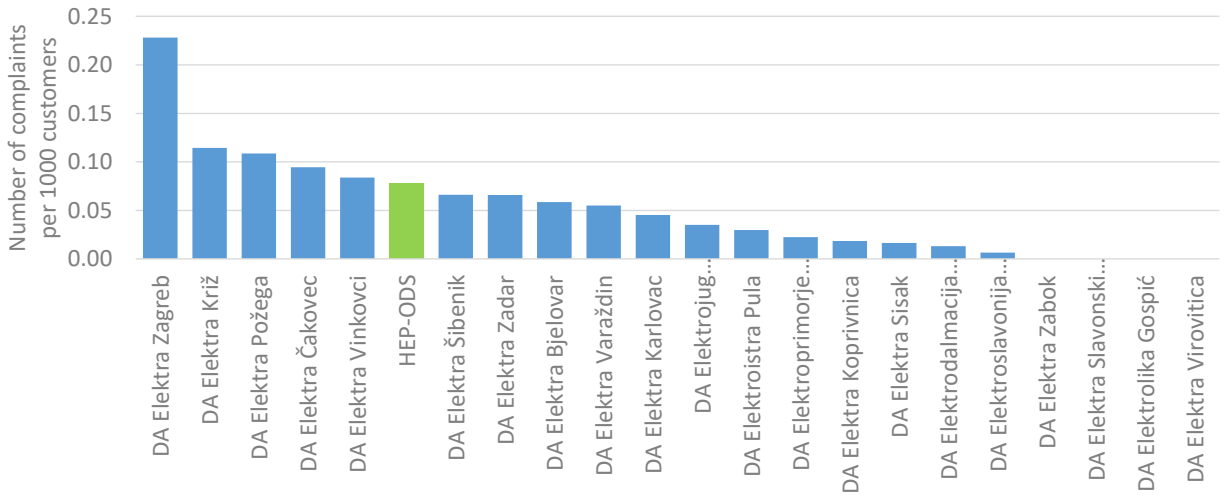
Performance of the HEP-ODS appeal committees in 2020

The consumer appeals committees in HEP-ODS distribution areas were established in accordance with the **Consumer Protection Act (Official Gazette Nos. 41/14, 110/15 and**

14/19). The appeals committees are comprised of the representatives of distribution areas and representatives of consumer associations.

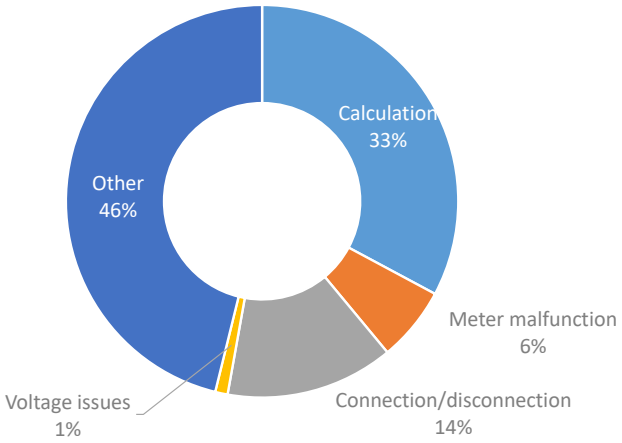
The consumer appeals committees process complaints related to calculations of electricity consumption, meter malfunctions, connections/disconnections, voltage issues, etc. HEP-ODS can receive and process queries and complaints via e-mail.

Figure 4.4.19 shows the number of consumer complaints per 1,000 consumers per distribution area, while Figure 4.4.20 shows the types of complaints in HEP-ODS distribution areas in 2020.



Source: HEP ODS

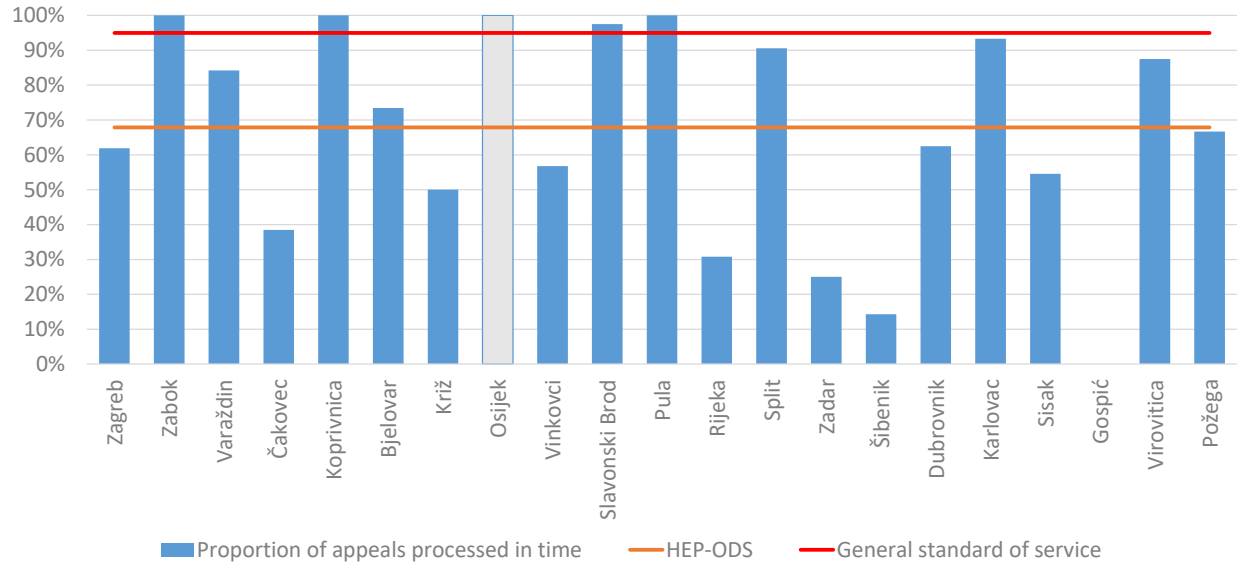
Figure 4.4.19 Number of consumer complaints per 1,000 customers per HEP-ODS distribution area in 2020



Source: HEP ODS

Figure 4.4.20 Types of complaints processed by consumer appeal committees of HEP-ODS distribution areas in 2020

Figure 4.4.21 shows the proportion of appeals processed in time compared to the required general standard of service per distribution area in 2020, excluding appeals pertaining to network access. There were no appeals in the distribution area of Elektroslavonija Osijek.



Source: HEP ODS

Figure 4.4.21 Proportion of appeals processed in time per HEP-ODS distribution area compared to the required general standard of service and HEP-ODS as a whole in 2020, excluding appeals pertaining to network access

The figures above highlight significant differences among distribution areas in the levels of fulfilment of the required general standard of service for timely resolution of appeals. As a consequence, HEP-ODS as a whole does not fulfil the required general standard.

Appeals from network users regarding network access are processed 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 2020, HEP-ODS received 70 consumer appeals regarding network access, of which 35 were resolved in time.

Observations on consumer protection in 2020

Most complaints and appeals processed by HERA related to invoices for electricity and to network connection, while most complaints processed by the HEP-ODS appeal committee related to billing and connection to the network.

The provisions of the *Requirements for the quality of electricity supply* regarding the submission and publication of data were implemented for the first time in 2020. The timeliness and quality of 2021 reports pertaining to 2020 were only partially satisfactory.

The reports HERA received in 2021 pertaining to the results from 2020 were in accordance with the *Requirements for the quality of electricity supply*.

Pursuant to the **Act on Procedures Involving Illegally Built Buildings (Official Gazette No. 86/12, 143/13, 65/17 and 14/19)**, the process of legalization of buildings built outside of construction areas and far from existing electricity infrastructure was continued. Once legalised, these buildings now comply with the basic requirements for the connection to the distribution network. Processing requests for connecting such buildings to the distribution network is very demanding, sometimes even impossible, as the structures are either not accessible from public areas or they are not located in areas where spatial plans provide for the construction of structures and access roads. As a result, HEP-ODS is either unable to obtain permits to build its infrastructure or the process is very long and expensive, involving the resolution of property ownership issues 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 requirements for grid connection approvals (hereinafter: EES) or refusals to issue EESs. The heavy inflow of

appeals is expected to continue, which is why some local authorities have adopted new spatial plans that include the legalised structures and their infrastructure for which access roads and corridors should be provided, and the others should follow.

In addition to a set of energy acts and regulations subordinate to these acts, household final customers are also protected by the **Consumer Protection Act**.

Indicators pertaining to household final customers in Croatia from 2016 to 2020 are shown in Table 4.4.17.

Table 4.4.17 Indicators for household final customers in Croatia from 2016 to 2020

Indicator	2016	2017	2018	2019	2020
Number of household final customers	2,186,999	2,223,119	2,220,180	2,240,916	2,263,628
Number of final customers supplied under the universal service	2,005,536	2,003,916	2,008,848	2,026,349	2,047,012
Number of working days from notification of debt to temporary disconnection in the case of non-payment [days]	16.9	17.41	14.06	11.72	9.90
Number of temporary disconnections of households due to non-payment	25,814	17,444	12,896	33,765	22,217
Number of BMPs with smart meters	-	-	66,612	149,436	270,818
Number of households with installed self-supplying photovoltaic systems	-	-	-	146	855

Source: HEP ODS

4.4.5 Guarantee of origin

Development of the guarantee of origin system

The guarantee of origin system enables suppliers of electricity to offer their final customers supply contracts or electricity delivery models with a guaranteed share of one or more electricity sources used for electricity generation. In addition, final customers can rely on this system when choosing their 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 final customers describing the structure of the electricity supplied during the previous year, between the 1st and 31st July of the current year. To HERA's knowledge, those suppliers who submitted reports to their final customers 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 final customers 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.

The reports for 2020 are published on HROTE's website, together with the *Annual report on the origin of electricity in the Republic Croatia for 2020*, 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 final customer, is proven according to the *Methodology* 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 for issuing guarantees of origin in Croatia, HROTE operates a Register of Guarantees of Origin (hereinafter: Register) – a computer system that stores guarantees of origin and is 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. 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. By the end of 2020, five producers of electricity, eight suppliers and three traders have created accounts in the Register. Table 4.4.18 provides an overview of registrations.

Table 4.4.18 Registrations in the Register of Guarantees of Origin

Type of registration	New registrations in 2020	Total registrations
User accounts of electricity producers	0	5
User accounts of other Register users	4	11
Total user accounts	4	16
Total registered production plants	2	20

Source: HROTE

In 2020, six registered suppliers traded in guarantees of origin, and guarantees of origin were issued for 20 production plants (HE Lešće, HE Varaždin, HE Orlovac, HE Dubrava, HE Čakovec, HE Vinodol, HE Rijeka, HE Dubrovnik, HE Gojak, HE Senj, HE Golubić, HE Zakučac, HE Miljacka, RHE Velebit, HE Peruća, HE Sklope, VE Trtar-Krtolin, MVE Ravna 1, mTEO, MHE Roški slap). An overview of transactions in guarantees of origin is provided in Table 4.4.19.

Table 4.4.19 Activities in the Register of Guarantees of Origin in 2019 and 2020

Activity	No. of guarantees (1 guarantee = 1 MWh)	
	2019	2020
Number of issued guarantees of origin for electricity generated in Croatia	4,633,694	4,855,963
Number of imported guarantees of origin	19,874	139,949
Number of exported guarantees of origin	2,385,597	2,163,776
Number of cancelled guarantees of origin for consumption	1,623,600	2,876,586
Number of expired guarantees of origin	0	0

Source: HROTE

In 2020, HROTE collected HRK 1,947,002.49 in fees from registered users. The costs of operating the Register and other activities in the guarantees of origin system amounted to HRK 915,728.32. When the total costs of operation and managing the Register and the costs of participation in AIB working groups are deducted from membership fees, the Register's balance was HRK 1,031,274.17.

Introducing auctioning of guarantees of origin

In 2019, HROTE began selling a part of the electricity from the incentives system on CROPEX pursuant to the **Renewable Energy Sources and High-Efficiency Cogeneration Act**. The transition to market-based sale of one part of the electricity from the incentives system opened up the possibility for the sale of guarantees of origin on the market. Guarantees of origin may be issued for electricity generated in the incentives system and can then be sold to participants in the electricity market on market principles, i.e., in auctions of guarantees of origin.

In 2020, HROTE issued guarantees of origin for a part of the electricity of eligible producers in the incentives system, which was sold on the electricity market through the EKO balance group. These guarantees were then sold in auctions via CROPEX's IT trading platform. Once an auction was finished and trade in guarantees successfully concluded, the funds were transferred to the incentives system fund, while the guarantees sold in auctions were transferred from HROTE's account in the Register to the accounts of auction participants who purchased the guarantees. Before every auction, HROTE published the minimum prices for each power plant group on its website *https://www.hrote.hr/drazbe-jamstva-podrijetla*.

The guarantees of origin offered in the auctions were issued for wind and biomass power plants, which are listed on the same website.

In 2020, the share of electricity from eligible producers in the incentives system sold in auctions was 60%, or 1,907,255 guarantees of origin. The total amount collected from the sale of guarantees of origin and transferred to the incentives system fund was HRK 10,857,839.47.

Observations on the guarantees of origin system

In 2020, increased activity rates were recorded in the Register due to an increase in buyer demand and an increase in prices on the European market. Two new facilities were registered, and 2,876,586 guarantees were cancelled (amounting to around 2.88 TWh of electricity), a rise of 1.25 TWh compared to 2019.

In 2020, a further increase of activity was recoded due to the registration of HE Peruća and HE Sklope.

It should be noted that there is still room for improvement of the legal framework governing the guarantees 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. 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.

With a rising number of new facilities, increased interest is expected in the market of guarantees of origin for the sale of electricity produced from renewable sources at facilities in the incentives system. As a result, the volume of guarantees of origin offered in auctions by HROTE will also increase.

4.5 Incentives for electricity production from renewable sources and cogeneration

Eligible electricity producers

The number of decisions on eligible electricity producer status granted by HERA in 2020 is shown in Table 4.5.1.

Table 4.5.1 Decisions on eligible electricity producer status granted by HERA in 2020

Type of facility / primary energy source	No. of decisions issued[75]	Plant capacity [MW]
Solar power plants		
Hydro power plants	4	134.40
Wind power plants	3	132.00
Biomass power plants	5	12.46
Geothermal power plants		
Power plants fuelled by biogas	2	3.20
Cogeneration		
Other plants using renewable sources		
Total	14	282.06

Source: HERA

For wind power plants, hydroelectric power plants and solar power plants, in 2020 HERA issued seven decisions on eligible producer status (four for hydroelectric power plants and three for wind power plants), one decision on extending a preliminary decision, one decision on the transfer of rights and obligations and eight prior approvals for planned changes.

For cogeneration, the following decisions were issued: seven decisions on eligible producer status (five for cogeneration using biomass and two for cogeneration using biogas), one decision refusing the approval of eligible electricity producer status, one decision altering the decision on eligible electricity producer status, nine decisions on extending a preliminary decision, one decision refusing the extension of a preliminary decision, one decision granting the change of project operator in a preliminary decision, one decision refusing the extension of a preliminary decision, one decision on the transfer of rights and obligations, one decision refusing the transfer of rights and obligations, and seven prior approvals for planned changes. In two cases a decision on terminating the procedure at the request of the party was issued.

An overview of the decisions granting eligible electricity producer status issued by HERA from 2007 to 2020[76] is given in Table 4.5.2.

[75] *Including decisions on participating in the guarantees of origin system.*

[76] *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 required to apply for a decision by HERA, etc.).*

Table 4.5.2 Decisions granting eligible electricity producer status issued by HERA from 2007 to 2020

Type of facility / primary energy source	Number of facilities	Total capacity [MW]
Solar power plants	230	24.39
Hydro power plants	39	2,095.51
Wind power plants	31	749.80
Biomass power plants	39	86.17
Geothermal power plants	1	10.00
Power plants fuelled by biogas	42	48.65
Cogeneration	6	112.94
Other plants using renewable sources (landfill gas, gas from wastewater treatment plants, etc.)	1	2.50
Total	389	3,129.97

Source: HERA

Incentive scheme for the production of electricity from renewable energy sources and cogeneration

In May 2020, the *Regulation on quotas for promoting electricity production from renewable energy sources and high-efficiency cogeneration* entered into force. This *Regulation* specifies the total connection capacities (total quotas) of all production plant groups eligible for incentives for electricity production from renewable energy sources and high-efficiency cogeneration, calculated by taking into account the state aid rules for environmental protection and energy production. It also supports the objectives in the field of electricity and thermal energy production from renewable energy sources and high-efficiency cogeneration (Table 4.5.3.). The total quota for all production plant groups is 2,265 MW.

Table 4.5.3 Total quota for promoting electricity production from renewable energy sources and high-efficiency cogeneration per individual production plant group

Production plant groups	Production plant classification based on primary energy source and installed capacity	Quota [MW]
a.2	Solar power plants with an installed capacity > 50 kW and ≤ 500 kW	210
a.3	Solar power plants with an installed capacity > 500 kW and ≤ 10 MW	240
a.4	Solar power plants with an installed capacity ≥ 10 MW	625
b.1	Hydroelectric power plants with an installed capacity ≤ 50 kW	4
b.2	Hydroelectric power plants with an installed capacity > 50 kW and ≤ 500 kW	10
b.3	Hydroelectric power plants with an installed capacity > 500 kW and ≤ 10 MW	10
c.4	Wind power plants with an installed capacity > 3 MW	1,050
d.2	Biomass power plants with an installed capacity > 50 kW and ≤ 500 kW	6
d.3	Biomass power plants with an installed capacity > 500 kW and ≤ 2 MW	20
d.4	Biomass power plants with an installed capacity > 2 MW and ≤ 5 MW	15
e.2	Geothermal power plants with an installed capacity > 500 kW	20
f.2	Biogas power plants with an installed capacity > 50 kW and ≤ 500 kW (inclusive)	15
f.3	Biogas power plants with an installed capacity > 500 kW and ≤ 2 MW (inclusive)	30
	Innovative technologies, in accordance with the production facility classification from the energy permit, whose development is supported by the European Union.	10

Source: Official Gazette

In accordance with the *Regulation*, in November 2020 HROTE organised the first call for tenders for awarding market premiums and for guaranteed purchase prices to incentivise the production of electricity from renewable sources. The public call for tenders specified production plant groups, available incentive quotas and maximum reference prices for

production plant groups, separately for market premiums and for guaranteed purchase prices. The text of the public call is available on HROTE's website.

The total quota in the call for tenders was 88 MW, as displayed in Table 4.5.4.

Table 4.5.4 Quotas for production plant groups in the public call for guaranteed purchase prices and for market premiums

Production plant groups	Production plant classification based on primary energy source and installed capacity	Quota [MW]
Guaranteed purchase price incentives		
a.2	Solar power plants with an installed capacity > 50 kW and ≤ 500 kW	50
b.1	Hydroelectric power plants with an installed capacity ≤ 50 kW	4
b.2	Hydroelectric power plants with an installed capacity > 50 kW and ≤ 500 kW	5
d.2	Biomass power plants with an installed capacity > 50 kW and ≤ 500 kW	6
f.2	Biogas power plants with an installed capacity > 50 kW and ≤ 500 kW (inclusive)	7
Guaranteed feed-in tariff incentives – TOTAL		72
Market premium incentives		
d.3	Biomass power plants with an installed capacity > 500 kW and ≤ 2 MW	8
f.3	Biogas power plants with an installed capacity > 500 kW and ≤ 2 MW (inclusive)	8
Market premium incentives – TOTAL		16

Source: HROTE

At the end of 2020, HROTE issued a Decision on the selection of the most favourable bidder, which is available on its website.

A total of 108 tenders were submitted, of which 93 for a guaranteed purchase price and 14 for market premiums, for projects with a total capacity of 41.4 MW. Contracts were awarded to 64 bidders for a guaranteed purchase price and to seven bidders for market premiums, with a total capacity of 25.5 MW, as shown in Table 4.5.5.

There were 33 invalid bids that were not taken into consideration (30 for a guaranteed purchase price and three for market premiums, with a total capacity of 13.4 MW), and four bids were not winning bids (two for a guaranteed purchase price for group f.2 and two for market premiums for the group f.3, with a total capacity of 2.734 MW). The total capacity of the invalid and valid, but not winning bids, was approximately 16 MW.

This shows that bids were submitted for approximately 41.5 MW, which is 47.2% of the total capacity in the call for tenders, and that the valid winning bids cover only 29% of the capacity in the call for tenders. Contracts for market premiums and guaranteed purchase prices will be signed during 2021.

Table 4.5.5 Capacities of valid winning bids by incentive model and production plant groups

Production plant groups	Production plant classification based on primary energy source and installed capacity	Capacity of valid winning bids [kW]	Capacity of valid winning tenders in relation to the quota
Guaranteed purchase price incentives			
a.2	Solar power plants with an installed capacity > 50 kW and ≤ 500 kW	13,396.4	27%
b.1	Hydroelectric power plants with an installed capacity ≤ 50 kW	0	0%
b.2	Hydroelectric power plants with an installed capacity > 50 kW and ≤ 500 kW	920	18%
d.2	Biomass power plants with an installed capacity > 50 kW and ≤ 500 kW	1,349	22%
f.2	Biogas power plants with an installed capacity > 50 kW and ≤ 500 kW (inclusive)	0	0%
Guaranteed feed-in tariff incentives – TOTAL		15,665.4	22%
Market premium incentives			
d.3	Biomass power plants with an installed capacity > 500 kW and ≤ 2 MW	2,100	26%
f.3	Biogas power plants with an installed capacity > 500 kW and ≤ 2 MW (inclusive)	7,740	97%
Market premium incentives – TOTAL		9,840	62%
Valid winning bids – TOTAL		25,505.4	29%

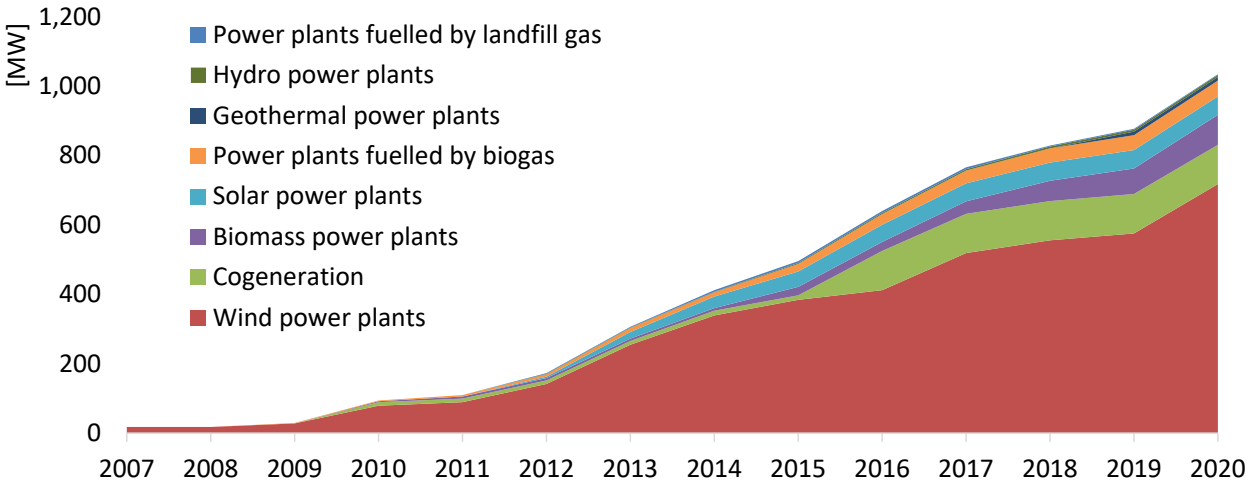
Source: HROTE

In 2019, 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* pursuant to the **Renewable Energy Sources and High-Efficiency Cogeneration Act**. In accordance with the *Regulation*, in 2020 electricity suppliers were obliged to take up 40% of net electricity delivered to HROTE by eligible electricity producers, compared to 70% in 2019.

Because of the COVID-19 pandemic and in order to lower the risks of undertakings from losing competitiveness due to costs arising from RES and cogeneration fees, in 2020 the Croatian Government adopted the *Regulation on the criteria for the payment of a reduced renewable energy sources and high-efficiency cogeneration charge*. The fee reduction is determined in accordance with levels of electro-intensity. A fee reduction percentage is set for each of the levels. Out of a total of 88 fee reduction requests, 71 undertakings were granted the right to a reduced fee (15 for the 40% category, 28 for the 60% category and 28 for the 80% category).

Eleven purchase contracts were activated in 2020 for electricity produced from renewable energy sources and cogeneration (incentives system) of a total capacity of 157.6 MW, while four contracts of a total capacity of 5.3 MW were terminated.

The gradual take-up of incentives by the production facilities since their introduction in 2007 is shown in Figure 4.5.1, and the basic indicators related to the incentives system are shown in Table 4.5.6.



Source: HROTE

Figure 4.5.1 Installed capacity of facilities in the incentives system from 2007 to 2020 by type of facility

Table 4.5.6 Production and incentives paid to eligible producers in 2020 by type of facility

Type of facility / primary energy source	Number of facilities	Installed capacity [MW]	Share in installed capacity	Electricity production [MWh]	Share in production	Paid incentives (net of VAT) [in mil. HRK]	Share in disbursements
Solar power plants	1,229	53.4	5.2%	73,206	2.2%	142.02	4.7%
Hydro power plants	14	5.9	0.6%	25,000	0.8%	25.49	0.8%
Wind power plants	26	717.8	69.4%	1,671,358	50.8%	1,278.28	42.1%
Biomass power plants	39	86.2	8.3%	506,931	15.4%	699.16	23.0%
Geothermal power plants	1	10.0	1.0%	76,233	2.3%	120.40	4.0%
Power plants fuelled by biogas	41	45.9	4.4%	354,800	10.8%	465.19	15.3%
Power plants fuelled by landfill gas and gas from wastewater treatment plants	1	2.5	0.2%	13	0.0%	0.01	0.0%
Cogeneration	6	113.3	10.9%	579,767	17.6%	308.26	10.1%
Total	**1,357**	**1,035.0**	**-**	**3,287,307**[77]	**-**	**3,039**	**-**

Source: HROTE

In 2020, wind power plants continued to have the largest share in the total installed capacity of all eligible producers in the incentives system. The last remaining wind power plants from the old feed-in[78] system commenced operation.

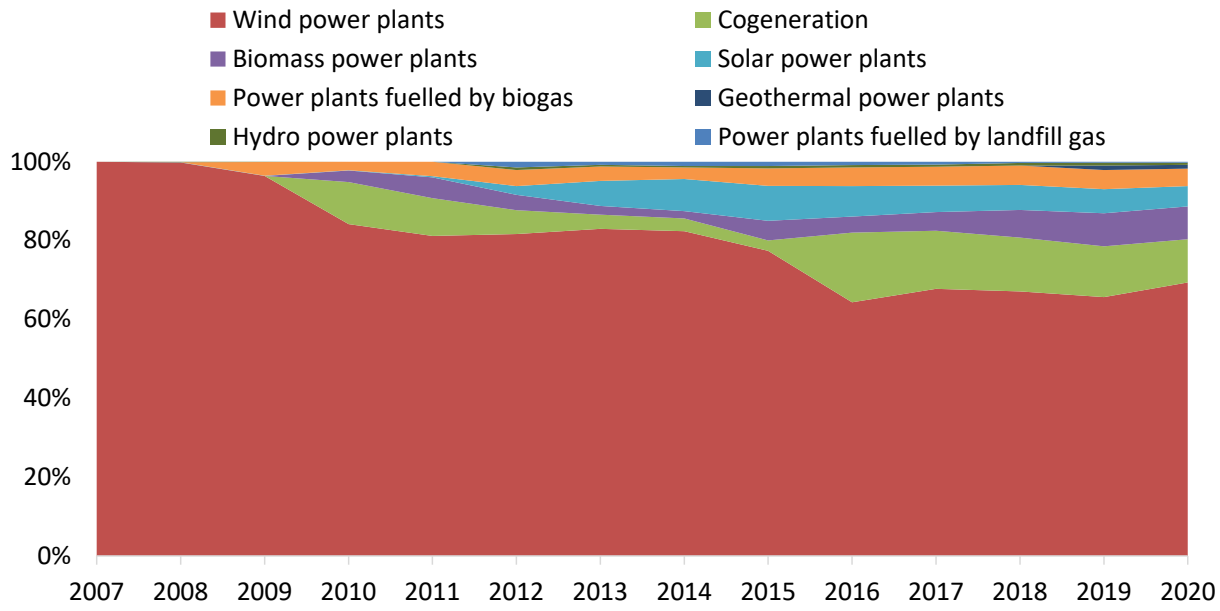
Last year 11 facilities with a total capacity of 157.66 MW became permanently operational. Only 14 facilities with a total installed capacity of 23.47 MW, for which contracts were concluded in accordance with the 2012 and 2013 Tariff system, are still not in operation. Since the deadlines for the inclusion of power plants into the incentives system have been extended due to the COVID-19 pandemic, the remaining electricity purchase contracts are expected to be activated by mid-2021.

[77] *The correct amount of energy produced in 2020 is 3,249,693.13 MWh (there is a difference of 37,614.21 MWh pertaining to electricity produced during power plant test runs in 2018 and 2019).*

[78] *In this text, 'feed-in' refers to a system (mechanism) of incentives for research, technology development and investments in the development of renewable energy sources, which is used to fully or partially socialise and cover costs of energy produced from renewable energy sources. It ensures the stability of prices and/or contracts for the sale of produced electricity under market conditions until these energy sources become competitive compared to other electricity sources on the market.*

Almost all feed-in contracts concluded by the end of 2015 have been activated.

Shares of installed capacity in the incentives system by facility type and by year are shown in Table 4.5.2.

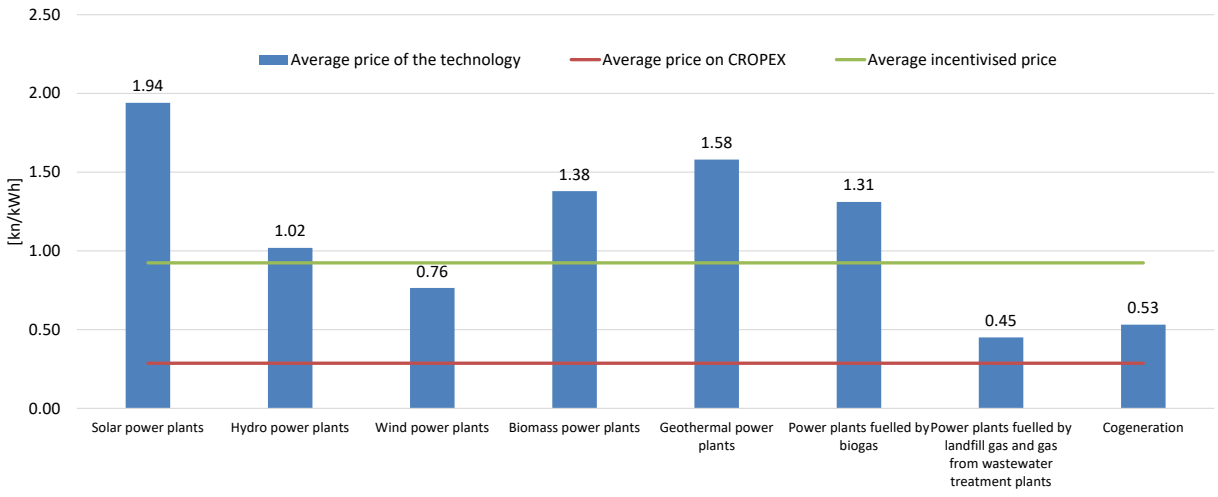


Source: HROTE

Figure 4.5.2 Shares of installed capacity of facilities in the incentives system from 2007 to 2020 by type of facility

In 2020, electricity generated in plants which participate in the incentives system amounted to 3.3 TWh. The share of wind power plant generation was almost 51%.

Average incentivised prices for delivered electricity by type of plant in the incentives system and overall for all technologies as compared to the annual average price of electricity on the CROPEX day-ahead market in 2020 (HRK 0.29 per kWh) are shown in Figure 4.5.3. The average incentivised price was HRK 0.92/kWh. The highest incentivised price (HRK 1.94/kWh) was paid for electricity from solar power plants, while electricity from power plants fuelled by landfill gas had the lowest incentivised price of HRK 0.45/kWh. The average incentivised price paid for electricity from wind power plants amounted to HRK 0.76/kWh.



Source: HROTE, HNB, CROPEX

Figure 4.5.3 Weighted average purchase prices of electricity in the incentives system by facility type in 2020

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

In 2020, HROTE's payments to eligible producers taking part in the incentives system were made from sources collected on the following grounds:

- up to 30 June 2020 all final customers of electricity in Croatia paid a fee of HRK 0.105 per kWh for promoting electricity production from renewable energy sources and cogeneration, while consumers required to obtain greenhouse gas emission permits paid a fee of HRK 0.007 per kWh. In accordance with the *Decision on the Amendment to the Regulation on the renewable energy sources and high-efficiency cogeneration charge* from 1 July 2020, the fee for incentivising RES and cogeneration is HRK 0,105 per kWh for all consumers, and HRK 0.021 per kWh for electricity consumers who are required to obtain greenhouse gas permission permits in accordance with the laws governing air protection. In addition to the above incentive fees, the *Decision on the Amendment to the Regulation on the renewable energy sources and high-efficiency cogeneration charge* specifies the fees for final customers who are entitled to a reduced fee depending on electro-intensity levels in accordance with the *Regulation on the criteria for the payment of a reduced renewable energy sources and high efficiency cogeneration charge*,
- all suppliers were obliged to take over 40% of electricity generated in the incentives system at the regulated price of HRK 0.42 per kWh in the amount proportional to their share in total electricity delivered to customers. Electricity generated in eligible producer facilities was allocated to suppliers in two ways:
  - by allocating realised quantities of electricity from the previous period via purchase 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.,
- revenue generated from the sale by the EKO balance group of 60% of electricity produced from renewable energy sources and cogeneration on CROPEX,
- revenue from the sale of guarantees of origin in auctions for the sale of electricity from eligible producers in the incentives system on CROPEX via the EKO balance group,
- revenue from the EKO balance group membership fee for eligible producers in the incentives system with a plant capacity higher than 50 kW.

Table 4.5.7 shows an increase in HROTE’s expenses in 2020, resulting from new production plants being added to the incentives system, the start of EKO balance group operations and reduced revenues from final customers.

Table 4.5.7 Overview of revenues and expenditures pertaining to the incentives system [mil. kn]

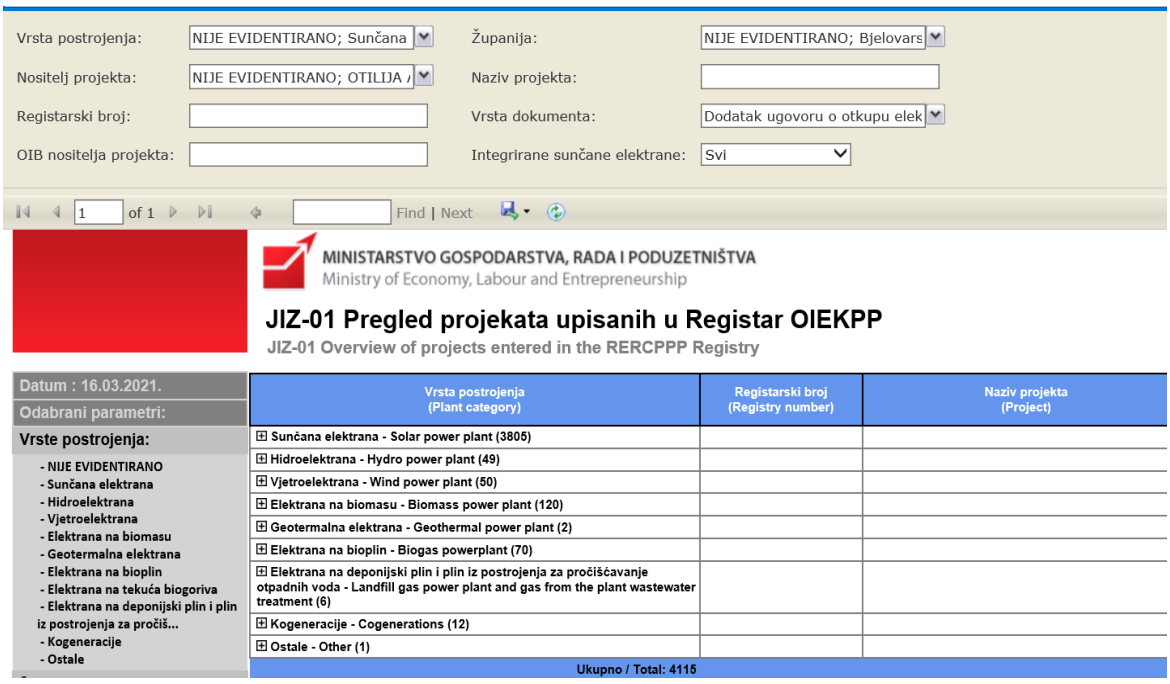
Revenue/expenses	2017	2018	2019	2020
Incentives system revenue				
Revenue from final customers of electricity (from RES&C charge)	890.73	1,602.34	1,598.65	1,487.08
Revenue from the sale of electricity from the incentives system to suppliers	956.47	1,042.66	847.38	552.27
Revenue from the sale of electricity on the market	-	-	315.31	612.64
Revenue from the sale of guarantees of origin	-	-	3.08	10.86
Revenue from EKO balance group membership fee	-	-	25.50	28.59
Interest revenue				0.19
Incentives system expenses				
Cost of electricity bought from eligible producers	1,912.79	2,176.32	2,667.11	3,038.82
Costs of financing HROTE's activities in the RES&C incentives system	12.45	11.10	11.00	7.25
Funds for financing EKO balance group activities				5.35
Balancing energy costs	-	-	45.36	11.96
Annual balance	**-78.02**	**457.58**	**66.45**	**-371.75**

Source: HROTE

Register of renewable energy sources and cogeneration and eligible producers

The Register of renewable energy sources and cogeneration and eligible producers 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 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.

The Register is available on the Ministry's website at https://oie-aplikacije.mzoe.hr/Pregledi/ (Figure 4.5.4), along with an interactive map of Croatia displaying the locations of all facilities from the Register, available at https://oie-aplikacije.mzoe.hr/InteraktivnaKarta/ (Figure 4.5.5).



Vrsta postrojenja: NIJE EVIDENTIRANO; Sunčana | Županija: NIJE EVIDENTIRANO; Bjelovars
Nositelj projekta: NIJE EVIDENTIRANO; OTILIJA | Naziv projekta:
Registarski broj: | Vrsta dokumenta: Dodatak ugovoru o otkupu elek
OIB nositelja projekta: | Integrirane sunčane elektrane: Svi

1 of 1 Find | Next

MINISTARSTVO GOSPODARSTVA, RADA I PODUZETNIŠTVA
Ministry of Economy, Labour and Entrepreneurship

JIZ-01 Pregled projekata upisanih u Registar OIEKPP

JIZ-01 Overview of projects entered in the RERCPPP Registry

Datum : 16.03.2021.

Odabrani parametri:

Vrste postrojenja:
- NIJE EVIDENTIRANO
- Sunčana elektrana
- Hidroelektrana
- Vjetroelektrana
- Elektrana na biomasu
- Geotermalna elektrana
- Elektrana na bioplin
- Elektrana na tekuća biogoriva
- Elektrana na deponijski plin i plin iz postrojenja za pročiš...
- Kogeneracije
- Ostale

Vrsta postrojenja (Plant category)	Registarski broj (Registry number)	Naziv projekta (Project)
Sunčana elektrana - Solar power plant (3805)		
Hidroelektrana - Hydro power plant (49)		
Vjetroelektrana - Wind power plant (50)		
Elektrana na biomasu - Biomass power plant (120)		
Geotermalna elektrana - Geothermal power plant (2)		
Elektrana na bioplin - Biogas powerplant (70)		
Elektrana na deponijski plin i plin iz postrojenja za pročišćavanje otpadnih voda - Landfill gas power plant and gas from the plant wastewater treatment (6)		
Kogeneracije - Cogenerations (12)		
Ostale - Other (1)		
Ukupno / Total: 4115		

Figure 4.5.4 Overview of data from the Register of renewable energy sources and cogeneration and eligible producers, https://oie-aplikacije.mzoe.hr/Pregledi/

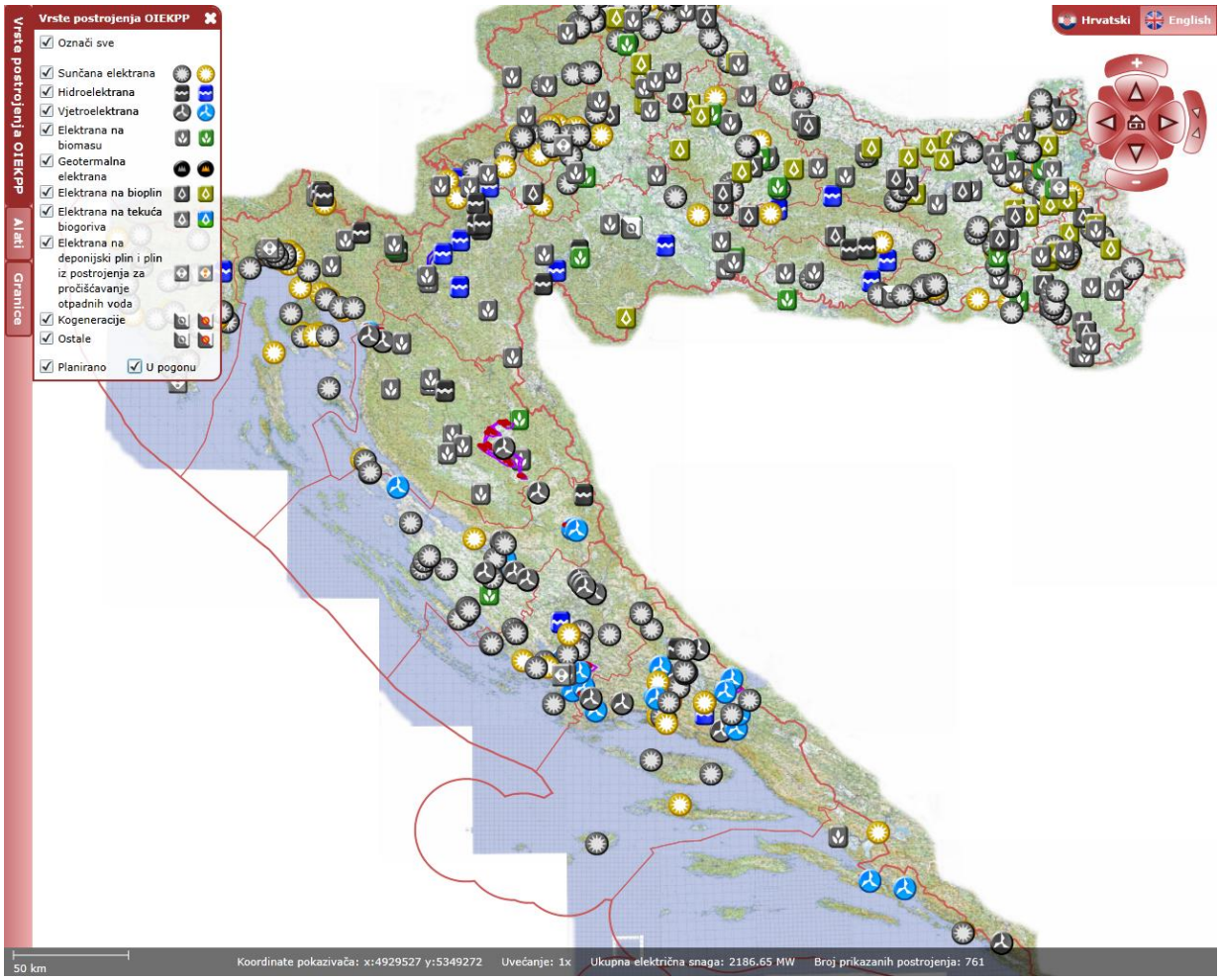


Figure 4.5.5 Interactive map of Croatia with the locations of all facilities in the Register of renewable energy sources and cogeneration and eligible producers, https://oie-aplikacije.mzoe.hr/InteraktivnaKarta/

In accordance with the *Ordinance on the Register of renewable energy sources and cogeneration and on eligible producers*, information, data, certificates, and documents regarding eligible producers are entered into the Register by HERA. Based on the *Ordinance*, in 2020 HERA entered into the Register 1,030 decisions regarding eligible producer status (preliminary decisions, final decisions, extensions, decisions to change the project operator, decisions altering decisions and other decisions), together with information accompanying the decisions, and over 200 technical descriptions of production facilities.

An overview of projects from the publicly available sections of the Register of renewable energy sources and cogeneration and on eligible producers and the Register of guarantees of origin is shown in Table 4.5.8. The table displays projects from the Register of renewable energy sources and cogeneration and on eligible producers and production facilities built to date in the incentives system and in the guarantees of origins systems.

Table 4.5.8 Overview of projects from the Register of renewable energy sources and cogeneration and on eligible producers, and the Register of Guarantees of Origin

Type of facility / primary energy source	Entered in the Register of RES&C and EP[1]		Constructed and in the incentives system[2]		Constructed and in the guarantees of origin system[2]	
	Number of facilities	Installed capacity [MW]	Number of facilities	Installed capacity [MW]	Number of facilities	Installed capacity [MW]
Solar power plants	3,805	379.4	1,230	53.4		
Hydro power plants	49	1,674.0	16	6.7	17	1,944.7
Wind power plants	50	2,096.4	26	717.8	2	17.2
Biomass power plants	120	218.8	48	106.8		
Geothermal power plants	2	20.0	1	10.0		
Power plants fuelled by biogas	70	76.3	43	47.9		
Power plants fuelled by landfill gas and gas from wastewater treatment plants	6	8.7	1	2.5	1	3
Cogeneration	12	1,069.0	6	113.3		
Other	1	1.0				
Total	**4,115**	**5,543**	**1,371**	**1,058**	**20**	**1,965**

Sources: the Ministry, HROTE

Activities of the EKO balance group

The establishment of the EKO balance group is regulated under the **Renewable Energy Sources and High-Efficiency Cogeneration Act** and the *Rules on electricity market organisation*. It includes electricity producers and other entities performing electricity production activities entitled to incentivised prices pursuant to concluded contracts on electricity purchase.

EKO balance group commenced operation at the beginning of 2019. 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 (Official Gazette No. 119/19)* specifies that in 2020 energy suppliers were obliged to take up 40% of the net electricity delivered to HROTE by eligible electricity producers participating in the incentives system. HROTE sold the remaining electricity produced by the EKO balancing group on the electricity market in accordance with the *Rules for the sale of electricity (*HROTE*,* 12/2018), which set up a combination of long-term and short-term electricity sales via three possible models: sale at auctions, sale on the electricity exchange and sale pursuant to framework agreements. Energy was sold on the day-ahead market, on the intraday market and in auctions.

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

Users of self-supply facilities

In December 2018, The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** introduced the definition of a user of a self-supply facility as a household final customer with a facility for self-supply of electricity from renewable energy sources or high-efficiency cogeneration connected to its own installations, whose surplus energy can be taken over by a supplier or another market participant under a relevant contract within a billing period, provided that the total volume of electricity delivered to the network by the self-supplying consumer within a calendar year is less than or equal to the electricity taken over from the network.

Upon request of a self-supply facility user, the supplier is obliged to conclude a supply contract with the user, containing provisions on take-up of the surplus electricity generated by the production plant. Electricity consumption, network charges and the charge for renewable energy sources and high-efficiency cogeneration applicable to self-supplying consumers is billed taking into account the difference between the taken and delivered energy within a billing period (one month) per tariff.

At the end of 2019, there were 146 users of self-supply facilities, compared to 851 such users at the end of December 2020. A total of 43 users lost their status.

The emergence of users of self-supply facilities and final customers with their own production plants affects the calculation of the fee for network use and, consequently, the revenues of HOPS and HEP-ODS. Therefore, HERA commissioned a study entitled *An assessment of the effect of final customers with own production plants on the fees for distribution and transmission network use*, which was completed in March 2020. The study evaluated the effect of final customers with own production plants in the low voltage network (with a photovoltaic system installed on the roof) on the drop in revenues of HOPS and HEP-ODS. Based on the criteria for the installation of photovoltaic systems for household and industrial consumers used in the study (ROI period shorter than 10 years and an internal profitability rate higher or equal to 8%), 63,321 photovoltaic systems with a total capacity of 277 MW were foreseen for households and 3,460 with a total capacity of 92 MW for industrial customers. With regard to the users of self-supply facilities, i.e. households, the study forecasts that the installation of the above number of photovoltaic systems would decrease the HEP-ODS revenue by 77.2 to 91.5 million HRK in the first year of their operation (depending on the orientation of the photovoltaic modules) or by 2.5% to 2.8% of its revenue from the network fee in 2018. Similarly, the drop in HOPS revenue would be 34.6 to 41.1 million HRK or 2.5% to 2.9% of its revenue from the network fee in 2018.

Considering the current tariff amounts, the findings of the study demonstrate that each installed kW of a photovoltaic system in a household will cause a drop in HEP-ODS revenue by 279 to 331 HRK per year and a drop in HOPS revenue by 125 to 148 HRK per year.

Observations on incentives for electricity production from renewable sources and cogeneration

The weighted average price of electricity paid in 2020 to eligible producers taking part in the incentives system is more than three times higher than the annual average electricity price on the day-ahead market on the CROPEX electricity exchange. At the same time, the annual average price of electricity on CROPEX decreased by over 21%.

The rising trend of electricity production in facilities using renewable energy sources and high-efficiency cogeneration and those in the incentives system has continued.

Given that HOPS is obliged to connect all facilities that have concluded a purchase contract with HROTE, the quantity of electricity produced from renewable energy sources and high-efficiency cogeneration will further increase, resulting higher funds required for the disbursement of incentives when the remaining facilities that have a contract with HROTE are built and included in the incentives system.

The expected rise in the volume of energy generated within the incentives system and the new obligation to reimburse the balancing 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 final customers. In addition, once suppliers are fully relieved of the obligation to purchase electricity from the incentives system at a regulated price, suppliers' 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. Due to the COVID-19 pandemic, in 2020 electricity consumption in Croatia decreased and the prices of electricity sold by the EKO balance group were also lower than forecast. This and the adoption of by-laws which enabled some users (energy-intensive industry) to pay a reduced fee resulted in a drop in revenues, which were not sufficient to cover the annual costs of the incentives system.

The **Act on Amendments to the Renewable Energy Sources and High-Efficiency Cogeneration Act** increased the capacity limit for the guaranteed purchase price incentive from 30 kW to 500 kW. In its opinion on the proposal for the **Act**, HERA warned the Ministry that the new limit would lead to a significant increase in 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 results of the first public call for tenders for awarding market premiums and for guaranteed purchase prices to incentivise the production of electricity from renewable energy sources demonstrate that the fulfilment of the guaranteed purchase price quota was a priority in the call for tenders. More specifically, if the total quota specified in the *Regulation on quotas* is divided between facilities with an installed capacity of up to 500 kW and those with more than 500 kW (the limit between a guaranteed purchase price contract and a market premium contract), it is evident that in the case of guaranteed purchase price contracts, it was possible to bid for as much as 28% of the relevant share of the total quota, while the share for market premium contracts was only 1% of the total quota.

In May 2020, the *Regulation on quotas for promoting electricity production from renewable energy sources and high-efficiency cogeneration* and the *Regulation on the amendments to the Regulation on promoting electricity production from renewable energy sources and high-efficiency cogeneration* were adopted. HERA issued its opinion on both documents. The *Regulation on quotas* provides for high-capacity production facilities (2,265 MW) to be included in the new incentives systems (market premium and guaranteed purchase price). The explanatory memorandum of the proposal for the *Regulation* states that the quotas were determined taking into account the **Strategy** and the *NECP*. However, the quotas are higher than 2030 objectives specified in these two documents.

In November 2020, in accordance with the above regulations, HROTE organised the first public call for tenders for awarding market premiums and for guaranteed purchase price incentivise electricity production from renewable sources. While the total quota in the call for tenders was 88 MW, tenders were submitted for projects with the capacity of around 41.4 MW (approximately 47% of the total capacity offered in the call) and contracts were concluded for only 25.5 MW. This shows that the valid winning tenders account only for 29% of the capacity in the call for tender. The reason for the low response could lie in the sizes of production plants specified in the call, primarily the fact that bids for the guaranteed purchase price could not be submitted for large production plants.

4.6 Energy efficiency in the electricity sector

Criteria for energy efficiency in transmission tariffs, distribution tariffs, and regulations

Pursuant to the *General terms and conditions for network usage and electricity supply*, calculated peak load is the tariff element applied to final customers with a connection capacity higher than 20 kW. The calculated peak load (maximum power value reached during the billing period used in the period of higher daily tariff) is a tariff element that directly encourages final customers to monitor and decide when they use their devices and whether they use them simultaneously, particularly those with high power consumption, and in doing so they indirectly control their electricity consumption. On 1 October 2020, when the new *General terms and conditions for network usage and electricity supply* came into force, the capacity limit was increased from 20 kW to 22 kW.

Enabling and promoting demand responses

In order to manage consumption, in accordance with the **Energy Act**, all users of the distribution network are guaranteed a separate meter in their housing unit for the purpose of measuring electricity consumption. If a housing unit is divided into two separate units, a separate billing metering point with its own meter is installed for each unit. This ensures that the final customers have easy access to data on their electricity consumption, based on which they can control their consumption to save money or earn extra income.

HEP-ODS submits the billing metering data from meter readings to the suppliers. In accordance with the **Electricity Market Act**, the suppliers then issue a single invoice for electricity and network use for each billing metering point, in accordance with the tariff system, prescribed fees and contracted prices. If a billing metering point cannot be accessed or read, electricity consumption is estimated, and the estimated value is clearly indicated in the invoice.

Household final customers can access their meter reading history and consumption data and submit their meter readings via a web portal (*https://mojamreza.hep.hr*).

Energy efficiency in network design and operation

Pursuant to the **Energy Efficiency Act**, in carrying out its regulatory tasks, HERA should take account of energy efficiency in accordance with the provisions of the Act governing the electricity and gas markets.

Pursuant to 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 (electrical discharge) and leakage current over insulators in transmission lines, dielectric losses of cables and capacitors, losses in low-voltage coils of electricity meters) or 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 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. Because such measures are also necessary to increase the safety of operation and compliance with the technical regulations, the investments are not based solely on savings made 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 in ten-year development plans for the transmission and distribution networks, with a detailed elaboration for the initial three- and one-year periods, which HERA approves each year, taking account of cost-effective improvements to the network infrastructure.

Once the conditions are met for the introduction of advanced technologies, such as load management technologies (e.g. installation of appropriate meters), HERA will revise the assessed potential for increases in energy efficiency of the electricity infrastructure and the target dates for their deployment.

The approved *Ten-year development plan for the transmission network 2021–2030 with a detailed elaboration of the initial three- and one-year periods* includes the following measures for improving energy efficiency: 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 the management of the electricity system.

The approved *Ten-year (2021–2030) development plan for the distribution network with a detailed elaboration of the initial three- and one-year periods* provides for the following measures for improving energy efficiency: the reconstruction of network portions with a small conductor cross-section and long line sections, upgrade of voltage levels for some portions of the network from 10 kV to 20 kV, replacement of the old power transformers with new units which would lead to fewer losses, further implementation of reactive power compensation. In addition, it proposes measures for the management of the electricity system (e.g. optimisation of network reconnect status, automatic voltage regulation).

Savings resulting from energy supply measures

The **Energy Efficiency Act** provides for a required energy savings scheme.

In 2019, the obligated parties were energy suppliers and their affiliated legal persons who supplied more than 300 GWh of energy in 2017 to final customers or distribution stations that sell electricity to final customers. In 2020, the obligated parties were suppliers who had delivered more than 100 GWh of energy in the penultimate year (in 2018). From 2021 onward, the suppliers who have delivered more than 50 GWh in the penultimate year will also be included in the scheme.

By 30 June of the current year, the Ministry issues a decision determining the savings obligation (in kWh) of the obligated parties for the following calendar year (hereinafter: the Obligation). If the unfulfilled portion of the Obligation from the previous year exceeds 10%, the Ministry will determine the one-off payment that the obligated party must make to the Environmental Protection and Energy Efficiency Fund.

The Ministry adopted the *Ordinance on the energy efficiency obligation scheme*. The *Ordinance* regulates the elements of the energy efficiency obligation scheme, as well as its implementation. This includes determining the share of new savings that will be realised through the scheme and the manner, periods, and deadlines for informing the obligated parties. The *Ordinance* sets out methods for calculating energy savings and rules for the transfer of realised savings. It defines the scope of the concept, the obligations of affiliated persons and how they share their obligations. It also defines the duration of the cumulation period and determines the compensation of unrealised savings in the obligation scheme, the incentives for increasing energy efficiency, which is a priority in energy poor households or in public housing, the trading in energy savings and the conditions for investing and incentivising energy efficiency. The *Ordinance* also prescribes the use of funds paid for unrealised savings and the conditions for exercising the right of payment in instalments. The periods of savings cumulation are also defined, with the first period ending on 31 December 2020.

As the legal requirements were made public in 2018, those suppliers who are still not ready to fulfil the obligations or those who would not realise any savings on their own, could purchase savings on the market. If they failed to do so, they would be required to pay to the Fund an amount specified by the regulations. The data delivered to HERA by the active suppliers under the obligation of realising savings show that all suppliers have fulfilled their obligations and submitted their reports to the Ministry.

Currently, electricity suppliers are not offering final customers any delivery 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 final customers have installed meters capable of monitoring consumption in shorter intervals or in several tariff periods, in their public offers the electricity suppliers do not offer special products targeting specific groups of final customers and their consumption patterns (e.g. delivery models adapted to vacation homes).

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

Financing energy efficiency measures in energy supply

Energy efficiency measures are in principle financed with own funds, borrowing (loans and leases) or energy performance contracts (EPCs), but most frequently through loans. In addition to traditional loans in which the final customer bears the financial and commercial risk, other models may be used where the risks are shared among the participants in the project (including not only the final customer, but also the contractor, equipment supplier, electricity supplier, or even a third party that provides funding). Various combinations of financing are used for households, including among others:

- financing the equipment supplier, where leasing is the most common method of financing,
- energy mortgage, where financing is obtained through a mortgage on the house/apartment, taking into account that increased energy efficiency increases the value of the property; it is attached to the property and not the owner, allowing for investments with longer repayment periods,
- financing through invoices for electricity, which entails a repayment of energy efficiency loans integrated in the monthly invoices,
- financing through dedicated credit lines offered by banks to improve energy efficiency in households (EBRD),
- pooled procurement of equipment for improving the energy efficiency of buildings, and

– carbon finance – green investment schemes/domestic carbon offsets.

In addition, national, regional and local authorities often encourage investments in programmes and projects for improving energy efficiency through various support schemes (subsidies, soft loans, tax reliefs, exemptions, etc.). These schemes should serve as an example and pave the way for private investments, instead of serving as their substitutes. Subsidy schemes (co-financing investments and interest rate subsidies) are very common methods of financing which support the high initial costs in energy efficiency projects. Co-financing of initial costs increases the financial rate of return on investment, which in turn increases the demand for such investments. They are most commonly used to support energy efficient renovation of existing buildings and to promote the use of renewable energy sources (RES). These measures target investments in existing, mature technologies (e.g. thermal insulation) and in new technologies (e.g. RES or micro-cogeneration systems). Subsidies are provided for the replacement of inadequate/unsuitable heating systems in buildings (e.g. electric heating), implementation of specific technologies (e.g. installation of solar panels and heat pumps), renovation of existing buildings to reduce their energy consumption by a required amount (in general by 20-30%) or for fulfilling obligations from existing regulations. In addition to subsidies for improving the energy efficiency of buildings, special schemes are in place for specific social groups (e.g. households with elderly residents), regardless of their social status. Concessional loans, usually used to implement energy efficiency measures, are characterised by:

– extended repayment periods,
– low or zero interest rates, and
– deferred start.

5 NATURAL GAS

5.1 Legal framework for natural gas

The legal framework for the gas sector and the gas market in Croatia comprises the **Energy Act**, the **Act on the Regulation of Energy Activities**, the **Gas Market Act**, the **Act on the Liquefied Natural Gas Terminal**, and regulations subordinate to these acts.

Following HERA's opinion on its draft in January 2020, the Croatian Parliament adopted the **Act on Amendments to the Gas Market Act (Official Gazette No. 23/20)** in February 2020.

The **Act on Amendments to the Gas Market Act** implements the provisions of *Directive (EU) 2019/692 of the European Parliament and of the Council of 17 April 2019 amending Directive 2009/73/EC concerning common rules for the internal market in natural gas* providing for a procedure in the event of cross-border disputes relative to the refusal of access to the upstream pipeline network, as well as obligatory consultations with EU Member States but also with third countries if the upstream pipeline network originates from a third country. In addition, the Act provides for a decision-making process applied by HERA in deciding on the exemption for new infrastructure when it includes both EU Member States and third countries.

It also amends and harmonises certain provisions of the **Gas Market Act**, which, inter alia, refer to the exchange of data among distribution system operators, the transmission system operator, and the gas storage system operator on the consumption by final customers of the public gas supply service, in relation to the procedure for gas storage capacity allocation and contracting for the period from 1 April 2020 to 31 March 2021. Further, it determines the period for which HERA organises a call for tenders for the selection of gas suppliers under public service obligation after 31 March 2021, and defines in more detail the area applicable to the specific public service gas supplier for household consumers by 1 April 2021.

In order to improve the functioning of the gas market in Croatia, HERA adopted the following by-laws in 2020 and early 2021:

- *Amendments to the General terms and conditions of gas supply (Official Gazette Nos. 50/18, 88/19 and 39/20)*
- *Amendments to the Network Code for the gas distribution system (Official Gazette Nos. 50/18, 88/19 and 36/20)*
- *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)*
- *Amendments to the Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette Nos. 48/18 and 79/20)*
- *Amendments to the Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette Nos. 34/18 and 14/20) and*
- *Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 108/20).*

Amendments to the General terms and conditions of gas supply (Official Gazette Nos. 50/18, 88/19 and 39/20)

The *Amendments to the General terms and conditions of gas supply (Official Gazette No. 39/20)*, adopted by HERA in March 2020, specify additional data collected in the Register of billing metering points (RBMP) and also improve on the measures for obtaining complete, accurate and up-to-date data in the RBMP, all of which is necessary for the application of the *Methodology for the allocation of gas energy*.

Also, the *Amendments* include provisions aimed at improving the quality of gas supply for distribution system operators, closed distribution system operators and gas suppliers

which do not fulfil the obligations from Article 27 of the *General terms and conditions for gas supply* in terms of entry and update of data in the RBMP, so that the data is complete, accurate and up-to-date, and can serve as a valid basis for correct and successful application of the *Methodology for the allocation of gas energy*.

The *Amendments to the General terms and conditions of gas supply* now also include the provisions of the *General terms and conditions of gas supply* pertaining to the gas price comparison tool, with additional clarifications of the tool's purpose and a definition of its users and functions, to make their use simpler and more accessible for its users. Pursuant to the amendments, all gas suppliers enter the information on final gas prices and gas supply conditions in the gas price comparison tool in a standardised format, providing the final customers with access and information on standardised offers. HERA is responsible for verifying and validating the entered information.

Amendments to the Network Code for the gas distribution system (Official Gazette Nos. 50/18, 88/19 and 36/20)

The *Amendments to the Network Code for the gas distribution system (Official Gazette No. 36/20)*, adopted by HERA in March 2020, provide for the beginning of application of the methodology for forecasting gas offtake and the distribution of calculated gas energy at exits from the transmission system from 1 October 2020. The provisions have been amended so that the existing method for gas allocation can still be applied under the new circumstances on the gas market after 1 April 2021.

The part of the *Amendments to the Network Code for the gas distribution system* that refers to the metering code was introduced so that the method for gas energy allocation can also easily be applied to the distribution systems, which receive gas from the transmission system, but also directly from upstream pipeline networks.

Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)

In July 2020, HERA adopted the *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)*. The *Methodology* has contributed to establishing harmonised rules at EU level on the procedure for setting gas transmission tariffs and their structure, ensuring the implementation of the *NC TAR Regulation*, and taking account of 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*, adopted by HERA in May 2019. The adoption of the *Methodology* was also a precondition for adopting applicable gas transmission tariffs for the period from the start of the commercial activity of the LNG terminal on the island of Krk on 1 January 2021, and for the third regulatory period 2021 – 2025.

The *Methodology* introduced the concept of reference price as a gas transmission tariff item, i.e., the price for an annual standard capacity product for firm capacity, and the concept of reserved price as the price for a specific non-annual standard capacity product. Transmission tariffs are now based exclusively on contracted capacity after the abolishment of the tariff item for gas quantities at exits from the transmission system, which accounted for 10% of allowed revenues of the gas transmission system operator in the first and second regulatory periods. The exit tariff in the separate zone has also been abolished because a separate zone is not considered to be a point in the transmission system. In addition, the allocation ratio of the allowed revenue of the gas transmission system operator at entry and exit points of the transmission system has been changed from 70:30 to 60:40.

The Methodology changes the values of discounts (security coefficients) for the calculation of tariffs for specific entry and exit points of the transmission system by abolishing the discounts at entry points from production facilities and at exit points in Croatia, which are not permitted pursuant to the *NC TAR Regulation*. Also, in order to promote the use of the LNG terminal and achieve long-term security of gas supply, the discount on the tariff at entry points from the terminal is increased from 10% to 15%, as

allowed by the Regulation. The discounts applied on the tariffs for the gas storage system have remained the same, and amount to 90% at entry points from storage facilities and 100% at exit points into storage facilities, taking account of the contribution of the storage facility to the flexibility of the system and security of supply.

Further, when compared to the previously applicable *Methodology for setting tariffs for gas transmission (Official Gazette Nos. 48/18 and 58/18)*, the price of short-term capacity lease of the transmission system on a quarterly, monthly, daily, and intraday basis has been reduced by an average of 13%. This has provided for a more favourable short-term capacity lease, and together with the requirement to optimise the necessary capacity reservation corresponding to the portfolio of the individual consumer, it also promotes efficient use of transmission system capacities and reduces the financial burden on the transmission system users.

The *Methodology* provides for a detailed procedure for determining the justified value of long-term tangible and intangible assets based on an analysis of the economic efficiency of the operator's existing assets, and a comparative analysis of the costs and the efficiency of transmission system operator activities in the Croatian context with the purpose of determining the justified share in the value of regulated assets.

It also contains provisions for determining, establishing and administration of the security of supply fee from the **Act on the LNG Terminal (Official Gazette No. 57/18)**, as well as provisions for cases of increased delivery of natural gas into the transmission system from the LNG terminal, in cases when a user contracts additional capacities of entries into the transmission system because the amount of delivered LNG is above standard. Given that the LNG terminal started its commercial activity in January 2021, the *Methodology* set the third regulatory period for the gas transmission activity as the period from 1 January 2021 to 31 December 2025.

Amendments to the Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette Nos. 48/18 and 79/20)

In July 2020, HERA adopted the *Amendments to the Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 79/20)*.

The *Amendments to the Methodology* set the start of the first regulatory period on 1 January 2021. It also abolished the discounts previously applicable to tariffs for the reception and dispatch of LNG for the long-term lease of capacities and volumes of leased LNG terminal capacity, and established provisions for cases when the volume of transmitted LNG is above standard. Moreover, the provisions on the regulatory account and the preconditions for its establishment have been amended to enable the LNG terminal operator to recover revenue at intervals different from those that would be applied to the recovery of allowed revenue without the use of regulatory accounts, with the purpose of ensuring stable and competitive tariff amounts during the entire period of the regulatory account.

The *Amendments to the Methodology* contain provisions for the criteria and the procedure for establishing the security of supply fee in cases when the anticipated revenue of the LNG terminal operator is lower than the anticipated allowed revenue set by HERA's decision due to the fact that the amount of leased LNG terminal capacity is lower than anticipated.

Amendments to the Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette Nos. 34/18 and 14/20)

In February 2020, HERA adopted the *Amendments to the Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 14/20)*. The Amendments to the *Methodology* included changes to the cost of gas supply as one of the components of the final price of gas supply, which amounted to a total of HRK 0.0145 per kWh in the period from 1 April 2020 to 31 March 2021.

Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 108/20)

In October 2020, HERA adopted the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 108/20)*.

The *Methodology* details the framework for setting the prices of gas supply as a public service for the period starting from 1 April 2021, as well as the requirements for the public call for tenders for the selection of gas suppliers under the public service obligation, which was organised by HERA from October to December 2020.

The *Methodology* includes important changes in determining the final gas supply price for the period after 1 April 2021 compared to the previous period until 31 March 2021. These include changes in the components of the final price, i.e. the scope of the costs of gas supply, so that the cost reflects only the price of gas at the reference gas market, whereas all other operating costs of the public service gas supplier (including the costs of the use of gas infrastructure, balancing energy costs, other operational costs and the public service gas supplier margin) make up a separate component of the cost, which is also the main criterion for the selection of gas suppliers under the public service obligation in public tenders.

Further, the regulatory year, for which the final price of gas supply is determined, is equal to the gas year, except for the transitional period from 1 April 2021 to 30 September 2024. The cost of gas purchase is now determined based on actual gas prices on the reference gas market for the period which directly precedes the day on which gas supply costs are calculated, which is an improvement on the previous method of calculation, whereas the limitation of the maximum change in the cost of gas purchase between regulatory years has been abolished. In addition, the Methodology abolished the principle of capping the final gas supply price, which had enabled the public service supplier to decide on the tariffs for gas supply as a public service. The fixed monthly gas supply fee has become a part of the total cost of gas supply offered in the public call for tenders for the selection of gas suppliers under the public service obligation.

Also, the guaranteed supply tariffs for non-household final customers have been increased during the first three months from the start of the guaranteed supply, in such a way that for the first month, the price of guaranteed supply is set at an amount 10% higher than the tariff for gas supply as a public service applicable to the concerned distribution area, whereas for the following two months this price is set at an amount 20% higher. As for the household final customers purchasing gas under market conditions, the price of guaranteed supply is now equal to the price applicable to household final customers using the public gas supply service.

In 2020 HERA granted its approval for the ***Rules on amendments to the Rules of operation of the liquefied natural gas terminal (Official Gazette Nos. 60/18, 39/20 and 136/20)***

Following HERA's approval, in March 2020 LNG HRVATSKA d.o.o. adopted the *Rules on amendments to the Rules of operation of the liquefied natural gas terminal (Official Gazette No. 39/20)*, changing the provisions on the annual procedure for contracting reception and dispatch services for liquefied natural gas (hereinafter: LNG) and contracting short-term LNG regasification capacities in the part concerning the rules on capacity allocation so that the capacities are allocated in the order in which requests are received. In addition, the Rules also clarify the periods for which individual services are contracted. Furthermore, in order to allocate the remaining LNG regasification capacities, all interested terminal users were given the opportunity to submit requests for annual capacity allocation every year by 15 June for a minimum period of one and a maximum period 15 gas years.

After the annual procedure for contracting reception and dispatch services for LNG is completed and information on the remaining capacities is made public, the short-term regasification capacities are allocated for each month of a gas year.

Following HERA's approval, in December 2020 LNG HRVATSKA d.o.o. adopted the *Rules on amendments to the Rules of operation of the liquefied natural gas terminal (Official Gazette No. 136/20)*, which regulate the responsibilities of LNG terminal users and the operator for indemnification of damages, the procedures in case of claims against one of the parties and the method for determining the maximum level of liability of the LNG terminal operator towards individual users, the conditions in which the LNG terminal operator has the right to discontinue the services to an LNG terminal user, the limitation of responsibility of the signatories to the contract on the use of the LNG terminal, as well as determining the allocation of total gas loss in line with the total quantities of regasified LNG instead of using the virtually stored amount, and applying total gas loss of the LNG terminal in the calculation of total gas loss of the terminal per gas year in case of interruptions in the provision of LNG terminal services due to maintenance.

In 2020 HERA granted its approval for the ***Amendments to the Storage Code (Official Gazette Nos. 50/18 and 26/20)***

Following HERA's approval, in March 2020 PODZEMNO SKLADIŠTE PLINA d.o.o. adopted the *Amendments to the Storage Code (Official Gazette No. 26/20)* with the purpose of harmonisation with the provisions of the **Act on Amendments to the Gas Market Act (Official Gazette No. 23/20)**, which entered into force on 4 March 2020. The *Amendments to the Storage Code* additionally specify the procedure for the proportional allocation of storage capacities to public service suppliers which are available for public gas supply to household final customers in the period from 1 April 2020 to 31 March 2021. They also specify the assignment of the right to contract storage services by a public service gas supplier to a supplier on the wholesale market, a gas supplier or a gas trader from which gas is procured for the supply of household final customers as part of the public gas supply service, as well as the deadlines for the conclusion of storage contracts and delivery deadlines, and the amount of the security which the system operator can determine based on the credit rating of the storage user.

In 2020, HERA granted its approval for the ***Amendments to the Network Code for the transmission system (Official Gazette Nos. 50/18, 31/19, 89/19 and 36/20)***

Following HERA's approval, in March 2020 PLINACRO d.o.o. adopted the *Amendments to the Network Code for the transmission system (Official Gazette No. 36/20)*, containing improved provisions on using the gas transmission service without contracted capacity, as well as provisions on the methodology for forecasting gas offtakes and the allocation of gas energy at exits from the transmission system, which are also entry points into the distribution system. This methodology is applicable to the period starting on 1 October 2020.

In 2020 HERA ensured for the implementation of ***Commission Regulation (EU) 2017/460 establishing a network code on harmonised transmission tariff structures for gas (NC TAR Regulation)***

The *NC TAR Regulation* is a binding legislative act transposing the European Union acquis into the Croatian regulatory system for gas transmission by laying 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)* in May 2019. Prior to the adoption of the above *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.

Within the specified period of one month following the end of the consultation, HERA published a summary of submissions received in the final consultation and forwarded the consultation documents to the Agency for the Cooperation of Energy Regulators (ACER) for analysis in accordance with Article 27 of *Commission Regulation (EU) 2017/460*. ACER's analysis, delivered to HERA and published on 17 April 2019, showed that the

proposed methodology elements were fully consistent with the provisions of the *NC TAR Regulation*.

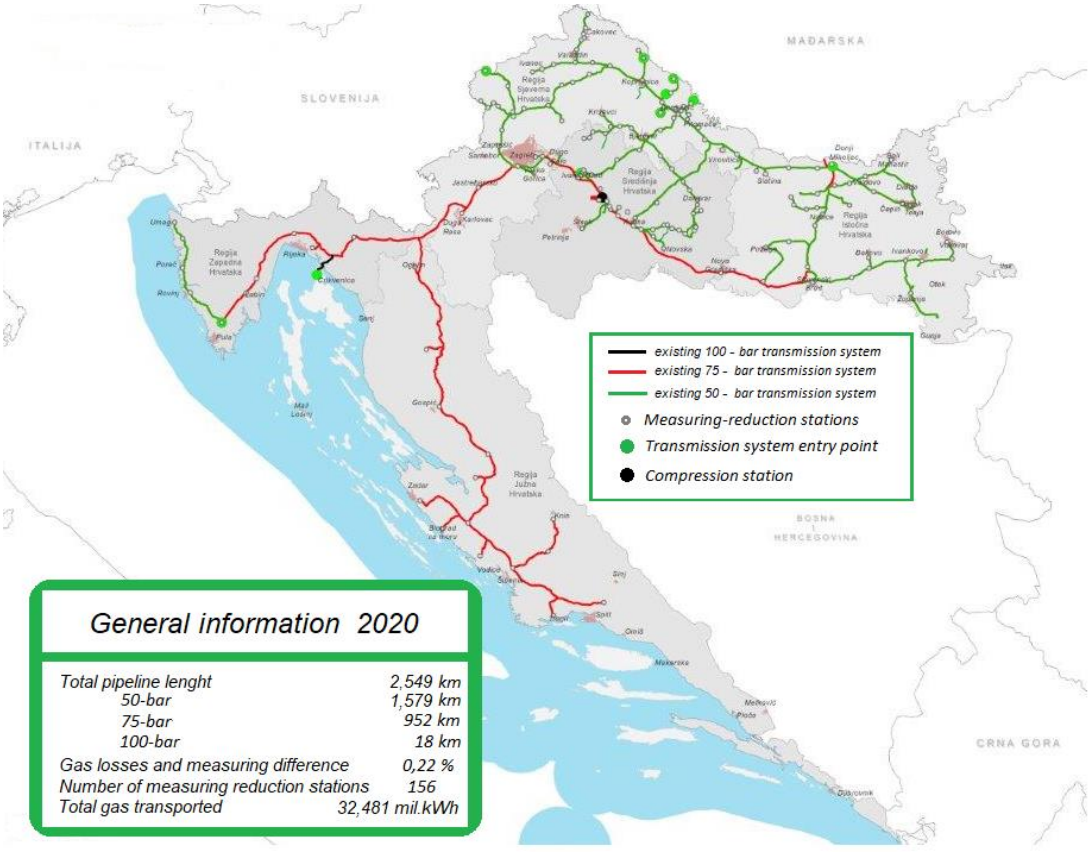
Finally, in July 2020 HERA adopted the new *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)*, containing all the elements from the *Decisions* and implementing the *NC TAR Regulation*, thus formally ensuring the implementation of the Regulation. Pursuant to the new *Methodology*, a new *Decision on tariffs for gas transmission (Official Gazette No. 147/20)* was adopted, establishing the tariff amounts for gas transmission for the third regulatory period 2021 – 2025.

5.2 Regulated network 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 the exit pressure reducing measuring stations (MRS), where the gas is delivered to gas distribution systems and to final (industrial) customers directly connected to the transmission system. The Croatian gas transmission system is shown in Figure 5.2.1.



Source: Plinacro d.o.o.

Figure 5.2.1 Croatian gas transmission system

The total length of the Croatian gas transmission system at the end of 2020 was 2,549 km, of which 952 km were gas pipelines with an operating pressure of 75 bar, 1,579 km were

gas pipelines with an operating pressure of 50 bar, and 18 km were gas pipelines with an operating pressure of 100 bar.

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

Gas from the transmission system is delivered to 164 connection points (156 exit pressure reducing metering stations), 37 of which are used to deliver gas to final customers connected to the transmission system, 124 connection points are used to deliver gas to distribution systems operated by 33 distribution system operators, one connection point is used for entry into and exit from the UGSF Okoli, and two exits are located at interconnections.

In 2020, the transmission system operator PLINACRO d.o.o. continued its development activities consisting of implementation of projects related to new import routes for natural gas and gas pipeline projects, pressure reducing metering stations (MRS), gas nodes, and compression stations in order to increase the regional security of gas supply.

Early 2020 saw the completion of the construction of the KS1 compression station in Velika Ludina, with a view of establishing a firm two-way capacity on the existing interconnector pipeline between Croatia and Hungary, and enabling gas transmission from the LNG terminal on the island of Krk. The use permit for the structure has been obtained, and it is now a part of the transmission system.

In 2020, construction activities were continued on the Zlobin-Omišalj dispatch pipeline for the LNG terminal. Once the construction was completed, the pipeline was granted a use permit, a trial run was performed in late 2020, and the pipeline is now operational. This project ensures the diversification of natural gas import routes to Croatia, and at the same time enables the supply of new quantities of natural gas to the neighbouring countries.

In addition, the following investments were also realised in 2020:

- construction of the Donji Miholjac – Belišće pipeline,
- reconstruction of the Ivanić Grad – Zagreb pipeline,
- completion of the main design for the Zagvozd – Imotski pipeline, which is part of the southern interconnection with Bosnia and Herzegovina,
- as for the investments in gas nodes, these include the completed reconstruction of the Slobodnica measuring-regulation node, and the activities required for obtaining the permits for the Ivanić Grad measuring-regulation node.

In 2020, the gas transmission service was used by 61 gas suppliers organised in 11 balance groups.

The number of transmission system users in 2020, calculated from the use of entry and exit capacities of the transmission system, was as follows:

- 7 users using entries to the transmission system at interconnections,
- 1 user using an entry to the transmission system from an upstream pipeline network,
- 42 users using exits from the transmission system to distribution systems,
- 10 users using exits from the transmission system to final customers, and
- 1 user using an exit from the transmission system at an interconnection.

In 2020, a total of 1,639 applications for yearly, quarterly, monthly, daily, and intraday capacity bookings were received via the capacity management system (SUKAP) and auctions on platforms for capacity lease and trade (PRISMA at the interconnection with Slovenia and RBP at the interconnection with Hungary).

During 2020, transmission system users used all available capacity products, with a trend towards increased use of quarterly capacity products and less frequent contracting of

yearly capacity products. Short-term capacity products at entries to the transmission system are usually used more intensively in the first quarter, mainly at interconnections, in order to meet the demands for increased quantities of gas due to low temperatures. The monthly and daily products at interconnections are also intensively used in the third quarter, in order to take advantage of relatively low wholesale prices of gas at foreign markets to fill the available storage capacities.

There are daily exchanges with the neighbouring transmission system operators at interconnection points with Hungary (*Donji Miholjac – Dravaszerdahely*) and Slovenia (*Zabok – Rogatec*) of data related to 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.

According to data submitted to HERA by the energy entity PLINACRO d.o.o., the total quantity of gas transported in Croatia in 2020 was 32,481,354,731 kWh, which is a 5.4% increase as compared to the total quantity transported in 2019. Total losses and imbalances in gas metering in 2020 were 0.22%. The largest quantity of gas for end consumption transported in a single day[79] was 137,147,615 kWh/day, which is a 3.1% increase as compared to 2019. In 2020, the maximum used capacity at all transmission system entries amounted to 8,077,995 kWh/h, which is a 12.8% increase as compared to 2019. The maximum used capacity at a single transmission system entry was achieved at Dravaszerdahely and amounted to 2,769,308 kWh/h, which is a 33.2% increase compared to 2019, when it was recorded at the underground gas storage entry. In addition, compared to 2019, there was a significant increase in the maximum used capacity at that entry (by 38.5%), and a mild increase at the Rogatec entry (by 2.7%). As for the entries from domestic production, the decreasing trend in capacity use continued, and amounted to 8.4% compared to 2019.

The quantities of transported gas by transmission system entry groups per month in 2020 are shown in Figure 5.2.2.

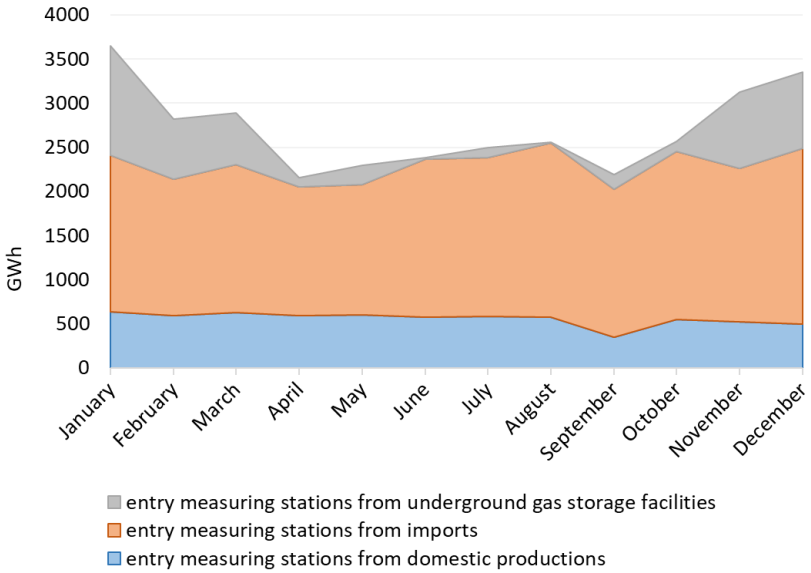


Figure 5.2.2 Quantities of transported gas by transmission system entry groups per month in 2020

The maximum used capacity at all transmission system exits in 2020 amounted to 7,163,541 kWh/h, which is a 0.1% increase compared to 2019. The largest maximum used

79 *Exits to distribution systems and exits to customers directly connected to the transmission system.*

capacity was recorded at exits into distribution systems in the amount of 3,095,934 kWh/h, which is a 1.9% decrease compared to 2019.

The quantities of transported gas by transmission system exit groups per month in 2020 are shown in Figure 5.2.3.

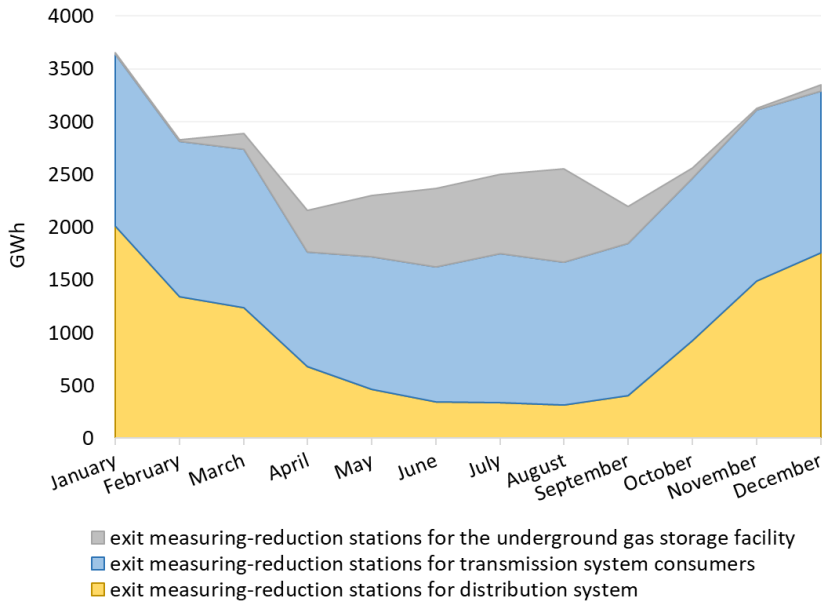


Figure 5.2.3 Quantities of transported gas by transmission exit groups per month in 2020

Total annual quantities of transported gas per final customer group are shown in Figure 5.2.4.

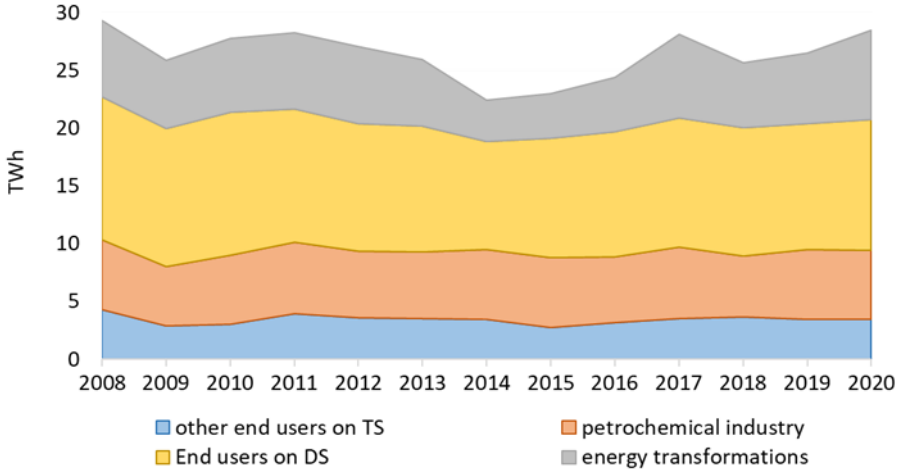


Figure 5.2.4 Total annual quantities of transported gas per final customer group

From January 2019, in addition to the existing firm physical capacity for gas transmission from Slovenia to Croatia, firm physical capacity was enabled at the Zabok-Rogatec interconnection for gas transmission in the opposite direction, in the quantity of 280,253 kWh/h, which has remained the same in 2020.

In addition to the firm physical capacity for gas transmission from Hungary to Croatia at the Donji Miholjac-Dravaszerdahely interconnection, following the construction of the KS1 compression station in Velika Ludina, which became operational in January 2020, the non-standard interruptible capacity use service of decreased interruptibility has been

replaced with the firm physical capacity service from Croatia to Hungary in the amount of 505,952 kWh/h.

An overview of gas transmission indicators per year for the period from 2017 to 2020 is shown in Table 5.2.1.

Table 5.2.1 Overview of gas transmission indicators per year for the period from 2017 to 2020

Indicators	2017	2018	2019	2020
Number of transmission system operators	1	1	1	1
Total length of pipelines in the gas transmission system (km)	2,693	2,693	2,531	2,549
Maximum quantity of gas transported for end consumption (TWh/day)	0.158	0.157	0.133	0.137
Quantity of transported gas for TS entry groups (TWh)	32.348	29.541	30.807	32.481
Quantity of transported gas for TS exit groups (TWh)	32.340	29.541	30.809	32.481

Transmission system balancing

Transmission system balancing was performed in accordance with the *Gas Market Code (Official Gazette No. 50/18)* and the provisions of the *Network Code for the transmission system (Official Gazette Nos. 50/18, 31/19, 89/19 and 36/20)*. The activities related to the application of *Commission Regulation (EU) No 312/2014* on balancing rules also continued.

In 2020, transmission system balancing was conducted in line with the applicable rules, with the transmission system operator intervening on the gas market operator trade platform by activating standardised short-term products at times when balance responsible parties were unable to balance their portfolios. Namely, balancing activities can be performed by using the products available on the trade platform as negative or positive balancing energy, by publishing a call for tenders for products if there are no suitable products on the trade platforms that can also be used as negative or positive balancing energy, or by using the balancing energy for the balancing service (which is contracted following an annual tender organised by the transmission system operator).

The number of interventions by the transmission system operator was lower in 2020 than in the previous year. However, the total volume of balancing energy activated in 2020 was somewhat higher. Since there were no tenders submitted for the above service, the transmission system operator did not contract any balancing services in 2020. There was also no need for the balancing service at the annual level, as the short-term products offered on the trade platform were sufficient for transmission system balancing requirements.

During 2020, a total of 157 million kWh of positive balancing energy and 287 million kWh of negative balancing energy were activated. When compared to total gas quantities taken into the transport system, this amounted to 0.88% of negative balancing energy and 0.48% of positive balancing energy.

Gas transmission regulation

The gas transmission is governed by the **Gas Market Act** and other regulations applicable to the energy sector, but also by the *Methodology for setting tariffs for gas transmission*. Its regulation is based on the method of incentivised regulation, i.e., establishing a maximum allowed revenue for the transmission system operator in a regulatory period. The allocation of allowed revenue and the setting of tariffs are based on an entry and exit model, without taking into consideration the length of transmission, that is the distance between entry and exit points of the transmission system (the postmark principle). According to the *Methodology*, allowed operating expenses are set by applying incentive mechanisms consisting of efficiency coefficients and allocation of actual savings, whereas 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 to approving investments in line

with the ten-year development plan for the transmission system, as well as by an *ex-post* review of realised investments. The *Methodology* also provides for the possibility of determining the justified value of long-term tangible and intangible assets based on an analysis of the economic efficiency of the operator's assets, and a comparative analysis of the costs and the efficiency of transmission system operator activities in the Croatian context.

Upon the expiry of a regulatory period, allowed revenues are revised, including operating and capital costs, and the revenues from tariffs are compared with the revised allowed revenues. Any established imbalances are included in the calculation of allowed revenues for the following regulatory period.

The regulatory period for gas transmission is a multi-annual period in the duration of five years, and allowed revenues and tariffs are determined separately for each year of the period. The third regulatory period, which started on 1 January 2021 and ends in 31 December 2025, is currently under way, and the applicable tariff amounts have been determined by applying the elements of the *Methodology* and have been harmonised with the *NC TAR Regulation*.

Gas transmission prices and the connection charge

Pursuant to the *Methodology for setting tariffs for gas transmission*, gas transmission tariffs are set by HERA and they are the same for all users of the transmission system.

2020 was also the final year of the second regulatory period for the energy activity of gas transmission, and the applicable tariff amounts were established by the *Decision on tariff amounts for gas transmission (Official Gazette No. 124/19)*, which was adopted by HERA in December 2019 in line with the *Methodology for setting tariffs for gas transmission (Official Gazette Nos. 48/18 and 58/18)*. Pursuant to the above *Decision*, the total average price for gas transmission in 2020 amounted to HRK 0.0122 per kWh, which is a 2.1% decrease compared to 2019.

Further, in July 2020 HERA adopted the new *Methodology for setting tariffs for gas transmission (Official Gazette No. 79/20)* in order to complete the implementation of *NC TAR Regulation*. In accordance with the new *Methodology*, a new *Decision on tariffs for gas transmission (Official Gazette No. 147/20)* was adopted in December 2020, establishing the tariff amounts for gas transmission for the years of the third regulatory period 2021 – 2025. The established tariffs for the use of the transmission system in the third regulatory period are based on the calculation of the anticipated allowed revenues of the operator, which include the difference identified after the regular revision of revenues for the previous (second) regulatory period 2017 – 2020, and which is to an extent influenced by the new gas transmission infrastructure that was needed to enable the dispatch of gas from the LNG terminal into the Croatian gas transmission system and further towards the EU.

Based on the established anticipated allowed revenues, and following the application of the elements from the *Methodology*, the tariff amounts are now the same for all entry points into the transmission system, except for entries into the transmission system from the storage facilities and the terminal for LNG, where an allowed discount is applied in relation to other tariffs. Tariff amounts are also the same for all exit points from the transmission system (exits in Croatia and exits at interconnections). Further, the fee for the quantity of transported gas is no longer applied as of the third regulatory period.

In line with the *Decision on tariffs for gas transmission* for the third regulatory period, the anticipated average cost of gas transmission amounts to HRK 0.0143/kWh in 2021, which is an increase of HRK 0.0021 per kWh, or 17.2%, when compared to the actual average cost of HRK 0.0122 per kWh in 2020. The anticipated cost of gas transmission in 2021 is also lower by 16.9% when compared to the actual unit cost from 2018, when it amounted to HRK 0.0172 per kWh.

Figure 5.2.5 shows the tariff amounts net of VAT for gas transmission for the years of the first and second regulatory periods 2014 – 2020, Figure 5.2.6 provides an overview of tariff amounts net of VAT for gas transmission in line with the decisions on tariff amounts for gas transmission adopted by HERA for the years of the third regulatory period 2021 – 2025 pursuant the new *Methodology*, and Figure 5.2.7 gives an overview of the realised average cost of gas transmission for the period 2014 – 2020, and the anticipated cost for 2021.

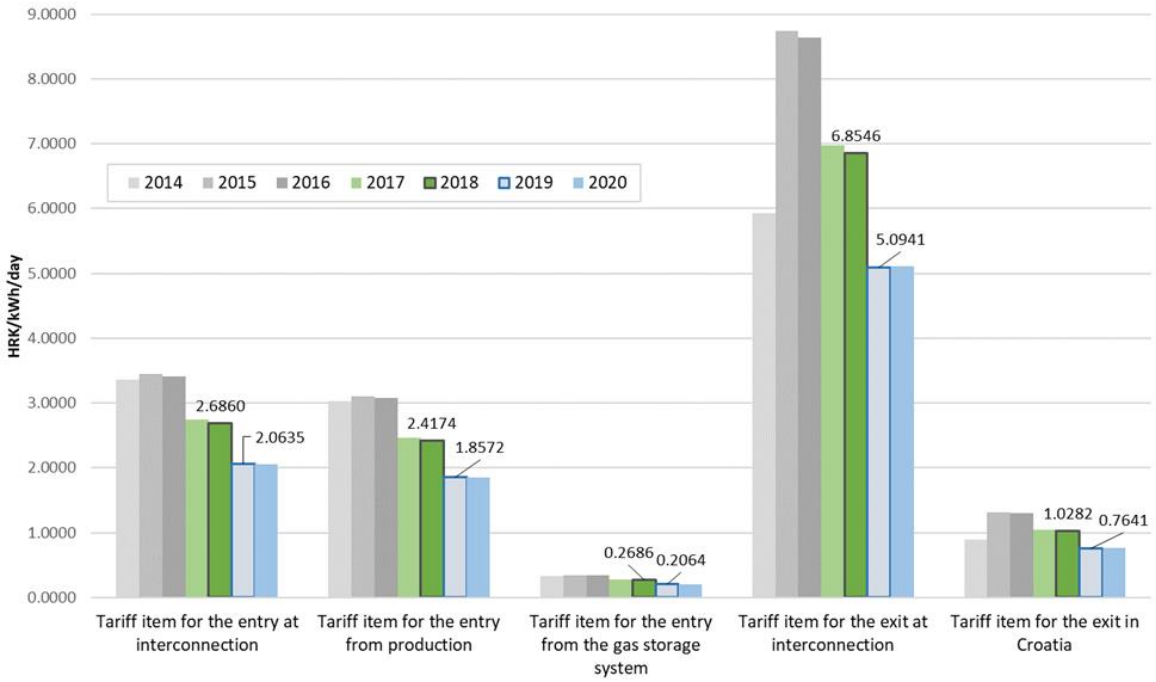


Figure 5.2.5 Tariff amounts net of VAT for gas transmission for the years of the first and second regulatory periods 2014–2020

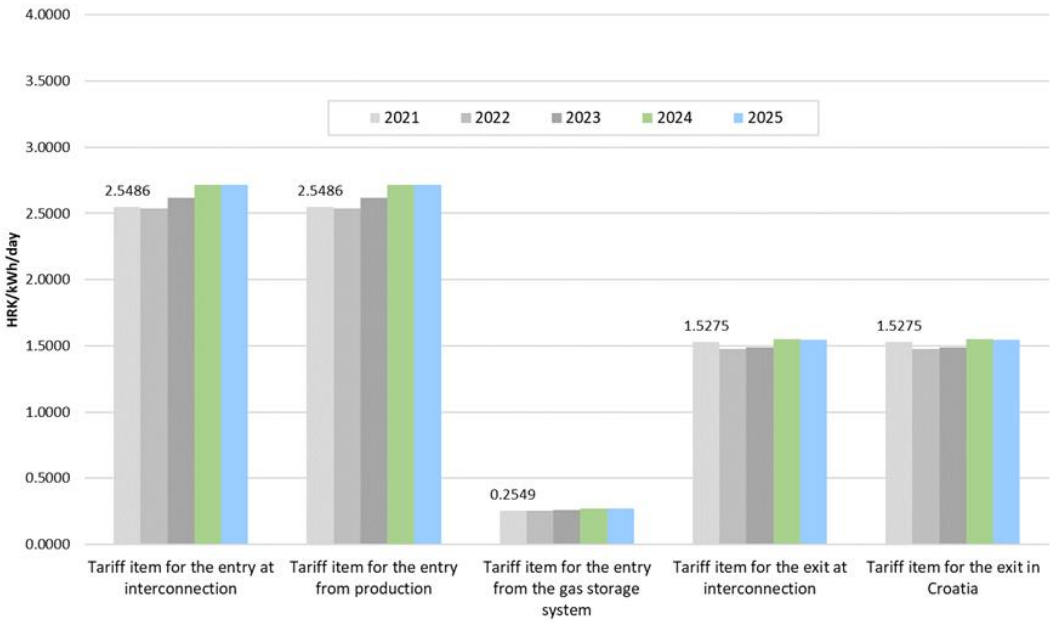


Figure 5.2.6 Tariff amounts net of VAT for gas transmission for the years of the third regulatory period 2021–2025

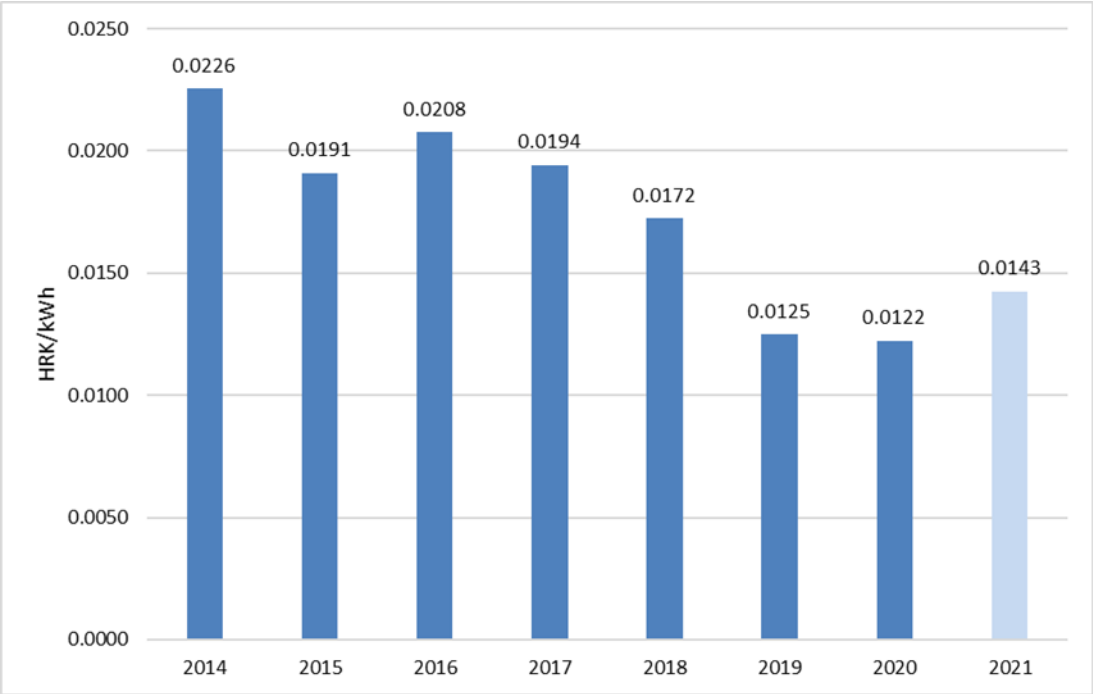


Figure 5.2.7 Overview of the realised average cost of gas transmission for the period 2014–2020 and the anticipated cost for 2021

In addition to gas transmission, the transmission system operator also provides the services of connection to the gas transmission system and connection capacity increase in line with the *Methodology for calculating the charge for the connection to the gas distribution or gas transmission system and for connection capacity increase (Official Gazette No. 48/18)*. This *Methodology* also determines the categories of connections to the gas transmission system, work complexity groups, the manner, elements, and criteria for the calculation of the charge for the connection to the gas transmission system and for connection capacity increase, the procedure for requests to determine or change the connection charge, as well as the adoption, publication and application of the connection charge. In addition to categories of connections and accompanying coefficients, the *Methodology* specifies the number of work hours required for the completion of connections to the transmission system for specific user category complexity groups.

The connection charge comprises the cost of fulfilment of unplanned technical requirements in the transmission system and the cost of connection to the transmission system. The cost of fulfilment of unplanned technical requirements, i.e., the cost of constructing new parts of the transmission system, consists of the cost of preparing project documentation, obtaining the necessary permits in line with the relevant legislation, resolving issues related to property rights, procuring necessary materials and equipment, and completing engineering, electrical, building, surveying and other accompanying works. The connection charge is paid directly by the investor who submitted the request for the service, and its amount depends on the complexity of works.

The connection charge is set by HERA for the regulatory period of five years. In 2020, the transmission system operator calculated the charge in accordance with HERA's *Decision on the charge for the connection to the gas distribution or gas transmission system and for connection capacity increase for the regulatory period 2017 – 2021 (Official Gazette No. 122/16)* from 16 December 2016.

5.2.2 Management of the liquefied natural gas terminal

Management of the liquefied natural gas terminal is a regulated energy activity performed as a public service. The energy entity LNG Hrvatska d.o.o. is the operator of the liquefied natural gas terminal in Croatia.

In 2020, activities related to project implementation and construction of the terminal for liquefied natural gas continued, and were completed by the end of the year. The arrival of the floating storage and regasification unit (FSRU) "LNG CROATIA" at the LNG terminal on the island of Krk in early December 2020 was followed by preparatory work required to put the terminal in service, which included testing all technical systems of the vessel and the onshore part of the LNG terminal in order for the LNG terminal to begin its commercial activities on 1 January 2021.

In line with the *Rules of operation of the liquefied natural gas terminal (Official Gazette Nos. 60/18, 39/20 and 136/20)*, all interested terminal users can lease the remaining long-term LNG regasification capacities by 15 June each year. The entire free capacity of the terminal has been leased by terminal users for the following three gas years.

The main elements of LNG terminal are the FSRU vessel "*LNG CROATIA*", jetty heads with associated facilities and structures, a high-pressure connecting pipeline and a connecting water supply line. The FSRU vessel "*LNG CROATIA*" consists of LNG loading and unloading equipment, four LNG storage tanks, LNG regasification equipment, equipment for boil-off gas management, natural gas dispatch equipment, engine room and facilities for electricity generation, propulsion equipment, operator room, firefighting systems and all other associated facilities. The total storage capacity of the FSRU vessel is 140,206 m^3. The LNG regasification equipment includes three LNG regasification units with a maximum regasification rate of 451,840 Nm^3/h. The LNG terminal can also accept all LNG carriers with a capacity ranging from 3,500 m^3 to 265,000 m^3.

The total value of the investment is estimated at EUR 233.6 million. The financial framework includes a grant from the European Commission in the amount of EUR 101.4 million, a grant awarded following a decision of the Croatian Government from 30 January 2019 to finance the first phase of the floating LNG terminal on the island of Krk in the amount of EUR 100 million, while a smaller part of the investment in the amount of EUR 32.2 million was financed by the co-owners of the terminal – energy entities HEP d.d. and PLINACRO d.o.o.

An overview of indicators for LNG terminal management for 2020 is shown in Table 5.2.2.

Table 5.2.2 Overview of indicators for LNG terminal management for 2020

Indicators	2017	2018	2019	2020
Total LNG received in the year (MWh)	-	-	-	127,260
Total LNG delivered from the terminal into the transmission system (MWh)	-	-	-	74,188
Total LNG stored at the terminal as at 31 December (MWh)	-	-	-	17,331
LNG reception capacity of the FSRU vessel (MWh/day)	-	-	-	48,000
LNG storage capacity (MWh/day)	-	-	-	840,000
LNG regasification capacity at the terminal (MWh/day)	-	-	-	10,800
Natural gas dispatch capacity into the transmission system (MWh/day)	-	-	-	72,000

Regulation of LNG terminal management

The LNG terminal management activities are governed by the **Gas Market Act**, the **Act on the Liquefied Natural Gas Terminal** and other regulations applicable to the energy sector, but also by the *Methodology for setting tariffs for the reception and dispatch of liquefied natural gas*, which is based on the method of incentivised regulation, i.e., establishing a maximum allowed revenue for the LNG terminal operator in a regulatory period. According to the above *Methodology*, allowed operating expenses are set by applying

incentive mechanisms consisting of efficiency coefficients and allocation of actual savings, whereas allowed capital costs are determined based on the allowed depreciation of regulated assets and the allowed rate of return on regulated assets. The *Methodology* also foresees the use of a regulatory account as a model for regulating energy activities which, in case of significant planned investments for the development of the LNG terminal, provides for a long-term return on invested assets to the operator, because otherwise the tariffs for the reception and dispatch of LNG would result in a service price which is non-competitive for the development of the project.

The *Methodology* also includes the component of economic efficiency of the operator's existing assets and provides for the possibility of determining the justified value of long-term tangible and intangible assets based on an analysis of the economic efficiency of the LNG terminal operator's assets, and a comparative analysis of the costs and efficiency of LNG terminal operator's activities in Croatia's vicinity.

The regulatory period is a multi-annual period in the duration of five years, and allowed revenues and tariffs are determined separately for each year of the period. The conditions for the operation of the LNG terminal are laid down in the *Rules of operation of the liquefied natural gas terminal*.

Cost of LNG reception and dispatch

Pursuant to the *Methodology for setting tariffs for the reception and dispatch of liquefied natural gas (Official Gazette Nos. 48/18 and 79/20)*, in December 2020 HERA adopted the *Decision on tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 144/20)* for the first regulatory period 2021 – 2025 and the *Decision on establishing a regulatory account for LNG terminal management for the energy entity LNG Hrvatska d.o.o., Zagreb, for the period 2021 – 2040*, with the purpose of setting a tariff for the LNG terminal management operator LNG Hrvatska d.o.o., which is competitive compared to the cost of service of other LNG terminal operators in Croatia's vicinity and reduces the otherwise significant tariff variability as a consequence of different levels of LNG terminal capacity lease in a 20-year period. Namely, tariffs greatly depend on actual and planned annual capacity lease of the LNG terminal, which was significantly higher than the results of the original binding Open Season procedure for capacity lease used for the calculation of indicative tariffs established by the *Decision on indicative tariffs for the reception and dispatch of liquefied natural gas (Official Gazette No. 56/18)* in June 2018.

Pursuant to the decisions, the tariffs have been established for the reception and dispatch of liquefied natural gas for the LNG terminal operator LNG Hrvatska d.o.o. They are the same for all years of the first regulatory period 2021 – 2025 and amount to EUR 1.17/MWh, which is 15.8% lower than the indicative tariff of EUR 1.39/MWh.

In December 2020, in accordance with the *Methodology for setting the price of non-standard services for gas transmission, distribution, storage, the reception and dispatch of liquefied natural gas, and gas supply as a public service (Official Gazette Nos. 48/18 and 25/19)*, HERA also adopted the *Decision on the prices of non-standard services of liquefied natural gas terminal operators (Official Gazette No. 144/20)* for the regulatory period 2021 – 2025, determined in line with the average work hour cost in the amount of HRK 270 per hour net of VAT.

5.2.3 Gas storage

Gas storage is a regulated energy activity performed as a public service. The gas storage system operator in Croatia is the energy entity PODZEMNO SKLADIŠTE PLINA d.o.o., which uses UGSF Okoli for natural gas storage.

UGSF Okoli consists of underground gas reservoirs (geological formations), operating and control wells, and an 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 gas storage system[80] for the working volume amounts to 4,700,000 MWh, the withdrawal capacity amounts to 2,116 MWh/h (50,784 MWh/day), while the injection capacity amounts to 1,587 MWh/h (38,088 MWh/day).

In 2020, a total of 3,155,476 MWh of natural gas were injected into UGSF Okoli, and 4,062,206 MWh of natural gas were withdrawn. There were several operating cycles in UGSF Okoli in 2020: two periods of gas withdrawal, two stand-by periods, and one period of gas injection. The day marking the end of the first 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 8 April 2020, when the working volume was 1,380,442 MWh. The final gas withdrawal cycle started on 17 October 2020, when the working volume was 4,439,655 MWh, which was also the highest working volume of UGSF Okoli in 2020. Natural gas stocks at UGSF Okoli on specific dates in 2020 are shown in Figure 5.2.8. The largest gas withdrawal capacity achieved in 2020 was 2,103 MWh/h, while the largest gas injection capacity achieved was 1,587 MWh/h.

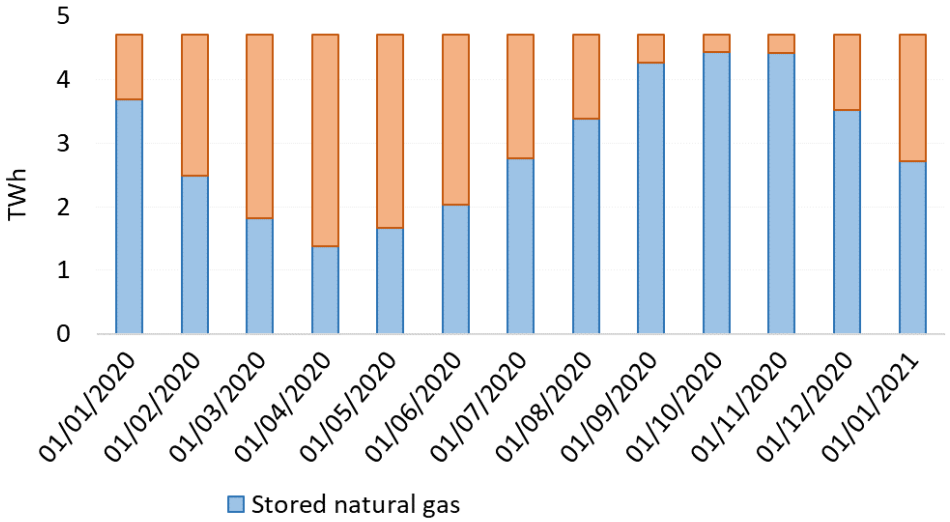


Figure 5.2.8 Natural gas stocks at USGF Okoli on specific dates in 2020

An overview of gas storage indicators for the years from 2017 to 2020 is shown in Table 5.2.3.

Table 5.2.3 Overview of gas storage indicators for the years from 2017 to 2020

Indicators	2017	2018	2019	2020
Working volume capacity of the storage facility (TWh)	5	5	5	5
Technical working volume capacity of the storage facility (SBU)	101	101	101	94
Maximum used working volume capacity of the storage facility (SBU)	96	95	100	90
Gas withdrawal capacity (MWh/h)	2,274	2,274	2,274	2,116
Gas injection capacity (MWh/h)	1,705	1,705	1,705	1,587

The following investments were started or completed in 2020:

- continuation of activities on the construction of the new underground gas storage facility in the "*Grubišno Polje*" production field, especially the following:

80 *The technical capacity of the gas storage system 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.*

  - identification of a production field suitable for the construction of the underground gas storage facility "Grubišno polje",
  - obtained final location permit for the underground gas storage facility development project,
  - preparation of the design for the development and production at the Grubišno Polje underground gas storage facility,
  - conclusion of a preliminary contract for the connection to the transmission system with the transmission system operator Plinacro d.o.o., and
  - resolved issues related to property rights of private owners of the land on which the facilities and structures of UGSF Grubišno polje is to be built,
- continued implementation of the project connecting UGSF Okoli to the public access network via optical fibre cables for the purpose of ensuring steady and reliable telecommunications for the needs of the control room, and installation of a server, dispatch software, and communication channels with the transmission system operator Plinacro d.o.o. The connection to the public access network is established by installing optical fibre cables from UGSF Okoli to the pressure reducing metering station Ludina (Plinacro) and by leasing two optical fibres from the Ludina node to the town of Ivanić Grad, where there is a redundant access point to the public access network of the Croatian Telecom. By the end of 2020 the optic fibre cable has been installed in full, and all other equipment was installed and tested in line with the contract concluded with the contractor. In addition, surveys of the as-built state were carried out and the project documentation required for submitting the use permit request was completed,
- update of the technical security system at UGSF Okoli with the purpose of improving the most critical points in the existing system. The system upgrade ensures the detection of unauthorised entry into the facility, the control of entry into critical areas and parts of the facility, and provision of warning and/or information signs. The video surveillance system is upgraded so that it covers the perimeter of the facilities in addition to the process part. Video surveillance has also been introduced in the corridors of the management building in Zagreb. The works include an upgrade of the firefighting and gas detection systems, and an expansion of the existing entry area.

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 – before 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 several users for the first time (four gas suppliers and the transmission system operator); and from 1 April 2017 onwards, when gas storage was used by 10 users (nine gas suppliers and the transmission system operator).

The gas storage system operator was obliged[81] to reserve a portion of the gas storage system capacity measured in standard bundled units (hereinafter: SBUs) for priority allocation to the supplier on the wholesale market from 1 April 2018 to 31 March 2020. Thus, from 1 April 2014 to 31 March 2017, the wholesale gas market supplier was allocated 70% of the total available capacity, whereas from 1 April 2017, during 2018 and 2019, and up to 31 March 2020 the number of SBUs allocated to the wholesale gas market supplier was reduced to 60% of the total available capacity.

In line with the provisions of the **Gas Market Act**, for the period from 1 April 2020 to 31 March 2021 the available SBUs were proportionally allocated by the gas storage

81 *Decision 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(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).*

system operator to public service suppliers, based on historic data on delivered gas quantities.

In June 2020 and in line with the *Storage Code (Official Gazette Nos. 50/18 and 26/20)*, the storage system operator allocated 54 available standard bundled units which were placed on the market for the contract period from 1 April 2021 to 31 March 2026.

The allocation of SBUs per user and displaying the three largest gas storage system users during those periods is shown in Figure 5.2.9.

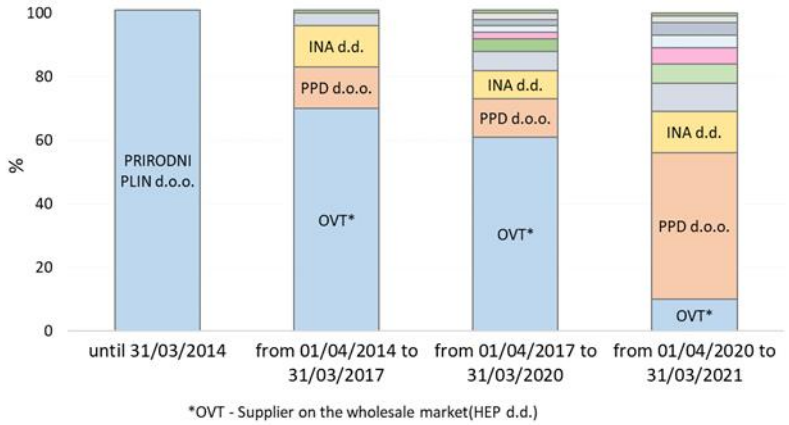


Figure 5.2.9 Allocation of UGSF Okoli gas storage capacities (standard bundled units)

To adapt to market demands and the new balancing rules, the gas storage system operator enabled gas storage system users to submit a higher number of re-nominations for the use of storage capacities during the gas day, to change direction of the flow, and change storage operating cycles.

Gas storage regulation

In addition to the **Gas Market Act** and other regulations applicable to the energy sector, gas storage activities are also governed by the *Methodology for setting tariffs for gas storage (Official Gazette No. 48/18).* The *Methodology* is based on the method of incentivised regulation, which entails establishing a maximum allowed revenue for the gas storage system operator. According to the *Methodology*, the allowed operating expenses of the operator are determined by applying incentive mechanisms based on efficiency coefficients and allocation of actual savings. The allowed capital expenses are determined in line with the allowed depreciation of regulated assets and allowed rate of return on regulated assets. The *Methodology* provides for the use of the regulatory account as a separate model for incentivised regulation of gas storage activities which, in case of operators planning significant investments in the development of the gas storage system, enables a suitable long-term return on sensibly invested assets under specific conditions. The *Methodology* also includes the component of economic efficiency of the operator's existing assets and provides for the possibility of determining the justified value of long-term tangible and intangible assets based on an analysis of the economic efficiency of the operator's assets and a comparative analysis of the costs and the efficiency of operator's activities in Croatia and its vicinity.

The regulatory period is a multi-annual period in the duration of five years, and allowed revenues and tariffs are determined separately for each year of the period. The conditions for the operation of gas storage facilities are defined by the *Storage Code (Official Gazette Nos. 50/18 and 26/20)*, which was amended in early 2020 for the purpose of its harmonisation with the **Gas Market Act** in the part concerning the procedure for the proportional allocation of storage capacities for gas supply as a public service.

Gas storage price

In 2020, the price of gas storage was established by the *Decision on tariffs for gas storage (Official Gazette No. 122/16)*, which was adopted by HERA in line with the *Methodology for setting tariffs for gas storage*. Pursuant to that *Decision*, which specifies tariff items for gas storage in the second regulatory period 2017 – 2021, the average tariff amounts for gas storage in 2020 were lower by 1.1% when compared to 2019. Figure 5.2.10 shows tariff amounts net of 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.

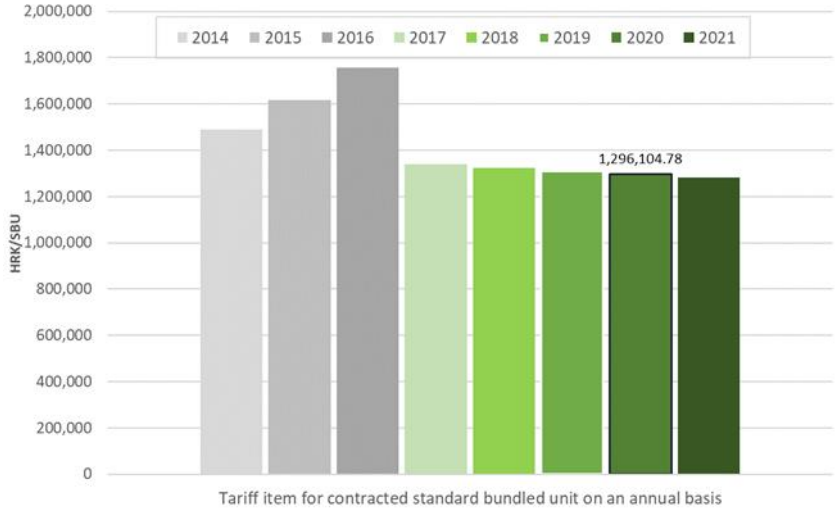


Figure 5.2.10 Tariff amounts net of VAT for contracted annual SBUs for the first and second regulatory periods 2014–2021

The total calculated fee based on the tariff item for the contracted annual SBUs accounted for 98.5% of the total gas storage fees charged to users by the gas storage system operator in 2020, while the remaining 1.5% 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 2020, gas distribution activities in Croatia were performed by 33 energy entities (distribution system operators), compared to 2019, when there were 35 distribution system operators. The drop is a result of a 2020 status change following the acquisition of energy entities PPD – Distribucija plina d.o.o., Vukovar and PLIN-VTC d.o.o., Virovitica by the energy entity HEP-PLIN d.o.o., Osijek.

According to data collected by HERA from 33 distribution system operators, the total quantity of gas distributed[82] in Croatia in 2020 amounted to 11,309 million kWh, which is a 3.6% increase in comparison to the total quantity distributed in 2019. The largest quantities were distributed to TM2 (4,319 million kWh), TM5 (1,245 million kWh), and TM3 (1,086 million kWh) tariff model users.

The total number of billing metering points for final customers connected to the distribution system in 2020 was 684,936, which was an increase of 0.7% compared to the total number of billing metering points in 2019. Out of that number, 679,390 billing metering points were under TM1–TM4 tariff models in 2020 (with an annual consumption

82 *Natural gas and non-standard gas.*

up to 100,000 kWh), and 5,546 were under TM5–TM12 tariff models (with an annual consumption exceeding 100,000 kWh).

The total length of all gas distribution systems in Croatia was 19,787 km at the end of 2020, which represents a 0.6% increase compared to 2019, according to data collected from distribution system operators. Out of the total length of the distribution systems, low-pressure gas pipelines accounted for 16.0%, medium-pressure gas pipelines accounted for 77.4%, and high-pressure gas pipelines accounted for 6.6%. In terms of construction material, 15.9% of the total distribution system at the end of 2020 was made of steel pipes, 82.2% was made of polyethylene pipes, and 1.9% was made of other materials. There were 130 odourisation stations in all distribution systems at the end of 2020. A comparison of the length of distribution systems, total technical capacity of entries into distribution systems, and gas losses by distribution system operator in Croatia in 2020 is shown in Figure 5.2.11. The geographical layout of the distribution system operators' distribution areas in 2020 is shown in Figure 5.2.12.

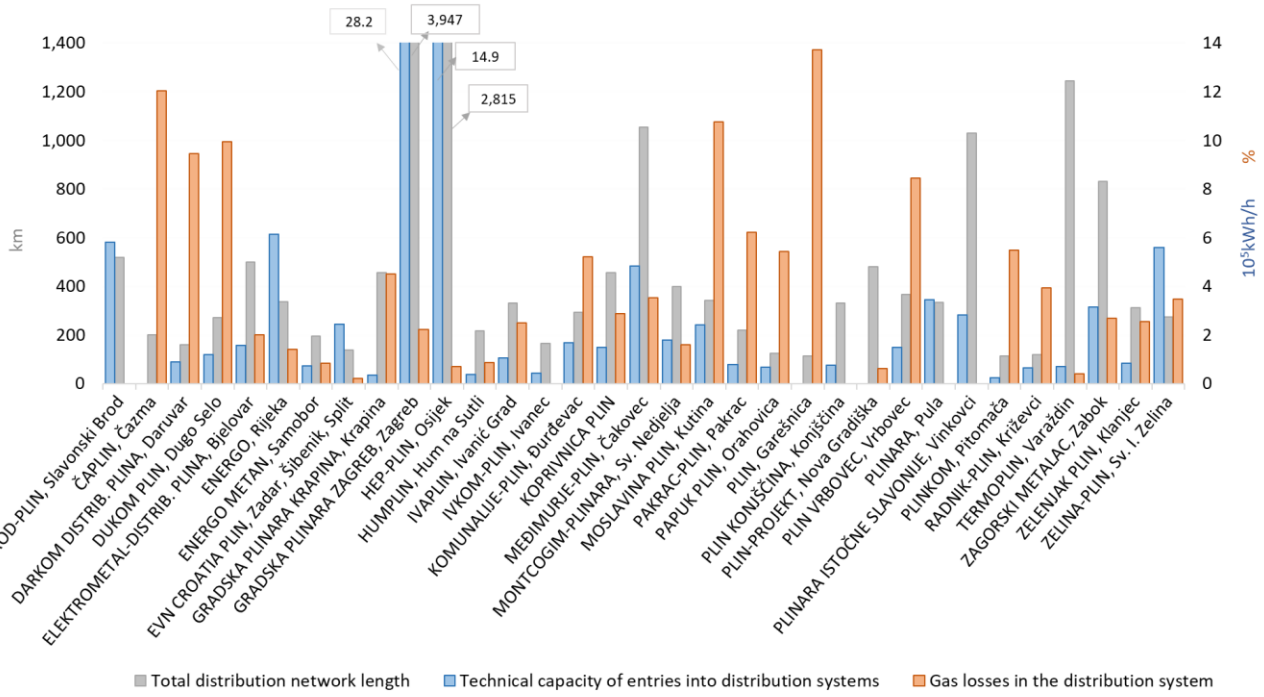


Figure 5.2.11 Comparison of the length of distribution systems, total technical capacity of entries into distribution systems, and gas losses by distribution system operator in Croatia in 2020

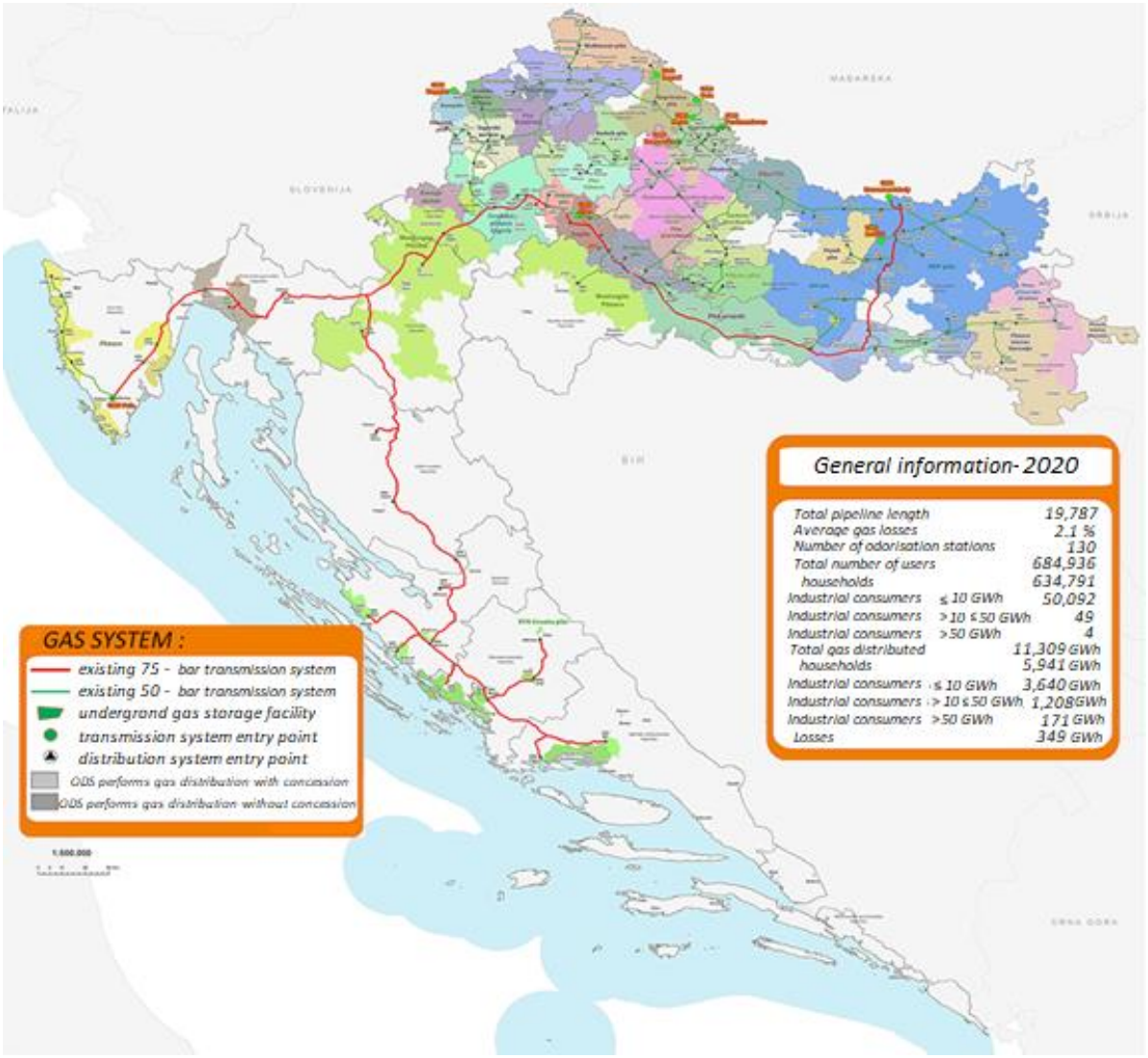


Figure 5.2.12 Distribution areas of the distribution system operators and basic information on gas distribution activities in Croatia in 2020

An overview of gas distribution indicators per year for the period from 2017 to 2020 is shown in Table 5.2.4.

Table 5.2.4 Overview of gas distribution indicators per year for the period from 2017 to 2020

Indicators	2017	2018	2019	2020
Number of distribution system operators	35	35	35	33
Total length of the distribution network (km)	19,091	19,448	19,673	19,787
Total quantity of gas distributed (GWh)	11,173	11,071	10,914	11,309

Gas distribution regulation

In addition to the **Gas Market Act** and other regulations applicable to the energy sector, gas distribution activities are also governed by the *Methodology for setting tariffs for gas distribution (Official Gazette No. 48/18).* This *Methodology* is based on a method for establishing the maximum allowed revenue for the gas distribution system operator in a regulatory period. The tariff items for gas distribution for all billing metering points in the same tariff model and within the distribution system managed by an individual operator are the same, regardless of the length of the distribution path (the postmark principle). According to the *Methodology*, allowed operating expenses are set by applying incentive mechanisms based on efficiency coefficients and allocation of actual savings, whereas

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 to approving investments in line with the development plan for the distribution system, as well as by an *ex post* review of realised investments.

The *Methodology* also provides for the possibility of determining the justified value of long-term tangible and intangible assets based on an analysis of economic efficiency and a comparative analysis of the costs and efficiency of distribution system operator activities in Croatia and its vicinity. Upon the expiry of a regulatory period, allowed revenues are revised, including operating and capital costs, and revenues generated from tariffs are compared with the revised allowed revenues. Any differences are included in the calculation of allowed revenues for the following regulatory period.

The *Methodology* also provides for the use of the regulatory account as a model for the regulation of gas distribution activities, which enables the operators planning significant investments in the development of new or existing distribution systems to recover some of the revenues, which are lower in the early years of the investment, in the later years of the regulatory account.

The regulatory period for gas distribution is a multi-annual period in the duration of five years, where allowed revenues and tariffs are determined separately for each year of the period. The second regulatory period, which started on 1 January 2017 and ends on 31 December 2021, is currently under way.

The *Methodology* classifies billing metering points into 12 tariff models according to annual gas consumption. An overview of the tariff models is shown in Table 5.3.3. 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.

Gas distribution prices and the connection charge

In 2020, the gas distribution price was determined according to the *Decision on gas distribution tariff amounts (Official Gazette No. 127/17)* and the *Decision on gas distribution tariff amounts for the energy entity HEP-PLIN d.o.o., Cara Hadrijana 7, Osijek (Official Gazette No. 94/20)*.

The total average weighted price of gas distribution in the period from 1 January to 31 December 2020 for all distribution system operators in Croatia was HRK 0.0501 per kWh, which is a 2.5% increase compared to 2019, when the price after calculating the actual distributed gas quantities amounted to HRK 0.0489 per kWh.

Average gas distribution tariffs net of VAT for the period 2018 – 2020 per distribution system operator in Croatia are shown in Figure 5.2.13.

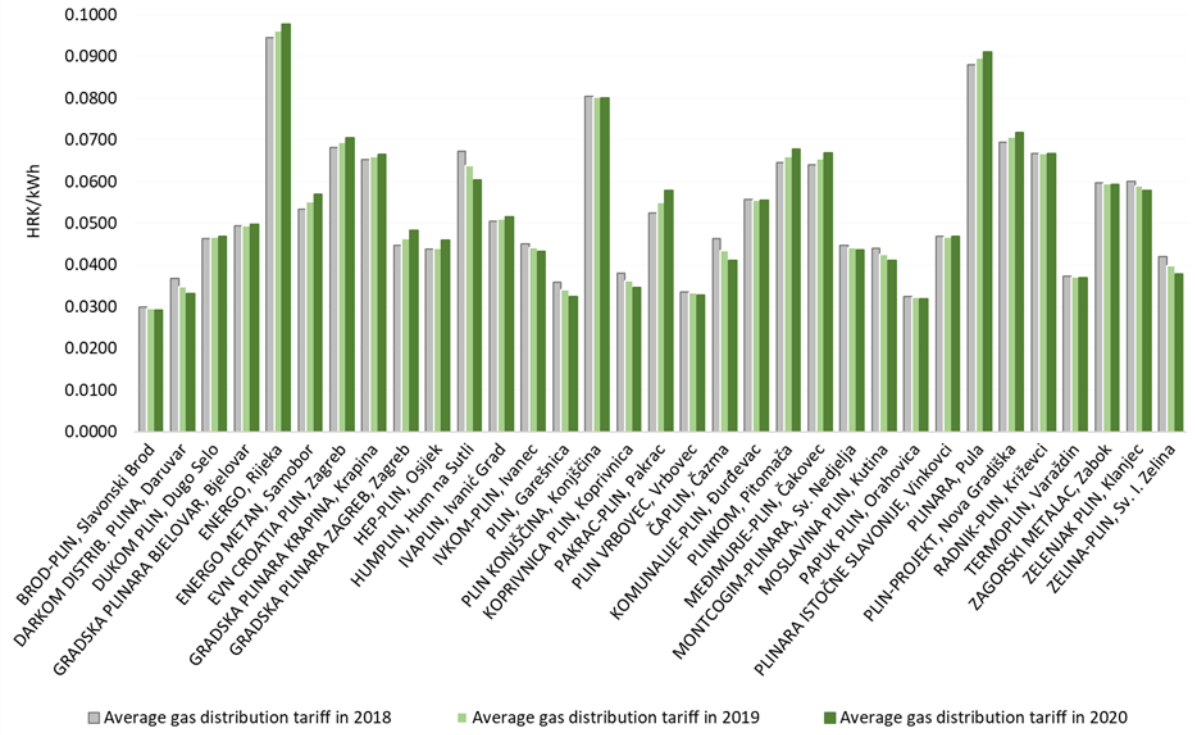


Figure 5.2.13 Average gas distribution tariffs net of VAT in 2020 compared to 2019 and 2018 per distribution system operator in Croatia

The connection charge to the gas distribution system is based on the *Methodology for calculating the charge for the connection to the gas distribution or gas transmission system and for connection capacity increase (Official Gazette No. 48/18)*. This *Methodology* also specifies the categories of connections to the gas distribution system, work complexity groups, the manner, elements, and criteria for the calculation of the charge for the connection to the gas distribution system and for connection capacity increase, the procedure for requests to determine or change the connection charge, as well as the adoption, publication and application of the connection charge. In addition to the categories of connections and accompanying coefficients, the *Methodology* specifies the number of work hours required for the completion of connections to the distribution system for specific user category complexity groups.

The connection charge comprises the cost of fulfilment of unplanned technical requirements in the distribution system and the cost of connection itself. It is charged directly to the investor who submitted the request for the service, and its amount depends on the complexity of works.

The distribution system operator calculates the charges for the above services in the current regulatory period based on HERA's *Decision on the charge for the connection to the gas distribution or transmission system and for connection capacity increase for the regulatory period 2017 – 2021 (Official Gazette No. 122/16)* from 16 December 2016.

According to the information that HERA collected from 33 distribution system operators, the total number of billing metering points for final customers connected to the distribution system increased in 2020 by 0.7% when compared to the total number of billing metering points in 2019. This means that the total corresponding revenue in 2020 should roughly be equal to the revenue generated in 2019, when the total revenue from connection and capacity increase charges amounted to HRK 24 million, which is 3.4% of the total business revenues of all distribution system operators in 2019.

5.2.5 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 the vertically integrated energy entity, must be organised in legal entities that are separate from other activities in the gas sector.

In 2020, 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 2020, gas was distributed by 33 energy entities; out of 51 energy entities licensed for gas supply, only 41 actively performed the activity. Out of a total of 33 operators, 11 distribution system operators were organised as independent legal entities engaged only in gas distribution, whereas 22 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 31 March 2021, with respect to their energy activities and unbundling requirements pursuant to the **Gas Market Act**, is shown in Figure 5.2.14.

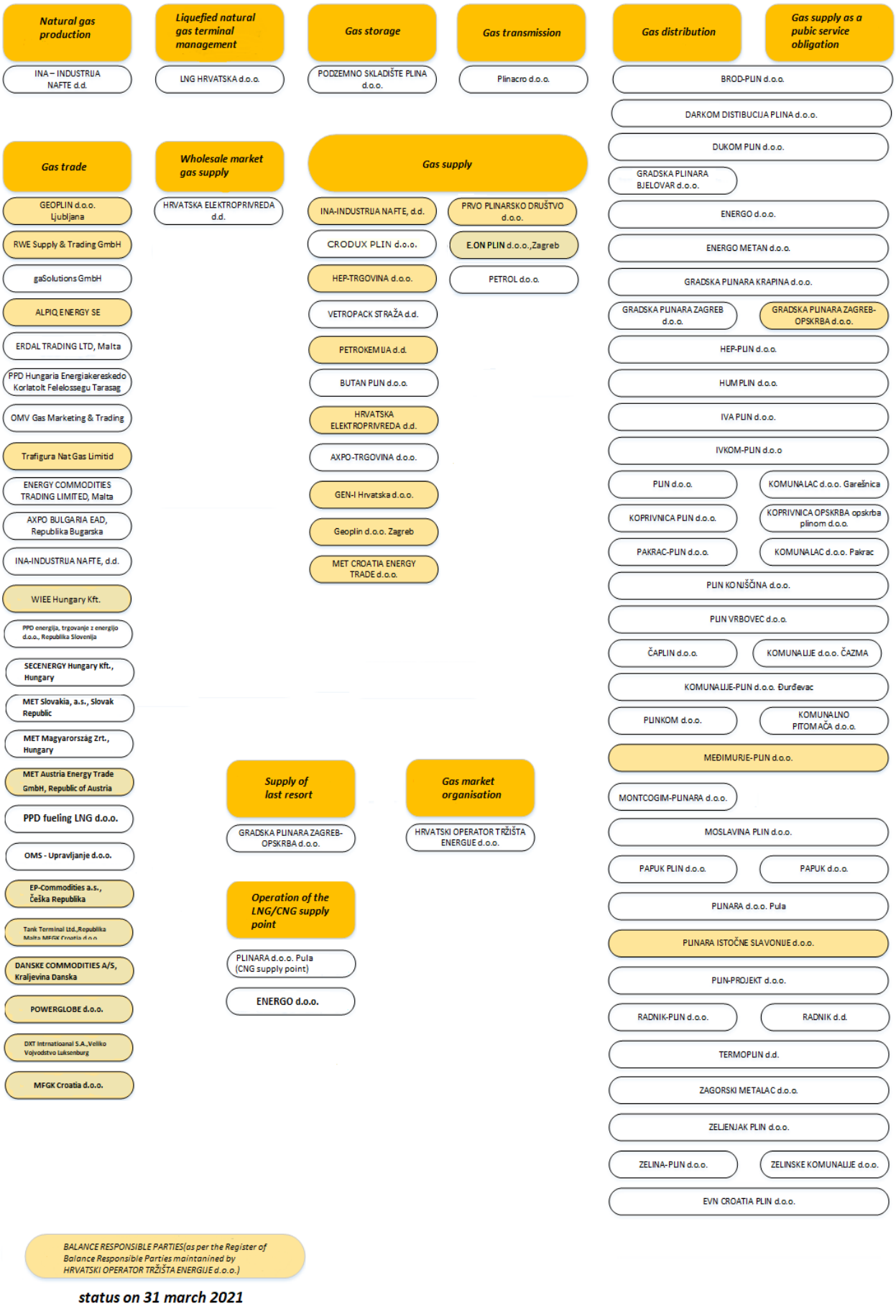


Figure 5.2.14 Structure of energy entities by their role in the Croatian gas market

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, in 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 for the certification of an operator:

- 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 to HERA an application for certification as a gas transmission system operator according to the unbundled ownership model. PLINACRO d.o.o. subsequently withdrew its application in April 2015, only to resubmit it in June 2015 according to the same model. By 2020 the application was supplemented several times to meet the missing requirements, primarily the separation of public bodies which at the same time control both PLlNACRO d.o.o. and one of the entities engaged in the production, trade and supply of electricity, and natural gas production. The final (supplemented) application for the certification of the transmission system operator according to the unbundled ownership model in line with the provisions of the **Gas Market Act** was submitted to HERA on 24 November 2020. Following the final supplemented application and HERA's continued cooperation with PLINACRO d.o.o., on 22 March 2021 HERA adopted the *Draft decision on the certification granted to PLINACRO d.o.o.*, as a transmission system operator with unbundled ownership, which was also submitted to the European Commission for its opinion.

5.3 Competitiveness and functioning of the natural gas market

Natural gas balance

In 2020, the total quantity of the natural gas which entered the transmission system amounted to 32,481 million kWh, which was 5.4% more than in 2019. Out of the total quantity, 6,675 million kWh or 20.6% of natural gas came from domestic production, which is 18.5% less than in the previous year; 20,821 million kWh or 64.1% of the total transported quantity of natural gas entered the transmission system from imports, which is 7.1% more than in 2019; and 4,985 million kWh or 15.3% of the total transported quantity of natural gas entered the transmission system from UGSF Okoli,, which is 57.2% more than in 2019 (Figure 5.3.1).

The total gas quantity that exited the transmission system in 2020 amounted to 32,481 million kWh, which is 5.4% more than in 2019. Out of these quantities, final customers directly connected to the transmission system received 17,117 million kWh or 52.7% of natural gas, which is 9.8% more than in the preceding year; 11,309 million kWh or 34.8% of natural gas were delivered to final customers connected to the distribution system, which is 3.6% more than in the preceding year, and 4,055 million kWh or 12.5% of the total quantity of natural gas were delivered to UGSF Okoli, which is 5.9% less than in 2019.

According to the data obtained from gas suppliers in Croatia, a total of 10,960 million kWh of natural gas were delivered to final customers in 2020 from the distribution systems, of which 5,941 million kWh (54.2%) were delivered to households and 5,019 million kWh (45.8%) to industrial final customers.

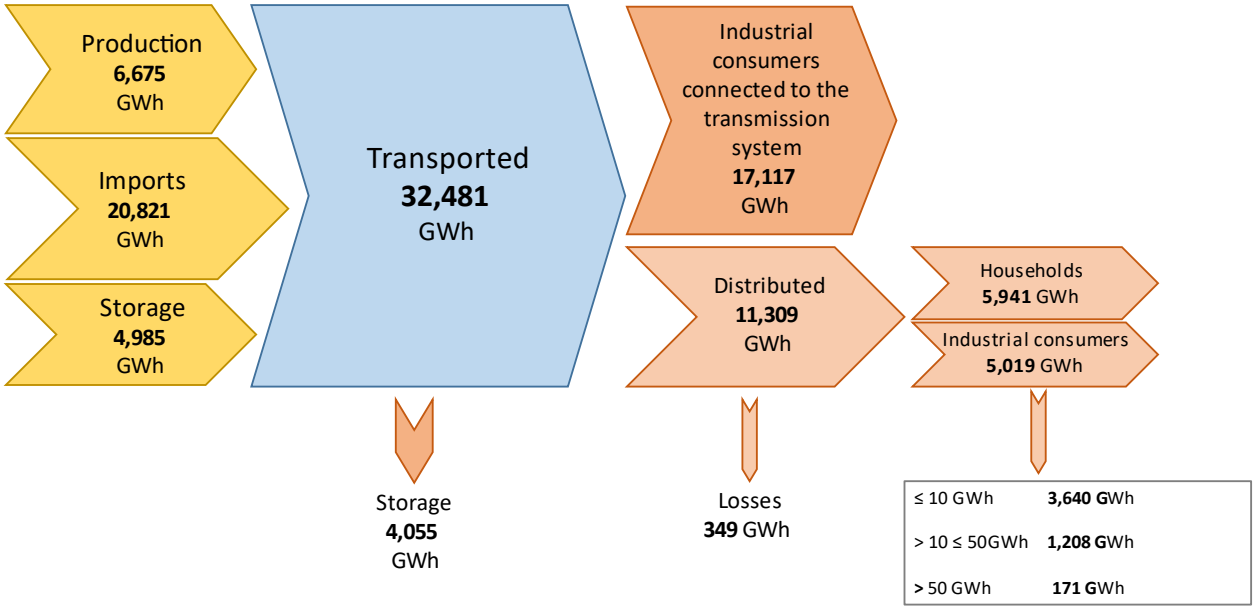


Figure 5.3.1 Natural gas balance in Croatia in 2020

In 2020, requests for transmission system capacity booking were submitted by 45 transmission system users, i.e. gas suppliers organised in 11 balance groups. The shares of individual balance groups in the quantity of transported gas for transmission system exit groups were as follows: the balance responsible party HEP Trgovina d.o.o. accounted for 27.6% of gas offtaken from the transmission system, the balance responsible party PRVO PLINARSKO DRUŠTVO d.d. accounted for 22.2% of gas, the balance responsible party INA d.d. accounted for 20.2% of gas, the balance responsible party HEP d.d. accounted for 10.2% of gas, and the remaining 7 balance groups accounted for 19.8% of gas offtaken from the system. The shares of individual balance groups in total natural gas quantities delivered at exits from the transmission system in 2020 are shown in Figure 5.3.2.

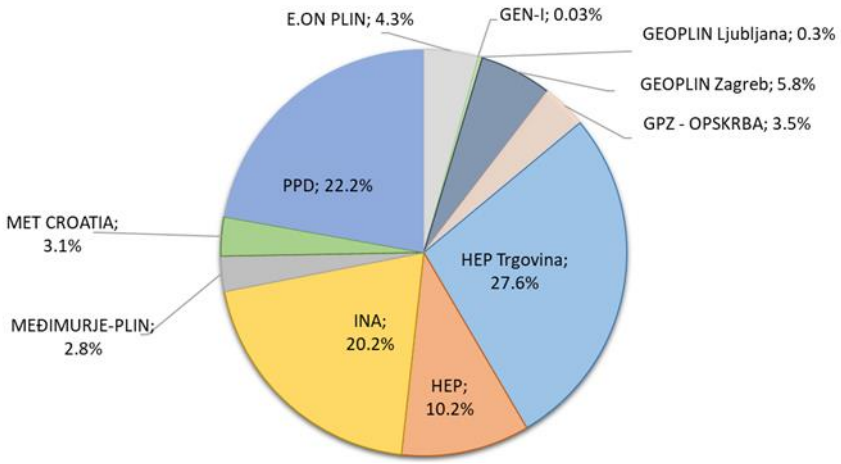


Figure 5.3.2 The share of balance groups in total natural gas quantities offtaken at exits from the transmission system in 2020

5.3.1 Wholesale natural gas market

Indicators of wholesale market development

The wholesale gas market in Croatia is organised according to the balance group model. Balance groups are 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.

Performance indicators of the wholesale market are reflected in a 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 sound market competition.

HHI measures the level of market concentration and is the most commonly used indicator for determining the concentration of market power. A higher HHI indicates high concentration and measures the market share held by a few of the largest suppliers. A market with an HHI score below 2,000 is considered as a competitive market in which none of the participants has a dominant influence. According to HERA's data for 2020, the HHI score for the Croatian wholesale gas market (excluding sales for supply under public service obligation) was 2,699, compared to 2,729 for 2019, which is an indicator of the relative dominance of a small number of suppliers on the wholesale gas market. The HHI trend of the Croatian wholesale gas market in the period from 2011 to 2020 is shown in Figure 5.3.3.

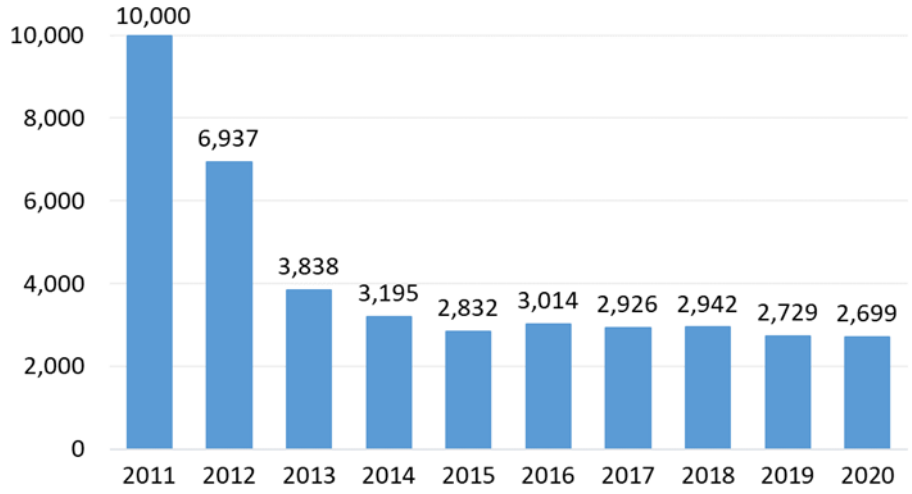


Figure 5.3.3 HHI trend of the Croatian wholesale gas market in the period 2011–2020

The number or diversity of gas supply sources is another indicator of the wholesale market development. According to HERA's data for 2020, gas in Croatia was mostly purchased from three sources – from domestic production, imports from Russia, and imported gas bought on gas exchanges, which is an indicator of a healthy competition and security of supply.

Another indicator used to evaluate the wholesale market development is the Residual Supply Index (RSI), a measure determining the relation between the sum of supply capacities of all but the largest supplier, and the total market demand. The RSI measures the market's dependence on the largest supplier by analysing the availability of alternative suppliers to avoid its full reliance or meeting its demands being placed on its largest supplier. An RSI equal to or higher than 110% indicates that the market can survive

without its largest supplier. According to ACER's report for 2019 (*ACER Market Monitoring Report 2019 – Gas Wholesale Market Volume*), the RSI in Croatia was above 110%, the same as in the period from 2013 to 2017, which indicates that the market does not depend on its largest gas supplier. According to HERA's calculations, in 2020 the RSI was also higher than 110%.

An overview of wholesale gas market indicators per year for the period from 2017 to 2020 is shown in Table 5.3.1.

Table 5.3.1 Overview of wholesale gas market indicators per year for the period from 2017 to 2020

Indicators	2017	2018	2019	2020
Total volume produced in Croatia (GWh)	11,193	9,664	8,194	6,675
Gas imported to Croatia (GWh)	17,955	15,535	19,442	20,821
Quantity of gas from storage facility (GWh)	3,191	4,342	3,172	4,985
Gas available for sale on the Croatian market (GWh)	32,340	29,541	30,807	32,481
Total quantity of gas sold on the wholesale market (GWh)	20,687	26,117	27,086	28,447
out of which: on the Croatian market (GWh)	20,459	25,963	26,275	26,629
exported from Croatia (GWh)	228	154	811	1,818
Number of gas supply sources	3	3	3	3
Number of active suppliers (balance responsible parties) on the wholesale market	11	13	13	10
Shares of the largest balance responsible parties on the wholesale market:				
HEP (HEP Trgovina and HEP d.d.)	52%	59%	49%	38%
INA	19%	15%	20%	20%
PRVO PLINARSKO DRUŠTVO	17%	12%	14%	22%
Others (less than 6%)	12%	14%	17%	20%

A significant component of Croatia's wholesale gas market is gas trade carried out at the virtual trading point (VTP). VTP is a gas trading place 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. There were eight active balance responsible parties at the VTP in 2020, which traded a total of 21,726 million kWh of gas (6.1% less than in 2019), as shown in Figure 5.3.4.

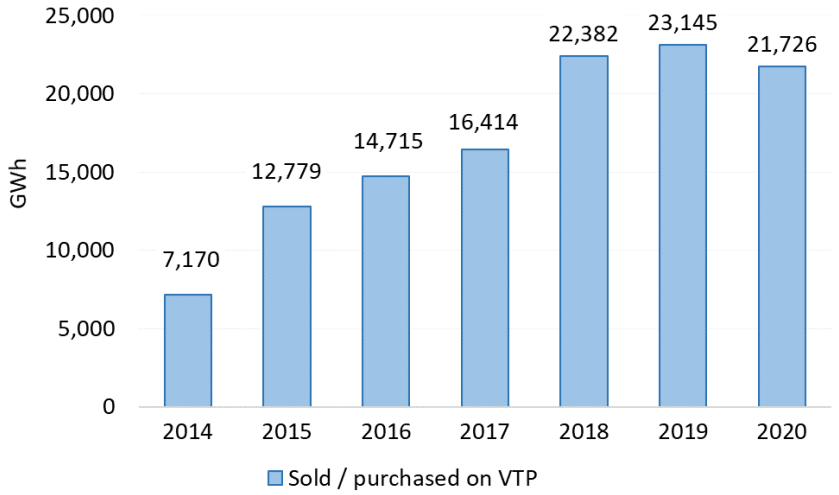


Figure 5.3.4 Gas quantities traded at the virtual trading point (VTP) in the period 2014–2020

In addition to trading at the VTP, transactions on the wholesale market in Croatia are also carried out at the trading platform. More specifically, an electronic gas trading platform

was established in accordance with *Regulation No 312/2014*, where all balance responsible parties and the transmission system operator may trade in 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, managed by HROTE d.o.o., enables transparent, non-discriminatory and anonymous trading. Since the establishment of the trading platform, i.e., since the full implementation of *Regulation No 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.

Gas prices on the wholesale market

The wholesale component of the gas price for household final customers using the public service, or the reference gas price which is the highest price at which the wholesale market supplier can sell gas to public service suppliers, is regulated and established in the decisions on tariffs for gas supply as a public service, and was HRK 0.1985 per kWh in the period from 1 January to 31 March 2020, and HRK 0.1924 per kWh in the period from 1 April to 31 December 2020. HEP d.d., as an appointed wholesale market supplier, applied the reference gas price of HRK 0.1825 per kWh, which is 5.1% lower than the reference gas price established by HERA and at the same time 8.1% lower than the reference gas price from the preceding period. In line with the provisions of the **Gas Market Act**, as of 31 March 2021 the function of the wholesale gas market supplier was abolished, along with the stipulation of the reference price of gas, which is the price at which the wholesale market supplier sells gas to public service suppliers for household final customers supplied under the public service obligation.

In 2020, HERA's questionnaire on gas supply and trade was again used to collect quarterly data from gas suppliers and traders in Croatia in order to monitor gas prices on the wholesale market. 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) on the wholesale market.

The average gas purchase price net of VAT on the wholesale market in 2020 (purchase under bilateral agreements, at the virtual trading point, on the trading platform, and from imports) was HRK 0.1216 per kWh, which is a decrease of 22.2% as compared to 2019, when it was HRK 0.1562 per kWh. In 2020, the average purchase price of gas on the market was the highest in Q1, when it was HRK 0.1383 per kWh, and the lowest in Q3, when it was HRK 0.0975 per kWh.

The average gas sale price net of VAT on the wholesale market in 2020 (sale under bilateral agreements, including trading at virtual trading points and sale on the trading platform, as well as exports from Croatia) was HRK 0.1346 per kWh, which is a decrease of 21% as compared to 2019, when the average price was HRK 0.1704 per kWh.

In 2020, a total of 10 gas suppliers and traders sold gas on the wholesale market. The highest average sale price on the wholesale market for individual gas suppliers and traders in 2020, including exports from Croatia, was HRK 0.1868 per kWh, while the lowest price was HRK 0.0831 per kWh.

Assessment of the functioning of the wholesale gas market

Based on the HHI, RSI and the number of gas supply sources as the most important indicators of the sound functioning of a wholesale market, it can be concluded that the wholesale gas market in Croatia still meets the parameters set in ACER's document *European Gas Target Model – Review and Update*, bearing in mind that the Croatian gas market is relatively small.

It is evident that due to the dominance of the three largest market participants (PRVO PLINARSKO DRUŠTVO d.o.o., GEOPLIN d.o.o., Ljubljana, and INA d.d., excluding HEP d.d. as a wholesale market supplier), other competing actors cannot realise their potentials, as reflected in a somewhat lower than in the previous year, but still high HHI score (2,699), pertaining to the share of balance groups in total natural gas quantities delivered at transmission system entries. Gas supply sources are diversified, and gas was mostly obtained from domestic production (INA d.d.), imported from Russia or purchased on the Austrian gas exchange. The RSI is still higher than 110%, which shows that the market is not dependent on just one source and that the security of supply is not threatened nor dependent on just one source of gas supply.

The construction of the LNG terminal, which became operational on 1 January 2021 and now provides supply route to Croatia, along with the increase of the level of diversification of gas supply sources, has increased competitiveness on the market and the security of supply.

5.3.2 Retail natural gas market

Quantities delivered to final customers

Transactions associated with the delivery of gas to customers, for the purpose of consumption by final customers, are made on the retail gas market. Gas supply is regulated by a contract between a final customer 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 2020 was as follows:

- 5,941 million kWh were delivered to household final customers[83] connected to the distribution system, which makes 21.2% of the total gas quantity delivered,
- 5,019 million kWh were delivered to industrial final customers connected to the distribution system, which makes 17.9% of the total gas quantity delivered, and
- 17,117 million kWh were delivered to industrial final customers connected to the transmission system, which makes 61% of the total gas quantity delivered.

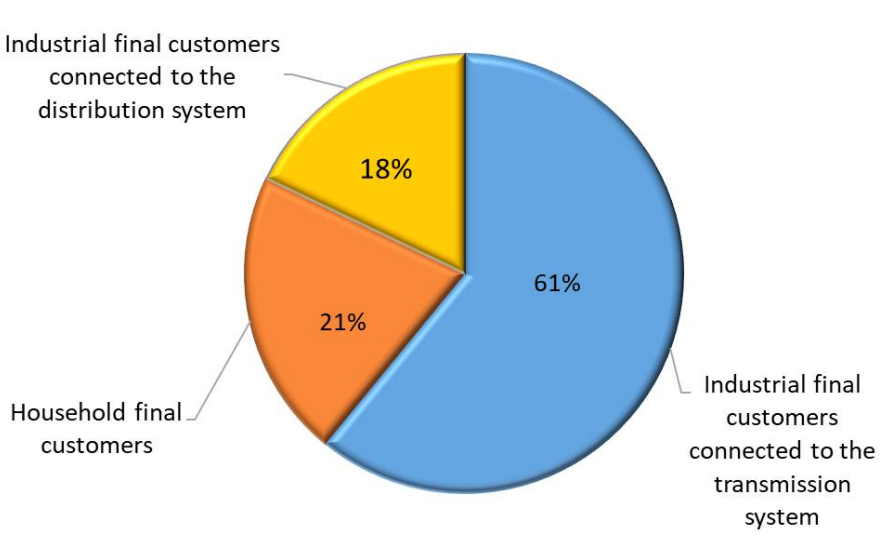


Figure 5.3.5 Structure of natural gas delivery from the transmission system in 2020

[83] *The household category includes household final customers using the public supply service and household final customers purchasing gas under market conditions.*

In 2020, the total gas quantity which gas suppliers delivered to final customers connected to the distribution system amounted to 10,960 million kWh. Out of these quantities, 5,941 million kWh of gas were delivered to household final customers, which is an increase of 2.8% as compared to 2019. A total of 5,019 million kWh of gas were delivered to industrial final customers connected to the distribution system, which is an increase of 1.7% as compared to 2019. A total of 17,117 million kWh of gas were delivered to final customers connected to the transmission system, which is an increase of 9.8% as compared to 2019.

The total number of final customers on the gas market at the end of 2020 was 684,955, of which 634,791 were household final customers, 50,145 were industrial final customers in the distribution system, and 19 were industrial final customers in the transmission system.

An overview of retail gas market indicators per year for the period from 2017 to 2020 is shown in Table 5.3.2.

Table 5.3.2 Overview of retail gas market indicators per year for the period from 2017 to 2020

Indicators	2017	2018	2019	2020
Total amount of gas sold on the retail market (GWh)	28,129	25,609	26,498	28,426
Of which: in the TS (GWh)	16,955	14,538	15,583	17,117
in the DS (GWh)	11,173	11,071	10,914	11,309
Remaining gas in storage on 31 Dec (GWh)	4,211	3,932	4,310	4,055
Out of total gas volume of gas sold in the DS: to households (GWh)	6,017	5,865	5,781	5,941
to industrial customers (GWh)	4,822	5,035	4,933	5,019
Losses in the DS (GWh)	334	171	200	349
Total number of final customers on the retail market (industrial and household)	662,864	671,737	679,997	684,955
Out of which: in the distribution system	662,845	671,716	679,976	684,936
in the transmission system	19	21	21	19
Total number of registered suppliers during the year	46	45	45	51
Out of which active suppliers	45	45	44	41
Total number of registered traders during the year	7	10	12	25
Out of which active traders			1	1
Specified time frame for supplier switching procedure (in days)	15	15	15	15
Average duration of supplier switching procedure (in days)	10	8	4	4
Supplier switching rate (per BMP)	2%	1%	1%	5%
Supplier switching rate according to distributed gas quantities (kWh)	6%	6%	7%	11%
Number of completed supplier switches (per BMP)	13,619	7,088	7,728	31,409
Number of terminated supplier switches (per BMP)	8,345	6,746	5,704	2,465

Indicators of retail gas market development

The HHI score for the retail market for industrial final customers in 2020 was 2,093, which is somewhat higher than in the previous year. In terms of competitiveness, this is still a good level of participation of all suppliers in the total gas trade on the retail market. The HHI trend for the Croatian retail gas market in the industrial segment in the period from 2011 to 2020 is shown in Figure 5.3.6.

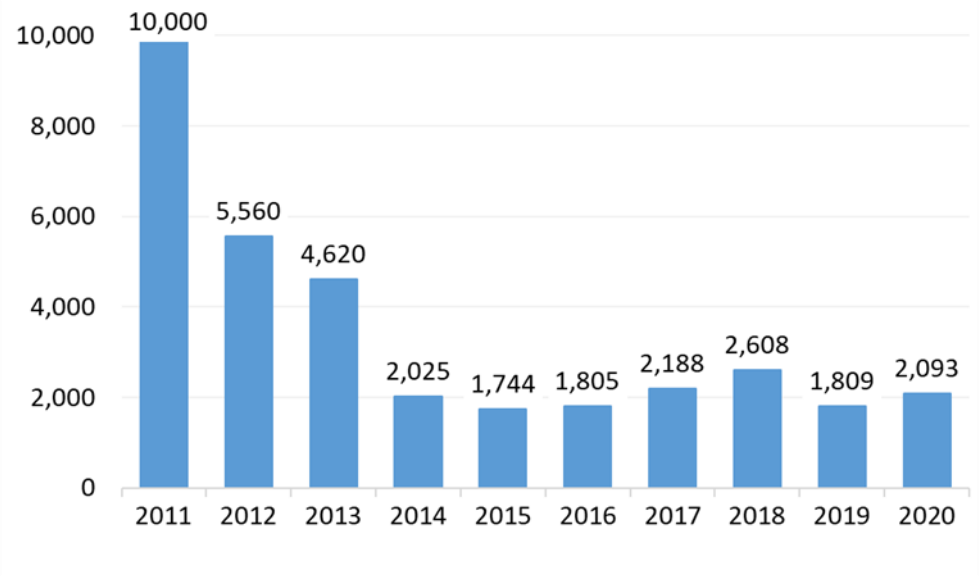


Figure 5.3.6 Overview of HHIs on the Croatian retail gas market for industrial final customers in the period 2011–2020

In addition to the concentration of market power, another important indicator of retail market development and effective retail market competition includes the 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 by supervising actions taken by energy entities during supplier switches and issues decisions on handling complaints (binding decisions, non-binding proposals for action, opinions).

The possibility of supplier switching and the awareness of final customers about the possibility of supplier 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 switching suppliers at the request of final customers.

According to the data on supplier switching collected by HROTE, 31,409 supplier switches were completed in 2020, which is 306.4% more than in the year before.

Compared to 2019, a significant rise in the number of supplier switches was recorded in 2020 for final customers that are entitled to supply under the public service obligation, with 27,988 completed supplier switches for final customers from the above category, which accounts for 89% of the total number of completed supplier switches. The switches, most of which occurred from April to May, and from November to December 2020, were mostly internal supplier switches, where the gas suppliers that are also suppliers under the public service obligation have contracted public gas supply service under market conditions with their household final customers. The rise in the number of supplier switches in the end of 2020 was largely influenced by the public tender for the selection of gas suppliers under the public service obligation for the period from 1 April 2021 to 30 September 2024. In the distribution areas where new public service gas suppliers were selected, some of the final customers who are entitled to the public service discontinued its use and transitioned from regulated conditions to gas supply under market conditions.

The proportion of gas distributed to final customers who have switched gas suppliers in 2020 was 10.7% (1,178 million kWh) of the total distributed quantity of gas (10,960 million kWh), while the share of successful supplier switches per BMPs (31,409) accounts for 4.6% of the total number of billing metering points (684,936) (Figure 5.3.7).

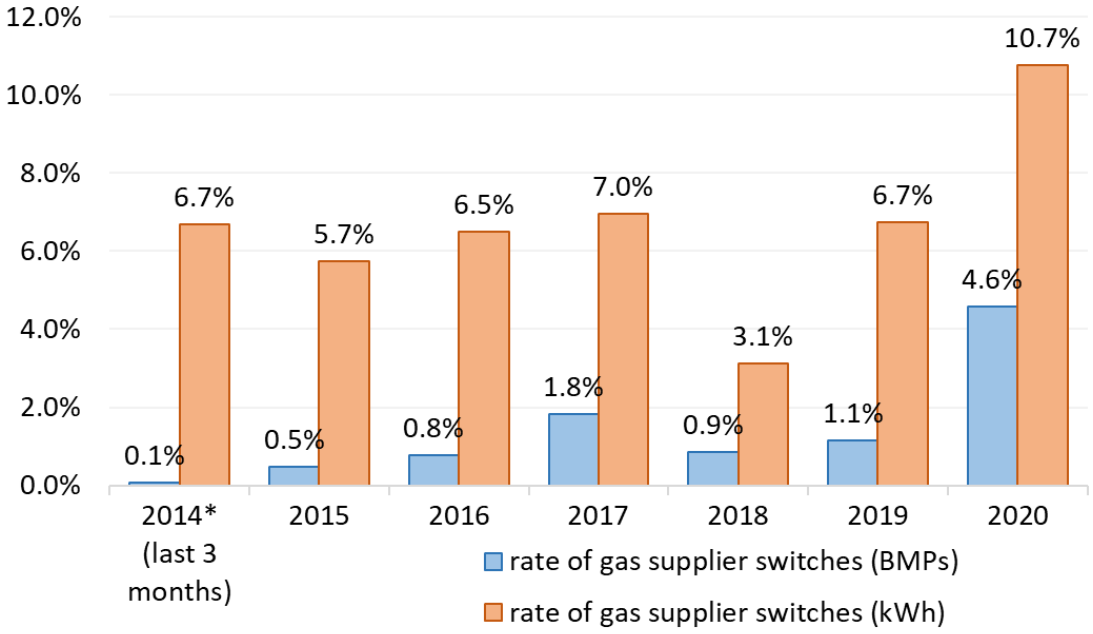


Figure 5.3.7 Rates of gas supplier switches per billing metering points (BMPs) and distributed gas quantities (kWh) since the beginning of retail market liberalisation in Croatia

In 2020, 2,465 supplier switching procedures were terminated, which is 56.8% less than in the previous year. An overview of complaints received concerning the behaviour of market participants is shown in Chapter 5.3.6 on Consumer protection. The reasons for the termination of supplier switching procedures are related to outstanding bills owed to current suppliers and withdrawals of final customers 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.

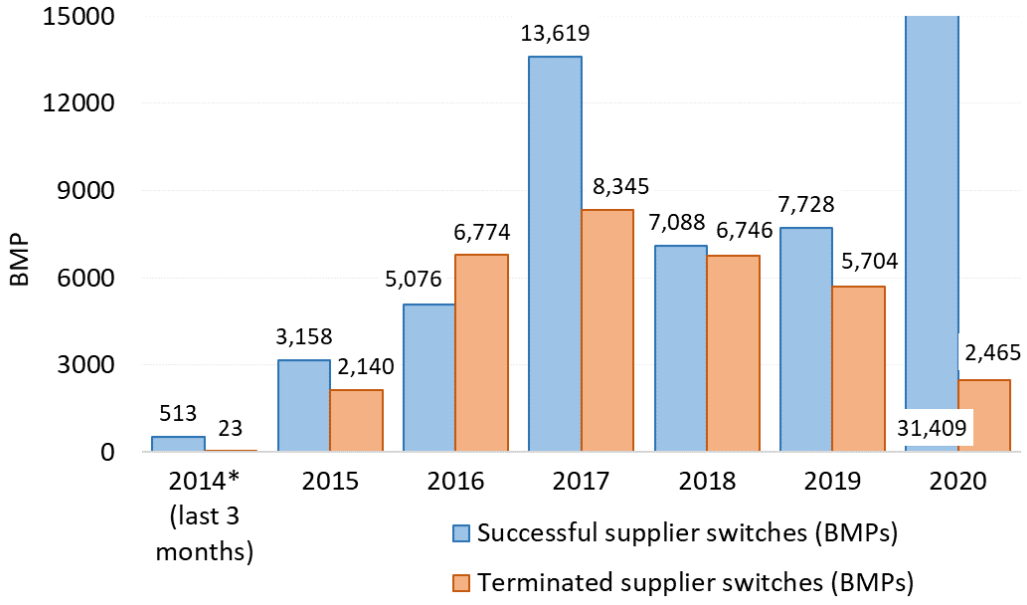


Figure 5.3.8 Number of completed and terminated gas supplier switches since the start of retail market liberalisation in Croatia

In consultation with HERA, HROTE has put in place security mechanisms to eliminate observed deficiencies and improve the software solution in 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*. The RBMP is a unique electronic database of final customer 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, in accordance with the *General terms and conditions of gas supply*, additional requirements 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 the RBMP, and
- the planned start date of supply has been introduced, which is agreed between the customer and the new supplier, meaning that the procedure of supplier switching, and conclusion of the gas supply contract can be carried out months before the beginning of gas supply by the new supplier.

Another requirement for effective competition is access to information for market participants. It is particularly important to communicate information on gas consumption to final customers, 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 final customers (by 1 March each year) on historical gas consumption in the preceding year and on estimated gas consumption in the current year.

HERA also informs customers of their rights and obligations:

- by regularly publishing information on HERA’s official website,
- by monitoring information published on energy entities’ websites,
- by responding to final customer inquiries, and
- via the tariff calculator (iPlin) for final customers supplied under the public service obligation regime.

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. In accordance with 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 all final customers 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

Gas prices on the retail market

The regulated retail gas price, applied to household final customers using the public service gas supply, is established pursuant to the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply*.

The tariffs for gas supply as a public service and guaranteed supply for all public service gas suppliers in Croatia in 2020 were established in the relevant decisions on tariffs for gas supply as a public service.

In 2020, the average gas sale price for household final customers[84] using the public gas supply service in Croatia was HRK 0.2701 per kWh (net of VAT), which is a 0.6% increase of the average price compared to 2019.

Pursuant to the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply*, in 2020 the gas price for final customers using the public service consisted of the reference gas price, the cost of gas distribution, and the cost of gas supply. The reference price of gas was the highest price at which the wholesale market supplier could sell gas to public service suppliers for household final customers, and was 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 2020 averaged 72% of the total regulated final price of gas net of VAT. Further, the share of the cost of gas distribution in the average final gas price in 2020 was 23% net of VAT, while the gross supply margin of public service suppliers was 5%. The structure of the final gas price for Croatian households in 2020 is shown in Figure 5.3.9.

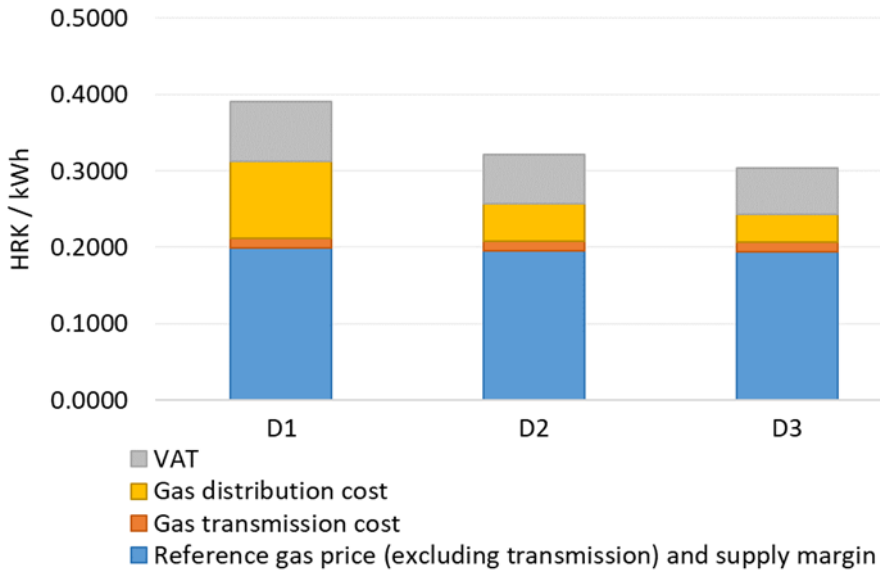


Figure 5.3.9 The structure of the final gas price for Croatian households in 2020 – EUROSTAT customer bands D1 – D3

An overview of tariff model categorisation under the *Methodology for setting tariffs for gas distribution* and their approximation with EUROSTAT customer bands used to monitor natural gas prices are shown in Table 5.3.3.

84 *The weighted average by delivered gas quantities for household final customers using the public service, for each respective public service gas supplier.*

Table 5.3.3 Overview of tariff model categorisation according to the Methodology for setting tariffs for gas distribution and EUROSTAT customer bands used to monitor natural gas prices

Tariff models according to the Methodology for setting tariffs for gas distribution			**Final customer categories used to monitor natural gas prices (D – household, I – industrial) – approximated with EUROSTAT customer bands**		
Tariff model code	**Range of consumption (kWh)**		**Category code**	**Range of consumption (kWh)**	
Households:					
TM1	≤ 5,000		D1	≤ 5,000	
TM2	5,000	25,000	D2	5,001	50,000
TM3	25,000	50,000			
TM4	50,000	100,000	D3	> 50,000	
TM5	100,000	1,000,000			
TM6	1,000,000	2,500,000			
TM7	2,500,000	5,000,000			
TM8	5,000,000	10,000,000			
TM9	10,000,000	25,000,000			
TM10	25,000,000	50,000,000			
TM11	50,000,000	100,000,000			
TM12	> 100,000,000				
Industrial:					
TM1	< 5,000		I1-1	≤ 100,000	
TM2	5,000	25,000			
TM3	25,000	50,000			
TM4	50,000	100,000			
TM5	100,000	1,000,000	I1-2	100,001	250,000
TM6	1,000,000	2,500,000	I2	250,001	2,500,000
TM7	2,500,000	5,000,000	I3-1	2,500,001	10,000,000
TM8	5,000,000	10,000,000			
TM9	10,000,000	25,000,000	I3-2	10,000,001	25,000,000
TM10	25,000,000	50,000,000	I4-1	25,000,001	50,000,000
TM11	50,000,000	100,000,000	I4-2	50,000,001	250,000,000
TM12	> 1000,000,000		I5	250,000,001	1,000,000,000
			I6	> 1,000,000,001	

In 2020, the average gas sale price in Croatia for industrial final customers connected to the distribution system[85] was HRK 0.2537 per kWh (net of VAT), or 6.2% less than in 2019. The lowest and highest prices were recorded in Q4 (HRK 0.2448 per kWh) and Q1 (HRK 0.2678 per kWh), respectively.

In 2020, the average gas sale price in Croatia for industrial final customers connected to the transmission system[86] was HRK 0.1327 per kWh (net of VAT), or 24.4% less than in 2019. The lowest and highest prices were recorded in Q3 (HRK 0.1081 per kWh) and Q1 (HRK 0.1549 per kWh), respectively.

Table 5.3.4 shows average gas sale prices net of VAT in Croatia in 2020 for final customers on the market (industrial) according to HERA's categorisation, separately for final customers connected to the transmission system and final customers connected to the

85 *The weighted average by delivered gas quantity for final customers on the market connected to the distribution system, for each gas supplier.*

86 *The weighted average by delivered gas quantity for final customers on the market connected to the transmission system, for each gas supplier.*

distribution system, as well as the total average sale prices of gas for all final customers on the market in Croatia.

Table 5.3.4 Average gas sale price for industrial final customers on the market in Croatia in 2020

Category (by annual consumption in kWh)		Final customers connected to the TRANSMISSION system (HRK per kWh)	Final customers connected to the DISTRIBUTION system (HRK per kWh)	TOTAL (HRK per kWh)
I1-1	≤ 100,000	*	0.3088	0.3087
I1-2	100,001 – 250,000	*	0.2887	0.2886
I2	250,001 – 2,500,000	*	0.2525	0.2521
I3-1	2,500,001 – 10,000,000	*	0.2441	0.2428
I3-2	10,000,001 – 25,000,000	*	0.2090	0.2064
I4-1	25,000,001 – 50,000,000	*	0.2096	0.2057
I4-2	50,000,001 – 250,000,000	0.1762	0.2324	0.1917
I5	250,000,001 – 1,000,000,000	*	-	0.1367
I6	> 1,000,000,001	0.1307	-	0.1307
TOTAL		**0.1327**	**0.2537**	**0.1631**

** The average price for this consumption category is not published for reasons of confidentiality, as there were less than three final customers in this category in 2020.*

HERA also analyses the structure of the final gas price for industrial final customers. In 2020, the cost of goods, which includes the cost of gas purchase and the supply margin, accounted for 80% of the total average gas price for all final customer categories on the market (net of VAT). The cost of gas transmission and the cost of gas distribution accounted for 5% and 15%, respectively. Figure 5.3.10 shows the structure of the final gas price in 2020 for industrial market final customers in Croatia according to EUROSTAT customer bands.

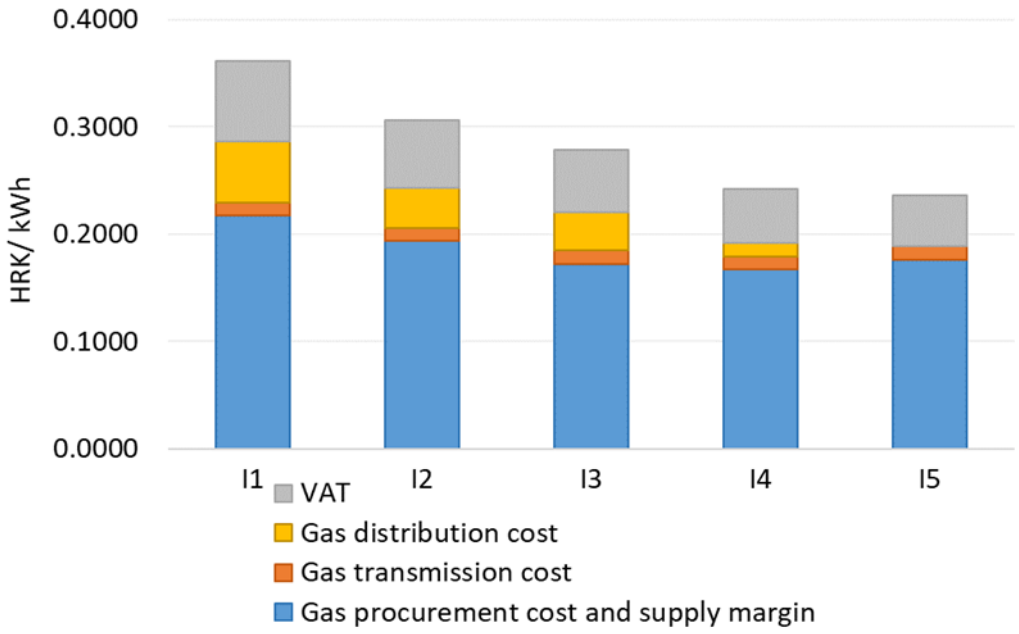


Figure 5.3.10 The structure of the final gas price for industrial final customers in Croatia in 2020 – EUROSTAT customer bands I1 – I6

The quarterly trends of average retail gas prices in 2020 for final customers on the market according to HERA's categorisation are shown in Figure 5.3.11. In 2020, the total average retail price of gas for all categories was HRK 0.1631 per kWh (net of VAT), which is a 18.6% increase compared to 2019.

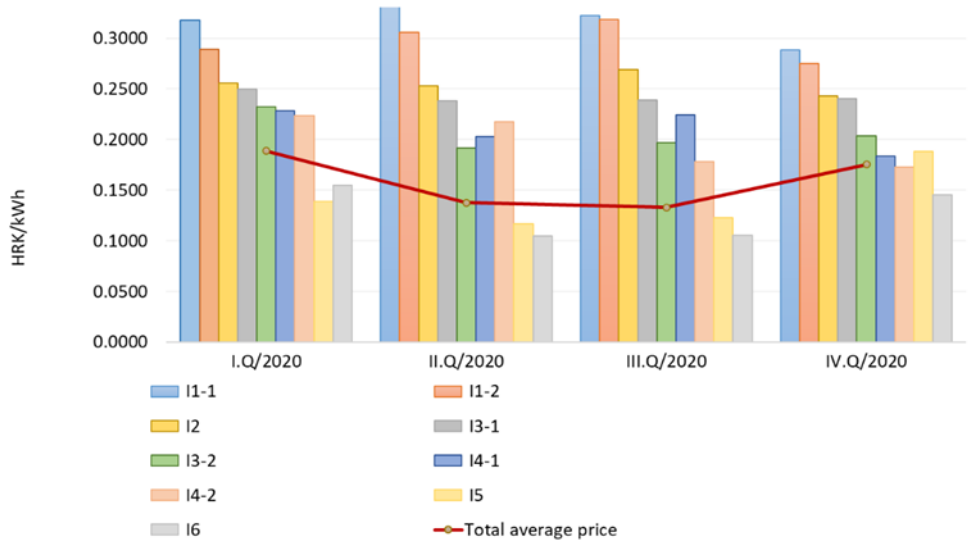


Figure 5.3.11 Average retail market gas prices net of VAT for industrial final customers on the market in Croatia, by quarter in 2020

HERA's final customer categorisation complies with *Directive 2012/27/EU*, *Commission Regulation (EU) 2016/1952*[87] and EUROSTAT's methodology, as well as with its own previous categorisation (three categories) to enable continuous monitoring and comparison of gas prices in a multiannual period.

Average retail market gas prices in Croatia for three gas consumption categories, by quarter from 2012 to 2020, are shown in Figure 5.3.12.

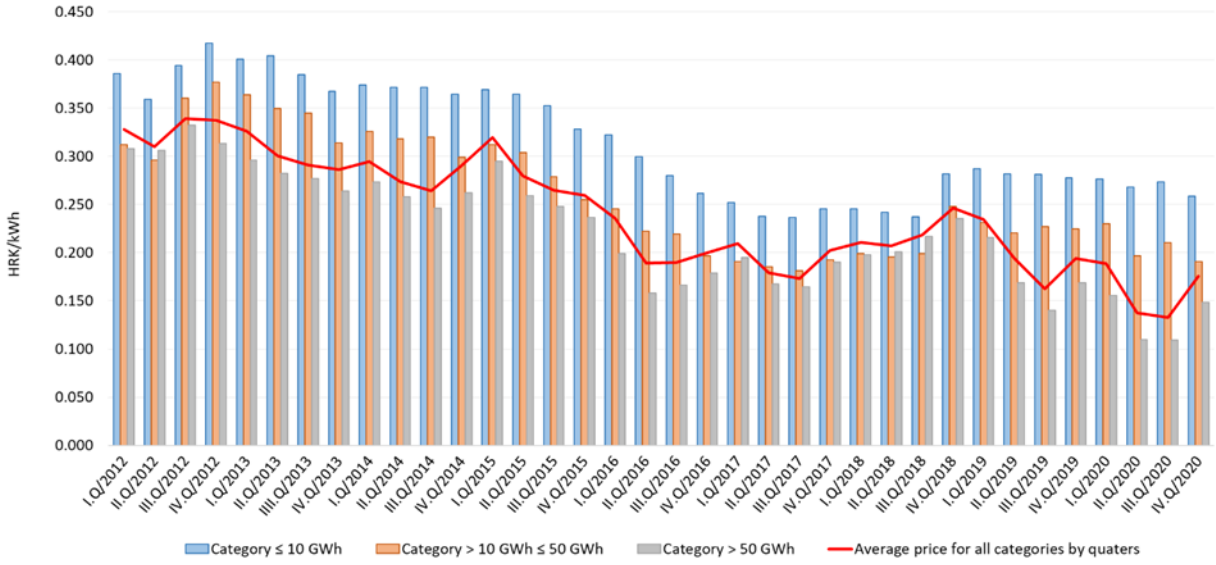


Figure 5.3.12 Average retail market gas prices net of VAT for industrial final customers on the market in Croatia, by quarter from 2012 to 2020

A comparison of annual retail and wholesale market prices of gas in 2020 shows that the average retail price was by 21.2% 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, and changes in the regulated wholesale price (wholesale market supplier – public service supplier) net of VAT from 2012 to 2020 are shown in Figure 5.3.13.

87 *Regulation (EU) 2016/1952 of the European Parliament and of the Council of 26 October 2016 on European statistics on natural gas and electricity prices and repealing Directive 2008/92/EC.*

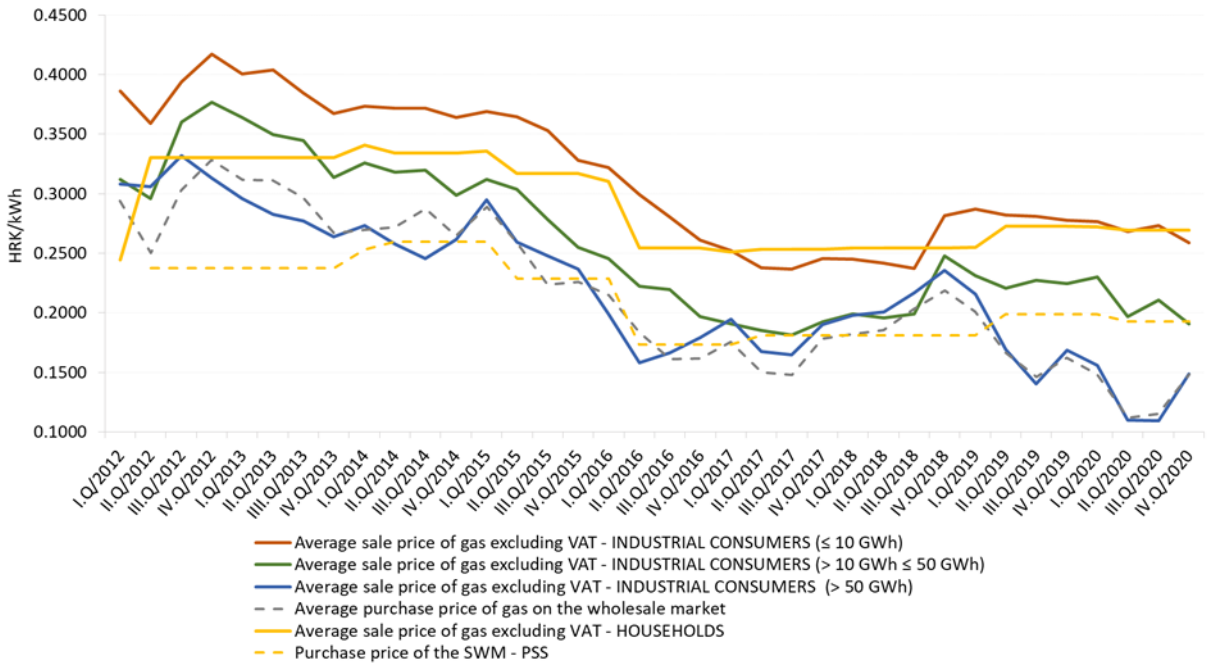


Figure 5.3.13 Average retail prices of gas for final customer categories on the market compared with the average wholesale price of gas on the market and the regulated wholesale gas price in the period 2012–2020

Natural gas prices for final customers in European countries – households

According to EUROSTAT, the prices of natural gas (net of taxes) for household final customers in the European Union decreased in 2020 by 5.3% on average, compared to 2019. Despite these changes, the price of natural gas net of taxes for households in Croatia was still 32.4% lower than the European average in 2020.

Figure 5.3.14 shows how natural gas retail prices in some European countries changed for households in consumption band D2, 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 2020[88].

In 2020, the average natural gas sale price including taxes for households in consumption band D2 was the highest in Sweden (EUR 28.5 per GJ), the Netherlands (EUR 27.85 per GJ), and Italy (EUR 22.57 per GJ), and the lowest in Latvia (EUR 8.26 per GJ), Hungary (EUR 8.71 per GJ) and Romania (EUR 8.95 per GJ). The price of natural gas for households in consumption band D2 including taxes in 2020 in Croatia was 43.0% lower than the European average.

The share of taxes in the total price of natural gas for this final customer category varied greatly and was the highest in Denmark (61.9%), the Netherlands (59.3%), Italy (37.9%) and Sweden (31.8%), and the lowest in Greece (8.4%), the UK (9.4%), and Luxembourg (10.4%). In Croatia, the share of taxes in the total price for this final customer category was 20.0%.

88 *The prices are calculated as average retail prices in the relevant years.*

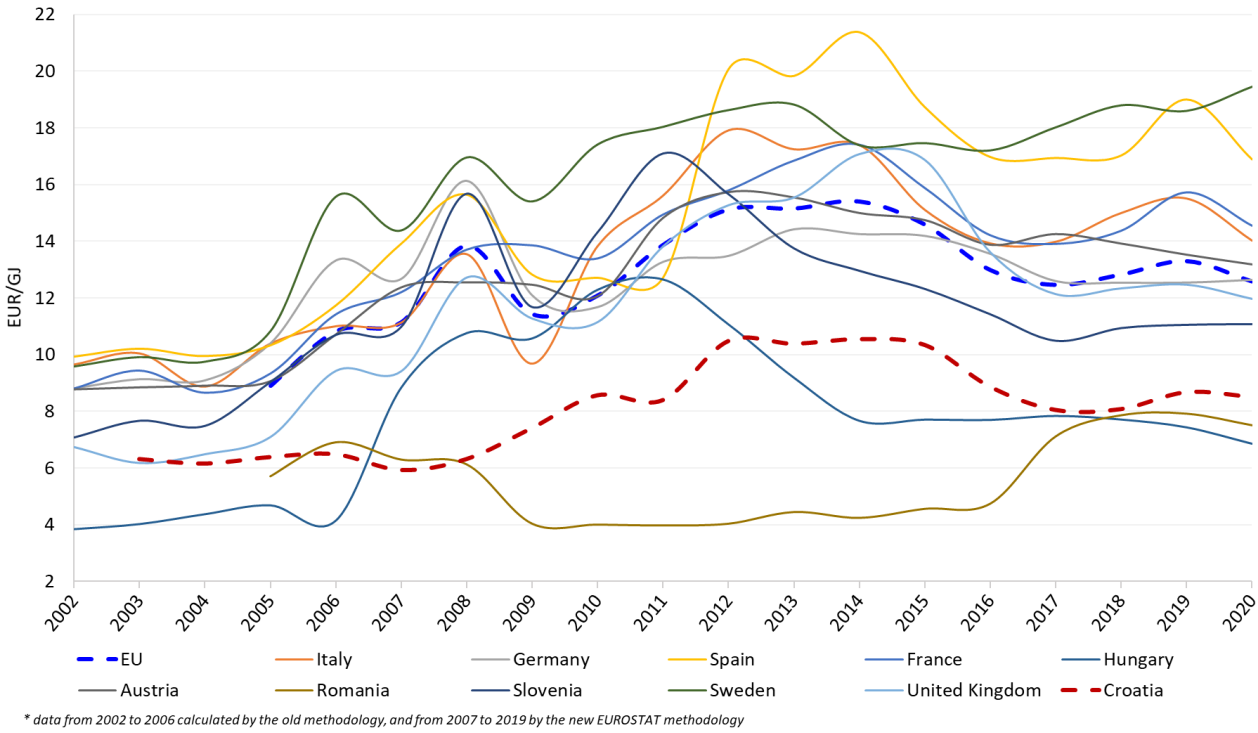


Figure 5.3.14 Changes in retail prices of natural gas for households in consumption band D2 in some European countries from 2002 to 2020 (net of taxes)

Figure 5.3.15 shows average natural gas prices for households in consumption band D2 in 2020, with and without taxes.

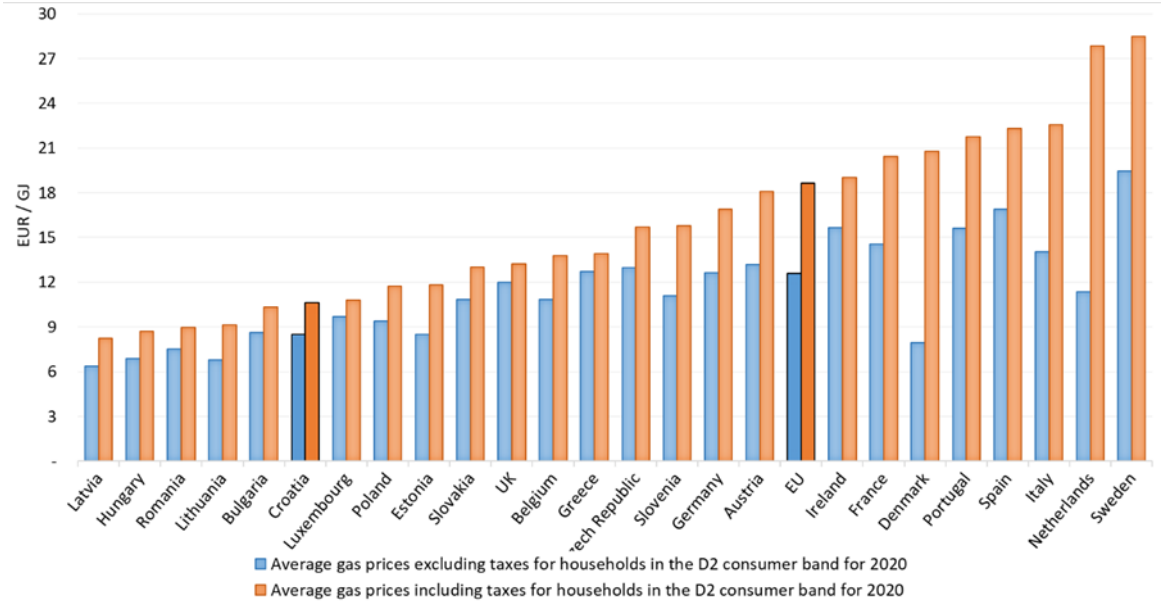


Figure 5.3.15 Average prices of natural gas for households in consumption band D2 in 2020 (with and without taxes)

In 2020, the price of natural gas for households in consumption band D2 expressed in PPS/GJ[89] in order to eliminate differences in the prices of goods/services across countries, was the highest in Portugal (25.92 PPS/GJ) and the lowest in Luxembourg (8.57 PPS/GJ). Taking into account the purchasing power standard expressed in PPS, the final price of gas including taxes for Croatian households in consumption band D2 was 16.47 PPS/GJ in

89 *PPS (purchasing power standard) is a measure of the amount of goods and services that a single unit can buy in different countries.*

2020, which is 11.8% lower than the European average. Figure 5.3.16 shows a comparison of average natural gas prices including taxes for households in consumption band D2 in European countries in 2019 and 2020, expressed in PPS/GJ.

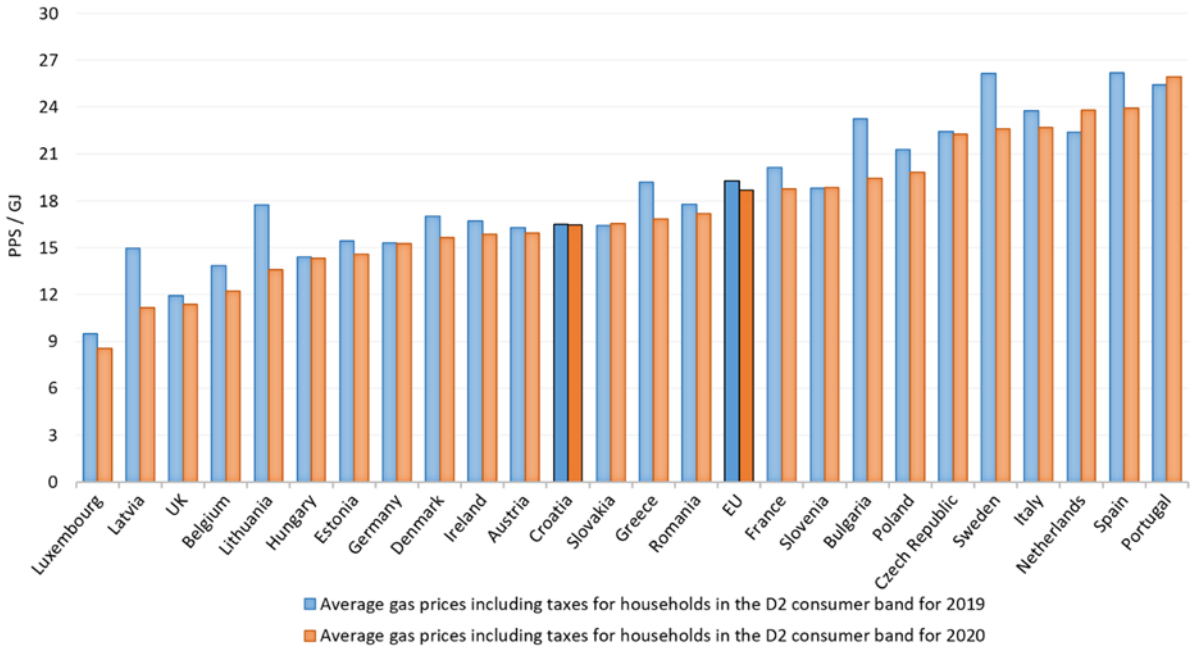


Figure 5.3.16 Natural gas prices for households in consumption band D2 in relation to the price of goods/services in the European countries (including taxes) in 2019 and 2020

Natural gas prices for final customers in European countries – industrial consumers

According to EUROSTAT, in 2020 the prices of natural gas net of taxes in the EU increased by 8.2% for industrial customers in consumption band I3, whose annual gas consumption is between 10,000 and 100,000 GJ, which approximately corresponds to a gas consumption of 300,000 to 3,000,000 m^3/year. Figure 5.3.17 shows average natural gas prices for industrial customers in consumption band I3 in EU countries for 2020, with and without taxes.

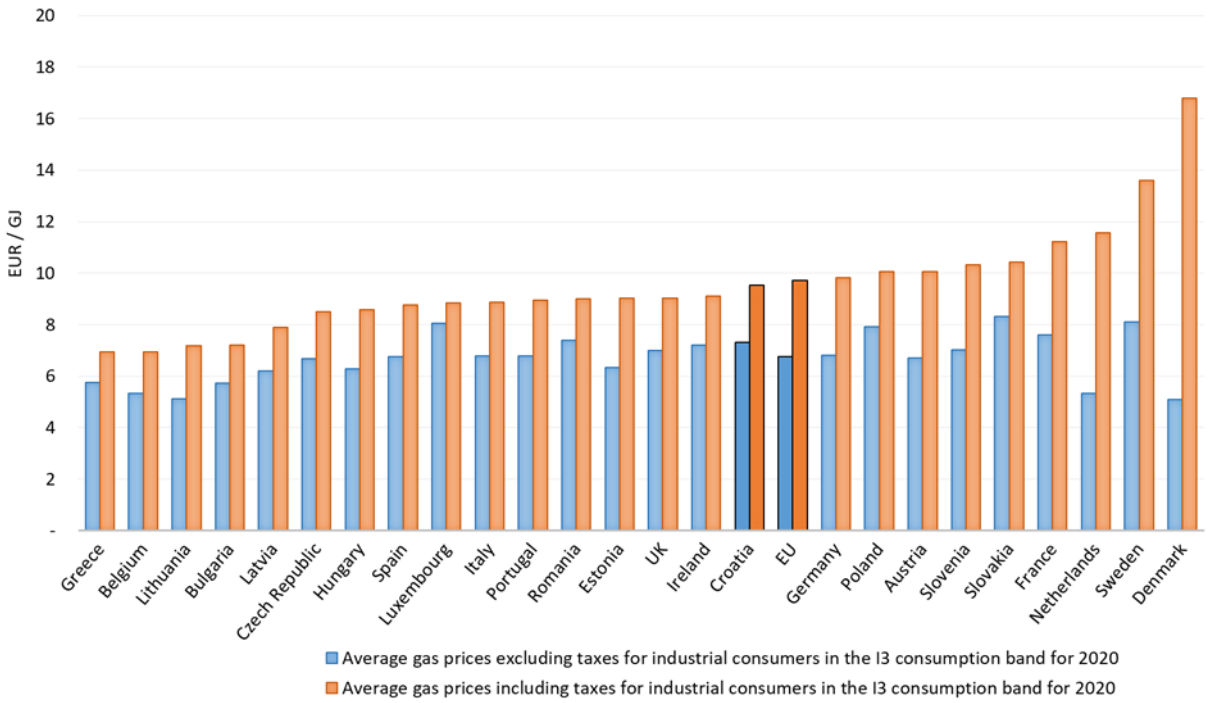


Figure 5.3.17 Average prices of natural gas for industrial customers in consumption band I3 in 2020 (with and without taxes)

In 2020, the price of natural gas including taxes for industrial customers in consumption band I3 was the highest in Denmark (EUR 16.79 per GJ) and Sweden (EUR 13.60 per GJ), and the lowest in Greece (EUR 6.93 per GJ), Belgium (EUR 6.95 per GJ) and Lithuania (EUR 7.18 per GJ). In Croatia, the average sale price of natural gas including taxes for industrial customers in consumption band I3 in 2020 was EUR 9.54 per GJ, which is 1.9% lower than the European average.

The share of taxes in the total price of natural gas for this customer category varied greatly and was the highest in Denmark (69.7%), the Netherlands (53.9%) and Sweden (40.4%), and the lowest in Luxembourg (8.9%), Greece (17.1%), and Romania (17.9%). In Croatia, the share of taxes in the total price for this customer category was 23.4% in 2020.

In 2020, the price of natural gas for industrial customers in consumption band I3 expressed in PPS/GJ, was the highest in Romania (17.29 PPS/GJ) and the lowest in Belgium (6.16 PPS/GJ). In Croatia, taking into account the purchasing power standard expressed in PPS, the final price of gas including taxes for industrial customers in consumption band I3 was 14.77 PPS/GJ, which is 46.4% higher than the European average. Figure 5.3.18 shows a comparison of natural gas retail prices with taxes between EU countries, for industrial customers in consumption band I3 for 2019 and 2020, expressed in PPS/GJ.

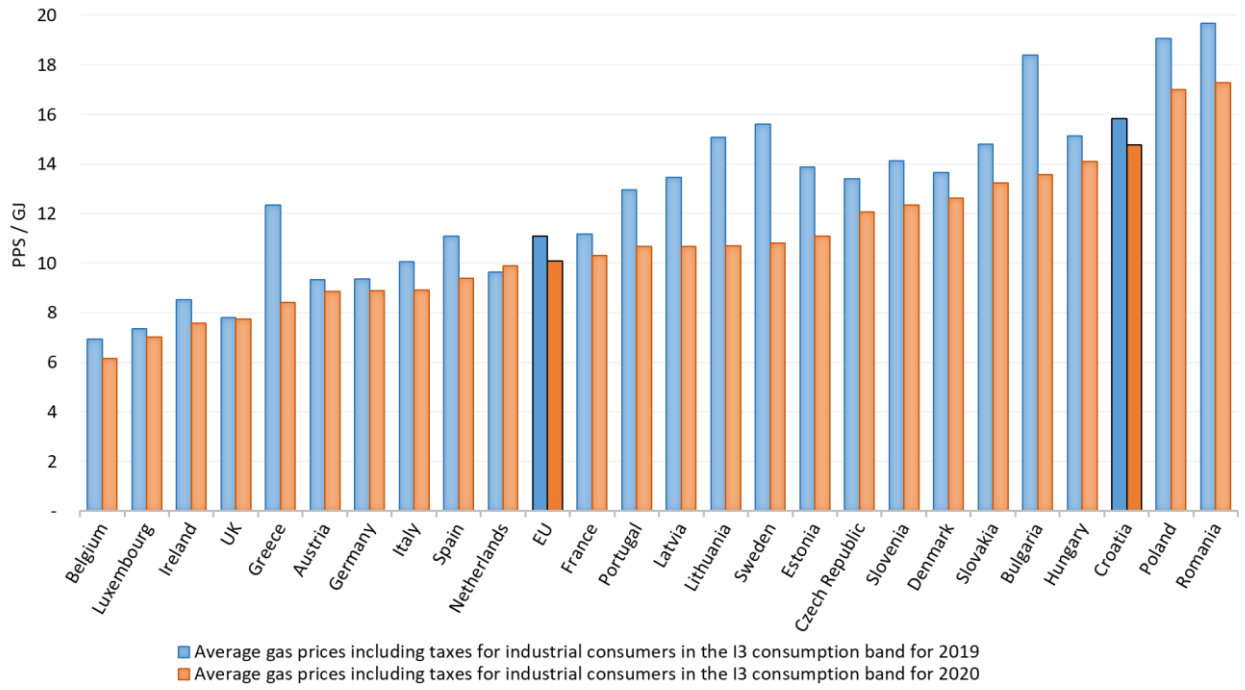


Figure 5.3.18 Natural gas prices for industrial customers in consumption band I3 in relation to the price of goods/services in European countries (including taxes) for 2019 and 2020

Assessment of the functioning of the retail gas market

The main indicators of the functioning of the retail market are the rate of gas supplier switches, HHI, and the influence of regulation on the market as a whole.

Following an increase in supplier switching rates in the period from 2014 to 2016 and a significant rise in 2017, the stagnation in 2018 caused a drop in the number of completed supplier switches. However, in 2019 the number of supplier switches (per number of BMPs) increased by 9.0% compared to 2018, which indicates that the market is slowly stabilising with an upward change trajectory.

In 2020, the number of completed supplier switches significantly increased compared to the previous year, with fewer terminated switching procedures resulting from the establishment of the RBMP and a significantly improved supplier switching procedure. The highest number of supplier switches were completed by final customers who are entitled to supply under the public service obligation, which indicates the beginning of deregulation of the Croatian gas market.

The HHI score, which is considered as a relevant indicator of market power concentration, is 2,093 for industrial final customers, which is still close to the target level (2.000) and indicates continuing positive trends on the retail market in 2020. Although the three largest participants are still dominant, changes in their shares in the gas market have triggered changes in HHI scores for 2019 and 2020, considering the fact that their combined gas market share is around 70%. The share of the most dominant participant somewhat decreased from as much as 48% in 2018 to 32% in 2019, and this difference was distributed between the other two dominant participants, which was a major factor that triggered a drop in HHI score to less than 2,000 in 2019. The share of that same participant slightly increased again in 2020 to 38%, and thus reduced the competitiveness of the other two dominant participants. In addition, the shares of smaller market participants also changed, which also affected the HHI score in 2020, albeit minimally.

The above changes in HHI scores over the last three years clearly show that the fluctuation of HHI (below and above the target level of 2,000) is still mostly caused by a more or less proportionate market share distribution between the three dominant participants.

In the majority of Croatian households, gas is still purchased under regulated conditions because household final customers supplied under the public service are protected from more significant price fluctuations on the gas market, which provides them with a certain level of security.

The development of the retail market is also stimulated by the establishment of a gas price comparison tool, which should be of key importance for final customers and should enable them to compare verified market-based offers from all gas suppliers at a single point and choose their gas supplier more easily. HERA plans to establish a gas price comparison tool in 2021.

An overview of retail gas market indicators for household final customers per year in the period from 2017 to 2020 is shown in Table 5.3.5.

Table 5.3.5 Overview of retail gas market indicators for household final customers per year for the period from 2017 to 2020

Retail natural gas market – HOUSEHOLD				
Indicators	**2017**	**2018**	**2019**	**2020**
Total amount of gas sold – household (GWh)	6,017	5,865	5,781	5,941
Out of which: under public service obligation (GWh)	5,808	5,471	5,388	5,380
under market conditions (GWh)	209	394	393	561
Number of household suppliers	35	36	37	33
Out of which: public service suppliers	34	34	34	31
suppliers under market conditions	2	9	10	10
Number of final customers – household	615,576	621,748	629,693	634,791
Out of which: under public service obligation	579,086	582,596	588,799	565,592
purchase under market conditions	36,490	39,152	40,894	69,199
Number of suppliers with market share > 5%	3	3	3	3
Number of suppliers with customer share > 5%	3	3	3	3
Share of three largest suppliers (per number of BMPs)	61%	60%	60%	64%
HHI (according to amount of gas sold)	2,155	2,138	2,050	2,073
HHI (according to number of BMPs)	2,193	2,159	2,137	2,282

An overview of retail gas market indicators for industrial final customers per year for the period from 2017 to 2020 is shown in Table 5.3.6.

Table 5.3.6 Overview of retail gas market indicators for industrial final customers per year for the period from 2017 to 2020

Retail natural gas market – INDUSTRIAL				
Indicators	**2017**	**2018**	**2019**	**2020**
Total amount of gas sold – industrial (GWh)	21,777	19,573	20,517	22,136
Out of which: in the transmission system (GWh)	16,955	14,538	15,583	17,117
in the distribution system (GWh)	4,822	5,035	4,933	5,019
Number of final customers – industrial	47,288	49,989	50,304	50,164
Out of which: in the transmission system	19	21	21	19
in the distribution system	47,269	49,968	50,283	50,145
Number of industrial suppliers	45	45	44	41
Out of which: active suppliers in the distribution system	44	43	43	40
active suppliers in the transmission system	8	9	9	7
Number of suppliers with market share > 5%	4	4	4	5
Number of suppliers with customer share > 5%	3	4	4	4
Share of three largest suppliers (by amount of gas sold)	75%	68%	69%	71%

5.3.4 Public service obligation in the gas sector

The performance of energy-related activities as public services is regulated by the **Energy Act**. A public service is defined as a service available at all times to final customers and energy entities at a regulated price and/or under regulated conditions for access to and use of the energy service, which must be available, sufficient and sustainable, taking account of 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 in the gas sector performed as public services are as follows:

- gas transmission, gas distribution, gas storage, LNG terminal management,
- wholesale market supplier activity (until 31 March 2021)
- supply under the public service obligation regime, guaranteed supply, and
- gas market organisation.

The public service obligation regime for gas supply regulates gas supply conditions and thus constitutes a protective measure for household final customers. Regulatory mechanisms for the protection of final customers who use the public service are established by the provisions of the **Gas Market Act** and the *General terms and conditions of gas supply*. The supplier under the public service obligation must charge the delivered gas pursuant to the applicable tariffs for gas supply as a public service established by HERA in accordance with the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply* (issued also by HERA), and to ensure gas quality and quality of service pursuant to the *General terms and conditions of gas supply*.

An important date for the deregulation of household gas prices is 1 April 2021, when further action was taken in the deregulation of the price of gas supplied as a public service, as set out in the provisions of the **Gas Market Act**. In order to develop the legal framework and further improve and develop gas supply as a public service in the period after 1 April 2021, in August 2020 HERA carried out a public consultation on the development of the model for gas supply as a public service and published a supporting document which includes HERA's vision of the deregulation process, as well as issues, followed by their possible solutions, arising from certain steps in the process. The document is available at:

https://www.hera.hr/hr/docs/2020/savjetovanje-2020-06_1.pdf.

Taking into consideration the results of the consultation conducted in September 2021, in October 2021 HERA adopted the *Methodology for setting tariffs for gas supply as a public service and guaranteed supply (Official Gazette No. 108/20)*, which specifies the framework for the regulation of prices for gas supply as a public service in the period after 1 April 2021, as well as the requirements for the public call for tenders to select the gas supplier under the public service obligation regime.

In the period from October to December 2020, HERA organised a public call for tenders to select a suppliers in the public service obligation regime for household final customers for the period from 1 April 2021 to 30 September 2024, for all distribution areas in Croatia. Based on the results of the public call for tenders, on 11 December 2020 HERA issued the decisions to select gas suppliers under the public service obligation regime for 33 distribution areas in Croatia for the period from 1 April 2021 to 30 September 2024. As a result of the call for tenders, as of 1 April 2021 the public gas supply in Croatia is performed by 14 gas suppliers, compared to 32 in the previous period.

The public call resulted in the selection of the most qualified and competitive tenderers as public service suppliers across the distribution areas, which provides for market competition among gas suppliers and an opportunity for household final customers to

benefit from the public service. HERA specified the qualifications and ranking of interested suppliers in the tender documentation, pursuant to the criteria laid down in the **Gas Market Act**, with the main selection criterion for public service suppliers being the lowest cost of gas supply.

It is necessary to highlight that household final customers have the right to choose whether to purchase gas under regulated conditions as a public service or freely on the market from the same or any other gas supplier, and are entitled to return from market conditions to the public service at any time.

Further, the **Gas Market Act** also provides for a protective measure in the form of guaranteed supply applicable to all final customers. The role of a guaranteed supplier is to provide the public gas supply service to the final customers who are left without a supplier in certain conditions, over a limited period and under regulated conditions. 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 gas supply as a public service and guaranteed supply*. The tariffs for guaranteed supply are established as follows:

a) for final customers purchasing gas under market conditions:
   - during the first month from the start date of guaranteed supply – in an amount 10% higher than the tariffs for gas supply as a public service established by HERA for gas suppliers under the public service obligation in a given distribution area, in accordance with the provisions of the *Methodology*,
   - in the subsequent two months (up to a total of three months from the start date of guaranteed supply) – in an amount 20% higher than the tariffs for gas supply as a public service established by HERA for suppliers under the public service obligation in a given distribution area, in accordance with the provisions of the *Methodology*, and
   - upon the expiry of three months from the start date of guaranteed supply – in an amount 30% higher than the tariffs for gas supply as a public service established by HERA for gas suppliers under the public service obligation in a given distribution area, in accordance with the provisions of the *Methodology*.

b) for final customers who are entitled to use the gas supply as a public service:
   - in an amount equal to the tariffs for gas supply as a public service established by HERA for gas suppliers under the public service obligation in a given distribution area, in accordance with the provisions of the *Methodology*.

Having applied the criteria from the tender documentation for the period from 1 October 2018 to 30 September 2021, HERA selected the energy entity GRADSKA PLINARA ZAGREB - OPSKRBA d.o.o. as the guaranteed gas supplier in Croatia. In the second quarter of 2021, HERA will organise a public call for tenders to select a guaranteed supplier for the next three gas years, that is for the period from 1 October 2021 to 30 September 2024.

5.3.5 Quality of gas supply

The **Gas Market Act** sets out the obligations of gas producers, closed distribution system organisers, and transmission, distribution, storage and LNG system operators, operators of the supply points for LNG and/or CNG (hereinafter: 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 supply provided by system operators and 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 final customers. The reliability of delivery implies the continuity of gas delivery from the transmission or distribution system in a given period, 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 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 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. This provides for the monitoring and collecting of data on the fulfilment of general and guaranteed standards of supply quality. 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 that the operators are obliged to provide to individual system users, final customers, or gas market operators. As of 1 April 2020, a system operator or gas supplier is obliged to provide the minimum level of gas supply quality, including to the gas market operator. Upon request of the gas market operator due to non-fulfilment of the guaranteed standard of quality of supply, the closed distribution system organiser or the gas supplier must pay a compensation pursuant to the *General terms and conditions of gas supply*.

Gas system operators 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 submit annual reports to HERA on the quality of gas supply for the preceding year by 1 March of the current year, and to publish them on their websites.

In this way, 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, odorization 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, entry and update of data in the Register of billing metering points).

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 final customers, 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, entry, and update of data in the Register of billing metering points).

As of June 2018, compensation is applied in case of failure to meet the guaranteed standard for the following three 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 final customer is entitled to compensation).

As of 1 April 2020, compensation is prescribed in case of failure to meet the guaranteed standard for entry and update of data in the RBMP (the distribution system operator,

closed distribution system organiser and gas suppliers are obliged to enforce the standards, and the gas market operator is entitled to compensation). Incentives and compensations for services whose provision fails to meet the guaranteed standard are to be implemented in the upcoming periods, after having established the values and compliance criteria for the general standards of gas supply quality, including compensation amounts for respective guaranteed standards of gas supply quality.

In 2020, the transmission system operator recorded 13 planned delivery interruptions in the gas transmission system. The total duration of all delivery interruptions in 2020 was 145 hours.

In 2020, distribution system operators recorded an average of 21 planned supply interruptions and 37 unplanned supply interruptions with an average duration of 206 and 75 hours, respectively.

5.3.6 Consumer protection

In 2020, HERA received a total of 164 submissions from natural and legal persons within its area of competence in the gas sector, as shown in Table 5.3.7.

Table 5.3.7 Customer submissions by type in 2020

Type of case	Number	Share [%]
Appeals	1	0.6
Complaints and other customer submissions	73	44.5
Inquiries	90	54.9
Total	**164**	**100**

Of the 73 complaints and other customer submissions, 54 were submitted by citizens (natural persons). Table 5.3.8 shows the most common reasons for complaints from natural persons.

Table 5.3.8 Complaints from natural persons in 2020

Complaints from natural persons	Number	Share [%]
Calculation of gas consumption	12	22.2%
Unauthorised use of gas	6	11.1%
Supplier switches	2	3.7%
Gas quality	3	5.6%
Suspension of gas supply	11	20.4%
Other	20	37.0%
Total	**54**	**100%**

The 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*, *Directive (EU) 2019/692 of the European Parliament and of the Council of 17 April 2019 amending Directive 2009/73/EC concerning common rules for the internal market in natural gas* and Annex I to *Directive 2009/73/EC Measures on Consumer Protection*. The provisions of this *Directive* and Annex I were transposed into the Croatian 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).

A measure protecting final customers of gas and users of gas systems against actions of gas system operators and suppliers, pursuant to Article 88 of the **Gas Market Act**, stipulates that a final customer dissatisfied with an action 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, final customers of gas are protected against actions of the gas supplier, pursuant to Article 24 of the *General terms and conditions of gas supply*, in that the final customers who are 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 final customers 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 final customers about the termination of the concluded gas supply contract,
- information in the invoice issued for delivered gas,
- failure to fulfil the provisions of the public service obligation contract for gas supply,
- failure to reconnect gas supply within specified time frames, upon payment of overdue amounts from the payment reminder, due to which gas delivery was suspended, and
- failure to switch suppliers in accordance with the *General terms and conditions of gas supply*.

On the basis of the complaint, HERA may take the following measures:

- issue 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 legal framework for the security of natural gas supply in Croatia is laid down in *Regulation (EU) 2017/1938 of 25 October 2017 of the European Parliament and of the Council concerning measures to safeguard security of gas supply and repealing Regulation (EU) No 994/2010*, which entered into force on 1 November 2017. The objective of *Regulation (EU) 2017/1938* is to boost solidarity and trust among 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 in the scope of their activities. The competent authority in charge of implementing measures under *Regulation (EU) 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 to mitigate risks identified in the risk assessment conducted in accordance with Article 9 of *Regulation (EU) No. 2010/994 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC*, and an emergency plan containing measures to mitigate the impact of gas supply disruptions pursuant to Article 10 of *Regulation (EU) No 2010/994*, in July 2014 the Croatian Government adopted the *Emergency plan concerning measures to safeguard the security of gas supply in Croatia (Official Gazette No. 78/14)*.

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 emergencies (Official Gazette No. 65/15)*.

The preventive action plans and 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 (EU) 2017/1938* are adopted.

5.5 Energy efficiency in the natural gas sector

Energy efficiency of natural gas infrastructure

The gas infrastructure is specific in that it is a large and expensive infrastructure that has been developing over several decades and that significant financial resources are required for its construction, maintenance, and upgrades. Therefore, increasing the energy efficiency of gas infrastructure poses a complex economic and environmental issue.

The energy efficiency of gas infrastructure predominantly refers to natural gas losses from the system and to the system's own energy consumption (gas and electricity). Gas losses occur in virtually all of the gas system components (transport, distribution, compression stations, measuring and regulation stations – MRSs, storage system) and are divided into losses due to ventilation (in reconstruction and maintenance), fugitive emissions (leakage) and losses due to incidents (accidents). The problem of gas losses in the system has recently become especially important, not only because of the direct energy losses but also because of an exceptional environmental problem caused by emissions of methane (CH_4), one of the essential components of natural gas, which is particularly significant considering that the greenhouse potential of methane is 25 times higher than that of the same quantity of carbon dioxide (CO_2).

Energy efficiency in Croatia is regulated by the **Energy Efficiency Act**. With the adoption of this **Act**, the Union acquis on energy efficiency has been fully transposed into Croatian legislation.

In the context of assessing the potential and proposing measures to increase energy efficiency of gas infrastructure, Article 16(1) of the **Act**, in line with the transposed EU acquis, stipulates that HERA should take energy efficiency into account when issuing decisions falling within its competence. This refers in particular to decisions regarding the tariff methodology when account has to be taken of cost-effective measures for increasing energy efficiency and when incentives to increase the efficiency of gas infrastructure are to be provided, and those that are detrimental to its efficiency abolished.

In its *Methodology for setting tariffs for gas distribution*, HERA stipulated that the operating costs comprise all justified operating costs associated with the gas distribution activities, including the costs of gas purchased to cover allowed gas losses up to a maximum of 3% of the total quantity of gas at entries to the distribution system. Further, in its *Methodology for setting tariffs for gas transmission*, HERA stipulated that the operating costs comprise all justified operating costs associated with gas transmission and do not include depreciation costs, but do include the cost of gas purchased to maintain linepack, for operational consumption and coverage of allowed operating losses and differences in measurements. The allowed operational losses and differences in measurements may account for a maximum of 0.3% of the total amount of gas at entries to the transmission system, determined on the basis of measured data on the use of transmission system capacity. The above provisions encourage energy efficiency of the transmission system operator and the distribution system operator by obliging them to develop, maintain and operate the system taking into account energy savings.

In accordance with Article 5 of the **Act**, energy efficiency policies are set out in energy efficiency plans.

In order to implement these tasks, HERA produced a study in 2017 entitled *An Assessment of the Potential and Proposal for Measures to Increase Energy Efficiency of Gas Infrastructure*. The aim of the study was to identify the potential for increasing the energy efficiency of gas infrastructure. Losses in gas infrastructure are based on the so-called net balancing methodology.

With a view to increasing energy efficiency of gas infrastructure, the study analysed the financially acceptable measures that can be implemented, and that have an impact on reducing losses in gas infrastructure. The above measures are included in the ten-year development plan for the Croatian gas transmission system for the period from 2017 to 2026, development plans for distribution systems and in development plans and reports on investments in the gas storage system which detail the planned investments in upgrading the system on an annual and multi-annual basis.

The target deployment dates for the considered measures are established by ten-year gas transmission system development plans, development plans and reports on investments in the gas storage system and distribution system development plans, with a detailed elaboration of the initial three-year and one-year periods, approved by HERA, taking into account cost-effective improvements to the gas infrastructure.

Applicable and cost-effective measures to increase energy efficiency of gas infrastructure arise from the need to reduce gas losses. The measures in the transmission system include connection to the low-pressure system (in case of reconstruction and maintenance of the existing system), improvements to the pneumatic valve system, control and possible replacement of pressure relief valves, and replacement of preheaters at measuring and regulation stations.

An analysis of distribution system development plans has shown the energy efficiency potential of the distribution system to be relatively high, especially in relation to the replacement of the existing steel pipes with PE pipes, and the control and possible replacement of pressure relief valves.

In gas storage systems, activities aimed at increasing energy efficiency include improvement of the energy efficiency of compressors, dehydration-rehydration units and the preheating system at the pressure reduction and regulation station.

Energy efficiency obligation scheme for energy entities in the gas sector – suppliers under the public service obligation

Pursuant to the provisions of Article 13(2) of the **Energy Efficiency Act**, in 2020 the scheme was obligatory for energy suppliers and their affiliated entities that are energy suppliers which in 2018 supplied more than 100 GWh of energy to the final customers or to distribution stations selling energy to final customers.

The competent Ministry adopts an ex officio decision determining the required savings in kWh of an obligated party for the current calendar year, on the basis of data on energy supplied by the obligated party to the final customers or to distribution stations that sold energy in the year before last, and the obligated party is required to submit the data to the Ministry by 30 June of the current year for the year before last.

The initial base value of the obligation is set by the Ministry at 1.5% of the obligated party's annual energy sales to final customers in the year before last. The Ministry reduces the initial base value for calculating the obligation by:

- the share of the target achieved by alternative measures in the observed year, starting from 2017,
- the share of biofuels which entities (which are also obligated parties) that place on the market diesel fuel or motor gasoline for the propulsion of motor vehicles were obliged to include in a certain percentage pursuant to special regulations governing the use of biofuels for transport,
- the share part of the energy supplied by an energy supplier to a customer who is a producer, distributor or supplier of thermal energy, and
- the share of the energy supplied by an energy supplier to an industry which is an obligated party under a regulation laying down the method of trading in greenhouse gas emission allowances.

The **Act** also stipulates that for unrealised savings of the obligated parties which do not exceed 10% of the total obligation in the previous year, the Ministry will increase the obligation by these unrealised savings from the preceding year. However, for the unfulfilled part of the obligation, the Ministry will ex officio determine the amount that the obligated party must pay to the Fund as a single payment in the name of unrealised savings with a payment deadline of 30 days from the date of delivery of the decision to the party. The payment for the unrealised share of the energy savings obligation from the preceding year is determined by multiplying the unrealised part of the obligation from the preceding year in kWh with a unit fee, expressed in HRK/kWh. The unit fee for the first and second cumulation periods of energy savings is HRK 1.2 per kWh, but is adjusted every year, starting from 1 January 2022, in relation to the determined adjusted unit fee from the preceding year, by multiplying it with the Consumer Price Index published by the Croatian Bureau of Statistics for the previous calendar year.

The Amendments to the Energy Efficiency Act specifies the cumulation periods of energy savings as follows:

1. The first cumulation period of energy savings runs from 1 January 2014 to 31 December 2020;

2. The second cumulation period of energy savings runs from 1 January 2021 to 31 December 2030;

3. The third and each subsequent cumulation period of energy savings is the following ten-year period.

It is important to note that, under the current provisions of the **Act**, energy savings realised in one cumulation period cannot be carried over to another cumulation period.

Introduction of advanced meters

Pursuant to the provisions of the **Energy Act**, the distribution system operator determines the technical requirements and the costs of deploying advanced metering devices and submits them to HERA, which performs a cost-benefit analysis and obtains the opinion of the representatives of consumer protection bodies to enable the minister responsible for energy to set out a programme of measures to introduce advanced meters for final customers.

HERA is drawing up the terms of reference for a study entitled *A background study for determining the technical requirements and costs of introducing advanced metering devices and their integration into a network for final customers of natural gas*, the implementation of which is planned to take place in 2021.

Given that there are 33 active distribution system operators in Croatia, and that so far HERA has not received any proposals from any of the distribution system operators on the technical requirements and costs of introducing advanced metering devices and systems for their networking, and that the minimum functionality of advanced meters devices has not yet been established in Croatia, the study will need to include an analysis of the necessary and acceptable functionality of the devices, as well as a proposal of the minimum functional requirements for advanced metering devices.

An overview of options and a concrete proposal of the minimum functional requirements for advanced metering devices with enabling technologies will be the subject of a public consultation with distribution system operators that HERA will carry out with a view to finding the functionalities and technologies that are acceptable to distribution system operators in Croatia. A final cost-benefit analysis should be carried out with regard to the accepted functionalities and best available technology.

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, 73/17, and 96/19)**, and regulations subordinate to 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), which is based on the **Air Protection Act (Official Gazette Nos. 130/11 and 47/14).** The new **Air Protection Act (Official Gazette No. 127/19)**, in effect from 1 January 2020, stipulates that the existing *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* will remain in force until adoption of a new regulation.

The programme for monitoring liquid petroleum fuel quality for 2020 (Official Gazette No. 123/19) lays down the method of sampling liquid petroleum fuels (especially for service stations and storage facilities), the number of samples, frequency of sampling, sampling locations depending on the quantity of liquid petroleum fuel placed on the national market by the supplier, as well as the method for performing and reporting on laboratory analyses of liquid petroleum fuel samples.

6.2 Oil transportation through pipelines

In Croatia, oil transportation through pipelines is carried out by Jadranski naftovod d.d. *(hereinafter: JANAF d.d.).* Pursuant to the **Oil and Petroleum Products Market Act**, JANAF d.d. provides legal and natural persons with access to the transport system in an impartial and transparent manner.

Oil is imported by tanker ships via the oil terminal in Omišalj on the island of Krk, and then further transported through JANAF's oil pipeline system to the 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 2020, a total of 6.8 million tonnes of crude oil were transported through the oil pipeline system, which is an increase of 4.6% compared to the previous year. Oil quantities transported from 2005 to 2020 and the quantities planned for 2021 are shown in Figure 6.2.2.

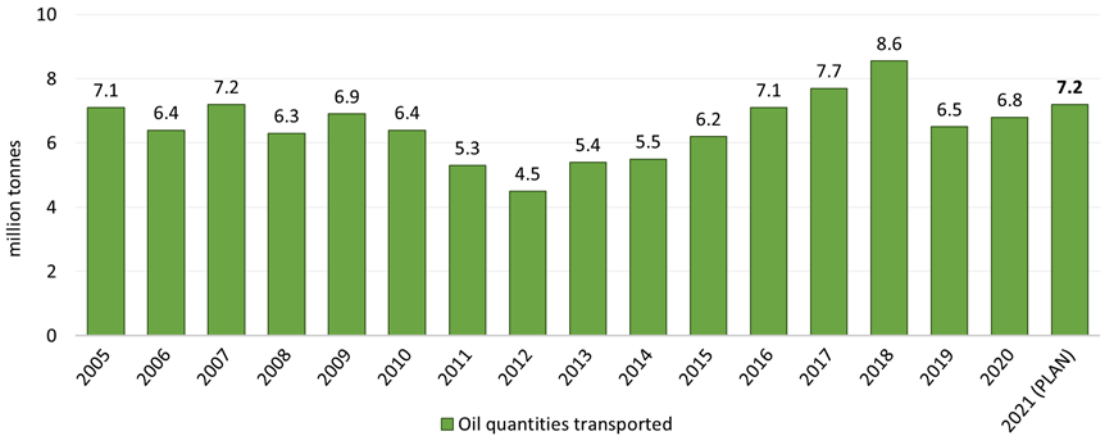


Figure 6.2.2 JANAF's oil pipeline system – transported quantities [in millions of tonnes]

Concerning the development of the oil pipeline system in 2020, particularly important activities undertaken by JANAF were investments in the pipeline system, investments in facilities and other infrastructure, investments in storage facilities, investments in security and environmental protection systems, investments in the electricity system, investments in other modernisation facilities, investments in business IT systems and software, etc.

6.3 Production of crude oil and petroleum products

Production of crude oil

Even though it is not considered an energy activity, 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. A significant decrease in domestic crude oil production was recorded in 2020, continuing the downward trend.

In addition to domestic production, Croatia also covers its demand for crude oil with imports, primarily from Azerbaijan, Nigeria, the United States of America, and Tunisia. In 2020, imports amounted to 1.89 million tonnes, which is a 6.9% decrease compared to 2019. A comparison of locally produced crude oil and imports processed in Croatia from 2006 to 2020 is shown in Figure 6.3.1.

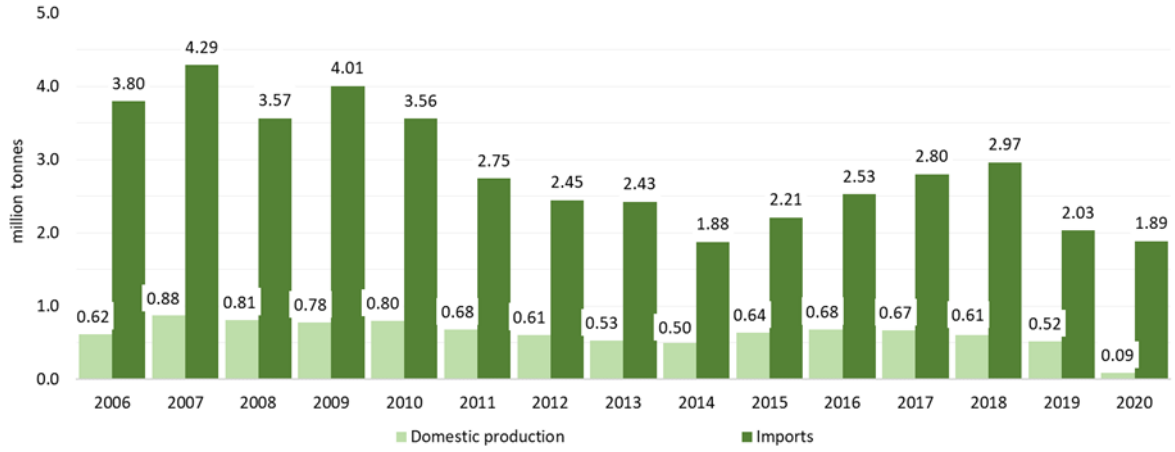


Figure 6.3.1 Crude oil quantities from domestic production and imports processed in Croatia from 2006 to 2020 [in millions of tonnes]

Production of petroleum products

Petroleum Products are produced by INA d.d. The petroleum products produced at the oil refinery in Rijeka and at the ethane facility Etan 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. Shares of raw materials used in Croatian refineries in 2020 are shown in Figure 6.3.2.

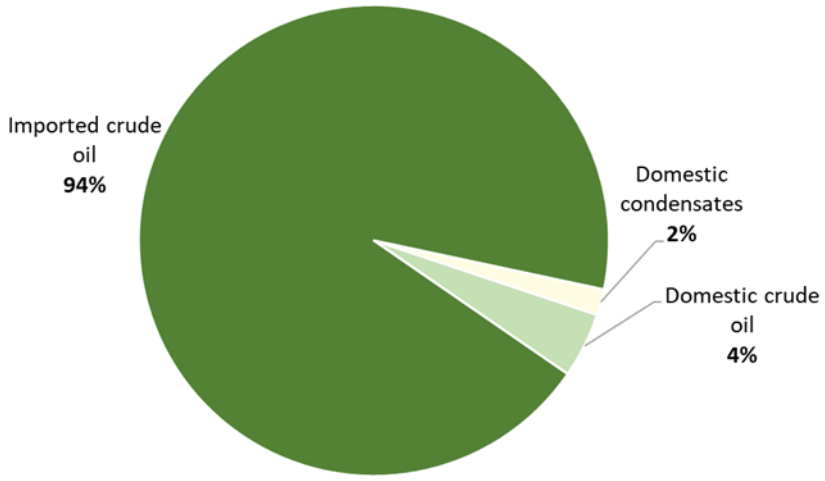


Figure 6.3.2 Shares of raw materials used in Croatian refineries in 2020

The total production of petroleum products in 2020 amounted to 2.5 million tonnes, which is 0.3 million tonnes less (a decrease of 10.7%) compared to 2017. It is a persistent indicator of a negative trend and increasing dependence on imports of petroleum products due to decreased domestic refinery capacities. The total quantities of petroleum products produced from 2006 to 2020 are shown in Figure 6.3.3.

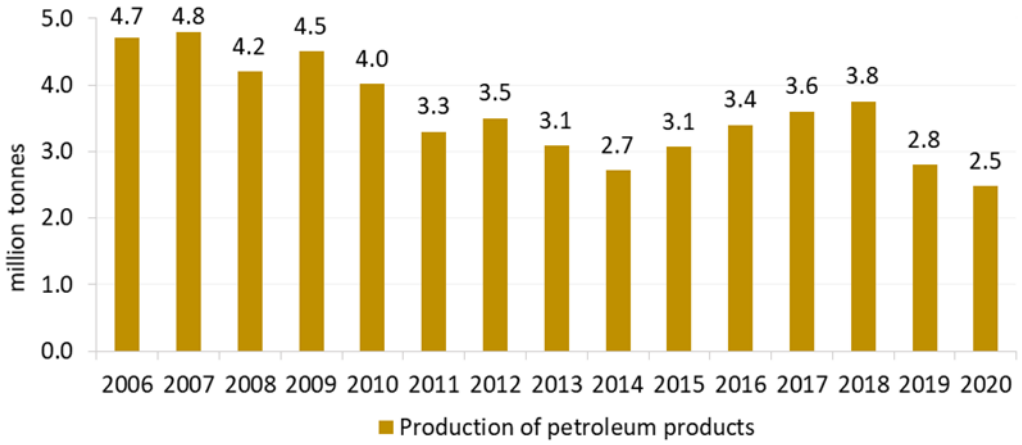


Figure 6.3.3 Quantities of petroleum products produced from 2006 to 2020 [in millions of tonnes]

The total production of liquefied petroleum gas in 2020 was 186,000 tonnes, which is 11,000 tonnes less (a decrease of 5.6%) compared to 2019. The quantities of liquefied petroleum gas (LPG) produced from 2006 to 2020 are shown in Figure 6.3.4.

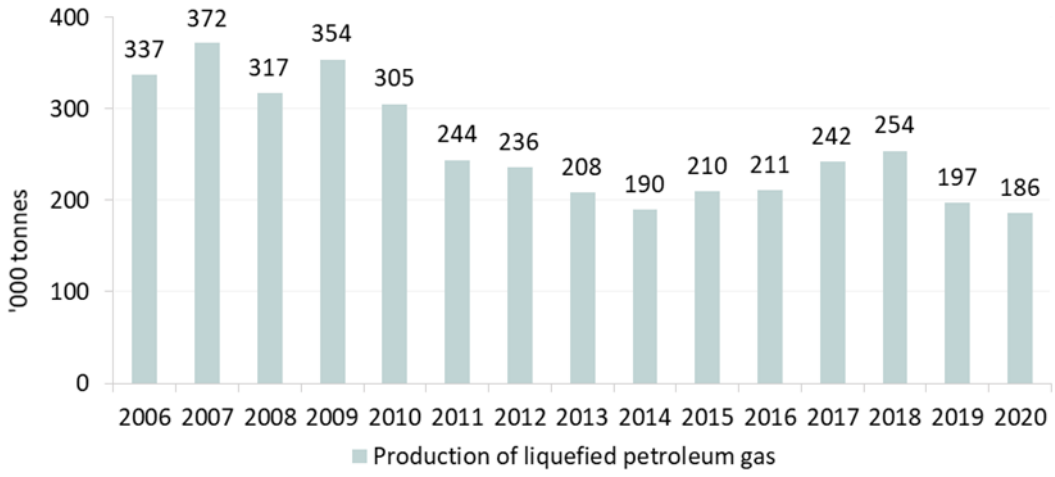


Figure 6.3.4 Quantities of LPG produced from 2006 to 2020 [in thousands of tonnes]

6.4 Competitiveness and functioning of the petroleum products market

According to the **Oil and Petroleum Products Market Act**, energy activities in the oil and petroleum product market include:

- production of petroleum products,
- oil transportation,
- wholesale trade in petroleum products,
- wholesale trade in liquefied petroleum gas,
- storage of oil and petroleum products, and
- storage of liquefied petroleum gas.

6.4.1 Storage of oil and petroleum products

In 2020, oil and petroleum products were stored by 21 energy entities, while the storage of liquefied petroleum gas was provided by four 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 ensuring the security of supply and/or for the purpose of trade. According to data furnished by energy entities, in 2020 total available storage capacities amounted to 2.79[90] million m^3, compared to a total of 2.97 million m^3 of available capacity in 2019 (excluding storage capacities within INA's refineries). The decrease is a result of a more accurate calculation of storage capacities. In the previous years, some storage operators incorrectly reported storage facilities rented out to other storage operators as their own, while the reporting form required them to report only those capacities used by the operator for the storage of oil, petroleum products or LPG. The geographical locations of the most important oil, petroleum products and LPG storage facilities in Croatia, by type of goods stored, are shown in Figure 6.4.1.

[90] *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: NAUTICA VUKOVAR d.o.o., Priljevo 14, 32000 Vukovar; and NAFTA CENTAR d.o.o. for trade and services, Mirka Kleščića 7, 10430 Samobor.*

Figure 6.4.1 Geographical locations of oil, petroleum products and LPG storage facilities by type of goods stored, and total storage capacities in 2020

6.4.2 Wholesale trade in petroleum products

Trading in petroleum products includes 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 2020, wholesale trade in petroleum products was carried out by 49 energy entities, while wholesale trade in liquefied petroleum gas (LPG) was carried out by 14 energy entities.

In 2020, total petroleum product sales amounted to 1.37 million tonnes, which is a drop by 47.8% or 1.25 million tonnes compared to 2019, when sales totalled 2.62 million

tonnes. This decrease in sales is a direct consequence of the slowdown of economic and social activities due to the COVID-19 pandemic.

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 1.54 million tonnes[91] of petroleum products were imported in 2020, which is 0.38 million tonnes or 19.8% less than in 2019. The quantities of petroleum products imported from 2006 to 2020 are shown in Figure 6.3.6.

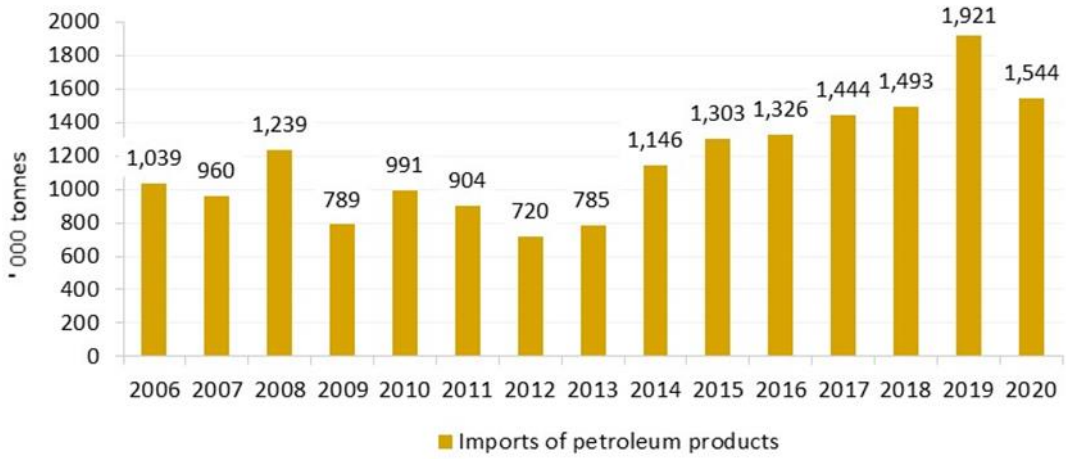


Figure 6.4.2 Imports of petroleum products from 2006 to 2020 [in thousands of tonnes]

Wholesale market prices of petroleum products

Since the **Oil and Petroleum Products Market Act** came into force in 2014, the prices of petroleum products in the Croatian market are no longer regulated but market based.

In order to monitor prices of petroleum products on the wholesale market, in 2020 HERA began collecting data on average prices of petroleum products by administering questionnaires to the wholesale traders of petroleum products registered in Croatia. The purpose of the questionnaire was to gather information on the quantities and prices of petroleum products purchased and sold on the wholesale market.

In 2020, the average purchase price of petroleum products in the wholesale market net of VAT and excise duties (purchase under bilateral agreements and from imports) was 3,679 HRK per tonne, while the average selling price net of VAT (sale under bilateral agreements and exports from Croatia) amounted to 3,785 HRK per tonne.

A total of 63 wholesale traders operated in the petroleum products wholesale market in 2020. The highest average selling price of petroleum products at the level of individual traders in the wholesale market in 2020, including exports from Croatia, amounted to 7,787 HRK per tonne, while the lowest price amounted to 2,947 HRK per tonne.

[91] *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: NAUTICA VUKOVAR d.o.o., Priljevo 14, 32000 Vukovar; NAFTA CENTAR d.o.o. – for trade and services, Mirka Kleščića 7, 10430 Samobor; TEHNOPETROL d.o.o. – for transport, trade and services, Gornja Trebinja 5, 47000 Karlovac; GRŽINČIĆ usluge transporta i trgovine d.o.o., Podstrmac 6, 51217 Klana; UNIJA-TRADE d.o.o., Pavičini 604, 52208 Krnica; ORA-FORM ZAGREB d.o.o., Oporovečki vinogradi 12 C, 10000 Zagreb; BRALA d.o.o., Ulica braće Dežmalj 26, 23242 Posedarje; TROMILJA BENZIN d.o.o. – for trade and services, Tromilja 1/a, 22221 Lozovac; AUTOPRIJEVOZNIK KLJAJIĆ d.o.o., Ježdovečka 118 B, 10250 Ježdovec; HUDEK-TRGOTRANS d.o.o., Biljevec 77, 42243 Biljevec; SEDLIĆ d.o.o., Berek 54, 43232 Berek, and PIA j.d.o.o. – for trade and services, Požeška cesta 1A, 35000 Slavonski Brod.*

Evaluating performance of the petroleum products wholesale market

The petroleum products wholesale market in Croatia was fully liberalized in 2014 after entry into force of the **Oil and Petroleum Products Market Act** and is organised on a commercial basis as in other EU Member States.

Performance indicators for the wholesale market are reflected primarily in the concentration of petroleum product traders in the market. Therefore, the most important benchmark applicable to the Croatia market is the HHI index.

HHI measures the level of market concentration and market competitiveness, and is the most commonly used indicator for determining the concentration of market power. A high HHI indicates a high level of concentration and identifies market shares held by a few of the largest traders. It is calculated by summing the squared market shares of all firms competing in a market. HHI ranges between 0 and 10,000, where high HHI closer to 10,000 indicates the presence of a monopoly in the market, meaning that one of the market participants has dominant influence.

According to data collected by HERA, the HHI score was 4,350 in 2020, and 5,455 in 2019. This shows that the Croatian petroleum products market continues to be moderately concentrated with a relatively low competitiveness, and that it is still dominated by only a few larger traders.

The HHI trend for the Croatian petroleum products wholesale market in the period from 2017 to 2020 is shown in Figure 6.4.3. From 2017 to 2019, HHI had a constant upward trend. However, taking into consideration that during that period, as well as in 2020, the market was fully open, the upward trend can only be explained by inconsistency of collected data.

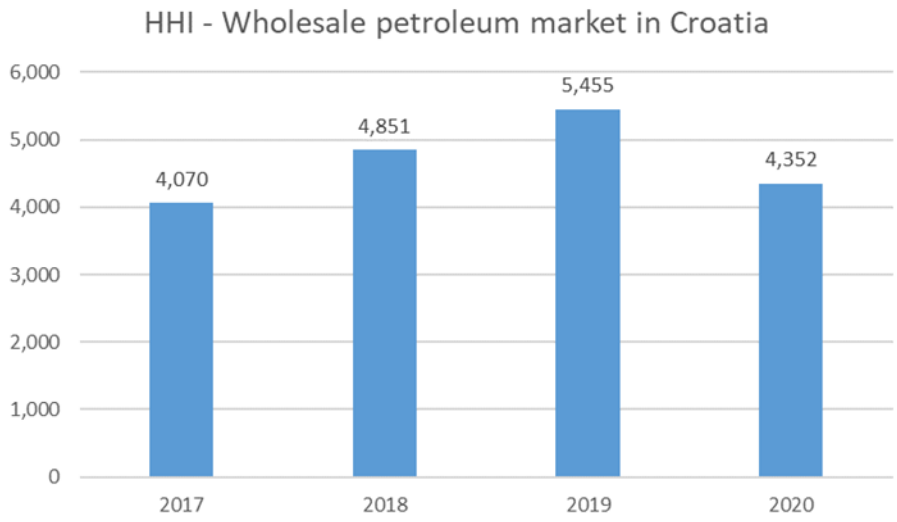


Figure 6.4.3 HHI trend for the Croatian wholesale gas market in the period 2017–2018

The number or diversity of supply sources for petroleum products is another indicator of the wholesale market development. According to data collected by HERA for the Croatian market in 2020, petroleum products were mostly purchased from two sources – from domestic production (refinery in Rijeka) and from imports (Hungary, Slovakia, Spain, Greece, and Italy), which is certainly an indicator of healthy competition and security of supply.

An analysis of HHI and the number of supply sources, as the most significant measures of the healthy functioning of a wholesale market, shows that the Croatian wholesale market for petroleum products is relatively small and that it is mainly dependent on the operations of INA, the largest trader in petroleum products.

The HHI score, which decreased compared to 2019, but has remained high at 4,350, clearly shows that the market is not fully competitive and that a dominating share in the petroleum products wholesale market is still held by four largest traders (INA d.d., CRODUX DERIVATI DVA d.o.o., PETROL d.o.o., and AGS HRVATSKA d.o.o.). The sources are diversified, primarily including petroleum products produced in INA's only remaining refinery in Rijeka and those imported from the neighbouring countries, which shows that the market is not dependent solely on one supply source and that the security of supply is not at risk.

Also, at the beginning of 2021, the Croatian petroleum products wholesale market significantly changed when PETROL d.o.o. acquired CRODUX DERIVATI DVA d.o.o., thereby increasing its market share by 10% and becoming the second largest trader after INA.

6.5 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 into Croatian legislation *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 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 preconditions and monitors the secure, regular, and quality supply of the oil and petroleum products market in Croatia, and is responsible for the 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 participates in an expert committee for monitoring the regular market supply of oil and petroleum products, which implements 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 of supply in the oil and petroleum products market. These involve measures to reduce 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 2020.

The CHA is obliged to form 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 nature of compulsory stocks for each year. No decision has been issued by the CHA regarding the quantity and nature of compulsory oil and petroleum product stocks for 2020.

7 BIOFUELS

7.1 Legal framework for biofuels

The biofuels market and the 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 regulations subordinate to 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 2020, four energy entities had licences for the production of biofuels. These entities produced a total of 171 tonnes of biodiesel, which is a decrease in production of 35.2% compared to 2019. The amount of biofuel produced in 2020 constitutes only a minor fraction of the record production in 2012, which amounted to 39,476 tonnes. The quantities of biofuel produced from 2009 to 2020 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 as a result of the termination of payment of cash incentives for the production of biofuels for transportation paid to biofuel producers by the Croatian Energy Market Operator (HROTE), and which ultimately resulted in insufficient investments in the modernization of biofuel production facilities.

The energy entities have a total of 1,800 m^3 of storage capacity. In 2020, the total capacity of biofuel production remained the same as in the previous years and amounted to 184 tonnes per day, with waste edible oil being the only raw material used to produce biofuel.

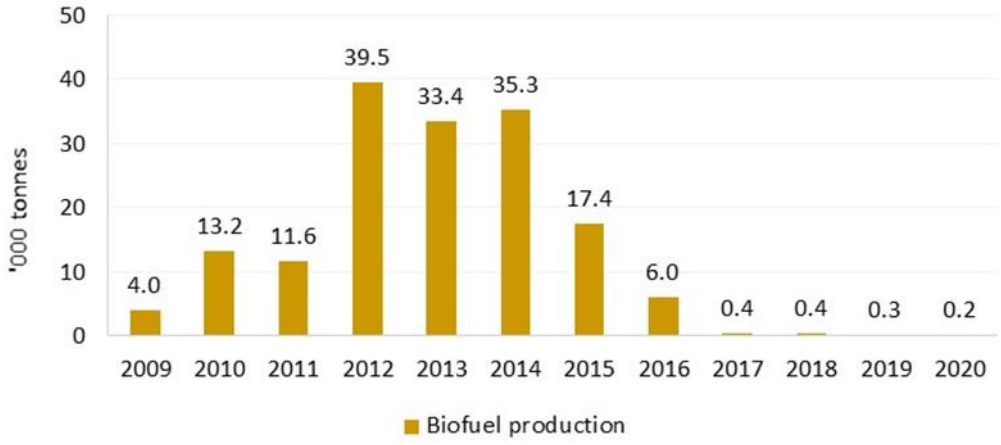


Figure 7.2.1 Quantities of biofuel produced from 2009 to 2020 [in thousands of tonnes]

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 it meets 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.

8 THERMAL ENERGY

8.1 Legal framework for thermal energy

Basic information on the legal framework for thermal energy

The legal framework of the thermal energy sector and thermal energy production, distribution and supply activities in Croatia consists of the **Energy Act, Act on the Regulation of Energy Activities, Thermal Energy Market Act**, and by-laws adopted pursuant to these acts.

HERA has adopted by-laws that regulate in detail certain activities in the thermal energy sector, namely: *General requirements for thermal energy supply (Official Gazette No. 35/14), General requirements for thermal energy delivery (Official Gazette Nos. 35/14 and 129/15)*, and *Network codes for thermal energy distribution (Official Gazette No. 35/14)*.

Particularly important for final customers of thermal energy is the *Ordinance on the method of allocating and calculating costs of supplied thermal energy (Official Gazette Nos. 99/14, 27/15 and 124/15)*. The majority of received inquiries and complaints pertain to that *Ordinance*.

The manner and conditions of performing energy activities in the heating sector (thermal energy production, distribution, and supply) depend on the type of heating system used to supply the final customers of thermal energy. Namely, the **Thermal Energy Market Act** distinguishes between district, closed and independent heating systems. A district heating system (DHS) is a large heating system covering multiple buildings/structures, and consisting of production facilities (boiler stations and cogeneration installations), as well as a hot water and/or steam distribution network longer than 2000 meters, with more than 500 independent consumer units. In a district heating system, only one energy entity distributes thermal energy through a concession agreement. A closed heating system (CHS) is smaller than a district heating system and covers multiple industrial and/or commercial and residential buildings/structures with less than 500 independent consumer unit connections, connected by external installations consisting in a hot water, warm water, and/or steam network distribution pipeline shorter than 2000 m. Closed heating systems do not perform the energy activity of thermal energy distribution. An independent heating system covers a single building/structure with multiple independent consumer units and its own boiler station.

In addition to the energy activities related to heating, there is also the activity of the buyer of thermal energy regulated by the **Thermal Energy Market Act,** which is not considered to be an energy activity. More specifically, thermal energy buyers are legal or natural persons who undertake the activity of thermal energy buyers in an independent, closed or district heating system in the name and for the account of the owner and/or co-owners of a given building/structure. The activity of the buyer of thermal energy includes the technical management, operation and the maintenance of internal installations, delivery of thermal energy with a view to calculating the thermal energy consumed and billing the final customers in a building/structure with an independent, closed, or district heating system, on the basis of a thermal energy consumption contract signed with the authorised representative of the co-owners. Thermal energy buyers purchase energy sources for the production of thermal energy in an independent heating system, or purchase thermal energy from suppliers of thermal energy in a closed or district heating system.

Pursuant to the **Thermal Energy Market Act**, in independent and closed heating systems, the prices of thermal energy delivered to the buyers of thermal energy or final customers are formed freely in accordance with the market conditions.

HERA adopts tariffs for the regulated activities of production and distribution of thermal energy, which must be applied by the energy entity performing these activities as a public

service in a district heating system. Charges for thermal energy supply and the fee for performing thermal energy buyer activities are contracted freely. Furthermore, in cases where the final customer uses thermal energy mostly for commercial purposes, the prices of all energy activities in district heating systems are determined according to market principles, or through a contract.

Tariffs for the production and distribution of thermal energy in district heating systems are determined according to 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)*. In addition, 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)*.

With regard to the construction of thermal energy production facilities, in early 2020 the *Ordinance on the criteria for issuing energy approvals for production facilities (Official Gazette No. 5/20)* was adopted pursuant to the **Thermal Energy Market Act**. This *Ordinance* regulates the issuing of energy approvals for all production facilities generating electricity and/or thermal energy, i.e., it regulates the issuing of energy approvals for power plants, cogeneration installations and boiler stations.

The *Ordinance on the criteria for issuing energy approvals for production facilities* establishes the requirement for a cost-benefit analysis for production facilities as a precondition for an energy approval. The **Thermal Energy Market Act** stipulates the requirement for a cost-benefit analysis for:

- new electricity and thermal energy production facilities with a total thermal input exceeding 20 MW in order to assess the cost and benefits of the operation of the facility as a high-efficiency cogeneration installation,
- significant reconstruction of existing production facilities for electricity and thermal energy production with a total thermal input exceeding 20 MW in order to assess the cost and benefits of their conversion to high-efficiency cogeneration,
- new industrial facilities or those undergoing significant reconstruction with a total thermal input exceeding 20 MW generating waste heat at a useful temperature level, in order to assess the cost and benefits of utilising the waste heat to satisfy economically justified demand, through cogeneration and connection of such facilities to closed and district heating systems, and
- new closed and district heating systems, or if new production facilities for thermal energy with a total thermal input exceeding 20 MW are planned for the existing closed and district heating systems, or if such existing facility is being reconstructed to a significant extent, in order to assess the cost and benefits of utilising waste heat from nearby industrial installations.

Exemptions from mandatory cost-benefit analyses are specified in Article 15(13) and (14) of the **Thermal Energy Market Act** and in the *Decision on the procedure for verifying criteria for exemptions from mandatory cost-benefit analyses for electricity and thermal energy production facilities used for peak loads and for facilities that produce reserve electricity (Official Gazette No. 153/13)*, adopted by HERA in 2013.

The cost-benefit analysis for individual facilities required to obtain an energy approval is carried out according to the *Ordinance on the preparation of cost-benefit analyses (Official Gazette No. 110/19).* That *Ordinance* specifies the details of the economic cost-benefit analysis within the framework of assessing national potentials for heating and cooling on the state level, pursuant to the provisions of *Directive 2012/27/EU, Directive 2018/2002/EU*, and *Commission Delegated Regulation 2019/826/EU*.

Changes in the legal framework in 2020

In its *Legislative Activities Plan for 2020*, the Croatian Government envisaged the drafting of a proposal for the **Act on Amendments to the Thermal Energy Market Act**. However,

given that the act has not been adopted, this activity has been transferred to the *Legislative Activities Plan for 2021*.

In order to ensure that the same price of gas is used in thermal energy production both for the final household customers of thermal energy and for the final household customers of gas, 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**, the Croatian Government adopted the **Regulation on the amendment to the Thermal Energy Market Act (Official Gazette No. 76/18)** and the **Regulation on the amendment to the Thermal Energy Market Act (Official Gazette No. 86/19)**. These **Regulations** ensured that the thermal energy producers which are considered to be small or medium enterprises and are connected to the gas distribution system, and which purchase gas to produce thermal energy for final household customers of thermal energy, have the right to procure gas under regulated conditions until the gas market is fully liberalised, i.e., by 31 March 2021. This provided for an equal treatment of the final household customers of thermal energy and final household customers of gas. **The Regulation on the amendment to the Thermal Energy Market Act (Official Gazette No. 86/19)** expired at the end of 2020. However, due to a favourable situation on the gas market, in 2020 entities in the thermal energy sector entities already started to purchase gas for thermal energy production at prices lower than the prices for final household customers of gas.

Following the legislative activities in 2020, in early 2021 the **Act on Amendments to the Energy Efficiency Act (Official Gazette No. 41/21)** entered into force. Although the amendments pursuant to that **Act** relate primarily to the transposition of several EU directives, important changes for energy entities in the thermal energy sector are introduced in the energy savings obligation scheme.

The energy efficiency obligation scheme obliges suppliers to implement energy efficiency measures in end use in the manner laid down in *Directive 2012/27/EU* and *Directive 2018/2002*. The **Energy Efficiency Act** provides for a gradual implementation according to which in 2019 the energy savings obligated parties were energy suppliers and their affiliates which in 2017 had supplied more than 300 GWh of energy, with the threshold being lowered to 100 GWh of energy in 2020, and finally to 50 GWh of energy in 2021. Entities in the heating sector subject to the obligation for 2020 were HEP-Toplinarstvo d.o.o., Zagreb, Brod-plin d.o.o., Slavonski Brod, and Energo d.o.o., Rijeka.

Act on Amendments to the Energy Efficiency Act (Official Gazette No. 41/21) introduced new provisions for the new cumulation period (period in which the implementation of measures is monitored), which runs from 1 January 2021 to 31 December 2021. At the same time, the *Ordinance on the energy efficiency obligation scheme (Official Gazette No. 41/19)* expired on the date of entry into force of that **Act**. Provisions from the *Ordinance on the energy efficiency obligation scheme* have been included in the **Energy Efficiency Act** or will be included in the *Ordinance on the system for monitoring, measuring and verification of energy savings*, the proposal of which was put up for a public consultation in May 2021.

The changes in the energy savings obligation scheme that took place in late 2020 and early 2021, are part of continued efforts to eliminate the difficulties occurring in practice since 2019, which led to the adoption of the *Ordinance on the energy efficiency obligation scheme* in early May 2019, and the **Act on Amendments to the Energy Efficiency Act (Official Gazette No. 25/20)** and *Ordinance on the system for monitoring, measuring and verification of energy savings* (Official Gazette No. 33/20) in early 2020. More specifically, although the implementation of the energy efficiency obligation scheme was foreseen by *Directive 2012/27/EU*, which pertains to energy efficiency, the first steps of its implementation in the Croatia were marked by numerous implementation difficulties and ambiguities. Firstly, the *Ordinance on the energy efficiency obligation scheme*, which regulates in detail the energy savings obligation scheme, was not adopted before early

May 2019. Also, due to the closure of the Centre for Monitoring Business Activities in the Energy Sector and Investments (CEI) in 2018, the role of the National Coordinating Body for Energy Efficiency was taken over by a new, separate internal unit at the ministry competent for energy. This transition resulted in difficulties in the implementation of the System for Monitoring, Measuring and Verification of Energy Savings (SMIV) and the adoption of the new *Ordinance on the system for monitoring, measuring and verification of energy savings (Official Gazette No. 33/20)*. Moreover, some energy suppliers were not ready to assume the obligation as it represented a significant burden on their business. However, major difficulties for energy suppliers are created by untimely issuing of decisions determining the obligation for specific obligated parties, the period in which the savings can be carried out and attributed, and the type of measures that may be recognised as constituting the fulfilment of the obligation. Some of those issues were resolved by the adoption of the **Act on Amendments to the Energy Efficiency Act**.

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 approximately 162,000 final customers, of which more than 95% fall under the category of households.

Thermal energy used for space heating and preparation of sanitary hot water is produced in cogeneration plants, as well as in local heating plants and separate boiler stations.

In 2020, energy entities supplied more than 2 TWh of thermal energy to households and industrial consumers (Figure 8.2.1). The total length of the distribution network and external installations is 445 kilometres.

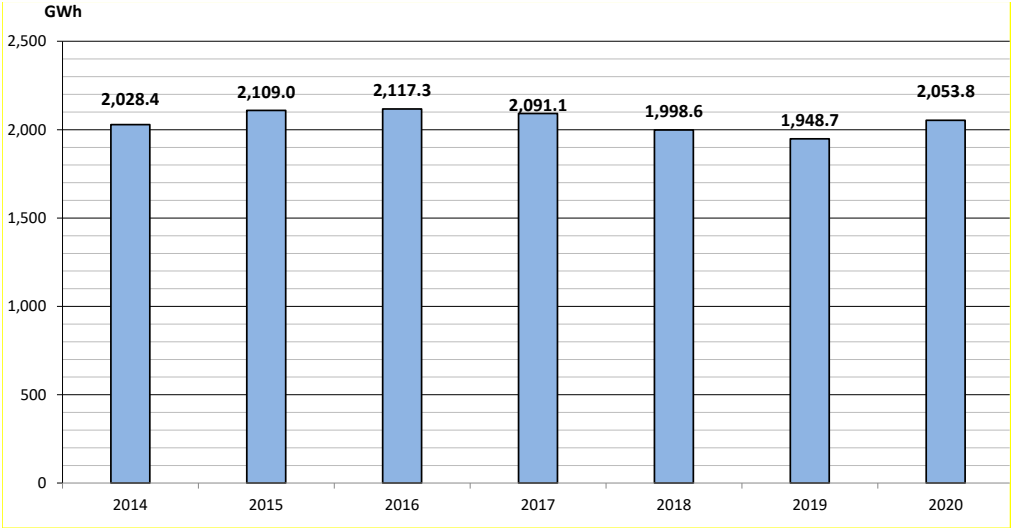


Figure 8.2.1 Supplied thermal energy in Croatia from 2014 to 2020

Table 8.2.1 contains data on 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 volumes of thermal energy supplied, number of final customers, installed capacity of the thermal energy production facilities, and contracted capacity in 2020. However, Table 8.2.1 does not include data pertaining to energy entities supplying thermal energy exclusively to industrial or commercial consumers, nor the data for energy entities that were not involved in this activity in 2020.

Average losses in thermal energy production and distribution for heating systems and energy entities from Table 8.2.1 amounted to 21.4% in 2020.

Average losses in distribution networks in 2020 amounted to 18.2%, compared to the previous year when average losses amounted to 19.4%.

Table 8.2.1 Data on energy entities in the thermal energy sector in 2020

Energy entity	Number of final customers	Network length	Total installed capacity	Thermal energy generated	Thermal energy supplied	Area	Fuel*
		km	MWt	GWh/year	GWh/year	m2	
HEP-Proizvodnja d.o.o.			1,486.00	2,186.55			NG, FO
Zagreb			1,201.00	1,814.11			NG, FO
Osijek			175.00	235.10			NG, FO, biomass
Sisak			110.00	137.34			NG, biomass
HEP-Toplinarstvo d.o.o.	133,601	391.24	315.29	134.09	1,877.07	10,000,178	NG, FOEL, LFO
Zagreb	107,787	287.69	62.63	48.40	1,465.76	8,090,911	NG, FOEL
Osijek	11,810	56.99	140.50	4.39	216.02	1,104,648	NG, FOEL, LFO
Sisak	4,152	30.03	0.00	0.00	121.40	284,163	NG
Velika Gorica	6,096	10.81	68.65	52.63	47.75	332,826	NG, FOEL, LFO
Samobor	1,383	3.35	18.11	12.69	11.67	78,814	NG, FOEL
Zaprešić	2,373	2.37	25.40	15.98	14.46	108,816	NG, FOEL
Energo d.o.o., Rijeka	9,565	15.08	97.04	60.74	55.94	560,255	NG, FOEL, FO
Gradska toplana d.o.o., Karlovac	7,835	21.20	88.63	63.08	51.00	503,175	NG
Brod-plin d.o.o., Slavonski Brod	3,711	5.48	33.91	32.73	31.24	189,483	NG
Tehnostan d.o.o., Vukovar	3,653	7.22	37.99	20.95	17.66	204,670	NG, FO
Vartop d.o.o., Varaždin	915	1.57	24.21	0.00	5.69	48,250	NG
GTG Vinkovci d.o.o., Vinkovci	1,627	1.60	17.83	7.99	8.12	88,317	NG, FO
Poslovni park Virovitica d.o.o., Virovitica	444	0.90	4.08	2.99	4.27	28,311	NG
Komunalac d.o.o., Požega	417	0.61	4.00	2.24	1.95	19,838	NG
SKG d.o.o., Ogulin	90	0.58	4.40	0.86	0.86	6,483	LFO
TOTAL	**161,858**	**445.48**	**2,113.37**	**2,512.21**	**2,053.79**	**11,648,960**	

** NG – natural gas, FO – fuel oil, FOEL – fuel oil extra light, LFO – light fuel oil*

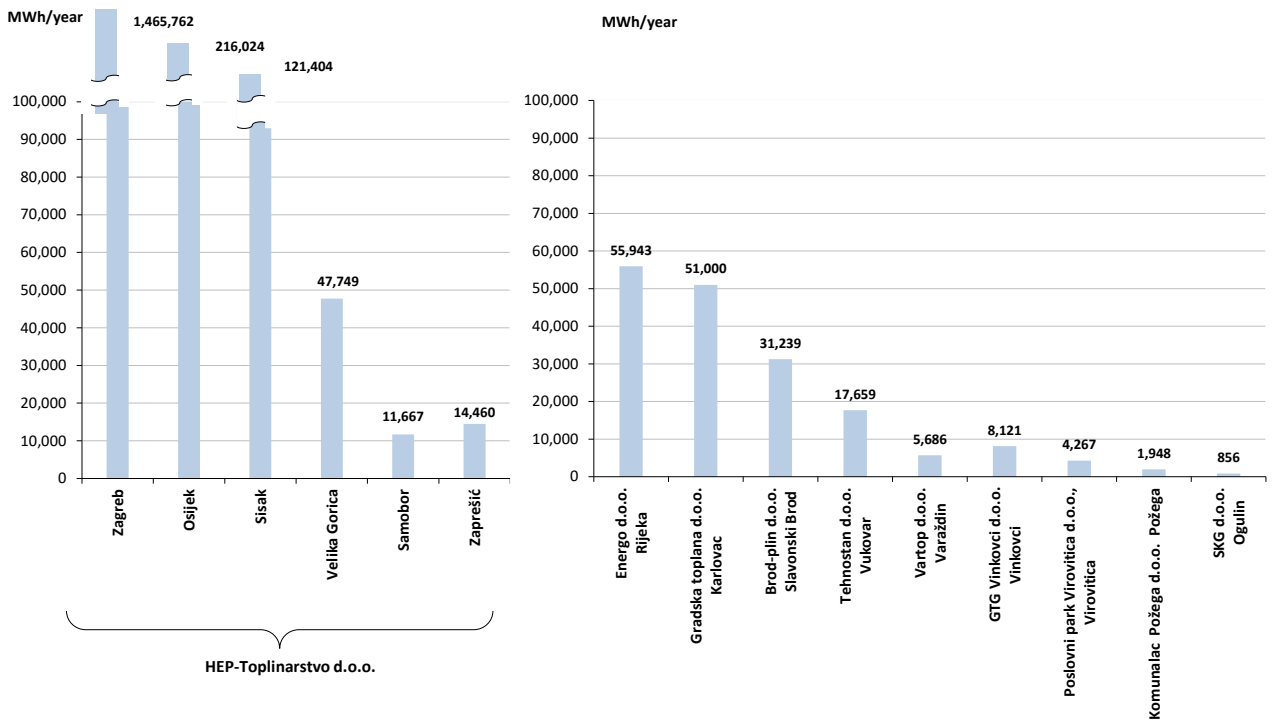


Figure 8.2.2 Thermal energy supplied in 2020

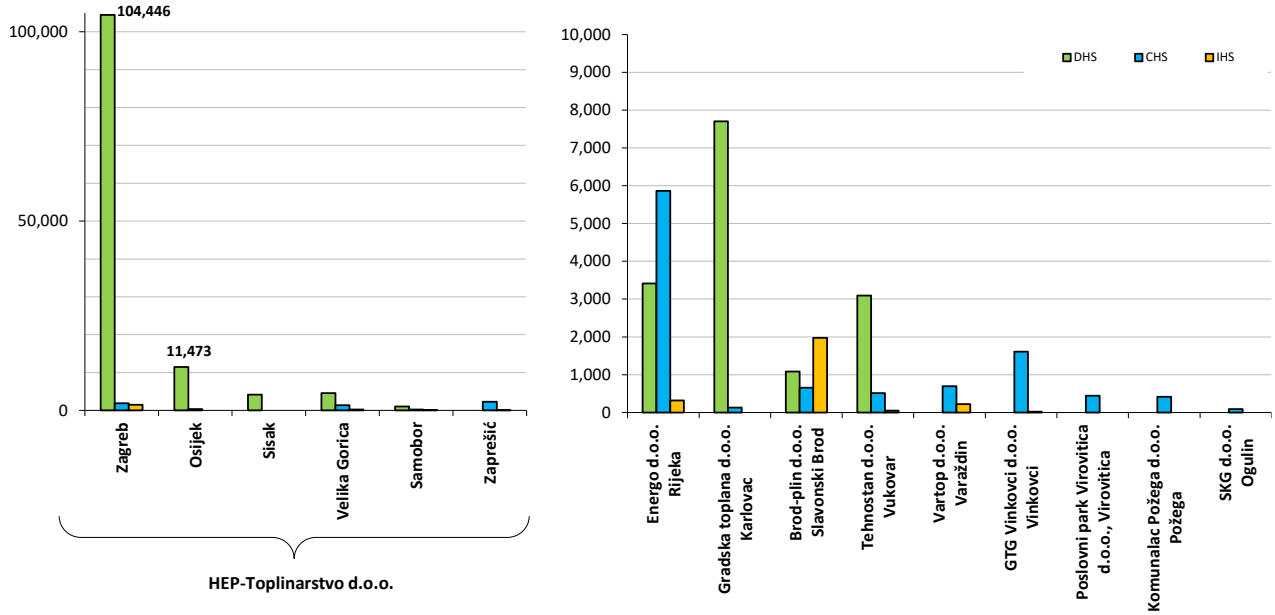


Figure 8.2.3 Number of final customers in 2020

The majority of energy entities in the thermal energy sector have a considerable installed capacity reserve in relation to the connection capacity. Although HEP-Toplinarstvo d.o.o. is the largest energy entity in the heating sector, 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 2020, HEP-Proizvodnja d.o.o. delivered 2,186.55 GWh of thermal energy to HEP-Toplinarstvo d.o.o.

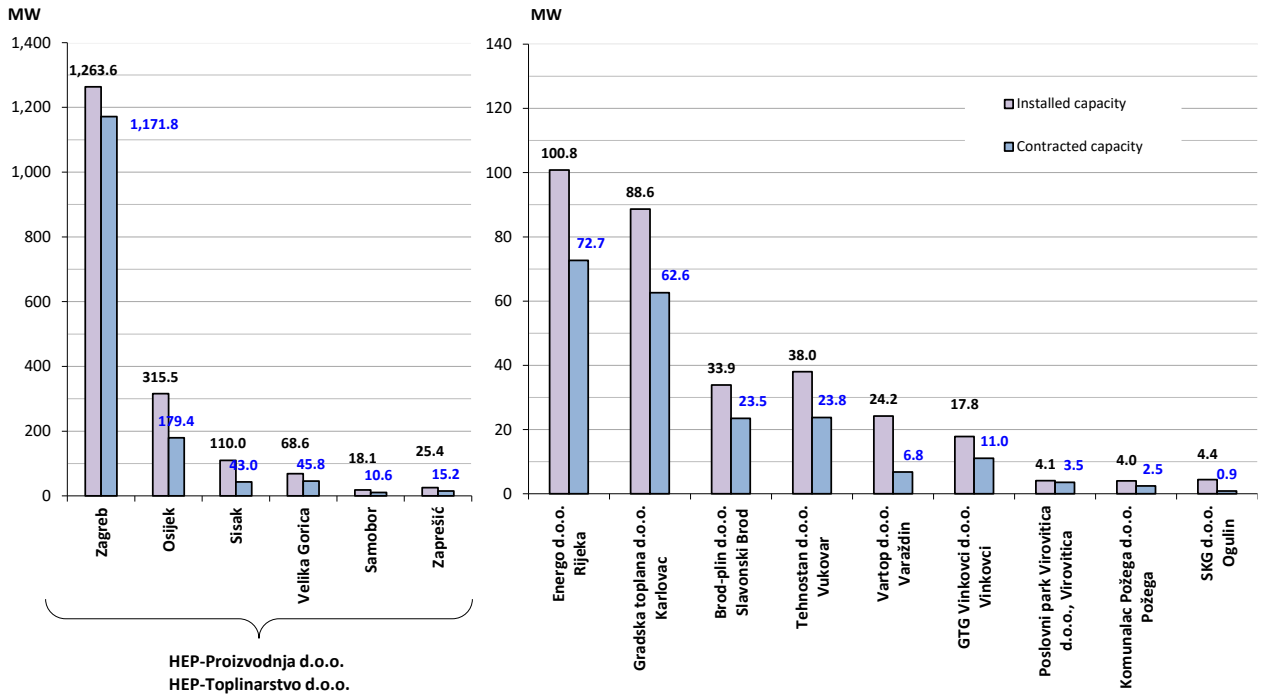


Figure 8.2.4 Installed capacity of thermal energy production facilities and contracted capacity in 2020

The majority of energy entities engaged in thermal energy production, distribution and supply are mostly owned by local government units or the state, with only a smal portion partially in private ownership. 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, district heating systems in Zagreb, Osijek, Sisak, Samobor, Velika Gorica, Rijeka, Karlovac, Slavonski Brod and Vukovar account for almost 87% of final-customer connections, 90% of surface area, and 93% of supplied thermal energy, as shown in Figure 8.2.5.

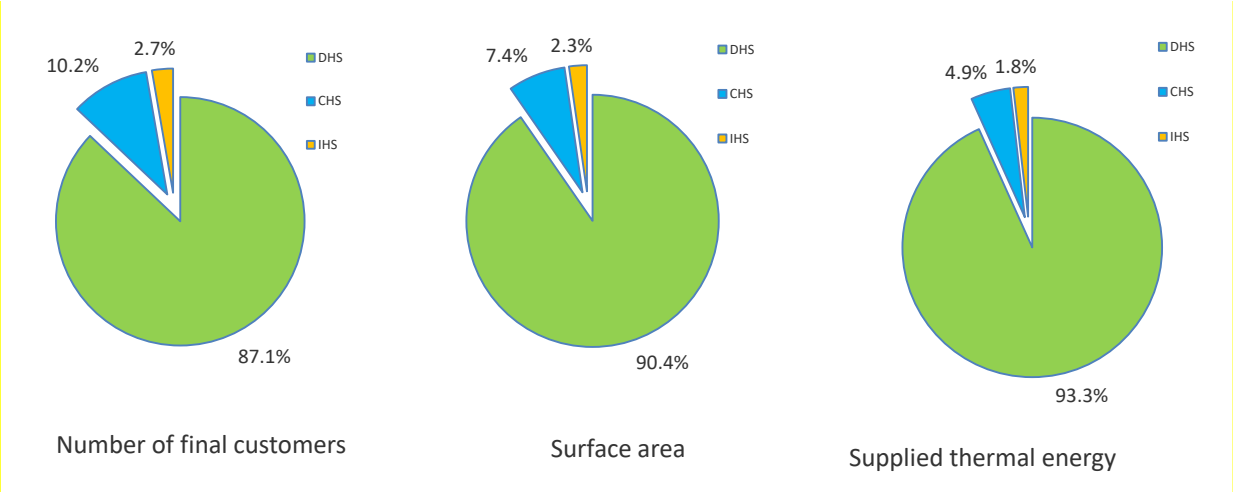


Figure 8.2.5 Share of final customers, surface area, and thermal energy supplied per heating system

8.2.2 Development of energy activities in the thermal energy sector

In 2020, nine licences were issued in the thermal energy sector for the performance of energy activities, namely:

- five licences for thermal energy production (BE-TO KARLOVAC d.o.o., Zagreb, DRVNI CENTAR GLINA d.o.o., Glina, ENERGANA GOSPIĆ 1 d.o.o., Šopot, HRVATSKA INDUSTRIJA ŠEĆERA d.d., Zagreb, MAKSIM TRADE ENERGIJA d.o.o., Žakanje) and
- four licences for thermal energy supply (BIOENERGETIKA d.o.o., Slavonski Brod, MAKSIM TRADE ENERGIJA d.o.o., Žakanje, UNI VIRIDAS d.o.o., Zagreb, SLAVONIJA OIE d.o.o., Slavonski Brod).

In 2020, the application of BIOEL d.o.o., Maslenjača, for a licence for the performance of the energy activity of thermal energy supply, was rejected.

In 2020, eight licences for the performance of energy activities were extended:

- five licences for thermal energy production (KOMUNALAC POŽEGA d.o.o., Požega, SLAVONIJA OIE d.o.o., Slavonski Brod, SPIN VALIS INTERNACIONAL d.o.o., Požega, BE-TO GLINA d.o.o., Glina, UNI VIRIDAS d.o.o., Zagreb) and
- three licences for thermal energy supply (ĐURO ĐAKOVIĆ Energetika i infrastruktura d.o.o., Slavonski Brod, GRADSKA TOPLANA d.o.o., Karlovac, GTG VINKOVCI d.o.o., Vinkovci).

In 2020, two licences for the performance of energy activities expired:

- one licence for thermal energy production (SENSE ESCO BELIŠĆE d.o.o., Zagreb) and
- one licence for thermal energy distribution (TEKIJA d.o.o., Požega).

On 31 December 2020, the number of valid licences in the thermal energy sector was as follows:

- 36 licences for thermal energy production,
- 6 licences for thermal energy distribution, and
- 30 licences for thermal energy supply.

New licences for thermal energy production and thermal energy supply are mostly related to the construction of new cogeneration installations in the incentives system for the production of electricity from renewable energy sources and cogeneration, for which HERA has issued decisions on eligible electricity producer status. Specifically, in 2020 HERA issued five decisions on eligible electricity producer status for production facilities using solid biomass, and three decisions for production facilities using biogas.

Pursuant to the **Thermal Energy Market Act**, and in connection with the activity of the buyers of thermal energy, HERA runs a register of thermal energy buyers available on its website. During 2020, five new thermal energy buyers were recorded in the register, and one business entity was deleted. Thus, as of 31 December 2020, there were 46 business entities (legal and natural persons) recorded in the register. In addition to the 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/structures.

In line with the regulations governing the incentives system for the production of electricity from renewable energy sources and cogeneration, 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 high-efficiency cogeneration installations using fossil fuels, the right to incentivised prices for delivered electricity is conditioned upon primary energy savings. In 2020, HERA issued 48 decisions on total annual efficiency of such production facilities, and five decisions on primary energy savings.

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 district heating systems.

In 2020, energy entities engaged in thermal energy production and thermal energy distribution in district heating systems did not submit any requests to determine tariff amounts for thermal energy production and thermal energy distribution. However, the *Methodology for setting tariffs for thermal energy production* allows for a simplified change in tariff amounts for energy in case of change in the price of the fuel used for thermal energy production by more than ±5% relative to the price of fuel based on which energy tariff amounts were approved. In 2020, HERA received two such applications for the change of energy tariff amounts, submitted by the energy entity BROD-PLIN d.o.o. Following these two applications, in 2020 tariffs were reduced in Slavonski Brod by 7.68% for the household tariff group, and by 14.41% for industrial and commercial consumers tariff group.

Table 8.2.2 shows tariff amounts for thermal energy production and thermal energy distribution for district heating systems as at 31 December 2020. 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 district 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 are contracted freely.

The chart in Figure 8.2.6 shows average shares of individual components in the total price of thermal energy for household final customers in district heating systems in Croatia. Shares of different components in the total thermal energy price were calculated based on the data on thermal energy delivered, connection capacity, surface area, and number of final customers in each district heating system in 2020, tariffs for the production and distribution of thermal energy, fees for thermal energy supply, and fees for thermal energy buyers.

Table 8.2.2 Tariff amounts for thermal energy production and thermal energy distribution for district heating systems as at 31 December 2020 (net of VAT)

Energy entity	District heating system	Tariff groups (Tg)*	Tariff models (TM)**	Tariff amounts as at 31 December 2020					
				Production		Distribution		Production + distribution	
				Energy [HRK/kWh] *[HRK/t]*	Capacity [HRK/kW] *[k/t/h]*	Energy [HRK/kWh] *[HRK/t]*	Capacity [HRK/kW] *[k/t/h]*	Energy [HRK/kWh] *[HRK/t]*	Capacity [HRK/kW] *[k/t/h]*
Energo d.o.o., Rijeka	GORNJA VEŽICA	Tg1	TM1	0.2961	9.50	0.0500	4.00	0.3461	13.50
		Tg2	TM2	0.2961	9.50	0.0500	4.00	0.3461	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	0.2619	11.60	0.0400	4.40	0.3019	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	0.2332	11.60	0.0500	5.20	0.2832	16.80
		Tg2	TM2	0.2650	11.60	0.0500	5.20	0.3150	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	0.3045	9.50	0.0470	5.00	0.3515	14.50
	OLAJNICA	Tg1	TM1	0.2696	9.50	0.0470	5.00	0.3166	14.50
		Tg2	TM2	0.3062	9.50	0.0470	5.00	0.3532	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*

* Tariff groups: Tg1 – households, and Tg2 – industrial and commercial consumers

** Tariff models: TM1 – hot/warm water (in HRK/kWh), TM2 – hot/warm water (in HRK/kWh), and TM3 – technological steam (in HRK/t)

*** Tariff items for the production of thermal energy have been determined for HEP-Proizvodnja d.o.o., Zagreb, which delivers thermal energy from its cogeneration plants for the needs of final customers of HEP-Toplinarstvo d.o.o.

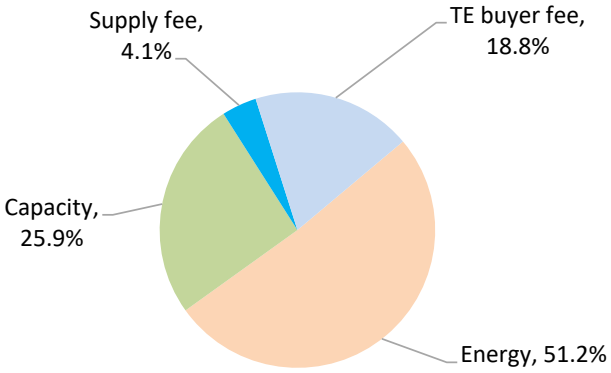
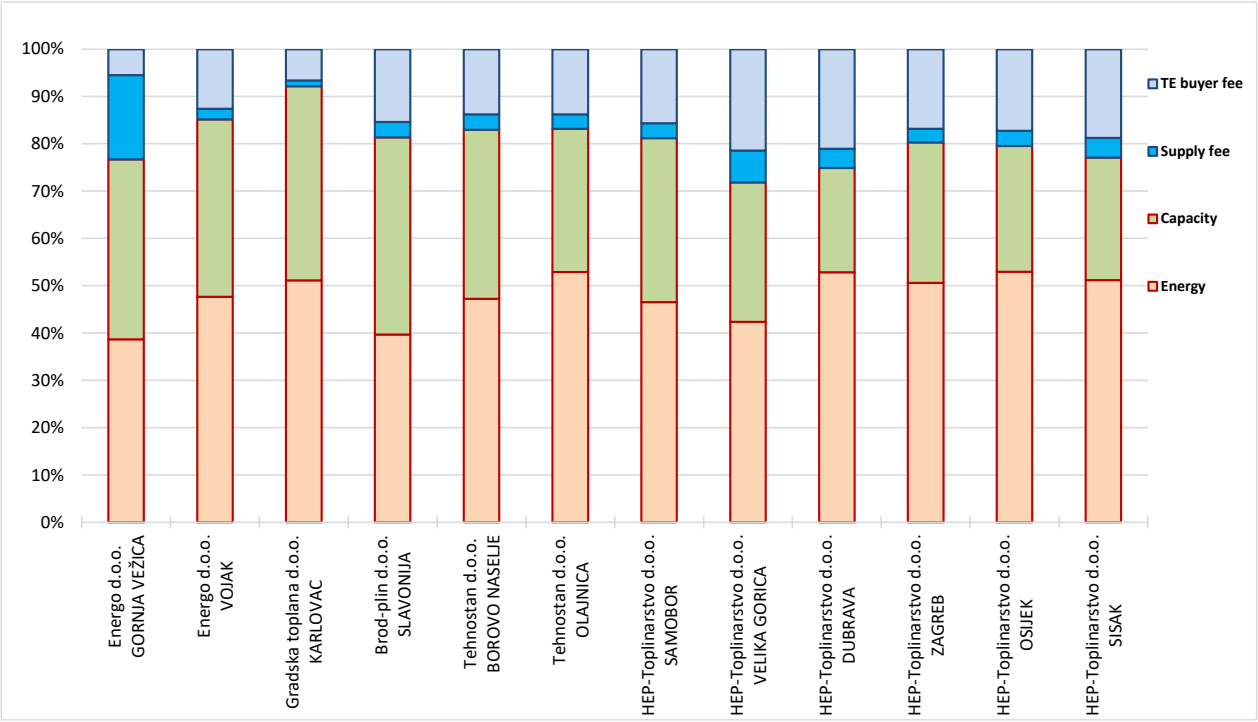


Figure 8.2.6 Average shares of individual components in the total price of thermal energy for household final customers for all district heating systems

As shown in Figure 8.2.6, the regulated share in the thermal energy price for all district heating systems averages around 77% (capacity plus energy).

For ease of comparison, Figure 8.2.7 provides a more detailed breakdown of the total price of thermal energy with its components for household final customers across district heating systems in Croatia in 2020.



TE buyer fee	5.5%	12.6%	6.6%	15.4%	13.8%	13.8%	15.6%	21.4%	21.1%	16.8%	17.2%	18.8%	Market share
Supply fee	17.8%	2.2%	1.2%	3.3%	3.2%	3.0%	3.2%	6.8%	4.1%	2.9%	3.2%	4.1%	
Capacity	38.0%	37.5%	41.0%	41.6%	35.7%	30.3%	34.7%	29.5%	22.0%	29.7%	26.6%	25.9%	Regulated share
Energy	38.7%	47.7%	51.1%	39.7%	47.2%	52.9%	46.5%	42.4%	52.9%	50.6%	53.0%	51.2%	

Figure 8.2.7 Breakdown of the total price of thermal energy for household final customers across district heating systems in 2020

Pursuant to the **Thermal Energy Market Act**, in independent and closed heating systems, the prices of thermal energy delivered to thermal energy buyers and final customers are formed freely in accordance with the market conditions. Given that none of the

components of thermal energy prices for closed and independent heating systems are set by HERA, the prices for those systems and their breakdown by components are not included in Table 8.2.2 and Figure 8.2.7.

8.2.4 Consumer protection

During 2020, HERA received 78 submissions (four appeals, 29 complaints, 41 inquiries and four other submissions) concerning the thermal energy sector. The submissions were made by thermal energy final customers, authorised representatives, energy entities and thermal energy buyers, institutions, and other parties.

Table 8.2.3. shows a breakdown of submissions related to heating by basic category and reasons for submission per category, with corresponding shares. Compared to 2019, which had been marked by complaints concerning thermal energy bills and requests of final customers and other legal and natural persons for opinions and interpretations of the **Thermal Market Energy Act** and the by-laws, the submissions received in 2020 (similarly to 2019), show a decline in the number of complaints related to the fixed costs of thermal energy and a decline in complaints concerning the work of thermal energy buyers and the companies in charge of installing and reading heat cost allocators. Instead, complaints and appeals primarily related to specific cases pertaining to the actions of energy entities and thermal energy buyers. In comparison with the previous year, there was a 6.7% decrease in the total number of submissions related to the heating sector.

Table 8.2.3 Submissions (appeals, complaints, inquiries, and other submissions) related to the heating sector received in 2020

Description	Number	Share in category [%]	Share in all submissions [%]
Appeals	**4**		**5.1%**
Complaints	**29**		**37.2%**
Complaints related to billing, calculation, and allocation	15	51.72%	
Complaints related to activities of thermal energy buyers	4	13.79%	
Complaints related to meter/heat cost allocator reading	5	17.24%	
Complaints related to suspension and disconnection	5	17.24%	
Inquiries	**41**		**52.6%**
Complaints related to billing, calculation, and allocation	9	21.95%	
Inquiries related to activities of thermal energy buyers	6	14.63%	
Inquiries related to meter/heat cost allocator reading	7	17.07%	
Inquiries related to suspension and disconnection	9	21.95%	
Inquiries related to energy licences, energy activities, etc.	10	24.39%	
Other	**4**		**5.1%**

Much like in 2019, the majority of submissions concerned thermal energy billing and the allocation and calculation of costs of supplied thermal energy, as well as to the obligations of thermal energy buyers, authorised representatives of co-owners of independent heating units within a building/structure, and persons in charge of reading devices for the local distribution of supplied thermal energy (heat cost allocators). The majority of complaints were essentially outside the remit, jurisdiction and responsibilities of HERA as specified by the acts and related by-laws governing the energy sector, and pertained to issues such as civil obligations, ownership and co-ownership, etc.

In terms of jurisdiction, it should be noted that an energy inspection unit for heating and gas was established at the State Inspectorate, tasked with, *inter alia*, monitoring the implementation of regulations governing:

- the requirements for the performance of energy activities of production, distribution, supply of thermal energy and thermal energy buyer activities,
- the obligations of energy entities and thermal energy buyers during the performance of electricity-related activities and the use of thermal energy in meeting the requirements for the security, reliability, consistency, and quality of thermal energy supply, as well as technical management, handling and maintenance of internal installations and any equipment located at the internal installation, and
- the measures to protect final customers of thermal energy, as well as the powers and responsibilities of co-owners and final customers of thermal energy.

However, the protection of final customers, i.e., consumer protection, is greatly burdened by the complex organization of activities as laid down in the **Thermal Energy Market Act**. More specifically, the protection of final customers' rights differs depending on whether the final customer is part of an independent heating system, closed heating system or district heating system because the requirements and manner of performing activities in those systems differ. Given the fact that the framework for the performance of energy activities of thermal energy production, distribution and supply and the activity of buyers of thermal energy differ depending on the type of heating system, final customers of thermal energy are often not sure whom and how they can address to resolve issues or have their rights protected. Moreover, such differences often prevent a direct comparison of prices and requirements for the performance of said activities, especially bearing in mind that the prices and tariffs for thermal energy production and distribution are regulated only in district heating systems (constituting only a part of the final price of thermal energy, as demonstrated in section 8.2.3.).

In apartment buildings, an additional issue related to consumer protection is the complexity of relationships between the co-owners (final customers of thermal energy), representatives of co-owners, managers, persons reading heat cost allocators and meters, thermal energy buyers and energy entities, with some roles in most buildings being exercised by the same person. The most common situation is the one where the thermal energy supplier is also a thermal energy buyer. However, there are also other situations, for example where the thermal energy buyer is also the person doing the reading, and it is also possible for the thermal energy buyer to be both a supplier and manager.

Moreover, the situation in apartment buildings is characterized by a specific relationship between the thermal energy buyer and final customer of thermal energy, which is regulated by a "thermal energy consumption agreement" concluded based on a decision of the majority of co-owners, but binding for all co-owners (i.e., final customers of thermal energy). There are also buildings in which thermal energy suppliers supply thermal energy without a concluded agreement on thermal energy consumption, as well as buildings in which gas suppliers supply gas for the needs of common boiler stations and allocate supplied gas to the co-owners of those buildings and boiler stations. Also important for the final customers is the service of reading heat cost allocators and separate meters that is not mentioned in the **Thermal Energy Market Act** and is therefore not covered by the required activities of thermal energy buyers. The reading is only superficially covered by the *Ordinance on the method of allocating and calculating costs of supplied thermal energy,* according to which this is done by an authorised representative of co-owners, or a natural or legal person authorised by them. In practice, the service of reading (frequently together with the installation of heat cost allocators) is or was contracted with business entities in different ways, with reading sometimes being contracted with individual final customers, and sometimes collectively for all co-owners (with the form of the agreement differing from building to building or from manager to manager).

Consequently, the various ways in which the supply and calculation of thermal energy are organized in apartment buildings, together with the issues of management or decision-making in apartment buildings, greatly interfere with the protection of final customers'

and consumers' rights. Therefore, it is necessary to improve legislation and practice in the heating sector in order to simplify the management and maintenance of heating systems in buildings and thermal energy calculation, bearing in mind the considerable similarities between the activity of buyer of thermal energy and the role of building manager.

8.2.5 Energy efficiency in heating systems

Energy efficiency in tariff systems

As explained in the previous chapters, HERA sets tariffs for thermal energy production and thermal energy distribution, which must then be applied by thermal energy producers and thermal energy distributors in district heating systems. However, the final price of thermal energy in district heating systems is only partly regulated, with the fee for thermal energy supply and the fee for thermal energy buyer activities being contracted freely.

Tariff items for thermal energy production and thermal energy distribution in district heating systems are determined according to the *Methodology for setting tariffs for thermal energy production* and the *Methodology for setting tariffs for thermal energy distribution*. All decisions on tariffs for thermal energy production and thermal energy distribution for individual district heating systems are available on HERA's website. In view of the fact that tariffs pertain to a given district heating system and not to an energy entity, tariffs reflect the costs of that particular district heating system. In other words, each district heating system has its own expenses which are ultimately related to the technical characteristics of production and distribution, including losses in the transformation and distribution of thermal energy.

Only two tariff items for individual tariff groups and tariff models are specified in the above methodologies – volume of energy and capacity. In principle, revenue from the energy volume tariff should cover variable energy costs, while revenue from the capacity tariff should cover fixed costs. The capacity tariff is applied to purchased or connection capacity, and as such constitutes a fixed charge in the final price of thermal energy.

According to the *Methodology for setting tariffs for thermal energy distribution*, HERA recognises realised losses in the hot water/warm water distribution network of up to 10% of the total thermal energy taken up at input point. Realised losses in the steam distribution network are also recognised, up to a maximum of 18%. In exceptional cases, HERA may approve higher losses in the distribution network, taking into account the specific terms and conditions, and characteristics of the distribution network, whereby the thermal energy distributor is required to provide an operational plan to reduce losses in the distribution network within a reasonable timeframe. According to the above *Methodology*, thermal energy losses in the distribution network for a regulatory year are calculated as the difference between measured thermal energy taken up in the base year at the points of demarcation between the producer and the distributor of thermal energy (input point), and delivered thermal energy in the base year at the points of demarcation between the distributor and the supplier of thermal energy (exit point).

According to the *Methodology for setting tariffs for thermal energy production*, thermal energy producers in a district heating system are required to provide proof of production losses for each type of fuel used to produce thermal energy. HERA will verify and confirm whether the losses are justified in order to determine variable costs. Following an analysis of variable costs and calculated losses in thermal energy production, HERA may establish that the variable costs are only partially justified, taking into account the specific terms and conditions, and the characteristics of production facilities.

High-efficiency cogeneration

According to the **Renewable Energy Sources and High-Efficiency Cogeneration Act,** legal or natural persons engaged in highly efficient production of electricity and thermal energy in a single production facility may be granted eligible electricity producer status. The

criteria for acquiring eligible electricity producer status are specified in the provisions of the **Renewable Energy Sources and High-Efficiency Cogeneration Act**, and the *Ordinance on acquiring eligible electricity producer status*, until adoption of the regulation from Article 25 of the **Renewable Energy Sources and High-Efficiency Cogeneration Act**, which should replace the above *Ordinance*.

Producers with eligible electricity producer status for natural gas cogeneration installations must achieve at least the minimum value of primary energy savings (PES). The procedure and parameters for calculating primary energy savings have been harmonised with the following EU regulations related to high-efficiency cogeneration:

- *Directive 2012/27/EU* and *Directive (EU) 2018/2002,*
- *Commission Delegated Regulation (EU) 2015/2402 of 12 October 2015 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU of the European Parliament and of the Council and repealing Commission Implementing Decision 2011/877/EU*, and
- *2008/952/EC: Commission Decision of 19 November 2008 establishing detailed guidelines for the implementation and application of Annex II to Directive 2004/8/EC of the European Parliament and of the Council (notified under document number C(2008) 7294).*

Based on the *Ordinance on acquiring eligible electricity producer status*, HERA has so far granted eligible electricity producer status to six natural gas cogeneration installations (as shown in Table 8.2.4). Having concluded the corresponding electricity purchase contracts with HROTE, all six installations are now part of the electricity production incentives system.

Table 8.2.4 Decisions granting eligible electricity producer status to high-efficiency cogeneration installations

Eligible producer	Name of installation	Capacity - electricity [MW]	Capacity - thermal [MW]	Date of decision
TERMOPLIN d.d.	TERMOPLIN cogeneration installation	0.033	Not indicated in the decision	26 July 2010
Hrvatska industrija šećera d.d. (transferred from SLADORANA d.d.)	Sladorana d.d. cogeneration installation	10.000	Not indicated in the decision	29 July 2010
ENERGO d.o.o., Rijeka	Energy facility by the Kantrida indoor swimming pool	0.460	0.720	28 March 2011
OSATINA GRUPA d.o.o., Semeljci	Greenhouse for hydroponic tomato production with ancillary facilities	0.650	1.208	29 May 2013
OSATINA GRUPA d.o.o., Semeljci	Tomašanci cogeneration 1MW + 1MW	1.800	2.416	12 June 2014
HEP-Proizvodnja d.o.o., Zagreb	Combined cogeneration block L, 100 MWe/80 MWt at TETO Zagreb	100.000	80.000	26 July 2016

In accordance with the *Ordinance on acquiring eligible electricity producer status*, HERA conducts annual supervision of primary energy savings and issues decisions determining the amounts of primary energy savings for each cogeneration installation.

HERA has issued decisions determining primary energy savings for 2019 for all six cogeneration installations (with five decisions issued in 2020, and one in 2021). All installations achieved a volume of primary energy savings higher than the required minimum. The decisions are published on HERA's website.

In accordance with the *Agreement on data exchange* concluded between HERA and the Croatian Bureau of Statistics on 12 June 2017, HERA delivered to the Bureau aggregate data on primary energy savings for the six cogeneration installations referred to above.

The Croatian Bureau of Statistics uses the aggregate data to complete EUROSTAT questionnaires, in accordance with *Directive 2012/27/EU*.

According to the **Renewable Energy Sources and High-Efficiency Cogeneration Act,** where electricity delivered from production facilities to the grid must be limited, the transmission system operator or distribution system operator are required to ensure that the production facilities with eligible producer status are given priority over other production facilities for the delivery of electricity to the grid, unless such priority delivery significantly undermines the reliability and stability of the system. In other words, cogeneration installations with eligible electricity producer status have priority in delivery. Similar provisions also exist in the **Thermal Energy Market Act** and the **Electricity Market Act**.

In addition, HERA calculates the total annual energy efficiency for biomass and biogas cogeneration installations that have concluded electricity purchase contracts using the *Tariff system for the production of electricity from renewable energy sources and cogeneration (Official Gazette No. 133/13, 151/13, 20/14, 107/14 and 100/15)* and the *Tariff system for the production of electricity from renewable energy sources and cogeneration (Official Gazette No. 63/12, 121/12 and 144/12).* The total annual energy efficiency is calculated as the efficiency of the plant in the conversion of primary fuel energy into delivered electricity and produced useful heat.

Energy efficiency obligation scheme

A detailed description of the legislative framework for the energy efficiency obligation scheme is given above. Its implementation began in 2019.

Given the gradual implementation of the energy efficiency obligation scheme, in 2020 the obligated parties were energy suppliers and their affiliated persons who had supplied a total of more than 100 GWh of energy in 2018. Entities in the heating sector subject to the obligation in 2020 were HEP-Toplinarstvo d.o.o., Zagreb, Brod-plin d.o.o., Slavonski Brod, and Energo d.o.o., Rijeka. Brod-plin d.o.o. and Energo d.o.o. were obligated parties in 2020 because they simultaneously acted as suppliers of thermal energy and gas, with their total gas and thermal energy delivered to final customers in 2018 (as the criterion for the obligation in 2020) being higher than the predefined threshold.

The final threshold of 50 GWh for obligated parties, to be applied from 2021 onwards, is a relatively high threshold for thermal energy suppliers.

9 TABLES AND FIGURES

9.1 Tables

9.2 Figures

10 ACRONYMS AND INDEX

4M MC	and/or 4M MC Project – Four Markets Market Coupling Project (day-ahead market coupling project between Hungary, Slovakia, the Czech Republic, and Romania)
AAC	Already Allocated Capacity
ACER	Agency for the Cooperation of Energy Regulators
aFRR	Automatic Frequency Restoration Reserve
AGEN-RS	Serbian energy regulatory
Aggregator	a natural or legal person who combines multiple consumer loads or generated electricity for sale, purchase, or auction in any electricity market
AIB	Association of Issuing Bodies
AIT	Average Interruption Time
ARIS	ACER REMIT Information System
BI	Business Intelligence
BMP	Billing metering point
BSP	Slovenian power exchange
CACM Regulation	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 (key EU financing instrument to promote growth, jobs, and competitiveness through targeted infrastructural investment at EU level)
CEF-TC	CEF Telecom call – Cybersecurity (CEF-TC-2019-2), E-PASIS project – System for Prevention and Analysis of HOPS's communication networks' security incidents
CEP	Clean Energy Package (the Clean Energy for all Europeans package)
CEREMP	Centralised European Register of Energy Market Participants
CHA	Croatian Hydrocarbon Agency
CHP	Cogeneration through combined heat and power
CHS	Closed heating system
Core FB MC	Core Flow-based Market Coupling
Core region	EU region for transmission capacity calculation not defined by bidding zones, but by borders, including the following cross-zonal borders (ISO country codes): FR-BE, BE-NL, FR-DE/LU, NL-DE/LU, BE-DE/LU, DE/LU-PL, DE/LU-CZ, AT-CZ, AT-HU, AT-SI, CZ-SK, CZ-PL, HU-SK, PL-SK, HR-SI, HR-HU, RO-HU, HU-SI, DE/LU-AT
Council	Council for Regulatory Affairs and Consumer Protection
CROPEX	Croatian Power Exchange
DA	Distribution area
DCC Regulation	Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection
DG ENER or ENER	Directorate-General of the European Commission for Energy)
DHS	District heating system
EBGL Regulation	Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing
EC	European Commission
EES	Grid connection approval
EKO Balance Group	Balance group run by HROTE, whose members are eligible producers of electricity and other entities that generate electricity and have concluded a contract with HROTE for the purchase of electricity from renewable energy sources and high-efficiency cogeneration

	(incentives for electricity production from renewable energy sources and high-efficiency cogeneration)
ELES	Slovenian transmission system operator
ENS	Energy Not Supplied
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSOG	European Network of Transmission System Operators for Gas
EOTRP	Report on the optimal technical solution for connecting to the network
E-PASIS	System for Prevention and Analysis of HOPS's communication networks' security incidents
EPC	Energy performance contract
EQS WS	CEER's Energy Quality of Supply Work Stream working group
ERNC Regulation	Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration
EU	European Union
EUPHEMIA	Computational algorithm used to calculate electricity prices on the electricity market
EUROSTAT	Statistical Office of the European Union
Ex-ante	means "in advance or before the event"; here it refers to approval of development plans and investments and setting tariffs and fees for a future period
Ex-post	means "after the fact or after the event"; here it refers to an analysis and/or review of results, realised plans and investments and justification for applied tariffs and fees in the preceding period
FB	Flow-Based
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
FCR	Frequency Containment Reserves
FEED-IN	Incentives system or mechanism for the development of renewable energy sources
FRR	Frequency Restoration Reserve
FSRU	Floating Storage and Regasification Unit
Fund	Environmental Protection and Energy Efficiency Fund
HANDA	Croatian Compulsory Oil Stocks Agency
HE	Hydroelectric power plant
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)
HT	Higher daily tariff
HTLS	High-temperature low-sag
HUDEX	Hungarian Derivative Energy Exchange
HUPX	Hungarian Power Exchange
HV	High voltage
HVDC Regulation	Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules
HVDC	High voltage direct current

IBWT	Italian Borders Working Table
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
ISO codes	ISO country codes: AL – Albania, AT – Austria, BA – Bosnia and Herzegovina, BE – Belgium, BG – Bulgaria, CY – Cyprus, CZ – Czechia, DK – Denmark, DE – Germany, EE – Estonia, GR – Greece, ES – Spain, FI – Finland, FR – France, GE – Georgia, HR – Croatia, HU – Hungary, IE – Ireland, IS – Iceland, IT – Italy, LI – Liechtenstein, LT – Lithuania, LU – Luxembourg, LV – Latvia, MD – Moldova, ME – Montenegro, MK – North Macedonia, MT – Malta, NL – Netherlands, NO – Norway, PL – Poland, PT – Portugal, RO – Romania, RS – Serbia, SE – Sweden, SI – Slovenia, SK – Slovakia, TR – Turkey, UA – Ukraine, UK – United Kingdom, XK – Kosovo
IT	Information Technology
ITC	and/or ITC Agreement – Inter-TSO Compensation for transit
ITO	Independent Transmission Operator
JANAF	Jadranski naftovod d.d.
JAO	Joint Allocation Office
LCOE	Levelized Cost of Electricity (average sale price including building costs, costs related to project financing, etc.)
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
LT	Lower daily tariff
LV	Low voltage
MC	Market Coupling
mFRR	Manual Frequency Restoration Reserve
MRS	Pressure reducing measuring station
MV	Medium voltage
n/a	Not applicable
NC TAR Regulation	Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas
NCV	Net calorific value of gas under standard conditions – energy released as heat when gas undergoes combustion with oxygen, at a combustion temperature of 15°C and natural gas temperature of 15°C
NECP	Integrated national energy and climate plan for the Republic of Croatia for the period 2021–2030
NEMO	Nominated Electricity Market Operator
NIS Directive	Directive (EU) 2016/1148 concerning measures for a high common level of security of network and information
NTC	Net Transfer Capacity
Open Season	A call for subscriptions / participation in an on-demand allocation mechanism allowing the transparent and non-discriminatory allocation of infrastructures access capacities and the dimensioning of supply to demand if necessary
PCI	Projects of Common Interest
PES	Primary Energy Savings
PPS	Purchasing Power Standards

PRISMA	Joint capacity booking platform at interconnections of gas transmission systems
RBMP	Register of billing metering points
RBP	Regional Booking Platform – for capacity booking at interconnections of gas transmission systems
RCC	Regional Coordinating Centre
Register	Register of renewable energy sources and cogeneration, and eligible producers
REMIT Regulation	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 source(s)
RES&C	Renewable energy sources and cogeneration
RfG Regulation	Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators
RHE	Reversible hydroelectric power plant
RSC	Regional Security Coordinator
RSI	Residual Supply Index
SAIDI	System Average Interruption Duration Index (supply continuity indicator – average total annual duration of interruption per customer)
SAIFI	System Average Interruption Frequency Index (supply continuity indicator – average annual number of interruptions per customer)
SBU	Standard bundled unit
SCADA	Supervisory Control and Data Acquisition
SEE CAO	Southeast Europe Coordinated Auction Office
SEE	Southeast Europe
SHB	Load-frequency control block including Slovenia, Croatia, and Bosnia and Herzegovina
SINCRO.GRID	A project co-financed from CEF. Its aim is to improve voltage quality in the electricity system and to implement dynamic line rating through advanced technical systems and algorithms
SMIV	System for Monitoring, Measuring and Verification of Energy Savings
SOGL Regulation	Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation
SOR	System Operation Region
Strategy	Energy Development Strategy of the Republic of Croatia until 2030 with an Outlook to 2050 (Official Gazette No. 25/20)
SUKAP	Capacity management system for yearly, quarterly, monthly, daily, and intraday capacity bookings
TM	Tariff model
TRM	Transmission Reliability Margin
TS	Transformer substation
TSC; TSCNET	Transmission System Operator Security Cooperation (TSC); TSCNET Services –Regional Security Coordinator Service for the TSOs in Central and South Eastern Europe
TYNDP 2020	Ten-Year Network Development Plan for EU transmission networks from 2020
UGSF Okoli	Okoli – Podzemno skladište plina d.o.o. (Underground Storage Facility Okoli)
VCBCC	Virtual cross-border control centre
VTT	Virtual trading point –a virtual gas trading place within the gas system (transmission system and gas storage system), where balance responsible parties can trade in gas
XBID	Cross Border Intraday

11 APPENDIX – LICENCES FOR ENERGY-RELATED ACTIVITIES

List of licences issued from 01/01/2020 to 31/12/2020	No. of issued licences
Electricity production	**9**
KIRNEK d.o.o., Mihovila Pavleka Miškine 64 c, 42000 Varaždin	
HRVATSKA INDUSTRIJA ŠEĆERA d.d., Ulica grada Vukovara 269g, 10000 Zagreb	
VJETROELEKTRANA ORJAK d.o.o. – for manufacturing and services, Ilica 1/A, 10000 Zagreb	
NTC GAJ d.o.o., Ulica Đure Dolušića 2B, 34551 Lipik	
SUNČANA ELEKTRANA VIS d.o.o., Fallerovo šetalište 22, 10000 Zagreb	
Eco-biogas d.o.o., Ivana Gorana Kovačića 2, 10451 Pisarovina	
BE-TO KARLOVAC d.o.o. – for manufacturing and services, Oranice 11, 10000 Zagreb	
RENETEH OGULIN d.o.o. – for electricity and thermal energy production, Otok Oštarski 4/e, 47300 Ogulin	
ENERGANA GOSPIĆ 1 d.o.o., Poslovno industrijska zona Šopot br. 28, 23240 Šopot	
Electricity supply	**2**
SOLARIS PONS d.o.o., Vukovarska 131, 31000 Osijek	
INA-INDUSTRIJA NAFTE d.d., Avenija V. Holjevca 10, 10000 Zagreb	
Electricity trade	**8**
SOLARIS PONS d.o.o., Vukovarska 131, 31000 Osijek	
TrailStone Renewables GmbH, Haus Cumberland, Kurfürstendamm 194, 10707 Berlin, Germany	
ENERGOVIA EOOD, Ivan Vazov district, 62A Burel Str., entr. A, floor 3, app. 9, 1408 Sofia, Bulgaria	
Energy Trading System OOD, Boris Arsov 5, entr. A, app. 68, 1000 Sofia, Bulgaria	
INA-INDUSTRIJA NAFTE d.d., Avenija V. Holjevca 10, 10000 Zagreb	
IE-ENERGY d.o.o., Vlade Grozdanića 11, 51000 Rijeka	
EDS International SK, s.r.o., Bajkalská 22, 821 09 Bratislava – Ružinov, Slovakia	
MFT Energy A/S, Margrethepladsen 4, 3. sal, DK-8000 Aarhus C, Denmark	
Gas trade	**13**
PPD energija d.o.o. – for energy trade, Pot za Brdom 104, 1000 Ljubljana, Slovenia	
SECENERGY Hungary Kft., Benczúr utca 11. fszt. 9., H-1068 Budapest, Hungary	
MET Slovakia, a.s., Rajská 7, 811 08 Bratislava, Slovakia	
MET Magyarország Zrt., Benczúr u. 13/b, H-1068 Budapest, Hungary	
MET Austria Energy Trade GmbH, Karl Waldbrunner Platz 1, 1210 Vienna, Austria	
PPD fueling LNG d.o.o., Gospodarska zona 13, 32000 Vukovar	
OMS - Upravljanje d.o.o., Avenija Marina Držića 71/B, 10000 Zagreb	
EP Commodities, a.s., Klimentská 1216/46, 110 00 Praha 1, Czech Republic	
Tank Terminal Ltd., 53, Office 2, Sir Adrian Dingli, Silema, Malta	
MFGK Croatia d.o.o., Radnička cesta 177, 10000 Zagreb	
DANSKE COMMODITIES A/S, Varkmestergade 3, 8000 Aarhus C, Denmark	
POWERGLOBE d.o.o., Ivana Lučića 2a, 10000 Zagreb	

List of licences issued from 01/01/2020 to 31/12/2020	No. of issued licences
DXT International S.A., Rue Guillaume Schneider 6, L-2522 Luxembourg, Luxembourg	
Management of supply points for liquefied natural gas and/or compressed natural gas	**2**
PLINARA d.o.o., Industrijska 17, 52100 Pula	
ENERGO d.o.o. – for thermal energy and gas production and distribution, Dolac 14, 51000 Rijeka	
Thermal energy production	**5**
DRVNI CENTAR GLINA d.o.o. – for manufacturing, trade and services, Žrtava Domovinskog rata 71, 44400 Glina	
HRVATSKA INDUSTRIJA ŠEĆERA d.d., Ulica grada Vukovara 269g, 10000 Zagreb	
MAKSIM TRADE ENERGIJA d.o.o., Žakanje 58, 47276 Žakanje	
BE-TO KARLOVAC d.o.o. – for manufacturing and services, Oranice 11, 10000 Zagreb	
ENERGANA GOSPIĆ 1 d.o.o., Poslovno-industrijska zona Šopot br. 28, 23240 Šopot	
Thermal energy supply	**4**
UNI VIRIDAS d.o.o., Ivana Lučića 2 A, 10000 Zagreb	
MAKSIM TRADE ENERGIJA d.o.o., Žakanje 58, 47276 Žakanje	
HEP-Toplinarstvo d.o.o. – for thermal energy production and distribution, Dr. Mile Budaka 1, 35000 Slavonski Brod	
SLAVONIJA OIE d.o.o. – renewable energy sources and trade, Svetog Lovre 75, 35000 Slavonski Brod	
Wholesale trade in petroleum products	**12**
ASPETROL d.o.o., Matuljska cesta 29 a, 51410 Opatija	
SEDLIĆ d.o.o., Berek 54, 43232 Berek	
ATTENDO CENTAR d.o.o., Rugvička 151/a, 10370 Dugo Selo	
BP-PETROL d.o.o., Rudolfa Matza 1, 10360 Sesvete	
GRŽINČIĆ d.o.o. – transport and trade services, Podstrmac 6, 51217 Klana	
KTC d.d., N. Tesle 18, 48260 Križevci	
ALDO COMMERCE d.o.o., Molindrio 11a, 52440 Poreč	
FUEL trading d.o.o. for services, Amruševa ulica 5, 10000 Zagreb	
PRIVAJ d.o.o., Putaljski put 58, 21212 Kaštel Sućurac	
PIA j.d.o.o. – for trade and services, Požeška cesta 1A, 35000 Slavonski Brod	
ŽMINJ PETROL d.o.o. – for construction, trade in goods and services, Matka Laginje 2/P, 52341 Žminj	
TOMICA BENZ d.o.o. – for manufacturing, trade and services, Kolodvorska 74, Donja Zdenčina	
Storage of oil and petroleum products	**1**
FUEL trading d.o.o. – for services, Amruševa ulica 5, 10000 Zagreb	
Wholesale trade in liquefied petroleum gas	**2**
Roguljić d.o.o., Koče Popovića 2, 31215 Divoš	
Continental Dynamics d.o.o., Ivana Gorana Kovačića 14, 10000 Zagreb	
TOTAL	**58**

List of licences extended from 01/01/2020 to 31/12/2020	No. of extended licences
Electricity production	**7**
UNIVERZAL d.o.o. – for waste management, production and trade, Cehovska 10, 42000 Varaždin	
SPIN VALIS INTERNACIONAL d.o.o. – for manufacturing and services, Industrijska 24, 34000 Požega	
SLAVONIJA OIE d.o.o. – renewable energy sources and trade, Svetog Lovre 75, 35000 Slavonski Brod	
UNI VIRIDAS d.o.o. – for energy, Ivana Lučića 2 A, 10000 Zagreb	
TEKONET d.o.o. – for telecommunications technology and services, Trnac 50, 10000 Zagreb	
FLAMTRON d.o.o. – for manufacturing and services, Ulica kralja Petra Krešimira IV br.1, 44320 Kutina	
Aiolos projekt d.o.o. – for energy production, Damira Tomljanovića Gavrana 17, 10000 Zagreb	
Electricity supply	**1**
PETROL d.o.o. – for trade and transport of oil and petroleum products, Otok, Oreškovićeva 6/h, 10010 Zagreb	
Electricity trade	**2**
Enel Global Trading S.p.A., Viale Regina Margherita 125, 00198 Rim, Italy	
Električni Finančni Tim d.o.o., Cesta v Mestni log 88 A, 1000 Ljubljana, Slovenia	
Gas distribution	**3**
PLINARA ISTOČNE SLAVONIJE d.o.o. – for gas distribution and supply, Ohridska 17, 32100 Vinkovci	
PAKRAC-PLIN d.o.o. – for gas distribution and supply, Ulica križnog puta 18, 34550 Pakrac	
HUMPLIN d.o.o. – for gas distribution, Lastine 1, 49231 Hum na Sutli	
Gas trade	**3**
PPD Hungária Energiakereskedő KFT, Montevideo utca 2/C, 1037 Budapest, Hungary	
OMV Gas Marketing & Trading GmbH, Trabrennstraße 6-8, 1020 Vienna, Austria	
Trafigura Nat Gas Limited, Blue Harbour Business Centre Level 1, Ta' Xbiex Yacht Marina, Ta' Xbiex XBX 1027, Malta	
Thermal energy production	**5**
KOMUNALAC POŽEGA d.o.o. – for public utilities, Vukovarska 8, 34000 Požega	
SLAVONIJA OIE d.o.o. – renewable energy sources and trade, Svetog Lovre 75, 35000 Slavonski Brod	
SPIN VALIS INTERNACIONAL d.o.o. – for manufacturing and services, Industrijska 24, 34000 Požega	
UNI VIRIDAS d.o.o. – for energy, Ivana Lučića 2 A, 10000 Zagreb	
BE TO GLINA d.o.o. – for manufacturing, trade and services, Žrtava Domovinskog rata 74/A, 44400 Glina	
Thermal energy supply	**3**
ĐURO ĐAKOVIĆ Energetika i infrastruktura d.o.o., Dr. Mile Budaka 1, 35000 Slavonski Brod	
GTG VINKOVCI d.o.o., Kralja Zvonimira 1, 32100 Vinkovci	
GRADSKA TOPLANA d.o.o. – for production and distribution of thermal energy, Tina Ujevića 7, 47000 Karlovac	
Production of biofuels	**1**
VITREX d.o.o. – for manufacturing and trade, Zbora narodne garde 3, 33000 Virovitica	

List of licences extended from 01/01/2020 to 31/12/2020	No. of extended licences
Wholesale trade in biofuels	**1**
CRODUX DERIVATI DVA d.o.o., Savska opatovina 36, 10090 Zagreb	
Storage of biofuels	**1**
VITREX d.o.o. – for manufacturing and trade, Zbora narodne garde 3, 33000 Virovitica	
Wholesale trade in petroleum products	**6**
ADRIA OIL d.o.o. – for sale of petroleum products, Spinčići 38, 51215 Kastav	
OKTAN ŽAŽINE d.o.o. – for transport and trade, Dužica 199, Dužica, 44272 Lekenik	
TRI BARTOLA d.o.o. – for trade and services, Hrvatskog sabora 25G, 23000 Zadar	
TOMICA BENZ d.o.o. – for manufacturing, trade and services, Kolodvorska 74, 10452 Donja Zdenčina	
NAVIS SUPPLEMENTUM d.o.o. – for supply of boats, Kralja Zvonimira 119, 21210 Solin	
DALER, d.o.o., Ulica Ivana Gorana Kovačića 14, 21000 Split	
Storage of oil and petroleum products	**2**
ETRADEX d.o.o. – for production and trade, Benazići 99, 52332 Pićan	
RIJEKA TRANS d.o.o. – for real estate trade and management, Kukuljanovo 337, 51227 Kukuljanovo	
Wholesale trade in liquefied petroleum gas	**3**
BUTAN PLIN d.o.o. – for wholesale and retail trade in petroleum products, Ulica rijeke Dragonje 23, 52466 Novigrad	
ZAGREBAČKI PROMETNI ZAVOD d.o.o., Ljubljanska avenija 1, 10000 Zagreb	
GAS OIL d.o.o. – for sale of petroleum products, Liburnijska 38, 51414 Ičići	
TOTAL	**38**

List of licences expired from 01/01/2020 to 31/12/2020	Number / reason for expiry of licences
Electricity production	**1**
PIK-VINKOVCI d.o.o. – for agricultural production, food industry and trade, Matije Gupca 130, 32100 Vinkovci	Expiry of validity
Electricity supply	**3**
CRODUX PLIN d.o.o. – for trade and services, Savska Opatovina 36, 10000 Zagreb	On own request
Proenergy d.o.o. – for electricity production, J. Marohnića 1, 10000 Zagreb	Expiry of validity
DOMAĆA ENERGIJA d.o.o. – for trade and services, Perjavica 74/A, 10000 Zagreb	Expiry of validity
Electricity trade	**8**
ELECTRADE S.P.A., Via Nonis 68/A, 36063 Marostica (VI), Italy	On own request
EDS International s.r.o. – for electricity trade, Bajkalska 22, 82109 Bratislava, Slovakia	Expiry of validity
INCERGO d.o.o. – for trade and services, Hruševečka ulica 9, 10000 Zagreb	Expiry of validity
Proenergy d.o.o. – for electricity production, J. Marohnića 1, 10000 Zagreb	Expiry of validity
Domaća energija d.o.o. – for trade and services, Perjavica 74/A, 10000 Zagreb	Expiry of validity
Green World Group OOD, Ivan Vazov k.br.36, Varna, Bulgaria	Expiry of validity

List of licences expired from 01/01/2020 to 31/12/2020	Number / reason for expiry of licences
ENERGIE2 d.o.o. – for electricity trade, Prilaz Gjure Deželića 74/II, 10000 Zagreb	Expiry of validity
GAZPROM MARKETING & TRADING LIMITED, 20 Triton Street, London NW1 3BF, United Kingdom	Expiry of validity
Gas distribution	**2**
PPD – Distribucija plina d.o.o., Gospodarska zona 13, 32000 Vukovar	Company removed from Commercial Register
PLIN VTC d.o.o., Ote Horvata 15, 33000 Virovitica	Company removed from Commercial Register
Gas supply	**5**
Acquamarin projekti d.o.o., Trogirska 3, 51000 Rijeka	Expiry of validity
Proenergy d.o.o., J. Marohnića 1, 10000 Zagreb	Expiry of validity
Incergo d.o.o., Hruševečka ulica 9, 10000 Zagreb	Expiry of validity
PPD-Opskrba kućanstava d.o.o., Gospodarska zona 13, 32000 Vukovar	Company removed from Commercial Register
PLIN VTC d.o.o., Ote Horvata 15, 33000 Virovitica	Company removed from Commercial Register
Thermal energy production	**1**
SENSE ESCO BELIŠĆE d.o.o. za usluge, Zagorska 31, 10000 Zagreb	Expiry of validity
Thermal energy distribution	**1**
TEKIJA, d.o.o. – for water services, Vodovodna 1, 34000 Požega	Expiry of validity
Production of biofuels	**1**
BIOTRON d.o.o., Karlovačka cesta 124, 47280 Ozalj	Expiry of validity
Storage of biofuels	**1**
Tankerkomerc d.o.o., Obala kneza Trpimira 2, 23000 Zadar	On own request
Wholesale trade in petroleum products	**8**
BDM d.o.o., Ante Starčevića 54, 35000 Slavonski Brod	Company removed from Commercial Register
BENZINSKA PUMPA BREBRIĆ d.o.o., Zagrebačka 51/b, 44322 Lipovljani	Expiry of validity
HUDEK-TRGOTRANS d.o.o., Biljevec 77, 42243 Biljevec	Expiry of validity
ORA-FORM d.o.o., Oporovečki vinogradi 12 C, 10000 Zagreb	Expiry of validity
Tankerkomerc d.o.o., Obala kneza Trpimira 2, 23000 Zadar	Expiry of validity
Tehnopetrol d.o.o., Gornja Trebinja 5, 47000 Karlovac	Expiry of validity
UNIJA TRADE d.o.o., Pavičini 604, 52208 Krnica	Expiry of validity
DP OIL ENERGY d.o.o., Osječka 73, 51000 Rijeka	Company removed from Commercial Register
Storage of oil and petroleum products	**1**
BDM d.o.o., Ante Starčevića 54, 35000 Slavonski Brod	Expiry of validity
Wholesale trade in liquefied petroleum gas	**1**

List of licences expired from 01/01/2020 to 31/12/2020	Number / reason for expiry of licences
CRODUX PLIN d.o.o. – for trade and services, Savska Opatovina 36, 10000 Zagreb	On own request
Storage of liquefied petroleum gas	**1**
CRODUX PLIN d.o.o. – for trade and services, Savska Opatovina 36, 10000 Zagreb	On own request
TOTAL	**34**

Energy-related activities	Valid licences – as at 31/12/2020
Electricity production	**68**
Electricity transmission	**1**
Electricity distribution	**1**
Electricity market organisation	**1**
Electricity supply	**12**
Electricity trade	**34**
Natural gas production	**1**
Gas transport	**1**
Gas storage	**1**
Management of liquefied natural gas terminals	**1**
Gas distribution	**33**
Gas market organisation	**1**
Gas trade	**25**
Gas supply	**46**
Management of supply points for liquefied natural gas and/or compressed natural gas	**2**
Thermal energy production	**36**
Thermal energy supply	**30**
Thermal energy distribution	**6**
Production of biofuels	**3**
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	**49**
Storage of oil and petroleum products	**20**
Storage of liquefied petroleum gas	**4**

Wholesale trade in liquefied petroleum gas	**14**
TOTAL:	**403**

On 31 December 2020, there were ***403 licences*** granted for energy-related activities in HERA's licence register.

Information on licences granted to perform energy-related activities is available in the licence register hosted by HERA:
https://www.hera.hr/hr/html/registar_dozvola.html.