



REPUBLIC OF CROATIA

CROATIAN ENERGY REGULATORY AGENCY



**SUMMARY OF THE ANNUAL REPORT
2023**

1. INTRODUCTION

The Croatian Energy Regulatory Agency (hereinafter: the HERA) is required, in accordance with the provisions of the Act on the Regulation of Energy Activities, to submit a report on its work, as well as the Report on the Execution of the Budget, to the Croatian Parliament once a year.

The 2023 Annual Report provides an overview of the most important observations, evaluations and analyses of the energy sector, the regulatory activities and work of the energy regulator over the past year, and a list of by-laws, decisions, rules, opinions, resolutions and other acts adopted by the HERA in 2023, which are important for the development and functioning of the energy markets, as well as public services in the energy sector of the Republic of Croatia.

In accordance with its regulatory obligations and powers, during 2023, the HERA significantly contributed to maintaining the stability and functioning of the energy markets. Following an exceptionally challenging and unstable 2022 on account of disturbances on the global energy market, there was a significant drop in energy prices in the first half of 2023, while further interventions by the Government of the Republic of Croatia additionally extended the measures to mitigate the disturbances on the energy market for the whole of 2023.

In accordance with its regulatory obligations and powers, during 2023, the HERA significantly contributed to maintaining the stability and proper functioning of energy markets.

The HERA continued implementation activities and the supervision of the implementation of the Regulation of the Government of the Republic of Croatia on Eliminating Disturbances on the Domestic Energy Market, which prescribed special and temporary measures until September 2024.

During 2023, the HERA supervised the work of energy entities and adopted a number of measures and instructions to improve their operations.

It is also important to note that during the entire 2023, the security of the energy supply to final customers was guaranteed, and the quality level was maintained.

In the existing domestic and international regulatory framework, the HERA will continue to perform its tasks with the aim of achieving an optimal balance between the interests of all participants in the energy market.

Board of Commissioners of the Croatian Energy Regulatory Agency:

Željko Vrban – Deputy President of the Board of Commissioners

Alenka Kinderman Lončarević – Member of the Board of Commissioners

Nikola Vištica – Member of the Board of Commissioners

2

BRIEF OVERVIEW OF HERA'S ACTIVITIES

ΚΑΔΑ ΗΕΚΑ-ε



2.

BRIEF OVERVIEW OF ACTIVITIES

In its Annual Report, the Croatian Energy Regulatory Agency (HERA) provided a detailed overview of the performance of its legally prescribed obligations, results and statistical indicators of individual sectors, the operations of regulated entities in the Croatian energy sector, and regulatory assessments and observations related to the development of the energy markets in Croatia.

Following an exceptionally challenging 2022 marked by disturbances on the global market, 2023 was marked by measures to resolve the crisis situation and by ensuring better preparation for possible future crisis situations. A drop in the prices of natural gas and electricity on the European wholesale markets also resulted in a drop in the prices on the Croatian wholesale and retail markets, while a decision of the Government of the Republic of Croatia also extended the measures to mitigate the disturbances on the gas and electricity markets during 2023, which allowed the continued secure and reliable energy supply to energy customers.

In this Report, the HERA provided an overview of all the important events in the energy sector that took place in 2023 and their consequences for the energy sector, as well as for the economy of the Republic of Croatia. The Report also contains a brief overview of the more important documents adopted in the European Union.

In accordance with its obligations and powers, the HERA carried out the necessary activities to ensure the optimal functioning of the energy markets/sector in Croatia in regulatory terms.

The structure of the Annual Report is in line with the recommendations of the Council of European Energy Regulators (CEER), while in terms of content, an effort was made to follow the regulatory reporting practice of the Agency for the Cooperation of Energy Regulators (ACER).

This chapter provides a brief overview of all the activities in the electricity, natural gas and thermal energy sectors, which are the focus of the regulators' work, while a statistical overview of key events is presented for the sectors of oil and petroleum products and biofuels. After the description of the HERA's organisational structure, authority and activities, the Report includes chapters in which all the sectors are described in detail.

2.1. Electricity

Characteristics of the electricity sector

The HERA ensures the implementation of the principle of transparent and non-discriminatory access to the electricity network and the regulation of entities with public service obligations in electricity activities. HERA adopts methodologies for setting tariffs in tariff regimes and for fixing a grid connection fee, the ordinance on general terms of the use of the network and electricity supply and other acts related to the terms of the use of the network, supply, supply quality, etc.

In addition, the HERA monitors the development of the electricity market and promotes competition and it also protects final electricity customers. Based on these principles, the HERA approves by-laws adopted by HOPS, HEP-ODS and HROTE, promotes efficient and rational use of electricity, entrepreneurship and investment in the electricity sector.

Like 2022, the year 2023 was highly challenging and demanding on account of all the events and characteristics on the energy markets across Europe, but also worldwide. Despite the electricity price reduction and stabilisation on European markets compared to 2022, government intervention setting the retail electricity prices and the measures related to generating surplus market revenues on wholesale electricity, the markets were still in force in the Republic of Croatia. Therefore, in 2023 as well, the HERA

dedicated and geared much of its time to activities related to the above circumstances, and particularly to the obligations arising for the HERA under the *Regulation on the Act on Emergency Intervention to Address High Electricity Prices*, the **Act on the implementation of Council Regulation (EU) 2022/1854 on an emergency intervention to address high energy prices** and the *Regulation on Eliminating Disturbances on the Domestic Energy Market* (Official Gazette, no. 31/23, 74/23, 107/23, 122/23 and 32/24).

Key indicators of the state of the electricity sector

Security of supply

The HERA monitors the balance of the power system of the Republic of Croatia based on hourly data on delivered electricity provided by system operators. Also, the HERA gives an opinion on the annual reports on the security of supply in the transmission/distribution system for the previous calendar year with a projection for the current calendar year, based on which the Ministry prepares its own annual report on the state of the security of the electricity supply for the previous calendar year and the expected electricity needs in Croatia for the future ten-year period.

The total connection capacity of all the power plants in the territory of the Republic of Croatia amounted to 6,244 MW at the end of 2023, specifically, 5,402 MW (87%) in transmission and 842 MW (13%) in distribution. It should also be noted that the connection capacity of distributed sources¹ was greater by 244 MW (41%) compared to 2022.

The most important primary source in electricity production in the Croatian electricity system (EES) in 2023 was hydropower, accounting for 47% of the total production and covering 41.3% of the total consumption. Fossil fuels remain an important source accounting for 29.6% of the total electricity production and covering 26% of the total consumption. Of the remaining sources, wind power accounts for the largest share in the total electricity production with 15.8% and covers 13.9% of the total consumption. A record share in covering the total consumption in the Croatian EES in 2023 was accounted for by electricity from renewable energy sources (RES) (62%).

The quantity of electricity produced in 2023 in hydroelectric power plants (7,534 GWh) is the second largest in history following the record in 2014. Likewise, the quantity of electricity produced by wind power plants (2,530 GWh) was the largest so far, as well as the quantity of electricity produced from fossil fuels (4,750 GWh), while the net imports (2,237 GWh) were at the lowest level in the last ten years.

The majority of electricity consumption in the Croatian EES in 2023 (18,266 GWh) was covered by electricity fed into the network by power plants located in the territory of the Republic of Croatia (16,029 GWh, 87.8%), while the remainder was covered by physical net imports of electricity (2,237 GWh, 12.2%). Power plants connected to the distribution network covered 9.7% of the total electricity consumption in the Croatian EES with electricity fed into the network (1,768 GWh).

The maximum load of the Croatian transmission system amounted to 3,198 MW; it took place on 24 August 2023. The minimum load was 1,241 MW and took place on 8 May 2023. The peak load of the system (transmission and distribution) in 2023 was 3,277 MW, while the total installed plant capacity at the end of 2023 was 6,244 MW. The ratio of the total connection capacity to the annual peak load in 2023 was 1.91.

The security of supply reports of the Croatian transmission system operator (Hrvatski operator prijenosnog sustava d.d., hereinafter: HOPS) and the Croatian distribution system operator (HEP-Operator distribucijskog sustava d.o.o, hereinafter: HEP-ODS), as well as the currently available data delivered to the HERA, lead to the conclusion that the security of the electricity supply in the Croatian EES was at a satisfactory level in 2023.

¹ *Distributed sources and/or distributed generation is a term indicating sources/production facilities of electricity or some other useful form of energy that are connected to the distribution network; they are most often located close to energy users and places of consumption, i.e., they are decentralised compared to "large" energy grids and the "large" sources connected to them.*

Finally, it is important to point out that, based on the systematic monitoring of the hourly balance of the electricity system of the Republic of Croatia, the HERA observed that, due to the large production in the territory of the Republic of Croatia, the Croatian EES was a net exporter of electricity for nearly 2,500 hours.

Retail market

The total electricity sales level in 2023 (16,491 GWh) was 1.9% lower compared to 2022. The level of electricity sales in the medium-voltage non-household category was 5.4% lower, while the level of sales to final customers in the household category for the White tariff model was 2.6% lower compared to 2022. The drop in sales could, among other things, be caused by the economic situation, climate conditions in 2023 or the increasing share of distributed production. Of the total electricity sold to households in late 2023, 90% refers to supply within the universal service, while the share for non-household customers within the framework of the guaranteed supply service was 11%.

The HERA continuously monitors shares on the retail electricity market based on data on supplier activities, the number of billing metering points and delivered electricity provided by system operators. Compared to 2022, in 2023 HHI² was increased in the household category from 7,852 to 8,335, and reduced in the non-household category from 6,709 to 6,386.

The share of suppliers that are subsidiaries of HEP d.d. (HEP-Opkrba d.o.o. and HEP ELEKTRA d.o.o.) in the supply to all customers in 2023 amounted to 92%.

One of the prerequisites for accelerating the energy transition is the introduction of advanced measurement. The HERA commissioned the study called the Basis for preparing a cost-benefit analysis of introducing advanced metering devices and systems for their networking to final electricity customers, which was completed in March 2023. The share of advanced meters installed for the non-household category is 56%. Advanced meters were installed for 89% of customers in the non-household category – the Red tariff model, whose average consumption per billing metering point is the highest and that mostly includes the industry and other energy-intensive businesses.

Following the application of the *Regulation on Eliminating Disturbances on the Domestic Energy Market* and its amendments, the medium-voltage non-household category (MV) and low-voltage non-household category (LV) recorded the greatest reduction in the price of electricity. The average price of electricity for household customers increased by 13% compared to 2022, while the average price of electricity for LV non-household customers was 11% lower compared to 2022.

The average total selling price of electricity for household customers increased by 9% compared to 2022, while the average total selling price of electricity for LV non-household customers was 7% lower compared to 2022. The final selling price for one kWh of electricity in 2023 for a typical final customer in the medium household category for the White tariff model was 0.1503 EUR/kWh, while in 2022 it amounted to 0.1431 EUR/kWh.

Protection of grid users

The highest number of complaints from final customers of electricity handled in the HERA concerned the invoiced amount, most of them relating to metering data. When handling cases, the HERA regularly asks for statements from the system operator. However, the distribution system operator often fails to meet the time-limit for submitting its statement, particularly in cases concerning connection procedures. The timeliness and quality in terms of data submission pursuant to the *Regulation on the Requirements for the Quality of the Electricity Supply* in 2024, referring to the results in 2023, were relatively satisfactory. The timeliness and quality of announcements on websites were unsatisfactory. The largest number of complaints received by suppliers concerned debt calculation, debt collection and debt claims lodged before courts. The largest number of complaints handled by complaint committees of HEP-ODS by distribution areas concerned the calculation, faulty meters and connection/disconnection. The indicators

² The market concentration index, or the Herfindahl-Hirschman Index (hereinafter: HHI), is a market concentration measure that serves as an indicator of the market power of individual businesses. HHI is considered to be very high over 250

for the time needed to handle complaints are still unsatisfactory, and HEP-ODS has to make additional efforts for improvements in that area.

Under the *Regulation on Eliminating Disturbances on the Domestic Energy Market* and its amendments, the Government of the Republic of Croatia introduced special measures for electricity trade, the method and conditions of price formation for certain electricity customer categories, the supervision of price implementation and special conditions for the performance of energy activities. The *Regulation* fixed the prices for customers in the household category and for certain customers in the non-household category, regardless of the supplier.

Quality of the electricity supply

Since 2017, the HERA has been systematically monitoring the indicators of the quality of the electricity supply based on the *Requirements for the Quality of the Electricity Supply (Official Gazette no. 37/17, 47/17, 31/18, 16/20)* and the *Regulation on the Requirements for the Quality of the Electricity Supply (Official Gazette no. 84/22)*, which it adopted in accordance with its powers and obligations. Among other things, the aforementioned acts prescribe the indicators and standards for the quality of the electricity supply and the method of measuring, collecting and publishing indicators of the quality of the electricity supply. In addition, the Regulation also determines the monetary compensation that energy entities are obliged to pay to grid users if the given individual quality indicators are exceeded (e.g. in case of exceeding the time required to resolve the request for the issuance of a grid connection approval).

Based on the monitoring of the indicators, the HERA found that, compared to 2022, the number and duration of power interruptions in the transmission network increased in 2023, as did the estimated electricity not supplied.

Indicators of the continuity of supply in the transmission network in 2023 were within the set limits of the general standards. Indicators in the distribution network were worse than in the previous years.

HEP-ODS has improved the existing power interruption monitoring system; however, in order to significantly improve the indicators, an additional set of measures to improve the continuity of supply needs to be implemented in certain distribution areas.

Programmes for the introduction of advanced networks and network automation should improve the mentioned indicators. Overall, the indicators of the service quality of HEP-ODS are approximately level with those in the previous year, but are below the prescribed general standards for the service quality. The indicator of the proportion of simple connections carried out in a timely manner for buildings (most often residential buildings with a gross surface area of up to 400 m², i.e. family houses) is low. In the past several years, this indicator has been at the level of a little over one-third of the prescribed general quality standard, only for it to drop to only 24% in 2023.

The trend of increasing the number of distributed sources was not followed by adequate service quality. Specifically, there have been a great number of instances where the time-limit for resolving a request to check the possibility of connecting the power-generating module to the existing plant of a final customer and for sending a certificate of the start of the use of the network, i.e. a change of status, was exceeded.

Regardless of the large number of instances where the guaranteed service quality indicators in the area of connection were exceeded, there are no requests from investors for compensation under the *Regulation on the Requirements for the Quality of the Electricity Supply*. Therefore, the HERA is considering the introduction of the automatic collection of that compensation, in accordance with the recommendations of the CEER and trends in Europe.³

Connection to the grid

On 14 July 2022, the HERA adopted the Methodology for Determining the Grid Connection Fee (Official Gazette, no. 84/22). Since the HERA has not yet decided on the amount of the unit grid connection fee, the Methodology for Determining the Fee for the Grid Connection of New Grid Users and for the Increase

³ According to the "7th CEER-ECRB Benchmarking Report on the Quality of Electricity and Gas Supply", in 2022, 11 CEER member countries enabled the automatic collection of certain compensation for service quality

in the Connection Capacity of Existing Grid Users (Official Gazette, no. 51/17, 31/18, 104/20), as well as the Decision on the Amount of the Fee for the Grid Connection and the Connection Capacity Increase (Official Gazette, no. 52/06), are in force.

Incentives for the production of electricity from renewable energy sources

Following a steady increase in the number of power plants in the incentives system, in 2022 the system recorded an annual drop of 37% in installed capacity and 22% in production, while in 2023 it recorded a drop of 3% in installed capacity and 28% in production. However, due to the situation on the electricity market, the contract termination trend has been almost entirely diminished.

As regards the guaranteed-purchase and guaranteed-price contracts, producers that are members of the EKO Balance Group (hereinafter: EKO BG) produced 2.0 TWh of electricity, 1.2 TWh of which was sold to suppliers by HROTE at the regulated price. The remainder was sold by HROTE on the wholesale market.

A portion of the electricity produced in power plants in the incentives system is sold on the Croatian electricity exchange (CROPEX), and a portion of the produced electricity is tied to sales contracts. When power plants started to opt out of the incentives system in 2022, there were instances where HROTE had to purchase energy to meet the demand for energy needed to fulfil long-term obligations. Therefore, the *Regulation on Incentivising Energy Generation from Renewable Energy Sources and High-Efficiency Cogeneration* adopted in 2023 introduced penalties for the early termination of incentives contracts.

Investments in the network

In 2023, the realised amount of investments in the transmission network amounted to EUR 96.6 million, taking into account all sources of financing for these investments, which is a historic high; thereby the largest portion of the funds was invested in the revitalisation, replacement and reconstruction on account of the age of the transmission network and increasing transmission capacity. The installation of submarine cables represents the biggest step forward in terms of the security of the electricity supply to the Adriatic islands. Cables were laid between Crikvenica and Krk and between Dugi Rat and Brač. In early 2024, new submarine cables were laid between Brač and Hvar, between Hvar and Korčula, between Krk and Cres and between Cres and Lošinj. All works were also finished for revitalising the existing 220 kV Senj-Melina transmission line, whose transmission capacity was significantly increased from 310 MVA to 580 MVA by installing new HTLS conductors. The revitalisation of the existing 220 kV conductors with new HTLS conductors on the segment Konjsko – Krš Pađene – Brinje, which will significantly increase the grid capacity for the acceptance of renewable energy sources and for cross-border trade, is expected to be completed during 2024.

During 2023, the increase in the connection of power plants to the distribution network continued, especially small solar power plants for which the connection procedure has been simplified and that are built as simple structures. The largest number of customers among them are those with self-supply that feed the excess electricity produced into the grid. Likewise, there was an increase in the number of connections of larger power plants at medium voltage. Total investments in the development of the distribution network in the amount of 2.42 billion euros are planned in the proposal for the ten-year plan. Investments conditional upon the connection of new users to the grid and increasing the connection capacity of existing users amount to one billion euros. Co-financed investments, i.e. investments with external sources of financing from EU funds, the National Recovery and Resilience Plan, the Solidarity Fund and other sources, represent a growing share of HEP-ODS's investments. Financing from the National Recovery and Resilience Plan as part of HEP-ODS's ten-year plan includes three major projects: the Modernisation and Development of an Advanced Network, the Modernisation of the Network in Natura 2000 areas, and the Submarine Cables in the Distribution Network for the Power Supply to Islands. The total planned investments in the development of the distribution network through these three projects over three years amount to EUR 228.77 million.

Transmission and distribution tariffs

The *Regulation on Eliminating Disturbances on the Domestic Energy Market* stipulated that HOPS and HEP-ODS would not submit a request to the HERA to change the amount of tariff items before 31 March 2024. The *Regulation on Eliminating Disturbances on the Domestic Energy Market* of March

2024 prescribed the ban on submitting requests to the HERA to change the amount of tariff items until 30 September 2024. Accordingly, system operators have not submitted requests to the HERA for the determination of tariff items both for 2023 and for 2024.

Losses in the network

The losses in the transmission network amounted to 464.83 GWh, that is, 15.51 GWh (3.5%) more than planned. The achieved price of electricity purchased to cover losses was 107.21 EUR/MWh without the imbalance settlement, or 106.85 EUR/MWh with the imbalance settlement. The total cost without the imbalance settlement was EUR 49.74 million (EUR 30.01 million less than planned), or EUR 49.80 million with the imbalance settlement. The losses in the distribution network amounted to 1,348.67 GWh, that is, 50.57 GWh (3.9%) more than planned. The achieved price of electricity purchased to cover losses was 62.23 EUR/MWh with the imbalance cost, or 59.85 EUR/MWh without the imbalance cost. The total cost of the purchase including the imbalance cost under the 2020 contract would have been EUR 83.93 million, but under the 2023 contract amendment that cost was EUR 80.72 million (without the imbalance cost).

Under the *Regulation on Eliminating Disturbances on the Domestic Energy Market* and the *Regulation on Amendments to the Regulation on Eliminating Disturbances on the Domestic Energy Market*, the Government of the Republic of Croatia reimbursed the price difference of 70.276 EUR/MWh to the achieved market purchase price of up to the maximum of 180 EUR/MWh. Thus, based on the above provision, the reimbursement to HOPS amounted to 11.9 million euros, and to HEP-ODS 3.6 million euros.

Wholesale market

HEP d.d. and its subsidiaries dominate in the installed capacity of power plants, produced electricity and electricity sold on the wholesale market. The total trading volume on the Croatian market in 2023 was 68.7 TWh, and HEP d.d.'s companies accounted for 44.3 TWh (not including HEP-ODS and HOPS).

The number of participants that met the conditions for entering the electricity market as of 31 December 2023 was 93 (43 for power generation, 12 were producers' pilot power plants, eight were suppliers and 30 were traders, not including HOPS, HEP-ODS, CROPEX and HROTE), which is an increase by 19 participants compared to 2022.

In 2023, there were 30 registered members on the CROPEX day-ahead market (CROPEX DA) and, alongside them, the Hungarian and Slovenian exchanges for the Slovenian and Hungarian border; while, alongside the Hungarian and Slovenian exchanges, 24 members of CROPEX traded on the intraday basis (CROPEX ID).

On the CROPEX day-ahead market, 30 exchange members purchased 4.7 TWh, and sold 5.0 TWh to CROPEX. On the CROPEX intraday market, 24 exchange members purchased 0.9 TWh, and sold 0.6 TWh to CROPEX.

The CROPEX intraday market switched to a fifteen-minute interval on 9 January 2024, for supplies on 10 January of the same year.

Since 2019, CROPEX has held auctions for the purchase of electricity for HOPS to cover losses. During 2023, a total of eight auctions were held for HOPS, specifically for: the third and fourth quarters of 2023, the first quarter of 2024, and the annual product for 2024.

Trading with Croatian financial derivatives indexed on CROPEX on the EEX exchange began on 26 June 2023 (weekly, monthly, quarterly and annual core and peak products). On 7 July 2023, the first transaction was performed on the EEX exchange for a long-term product.

In addition to the existing auctions of guarantees of origin from the incentives system owned by HROTE, in 2023 CROPEX organised a market for the sale of guarantees of origin outside the incentives system for guarantee holders both in and outside Croatia. The first such auction was organised in May 2023. The amount of guarantees sold in 2023 and at the beginning of 2024 was 618,709 for the incentives system and 152,655 guarantees outside the incentives system.

Cross-zonal trading

The HERA particularly monitors the allocation of cross-zonal capacities⁴ on the borders of the Republic of Croatia based on the data provided to it by HOPS.

The coordinated regional allocation of cross-zonal capacities in all the time frames on a market basis has been established at all borders except for intraday capacity allocations at the borders with Serbia and Bosnia and Herzegovina.

Among the Croatian borders, from 1 January 2023, it was only on the border with Hungary that no electricity exchanges were possible for annual capacities with physical delivery. Since July 2022, no exchanges with physical delivery for other products (monthly) were allowed for the Hungarian border, and instead of capacities, only financial products were offered for exchanges with physical delivery.

In the last several years, revenue from cross-zonal capacity allocation has increased significantly, which can be linked to the beginning of regional day-ahead capacity allocations in the Core region, as well as generally higher prices on wholesale markets. During 2021, HOPS generated revenue on this basis in the amount of EUR 13.9 million, in 2022 this amount increased to EUR 48.2 million, and in 2023 it finally amounted to EUR 67.4 million.

Electric power system balancing and imbalance settlement

The HERA monitors the imbalance settlement based on the data on realised market positions at the hourly level provided by HROTE on a monthly basis.

The imbalance price is the same for all the balance groups in each settlement interval and is determined based on the *Rules on Electricity System Balancing* adopted by HOPS.

During 2023, the imbalance settlement procedure and the market in Croatia operated on an hourly basis, and from 1 January 2024, it switched to a fifteen-minute basis. The CROPEX day-ahead market continued to operate on an hourly basis, while the CROPEX intraday market switched to the fifteen-minute basis in January 2024.

In 2023, HROTE settled imbalances of the balancing groups in the amount of EUR 25 million.

The HERA also monitors the procurement of electricity for electricity system balancing based on hourly data on activated balancing electricity and the associated costs.

In 2023, HOPS's total net costs for balancing energy from power reserves amounted to EUR 9.5 million. For other balancing energies, the amounts are as follows: the net revenue in the amount of EUR 6.3 million was generated from the imbalance netting cooperation process, the net cost from the common settlement for the unintended exchanges of energy was EUR 0.5 million, and the net revenue from the energy from the frequency containment process was EUR 116 thousand. The total net cost of all balancing energies amounted to EUR 16.3 million.

The new *Rules on Electricity System Balancing* (HOPS, 12/2023) introduced payment for frequency maintenance capacity (FCR), a primary power reserve, which will apply from 1 January 2025.

Energy efficiency

Directive 2012/27/EU, i.e. *Directive 2018/2002/EU*, and the **Energy Efficiency Act** generally define the HERA's obligations regarding energy efficiency. The obligations primarily refer to taking account of energy efficiency in decisions and tariff methodologies related to the transmission and distribution of electricity, and to enabling and promoting demand response. The HERA fulfils these obligations by adopting by-laws that direct HOPS, HEP-ODS and grid users to behave in accordance with energy-efficiency principles.

⁴ cross-zonal capacity – capacity between two trading zones that serves for electricity trading between neighbouring bidding zones or at the regional level for capacity calculation

HOPS's *Proposal for the Ten-year development plan for the transmission network in 2024-2033 with a detailed elaboration for the initial three-year and one-year periods* provides for conventional measures to improve energy efficiency through conductor replacement (the use of HTLS conductors, the replacement of 110 kV submarine oil cables with new environmentally friendly cables with higher transmission capacities, and the replacement of overhead lines with cable lines), transformer replacement (the replacement of old transformers with new low-loss transformers), grid reinforcement (the construction of new lines), and the improvement of transmission network management (the optimisation of power flows and the optimisation of power transformer operation).

HEP-ODS's *Proposal for the Ten-year (2024-2033) development plan for the distribution network with a detailed elaboration for the initial three-year and one-year periods* provides for direct measures to replace parts of the network, measures to achieve the more efficient operation of the distribution network, and measures to ensure more efficient planning and the implementation of direct measures to increase efficiency at the system level. Among the measures related to the replacement of parts of the distribution network, it is necessary to highlight the transition of parts of the network from 10 kV to 20 kV (investments in the reconstruction of MV lines and MV/LV transformer stations), which continues the transition of the MV network from 10 kV and 35 kV to 20 kV, with the gradual introduction of 110/10(20) kV direct transformation and the phase-out of 35/10(20) kV transformation. The percentage of MV transformer stations ready to switch to 20 kV or operating at 20 kV was 61.7%. The percentage of 20 kV lines was 29.4%, which is relatively low, although this share is continuously increasing.

With the aim of contributing to the achievement of national indicative energy efficiency targets, the **Energy Efficiency Act** set mandatory cumulative energy-saving targets in energy end-use for the second energy savings cumulation period, which will last from 1 January 2021 to 31 December 2030. The mandatory cumulative targets are achieved through a combination of the energy efficiency obligation system prescribed by the **Act** and alternative policy measures defined in the NECP and the *National Energy Efficiency Action Plan for the period from 2022 to 2024*. The Ministry responsible for energy makes an *ex officio* decision defining the energy savings requirement in kWh for a particular year, and obligated parties are required to deliver reports on the realised savings to the Ministry and enter data on implemented measures into the System for the Monitoring and Verification of Energy Savings (hereinafter: the SMIV). In 2023, the obligated parties were energy suppliers that delivered more than 300 GWh of electricity in 2021 (the obligation in a given year is determined on the basis of the delivered electricity in the year before last). However, it should be emphasised that the obligation applies to an energy supplier and all its subsidiaries that are energy suppliers according to the definition of the term in the **Energy Efficiency Act**. According to the statements received by the HERA from active electricity suppliers, nearly all the active electricity suppliers that were obligated parties in 2023 fulfilled their requirements and reported them to the Ministry.

2.2. Natural gas

Characteristics of the gas sector in 2023

In addition to the prices on wholesale markets in the European Union, decisions of the Government of the Republic of Croatia extending the measures to mitigate disturbances on the gas market during 2023 continued to have the most significant impact on the situation in the gas sector in Croatia in 2023. The wholesale gas market in the European Union in 2023 was marked by a decline in natural gas prices, which resulted in the reduced need to withdraw gas from storage, which was ultimately reflected in a high level of gas storage. Gas prices on European markets dropped during 2023 and ranged from around 50 EUR/MWh in the first quarter of 2023 to 30 EUR/MWh at the end of 2023. The significant drop in gas prices on the European wholesale markets also affected the gas market in Croatia, resulting in a significant drop in gas prices in 2023 compared to 2022. The average wholesale price of gas, excluding VAT, in 2023 amounted to 0.0513 EUR/kWh, which was 49.1% lower than in 2022.

The reduction of gas prices on the wholesale market also affected, with a certain delay and to a certain extent, the reduction of gas prices on the retail gas market in the non-household segment. Thus, the average selling price of gas, excluding VAT, for final customers in the non-household category connected to the distribution system in Croatia in 2023 was 0.0680 EUR/kWh at the gross calorific value, which is 11.3% lower compared to 2022, while the average selling price of gas, excluding VAT, for final customers

in the non-household category connected to the transmission system in Croatia in 2023 was 0.1041 EUR/kWh, which is 15.4% higher compared to 2022. In both final customer categories, the lowest average selling prices during 2023 were recorded in the fourth quarter.

Final customers in the household category who used the public gas supply service in 2023, which is more than 99% of households in Croatia, were still protected from fluctuating and unpredictable gas prices, as the prices were guaranteed and unchangeable during the regulatory year under the decisions on the amount of tariff items for the public gas supply service, which guaranteed security for final customers in the household category. Likewise, the extension of the measures to subsidise the final price of the gas supply adopted by the Government of the Republic of Croatia, in the period from 1 April 2023 to 31 March 2024, kept the final price of gas for households at the same levels as in the previous period, and it also enabled a significant subsidisation of the final price of the gas supply for micro, small and medium-sized enterprises.

In order to continue the implementation of the measures provided by the 2022 *Regulation on Eliminating Disturbances on the Domestic Energy Market*, the Government of the Republic of Croatia adopted a new *Regulation on Eliminating Disturbances on the Domestic Energy Market* (Official Gazette no. 31/23) on 16 March 2023, which prescribed special and temporary measures for the period from 1 April 2023 to 31 March 2024. The *Regulation* adopted in March 2023 stipulated that, as in the previous period, INA d.d. was obliged to sell all the gas produced in Croatia to the company HEP d.d., at a price in accordance with the methodology for setting tariffs for public service gas supply and guaranteed supply. This obligation of the company INA d.d. expired on 6 July 2023 with the entry into force of the *Regulation on Amendments to the Regulation on Eliminating Disturbances on the Domestic Energy Market* (Official Gazette, no. 74/23).

The same amendments to the *Regulation* of July 2023 provided traders and suppliers of gas that, in the period from 1 April 2023 to 31 March 2024, supplied gas to suppliers with a public service obligation based on a gas sales contract concluded before 1 April 2023 with the right to reimbursement for the difference in the price of gas, if the gas for a supplier with a public service obligation was purchased at an average gas price that was higher than the price fixed by the methodology for setting tariffs for the public service gas supply and guaranteed supply.

In March 2024, the Government of the Republic of Croatia adopted the *Regulation on Amendments to the Regulation on Eliminating Disturbances on the Domestic Energy Market* (Official Gazette, no. 32/24), which, among other things, extended certain measures related to the stability of natural gas and thermal energy supply. The *Regulation* prescribes an obligation for gas storage system users, which requires them to fill the storage with gas amounting to 63% of their total leased gas storage capacity by 1 August 2024, with 74% of their total leased storage capacity by 1 October 2024, and with 90% of their total leased storage capacity by 1 November 2024. Likewise, the amendments to the *Regulation* provide for the right of distribution system operators to reimbursement for the difference in the price of gas for losses in the distribution system for the period from 1 April 2022 to 31 March 2024.

Overview of measures and activities in the gas sector within the competence of the HERA

During 2023, the HERA implemented measures and undertook activities with regard to making relevant decisions, instructions and providing information to participants in the gas market, while taking into account the adopted *Decision on the proclamation of an early warning regarding the level of the crisis state in the protection of the security of gas supply to the Republic of Croatia* and the *Regulation on Eliminating Disturbances on the Domestic Energy Market*.

Guaranteed gas supply

Guaranteed gas supply is a public service of supplying gas to a final customer that, under certain conditions, has been left without a supplier, and therefore, in order to ensure the continuity of gas supply, such a customer is supplied by a guaranteed supplier under regulated conditions.

By the decision of the HERA of March 2022, the energy entity HEP-PLIN d.o.o. was designated as the guaranteed gas supplier for the period from 10 March 2022 to 30 September 2024. In 2023, the guaranteed gas supply continued to apply based on the 2022 decisions of the HERA for final customers that had previously been supplied by IVAPLIN d.o.o., Ivanić-Grad, BROD-PLIN d.o.o., Slavonski Brod,

and ZELINSKE KOMUNALIJE d.o.o., Sveti Ivan Zelina. In addition, under the *Regulation on Eliminating Disturbances on the Domestic Energy Market*, the Government of the Republic of Croatia enabled all non-household customers that were left without a supply contract, or that did not receive a single offer from a gas supplier for the period until 30 September 2024, to switch to the guaranteed gas supply in accordance with the conditions that apply to guaranteed supply.

The amounts of tariff items for guaranteed supply for final customers entitled to a public gas supply service (households) according to the *Methodology for setting tariffs for public service gas supply and guaranteed supply* are set in the amounts equal to the amounts of the tariff items for public gas supply service for a supplier with a public service obligation in a particular distribution area adopted by the HERA. Households can use the guaranteed supply for an indefinite period, i.e. until a supply contract is concluded under market conditions or until a new supplier with a public service obligation is selected for the relevant distribution area, based on a public tender procedure conducted, in accordance with the **Gas Market Act**, by the HERA.

As regards the non-household category, i.e. final customers other than households, the price of the guaranteed supply is set for each quarter by the relevant decisions for guaranteed gas supply adopted by the HERA.

Consumer protection

With the aim of protecting customers in the household category and ensuring the security, regularity and quality of the gas supply, on 23 September 2022, the HERA adopted the *Decision on the beginning of public gas supply service provision to final customers in the household category with a terminated gas supply contract*, and this Decision continued to apply during 2023 as well. This Decision prescribed that a change of supplier and the beginning of public gas supply service provision to final customers in the household category with a terminated gas supply contract during the validity of the *Regulation* would be carried out automatically.

In order to protect final customers, the HERA continuously reminded and asked all gas suppliers to ensure that their final customers are protected from unfair and misleading sales methods, that the provisions of gas supply contracts are fair to the final customers, and that they clearly, simply and unambiguously describe the rights and obligations of both the supplier and the customer. The HERA continuously analyses offers, standardised contracts and contractual conditions of gas suppliers in the procedures for issuing and extending licences for the performance of gas supply activities.

Upon receiving complaints and inquiries from final customers and other participants in the gas market, the HERA collects additional information and statements from stakeholders in specific cases, informs final customers of their rights and, if necessary, gives instructions and orders to energy entities with the aim of eliminating identified deficiencies in procedures.

Activities in the implementation of the Regulation on Eliminating Disturbances on the Domestic Energy Market

Based on the provisions of the 2023 *Regulation on Eliminating Disturbances on the Domestic Energy Market*, the HERA was obliged, at the request of the Ministry, to submit the necessary data on customers, quantities and prices for distribution system operators for the purpose of settling losses for gas distribution, for transmission system operators for the purpose of settling gas losses in the transmission system, and for the operational consumption of technological facilities of the transmission system, on suppliers with a public service obligation, for the needs of customers of thermal energy from an independent thermal system, for the public gas supply service for the needs of customers in the household category and to the company HEP-PLIN d.o.o. for the needs of gas customers in the non-household category referred to in Article 3(3) of the *Regulation*, which include health institutions, preschools and schools, associations and cooperatives, municipalities, cities and counties, and other customer categories. During July and August 2023, the HERA collected and analysed data from energy entities and, based on that data, estimated the total quantities of gas needed for HEP d.d. under the *Regulation* for the period from 1 August 2023 to 31 March 2024. The HERA submitted that data to the Ministry.

For the purpose of monitoring the implementation of the *Regulation*, at the end of each month, the HERA collected from HEP d.d. data on the delivered quantities of gas, as well as data on the total remaining quantities of gas and a projection of the gas off-take and delivery balance by month.

Change in the method of determining the final price of gas for households within public gas supply service provision

One of HERA's duties is, among other things, to implement measures for the protection of final customers, which includes the supply of gas at reasonable prices. Bearing in mind the disturbances on the energy market and the significant increase in gas prices on the European gas markets during 2022, in April 2023, the HERA adopted the *Amendments to the Methodology for setting tariffs for public service gas supply and guaranteed supply (Official Gazette no. 38/23)*, which prescribe a new method of determining gas procurement costs for the 2023/2024 regulatory year and for the 2024 regulatory year that reflects current gas prices on the market. If the amendments to the *Methodology* had not been adopted, there would have been a multiple increase in the final price of gas for households that use the public service, which would have disrupted market relations and called into question the possibility of supplying gas to final customers (households) from suppliers with a public service obligation.

In March 2024, the HERA adopted the new *Methodology for setting tariffs for the public service gas supply and guaranteed supply*, determining the cost of gas procurement, which represents the wholesale component in the structure of the final price of gas supply, on the basis of prices for seasonal futures trading (winter and summer) on the reference European gas market (the Dutch TTF – *Title Transfer Facility*) published during May and June of the current year. This method, i.e. shortening the reference period for determining the cost of gas procurement, contributes to the reduction of risks linked to gas procurement by suppliers with a public service obligation on the wholesale market. In April 2024, the HERA will issue an amendment to the *Methodology* in question due to the need to harmonise the reference period for determining the cost of procurement, in connection with the tender for the selection of a supplier with a public service obligation that the HERA is conducting in 2024.

The share of the gas procurement cost in the total average regulated final gas price in 2023 was 74.0%, while the share of the gas distribution cost was 13.2%, and the gas supply cost (which includes the cost of transmission, cost of storage, other related costs and the supply margin of suppliers) was 12.8%.

Key indicators of the state of the gas sector

Wholesale market

The significant drop in gas prices on the European wholesale markets also affected the gas market in Croatia, resulting in a significant drop in gas prices in 2023 compared to 2022. The average wholesale price of gas, excluding VAT, in Croatia in 2023 amounted to 0.0513 EUR/kWh, which was 49.1% lower than in 2022, when it amounted to 0.1007 EUR/kWh expressed using the gross calorific value of gas.

Retail market

The average selling price of gas, excluding VAT, for final customers in the non-household category connected to the distribution system in Croatia in 2023 was 0.0680 EUR/kWh at gross calorific value, which is 11.3% lower compared to 2022, while the average selling price of gas, excluding VAT, for final customers in the non-household category connected to the transmission system in Croatia in 2023 was 0.1041 EUR/kWh, which is 15.4% higher compared to 2022.

The average retail price of gas in Croatia, excluding VAT, for all final customers in the non-household category⁵ in 2023 was 0.0936 EUR/kWh, which is an increase of 9.0% compared to 2022. At the same time, in the first half of 2023, the average retail price for final customers in the non-household category, excluding VAT, was 0.1077 EUR/kWh, which is 71.4% higher than the average price for the same period in 2022, while in the second half of 2023, the gas price significantly dropped and was 29.0% lower compared to the same period in 2022.

⁵ The non-household category includes all final gas customers that are not households. The Gas Market Act (Official Gazette, no. 18/18 and 23/20) defines non-household final customers as customers that buy gas not intended for use in their own household.

In 2023, the average gas selling price for final customers in the household category⁶ in Croatia was 0.0592 EUR/kWh, which represents an increase of 38.2% compared to 2022. Taking into account the measures of the Government of the Republic of Croatia, namely tax relief and subsidising the price of gas for final customers in the household category, the average increase in the final price of gas for households using the public service in 2023 compared to 2022 was about 12.8%.

The final price of gas for households, net of taxes, in Croatia in 2023 was still significantly lower than the EU average, by 52.5%, while the final price of gas for households including taxes in Croatia in 2023 was 61.0% lower than the EU average.

The final price of gas for non-household customers, net of taxes, in Croatia in 2023 was 7.9% lower than the EU average, while the final price of gas including taxes for non-household customers in Croatia in 2023 was 21.3% lower than the EU average.

Natural gas production

In order to ensure gas supplies and increase the availability of natural gas in the Republic of Croatia, in 2023, the obligation to increase the production of natural gas by 10% compared to the planned production of natural gas, depending on technical and technological possibilities, was prescribed for the natural gas producer INA d.d. in accordance with the *Regulation on Eliminating Disturbances on the Domestic Energy Market (Official Gazette, no. 104/22, 106/22, 121/22 and 156/22)* and the *Regulation on Eliminating Disturbances on the Domestic Energy Market (Official Gazette, no. 31/23, 74/23, 107/23 and 122/23)*. Additional quantities of gas from production, in accordance with the abovementioned provisions of the *Regulation*, in addition to the continuous gas supply from other sources, contributed to ensuring sufficient quantities of gas in Croatia in 2023.

Gas import

Since the beginning of commercial operation, i.e. from 1 January 2021, more than 11.5 million m³ of liquefied natural gas (LNG) has been gasified at the liquefied natural gas terminal, and more than 7 billion m³ of natural gas has entered the transmission system of the Republic of Croatia from the LNG terminal. In 2023, more than 69.6% of all quantities of natural gas delivered to the transmission system of the Republic of Croatia was delivered through the LNG terminal. A total of 30 LNG transport ships from 6 different countries arrived at the LNG terminal in 2023. During 2023, the gasification capacity of the LNG terminal was increased to 2.96 billion m³ of natural gas per year, and the capacities are fully leased until 2030. The shares of the total contracted capacity of the LNG terminal for the 2021–2040 period, by users of the LNG terminal, with the balance at the end of 2023, were: PPD d.o.o. 44.5%, MVM CEEnergy Croatia d.o.o. 18.7%, HEP d.d. 15.5%, MET Austria 9.0%, MET Croatia Energy Trade d.o.o. 3.9%, INA d.d. 5.5% and Geoplin d.o.o. 2.9%.

Gas transmission

The total quantity of natural gas measured at the entrance to the transmission system in 2023 was 40,343 GWh (domestic production 5,592 GWh, imports at interconnections 3,275 GWh, imports from the LNG terminal 28,082 GWh, and entrance from the storage facility 3,394 GWh), which was 1.7% less than in 2022. At the LNG terminal entrance to the Croatian transmission system, the transmitted quantity of gas amounted to 28,082 GWh, or 69.6% of the total transmitted quantity of gas, which is 6.1% more than in 2022. The total transported quantities of gas for exit groups from the Croatian transmission system in 2022 amounted to 40,340 GWh, which is 1.7% less compared to the total transported quantities recorded at the exit in 2022.

Gas storage

Given the expiry of the period for which the Decision on securing gas supplies was prescribed, on 31 March 2023, the Government of the Republic of Croatia adopted a new Decision on securing gas supplies on the territory of the Republic of Croatia for the 2023/2024 heating season (Official Gazette, no. 37/23), which stipulates that the gas storage capacities that were given by other users of the gas

⁶ Including final customers in the household category that use the public supply service and final customers in the household category using the market service.

storage system to the company HEP d.d. for the purpose of securing gas supplies in the territory of the Republic of Croatia remain at the disposal of the company HEP d.d. from 1 April 2023 to 31 March 2024. Likewise, the new Decision on securing gas supplies prescribes an obligation for gas storage system users, which requires them to fill the storage with gas amounting to 63% of their total leased gas storage capacity by 1 August 2023, with 74% of their total leased storage capacity by 1 October 2023, and with 90% by 1 November 2023. On 12 January 2023, the storage was 92% full, which represents the highest level of filling in the last five years. In 2023, activities continued on the project of the construction of a new underground gas storage at the Grubišno Polje exploitation field; during the third and fourth quarters of 2023, trial use of all the newly constructed facilities and plants was carried out, and on 21 December 2023, after obtaining use permits, the exploitation of natural gas in the new exploitation field commenced.

Market development indicators

The total quantity of natural gas delivered to final customers in Croatia on the retail market in 2023 amounted to 26,022 GWh, which was 7.4% more than in 2022. Of this amount, a total of 6,064 GWh of gas was delivered to final customers in the household category, which represents a decrease of 6.0% compared to 2022. A total of 5,171 GWh of gas was delivered to final customers in the non-household category connected to the distribution system, which represents a decrease of 3.0% compared to 2022. A total of 14,787 GWh of gas was delivered to industrial final customers connected to the transmission system, which represents an increase of 18.7% compared to 2022. At the same time, gas exports at interconnections amounted to 11,852 GWh, which represents an increase of 3% compared to 2022.

Natural gas in Croatia was procured from multiple sources: from domestic production, from imports at interconnections with Slovenia and Hungary, and from the LNG terminal, which is an indicator of the diversity of supply routes and a significant factor in the security of supply.

During 2023, the technological and commercial management of the transmission system continued to be affected by changes on the gas markets in the EU and Croatia caused by the war in Ukraine and restrictions on the import of Russian gas. The LNG terminal is the key gas supply route and filling gas storages, in order to enter the winter period with the largest gas supplies possible, is an obligation and priority of all European Union Member States. Both interconnections were used primarily for gas export. The above conditions and events on the gas market in the EU and Croatia still affect the reservations and utilisation of capacities, primarily at the entrance from the LNG terminal and at interconnections. In particular, it is necessary to note the continued contracting and use of short-term capacities at the exits of the interconnections, which were influenced not only by the capacity increase at the LNG terminal entry, but also by the temporary cessation of operations of Petrokemija d.d. for the greater part of the year and gas exports to neighbouring countries. During 2023, contractual congestion of transport capacities at the exit of the Donji Miholjac interconnection was recorded for the first time and, consequently, in March 2023, the HERA issued a decision to apply the “use-it-or-lose-it” mechanism for continuous day-ahead capacity in order to offer part of the contracted but unused daily capacity to other users for contracting in order to achieve efficient cross-border gas exchange.

The most significant investments related to investments in the Zlobin-Bosiljevo gas pipeline project as an integral part of a broader project to strengthen gas infrastructure, for which the Government of the Republic of Croatia issued a decision in August 2022 to participate in the financing of the construction, in order to increase the gasification capacity of the LNG terminal on the island of Krk to 6.1 billion m³ of gas per year.

In early 2024, a grant agreement was signed, granting the energy entity Plinacro d.o.o. a grant of EUR 553 million under the Recovery and Resilience Facility for the construction of four gas pipelines (Zlobin – Bosiljevo, Bosiljevo – Sisak – Kozarac and Zabok – Lučko) that will transport gas from the LNG terminal to Slovenia and Hungary, and then to other Southeast European countries. The project was launched with the aim of ensuring the energy independence of the Republic of Croatia, as well as ensuring the continuity and security of the natural gas supply to household and non-household customers in the territory of the Republic of Croatia and other Member States of the European Union.

In 2023, a total of 19 gas suppliers and traders organised as balance group managers sold gas on the wholesale market. A moderate level of competition was maintained on the wholesale gas market, dominated by several major suppliers. Specifically, the market concentration index – the Herfindahl-

Hirschman Index (hereinafter: HHI) – on the Croatian wholesale gas market amounted to 2,068 in 2023, while it amounted to 1,996 in 2022, which is an indicator of a slight slowdown in the trend of competition development and an increase in concentration on the wholesale market. The largest shares in the total natural gas quantities sold on the wholesale market belong to the balance groups PRVO PLINARSKO DRUŠTVO d.o.o., MVM CEEnergy Croatia d.o.o. and MET Croatia Energy Trade d.o.o.

The market concentration indicator (HHI) for the retail market in the non-household category in 2023 was somewhat lower than in 2022 and was 3,085. In terms of competition, the above indicates an imbalance in the share of suppliers in the total gas trade on the retail market caused by the energy crisis, due to the reduction of the share of dominant energy entities from previous years.

The majority of households in Croatia purchase gas under regulated conditions (99% of the total number of final customers in the household category on 31 December 2023 were final customers that use the public gas supply service), considering the regulation model of the final price of gas, which protects final customers in the household category that use the public gas supply service from fluctuations on the gas market, ensuring a predictable, guaranteed final price of gas throughout the regulatory year, as well as considering the other regulated conditions of gas supply.

Compared to 2022, a significant decrease in the number of completed gas supplier switches was recorded in 2023. In 2023, 5,023 requests to switch suppliers were submitted. Of these, 389 requests refer to the household category, while 4,634 requests refer to the non-household category. Of the total number of requests submitted, for 3,858 requests (77%), the supplier switching procedure was carried out, while for 1,165 requests (23%) the switching procedure was discontinued. The reason for the lower number of supplier switching is the reduced interest of final customers, which decided not to switch suppliers due to the higher gas market prices prevailing during 2023.

2.3. Oil, petroleum products and biofuels

In 2023, the oil, petroleum products and biofuel sector in Croatia was marked by a slight decrease in the production of petroleum products, an increase in petroleum product imports, and an increase in the quantities of crude oil transported via the oil pipeline system. In 2023, the Rijeka Oil Refinery refined 256,000 tonnes of crude oil, 43,000 tonnes of domestically produced condensates, 641,000 tonnes of other raw materials (domestic and imported) needed for refining, and 1.35 million tonnes of imported crude oil from Azerbaijan, Nigeria, DR Congo and Kazakhstan. The total demand for raw materials for the production of petroleum products amounted to 2.29 million tonnes.

The production of petroleum products in 2022 amounted to 2.08 million tonnes, which represents a decrease of 3.2% compared to the quantities produced in 2022. A total of 2.6 million tonnes of petroleum products were imported, which is an increase in imports of 0.33 million tonnes, or 14.4% compared to the quantities imported in 2022.

The total production of liquefied petroleum gas in 2023 amounted to 155,300 tonnes, which is a decrease of 3,700 tonnes, or 2.3%, compared to 2022.

The production of biofuel in 2023 increased significantly and amounted to 920 tonnes, which represents an increase of 147.3% compared to 2022, when 372 tonnes of biofuel were produced.

Sources for the procurement of petroleum products are diversified; the majority of petroleum products are produced in the oil refinery in Rijeka, which is owned by INA d.d., or procured through imports of petroleum products from surrounding countries, which indicates that the market is not dependent on only one source, i.e. the security of supply is not at risk and does not rely on only one source for the procurement of petroleum products.

The rise in the prices of petroleum products in 2023 required continued intervention by the Government of the Republic of Croatia by adopting a number of *Regulations on Determining the Maximum Retail Price of Petroleum Products*, where the period for determining the highest retail prices of petroleum products was set to 14 days, as well as by adopting a number of *Regulations amending the Regulation on the Amount of Excise Duty on Energy Products and Electricity*.

2.4. Thermal energy

Characteristics of the thermal energy sector in 2023

During 2023, the thermal energy sector was exposed to high prices of natural gas on the European markets, which began to increase back in 2022 and required the implementation of measures aimed at mitigating the price impact on households and the economy and securing energy supply, as well as customer protection and the fight against energy poverty. In the fall of 2022, the Government adopted the *Regulation on Eliminating Disturbances on the Domestic Energy Market* (Official Gazette, no. 104/22, 106/22, 121/22, 156/22) (hereinafter: the 2022 Regulation) “freezing” the prices of thermal energy for final customers, and based on a special Decision, it was determined that the difference between the market and the “frozen” unit prices for district and closed heating systems would be subsidised, while for independent heating systems, gas quantities would be provided at the price of the public service. In accordance with the *2022 Regulation* and based on data submitted by energy entities for the 2022/2023 season, the HERA calculated the unit prices for thermal energy production in district heating systems (hereinafter: DHS) and closed heating systems (hereinafter: CHS) and issued decisions for all DHSs and CHSs in September and October 2022. The decisions are publicly available and published on the HERA website. During 2023, the HERA reviewed calculations based on issued invoices for delivered thermal energy and incoming invoices for energy product consumption in 2022/2023.

This measure was continued under the *Regulation on Eliminating Disturbances on the Domestic Energy Market* (Official Gazette, no. 31/23, 74/23, 107/23, 122/23 and 32/24) (hereinafter: the 2023 Regulation).

Most of the biogas plants that had the eligible electricity producer status until 2022 had signed contracts with HROTE on the purchase of electricity. Due to the disturbances on the energy market and according to data from the end of 2023, a total of 23 plants left HROTE's incentives system, of which 17 were biogas plants, 3 were biomass plants and 3 were high-efficiency cogeneration plants using natural gas.

Overview of measures and activities in the thermal energy sector

In 2023, the HERA issued two licences for the performance of thermal energy production activities and eight licences for thermal energy supply. Similar to the previous year, the new licences issued in 2023 are primarily the result of the construction of cogeneration plants participating in the incentives system for electricity production from renewable energy sources and high-efficiency cogeneration.

In 2023, the HERA issued one decision granting the eligible electricity producer status to a new biomass cogeneration plant. The majority of the cogeneration plants participating in the incentives system for electricity production from renewable energy sources and high-efficiency cogeneration use the thermal energy produced for their own needs or supply it to a single energy entity (wood processing company, greenhouse or farm). A significant portion of the thermal energy used for own needs pertains to the preparation of the primary energy source (wood chip drying or the production of biogas).

In accordance with the *2022 Regulation on Eliminating Disturbances on the Energy Market* and based on data submitted by energy entities for the 2022/2023 season, the HERA calculated the unit prices for thermal energy production in district heating systems (hereinafter: DHS) and closed heating systems (hereinafter: CHS) and issued decisions for all DHSs and CHSs in September and October 2022. The decisions are publicly available and published on the HERA website. During 2023, the HERA reviewed calculations based on issued invoices for delivered thermal energy and incoming invoices for energy product consumption in 2022/2023.

In accordance with the new *2023 Regulation on Eliminating Disturbances on the Energy Market* and based on data submitted by energy entities for the 2023/2024 season, the HERA calculated the unit prices for thermal energy production in DHSs and CHSs and issued new decisions in September and October 2023. The decisions are publicly available and published on the HERA website.

In addition, in accordance with the *2023 Regulation*, for customers in district heating systems that use processing steam for technological purposes, the HERA issued Decisions on the reimbursement of part

of the cost of the processing steam consumed in the technological process that does not include distribution costs and was paid in accordance with the contract with the supplier in the district heating system for the period from 1 October 2022 to 30 September 2023.

In accordance with Article 5 of the **Act on the Implementation of Council Regulation (EU) 2022/1854 on an emergency intervention to address high energy prices** (Official Gazette no. 71/23), which provides for the implementation of Council Regulation (EU) 2022/1854 of 6 October 2022 on an emergency intervention to address high energy prices (OJ L 2611, 7.10.2022), in the part concerning measures for the application of caps on market revenues and the distribution of surplus congestion income revenues to final electricity customers, the HERA calculated new electricity production prices for plants that use biomass and biogas. The HERA requested data on the price of electricity production from HROTE. The HERA based the new maximum price, i.e. the price cap, which was higher than 180 euros per MWh of produced electricity, on the Methodology for calculating maximum reference values and feed-in tariffs under Article 27 and on the Calculation of production costs under Article 31 of the *RES&HEC Regulation*, on the basis of data submitted by the electricity market operator and individual companies, and during 2024, it issued decisions for all companies that have biogas plants. The HERA determined that the higher electricity price of 180 EUR/MWh, which was the limit prescribed by the Regulation for a total of six biogas plants, was justified.

During 2023, there were no major changes in terms of the development of heating systems, i.e. the total number of final customers of thermal energy, network length and the installed plant capacity of existing energy entities did not change compared to the previous year. Likewise, in accordance with the *2022 Regulation* and the *2023 Regulation*, there were no changes to the tariff items and the price of thermal energy for final customers remained unchanged.

Key indicators of the state of the thermal energy sector

The thermal energy sector is regulated by the **Thermal Energy Market Act** (Official Gazette, no. 80/13), which introduced the concept of a free thermal energy market, in which only thermal energy distribution remains a public service supervised by a regulatory body, while thermal energy production and supply are left to the market laws of supply and demand. The HERA establishes tariff items for regulated activities, which are thermal energy production activities and thermal energy distribution in a district heating system. The fee for the supply of thermal energy and the fee for performing the activities of thermal energy customers are agreed on freely. Also, when a final thermal energy customer predominantly uses this energy for business, the prices of all energy activities in district heating systems are determined by a contract. In accordance with the Act, in independent heating systems and closed heating systems, the prices of thermal energy supplied to thermal energy customers and final thermal energy customers are agreed on freely.

The Act introduced systematic changes in the regulation, organisation, functioning and development of the thermal energy market; however, market creation did not take off in the national context and there were no effects expected in terms of developing competition in the thermal energy supply sector, and especially the activities of thermal energy customers.

The manner and conditions for performing thermal energy production, thermal energy distribution and thermal energy supply activities are regulated depending on the type of the heating system that supplies the final customers with thermal energy. Thermal energy supply is an energy activity of delivering thermal energy from the thermal energy producer, through the thermal energy distributor and thermal energy customer to the final customer.

The Act recognises district, closed and independent heating systems. In district and closed heating systems, the activity of a thermal energy customer and all energy activities related to the thermal energy sector have been performed almost entirely by the same vertically integrated energy entities for years. As for independent heating systems, the activity of a thermal energy customer is mainly performed by energy entities that perform energy activities related to the thermal energy sector in a specific area, with other thermal energy customers active in some cities. Six of the largest energy entities can be noted: HEP-TOPLINARSTVO d.o.o., Zagreb; GRADSKA TOPLANA d.o.o., Karlovac; Tehnostan d.o.o., Vukovar; GTG VINKOVCI d.o.o., Vinkovci; BROD-PLIN d.o.o., Slavonski Brod; ENERGO d.o.o., Rijeka, all of which perform the activity of a customer for more than 97% of final customers in Croatia. Additional entities

include Vartop d.o.o., Varaždin; Poslovni park Virovitica d.o.o.; Komunalac d.o.o., Požega and SKG d.o.o., Ogulin.

The listed energy entities for thermal energy production, distribution and supply in Croatia provide the services of space heating and the preparation of sanitary hot water for more than 161,000 final customers in Zagreb, Osijek, Sisak, Samobor, Velika Gorica, Zaprešić, Rijeka, Karlovac, Vukovar, Slavonski Brod, Vinkovci, Varaždin, Virovitica, Požega and Ogulin. More than 95.5% of the total number of final customers fall under the household category

Thermal energy used for space heating and the preparation of sanitary hot water is produced in cogeneration thermal power plants, as well as in local heating plants, i.e. separate boiler rooms, which predominantly use natural gas for energy. The total installed capacity is 2,202.18 MWt, and the supplied thermal energy in 2023 was 1,827.13 GWh. The average losses in thermal energy production and distribution for thermal systems managed by the above energy entities amounted to 22% in 2023, while the average losses in the distribution networks amounted to 19.8%.

Furthermore, thermal energy production in cogeneration plants that simultaneously produce electricity and thermal energy is regulated by the **Renewable Energy Sources and High-Efficiency Cogeneration Act** (Official Gazette, no. 138/21 and 83/23). For biomass, biogas and cogeneration plants participating in the incentives system for electricity production from renewable energy sources and high-efficiency cogeneration, the Act prescribes the conditions for energy efficiency, which is defined by the HERA annually as efficiency in converting primary fuel energy into electricity and useful heat. According to the current tariff systems, biomass and biogas cogeneration plants are required to achieve a total annual energy efficiency of at least 50%. For high-efficiency cogeneration plants using fossil fuels, the Act prescribes monitoring the fulfilment of the conditions for primary energy savings. On the basis of the submitted reports on the realisation of the annual production plans that the plants are obliged to submit to the HERA and other available documentation and information, the HERA determines the total annual energy efficiency for each individual plant in a decision.

The total installed capacity of cogeneration plants is 326.829 MW of thermal energy and 237.816 MW of electricity, of which biomass plants account for 193.823 MW of thermal energy and 86.984 MW of electricity, biogas plants account for 48.662 MW of thermal energy and 47.922 MW of electricity, while high-efficiency cogeneration plants account for 84.344 MW of thermal energy and 102.910 MW of electricity.

These plants use the produced thermal energy in various ways: for space heating, for their own needs, for drying wood chips, pellets, briquettes, timber and some of the plants transfer thermal energy to other legal entities that use it for wood processing plants, dryers, greenhouses, farms, space heating, etc.