Generating Electricity from Renewable Sources in CEE & SEE

Energy Industry Group

Croatia

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Country General Information

Capital: Zagreb

Location: part of both Central and Southeast Europe, bordered by Hungary in the north, Slovenia to the west, Bosnia and Herzegovina and Serbia to the east, Montenegro and the Adriatic Sea to the south, Croatia lies mostly between latitudes 42° and 47° N and longitudes 13° and 20° E.

Surface: Croatia covers an area of 56,594 km2. The small, crescent-shaped country is highly diverse geographically.

Population: 3,871,833

Climate: Classified as moderately warm and rainy continental but can be divided into three (3) separate climate regions: continental, Alpine and Mediterranean. Croatia has four (4) distinct seasons.

Resources: Natural resources that are found in the country in quantities significant enough for production include oil, coal, bauxite, low-grade iron ore, calcium, gypsum, natural asphalt, silica, mica, clays, salt, and hydropower. Karst topography makes up about half of Croatia and is especially prominent in the Dinaric Alps.

Electricity Grid: The total length of the distribution electricity grid is 140,065 km, with 26,567 transformer substations. The system is networked with 4,519 km of lines at 35(30) kV of voltage, 37,625 km of lines at 10(20) kV of voltage, 62,083 km of lines at 0.4 kV of voltage and about 35,841 km of residential connections.

Electricity Transmission, Distribution and Supply: Croatia has adopted the ITO market unbundling model, whereby the Croatian Transmission System Operator (HOPS) is separate from the Croatian Electric Power Company (HEP Group). HOPS owns the transmission network. The distribution of electricity is provided by the Croatian Distribution System Operator (HEP-DSO). The electricity supply is provided by seven (7) providers.

Official Language(s): Croatian

EU Member: since 1 July 2013.

NATO Member: since 2009.

United Nations Member: since 1992.

Currency: As of 1 January 2023, pursuant to the Law on the Introduction of the Euro as the Official Currency in the Republic of Croatia, Croatia adopted the euro and became the 20th member of the euro area. Prior to this change, Croatia's official currency was the Croatian Kuna (HRK) between 1994 and 2023.

Schengen: As of 1 January 2023, Croatia became the 27th country of the Schengen area. Starting from that date, border and customs checks were abolished at the borders between Croatia and other Schengen member states for people crossing the borders by road, rail or water. Screening of those traveling by plane ceased from 26 March 2023.

Political System, Administrative Organisation and Economy: Politics in Croatia are defined by a parliamentary, representative democratic republic framework, where the Prime Minister of Croatia is the head of government in a multi-party system. The Head of State is the President. Below the national level, Croatia is divided into twenty (20) administrative counties called županije In addition to the capital city of Zagreb, which is considered separately. Croatia has an economy predominantly based on services, with tourism as one of the pillars of the service industry subsector.

1. Defined Terms for the Main Permits required for RES-Electricity Generation Facilities

Building Permit	Administrative deed issued by the Ministry of Physical Planning, Construction and State Assets (**"MPCA"**) or local authorities, depending on the type of RES Facility. The construction of a project may begin only after the Building Permit (*građevinska dozvola*) becomes final. As a partial exception from this rule, a Building Permit is not required for the construction of buildings and equipment connected to the electrical grid, which are designed for the generation of electricity with an installed capacity of up to 10 MW. This includes solar power plants or agrosolar power plants within the meaning of the law on spatial planning, for which ownership relations on the land where the facility will be built are resolved (meaning that there are no unresolved disputes and the ownership relations in practice correspond to what is registered in the land registry / cadastre) (**"Simple Power Plants"**). The Building Permit expires if the construction of the RES Facility does not commence within three (3) years from the date on which it became final. However, the validity may be extended for an additional three (3) year period if the conditions for construction defined within the spatial plan and Location Permit remain unchanged.
CHP	High-Efficiency Cogeneration
CROPEX	Croatian Power Exchange Ltd.
Decision on the Status of an Eligible Producer	The deed issued by the Croatian Energy Regulatory Agency (**"HERA"**), which is considered the final step in the permit collection process. Exceptionally, for Simple Power Plants, the decision is not issued; the status of an eligible producer is granted on the basis of evidence that the RES Facility has acquired the right to a permanent connection to the electricity grid. However, if a Simple Power Plant wishes to participate in the electricity Guarantees of Origin (**"GO"**), it must hold the Decision on the Status of an Eligible Producer.

Electricity Approval	Administrative deed issued by the Croatian Transmission System Operator (**"HOPS"**)/Croatian Distribution System Operator (**"HEP-DSO"**). Electricity Approval (*elektro-energetska suglasnost*) sets out the technical requirements and financial obligations for the connection to the power grid and for its use.
Energy Licence	Administrative deed issued by HERA (*dozvola za obavljanje energetske djelatnosti*) allowing its beneficiary to perform one of the following activities involving electricity on the energy market: generation/transmission/distribution/ supply/trade of electricity, aggregation, energy storage, organisation of the electricity market, organisation of the citizen energy community and/or activities of the closed distribution system operator.
Energy Permit	Administrative deed issued by the Ministry of Economy and Sustainable Development (**"MESD"**), representing the authorisation to build and run facilities using renewable energy or cogeneration. An Energy Permit (*energetsko odobrenje*) is required for the construction of RES Facilities, except for Simple Power Plants. An Energy Permit is considered proof of a legal interest in obtaining a Location Permit and a Building Permit. When the Energy Permit is issued through a public tender, it is awarded to the bidder whose proposal offers the greatest advantages.
Environmental Impact Assessment	Assessment validated by MESD, seeking to minimise from the earliest phase of a project, the negative effects to the environment and maximise environmental quality. Either an Environmental Impact Assessment (**"EIA"**) or an Assessment on the Need to conduct the EIA (**"Need Assessment"**) must be carried out in the preparatory phase of an intended project and prior to issuance of the Location Permit. Performing an EIA is mandatory for facilities capable of generating more than 100 MW of electricity (more than 20 MW for wind power plants). For solar stand-alone, wind and hydro power plants, and other RES Facilities capable of generating more than 10 MW, a Need Assessment is performed. A full EIA will then be performed only if the MESD decides that it is necessary.

Feed-in Tariff	A support mechanism available for RES Facilities under "old" regulations until the expiry of the originally contracted term. During such term, RES-Electricity Producers are not entitled to participate in the new system incentives under Guaranteed off-take price or Market Premium. There are two (2) concurrent Feed-in Tariffs (i) the tariff system applying to those power plants with off-take agreements in place on or before 31 December 2013; and (ii) the tariff system applying to those power plants with off-take contracts granted from 1 January 2014.
Grid Connection Agreement	Administrative deed issued by the grid operator to connect a new generating facility or to modify or replace the connection of an already generating facility to the grid.
Grid Usage Agreement	Administrative deed issued by the grid operator that defines when electricity will start entering the transmission system and the technical requirements for using the grid.
Guaranteed Off-Take Price	A support mechanism provided to eligible producers of RES-Electricity (**"RES-Electricity Producers"**) which have been selected as the best bidders in the tender process. The selected candidates are entitled to conclude the agreement at a guaranteed purchase price with the Croatian Energy Market Operator (**"HROTE"**) and sell electricity to HROTE at the purchase price achieved in the tender, which is paid according to the delivered net RES-Electricity. The Guaranteed Off-Take Price is not available to those RES-Electricity Producers benefiting from the Feed-In Tariff.
Location Permit	Administrative deed issued by the MPCA or the local authorities, depending on the type of RES Facility and the planned construction/reconstruction location. To obtain a Location Permit (*lokacijska dozvola*), the applicant must provide a concept design to the competent authority, which should comply with the special requirements prescribed by technical and safety laws and other regulations. If an EIA is required for a power plant, it must be obtained prior to application for the issuance of the Location Permit.

Market Premium	A support mechanism pursuant to which RES-Electricity Producers receive premium support based on the market premium agreement concluded with HROTE. The amount of Market Premium is paid for delivered net RES-Electricity to HROTE and is determined for a specific type of RES Facility, based on the difference between the market price of electricity and the reference value of electricity offered in the public tender. Market Premium is not available to those RES-Electricity Producers benefiting from the Feed-In Tariff.
RES	Renewable Energy Sources
RES Act 2021	Renewable Energy Sources and High-Efficiency Cogeneration Act (Official Gazette no. 138/2021, 83/2023) currently in force.
RES-Electricity	Electricity obtained from renewable energy sources such as wind, solar, aerothermal, geothermal, hydrothermal and oceanic waves, hydraulic, biomass and biogas.
RES Facility	A generation facility using renewable energy sources such as wind, solar, aerothermal, geothermal, hydrothermal and oceanic waves, hydraulic, biomass and biogas to generate electricity.
RES Support Scheme	State-aid scheme aimed at supporting RES-Electricity based on either (i) the Guaranteed off-take price; or (ii) Market Premium. However, (iii) the Feed-in Tariff accredited until 31 December 2016 remains eligible for RES Facilities with agreements concluded under Feed-in Tariff until their expiry.

Usage Permit	Administrative deed issued by the MPCA or other authorised authority, depending on the capacity of a RES Facility. After finalising the construction of a RES Facility, the technical inspection will be carried out, in order to examine if all the conditions set out in the Building Permit are met. The MPCA or another competent authority will issue a Usage Permit only if it determines that the RES Facility is compliant with the Building Permit. With the Usage Permit, a RES Facility can legally commence its operations.

2. Envisaged need of investments in Croatia

The RES Act 2021 entered into force on 23 December 2021. Subsequent amendments to the Act were introduced in July 2023. Following its enactment, several bylaws were established to provide more detailed provisions for the implementation of the RES Act 2021. Notably, key regulations, such as those pertaining to utilisation and encouraging electricity production from RES and CHP, were enacted. However, certain bylaws established under the prior RES Act 2016 remain applicable.

For the period until 2030, certain activities aimed at increasing the safety and flexibility of the electricity system are expected. These special efforts are anticipated to focus on the development of reversible hydropower plants and battery storage, and on the organisation of market balance. These achievements will allow electricity to be accumulated when it is cheaper and then sold at a better price when needed. The storage of energy should establish a better integration of variable and intermittent renewable energy sources into the grid. Moreover, further improvements in the software tools responsible for precise scheming of the electricity production should mitigate the risk of imbalances in the system caused by intermittency.

Additionally, better integration is planned with further investments in the design of the electricity market, in which intraday trading should ultimately be approximated to real-time trading. Balancing real-time production and consumption should bring significant stability to the variable nature of renewable energy, in which the levels of supply and demand are often not coherent.

Further advancements in the development of the RES system are anticipated upon the full implementation of revisions to the EU directives within the Clean Energy for all Europeans Package. Currently, the implementation is pending for the revised Energy Efficiency Directive (EU/2023/1791)[1], which took effect on 10 October 2023, and the revisited Renewable Energy Directive (EU/2023/2413), commonly referred to as RED III[2], effective since 20 November 2023. RED III mandates an increase in the overall EU RES target from 32% to 42,5%, in order to significantly accelerate the current pace of deployment of renewable energy and phase-out the European Union's dependence on Russia.

3. Executive Summary-RES Market Status and Development of RES Facilities

3.1 Market Overview – Factsheets

3.1.1 Support scheme

- In 2001, Croatia adopted a set of new energy-related laws and regulations, harmonising its energy market with the EU legislation. Amendments followed in 2004, with the implementation of the common rules for internal market of electricity;
- The Croatian RES-Electricity market developed in 2007, with the Governmental Tariff System for Generation of Electricity from Renewable Energy Sources and Cogeneration entering into force. The regulation provided incentivised prices of electricity paid to the eligible producers by HROTE. Feed-in Tariff unit prices were determined according to the type of power plant (initial distinctive capacity was 1 MW) and the source used for generation, multiplied by the correction factor according to the statutory formula;
- The incentive prices obtained under the Feed-in Tariff were granted until the end of the contracted term, which was usually fourteen (14) years;

1 Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955)

2 Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652

- In 2016, Croatia introduced a new RES-Electricity promotion scheme: (i) Guaranteed off-take price, initially available for RES-Electricity Producers with facilities having a capacity of up to 30 KW (extended in 2018 to 500 KW); and (ii) Market Premium, available for all RES-Electricity Producers. Existing power plants continued to receive incentives based upon the Feed-in Tariff;
- In 2019, a regulation providing for the selection of candidates for the RES-Support Scheme in public tenders entered into force. This regulation allowed (i) RES-Electricity Producers with a capacity of up to 500 KW, who win a tender, to be awarded a Guaranteed off-take price with HROTE whereby the entire output produced in a RES Facility will be purchased at the determined price; and (ii) RES-Electricity Producers with a larger capacity (however there is no limitation; small-capacity producers may also apply) to compete in a public tender to be awarded the Market Premium. The participants selected as having the best bids in the public tender are entitled to sell electricity on the open market and are awarded the allotted Market Premium to make up the difference between the tender price and the market price;
- By July 2020, Croatia had adopted the package of secondary legislation that was necessary to put the legislative scheme into practice, the package included: (i) Regulation on quotas to encourage the generation of electricity from renewable energy sources and high-efficiency cogeneration, (ii) Decision to amend the Decision on the fee for renewable energy sources and high-efficiency cogeneration, (iii) Regulation on the criteria for payment of the reduced fee for renewable energy sources and high-efficiency cogeneration, and (iv) Regulation on the amendments to the Regulation on the support of electricity from renewable energy sources and high-efficiency cogeneration;
- In September 2020, HROTE published the first auction to award the Guaranteed off-take price and the Market Premium incentive. The auction for the Guaranteed off-take price was offered to small solar power plants (aggregate quota of 50 MW), small hydropower plants (aggregate quota of 9 MW), small biogas power plants (aggregate quota of 7 MW) and small biomass power plants (aggregate quota of 6 MW). The Market Premium was offered exclusively to biomass and biogas power plants with an installed capacity of more than 500 KW and up to 2 MW (aggregate quota of 8 MW for each);
- On 8 December 2021, the Croatian parliament passed the new RES Act 2021, which entered into force on 23 December 2021. The RES Act 2021 sets Croatia's renewable energy target as a percentage of gross final energy consumption by 2030 36.6%;

- On 9 December 2021, the European Commission approved the Croatian Market Premium programme to support the production of electricity from renewable energy sources. The programme will provide EUR 783 million in grants to the beneficiaries selected in the public tenders and will cover the period from 2021 to 2023. The first public tender under this programme was launched in June 2022;
- The first public tender for the allocation of Market Premium under the RES Act 2021 took place in June and July 2022. The tender offered the following quotas of connected power capacities per category of production facilities: (i) 300,000 kW for Solar power plants with an installed capacity greater than 500 kW, (ii) 4,000 kW for Hydroelectric power plants with an installed capacity greater than 500 kW up to and including 10 MW, (iii) 300,000 kW for Wind power plants with an installed capacity greater than 3 MW, (iv) 8,000 kW for Biomass power plants with an installed capacity greater than 500 kW up to and including 5 MW, (v) 16,000 kW for Biogas power plants with an installed capacity greater than 500 kW up to and including 2 MW and (vi) 10,000 kW for Geothermal power plants with an installed capacity greater than 500 kW. By the end of the tendering, 19 bids were properly submitted within the time fixed. Those bids comprised a volume of 150 MW;
- The year 2022 was marked by numerous contract terminations between eligible producers and HROTE. By year-end, 67 contracts were terminated at the request of the eligible producer who assessed that they could generate higher revenue by selling electricity from their facilities on the electricity market compared to revenues based on contracted incentive prices;
- In July 2023, the newly enacted Ordinance on the Promotion of Electricity Production from Renewable Energy Sources and High-Efficiency Cogeneration prescribed conditions for obtaining, implementing, and terminating entitlements to Market Premiums and Guaranteed Off-Take Price incentives. It also outlined the tendering process for their allocation, including methodologies for calculating maximum reference values and guaranteed purchase prices for electricity;

- In the third quarter of 2023, HROTE conducted market research to assess the interest of potential applicants in the Market Premium tender. Specific questionnaires were distributed for various technologies, including biomass, biogas, hydroelectric, solar, and wind. The inquiries covered a range of aspects, encompassing technology types, project maturity, anticipated participation interest, expected energy generation and revenue, CAPEX, financing conditions, OPEX, and for biomass and biogas, details about the necessary feedstock. The collected data from these questionnaires will be utilised by HROTE in the future to formulate the tender conditions that optimally align with the current market needs and the preferences of potential investors.

3.1.2 Market Developments

- In May 2014, HOPS and HROTE founded the Croatian Power Exchange (CROPEX). The launch of the day-ahead market followed in February 2016, providing a wholesale price of electricity in a transparent, liberalised and competitive trade environment for the first time. The intraday market of electricity was launched in April 2017;
- According to Eurostat data, in 2018 Croatia achieved a 28.02% share of renewable energy in gross final energy consumption and thus exceeded the target of a 20% share of RES-Electricity in gross final energy consumption by 2020;
- On 28 December 2018 Croatia notified its draft National Energy and Climate Plan for 2021-2030 (**"NECP")** to the European Commission. Under the NECP, Croatia committed to achieving a 36.4% share of renewable energy in gross final energy consumption by 2030, which was one of the most ambitious goals among EU countries. The NECP was adopted in December 2019;
- Further liberalisation to the RES-Electricity market followed in 2019 with the abandonment of former suppliers' obligations to take over the total green electricity delivered by RES-Electricity Producers from HROTE, amounting to a 70% share (while HROTE is allowed to offer the remaining 30% on the open market);
- In the last quarter of 2019, the Register of Renewable Energy Sources, Cogeneration and Eligible Producers was established;
- In January 2022, the share of net electricity delivered by eligible producers to HROTE, which suppliers must take over from HROTE, was reduced to 60%.

The remaining 40% is offered on the open market;

- In March 2022, the Croatian Parliament adopted the National Strategy for Hydrogen from 2021 to 2050. This strategy aims to establish 70 MW of hydrogen production capacity by 2030, with a projected increase to 2,750 MW by 2050. The initiative is part of the Croatian strategy to boost hydrogen's share of total energy consumption from the current 0% to 0.2% percent by 2030, and further to 11% percent by 2050;
- The first amendment to the RES Act 2021 followed in July 2023, introducing only minor changes, primarily related to the regulation of self-suppliers of electricity (in Croatian: *korisnik postrojenja za samoopskrbu*). These changes allowed users of self-supply facilities to maintain their status even if they produce more electricity in a calendar year than they consume. Previously, in such cases, they would transition to the category of own consumption (in Croatian: *krajnji kupac s vlastitom proizvodnjom*). However, under the amendments, any excess electricity produced annually shall be compensated according to market electricity rules, accounting regulations, and contractual agreements with suppliers;
- The new Rules on the Connection to the Transmission Grid and the Rules on the Connection to the Distribution Grid were adopted on 14 July 2023, and entered into force on 1 September 2023. The rules set out a detailed procedure for the grid connection, preparation and content of the Optimal Technical Solution Study (EOTRP), issuance of the connection conditions and special connection conditions, establishment of technical conditions in the grid, the procedure for changes to the connection, resolving complaints, etc. The key milestones of the grid connection process are outlined in Section 3.2 Grid Connection Specifics below. Additionally, the recently enacted Network Rules of the Transmission System came into effect this February;
- The complete legislative framework is still incomplete, as the grid connection costs remain unknown. This presents a significant challenge for projects, as they are required to secure a Building Permit within five years of obtaining an Energy Permit, yet they are unable to finalise a Grid Connection Agreement due to the lack of clarity regarding connection costs. The situation is further complicated for projects that obtained an Energy Permit under the now-obsolete 2013 Electricity Market Act, as they face a five-year deadline to construct a production facility and obtain a Usage Permit.

3.2 RES Market Status, Permitting, Grid Connection, Licensing of RES Facilities in Croatia

General Market Data	
RES Target 2020	27.47%, reported achieved in 2019
RES Target 2030	36.6%
Overall installed General Capacity including RES (overall production)	In 2022, total primary energy production was 155.0 PJ.
Installed capacity by technology in 2021	Wind – 2,102.3 MW Hydro – 2,107.7 MW Biomass – 218.8 MW PV – 1,133.9 MW Biogas – 78.1 MW
RES Support Scheme	
Beneficiaries of RES Support Scheme	Guaranteed off-take price and Market Premium. The beneficiaries are divided in different groups according to the sources, technology used and installed capacity of RES Facilities. The Feed-in Tariff is received by those RES Facilities built prior to 31 December 2015.
Priority and guaranteed off take into the grid	○ RES-Electricity Producers that have obtained a Decision on the status of an eligible producer from HERA have priority access to the grid.
Other incentives	○ Mandatory share of Net Electricity delivered by eligible producers to HROTE to be purchased by the energy suppliers; ○ GOs provided for eligible producers not already participating in the Feed-in Tariff or the Guaranteed off-take price.

Other conditions

- For the construction of new generating and storage facilities, with the exception of those outlined in the subsequent item, MESD conducts a public tender to award an Energy Permit after having received an expression of interest from a potential investor;
- Public tender is not carried out to award an Energy Permit for: (i) renovation and/or revitalisation of the existing generating or storage facilities, (ii) construction of geothermal facilities, (iii) if ownership relations on the land where the investor plans to build a facility are resolved (i.e., there are no unresolved disputes and the ownership relations in practice correspond to what is registered in the land registry / cadastre), (iv) generating facilities that do not use renewable energy sources and (v) agrosolar power plants;
- For Simple Power Plants, an Energy Permit is not required;
- The criteria for selecting the best bid are determined in the call for tender:
  - for the construction of facilities under 500 KW, this will be the best price offered for the Energy Permit as well as the best available technologies,
  - for the construction of the facilities over 500 KW, the criteria will be determined by weighting the price offered for the Energy Permit, the competitiveness of the facility, energy efficiency, the deadline for construction and the compensation to the local self-government unit and/or the possibility of local self-government unit participating and/or acquiring a shareholding;
- By obtaining an Energy Permit, the investor acquires the status of project holder and is entered in the Register of Renewable Energy Sources, Cogeneration and Eligible Producers. After entering into a Grid Connection Agreement with the TSO/DSO, the investor may apply for a Location Permit / Building Permit. Furthermore, if the RES Facility is to be located on public land, an easement right or building right must be established (once the Location Permit / Building Permit becomes final and binding);

- An Energy Licence is mandatory (certain exceptions regarding capacity, trial runs and behind-the-meter facilities apply);
- No installed capacity limit, as long as the grid allows this from a technical point of view.

Grid Connection Specifics

Procedure

- A new entrant to the electricity grid must conclude a Grid Connection Agreement and a Grid Usage Agreement with HOPS or HEP-DSO;
- Prior to entering into a Grid Usage Agreement, the investor must hold an Electricity Approval and a Location Permit;
- The Grid Connection Agreement is concluded prior to the issuance of the Electricity Approval and Location Permit. It must adhere to the Optimal Technical Solution Study (EOTRP) conducted by authorised persons, which outlines the potential method for connecting the facility to the grid, along with key technical specifications and essential data for sizing the facility;
- Depending on the technology deployed, the installed capacity and the connection to the grid, an investor can obtain the necessary approvals within approximately one (1) and two (2) years;
- The duration of this period might extend further due to the stipulation in the 2023 Rules on Connection to the Transmission Grid, according to which HOPS committed to accepting requests for delivery of the data on the state of the transmission grid (essential for authorised persons to draft EOTRP) solely once a year, occurring between May 1 and May 15.
- The costs of grid connection and/or capacity upgrades, improvements or expansion of the grid are borne by the investor.

Licensing	
Procedure	After the completion of the construction phase of the RES Facility, the following licences must be acquired: ○ Usage Permit, only after a successfully implemented trial run and after obtaining a Certificate for Permanent Operation; ○ Energy Licence to Generate RES-Electricity; ○ Decision on the status of an eligible producer.
Duration of administrative procedure	The procedure takes a minimum of two (2) months. The licensing procedures require frequent direct communication with HERA and the competent Ministry. However, it is not possible to provide any precise estimate on the time frame necessary for the issue of licences/authorisations.
Licence's validity	Up to thirty (30) years. May be extended.

4. Key changes to the RES Support Scheme since 2016

A new programme of incentives under Croatian law was introduced on 1 January 2016, with the entry into force of the now obsolete RES Act 2016. Amendments followed in 2016, 2017 and 2018, while in December 2021 the new RES Act 2021 entered into force. The RES Act 2021 introduced certain changes to the RES system but has maintained the existing Guaranteed off-take price and the Market Premium incentive models.

4.1 Available Incentives

The key aspects of the existing support system, which replaced the Feed-in Tariff, are described below. Both incentives aim to encourage the construction of new[3] RES Facilities until the quota for incentives set by the Croatian Government is met. The incentives are made available to candidates through the public tender

3 Within the context of the RES Act 2021, the term "new facility" also encompasses the reconstruction of existing production facilities that satisfy specific age and reconstruction cost requirements.

conducted by HROTE, after they receive the status of an eligible producer from HERA. According to the RES Act 2021, HROTE should select candidates at least (i) once a year for the Guaranteed off-take price incentive and (ii) once every three years for the Market Premium incentive.

4.1.1 Guaranteed Off-Take Price

- Monetary compensation provided by HROTE to eligible producers selected through a public tender, for the net electricity supplied from the RES Facility to the power grid. However, the Guaranteed Off-Take Price will not be paid in situations where there are significantly changed circumstances and *force majeure*, in which case the principle of risk shared proportionality between the contracting parties shall apply;
- Offered to all eligible producers, regardless of the size of the RES Facility4;
- The applicant selected as having submitted the best bid in a public tender will conclude the agreement on the guaranteed purchase price with HROTE, and thus be allowed to sell electricity exclusively to HROTE (i.e. it will not participate as an individual trader on the electricity market);
- The agreement is concluded for the term of twelve (12) years, starting from the day the status of eligible producer is obtained;
- The amount of Guaranteed off-take price is created in the tendering process. Prior to the tender, by using the methodology for estimating the market conditions, HROTE should announce the amount of the maximum guaranteed purchase price for each group of RES Facilities. The amount of the purchase price offered by each bidder should not exceed the maximum guaranteed purchase price defined by HROTE for that type of RES Facility;
- The amount of the Guaranteed off-take price determined in the agreement will remain unchanged during the entire contractual term, but the variable part of the price should be indexed every year in order to reflect inflation (by applying the indices of consumer prices published by the Croatian Bureau of Statistics).

4 Under the RES Act 2016, the Guaranteed Off-Take Price was available to eligible producers with RES Facilities capacity of up to 500 KW.

4.1.2 Market Premium

- Monetary compensation provided by HROTE to eligible producers selected through a public tender, for the net electricity supplied from the RES Facility to the power grid;
- Offered to all eligible producers, regardless of the size of the RES Facility;
- After concluding the Market Premium agreement with HROTE, the producers are not obligated to sell the produced electricity exclusively to HROTE. They are authorised to trade electricity on the open market with different producers, traders and suppliers of electricity, in accordance with the regulations governing the electricity market. However, if HROTE exercises its right of first refusal, producers must sell electricity to HROTE at the reference price (said right may be exercised by 30 October of the current year for the following year);
- A Market Premium agreement is concluded for a term of twelve (12) years, starting from the day status of eligible producer is obtained;
- The amount of premium is a variable component and depends on the market prices of electricity. It is equal to the difference between the reference value of electricity offered by an eligible producer (determined in the Market Premium agreement) and the current market price of electricity. If the market prices are lower, the amount of the premium goes up. In contrast, the premium is reduced if the market price of electricity goes up. If the market price of electricity exceeds the reference price of electricity determined in the Market Premium agreement, the eligible producer must return any attained difference in price to HROTE before the 25th day of the month, in respect of the preceding month;
- In a public tender, HROTE will first publish the amount of the maximum reference value for electricity expressed in EUR/KWh for each group of RES Facilities. The maximum reference value is revised once a year, in order to reflect changes in the production costs of electricity per unit of electricity produced by the RES Facility from each group. The revised input parameters are considered when determining the maximum reference values for the new public tenders;
- For the purpose of optimising support toward a market-price system, it is expected that applicants will aim to offer a reference value amount which is as close as possible to the actual market price of electricity.

4.2 Register of Renewable Energy Sources, Cogeneration and Eligible Producers

This register was adopted in 2019 with the Ministerial Regulation on Register of Renewable Energy Sources, Cogeneration and Eligible producers.

Led by the MESD's RES department, the register represents a unique and accurate record of ongoing RES-Electricity projects in Croatia. For instance, it is where information on available quotas for incentives, conducted tenders, ongoing tenders and announced tenders may be found. The data kept in the register is used to generate the predefined reports for the Ministry and the general public.

The Register is publicly available via an online application5 on the Ministry's webpage. The application also provides a graphical allocation6 of the projects. As of February 2024, there were 3902 solar power plants, 56 hydro power plants, 50 wind power plants, 120 biomass power plants, three geothermal power plants, 71 biogas power plants, five landfill gas and wastewater treatment gas power plants, 12 cogeneration plants and one battery energy storage included in the register.

4.3 Suppliers' Obligation to Repurchase Net Electricity Delivered by Eligible Producers to HROTE

Since the entry into force of the latest Governmental Ordinance on the Share of Net Electricity Delivered by Eligible Producers that Electricity Suppliers Must Take Over from the Electricity Market Operator in January 2022, suppliers must take over 60% of the net electricity delivered by RES-Electricity Producers to HROTE. The remaining 40% of net electricity delivered by RES-Electricity Producers to HROTE is offered on the electricity market.

5 https://oie-aplikacije.mzoe.hr/pregledi/PopupIzvjestaj.aspx?ReportId=5b47346e-67aa-4df2-9603-fa83c47061e3.

6 https://oie-aplikacije.mzoe.hr/pregledi/PopupIzvjestaj.aspx?ReportId=17ed7352-2f8d-416b-b2fb-cec912e96428

4.4 Developments on the Market of GOs

The system of GOs is another support model for RES-Electricity offered on the Croatian market. It is reserved exclusively for eligible producers that are not already participating in a Feed-in Tariff or Guaranteed off-take price.

GO is an electronic deed which provides to the end customer the proportion or amount of RES-Electricity in total electricity mix of a supplier. The basic unit is 1 MWh. In the system of GOs, eligible producers can request that GOs be issued for the electricity produced at their RES Facility and may thereafter trade these GOs with suppliers of electricity.

The data on issuing, transferring and cancelling of GOs is collected in the Register of GOs operated by HROTE. In 2022, the Register of GOs reported six (6) suppliers, twelve (12) RES-Electricity producers in total, three (3) traders and two (2) Registry users with production facility.

In 2023, HROTE conducted five auctions of GOs via CROPEX's IT trading platform for energy generated in wind farms and small biomass power plants. These auctions took place in April, July, and October. Through auctions, HROTE successfully sold a combined total of 618,709 GOs. The prices achieved ranged from 3.56 EUR/GO to 6.91 EUR/GO for energy produced in wind farms, while energy derived from biomass reached a price of 7.10 EUR/GO.

On 9 March 2023, the Government introduced a new Ordinance on the system of GOs for energy, aligning it with the provisions on of the Directive (EU) 2018/2001 (commonly known as RED II). The new legislative framework broadens the scope of GO issuance beyond electricity generated from renewable energy sources to include gas derived from renewable sources like biomethane, hydrogen, and low-carbon hydrogen. Additionally, it encompasses thermal energy (heating and/or cooling) and CHP using natural gas as fuel. Furthermore, a significant aspect of the new Ordinance is the introduction of transferability for GOs, irrespective of the energy they represent. This means that transfers can occur between users registered in Croatia, as well as with users registered in other countries. The purpose of these transfers is to demonstrate the proportion or quantity of energy within the total supplied energy volume. Consequently, a GO issued in Slovenia for instance, for electricity generated from the Krško Nuclear Power Plant, can now be fully acknowledged in Croatia.

4.5 Launching the Day-Ahead and Intraday Market at the Croatian Electricity Exchange (CROPEX)

CROPEX is the central point for trading electricity in Croatia. All interested market participants willing to become CROPEX members shall sign the membership agreement and thus gain access to the training platform. CROPEX is jointly operated by HROTE and HOPS.

The day-ahead and intraday market on CROPEX have been operative for several years now. The intraday market provides users with a better flexibility in the system, where they can almost in real-time adjust their positions in accordance with potential deviations on the market.

In July 2018, the Croatian and Slovenian electricity markets merged as part of the Multi-regional Coupling project (MRC). The merger resulted in an exponentially larger volume of electricity trading (449,305 MWh in October 2018) that exceeded the total amount traded on CROPEX throughout the first two years of its existence.

Further development occurred with the launch of the Core Flow-Based Market Coupling project that is supposed to connect the CROPEX and HUPX (Hungarian Power Exchange) day-ahead markets. The first phase of joint regional testing (Full Integration Testing – FIT), focusing on the functionality between all systems involved in the FB MC process, was successfully finished on 13 January 2022. The following phase of testing (Simulation Integration Testing – SIT), which focused on testing joint operational procedures, commenced on 17 January 2022. On 8 June 2022 the project parties announced the successful go-live of the project. With the project's implementation, the daily cross-border capacity at the Croatian-Hungarian border is no longer allocated directly through the JAO platform but rather indirectly through the mechanism of connecting electricity exchanges.

According to HERA's annual report for 2022, twenty-five (25) registered members on the intraday market purchased electricity with a total capacity of 399,1 GWh from CROPEX. On the other hand, CROPEX's day-ahead market had thirty (30) registered members in 2022. The volume traded on the day-ahead market in 2022 was 5.789 GWh.

Starting from 9 January 2024, CROPEX expanded its intraday market by introducing 15-minute trading products (on top of the current 60-minute trading products) and the ability to trade 15 MTU across all SIDC borders. 15-minute products on the intraday market were issued in response to the growing demand for shorter trading periods, enabling participants to react swiftly to market changes and optimize their power portfolio management. The first 15-minute transaction on CROPEX intraday was concluded between a CROPEX member and a market participant from Romania with a realized volume of 1.9 MWh.

4.6 ECO Balance Group

By entering into the agreement under the Feed-in Tariff or the Guaranteed purchase price with HROTE, eligible producers of RES-Electricity automatically become the members of the ECO balance group. The ECO balance group started its operation on 1 January 2019.

In order to provide accurate production plans, producers should submit precise information on the intended production at their RES-Facilities to HROTE. The intention of the ECO balance group is to ensure the stability of the electricity system, by keeping the production and consumption of electricity always in balance. HROTE is financially responsible for any imbalances in the ECO balance group which may arise due to deviations in the realised hourly delivery of electricity compared to the preliminary estimates in the production plans.

Members of the ECO balance group with a connected capacity above 50 KW pay the monthly balancing compensation determined under the electricity balancing assessment. The compensation is calculated depending on the net supplied power of electricity. Members of the ECO balance group shall submit a non-transferable, irrevocable and unconditional bank guarantee to HROTE, in order to guarantee that the compensation is paid, or alternatively, transfer a security deposit into HROTE's bank account.

In 2021, the total production plan of the ECO balance group for the day-ahead market was 3,487,066 GWh, of which suppliers took over 1,386,804 GWh. A capacity of 1,006,780 GWh was sold through auctions while HROTE sold the remaining 1,093,482 GWh on the day-ahead market on CROPEX.

The total production plan of the ECO balance group for the day-ahead market in 2022 was 2,758,945 GWh, of which suppliers took over 1,672,094 GWh. The remaining capacity of 1,051,200 GWh was offered in auctions.

5. Significant and/or expected changes

5.1 RES-Electricity Share of Final Consumption Promoted by Croatia under the Integrated National Energy and Climate Plan for the period 2021-2030

The first draft of the NECP for the period 2021-2030 was submitted to the European Commission at the end of 2018. The plan presented an overview of the energy system, along with the energy and climate policy framework, detailing national targets for each of the five key dimensions of the Energy Union. Additionally, it outlined the corresponding policies and measures aimed at achieving these targets. Special emphasis was placed on the goals set for 2030, encompassing reductions in greenhouse gas emissions, increases in renewable energy utilization, improvements in energy efficiency, and enhancements in electricity interconnection. According to the original NECP, Croatia pledged to achieve a renewable energy share of 36.4% in final energy consumption by 2030.

Given that the Fit for 55 package and the REPowerEU plan revisited the European energy and climate targets, including raising the mandatory renewable energy target for 2030 to at least 42.5% from the previous 32%, Member States were due to submit an updated draft of the NECPs to the Commission by 30 June 2023. The Croatian draft update of the NECP proposed increasing the share of renewables in final gross energy consumption to 42.5%.

The European Commission has published its recommendations to the updated NECP for Croatia in December 2023. Most notably, the Commission invited Croatia to support its ambitious goal of 42.5% share of renewable energy by 2030 with detailed and quantified policies and measures for the further uptake of renewables. These measures include: (i) accelerating electricity production from renewable energy through reverse auctions, (ii) encouraging self-consumption and long-term power purchase agreements, (iii) fostering regional cooperation, (iv) upgrading

equipment in district heating systems, (v) continuing incentives financed by the auctioning of emission allowances etc. These recommendations are expected to be implemented in the final updated NECP, which is due by 30 June 2024.

5. 2 National Energy Development Strategy for the Period until 2030 with Perspective to 2050

The Energy Development Strategy of the Republic of Croatia, adopted in February 2020, represents a step towards achieving the vision of a low-carbon energy economy and transitioning to a new era of energy policy that will provide an affordable, secure and quality energy supply, without an additional burden on the state budget through state aid and incentives.

The energy policy and strategy of the Republic of Croatia is focused on the EU goals of reducing greenhouse gas emissions, increasing the share of RES in the energy mix, energy efficiency, as well as security and quality of supply. It also aims to develop the EU's internal energy supply market, energy infrastructure, and competitiveness. Two energy transition scenarios were established under the Energy Development Strategy – one moderate and one accelerated – which assume that the share of renewable energy in final gross energy consumption will amount to approximately 37% by 2030 and within a range from 53% to slightly above 65.5% by 2050.

It is projected that by 2030 there will be a reduction in total greenhouse gas emissions ranging between 35.4% and 37.5%, and that by 2050 there will be a reduction ranging between 64.3% and 74.4%, compared to 1990 levels.

5. 3 Low-Carbon Development Strategy of the Republic of Croatia for the Period until 2030 with an Outlook to 2050

On 2 June 2021, the Croatian Parliament adopted the Low-carbon Development Strategy of the Republic of Croatia for the period until 2030, with an outlook to 2050. The core objectives of the strategy include achieving sustainable development and economic growth based on a low-carbon economy, resource efficiency, lower energy

consumption and the increased use of renewable energy sources. The strategy sets out 102 technical and organisational measures that will be implemented throughout every sector of the economy, including energy, transport, industry, construction, waste management, agriculture, tourism and services.

By 2050, the strategy aims to achieve an ambitious 80% reduction in emissions compared to 1990 levels. However, analysis shows that the investment and implementation of the measures set out in the strategy will lead to an increase in all core macroeconomic indicators. With the NU1 (gradual transition) and NU2 (strong transition) scenarios, Croatia should achieve a cut in emissions of between 33.5% and 36.7% by 2030 and a cut of between 56.8% and 73.1% by 2050, as compared to 1990 levels.

5.4 National Recovery and Resilience Plan 2021-2026 (NRRP)

In July 2021 the European Commission gave the green light to Croatia's National Recovery and Resilience Plan 2021-2026, signalling its commitment to provide EUR 6.3 billion in grants and EUR 3.6 billion in favourable loans to support it. This plan, considered a pivotal instrument for economic transformation, outlined a comprehensive strategy involving 146 investments and 76 reforms aimed at fostering economic and social recovery and mitigating the impacts of the Covid-19 crisis.

The initial plan consisted of six components[7], whereby 40% of the allocation was foreseen for measures relating to climate goals, including the acceptance of renewable energy sources, energy efficiency, reconstruction of buildings after earthquakes and sustainable mobility. The plan assumes that RES-Electricity will make up to 60% of final electricity consumption by 2030.

On 31 August 2023, Croatia submitted a revised and more ambitious NRRP to the Commission, which includes a chapter dedicated to REPowerEU. The updated plan comprises 234 measures projected for implementation, further facilitated by the successful completion of 197 milestones and 237 targets, amounting to EUR 10,04 billion in total (EUR 5.8 billion in RRF grants and EUR 4.2 billion in RRF loans). The Commission issued its second positive assessment to Croatia's NRRP on 21 November 2023.

7 (i) The economy, (ii) public administration, justice and state assets, (iii) education, science and research, (iv) the labour market and social welfare, (v) healthcare and (vi) renovation of buildings as part of post-earthquake reconstruction.

To date, Croatia has received EUR 3,503.1 million in RRF grants, equivalent to 34.9% of Croatia's amended NRRP. This comprises EUR 1,403.1 million in pre-financing and EUR 2,100 million in regular payments. These disbursements were contingent upon the successful completion of 86 milestones and 18 targets, primarily involving the adoption of national strategic framework documents, including revised or new legislation, strategies, and programs.

A fourth payment request worth EUR 162.5 million in grants was submitted on 21 December 2023. This request is associated with nine milestones and seven targets, which covers transformative reforms and significant investments across various sectors, such as public health, education, energy, research and innovation and public administration.

All reforms and investments envisaged in the NRRP that contribute to smart, sustainable and inclusive growth, job creation, economic productivity, competitiveness and a strengthening of economic, social and territorial cohesion must be implemented by August 2026.

5.5 Renewable hydrogen

In March 2022, the Croatian Parliament adopted the Croatian Strategy for Hydrogen until 2050 which establishes the framework possibilities for the development of production, storage, transport, and general use of hydrogen. The strategy identifies the following strategic objectives in Croatia: (i) increase of renewable hydrogen production, (ii) increase of the exploitation potential of RES for the production of renewable hydrogen, (iii) increase of the use of hydrogen and (iv) encouragement of the development of science, research and development of hydrogen technologies. The Croatian strategy for hydrogen until 2050 sets the goal of increasing the share of hydrogen in total energy consumption from the current 0% to 0.2% by 2030 and further to 11% by 2050. The vision therefore is to install electrolysers with a capacity of 1,270 MW by 2030 and 7,330 MW by 2050. Hydrogen production in Croatia is anticipated to rely on the exploration, development, and implementation of various low-carbon hydrogen production option methods in existing industrial hubs that serve as prospective demand hubs.

In 2023, the first European cross-border initiative aimed at establishing a dedicated hydrogen valley was initiated. This project, known as the North Adriatic Hydrogen Valley, involves Slovenia, Croatia and the Italian Region of Friuli Venezia Giulia. Key industrial players from these regions will develop pilot projects aimed at producing over 5,000 tonnes of green hydrogen annually from renewable energy sources, alongside its storage, distribution and utilisation. The project's overreaching goal is decarbonisation of significant industrial sectors, such as steel and cement production, as well as the implementation of sustainable transport solutions to reduce carbon emissions. The total estimated duration of the project is 72 months.

Recent legislative revisions to the RES Act in 2023 have designated the Croatian Hydrogen Agency as the National Coordinating Body for Hydrogen. The scope of the agency's activities can be divided into eight groups as follows: (i) programming and implementation of strategic planning, (ii) preparing complex and innovative projects of national interest, (iii) stakeholder mapping following technical verification of capacities, potentials and seriousness of project proposals, (iv) implementing projects in relevant funds, (v) coordinating the implementation process in complex and innovative projects of national interest, (vi) communicating with other member states regarding project positioning, negotiation in the context of project complementarity, etc., (vii) identifying and activating financial sources and (viii) reporting obligations.

5.6 Agrosolar power plants

Agrosolar power plant refers to the co-location of solar power with appropriate agricultural land. By leveraging the positive attributes of shielding crops from adverse weather conditions and other stressors such as solar radiation and frost, while simultaneously enhancing yield potential, agrosolar technology solutions are expected to become integral in future agricultural practices. Croatia, having experienced significant agricultural damage from extreme weather events in the past, formally acknowledged the advantages of agrosolar power plants in 2023. This recognition manifested in legal provisions enabling the placement of these plants across all agricultural areas under permanent plantations that are registered in the agricultural land use records (ARKOD).

Studies indicate that Croatia has the capacity to install up to 900 MW of solar energy through agrivoltaics, utilising just 1% of suitable land. Furthermore, by expanding the allocation of agricultural land for agrivoltaic installations to 5% of

Croatia's total agricultural area, solar photovoltaic capacity could escalate to 4.7 GW. Purely based on these statistics there is no doubt that agrosolar power plants will play an important role in Croatia's future energy landscape.

In the context of permitting, it is worth mentioning that for a project to qualify as an agrosolar power plant, it must meet certain conditions set forth in the Law on Spatial Planning. However, as mentioned in the introductory section of this guide, a Building Permit is not a prerequisite for initiating construction of agrosolar power plants. Croatia witnessed the launch of its first official agrosolar project in June 2023, with an installed capacity of 15 MW/p and a total investment of EUR 10 million.

5.7 Storage

Croatia has started a new chapter of its energy policy – especially in terms of the competitiveness of new technologies in energy generation and storage – by adopting its National Energy Development Strategy for the Period until 2030 with an eye towards 2050.

Common rules for energy storage are established in the new Electricity Market Act that entered into force on 22 October 2021. Under the Electricity Market Act, electricity may be stored in a facility by converting it into another form of energy, and includes reversible power plants, pumping power plants, electric boilers with tanks, heat pumps, battery tanks, electrolysers with hydrogen tanks and other devices in which electricity may be stored in some form and later transmitted to the transmission or distribution grid.

In general, to participate in the electricity market, the energy storage operator must hold an Energy Licence to Store Electricity (*dozvola za skladištenje energije*). However, exceptions apply in the following cases: (i) if the total installed power of the energy storage facility is below 500 KW; (ii) if the storage facility is conducting a trial run (or is between a trial run and acquiring the Energy Licence to Store Electricity, with a maximum duration of 60 days); or (iii) when the storage is not considered an electricity activity (i.e. if the energy storage facility is behind the metering point of an "active purchaser", if it is used exclusively for personal needs whereby electricity is not transmitted to the grid, or if the TSO or DSO is using the storage facility to fulfil its obligations set out in the Electricity Market Act).

Energy storage operators at the metering point of facilities with an installed capacity exceeding 500 KW may provide electricity on the wholesale market. The energy storage operator will be financially responsible for any deviations caused to the electricity system.

As at February 2024, one energy storage facility with a capacity of 66 MW has been included in the Register of Renewable Energy Sources, Cogeneration and Eligible Producers.

6. Support scheme for cogeneration

In Croatia, there is no specific legislation governing the system for the high-efficiency cogeneration of combined heat and power (CHP). The RES Act 2021 applies to both RES-Electricity and CHP, as does the general regulatory framework governing the energy sector, the regulation of energy activities, the electricity market, the gas market and the heat market. In accordance with the current tariff systems, cogeneration plants using biomass and biogas are required to achieve a minimum annual energy efficiency of 50%, in order to obtain the incentivised price for supplied electricity.

According to the latest available data, as at 31 December 2022, Croatia had a total of 12 CHP facilities installed, with a cumulative capacity of 1,069 MW. However, only one facility (with a capacity of 0.5 MW) continues to participate in the incentive system, given that during 2022 three facilities, totalling approximately 103 MW in capacity, terminated their contracts with HROTE and ceased delivering energy within the incentive system. The reason for said decision stems from the assessment made by producers of CHP that they can get better prices for electricity by selling on the open market rather than through the contracted incentive scheme.

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