POSITION PAPER

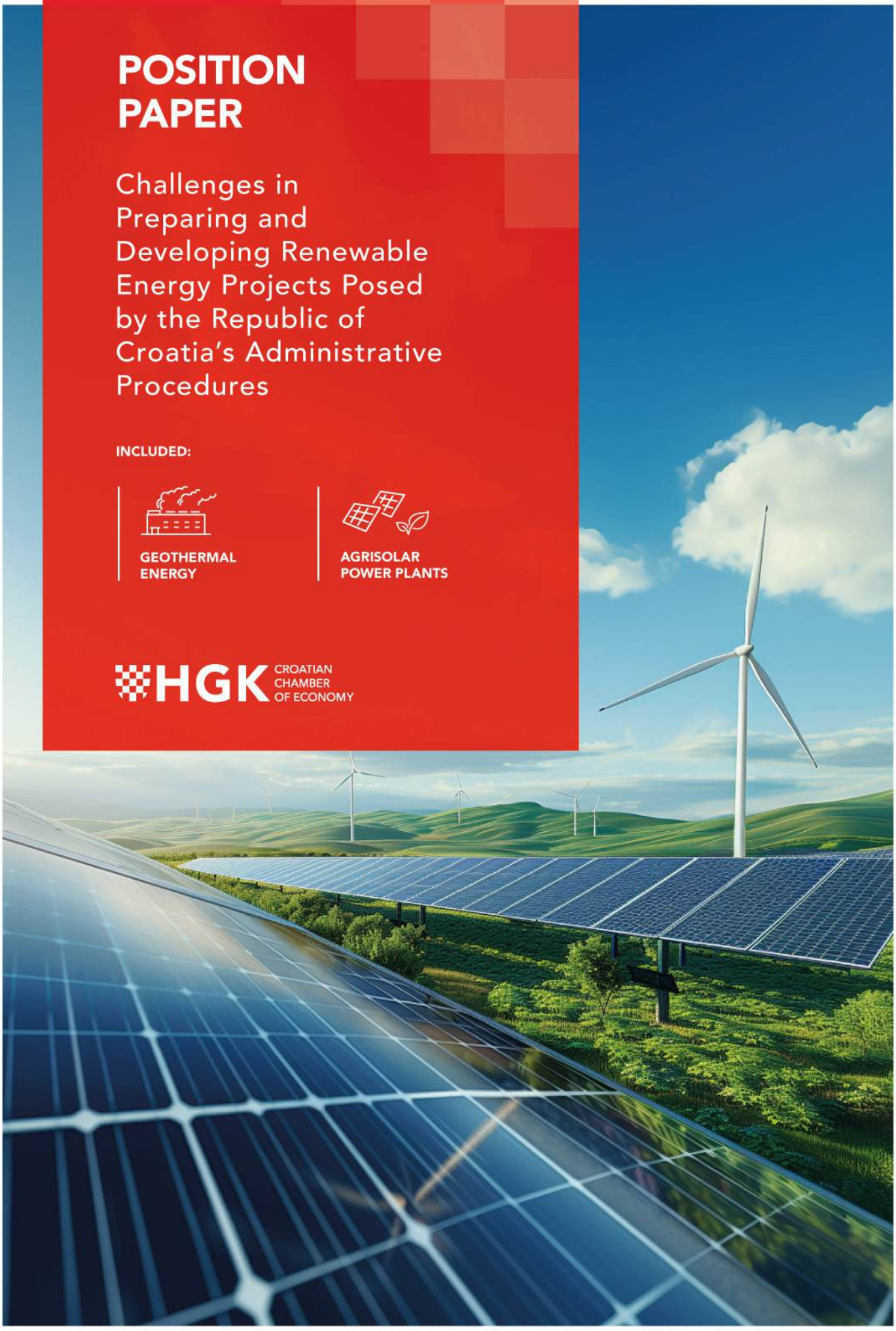
Challenges in Preparing and Developing Renewable Energy Projects Posed by the Republic of Croatia's Administrative Procedures

INCLUDED:

GEOTHERMAL ENERGY

AGRISOLAR POWER PLANTS

HGK CROATIAN CHAMBER OF ECONOMY



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MAIN EDITOR
Marija Šćulac

AUTHORS OF ANALYSIS
Association of the Renewable Energy Sources at the Croatian Chamber of Economy

EXECUTIVE EDITORS
Danijela Jemrić, Tamara Kelava, Antonija Knežević, Željka Rukavina

GRAPHIC DESIGN, EDITING AND PREPARATION
Renato Pongrac

LANGUAGE EDITOR
Sandra Baksa

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INTRODUCTION

Billions of euros spent on energy subsidies and one of the highest inflations in the last few decades are the disastrous consequences of the energy crisis. While the damage caused by it is still being analyzed, the climate crisis continues to increase. Last year was the second warmest year ever recorded in Europe. Considering this context and lessons learned regarding the fact that the reliance on fossil fuels creates huge economic and safety risks, it is clear that the transition to more accessible renewable energy can help in several aspects. It is also clear that the energy sector transition has no alternative.

Having this idea in mind, the European Commission initiated the acceleration of the green energy transition and increased the goals referring to the portion of renewable energy sources in the amount of 42.5 percent by 2030.1 However, these ambitions are not equally realized throughout Europe.

Some countries are intensively working on it, while others have not started implementing their plans yet. Unfortunately, Croatia is in the second group. According to the Eurostat data, Croatia is among the four countries that have increased the portion of total consumption of renewable energy sources as least since 2015. The reasons must be looked for in the late bylaws referring to the new legislation about renewable energy sources and the prolonged administrative procedures for developing renewable energy sources.

Despite the great interest in investments in renewable energy sources and the extensive potential of that field, Croatia's goals are not ambitious enough. The former is evident from the proposal of the revision of the National Energy and Climate Plan (NECP), according to which only one GW solar power plant is planned by 2030, while Slovenia, with half as much population, intends to install 3.5. GW. The European Commission stated numerous objections to the Croatian plan proposal. Therefore, the European Commission evaluation2 defines that the National Energy and Climate Plan draft does not contain information on the gradual removal of coal use at the latest by 2033. On the contrary, the continuation of the use of the only coal-fired power plant until 2040 is being considered.

The realization of the goal of 1,500 MW of the new renewable energy sources projects by 2024, as defined in the National Recovery and Resilience Plan (NPOO), is questionable. Although the procedures for developing the self-supplied solar power plants have been partially accelerated, it is not likely that the above-defined number can be reached within the set deadline. One of the reasons for this is the failure to organize a tender for the market premium despite the approved Program of State Incentives for Electricity Production using Renewable Energy Sources.

As stated in the first Position Paper, which was drafted last year, the Croatian Chamber of Economy and the Association of the Renewable Energy Sources of the Croatian Chamber of Economy warned that the administrative procedures for the preparation and development of renewable energy sources projects take too long and are too slow. Therefore, it is necessary to take additional measures to speed things up. In this issue, we elaborate on positive steps taken within the last year and emphasize old and new obstacles that needs to be removed to realize a faster energy transition in Croatia. Two additional areas not mentioned in the previous version have also been covered: geothermal and agrisolar power plants.

We hope this document will encourage dialogue among key stakeholders in developing renewable energy sources, accelerating the energy sector's transition.

National renewable energy sources can stimulate the economy, improve the country's energy balance, decrease carbon emissions, and result in measurable economic impacts and benefits for the community. Therefore, an increase in the portion of energy produced using renewable energy sources has to be prioritized in the upcoming period. "Investing significant effort into strengthening the renewable energy sources capacities", as stated in numerous strategic documents, has to be implemented into specific actions to realize such a goal.

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1 Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy

2 https://commission.europa.eu/system/files/2023-12/SWD_Assessment_draft_updated_NECP_Croatia_2023.pdf

2.1. LEGAL FRAMEWORK

The sector of electricity production using renewable energy sources is regulated by two basic laws – Act on the Electricity Market (ZOTEE, OG 111/2021, 83/2023) and Act on Renewable Energy Sources and High-Efficiency Cogeneration (ZOIEVUK, OG 138/2021, 83/2023). These laws are the base for all other legal regulations and bylaws under the jurisdiction of the ministries, directorates, and public institutions in charge of electricity production using renewable energy sources. Apart from the compliance of the national legal framework with the EU legal acquis, the main reason why the above laws were adopted at the end of 2021 was the simplification of the procedures for the development of the renewable energy sources projects, and under the above, intensive investments in the production of green energy and reaching Croatia's goals referring to renewable energy sources. However, instead of acceleration, the new legal framework caused additional deceleration of the sector's development.

Key reasons were failure to adopt several foreseen bylaws without which full law implementation could not be possible within the set deadlines, as well as a generally high number of bylaws which are often colliding and are not adopted or revised in parallel, thus additionally slowing down the investment implementation and realization. Following the list available on the Croatian Energy Regulatory Agency (HERA) website, there are currently 50 valid bylaws relevant to the electricity market and renewable energy sources, some of which have not been adopted. If we add slow administration to this, the result is the most prolonged process of developing renewable energy sources in Europe, confirmed by the research implemented by a non-profit organization called Ember.

The most relevant bylaw, which was supposed to be adopted in January 2021, was over 500 days late as it was adopted in June 2023. This is the Regulation on the Criteria for Implementing a Public Tender for the Energy Approval Issuance and Conditions for the Energy Approval Issuance (Regulation on the Energy Approval).

Apart from the Regulation mentioned above, and being almost a year late, Regulations on the Connection to a Transmission Network and Regulations on the Connection to a Distribution Network were also drafted and applied as of 1 September 2023 (they should have been made within 12 months from the date when the new law entered into force that is by 22 October 2022). HERA stopped their adoption in November 2022, explaining that compliance between the regulations of the Croatian Transmission System Operator (HOPS) and HEP ODS (Distribution System Operator) is needed. This meant that the whole procedure of connecting the projects to the network was stopped entirely. The above Regulations define the development of the Study on the Possibility of the Connection to the Network (EMP). Expressing interest in energy approval (EO) was impossible without such a document. Network Regulations for the Transmission System have recently been made, while the regulations for the distribution system are still waiting for approval from the Ministry of Economy and Sustainable Development and HERA.

Unfortunately, the new Act on the Electricity Market has decelerated the development of the new projects and the development of the projects in the advanced development phase. Per Article 133 and the transitional provision of the new Act on the Electricity Market, the request with the expression of interest for the implementation of a public tender for energy approval could have been submitted by the investors with the location and/or construction permit, and/or (prior) electro-energy approval, and/or decision on the environmental acceptability, who did not need to wait for the Regulation. The deadline was 19 January 2022, and the expression of interest for the energy approval was submitted by 216 applicants with the projects' total power of over six GW. For the sake of comparison, Croatia currently has around 1.6 GW of wind farms and solar power plants. More than two years have passed since those requests were submitted. However, energy approval tenders have still not been published for all of them. According to the data provided by the Ministry of Economy and Sustainable Development, 58 requests were rejected by the end of 2023, and 106 energy approval public tenders were organized. From that moment until today, only eight more energy approval public tenders have been published. That means the projects with valid documentation have been waiting for their tenders for two years. It is not known which criteria the Ministry used when deciding on the order of organizing energy approval tenders, but

the date of the documents' handover was definitely not the criteria.
From the decisions published on selecting the best tenderer, it is clear that only four tenders included more than one tenderer. The condition to take part in the tender was that the applicant expressed his interest according to Article 133, paragraph 2 of the Act on the Electricity Market. Therefore, the Ministry of Economy and Sustainable Development had a complete overview of the situation on 10 January 2022 and could have seen which expressions of interest included valid documentation, which had to be rejected, and which projects included more tenderers. The above mentioned raises the question of whether there is any sense in implementing long-term tenderprocedures if the expressions of interest immediately indicate if there is more than one interest for a location. If there is only one expression of interest, the validity of the delivered documentation has to be inspected, and energy approval has to be awarded without implementing a long-term tender procedure.

One part of the investors could not express interest following Article 133 because the Ministry, for an unknown reason, interpreted the article mentioned above in a way that they accepted the decision on the environmental acceptability, location, and construction permit issued by 19 January 2022 and (prior) electro-energy approval issued by 21 October 2021. Therefore, they rejected the idea of organizing an energy approval tender for the projects that had the Connection Agreement concluded and/or (prior) electro-energy approval issued in the period from 21 October 2021 to 19 January 2022.

Currently, the greatest obstacle to developing renewable energy sources is the unknown connection fee amount. HERA must decide on this amount based on the system operator's proposal. The decision on the unit prices for the connection to the electro-energy network has been awaited as of the end of 2022. Due to this, further development of one part of the projects with the energy approval was stopped. These projects cannot get their Connection Agreements without a defined connection fee. Consequently, they cannot take the following steps: obtaining the location and construction permit. And while the administration is late, projects have a deadline of five years, by which time, in accordance with ZOTEE, they must build a production plant and obtain a usage permit. or they will lose energy approval.

Unknown connection expense is a limiting factor for the new renewable energy sources projects as this is the main parameter considered when analyzing investment profitability and impacts the decisions regarding project implementation.

The problem is not only with the non-existing acts but even those already adopted.

This is precisely the case with the long-expected Energy Approval Regulation, which is quite unclear in some sections. Therefore, the investors still do not know whether energy approval projects located on mixed land – partially owned by the state or local authority units and partially privately owned – can be obtained and in what manner. Apart from the inconclusive articles, some provisions are repeated; for example, the content of Article 14, paragraph 5 is identical to Article 15, paragraph 4. Although there was more than enough time to prepare the Regulation, its final version contains mistakes; for example, instead of paragraph 13, Article 18, paragraph 14 refers to paragraph 12 of the same Article thereby failing to define the annual compensation intended for local self-government units for projects with resolved property-legal relations. Furthermore, it is not defined for which period the pre-contract/easement agreement should be concluded to be a valid proof of resolved ownership or property law relations. To explain the meaning of the text contained in specific articles of the Energy Approval Regulation, the Association of the Renewable Energy Sources of the Croatian Chamber of Economy sent an inquiry to the Ministry, but there was no answer.

There is almost no field where the interpretation of the provisions made by different public institutions does not pose a problem. Sometimes, clearly defined provisions are interpreted without having any base in the text itself, resulting in additional legal insecurity. For example, HERA, although it is not explicitly stated in the text, freely interpreted Article 6 of the Regulation on the permits for the approvals for the energy activities and management of the register of the issued and withdrawn permits for energy activities (OG 44/2022). This Regulation states that qualified workers must have a work agreement, but it does not define the number of hours. Despite this, HERA insists that the work agreement has to define full-time working hours. This was not the case in the past, and the work agreement could have included part-time working hours (in a manner that eight working hours was divided among several companies within the group of companies dealing with the same energy activities and producing electricity using renewable energy sources). Therefore, it is not clear why the interpretation of the above-stated provision was suddenly changed.

One of the areas that was not defined well enough in the regulatory framework is **energy storage** facilities. While evaluating the tenders for the award of the energy approval, the above Regulation evaluates the installation of the energy storage and defines financial fees or penalties in case the energy storage is not constructed. However, simultaneously, this is not defined clearly enough in the remaining part of the energy regulatory framework. There is no straightforward development process, especially regarding the connection to the electro-energy network. Considering that the energy storage significantly increases the usability of the intermittent sources production possibilities and that they have the potential to provide additional services in the electro-energy system, their implementation in the regulatory framework is necessary. Acts that have not yet been adopted, such as Network Regulations for the Distribution System Operator, should include energy storage, which are crucial for further market development.

While the energy storage is not defined well enough, some existing rules require amendments as they contain illogical provisions. For example, Regulation on the Maximal Allowed Noise Levels considering the Noise Source, Time and Location (OG 143/2021) defines that the **residual noise** (total noise which is created at a particular location before there was a change of the existing situation, which presents zero condition before the construction) cannot be increased for over one decibel once the wind farm is constructed. However, noise measurement devices measure with the accuracy of +/-2 dB. For comparison, France, which has one of the strictest regulations in this area, defines the residual noise as not being increased for over five dB per day or three per night.

Since the last position paper, there have also been some **positive legal changes**, which will significantly improve the speed and efficiency of the project development. These mainly refer to the scope of work of the Ministry of Physical Planning, Construction and Assets (MPUGiDI) and to the Act on the Amendments of the Physical Planning Act (ZPU, OG 67/23), which was the first to define agrisolar power plants and the Regulation on the Amendments of the Ordinance on Simple and Other Construction Works and Works (OG 112/17, 34/18, 36/19, 98/19, 31/20, 74/22, 155/23) which significantly simplifies and accelerates the process of obtaining the permits for the solar power plants of up to 10 MW.

The new amendments of the Ordinance on Simple and Other Construction Works and Works define that structures and equipment with connection to the electricity network and intended for electricity production with the installed power of up to 10 MW can be constructed without a construction permit and following the main project. This refers to solar or agrisolar power plants as defined by the act determining physical planning on the land with solved property and legal relations. Nevertheless, the Regulation deviates from other documents defining this field in terms of terminology, as all other regulations refer to connected, not installed power.

Also, contrary to the spatial plan, works can be designed, built and carried out on the roof of an existing building in order to install a system of solar collectors, i.e. photovoltaic modules for the purpose of producing heat or electricity for the needs of that building (except in the national park and nature park),

and the construction of solar panels is allowed and agro-solar power plants (buildings from Article 4, Point 26 of the Ordinance) on the areas where they can be built according to the law regulating spatial planning.

Unfortunately, this presents the only visible acceleration achieved within the last year in the field of renewable energy sources. Implementing all procedures lasts too long, far longer than legally defined deadlines. The projects that expressed their interest in energy approval following the new Energy Approval Regulation are waiting for more than 90 days as of the procedure initiation. By the time this text was written, only three energy approval tenders for state land had been announced, although more than 30 projects were requested for the tender. It is unknown how many energy approvals have been awarded by the Ministry for projects with solved property and legal relations, as the Ministry's website does not contain such information. The Register of the Renewable Energy Sources, Cogeneration and Privileged Producers (OIEKPP Register) is exceptionally poorly organized. In the document entitled Evaluation with the Recommendations for the Removal of Obstacles and Simplifying Administrative Procedures Limiting Greater Usage of Energy from Renewable Energy Sources, which was developed within the National Recovery and Resilience Plan (NPOO), the Ministry stated that the OIEKPP Register should be established by the end of 2023 and that it shall be based on more modern technology. However, this has not been realized.

In that document, the resolution of 43 administrative obstacles was announced, with specific proposals. The end of 2023 is defined as a deadline for most of them. However, a significant part of the obstacles has not been removed yet.

In the text below, we emphasized relevant bylaws adopted within the previous year and those that are late and disable the preparation and development of renewable energy projects in the Republic of Croatia (Table 1 and Table 2).

Tablica 1:
Important bylaws adopted within the last year

Decision on the Amount of Tariffs for Electricity Transmission (OG 27/24)	*6 March 2024*	*(applicable as of 1 April 2024)*
Regulation on the Usage of Renewable Energy Sources and High-Efficiency Cogeneration (OG 28/23)	*10 March 2023*	*(applicable as of 11 March 2023)*
Regulation on the Energy Origin Guarantee System (OG 28/23)	*10 March 2023*	*(applicable as of 11 March 2023)*
Regulation on the Usage of Renewable Energy Sources and High-Efficiency Cogeneration (OG 28/23)	*21 June 2023*	*(applicable as of 7 July 2023)*
Regulation on the Criteria for the Implementation of Public Tender for the Issuance of Energy Approval and Conditions for the Energy Approval Issuance (OG 70/23)	*29 June 2023*	*(applicable as of 7 July 2023)*
Regulation on the Incentives for Electricity Production using Renewable Energy Sources and High-Efficiency Cogeneration (OG 70/23)*)*	*29 June 2023*	(s početkom primjene od 7. srpnja 2023.)
Regulations on the Connection to the Transmission Network	*14 July 2023*	*(applicable as of 1 September 2023)*
Regulations on the Connection to the Distribution Network	*14 July 2023*	*(applicable as of 01 September 2023)*
Act on the Amendments of the Act on the Electricity Market (OG 111/21, 83/23)	*21 July 2023*	*(applicable as of 29 July 2023)*
Act on the Amendments of the Act on the Renewable Energy Sources and High-Efficiency Cogeneration (ZOIEVUK, OG 138/21, 83/23)	*21 July 2023*	*(applicable as of 29 July 2023 and individual provisions as of 1 January 2024)*

Regulations on Non-standard Services provided by HEP ODS and Pricelist for Non-standard Services provided by HEP ODS (HEP ODS, 12/2023, HEP ODS, 12/2023)	*11 December 2023 and 1 January 2024*	*(applicable as of 1 January 2024)*
Regulations on the Electro-energy System Balancing (HOPS, 12/2023)	*14 December 2023*	*(applicable as of 30 December 2023)*
Regulation on the Amendments to the Ordinance on Simple and Other Construction Works and Works (OG 155/2023)	*22 December 2023*	*(applicable as of 30 December 2023)*
Transmission System Network Regulations (OG 10/24)	*26 January. 2024*	*(applicable as of 3 February 2024)*

Table 2:
Important bylaws which have not yet been drafted:

Network Regulations by the Distribution System Operator, which HERA is approving.
Decision on the amount of unit fee for the connection to the network which, pursuant to Article 22 of the Methodology for Determining the Fee for the Connection to Electro-Energy Network (OG 84/22), HERA was supposed to make within 60 days as of the date of the entrance into force (28 July 2022) or by 29 September 2022
PThe regulations for the electricity market organization, made by HROTE, should have been adopted within six months when the Act on the Electricity Market entered into force or by 22 April 2022
Regulations for managing congestion within the Croatian electro-energy system, including connecting lines..

Raised Issues:

- Lack of bylaws foreseen by the Act on the Electricity Market (primarily the Decision on the amount of the Unit Fee for the Network Connection and Network Regulations by the Distribution System Operator and Regulations for the Electricity Market Organization)
- Significantly prolonged processing of the requests for the energy approval issuance, i.e. on the basis of Article 133. with the transitional provisions of the Act on the Electricity Market or under Article 133
- Delays in responses to new expressions of interest in accordance withunder the Regulation on the criteria for the implementation of a public tender for the issuance of energy approval and conditions for the issuance of energy approval
- Regulation on the criteria for the implementation of a public tender for the energy approval issuance and conditions for the issuance of energy approval is quite unclear and inconclusive in some parts
- Energy storage is not defined well enough in the regulatory framework
- OIEKPP register is exceptionally poorly organized
- Provisions on residual noise, which cannot exceed one decibel although measurement devices have the accuracy of +/- 2 dB, are entirely illogical

Solution Proposal:

- Urgent adoption of bylaws as foreseen by the Act on the Electricity Market
- Urgent processing of the requests for the issuance of energy approvals pursuant to Article 133 of the Act on the Electricity Market
- Acceleration and simplification of all procedures implemented in order to obtain permits and decisions within the procedure of developing and constructing renewable energy sources projects in order to decrease the regulatory risk to a minimal level
- Amendment to the Regulation on the criteria for the implementation of a public tender for the issuance of the energy approval and conditions for the issuance of the energy approval, or at least interpretation for specific regulation provisions which remain unclear
- A better definition of energy storage in the regulatory framework
- Establishing a better -organized OIEKPP Register
- Amendment of Article 6 of the Regulation on the Highest Allowed Noise Level considering the Noise Source Type, Time, and Location (OG 143/2021) in a manner that the "level of noise on the newly constructed infrastructural facilities caused by road traffic, railway traffic, car cables" is followed by "and wind farms")
- Recognizing the necessity of the revision of the tariff model and items for the production pump plants and energy storages, which have the function of distributing the market and balancing the system regardless of the connection voltage level (plants that take energy from the grid for energy transformations, and which by definition are not final consumption).

2.2. CONNECTION TO ELECTRO-ENERGY NETWORK

Although the Regulations on the Connection to the Transmission Network and Regulations on the Connection to the Distribution Network entered into force on 1 September 2023, as mentioned in the previous paragraph, an unknown amount of the unit price for the connection to the electro-energy network presents a significant obstacle in the development of the renewable energy projects. Croatian Energy Regulatory Agency (HERA) should have defined the fee amount in September 2022. Without such information, it is impossible to plan the investments, as the connection to the network presents an essential part of the investment. Let's consider that, at the very beginning of the project, and in accordance with the Act on the Electricity Market, the investors have to pay for the energy approval (fee for energy approval issuance). It is necessary to transparently and gradually pay for network connections to avoid an exceptional financial burden for the project development in the early phase. Furthermore, it is necessary to ensure the co-financing of future connection expenses for all plants using renewable energy sources.

This would mitigate the most significant risk of renewable energy projects and ensure the profitability of the new projects. Key long-term financing sources for the network construction are network and connection fees. Along with the existing fee structure, realising an ambitious plan for integrating renewable energy sources in Croatia is impossible. Therefore, transmission and distribution operators want to rely on the connection fee as much as possible.

At the moment of preparing this document, HERA started public counselling for a Ten-year plan for the development of the Croatian distribution network from 2024 – 2033 with detailed elaboration for the initial three-year and one-year period (10G plan) for HEP ODS, but not HOPS. Following the Act on the Electricity Market, the deadline for delivering a 10-year plan to HERA was 30 September last year. However, even with the approval of the Ministry of Economy and Sustainable Development, HERA did not approve a ten-year plan for the period from 2023 to 2032 to either HOPS or HEP ODS. Therefore, the plan for the period from 2022 to 2031 is currently a valid investment plan. Ten-year plans for developing the electro-energy network are crucial for system operators and present and future network users. Failure to adopt and reach compliance between ten-year plans and the market situation has potential adverse impacts, especially on developing renewable energy projects.

From the proposal of a Ten-year plan for the development of the Croatian transmission network from 2023 – 2032, we can conclude that the investments in the transmission network are to be financed exclusively via new connections. This automatically means a high connection fee. If this is realized, the expenses of the renewable energy projects shall be increased, making them uncompetitive compared to other EU countries. Consequently, the energy transition shall be decelerated. On the other hand, the Association of the Renewable Energy projects at the Croatian Chamber of Economy does not advocate the complete removal of this fee, as, in that case, the financing of the electro-energy network development would be questionable, and the development of renewable energy projects would be decelerated. However, it is imperative that, once the decision on the fee is made, it is valid for a minimum of 5 years for the investors in renewable energy sources to be able to plan their investments.

Infrastructural investments into the electro-energy network present a fundamental precondition for accepting new electricity producers using renewable sources. To successfully integrate renewable energy sources, transmission and distribution networks must be flexible, resilient, and capable of managing variable production typical for energy obtained from the sun or wind. Considering that the process of constructing electro-energy infrastructure is exceptionally long, it is crucial to start constructing additional transmission capacities as soon as possible so that the network development does not stop while the connection fee funds are collected.

The development of an electro-energy network is the spine of green transition. This was recognized by the European Commission, which, at the end of last year, proposed an Action plan for a broader and faster introduction of more efficient electro-energy networks. This action plan determines specific and adjusted measures for stimulating the investments needed to improve European electro-energy networks. As 40 percent of distribution networks are older than 40 years, and the cross-border transmission capacity is expected to double by 2030, the European Commission evaluates that investments in the amount of 584 billion Euros are needed at the EU level. The Croatian transmission network is ancient. Sixty-one per cent of lines are older than 40 years. Apart from the aforementioned, the electro-energy network was initially designed for great industrial consumers, and the structure of network users is significantly different nowadays, which requires topology changes and presents an additional challenge which has to be handled simultaneously with renewable energy integration.

In the Recommendation of the European Commission from 2023, it is stated that the transmission network has to be significantly improved to increase the integration of renewable energy sources in Croatia. According to the evaluations stated in this document, between 600 and 800 million Euros must be invested in the network expansion to integrate additional capacities. However, Croatia has not been capable of making ten-year plans or defining the connection price for almost two years.

Along with the investments in the new and modernization of the existing electro-energy network, it is necessary to establish a publically available platform with HOPS infrastructure and clear indicators of its potential capacities or limitations for the acceptance of the new production plants or consumers to plan the investments into new energy facilities better (information on the connection possibilities that HOPS publishes at its websites have to be digitalized and unified). This is not necessary just for the renewable energy plants but for all more significant investments since the information on the approximate connection potential (remaining available connection power in constructed substations, including constructed electrical switchboards) is vital to plan the development of all economic projects (industries, more significant consumers and similar).

The procedure of obtaining pre-connection and connection to the electro-energy network, as the Connection Regulation foresaw, lasts for minimally 240 days. An additional problem is hidden in the fact that HOPS provides the situation at the network for the need to draft the Study on the Connection Optimal Technical Solution (EOTRP) once a year, from 1 to 15 May. Therefore, the investors might wait for over 11 months to be able to request the network connection. The procedure of connecting to the network, as well as all other procedures and steps that are taken while constructing non- integrated solar power plants and wind farms, regarding the suitable regulations, are described in the Guideline for the renewable energy sources projects, published by the Croatian Chamber of Economy in 2023.

When the Act on the Electricity Market was passed, connecting to the transmission network was stopped. This presents a significant problem to the investors who have obtained Energy approval following the transitional provisions of the Act, considering that they have a deadline of five years to finalize the project but, due to an unknown connection price, cannot conclude the Connection Agreement and continue further procedures. Also, the Ministry of Economy and Sustainable Development does not acknowledge

the Connection Agreements concluded after the Act entered into force. Therefore, the investors with the previously concluded Connection Agreement and issued electro-energy approval are instructed to repeat the connection procedure.

At the end of January 2024, the Official Gazette published the new Transmission System Network Regulations. All stakeholders waited for the new Network Regulations as it was announced that the operative limitations, as defined by the Act on the Electricity Market and new Regulations on the Connection to the Transmission Network, shall be defined by this document. It has been announced that it will be part of the Network Rules, given that it is about system and plant management. However, operational restrictions are barely mentioned in the Network Rules and do not instill security or reduce risk when planning project development and securing funding.

Raised issues:

- Distribution system network regulations have not been adopted, and the approval of the Ministry of Economy and Sustainable Development is being awaited
- The network connection fee has not been defined, and HERA's approval is being awaited
- Excessive reliance of transmission and distribution system operators on network connection fees as a source of funds for the construction of the electric power network
- Insufficiently planned investments into the electro-energy network
- Lengthy preliminary connection procedures and procedures of connecting to an electro-energy network
- HOPS present a network situation for EOTRP development once a year in the the period between 1 and 15 May
- Ten-year plans for the network development are two years late, although they are crucial for both system operators and network users.
- Network regulations do not define operative limitations
- The available connection capacities (in terms of power and time) in transmission and distribution network hubs have not been determined as possible solutions for connecting new and enhanced RES in the Republic of Croatia.

Solution proposal:

- Adoption of the Distribution system network regulations
- Urgently defining the connection fee for 2024
- Ensuring co-financing of the connection fee on a national level for all production plants using renewable energy sources
- Initiating the construction of additional electro-energy network transmission capacities as soon as possible
- Establishing digital and publicallypublicly available platforms with HOPS infrastructure and indicators of the potential capacity and limitations for the acceptance of the new production plants
- Acceleration of the preliminary connection procedure and procedure for the connection to the electro-energy network
- Compliance between the Ten-year plan for network development and other system operators' activities
- Separation of operative limitations per phase (developmental phase, drive phase) in terms of terminology
- Investigate the utilization of built-in connection capacities in transmission and distribution network hubs, significant remaining connection potential for new RES within the existing state of network construction with the applications of advanced apps.

2.3. REGULATIONS COMPLIANCE

Along with the unfinished bylaws, a significant obstacle to realising renewable energy projects is the failure to comply the new acts with the existing ones. This primarily refers to non-compliance between the Act on the Renewable Energy Sources and High-Efficiency Cogeneration (ZOIEVUK) and the Act on the Electricity Market (ZOTEE) with the key act defining the construction field: Construction Act (ZOG, OG 153/13, 20/17, 39/19, 125/19). The last ZOG amendments entered into force in 2019. Therefore, this Act does not comply with the newly adopted acts defining the field of renewable energy sources.

Non-compliance with regulations, among other things, is reflected in the different practices of issuing construction acts to different plants producing electricity from renewable energy sources. Although all competent county offices should act equally, due to differences in their actions, the Ministry of Physical Planning, Construction, and State Assets issued an instruction to all administrative bodies on 20 September 2022. This instruction forbids the issuance of the location or construction permit to the projects for which the tender for the award of state land following ZOIEVUK from 2016 or the tender for the energy approval award under the provisions of ZOTEE from 2021 was not implemented. Considering that the Ministry issued this instruction, although the legislative framework of ZOG and the Spatial Planning Act (ZPU) was not harmonized with the relevant laws of the energy sector (ZOTEE and ZOIEVUK), only two interpretations of this instruction are possible. First, all the decisions and acts on construction issued before the above-defined instruction oppose the law. The second interpretation is that all the actions after the issuance of this instruction oppose the Construction Act. Construction Act and Physical Planning Act have not yet made changes that would solve this interpretation. At the level of administrative bodies, the existing provisions and instructions issued by the Ministry are still interpreted differently.

The fact that the amendments of one regulation, without amending the related regulations, can lead to an administrative limbo is best apparent from the example of the amendment of the Ordinance on simple and other buildings and works (OG 155/23) from December 2023. Per this Regulation, the solar power plant projects of up to 10 MW of power (under the condition that the property and legal relations are solved) become simple structures. Therefore, they do not require energy approval or a construction permit. This amendment significantly simplified the procedure for the investors. However, due to the failure to adjust other regulations, the procedure of acquiring the status of privileged producer and the procedure of participation in the register of the energy origin guarantee, which is crucial to prove the origin of the energy obtained from renewable sources and which presents additional income for the producers on the market, remains unclear for such projects.

ZOTEE defines production plants as simple structures that, following the regulations defining construction, do not need to obtain energy approval. On the other hand, and per ZOIEVUK, the condition for the status of the privileged producer is registration into the OIEKPP Register, which requires energy approval. Apart from the procedure mentioned above defined by ZOIEVUK, the privileged producer status can be acquired by the end consumer with his personal production and the user of the self-supply plant, but not the renewable energy sources plant with the power of 10 MW, which is considered a simple structure under the construction regulations.

During future compliance with different regulations, focus should be placed on complying with terms and definitions referring to renewable energy projects. Administrative bodies often misinterpret many synonyms. It is necessary to define the term of the power plant connection power (not installed) to have unique interpretations and actions by all administrative bodies. In the Regulation on the Amendments of the Ordinance on simple and other buildings and works, the installed power term is used instead of the connection power term when defining solar power plants as simple structures. This opposes other provisions and acts that define power plant power.

Considering the scope of this topic and cross-sectoral character, and to efficiently solve non- compliance between the regulations in force and those that are to be adopted, we find it necessary to found

a cross-sectorial working group with the representatives of the Ministry of Economy and Sustainable Development, Ministry of Construction, Physical Planning and State Assets, HEP ODS, HOPS, HERA, HROTE, and the representatives of the Association of the Renewable Energy Sources at the Croatian Chamber of Economy.
Such a working group could conclude and set clear deadlines to reach compliance with regulations and implement acts within 30 days.

Judging by the recent practice, overall compliance with numerous regulations in the electricity production sector using renewable energy sources would require long-term efforts (several years). Although needed, such action could result in additional deceleration of the implementation of renewable energy projects. Only by urgently adopting lex specialis for the renewable energy sources sector could we accelerate the realization of the renewable energy sources projects and realize multiple positive effects on the investment climate, activation of the Croatian economy, and energy balance of our country.

Raised issues:

- Non-compliance between ZOIEVUK and ZOTEE with fundamental law defining the construction act: The Construction Act
- A large number of regulations defining the field of renewable energy sources, makes make the compliance of different acts more difficult
- Non-compliance of the Act on Renewable Energy Sources and High -Efficiency Cogeneration (ZOIEVUK) with the Regulation on Amendments to the Ordinance on simple and other buildings and works
- Non-compliance between the activities taken by the Ministry of Economy and Sustainable Development and the Ministry of Physical Planning, Construction, and State Assets in relation toconcerning the actions taken by the administrative institutions at a county level
- Lack of lex specialis, which would define project preparation and implementation in the sector of electricity production using renewable energy sources

Solution proposal:

- To implement amendments to the Construction Act so that the processing of requests for the issuance of construction documents for facilities for the production of electricity from RES, i.e. projects that have an energy approval in their request, receives priority when solving
- To decrease the number of regulations defining the field of renewable energy sources for them to be complied with while implementing legal amendments
- Align ZOIEVUK with the Ordinance on Amendments to the Ordinance on Simple and Other Buildings and Works
- To engage necessary capacities at the level of the Ministry of Construction, Physical Planning, and State Assets to prioritize and solve requests with energy approval, to clearly define the criteria and procedures via foreseen amendments of the legislation framework, and to inform the administrative bodies on the above mentioned to avoid different practices when dealing with the cases with identical requirements and conditions
- To adopt lex specialis defining preparation and implementation of the projects in the sector of electricity production using renewable energy sources

2.4.
ENVIRONMENT AND NATURE IMPACT

It is a paradoxical fact that environmental protection is the single most prolonged procedure in the entire process of obtaining permits for RES projects, taking into account that renewable energy sources mitigate threats to the environment.

There are three most common procedures regarding environmental protection in RES: the procedure of the Evaluation of the Need for the Environmental Impact Assessment (OPUO), the Main Intervention Acceptability Assessment for the Ecological Network (GO), and the Environmental Impact Assessment (PUO). The procedures for the Main Intervention Acceptability Assessment for the Ecological Network (GO) and Environmental Impact Assessment (PUO) require previous year-long monitoring, which extends the duration of all required actions to obtain the permit along with administrative time. The total duration of the environmental impact assessment of procedures of RES electricity production facilities (without monitoring) (without monitoring) is shown in the following table (Table 3).

Table 3
Environmental impact assessment duration of the plants with the electricity production from renewable energy sources

Renewable energy source category	Forseen procedure	Legally defined procedure duration
Solar power plants up to 100 MW	OPUO	2 months
Solar power plants over 100 MW	PUO	6 months
Wind farms up to 20 MW	OPUO	2 months
Wind farms over 20 MW	PUO	6 months

According to the current legal framework, the competent authority may issue a decision that either the Main Intervention Acceptability Assessment for the Ecological Network (GO) or the Environmental Impact Assessment (PUO) has to be implemented for any renewable energy source project regardless of its size. Consequently, there is no method for planning the required duration of project development. This poses a significant risk to the investor. However, the most concerning fact is that the aforementioned procedures last four to six times longer than they are legally defined. Such a considerable deadline extension presents a problem as, per the valid regulations, one can lose energy approval if one fails to realize the energy project within a set deadline. In addition, significant financial penalties are defined if the deadline for the project realization is exceeded. The duration of the energy approval should be automatically extended for the period of extension made by the public and legal bodies concerning the deadlines defined for obtaining the documents necessary for the realization of the projects.

Therefore, it is vital to urgently increase personnel to accelerate the subject processes and their resolutions by reasonable deadlines because insufficient administrative capacities are usually underlined as the reason for extending deadlines by competent authorities. This is already foreseen in the document Assessment with Recommendations for the Removal of Barriers and Relief of Administrative Procedures which Limit Increased Use of Energy Obtained from Renewable Energy Sources, published by the Ministry of Economy and Sustainable Development (MINGOR). It is stated that strengthening administrative capacities is necessary, and even the employment of 34 new employees is foreseen by the end of 2023 in the Directorate for Environmental Impact Assessment and Sustainable Waste Management, the Directorate for Nature Protection, and the Institute for Environmental and Nature Protection. However,

considering that the PUO and OPUO procedures were not accelerated, it seems that the planned personnel reinforcement in the Directorates above and the Institute did not take place.

One of the reasons for the duration of the administrative procedures of issuing a decision on the environmental acceptability of the intervention is the large number of cases. On top of that, the procedures are not digitalized, which slows down the management of the cases in such a heavily burdened system. Digitization would also help with greater transparency, as some projects promptly realize their environmental procedures while others are forced to wait patiently.

The need to implement the environmental protection procedure could be abolished for specific interventions, which have been determined in practice to have had no significant effects on the environment, to achieve greater system efficiency. More precisely, the need to implement the OPOU procedure for solar power plants with up to 10 MW of connection power located outside the Natura 2000 ecological network could be eliminated.

The need to implement environmental impact procedures may be eliminated in some instances of project amendments, i.e. the application of newer technology. Due to technological advances and finding a better/optimal technical solution, or increasing the plant installed power, for the amendments to the location permit, the Ministry of Physical Planning, Construction and State Assets (MPUGiDI) is obliged to demand compliance issued by the Ministry of Economy and Sustainable Development (MINGOR) (more specifically the Department for the Environment and Nature Protection) on the suggested amendments under current regulations. If the physical planning conditions remain unchanged, MPUGiDI should be able to decide on the amendments to the location permit independently, and MINGOR would have to implement certain adjustments with the best practice and overwhelming interest. For example, increasing the wind turbine rotor by <10% or shifting in the approved scope within 1x of the total height of the wind turbine should not result in a new intervention assessment procedure. The same goes for the solar power plants in the event of increased module power, construction height, or changes within the intervention scope. The amendments to such procedures should be urgently issued to enable the realization of the newest technology, which is also the most acceptable for the environment and nature. This approach would additionally unburden the system and the processes. Therefore, the construction of additional capacities of renewable energy sources would be enabled within the consumed spatial units.

Raised issues:

- insufficient number of employees working on the large number of cases in the competent administrative bodies and lack of content standardization concerning case solutions in the intervention description, which often leads to case amendments
- focus on the administrative form
- duration of the procedures implemented by public and legal bodies concerning the issuance of the opinion within the OPUO, GO, and PUO procedures
- non-existence of priority requests – relevant, national projects are mixed with small local projects without any prioritizing: the OPUO procedures are disregarded due to a large number of other requests
- The Regulation on the Criteria for the Implementation of a Public Tender for the Energy Approval Issuance and Conditions for the Energy Approval Issuance prescribes financial penalties in case of exceeding the deadline for project realization without considering the exceeding of legal deadlines by public and legal bodies.

Solution proposal:

- To improve work organization and introduce digitalization in the entire administrative procedure:
  - Digitalization enables reminders to be sent automatically to the bodies that failed to provide their opinion and reminders for open cases.
  - If the public and legal body fails to provide its opinion in time, the opinion is automatically-considered positive, and the procedure of issuing the solution for the subject case is initiated.
  - The system enables greater standardization of work and monitoring of the efficiency of certain officials.

  - The requests to initiate the procedure are submitted online with all the necessary annexes, eliminating paperwork and cutting out lost paperwork.
  - If one of the officials is absent, the system automatically assigns the case to an available official.
  - The system determines the chronology of dealing with the cases upon receipt of all requested opinions or expiration of 30 days from the request for the opinion of the public and legal bodies; the case is assigned by default to an official to be resolved.
- To establish a system in which it will be possible to see when a particular request was transparently submitted, and when it received a solution
- To increase the number of employed officials to implement these essential procedures with care which is suitable for the protection of national interests – primarily environmental protection until digitalization is introduced
- To amend the regulations and acts to assign priority to renewable energy sources projects, reduce the number of cases going through different procedures, clearly define the situations which require intervention amendments, and specialize a certain number of officials only for renewable energy sources projects
- By amending the Regulation on the Environmental Impact Assessment (OG 61/14 and 3/17), it is necessary to change the limit for the implementation of the OPUO procedure so as to refer only forto the solar power plant of over 10 MW of connection power, if such interventions are located outside the Natura 2000 ecological network
- define cases in which new OPUO, PUO and GO procedures should not be implemented when applying newer technology
- the duration of the energy approval should be automatically extended for the period of extension made by the public and legal bodies concerning the prescribed deadlines for obtaining the documents.

2.5. PHYSICAL PLANNING

One of the most common reasons for the long-term development of renewable energy source projects is the problem of physical planning. Non-compliance with the municipal and county plans, uneven understanding of the compliance necessity, as well as very illogical and harmful restrictions regarding the minimal distances of the renewable energy sources from the communities, roads, and the limits in the occupied areas are some of the most prominent problems. The uneven practice of defining suitable zones for non-integrated solar power plants is evident in the physical plans of the coastal counties. For example, the plant's minimum distance from a community's construction area (from 500 to 1,000 m) or the distance from the roads (from 100 to 300 m) are often unevenly defined.
Furthermore, physical plans require a distance from mineral exploitation fields of 500 m in some counties, whereas, in others, solar power plants are only allowed within the areas intended for wind farms. Due to the strict provisions of the physical plan of the Dubrovnik-Neretva County regarding the distance between rows of panels, it is necessary to occupy a significantly larger area of land. For example, 16 hectares of land would be needed for a project with a connection power of 9.9 MW without this regulation, while 20 hectares would be occupied by applying this provision. Reviewing some of the provisions related to the county's physical plans shows a clearly uneven and overly standardized practice for defining suitable areas for the renewable energy sources plants (Table 4).

In most physical plans, the exact distances are used for wind turbines and solar power plants, even though these technologies do not have the same impact on the environment and people. Necessary distances from the inhabited houses (but not communities) should be defined for wind farms due to safety reasons, noise, and possible shading, even though there is no need to burden the textual part of physical planning with this since this issue is part of the environmental impact assessment. Furthermore, solar power plants installed on roofs are allowed in all physical plans, but for some reason, non-integrated solar panels have to be 500 or more meters away from the same roof. A special issue in physical planning is the distance between the power plants and the limits of communities, and even more so from the construction area of a community, considering that stone houses which have been abandoned for decades and for which it is complicated (if not impossible) to obtain deletion from spatial plans are located within these limits. Similarly, physical plans often intersect with road and rail corridors planned long ago that remain forever charted even though they are not planned to be realized. As long as such corridors exist in physical plans, separating the RES plants by 300 m is essential. Prior to the adoption of new physical plans or their amendments, it is mandatory to request an opinion from competent authorities or companies that suggested the registration of these infrastructural facilities, i.e. it is necessary to request an opinion about the planned construction of such facilities which are to be deleted if those as mentioned earlier do not respond to the request.

To solve this problem, and in the absence of a State Plan, the Republic of Croatia could accelerate the project development by adopting a temporary Regulation for RES that would standardize these criteria and define unified provisions on the physical planning of RES (by different technologies).

Furthermore, it is crucial to clearly define the wind farm, solar power plant, or any other RES plant as an energy facility consisting of a production plant, a transformer, and connection power lines. Considering that the electro-energy network connections are defined via network operator, they are subject to changes and should be defined exclusively in the physical plans' textual provisions, not in graphic representations, i.e., diagrams. Contrarily, the operator may decide to change the connection location; therefore, changes to the physical plans would have to be implemented from the beginning.

There is already an instruction from the Croatian Transmission System Operator (HOPS) and ODS (Distribution System Operator) that power lines should not be charted in proposals for changes to physical plans but should only be included in the textual part of physical plans. Therefore, counties and local self-government units are expected to be guided by this instruction when making changes to physical plans.

Table 4

Provisions related to the county physical plans from which the uneven practice for defining suitable areas for planning solar power plants is evident

	CPP Dubrovnik-Neretva	CPP Šibenik-Knin	CPP Zadar	CPP Split- Dalmatia	CPP Lika-Senj
DISTANCE	The distance is 500 m from the borders of the construction area of communities and tourist zones	The distance from the construction area is 500 m, and from the railroad, highway, and freeway, 300 m, and other public roads, 100 m	The distance from the community is 1000 m unless the PUO shows a shorter distance is possible. In such a case, it is 500 m	The distance from the community and tourist zones is 500 m. The distance from high-level roads (highway, motorway) is 200 m as the crow flies. The distance from other roads is 100 m. The distance from the airport is 800 m.	The distance from the construction area is 1000 m, from roads and infrastructure facilities 150 m, from cultural property 500 m, and from mineral raw materials exploitation fields 500 m
SIE OF THE SOLAR POWER PLANT	In the event of large solar power plants, it is necessary to divide the land plot into multiple fields to enable a wildlife corridor for animals. Ensure a distance between the rows of panels (higher part of the previous and lower part of the next panel) of 220% of the total length of the panel.	/	/	/	The area of a solar park is limited to 2 km², with interval spacing of min 1 km. Maximum terrain coverage with solar park system elements must not exceed 50%
LOCATION/VISIILITY	Determine the size and location of the plant following the visual impact analysis. Choose locations that will not prevent the expansion of the community and will not interfere with the characteristic contours of the community.	They are primarily planned in areas where infrastructure already exists. They cannot be planned on terrain with a slope greater than 15% of the natural terrain.	Solar panels may only be planned within the wind farm. Outside the zones, exposed to views of the valuable landscape and from the sea and main roads. Harmonize the position of wind farms and solar power plants in relation to telecommunication facilities.	Infrastructural facilities planned on the islands and the coastal area must not be visible from the coast or the coastal water area. Determine the size and location of the surfaces in accordance with the visual impact analysis.	/

At the moment, a new problem is looming that could further slow down changes to physical plans. Namely, since the beginning of this year, the new generation plans have been developed, but the developers state that they have not received enough training to work on the new application and that the new system is not functional enough, which will further slow down the development of physical plans.

The latest amendments to the Physical Planning Act have brought progress in accelerating the RES development. Namely, the amendments expanded the areas where installation of solar power plants is allowed. For example, the construction of solar power plants is allowed in areas provided for the construction of solar power plants in the physical plans of any level, thus eliminating the previous obstacle that arose due to opposing physical plans of different levels (for example, county and municipal). Furthermore, it is possible to build solar power plants on the surfaces of the separated construction area, outside the communities of economic and business purposes (classified as I and K), on agricultural land classified as P3, near economic and business zones, water surfaces such as lakes and ponds, waste disposal sites, exploitation fields of mineral raw materials and sea salt and within the construction particles of existing infrastructure and water structures.

For the first time, the Act also defined agrisolar power plants as a particular type of solar power plant installed on agricultural land, enabling the combined use of land for agricultural production and producing electricity from solar energy.

The novelty is that it is possible to build an energy transport system within all existing planned corridors following the facility's technical requirements, regardless of the conditions from the physical plan.

Raised issues:

- Along with, in some cases, a very doubtful process of determining the borders for the renewable energy sources usage in physical plans, in areas with the greatest potential (wind and sun at the coast), questionable restrictions additionally limit surfaces available for the construction of RES plants.
- Abandoned communities and road corridors that are not intended to be constructed limit the development of RES projects.
- The concepts of wind farms, solar power plants, and other RES plants are unevenly defined.
- Due to a change in the operator's decision on the connection location, changes to the physical plans must be implemented from the beginning.

Solution proposal:

- To standardize the practice and definition in lower level plans by the temporary Regulation on RES
- To delete abandoned communities and road corridors from the physical plans that are not planned to be realized
- To clearly conceptually define a wind farm, a solar power plant, or any other RES plant
- To define connections to the electro-energy network exclusively in the textual provisions of
- physical plans, and not in graphic representations

2.6. AGRISOLAR POWER PLANTS

Agrisolar power plants have only recently been legally regulated in Croatia; therefore, there is still a series of technical and regulatory concerns for their implementation. However, the interest in such projects is extremely high, representing an incentive for further development. Accordingly, it is necessary to harmonize their development procedures with various legislative regulations for these commendable interventions to realize their full potential and provide Croatia with a double green future - in agriculture and the production of renewable electricity. Below is a brief overview of current problems in the development of agrisolar power plants and suggestions for solutions.

LEGAL FRAMEWORK

Agrisolar power plants are, apart from the basic regulations described in Chapter 2.1. under the section Legal framework, defined by the following documents:

- the Act on Amendments of the Physical Planning Act (OG 67/2023)
- the Regulation on the Criteria for the Implementation of a Public Tender for the Energy Approval Issuance and Conditions for the Energy Approval Issuance (OG 70/2023)
- the Regulation on the Incentives for Electricity Production using Renewable Energy Sources and High-Efficiency Cogeneration (OG 70/23)
- the Ordinance on Amendments to the Ordinance on Simple and Other Buildings and Works (OGG 155/2023)

The Regulation on the Criteria for the Implementation of a Public Tender for the Energy Approval Issuance and Conditions for the Energy Approval Issuance defined that for agrisolar power plants, there is no need to conduct a tender for an energy approval i.e. it can be obtained directly. Considering the duration of tenders for energy approval, the procedure for developing agrisolar projects has been considerably facilitated and accelerated. Amendments to the Ordinance on Simple and Other Buildings and Works brought additional acceleration. Agrisolar power plants up to 10 MW are classified into simple structures, an additional positive step in speeding up procedures for such smaller projects.

On the other hand, although the Regulation on the Incentives for the Electricity Production using Renewable Energy Sources and High-Efficiency Cogeneration defined agrisolar power plants as one of the interventions worthy of incentives, for now, there is no indication of any incentive model with guaranteed electricity purchase prices.

The experiences of other countries, unfortunately, indicate that it is possible to misapply the definitions in the legal framework regarding agrisolar power plants, and it is necessary to prevent them from the very beginning In Italy, some investors developed projects on part of the agricultural land, as classic solar power plants, claiming it was intended for agricultural production. For example, a classic solar power plant would be installed on 10 ha out of 50 ha, while the rest would be occupied by agricultural production. Such a practice is unacceptable and represents unfair competition. The agrisolar power plant should be intertwined with the plantation on which it is placed, and the plantation must be continuously distributed between and/or below the photovoltaic rows. Such projects should improve agricultural productivity, reduce the risk of natural disasters for agricultural crops and thus create a synergy between agriculture and renewable energy. Therefore, the administrative procedures for obtaining the necessary permits should ensure the continuous achievement of the objectives of developing agricultural activity for each agrisolar power plant project.

Raised Issues

- Possible incorrect application of definitions in the legal framework regarding agrisolar power plants

Solution Proposal:

- Through the administrative procedures for obtaining the necessary permits, ensure the continuous achievement of the objectives of the development of agricultural activity for each agrisolar power plant project.

CONNECTION TO THE ELECTRO-ENERGY NETWORK

As stated in Chapter 2.2., on connection to the electro-energy network, an essential precondition for realising such investments is the availability of the network for connection, i.e. that it is within a financially profitable range. The missing link for the complete calculation of the financial indicators of an agrisolar project is the connection fee; therefore, it cannot be said with certainty how profitable these projects are until this last item is known.

Raised Issues:

- The fee for connection to the network has not been adopted, pending approval by the Croatian Energy Regulatory Agency (HERA)

Solution Proposal:

- To determine connection fees for the year 2024 as a matter of urgency.

REGULATIONS COMPLIANCE

› Changing one regulation without changing the related regulations often leads to inconsistencies in regulations and their different interpretations, further complicating investments' implementation and realisation. Such an example was brought by the amendment of the Ordinance on Simple and Other Construction Works and Works (OG 155/23). On the one hand, according to the regulation above, agrisolar power plants with an installed capacity of up to 10 MW are declared simple structures; therefore, it is not necessary to obtain an energy approval or building permit for them. On the other hand, the term installed is used in the regulation instead of connection power, which contradicts other provisions and acts regulating power plants' power. This inconsistency is also visible in plans on the local level, which refer to connection power rather than installed power. The issue of setting up agrisolar power plants on lands classified as P1 and P2, where permanent plantations have been established, remains open. The position of the Ministry of Physical Planning, Construction and State Assets and the Ministry of Economy and Sustainable Development is that it is possible to do the abovementioned according to the existing legal framework. At the same time, the Ministry of Agriculture does not agree with this thesis, interpreting the Agricultural Land Act's provisions as obstacles to installing any solar panels on agricultural land classified as P1 and P2. The position of the Ministry of Physical Planning, Construction, and State Assets is that classical solar power plants are not allowed on agricultural land classified as P1 and P2 under any circumstances; however, agrisolar power plants can be installed on land classified as P1 and P2 due to their agricultural purpose.

Raised Issues:

- non-compliance of ZOIEVUK with the Ordinance on Amendments to the Ordinance on Simple and Other Buildings and Works
- Inconsistent position of ministries regarding the installation of agro-solaragrisolar power plants on land classified as P1 and P2

Solution Proposal:

- To harmonize the regulations and terminology from different departments that define the construction of agrisolar power plants
- To harmonize the position between the ministries regarding the installation of agrisolar power plants on land classified as P1 and P2

ENVIRONMENT AND NATURE IMPACT

› Concerning the energy component of the intervention, for agrisolar projects, it is still necessary to carry out an assessment procedure on the need for environmental impact assessment, but this is not explicitly clear in the context of amendments to the Ordinance on simple and other buildings and works. Furthermore, agrisolar power plants are still not listed as separate projects in the Regulation on Environmental Impact Assessment (and associated amendments) (OG 3/17), which raises questions for investors about the need to implement procedures in environmental and nature protection.

Along with a more precise definition of agrisolar power plants in the entire legal regulation, including the one related to environmental protection, in this specific segment of RES projects, it is necessary to speed up the process of obtaining a decision on the project's acceptability for the environment.

Raised issues:

- Agrisolar power plants are not defined in all legal regulations that apply to them
- long-lasting procedures for obtaining a decision on the environmental acceptability of the project

Solution proposal:

- To define agrisolar power plants in all laws and bylaws that apply to them
- To accelerate the procedures for obtaining a decision on the acceptability of the project for the environment

PHYSICAL PLANNING

The Act on Amendments of the Physical Planning Act defined agrisolar power plants and the areas where they can be realized. Currently, they are allowed only on permanent plantations registered in the records of agricultural land use (ARKOD) or within facilities intended for agricultural production (e.g. farms and greenhouses).

Furthermore, expanding the possibility of building agrisolar power plants should be considered in areas under aromatic and medicinal plants and other types of perennial plantations that are permanently grown on a particular area and belong to the category of arable land, according to ARKOD (land parcel identification system).

In general, it would be necessary to define which areas Croatia wants to increase agricultural production in a targeted manner and enable the installation of agrisolar power plants, as this will undoubtedly increase the cultivation of these crops. The legal emphasis could be placed on raising crops in eco and biodynamic production, through which it will be possible to provide incentives for such plantations more permanently and to achieve production that is in high demand, profitable, and safe for the environment and nature.

It should be further emphasized that not all regions have the exact representation of permanent plantations; therefore, in regions lacking, it would be desirable to enable some other options, such as the already mentioned perennial plantations, to optimize the utilization of the electro-energy network.

Raised Issues:

- Agrisolar power plants can only be installed on permanent plantations
- The possibility of damage to existing permanent plantations during the installation of power plants

Solution Proposal:

- To enable the planting of permanent plantations after the construction of the solar power plant and before obtaining the permit
- To ensure the restoration of damaged permanent plantations
- To encourage eco and biodynamic agriculture as an integral part of the sustainability of such projects

CONCLUSION

Overall, the legal framework has created a favourable climate for investing in agrisolar power plants; therefore, we can be satisfied with the rapid establishment of the legal framework. Although their development is presently restricted solely to permanent plantations, given the multiple advantages of agrisolar power plants, we propose that they be enabled on other types of agricultural land.

2.7. GEOTHERMAL ENERGY

In the context of the global transition to renewable energy sources, geothermal energy in Croatia faces several challenges arising from the specificity of its legal framework. The Act on the Exploration and Exploitation of Hydrocarbons (OG 52/18, 52/19, 30/21) provides the basic legal framework, but several specific challenges require careful and targeted action.

This sector, regulated by the Act on the Exploration and Exploitation of Hydrocarbons and additionally covered by specific regulations such as ZOTEE and ZOIEVUK, is in a complex maze of rules that require coordination among different public and legal bodies. Such a situation not only slows down the realization of geothermal projects but also complicates the necessary steps for their implementation, pointing to the urgent need for revision and adjustment of the legal framework.

According to the Croatian Hydrocarbon Agency, the total capacity for constructing geothermal power plants in Croatia is 1,000 MW. So far, only one power plant with a connection capacity of 10 MW has been built, which clearly indicates the insufficient utilization of existing resources. In the direct use of geothermal heating for industry, building heating, and agriculture, Croatia also rarely uses considerable geothermal resources from shallower, lower-temperature deposits.

A small-scale space occupation is one of the many advantages of geothermal energy sources over other RESs. Geothermal energy can be produced continuously 24 hours a day, regardless of weather conditions. It can thus help the stability of the electro-energy network, and thanks to the predictability and flexibility of geothermal power plants' operation, it also helps balance the network.

In the Croatian context, it is particularly important that geothermal sources are located in the north of the country, an area facing demographic challenges. The development of geothermal projects could contribute to the revitalization of these areas. The construction of geothermal power plants enables the significant involvement of local producers and companies, with the potential engagement of up to 70 per cent, which, combined with high capital investments, results in significant economic benefits for the local community and society in general.

On the other hand, geothermal projects have longer development timelines, require higher initial capital expenditures, and face risk during the early stages of exploration. Due to these specifics, developing geothermal projects without an agreement on market premium or some other state support program is impossible. Unfortunately, in the latest State Support Program for the Promotion of Renewable Energy Sources and High-Efficiency Cogeneration defined by the Croatian Energy Market Operator (HROTE), a market premium in 2021 – 2023 ensured a quota of only 20 MW for geothermal power plants, and even this was not used. Not conducting the tender to allocate the market premium (NTP) directly affected the geothermal energy sector, where projects ready to apply could not enter the tender. This situation threatens the sustainability and implementation of projects, creating a pessimistic and unfavourable perspective of the future of geothermal energy for potential investors.

Furthermore, the development of the thermal energy supply is a critical element in achieving the goals of decarbonization and the transition to sustainable energy sources, as emphasized in the policies of the European Union. Despite the recognized potential for sustainable development contribution and the reduction of greenhouse gas emissions, the realization of geothermal projects intended to develop the thermal industry encounters significant obstacles. Local communities that recognize the value of geothermal energy for heating face the challenge of mobilizing the necessary financial resources to initiate and implement these projects. In this context, it becomes evident that without establishing targeted financial funds specially designed to support geothermal projects for thermal energy supply, local communities will not be able to realize planned projects.

LEGAL FRAMEWORK

Unlike other renewable energy technologies, energy approval (EO) is not the first step in geothermal project development. According to the current legal framework, it is possible to obtain it only after carrying out research activities following the Research Permit, which is awarded to the investor for a specific research area by MINGOR based on a public tender and a series of administrative procedures that lead to the signing of the Exploitation Agreement. It is an extraordinarily long and complex process that includes many steps. Considering that the EO is a prerequisite for resolving the network access, this project development order makes it impossible to sign the network access agreement until the above procedure is completed, further slowing down the development of geothermal projects.

Therefore, it should be possible to obtain an EO after obtaining the Decisions on determining the quantity and quality of geothermal water reserves for energy purposes. One of the critical results of the research work is the assessment of geothermal water reserves, which MINGOR confirms by accepting the study on reserves, which also defines the power of the geothermal plant. The further administrative procedure that leads to the signing of the Exploitation Agreement, which can last up to 18 months, does not change either the confirmed reserves or the power of the geothermal plant. That is why in Art. 18, paragraph 3 of the Regulation on the Criteria for the Implementation of a Public Tender for the Energy Approval Issuance and Conditions for the Energy Approval Issuance (OG 70/2023), the investor should have been asked for a Decision on determining the quantity and quality of geothermal water reserves for energy purposes as a required document for geothermal power plants, instead of the Exploitation Agreement.

Also, apart from the Regulation (Art. 18) and ZOTEE (Art. 17), it is necessary to define the procedure for granting an energy permit for geothermal projects without conducting a public tender more precisely, that is, that an energy permit for geothermal projects can be granted based on one of the following two criteria: 1. resolved property and legal relations on the land planned for the construction of the production facility; 2. approved Elaboration on reserves, i.e. Decision on determined quantities and quality of geothermal water reserves for energy purposes.

In the direct use of geothermal heat for industry, building heating and agriculture, Croatia currently rarely uses geothermal resources from shallower, lower-temperature deposits. Changes to the Act on the Exploration and Exploitation of Hydrocarbons, which currently does not distinguish between farmers and investors in large geothermal projects, would certainly help their greater use.
Legal amendments should distinguish between them to facilitate the development of smaller projects. For example, the legal framework does not recognize the possibility of developing small (shallow) wells (single well model) suitable for agriculture, the development of which requires much smaller initial investments. Also, farmers who want to develop a geothermal project must employ a graduate oil mining

engineer full-time, like all other companies that deal with geothermal projects, which represents an additional financial and procedural burden. It is necessary to prescribe provisions that will facilitate the development of small projects and shallow wells and thus promote the use of geothermal energy in the agricultural sector. Additionally, such projects should be allowed to contract an external oil mining engineer in the exploitation and research phases, which would significantly reduce the costs of such projects.

In the last few years, many permits for the exploration and exploitation of geothermal resources in the Republic of Croatia have been granted, which has led to a significant increase in the need to drill numerous exploratory and development geothermal wells. Given the insufficient number of drilling rigs available in the Republic of Croatia, importing drilling rigs with appropriate characteristics from other countries will be necessary. It is necessary to optimize and simplify the process of their certification to facilitate and speed up this process and generally encourage the development of the oil services market.

Even a minor revision of legal and procedural restrictions can have a concrete effect on accelerating the transition to renewable sources. An example of this is the Regulation on the Usage of Renewable Energy Sources and High-Efficiency Cogeneration (OG 28/2023), which in Article 35 stipulates that the internal consumption of the power plant can be covered by another RES (e.g. photovoltaics) built on the location of the power plant up to the level of 10 per cent of the total energy produced. Given that the working areas of the physically relocated exploitation wells and the geothermal water collection system are, in principle, part of the total area of the geothermal power plant and not the geothermal power plant itself, the text of the Regulation should be amended so that the construction of other RES projects, is allowed not only on the cadastral parcel on which production plant is built but also in the associated working areas.

Raised Issues:

- EO can only be obtained after signing the Exploitation Agreement, which further slows down the development of geothermal power plants
- The Act on the Exploration and Exploitation of Hydrocarbons currently does not differentiate between farmers and large companies
- The Regulation on the Usage of Renewable Energy Sources and High-efficiency Cogeneration does not allow a hybrid power plant on the entire geothermal power plant working area

Solution Proposal:

- To obtain an EO after obtaining the Decision on determining the quantity and quality of geothermal water reserves for energy purposes
- To obtain the EO for geothermal projects with fully resolved property and legal relations without signing the Agreement on the Exploitation of Geothermal Water, as well as to all other RES projects
- To modify the Act on the Exploration and Exploitation of Hydrocarbons to make a distinction between large and small projects:
    a) recognize the possibility of developing small (shallow) wells (single well model)
    b) enable small projects and shallow wells to contract an external oil mining engineer in the exploitation phase
- To optimize and simplify the drilling plant certification procedure
- To modify Article 35 of the Regulation on the Usage of Renewable Energy Sources and High-Efficient Cogeneration so that the construction of other RES projects is also enabled in the associated work areas, except on the cadastral plot where the production plant is built.

> CONNECTION TO THE ELECTRO-ENERGY NETWORK

The long-lasting procedure for the development of geothermal projects is further extended by the Regulations on the Connection to the Transmission Network (defined by HOPS), which stipulates that the

network condition data needed to prepare the Study on Optimal Technical Solution of the Connection (EOTRP) can be obtained only once a year (from 1 to 15 May). Projects that fail to submit the request in this narrow window must wait 11 and a half months until the next opportunity to obtain network condition data. Starting the procedure of connection to the network at any time should be allowed for geothermal projects, at least four times a year, due to the significant complexity of development and high capital investments and given that geothermal energy sources are located in the continental part of Croatia, where the electro-energy network has excess capacity; therefore, the mutual influence of new projects is significantly smaller, and overall, geothermal projects are not as numerous as projects of other renewable energy sources.

Raised Issues:

- Under the Regulations on the Connection to the Transmission Network (defined by HOPS), data on the condition of the network can be obtained only once a year (from May 1 to 15) to prepare the EOTRP.

Solution Proposal:

- The network connection procedure for the geothermal projects should be commenced at any time, at least four times a year.

REGULATIONS COMPLIANCE

Project deadlines for EU funding are often too short and set unrealistically considering the long-lasting administrative processes of preparing geothermal projects (e.g. OPUO), which leads to difficulties in withdrawing approved funds or even, in the worst case, the failure to withdraw funds. Therefore, it is necessary to work on simplifying and speeding up administrative processes continuously but also to apply measures such as automatic approval of submitted requests in case of "silence of the administration" when issuance of the requested decisions is past the legally prescribed deadline, as well as an automatic extension of the validity of existing permits (e.g. permits for the exploration of geothermal waters) for the period in which the public and legal bodies were unjustifiably late.

At the EU level, geothermal heating projects, especially in local communities, are seen as projects that EU funds should support, but there are no adequate funds for this area in the Republic of Croatia. Therefore, adequate conditions for targeted tenders for financing geothermal heating projects should be determined in cooperation with the Ministry of Regional Development, as well as easier access and greater utilization of EU funds for that area.

Raised Issues:

- Short and unrealistically set project deadlines for EU funding
- Non-compliance with deadlines in the already long administrative processes of preparing geothermal projects
- Lack of adequately prepared funds for the field of geothermal heating projects

Solution Proposal:

- To automatically approve submitted requests in case of "silence of the administration" when issuance of the requested decisions is past the legally prescribed deadline
- To automatically extend the validity of existing permits (e.g. permits for the exploration of geothermal waters) for the period in which the public and legal bodies were unjustifiably late
- To develop adequate conditions for targeted tenders for financing geothermal heating projects

PHYSICAL PLANNING

In line with existing practice, change of physical plans and strategic assessments of the environmental impact when determining geothermal water exploitation fields (EPGV) was a long-lasting and demanding process that significantly delayed the start of exploitation but was also a source of controversy due to a lack of understanding of the geothermal water exploitation concept. This resulted in a request to relocate EPGV from protected nature areas according to the environmental impact assessment, despite the fact that drilling of exploitation wells and construction of facilities were not foreseen during exploitation in protected areas. It should be stated that the EPGV is only a surface projection of geothermal deposits located at a depth of several kilometres, and the objects on the surface occupy less than one per cent of the total area of the EPGV.

Targeted adjustments of the Physical Planning Act and the Act on the Exploration and Exploitation of Hydrocarbons should enable more straightforward and faster determination of the exploitation field. When considering the impact of geothermal projects on the environment, the results of the Strategic Environmental Impact Assessment from 2022, based on the Geothermal Potential Development Plan of the Republic of Croatia until 2030, should be considered. Some counties in the continental part of Croatia implemented good existing practices by including the provision in their physical plans, stating that the entire area of the county is an area for exploitation of geothermal waters and that exploitation fields can be determined without additional changes to the physical plan. Such provisions should be included in the physical plans of every county in continental Croatia and be accepted by the Ministry of Physical Planning, Construction, and State Assets when obtaining certificates of the project's compatibility with the physical plan.

Raised Issues:

- Misunderstanding of the concept of exploitation of geothermal water in environmental impact assessment procedures
- Long-lasting processes of modifying physical plans

Solution Proposal:

- To enable the determination of the exploitation field to become straightforward and faster through targeted adjustments of the Physical Planning Act and the Act on the Exploration and Exploitation of Hydrocarbons
- To include provisions in the physical plans of every county in continental Croatia stating that the area of the entire county is an area for exploitation of geothermal waters and that exploitation fields can be determined without additional changes to the physical plan

ENVIRONMENT AND NATURE IMPACT

Like other renewable energy projects, geothermal projects are also affected by a highly long-lasting process of obtaining a decision on the environmental acceptability of the project. It is necessary to speed up the implementation of these procedures, and the Association of Renewable Energy Sources of the Croatian Chamber of Economy (OIE HGK) advocates that procedures related to renewable energy sources, given their importance in the context of the decarbonization of the Republic of Croatia, have priority over procedures for other interventions.

Table 5
Environmental impact assessment duration of the plants with the electricity production:

Geothermal power plant	Foreseen procedure	Legally defined procedure duration	The current duration of the procedure
	OPUO	2 months	up to 18 months

Raised Issues:

- Long-lasting procedures for obtaining a decision on the environmental acceptability of the project

Solution Proposal:

- To carry out procedures for checking and obtaining the OPUO within the legally prescribed period of 2 months upon receiving a request

CONCLUSION

Adjustment of the legal framework for the incentive of geothermal energy development

The current approach, which treats geothermal energy within a legal framework intended for defining hydrocarbons, does not adequately reflect the unique advantages and challenges of geothermal energy as a renewable resource. Geothermal projects deserve a specific approach, considering their environmental sustainability, capacity to contribute to local communities, and potential to reduce dependence on imported energy.

Therefore, it is recommended to develop a particular act on geothermal energy that would:

- **Clearly define geothermal projects**
  The act should distinguish geothermal projects from hydrocarbon projects, promoting them as key players in the transition towards sustainable energy solutions.
- **Provide incentive measures for investments**
  Introducing simplified administrative procedures, transparent criteria for issuing permits, and financial incentives are essential for stimulating investments in the geothermal energy sector.
- **Adapt the approach according to the type of project**
  The act should allow flexibility in the approach, considering the specific needs of different types of geothermal projects, including locally managed heating projects, electricity, and the use of geothermal energy in agriculture.
- **Encourage cooperation between different actorsstakeholders**
  It is necessary to strengthen intersectoral cooperation and coordination between different authorities and stakeholders involved in developing geothermal projects to increase efficiency and reduce costs.

By revising legal and procedural restrictions, the state can specifically influence the acceleration of the transition to renewable sources, thus proving its readiness by taking practical steps in developing green energy.

CONCLUSION

Prompted by the energy crisis, Europe increased its ambitions and accelerated the pace of transition towards clean energy. However, although production reached a record level and wind and solar energy capacity increased in 2023, the energy transition is still not proceeding at the desired speed. Some countries have approached this goal more ambitiously and are rapidly increasing RES share in electricity production, but not all member states are aiming high enough to achieve the ambitious net-zero agenda. Numerous obstacles that limit the rapid application of green energy have not yet been removed. Complicated regulations, slow issuance of permits and insufficient investments in the electro-energy network are the most common bottlenecks that slow down investments in renewable energy sources.

These exact problems are also characteristics of Croatia's renewable energy sources sector, whose exceptional potential is blocked by bureaucratic procedures. An additional aggravating circumstance is the legal uncertainty caused by changes in the legislation and the slow adoption of all bylaws that apply to them. Two and a half years after making the crucial laws for renewable energy sources, the legal framework has not yet been finalized, although we have been waiting for the solution of this Gordian legislation knot for renewable energy sources for years. On the contrary, instead of accelerating the process, new laws did just the opposite.

The problem is not only with the non-existing acts but even those already adopted. This is precisely the case with the long-expected Energy Approval Regulation, which is quite unclear in some sections. Therefore, the investors still do not know whether energy approval projects located on mixed land – partially owned by the state or local authority units and partially privately owned – can be obtained and in what manner. In addition to the fact that particular articles of the Regulation are vague, several provisions are repeated.

On the other hand, energy storage are mostly not legally regulated, although this presents a critical area for future renewable energy sources development.

Since the last position paper, there have also been some positive legal changes, which will significantly improve the speed and efficiency of the project development. First, they refer to the scope of work of the Ministry of Physical Planning, Construction, and State Assets. The changes were made by the Act on the Amendments of the Physical Planning Act, which regulated agrisolar power plants for the first time, and by the Regulation on Amendments to the Ordinance on simple and other buildings and works, which significantly enabled and accelerated the process of obtaining permits for solar power plants up to 10 MW.

Unfortunately, this presents the only visible acceleration achieved within the last year in the field of renewable energy sources. The implementation of all procedures takes much longer than legally prescribed, while at the same time, the projects that are not completed within the defined deadline receive penalties.

This is the case particularly in the procedure for issuing energy approval. Energy approval requests were submitted more than two years ago following the transitional provisions of the new legislation but have not yet been resolved. Energy approvals for the new projects are equally slow;
i.e. the projects were finally able to apply for energy approval after two years of waiting. At the time of writing this document, only three tenders for energy approval on state land have been announced under the new EO Regulation, although more than 30 projects have requested the tender. Besides the mentioned, energy approval tenders are not announced as they are received, so it is entirely unclear which criteria the Ministry of Economy and Sustainable Development considers when making the tender publication decision.

After a significant delay, and not long after the publication of the first Position Paper, several necessary bylaws were published, but the amount of the connection fee is still unknown, which practically brought the entire process of connection to the transmission network to a standstill. Because of this, projects at an advanced stage of development face impossible demands due to the five-year deadline for the completion of the project; however, the procedure cannot be continued. In addition, the development of new projects is also blocked, considering that the price of the connection is the fundamental parameter when assessing the profitability of the investment. It is simply impossible to plan long-term investments in such an uncertain environment.

After the connection price to the network is finally decided, investors will face an extremely lengthy procedure, which is further complicated because this process can be initiated only once a year, from 1 to May 15, per the Regulations for the connection to the Transmission Network. Thus, it is possible that investors have to wait more than 11 months to be able to request a connection to the network.

Not even newly established Network rules of the transmission system did not improve the development of renewable energy sources projects. Although it has been announced several times that this document will define operational limitations, they are barely mentioned, so this risk, which is extremely important for project development planning and securing financing, is still unknown.

Besides not defining the connection price, HERA failed to approve the ten-year development plan for the electro-energy network on time. It is easy to conclude that this affects the network construction, which is the backbone of the green transition and is essential for increasing the integration of renewable energy sources.

One of the major problems of renewable energy sources is the fact that this field is defined by numerous laws and bylaws under the jurisdiction of different institutions, for example, in the area of physical planning, obtaining concessions and permits, environmental protection, nature protection, consents and permits in the field of energy, etc. adopting one regulation does not always mean that the regulation under the jurisdiction of some other institution is going to comply with it. This leads to a regulatory limbo. Sometimes, even the acts under the jurisdiction of one ministry are not coordinated.

The amendment to the Ordinance on simple and other buildings and works from December 2023 exemplifies this. According to the amendment, projects for solar power plants with a power of up to 10 MW (provided that property and legal relations are fully resolved) become simple structures, so an energy permit or a building permit is not required. This change significantly simplified the procedure for investors, but as other regulations were not adjusted accordingly, the procedure for acquiring the status of a privileged producer and the procedure for participating in the guarantee of energy origin register remained unclear. Namely, while there is no demand for the energy approval for production plants considered simple structures according to ZOTEE, the condition for acquiring the status of a privileged producer is the registration in the OIEKPP Register, for which an energy approval is required, according to ZOIEVUK.

The complex maze of rules particularly slows down geothermal projects regulated by the Act on the Exploration and Exploitation of Hydrocarbons, in addition to ZOTEE and ZOIEVUK. The current approach, which treats geothermal energy within a legal framework intended for defining hydrocarbons, does not adequately reflect the unique advantages and challenges of geothermal energy as a renewable resource.

It is necessary to increase inter-sectoral cooperation when drafting and adopting regulations that impact the field of renewable energy sources so that the regulations can be complied with promptly. This primarily refers to increased coordination of the competent ministries, HERA, HROTE, HOPS, and HEP ODS, while adopting the new regulations and amending the existing ones.

There is a paradox in the fact that environmental protection individually presents the most prolonged procedure in the process of obtaining the permit for renewable energy projects, considering that renewable energy sources mitigate the threat to the environment. These procedures last four to six times longer than it is legally defined. Such a vast deadline extension presents a problem as, per the valid regulations, one can lose energy approval if one fails to realize the energy project within a set deadline. Apart from the mentioned, outstanding financial penalties are defined if the deadline for the project realization is exceeded. The duration of the energy approval should be automatically extended for the period of extension made by the public and legal bodies concerning the deadlines defined for obtaining the documents necessary for the realization of the projects.

The latest amendments to the Physical Planning Act have brought progress in accelerating the development of renewable energy sources. Namely, the amendments expanded the areas where installation of solar power plants is allowed. For example, the construction of solar power plants is allowed in areas provided for the construction of solar power plants in the physical plans of any level, thus eliminating the previous obstacle that arose due to opposing physical plans of different levels (for example, county and municipal). Furthermore, it is possible to build solar power plants on the surfaces of the separated construction area, outside the settlement or economic and business purposes (classified as I and K), on agricultural land classified as P3, near economic and business zones, water surfaces such as lakes and ponds, waste disposal sites, exploitation fields of mineral raw materials and sea salt and within plots of existing infrastructure and water structures.

Also, the legal framework created a suitable climate for investing in agrisolar power plants. Although their development is at the moment restricted solely to permanent plantations, we believe that adequate

usage will reveal their full potential and that this practice will be considered on other types of agricultural land. The missing link for the complete calculation of the financial indicators of an agrisolar project is the connection fee; therefore, it cannot be said with certainty how profitable these projects are until this last item is known.

The problem in physical planning, which remained unresolved, refers to the standardized practice of defining zones suitable for renewable energy sources. For example, the plant's minimum distance from a building area of the settlement (it varies from 500 to 1,000 m) or the distance from the roads (it varies from 100 to 300 m) are often unevenly defined.

Unfortunately, the obstacles and problems mentioned above are the most significant barriers that pose difficulties in the faster implementation of renewable energy sources projects. Therefore, addressing them is a crucial prerequisite for a faster energy transition, leading to climate neutrality, which the EU, including Croatia, has set as one of its priorities.

Finally, the field of renewable energy sources does not require declarative or general support but concrete measures and moves that will lead to an unambiguous and finalized legal framework, clear and well-defined procedures, and, finally, an accelerated process. It cannot be done with individual measures without a vision that includes an overall situation. This can only be achieved by compliance and better cooperation among all key stakeholders in the energy sector, which has not been the case so far.

GLOSSARY AND MEANING OF ABBREVIATIONS

EMP	Connection Feasibility Study
Energy	electricity
EOTRP	Study on Optimal Technical Solution of the Connection
EO	Energy Approval
EPGV	geothermal water exploitation fields
EZO	Study on the Environmental Protection
GO	Main Intervention Acceptability Assessment for the Ecological Network
HERA	Croatian Energy Regulatory Agency
HEP	Croatian Electric Power Organization Company
HEP ODS	distribution system operator in the Republic of Croatia
HOPS	transmission system operator in the Republic of Croatia
Integrated solar power plant SE	One being constructed on existing buildings, houses or factory halls to supply energy to the building or deliver it to the grid (electricity market)
MINGOR	Ministry of Economy and Sustainable Development
MPUGiDI	Ministry of Physical Planning, Construction and State Assets
NECP	National energy and climate plan
Non-integrated solar power plant SE	one being constructed on an undeveloped land to supply energy to the network (electricity market)
NPOO	National Plan of Recovery and Resilience
NTP	Tender for the allocation of the market premium
OIE	renewable energy sources
OPUO	Evaluation of the Need for the Environmental Impact Assessment
PUO	Environmental Impact Assessment
RH	Republic of Croatia
SE	solar power plant
VE	wind farm
ZOG	Construction Act
ZOIEVUK	Act on Renewable Energy Sources and High-Efficiency Cogeneration
ZOTEE	Electricity Market Act
ZPU	Spatial PlanningAct

HGK
CROATIAN
CHAMBER
OF ECONOMY

Rooseveltov trg 2
10000 Zagreb
hgk@hgk.hr