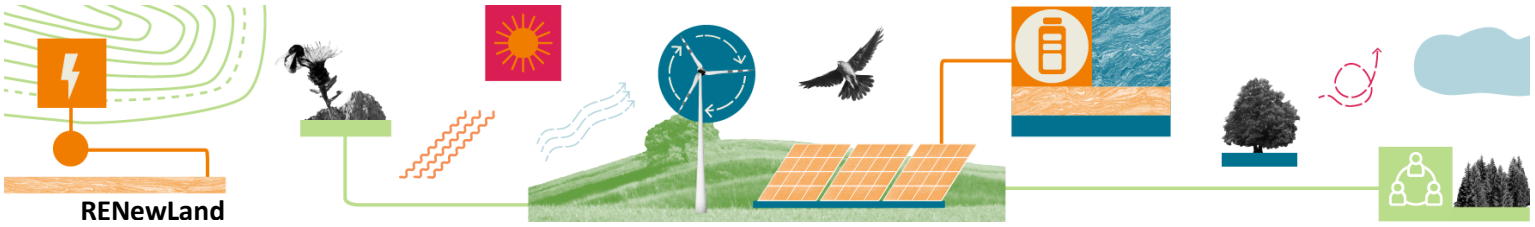

Expert advice on spatial planning for renewable energy sources and land hierarchy conflict

Trinomics

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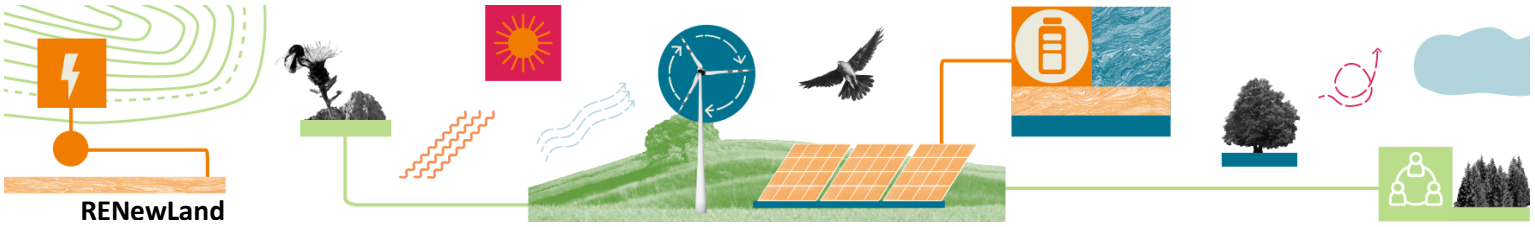

Contract details

Energy Policy Group

Expert advice on spatial planning for renewable energy sources and land hierarchy conflict

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Date

Rotterdam, 20/06/2024

Disclaimer

The views expressed herein can in no way be taken to reflect the official opinion of any of the partners of the RenewLand consortium.

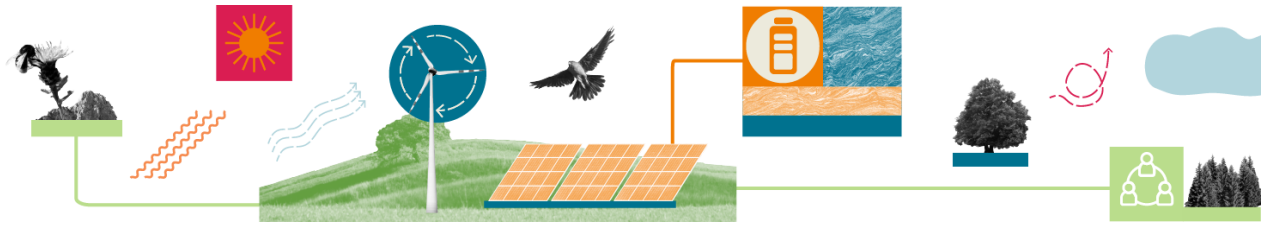

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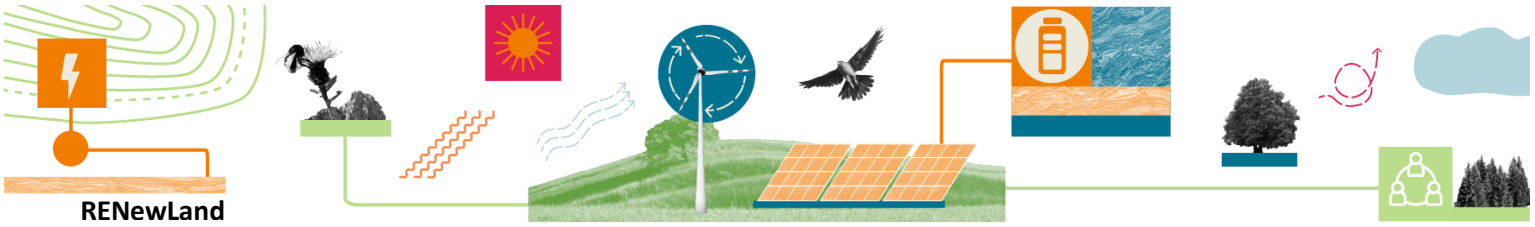
Table of contents



1. Executive summary

Introduction and context

This report has been prepared for the Energy Policy Group in the context of the RENewLand project funded by the European Climate Initiative (EUKI). This report aims to describe progress with the process to set up Renewable Acceleration Areas in three EU Member States, identifying good practices and relevant approaches that can be replicated in other countries, in particular CEE countries such as Bulgaria, Hungary and Romania.

As from the European Commission's communication on March 8, 2022, titled "*RePowerEU: Joint European Action for More Affordable, Secure, and Sustainable Energy*," EU Member States have been urged to reduce dependence on fossil fuels and facilitate the rapid development of renewable energy projects while minimizing their territorial impact. In this context, the revised Renewable Energy Directive (RED), adopted on October 9, 2023, includes two critical provisions for integrating spatial planning and renewable energy development. Article 15b requires Member States to carry out a comprehensive technical mapping of the renewable energy potential of the country, and the available surface necessary for the installation of renewable energy plants and their related infrastructure. On this basis, Article 15c mandates the creation of Renewable Acceleration Areas (RAAs). These should be identified and formally designated based on their suitability for rapid renewable energy development with minimal environmental impact. On May 2024, the European Commission – DG ENER published the *Guidance on designating renewables acceleration areas*.[1]

Case Studies

Progress with the RAA identification process has been rather patchy across the EU, and to date no Member State has fully completed the process and designated such areas. However, this report identifies a set of emerging good practices that are expected to ensure a smooth and effective process, and that can be implemented in Member States that are in the earliest phases of the implementation, such as Romania, Bulgaria and Hungary. The analysis presented here is based on publicly available information and interviews with informed officials and professionals in three countries with relevant experience:

(i) *Portugal*. While current political changes have brought the process to a temporary stop, Portuguese authorities have managed to carry out successfully several steps of the RAA identification process. In particular, we present here the methods and results used for the mapping process, with a particular focus on the scenario approach adopted at national level.

(ii) *Croatia*. This case study focuses on the experience of Zadar County, which has successfully identified suitable areas for renewable energy development as a pilot area. In particular, we present here the multi-criteria analysis carried out to identify and rank sensitivities across the county.

[1] https://energy.ec.europa.eu/publications/guidance-designating-renewables-acceleration-areas_en

(iii) *Czechia*. Recent developments have formally set in motion the process to identify and designate RAAs, including establishing roles and responsibilities, deadlines, and procedures.

Summary of best practices and recommendations

From the detailed case studies, several best practices emerge that can guide other Member States in their renewable energy spatial planning efforts:

1. *Establish inter-institutional collaboration*

A significant takeaway from Portugal's approach is the formation of an inter-institutional working group for mapping exercises. This group was able to harness diverse competences and data from various public administration sectors, thereby efficiently using the available knowledge to develop comprehensive sensitivity analysis. When the country implements a decentralized approach for RAAs designation, ensuring collaborative efforts between different levels of government and public administration is also crucial. For example, an interactive GIS platform with nation-wide relevant data available to lower administrative levels can significantly enhance the effectiveness of mapping and planning. A similar process has been adopted successfully in Czechia, where a detailed map has been produced and made available to local authorities in charge of carrying out the subsequent steps of the identification process.

2. *Identify and manage controversial areas*

During the mapping process, it is essential to identify areas where the intensive deployment of renewable energy production might conflict with other uses or interests. Portugal's strategy of pinpointing "controversial" areas", e.g. those with high landscape or cultural value, or those where impacts are uncertain, helps foresee and mitigate potential conflicts. Early identification allows sufficient time for negotiating over the inclusion of these areas with relevant stakeholders (as seen in Czechia, in occasion of the negotiation between the Ministry of Environment and the Ministry of Defence), or these areas can be given low priority and excluded from RAAs, reducing the likelihood of controversies and facilitating smoother implementation.

3. *Develop and use decision-making tools*

Croatia's successful use of Multi-Criteria Analysis (MCA) in Zadar County and Portugal's scenario approach underscore the value of established decision-making tools. These tools can help resolve local conflicts and balance competing land uses by providing a structured approach to evaluate and/or rank potential areas for renewable energy projects, and provide a clearer understanding of land availability and the potential trade-offs involved in excluding sensitive areas.

4. *Citizen and stakeholder engagement*

Involving stakeholders and engaging citizens early in the planning stages of RAAs – i.e. before the public participation requested under the SEA and Habitats Directives – can significantly enhance the process. Early engagement allows for the identification of potential issues during the plan development phase, enabling timely adjustments and reducing the risk of higher administrative costs later on. This approach also helps to minimize the likelihood of legal disputes that could challenge the final plans. By consulting stakeholders from the beginning, planners gain a more comprehensive understanding of various concerns and perspectives, fostering a collaborative approach to addressing

challenges. Environmental data, often held by NGOs and research institutions, are essential for RAA planning. Collaboration with these entities indeed provide access to valuable datasets, facilitating the creation of detailed sensitivity maps and a thorough understanding of key environmental issues.

5. *Legal and institutional clarity*

Setting clear legal responsibilities within the public administration, as well as clear deadlines, streamlines planning processes, making them more efficient and reducing potential delays. In case of decentralized designation processes, it is advisable that central authorities provide support and oversight to regional and/or local entities to ensure uniformity and compliance of the regulation across the national territory and alignment with national goals.

By adopting these practices, Member States can effectively navigate the complexities of renewable energy deployment, ensuring that their energy transition is both sustainable and socially acceptable.

2. Introduction

Context

In response to the Commission's communication on March 8, 2022, titled "*RePowerEU: Joint European Action for more affordable, secure, and sustainable energy*," EU Member States have been called upon to diversify their energy sources and reduce dependence on fossil fuels. To facilitate the rapid development of renewable energy projects while minimizing their territorial impact, the European Commission introduced several key initiatives as part of the "REPowerEU Plan." These include amendments to Directive (EU) 2018/2001 (RED), which proposed the designation of renewable energy areas with streamlined environmental licensing. Additionally, Regulation (EU) 2022/2577, adopted on December 22, 2022, aimed to expedite renewable energy deployment over an 18-month period. In its article 6, it is established that Member States may grant exemptions, in relation to environmental impact assessments and species protection assessments, as long as the project is located in a specific energy zone renewable energy and that it has previously been subject to a strategic environmental assessment (SEA). These provisions have been refined and confirmed beyond the 18-months period of application of Regulation (EU) 2022/2577 by the revised RED, finally adopted on October 9, 2023. Among the main novelties introduced by the revised RED are two provisions that require Member State to engage in mapping and spatial planning for renewable energy production.

On the one hand, **Article 15b** requires Member State to carry out, by 21 May 2025, a coordinated mapping of their territory to identify the domestic potential for the deployment of renewable energy necessary to meet their national contributions towards the overall Union renewable energy target for 2030. This mapping endeavour should cover the available land and water surface and take into account the potential for renewable energy production, the projected energy demand, the availability of current infrastructure and the potential for upgrading and extending it. This provision aims at ensuring that Member States acquire the necessary information to orderly guide the deployment of renewable energy in the country, balancing land surface needs, energy potential, energy demand and grid capacity. The resulting mapped areas are expected to facilitate the development of RE projects which will need to undergo the standard permitting procedure and be compatible with pre-existing uses of those areas.

On the other hand, **Article 15c** of the revised RED introduces a second spatial planning provision which requires Member States to designate Renewables Acceleration Areas (RAAs) by 21 February 2026. These areas should be identified as a subset of the areas mapped under the previous Article 15b and will enjoy a particularly fast permitting procedure. To qualify as RAAs, they must be sufficiently homogeneous and particularly suitable for the development of renewable energy projects by having low environmental sensitivity. The requirements for RAA identification are laid down in Article 15c(1)(a).

First, Article 15c(1)(a) provides an indicative list of sites that Member States should prioritize when deciding the location of RAAs, as they are expected to have low environmental sensitivity and, consequently, lower environmental impacts. These are mainly artificial and built areas and include

rooftops, parking areas, transport infrastructures, industrial sites and mines, artificial water reservoirs, and degraded agricultural land.

Second, the same Article excludes certain locations as potential RAAs given the higher likelihood of significant environmental impacts. The provision is comprised of two main parts:

- a direct exclusion for Natura 2000 sites, designated under the Habitats Directive, and other protected areas identified under national protection schemes for nature and biodiversity conservation. The latter include, for instance, national or regional parks, nature reserves, and UNESCO biosphere reserves. An exception is provided for artificial and built areas, although located within the protected sites.
- the exclusion of major bird and marine mammal migratory routes as well as other areas identified on the basis of sensitivity maps and other tools (e.g. wildlife sensitivity mapping), except for artificial and built surfaces located in those areas such as rooftops, parking areas or transport infrastructure.

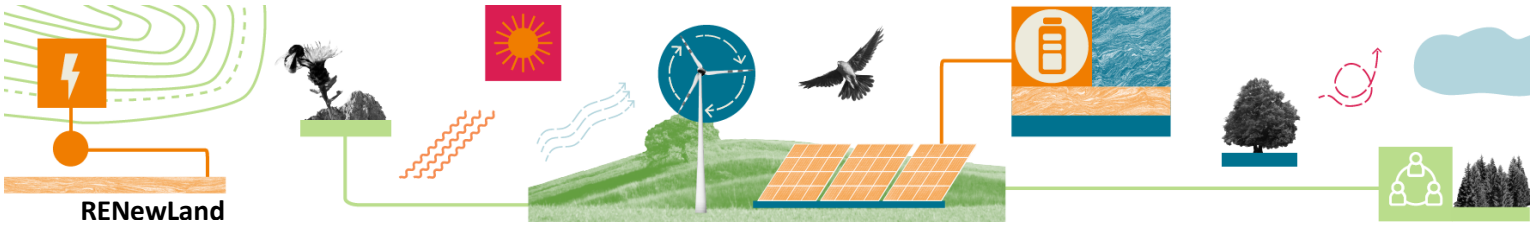
The selection of RAAs must be made by a planning instrument subject to a SEA pursuant to Directive 2001/42/EC. The individual projects carried out within the RAAs will, on the other hand, be exempt from the Environmental Impact Assessment (EIA). However, they may be subject to a case-by-case decision to undergo the EIA if they are highly likely to give rise to significant unforeseen adverse effects in view of the environmental sensitivity of the geographical areas where they are located, which were not identified during the SEA[2].

The maximum time limit for authorizing projects in RAAs is set at 12 months – compared to the normal 24-month time limit – except for offshore projects (24 months instead of 36). In addition, it is worth noting that certain projects that might be included in RAAs, such as solar PV on rooftops and parking lots, already enjoys even shorter permitting procedures as provided by Regulation (EU) 2022/2577.[3]

Finally, the same model of streamlined permitting process is adapted and applied to the network infrastructures and stand-alone storage systems which are essential for the integration of renewables in the electricity system.

The process for the designation of RAAs requires Member States to gather accurate information on renewable energy potential, as well as reliable spatial and environmental data, to develop a sound mapping methodology and ensure appropriate resources for the selection process of suitable areas. An additional condition for a satisfactory outcome of the designation process is the minimisation of trade-offs with other land uses, which would increase the acceptance of the RAAs in local communities. Identifying potential synergies – for example with environmental restoration – would further strengthen the benefits of RAAs. Valuable contributions in all these regards could come from a systematic stakeholder engagement throughout the process.

[2] Article 16a of the revised RED
[3] Article 4 of Regulation (EU) 2022/2577



This report

This report has been prepared based on the request and guidance of the Energy Policy Group, with the support of WWF, in the context of the RENewLand project funded by the European Climate Initiative (EUKI). This report aims to describe progress with the process to set up RAAs in three EU Member States, identifying good practices and relevant approaches that can be replicated in other countries, in particular CEE countries such as Bulgaria, Hungary and Romania.

Progress with mapping and RAA identification process has been rather patchy across the EU, and to date no Member State has fully completed the process. However, it is possible to identify good practices in countries that are currently completing the process, as well as by considering local experiences. To do so, we have reviewed publicly available information and spoken with informed officials and professionals regarding three selected countries.

This report examines the experience of:

- *Portugal*. While current political changes have brought the process to a temporary stop, Portuguese authorities have managed to carry out successfully several steps of the RAA identification process. In particular, we present here the methods and results used for the mapping process, with a particular focus on the implemented scenario approach.
- *Croatia*. This analysis focuses on the experience of Zadar County, which has successfully identified suitable areas for renewable energy development as a pilot area. In particular, we present here the multi-criteria analysis carried out to identify and rank sensitivities across the county.
- *Czechia*. Recent developments have formally set in motion the process to identify and designate RAAs, including establishing roles and responsibilities, deadlines, and procedures.

Finally, this report summarises the most important and transferrable best practices, by bringing together the relevant experiences of the three countries and, where appropriate, other Member States.

However, it is important to recognize that each Member State has its own unique environmental, policy, and energy context. Therefore, while the approaches and methodologies outlined in this document offer a solid foundation, they will need to be carefully adapted to fit the specific circumstances and regulatory landscapes of each country.

3. Portugal

Overview

Portugal extends over an area of 92 230 km^2. In 2022, it had a population of 10 467 366 people. GDP (PPP) estimated for 2022 was EUR 242.3 billion, or EUR 23 500 per capita.[4]

Figure 1 - Map of Portugal (Google)

It is located on the western coast of the Iberian Peninsula and plateau. The landscape is mountainous towards the north of the county, while the south features low hills and broad, flat valleys. Continental Portugal has a 943 km long coastline on the Atlantic Ocean. The country also includes the two archipelagos of the Azores and Madeira.

According to the International Energy Agency (IEA), in 2022 Portugal was responsible for 1.02% of Europe's Total Energy Supply (TES)[5], with the majority of its supply (71%) still coming from fossil fuels.[6]

On the other hand, renewables accounted for 62% of Portugal's electricity generation in 2021. Wind contributed a 26% share, hydro power 23%, solar energy 4% and biofuels made up 8%.[7] Coal and oil both had minimal contribution.[8] This indicates a significant reliance on natural gas and renewable energy sources such as wind, hydro, solar and biofuels.[8]

RES trends

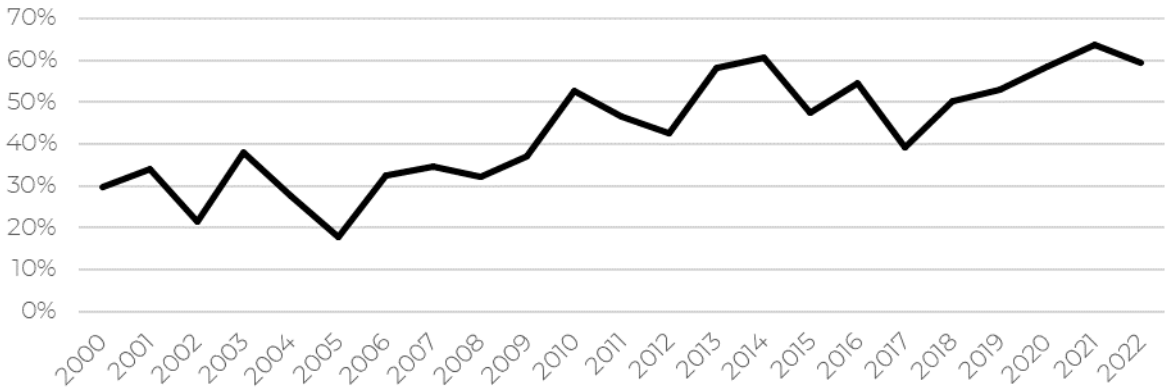


Figure 2 presents an overview of the proportion of renewables in Portugal's electricity production from 2000 to 2022. Renewable energy production consists mainly of wind (with a 52% share)

[4] Eurostat
[5] The TES encompasses all energy produced in or imported to a country, with the exclusion of what is exported or stored
[6] IEA, 2024, Energy mix Portugal
[7] IRENA, 2023 Energy profile Portugal
[8] IEA, 2024, Electricity production Portugal

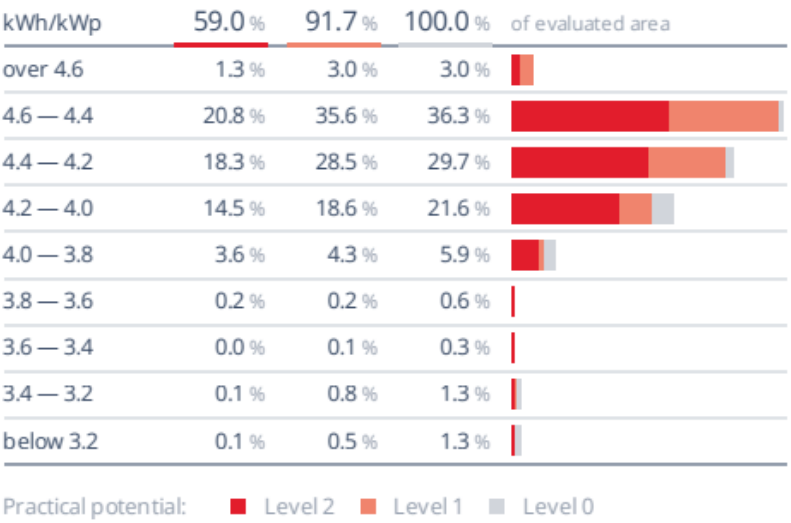
followed by hydro and solar PV, with respectively 34% and 14%. Over the period 2000 to 2022, there has been an upward trend, with a growth of 100%. However, the increase in the period 2010-2022 was significantly lower.[9]

Figure 2 Share of renewables in electricity generation Portugal.[9]

RE potential

Portugal has a great potential for establishing a highly decarbonized electricity production sector, due to the availability of renewable resources such as water, wind, sunlight, biomass, and geothermal power.

Regarding solar, Portugal has an average theoretical potential (Global Horizontal Irradiation – GHI) of 4.566 kWh/m^2. The distribution of PV power output is displayed in Figure 3 below.



[9] IEA, 2024, Portugal Renewables

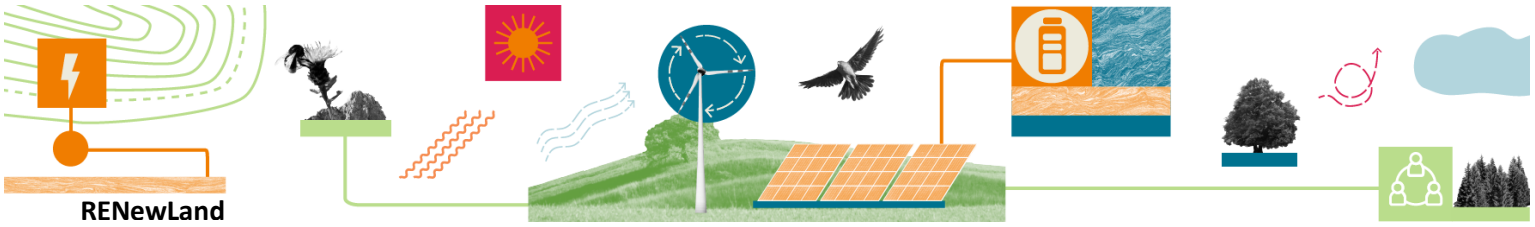


Figure 3 Distribution of photovoltaic power output. Source: Portugal country factsheet. Global Solar Atlas, World Bank Group, 2024[10]

For wind, the mean power density (MPD) ranges between 254 W/m^2 and 872 W/m^2. The 10% windiest areas have a MPD of 552 W/m^2 and an average wind speed of 7.62 m/s.[11]

Furthermore, Portugal has developed a reliable and secure electricity system capable of managing the variability associated with renewables, which is planned to be further improved in the next decade. Looking forward to 2030, the primary focus for the electricity production sector will be on solar energy, with wind energy playing a secondary role.[12]

Solar energy in Portugal is highly cost-competitive prices in comparison to other traditional solutions, and is an abundant resource.[12] As for wind energy, the focus will be mainly on hybridization, new equipment, and repowering.[12]

RE targets

Significant developments in solar and wind energy are expected in Portugal by 2030. Wind generation will continue to grow, with a focus on both onshore and offshore wind. Solar PV technology, with its competitive prices, will offer benefits compared to conventional solutions.[12] Table provides an overview of the estimated changes in installed capacities for hydro, wind, and solar PV between 2020 and 2030. The table indicates that solar power PV will surpass hydro power as the primary source of electricity during this period, followed by Wind power. Solar PV is expected to experience the greatest increase in capacity between 2025 and 2030.

Table 1 - Perspectives for the evolution of expected installed capacity [GW} for the production of electricity by hydro, wind and solar in Portugal for the 2030 horizon.[13]

Sector [GW]	2025	2030
Hydro	8.1	8.1
Wind	6.3	12.4
Solar Photovoltaic	8.4`	20.4

Spatial planning for renewable energy production

In this section we examine the progress made by Portugal to implement Article 15c of the revised RED. While Portugal is particularly advanced in the process of identifying RAAs[14], the coordinated mapping of renewable potential and infrastructures is still ongoing (Article 15b). We thus focus, in this section, on the legal setting and significant features of the methodology utilized to identify

[10] Available at: https://globalsolaratlas.info/global-pv-potential-study

[11] Data at 100m height. Source: Global Wind Atlas, Portugal: https://globalwindatlas.info/en/area/Portugal

[12] NECP 2030, 2023, Updated national energy and Climate Plan 2021-2030

[13] *Ibidem*

[14] The full report of the RAAs mapping can be found at: https://www.lneg.pt/resultados-e-conclusoes-do-gtaer-grupo-de-trabalho-para-a-definicao-das-areas-de-aceleracao-de-energias-renovaveis/

suitable locations for RAAs, highlighting the aspects that can be considered good practices and lessons learned that might be useful for guiding other countries' similar initiatives.

Legal framework

The mapping exercise towards the identification of RAAs has been entrusted by Order 11912/2023[15] to the Working Group for the Definition of Renewable Energy Acceleration Areas (GTAER) which is composed of representatives from the Office of the Secretary of State for Energy and Climate, the National Laboratory for Energy and Geology (LNEG), the Portuguese Environment Agency, and the General Directorate of Energy and Geology. Also involved in the GTAER are the Institute for the Conservation of Nature and Forests (ICNF), the operator of the National Energy Network (REN), the operator of the National Distribution Network (E-Redes), the Directorate-General for Cultural Heritage (DGPC) and the Directorate-General for Agriculture and Rural Development (DGADR).

While the GTAER was only established in November 2023, an informal Working Group with a similar composition, led by the LNEG, was already working since 2022, upon request of the government, on the identification of the areas across the country with lower environmental and heritage sensitivity for the location of renewable energy production, to be used as dedicated areas for renewables or "go-to areas". The outcomes of the GTAER identification process largely update and build on the mapping carried out under this previous framework.

Entrusting the mapping exercise to a technical agency like LNEG supported by experts from all relevant public administrations, has been pivotal. This collaborative approach fosters inter-institutional cooperation from the outset of the RAAs selection process, encompassing the diverse range of relevant competences and data available within the public administrations.

More recently, in March 2024, the Presidency of the Council of Ministry reshaped this administrative setting by establishing a new Mission Structure for the Licensing of Renewable Energy Projects 2030 (EMER 2030) [16] with a different (less technical) composition from the GTAER. EMER 2030 will formally present a proposal for the designation of RAAs, as provided under Article 15c of the revised RED, i.e. the actual spatial planning tool to be subjected to a Strategic Environmental Assessment (SEA) and formally approved. It is worth noting that EMER 2030 has been entrusted a wide scope of actions ranging from the consolidation of the legal and regulatory framework applicable to all aspects of permitting of renewable energy and storage projects, to developing a One-Stop-Shop digital system for streamlining permitting processes, to developing a calendar for the allocation of new capacity for RE projects.

Sensitivity mapping

The mapping endeavour led by the GTAER Working Group mapped sensitivities according to a number of criteria, excluded sensitive areas as potential locations for RAAs by removing them from the map of inland Portugal, and obtained as a result a set of suitable areas for the deployment of

[15] Available at: https://diariodarepublica.pt/dr/detalhe/despacho/11912-2023-224661349

[16] Resolution of the Council of Ministers no. 50/2024, available at: https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/50-2024-857366012

renewable energy. This exercise yielded interesting results and provides a replicable methodology to other Member States seeking to undertake similar initiatives.

In the areas identified as suitable – once officially designated – Portugal would implement a streamlined permitting process for solar and wind energy projects, as provided under Article 15c of the revised RED. Conversely, in areas outside the designated RAAs, renewable energy projects would still need to undergo the standard permitting procedure.

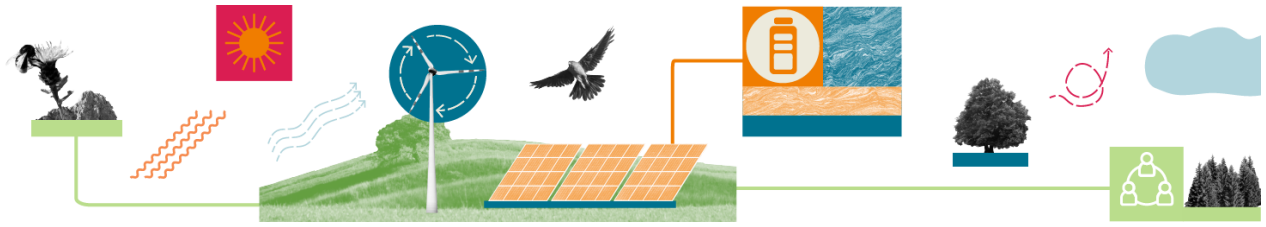
It is crucial to clarify that the mapping endeavour led by GTAER does not, in itself, designate RAAs. The actual designation will occur subsequent to the development of a comprehensive plan to be proposed by the newly established Mission Structure EMER 2030. This plan will necessitate a Strategic Environmental Assessment (SEA) and formal approval. Instead, the study conducted by GTAER has a technical nature, delineating areas free from the exclusion criteria outlined in revised RED along with additional exclusion parameters deemed pertinent for the Portuguese context. The findings are accessible via the public Geoportal tool, with regular updates reflecting the evolving nature of the study and the dynamic indicators employed in map generation.

The mapping has been organised as divided in three parts covering (i) natural areas, (ii) artificial areas and (iii) reservoirs. As the GTAER report only briefly describes the latter two categories, we focus here in particular on the methodology used for mapping potential RAAs in natural areas. In this regard, the main methodological steps were the following:

1. **Data gathering to identify exclusion areas** - environmental and heritage constraints have been identified in line with the requirements of the revised RED, with additional constraints identified which were deemed necessary in the Portuguese context. Data gathering relied on the institutional cooperation framed within the Working Group, NGOs, the National Ecological Network and data from previous projects' Environmental Impact Assessments.
2. **Development of GIS datasets** of exclusion areas, based on compilation of relevant spatial information for each constraint.
3. **Development of a GIS algorithm** to subtract from the map of Portugal continental territory all areas (polygons) that had at least one constraint.
4. **Potential areas for RAAs** were thus obtained as a result, i.e. only areas not covered by any constraint.
5. **Scenarios development**, to reflect different criteria adopted to identify exclusion areas. We focus on the scenario approach in the section below.

Regarding point 1 above, the **exclusion criteria** considered by GTAER encompassed the following:

- Designated protected areas for nature conservation and other environmentally sensitive areas:
    - Natura 2000 sites and other areas designated for nature conservation, including RAMSAR protected wetlands, UNESCO biosphere reserves, and Geosites (geological heritage sites);
    - Migratory routes of selected bird species
    - IBAs (Important Birds and Biodiversity Areas)



- habitats of IUCN red-listed birds,
- Important sites for selected species (Bufo real, Iberian lynx, Bonelli's eagle, Black vulture, butterfly Euphydryas, wolves, etc.),
- 500m buffer around wetlands and natural water bodies;
- Coastal protection zones as identified in the Coastal Zone Programs;
- Protected areas under the Water Framework Directive, bathing areas, vulnerable zones under the Nitrates Directive, and areas at risk of flooding as identified under the Flood Directive
- Areas relevant to mineral and natural waters
- Aquifer systems of mainland Portugal (SAPC) – porous aquifers;

- Unsuitable land use classes and erosion risk:
  - Areas with a slope of more than 20%, geologically unstable areas (erosion, earthquake risks etc.). In this regard, data are available for all Europe in the EU-DEM database (Digital Elevation Model over Europe) maintained by the European Environmental Agency.
  - Land use classes excluded: bare rocks and dunes, salt marshes and tidal flats, natural surface water bodies, as identified by the Portuguese Land Use Map (COS).
- Cultural heritage, including archaeological heritage, with buffer areas of 150m;
- Areas related to forest management, e.g. National Network of Trees of Public Interest, ecological corridors identified under the Regional Planning Programs on Forestry, relevant areas for biogenetic resources, etc.
- Areas of interest for mining development, i.e. prospecting/research areas for mineral deposits, current mining concessions, areas interested by mining concession applications.
- National Agricultural Reserves and National Ecological Reserves, defined at the municipal level;
- Buffer zones around residential and mixed-use buildings;
- Potentially controversial types of land use, especially selected among land uses typical of the Portuguese landscape, e.g. vines, orchards, olive groves, cork oak forests, agroforestry, etc.

Scenario approach

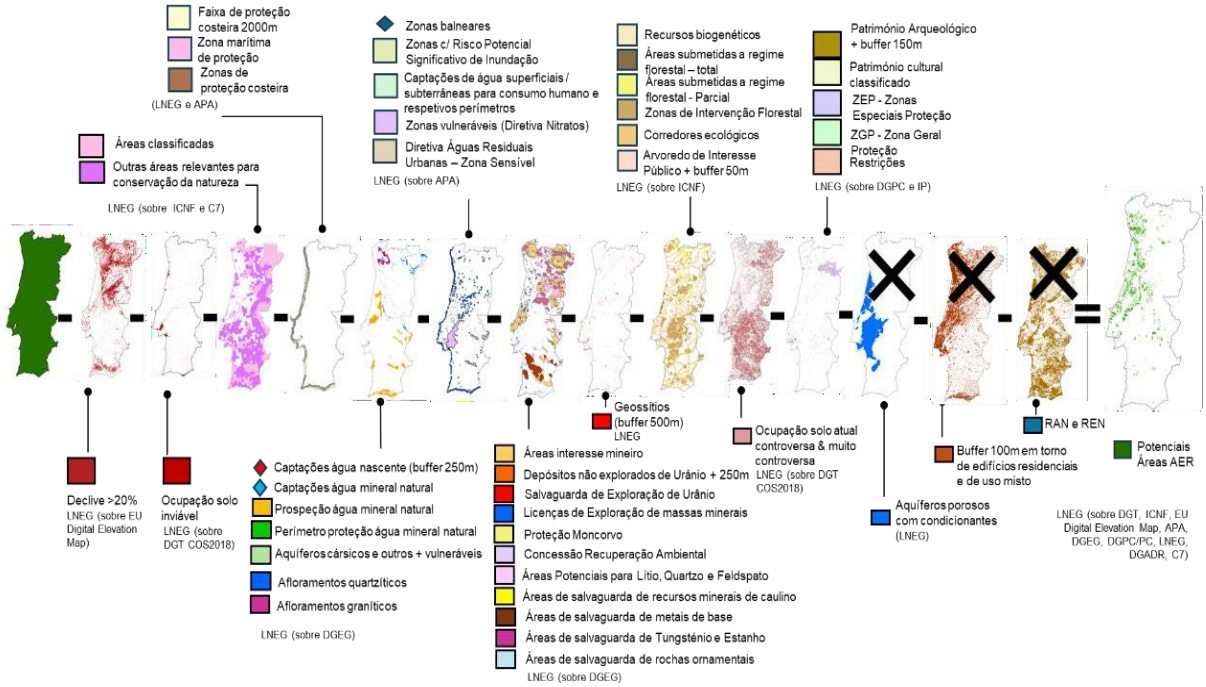
A critical feature of the mapping process in Portugal which emerges as a good practice is the development of different scenarios to identify potential suitable sites for RAAs in natural areas.

As mentioned above, the revised RED expressly excludes Natura 2000 sites, other protected areas, major bird and marine mammal migratory routes as well as "other areas identified on the basis of sensitivity maps and other tools". This leaves room to Member States to adapt exclusions to their own environmental context. During the works of the GTAER Working Group, controversies arose regarding the exclusion of a few environmental constraints, namely (a) certain areas related to porous aquifers, (b) the width of buffer areas from residential and mixed-use buildings, and (c) ecological corridors (a network of green infrastructures called National Ecological Reserves or REN, under Portuguese law) and sensitive agricultural areas (National Agricultural Reserves or RAN).

Five scenarios were thus developed which differ in terms of whether or not the abovementioned constraints are excluded from the potentially suitable sites for RAAs. Moreover, it provides different options to be compared with the land area needed to meet the renewable energy targets of the country, in order to ensure a good match while minimising additional land occupation.

The five scenarios identified are the following:

1. **Scenario A**: this is the base scenario where none of the controversial constraints were considered. The scenario is presented in the figure below. The different layers represent the mandatory exclusions under the RED and the additional exclusions identified by the Portuguese authorities, without adding also the controversial ones with are addressed in the subsequent scenarios. The last layer on the right represents the available areas for RAAs under Scenario A.



2. **Scenario B**: using Scenario A as a starting point, this scenario further excludes from potential RAAs the areas related to a few aquifers classified as porous or vulnerable by LNEG. This exclusion reflects a conservative approach as the impacts of renewable energy projects on aquifers 'recharge has not been fully investigated yet.
3. **Scenario C**: it builds on the base scenario and also excludes buffer areas of 100m width from residential and mixed-use buildings.
4. **Scenario D**: this scenario builds on Scenario A and, in addition, removes from the map the REN and RAN areas as available in February 2024 (not all have been mapped yet).

Figure 4 - Map layers used to define Scenario A

5. **Scenario E**: in this scenario, GTAER added all the other constraints identified under the previous scenarios to the exclusions under Scenario A, and removed them from the map.

The five scenarios obtained are shown in the figure below:

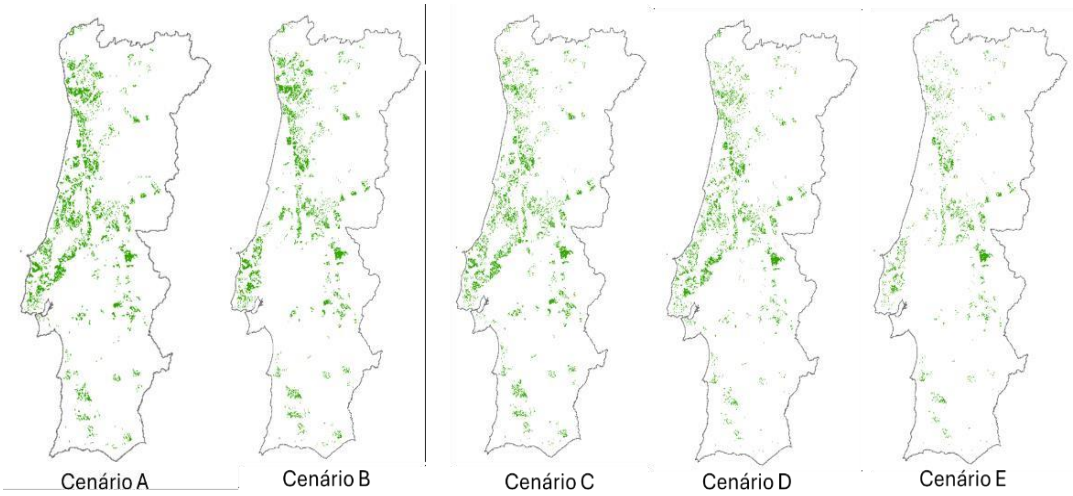


Figure 5 - Five scenarios developed by GTAER

In order to identify the suitable location for RAAs, the methodology then provides that the resulting layers are compared with the following information, in spatial format:

- Location of existing or planned solar PV and onshore wind renewable plants;
- Availability of renewable solar and wind resources using data developed by the LNEG and the Global Solar Atlas;
- Current and planned electricity transmission network layout, in accordance with the most updated version of the relevant Transmission Network Development and Investment Plan;
- Distribution network layout in high and medium voltage according to information provided by the E-Redes;
- Map of electricity demand in industrial areas;
- Public utility easements and restrictions with gas and oil pipelines;
- Primary network of fuel management strips to prevent rural fires.

Stakeholder consultation

Another interesting feature of the Portuguese experience has been the public participation to the mapping process. Instead of waiting for the public consultation mandated under the Strategic Environmental Assessment of the proposed plans for RAAs, the GTAER published the maps of the suitable areas identified as soon as they were ready.

The different scenarios have thus been made available for comments, and the public was also allowed to provide further data and documents to be included, if relevant, in the mapping process knowledge database. According to an officer interviewed on this topic, there has been a high participation, which allowed to review and refine the different scenarios several times, until the last version was published in March 2024 and reflected in the final report of the GTAER.

Summary of best practices

In light of the above, a few good practices can be drawn from the Portuguese experience so far. In this section we highlight these practices and the lessons-learned that could guide the localisation of renewable energy production projects and dedicated areas in other countries.

- Entrusting the mapping exercise to an inter-institutional Working Group. Collecting data for the sensitivity analysis is a crucial step in the mapping process, and data availability may be a significant bottleneck. Setting up an inter-institutional working group can help to address this challenge, as it allows to harness a range of relevant competences and data already available across the public administration. To complement the knowledge database, extensive expert consultation and stakeholder engagement is also advisable.
- Creating a new entity with competence over the administrative process leading to the designation of RAAs as well as other relevant issues related to RES acceleration such as the rationalisation of the regulatory framework, the allocation of new capacity and the steps needed to streamline permitting processes. Although this depends on the existing framework in place, identifying a focal point with clear responsibilities on achieving RAAs designation and general RES acceleration might be helpful to streamline these processes.
- During the mapping exercise, identifying the areas where renewable energy production might conflict with other uses. Portugal termed “controversial” areas those which are not considered for direct exclusion under the revised RED but where locating a RAA might nevertheless raise conflicts, for example because of high landscape or cultural value, or because of the uncertainty related to the potential impacts of renewable energy projects in those areas. Depending on the outcomes of the mapping under Article 15b and the land needed for achieving the country’s energy targets, such controversial areas might or might not be excluded from RAAs. However, their early identification in the mapping process helps to foresee possible controversies, which could be minimised by giving these areas low priority when deciding on RAAs siting. Developing scenarios for the exclusion of key controversial areas might also help in this regard (see below).
- Developing different scenarios. This approach serves two main objectives. On the one hand, it helps to make explicit the “weight” in terms of land of key controversial exclusions (that might be proposed during the mapping process). For example, in the Portuguese case, there was uncertainty on whether certain renewable energy technologies can negatively affect the recharge of aquifers. The recharging areas of a few sensitive aquifers were thus proposed for exclusion but this raised a debate regarding the potential effect that such exclusion could have

on the total available land for energy production. The GTAER thus developed a scenario to show what the exclusion would entail in terms of reduced land availability, which facilitates decision-making. On the other hand, the availability of different scenarios might also ease the compliance with the SEA Directive, which requires to assess possible alternatives to the proposed RAA plan.

4. Croatia

Overview

Croatia extends over an area of 56 594 km^2. According to the last census in 2021, it had a population of 3 871 833 people. GDP estimated for 2022 was EUR 68.4 billion, or EUR 17 500 per capita.[17]

Most of the Croatian landscape, especially in the northern regions, is characterized by lowlands, with elevations of less than 200 metres above sea level recorded in 53.42% of the country. High areas are found in found in all regions of Croatia with a particular concentration in the central regions of the country. Croatia has a long coastline on the Adriatic Sea of 1 777 km, excluding the islands.

Figure 6 - Map of Croatia (Google)

In 2022, according to the IEA, Croatia was responsible of 0.43% of Europe's total TES, of which 69% originates from fossil fuels and 31% originates from renewables.[18]

In 2021, hydroelectric power was the primary source of electricity generation in Croatia, accounting for 48% of the total electricity generated. Natural gas was the second most significant contributor, responsible for 20%. Wind, coal and biofuels were responsible for 13.6%, 9.6%, and 7.2% of total electricity generation, respectively. It is noteworthy that Solar PV accounted for only 1% of electricity generation, which is significantly lower than Europe's average of 5%.[19]

RES trends

Error! Reference source not found. shows the percentage of renewable in Croatia's final electricity production between 2000 and 2022. The proportion of renewables in the final energy consumption reached 65% in 2022, with the highest share being 74% in 2014. Overall, from 2000 to 2022, the use of renewable energy showed an upward trend, with a growth of 14%. Hydro contributed the most to

[17] Eurostat
[18] (IEA, 2024), Energy mix Croatia
[19] (IEA, 2024), Electricity mix Croatia

the total generation of renewables, accounting for 76%, followed by wind with 22% and solar PV with only 2%.[20]

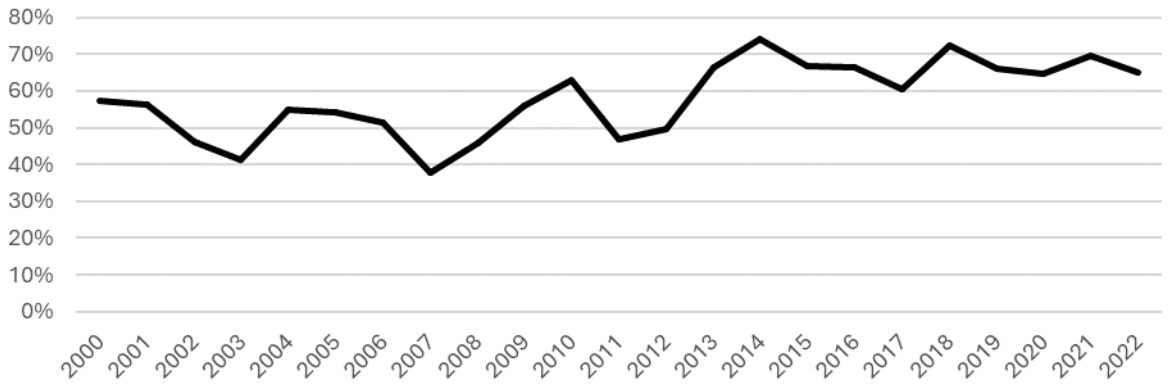


Figure 7 - Share of renewables in electricity production Croatia[21]

RE potential

Croatia has significant potential for renewable energy generations. Its solar average theoretical potential (GHI) is 3.737 kWh/m^2. The distribution of PV power output is displayed in Figure 8 below.

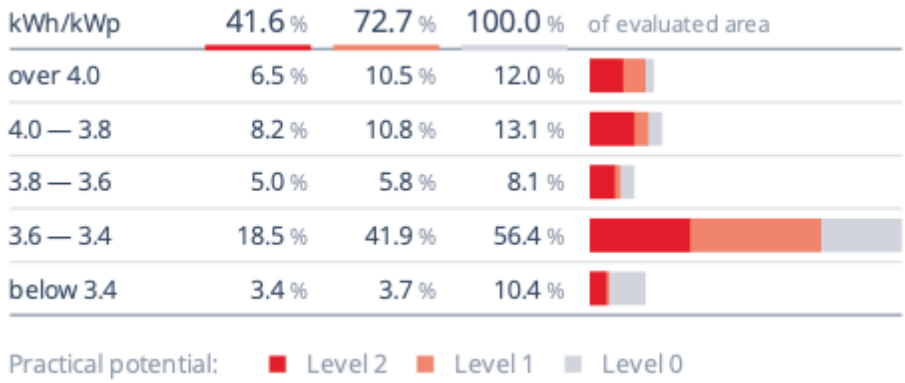
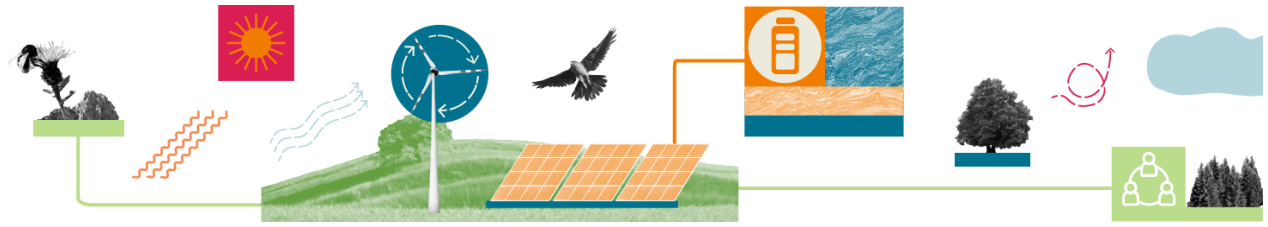


Figure 8 - Distribution of photovoltaic power output. Source: Croatia country factsheet. Global Solar Atlas, World Bank Group, 2024[22]

Wind is the renewable energy source with the highest potential, with a mean power density (MPD) ranging between 341 W/m^2 and 1 892 W/m^2. The 10% windiest areas have a MPD of 1 169 W/m^2 and an average wind speed of 8 m/s.[23]

[20] (IEA, 2024), Croatia Renewables
[21] *Ibidem*
[22] Available at: https://globalsolaratlas.info/global-pv-potential-study
[23] Data at 100m height. Source: Global Wind Atlas, Croatia: https://globalwindatlas.info/en/area/Croatia



Additionally, there are opportunities for the development of hydroelectric power and, to a lesser extent, biomass and geothermal energy sources.[24]

While the hydroelectric potential in Croatia is uncertain due to cost and conflicting use of rivers, wind energy appears as an attractive option, with Levelized Cost of Electricity falling below EUR 50/MWh in the most suitable locations. Meanwhile, solar PV power plants can also produce electricity at a competitive LCOE, as low as EUR 70/MWh under low-cost capital scenarios.[24]

RE targets

The share of renewables in the final consumption of electricity is aimed to increase to 74% by 2030.[25] In order to meet the higher share of renewable electricity generation, together with the higher demand for electricity, which is caused by the increasing electrification, investments must be made in renewable power plant capacities. Table 2 - Perspectives for the evolution of expected installed capacity [GW] for the production of electricity by hydro, wind and solar in Croatia, in the 2021-2050 period. **Error! Bookmark not defined.**

provides the expected capacity of hydro, wind, and solar technologies for the years 2021, 2030, 2040 and 2050, according to the NECP. The capacities of wind and solar generation will significantly increase from 2021 to 2030, with wind expected to overtake hydro as the primary source of electricity by 2030 and solar catching up later.[26]

Table 2 - Perspectives for the evolution of expected installed capacity [GW] for the production of electricity by hydro, wind and solar in Croatia, in the 2021-2050 period.[27] **Error! Bookmark not defined.**

Technology [GW]	2021	2030	2040	2050
Hydro	2.2	2.4	3.8	3.9
Wind	1.0	2.6	4.4	8.5
Solar	0.1	1.0	1.6	3.2

Spatial planning for renewable energy production

In this section, we present the methodology developed by the Croatian Energy Institute Hrvoje Pozar (EIHP), in collaboration with The Nature Conservancy (TNC), for identifying suitable areas for developing solar and wind renewable energy with low impact on environmentally sensitive areas and socio-economic vulnerabilities. Such methodology was applied in 2021 in a pilot project carried out in Zadar County, one of the 20 counties of Croatia, with the explicit goal of testing an approach that would be suitable for other regions in Southeast Europe and beyond. We focus in particular on the methodology that has been used for assessing sensitivities and rank potential suitable areas based on their impact on a set of indicators.

[24] (IRENA, 2017), Cost-competitive renewable power generation: Potential across South East Europe

[25] Ministry of Economy and Sustainable Development (2023) Integrated national energy and climate plan for the republic of Croatia for the period 2021-2030

[26] NECP 2030, 2023, Integrated national energy and climate plan for the republic of Croatia for the period 2021-2030

[27] *Ibidem*

Zadar County pilot project

Zadar County was chosen as the ideal location for testing this approach due to its solar and wind potential. The Croatian coast, boasting over 2 000 hours of sunshine annually, provides rich solar radiance, while Zadar is one of Europe's windiest areas, with a mean power density of 1 999 W/m² which puts it in the top 10% windiest regions. Already a hub for wind energy and poised to become a centre for utility-scale solar, Zadar also stands out as a biodiversity hotspot, with 50% of its area part of the Natura 2000 network of protected sites. This entails risks of trade-offs between renewable energy production and environmental sensitivities which need to be carefully addressed in the planning process. In addition, the willingness of Zadar County's administration and leadership to support the project ensured the collaboration of spatial planning authorities and local stakeholders.

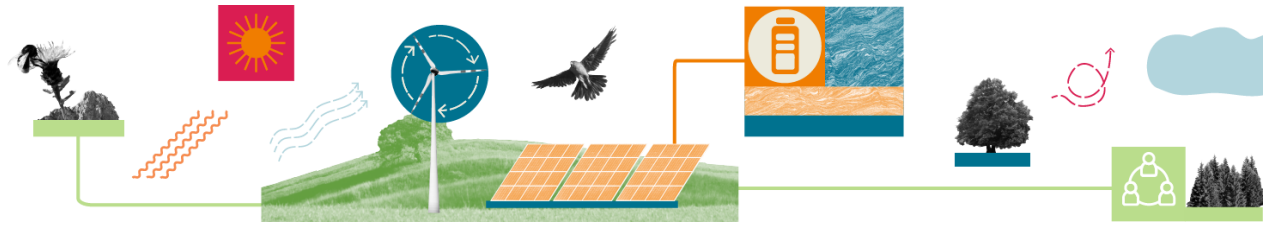
It is also worth mentioning that the pilot project was carried out in 2021, prior to the entry into force of the revised Renewable Energy Directive (RED). Consequently, it was not initially developed as an implementation of this directive. However, most of the environmental exclusions mandated by the revised RED were already considered in the project. Furthermore, the methodological approach for identifying suitable areas developed for Zadar County is currently being scaled up at the national level for the identification of RAAs, confirming its relevance as a tool to implement Article 15c of the RED.

Sensitivity mapping

As mentioned above, the pilot project carried out in Zadar County was aimed to identify suitable areas for RES deployment avoiding environmentally and socio-economically sensitive areas. To this end, the EIHP and TNC developed a sensitivity mapping methodology. This included a multicriteria analysis which is further detailed in the following section.

The sensitivity mapping was comprised of three steps:

- In the first step, exclusion zones were identified. These are areas where the establishment of wind and solar power plants is legally prohibited or restricted according to the national legislation which regulates nature protection, infrastructure development, spatial planning and other relevant sectors. Examples include national parks and other protected areas, including Natura 2000 sites, cultural heritage, as well as prescribed corridors along transport infrastructure.
- The second step focused on identifying very highly sensitive zones. Under this category, for instance, were mapped the habitats of endangered and vulnerable species, forest ecosystems and other areas with high value in terms of biodiversity, landscape or cultural heritage. These areas are not always legally protected but are often subject to a certain degree of conservation and sustainable management. They were thus addressed in the mapping in the application of the precautionary principle. The pilot project report recommends paying particular attention to these areas when deciding on the location of renewable energy plants, and subject them to careful scrutiny under the SEA and EIA procedures. However, from the perspective of RAAs designation, it is important to note that some of those very highly sensitive zones would now fall under the exclusions set by Article 15c of the revised RED (major migratory routes of birds and marine mammals, and other environmentally sensitive areas).



- In the third step, the remaining areas were evaluated against a set of 20 indicators for wind power and 18 indicators for solar power and their sensitivity level was then determined using a multicriteria analysis, which was peer-reviewed through stakeholder engagement.[28]

Sensitivity mapping in Spain

The Ministry for Ecological Transition and the Demographic Challenge (MITECO) in Spain developed a sensitivity mapping tool in 2020 to identify areas of varying environmental suitability for onshore wind and PV projects on the mainland. This tool, based on Article 21 of Law 07/2021, creates a zoning system that measures environmental sensitivity through an index and is published on national geodata portals. Although not mandatory, it guides spatial planning by indicating lower-impact areas for renewable energy (RE) projects. As the tools was developed before the revision of the RED, it was not aimed at identifying RAAs. However, it has been used to identify low and medium sensitivity areas for which MITECO provided an "environmental express permitting", a mechanism later expanded to nearly all mainland areas except highly sensitive areas such as protected sites.

Indicators and relevant weighting factors are described in this report.

Multicriteria analysis

Multicriteria analysis (MCA) can be used to identify the most preferred option, to rank options, to shortlist a limited number of options for further analysis or simply to distinguish acceptable from unacceptable possibilities.[29] The main purpose of MCA techniques is to deal with the difficulties that human decision-makers have in handling large amounts of complex information by making different criteria explicit.

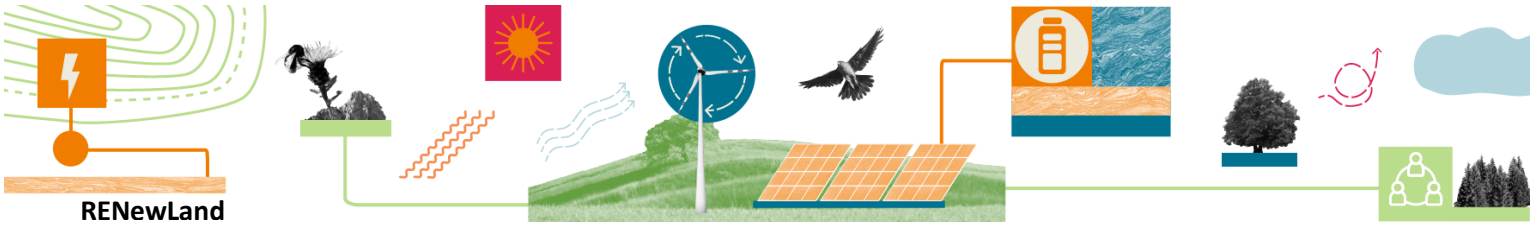
In the Zadar County pilot project MCA was used as part of its sensitivity mapping process. Once exclusion zones and highly sensitive zones were identified, EIHP used this methodology to determine if the remaining areas had (a) highly sensitivity, (b) medium sensitivity or (c) low sensitivity.

In detail, the remaining areas have been analysed against a set of indicators and sub-indicators. The MCA indicators are divided into three categories: Social and cultural features, natural resources important for development potential, and nature and biodiversity. The Table below displays the various indicators for both wind and solar power plants, grouped according to the three categories.

Table 3 - Indicators and sub-indicators used in MCA for wind and solar power plants[30]

Wind power plants	Solar power plants
Social and cultural features	
Distance from the settlement	Distance from the settlement

[28] EIHP and The Nature Conservancy (2021), How spatial planning can accelerate renewable energy uptake in southeast Europe
[29] Department for Communities and Local Government: London (2009), Multi-criteria analysis: a manual
[30] EIHP and The Nature Conservancy (2021), How spatial planning can accelerate renewable energy uptake in southeast Europe



Number of inhabitants	Number of inhabitants
Distance from cultural goods	Distance from cultural goods
Landscape values	Landscape values
Panoramic values	Panoramic values
Visual quality / exposure	Visual quality / exposure
Natural resources and development potentials	
Agriculture land	Agriculture land
Forest	Forest
Waters	Waters
Tourist zones	Tourist zones
Tourist zones – planned	Tourist zones – planned
Recreation zones	Recreation zones
Nature and biodiversity	
Protected areas	Protected areas
Endangered and rare habitats	Ecological network
Habitats important for bats (forests, rivers, streams, ponds)	Endangered and rare habitats
Distribution areas of bat species with high risk of collision with turbines, according to EUROBATS	EUROBATS – internationally important habitats for bats
Habitats important for birds (lakes and wetlands)	Habitats important for sensitive bird species
Habitats important for birds (rivers, cliffs and rocks)	Habitat suitability for large carnivores (*Ursus arctos, Canis lupus, Lynx lynx)*
Area of distribution of sensitive bird species	
Habitat suitability for large carnivores (*Ursus arctos, Canis lupus, Lynx lynx*)	

Each area was evaluated against each indicator and given a score between 1 and 5 based on its prevailing characteristics and defined threshold. A score of 1 indicates low sensitivity to the potential impact of wind and solar power plants, while a score of 5 indicates high sensitivity for that specific indicator. Additionally, each indicator was allocated a weighting factor and the final sensitivity level of the assessed area within the respective category was obtained by summing the products of the indicator score and its weighting factor. In the final step, the scores obtained for each indicator group were summed to get the overall sensitivity level of the region. The weighing factors were confirmed and adjusted based on stakeholder feedback.

The scores were then normalized on a scale from 0 to 100 using min-max normalization to allow for a better determination of the sensitivity. Areas with a score of 0-40 were defined as low sensitivity, 40-70 as medium sensitivity and 70-100 as high sensitivity areas.[31]

[31] Energy Institute Hrvoje Pozar (2021), Integrated Renewable Energy Planning in Southeast Europe

Identification of suitable locations

After the sensitivity assessment, the project team further divided the resulting areas based on additional criteria to determine their technical suitability for the deployment of renewable energy. These criteria align with the mapping requirement under Article 15b of the revised RED and include:

(a) existing solar and wind plants installed,
(b) solar irradiance and wind speed,
(c) slope of the terrain,
(d) distance from existing transmission lines

This suitability assessment resulted in the further subdivision of the areas into excellent, very good and good suitability areas. The project team also made a conservative assumption that only 5% of the low sensitivity areas will be used for the deployment of renewable energy, taking into consideration land ownership and potential related issues with land rights, size of land parcels, and competition with other types of projects. In the remaining areas, the project team estimated that over 1.1 GW of solar and wind potential would be available for solar and wind projects, which would cover almost one third of the total Croatia target for wind and solar power in 2030.

Stakeholder consultation

During the execution of the pilot project, EIHP engaged in intensive consultations with the local communities and experts involved in renewables planning in order to capture and incorporate environmental and social sensitivities. One presentation to stakeholders, seven individual expert consultations and a peer review workshops were organised with experts from the field of nature protection, the government's spatial planning departments, and environmental NGOs over a period of nine months.

Input on the study's methodology was collected during these events. The stakeholders were selected based on stakeholder mapping results, their relevance for the project, and their willingness to participate. They were introduced to the project concept and partners at a workshop before the project began. All workshop participants were also invited to take part in the project consultation activities.

The first stakeholders' workshop took place with the goal of introducing stakeholders to the project and its anticipated outcomes. Additionally, individual experts were interviewed based on their expertise and willingness to participate. The goal of these consultations was to introduce the sensitivity assessment methodology and ask specific questions about wind and solar energy in order to identify relevant indicators. Following the expert consultations, the list of indicators was developed, as presented in **Error! Reference source not found.**, along with their proposed weighting factors. The project results were presented at the "Peer Review Workshop." The participants provided final comments on the study and were invited to participate in an online survey to validate the weighting factors used in the MCA. Hereafter, the weighting factors were adjusted accordingly.

Summary of best practices

Based on the analysis presented above, the Croatian experience presents some good practices and lessons-learned that could guide the localisation of renewable energy production projects and dedicated areas in other countries.

1. Learn-by-doing. If time allows, the selection of a promising region within the country, where local administration, local stakeholders and citizens are ready to participate in the process, can provide important lessons and insights that can be then adopted at national level, including within the legislative framework.
2. The use of established decision-making tools can play an important role in settling local conflicts. The MCA used to evaluate and rank suitable areas in Zadar county was an effective approach to cut through the complexity of competing land uses. The approach worked as it was tailored to the region and was developed via the interaction with local stakeholders and experts.
3. Ranking potential areas. While mapping potentially suitable areas is important, a significant support to the process of identifying the best candidate location is the ranking of the suitability level of each area.

5. Czechia

Overview

Czechia extends over an area of 78 871 km^2 with a population of 10 900 555 people. GDP estimated for 2022 was EUR 276.3 billion, or EUR 25 850 per capita.[32]

It is a landlocked country located in Central Europe. Its landscape mostly consists of low hills and plateaus surrounded along the borders by low mountains.

Figure 9 - Map of Czechia (Google)

As of 2022, the energy supply of Czechia still largely relied on conventional energy sources, with fossil fuels dominating the landscape. Coal and oil collectively accounted for 53% of the total energy supply, with natural gas following closely behind, contributing 15%. Renewable energy sources,

[32] Eurostat

collectively, comprise 13% of the mix. Nuclear energy stands out as another notable contributor, with 19%.[33]

The Czech electricity supply relies for most of its electricity on two large nuclear plants and several smaller conventional coal power plants. Nuclear and coal power plants provide primarily baseload power at a high level of utilization, while gas fired units, reservoir hydro and pumped storage provide flexible generation.[34] In the 2022. Czech electricity supply mix, coal accounts for 44% of the total energy supply, while nuclear energy follows closely behind, contributing 37%. Renewable energy sources, collectively, make up only 13% of the mix.[35]

RES trends

Figure 10 displays the gradual rise in the percentage of renewables in Czech electricity production over the past two decades. From a baseline of 3.1% in 2000, the share increased steadily to 12.8% by 2022. The largest portion of this energy mix is made up of hydro and solar PV.[36]

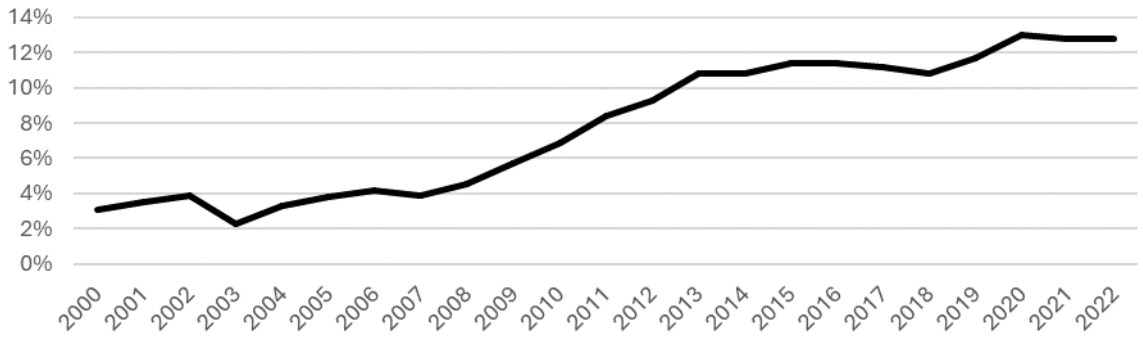
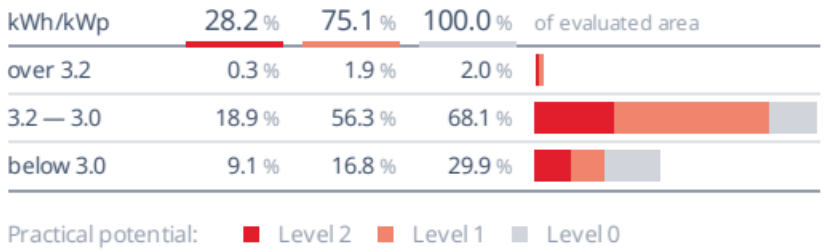


Figure 10 - Share of renewables in electricity production, Czechia.

RE potential

Czechia has abundant potential in renewable energy sources. The average theoretical potential (for solar energy is 3.081 kWh/m^2. The distribution of PV power output is displayed in Figure 11 below.



[33] (IEA, 2022), Energy mix Czechia
[34] (United States of America Department of Commerce, 2023), International Trade Administration
[35] (IEA, 2022), Sources of electricity generation Czechia
[36] (IEA, 2022), Czech Republic - Renewables - IEA

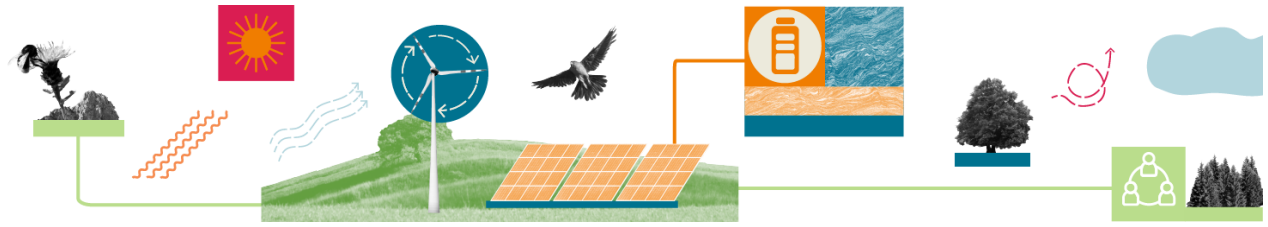


Figure 11 - Distribution of photovoltaic power output. Source: Czechia country factsheet. Global Solar Atlas, World Bank Group, 2024[37]

Regarding its wind energy potential, Czechia has a mean power density (MPD) ranging between 289 W/m^2 and 613 W/m^2. The 10% windiest areas have a MPD of 486 W/m^2 and an average wind speed of 7.24 m/s.[38]

The NECP emphasizes the development of these resources to diversify the energy mix. Additionally, there is substantial potential for improving energy efficiency across sectors such as buildings, industry and transport.[39]

RE targets

In order to pursue the electrification path, it is necessary to focus first on greening electricity generation, particularly through the development of photovoltaic power plants and of wind energy. As for other EU countries, a mayor bottleneck lies in the planning and permitting process, which Czechia is working to simplify and accelerate in line with the requirements of the RED and Repower EU. Czechia aims to have 10.1 GW of photovoltaic generation connected to the grid by 2030, as well as 1.5 GW of wind farms.[39]

Table 4 - Share of different fuels in electricity production provides the share of different fuels in electricity production in 2016 and the target for 2040. The data shows a significant decrease in the use of coal and other solid non-renewable fuels and an increase in both nuclear and renewable energy sources.[39]

Table 4 - Share of different fuels in electricity production

	Share in 2022[40]	Target for 2040[41]
Coal and other solid non-renewable fuels	44%	11-21%
Nuclear	37%	46-58%
Natural gas	5%	5-15%
Renewable and secondary energy sources	14%	18-25%

Spatial planning for renewable energy production

Legal framework

Act No. 416/2009 Coll. (LZ)[42] is the key planning law in Czechia, dealing with provisions related to the construction of transport, water, energy and electronic communications infrastructure. Since the new amendments, effective from 1 January 2024, the law is now called the "*Act on accelerating the*

[37] Available at: https://globalsolaratlas.info/global-pv-potential-study
[38] Data at 100m height. Source: Global Wind Atlas, Czech Republic: https://globalwindatlas.info/en/area/Czechia
[39] Czech Republic (2023), Update of the Czech National Plan of the Republics in the field of energy and climate
[40] IEA (2022), Sources of electricity generation Czechia
[41] Czech Republic (2023), Update of the Czech National Plan of the Republics in the field of energy and climate
[42] zakonyprolidi.cz (2009) **Act** No. 416/2009 Coll. **(LZ)**

construction of strategically important infrastructure", and introduces important changes for energy infrastructure planning[43]:

- Adjusted jurisdiction for energy infrastructure projects of common interest, now under the Transport and Energy Building Authority.
- decisions and compensation for expropriation of areas for energy infrastructure, including the inadmissibility of appeals
- The issuance of the environmental opinion is now the exclusive competence of the Transport and Energy Building Authority for strategically important infrastructure[44]

This follows a number of other actions to facilitate the permitting procedures for the development and operation of new renewable energy sources promoted by the Czech government. In 2023, an amendment to the Czech Energy Act and the Czech Construction Act, nicknamed Lex RES I., became effective, bringing set of changes to the RES permitting procedures in Czechia. These include: [45]

- No electricity generation licence is required for sources up to 50 kW.
- Planning permit is not required for stand-alone RES installations up to 50 kW (some exceptions provided).
- Building permit is not required for on-site RES installations up to 50 kW (some exceptions provided).
- Renewable energy plants with an installed capacity of over 1 MW are declared by law to be established and operated in the public interest resulting in the simplification of certain permitting procedures.
- Power plants will be considered part of the technical infrastructure, which again will simplify the development process.

On the other hand, the government is taking steps to effectively ban the development of new RES installations on the best quality agricultural land, which in Czech terms represents the first and second protection classes according to the soil ecological classification. A more flexible regime should apply to agrivoltaics projects, allowing use of land for both agriculture and for photovoltaic installations.

Spatial development policy of the Czech Republic

The Spatial Development Policy of the Czech Republic (PÚR ČR)[46] is a national spatial planning tool, which serves mainly for the coordination of spatial development at the national level and for the coordination of spatial planning activities, especially at regional level. Its main purpose is to coordinate the territorial planning activities of the regions and/or municipalities and sectoral policies, strategies and documents with a territorial component. The document also sets out regional planning priorities and defines development plans (areas and corridors) of transport and technical

[43] Zi+ (2024) Liniový zákon pod přívalem změn
[44] Podnikatel.cz (2024) Zákon o urychlení výstavby dopravní infrastruktury (úplné znění)
[45] CMS Law, Expert guide to renewable energy
[46] Ministry of Regional Development (2024) POLITIKA ÚZEMNÍHO ROZVOJE České republiky (Úplné znění závazné od 1. 3. 2024)

infrastructure of national and international interest[47]. Energy infrastructure is included among other key infrastructure, such as transport and communications.

The implementation of the PÚR ČR is supported by the Consultative Committee, an advisory body established in 2004 which involves several Ministries and key national institutions, as well as representatives of regional authorities and representatives of the Czech Chamber of Architects. The key tasks of the Committee include:

- ensuring the cooperation of ministries and other central administrative offices and regions in the preparation of the Spatial Development Policy of the Czech Republic, or its updating, and when providing relevant documents;
- reviewing and discussing submitted materials;
- discussion of mutual territorial ties and impacts on the territory;
- preparation of proposals for solutions to identified problems to be submitted to the Coordination Committee for the preparation of the Spatial Development Policy of the Czech Republic

Another key component of the legislative framework is the Regional Development Strategy of the Czech Republic 2021+[48,49], which defines different types of territory based on their potential and specific needs, identifying thematic areas in which a territory-specific approach to development is needed or desirable. The document aims to set out a strategy to improve the coordination of strategic and spatial planning. In the strategy, energy planning is recognised as a key responsibility of regional and local administrations.

RAA process

In April 2024, with Government Resolution No. 272 (hereafter, Resolution 272),[50] the Czech government has approved the act that sets the formal process for defining RAAs[51, 52]. The document establishes that industrial areas, so-called brownfields, or on the sites of former mines should be prioritized for the localization of RAAs. On the contrary, RAAs will be prohibited in the territory of the Natura 2000 network, in national parks and in protected landscape areas classified as *first* and *second* class of protection. Aviation fields or areas critical for national defence will be assessed on a case-by-case basis.

Resolution 272 also sets a limit of 12 months for the permitting process in the designated areas, less than 6 months for equipment up to 150kW (the maximum limit outside RAAs is 2 years)[53], in line with the RED.

However, the RAA identification and setting process started already in early 2023 (under the so-called go-to areas identification process), and it is now progressing under the leadership of the Ministry of

[47] European Commission (2023) NECP Czechia
[48] Ministry of Regional Development (2021) REGIONAL DEVELOPMENT STRATEGY OF THE CZECH REPUBLIC 2021+
[49] Ministry of Regional Development (2021) Regional Development Strategy of the Czech Republic 2021+
[50] https://www.odok.cz/portal/zvlady/usneseni/2024/272/
[51] Results of the government meeting on 24 April 2024 | Government of the Czech Republic
[52] REM Space Vláda schválila postup pro akcelerační zóny obnovitelných zdrojů energie and
[53] TBZ info (2024) Akcelerační zóny usnadní rozvoj obnovitelných zdrojů energie

Industry and Trade, and will involve close cooperation with the Ministry of the Environment, the Ministry of Regional Development and with regional and municipal authorities.

Mapping

One of the first steps taken by the Czech authorities has been on mapping. To start the process, in 2023 the Minister of the Environment launched a *Hackathon - Areas for renewable resources (go-to zones)*[54], to invite citizens and stakeholders to contribute to the process of identifying potential suitable areas. The event was split into 4 sessions (where to place solar and wind installations, how to adapt the planning process and land ownership, how to communicate the plan, how to adapt it to your region).

A first version of the map, a map of "go-to zones", was defined in early 2023. This identified suitable locations for the construction primarily of wind power plants and photovoltaics. With the collaboration of the Ministry of Industry and Trade, the map is now being refined using a multicriteria and multi-step approach. The data for measuring the additional criteria was collected from several institutions, such as environmental agencies, airways operators, the military etc., and overlaid to the initial map via GIS coordinates. The process was iterative and took several stages before its current form which includes over 60 layers[55] of restrictions, such as protected areas, sensitive infrastructure, transport infrastructures, buffer areas and so on, aligning with the new Resolution 272 restrictions. Once these exclusions areas are overlaid to the map of potentially viable areas for RES development initially identified, only 2-4% of the Czech territory appears to be suitable for RAAs area. A particularly complicated step involved negotiations between the Ministry of Environment and the Ministry of Defence, as a significant portion of Czech land is reserved or considered sensitive for military purposes. Although the details of these negotiations have not been made public, some areas previously reserved for military reasons have been freed up for RES development, albeit with some possible restrictions.

Early in 2024, a completely revised map that took all those factors into account was circulated with the stakeholders currently involved in the process.

Resolution 272

The abovementioned Resolution 272[56] (*Determination of the basic procedure for defining the areas necessary for Czechia's contribution to the overall EU target for renewable energy sources by 2030 and areas for the accelerated deployment of renewable energy sources*) refers directly to RAAs, and recognises the need for close cooperation among different state actors (*state and local government authorities under the leadership of the Ministry of Industry and Trade in cooperation with the Ministry of the Environment and the Ministry of Regional Development*).

The basic procedure is specified in Part III of material n. 299/24 (currently unpublished), and requires the submission of a proposal to update the Spatial Development Policy of the Czech Republic accordingly. Recognising the urgency of the matter (urgent public interest), Resolution 272 also shortened the deadline for different steps of the process to update the Spatial Development Policy.

[54] Ministry of the Environment (2023) Hackathon - Oblasti pro obnovitelné zdroje (go-to zóny)
[55] TBZ.info (2024) Acceleration areas will facilitate the development of renewable energy sources
[56] ODok Portal - Resolution 272/2024

Similarly, Resolution 272 requires:

- the Deputy Prime Minister for Digitization and the Minister for Regional Development to prepare and submit to the government by December 31, 2024 a proposal to update the Spatial Development Policy of the Czech Republic".
- the Minister of Industry and Trade in cooperation with the Deputy Prime Minister for Digitization and the Minister for Regional Development and the Minister of the Environment submit to the government an initiative to change the territorial development plan by 31 December 2025.
- the Minister of Industry and Trade, in cooperation with the Minister of the Environment and the Deputy Prime Minister for Digitization and the Minister for Regional Development, to prepare and submit to the government by October 30, 2024, an evaluation of the possible demarcation of areas for the development of energy production plants from other types of renewable energy sources not included in the main procedure 299/24 and a proposal to simplify the permitting processes for these power plants, their connection to the distribution or transmission system and any equipment for energy storage at the site of the power plants.
- The cooperation of all the above-mentioned ministries and other parties aimed at establishing the total area required to meet the renewable targets (Article 15b Directive 2023/2413) and the area destined to the accelerated deployment – RAAs - (article 15c Directive 2023/2413).

As mentioned, the resolution, in line with the RED, also sets a limit of 12 months for the permitting process in the designated areas, and reduces this to less than 6 months for equipment up to 150kW (the term maximum limit outside RAAs is 2 years).

However, the document outlining the procedure itself is not yet public, not even in draft form. It has been discussed among a restricted group of institutional actors and professionals, to ensure its content is fit for purpose and does not contain elements that may elicit a strong public opposition. The formal institutional consultation process is carried out via an inter-ministerial committee, which met in spring 2023 and will continue to meet in 2024 to gather inputs from governmental and private-sector stakeholders (such as business associations), but not from the general public, which instead will be involved via official public consultations. Official consultations should be held later in the course of 2024, so that all institutions, and interest groups will be able to have a say. At the same time, regional authorities are discussing with the Ministry of Environment and the Ministry for Regional Development their specific role in implementing the process. While regions are keen to keep their planning rights, RAA planning may be a double-edged sword for them, as their voters may not agree with the decision. Therefore, the Czech government is currently considering a time-limit on the process led by regions: if these fail to identify suitable areas by the deadline the central government will take over and identify these areas at national level.

Such an elaborate process is necessary because the definition of RAA in Czechia is a contentious issue, and the planning is formally under the responsibility of the 14 regional authorities – which require strong institutional coordination and a careful communication plan.

De-centralised approach to RAA designation: the case of France

France adopted Law n. 2023-175 of 10 March 2023 for RE acceleration (ApER) which entrusts the designation of RAAs to municipalities. The latter will have to ensure that the identified areas are compatible with specific territorial constraints and priorities, and match the renewable energy potential of the territory. On the other hand, since data availability is a crucial condition for successful RAA designation – with particular regard to the data needed to map exclusion areas - the central government prepared and made available a GIS platform where municipalities can find data on the energy potential and current production, exclusion areas, and other useful information. On the same platform, municipalities can identify the RAAs to be designated in their territory and ask for technical support and clarifications.

In cases where a de-centralised approach to RAA designation is implemented, support tools such as the French GIS platform are considered a good practice to avoid fragmentation of the legal

Update to the Spatial Development Policy

The new process, including the responsibilities for regional authorities, will be enshrined in law into an update to the Spatial Development Policy, which will have to be approved by the end of 2024 (as required by resolution 272). While the law-making process is still open, and consultations are still ongoing, it is likely that the new law will:

- Task regional authorities to prepare the RAA plans, with the involvement of urban planners and local stakeholders. These plans will then have to be approved by the Regional Parliaments.
- Require regional authorities to carry out an SEA process, including defining the mitigating measures. The regional authorities will need to propose mitigation measures that might be necessary to mitigate the impacts of solar or wind plants in these areas.
- Require the Ministry of Environment to assist regional authorities in the process by, for example by providing financial and technical support, including in aspects such as mapping and data availability.
- Include a provision that will require the central government to override the Regions if these are not able to complete the local planning process within the deadline. Although no official deadline has been set yet, the Ministry of Regional Development has to present the whole national spatial plan by end of 2025. If Regional Plans are not ready by that time, a national plan will set out the RAAs for those Regions that have failed to identify them.

Summary of best practices

The process to identify RAA in Czechia is progressing, but a rather slow pace. This is because the Czech government is trying to manage a series of challenges, in particular:

- Contentiousness: RAAs and RES planning and approval is attracting public opposition, mostly on the ground of environmental and landscape protection.

- Devolution: the 14 regional authorities are formally responsible for the identification of RAAs as part of their planning powers, but the political will to do so is limited.
- Several institutional stakeholders: large numbers of ministries and national and regional institutions are to be involved in the process, as well as a many private sector lobbying, NGOs and other representation groups.

Based on these challenges and on the description of the progress presented in the previous sections, the following best practices can be identified for Czechia:

1. Planning for energy infrastructure as part of wider planning process. The planning framework of Czechia encompasses all nationally significant infrastructure, including sectors such as transport and telecommunications, which allows to exploit synergies and proven processes for energy planning on a national scale. As part of this framework, Czechia has an established consultive group, which is taking an important role in facilitating and speeding up the involvement of key institutional stakeholders for the RAA process.
2. Set key responsibilities, processes and deadlines at the national level. A recently approved Resolution of the Government assigns responsibilities to various ministries, and set a deadline for the approval of the process that will guide Regions in identifying RAAs. This clarity is particularly important when the legal framework allocates significant planning powers to local administrations and decentralised bodies.
3. Streamline mapping and complete the mapping process early. While the planning responsibility is with regional authorities, central authorities have already completed the mapping process for suitable areas across the country in high detail, involving a significant number of stakeholders in the process. This means that regional planning authorities have a clear starting point for identifying the suitable areas, which would speed up significantly their adoption process. This is rather similar to the approach adopted by Portugal, where the mapping process was iterative and involved key institutional actors in providing data.
4. Communication strategy and communication management. Given the high political sensitivity of the process, Czech authorities are carefully managing the amount of information that is shared with the wider public. While is not possible to evaluate whether the amount of information shared to date by the Czech authorities is appropriate, it is certainly a good practice to actively manage citizens' responses by ensuring that the proposal for identifying RAAs is sufficiently mature but can still benefit from stakeholders' inputs. For example, in the Portuguese case, the public was engaged as soon as the draft scenarios of suitable locations for RAAs were ready.

6. Conclusion and recommendations

The experiences of Portugal, Croatia, and Czechia in localizing RAAs offer valuable lessons and best practices that can guide other countries in similar endeavours.

1. *Establish inter-institutional collaboration*

A significant takeaway from Portugal's approach is the formation of an inter-institutional working group for mapping exercises. This group was able to harness diverse competences and data from various public administration sectors, thereby efficiently using the available knowledge to develop comprehensive sensitivity analysis. When the country implements a decentralized approach for RAAs designation, ensuring collaborative efforts between different levels of government and public administration is also crucial. For example, an interactive GIS platform with nation-wide relevant data available to lower administrative levels can significantly enhance the effectiveness of mapping and planning. A similar process has been adopted successfully in Czechia, where a detailed map has been produced and made available to local authorities in charge of carrying out the subsequent steps of the identification process.

2. *Identify and manage controversial areas*

During the mapping process, it is essential to identify areas where the intensive deployment of renewable energy production might conflict with other uses or interests. Portugal's strategy of pinpointing "controversial" areas", e.g. those with high landscape or cultural value, or those where impacts are uncertain, helps foresee and mitigate potential conflicts. Early identification allows these areas to be given low priority or excluded from RAAs, reducing the likelihood of controversies and facilitating smoother implementation.

3. *Develop and use decision-making tools*

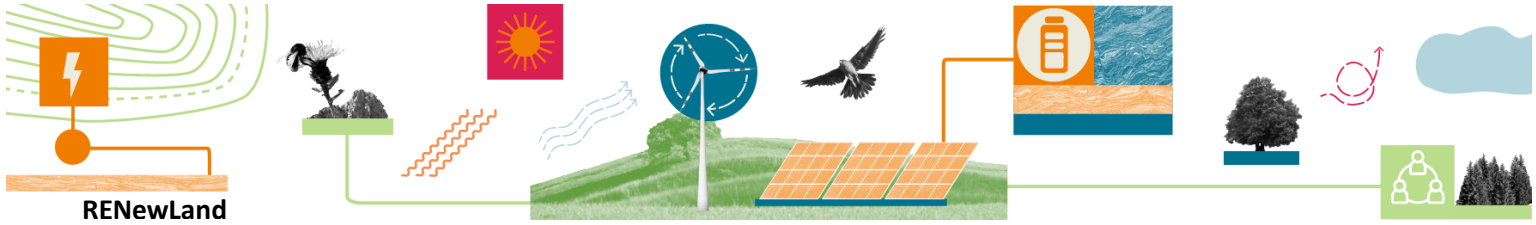
Croatia's successful use of Multi-Criteria Analysis (MCA) in Zadar County and Portugal's scenario approach underscore the value of established decision-making tools. These tools can help resolve local conflicts and balance competing land uses by providing a structured approach to evaluate and/or rank potential areas for renewable energy projects, and provide a clearer understanding of land availability and the potential trade-offs involved in excluding sensitive areas.

4. *Public and stakeholder engagement*

Involving stakeholders and engaging the public early in the planning stages of RAAs – i.e. before the public participation requested under the SEA and Habitats Directives – can significantly enhance the process. Early engagement allows for the identification of potential issues during the plan development phase, enabling timely adjustments and reducing the risk of higher administrative costs later on. This approach also helps to minimize the likelihood of legal disputes that could challenge the final plans. By consulting stakeholders from the beginning, planners gain a more comprehensive understanding of various concerns and perspectives, fostering a collaborative approach to addressing challenges., early stakeholder engagement is crucial for effective data gathering. Environmental data, often held by NGOs and research institutions, are essential for RAA planning. Collaboration with these entities also provides access to valuable datasets, facilitating the creation of detailed sensitivity maps and a thorough understanding of key environmental issues.

5. *Legal and institutional clarity*

Setting clear legal responsibilities within the public administration, as well as clear deadlines, streamlines planning processes, making them more efficient and reducing potential delays. In case of decentralized designation processes, it is advisable that central authorities provide support and oversight to regional and/or local entities to ensure uniformity and compliance of the regulation across the national territory and alignment with national goals.



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