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Guidance on designating renewables acceleration areas

Accompanying the document

Commission Recommendation

on speeding up permit-granting procedures for renewable energy and related infrastructure projects

{C(2024) 2660 final} - {SWD(2024) 124 final}

Guidance on designating renewables acceleration areas

1. Introduction

The revised Renewable Energy Directive (RED)[1] sets a binding target for renewable energy of 42.5% of the EU's gross final energy consumption, with the aspiration to reach 45% by 2030. This requires doubling the EU's renewable energy share by 2030 in the energy mix compared to the 2022[2] level of 23%, and a sharp increase of the share of renewable energy sources (RES) in the electricity mix[3]. As a result, between 2020 and 2030, the installed wind and solar power generation capacity is also projected to double, to 510 GW and 592 GW, respectively[4].

Lengthy and complex administrative permit-granting procedures are among the key barriers to investment in renewable energy projects and their related infrastructure. Tackling the permitting-related bottlenecks directly supports competitiveness, by enabling investments to be made more quickly, giving industry visibility of a more robust project pipeline and facilitating the planning of future investments. The additional renewable energy capacities needed to meet the 2030 target will have implications for the ability of authorities to process project permits at the required speed and therefore require adequate staffing of permitting authorities but also adapting the permitting rules to the new reality. Furthermore, meeting the renewable energy target will have significant implications for spatial requirements on land and at sea.

These challenges highlight the importance of coordinated future-oriented spatial planning in order to ensure adequate space for renewable energy installations, while recognising other legitimate societal and enviromental needs as well as compliance with other legislation. For example, installing wind or solar installations at or near industrial sites or along transport corridors, and installing photovoltaics (PV) or thermal solar on rooftops and other artificial structures (i.e. car parking roofs), can help reaching the renewable energy targets while minimising the need for additional space[5]. According to some estimates, such solar installations could have the potential to generate up to a quarter of the EU's current electricity consumption[6], which points to the need for new renewable energy capacities beyond rooftops to meet the 2030 renewable energy target. In addition, hybridisation of projects (by combining different renewable energy technologies) and multiple use of land and sea (combining electricity production with other activities) can have a positive impact in this regard by reducing the need for space, alleviating grid-related constraints and helping to increase public acceptance of renewable energy projects. As part of the REPowerEU Plan[7], the European Commission has taken legislative and non-legislative action to speed up and streamline permitting procedures for

[1] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328 21.12.2018, p. 82), as amended by Directive (EU) 2023/2413 (OJ L, 2023/2413, 31.10.2023).

[2] https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20231222-2

[3] From 41% in 2022 to 69% in 2030.

[4] Commission staff working document implementing the REPowerEU action plan: investment needs, hydrogen accelerator and achieving the bio-methane targets, accompaying the document Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, REPowerEU Plan, SWD(2022)230 final.

[5] The Energy Performance of Building Directive introduces a solar mandate which will ensure the deployment of suitable solar energy installations in certain categories of buildings.

[6] Bódis, K., Kougias, I., Jäger-Waldau, A., Taylor, N., Szabó, S., 'A high-resolution geospatial assessment of the rooftop solar photovoltaic potential in the European Union', *Renewable and Sustainable Energy Reviews*, 114, art. no. 109309, 2019.

[7] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, *REPowerEU Plan*, COM(2022)230 final.

renewables across the EU in order to support accelerated deployment of this type of energy while maintaining a strategic vision on possible environmental impacts.

The revised RED[8] addresses the permitting bottleneck in a comprehensive manner (Articles 15b-16f), including through better planning as well as shortening and simplification of procedures. The Directive requires the competent authorities of Member States to promote multiple uses of space to minimise potential land or sea use conflicts and to designate renewables acceleration areas (RAAs) for at least one renewable energy technology by 21 February 2026. RAAs are areas where the deployment of renewable energy projects of a specific technology is not expected to have significant environmental impacts.

The European Wind Power Action Plan[9] adopted in October 2023 pointed to the need to accelerate deployment of renewable energy projects through increased predictability and faster permitting. This can be achieved, among other things, by faster implementation of the new regulatory framework on permitting, in particular the revised RED. In order to speed up the transposition and implementation of the revised RED, the European Wind Power Action Plan announced the launch of the 'Accele-RES' initiative, which includes issuing guidance to support Member States in designating RAAs.

Given the novelty of the concept of RAAs, the different starting points of Member States and the time-consuming and complex processes which the designation of RAAs could entail, practical guidance is deemed necessary to ensure that the implementation of this provision takes place in a timely manner, is effective and contributes to a more rapid roll-out of renewable energy while minimising environmental impacts.

This guidance accompanies the Commission Recommendation on speeding up permit-granting procedures for renewable energy and related infrastructure projects[10]. Its objective is to provide Member States with non-binding practical considerations, good practice examples and an overview of possible mapping, planning and digital tools that can support the designation of RAAs, which Member States must carry out pursuant to Article 15c of the Renewable Energy Directive. It may not under any circumstances be taken as interpreting the provisions of the Renewable Energy Directive. The focus of this guidance is on ground-mounted solar and on onshore and offshore wind projects, given their expected significant share in the installed power generation capacity by 2030, and the key role of these technologies in achieving the EU's 2030 renewable energy targets.

2. New mapping obligations under the revised RED: main differences between Articles 15b and 15c

The revised RED highlights the importance of thorough mapping and spatial planning for renewable energy projects by introducing new mapping obligations for Member States in Articles 15b and 15c.

Article 15b requires Member States to translate their national contributions towards the revised EU renewable energy target into the areas that are required for the renewable energy projects needed to achieve those targets. Member States must carry out this mapping by 21 May 2025. This mapping

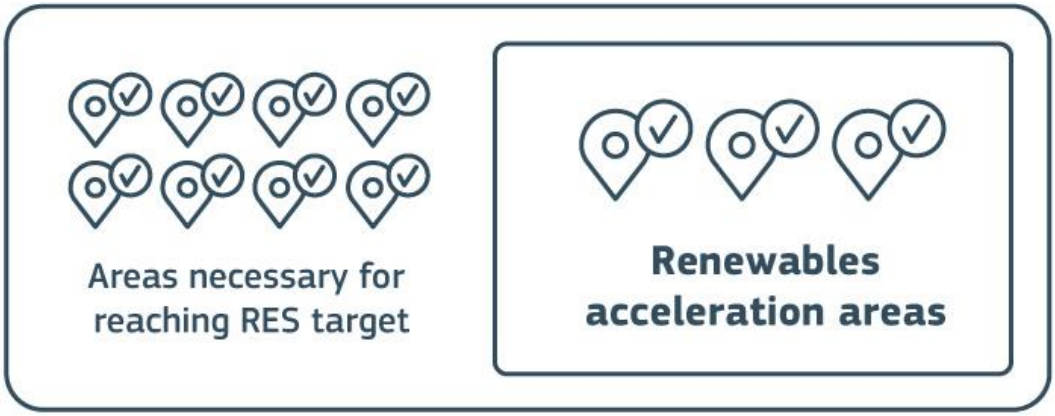
[8] Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (OJ L, 2023/2413, 31.10.2023).

[9] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *European Wind Power Action Plan*, COM(2023)669 final.

[10] Commission Recommendation on speeding up permit-granting procedures for renewable energy and related infrastructure projects, C(2024) 2660.

aims to identify areas with good renewable energy potential while seeking to promote multiple uses of space and precedes the subsequent identification of RAAs. Section 3 provides more details about the mapping obligation under Article 15b.

Article 15c introduces a more targeted obligation to designate specific areas as RAAs. Taking as a starting point the areas identified under Article 15b, Member States must identify within their boundaries, areas that can be designated as RAAs for at least one renewable energy technology. RAAs should be areas on land, sea or inland waters that are particularly suitable for the installation of renewable energy plants on the basis that the deployment of these installations is not expected to have significant environmental impacts. The competent authorities of Member States must designate RAAs by 21 February 2026. Section 4 provides more details about the steps for the designation of RAAs.



3. Article 15b and mapping the potential for renewable energy production

Article 15b of the revised RED requires Member States to carry out a coordinated mapping exercise of their territory to identify the land, surface, sub-surface and sea or inland water areas necessary for the installation of renewable energy plants and related infrastructure needed to meet at least their national contributions towards the revised EU renewable energy target for 2030 of 42.5% (with an aspiration to reach 45%).

The areas identified under Article 15b, together with the existing renewable energy plants and cooperation mechanisms should be commensurate with the estimated trajectories and total planned installed capacity by renewable energy technology set out in the Member States' national energy and climate plans. This means that, when carrying out this mapping, Member States need to take into account the existing renewable energy capacity installed in their territory and the amount of renewable energy they expect to achieve via cooperation with other Member States (i.e., statistical transfers and other cooperation mechanisms included in the Directive) and, on this basis, assess the additional capacity they need to meet at least their national contributions to the EU target and what this represents in terms of space or territory.

According to the Directive, Member States should also promote multiple uses of the areas they identify to comply with their obligation under Article 15b. Specifically for solar energy, the EU Solar

Energy Strategy[11], adopted in May 2022, announced that the Commission would provide guidance to Member States on promoting innovative forms of solar deployment that either allow for multiple use of space (agri-PV, floating PV, transport infrastructure PV) or are integrated with other products (building-integrated PV and vehicle-integrated PV). The topic of multiple uses of space will therefore be addressed in more detail in the dedicated guidance.

For this first mapping obligation, Member States must consider the criteria laid down in Article 15b. In particular, Member States must take into account: (i) the potential for renewable energy production in the different land surface, sub-surface, sea or inland water areas (i.e. they must identify which areas have more potential for the installation of renewable energy projects of a specific technology); (ii) the projected demand for energy, taking into account demand response flexibility, expected efficiency gains and energy system integration, and (iii) the availability of relevant energy infrastructure, including grids, storage and other flexibility tools or the potential to create or upgrade such grid infrastructure and storage. The revised RED does not explicitly require Member States to take into account environmental considerations at this stage. Instead, this is a key aspect of the designation of RAAs under Article 15c.

Some areas or regions may have particularly good potential for the deployment of a specific type of renewable energy projects but may be too remote from main energy consumption centres. Similarly, utilisation of the renewable energy resource potential may require substantial reinforcement of the grid infrastructure to integrate the renewable energy production into the electricity system, or such infrastructure may be lacking altogether. These situations would require an assessment on whether renewable energy can be deployed in these areas or regions in a timely and economically viable manner so as to be part of the national contributions towards the revised EU renewable energy target for 2030. The EU Action Plan for Grids[12] has identified several cross-cutting actions for accelerating the pace of grid development in Europe, which include enhancing long-term network planning and ensuring faster permitting processes.

Digital tools to identify sites with good potential for renewable energy production

Digital tools, in particular geospatial information system (GIS) technology, are being regularly used in the selection of sites with the highest renewable energy potential. Such tools can play a key role to fulfil the mapping obligation in Article 15b.

[11] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, *EU Solar Energy Strategy*, COM(2022) 221 final, 18.5.2022.

[12] Communication from the Commission to the European parliament, the Council, the European Economic and social committee and the Committee of the regions, *Grids, the missing link - An EU Action Plan for Grids*, COM(2023)757 final.

GIS and associated modelling approaches offer the potential to spatially outline areas that are suitable for the deployment of renewable energy plants, using a wide range of physical, technical, legal, economic and social criteria, including those related to energy demand and infrastructure availability. Spatial decision support systems also offer the opportunity to compare various scenarios and criteria weightings.

The Commission's Joint Research Centre (JRC) has developed the Photovoltaic Geographical Information System (PVGIS) tool[13], which provides information about solar radiation and PV system performance for any location in Europe. The Global Wind Atlas (GWA)[14] is a web-based application that can be used to identify areas with high potential for wind power generation. The New European Wind Atlas[15] complements the GWA and in particular offers offshore wind data where gaps exist in the GWA.

The Energy and Industry Geography Lab[16] is the Commission's tool to support infrastructure planning for the energy transition. It brings together a wealth of geospatial information on energy, including datasets on the renewable energy potential at NUTS2 level[17], industry and environmental factors. Work will continue in 2024 to include in the Energy and Industry Geography Lab additional data layers that can support Member States in carrying out the mapping requirements of Article 15b, including a new high-resolution dataset of the potential for wind and solar.

According to the Directive, the mapping should be a coordinated exercise involving all relevant national, regional and local authorities and entities, including network operators, where appropriate. Involvement of the public in this exercise to identify the territorial needs for renewable energy projects would enhance debate and acceptance of the renewable energy projects and allow local communities to play an active role at an early stage.

The involvement of network operators can provide indications as to the infrastructure needs to integrate a much higher share of renewable energy into the system and enable Member States to plan accordingly. Proactive involvement of local or regional authorities in charge of mapping or spatial planning in close coordination with system operators including at the distribution level can play a crucial role in ensuring successful mapping and identification of areas. Access to relevant data by system operators could support the mapping and identification of the most appropriate areas to deliver on the national renewable energy objectives.

Article 15b allows Member States to use or build upon their existing spatial planning documents or plans, including maritime spatial plans set up in accordance with the Maritime Spatial Planning Directive[18]. This allows Member States to leverage existing work to avoid duplication and incurring additional administrative burden. For instance, the Maritime Spatial Planning Directive puts in place a framework for the development and implementation of maritime spatial planning, to promote

[13] https://joint-research-centre.ec.europa.eu/photovoltaic-geographical-information-system-pvgis_en

[14] https://globalwindatlas.info/en

[15] https://map.neweuropeanwindatlas.eu/

[16] https://joint-research-centre.ec.europa.eu/scientific-tools-databases/energy-and-industry-geography-lab_en

[17] ENSPERSO 2.0, https://data.jrc.ec.europa.eu/collection/id-00138

[18] Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning (OJ L 257, 28.8.2014, p. 135).

coexistence of uses of the maritime space for various purposes, including renewable energy generation, and where applicable, the appropriate apportionment of the uses and activities. This Directive requires the Member States to draw up maritime spatial plans, comprising relevant existing and future activities and uses in their marine waters, and submit them to the Commission by March 2021. Full implementation of this obligation is necessary for sustainable deployment of offshore wind energy. Member States around the North Sea basin, and increasingly around the Baltic Sea and in the Atlantic, have included substantial dedicated areas for offshore wind projects in their maritime spatial plans. Most of these Member States are revising their plans to accommodate the recent very large increases in their offshore wind targets in the medium and long-term and to define additional areas for offshore wind. When it comes to emerging sea basins, maritime spatial plans are in place or are being prepared, and the identification of areas for offshore wind is ongoing. In the framework of the North Seas Energy Cooperation (NSEC) and of the Baltic Energy Market Interconnection Plan (BEMIP) High-Level Groups, Member States concerned have published the schedule for the upcoming tenders up to 2030[19][20].

The revised RED does not prescribe a specific top-down or bottom-up approach for the mapping under Article 15b, so Member States can decide which approach to follow, depending on their administrative set-up.

Germany has set objectives at federal level in terms of surface area required to deploy onshore wind power by 2030 following a top-down approach: by 2026, its 13 larger states must designate on average 1.4% of their surface area for onshore wind power, and by 2032 they must reach their respective target of 1.8-2.2% depending on the targets that have been set based in particular on the analysis of the wind conditions and the size of their nature protection areas. To this end, the states must carry out their own planning, guided by a set of uniform rules and modelling issued by the federal government[21].

Similarly, other regions have started evaluating the space requirements of their renewable energy objectives. For instance, the autonomous region of Catalonia in **Spain** has assessed that the additional capacities of wind and solar photovoltaic projects to be deployed in its territory will require an extension of about 800 km2, which represents 2.5% of the territory of Catalonia[22].

4. Article 15c and designating RAAs where the deployment of renewable energy projects is not expected to have a significant environmental impact

The main objective of Article 15c is to identify and designate specific areas on land, sea or inland waters that are particularly suitable for the installation of renewable energy plants for the accelerated deployment of at least one renewable energy technology, where:

[19] NSEC tender planning, https://energy.ec.europa.eu/system/files/2023-11/231117%20NSEC%20tender%20planning%20-%20November%202023_0.pdf

[20] BEMIP tender planning, https://energy.ec.europa.eu/document/download/8ed69936-1540-4b4d-a64a-168b6b19de3c_en?filename=20231211_BEMIP_offshore_wind_joint_tender_planning_FINAL_DRAFT.pdf

[21] https://www.bundesregierung.de/breg-de/schwerpunkte/klimaschutz/onshore-wind-energy-act-2060954

[22] Prospectiva energètica de Catalunya 2050, https://icaen.gencat.cat/web/.content/10_ICAEN/17_publicacions_informes/PROENCAT/20230512_Proencat-2050_web_Acc.pdf

i. the deployment of the specific renewable energy technology is not expected to have a significant environmental impact, in view of the particularities of the selected area and,
ii. consequently, renewable energy projects located in these areas can benefit from the shorter permitting procedures of Article 16a. Projects in RAAs can benefit in particular from an exemption, under certain conditions, from the requirement to carry out environmental assessments under the Environmental Impact Assessment Directive[23] and Habitats Directive,[24] which are replaced by a shorter screening procedure.

In order to ensure a swift and timely designation of RAAs, Member States may build on their existing planning and mapping documents in case they have already started to identify or identified specific areas for faster deployment of renewable energy projects. It is particularly important to stress that RAAs are only a part of the areas where renewable energy projects can be deployed. Their designation does not prevent the ongoing and future installation of renewable energy projects in all other areas that may be available for renewable energy deployment, including areas that may be unsuitable or excluded from the designation of RAAs. RAAs are thus only a sub-set of all the possible areas where renewable energy projects can be developed under different (faster and simpler) permitting rules, and their size may vary, depending on the technology and the characteristics of Member States' land and sea territories. For this reason, the designation of RAAs should not lead to the creation of 'no-go areas' for renewable energy projects: while some areas should not be considered or designated as RAAs, renewable energy projects may still be installed in those areas if they receive a permit subject to the relevant requirements[25].

In addition to the environmental considerations related to the identification of RAAs, broader spatial planning elements and the regulatory landscape are also relevant considerations in the site selection process. The RES Simplify[26] interim report analysed the entire permit-granting process for renewable energy projects in the EU, with site selection as the first step before acquiring any permits. The findings identified additional site selection-related challenges other than environmental considerations, such as the lack of available sites, which in many cases is due to conflicts with the existing land uses, or disproportionately strict minimum distance requirements to housing, which in some cases can make most of the territory of a country inaccessible for installing renewable energy plants. Therefore, finding out if any legal obstacles or restrictions exist for installing the planned renewable energy technology in the chosen type of area (for example, a general prohibition to install renewable energy plants along transport corridors) is one of the first steps in the broader area selection process. Carrying out this analysis at an early stage allows time for any potential amendments to laws or regulations, where these may be necessary.

Moreover, the provisionally agreed Net-Zero Industry Act invites Member States to designate Net-Zero Acceleration Valleys to foster net-zero industrial activity clusters and streamline their

[23] Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, OJ L 124, 25.4.2014, p. 1–18.
[24] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, OJ L 206, 22.7.1992, p. 7–50.
[25] The permitting rules included in Article 16b of the revised RED apply to these projects.
[26] *Technical support for RES policy development and implementation - Simplification of permission and administrative procedures for RES installations (RES Simplify) - Interim report.* https://op.europa.eu/en/publication-detail/-/publication/0e9db9fa-d653-11ec-a95f-01aa75ed71a1/language-en

administrative procedures. In this regard, the potential synergies between these two sets of areas can lead to efficiency gains.

a. Main steps for the designation of RAAs under Article 15c

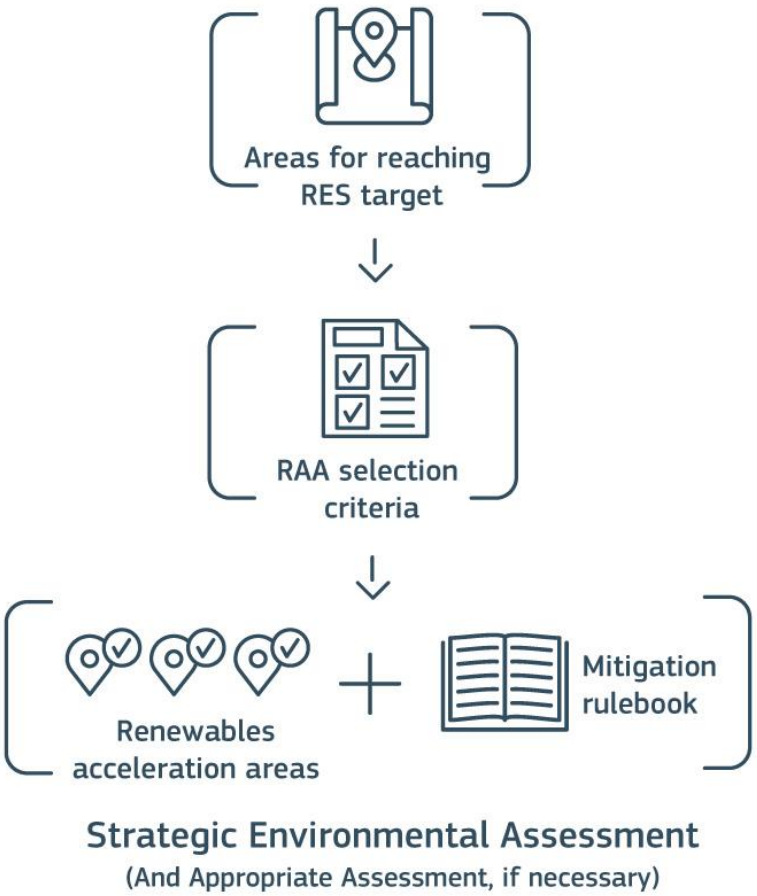
There are two main steps in the process to designate RAAs. The first (step 1) is the preparation of the RAA plan for the specific technology or technologies to be deployed in these areas, including:

- The identification of the RAAs following the requirements laid down in Article 15c(1)(a). In this process, Member States must give priority to specific areas where environmental impacts are expected not to be significant, namely artificial and built surfaces, and exclude certain areas from the designation. In order to identify the areas, Member States should use all appropriate and proportionate tools and datasets at their disposal, including wildlife sensitivity mapping.

- The preparation of a mitigation 'rulebook' consisting of a set of rules on mitigation measures to adopt in the specific area, aimed at avoiding or where not possible significantly reducing the environmental impacts resulting from the installation of projects in those areas. The renewable energy projects located in RAAs that comply with these rules can benefit from the simpler procedures set out in Article 16a, and in particular the exemption from dedicated environmental assessments. The rules included in the mitigation rulebook have to be targeted to the specificities of the area and the renewable energy technology that will be deployed there. More details on the preparation of the mitigation rulebook are covered in Section 6 of this document.

As a second step (step 2), the draft plans for the designation of RAAs need to be made subject to a strategic environmental assessment in accordance with the Strategic Environmental Assessment Directive[27] in all cases. If the plan is likely to have a significant impact on Natura 2000 sites, it is also necessary to carry out an appropriate assessment under Article 6(3) of the Habitats Directive. Member States should ascertain that the RAA plan will not have a significant environmental impact as per Article 15c(1)(a).

[27] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, OJ L 197, 21.7.2001, p. 30–37.



The next sections aim to provide practical considerations on the first aspect of step 1, namely the identification of suitable land and sea areas for the deployment of wind and solar energy projects[28].

b. Identifying the most suitable areas to become RAAs

Following an appropriate site selection process at the strategic planning level for the designation of RAAs for a specific renewable energy technology can be considered the first step to avoid significant environmental effects resulting from the installation and operation of renewable energy projects in these areas – and may even bring benefits for the environment. As such, the designation process can be considered the first mitigation measure to avoid or significantly reduce likely environmental impacts that may arise from the deployment of renewable energy projects.

Article 15c(1)(a)(i) sets out a non-exhaustive list of areas that should be given priority to become RAAs: artificial and built surfaces, such as rooftops and facades of buildings, transport infrastructure and their direct surroundings, parking areas, farms, waste sites, industrial sites, mines, artificial inland water bodies, lakes or reservoirs and, where appropriate, urban waste water treatment sites, as well as degraded land not usable for agriculture. These examples refer to land and inland water

[28] Further considerations on the designation of renewables acceleration areas will be included in the final report *Study on the designation of renewables acceleration areas (RAAs) for onshore and offshore wind and solar photovoltaic energy [forthcoming]*

areas and surfaces; when it comes to sea areas, the Directive does not mention any types of areas in particular that should be prioritised for designating RAAs.

The areas mentioned present a common feature: they are mainly either artificial and built areas, with ongoing economic activities such as transport or industry, or degraded land not usable for agriculture. This is based on the premise that the environmental impacts of renewable energy projects in these areas, regardless of their technology, are expected to be less significant than in other areas. Nevertheless, environmental impacts cannot *a priori* be ruled out in these or any other areas. Appropriate tools and datasets should be used to identify, among these priority areas, those where the deployment of renewable energy projects is not expected to have significant impacts. An overview of possible tools and datasets is provided in Section 4c of this document.

Areas along transport infrastructure

Wind and solar plants can be installed alongside transport infrastructure and its direct surroundings with multiple opportunities and benefits. A JRC study[29] assessed the potential of three PV applications, including vertical bifacial PV, along roads and rails in the EU and concluded that the total technical installed capacity potential amounts to 403 GWp. The installation of solar and wind plants along transport infrastructure may also increase the awareness of the need for renewable energy and contribute to improved public perception, especially where plants are associated with installed charging points for electric vehicles. Areas dedicated to major transport infrastructure are usually highly developed and have a low environmental value, although a case-by-case assessment of each area is necessary. For these areas, safety aspects and regulations are further relevant factors to consider, and in some Member States, regulations specifically prohibit installing renewable energy plants in the proximity of transport infrastructure for safety reasons. Nevertheless, in some cases, these rules may be obsolete and may not take into account the technological advancement of the different renewable energy technologies. Solar panels can also be installed on noise barriers or canopies along motorways or railways, minimising land and environmental constraints. If solar panels are installed on noise barriers, transparent, sound-absorbing material needs to be placed over the panel, to ensure that the noise barriers can carry out their primary function. In laboratory tests, this has caused loss in energy yield, pointing to the need to further improve the material used[30].

The **French** urban planning code used to prohibit the installation of solar PV plants within a 100 metre buffer on either side of motorways and within a 75 metre buffer from other roads classified as major traffic arteries. The 2023 French law on renewable energy acceleration[31] addressed this barrier by amending the urban planning code to introduce a derogation from the ban on construction in buffer areas for solar energy plants.

In **Germany**, the ban to build within 40 metres of motorways has been lifted and instead a 200 metre corridor next to the motorway has been designated as a privileged area for solar PV[32].

[29] Kakoulaki et al., *Communication on the potential of applied PV in the European Union: Rooftops, reservoirs, roads (R3)*, European Commission, Joint Research Centre, 2024, https://doi.org/10.1051/epjpv/2023035

[30] https://www.pv-magazine.com/2021/07/19/testing-field-for-pv-noise-barriers/

[31] Law n. 2023-175 of 10 March 2023 for renewable energy acceleration (ApER)

[32] https://www.klimaschutz-niedersachsen.de/aktuelles/Privilegierung-von-PV-Freiflaechenanlagen-entlang-von-Autobahnen-und-mehrgleisigen-Schienenstrecken-2656

Industrial sites and mines

Mines can also be suitable sites to install solar PV and in some cases, wind energy. The topography of mines often provides the elevation needed for sufficient output and the sites also tend to have the necessary electricity networks and transport infrastructure close by. Designating RAAs in mines or other industrial sites provides further synergies by locating renewable energy generation close to areas with high energy consumption. A recent report estimated that an effective energy management based on renewable energy sources can reduce energy costs by 25% in existing mines and 50% in new ones[33]. However, given the role of mines as potential habitats for bats, mapping sensitivity areas for bats might be particularly relevant when considering designating mines as RAAs.

While former mines can also be used for other purposes, for example, cultural or recreational, multiple examples of solar farms installed in former mines already exist, for example in Belgium, Germany, Hungary, Poland and Slovenia. More are being planned, such as wind and solar projects with a total capacity of close to 7000 MW that are planned to be built in the Lusatia region (Germany) by 2030, primarily on former mining sites[34]. Nevertheless, stability of the site needs to be assessed in particular with a view to constructing appropriate foundations for wind turbines, and the additional analysis and the potential technical adaptations can lead to higher costs compared to a greenfield site. On the other hand, land transaction costs in former mining areas may be lower, due to the relatively few owners compared with greenfield sites[35]. A research project is currently underway to investigate how quickly construction of wind turbines can take place on freshly recultivated areas at former open cast mining sites, given that it can take several years for the soil to settle so that it can be built on[36].

Slovenia's recovery and resilience plan (RRP) includes a reform under which Slovenia will identify priority areas for solar and wind, with priority areas for solar to be identified at car parks, railways, closed landfills and abandoned mines. The reform was implemented with the entry into force of the Act on the Promotion of the Use of Renewable Energy Sources.

Artificial inland water bodies and wastewater treatment sites

Artificial inland water bodies, lakes or reservoirs usually display low value for biodiversity, making them suitable candidates for being designated as RAAs. Among artificial water bodies, concrete irrigation canals present in the rural areas of several Member States are suitable for solar power production. Solar panel coverage of the concrete irrigation channels could also create the additional benefit of reducing water evaporation, in addition to the benefits from energy production. Several solar projects on canals are under development in the EU. For example, the 12MW Canal de Provence floating solar PV plant is currently in the permitting stage and is projected to occupy a total canal surface with a length of 5420 metres in southern France[37]. Once operational, it will generate a total of 19GWh per year. Similar projects are under development in Spain, for example a 160MW

[33] https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Energy-and-Resources/gx-renewables-in-mining-final-report-for-web.pdf
[34] https://www.weforum.org/agenda/2023/06/east-german-mining-belt-green-energy-transition/
[35] *JRC science for policy report – EU coal regions: opportunities and challenges ahead*, 2018, https://publications.jrc.ec.europa.eu/repository/handle/JRC112593
[36] https://www.rwe.com/en/press/rwe-renewables-europe-australia/2023-05-09-wind-power-without-long-wait/
[37] https://www.pv-magazine.com/2022/02/23/frances-provence-canal-to-host-12mw-of-solar/

plant being developed on the Navarra Canal, the country's largest artificial irrigation canal network[38]. When promoting multiple uses of space and allowing energy production in a given area in combination with other uses, the pre-existing uses of that area need to be considered.

Solar PV can be installed at urban wastewater treatment sites, with the added benefit of producing a share of the energy demand of the plants and/or combining the production with the energy production from urban wastewater. Since urban wastewater treatment sites tend to be located in urban or sub-urban areas, installing wind energy in these sites is less suitable than solar energy.

Degraded land not usable for agriculture

Degraded land may become unsuitable for agriculture due to various reasons such as poor soil quality, erosion or contamination. This often occurs in open areas with limited vegetation. Designating these areas as RAAs can enable the use of otherwise unproductive areas while minimising competition for agricultural land use. Areas with degraded land not usable for agriculture may have restoration potential. For these reasons, in some cases, restoration of degraded land can be pursued together with the deployment of renewable energy, enabling the provision of ecosystem services relevant to climate mitigation and adaptation and biodiversity. For example, solar parks can be planned and managed in ways that directly benefit pollinators species by providing foraging, nesting and breeding resources, increasing semi-natural habitat in the landscape and promoting connectivity[39]. When possible, these win-win approaches should be prioritised.

Areas to be excluded from RAA designation based on Article 15c criteria

Article 15c also indicates certain areas that must be excluded from the process of designating RAAs due to their high environmental value (with the exception of artificial and built surfaces located in those areas where synergies with the existing structures and uses of those areas can be harnessed): Natura 2000 sites, areas designated under national protection schemes for nature and biodiversity conservation, major bird and marine mammal migratory routes as well as other areas identified on the basis of sensitivity maps and other appropriate and proportionate tools and datasets.

According to the Directive, when identifying these areas, Member States have to take into account the data available in the context of the development of a coherent Natura 2000 network, as regards both, habitat types and species covered by the Habitats Directive and birds and sites protected under the Birds Directive[40]. Swift completion of the Natura 2000 network could facilitate the timely identification of RAAs by improving the certainty of area classification and data availability.

Information and data on bird migratory routes might be available to project developers and the competent authorities from environmental impact assessments or appropriate assessments carried out in the context of specific past projects. However, granular, local-level data on migratory routes may be scarce and/or maintained outside centralised authorities, for example gathered by research institutions or non-governmental organisations (NGOs). Collaboration between the competent authorities tasked with designating RAAs and other entities that may hold relevant data is key for

[38] https://www.pv-magazine.com/2022/06/07/project-to-deploy-160-mw-solar-array-on-spanish-canal-moves-forward/
[39] Blaydes, H. et al., 'Opportunities to enhance pollinator biodiversity in solar parks', *Renewable and Sustainable Energy Reviews*, Vol. 145, 111065, 2021. https://doi.org/10.1016/j.rser.2021.111065
[40] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7).

identifying potential environmental impacts and areas to be excluded from RAA designation at an early stage and could be achieved by targeted stakeholder consultations (see also Section 7).

A pilot project was carried out in Zadar County in **Croatia**[41], and the methodology developed in the project is feeding into a wider study on potential areas for RAA designation at the national level. In the project, a step-wise approach to sensitivity mapping was implemented. First, areas with legal constraints, such as national parks and strict reserves, were identified. Second, areas that are potentially highly sensitive to the development of wind and solar projects from an environmental perspective were identified. Third, the remaining areas were evaluated against a set of environmental and socio-economic indicators using multi-criteria analysis. The results of this analysis were compared to areas deemed suitable for wind and solar on the basis of resource potential to identify areas with low levels of sensitivity that are also suitable from a resource potential point of view.

Finally, when designating RAAs, the likelihood of cross-border impacts on the territory of other Member States is a relevant consideration. Article 16a(3) of the revised RED stipulates that the exemption from the environmental assessment does not apply to projects that are likely to have significant effects on the environment in another Member State or where a Member State that is likely to be significantly affected so requests, in accordance with Article 7 of the Environmental Impact Assessment Directive. Therefore, in order to fully benefit from the more streamlined procedures in RAAs (including the exemption from project-specific environmental assessments), Member States should avoid identifying as RAAs areas where the installation of renewable energy projects is likely to give rise to cross-border impacts.

The next section provides an overview of tools and datasets that could be used for identifying areas that need to be excluded and areas where the installation of renewable energy projects is not expected to have significant environmental impacts or could be mitigated with the application of the rules and measures identified in the mitigation rulebook[42].

c. Data and digital tools to identify RAAs

Up-to-date spatial plans and appropriate digital tools are key enablers that can support the designation of RAAs. The Commission's Energy and Industry Geography Lab supports planning choices by national and regional authorities and the identification of RAAs by providing a wide range of datasets covering relevant energy and environmental factors.

[41] How spatial planning can accelerate renewable energy uptake in Southeast Europe, https://www.eihp.hr/wp-content/uploads/2021/04/WEB-Location-location-location-how-spatial-planning-can-accelerate-renewable-energy-uptake-in-Southeast-Europe-TNC_doc2.pdf

[42] Further considerations on identifying these areas will be included in the final report *Study on the designation of renewables acceleration areas (RAAs) for onshore and offshore wind and solar photovoltaic energy [forthcoming]*

In early 2024, the Energy and Industry Geography Lab included the below datasets:

- **Natura 2000 sites**. The data layer displays the borders of Natura2000 sites, as officially reported by Member States to the Commission.
- **Nationally designated protected areas**. This data layer displays nationally designated protected areas, as officially reported by Member States to the European Environment Agency.
- **Key biodiversity areas**. The data is provided by BirdLife International on behalf of the Key Biodiversity Areas partnership.
- **Important bird areas**. The data is provided by BirdLife International and is a collection of data provided by partners, digitised by the BirdLife Secretariat, or third parties.
- **Ecologically or biologically significant marine areas (EBSAs)**. The data is provided by the Convention on Biological Diversity.
- **Underwater noise**. This data layer provides an overview of the occurrence of all the activities that produce relevant sounds that place pressure on the environment and allows to establish the current level of continuous and impulsive sounds.
- **Peatlands**. This data layer presents a comprehensive peatland map for the whole of Europe and is relevant in the context of excluding areas from acceleration areas on the basis of sensitivity maps.
- **Industrial facilities**. This data layer includes the locations of industrial facilities, which can be considered among the priority areas for RAA designation.
- **Wastewater treatment plants**. This data layer includes the locations of urban wastewater treatment plants in the EU, as officially reported by Member States to the Commission.

Throughout 2024, work will continue to add additional layers to the Energy and Industry Geography Lab, for example data on the occurrence and distribution of endangered species provided by the JRC's Knowledge Centre for Biodiversity[43]. Examples on bird tracking data have been included and will be further supplemented with data on other species at a later stage.

All datasets are publicly accessible. On the website of the Energy and Industry Geography Lab, additional information is available such as data documentation and metadata[44] with information on the data provider, the spatial and temporal resolution, and the usage conditions. In addition, the landing page offers a quickstart guide and a tutorial[45].

The datasets available at the Energy and Industry Geography Lab have some limitations that need to be taken into account. These limitations include data gaps (e.g. data not available for all Member States) and data quality issues. Also, robust scientific research is needed for all species to determine to what extent they are impacted by the deployment of renewable energy. For example, deployment can have different impacts depending on the age and activity of the species (e.g. foraging, reproduction, breeding, migration). Also, data on species movement, such as flight heights

[43] https://knowledge4policy.ec.europa.eu/biodiversity_en

[44] https://joint-research-centre.ec.europa.eu/energy-and-industry-geography-lab/documentation-energy-and-industry-geography-lab_en

[45] https://joint-research-centre.ec.europa.eu/energy-and-industry-geography-lab/manuals-and-tutorials-energy-and-industry-geography-lab_en

and flight routes are needed in order to assess potential impacts and identify appropriate mitigation measures.

Designating and managing Natura 2000 sites has driven progress in collecting biodiversity-related information and developing user-friendly tools to access it. Nevertheless, not all this information has been collected through comparable scientific approaches or is of the same quality. Furthermore, a considerable amount of key data exists outside the databases related to the Natura 2000 network, collected for example by research institutions or for the purposes of carrying out environmental impact assessments. Consolidating all this data could improve data availability and quality and contribute to improved decision-making. A related overarching challenge stems from the fact that renewable energy technologies are not developed to the same degree across the EU, which results in data on environmental impacts being available only for the countries or regions where the development is more advanced.

Since no individual dataset provides the complete picture, Member States have the possibility to supplement data from the Energy and Industry Geography Lab with datasets available at national or regional level in order to improve the robustness of the site characterisation for the purpose of identifying and designating RAAs. Some of the environmental data relevant for the purposes of identifying areas where renewable energy plants would not have a significant environmental impact are maintained by research institutions and NGOs. Several international, national and regional databases and tools on species and habitats exist that can assist the competent authorities in the designation process. Additional environmental data collection may also be helpful in areas where it is limited or not available.

Digital tools and databases:

Movebank[46] is a free, online database of animal tracking data and other data collected by means of sensors on animals, hosted by the Max Planck Institute of Animal Behaviour.

Migration Mapping Tool[47] is a database maintained by EURING, the coordinating organisation for European bird ringing schemes. It provides information on the migratory connectivity of 50 bird species in Europe. EURING and Movebank data on the Eurasia-Africa bird migration flyway are also combined in the **Migration Atlas**[48] tool.

The **Important Marine Mammal Areas e-Atlas**[49] includes areas as identified by the Marine Mammal Protected Areas Task Force of the International Union for Conservation of Nature.

EMODnet[50] (European Marine Observation and Data Network) is a platform supported by the EU integrated maritime policy on which various organisations make marine data publicly accessible. It also includes data on seabed habitats in Europe (**EUSeaMap**[51]).

The **European Maritime Spatial Planning platform**[52] is a service developed by the European Commission Directorate General for Maritime Affairs and Fisheries (DG MARE), for Member

[46] https://www.movebank.org/cms/movebank-main
[47] https://euring.org/research/migration-mapping
[48] https://migrationatlas.org/
[49] https://www.marinemammalhabitat.org/imma-eatlas/
[50] https://emodnet.ec.europa.eu/geoviewer/
[51] https://emodnet.ec.europa.eu/en/seabed-habitats

States, stakeholders and experts to share relevant knowledge and experiences on Maritime Spatial Planning (MSP). It shows the status of MSP processes in each coastal EU Member State as well as Sea basin overviews, projects, best practice and scientific publications. It analyses co-existence and multi-use of activities at sea[53] including with a compendium of examples.

In addition to the listed digital tools and databases, the Earth Observation data, for instance from the Copernicus Programme, could be used. Copernicus offers a rich repository of free and open satellite data and geospatial information. It provides a wealth of data resources, including land use and land cover data, digital elevation models, and data that can be used to derive information on assessing renewable energy potential and environmental impact.

5. Main environmental impacts of wind and solar energy technologies[54]

Before their adoption, the plans designating RAAs must be made subject to an environmental assessment in accordance with the Strategic Environmental Assessment Directive, and, if they are likely to have a significant impact on Natura 2000 sites, to the appropriate assessment in accordance with Article 6(3) of the Habitats Directive. The fact that RAAs are not located in Natura 2000 sites or other protected areas such as marine protected areas, does not as such guarantee the absence of impacts of renewable energy projects that would be located in RAAs on those sites. Such impacts may exist for instance, if the RAA is located very close to a Natura 2000 site.

The potential impact on Natura 2000 or other protected sites needs to be carefully considered in the area selection process in view of the additional, more in-depth assessments that need to be carried out during the preparation of the RAA plan in case of likely impacts and to minimise the risk of subsequent legal disputes that could impede the timely approval and implementation of the RAAs' plans. For instance, locating RAAs close to important breeding, feeding or nesting grounds for protected bird species may lead to such environmental impacts. These aspects should be considered both at the level of the designation of the area and for the purposes of the identification of rules on mitigation measures to avoid or reduce the expected environmental impacts that may arise in RAAs.

According to the Strategic Environmental Assessment Directive, an environmental report must be prepared in which the likely significant effects on the environment of implementing the plan designating the RAA are identified, described and evaluated. The environmental impacts that need to be considered are related to all stages of project development, from planning, construction and operation to decommissioning. Moreover, the possible impacts arising from the integration of the renewable energy plants into the system (i.e. grids or storage) will need to be considered, regardless of the technology. When designating RAAs, the specific characteristics of the site in question - such as the previous use of the area or the species present in it, including seasonal presence when there is an impact on main migratory routes - as well as the specificities of the renewable energy technology, need to be considered and described in the report.

[52] https://maritime-spatial-planning.ec.europa.eu/

[53] https://maritime-spatial-planning.ec.europa.eu/msp-resources/co-existence-and-multi-use-activities

[54] Further details on these impacts will be available in the final report *Study on the designation of renewables acceleration areas (RAAs) for onshore and offshore wind and solar photovoltaic energy [forthcoming]*

a. Environmental impacts of onshore wind energy

In general, in the construction stage of onshore wind farms, grid connection infrastructure and access roads, land clearance is required, which may lead to the deterioration or loss of habitats. The impacts vary depending on the previous use of the area, with higher impacts resulting from clearing pristine areas, compared to lower impacts when degraded land is used. It is estimated that around 97-98% of the land area occupied by a typical wind farm can be used at the same time for other purposes[55] and thus enables the coexistence of wind farm development with other land uses, including those aimed at restoring such land for enhancing biodiversity.

In the project operation stage, birds and bats may collide with the wind turbine blades, resulting in injury and/or death. Factors affecting the collision risk are specific to the site, species (for example, their size, weight or typical flying height) and wind turbine design (for example their size, rotor speed and warning lights).

Barrier effect is an impact that can be present in the construction, operation and decommissioning stages of wind energy projects. It is defined as hindrance to movement for birds, bats and terrestrial species that leads to their needing to use additional energy to avoid the wind turbines and the associated infrastructure. The energy depletion may alter foraging patterns and breeding behaviour and lead to negative impacts on breeding success and population density. Habitat deterioration or loss may also affect birds, bats and terrestrial species.

b. Environmental impacts of offshore wind energy

Several environmental impacts identified for onshore wind are also applicable to offshore wind. The negative impacts of offshore wind analysed in scientific literature concern underwater noise, different types of pollution (such as contaminants, chemicals or marine litter), collision of animals with the installations, seabed habitat loss and degradation, barrier effects, change of hydrographic conditions and emission of electromagnetic fields through the connected cables. Similarly to onshore wind, the construction and operation of offshore wind farms may lead to the disturbance of breeding, feeding and resting sites, as well as migration routes of birds and marine animals. This can lead to temporary or permanent displacement of species (and ultimately loss of specific areas as habitats for those species). Barrier effects can also occur in the construction, operation and decommissioning stages of project. On the other hand, offshore wind farms often have a positive impact on the marine environment by enabling the creation of artificial reef effects, which can be supported by restoration measures in areas with reefs or degraded reefs due to past human activities.

Underwater noise is among the most common environmental impacts related to offshore wind. Noise is created in the project development, construction, operation and decommissioning phases. The impacts of underwater noise apply generally in all the sea areas where marine species are present, but the more detailed impact on particular species needs to be assessed in view of the presence of the species in the area that is being considered for the potential designation as an RAA.

[55] https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/land-a-crucial-resource-for-the-energy-transition

Pollution can be classified into chemical pollution, waste, greenhouse gas emissions and sediment pollution. It needs to be considered in the wind farm's project development, construction, operation and decommissioning phases. Pollution of water, and/or air in the case of emissions from vessels, affects marine animals and vegetation in the respective area, as well as birds passing through the area.

Collision with wind turbine blades or towers represents another frequent environmental impact and affects birds and bats in the operational phase of offshore wind farms. Marine mammals may also be at risk of collision with offshore vessels in the construction, operation and decommissioning stages. Environmental impacts during and after decommissioning, including from possible remnants of parts of disused installations at sea, should also be taken into consideration and addressed in the plan designating RAAs.

In addition to the impacts of individual offshore turbines, the cumulative impacts of offshore wind parks should be, to the extent possible, quantified, monitored and addressed (see also Section 5d).

c. Environmental impacts of solar energy (utility-scale photovoltaic and concentrated solar)

The main negative environmental impacts of solar energy technologies identified in scientific literature are habitat degradation, changes in the microclimate, various types of pollution and negative impacts on wildlife, such as injury, mortality or displacement and habitat loss due to barrier effects.

Solar plants can cause various types of pollution during the construction and decommissioning phase, like any civil construction work, which can have negative impacts on both flora and fauna.

Increased pollution levels can impact the mortality rate of organisms living in the area. Collision with the structures, burn and electrocution from the grid connection infrastructure are potential risks to be taken into account. In the operation phase, PV panels can reach high temperatures (over 70°C), which can change the microclimate and - for very large systems - may create a heat island effect in areas with low wind speeds. PV panels can also create shade, which can have both negative (e.g. degrading and preventing vegetation from growing) and positive (e.g. for organisms that need shade) impacts.

Installing solar plants might require removing existing vegetation, which could have a negative impact on the fertility of the land and could potentially lead to soil loss. Habitat degradation could lead to a reduction in the number and diversity of species present, or even cause species displacement and subsequent habitat loss. However, these areas are usually replanted to prevent this and promote biodiversity. In addition, in arid or semi-arid areas, installing solar plants can have a positive effect on vegetation and water retention.

Barrier effects can occur when the movement and seasonal migration of wildlife is blocked, which could lead, for example, to a reduction or depletion of available food and resting areas. Blockages can be caused by the solar installation itself, its grid connection, and access roads to the installation, as it is usually surrounded by security fences. Barrier effects can also have a positive impact, as they can provide shelter or escape routes for animals from their predators.

d. Cumulative impacts

In the context of renewable energy development, cumulative impacts can refer to the impacts of multiple projects of the same technology or different technologies (e.g. solar and wind development in the same space) occurring simultaneously in a specific geographic area. In addition to the impacts stemming from each individual project, a larger concentration of projects amplifies their collective influence on ecosystems, species and habitats. Spatial accumulation of projects can lead to such structural impacts as habitat fragmentation, degradation or loss, barrier effects and population shifts. With a higher concentration of renewable energy plants as well as other projects in the same area, there is also an increased risk of pollution generated by construction and maintenance operations, as well as an increased risk of wildlife injury and mortality. For onshore renewable energy, in addition to the renewable plants themselves, the impacts from the associated grid infrastructure and access roads also need to be considered. Cumulation of impacts with other existing or planned projects unrelated to the deployment of renewable energy also needs to be taken into account.

The Marine Strategy Framework Directive[56] is the framework for considering and assessing the cumulative impact of human activities on marine ecosystems and for taking measures so that they remain within their carrying capacity. In the last few years, progress has been made on assessing the cumulative impacts of offshore energy but further research and monitoring are required.

Scientific literature points out, for example, that often monitoring has been carried-out at localised sites and focused on specific species. Sound monitoring, measuring multiple pressures and impacts on ecosystems and their services, at wider scale and also in interaction with other sea activities, is still largely missing[57] and could be addressed by further developing models and other instruments for environmental risk assessment and maritime spatial planning, considering impacts during construction, operation and decommissioning and possibly, repowering.

The **Netherlands** has developed a framework[58] to assess the accumulation of ecological effects of offshore wind. It looks at the cumulative effects of existing offshore wind farms and those under construction or planned by 2030, to determine if the existing and future offshore wind farms taken as a whole will have significant negative effects on the ecology.

6. Mitigation rulebook

According to Article 15c, the plan designating RAAs needs to include a 'mitigation rulebook' outlining rules on effective mitigation measures in order to avoid or, if not possible, significantly reduce the

[56] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (OJ L 164, 25.6.2008, p. 19).

[57] Galparsoro, I., Menchaca, I., Seeger, I., Nurmi, M., McDonald, H., Garmendia, J.M., Pouso, S., Borja, Á., *Mapping potential environmental impacts of offshore renewable energy*. ETC/ ICM Report 2/2022. https://www.eionet.europa.eu/etcs/etc-icm/products/etc-icm-reports/etc-icm-report-2-2022-mapping-potential-environmental-impacts-of-offshore-renewable-energy

[58] https://www.noordzeeloket.nl/en/functions-and-use/offshore-wind-energy/ecology/

environmental impacts that the deployment of renewable energy projects may have in a particular RAA.

As indicated in previous sections, careful selection of areas to be designated as RAAs can be considered the first mitigation measure to avoid or significantly minimise the possible environmental impacts that the installation and operation of renewable energy plants can lead to. However, additional mitigation measures may be needed to address the impacts that the specific renewable energy technology may have on a particular area, due to the characteristics of the area. For this reason, according to the Directive, Member States have to include in the plan a set of rules on effective mitigation measures that renewable energy projects located in those areas should adopt and comply with in order to address the most likely impacts. Where appropriate, Member States need to ensure that mitigation measures are applied in a proportionate and timely manner to ensure compliance with the obligations laid down in the Habitats Directive, the Birds Directive and the Water Framework Directive[59].

The aim of the preparation of the plan for the designation of the RAA, including the mitigation rulebook, is to front-load the assessment of possible environmental impacts of renewable energy projects in specific areas and to identify *ex ante* appropriate and proportionate mitigation measures that projects located in RAAs will need to implement to avoid or reduce the impacts that may arise. This mitigation rulebook is a key part of the plan designating the RAA because the projects that follow the rules and mitigation measures of the mitigation rulebook can benefit from a presumption of compliance with the relevant provisions of the EU environmental law and in cases where this would have been relevant, from an exemption from the environmental assessment under the Environmental Impact Assessment Directive and the assessment under Article 6(3) of the Habitats Directive. Therefore, this way of identifying and addressing impacts at a strategic level allows most projects in RAAs to benefit from simpler and faster procedures, including exemptions from environmental assessments.

Mitigation measures and mitigation hierarchy

The deployment of renewable energy projects in RAAs can give rise to environmental impacts throughout the lifespan of the project, i.e., from the project construction phase up to its decommissioning. Section 5 identifies the most likely impacts of the deployment of wind and ground-mounted solar projects.

Article 15c indicates that the aim of the mitigation rulebook should be to avoid, or if not possible, significantly reduce the environmental impacts that the deployment of renewable energy projects may have in the specific RAA. The rules on effective mitigation measures included in the mitigation rulebook should therefore follow a hierarchical approach aiming to:

- first, avoid the impacts: preventing significant impacts from occurring in the first place, and
- if this is not possible, reduce the impacts: reducing the magnitude and/or likelihood of an impact.

These mitigation measures can be applied at different stages of the lifespan of the project, ranging from the planning or site selection stage to the construction, operation or decommissioning stage of

[59] The obligations laid down in Article 6(2) and Article 12(1) of Directive 92/43/EEC, Article 5 of Directive 2009/147/EEC and Article 4(1), point (a)(i), of Directive 2000/60/EC of the European Parliament and of the Council and to avoid deterioration and achieve good ecological status or good ecological potential in accordance with Article 4(1), point (a), of Directive 2000/60/EC.

the project.

Avoidance measures

Avoidance measures can generally be grouped in the below categories:

- Site selection measures taken at the planning stage: identifying suitable locations for renewable energy projects, away from ecologically sensitive areas, is a key avoidance measure. Excluding areas with high environmental value from being designated as RAAs is based on this mitigation measure. The determination of the exact position of the renewable energy projects within the designated areas may further contribute to reducing impacts.
- Project design measures: certain impacts can be avoided to a large extent by a conscious and careful renewable energy project design that takes into consideration the environmental sensitivities of RAAs. For instance, when it comes to wind turbines, the choice of the number of turbines and other technical specificities such as the height or foundation design can help avoid environmental impacts such as collision risk.
- Scheduling measures: temporary adjustments to the operation of renewable energy projects can account for seasonal and diurnal patterns of species behaviour (to the extent these areas cannot be avoided), and ecosystem functioning. Depending on the timing of the measure, it can aim to avoid or reduce impacts as much as possible.

Reduction measures

Mitigation measures can also reduce the duration, magnitude and extent of the environmental impacts that cannot be completely avoided. They can take the following form:

- Project design measures: these can reduce the intensity of impacts (e.g., the installation of bird flight diverters on power lines or visual deterrents on wind turbines to increase visibility to birds can reduce the risk of collision).
- Deterrents: acoustic, visual, electromagnetic or other type of measures can be applied to reduce the levels of pollutants (for example, acoustic deterrent devices can be used during the construction and operation of offshore projects to reduce underwater noise).

Article 15c calls for the application of mitigation measures in a 'proportionate and timely manner'. Therefore, when drawing up the mitigation rulebook, balance between both types of measures should be sought. Depending on the extent and intensity of the expected impacts, scheduling measures (for instance turbine shutdown at certain moments) may be the only possible measure to address impacts or may, on the other hand, be considered disproportionate if other similarly effective measures are available.

The full draft plan, including the draft mitigation rulebook, needs to be made subject to a strategic environmental assessment. The aim of the assessment is to identify the most likely environmental impacts and the suitability of the mitigation rulebook in addressing them.

At the stage of preparing the mitigation rulebook, Member States do not have specific information on the characteristics of the specific projects that will be installed and operated in the RAA. Against this background, the below considerations can guide the preparation of the mitigation rulebook.

First, the characteristics of the area and of the renewable energy technology that will be deployed there can already act as general filters to determine the scope of the mitigation rulebook. For example, if a Member State wants to designate as RAAs the surrounding area of all road transport infrastructure (i.e. motorways) across its territory for the purposes of installing ground-mounted solar projects along the existing infrastructure, the mitigation rulebook should focus on addressing

the most likely environmental impacts that ground-mounted solar projects may give rise to in those areas and explore synergies with the existing infrastructure and any existing mitigation measures that those infrastructure projects may already be applying.

Second, the scope and type of measures included in the mitigation rulebook can to a large extent be determined by the expected sensitivities of the identified area and by the approach followed at the stage of identifying the most suitable areas. If Member States follow a very conservative approach at the stage of identifying the areas to become RAAs, which already avoids important environmental impacts, the mitigation rulebook may be limited to targeted measures aimed at addressing or reducing the limited impacts that may arise. However, following such an approach may entail the risk that very few areas are available for designation as RAAs which may compromise the objectives underlying the obligation to designate RAAs. To remedy this, in cases where several impacts cannot be ruled out at the stage of the designation of the area, the mitigation rulebook can act as an important complement by including more robust measures. In this case, the mitigation rulebook could include more effective measures aimed at "avoiding" impacts (such as scheduling measures).

Third, the rules on effective mitigation measures included in the mitigation rulebook may include rules of a general scope aimed at defining the characteristics of the future projects to be installed in the RAA in order to be able to better identify and address the possible environmental impacts that may arise from the installation of renewable energy projects in RAAs. Project design measures can significantly avoid or reduce impacts and may be more proportionate or less disturbing than scheduling measures that require to stop operation and production during specific periods. The mitigation rulebook may contain general categories of project design measures (for example the rule to adopt visual deterrents for species protection) which can be further defined at project level during the screening procedure, as appropriate. Another possible approach could be to identify more detailed rules on mitigation measures (for example prescribing a specific type of visual deterrent or introducing ranges for the allowed height of wind turbines in specific sites in the RAA if collision risks with protected species are identified in those sites).

Fourth, cumulative impacts in a RAA may be addressed by rules specifying the maximum capacity to be installed in a given RAA, since the expected impacts can be more easily measured ex ante if the number of projects to be installed in an area is known.

The following paragraphs provide an overview of mitigation measures aimed to address some of the most frequent impacts resulting from wind and solar energy projects[60]. The magnitude of these impacts will depend on the exact location of the projects. Setting up a framework to monitor the effectiveness of mitigation measures can further contribute to minimising the negative environmental impacts.

a) Mitigation measures for onshore wind projects

Several impacts, such as habitat deterioration or barrier effect can be mitigated as of the planning stage, both from the perspective of the area selection, for example by siting wind farms away from sensitive bird and bat habitats, and the siting of the individual turbines. This can be done by aligning

[60] Further considerations on mitigation measures will be included in the final report *Study on the designation of renewables acceleration areas (RAAs) for onshore and offshore wind and solar photovoltaic energy [forthcoming]*

turbines parallel to and not across bird flight routes and by arranging them in clusters to create flight corridors. During the construction stage it is recommended to avoid, reduce or phase construction activities in ecologically sensitive periods. During the operation stage, potential mitigation measures to minimise the risk of collision could include installing audible and/or visual deterrents, adapting the turbine rotation speed or temporarily shutting down the turbines. Technology solutions are emerging that rely on radars or sensors to detect approaching birds and adapt the wind turbine operation to their behaviour, and with further testing and monitoring of their effectiveness could supplement the set of mitigation measures.

Possible ways to mitigate the risk of electrocution include installing structures that discourage birds from perching or prevent them from perching close to energised wires, or installing plastic hoods, silicon tubes or insulators covering the metal console.

Further detailed guidance on mitigation measures to address the most likely environmental impacts resulting from wind projects is available[61]. This guidance was adopted before the revised RED entered into force and therefore the legislative regime applicable to wind energy projects has changed. Nevertheless, the factual information and examples regarding impacts and mitigation measures are still relevant.

b) Mitigation measures for offshore wind projects

Similarly to onshore wind, thorough area selection and turbine positioning are key mitigation measures to avoid sensitive habitats. To the extent that the environmental impacts of offshore wind during the operation stage are similar to those of onshore wind, for example related to collisions, similar mitigation measures can be considered, while adapting them to the specificity of the selected area. Possible ways to mitigate the impacts of underwater noise during the project construction stage include seasonal limitations of piling activities, as well as noise reduction through reflection, absorption and shielding around the pile driving site. When it comes to displacement and habitat loss, alternative cable installation methods with lower impacts can be considered depending on the seabed type. Defined routes for offshore vessels can also help avoid sensitive habitats.

c) Mitigation measures for solar energy projects

Several impacts, such as wildlife injury and mortality, habitat degradation and barrier effects and subsequent habitat loss, can be mitigated as of the project planning stage, by avoiding sensitive areas and choosing degraded or lower-value biodiversity areas, or by modifying the design and location of powerlines by re-routing them or marking them to prevent collision and electrocution risks and avoid barrier effects. Another option is burying the lines, in case of new projects and where economically feasible. During the construction and decommissioning phase, re-scheduling the timing of construction to avoid disturbing wildlife in sensitive periods can also help mitigate these impacts.

The mitigation rulebook could include rules requiring projects to incorporate specific technical characteristics such as curved mirrors or bird flight diverters to reduce the attraction of insects and the likelihood of bird collisions, or to modify the fencing, for instance leaving a gap between the fence

[61] *Guidance document on wind energy developments and EU nature legislation*, https://op.europa.eu/en/publication-detail/-/publication/2b08de80-5ad4-11eb-b59f-01aa75ed71a1

and the ground or using elements to improve the connection to the wider landscape such as hedges or ditches.

Pollution can be mitigated at various stages of the project's life, starting from the construction phase, for example by ensuring proper waste disposal or avoiding lighting sensitive wildlife areas. Covering the surface under and around panels with vegetation, such as agricultural or grazing crops, can contribute both to mitigating the changes in the microclimate by reducing the temperature and to mitigating habitat degradation by reducing the soil erosion and desertification process and controlling vegetation through grazing. These approaches can also support pollination. Habitat degradation can also be mitigated during the construction phase, for instance by mounting the panels on driven pile or screw foundations to reduce the impact on soil, or by installing sufficient drainage infrastructure to reduce freshwater habitat fragmentation.

7. Stakeholder engagement and public consultation

Striking the right balance between timely and effective designation of RAAs and appropriate public involvement and participation throughout the RAA designation process is key to increasing the likelihood of public acceptance of the renewable energy projects that will be developed in these areas. Early involvement of stakeholders and the public - as of the development phase of the RAAs plans - allows for timely adjustments, where needed, minimises delays and thus administrative costs at later stages of the designation, and reduces the risk of the final plans encountering legal challenges. It also helps to identify environmental, economic and social impacts, including on landscape and cultural heritage, and solutions to mitigate these issues.

Article 15d of the revised RED requires Member States to promote public participation at two levels: during the preparation of the plans designating RAAs, in accordance with Article 6 of the Strategic Environmental Assessment Directive, and by means of direct and indirect participation of local communities in renewable energy projects.

Renewable energy projects in RAAs are exempted from an environmental assessment at project level subject to specific conditions. Therefore, public consultation on projects located in RAAs will have to take place at the level of the strategic environmental assessment, that must be carried out for the plans designating RAAs. In this regard, it is crucial to ensure a meaningful public consultation process when preparing the plans for the designation of RAAs, meeting the requirements not only of EU law, but also of international law, such as Article 7 of the Aarhus Convention[62]. This will mean early involvement of the public, providing sufficient background information and taking due account of the public's opinion.

The Strategic Environmental Assessment Directive specifies that the draft plan as well as the environmental report prepared in accordance with the Directive must be available to the public and the authorities that need to be consulted (i.e. those likely to be concerned by the environmental effects of implementing the plan). The authorities concerned and the public must be given the opportunity in a timely manner to express their opinions on the draft plan and the accompanying environmental report(s) before the plan is adopted. Member States also need to identify the public that should be consulted, including the public affected or likely to be affected or having an interest.

[62] United Nations Economic Commission for Europe Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

In the context of designating RAAs, these could include environmental NGOs, the scientific community and experts with knowledge on local habitats and species, and representatives from the industry and project developers that will install renewable energy projects in the designated areas.

Early engagement with the relevant stakeholders is also crucial for gathering data to identify the environmental impacts that are most likely to arise and the most appropriate and proportionate mitigation measures that could be included in the mitigation rulebook. Some of the datasets and databases maintained by the research community or NGOs can supplement the data held by public authorities. This underscores the importance of identifying relevant stakeholders at an early stage and involving them in the designation process. This will also help minimise the risk of future projects being challenged before administrative or judicial bodies.

There are various tools for involving stakeholders in the RAAs designation process. Open public consultations can be organised to solicit feedback from local residents and other stakeholders on draft plans designating RAAs. Stakeholder consultations can also be carried out by setting up task forces bringing together different stakeholder groups or by organising expert consultations or workshops.

Beyond public consultation at the RAA designation stage, public acceptance of renewable energy projects can be promoted by means of direct and indirect participation of local communities in these projects. Local ownership is one way to ensure that the benefits of renewable energy projects are shared with the local community and can be achieved, for example, by giving priority to community-owned projects, requiring a certain percentage of a specific project to be owned by the community, or setting specific targets for community projects.

8. Final considerations for identifying and designating RAAs

To ensure timely and effective designation of RAAs by 21 February 2026, several environmental and non-environmental considerations are relevant. Ensuring that permitting authorities at national, regional and local level are appropriately staffed and skilled is a cross-cutting prerequisite for the extensive effort required to accelerate the deployment of renewable energy, including the designation of RAAs.

As regards the broader identification of areas for the chosen technology, an overview of the applicable legal and regulatory framework at an early stage can help identify obstacles to the installation of a particular technology in a particular type of site or area. If such obstacles exist, time for making the necessary changes to eliminate the barriers needs to be factored into the planning process for the RAA designation.

Identifying areas that need to be excluded on the basis of their environmental sensitivity requires assessing data availability and identifying data gaps to ensure the most comprehensive and robust data coverage. In some cases, additional environmental data collection may be helpful.

Similarly, while the availability of grid capacity should be considered already at the level of the areas defined under Article 15b, it is a relevant consideration also specifically in the context of designating RAAs. Plans designating RAAs can also point to areas where there are gaps in electricity grid coverage and thus serve as an input into the grid planning process for 2030.

It is key to map stakeholders that need to be involved in the designation process and to devise a suitable stakeholder engagement strategy already before the plan undergoes a strategic environmental assessment. Stakeholder involvement activities, including public consultation, make it

possible to consider and take account of expert views and concerns of local communities and the public affected in a timely manner, to minimise subsequent legal challenges for the designated area or projects that are to be installed in it.

Given the wide range of competences of authorities at regional and local level across the EU when it comes to planning and permitting, a careful balance needs to be found between ensuring a degree of uniformity in approaches taken at different administrative levels within one Member State, and recognising the roles of regional and local authorities. Some degree of uniformity at national level for RAAs designation is desirable, in line with the constitutional set-up of Member States. Fragmented planning of priority areas and areas that need to be excluded risks creating a lack of clarity for renewable energy project developers and investors and could reduce support for the RAA designation process. Where local authorities are tasked with identifying and designating RAAs, tools may be needed at national level that facilitate the centralisation of all available data and provide a harmonised methodological approach to area selection. Similarly, the designation of RAAs will require cooperation between different administrative levels and policy domains, from energy to nature conservation and spatial planning, within Member States, and across Member States, where cross-border impacts could be of relevance.

ANNEX I - STAKEHOLDER CONSULTATION in the preparation of the guidance

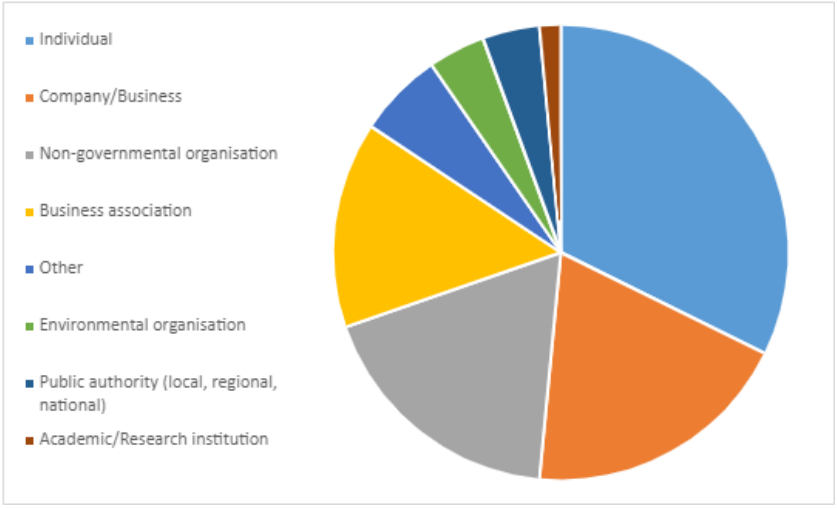
In the preparation of the guidance to facilitate designating RAAs, stakeholder consultation activities were carried out through an online 'call for evidence', which was available for feedback on the Commission's consultation website 'Have your say'[63] for 4 weeks.

The objective of the consultation was to gather feedback from stakeholders on the proposed scope and content of the initiative. The main stakeholders targeted were public authorities (Member States, and regional and local authorities), renewable energy producers, renewable energy associations and non-governmental organisations (NGOs).

The consultation reached all identified stakeholder groups as well as additional stakeholder groups, such as academic and research institutions. Feedback was received from public authorities (mainly at local and regional level, with one national-level contribution), companies active in renewable energy production and transmission and distribution system operators. NGOs, environmental organisations and individuals also provided input. The Commission carried out a qualitative analysis of the replies to the call for evidence, including the attached position papers.

This document should be regarded solely as a summary of the stakeholder contributions. It cannot in any circumstances be regarded as the official position of the Commission or its services and thus it is not binding on the Commission. Responses to the consultation activities also cannot be considered as a representative sample of the views of the EU population.

The Commission received 211 replies to the call for evidence, of which 13 were duplicates (same respondent or same comment). After eliminating the duplicates, out of 198 replies, individuals represented the largest group of respondents (64 replies), followed by companies/businesses (38), NGOs (36), business associations (29), other stakeholders (12), public authorities (8), environmental organisations (8) and academic/research institutions (3).



[63] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14075-Renewable-energy-guidance-on-designating-renewables-acceleration-areas_en

Fig. 1: Overview stakeholder replies by sector

In terms of geographical distribution, 49 replies came from Spain, 30 replies from Belgium (most of which from business associations and NGOs), 25 from Germany, 19 from Italy and 18 from France. Another 14 Member States accounted for fewer than 10 replies each. In total, respondents from 19 Member States replied to the call for evidence. Respondents from non-EU countries such as the United Kingdom, Norway and Switzerland also submitted a small number of replies.

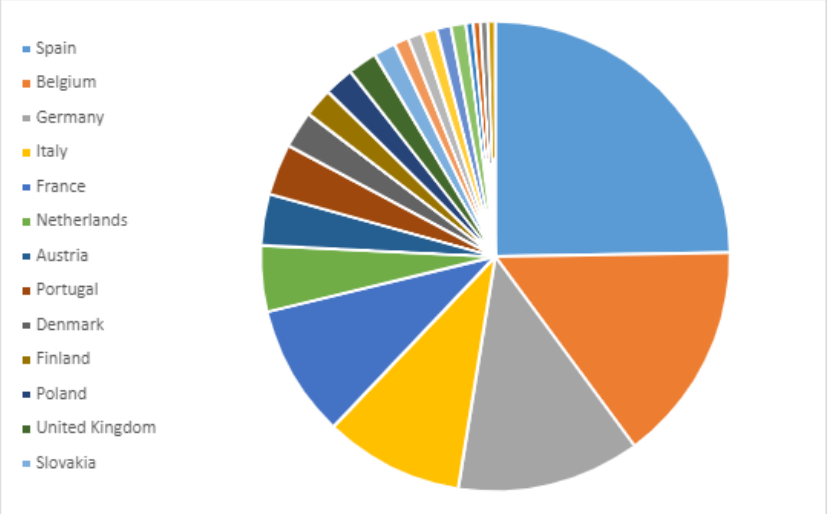


Fig. 2: Overview stakeholder replies by country

Among the replies, the 'Have Your Say' platform identified a campaign by Spanish NGOs and individuals in which 13 respondents, mainly anonymous individuals, shared the same comment and the same position paper by the NGO Alianza Energia y Territorio. The Commission has identified at least a further 20 respondents, NGOs and individuals, who have shared either the same position paper in its entirety or parts of it in their submissions. The respondents expressed concerns about the way in which some renewable energy projects had been installed in Spain, and called for a planned, democratic and science-based approach to the designation of RAAs that effectively excludes areas with high biodiversity, landscape and agricultural value. Moreover, they asked to prioritise deployment on rooftops and in degraded and industrial areas, close to the consumption points, so that it is not necessary to build new electricity network lines. The campaign also called for the repeal of the Council Emergency Regulation on accelerating permitting for renewable energy projects[64] and the Spanish Royal Decree[65] implementing its provisions on environmental impacts exemptions.

Other stakeholders also called for rooftop solar to be prioritised, especially in countries such as Italy where there is high solar potential, to minimise the need for additional space and the potential environmental impact of renewable energy projects. Moreover, several individuals showed their opposition to the Commission's initiative, referring to the intermittent nature of solar and wind

[64] Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy (OJ L 335, 29.12.2022, p. 36).
[65] Royal Decree-Law 20/2022 of 27 December on measures to respond to the economic and social consequences of the war in Ukraine and to support the reconstruction of the island of La Palma and other situations of vulnerability.

energy or to the impacts of these technologies on the environment, biodiversity or landscape, among others. Several individuals from the Netherlands in particular pointed to cross-border impacts caused by the installation of onshore wind energy in other Member States close to the Dutch border and the fact that these countries have different rules for siting renewables.

Several companies, business associations and individuals asked to include other technologies than wind and solar PV in the guidance, as the designation of RAAs under the Renewable Energy Directive is open to any type of renewable energy technology. Some stakeholders asked to broaden the scope of the guidance to also include an interpretation of the legal provisions, while others stressed that additional interpretative guidance is not needed as it would only interfere with ongoing implementation in Member States. Stakeholders mostly from companies and business associations in countries that have already started designating dedicated areas for renewable energy stressed the importance of avoiding overlaps between RAAs and ongoing national work and ensuring that the designation of RAAs does not create delays for projects outside these areas. Stakeholders from companies and business associations raised the risk of the designation of RAAs leading to the creation of no-go zones for renewables in areas outside acceleration areas. Several stakeholders, in particular from NGOs and environmental organisations also questioned the feasibility of the designating RAAs for offshore wind energy, due to the complexity of offshore projects and, in some cases, the lack of data on environmental impacts, in particular cumulative impacts.

There was broad agreement across several stakeholder groups on the need to consider the availability of grid infrastructure or the ability to develop grid infrastructure in areas that could be designated as RAAs. Public participation and acceptance were other areas that several stakeholder groups, including NGOs, individuals and companies, stressed as crucial to the success of the designation of RAAs and the deployment of renewable energy more broadly. NGOs and environmental organisations pointed to the applicability of the Aarhus Convention beyond requirements on public participation in EU law and called for ensuring early public consultation on the designation of RAAs, fair and representative participation of various constituents of society and providing sufficient background information to enable meaningful contributions. Other replies pointed to means to improve local acceptance of projects through community ownership or revenue-sharing arrangements with project promoters.

Stakeholders had nuanced views on the level at which coordination and implementation of RAAs need to take place. Local and regional authorities and their representative organisations argued against the designation of RAAs at national level and insisted on keeping the final decision at local level. Industry associations and companies, while recognising the role of the local level in ensuring public acceptance, pointed to the need to set up a governance system at national level to avoid the use of different methodologies for the designation of RAAs and a fragmented framework that hampers investment. By contrast, there was broad agreement amongst different stakeholder groups on the need to ensure appropriate staffing for permitting authorities in municipalities, regions and at national level.

Stakeholders from NGOs and environmental organisations stressed the importance of strategic planning and evaluating the possibility of combining renewables installations with biodiversity restoration measures. Several replies - from these stakeholder groups but also from companies and business associations - provided good practice examples of species sensitivity mapping, digital tools and means to improve public acceptance.

The replies received through the call for evidence have been considered in the finalisation of the initiative. As explained in the call for evidence, the purpose of the initiative is to provide practical guidance in a timely manner to help Member States in successfully identifying and designating renewables accelerate areas before the deadline (February 2026). Regarding data and tools that could support the designation of RAAs, several of the good practices shared in the call for evidence have been incorporated into the guidance.

As regards the requests to broaden the scope of the guidance to also include other technologies than wind and solar PV, most sections of this guidance and most information provided in it can help Member States designate renewable energy areas for any renewable energy technology. However, when it comes to the environmental impacts of renewable energy technologies and corresponding mitigation measures, this practical guidance covers only wind and solar PV due to their significant role in achieving the EU's 2030 renewable energy target. In this regard, it should be clarified that the Renewable Energy Directive does not require Member States to designate RAAs specifically for these two technologies. There is also no requirement to designate RAAs offshore – the guidance includes possible tools and considerations that can help Member States that wish to explore this option.

The guidance also includes a dedicated section on stakeholder engagement and public consultation, focusing on the importance of involving in RAA designation process those groups in society who are likely to be affected by the potential environmental impacts of the designation of RAAs and who are likely to have the most information on environmental impacts and appropriate and proportionate rules to mitigate them, and the tools available for Member States to involve them.