Offshore Wind Energy & Biodiversity Protection

Roadmap to Enhanced Policy Coherence

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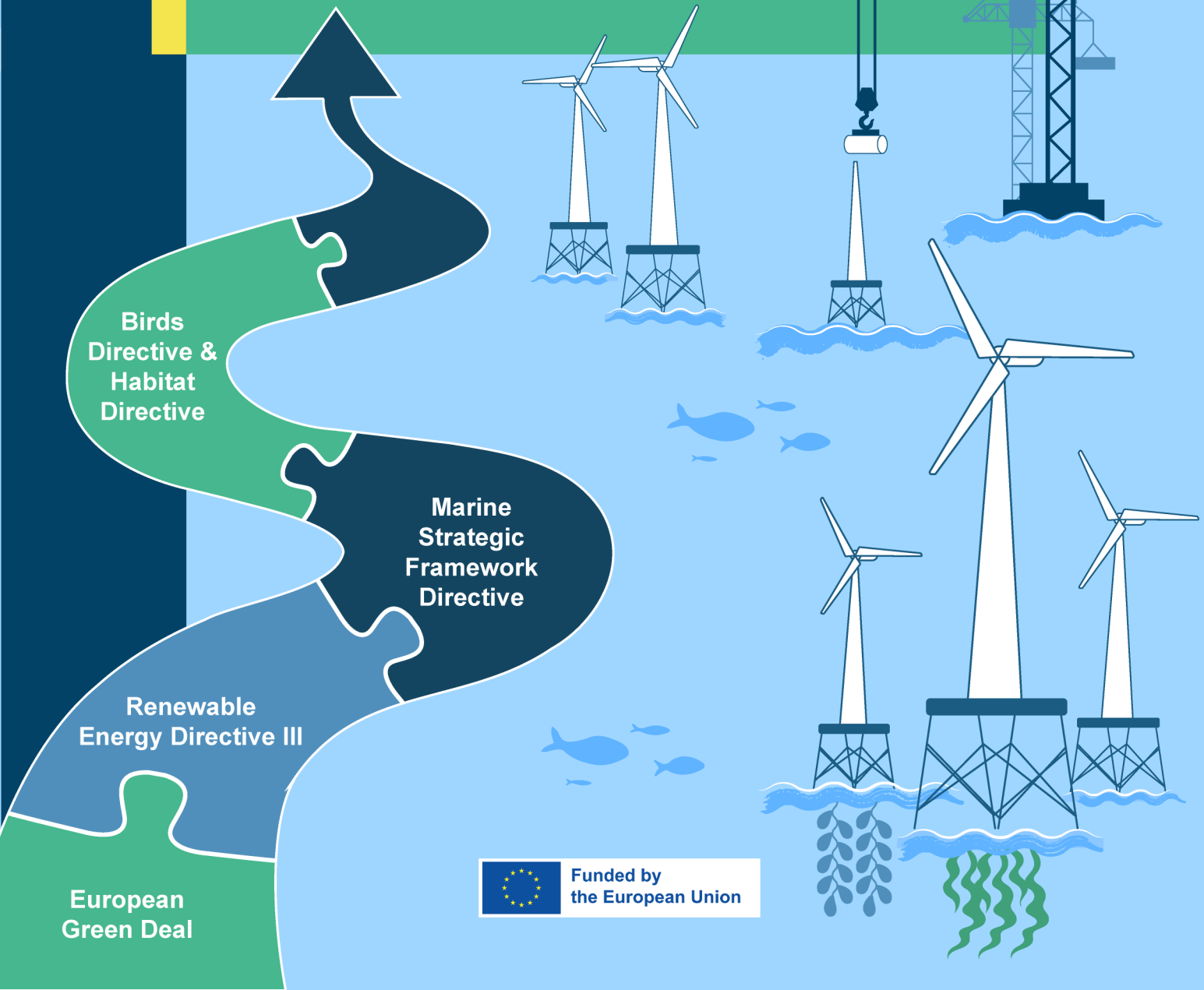

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Table of Contents

A. The European Green Deal's dueling priorities 4

B. Offshore wind expansion and biodiversity protection
Are these goals at odds? 6

C. Policy coherence at the EU level 7

D. Policy coherence at the national level 8

Germany 8

Netherlands 10

Norway 12

E. Key factors limiting policy coherence 14

F. Recommendations 15

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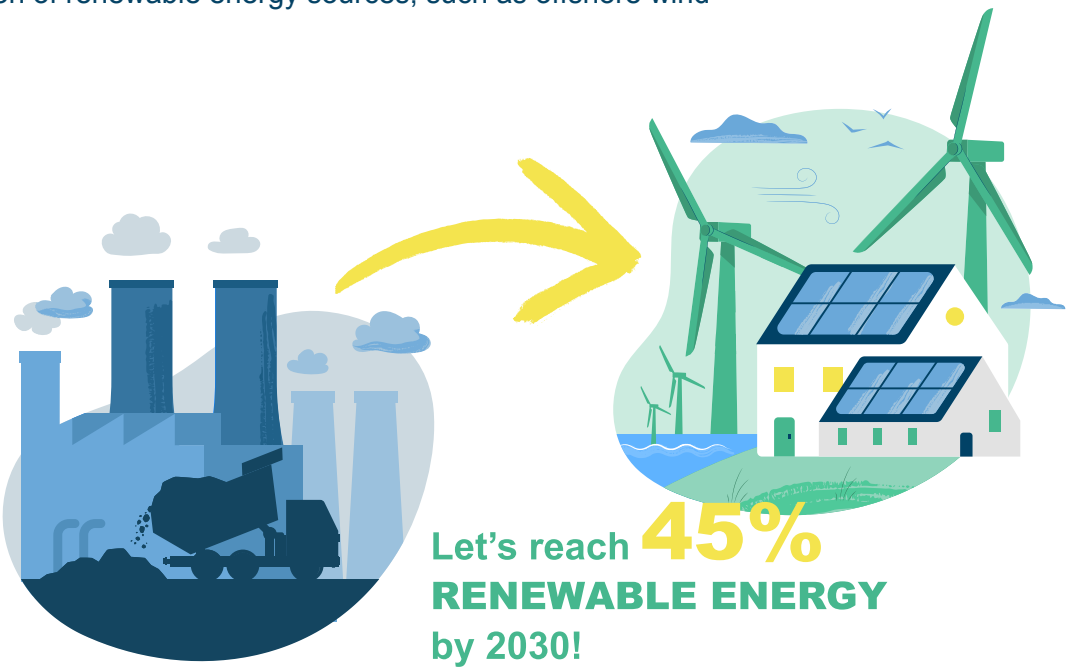
Roadmap Summary

Offshore wind energy plays a crucial role in the European transition to renewable energy, with many countries setting ambitious targets under the **European Green Deal**. However, the expansion of this sector impacts marine ecosystems, which are already under pressure from climate change and other human activities. This roadmap outlines recommendations to enhance coherence between offshore wind energy development and marine biodiversity protection. It identifies barriers such as fragmented governance, inconsistent environmental assessments, and limited stakeholder engagement. Drawing on the experiences of Germany, the Netherlands, and Norway, it underscores the misalignment between renewable energy targets and biodiversity conservation policies, which often operate independently.

This roadmap examines key European policies, including the **Renewable Energy Directive III**, the **European Union Biodiversity Strategy for 2030**, and the **Marine Strategy Framework Directive**. These policies offer a framework for aligning offshore wind energy expansion with biodiversity goals, but better policy coherence in practice is needed. By emphasizing improvements to marine spatial planning, early-stage environmental assessments, and inter-agency coordination, the roadmap provides practical guidance to ensure that the development of offshore wind energy aligns more effectively with marine biodiversity objectives in the European Union

A The European Green Deal's dueling priorities: Renewable energy & marine ecosystem protection

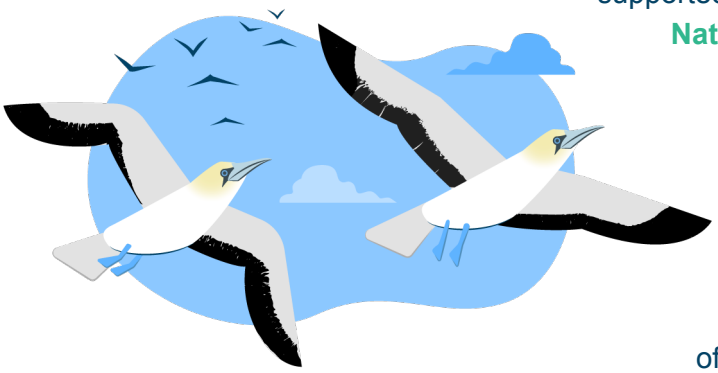
The **European Green Deal** marks a dramatic shift from market-driven energy policies to an environmentally integrated approach to energy generation, with the aim of achieving climate neutrality by 2050. This transformation is part of delivering the European Union's (EU) vision of a European society and economy that thrives while reducing greenhouse gas emissions and protecting the environment. The Green Deal's energy policy centers on two key pillars: (1) decarbonization and (2) advancing the transition to clean, secure, and affor able energy. A key part of this transition is the expansion of renewable energy sources, such as offshore wind



The **European Green Deal** also highlights biodiversity as essential to a healthy, prosperous, and sustainable Europe. Scaling up renewable energy is vital but must be carefully planned to avoid harming marine biodiversity. As the EU moves from fossil fuels to renewable energy, including offshore wind, embedding biodiversity protection in this transition is crucial for long-term sustainability. To deliver the ambitious climate and biodiversity goals of the Green Deal, the EU has put in place a range of policies and strategies aimed at biodiversity protection and ecosystem restoration as well as accelerating the deployment of renewable energy. The following sections outline key policy instruments that drive these two Green Deal priorities.

Ambitions to protect biodiversity

The **EU Biodiversity Strategy for 2030** aims to restore, protect, and enhance resilience of ecosystems by 2050, with key milestones for 2030. These include protecting 30% of the EU's land and sea areas, with at least one-third of them under strict protection and restoring degraded ecosystems. The strategy also aims to minimize the impact of activities like fishing and resource extraction on sensitive habitats, particularly the seabed. The Biodiversity Strategy for 2030 is implemented through a series of directives and regulations. The **Habitats and Birds Directives** aim to secure favorable conservation status for selected species and habitats, supported by the Natura 2000 network. Additionally, the **Nature Restoration Regulation (2024)** requires restoration of at least 20% of marine ecosystems by 2030 and all degraded marine ecosystems by 2050. While the **Marine Strategy Framework Directive** provides a broader framework for conserving marine environments, addressing issues such as sea-floor integrit , biodiversity, and underwater noise are critical concerns for offshore wind development.



Ambitions to expand renewable energy generation

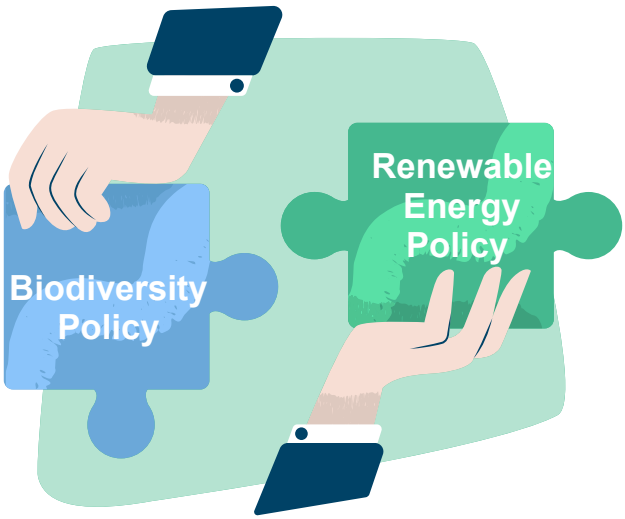
The **European Climate Law**, which writes into law the Green Deal's climate neutrality goals, mandates climate neutrality by 2050, with interim goals for 2030 and 2040. To achieve these targets, the **Renewable Energy Directive III** sets a legally binding obligation for 42.5% of energy consumption in the EU to be from renewable sources by 2030. The Directive introduces numerous measures aimed at streamlining and simplifying designation and licensing processes. These measures include establishing renewable energy acceleration areas with simplified environmental impact assessments, setting time limits for project permitting, classifying renewable energy projects as projects of overriding public interest, and granting exemptions under the **Habitats and Birds Directives** to fast-track projects. Offshore wind is intended to play a central role in the expansion of renewable energies in the EU, with the aim of generating 60 gigawatts of offshore wind energy by 2030.

B Offshore wind expansion and biodiversity protection: Are these goals at odds?

Balancing offshore wind expansion with biodiversity protection is increasingly complex. While energy targets—such as the aim of generating 60 gigawatts of offshore wind energy by 2030 —are often legally binding and measurable, biodiversity goals tend to lack enforceable targets, making them harder to implement. This imbalance can create conflicts, particularly where wind energy projects overlap with sensitive marine ecosystems.

Offshore wind farms impact marine biodiversity by altering the sea floor, posing collision risks to seabirds and bats, disturbing marine mammals through construction noise, and affecting migratory species due to transmission cable magnetism. These farms are often located on shallow banks, which are biodiversity hotspots. The long-term, cumulative ecological impact of expanding offshore wind across European seas remains unclear.

As offshore wind energy grows and competition for marine space intensifies, careful planning is essential to balance energy and conservation goals. While offshore wind is vital for reducing emissions and enhancing energy security, it must be strategically regulated to minimize environmental impacts. For example, EU Member States have begun using marine spatial plans under the **Maritime Spatial Planning Directive** to identify suitable sites for offshore wind parks. Further, **Strategic Environmental Assessments** and **Environmental Impact Assessments** are used as instruments to integrate ecological and social considerations into development decisions. These policies and tools are essential for aligning renewable energy growth with marine biodiversity protection.



C Policy coherence at the EU level

Ensuring policy coherence is crucial for aligning renewable energy expansion with marine biodiversity protection. The question is, how coherent are the relevant policies?

Ensuring good environmental status of marine ecosystems in planning

The **Marine Strategy Framework Directive** sets out a framework to ensure that good environmental status of marine ecosystems is achieved. Meanwhile, the **Maritime Spatial Planning Directive** aims to coordinate offshore wind expansion with other uses of ocean space. However, the Maritime Spatial Planning Directive does not explicitly reference the Marine Strategy Framework Directive. As a result, when Member States use maritime spatial plans to allocate space for offshore wind, there is a risk that ecological limits defined by the good environmental status are overlooked. In practice, maritime spatial plans have often been used to promote economic growth and prioritize sectoral development—particularly renewable energy—rather than to balance energy expansion with biodiversity conservation.

Offshore wind acceleration & the role of exemptions

The **Renewable Energy Directive III** introduces exemptions from environmental impact assessments to accelerate permitting for renewable energy projects, reducing environmental safeguards. The Directive establishes “renewables acceleration areas” in which strategic impact assessments at the planning level can be used to permit renewable energy developments without individual environmental impact assessments at the project level. However, this exemption from project level environmental impact assessments is at odds with the prevention principle under article 191(2) of the **Treaty on the Functioning of the European Union** and the commitments to achieve good environmental status under the **Marine Strategy Framework Directive**.

The **Renewable Energy Directive III** further introduces a single permitting procedure, classifying offshore renewables as being of overriding public interest. This allows projects, both inside and outside of acceleration areas, to proceed despite their potential environmental impacts on Natura 2000 sites or protected species, provided that appropriate compensation or mitigation measures are put in place.

Streamlining permitting processes for offshore renewables is necessary for achieving the Green Deal climate targets. At the same time, acceleration at the cost of environmental safeguards risks undermining biodiversity objectives by allowing projects to proceed despite significant uncertainty both about their environmental impacts but also about the effectiveness of mitigation measures.

D Policy coherence at the national level

Germany

Germany aims to reach 30 gigawatts of offshore wind capacity by 2030, 40 gigawatts by 2035, and 70 gigawatts by 2045. These targets were set in 2022–2023 to speed up the energy transition. As of late 2024, capacity stands at 9.2 gigawatts with 1,639 turbines in the North and Baltic Seas. Achieving the 2030 targets will require rapid expansion over the coming years. Germany has a structured policy and planning framework in place to guide this expansion while addressing biodiversity goals.

Key policies, planning instruments & tools

- **The Offshore Wind Energy Act**: The core legal framework for Germany, setting binding targets and regulating site planning, auctions, and permitting of offshore wind. The framework mandates the Federal Maritime and Hydrographic Agency to regularly issue a Site Development Plan that designates specific offshore areas and grid connection schedules to meet the expansion targets. While full transposition of the Renewable Energy Directive III is pending, the 2023 amendment of the Offshore Wind Energy Act anticipated the policy and includes acceleration areas for streamlined permitting.

- **The Environmental Impact Assessment Act**: Transposes the Strategic Environmental Assessment Directive and the Environmental Impact Assessment Directive, ensuring strategic and project-level environmental assessments. While Environmental Impact Assessments are simplified in acceleration zones, Strategic Environmental Assessments remain mandatory.

- **Federal Nature Conservation Act & Federal Water Act**: Transposes key EU environmental directives, including the Habitats, Birds, and Marine Strategy Framework Directives, into national law. These laws support the EU Biodiversity Strategy's objectives, including the 30% protection goal.

- **Spatial Planning Act**: Transposes the Maritime Spatial Planning Directive. Germany's 2021 maritime spatial plan designates space for energy, shipping, fishing, and conservation. While the plan designates new areas to support offshore wind expansion, it has been criticised for insufficiently integrating biodiversity needs.

Germany's mature offshore wind sector and integrated legal framework offer important insights for other countries. However, the rapid pace of expansion poses ongoing challenges, particularly around assessing and mitigating the cumulative environmental impact.

Barriers to reconciling biodiversity and offshore energy targets

- **Siloed organisational structures**: Offshore wind, permitting, and environmental policy are handled by separate ministries and agencies, which reinforces siloed approaches that prioritise sectoral mandates over integrated planning. The Federal Agency for Nature Conservation can object to plans that affect protected areas, but coordination remains weak

- **Ineffective science-policy interface**: Germany has a significant amount of scientific monitoring and research on offshore wind – for example, every project must conduct environmental monitoring (birds, marine mammals, benthos). The challenge is ensuring that this knowledge feeds back into policy and planning. One issue has been the slow incorporation of cumulative impact assessments into planning decisions.

- **Ineffective stakeholder involvement**: While formal mechanisms like consultations, advisory forums, and NGO-industry dialogues exist, they are often seen as ineffective. Stakeholders are involved in offshore wind development through formal consultations, advisory forums and industry-NGO dialogues. Stakeholder input, particularly from environmental groups, is not always reflected in final decisions.

What can other countries learn from Germany?

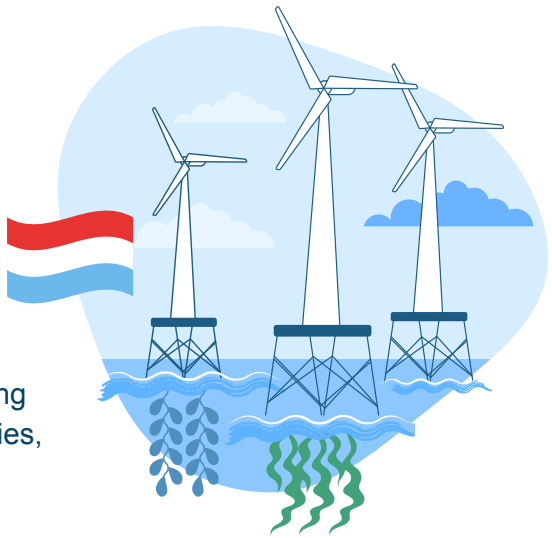
- **Clear legal frameworks and ambitious renewable energy targets**: Germany's approach shows how binding offshore wind targets combined with planning tools such as the Site Development Plan can accelerate offshore wind deployment while embedding essential environmental safeguards.

- **Integrating biodiversity into maritime spatial plans**: Germany's maritime spatial planning process is criticised for failing to integrate biodiversity objectives effectively, treating them as secondary to economic and energy priorities. Other countries could learn from this experience by effectively integrating biodiversity objectives into their marine spatial plans.

- **Enabling an effective science-policy interface**: Data collection alone is not enough. Germany's case shows the need for mechanisms that ensure environmental monitoring directly informs planning. This includes better data sharing, feedback loops into decision-making, and tools to evaluate cumulative and long-term impacts.

- **Improved stakeholder participation and transparency**: Germany's experience underscores the importance of meaningful stakeholder participation. Key improvements include clear feedback mechanisms, early and continuous engagement, and balanced representation of environmental and energy interests throughout the process.

The Netherlands



The Netherlands aims to expand its offshore ind capacity to 21 gigawatts by 2032, 50 gigawatts by 2040, and 70 gigawatts by 2050. The Dutch strategy is to integrate marine spatial planning, environmental assessments, and nature-inclusive design to balance energy production with biodiversity conservation. A key aspect of this strategy is the adoption of multi-use approaches, combining offshore wind with aquaculture and marine restoration, while ensuring strong stakeholder collaboration between governmental agencies, industry, and environmental groups.

Key policies, planning instruments & tools

- **North Sea Programme 2022-2027**: The Dutch marine spatial plan designates specific wind farm zones to minimize overlap with ecologically sensitive areas and integrates nature restoration measures alongside wind development to enhance marine ecosystems. This includes habitat restoration for species affected by fishing and other activities to strengthen biodiversity within and outside wind farms.

- **Strategic Environmental Assessments, Appropriate Assessments, and the Framework for Assessing Ecological and Cumulative Effects (KEC)**: These frameworks are used to evaluate wind farm environmental impacts. Research under programs like Wind op Zee Ecologisch Programma complements these assessments and drives innovation in biodiversity impact mitigation and restoration.

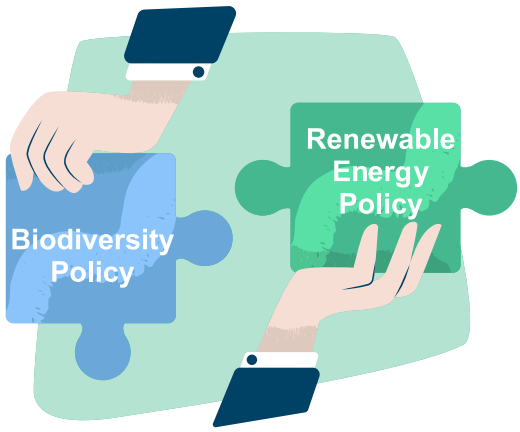
- **Nature-inclusive design and multi-use strategies**: The Netherlands promotes nature-inclusive designs that attract marine species and multi-use strategies that incorporate wind farms with aquaculture. Ecological criteria are now part of tender procedures, incentivizing developers to adopt biodiversity-friendly approaches.

- **Stakeholder engagement**: A hallmark of the Dutch approach is its emphasis on stakeholder engagement bringing together government agencies, environmental organizations, and industry players (e.g., North Sea Consultations and Community of Practice North Sea) to foster synergies between offshore wind development and marine ecosystem enhancement

The Dutch approach is notable for its emphasis on bringing various stakeholders together and creating synergies between offshore wind and marine ecosystem enhancement. This integrated strategy could serve as a model for other countries seeking to balance energy production with biodiversity protection.

Barriers to reconciling biodiversity and offshore energy targets

- **Limited influence of Strategic Environmental Assessments in early-stage site selection**: Decisions are often made before understanding comprehensive ecological impacts, particularly regarding cumulative and cross-boundary effects
- **Prioritization of renewable energy targets over biodiversity**: Mitigation or compensation measures are often used to replace preventive strategies for biodiversity protection.
- **Institutional fragmentation**: Multiple ministries with divergent priorities create inconsistencies in planning and permitting processes, hindering integrated, ecosystem-based management.



What can other countries learn from the Netherlands?

- **Integrated marine spatial planning and a one-stop-shop permitting systems**: Both processes emphasise the importance of early and coordinated stakeholder engagement to reconcile competing interests.
- **Transparent and collaborative decision-making**: Regular consultations, such as the North Sea Agreement, foster collaboration in decision-making among diverse sectors.
- **Inclusive stakeholder approach**: Combining sector-specific expertise with transboundary coordination offers a blueprint for enhancing coherence between environmental safeguards and energy objectives.

Norway

Norway, a newcomer to offshore wind, awarded its first 1.5 gigawatt capacity area in March 2024, with a target of 30 gigawatts by 2040. The country uses Strategic Environmental Assessments and Environmental Impact Assessments to evaluate environmental impacts before project approval. While well-positioned due to its vast marine areas and offshore ndustry expertise, balancing wind expansion with marine conservation is challenging, particularly for areas beyond territorial waters, where no biodiversity protection legislation currently exists.

Key policies, planning instruments & tools

- **Offshore Energy Act**: This act is the cornerstone of Norway's regulatory framework for offshore renewable energy production and stipulates that before the government can open an area, a Strategic Environmental Assessment must be conducted. Based on this assessment, a smaller sub-section can be opened and issued for a tender process. Once an area is awarded, the developer must conduct a project-specific Environmental Impact Assessment, which must be approved before a concession is granted.

- **Cross-sectoral process for site identification**: The identification of suitable areas is done through a cross-sectoral process that considers wind conditions, technical suitability, environmental conflicts, and impact on fisheries

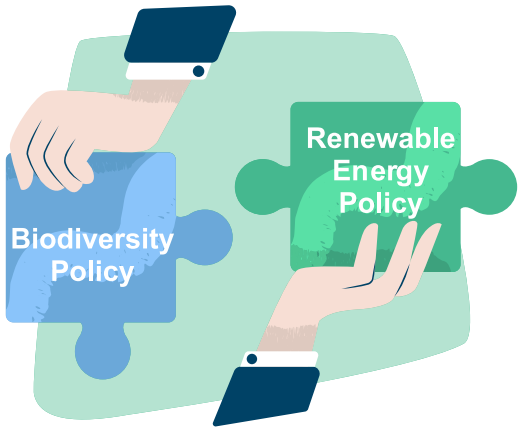
- **Integrated ecosystem-based ocean management plans**: These plans provide a framework for knowledge development and decision-making and include "particularly valuable and vulnerable areas".

- **The Nature Diversity Act**: It mandates that any activity must consider their impact on biodiversity and ecological processes; it emphasizes the precautionary principle, ecosystem-based management, and the need for scientific knowledge in decision-making. It allows to implement marine protected areas, though only in territorial waters. New legislation is currently under development to allow the implementation of marine protected areas beyond territorial waters.

Norway is taking a cautious, site-focused approach to offshore ind, prioritizing areas with minimal conflicts and elying on Strategic Environmental Assessments. However, the lack of established biodiversity protection laws creates regulatory challenges. As legislation evolves, ongoing research, monitoring, and adaptive management will be key to shaping a sustainable offshore wind secto .

Barriers to reconciling biodiversity and offshore energy targets

- **Limited alignment of offshore wind and ocean management plans**: There is a lack of clear guidelines on how offshore wind energy planning should relate to ecologically sensitive areas
- **Limited focus on cumulative and transboundary impacts**: The area-based approach of Strategic Environmental Assessments limits the ability to assess broader ecological effects
- **Limited focus of Strategic Environmental Assessments and Environmental Impact Assessments**: These assessments primarily focus on immediate impacts and mitigation measures, often overlooking broader environmental goals like restoration and nature-inclusive designs.



What can other countries learn from Norway?

- Strategic Environmental Assessments play a central role in the early stages of offshore wind energy governance and serve as potentially powerful tools in the planning process, delivering detailed information and identifying knowledge gaps and needs.

E Key factors limiting policy coherence

The cases of Germany, the Netherlands and Norway exemplify that there are key factors limiting policy coherence across Europe that must be addressed to ensure the alignment of offshore wind and biodiversity policy. The following key factors have been identified:

Scientific knowledge gap: One of the key challenges is a lack of comprehensive data on the impact of offshore wind farms on marine biodiversity, making it difficult to ensure that renewable energy expansion aligns with conservation objectives.

Legal exemptions: The Renewable Energy Directive III allows exemptions from the duty to carry out Environmental Impact Assessments for offshore wind projects located in designated acceleration areas, which may result in biodiversity impacts being overlooked.

Limited impact assessments: Assessments of ecological impact are often limited to protected, red listed, and commercial species, which means that the larger ecological effects of offshore wind have not been considered. Moreover, there are currently no proper cumulative impact assessments in place.

Power imbalances: The Marine Strategy Framework Directive lacks the regulatory authority at the national level to influence energy planning decisions and does not have adequate descriptors on the ecological impacts of offshore wind. Meanwhile, the Renewable Energy Directive III has the power to prioritize renewable energy expansion over biodiversity considerations through exemptions and streamlined permitting.

Overriding public interest: Under the Renewable Energy Directive III, offshore wind projects are granted the status of 'overriding public interest' by default, making it more difficult to challenge developments on environmental grounds. While this policy is intended to streamline the energy transition, it potentially sidelines biodiversity concerns, reducing the scope for stricter environmental assessments.

F Recommendations

- **Strengthen maritime spatial planning**, establishing ‘go-to’ and ‘no-go’ areas for offshore wind development based on ecological impact assessments. For maritime spatial plans to be effective in steering development away from sensitive and important ecosystems, they must be legally binding, enforceable, and capable of integrating sectoral interests (including energy and biodiversity conservation).

- **Make the good environmental status objective under the Marine Strategy Framework Directive legally binding**. This would represent a major step in helping to align renewable energy expansion with marine conservation goals.

- **Strengthen early-stage Strategic Environmental Assessments** to provide detailed assessments of ecological impacts, and to ensure that cumulative and transboundary ecological impacts are fully considered before sites are designated, rather than relying on mitigation measures later in the process.

- **Develop a robust cumulative impact assessment framework**, including comprehensive baseline data and standardized ecological thresholds, to quantify long-term and cross-sectoral effects. This framework should integrate the Marine Strategy Framework descriptors to ensure that biodiversity is prioritized alongside energy goals.

- **Enhance coordination and integration among governmental agencies** by establishing or strengthening interdepartmental consultation mechanisms. These processes should ensure that environmental objectives are given equal weight alongside renewable energy goals.

- **Systematically integrate mitigation measures into planning and assessment processes** for offshore wind developments by including best practices on avoidance, restoration, and offsetting. This will promote long-term ecological benefits and encourage restoration and nature-inclusive designs in offshore wind projects

- **Implement adaptive management**, so that the operation of existing wind parks can respond to new scientific knowledge (for example through the inclusion of start-stop procedures when more information is available).

- **Make stakeholder engagement processes more effective**, timely, and legitimate, through both formal processes like the North Sea Consultation and informal platforms such as the Community of Practice North Sea. This can foster innovative, nature-inclusive design and multi-use strategies that reconcile renewable energy expansion with marine ecosystem conservation.

Conclusion

Improving policy coherence between offshore win energy development and biodiversity protection is essential for achieving the goals set out in the European Green Deal. The Renewable Energy Directive III, the EU Biodiversity Strategy for 2030, and the Marine Strategy Framework Directive all provide critical frameworks, but their integration and alignment face challenges. Strengthening coordination, ensuring early-stage comprehensive assessments, and reevaluating legal exemptions for offshore wind projects will be important steps in creating a truly integrated policy framework. Ensuring the coherence of these policies is pivotal in supporting both the EU's renewable energy ambitions and its commitment to safeguarding marine biodiversity for the health of European ecosystems.

This Roadmap is a result of the CrossGov project which aims to enhance knowledge on how coherence and cross-compliance of marine related policies and legislation affect the ability to realise the EU Green Deal's goals. The roadmap is based on the findings from the following CrossGov publications and reports:

- Handbook on Policy Coherence: An easy guide to assess and understand policy coherence
- Mapping EU policies and Green Deal objectives: observations for policy coherence in the marine domain, page 49-55
- Scoping: Concretising the policy targets and developing key scenarios, page 18-24
- Horizontal coherence in EU law and policy: Analysing, explaining and improving the horizontal coherence of EU policy design, page 19-21, 94-95, 105

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