Reconciling offshore wind and biodiversity targets: Are we on track to realise the European Green Deal?

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Theme: Governance

Workshop Summary

The European Union faces a challenge in reconciling its ambitious offshore wind energy goals with the imperative to protect marine biodiversity. As the EU races to combat climate change, the rapid expansion of offshore wind farms has emerged as a key strategy. However, this surge in renewable energy development raises critical questions about its impact on fragile marine ecosystems.

The European Green Deal sets forth a vision of sustainable growth, aiming to achieve climate neutrality while preserving and restoring biodiversity. Yet, as offshore wind capacity targets soar—with plans to increase from the current 12 GW to over 300 GW by 2050—concerns mount over the potential ecological consequences.

This tension between renewable energy expansion and marine conservation highlights a fundamental question: How can we ensure policy coherence between these two crucial objectives? The EU's progress in climate action, exemplified by the Climate Law and Renewable Energy Directive III (REDIII), has outpaced measures to safeguard marine biodiversity. This imbalance underscores the need for a more integrated approach.

At the 3rd Blue Mission BANOS Arena in Amsterdam in November 2025, the CrossGov team hosted a workshop on the topic, taking a closer look at how Norway, the Netherlands, and Germany are balancing offshore wind energy expansion and biodiversity protection. Each country is at a different stage in its offshore wind journey, employing unique strategies to reconcile renewable energy expansion with ecological conservation.

Norway: A Newcomer with Potential

Norway, a relative newcomer to offshore wind, awarded its first 1.5 GW capacity area in March 2024, with plans for 30 GW by 2040. The country's approach is still evolving, focusing on:

1. Selecting areas with optimal wind conditions and minimal environmental conflicts
2. Prioritizing sites far from the coast, seabird colonies, and major fishing zones
3. Developing new legislation to protect areas beyond territorial waters
4. Utilizing mandatory Strategic Environmental Assessments (SEAs) to evaluate potential environmental impacts

Norway's vast maritime areas and strong offshore expertise from its oil and gas industry position it well for future offshore wind development. However, the country faces challenges in balancing this new industry with its traditional fishing sector and pristine marine environments.

The Netherlands: A Multi-faceted Approach

The Netherlands has set aggressive targets: 21 GW by 2030, 50 GW by 2040, and 70 GW by 2050. Their comprehensive strategy includes:

1. Marine Spatial Planning (MSP) to designate wind farm zones while minimizing overlap with ecologically sensitive areas
2. Implementing the North Sea Programme, which incorporates nature restoration measures alongside wind farm development
3. Employing SEAs, Appropriate Assessments, and the Framework for Assessing Ecological and Cumulative Effects (KEC)
4. Encouraging nature-inclusive design practices and multi-use approaches, combining wind farms with aquaculture or passive fisheries

The Dutch approach is notable for its emphasis on 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.

Germany: A Mature Market with Comprehensive Planning

Germany aims for 30 GW of offshore wind capacity by 2030, 40 GW by 2035, and 70 GW by 2045. The country's approach is characterized by:

1. Utilizing Marine Spatial Planning and the 2021 Maritime Spatial Plan
2. Conducting SEAs to evaluate environmental impacts, including cumulative and transboundary effects
3. Implementing the Site Development Plan as a cornerstone of the planning and allocation process
4. Integrating EU directives such as the Habitats and Birds Directives and the Marine Strategy Framework Directive into national law

Germany's mature offshore wind sector and comprehensive planning approach provide valuable lessons for countries at earlier stages of development. However, the rapid expansion also presents challenges in managing cumulative environmental impacts.

Comparative Analysis and Challenges

While all three countries are making efforts to protect biodiversity alongside offshore wind development, several challenges and differences emerge in their approaches. Norway, being in the early stages of strategy development, is currently creating new legislation for offshore protection. In contrast, the Netherlands and Germany have more established frameworks, having already integrated EU directives into their national laws.

The countries also differ in their spatial planning approaches. The Netherlands emphasizes multi-use strategies, combining wind farms with other activities such as aquaculture or nature restoration. Germany, on the other hand, focuses on comprehensive marine spatial planning. Norway's approach is primarily based on careful location selection to minimize conflicts with existing marine activities and environmental concerns.

In terms of assessment tools, each country has its own focus. The Netherlands employs specific instruments like the Framework for Assessing Ecological and Cumulative Effects (KEC) to evaluate biodiversity impacts. Germany is working on expanding its assessment capabilities to better understand cumulative effects. Norway, at this stage, relies primarily on Strategic Environmental Assessments (SEAs) for evaluating potential environmental impacts.

Nature-inclusive design is another area where approaches differ. The Netherlands has taken a strong lead in integrating nature-inclusive designs in wind farms, actively incorporating measures to enhance marine ecosystems within offshore wind projects. This feature is less prominent in the German and Norwegian approaches, although both countries are increasingly considering such measures.

These differences reflect the varying stages of offshore wind development and environmental policy integration among the three countries, with each adapting its strategy to its specific context, regulatory environment, and ecological challenges.

Biodiversity Protection: Sufficiently Safeguarded?

The rapid expansion of offshore wind energy, particularly in Germany and the Netherlands, raises significant concerns about cumulative effects on marine ecosystems. While efforts are underway to protect biodiversity, several critical issues remain unresolved.

One major concern is the long-term impact of multiple wind farms on marine ecosystems, which is not yet fully understood. The expansion into deeper waters could alter local and regional hydrodynamics, affecting prey availability for various marine species.

Additionally, the effects on migratory species, including birds and marine mammals, necessitate transboundary cooperation and assessment. For instance, underwater noise from construction activities poses risks to marine mammals, while migratory birds may face collision hazards.

Seabed habitats also require attention. While offshore structures can create artificial reefs that enhance local biodiversity, they may simultaneously disrupt soft sediment habitats. The ecological implications of these changes need further investigation.

Balancing wind farm development with sustainable fisheries poses another challenge. While the exclusion of trawling activities near wind farms can boost local biological productivity, it raises questions about the displacement of fishing efforts and its broader ecological impacts.
Finally, effective long-term monitoring programs and adaptive management strategies are crucial but still in development. Future research should focus on understanding how offshore wind farms influence primary production and interact with climate change and fisheries dynamics.

While all three countries are making efforts to protect biodiversity alongside offshore wind development, several challenges remain. Norway's approach is still in its early stages, with biodiversity protection legislation in progress. The Netherlands has implemented a developed strategy, but cumulative effects on seabirds and marine mammals remain a concern. Germany has an established framework, but the rapid expansion of offshore wind raises questions about the effectiveness of marine protected areas. The rapid expansion of offshore wind, particularly in Germany and the Netherlands, raises concerns about cumulative effects on marine ecosystems.

Conclusion and Future Outlook

While Norway, the Netherlands, and Germany are making strides in balancing offshore wind development with biodiversity protection, biodiversity protection continues to lag behind and is effectively being prioritised as a secondary goal. The rapid pace of offshore wind expansion necessitates continued research, monitoring, and adaptive management.

Moving forward, increased collaboration between these countries and others in the North Sea region will be crucial. Sharing best practices, coordinating spatial planning, and conducting joint research on cumulative impacts could lead to more effective strategies for protecting marine biodiversity while meeting renewable energy goals. As the offshore wind sector continues to grow, these countries' experiences will provide valuable insights for other nations seeking to develop their offshore wind resources sustainably. The challenge lies in maintaining the momentum of renewable energy expansion while ensuring the long-term health and resilience of marine ecosystems.