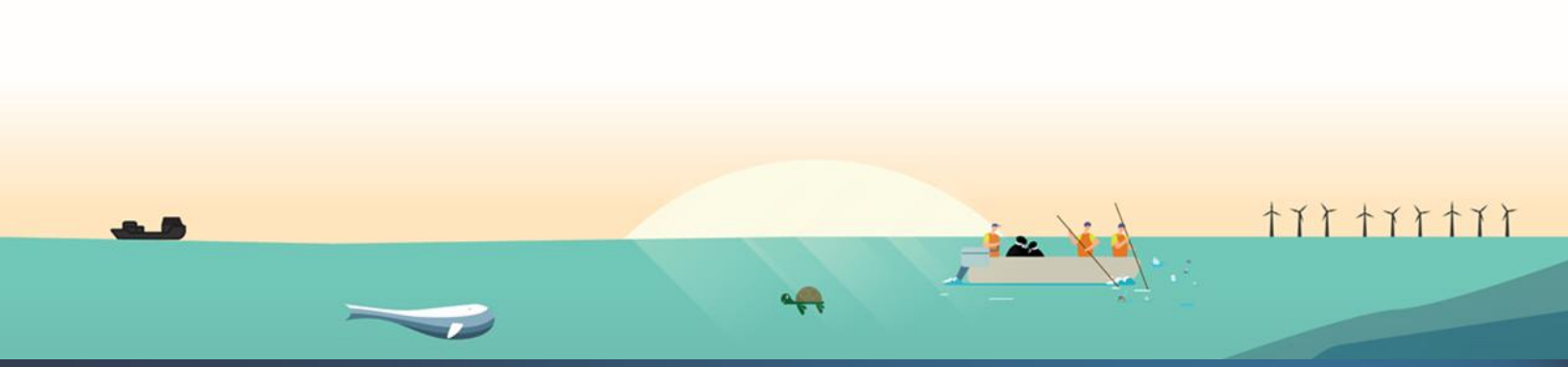

A Strategy for Europe's Resilient and Socially Just Energy Transition to 2050 – Energy Islands as Part of the Solution

Policy Brief

December 2025

Highlights

- Energy islands and offshore wind energy can play a crucial role in the green transition, provided that the economic, environmental, and social aspects are taken into consideration.
- Currently, the green transition is slowed down by fragmented governance, inadequate market design, and persistent social and environmental opposition.
- To facilitate the implementation of large energy projects, EU policymakers should (among others): (1) Mandate social and financial certainty; (2) Harmonize permitting and planning across the EU; (3) Ensure grid resilience and integration; (4) Structure a just and green transition.
- This policy brief is a result of research conducted by the PERMAGOV project which sets out to improve EU marine governance so that it can better meet the goals and objectives established in the European Green Deal.

Policy Objectives

To meet the 2050 climate goals of the European Green Deal (EGD), Denmark announced in 2020 the development of energy islands. These are large hubs located on natural and artificial islands which should generate, process, and distribute offshore wind energy.

Of the two energy islands planned by Denmark, the Bornholm energy island in the Baltic Sea has received the status of Project of Common Interest (PCI) within the EU. This means it can benefit from faster planning and permit approvals and from increased visibility to investors. Energy islands have the potential to become an example for future installations around the world, and therefore it is crucial to consider the social dimensions: a socially-just energy island is an infrastructure where the needs of all the stakeholders are considered, and not a project which is implemented with a top-down approach.

Several challenges have led to the delay of the Bornholm energy island and to the indefinite postponement of the artificial island located in the North Sea.

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Major geopolitical disruptions affected the implementation of the two projects but, at the same time, Europe's transition to a 100% renewable energy system is currently constrained by three major systemic challenges that negatively affect the establishment of offshore wind (fundamental for the implementation of energy islands).

These challenges are:

- **Fragmented governance:** The EU, national governments, and local municipalities view these projects differently, resulting in uncertainty and perceived top-down implementation.
- **Inadequate market design:** For projects and related infrastructure implementation, the current market design is unfavourable, which leads to a higher risk of investment for energy companies and, consequently, a lower interest in offshore implementation.
- **Persistent social and environmental opposition:** As local communities, with their social and environmental concerns, are not sufficiently involved in the planning of energy islands, projects can be delayed or cancelled, slowing down the green transition. Insights from our research highlight the importance of agreeing on a shared vision in which energy islands contribute positively to climate action, biodiversity protection, and local development. The latter means that the energy islands must ensure that affected communities experience real and lasting benefits.

Thus, to secure climate goals and ensure a socially equitable transition, the EU and national governments must implement a unified strategy that links finance, infrastructure, and local acceptance. The recommendations in this policy brief aim to support policymakers, authorities, and industry in shaping a just, trusted, and sustainable offshore energy future.

1. Overcoming Systemic Coordination and Governance Failures

A fundamental impediment to the green energy transition is the systemic fragmentation between the different planning levels (from municipal to EU), regulatory sectors (energy, nature, fisheries), and the supply/demand infrastructure: EU and national governments can set goals for green energy implementation, but the burdens (both social and environmental) of these decisions ultimately fall on municipalities. Furthermore, the installation of offshore wind turbines and the implementation of energy islands make sense only if the supply of green energy is coupled with a relevant demand, in a cost-effective way (for both sides).

1.1 The disconnects in energy- related infrastructure planning

Infrastructure development is severely hampered by a lack of coordination, as evidenced by:

- **The hydrogen disconnect:** The failure to seamlessly link renewable energy supply (e.g. energy produced by offshore wind farms) with demand infrastructure (e.g. hydrogen pipelines, meant to store and transfer energy to utilisation points), creates uncertainty for investors. Successful policy requires a mandated alignment between offshore wind projects and tangible hydrogen offtake plans, to ensure connection between supply and demand.
- **Transmission bottlenecks:** Vital transmission lines (e.g. German Direct Current lines) are severely delayed due to local opposition and lengthy, fragmented environmental permitting, both within and across EU countries. This highlights the need for streamlined permitting procedures, combined with processes that secure public acceptance, to secure the physical transfer of energy.

1.2 Fragmentation in governance and decision-making

Large, green energy transition projects, and particularly energy islands (due to their cross-border nature), face major challenges due to unevenly distributed governance authority:

- **Multi-level fragmentation:** The EU sets targets and national authorities decide on the sites, while municipalities that are the host communities often have limited formal influence on the establishment of energy islands. This results in uncertainty about project implementation and a perception of top-down decision-making that is not aligned with the policy objective of socially equitable transitions.
- **The permitting barrier:** Slow, complex, and unpredictable national permitting processes are the biggest non-financial barrier slowing the deployment of renewable energy.

2. Reforming Market Mechanics and Securing Investment

To secure financing, protect taxpayers from excessively expensive or inadequate solutions, and foster a competitive European supply chain (so that the green transition can also secure local jobs), the focus must shift from the sole pursuit of the lowest price, to balancing cost with long-term security, local benefit, and industry strength.

2.1 Mandating financial stability with two-sided Contracts for Difference

To de-risk investment and provide necessary price certainty while protecting the public purse, the use of market models must be reformed:

- **Two-sided Contracts for Difference (CfDs):** This mechanism is essential, providing developers with a stable floor price to secure financing, while allowing the state to claw back excess profits during periods of high market prices, aligning risk and reward.
- **Integrated demand signals:** This stability should be strengthened by increasing the use of Power Purchase Agreements (PPAs), particularly leveraging the large, stable purchasing power of the public sector (e.g. hospitals, government buildings).

2.2 Fostering a European supply chain

To prevent the type of economic collapse seen in the European solar industry and ensure energy security, procurement must become strategic:

- **Non-price criteria:** Future tenders for offshore wind energy production must integrate criteria such as security of supply (control over essential components), local production, and sustainability alongside cost. This ensures that the climate transition benefits European industry and reduces excessive dependence on non-European suppliers, while also meeting social and ecological sustainability goals.

3. Building Social Acceptance and Ensuring a Just Transition

Public opposition and concerns over equity and environmental impact are major bottlenecks. Policy must mandate mechanisms that ensure tangible local benefits and responsible ecological stewardship. Social acceptance is not an automatic outcome of technical optimisation; it is a result of trust, fairness, and meaningful inclusion of the people who are affected.

3.1 Mandatory co-creation and benefit-sharing

To address the common local concern of insufficient local influence and the absence of clear benefits:

- **Early inclusion of stakeholders:** Mandate co-creation processes that include stakeholders at an early stage in discussions about the location of major infrastructure, rather than having late-stage consultations. This can be done, for example, through citizens' assemblies.
- **Ensure fair benefit distribution:** Create formal benefit-sharing mechanisms, such as:
    - Local Development Funds linked to energy island or project revenues.
    - Public/citizen co-ownership models, allowing local investment in projects to build trust and to ensure direct returns.
    - The design of transparent and predictable compensation schemes.
- **Respect for local identity and place-based knowledge:** recognise that communities hold valuable insights into marine use, cultural landscapes, and local priorities.

3.2 Strengthen industrialisation in the EU

The transition must serve as an active industrial policy that strengthens competitiveness in the EU while meeting European Green Deal objectives.

- **Targeted industrial support:** Policy must provide stable, long-term financial and technical support to help high-emitting industrial sectors in EU (e.g. steel, chemicals) decarbonise their processes, rather than forcing relocation or closure.
- **Skills and employment:** Investment should be directed towards re-skilling and up-skilling programs for workers transitioning out of fossil fuel sectors, creating the skills needed for the green transition.

3.3 Integrate environmental protection

Energy projects can threaten sensitive marine and coastal ecosystems, and thereby biodiversity goals. Environmental governance must be proactive, long-term, and transparent. These aspects can be strengthened through:

- **Data and baselines:** Requirements to establish robust biodiversity baselines before permitting is granted.
- **Long-term monitoring:** Establish joint monitoring platforms (government, industry, civil society, academia) and ensure open access to real-time environmental data.
- **Nature-positive design:** Apply nature-positive design principles to infrastructure development to minimize cumulative impacts and habitat disturbance.

4. Strategic Planning for a Resilient 2050 Energy System

Successful energy policy requires planning for a multi-faceted, resilient energy system that looks beyond immediate challenges.

4.1 Offshore wind and strategic placement

Offshore wind energy is a critical technology for the coming decades in meeting climate goals within a short time-frame. However, its supporting infrastructure must be smart, allowing for financial and social sustainability:

- Energy islands can optimise the utilisation of wind energy, if they are developed with the demand-side in mind.
- Placing Power-to-X (P2X) facilities (i.e. energy conversion plants) offshore is economically inefficient because the excess heat generated cannot be utilised for other purposes. Policy must mandate land-based P2X facilities near district heating systems to maximise energy efficiency.
- Small scale, decentralised installations (e.g. rooftop solar photovoltaic, household wind turbines, and biogas plants) can support the infrastructure by covering the demand locally and therefore reducing the need for large, expensive and slow-to-develop transmission lines.

4.2 Regional grid integration

To maximise the use of intermittent renewables across the continent, grid integration must be accelerated:

- Interconnection: Rapidly invest in cross-border interconnectors and ensure the full synchronisation of the EU's internal power grids to allow the efficient flow of wind power from the North and solar power from the South.
- Harmonisation: Simplify grid access by compelling national regulators to harmonise technical standards and procedures across the EU region.

5. Key Recommendations for a Unified Strategy

- **Mandate social and financial certainty:** Implement Two-Sided CfDs, (which allow for a stable economy of the energy plants) and formal benefit-sharing mechanisms (e.g. local funds and citizen ownership) to de-risk investment while securing local acceptance and protecting taxpayers from excessive compensations to energy companies.
- **Harmonize permitting and planning:** Establish an EU-wide 'Gold Standard' for permitting, standardising time and requirements needed for the establishment of energy infrastructure. Mandate co-creation stages in major infrastructure planning (e.g. energy islands, transmission lines).
- **Ensure grid resilience and integration:** Prioritise cross-border interconnection in EU, rapidly deploy flexible capacity (e.g. through battery storage, renewable gas power plants), and strategically locate P2X facilities on land near district heating systems to maximise energy efficiency.
- **Structure a just and green transition:** Integrate non-price criteria (local content, security, environment) into tenders. Implement re-skilling programs enabling the European workforce to contribute to the green transition. Set requirements to secure long-term environmental monitoring and open access to data.

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