MARINEWIND

Market Uptake Measures of Floating Offshore Wind Technology Systems (FOWTs)

Booklet on MARINEWIND Recommendations

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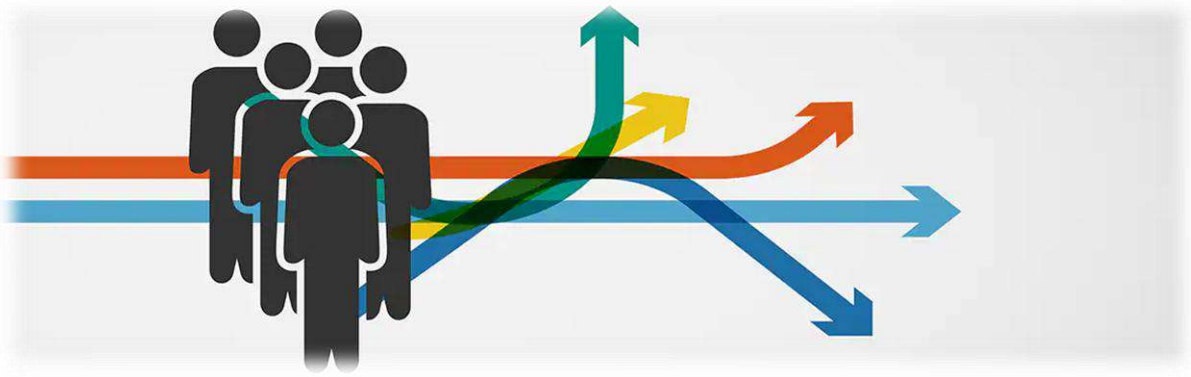
INTRODUCTION

MARINEWIND is a 3-year Coordination and Support Action which started in November 2022 and is supported by the European Union within the framework of the Horizon Europe programme **(GA No 101075572)**. It aims to identify bottlenecks and potential opportunities to strengthen the **Floating Offshore Wind Technologies (FOWTs)** and increase their market uptake across Europe. Particularly, it aims to:

- Increase awareness towards developing political and business agendas open to the floating offshore wind energy opportunities,
- Increase social acceptance of FOWT via science-based evidence and tools,
- Contribute to the development of efficient financial frameworks to support further investments in FOWT,
- Provide solutions characterized by a wide potential for reapplication and long-term viability.

This booklet brings together **key recommendations from the MARINEWIND** project to support the development and market uptake of FOWTs across Europe. It is based on the MARINEWIND deliverable **"D4.2_Recommendations for MARINEWIND Stakeholders"**, which is the result of joint efforts by the MARINEWIND partners and concerns the countries to which the five MARINEWIND Labs belong, namely Italy, Spain, Portugal, the United Kingdom and Greece, as well as the European level.



Its main objective is to offer clear, practical guidance to a wide range of stakeholders - from public authorities and SMEs to industry actors, citizens, and research communities – informing, inspiring and supporting decisions that will shape the future of floating offshore wind in Europe. The recommendations aim to help overcome barriers to floating offshore wind, such as social acceptance, environmental protection, permitting challenges, and supply chain and technology readiness.

What's inside the booklet

- **Introduction**: Explains the purpose of the booklet, and who it's for.
- **Stakeholder Recommendations**: Presents the national and European-level recommendations for all stakeholders, structured by country and topic.
- **Conclusions**: Highlights key takeaways and the next steps for turning these recommendations into real-world impact.

MARINEWIND STAKEHOLDER RECOMMENDATIONS

Based on the experiences and outcomes of the MARINEWIND project, this section provides practical recommendations designed to guide stakeholders in advancing floating offshore wind development. The recommendations are structured in two parts:

- those applicable and relevant at many countries at **European level**, and
- tailored guidance for country **Lab specific contexts**.

To make this booklet easier to navigate, a set of icons is used to highlight key information about each recommendation. Here's what they mean:

🗂️ **Relevant project Work Package(s)** – The part of the MARINEWIND project where this topic was explored.

📄 **Relevant project Deliverable(s)** – The official project report(s) that support this recommendation.

🗺️ **Geography Level of reference** – Whether the recommendation applies at a specific Lab or European level.

➡️ **Dimension of the recommendation** – The main area it addresses, such as policy, environment, social, economic, or technological aspects.

👥 **Target stakeholders** – The groups most affected by or involved in implementing the recommendation.

📌 **High level recommendation** – The broader challenge to be addressed by the specific recommended action(s).

This paragraph presents recommendations applicable across many countries at the European level, drawing on the MARINEWIND project's insights and engagement with stakeholders. They aim to inform EU stakeholders by addressing cross-border challenges and opportunities to advance the sustainable development and market uptake of FOWT throughout Europe.

#1 🏷️ Innovative and sustainable technological solutions in FOWT development 🏷️

🗂️ WP2 – Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of Social and Environmental Barriers and Enablers

🗺️ European level

➡️ Environmental, Technological

👥 Industry, Public Authorities

📌 ***Mitigation of the negative environmental impacts on marine ecosystem***

🧩 **Context:**

The specificities and size of FOWT projects introduce new environmental conditions from the construction stage to their operation and decommission. The main environmental concerns raising from these conditions are acoustic and electromagnetic disturbances, impacts on seabirds, changes in atmospheric and oceanic dynamics, alteration of seabed integrity and water quality due to the presence of moving artificial structures, effects on the marine species behaviour due to the presence of mooring lines and submarine cables or an increased risk of accidents, related to a higher density of marine space use.

There are feasible technological solutions that could be applied on FOWT projects and not only reduce the negative environmental impact on marine ecosystems but also increase the positive ones. To this end, the need for faster environmental impact assessment, and licensing, could be met through these innovative technologies, which would ensure certain sustainability standards.

🎯 **Description:**

The interaction of FOWT with marine ecosystems can manifest through a complex range of environmental impacts. Innovative technological solutions should be developed to minimize the negative and maximize the positive environmental impacts on marine ecosystems and facilitate the development of FOWTs. Such technologies are: (i) Shielding of cables, (ii) Non-toxic coatings, (iii) Bird detection technologies for automated braking, and (iv) Noise dampening systems.

✨ **Who is involved and potential Benefits:**

The introduction of innovative solutions can facilitate the environmental impact assessment in the licensing process and make the investment in FOWTs more attractive.

Industrial Stakeholders

- **Economic growth**: Applying innovative technologies on the development of FOWTs will contribute to increased market share and economic development of industrial stakeholders specialized in these technologies.
- **Shorter licensing process**: By using innovative technologies that reduce negative environmental impacts by design, investors can obtain faster the license to develop and operate a FOWT, as the environmental impact assessment will be completed in a shorter period of time.
- **Preservation of Ecosystems**: By reducing disruption to marine and coastal ecosystems, these projects help maintain biodiversity, which is vital for local industries such as tourism and fishing.

Public Authorities (Local, Regional, and National Governments)

- **Enhanced public support**: Projects with minimized environmental impacts are likely to face less resistance from local communities and stakeholders, simplifying approval processes and ensuring smoother project implementation.
- **Alignment with Sustainability Goals**: Environmental-friendly designs support national climate targets and reinforce public authorities' commitment to sustainable development.
- **Improved Investor Confidence**: Environmentally sustainable designs can attract investors who prioritize ESG (Environmental, Social, and Governance) criteria.

🔗 **References:** [2], [39], [40]

#2 🏷️ **Enhance grid connection and ease power transmission** 🏷️

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.2 – Analysis of technological barriers and enablers of floating offshore wind

🗺️ European level

➡️ Technological

👥 Industry, Academia

📌 ***Facilitate technological maturity for developing FOWTs***

🧩 **Context:**

Grid connection and power transmission are critical components in the development and efficient operation of FOWTs. These systems ensure that generated energy is reliably delivered to onshore grids, overcoming unique challenges related to distance, environmental conditions, and technical constraints.

As FOWTs are located far from the coastline, the cost of grid connection rises significantly due to the need for longer undersea cables and advanced technologies to minimize energy loss. Along with the increasing deployment targets and rapid installation schedules the seamless integration of offshore wind farms into onshore grids is further complicated.

Additionally, FOWTs are subject to constant motion from waves and currents, demanding flexible yet durable cabling systems capable of withstanding harsh environmental conditions over their

operational lifespans. Installing subsea cables presents additional challenges, requiring careful consideration of varying water depths, seabed conditions, and potential conflicts with marine ecosystems or existing infrastructure, such as shipping lanes and telecommunications networks.

These challenges underscore the need for innovative solutions to enhance grid connection and ease power transmission, ensuring the viability and scalability of FOWTs.

🎯 **Description:**

The recommendation aims to promote the adoption of advanced technologies to boost technological maturity in terms of developing FOWTs. For instance, the innovative transmission technologies Modular Multilevel Converters (MMCs) and High Voltage Direct Current (HVDC) systems can be used in flexible DC transmission. Additionally, dynamic, robust and flexible cables, along with specialized connectors, protectors and ancillary equipment can increase efficiency, reliability, and durability of grid connections and power transmission for FOWT projects, even under challenging environmental conditions. Finally, efforts in the domain of floating platform designs should be enhanced to optimize stability and efficiency, while considering environmental conditions.

✨ **Who is involved and potential Benefits:**

The recommendation offers significant benefits by enhancing industry efficiency and reliability while driving academic innovation through research opportunities and advancements in grid connection and power transmission technologies.

Industrial Stakeholders

- **Lower Costs**: Improved grid connection and transmission technologies lower operational costs, enhance reliability, and make large-scale FOWT projects more viable. This boosts profitability and competitiveness, encouraging further investment and innovation.
- **Risk mitigation**: By ensuring robust and reliable infrastructure, technical challenges such as dynamic cable durability, drift-off effects, downtime and maintenance costs are reduced, minimizing the operational risks and improving the overall project feasibility and profitability.

Academia

- **Pushing of State-of-the-Art**: Researchers and Academic institutions could leverage the focus on advanced technologies to drive innovation and develop new methodologies or materials. This could lead to breakthroughs in dynamic cable systems, improved efficiency, and comprehensive study of environmental impacts.
- **Collaboration with Industry**: Academic institutions can utilize their expertise and research in advanced technologies and materials to foster collaboration with industry and unlock funding opportunities.

🔗 **References:** [4], [41], [42]

#3 🏷️ Foster the knowledge sharing with forerunner countries in the Floating and Offshore Wind sector 🏷️

🗂️ WP1 - Policy framework assessment and co-creation, WP2 - Social acceptance and environmental impact analysis, WP3 – Financing, techno-economic analysis and survey

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D2.1 – Analysis of social and environmental barriers and enablers, D3.1 – Analysis of financial and market barriers and enablers, D3.2 – Analysis of technological barriers and enablers

🗺️ European level

➡️ Policy, Regulatory, Social, Environmental, Financial, Market, Technological

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation

📌 ***Closing the knowledge gaps in terms of technological solutions, skills needed, investments schemes and indication on how to shape a supportive regulatory and policy framework by leveraging on the insights provided by operating wind farms***

🧩 **Context:**

Key barriers hindering the development of FOWTs in the Mediterranean countries are resulting from multiple factors, which could be summarised as follows:

- Multiple and competing instances resulting from economic, environmental and social considerations to be considered and adequately balanced in the definition of the objectives.
- Lack of clear policy framework and well-defined incentives to attract investors.
- Shortcomings linked to a predominant decentralised and "developer-led" approach.
- Lack of a well-trained local workforce along the whole value chain.
- Bureaucratic hurdles in approval processes leading to obstacles and delays.
- Lack of a shared vision amongst policymakers on the role of offshore wind in the energy mix, which does not match with the objectives of the energy transition.

To guide a sustainable and responsible development of FOWTs, overcoming the above-mentioned barriers, the EU Mediterranean countries could leverage on the expertise of forerunner countries – such as Denmark, Norway and the United Kingdom – through the establishment of synergies and a process to foster the knowledge exchange, closing the gaps at different levels, covering the technological, regulatory, financial and educational aspects.

For this purpose, the experience of the WINDMED project could be used as a best practice. In fact, in order to facilitate the exchange of best practices between Denmark and other Mediterranean countries, the project has established a close cooperation with the Danish Embassy in Italy, securing a strong involvement of wind sector stakeholders and public authorities.

🎯 **Description:**

To accelerate the deployment of FOWTs in the Mediterranean Sea, following the path of the forerunner countries, the EU has to undertake a well-defined process to foster the exchange of knowledge and best practices that will help to close the existing gaps from the technological, regulatory, financial and educational perspectives.

✨ **Who is involved and potential Benefits:**

The establishment of synergies and cooperation actions oriented towards the exchange of knowledge and best practices between the Mediterranean area and forerunner countries in the FOWT sector has cascading effects on all the stakeholder groups. The expected benefits are listed below, according to the different categories:

Industrial stakeholders & Green innovators

Indications on the type of technologies and materials to be applied, how to address technological challenges (e.g., regarding floaters assembly and design, dynamic cables, floating sub-stations), type of expertise needed and well-established training programmes to be replicated, how to optimise the use of the maritime space amongst different projects, learning from on available data, be prepared for the authorisation process.

Public Authorities

Insights on the type of interventions needed at the policy level to foster the deployment of FOWTs in terms of integration of different perspectives and needs into a comprehensive framework; methodologies on how to ensure the engagement of the community; regulation of the provision of financial incentives for developers and energy management for the communities, indications on how to simplify and accelerate the authorisation process, with the ultimate goal to achieve the energy targets.

Academia

Leveraging on a huge amount of data, covering the assessment of the environmental impact, the latest technologies developed, and the type of materials applied, to further enrich and expand their studies.

Civil society

Experimenting the socio-economic benefits from first-hand experiences and benefitting from well-established training programmes, having a clearer overview of the impacts stemming from the implementation of an offshore wind farms.

🔗 **References:** [1], [2], [3], [4], [5], [6]

#4 🏷️ **Foster the development of a European supply and value chain** 🏷️

🗂️ WP1 - Policy framework assessment and co-creation, WP2 - Social acceptance and environmental impact analysis, WP3 – Financing, techno-economic analysis and survey

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D2.1 – Analysis of social and environmental barriers and enablers, D3.1 – Analysis of financial and market barriers and enablers, D3.2 – Analysis of technological barriers and enablers

🗺️ European level

➡️ Policy, Regulatory, Social, Environmental, Financial, Market, Technological

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Need to reduce EU dependency in terms of supply of critical raw material & energy provision***

🧩 **Context:**

Despite the overall positive development in the past, the European wind industry currently faces major problems exacerbated by geopolitical instability, growing competition from abroad and rapid technological changes. The main factors hindering the full potential of the EU wind industry are:

- Uncertain demand for wind turbines in the EU due to the lack of a clear overview of the planned wind deployment at the national level, leading to an inadequate planning of investments and the under-utilisation of the production capacities.

- Complex permitting procedures characterised by administrative burdens and long awaiting times, leading to significant delays for the approval new projects.
- A challenging context marked by difficulties in accessing raw materials and financing, high inflation and price volatility.
- Inadequate and heterogeneous design of national tenders for the development of renewable energy, based mainly on price criteria rather than introducing penalties for non-execution of projects and non-price criteria, covering environmental and social aspects.
- Increasing international competition due to the role of China as supplier of raw materials to the EU and as an emerging competitor in third country markets, leveraging prices on average 20% lower compared to the EU and US counterparts, and causing a potential reduction of competitiveness and innovation on the EU market.
- Limited availability of skilled workers (e.g., operators of vessels, cranes or heavy lifts) in the wind manufacturing sector affecting the increase of the European production capacity.

Thus, in order to reach the ambitious climate targets set at the EU level, a coherent plan to accelerate the decarbonisation in a cost-efficient way is required, establishing a fair and competitive international environment for the EU wind manufacturers based on an EU-based supply chain. Key actions to secure a leading role of European industry in the clean energy sector should include:

- Foster the engagement and coordination amongst key industrial players, financial investors, and Member States to shape a favourable business environment to enable a strong EU wind industry.
- Support skills development for the renewable energy sector.
- Harmonise and improve Member States' auction design principles by introducing non-price criteria.
- Action plan to facilitate grids build-out, including both transmission and distribution levels, to accelerating key cross border electricity infrastructure projects.
- Lower the cost of energy for end-users with the support of adequate policies to decouple the price of natural gas from clean energy.
- Increasing the supply of both private and public finance for clean energy deployment and accelerate the timing of the permitting for installation.
- Creating an Energy Union with an institutional framework to strengthen the monitoring, investigation and decision-making powers at the EU level so that decisions and market functions of cross-border relevance are taken centrally.
- Refocusing the support for clean tech manufacturing, focusing on technologies where the EU has a leading role.

The above-mentioned actions should be implemented in a short time to guarantee the achievement of the energy targets, being all the Member States aware of the development potential inherent in the key sectors (e.g., robotics, automation, etc.) and then take action to adapt the production system and the available technologies to the wind energy industry, leveraging on the high-quality skills, workforce and resources that are currently available within the European Union.

🎯 **Description:**

Geopolitical instability, increasing competition from abroad and rapid technological changes are threatening Europe's growth. To reduce the dependencies from external suppliers and have a leading role in the decarbonisation process, the EU has to build a common strategy for the creation of an EU-based supply and value chain.

✨ **Who is involved and potential Benefits:**

The creation of an EU-based supply and value chain has wider positive benefits shared amongst all the stakeholder groups, as follows:

- **Accelerate the achievement of the 2030 and 2050 Climate Targets** through a shared action plan joining efforts at the EU and national levels.
- **Create a favourable environment to trigger investments**.
- **Ensure the coordination amongst the EU Member States** in terms of financial investments, policies and strategies.
- **Reduce the dependencies from external suppliers** for critical raw materials and energy.
- **Guarantee a better coordination amongst different polices** (fiscal, trade and foreign economic policies) and policymakers both at the EU and national level, to streamline and standardise the authorisation process and establish a centralised decision-making for specific topics related to energy.
- **Create new opportunities and positive spill-over effects** on the local communities in terms of job creation, trainings, refurbishment of marginal areas, boosting the local economy.

🔗 **References:** [1], [2], [3], [4], [5], [6], [44], [45]

#5 🏷️ Addressing Visual Impact Concerns in Offshore Wind Installations 🏷️

🗂️ WP2 – Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of Social and Environmental Barriers and Enablers

🗺️ European level

➡️ Policy, Social, Environmental

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation

📌 ***Develop community-focused awareness campaigns to contextualize the visual impact of Offshore Wind Farms (OWF) and promote the long-term environmental benefits***

🧩 **Context:**

The visual impact of OWFs has been a significant concern among coastal communities, often leading to resistance against new developments. Public perception studies indicate that visible structures disrupt the natural landscape, which may affect tourism and local acceptance. However, examples from other countries highlight the success of education campaigns in shifting perceptions towards seeing these installations as symbols of environmental progress. Addressing these issues requires collaborative efforts between developers, local governments, and the public to highlight the benefits of renewable energy while respecting cultural and aesthetic values.

🎯 **Description:**

Promote dialogue and visual impact studies to address concerns regarding OW installations and their effect on seascapes, emphasizing the role of renewable energy in combating climate change.

✨ **Who is involved and potential Benefits:**

Effectively addressing visual impacts in OWFs projects unlocks numerous benefits for both local communities and project developers. By integrating advanced design techniques, such as camouflaged or visually appealing turbine structures, and strategically positioning wind farms at

greater distances from the shore, the aesthetic concerns of coastal populations can be significantly alleviated. This approach not only mitigates opposition but fosters a deeper sense of community collaboration and ownership over renewable energy initiatives.

One immediate benefit is the enhancement of public trust and acceptance, which can accelerate project approval processes and reduce costly delays. Communities that perceive developers as respectful of local heritage and landscapes are more likely to support such projects, minimizing conflicts and fostering long-term cooperation. Additionally, OWFs located and designed with visual impact in mind may bolster local economies by maintaining or even enhancing tourism appeal (e.g. integrating viewing platforms, visitor centers, educational outreach programs tied to offshore installations) & transform these sites into attractions that celebrate sustainability and innovation.

By harmonizing energy development with coastal aesthetics, these measures also advance broader climate and energy transition goals. Aligning with EU sustainability standards, projects that account for visual impacts demonstrate a commitment to both environmental and social considerations, paving the way for more equitable and ecologically sound energy solutions.

🔗 **References:** [2], [23], [24], [45], [46]

#6 🏷️ Raising Public Awareness about Offshore Wind Benefits 🏷️

🗂️ WP2 – Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of Social and Environmental Barriers and Enablers

🗺️ European level

➡️ Social, Environmental

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Implement awareness campaigns to educate the public on the economic, social, and environmental benefits of offshore wind energy***

🧩 **Context:**

Public misperceptions about offshore wind farms often hinder project development. These include concerns about costs, environmental impacts, and disruption to local activities. Education campaigns can address these misconceptions, fostering greater understanding and acceptance. Drawing on examples from Northern Europe, such initiatives should highlight offshore wind's role in combating climate change, reducing energy costs, and creating jobs.

🎯 **Description:**

Develop targeted communication strategies to increase public understanding and support for offshore wind projects.

✨ **Who is involved and potential Benefits:**

Awareness campaigns about the benefits of offshore wind energy provide significant advantages for various stakeholder groups, fostering a supportive environment for project implementation and long-term success. These benefits include:

- Enhanced understanding of renewable energy leads to increased acceptance and participation in local projects. Awareness initiatives help dispel common misconceptions about offshore wind farms, such as high costs or environmental harm, creating a more

informed community that recognizes the benefits of clean energy, such as improved air quality, job creation, and energy cost reductions.

- Greater public support reduces opposition and associated delays, enabling smoother project development and deployment. A well-informed public can also attract investments by showcasing successful case studies and reinforcing confidence in the sector.
- Authorities: Increased public understanding and acceptance minimize conflicts, streamlining planning and permitting processes. Such campaigns also align with broader climate goals, such as reducing greenhouse gas emissions, and demonstrate governmental commitment to sustainable development.
- The integration of research-driven messaging in campaigns enhances their credibility and impact. Additionally, public engagement initiatives foster opportunities for new research into renewable energy technologies and social acceptance dynamics.
- Local workshops and interactive events strengthen community bonds by addressing specific concerns and involving citizens in decision-making processes. This inclusive approach builds trust and mitigates the "Not In My Back Yard" (NIMBY) attitude often seen with energy projects.
- Using technologies like virtual reality to visualize offshore wind projects can bridge the gap between abstract concepts and tangible benefits. These tools make it easier for stakeholders to comprehend the scale, aesthetics, and impact of projects, enhancing engagement and support.

Overall, such campaigns lay the groundwork for a collaborative approach to renewable energy development, ensuring that economic, social, and environmental benefits are maximized across stakeholder groups. By fostering greater public awareness, the offshore wind sector can achieve a more sustainable and inclusive transition to clean energy.

🔗 **References:** [2], [23], [24], [45], [46]

This section outlines recommendations tailored to the specific contexts of the 5 MARINEWIND Labs. These targeted recommendations reflect local challenges, priorities, and stakeholder's input, and are intended to support national and regional authorities, industry players, and other relevant actors in fostering the growth of floating offshore wind at the regional/local level.

Italy

#1 🏷️ Foster the development of adequate infrastructures and ports for the production, assembly and delivery of FOWTs 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP3 – Financing, techno-economic analysis and survey

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D3.1 - Analysis of financial and market barriers and enablers, D3.2 - Analysis of technological barriers and enablers

🗺️ Italian Lab

➡️ Policy, Financial, Market, Technological

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Lack of adequate infrastructures to support the deployment of floating offshore wind plants***

🧩 **Context:**

The availability of adequate infrastructure, especially ports for the production, assembly and delivery of floating platforms, is a key factor to accelerate the deployment of FOW. However, a lack of proper spaces to support the offshore wind farms in all the stages has been identified. This entails many challenges at different levels:

- Logistical and administrative challenges to adapt port facilities to offshore wind operations.
- Need to ensure that port yards have sufficient available space to be dedicated to FOWTs and are well-connected to floaters' production facilities.
- Complex authorisation procedure requiring the coordination of several institutional actors including Port Authority for the update of harbour's plan and to approve the assignment of new functions to the port.
- Lack of adequate funds to co-financing the development of ports in central and southern Italy to support the offshore wind supply chain.

To tackle the above-mentioned challenges and foster the development of adequate infrastructures, the Italian Government set additional measures, which were included in the Legislative Decree "Energy Security" (Art.8, Law n.181, 9 December 2023). In addition, the Ministry for the Environment and the Energy Security launched a call for expressions of interest to identify two ports in Southern Italy and additional areas to be designated as offshore wind hubs. The ports of Augusta and Taranto were selected (Interministerial Decree No. 167 of the Ministry of Infrastructure and Transport, Ministry of Environment and Energy Security and Ministry of Economy and Finance, July 4, 2025).

🎯 **Description:**

To accelerate the deployment of wind farms, Italy should adapt the infrastructure and ports to the specific requirements for the production, assembly, and delivery of FOW throughout the life cycle of the plant. Thus, Italy must implement strategic actions at administrative, financial and operational levels to trigger investments in key infrastructure, with positive spill-over effects on the local economy, especially in terms of job creation and developing a market for high-tech boats and ports.

✨ **Who is involved and potential Benefits:**

Industrial and Green Innovation Stakeholders

- **Adequate infrastructures to rely on** for the deployment of offshore wind plants, reducing the risks and boosting investments.
- **Reduced waiting time for the adaptation of ports** following a clearer division of competences and smoother authorisation procedure.
- **Availability of local-based infrastructures, materials and workforce** resulting in cost reduction and minor dependence from external suppliers.

Public Authorities

- **Clearer division of responsibilities** to streamline the decision-making and authorisation procedure for the adaption of ports to the requirements of FOWTs.
- **More informed funding allocation** to support the implementation of RES policies, with clear indications on the measures to be undertaken.

Civil Society

- **New opportunities in terms of job creation**, leveraging on the existing expertise of the local workers adapted to the FOWTs needs through an upskilling process.
- **Renovation of the port and its surroundings**, creating positive widespread benefits for the local community.

🔗 **References:** [1], [3], [4], [6]

#2 🏷️ Co-create adequate management practices and compensation measures for the fishing sector, instead of restrictive regulations, where possible 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP2 - Social acceptance and environmental impact analysis

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D2.1 – Analysis of social and environmental barriers and enablers

🗺️ Italian Lab

➡️ Policy, Regulatory, Social, Environmental

👥 Industry, Public Authorities, Civil Society

📌 ***Reduce the potential conflicts between different socio-economic activities linked to the use of the sea***

🧩 **Context:**

The Italian fishing sector is facing a major crisis, recording a 35% decrease in the quantities of the fish caught and a 20% reduction of the employment rate. According to the fishermen position collected during the MARINEWIND Italian co-creation workshop, the realisation of FOW farms could potentially boost the negative effects of the crisis, due to the combination of the following factors:

- Restrictive regulations imposed by European authorities and local NGOs, as well as by the need to co-exist with other uses of the sea, which are limiting the available area to be reserved to fishing.
- Potential conflicts between FOW farms and traditional bottom trawling (with an estimated reduction of the fishing areas of 43% in the Mediterranean).
- Fishing is no longer considered as an attractive job by the young people.
- Spill-over effects generated by the crisis of the fishing activities on the entire supply chain.

To overcome the above-mentioned barriers, the following actions should be implemented: (i) identifying good regulation and management practices instead of restrictive measures; (ii) exploring the co-existence between and small-scale fishing and new anchoring technologies; (iii) considering fishermen' specific needs from the initial planning stages; (iv) co-designing possible solutions and compensation measures with the fishing sector; (v) Highlighting the positive environmental impacts of FOW plants, which could promote the repopulation of protected areas while respecting biological spawning times.

🎯 **Description:**

To overcome the potential conflicts related to the multiple uses of the sea, Italy has to consider the specific needs and expectations expressed by the different socio-economic categories, especially fishermen. The shaping of ad-hoc regulations and the provision of adequate compensation measures will foster a better use of the sea as renewable resource, reducing oppositions to new FOW technologies.

✨ **Who is involved and potential Benefits:**

<u>Industry</u>

- **Reduced conflicts with other uses of the sea** through ad-hoc regulations and compensation measures, decreasing the opposition of other socio-economic activities, especially the fishing sector, to the realisation of offshore wind farms.
- **New collaboration opportunities** with other socio-economic activities at sea.

Public authorities

- **Clear indications to shape the policy framework for the implementation of FOW foreseeing** compensation measures to foster the co-existence amongst different uses of the sea.
- **Policy coordination at the local and EU level**, aligning the different objectives and providing fishermen with clear indications about the areas dedicated to fishing activities.

Civil society

- **Well-defined rules for the fishing sector** with a clear identification of the areas reserved to fishing and an adequate assessment of the costs-benefits generated by FOW.
- **Clear management practices** to deal with the needs of the different socio-economic activities related to the marine environment.

🔗 **References:** [1], [2], [5], [6]

#3 🏷️ Promoting a greater focus on the development of positive externalities for local communities to foster social acceptance 🏷️

🗂️ WP2 - Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of social and environmental barriers and enablers

🗺️ Italian Lab

➡️ Policy, Social, Financial, Market

👥 Industry, Public Authorities, Civil Society

📌 ***Lack of social acceptance amongst the local communities due to widespread misconceptions related to FOW***

🧩 **Context:**

Fostering dialogue and open discussions with neighbouring territories and the local communities is a pivotal action to increase the social acceptance and take the project forward by demonstrating that FOW is concrete, sustainable, and can co-exist with different instances and realities. However, the level of social acceptance around FOW is low, due to: (i) widespread misconceptions and false myths; (ii) limited information about the realisation of FOW plants; (iii) lack of a clear co-creation pathway to ensure the engagement of key actors from the initial planning phase. To overcome the above-mentioned challenges, the following actions should be undertaken: (i) properly communicate the positive spill-over effects generated by FOW on the local economy and labour market in terms of job creation, reskilling opportunities and training; (ii) implement measures to guarantee stable and reduced electricity price; (iii) establish an ongoing dialogue, based on sound scientific knowledge, with the local community in all the phases of the project (e.g., awareness-raising campaigns, educational activities, roundtables) to collect in advance their concerns and expectations; (iv) involve national and local SMEs to generate positive externalities on the communities; (v) Foresee compensation actions oriented towards the renewal of the area and with a potential boosting effect on tourism (e.g., refurbishment of the Tuna factory in Favignana funded by the 7SEASmed project in the Sicily Region).

🎯 **Description:**

To tackle the widespread misconceptions related to FOW at the local level, Italy has to establish an ongoing dialogue with the local communities, based on the sharing of information from the initial phases of the project and the clear perception of the socio-economic benefits, to be further developed with the ultimate goal to increase the level of social acceptance.

✨ **Who is involved and potential Benefits:**

Industrial Stakeholders

- **Fostering investments** by reducing of the perceived risks and uncertainties linked to the possible opposition of the local community.
- **Increased level of social acceptance** by establishing a dialogue with local communities from the beginning of the project.
- **Relying on a local workforce and supply chain** reducing the dependence from materials and expertise outside the EU, while showing the positive externalities for the local community.

Public authorities

- **Increasing the public trust**: clear socio-economic improvements for the local communities, perceived as promoted by public authorities.
- **Improvement of the consulting and decision-making process** through the active involvement of the local community affected by the policies.

Civil society

- **Growth of the local economy and renewal of the public space** through the spill-over effects and new opportunities generated by FOW, with the creation of a local-based workforce.
- **Reduction of the electricity price**: warranties in terms of stable energy prices and production of green energy able to address the local consumption.
- **Strengthening the participatory process**: higher involvement of the citizens in the decision-making process and the co-creation of solutions, resulting in a higher level of consent.

🔗 **References:** [2], [5], [6]

#4 🏷️ Provide clear financial incentives to foster investments in Italian FOW sector 🏷️

🗂️ WP3 - Financing, techno-economic analysis and survey

📄 D3.1 - Analysis of financial and market barriers and enablers, D3.2 - Analysis of technological barriers and enablers

🗺️ Italian Lab

➡️ Policy, Regulatory, Social, Financial, Market

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Lack of incentives for industrial players to address the high investment risks related to FOWTs***

🧩 **Context:**

The Italian industry lacks the capacity to address the market demands related to wind energy in a short time, especially regarding the provision of the necessary components (e.g. turbines, cables), which could be available only starting from 2029. Thus, the provision of financial incentives and state

aid is crucial for the deployment of FOW in Italy, being pivotal financial instruments to tackle the following barriers:

- The Italian industry needs to be adapted to the FOW needs, reconverting available skills and capacities of advanced sectors (e.g., technological upgrade of the Italian metalwork sector, currently located inland and oriented towards other types of production).
- The deployment of the FOW plants is capital-intensive compared to other technologies, due to the need to carry out preliminary geotechnical and environmental analysis.
- Need to address high costs, investment risks and uncertainties to increase the predictability of revenues and bankability of projects.
- FOW technologies have a lower level of technology readiness and lack of track-record compared to onshore wind.
- Need to establish a clear pathway to reduce the traditional dependency from fossil fuels and set up clear and achievable long-term energy production targets.
- Define a clear long-term industrial vision with an ambitious objective for FOW, stimulating the development of dedicated supply chains.

🎯 **Description:**

To accelerate the market uptake of FOW, Italy has to attract and foster investments. To this purpose, the provision of clear financial incentives is crucial to adapt the Italian industry to the needs of the sector, while reducing high costs, investment risks and uncertainty.

✨ **Who is involved and potential Benefits:**

Industrial and Green Innovation Stakeholders

- **Foster the investments by reducing high costs, investment risks and uncertainties** in the Italian offshore wind market.
- **Enable a major predictability of revenues and bankability** of projects.
- **Build a local supply chain and rely on a skilled workforce** by adapting the Italian industry to the offshore wind needs.

Public Authorities

- **Inform the design of tailored policy interventions** leveraging on the gaps identified and the type of financial support needed.
- **Support in the definition of clear long-term targets** in terms of energy production and which are achievable and reliable, as well as their achievement.
- **Attract investors** through clear regulations and financial incentives, creating an attractive environment for investors and thus bringing more projects.

Civil Society

- **Leveraging on new opportunities in terms of jobs creation, training, upskilling and reskilling** to address the specific needs of FOWTs which could revitalise the Italian industry.
- **Revitalisation of marginal areas**, following investments which could tackle social problems and creating recreational spaces for the local community.

🔗 **References:** [3], [4], [5], [6]

#5 🏷️ Develop integrated planning strategies by including the environmental protection aspects and synchronising the national and regional objectives with the "developer-led" and decentralised approach taken so far to guide the deployment of FOWTs 🏷️

🗂️ WP1 – Policy framework assessment and co-creation

📄 D1.1 – Analysis of policy and regulatory barriers and enablers

🗺️ Italian Lab

➡️ Policy, Social, Environmental, Market

👥 Industry, Public Authorities, Green Innovation

📌 ***Significant delays in the approval of a national Maritime Spatial Planning leading to a bottom-up approach in the assignment of areas to market operators***

🧩 **Context:**

- A timely political planning for the deployment of FOW is crucial to ensure a coordination amongst the different actors and thus reaching the energy targets. However, significant delays in the approval of an Italian Maritime Spatial Planning, which was adopted only on the 25th of September 2024 and previously replaced by a bottom-up approach led by the industrial developers, slowed down the deployment of FOW, due to: Lack of an optimised use of the maritime space with potential overlapping and conflicts amongst different projects.
- Lack of a common vision amongst policymakers and national stakeholders on the role of offshore wind in the energy mix.
- Lack of clear targets to be reached in terms of energy production at the national and local level. In July 2024, the new version of the Italian National Energy and Climate Plan (NECP) was sent to the EC, setting a target of 2.1 GW to be installed by 2030, misaligned with the timeframe of the auction clearing.
- Lack of coordination between the Italian government and the private technical developers.

Moreover, the drafting of a planning strategy for FOW should integrate the environmental protection aspects, the assessment of visual impact, as well as the preservation of archaeological assets, regarded as a key concern in the Italian context. Thus, integrated planning strategies to balance biodiversity protection while fostering renewable energy development should be designed in collaboration with private technical developers, ensuring the effective management of the impacts generated by offshore projects.

To this purpose, two best practices could be identified. The first one is represented by the 7SEASmed project, located in the Sicily Region. Starting from the very preliminary phases of the project, developers consulted the local community to successfully address the concerns about the visual impact of the FOW farms, indicated as main cause of the opposition to the implementation of such projects, decreasing the level of social acceptance.

A second-best practice and inspirational case is represented by the Irish Government who, while still working on their national MSP, is favouring a decentralised parallel approach fostering synergies with private technical developers to shorten waiting times.

🎯 **Description:**

To accelerate the uptake of FOW and ensure the achievement of the energy targets, Italy has to guarantee a timely strategical planning, synchronising the national and regional objectives with the bottom-up approach promoted by the developers, while integrating insights from the environmental and geotechnical studies. An integrated planning resulting from a close cooperation between policymakers and technical developers would reassure investors and align the objectives set for the energy transition.

✨ **Who is involved and potential Benefits:**

Industrial Stakeholders and Green Innovation

- **Improving the location of the projects according to the specific geographical features** of the Italian waters and the wind resource availability.
- **Optimising the use of the maritime space**, avoiding potential overlaps among different projects and conflicts with other uses of the sea, especially with the fishing sector.
- **Promoting a clear long-term industrial vision** in terms of targets to be achieved and shared by both policymakers and technical developers, to reassure investors, stimulate the development of the supply chain and avoid the perception of conflicting competences.

Public Authorities

- **Increasing collaboration opportunities with technical developers**, leveraging on mutual expertise and preliminary studies to shape more informed RES policies.
- **Creating a stable and supportive policy framework with a clear political and industrial strategy**, fostering investments and ensuring that the deployment of FOWTs matches with the objectives set for the energy transition.
- **Allowing a clear definition of roles and competences between the different actors** involved in the process, avoiding overlaps and shortening the duration of the whole permitting and legislative process.

🔗 **References:** [1], [5], [6], [7], [8]

Spain

#1	🏷️ Coexistence of OW and Fisheries: Addressing Impact and Opportunities 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP2 - Social acceptance and environmental impact analysis

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D2.1 – Analysis of social and environmental barriers and enablers

🗺️ Spanish Lab

➡️ Policy, Regulatory, Social, Environmental

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation

📌 ***Enhance collaboration between OW developers & local fisheries to mitigate socio-economic impacts***

🧩 **Context:**

The installation of OW turbines can disrupt traditional fishing activities, leading to conflicts between developers and local communities. Fishermen have expressed concerns about restricted access to fishing zones and potential ecological disruptions that may affect fish stocks. Additionally, there is a perceived lack of transparency in decision-making processes, exacerbating mistrust. Best practices from other regions highlight the importance of establishing cooperative frameworks that balance renewable energy goals with the livelihoods of coastal communities.

🎯 **Description:**

Promote policies and strategies that facilitate coexistence between OWF and fisheries by emphasizing compensation mechanisms, transparent communication, and collaborative management models.

✨ **Who is involved and potential Benefits:**

The integration of OW farms with fisheries provides a valuable opportunity to advance renewable energy while protecting coastal fishing livelihoods. Effective communication and collaboration, particularly through fisheries liaison officers, can build trust and address concerns related to safety, gear management, and operations. Marine spatial planning and technological solutions—such as navigable wind farm layouts and artificial reefs—can enhance coexistence by supporting marine habitats and reducing ecological impact. Fair compensation, diversification of fishing activities, education, and stakeholder involvement further promote resilience and long-term collaboration. This integrated approach aligns with EU renewable energy targets while maintaining socio-economic and environmental stability in coastal regions.

🔗 **References:** [2], [23], [24], [25]

#2 🏷️ Balancing Offshore Wind (OW) Development with Cultural Heritage Conservation 🏷️

🗂️ WP2 - Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of social and environmental barriers and enablers

🗺️ Spanish Lab

➡️ Policy, Regulatory, Social, Environmental

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation

📌 ***Ensure OW projects respect cultural heritage sites through comprehensive impact assessments and stakeholder consultations***

🧩 **Context:**

OW development near coastal cultural heritage sites can create tensions due to concerns over historical integrity and identity. Areas with historic ports or protected zones require careful planning. Early consultation with heritage bodies and cultural impact assessments, as seen in other EU regions, help balance renewable energy goals with cultural preservation.

🎯 **Description:**

Implement frameworks to protect cultural heritage while advancing OW development, ensuring the alignment of renewable energy goals with the preservation of historical and cultural landmarks.

- **Industry:** Work closely with cultural heritage experts to avoid sensitive areas and minimize disruptions.
- **Academia:** Research the long-term impacts of offshore projects on cultural heritage sites.
- **Public Authorities:** Develop policies that integrate cultural preservation into renewable energy planning.
- **Civil Society:** Advocate for transparent discussions about potential cultural impacts and solutions.
- **Green Innovation:** Explore construction techniques and designs that preserve the visual and physical integrity of cultural sites.

✨ **Who is involved and potential Benefits:**

Balancing OW development with cultural heritage conservation presents an opportunity to integrate renewable energy progress with the protection of historical and cultural legacies in coastal regions. By incorporating cultural heritage considerations into project planning, visual and aesthetic impacts on coastal landscapes can be minimized, while archaeological prospection before and during construction helps identify and preserve underwater heritage sites. Engaging local communities, indigenous groups, and stakeholders fosters trust and collaboration, enhancing cultural identity, tourism, and economic development. The relatively low visual impact of OWF supports their harmonious coexistence with heritage sites, and these projects also offer educational opportunities that strengthen community ties to their cultural environment. This approach exemplifies a holistic integration of sustainable energy development with cultural preservation, respecting the past while embracing innovation.

🔗 **References:** [2], [23], [24], [26]

#3 🏷️ **Advancing Research for Sustainable Marine Coexistence** 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP2 - Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of social and environmental barriers and enablers

🗺️ Spanish Lab

➡️ Policy, Social, Environmental, Technological

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation

📌 ***Promote research initiatives and technological innovation to enhance coexistence between marine biodiversity and OWF***

🧩 **Context:**

OW projects pose ecological challenges, especially in biodiversity-rich areas, including habitat disruption, noise pollution, and impacts on migratory species. Limited data hinders effective mitigation, but multidisciplinary research and technological innovations like wildlife monitoring and eco-friendly turbines can reduce environmental impacts. Experiences from the Baltic and North Seas emphasize the role of stakeholder collaboration in driving sustainable solutions.

🎯 **Description:**

Develop research programs and support innovation aimed at minimizing ecological disruptions while optimizing OW energy production.

Industry: Invest in eco-friendly technology to minimize habitat disruption.

Academia: Focus on research initiatives addressing biodiversity and renewable energy coexistence.

Public Authorities: Fund research programs and provide incentives for eco-innovation.

Civil Society: Advocate for transparent research processes and inclusion of local knowledge.

Green Innovation: Develop solutions like biodegradable materials and advanced monitoring tools**.**

✨ **Who is involved and potential Benefits:**

Focusing on sustainable marine coexistence ensures OW developments align with ecological, social, and economic priorities by mitigating spatial conflicts and optimizing marine resource use. Enhanced coexistence frameworks can transform wind farms into multifunctional areas that support biodiversity, sustainable fisheries, aquaculture, and other marine activities. For fisheries, passive fishing methods help reduce conflicts and benefit species like brown crab and Atlantic cod through the "reef effect" of OWF. In aquaculture, combining wind farms with seaweed and bivalve farming promotes sustainable food production and carbon mitigation while easing pressure on coastal ecosystems. OWF can also function as Marine Protected Areas, contributing to global biodiversity goals such as the Kunming–Montreal Framework. These advances encourage stakeholder engagement, improving social acceptance through better communication and collaboration among industries, regulators, and researchers. The insights gained from coexistence strategies open new economic opportunities and strengthen OW's role in the blue economy.

🔗 **References:** [2], [23], [24], [27], [28]

#4 🏷️ Speed up the approval process for regulatory frameworks for offshore wind deployment 🏷️

🗂️ WP1 – Policy framework assessment and co-creation

📄 D1.1 – Analysis of policy and regulatory barriers and enablers

🗺️ Spanish Lab

➡️ Policy, Regulatory, Social, Environmental, Financial, Market Technological

👥 Industry, Academia, Public Authorities

📌 ***Speed up the definition and implementation of a clear, coordinated regulatory framework for floating offshore wind in Spain***

🧩 **Context:**

A clear regulatory framework is essential for the deployment of FOW, both to ensure the achievement of national energy targets and to establish a shared roadmap among key stakeholders. However, the lack of a coherent Spanish regulatory framework has hindered interest in and deployment of FOWTs. This situation stems from several interrelated factors:

- The absence of a clear and comprehensive roadmap for OW development can lead to potential conflicts between overlapping projects. A key proposal to address this is the establishment of a **single window process**, where EIA, water area permits, and grid connection requests are submitted together in a single application. This process would be managed centrally by the Ministry, which would coordinate and collect feedback from all relevant authorities, streamlining and accelerating administrative procedures.
- A lack of shared vision among policymakers and national stakeholders regarding the role of OW in the future energy mix.
- Uncertainty around national and regional energy production targets. Although the updated Spanish National Energy and Climate Plan sets a target of 3 GW of OW capacity by 2030, no timeline for auctions has been defined.
- Limited coordination between the Spanish government and private developers, despite prior geophysical and geotechnical surveys conducted in preparation for FOW deployment.

🎯 **Description:**

The deployment of FOW technologies in Spain is constrained by the lack of a clear, timely regulatory framework. An urgent, coherent roadmap with aligned targets is needed to enhance coordination between public authorities and private developers, including a single-window permitting system to streamline authorizations. The goal is to accelerate approvals, unlock investment, and fast-track project deployment.

✨ **Who is involved and potential Benefits:**

A well-defined regulatory framework would provide clarity and predictability to investors and developers, reducing uncertainty and attracting private capital. Implementing a streamlined permitting process (e.g., single-window system) would minimize bureaucratic delays and administrative burdens, accelerating the deployment timeline. Ultimately, these improvements will

support the achievement of national energy and climate targets, promote industrial growth, and position Spain as a leader in FOW technology.

🔗 **References:** [1], [23], [24], [29], [30]

#5 🏷️ Strengthen Spain's Supply Chain for Employment and Social Impact 🏷️

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.2 – Analysis of technological barriers and enablers

🗺️ Spanish Lab

➡️ Policy, Social, Financial, Market, Technological

👥 Industry, Civil Society, Green Innovation

📌 ***Boost the Spanish supply chain by capitalising on the country's capabilities in naval construction and the steel industry to support the deployment of FOWT***

🧩 **Context:**

Spain possesses a solid industrial base in shipbuilding, naval engineering, and offshore infrastructure, supported by well-established shipyards along its coast. However, national supply chain is not yet fully prepared to meet the requirements of FOW technologies. Key challenges are:

- Limited specialization in critical FOWT components (floating platforms, dynamic cables, anchoring systems), often sourced internationally.
- Lack of coordination between shipyards, engineering firms, and developers, hindering alignment of production capacities with project timelines.
- Insufficient investment in facility upgrades and digitalization to meet FOWT precision, scale, and schedule demands.
- Supply chain fragmentation, with SMEs struggling to access large procurement processes.
- Uncertainty in regulatory and auction calendars, discouraging long-term industrial planning.

Addressing these gaps is essential to maximize job creation in coastal and industrial regions, boost societal support for FOW projects, reduce import dependence, and position Spain as a competitive hub in Europe's OW sector.

🎯 **Description:**

This recommendation proposes leveraging Spain's industrial strengths, especially naval construction and steel manufacturing, to adapt and activate the supply chain for FOW technologies. Aligning these sectors with deployment goals will build a resilient, competitive, and innovative supply chain, generating local employment and enhancing social acceptance of the energy transition.

✨ **Who is involved and potential Benefits:**

A stronger Spanish supply chain will create quality jobs, especially in shipbuilding and steel regions, fostering social acceptance through local economic growth. It will reduce import reliance, shorten project delivery times, and increase Spain's strategic autonomy in the clean energy transition. By fostering collaboration between traditional industries and emerging OW technologies, Spain can position itself as a leading European player in FOW development.

🔗 **References:** [1], [23], [24], [29]

Portugal

#1 🏷️ Enhance Infrastructure Readiness for Floating Offshore Wind Development 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP3 – Financing, techno-economic analysis and survey

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D3.1 - Analysis of financial and market barriers and enablers, D3.2 - Analysis of technological barriers and enablers

🗺️ Portugal Lab

➡️ Policy, Market, Technological

👥 Industry, Public Authorities, Green Innovation

📌 ***Address infrastructure bottlenecks, including ports and grid connections, to ensure readiness for the large-scale deployment of floating offshore wind technologies (FOWTs)***

🧩 **Context:**

Key ports in Portugal, such as Viana do Castelo, Figueira da Foz, and Sines, require substantial upgrades to meet the needs of FOWTs, from assembly to maintenance. The national grid also lacks the capacity to integrate the projected offshore wind capacity. These barriers threaten the timely achievement of Portugal's targets, including 2 GW of installed capacity by 2030 and 10 GW auctioned by 2050.

🎯 **Description:**

To accelerate the large-scale deployment of floating offshore wind farms, Portugal must tackle critical infrastructure bottlenecks through coordinated, forward-looking measures. Strategic actions should focus on upgrading and expanding port infrastructure to handle the assembly, storage, and maintenance of large floating platforms and/or turbines. Reinforcing onshore and offshore grid connections and interconnectors is essential to ensure the stable and efficient transmission of electricity from offshore installations to consumption centers. Additionally, enhancing port logistics, (e.g., heavy-lift capacity and specialized vessels) will enable streamlined construction, installation, and servicing of FOWTs.

Industry: Invest in port-specific equipment and facilities to accommodate large turbines.

Public Authorities: Simplify permitting and allocate funding for port and grid upgrades.

Green Innovation: Develop innovative logistics solutions to optimise supply chains.

✨ **Who is involved and potential Benefits:**

Infrastructure readiness will enable the efficient deployment of FOWTs, create jobs in coastal areas, and attract global investments. It will also ensure grid reliability and energy security. Specific benefits for each stakeholder group include:

Industry:

- **Improved port facilities and specialized equipment** will lower logistical costs and reduce delays in the construction and maintenance of FOW farms.
- Enhanced infrastructure **will attract international developers and investors**, boost competitiveness and opening doors for technology export and collaboration.

Public Authorities:

- **Addressing infrastructure bottlenecks** will help Portugal meet its national renewable energy targets and EU climate goals more reliably and cost-effectively.
- **Strengthened grid connections** will ensure stable electricity supply, contributing to national energy security and resilience against market volatility.

Green Innovation Sector:

- **Developing innovative logistics and supply chain solutions** will foster new R&D and business opportunities for startups and research centres.

🔗 **References:** [30], [31]

#2 🏷️ Integrate Non-Price Criteria into Offshore Wind Auctions 🏷️

🗂️ WP1 – Policy framework assessment and co-creation

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D1.2 - Final policy framework analysis

🗺️ Portugal Lab

➡️ Policy, Regulatory, Social

👥 Industry, Public Authorities, Civil Society

📌 ***Adopt non-price criteria in offshore wind auctions to promote sustainability, local supply chain development, and social acceptance***

🧩 **Context:**

The Portuguese government has initiated discussions and aims to auction up to 10 GW of offshore wind capacity by 2050, presenting a significant opportunity to accelerate the energy transition and strengthen the green economy. However, current auction models primarily favour the lowest bid, often overlooking broader sustainability and socio-economic goals. Aligning auction design with EU best practices by integrating non-price criteria can ensure that floating offshore wind projects deliver long-term environmental protection, local economic benefits, and stronger community trust, ultimately improving project success rates and reducing opposition. On top of that, Stakeholder feedback gained during the MARINEWIND co-creation workshops highlighted the importance of prioritising biodiversity protection and community benefits.

🎯 **Description:**

Incorporating non-price criteria — such as environmental impact mitigation, local content requirements, and community engagement — will encourage developers to design projects that can foster a balanced and sustainable development of FOWTs. Auctions should reward projects that contribute to biodiversity recovery, local employment, and social benefits.

Industry: Develop innovative, environmentally friendly technologies, strengthen partnerships with local suppliers, and engage proactively with communities to build trust and secure project licenses.

Public Authorities: Define clear, transparent non-price criteria and ensure fair weightage alongside cost considerations; monitor compliance and adjust frameworks to reflect evolving sustainability goals.

Civil Society: Advocate for inclusive processes and actively participate in shaping community benefit schemes to ensure that local voices are heard and respected.

✨ **Who is involved and potential Benefits:**

Integrating non-price criteria will create a sustainable framework for offshore wind, improve social acceptance, and position Portugal as a model for inclusive energy transitions.

Industry

- **Stimulate local supply chain development**, increasing resilience and reducing logistical costs.

Public Authorities

- **Deliver balanced auction outcomes** that contribute not only to lowest cost but also to biodiversity protection and regional development.
- **Meet EU environmental standards and climate targets** more effectively while supporting just transition goals.

Civil Society

- Benefit from l**ocal job creation, community investment funds, or infrastructure improvements** tied to offshore wind projects.
- Have a stronger voice in **shaping project impacts and ensuring fair distribution** of benefits.

🔗 **References:** [30], [31]

#3 🏷️ Promote Coexistence Between Offshore Wind Farms and Maritime Activities 🏷️

🗂️ WP2 - Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of social and environmental barriers and enablers, D2.2 - Final social acceptance and environmental impact analysis

🗺️ Portugal Lab

➡️ Policy, Social, Environmental

👥 Industry, Public Authorities, Civil Society

📌 ***Ensure coexistence by addressing conflicts with fishing and shipping industries through collaborative engagement and adaptive spatial planning***

🧩 **Context:**

Local fishermen in Viana do Castelo are concerned about losing access to fishing areas, impacts on fish stocks, and economic risks to coastal communities. Offshore wind farms may also intersect with busy shipping lanes, raising navigational safety issues. Without proactive conflict management, floating offshore wind projects risk delays, legal challenges, and local opposition. Transparent stakeholder dialogues, clear spatial planning, and innovative multi-use concepts can minimise conflicts, protect marine ecosystems, and generate added value for multiple maritime sectors.

🎯 **Description:**

The goal is to ensure that the deployment of floating offshore wind farms minimises disruption to traditional maritime activities and enhances synergies where possible. Collaborative approaches

should include early and continuous stakeholder engagement, joint resource planning, fair compensation measures, and opportunities for co-benefits.

Industry: Actively explore synergies between wind farms and other maritime sectors, such as combining wind farms with aquaculture, fisheries enhancement zones, or tourism initiatives, to create added value.

Public Authorities: Facilitate inclusive stakeholder roundtables and ensure clear, balanced allocation of sea space. Implement monitoring frameworks to adjust plans as needed.

Civil Society: Promote fair compensation, sustainable livelihoods, and inclusive decision-making that reflects local knowledge and community needs in the development of FOW projects.

✨ **Who is involved and potential Benefits:**

Building trust and fostering coexistence will reduce project opposition, promote marine biodiversity, and strengthen stakeholder relationships.

Industry:

- Reduced risk of delays and disputes through early conflict resolution and transparent engagement.
- Potential new business models combining offshore wind with other blue economy activities.

Public Authorities:

- Smoother project permitting and faster deployment by demonstrating balanced treatment of all maritime users.
- Enhanced reputation for inclusive governance and responsible marine spatial planning.

Civil Society:

- Continued access to traditional fishing grounds where possible, or fair and transparent compensation where access is restricted.
- Improved trust in decision-making and increased involvement in shaping the sustainable use of coastal and marine resources.

🔗 **References:** [30], [31]

#4 🏷️ **Strengthen Local Supply Chains for Floating Offshore Wind** 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP3 - Financing, techno-economic analysis and survey

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D3.1 - Analysis of financial and market barriers and enablers, D3.2 - Analysis of technological barriers and enablers

🗺️ Portugal Lab

➡️ Policy, Regulatory, Financial, Market, Technological

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Enhance the capacity and readiness of local supply chains to meet the unique requirements of floating offshore wind technologies, ensuring resilience, reducing dependency on external suppliers, and fostering local economic benefits***

🧩 **Context:**

Portugal's ambition to auction 2 GW of offshore wind capacity by 2030 presents an immense opportunity for local supply chains. However, the workshops revealed critical gaps that need to be addressed: industrial readiness, vessel availability, workforce skills, supply chain bottlenecks. To overcome these challenges, Portugal must leverage its industrial heritage in sectors like shipbuilding and metalwork while encouraging public-private partnerships and foreign direct investment to bridge capacity gaps. Clear incentives and strategic planning will be essential to unlock the potential of local industries, create jobs, and ensure timely project execution.

🎯 **Description:**

The successful deployment of floating offshore wind technologies in Portugal depends on robust, resilient, and efficient local supply chains. This includes capacity building in key industrial sectors such as manufacturing (e.g., turbines, dynamic cables), services (e.g., vessel construction), and infrastructure (e.g., port facilities). While Portugal has a strong base in onshore wind, the transition to floating offshore wind requires targeted investments to address gaps in production capacity, logistics, and workforce skills.

- **Industry**: Collaborate with local suppliers to develop scalable solutions for manufacturing and logistics and invest in workforce training programs in collaboration with academia.
- **Public Authorities**: Provide targeted financial incentives to attract investments in local manufacturing and streamline permitting processes to enable faster development of supply chain infrastructure.
- **Civil Society**: Engage with local communities to highlight job opportunities and socio-economic benefits from supply chain development.
- **Green Innovation**: Promote the use of sustainable materials and technologies in local supply chain processes.

✨ **Who is involved and potential Benefits:**

Industry

- **Economic Growth**: Enhanced supply chains will drive local job creation and attract foreign investment, boosting regional economies.
- **Reduced Dependency**: A self-reliant supply chain will minimize delays and risks associated with international procurement.
- **Resilience**: Localized production ensures greater resilience against global market fluctuations.

Public authorities and Civil Society

- **Sustainability**: Encouraging green innovation in supply chain practices will align with Portugal's decarbonization goals.

🔗 **References:** [30], [31], [32]

#5 🤌 Ensure Comprehensive Environmental Impact Assessments (EIAs) 🤌

🗂️ WP1 – Policy framework assessment and co-creation, WP2 – Social acceptance and environmental impact analysis

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D2.1 – Analysis of social and environmental barriers and enablers

🗺️ Portugal Lab

➡️ Policy, Social, Environmental

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Mandate rigorous and transparent EIAs for FOW projects, ensuring that cover biodiversity, marine ecosystems, and cumulative impacts, while promoting stakeholder engagement***

🧩 **Context:**

The deployment of FOW farms in Portugal will affect marine environments, including sensitive habitats, biodiversity, and ecosystem dynamics. The workshops highlighted the need to assess impacts early in project development, noting key issues such as limited marine baseline data, concerns over habitat degradation, cumulative impacts, and low public awareness of mitigation measures.

🎯 **Description:**

Strengthen Portugal's EIA framework with solid studies, transparency, stakeholder input, and lessons from WindFloat Atlantic. Comprehensive EIAs are key to identifying and addressing FOW impacts on marine ecosystems, including biodiversity loss, habitat change, and cumulative effects.

- **Industry**: Conduct early, thorough assessments and apply innovative mitigation technologies.
- **Public Authorities**: Standardize EIA requirements and support data sharing.
- **Civil Society**: Involve communities and environmental groups in EIAs and ensure transparent communication.
- **Green Innovation**: Develop advanced tools for monitoring and mitigating environmental impacts.

✨ **Who is involved and potential Benefits:**

<u>Industry</u>

- **Risk Reduction**: High-quality EIAs reduces the likelihood of costly delays, legal disputes, or opposition.

<u>Public Authorities</u>

- **Policy Alignment**: Supports national commitments to EU environmental directives, marine spatial planning, and climate goals.
- **Evidence-Based Decisions**: Reliable EIA data equips regulators to make sound, transparent permitting decisions that balance renewable energy targets with biodiversity protection.
- **Public Confidence**: Rigorous processes strengthen the credibility of permitting authorities and build citizen trust in the governance of offshore resources.

<u>Civil Society</u>

- **Transparency and Voice**: Stakeholders gain a clear view of potential environmental impacts and can participate meaningfully in project design and mitigation measures.

- **Ecosystem Protection**: Strong EIAs help protect marine biodiversity, fishing grounds, and coastal livelihoods that depend on healthy ecosystems.

Green Innovation

- **New Solutions**: Comprehensive environmental monitoring drives innovation in low-impact installation techniques, species-friendly turbine designs, and nature-inclusive infrastructure.
- **Shared Learning**: EIAs generate valuable open data that can be used by researchers, innovators, and other projects to improve best practices and cumulative impact assessments.

🔗 **References:** [30], [31], [32]

United Kingdom

#1	🏷️ Accelerate grid upgrades for floating wind 🏷️

🗂️ WP1 – Policy framework assessment and co-creation, WP3- Financial and technological assessment

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D3.2 — Analysis of technological barriers and enablers, D1.2 – Final policy framework analysis

🗺️ UK Lab

➡️ Policy, Regulatory, Financial, Market, Technological

👥 Industry, Public Authorities, Green Innovation

📌 ***Address the critical need for upgrading grid connections to reduce bottlenecks and facilitate the rapid integration of new floating offshore wind generation***

🧩 **Context:**

Grid bottlenecks are delaying floating offshore wind (FOW) deployment, leading to **curtailment** due to limited grid capacity. **Connection delays** are also hindering construction and causing slow approvals, which can affect project timelines. **Uncertainty in investor confidence** around grid access deters investment. **Planning bottlenecks** resulting from complex authorisation processes delay infrastructure upgrades. Addressing these issues is vital to meet the UK's renewable energy targets and enable the growth of FOW.

🎯 **Description:**

Fast-track grid upgrades and reform connection processes, as highlighted by NESO and the Electricity Networks Commissioner. Prioritise FOW zones in Scotland and Wales. **Why now:** AR7's limited offshore wind uptake and NESO's 2025 reforms show an urgent need for grid readiness. Delays risk undermining the UK's 2030 targets.

✨ **Who is involved and potential Benefits:**

Key stakeholders & benefits: NESO, Ofgem, National Grid, Crown Estate, devolved governments, developers and supply chain.

- Industry: Collaborate with grid operators to resolve bottlenecks and improve connection efficiency.
- Academia: provide research and expertise on advanced grid technologies.
- Public Authorities: Fund and streamline grid upgrades through supportive policies.
- Civil Society: Promote sustainable, community-friendly grid development.
- Green Innovators: Drive adoption of smart, efficient grid solutions.
- Green Innovation: Promote innovative technologies in grid upgrades to enhance efficiency and sustainability.

🔗 **References:** [1], [4], [9], [10], [11]

#2 🏷️ Policy and Market reform for accelerating floating offshore wind deployment 🏷️

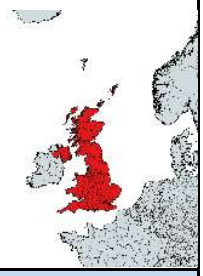
🗂️ WP1 – Policy framework assessment and co-creation

📄 D1.1 – Analysis of policy and regulatory barriers and enablers, D1.4— Final policy framework analysis (WIP)

🗺️ UK Lab

➡️ Policy, Regulatory, Financial, Market

👥 Industry, Public Authorities, Civil Society, Green Innovation



📌 ***Implement comprehensive policy and market reforms to create a conducive environment for the rapid deployment of floating offshore wind projects in the UK***

🧩 **Context:**

The deployment of floating offshore wind in the UK faces several policies and market-related challenges. Complex planning, weak incentives, and market uncertainty are stalling FOW investment.

🎯 **Description:**

Comprehensive policy and market reforms are urgently needed. Reforming the Contracts for Difference (CfD) scheme to better reflect the risk profile and cost structure of floating wind is essential. This includes offering tailored strike prices, tax incentives, and blended finance options such as green bonds and public-private partnerships (PPPs).

Long-term regulatory stability is needed with market mechanisms fit for the purpose. Aligning reforms with NESO's Net Zero Market Reform and Ofgem's 2025 announcements will help create a coherent, future-proof framework. Embedding floating wind into the GB Energy and Industrial Strategy, with clear deployment targets and supply chain support, will further strengthen investor confidence and unlock economic growth. These reforms will not only accelerate FOW deployment but also position the UK as a global leader in offshore wind innovation.

✨ **Who is involved and potential Benefits:**

Implementing policy and market reforms will unlock investment, accelerate deployment, and strengthen the UK's position in floating offshore wind. Streamlined planning, tailored CfD schemes, and regulatory clarity will reduce costs and timelines, making projects more viable and competitive.

- **Industry & developers:** Engage with policymakers to shape permitting and CfD reforms. Certification bodies and innovation hubs (e.g. ORE Catapult, EMEC, FLOWIC) provide technical validation and support for scaling technologies.
- **Government & regulators:** DESNZ, devolved administrations, and local planning authorities must simplify approvals and align incentives with net-zero goals. NESO and Ofgem play key roles in market reform and grid access.
- **Community & marine stakeholders:** Coastal communities, fisheries, and marine users need early engagement to ensure mutual benefit and avoid conflict.
- **Finance & investment:** Banks, funds, and investors are essential for scaling projects. Enhanced CfDs and blended finance models (e.g. green bonds, PPPs) reduce risk and attract capital.

🔗 **References:** [1], [12], [13], [14], [15]

#3	🤌 Infrastructure Development for Floating Offshore Wind 🤌

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.1 —Analysis of financial and market barriers and enablers, D3.2 — Analysis of technological barriers and enablers

🗺️ UK Lab

➡️ Policy, Regulatory, Financial, Market, Technological

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation

📌 ***Address the critical need for robust port and grid infrastructure to support the large-scale deployment of floating offshore wind farms in the UK***

🧩 **Context:**

The UK's port and grid infrastructure are not yet equipped to support large-scale floating offshore wind deployment. Scotland and Wales, key regions for FOW growth, face limitations in deep-water access, heavy-lift capacity, and grid connectivity.

🎯 **Description:**

Invest in strategic upgrades for port facilities and grid infrastructure, particularly in high-potential regions. This includes enhancing port capabilities for assembly, storage, and transportation of large components and upgrading grid connections to handle increased power generation from projects like ScotWind. Support should come from public funding, private investment, and coordinated planning through The Crown Estate and devolved governments. Align infrastructure development with ScotWind and GB-wide industrial strategy goals.

✨ **Who is involved and potential Benefits:**

Strategic infrastructure upgrades will unlock deployment capacity, reduce costs, and support regional economies, especially in Scotland and Wales.

- **Industry & developers**: collaborate with port authorities across the UK to develop specialised facilities for floating wind components. Benefit from reduced logistics costs and faster deployment.
- **Academia & innovation centres**: organisations like ORE Catapult, EMEC, and UK FOWTT provide research, testing, and technical expertise to support infrastructure design and commercialisation.
- **Public authorities**: national and devolved governments must fund upgrades and streamline planning. The Crown Estate and Crown Estate Scotland play a pivotal role in seabed leasing and enabling access to suitable sites.
- **Civil society & environmental groups**: Local communities, coastal authorities, and NGOs (e.g. RSPB, WWF) ensure projects are environmentally sustainable and socially inclusive, helping secure a social licence to operate.
- **Finance & investors**: Banks, funds, and financial institutions provide capital for large-scale infrastructure. Their involvement is critical to scaling the sector.
- **Trade associations & green innovators**: Groups like RenewableUK support policy development and industry collaboration, while innovators promote low-carbon technologies to enhance sustainability.

🔗 **References:** [16], [17], [18]

#4 🏷️ Innovative financing mechanisms for Floating wind 🏷️

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.1 —Analysis of financial and market barriers and enablers, D3.2 — Analysis of technological barriers and enablers

🗺️ UK Lab

➡️ Financial, Market

👥 Industry, Public Authorities, Civil Society

📌 ***Introduce diversified funding mechanisms such as Contract for Difference (CfD) schemes, Public-Private Partnerships (PPPs) and green bonds to bridge financial gaps, reduce investor risks, and catalyse private sector engagement***

🧩 **Context:**

High capital costs and financial risk are slowing FOW deployment. Latest allocation rounds limited success and low capacity awards highlight the need for tailored funding models.

🎯 **Description:**

To unlock large-scale deployment of floating offshore wind in the UK, financing mechanisms must be diversified and tailored to the sector's unique risk profile. This includes redesigning CfD auctions to offer competitive strike prices and longer contract durations for floating wind, enabling predictable revenue and investor confidence. Public-Private Partnerships (PPPs) should be expanded to pool capital and share risk, while green bonds and blended finance instruments can attract ESG-focused investment. Government-backed guarantees and transparent funding structures will further de-risk early-stage projects and ensure community benefit.

These actions should align with the UK's industrial strategy and net-zero goals, supporting supply chain development and regional growth. Lessons from successful projects like Hywind Scotland and Kincardine can inform future funding models, while collaboration between government, industry, and financial institutions will be key to scaling the sector sustainably.

✨ **Who is involved and potential Benefits:**

Expanding financing mechanisms, such as tailored CfDs, PPPs, and green bonds, will unlock investment, reduce risk, and accelerate deployment of floating offshore wind in the UK.

- **Industry & developers:** benefit from predictable revenue through enhanced CfDs and shared-risk PPP models. These mechanisms improve investment confidence, reduce LCOE, and enable faster scaling of projects.
- **Public authorities**: local and national governments can stimulate regional growth, job creation, and energy security by aligning CfD design with net-zero goals and supporting PPP frameworks. Transparent coordination builds public trust.
- **Green innovation & academia**: targeted funding supports R&D in advanced technologies like modular platforms and hybrid systems, enabling faster innovation and market entry.
- **Investors & financial institutions:** banks and funds gain access to stable, ESG-aligned returns through diversified instruments. Their involvement is critical to scaling the sector.
- **Civil society:** Transparent financing drives local impact and sustainability.

🔗 **References:** [3], [4]

#5	🏷️ Establish port infrastructure investment programme 🏷️

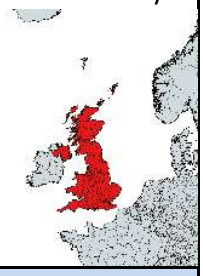
🗂️ WP1 – Policy Framework Assessment, WP3 – Financing, techno-economic analysis and survey

📄 D1.1 —Analysis of Policy and Regulatory Barriers and Enablers, D3.1 — Analysis of financial and market barriers and enablers

🗺️ UK Lab

➡️ Policy, Financial, Market, Technological

👥 Industry, Academia, Public Authorities, Civil Society, Green Innovation



📌 ***Develop a targeted investment programme to modernise port infrastructure across the UK, focusing on facilities supporting floating offshore wind turbines (FOWTs). Using blended financing mechanisms to enhance the supply chain, reduce costs, and establish the UK as a leader in offshore wind logistics***

🧩 **Context:**

Many UK ports currently lack the infrastructure needed to support floating offshore wind, such as deep-water access and heavy-lift capacity. This limits project efficiency and increases reliance on overseas facilities. While some ports have made progress, wider upgrades are needed to meet future demand.

🎯 **Description:**

The UK requires the launch of a coordinated investment programme to modernise UK ports for floating wind deployment. Specific port infrastructure investment programmes would focus on strategic port locations, leveraging public and private funding to modernise facilities for FOWT manufacturing, assembly, and deployment. The use of **blended finance** (PPPs, green bonds, government grants) is needed to accelerate upgrades, reduce costs, and strengthen the domestic supply chain. Without action, the UK risks missing 2030 targets and losing competitiveness to international players.

✨ **Who is involved and potential Benefits:**

Port infrastructure investment programmes would unlock floating offshore wind at scale by upgrading underdeveloped UK ports, reducing reliance on overseas facilities and cutting project costs.

- **Financing bodies** can offer low-interest loans and project finance, while **mutual funds** and **wealth managers** channel private capital into green infrastructure through ESG-focused products and blended finance.
- **Industry** would benefit from streamlined logistics and may co-invest in port upgrades and co-located facilities.
- **Public authorities** would advance net-zero goals, support regional economies, and coordinate long-term planning.
- **Academia** could inform port design through research, while **civil society** benefits from local job creation and economic growth.
- **Green tech firms** would gain opportunities to pilot new solutions for efficient, low-carbon port operations.

🔗 **References:** [1], [19], [20], [21], [22]

#6 Integrated port and supply chain optimisation for floating wind

🗂️ WP1 – Policy Framework Assessment, WP3 – Financing, techno-economic analysis and survey

📄 D1.1 — Analysis of Financial and Market Barriers and Enablers, D3.1 — Analysis of financial and market barriers and enablers

🗺️ UK Lab

➡️ Financial, Market, Technological

👥 Industry, Public Authorities, Green Innovation

📌 ***Develop and implement a coordinated strategy to modernise ports and streamline the supply chain for floating offshore wind turbines (FOWTs), exploiting existing investments, fostering public-private collaborations, and utilising advanced logistics and manufacturing innovations to reduce costs and accelerate deployment***

🧩 **Context:**

The UK's floating offshore wind (FOWT) ambitions are constrained by limited port infrastructure, high logistics costs, and fragmented supply chains. Many ports lack heavy-lift capabilities, deep-water access, and space for component storage and assembly. While progress has been made through initiatives like the Crown Estate's Supply Chain Accelerator Fund and port upgrades at Nigg and Able Seaton, these efforts remain isolated. With 5 GW of floating wind targeted by 2030, a coordinated strategy is needed to upgrade key ports and streamline the supply chain.

🎯 **Description:**

Launch a coordinated national initiative to modernise key ports and integrate the floating offshore wind supply chain, including identifying priority port locations, aligning existing public funding with private investment, and supporting infrastructure upgrades such as deep-water access, heavy-lift capacity, and co-located manufacturing.

Accelerate impact, a cross-sector taskforce to oversee planning, investment, and technology adoption. Public-private partnerships, green financing tools, and regional collaboration are essential to ensure cost-effective delivery and long-term competitiveness in the global offshore wind market.

✨ **Who is involved and potential Benefits:**

- **Financial & investment institutions**: enable infrastructure upgrades through green loans, ESG funds, and long-term capital. Benefit from stable, sustainable returns aligned with net-zero goals.
- **Industry & investors:** co-invest in ports and supply chain innovation. Gain from reduced costs, faster deployment, and stronger market positioning.
- **Public authorities**: coordinate funding and planning to meet national offshore wind targets while driving regional economic growth.
- **Innovation & academia**: develop new technologies and provide research to optimise logistics and port operations.
- **Communities & civil society**: benefit from job creation, local investment, and inclusive economic development in coastal regions.

🔗 **References:** [1], [19], [20], [21], [22]

Greece

#1 🔑 Develop a clear permitting process to promote clarity 🔑

🗂️ WP1 – Policy framework assessment and co-creation

📄 D1.1 – Analysis of policy and regulatory barriers and enablers

🗺️ Greek Lab

➡️ Policy, Regulatory

👥 Industry, Public Authorities, Green Innovation

📌 *Reduce excessive duration of the licensing process*

🧩 **Context:** It is well known that one of the main bottlenecks in Greece is the excessive duration (estimated and real) of the licensing processes. This is prevalent from the authorization process of the onshore wind farms over the last decades. The main reasons for the excess duration are:

- The complexity of the regulatory framework
- The opposition of some categories of stakeholders
- The lack of a consolidated experience in the sector
- The lack of human resources with adequate skill dedicated to the process

Based on the National Plan for the Energy and the Climate, the large energy savings required (-1.6% in 2030 and -26.5% in 2050 compared to 2021, despite economic growth) are accompanied by an impressive electrification of the vast majority of sectors of the economy, resulting in an increase of 21.7% in 2030 and a more than tripling in 2050 compared to 2021. This challenge should lead to a completely different and impressive development of the electricity system, both in terms of power generation and the transmission and distribution of electricity. Therefore, there is no time to waste (much more than required) in endless procedures which cause delays and/or postpone the development of Renewable Energy projects.

🎯 **Description:**

To overcome the complexity of the licensing process, Greece has to take a pathway of simplification. Process clarity through a clear permitting process to be administered by a competent and trusted entity will attract increased domestic and foreign investments. This can be achieved by i) transparent and predictable guidelines (permitting roadmap, standardized criteria, digitalization of the permitting process), ii) comprehensive stakeholder consultations (early and often engagement, public participation), iii) alignment with best practices in EU and beyond, iv) facilitation of grid connection approvals and v) simplification of financial and legal requirements.

✨ **Who is involved and potential Benefits:**

A clear permitting process for offshore wind projects in Greece can deliver significant benefits across industrial, governmental, and green innovation sectors by creating a more predictable, efficient, and investment-friendly environment.

Industrial Stakeholders

- **Predictable Timelines and Reduced Costs**: Clear permitting helps industrial stakeholders anticipate timelines and avoid costly delays associated with regulatory barriers or unexpected compliance requirements.
- **Investment Confidence**: A transparent and streamlined process can encourage more private investment by reducing perceived risks and uncertainties, making it easier for developers and investors to commit to long-term projects.
- **Scalability and Operational Efficiency**: Faster permitting facilitates the scaling of production and construction activities, enabling industrial players to deploy turbines and infrastructure in a timely manner to meet increasing energy demands.

Public Authorities (Local, Regional, and National Governments)

- **Economic Development and Job Creation**: By smoothing out the permitting process, governments can attract more projects, boosting local economies through job creation in construction, maintenance, and supply chain & logistics.
- **Improved Regulatory Compliance and Environmental Safeguards**: A clear process enables public authorities to better coordinate with developers on environmental standards and ensure that biodiversity and marine ecosystems are protected.
- **Public Trust and Transparency**: Streamlined processes can foster greater public trust and increased social acceptance as communities are better informed about project stages, safety measures, and the environmental impact of offshore installations.

Green Innovation Stakeholders

- **Faster Pathways to Market for New Technologies**: A predictable permitting process can expedite testing and deployment of innovative technologies in offshore wind (such as floating turbines or new blade materials) by reducing bureaucratic bottlenecks.
- **Increased Collaboration Opportunities**: A transparent regulatory framework encourages collaboration between tech developers, environmental advocates, and industry players, enabling innovation and environmentally responsible practices to coexist.
- **Strengthened Sustainability Objectives**: Clarity in regulatory processes allows green innovation stakeholders to align project development with sustainability goals, supporting the larger shift to renewable energy while minimizing ecological impacts.

🔗 **References:** [1], [33], [34]

#2 🏷️ Sustainable approaches for harmonizing FOWTs with Tourism Industry 🏷️

🗂️ WP2 – Social acceptance and environmental impact analysis

📄 D2.1 – Analysis of Social and Environmental Barriers and Enablers

🗺️ Greek Lab

➡️ Social

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Reduction of negative impact on tourism industry***

🧩 **Context:**

The challenge of attracting potential investors for FOWTs projects in Greece is complex due to the nation's heavy reliance on tourism, which constitutes a significant portion of its Gross Domestic

Product (GDP). Greece's coastlines and marine tourism attract millions of visitors annually in terms of scenery, informal activities and/or sports (e.g., recreational boating), hence any FOWT developments, especially floating infrastructures that are visible from the coast, can provoke resistance both from local communities and tourism stakeholders.

Stakeholders' concerns primarily revolve around the potential visual pollution, noise, and perceived disruptions to natural landscapes and marine ecosystems. These attributes are critical to Greece's appeal as a tourist destination and can harm local tourism. As a result, any resistance arising from these concerns may lead to extensive bureaucracy and long delays not only in the licensing process of FOWT projects, but also in their development and operation, thus undermining investor interest.

🎯 **Description:**

The mitigation of negative impact related to the development of FOWTs on tourist zones requires a strategic approach. Particularly, siting far from frequented tourist zones, enhancing community engagement, and demonstrating economic benefits for tourism entrepreneurs could reduce public opposition, while clear communication and inclusive planning processes can contribute to acceptance, showing that FOWTs could coexist with the tourism sector and support Greece's transition to clean energy. In addition, integration with blue tourism and promotion of a green image could lead to a great reduction of negative impact of the tourism industry.

✨ **Who is involved and potential Benefits:**

A strategic approach including specific actions to harmonize the development of FOWT with the industry tourism can deliver significant benefits across industrial, governmental, and civil society sectors by creating a more sustainable and investment-friendly environment.

Industrial Stakeholders

- **Reduced bureaucracy and delays**: Harmonizing FOWTs with the tourism industry will lead to less bureaucracy and delays, helping industrial players to develop accurate timelines and avoid costly delays associated with social acceptance.
- **Lower investment risk**: A transparent process along with clear communication can reduce unexpected barriers and risks related to local society's opposition to FOWT projects, thus attracting more investors.

Public Authorities (Local, Regional, and National Governments)

- **Project scalability**: By siting the FOWT projects far from the coastline, government can fill the gap between FOWT development and Tourism Industry, creating in this way a friendly environment for more projects.
- **National goals**: Reducing the negative impact on tourism industry, government can develop more FOWT projects and achieve its national goals towards the transition to green energy.

Civil Society and SMEs

- **Increased Collaboration Opportunities**: Clear communication and inclusive planning processes encourage collaboration between FOWT developers and civil society/SMEs, creating space for local economic growth.
- **Economic Development and Job creation**: Demonstrating the economic benefits of FOWT projects can increase social acceptance and bring more projects, resulting in job creation in local societies and economic development of local entrepreneurs.

🔗 **References:** [2], [35]

#3 🏷️ Offer financial incentives to reduce upfront costs and risks 🏷️

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.1 – Analysis of financial and market barriers and enablers

🗺️ Greek Lab

➡️ Financial

👥 Industry, Public Authorities, Green Innovation

📌 ***Provision of financial support to accelerate the deployment of FOWT projects***

🧩 **Context:**

The financial dimension poses significant barriers to developing and deploying FOWT projects in Greece. Securing financing for large-scale offshore wind initiatives is particularly challenging due to their high upfront costs, extended payback periods, and the perception of increased investment risks. These factors often prevent potential investors, particularly in an environment where competition for capital is intense. Additionally, FOWT projects must compete with other renewable energy sources, such as solar and onshore wind farms, as well as conventional fossil fuels. National economy and market dynamics heavily influence this competition, potentially limiting the attractiveness of FOWTs to investors.

Moreover, fluctuating energy prices, combined with changes in subsidy schemes and evolving market conditions, increase uncertainty about the economic viability of FOW projects. Such volatility complicates long-term financial planning, creating challenges in terms of consistent returns to investors. Addressing these financial barriers will require a combination of tailored policy frameworks, innovative financing mechanisms, and efforts to mitigate perceived risks, ensuring FOWTs become a viable and attractive investment option.

🎯 **Description:**

Greek government can offer financial incentives and subsidies to reduce the upfront costs and risks associated with the development and deployment of FOWTs projects. These incentives may include among others i) Capital Grants and Subsidies, ii) Tax incentives (tax credits, accelerated depreciation, VAT reductions), iii) Feed-in Tariffs (FiTs) and Power Purchase Agreements (PPAs), iv) Risk Mitigation Mechanisms, v) Public-Private Partnerships (PPPs).

✨ **Who is involved and potential Benefits:**

The provision of financial support is crucial for the deployment of FOWT projects in Greece, offering critical benefits both not only for the government but also for SMEs and industrial stakeholders.

<u>Industrial Stakeholders</u>

- **Risk mitigation**: Reducing uncertainties and risks linked to energy prices creates a more stable investment climate, encouraging long-term strategic planning.
- **Improved Market Competitiveness**: Financing mechanisms that enhance financial feasibility allow the industry to compete more effectively against other renewable energy sources and conventional fuels.

<u>Public Authorities (Government)</u>

- **Accelerated Renewable Energy Goals**: Enabling FOWT financing supports Greece's transition to clean energy, aligning with national and EU climate targets.
- **Economic Growth and Job Creation**: Effective financial frameworks demonstrate the government's ability to facilitate innovation, attracting further investments thus stimulating job creation, infrastructure development, and regional economic activity.

SMEs (Investors)

- **New Investment Opportunities**: Reduced financial risks make FOWTs a viable investment for private investors.
- **Potential for Higher Returns**: Enhanced financial mechanisms and stability improve project profitability, making investments more attractive.

🔗 **References:** [3], [36]

#4 🏷️ **Strengthening the national supply chain through local content** 🏷️

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.1 – Analysis of financial and market barriers and enablers

🗺️ Greek Lab

➡️ Policy, Social, Market, Technological

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Facilitate technological maturity for developing FOWTs***

🧩 **Context:**

Greece possesses significant potential to develop a robust supply chain for FOWT, leveraging its existing infrastructure and industrial capacity. Decommissioned facilities across the country present an opportunity for revitalization, offering ideal sites for manufacturing and assembling FOWT components at a lower cost. This could stimulate economic growth, create jobs, and support local industries. Hellenic Cables, one of Europe's leading cable manufacturers, brings world-class expertise and capacity to produce high-quality, durable cables essential for FOWT projects. Its involvement could enhance domestic capabilities and reduce dependence on foreign suppliers.

Moreover, Greece has a strong domestic production of steel and cement, two critical materials for FOWT construction. Utilizing these locally produced resources can significantly lower costs, streamline logistics, and improve supply chain reliability. This alignment of local infrastructure and expertise provides a strong foundation for Greece to lead in FOWT development, fostering national growth and global competitiveness.

🎯 **Description:**

The goal is to strengthen Greece's national supply chain in the wind energy sector by revitalizing decommissioned shipyards and ports, leveraging domestic steel and cement production, and harnessing the expertise of Hellenic Cables in subsea cable systems. This approach seeks to reduce costs, create jobs, and advance Greece's technological maturity for the development of FOWTs.

✨ **Who is involved and potential Benefits:**

The recommendation offers benefits by fostering economic growth, job creation, and enhanced local capabilities for industry, public authorities, civil society, and Green Innovation, strengthening Greece's renewable energy sector and supply chain.

Industrial Stakeholders

- **Growth opportunities**: Local manufacturers, shipyards, and cable producers can greatly have increased demand for their products and services, thus boosting revenues and strengthening domestic industrial capabilities. Local suppliers can also become more competitive in the global market for FOWT components.

Public Authorities

- **Increase national independence**: Public authorities benefit from economic revitalization in regions with decommissioned shipyards and ports. The development of a local FOWT supply chain aligns with national renewable energy and sustainability goals, reduces reliance on imports, and supports Greece's energy transition.
- **Enhance local public acceptance**: Local engagement in renewable energy projects promotes social acceptance of the energy transition and delivers long-term sustainability benefits.

Civil Society

- **Local job creation**: Communities benefit through new employment opportunities and economic growth, particularly in areas around revitalized shipyards and industrial zones.

Green Innovation (SMEs & Investors)

- **Business opportunities**: SMEs interested in the FOWT sector can seize new business opportunities as the local supply chain for FOWT develops.
- **Increased investment returns**: Investors will benefit from a growing market with clear national strategy, which can yield returns as Greece moves towards green energy transition.

🔗 **References:** [3], [36], [37]

#5 🏷️ Prioritization and revitalization of Greek infrastructure (ports & shipyards) 🏷️

🗂️ WP3 – Financing, techno-economic analysis and survey

📄 D3.1 – Analysis of financial and market barriers and enablers

🗺️ Greek Lab

➡️ Policy, Regulatory, Social, Technological

👥 Industry, Public Authorities, Civil Society, Green Innovation

📌 ***Develop a national strategic investment plan to modernize and repurpose key Greek ports and shipyards to support the entire lifecycle of FOWTs***

🧩 **Context:**

Ports are central to the development of offshore wind. They play a key role for the local supply chain, logistics and supporting infrastructure (e.g. storage of components). Ports are where operation and maintenance of offshore wind farms are run, where all offshore wind turbines and other equipment get transported, and where floating turbines are assembled.

Based on a recent study conducted by the Norwegian Offshore Wind on behalf of the Hellenic Wind Energy Association, a significant challenge for supporting participation in the OW industry is the

inadequacy of port infrastructure to meet the requirements of typical OWFs and the assembly needs of standard floating wind turbines. A common issue across all ports, regardless of size or potential for future expansion, is the limited availability of space. While some ports include minor or major expansions in their master plans, the realization of these expansions often remains uncertain due to management uncertainties, government barriers or funding constraints.

Finally, the need to achieve the national goals towards green energy, along with the precipitation in the development of pilot projects, make it necessary to have adequate, ready to operate infrastructure to implement the projects within the specified timeframes, hence avoiding delays.

🎯 **Description:**

The recommendation aims to facilitate the development of FOWTs in Greece by prioritizing and speeding-up the revitalization and/or expansion of ports and shipyards critical to the development of the OW projects in Greece. This approach aims to avoid delays during the construction phase of the projects related to component imports, insufficient infrastructure and logistics. This could be achieved by i) infrastructure assessments, ii) upgrade of port facilities (Deep-Water Berths, Heavy-Lift Cranes and Equipment, Storage and Assembly Areas), iii) Integration of Digitalization and Automation (smart ports, Automation in Shipyards), and iv) attract investments and partnerships.

✨ **Who is involved and potential Benefits:**

Revitalizing and upgrading Greek ports and shipyards will streamline FOWT development, reduce delays, enhance local job opportunities, and attract investments by addressing infrastructure challenges and boosting supply chain readiness and efficiency.

Industrial Stakeholders

- **Enhanced operational efficiency**: Improved infrastructure will streamline supply chain logistics, reduce delays, and facilitate the efficient assembly and deployment of FOWTs.

Public Authorities

- **Increase national independence**: The development of a local FOWT supply chain aligns with national renewable energy and sustainability goals, reduces reliance on imports, and supports Greece's energy transition.
- **Increased competitiveness**: Localized infrastructure will reduce dependency on imports, lower costs, and position Greek companies as key players in the FOWT value chain.
- **Economic development**: Infrastructure revitalization and upgrade will stimulate regional economic growth and support the transition to a green economy.
- **Strengthened policy implementation**: Accelerated infrastructure revitalization and upgrade will align with national and EU renewable energy targets, showcasing Greece’s commitment to clean energy initiatives.

Civil Society

- **Local job creation**: The revitalization of ports and shipyards will generate employment opportunities in both construction and operational phases.

Green Innovation (Investors)

- **Reduced project risks**: Improved infrastructure mitigates logistical challenges and uncertainties, making FOWT projects more viable and attractive for investment.
- **Higher return potential:** Accelerated infrastructure readiness can shorten project timelines, leading to earlier returns on investments in FOWT projects.

🔗 **References:** [3], [37], [38]

CONCLUSIONS

In summary, some key takeaways that could greatly enhance the FOWTs uptake are:

Promote technological innovation and infrastructure readiness including advanced grid connection solutions and upgraded port facilities, to support the efficient deployment of FOWTs across Europe.

Develop a resilient EU-based supply and value chain to reduce dependencies on non-EU suppliers, enhance industrial competitiveness, and ensure long-term strategic autonomy in the wind sector.

Implement inclusive and transparent planning frameworks, integrating environmental protections, stakeholder engagement, and streamlined permitting processes at both EU and national levels.

Increase social acceptance through community-focused initiatives, such as raising awareness campaigns, compensation mechanisms for affected sectors, and the co-creation of local benefits.

Adopt supportive policy and financial instruments, including non-price auction criteria, long-term investment incentives, and targeted training programs to accelerate market uptake and ensure fair economic growth.

Develop a clear permitting process to promote clarity and reduce excessive duration.

These recommendations also supported the **MARINEWIND Action Plan for Public Acceptance of FOWTs**, which builds on the ideas shared here to help increase citizen engagement and reduce non-technological barriers across Europe.

Let's act together!

The future of floating offshore wind is not just in the hands of policymakers or engineers — it's a shared journey that involves all of us. By putting these recommendations into practice, we can foster the development of FOWTs, creating a clean energy transition that is not only technically sound, but also socially fair, environmentally responsible, and economically inclusive.

We invite everyone — from government bodies and local authorities to industry leaders, researchers, civil society organisations, and SMEs — to **take ownership** of these ideas, adapt them to your own context, and be part of the transformation.

Talk about them. Share them. Use them. Together, we can turn these recommendations into real impact — for people, nature, and a climate-neutral Europe.

Want to learn more?

📄 **Full background and methodology**: D4.2_Recommendations for MARINEWIND Stakeholders

🌐 **About the MARINEWIND project**

🛠️ **About the MARINEWIND webGIS tool**

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