

EXPLORING COEXISTENCE OPPORTUNITIES FOR OFFSHORE WIND AND FISHERIES IN SOUTH KOREA

GLOBAL OVERVIEW AND BEST PRACTICES FOR SOUTH KOREA



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Attribution

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Foreword

South Korea, through its 10th National Electricity Supply and Demand Plan, is targeting to generate 21.6% of its electricity from renewable sources by 2030. Although the national government recognises the potential of renewable energy, including offshore wind, to provide reliable, scalable and sustainable sources of electricity, the commercial development of offshore wind remains gradual. Local acceptance issues, especially the perceived clashes of interests between fishers and the offshore wind industry, has given rise to legitimate concerns within the fishing community, which has in turn contributed to a negative perception of offshore wind among some stakeholders.

Under the current policy framework in South Korea, fisheries engagements often occur only post-siting, a practice which has inadvertently bred distrust. Inadequate consultation methods further undermine the fishing industry, exacerbating concerns and hindering the potential for collaborative solutions.

Recognizing these urgent issues, the Global Wind Energy Council commissioned this report: “Exploring Coexistence Opportunities for Offshore Wind and Fisheries in South Korea - Global Overview and Best Practices for South Korea”. The purpose of this report is to signal the need for a systematic and inclusive approach for collaboration between the fishery industry and the offshore wind industry. By distilling global best practices and highlighting successful coexistence models, we strive to offer a blueprint for South Korea. Through a systematic approach to engagement, we aspire to bridge the gaps that currently undermine trust, ensuring that the interests of both industries are not only recognized but actively safeguarded.

Table of Contents

Tables	6
Exhibits	6
Acronyms	7
Executive Summary	9
Background and Aims	12
Relationship Between the OFW and Fisheries Sectors in South Korea	15
International Experience on Fisheries Coexistence with OFW	22
Latest Developments in South Korea	37
Recommendations	44



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Tables

Table 1: Key milestones in the Tongyeong example of conflict between OFW development and commercial fisheries	16
Table 2: Summary of key concerns between the fisheries and OFW sectors in South Korea	20
Table 3: Summary of international approaches towards coexistence.	35

Exhibits

Exhibit 1: Offshore wind project status in South Korea	13
Exhibit 2: Tongyeong fishers' opposition to offshore wind development	16
Exhibit 3: Location of proposed offshore wind farms and anchovy catch in waters off Tongyeong	17
Exhibit 4: Opinions of fishers documented in Tongyeong workshop hosted by KEI (2020)	18
Exhibit 5: Comparison of current developer-led processes with the new government-led model to be established under the Offshore Wind Promotion Act.	40
Exhibit 6: Locations of Incheon's offshore wind projects (2022)	41
Exhibit 7: Fisheries workshop to select preferred areas of OFW development.	42
Exhibit 8: Offshore wind sites identified through engagement with fisheries (2.7 GW)	42

Acronyms

EBL	Electric Business License
FLOWW	Fishing Liaison with OFW and Wet Renewables Group
GW	Gigawatts
KEI	South Korea Environment Institute
MSP	Marine Spatial Planning
MW	Megawatts
ORJIP	Offshore Renewables Joint Industry Programme
OFW	Offshore wind
OWF	Offshore wind farms
UK	United Kingdom

EXECUTIVE SUMMARY



Executive summary

Offshore wind (OFW) is a reliable, scalable sustainable source of electricity, and many countries around the world are pursuing commercial deployment to support the transition towards their carbon neutral goals. The South Korean Government has set a target of reaching 14.3 GW of OFW before 2030, and as of 2023, the country has 140 MW of installed capacity across six windfarms. Despite this ambitious target, commercial development is experiencing delays, due, in part, to opposition from the commercial fishing sector.

The fishing industry is concerned about the potential impacts of OFW development on livelihoods and economic viability. Perceived issues such as displacement from fishing grounds and potential changes in fish population distribution from OFW development increase the uncertainty facing fisheries.

To date, engagements with fisheries on OFW development in South Korea have taken place only after projects have been sited, due to the regulatory framework that sets the process for project development. The dynamic has potentially contributed to increased feelings of distrust from the fishing sector, expressed in local protests.

In addition, insufficient consultation methods mean that fisheries can feel they do not have an opportunity to influence decision making. The lack of a systematic approach to compensation for potential economic losses in South Korea results in inconsistencies or inadequacies in how it is determined and distributed among affected parties, ultimately limiting its effectiveness.

The negative perception of OFW development may be driven by limited understanding of the goals, risks, and benefits of the OFW sector, or the spread of misinformation and disinformation. Further, perceived conflicts are sometimes amplified by pre-existing distrust between fishers from previous negative experiences with infrastructure project developers.

Similar challenges have been observed around the world in countries with OFW providing potential solutions.

Coexistence between OFW development and commercial fisheries requires enhanced multi-stakeholder collaboration to achieve, and this should be the objective in South Korea to enable renewable energy deployment targets, whilst mitigating risks to the commercial fishing sector.

In many countries, there are approaches employed by different actors in the OFW development process, such as developers, governments, statutory agencies and bodies to support harmonious before coexistence between the two sectors. These include:

- Developing best practices on coexistence through ongoing collaboration and the provision of appropriate forums to enhance such collaboration
- Utilising marine spatial planning to balance interests of multiple sectors
- Developing regulatory frameworks and guidance on acceptable fishing practices compatible with OFW development
- Promoting buy-in through consultations
- Developing regulations to support multi-use options of OFW farms, including for food production, marine ecosystem, restoration, transport storage and others
- The provision of applicable and appropriate compensation schemes
- Involvement of fisheries with employment and service provision opportunities

Based on these approaches, we outline main recommendations for the South Korean Government and its agencies to enable of coexistence and to address key concerns of the fishing sector.



Institutional improvements: legislation of government-led planned siting and bidding system for business developers

1. The simultaneous use of government and developer-led OFW project schemes South Korea requires clarity and coordination to avoid confusion among stakeholders.
2. The passing of the Offshore Wind Power Promotion Act should be prioritised to allow clear guidance of future projects.
3. The Offshore Wind Power Promotion Act is expected to streamline licensing and improve consensus-building with fisheries, emphasising the urgency on its implementation.
4. Post-legislation discussions are crucial to address issues facing projects with EBLs, defining government roles, and incorporating community coexistence plans as bid requirements.
5. Clear government guidance and improved clarity on EBLs are crucial for South Korea OFW projects.

Recommendations on the role of each actor

The Central Government should enact the Offshore Wind Power Promotion Act with a clear implementation plan. They should increase coordination and provide local governments with necessary resources in the siting of OFW farms and continue to work with key stakeholders, implementing programs to positively change perceptions of OFW development.

Local Governments, including municipality and provincial governments should operate public-private councils, establish wind master plans at the regional level, identify win-win solutions that are mutually beneficial to different stakeholders and provide clear guidelines on assessing the local communities and fishers that are directly impacted. They should also continue to work with civil society organisations and other key stakeholders to build social support and capacity build.

The Offshore Wind Industry is recommended to prepare both technical and social aspects for its future tenders, standardise the conduct of environment and social impact assessments and create an information-sharing system that is transparent and open. Projects that are developer-led should consider establishing local councils, and also ensure sufficient information sharing. The industry should focus on technological innovation measures to ensure offshore wind can coexist in harmony with nature.



A diver in a black wetsuit and scuba gear is positioned horizontally in the water, holding a vertical pole. The pole has a camera and a light attached to it. The diver is looking down at a dense field of coral on the seabed. The water is clear and blue, with sunlight filtering through from above. The diver's equipment includes a tank, regulator, and fins. The coral on the seabed is a mix of green and brown, with many small, branching structures. A thin line or rope is visible on the seabed, possibly marking a transect. The overall scene is a scientific or research activity in a marine environment.

BACKGROUND AND AIMS

Background and aims

Offshore wind (OFW) provides cost-effective, sustainable and secure electricity, as countries continue to decarbonise and aim for net-zero. The South Korean government aims to have 21.6% of its electricity generation derived from renewables by 2030, and to achieve this, it plans to deploy 14.3 GW of OFW by 2030.¹² Despite these targets, South Korea has seen slow growth in OFW deployment. Currently, only six fixed-bottom OFW farms are in operation, generating approximately 140 MW. OFW can provide a range of benefits such as creating local employment, economic opportunities for the wider local supply chain and the development of infrastructure such as ports.

Fisheries acceptance of offshore wind is a key challenge in South Korea.

A key objective for the OFW industry in South Korea is to identify ways to progress the development of OFW and deployment of offshore wind farms. During planning stages, it is vital to consider the risks and benefits for local communities and industries such as fisheries, to ensure overall long-term success of the projects.

One of the reasons for South Korea's stalled OFW deployment is the lack of consultation and agreement with fishers during the siting and permitting phases. OFW projects can be delayed or halted for long periods of time due to opposition from fisheries.

To help address this, there is an intention to implement a new 'government-led' centralised development process to replace the current 'developer-led' decentralised approach. This process will first establish public-private partnerships during the siting phase to identify concerns and challenges for fisheries. After site selection, operators will be selected through competitive tenders. It is hoped that this process will help overcome the opposition of fishing communities to OFW.

The current offshore wind development process in South Korea is a developer-led open-door system, i.e. where the project developer is responsible for development activities such as site investigation.

Whilst future updates may be positive from the perspective of engaging with fisheries, it is important to note that there are many 'developer-led' projects that are already in development in the country. In these projects, it is unclear whether the above-mentioned 'government-led' centralised approach will be adopted.

OFW projects can have lengthy development timelines which typically exceed seven years from concept to construction. Given this, the vast majority of projects with the potential to be deployed before 2030 are following the 'developer-led' development model. Therefore, for shorter-term deployment targets, it is of great importance to consider how these projects may also engage fisheries, in addition to those that will follow the 'government-led' approach.

¹IEA (2020), South Korean Renewable Energy 3020 Plan. Source: Link.

²OffshoreWIND.biz, (2023), Plans Unveiled for New Multi-Gigawatt Offshore Wind Project in South Korea. Source: Link.



The current permitting process can take between seven to ten years and operators must obtain various licences, such as the Electric Business License (EBL), through 29 laws and more than ten government organisations. The licence entitles the operator to conduct a preliminary investigation before proceeding with the project. A total of 84 projects representing 27.67 GW have acquired EBLs up to the end of 2023, with the majority of the planned projects located in the areas of South Jeolla province, followed by Busan and Ulsan.³ As these projects are already underway on a 'developer-led' basis, it is crucial to identify the best ways for developers to work with fishers to address their concerns and explore opportunities for mutual benefit, but also avoid unnecessary delay.

OFW targets and progress

In January 2023, the South Korean government announced the '10th National Electricity Supply and Demand Plan (2022-2036)', which aims to secure a 21.6% share of renewable energy generation in total electricity generation by 2030. To achieve this, it plans to promote 14.3 GW of OFW power generation by 2030, an increase from the previous target of 12 GW. South Korea's current OFW projects in operation stands at 140 MW. This means the country is less than 1% of the way to its 2030 target at present.



Exhibit 1 shows the status of South Korea's OFW projects by stage of development through the end of August 2022. The cumulative capacity of projects that have received EBLs, which is considered the initial stage of development, is 19.7 GW. The cumulative capacity of projects that are considering applying for an electricity business licence or are under review for an electricity business licence is similar at 19.4 GW. In comparison to these projects, only 140 MW of offshore wind farms are in operation.

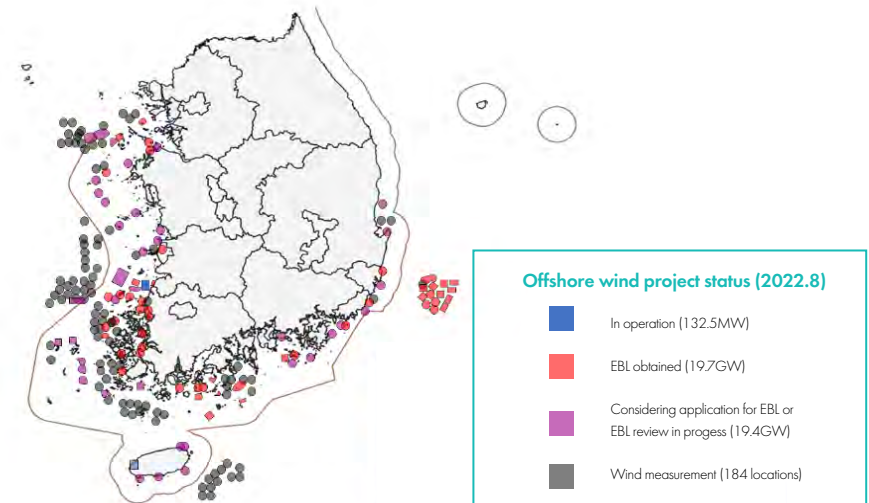


Exhibit 1: Offshore wind project status in South Korea⁴

The objectives of this report are to:

- Examine and summarise the main challenges that OFW projects in South Korea need to address with respect to conflicts with fisheries and other stakeholders.
- Learn from international experience to identify best practices for working alongside local stakeholders, particularly in the fisheries sector.
- Provide recommendations for coexistence strategies for both government-led and developer-led OFW projects based on analysis and findings within this report.

³The Carbon Trust. Challenges and opportunities for South Korean offshore wind supply chain. 2023. Source: Link

⁴Source: Press release from the National Federation of Fisheries Cooperatives (2022. 10. 03).

RELATIONSHIP BETWEEN THE OFW AND FISHERIES SECTORS IN SOUTH KOREA



Relationship between the OFW and fisheries sectors in South Korea

For long-term sustainable and successful development of the OFW industry, it is necessary to ensure that stakeholders outside of the industry can understand the benefits of OFW development, and that development is pursued in a just and collaborative way. Whilst the benefits of OFW in providing low carbon electricity generation and economic opportunity are well-known, it is vital to acknowledge the concerns and potential challenges faced by affected communities such as the fishing industry.

Fisheries may have concerns about OFW developments for two key reasons:

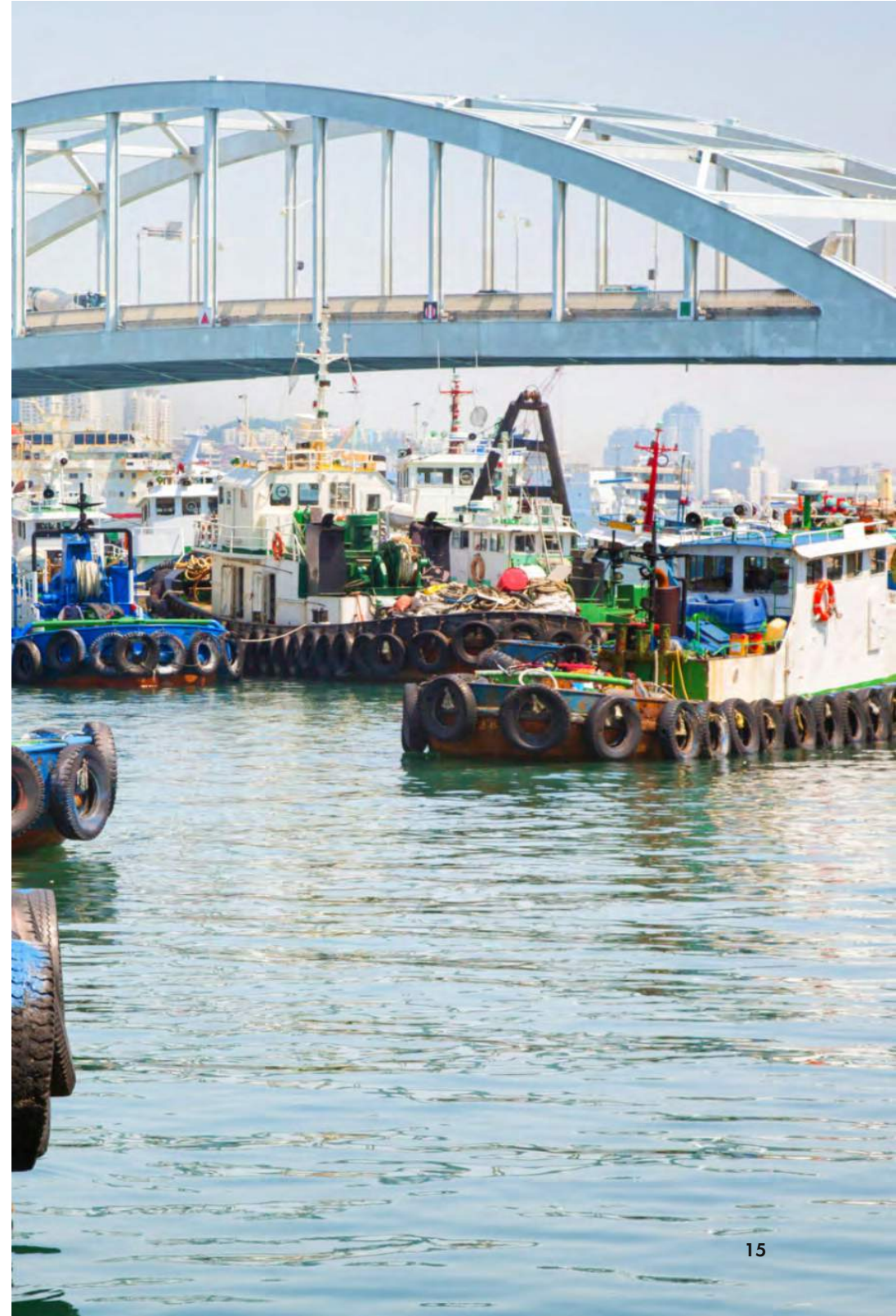
1. There is potential displacement of fishing activities. If developments are sited in prime fishing areas without sufficient mitigation, difficulties with continuing fishing activities around OFW infrastructure, or exclusion zones, may lead to displacement.
2. There are potential impacts on marine ecosystems, which could affect nearby fishing activities and yields.

Ultimately, the concerns pertain to the potential impact of OFW development on the economic value of fishing and the livelihoods of the communities it affects.

While not the primary focus of this report, it is important to note that there are opportunities for addressing both issues mentioned, including fostering coexistence and sustaining fishing operations around OFW infrastructure where possible. In addition, there is the potential for increased fishing yields near OFW developments due to positive population impacts of OFW infrastructure. These concerns and impacts can be mitigated through careful considerations and collaboration during the OFW planning phase, which will be further explored in this report.

Conflicts between the OFW and fisheries sectors

In South Korea, there is concern amongst commercial fisheries about these potential impacts on the marine environment and fishers' livelihoods arising from OFW development. These concerns have manifested in protests and challenges across numerous regions in South Korea. This opposition from the fisheries industry is not confined to any specific region, but prevalent across many coastal areas in South Korea. This suggests that conflicts to OFW development are relatively pervasive among fishing communities, and thus require urgent remediations.



The root causes of the conflicts identified between fisheries and OFW development in South Korea often include delayed engagement with the fishing community, insufficient trust-building, limited compensation, and negative perceptions of OFW's impact due to misunderstandings or past challenges.

From the perspective of the OFW industry, opposition from local stakeholders poses a significant risk to project development through potential delays, permitting issues, and disruption of development activity. Moreover, strong opposition and discontent from local stakeholders risks reputational damage to the OFW sector, which could result in reduced governmental interest or ability to support OFW if unaddressed. This would compound the challenges faced by South Korea in reaching its renewable energy and OFW targets. It is thus paramount to understand the specific concerns from local stakeholders and the fisheries sector, as a starting point to develop mitigation actions that alleviate such conflicts.

Case study: The response of the fishing sector to OFW development in Tongyeong

Tongyeong is a representative fishing town located on the south coast of South Korea. Opposition to offshore wind by Tongyeong fishers began in earnest in 2019, shortly after it became known that a private energy operator had obtained a licence to operate in local waters. They had organised a signature drive, held several rallies on land and at sea, and filed a lawsuit to revoke the EBL. They have also expressed their opposition to the project at the environmental impact assessment public hearing (Table 1 and Exhibit 2).

Table 1: Key milestones in the Tongyeong example of conflict between OFW development and commercial fisheries⁵

March 2019	The first electricity business licence (384 MW) was granted, sparking widespread opposition from fishers.
June 2021	Another operator obtained a second licence (224 MW), which intensified the opposition.
December 2021	Local fishing associations filed a lawsuit against the government to revoke the licence.
Throughout 2022	Local fishers continued to rally against offshore wind.
September 2023	Another operator applied for the third licence (340 MW).
December 2023	Fishers testified at a public hearing on the draft environmental impact assessment for the first offshore wind project to be licensed.



Exhibit 2: Tongyeong fishers' opposition to offshore wind development⁶

⁵Source: Busan Ilbo (2023.09.24); The Chosun Daily (2021.11.22);
⁶Kyongnam Shinmun (2019.09.30);
 Newsis (2023.12.13); Kyongnam Shinmun (2022.02.16).
 Source: Media coverage (KN news and Chosun Ilbo)

As of 2023, about 1.2 GW of OFW development is underway by four different operators in Tongyeong. Two operators have already obtained EBLs for approximately 600 MW in total. However, fishers in Tongyeong have consistently opposed the projects, demanding the cancellation of OFW development. The main reason for the fishers' opposition is that the proposed site of the OFW includes one of South Korea's most important anchovy fishing grounds (Exhibit 3).

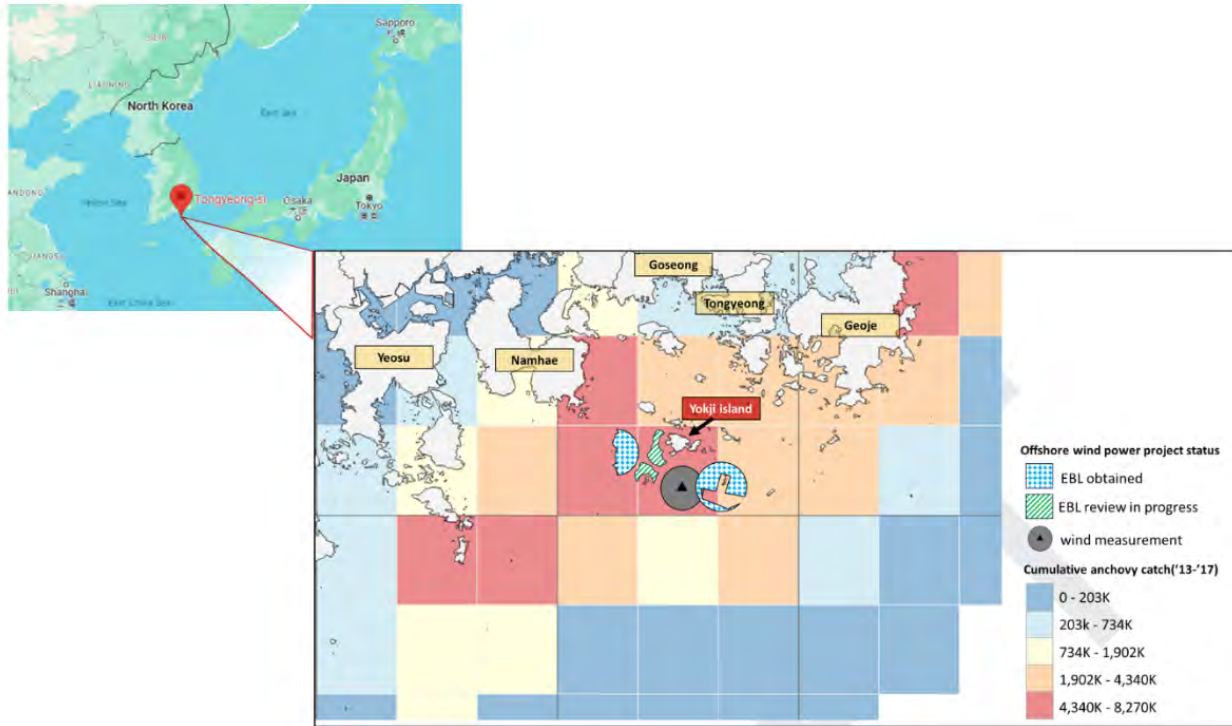
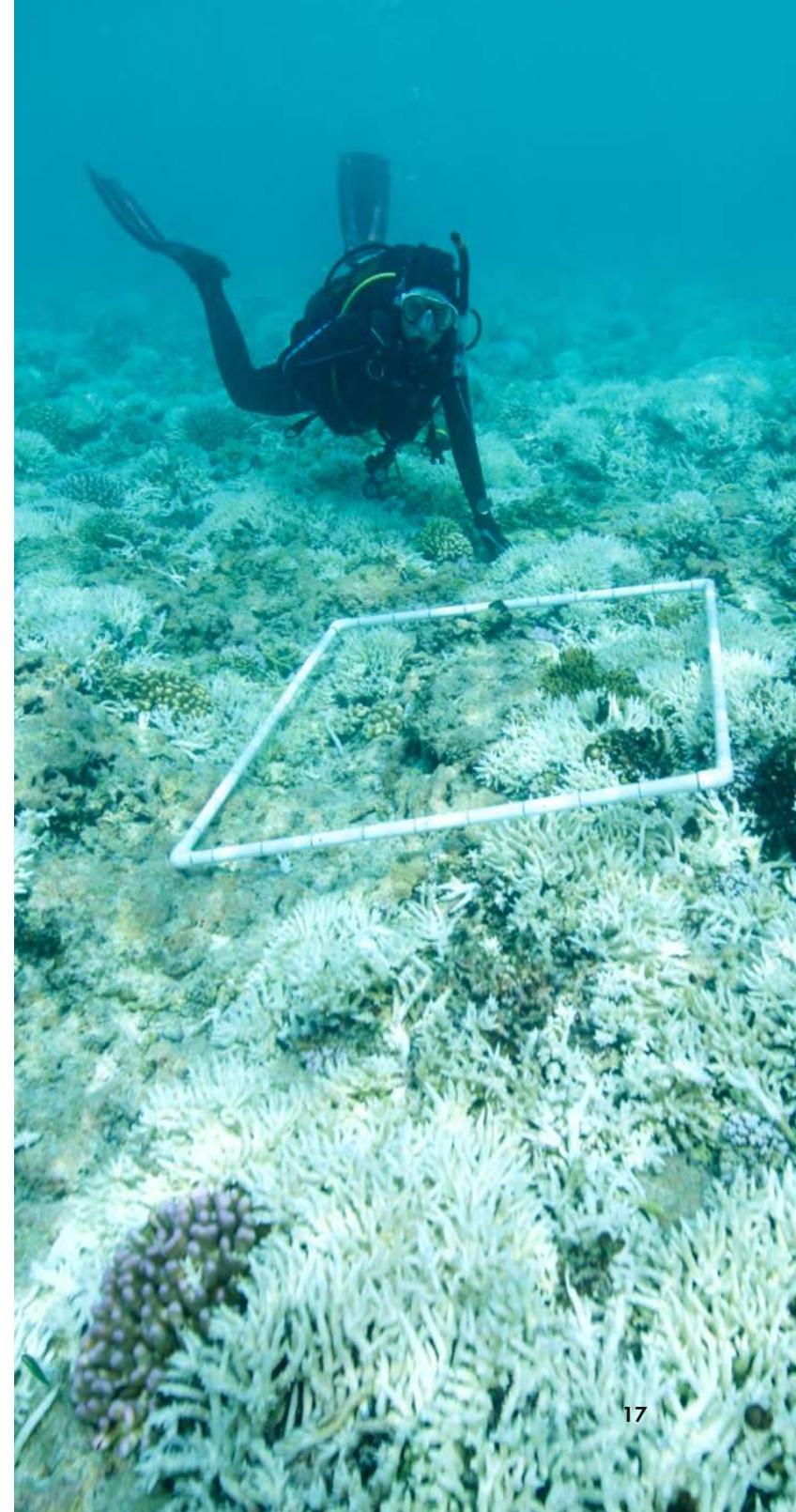


Exhibit 3: Location of proposed offshore wind farms and anchovy catch in waters off Tongyeong⁷

In recognition of the growing conflicts between fisheries and the OFW industry, the Korea Environment Institute (KEI) invited fishers from Tongyeong to participate in a public dialogue program in 2020 to discuss key issues related to OFW projects. Of those who participated, **56% mentioned that "accurate assessment of potential impact on fisheries is needed"** for OFW and fisheries to coexist, and that **"substantial public consultation is needed prior to planning."** 48% also said that **"information about the project needs to be disclosed"**. Exhibit 4 provides a full breakdown of the responses captured from participants during the session.

⁷Source: Gyeongsangnam-do & Ministry of Oceans and Fisheries (2019); Busan Ilbo (2023.09.24).



Compensation measures and benefit-sharing schemes are insufficient and ineffective in changing negative perceptions of OFW development.

In South Korea, OFW operators often offer financial compensation to individual fishers who express opposition to projects. There is anecdotal evidence that local fishers have chosen to express their concerns more emphatically, possibly with the aim of securing larger compensation payments, or have reached out directly to operators to discuss compensation.⁸ At present, compensation measures from OFW developers and operators are limited to individual engagements with fishers, with no broader systematic approach or best-practice framework guiding the interactions between both sectors. There is a lack of information and knowledge among South Korean fishers, operators, and the government regarding how to design win-win solutions that encourage coexistence between the fisheries and OFW sectors, and how to establish a system to streamline such long-term solutions.

Alternative existing efforts to alleviate livelihood concerns have mostly been limited to benefit-sharing schemes between local stakeholders and OFW farms, which have not been very effective in practice. Currently, South Korea's benefit-sharing schemes focus on investment returns, which is not very effective in establishing stakeholder acceptance. The Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy has introduced a "resident participation system", where qualifying residents and fishers voluntarily invest in power plants and receive dividends or interest in return.

However, the effectiveness of benefit-sharing schemes in terms of promoting local acceptance is dependent upon the project's wider social, environmental, and economic impacts on the local community, and the scheme's ability to account for this context.⁹

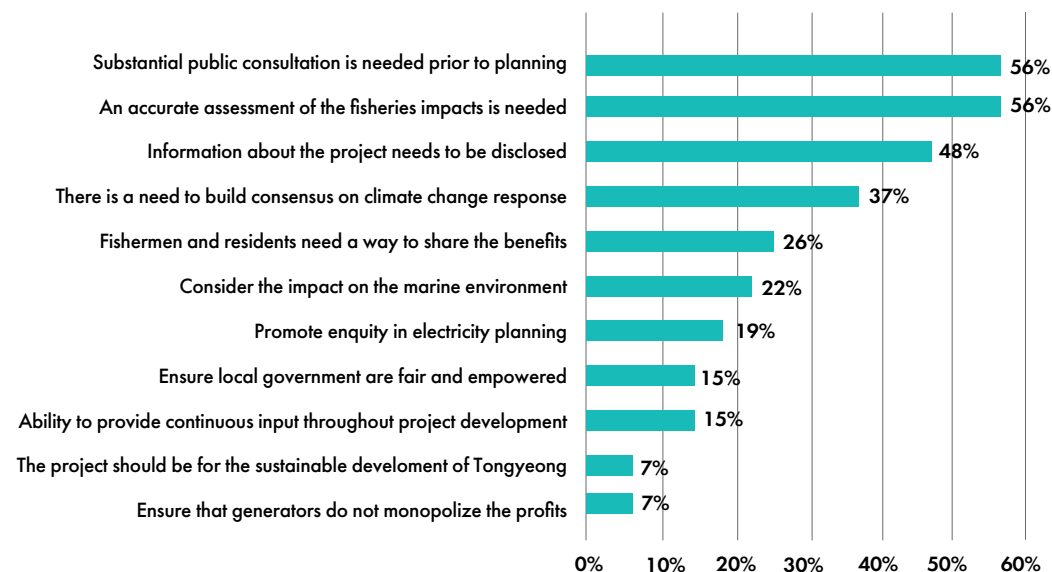


Exhibit 4: Opinions of fishers documented in Tongyeong workshop hosted by KEI (2020)

Understanding specific concerns from fisheries regarding OFW development

Based on the results of the Tongyeong workshop, and further industry analysis, the key concerns raised by the fishing sector regarding OFW development are detailed below.

Concerns with economic impact, compensation offerings, and long-term impacts

OFW development can have negative impacts on livelihoods and economic outcomes.

Most fishers are concerned that OFW farms will reduce the size of areas available for fishing and cause economic losses due to reduced catches. Concerns about the impact of OFW development on the marine environment, and associated impacts on fish populations and distributions, add to these economic concerns. Ultimately, these lead to concerns about potential job losses and substantial changes to livelihoods, with fishers having limited options for alternative sources of income.

The fishing industry is particularly concerned about these negative impacts in circumstances when the industry feels that OFW farm planning has failed to account for existing users of the sea area. There have been no impact assessments to gauge how OFW will change fishers' incomes or livelihoods in South Korea, and this uncertainty creates concern for the fishing industry.

⁸Assist University Fieldwork Research

⁹Solutions For Our Climate, (2023). 12 Key Issues That Will Define Offshore Wind's Success in South Korea.

Source: Link.

Lack of a long-term regional plan for OFW development increases uncertainty of long-term impacts.

As OFW development proceeds, the individual displacement risk for fisheries from individual OFW projects is compounded by cumulative impacts from multiple developments, leading to an increased spatial squeeze. Fisheries may be concerned regarding increasing and long-term impacts that are uncertain at present.

At present, OFW development planning within regions in South Korea has been led by individual operators. There are significant economic benefits from OFW that will drive regional development, so comprehensive plans for related industries, jobs, infrastructure, are needed in addition to individual project power generation and transmission plans.

Such efforts can help to build consensus for the project in the local community and potentially have a positive effect on fishers' acceptance. To this end, local and central governments, local fisheries, and industries should participate in the development of regional master plans to effectively identify inter-sectoral linkages and related measures.



Concerns with current engagement procedures and opportunities to input into OFW farm planning

Engagements with fishers on OFW planning often take place too late into the project development cycle, which can exacerbate feelings of distrust between sectors.

In most OFW projects in South Korea to date, which follow the 'developer-led' development model, engagement with fisheries has occurred too late in the process. The site has been chosen, and early implementation planning has commenced before fisheries were informed about the projects. This delayed involvement has often resulted in strong opposition from the fishing community. Delaying engagements and relevant disclosures can undermine the sense of transparency and collaboration between the two industries.

Transparency and collaboration are crucial for gaining social acceptance for the development of OFW and other major infrastructure. This is important for all stakeholders, especially those most affected by development, such as fisheries stakeholders. Delaying engagements and withholding relevant information undermines project transparency, leading to heightened tensions between stakeholders.

Existing consultation methods do not sufficiently foster trust and collaboration between fishers and the OFW industry.

South Korean fishers are concerned that consultation methods utilised to date have focused on communicating updates to fishers, rather than seeking their input. For example, developers have organised one-sided briefing sessions and public hearings to provide details of already established projects, with little opportunity to gather feedback from fisheries.

As previously noted in Exhibit 4, the fishing industry has highlighted that there is a lack of adequate information sharing that takes place between the OFW stakeholders and local fishers, which may create confusion around the planning process or exacerbate distrust between stakeholders. Consequently, fishers do not perceive themselves to be primary stakeholders within the OFW planning processes and thereby are not empowered to raise perceived conflicts to relevant authorities in time for them to be adequately addressed within OFW planning.

Negative perceptions of the OFW sector may sometimes be increased by limited understanding, and previous issues with government agencies and the private sector

Uncertainty driven by limited understanding of the OFW sector may sometimes drive negative perceptions of OFW development.

In new OFW markets, the goals, risks, and benefits of OFW projects are often not communicated or inaccurately portrayed to local fishers. This is also the case in South Korea. In the absence of clear and accessible information, there is uncertainty over the expected impacts, which fuel apprehension and potentially opposition to OFW development.

In addition, the spread of misinformation and disinformation within fishing communities further contributes to the negative perception of OFW. Such misconceptions can circulate rapidly at scale and can spillover across borders, especially where there are pre-existing perceptions of the negative impacts of OFW farms on local livelihoods.

Concerns due to pre-existing distrust between fishers and relevant government agencies and private sector, which are unaddressed.

In many cases, communities in areas with proposed OFW farms have previously experienced a loss of trust in dealings with companies and governments, often due to incidents unrelated to OFW. Initiating a dialogue with fishers in these areas becomes challenging for operators as a result, as fishers already hold distrust with existing authority bodies and private sector actors.

Summary of key concerns from fisheries towards OFW development in South Korea

There are several concerns from fisheries in South Korea towards OFW development resulting from potential economic and livelihood impacts, present inadequate mitigation and compensation, engagement failures during OFW planning to date, and negative perceptions more generally. In South Korea, it will be important that remedies to support coexistence between fisheries and OFW development respond directly to these identified concerns. A summary of the major concerns discussed above is included in Table 2.

Table 2: Summary of key concerns between the fisheries and OFW sectors in South Korea

Summary of key concerns
OFW development can have negative impacts on livelihoods and economic outcomes.
Compensation measures and benefit-sharing schemes are insufficient and ineffective in changing negative perceptions of OFW development.
Lack of a long-term regional plan for OFW development increases uncertainty of long-term impacts.
Engagements with fishers on OFW planning often take place too late into the project development cycle, which can exacerbate feelings of distrust between sectors.
Existing consultation methods do not sufficiently foster trust and collaboration between fishers and the OFW industry.
Uncertainty driven by limited understanding of the OFW sector may sometimes drive negative perceptions of OFW development.
Concerns due to pre-existing distrust between fishers and relevant government agencies and private sector, which are unaddressed.

INTERNATIONAL EXPERIENCE ON FISHERIES COEXISTENCE WITH OFW



International Experience on fisheries coexistence with OFW

Conflict between OFW development and commercial fisheries is not unique to South Korea. Similar challenges have been experienced in many OFW markets, including those with greater capacities of OFW installation. These markets have implemented strategies to alleviate conflict and support coexistence.

This section first describes the case for coexistence, before outlining approaches that have been implemented in international OFW markets to mitigate conflict between the two sectors.

Typical approaches to enabling fisheries coexistence with OFW projects are provided in this section based on international experiences and recommendations from literature. The approaches are categorised based on whether they are typically developer-led or government-led. However, there may be opportunities to incorporate developer-led approaches into a government-led development model, and vice versa, for South Korea's consideration.

As outlined previously, to date the OFW project development process in South Korea has been led by developers, and it is these projects that are expected to be constructed first in the country and are therefore most relevant for shorter-term deployment targets. However, discussion around enactment of the Wind Power Promotion Act could bring in a more government-led model. In international OFW markets, both developer-led and government-led development approaches exist. For the South Korean context, given that developer-led approaches will be very relevant to projects currently in development, and it is possible that government-led models will be relevant to future projects, there are opportunities to learn from actions under both models regarding engagement with fisheries.

Coexistence could offer a solution to conflict between commercial fisheries and OFW development

Coexistence in the case of commercial fisheries and OFW development would mean a system by which both industries can exist harmoniously despite previous conflict and concerns. In this system, OFW development would be able to proceed, but in a way that enables continued fishing activity.

Achieving coexistence is challenging for a number of reasons, including:

- Fear of exclusion and displacement;
- Lack of data on potential impacts;
- Cumulative impacts of OFW farms;
- Context-specific factors, such as the size and type of wind farm, the nature of the fishing activity (e.g., method and gear type), and environmental conditions;
- Exacerbation of impacts on marine life through OFW impacts and habitat stress caused by fishing activities;
- Changing fish behaviour due to industrial activity and climate change;
- Accidental damage; and
- Inadequate mitigation and compensation for lost earnings.

Various countries have initiated strategies to address specific challenges related to coexistence, emphasising stakeholder inclusion, habitat preservation, and conflict resolution mechanisms. There is need for further research and comprehensive strategies to optimise coexistence while addressing the diverse range of issues impacting the relationship between OFW and commercial fishing.

Co-location refers to the opportunity for fishing activity to continue in areas of OFW development, as has been experienced internationally, for example Westermest Rough Offshore Wind Farm in the UK¹⁰. Co-location has often been cited as a way to avoid conflict altogether, but there are difficulties with accommodating active fishing operations within OFW farms regarding safety concerns and risk of damaging infrastructure. Opportunities for co-location are context-specific, and will depend on environmental conditions, fishing gear type, and wind farm characteristics.

Current insights into opportunities and obstacles stem largely from international experiences with older installations, although future wind farms are anticipated to offer better conditions for co-location.¹¹ Furthermore, co-location may be increasingly necessary in future as deployment increases and there is an increase in spatial squeeze for developments.

The following international approaches can help move towards coexistence between OFW and the fishing sector.

¹⁰ Ørsted, Can offshore wind and commercial fishing coexist? Source: Link.

¹¹ Swedish Agency for Marine and Water Management and Swedish Energy Agency (2023). Coexistence of OFW power with commercial fishing, aquaculture and nature conservation.

Approaches that are typically developer-led

Establishing consultation groups early in the planning process to encourage dialogue can be useful to identify and resolve potential issues quickly. Given that this has been highlighted as a specific concern in South Korea, leading to significant distrust within the fishing community towards the OFW sector, the following case studies present approaches for industry to actively seek input from local stakeholders. This proactive engagement aims to address concerns related to the impact of fishing activities and potential design modifications, thereby fostering a more collaborative and transparent relationship.

Adapting the design of OFW farms based on project-specific consultations with fishers

Consultations with fishers can be targeted towards adapting the design and siting of OFW farms and infrastructure to enhance the potential for coexistence. This approach is developer-led as final design decisions will be taken by the developer, based on this input from fishers.

- **Advantages:** Inviting views from fishers can provide useful information on how OFW farms can be modified to reduce the impacts on fishing activities and mitigate concerns about existing design features so that fishers are more receptive towards OFW projects (increased stakeholder buy-in).
- **Challenges:** It may not be possible to accommodate all suggestions from fishers (due to technology, cost, lack of understanding, etc.), which could lead to further disagreement and/or conflict.

The following design adaptations are provided from literature¹² on adjustments that OFW farms can make to better support fishing activities.

¹² Swedish Agency for Marine and Water Management and Swedish Energy Agency (2023). Coexistence of offshore wind power with commercial fishing, aquaculture and nature conservation.



OFW design adaptations	Key Elements Discussed in Literature
Positioning turbines to allow fishing and navigation between turbines	<p>The layout of wind farms needs to ensure that there is enough space for fishing gear to be operated at a safe distance from the wind farm's fixed installations. For example, fixed bottom turbines require shorter safety distances between fishing vessels and wind turbines than wind farms with floating turbines due to additional challenges from mooring lines, which pose significant risks of fishing gear entanglement or snagging.</p> <p>In addition to the distance, turbines can be positioned in straight rows and avoid pointed corners at the edges of the wind farm. For fishing that follows depth curves such as shrimp trawling, turbines could be positioned alongside the depth curve to facilitate coexistence.</p>
Foundation structures could be designed to promote coexistence	<p>Protruding elements of the foundation that are close to the sea surface may cause damage to fishing vessels if there is a collision. Foundations could also have a smooth surface and the number of parts and attachment points should be minimised to reduce the likelihood of fishing gear becoming entrapped.</p>
Burying cables to minimise exposure to fishing activity	<p>Enabling fishing with bottom gear, particularly bottom trawling, requires burying the cables from the wind farm at a depth of 1-2 metres.¹³ This is based on literature regarding fishing gear penetration. Work by Linnane et al. (2000)¹⁴ indicates that fishing gear penetration is limited to a maximum of 0.3 metres penetration even in soft sediment. More recent studies also validate this figure.¹⁵</p> <p>In Germany, cables are identified in the marine spatial planning process and are gathered in cable corridors by coordinating and co-locating cables and pipes for different purposes. However, further cable protection measures such as prohibiting anchorage within a certain distance may be required. This is the case in Denmark where there is a decree protecting marine cables and underwater pipelines by prohibiting fishing with gear with seabed contact within 200 metres of underwater cables.</p> <p>However, the burying of cables in OFW farms depends on ground conditions. A rocky seabed may necessitate laying cables on the seabed with protective measures like rock armouring or concrete mattresses. Furthermore, cables that have been buried may become unearthed during operation with seabed movement etc., and so cable positioning and safe operation of fishing activity over cables cannot be guaranteed, even if the cables were originally buried to a sufficient depth.</p>
Installation of asset monitoring technologies centralised monitoring and safety service for OFW farms	<p>Technologies are available to support monitoring of OFW assets during operation. For example, cable monitoring technologies exist to provide real-time insights on the depth of cable burial, exposure, impact detection and environmental monitoring. Whilst this data is useful for operation and maintenance of the wind farm, there is potential that sharing such data with fisheries may increase available information for decision-making.</p>
Multi-purpose platforms	<p>The integration of offshore multi-purpose platforms is a novel concept aimed at managing conflicts between offshore renewables and aquaculture systems. Pilot projects in China are looking to demonstrate the use of multi-purpose platforms.¹⁶ The benefits evident in these pilot projects include cost reduction through shared infrastructure, spatial utilisation, optimised marine spatial planning, and offering sustainable energy, food and employment opportunities for remote communities. However, there are expected legal, social, environmental, and technical challenges affecting the likelihood of such projects to scale, and further research is required on the development of a unified regulatory framework to support the shared use of infrastructure.</p>

¹³ SSPA. (2022). Sjösäkerhetsanalys - fiske i havsbaserade vindkraftparker. Swedish Energy Agency, registration number 2022-008944.

¹⁴ Linnane, A., Ball, B., Munday, B., Van Marlen, B., Bergman, M. and Fonteyne, R (2000). A Review of Potential Techniques to Reduce the Environmental Impact of Demersal Trawls, Irish Fisheries Investigations (New Series) No. 7.

¹⁵ Carbon Trust (2015). Cable Burial Risk Assessment Methodology. Source: Link.

¹⁶ The Fish Site, (2020) Can aquaculture co-locate with offshore energy projects? Source: Link.

Approaches that are typically government-led

Government-led approaches can offer an effective means of formalising the involvement of the fishing community in key OFW development decisions. In addition, governments can play a role in clarifying the rights of all parties involved, which could include safeguarding livelihoods or seeking compensation for potential damages. Formalising the involvement of the fishing industry in OFW development ensures that stakeholders are well-informed about their entitlements and the repercussions of non-compliance. The following case studies outline strategies that can be tailored to the South Korean context, where the government's responsibility to protect stakeholder interests can play a pivotal role in cultivating trust within the fishing community.

Utilising Marine spatial planning (MSP) to balance interests of multiple sectors

MSP processes can be designed to incorporate consideration of social and economic impacts of OFW developments on fishing activity, so that its output on suitable sites for OFW development support coexistence with fisheries. MSP is usually undertaken by governments for the purpose of balancing interests in the marine area, including commercial fisheries and OFW development.

- **Advantages:** Using MSP as an approach to managing coexistence is useful as stakeholder engagements may be built into its process. Most MSP involves engaging various marine stakeholders about current and future marine activities. Further, MSP can allow for clear integration of ecological data to support decisions. MSP usually results in the development of a plan or designation of areas for specific marine activities, such as OFW development.
- **Challenges:** There is an expectation that MSP involves balancing the needs of multiple industries including OFW, fishing, shipping, military, recreation, etc. Therefore, promoting coexistence may be only one of many aims. Other difficulties can include the availability of data to support MSP decision-making, which can add challenges into the effective designation of areas for specific marine activities.



International examples of the use of MSP processes to promote fisher coexistence is provided below:

International examples	Best practices
<p>Acknowledging the special status of fishers in the MSP processes, Poland¹⁷</p>	<p>In Poland, proactive measures were taken to involve artisanal fishers by conducting initial in-person interviews as part of developing the MSP framework. The first round addressed overarching issues faced by fishers, while the second focused on collaboratively exploring solutions for harmonising fishers' activities with OFW farms. These initiatives provided valuable insights to planners, contributing to the creation of MSP solutions (interviewing fishers during the process to identify solutions for coexistence and identifying important fishing sites) tailored to support fisheries, thus fostering a more "fishery-friendly" approach within the planning process.</p>
<p>Drawing on fishers' knowledge to create an evidence base, Scotland¹⁶</p>	<p>Marine Scotland initiated ScotMap, a collaborative fisheries mapping initiative to enhance understanding regarding fishing activities among smaller vessels lacking Vessel Monitoring Systems. Through engagement with over 1,000 fishers, the project aimed to pinpoint specific maritime zones utilised for fishing endeavours. The interviews also provided insights into the economic significance of these areas, estimating their contribution to vessel earnings between 2007 and 2011. The data served as a foundation for generating maps showcasing the intensity of fishing activities and the socio-economic relevance of diverse sea regions to the fishing community.</p>

Developing regulations to support coexistence

This is a government-led approach where regulatory frameworks can be created to facilitate the shared use of marine spaces by fisheries, ships and OFW simultaneously. Ensuring coexistence as a prerequisite for OFW developers to secure permits is also a potential approach to regulation.

- **Advantages:** If well-designed, regulations can reduce market uncertainty on the use of marine areas and support cooperation among stakeholders.
- **Challenges:** There is a risk of developing regulations that are too complex and time-consuming to adhere to, and risk conflict if not properly enforced. Regulations that do not appropriately account for the economic and ecological impacts of allowing sites to be used for multiple requirements may also do more harm.

¹⁶ The Fish Site, (2020) Can aquaculture co-locate with offshore energy projects? Source: Link.

¹⁷ European Marine Spatial Platform, Conflict Fiche 5: Offshore wind and commercial fisheries. Source: Link.



Examples of lessons learned from international approaches to regulating coexistence include:

International examples	Recommendations
<p>Piloting multi-use solutions, Netherlands¹⁶</p>	<p>In 2015, the Dutch government sought to provide fishing vessels with access to wind farms within the Dutch Exclusive Economic Zone, prompting a comprehensive risk assessment. Collaborating with stakeholders, including wind farm owners, a set of regulations was proposed, allowing vessel transit and specific fishing activities within safety zones, contingent upon adhering to government-specified gear and safety criteria.</p> <p>Pilot initiatives in 2016/2017 aimed to open three wind farms for vessel transit and multi-use. However, disagreements arose over cost-sharing and liability between wind farm operators and stakeholders, hindering consensus. Concerns regarding infrastructure adaptation costs, operational disruptions, and potential reputational damage to the wind energy sector persisted. The Ministry of Economic Affairs and Climate Policy commissioned an independent review of risk studies, uncovering additional hazards posed by certain fishing methods to wind farms.</p> <p>Despite this, in 2018, the government implemented the proposed restrictions, agreeing to monitor, manage incidents, and conduct policy evaluations in collaboration with wind farm owners during a two-year pilot, extendable based on new insights. Plans for future wind farms include designated transit corridors for vessels up to 45 meters, scheduled for construction between 2019 and 2023, aiming to provide a long-term solution for coexistence.</p>
<p>Supporting fisheries with designated migration corridors, Poland¹⁶</p>	<p>Within the Polish Marine Spatial Planning (MSP) process, designated blue corridors were created to facilitate the safe migration of diadromous organisms. These corridors strictly prohibit any construction that might impede this crucial migration process. Interestingly, OFW farms in Poland are situated beyond these corridors and remain unaffected. However, these spaces are accessible to fishing vessels, presenting a notable model for resolving conflicts between fishing activities and offshore energy ventures.</p>
<p>Requirements for coexistence plans between developers and fishers, Denmark¹⁶</p>	<p>In Denmark, wind power developers are required to have initiated a dialogue with affected fishers in order for a permit to be granted. For example, in draft decisions on permits for specific sites in Denmark, the Halland County Administrative Board proposed conditions for the developer to maintain a dialogue with the commercial fishing organisation and work with them to establish and maintain a cooperation plan to enable commercial fishing in the wind farm. While the contents of the coexistence plans were not specified, the regulations set up conditions for regular evaluation and auditing to strengthen cooperation between all stakeholders.</p>

Developing guidance on acceptable fishing practices to support compatibility with OFW farms, potentially supported by regulation

Opportunities for co-location can be increased with particular fishing practices and activities, including selection of gear type. Certain gear types and avoidance strategies can increase the potential for coexistence and co-location by reducing the risk of damage to OFW and fishing infrastructure. It is sensible for such guidance to be government-led, as this will appear more independent than if produced by OFW developers. A government-led approach can be to develop guidance for this implementation, potentially supported by regulation to mandate specific practices in and around OFW farms.

¹⁶ The Fish Site, (2020) Can aquaculture co-locate with offshore energy projects? Source: Link.



- **Advantages:** Clear guidelines can reduce the risk of conflict and provide greater certainty to both fishers and OFW developers on the type of activity that is safe and permissible around OFW farms.
- **Challenges:** Monitoring compliance will be an issue and requires feasible enforcement measures that are not administratively onerous for fishers to abide by. Regulations will also need to keep up with technology advancements, which can be challenging.

The following recommendations¹⁶ are taken from literature on how encouragement of certain types of fishing activities that are less risky towards OFW operations can support coexistence.

Adaptation of fishing activities	Recommendations from literature
Fishing with passive gear	Passive gear has greater potential for coexistence, specifically with cages, hooks, and gillnets, as they pose a lower risk to wind turbines compared to active gear. Generally, smaller gear and gear with less contact with the seabed are better suited for co-location. However, the possibility of changing gear is very limited for most fishers and vessels due to fishing licensing and costs. International experiences show that a greater number of fishers choose to stop fishing, or fish in other areas rather than switching to other types of gear. Further innovation of fishing gear suitable for wind farms is therefore considered necessary going forward.
Restrictions on when fishing may take place in the wind farm	Limits regarding in which conditions fishing should and should not take place are based on the type and size of vessels, and this guidance should be developed in consultation between local fishers and the wind farm operator. In the UK, the Kingfisher Information Service – Offshore Renewable and Cable Awareness project – developed a bulletin system that reminded fishers to be particularly cautious when fishing near various wind farm structures and their associated cables. The development of monitoring systems and industry standards can help increase preparedness and minimise technical failures of vessels.

¹⁶Swedish Agency for Marine and Water Management and Swedish Energy Agency (2023). Coexistence of OFW power with commercial fishing, aquaculture and nature conservation.



Compensation schemes

Where the development of OFW farms has resulted in a loss of income or increased expenditure for fishing, compensation has, in some cases, been paid to the fishers affected. This is typically government-led in terms of incentivising or mandating OFW developers to provide compensation where negative economic impacts are identified.

- **Advantages:** Clear guidelines can reduce the risk of conflict and provide greater certainty to both fishers and OFW developers on the type of activity that is safe and permissible around OFW farms.
- **Challenges:** Monitoring compliance will be an issue and requires feasible enforcement measures that are not administratively onerous for fishers to abide by. Regulations will also need to keep up with technology advancements, which can be challenging.

International examples¹⁹ of compensation paid to fishers as a last resort are provided below:

Compensation examples	Description
Using compensation where regulations create a loss of income	In Denmark, where cable protection regulations effectively exclude all fishing using gear with seabed contact from wind farms, monetary compensation to the fishers affected has so far been the most common measure for managing the conflict with wind power.
Compensating for the impacts of OFW farm construction	In the UK, the use of a Fisheries Management and Mitigation Strategy has become a standard part of the permitting process. The strategy includes financial compensation to fishers affected by the construction and maintenance of a wind farm and its infrastructure. The compensation is paid to offset the loss of income and is typically calculated based on catch and income history. It is designed through joint agreements between the actors concerned, usually without direct involvement of the state and in most cases at an early stage of the planning or permitting process.

¹⁹Swedish Agency for Marine and Water Management and Swedish Energy Agency (2023). Coexistence of OFW power with commercial fishing, aquaculture and nature conservation.



Approaches that can be led by government and developers

The following approaches utilised internationally can work either as developer-led or government-led approaches.

Establishment of collaborative platforms with the objective of supporting coexistence, and creation of best practice

Coordinating joint efforts between fishers and OFW stakeholders can enable the development of shared resources to guide coexistence and establish best practices. The requirement for leadership, facilitation, resource allocation and long-term commitment to support ongoing collaboration will primarily lie with OFW stakeholders, making it a suitable developer-led approach. These may be industry-led or centrally-led.

- **Advantages:** Collaborative approach that can build trust and experience of the sectors working together. This approach can reduce the risk of conflict between stakeholders and enable the development of solutions that consider both parties' needs.
- **Challenges:** This can be a time-consuming process to achieve consensus and may be challenging to implement if there are no means of holding stakeholders accountable for abiding by the best practices.

The following examples are taken from international best practices on how collaboration has been used by OFW developers and other stakeholders to promote coexistence with fisheries.

International examples	Best practices
Fishing Liaison with OFW and Wet Renewables Group (FLOWW), UK ²⁰	FLOWW was set up in 2002 to foster good relations between the fishing and offshore renewable energy sectors and encourage coexistence of the industries across the UK. The Crown Estate provides the secretariat services to the group which comprises 40 organisations across developers and fishing industry bodies. Its best practice guidance has been developed through three OFW leasing rounds, and includes the following recommendations:

²⁰ The Crown Estate, Marine FLOWW. Source: Link.



	<ul style="list-style-type: none"> • Developers must undertake formal consultation with fisheries stakeholders, allowing them to submit their views on the OFW projects and provide data on the possible impacts on fishing activities as part of the Environmental Impact Assessment. Developers can identify relevant fishers by making port visits at the earliest opportunity, and work with fishing federations to promote local relationships. • Developers should be responsible for sharing necessary information on the project such as its position, size, safety zone proposals and associated submarine cable routes and landing points with the local fishers at the earliest opportunity. Project design must consider spatial constraints planning and mitigation efforts around array cabling layout or burial, foundation design, safety zone application, and decommissioning plans. • A Company Fishing Liaison Officer and a Fishing Industry Representative are key roles that should be appointed by the developer to ensure that the flow of information and discussion between developers and the fishing industries is maintained. During the planning phase, the officer should ensure that the developer benefits from industry knowledge and feeds this into site selection and the assessment of potential impacts where possible. During the construction phase, the officer can ensure timely provision of information regarding programmed vessel movements or delays and act as the main 24-hour point of contact for the fishing industry to get in touch. • The fishing liaison plan should be updated during the planning and construction phases of development, and then again during operation. • If coexistence is not possible, then mitigation for disruption and displacement of fishing activity should be considered as the priority, with commercial compensation only being used as a last resort where significant residual impacts cannot otherwise be mitigated.
<p>Communities of Practice North Sea, Netherlands²¹</p>	<p>The Netherlands set up a Community of Practice to stimulate the development of multi-use pilots by bringing interested parties together, sharing experiences and learning from each other in a context of existing and developing spatial and social claims. This development is part of the government's strategy aimed at finding a balance between OFW energy development, nature conservation and seafood production.</p> <p>Representatives worked together to support multi-use pilots related to licensing procedures or the use of fishing gear in OFW farms for example. The activities supported knowledge exchange and built a shared understanding around marine multi-use approaches between stakeholders in an informal setting. The lessons from the Netherlands suggest that the Community of Practice approach can act as a participatory action-oriented tool if participants share a joint definition of what it is about, allow for sufficient time to get to know each other and build trust, make sure that the agenda equally allows for views from the fishing industry as well as the OFW industry, and promote transparent communication.</p>
<p>SSE Renewables Principles for Coexistence with Commercial Fisheries²²</p>	<p>SSE Renewables outlined their plans to better coexist with fisheries when building and developing OFW projects. The plan focuses on 'The Three C's':</p> <ul style="list-style-type: none"> • Communication – transparent and effective communication of activities. • Collaboration – development of mitigation and operation strategies with input from the fisheries sector. • Coexistence – understanding conflicting viewpoints and achieving a synergetic approach to coexistence.

²¹The European Maritime Spatial Planning Platform, Combining offshore wind farms, nature conservation and seafood: Lessons from a Dutch community of practice. Source: Link.

²²SSE Renewables Principles For Co-Existence With Commercial Fisheries. Source: Link.

The plan aims to allow the developer to deliver multiple benefits:

- Employment: A Company Fishing Liaison Officer is employed to maintain timely communication with fishers regarding project development activities. In addition, fishing vessels may be employed to support survey works, and act as guard vessels.
- Cooperation agreements: Offer support and guidance to fishers who may lose access to their regular grounds temporarily during pre-construction and construction works or face loss or damage of gear. In such cases, SSE Renewables has established a claims process for affected fishers who can work with the Fishing Liaison Officer to be appropriately compensated.
- Access to data: Sharing geophysical survey data prior to construction, and timely survey data during operation to fisheries to aid decision-making.
- Service requirements: Requirements for services including scouting surveys and post-construction trials (including over trawl), fisheries impact assessments, acting as guard vessels, amongst other opportunities.

**Offshore
Renewables
Joint Industry
Programme
(ORJIP) for
Offshore Wind**²³

The Offshore Renewables Joint Industry Programme (ORJIP) for Offshore Wind is a developer-led collaborative initiative that aims to:

- Fund research to improve our understanding of the effects of OFW on the marine environment;
- Reduce the risk of not getting or delaying consent for OFW developments;
- Reduce the risk of getting consent with conditions that reduce viability of the project.

The programme pools resources from the private sector and public sector bodies to fund projects that provide empirical data to support consenting authorities in evaluating the environmental risk of OFW. Projects are prioritised and informed by the ORJIP Advisory Network that includes key stakeholders such as statutory nature conservation bodies, academics, non-governmental organisations and others.

One of the projects funded under this programme aims to improve the evidence base for coexistence between commercial fishing and offshore renewables with a focus on cabling. The project aims to understand the operational risk of fishing over subsea cables considering seabed conditions, geology and seabed morphology. This research will provide practical evidence to support risk assessments and improve safety of fishing activity near OFW cables.

Promoting buy-in through targeted consultations

Lack of engagement during OFW development decision-making has been highlighted as a key concern. Promoting buy-in through consultations involves engaging the fishing community in discussions and decision-making processes as a way to address concerns and build trust. This can be general engagement and ongoing consultation, but is most effective when there is targeted consultation for specific decisions to be made. Government or industry can take the lead role depending on existing relationships between stakeholders and the level of openness from the fishing community to engage with the OFW industry.

²³The Carbon Trust, Offshore Renewables Joint Industry Programme (ORJIP) for Offshore Wind. Source: Link.

- **Advantages:** Consultations led by developers or the government can ensure that concerns facing fishers regarding OFW development are alleviated early on and mitigate the likelihood of conflict.
- **Challenges:** Consultation processes can be lengthy and resource intensive, and if the reasoning for this is not clear, or views are ignored, then there is a risk of further aggravating stakeholder concerns. Consultation without a clear rationale or outcome can cause stakeholder exhaustion, which can increase conflict.

Below is an example where consultations have supported fishery acceptance of OFW projects include:

Example	Description
<p>Generating evidence-based buy-in, Japan²⁴</p>	<p>Toda Corp's OFW farm was initially faced with concerns from the Fukue Fisheries Cooperative Association regarding impacts on the community and ecology. Specifically, the Association was worried about the possibility of fish distribution changes due to the noise, and the potential harm on the local bird population. However, the Ministry of Environment collected data and shared this with the Association, convincing them of the project's benefits. For example, the data found that fish appeared to be attracted to the floating turbines, making the local fishing grounds more productive.</p>

Involvement of fisheries with employment and service provision opportunities

Providing economic opportunities for fisheries through OFW design, installation, and operation can enable additional benefits. The creation of economic opportunities for fisheries through OFW projects can involve both developer-led initiatives like guidelines or government-led mandates like regulatory requirements. It is important to note that, in the examples below, the job opportunities may differ from those affected by OFW development, may not be as extensive, and may not be attractive to current fishers. Moreover, whilst these are new job opportunities, they may not be captured by the fishing industry.

- **Advantages:** Clear economic opportunity for service providers or employed individuals.
- **Challenges:** Scale may be restricted to specific individuals or services. Value of services will vary in certain markets and be dependent on specific policies. Additionally, alternative employment does not necessarily mitigate impacts to livelihoods and changes in lifestyle.

²⁴ Reuters, Japan Harnesses offshore wind to power the future. Source: Link.



Examples where economic opportunities can be created include:

Example	Description
Fishing gear required for OFW development surveys and trials	<p>In some cases, fishing gear and vessels may be required to support OFW site surveys and trials.</p> <p>For example, over-trawl trials have been proposed in Scotland to industry as a method to verify whether it is safe to undertake demersal trawling or dredging over a subsea cable or deployed external cable protection. Local fishing services would be required to undertake these trials. However, on a practical level, these trials may only provide a view of a snapshot in time and there is debate as to their effectiveness.</p> <p>It has been suggested that OFW farms could become eco-tourism attractions. There is limited evidence available, but small-scale opportunities have been observed in the UK, where boat trips to visit wind farm sites are available. Local fishers may benefit in utilising vessels for such purposes, providing a secondary source of income.</p>
Guard vessels ²⁵	<p>OFW farms offer opportunities for alternative employment for fishers such as guarding and safety roles. As fishers have valuable maritime expertise and local knowledge, they can serve as crew members on board guard vessels which monitor the perimeters of wind farms to prevent entry of unauthorised vessels and ensure that safety protocols are adhered to.</p>
Bird and marine mammal surveys / monitoring	<p>Due to their familiarity with the local marine environment, fishers can also gain employment in environmental monitoring efforts, recording sightings and behaviour patterns of birds and marine mammals and noting potential impacts of OFW farms on these aspects. This survey data can also be used to ensure compliance with environmental regulations where relevant.</p>
OFW eco-tourism ^{26,27}	<p>It has been suggested that OFW farms could become eco-tourism attractions. There is limited evidence available, but small-scale opportunities have been observed in the UK, where boat trips to visit wind farm sites are available. Local fishers may benefit in utilising vessels for such purposes, providing a secondary source of income.</p>
Employment of a fisheries liaison officer	<p>Developers will often employ fisheries liaison officers to act as a direct link between their activities and the fishing sector in order to provide them with access to necessary expertise during the project planning phases for site selection and impact assessments, and assist in generating buy-in for new OFW developments from the fishing community. The roles not only represent employment opportunities, but also provide a link between two industries, fostering cooperation and maximising benefits of OFW development while addressing concerns of the fishing industry.</p>

²⁵ Wind Europe (2020) OFW and fisheries: a win-win relationship is essential for the energy transition. Source: [Link](#)

²⁶ The Economist (2023) Britain's OFW farms attract tourists. Source: [Link](#)

²⁷ Vattenfall (2021), The impacts of offshore wind farms on local tourism and recreation: a research study. Source: [Link](#)



Summary of international approaches towards coexistence

There are numerous approaches taken internationally to support coexistence. For South Korea's status and context, it is important to consider what has worked well elsewhere, and which of these approaches would best address the specific concerns of local fisheries.

Table 3: Summary of international approaches towards coexistence.

Developer-led approaches
Adapting the design of OFW farms based on project-specific consultations
Government-led approaches
Utilising marine spatial planning (MSP) to balance interests of multiple sectors
Developing regulations to support coexistence
Developing guidance on acceptable fishing practices to support compatibility with OFW farms, potentially supported by regulation
Compensation schemes
Developer-led or government-led approaches
Establishment of collaborative platforms with the objective of supporting coexistence, and creation of best practice
Promoting buy-in through targeted consultations
Involvement of fisheries with employment and service provision opportunities.



LATEST DEVELOPMENTS IN SOUTH KOREA



Latest developments in South Korea

The previous section explored a variety of international approaches led by government and developers to support OFW and fishery coexistence. This section delves into the recent initiatives introduced in South Korea to overcome challenges and conflict faced to date.

These include the **OFW Power Development Plan for Coexistence with Residents and Fisheries in 2020** and ongoing Special Bills related to the Offshore Wind Promotion Acts introducing public-private councils and bidding systems. In addition, this section details existing efforts by the South Korean government to enhance developer-led and government-led for engagement and stakeholder consultation.



Legislative background of the Offshore Wind Promotion Act

South Korean government has implemented recent legislation to reduce conflicts

As previously mentioned, to help meet various climate commitments, the South Korean government has set a target of 14.3 GW of offshore wind installations by 2030. However, for a variety of reasons, including the lack of acceptance by fishers, progress towards the 2030 OFW deployment target has been slower than planned. To improve this situation, on July 17, 2020, the South Korean government announced a plan to promote the construction of large-scale OFW farms through the **'Offshore Wind Development Plan for Coexistence with Residents and Fisheries'**.

This plan outlines a comprehensive strategy to expedite large-scale OFW projects using a 'government-led' development model, with significant implications on the relationship between OFW developments and local stakeholders including the fishing community. In the government-led model, the government is typically responsible for zoning, site selection, and selecting a developer to implement the project via a bidding process. In this case, **the Offshore Wind Development Plan notes that the local governments will take the lead in selecting OFW farm locations** and operate a public-private council in collaboration with fishers to listen to their concerns and build their understanding of OFW power.

The South Korean government also published the **'Guidelines for Offshore Wind Power Development'** in 2023.

These Guidelines promote an approach for developer-led projects where industry takes the initiative to conduct community engagements to inform site selection and feasibility assessments. In this case, the Guidelines advocate for developers interested in setting up OFW farm projects to establish a 'local council' aimed at engaging stakeholders, particularly the fishing community. This ensures that consultations with fishers are completed before finalising the site location.

South Korea has amended its relevant laws twice (in 2020 and 2022) to allow stakeholder consultations, including those with the fishing community, to begin at an earlier stage of OFW projects. Prior to the amendments, there was no legal procedure for soliciting the fishing community's opinions at the beginning of OFW projects before EBLs were obtained. However, recent legal changes enable the inclusion of stakeholders, including fishers, to be heard at an earlier stage. For example, in 2020, the **Electricity Business Act** was amended to include a new provision mandating public notification of wind power projects and the collection of residents' opinions in order to obtain an Electricity Business License. Subsequently, in 2022, the **Act on the Management and Reclamation of Shared Waters** was amended to require stakeholder consultations, inclusive of the fishing community, at the project's outset and prior to wind turbine installation.

Offshore Wind Promotion Act

The following measures will be introduced through the Offshore Wind Promotion Act: consideration of fishing activities in the site selection process; operation of a public-private council for consensus building; introduction of a bidding system to select project operators; and establishment of a Wind Energy Committee.

Consideration of fishing activities in the site selection process

- A comprehensive geographic information system called the Wind Power Location Information Network will be established to select OFW farm sites while accounting for fishing activities.
- Stakeholder engagement through briefings and public hearings will be necessary before selecting a preliminary site for the project.

Public-private council

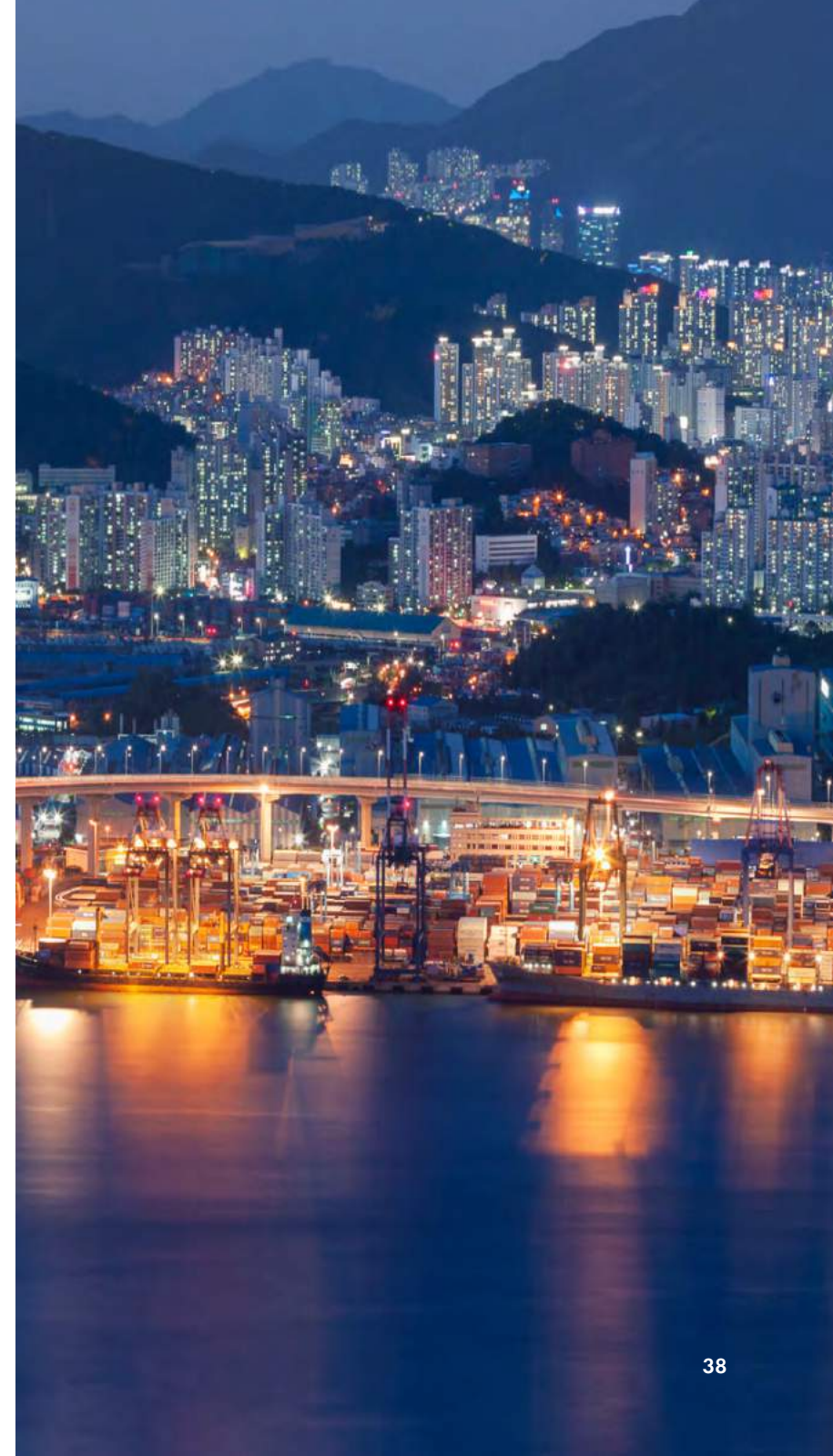
- A public-private council will be established as a new institutional mechanism with the objective of increasing consensus between OFW and the fishing sector.
- The local government will be responsible for convening a public-private council prior to site selection. The council will comprise government and private sector representatives, including fishers and OFW experts, and will serve to mediate key issues concerning all stakeholders.
- The public-private council's mandate includes information sharing about OFW projects, building consensus on site selection, and developing a project implementation plan.

Key areas of discussion within the public-private council will include the following aspects:

1. the basic design plan of the proposed OFW project;
2. the designation and alteration of development areas;
3. local coexistence plans and resident profit-sharing mechanisms;
4. fisheries and local economy revitalisation plans; and
5. other matters crucial for securing stakeholder support.

Bidding system

- Site selection will follow a "government-led process," wherein the operator will be selected through a tender process once the site has been determined.
- The Ministry of Trade, Industry and Energy is responsible for the selection of the operator, with the decision-making process overseen by the Wind Energy Committee.



- The criteria for selecting a business operator will include:
 1. Ability to efficiently deliver OFW projects, including cost of power generation.
 2. Financial capability.
 3. Efforts to ensure mutual growth and stakeholder acceptance, including profit-sharing arrangements.
 4. Alignment with the relevant laws for the successful implementation of OFW projects.

Wind Energy Committee

- The Wind Energy Committee, composed of government ministers, will be established to deliberate and resolve matters related to OFW development.
- Chaired by the Prime Minister, the Wind Energy Committee will include key members such as the Minister of Economy and Finance, the Minister of National Defense, the Minister of the Interior and Safety, the Minister of Agriculture, Food and Rural Affairs, the Minister of Trade, Industry and Energy, the Minister of Environment, the Minister of Land, Infrastructure and Transport, the Minister of Oceans and Fisheries, and the Director of the Cultural Heritage Administration.
- The Committee's mandate includes facilitating inter-ministerial cooperation and expediting the processing of various licences and permits required for OFW projects.

Three further bills are under consideration to improve procedures as part of the Offshore Wind Promotion Act

The South Korean government is considering new improvements to the Offshore Wind Promotion Act. As of February 2024, the National Assembly is considering three bills under this Act to redesign the OFW development system. These bills, put forward by lawmakers from both the ruling and opposition parties, offer a chance to address existing challenges and foster positive development in the sector.²⁸

1. Special bill to promote wind power supply
2. Special bill on offshore wind power planning and industry development
3. Special bill for the promotion of offshore wind power

The three bills currently pending in the National Assembly share a common goal to move towards a government-led process for OFW deployment. Exhibit 5 compares these new government-led processes established by the Offshore Wind Promotion Act with the current developer-led processes. This Act presents an opportunity to address many of the issues concerning OFW farms and the fishing community's acceptance as discussed in Chapter 2.

²⁸ (1) Special Bill to Promote Wind Power Supply (Rep. Kim Won-young of the Democratic Party of South Korea, May 2021),
 (2) Special Bill on Offshore Wind Power Planning and Industry Development (Rep. Han Moo-kyung of the People's Power, March 2023),
 (3) Special Bill for the Promotion of Offshore Wind Power (Rep. Kim Han-jung, Democratic Party of South Korea, March 2023).

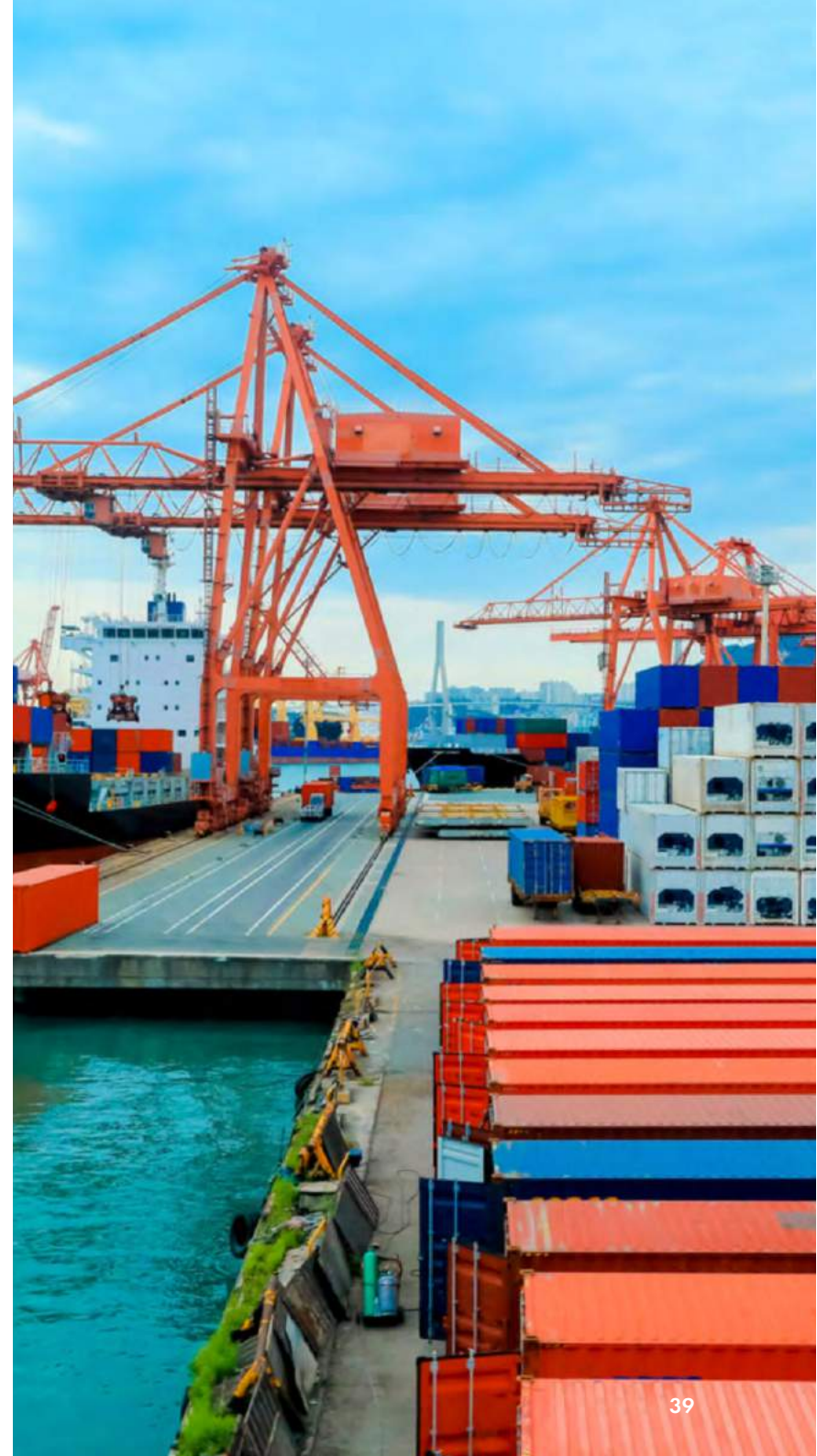
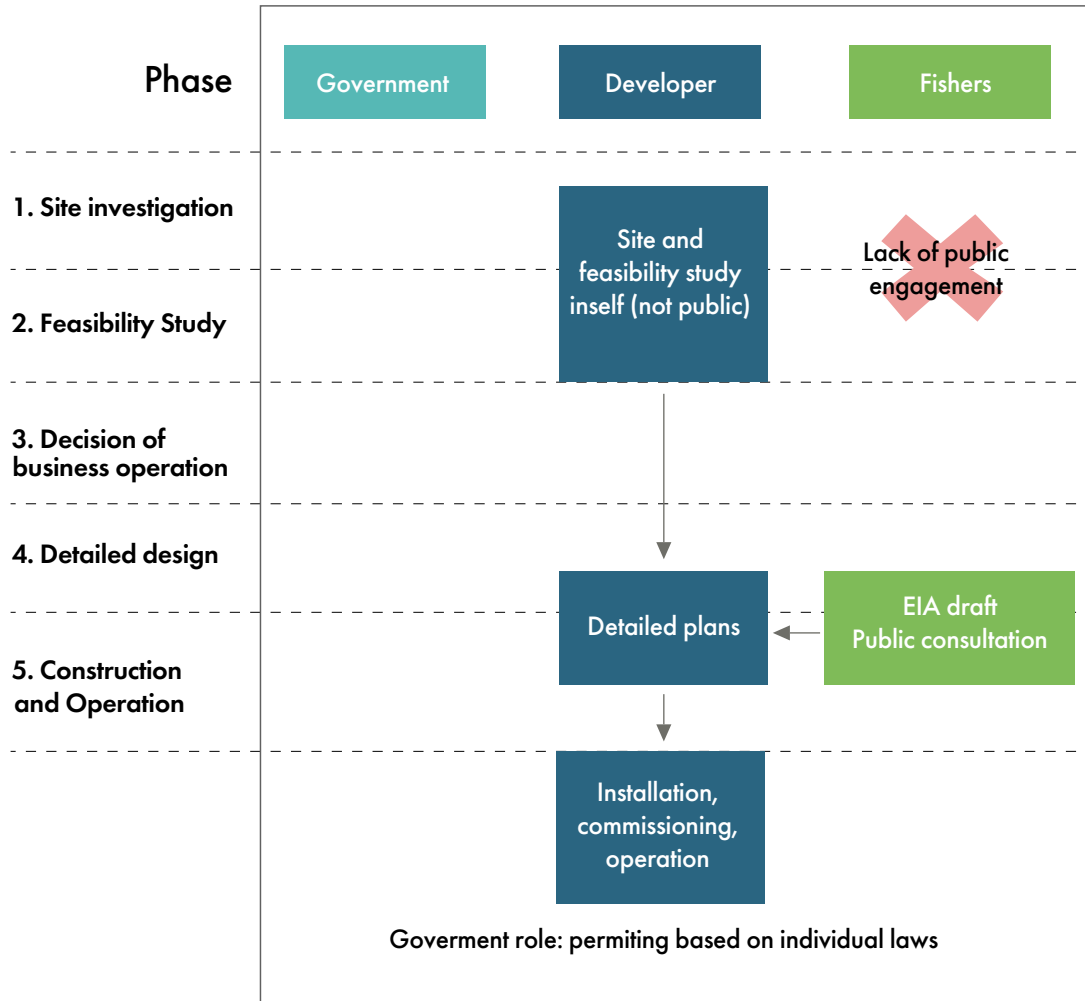
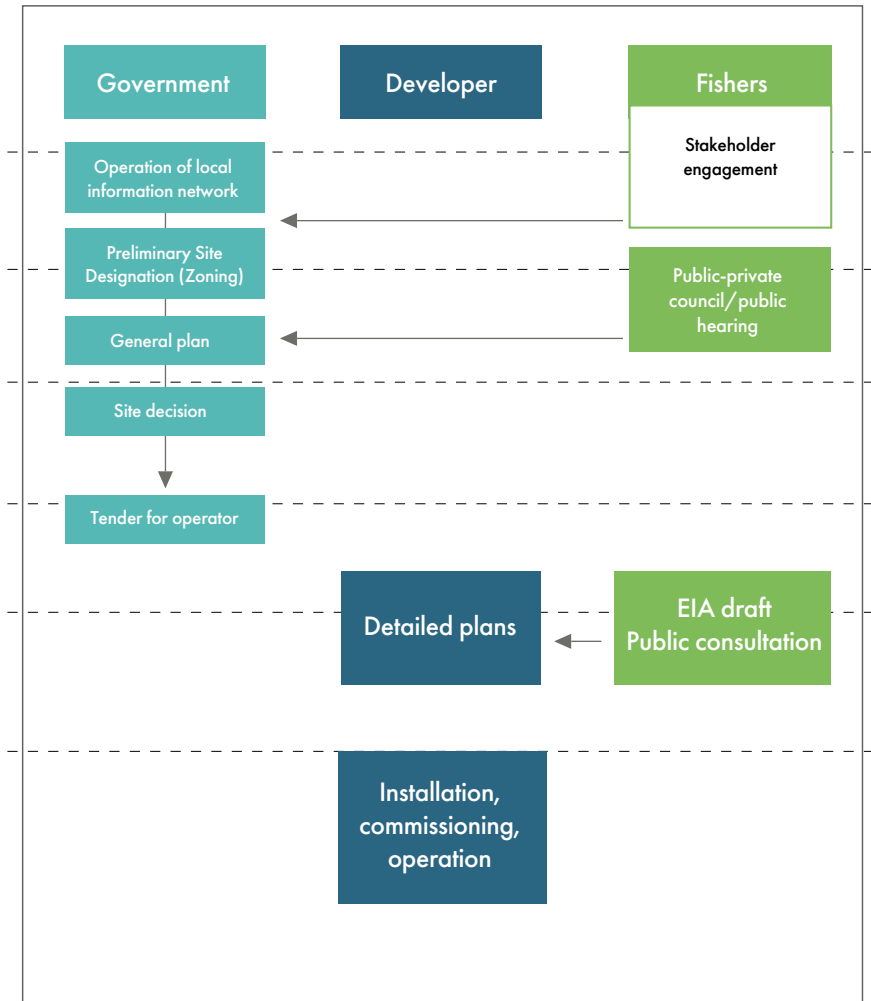


Exhibit 5: Comparison of current developer-led processes with the new government-led model to be established under the Offshore Wind Promotion Act

Developer-led Process



Government-led Process



Case Study: Offshore Wind Siting Through Fishery Engagement in Incheon

In 2023, the South Korean city of Incheon conducted a pilot program supported by the central government to identify OFW sites by engaging fishers in the initial site survey phase. The Incheon case aligns with international best practices discussed in Chapter 3 as it emphasises the role of stakeholder engagement and establishment of early consultation groups as key coexistence strategies to resolve conflicts.

Background

Incheon is an active area of OFW development, with 23 sites having wind measurement equipment installed for initial site surveys by 2022, and a total of 13 operators participating. Two companies have also obtained electricity business licences.

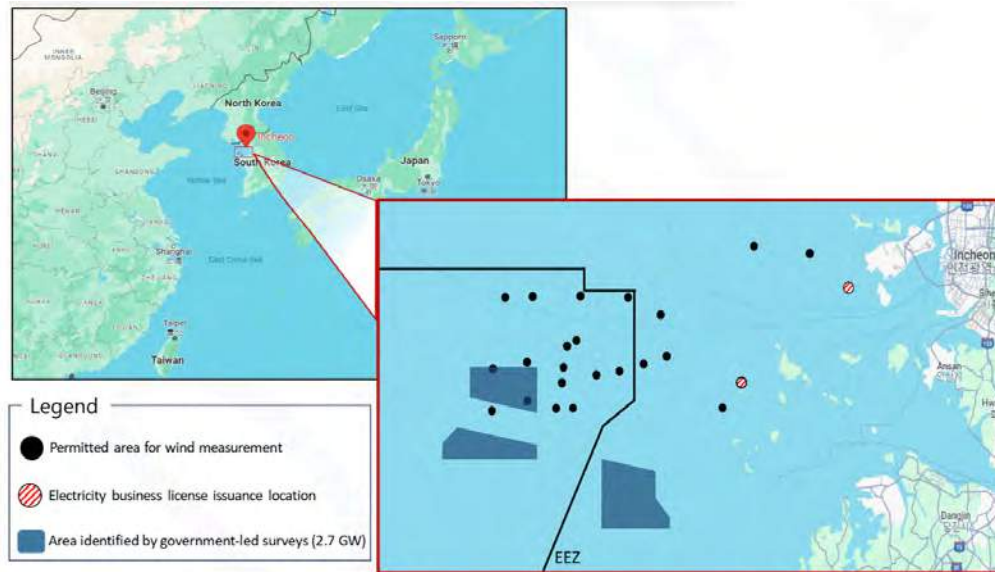


Exhibit 6: Locations of Incheon's offshore wind projects (2022)²⁹

Key: Blue circles – Wind measurement equipment installation locations / Red circles – EBL project locations.

²⁹ Source: Google maps (background map), license status (Incheon City Council, 2022)

³⁰ Incheon Anchor Gillnet Association, Is the Incheon wind yours? Source: <https://ipwn.tistory.com/869>

In December 2021, fisher's organisations in Incheon released a joint statement opposing offshore wind projects. They cited four main reasons for opposing offshore wind projects.³⁰

- 1) Lack of consultation with fishers as directly affected stakeholders;
- 2) Reduced fishing areas and disruption of fishing activities;
- 3) Encroachment on shipping lanes; and
- 4) Damage to marine ecosystems.

The conflict escalated, resulting in fishers rallying against OFW projects in March 2022.

Offshore wind site selection with fisheries participation

To resolve OFW conflicts, Incheon implemented a publicly supported OFW site identification programme, which aimed to identify suitable locations for OFW farms. The programme involved engaging various stakeholders, particularly fishers, in the initial phases of site selection to ensure that their concerns are considered and encourage their buy-in for proposed OFW projects. The programme aimed to select project sites based on economic feasibility, environmental considerations, and acceptance from the fishing community.

This programme allowed the fishing community to participate in site surveys and propose mutually agreeable locations. KEPCO and four public research organisations worked with Incheon City to identify suitable OFW zones. The South Korea Environment Institute (KEI) visited Incheon fishing communities to conduct a site preference survey and engaged fishers in discussions to identify areas where they opposed OFW and areas where they were willing to negotiate. This led to the creation of the **'Incheon Fishers Location Preference Map'** (see Exhibit 7).

The map was used to guide the selection of suitable OFW project locations. The map, which delineates the region into small grids, allows fishers to indicate their preferences which range from 'absolutely opposed', to 'negotiable', or 'in favour'. These preferences were synthesised to identify locations where consensus could be reached among the entire group. Subsequently, this map was overlaid with additional maritime spatial data, including maritime traffic patterns, military activities, and wind conditions. The integration of this information facilitated the identification of suitable zones for OFW development in Incheon.



Siting preference of Incheon fishermen (17 organizations)

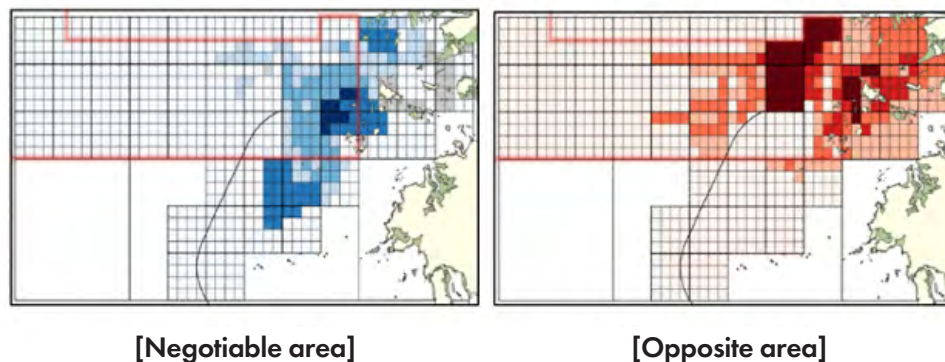


Exhibit 7: Fisheries workshop to select preferred areas of OFW development.³¹

Site selection activities began in June 2022, resulting in a shortlist of 2.7 GW of potential OFW sites by August 2023 (see Exhibit 8). The OFW sites in the figure were selected based on the preferences of the Incheon fishing community, and any proposed project in the area is subject to receiving consent from fishers.

Incheon's site identification programme demonstrates the importance of involving fishers in the siting phase of an OFW project in reaching consensus on zones for OFW development. By doing so, Incheon demonstrated a commitment to inclusive decision-making and this approach serves as a model for other regions in South Korea seeking to balance OFW goals with social considerations.



Exhibit 8: Offshore wind sites identified through engagement with fisheries (2.7 GW).³²

³¹ Source: KEI

³² Kyungin Ilbo (2023.11.29)



RECOMMENDATIONS

Recommendations

This section outlines recommended actions for South Korean OFW stakeholders to enable of coexistence between OFW and the commercial fishing sector. The recommendations have been developed to address key concerns of the fishing sector (Section 2), learn from international experiences, (Section 3), and build on initiatives already under way in South Korea (Section 4).

Institutional improvements: Legislation of government-led planned siting and bidding system for business developers

The simultaneous use of government and developer led OFW project schemes in South Korea requires clarity and coordination to avoid confusion among stakeholders. As previously described, South Korea is in the process of enacting the Offshore Wind Power Promotion Act. The Act will implement a government-led development approach. At the same time, projects are continuing development under the developer-led model. The current situation where two different project development schemes (government-led and developer-led) are being promoted simultaneously is causing confusion for stakeholders including local government and fisheries. The OFW industry supports the promotion of projects under both systems, however, there needs to be clarity over project schemes.

The passing of The Offshore Wind Power Promotion Act should be prioritised to allow clear guidance to future projects. As the Act is currently underway, the industry is committed to supporting the government in defining a clear future policy direction, moving to a new system where the siting of OFW projects will be government-led, whilst understanding that there are current projects in development under the developer-led model. Once the Act is passed, a clear implementation plan for the Act is required.

Upon the passing of the Offshore Wind Promotion Act, it should be implemented with urgency given it is expected to streamline licensing and improve consensus-building with fishers. The enactment of the Offshore Wind Power Promotion Act could have a number of positive outcomes. First, the Wind Energy Commission will be able to efficiently process project licences and permits. Second, it will be positive for consensus-building with fishers, as public-private councils will be operated in the siting process. Third, the government will ensure fisheries acceptance of the project at the site selection stage, so offshore wind operators can expect more stable and predictable project implementation. Considering these points, it is of high priority to enact the Offshore Wind Power Promotion Act as soon as possible.

Undertake multi-stakeholder discussions between government, industry and local communities to address issues facing projects with EBLs, defining government roles, and incorporating community coexistence plans as bid requirements. If the 'Offshore Wind Power Promotion Act' is passed, the industry sees opportunities in implementation of the new system. First, measures for projects that have already obtained EBLs should be discussed. Second, it is necessary to determine how the central and local governments will divide their roles in the future. Third, it is essential to discuss how to consider not only the lowest price as a selection criterion, but also plans for coexistence with local communities when bidding to select a business operator. After the legislation, a more detailed system design will need to be made through an enforcement decree.

Improve government guidance on stakeholder engagement to obtain EBLs for South Korean OFW projects. Regardless of whether or not the Offshore Wind Power Promotion Act is adopted, it is essential to improve the guidance from the government in regard to the stakeholder engagement process that is required for the EBL projects. In addition, the EBL only authorises the operator to conduct a preliminary investigation, not an approval of the business, but in South Korea, the electricity business licence is sometimes misunderstood as an approval of the project. It is also necessary to consider improving the terminology of the EBL to clearly convey its meaning.

Recommendations on the role of each actor

For coexistence to be enabled, action should be taken by government, industry, and wider stakeholders. The actions required by each sector are included below.

Central Government

- The central government should enact the 'Offshore Wind Power Promotion Act' with a clear implementation plan to clarify the expected stakeholder engagement requirements for the EBL projects.
- As local governments are proposed to play a role in siting OFW farms, the central government should increase coordination and provide local governments with the necessary resources, such as budgets and manpower, to enable them to do so. The central government should streamline the various licensing, approval, and permitting processes required for offshore wind projects and clarify the criteria for obtaining permits.
- The central government should take a leading role to consult not only with fishery but also with other stakeholders such as the Ministry of Defence, Ministry of Oceans and Fisheries, ministry of Environment and Ministry of Trade, Industry and Energy at the stage of siting offshore wind projects.
- Marine spatial plans should take into account stakeholder consultations with key groups, such as fishers.
- The central government should prepare integrated guidance or standard in terms of fisheries compensation and community benefit fund so that developers commonly refer to and apply to offshore wind projects regardless of region with consistency.
- Working with civil society organisations and other key stakeholders, the central government should develop and implement programs to positively change perceptions of offshore wind farm development including educational campaigns and capacity building initiatives.

Local governments including municipality and provincial governments

- Local governments should take a leading role in identifying the eligibility of key stakeholders so that developers can make sure to consult with right people in order to make relevant stakeholder management, as well as in organising community benefit funds and keeping its transparency and equitability in operation.
- Local governments should leverage new and existing partnerships in-country and internationally so that they are able to build capacity around successful coexistence practices to strategically plan and execute impactful initiatives at the local level.
- Local governments should operate public-private councils to ensure that fishers are accommodated during the siting and basic planning stages of offshore wind projects.
- Local governments should establish offshore wind master plans at the regional level rather than at the individual project level. This will help to revitalise local industries, including offshore wind and fisheries.
- Local governments should identify a variety of win-win solutions that can mutually benefit both offshore wind operators and local fishers, as well as industries across the wind industry value chain.
 - Local governments should determine and provide guidelines on assessing the local community and or fisheries that are directly impacted, assessing the congruence between the natural habitats of local fish species and the fishers specialisation in a given area.
 - Impacted local community areas including fisheries should be identified to allow for greater clarity on various permit requirements (e.g., the occupancy or use permit of public waters currently requires the unanimous consent of impacted fisheries or local community groups). At present the process of claiming an impact area is not clearly defined.
- Working with civil society organisations and other key stakeholders, local governments should strive to build social support for offshore wind development by running capacity-building education programs.

The Offshore Wind Industry

- Future tender criteria recommends preparation on both technical aspects (e.g. economic feasibility, and designing offshore wind farms to account for fishing vessel passage, etc.) and social aspects (e.g. interaction with local stakeholders such as fishers, local coexistence plan, securing fisheries acceptance of the project, etc.).
- Standardise the conduct of environmental impact assessment and social impact assessment to prevent various environmental and social risks that may arise from the construction of offshore wind farms.
- Improve transparency, and openness in decision-making and strengthen corporate social responsibility by adopting ESG management.
- Focus on technological innovation measures, including avoidance, minimisation, and remediation to ensure OFW farms can coexist in harmony with nature.
- Developer-led projects being promoted under the current system should also ensure that there is sufficient information-sharing and meaningful engagement with local stakeholders, fishers, from the pre-siting phase before obtaining an EBL.
- Projects that have already received EBLs should consider establishing local councils to consult with fishers to help increase their acceptance.
- The creation of an information-sharing system would ensure fishers are well-informed about OFW projects, at an earlier stage and active efforts by project operators to provide accurate information could prevent misunderstandings or potential mistrust of the overall project. Additionally, it would be beneficial for the OFW industry to create an environment that encourages the proactive and ongoing involvement of the fishers during the pre-planning stages rather than a reactive or passive involvement. This will better position them during consultations and foster a sense of agency with regards to decisions that can have a significant impact on their own livelihoods.
- To reduce the spread of misinformation, various educational and training opportunities should be provided to fishers to improve their understanding of OFW farms. It may therefore be helpful to consider training programs such as an offshore wind academy to help build capacity, or to organise activities such as an offshore wind photo exhibition to help create a positive image.



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