

Conflict fiche 5: Offshore wind and commercial fisheries

Given that offshore wind energy potential is most utilized in the North Sea, Baltic Sea and Eastern Atlantic, conflicts between offshore wind farming and commercial fisheries have mostly been relevant in these sea basins. This particularly applies to countries where there is a strong fisheries sector as well as a concerted drive to develop offshore renewables, such as the UK. In most of the affected Member States, specific conflicts with fisheries were present before the introduction of MSP; at the time, they were dealt with through sectoral planning frameworks. In recent years, facilitated by the introduction of the EU MSP Directive, Member States have been making efforts to adopt a more integrated approach to planning for offshore wind energy. Member States keen to develop offshore wind farming, such as Poland and Estonia, are now looking to MSP to address these conflicts in a proactive way.

This fiche outlines some of the ways that Member States have found for dealing with this conflict.

1. Description of the two sectors

1.1. Offshore wind

Offshore renewable energy is the fastest growing sector of the blue economy in Europe, with considerable potential to deliver technological development and job opportunities. Direct employment in the EU more than doubled between 2014 and 2016, rising to about 160 000 and now exceeding total employment in the EU fishing fleet.¹ Strong policy drivers, as well as the continued development of the industry are expected to push offshore wind farming into further growth. The EU Renewable Energy Directive requires the EU to meet at least 20% of its total energy needs from renewables by 2020, to be achieved by attaining individual national targets. Prices for projects to be completed in the next 5 years are lower than previously as a result of the maturing of the industry, improved technology, growing investor confidence, and the introduction and deployment of a new generation of turbines, with enormous swept area and tremendous output². Developments are particularly strong in the Eastern Atlantic, North and Baltic Sea, but are also beginning in other sea areas. The UK currently has the largest amount of installed offshore wind capacity in Europe, with 40.8% of all installations³.

¹ EU Commission (2018a)

² IRENA (2018)

³ Ibid.

Offshore wind farm-related decisions have consequences in the long term as wind farms have a life span of 25-30 years. It is also a contentious sector as positive and negative externalities can be high. There are conflicts with many other sectors (such as impacts on the safety of navigation, environmental impacts) but also potential synergies, such as artificial reef formation or possibilities for co-location (e.g. mariculture).

COUNTRY	NO. OF FARMS	NO. OF TURBINES CONNECTED	CAPACITY INSTALLED (MW)	CAPACITY INSTALLED/ DECOMMISSIONED IN 2017 (MW)
UK	31	1,753	6,835	1,679
GERMANY	23	1,169	5,355	1,247
DENMARK	12	506	1,266	-5
NETHERLANDS	7	365	1,118	0
BELGIUM	6	232	877	165
SWEDEN	5	86	202	0
FINLAND	3	28	92	60
IRELAND	2	7	25	0
SPAIN	1	1	5	0
NORWAY	1	1	2	0
FRANCE	1	1	2	2
Total	92	4,149	15,780	3,148

Figure 1: Number of offshore wind farms with grid-connected turbines, number of turbines connected and MW grid-connected at the end of 2017 per country⁴

When developing offshore wind farms, planners and developers look for ways of reducing costs. Sea depth and distance from the shore are important factors in the costs of offshore turbines. Foundations are particularly expensive at sea. For a conventional onshore turbine, the foundations' share of the total cost is normally around 5-9 per cent, while the average for offshore turbines might be close to 21 per cent⁵. Low depth zones are often closer to the shore and thereby more affordable for developing OWF, although shallow banks in deeper water are also increasingly attractive due to new ways of converting AC into DC, enabling the use of cheaper high voltage DC links for transmission⁶. The offshore wind turbines in the German Exclusive Economic Zone are situated at the greatest average water depth at 28 metres. Turbines in Finland (6 m) and Sweden (9 m) are sited in the shallowest water.⁷

⁴ Wind Europe (2018a)

⁵ Wind Energy The Facts.org (2008)

⁶ <https://www.maritime-executive.com/article/new-system-optimizes-transmission-from-offshore-wind-farms>, accessed 7 January 2019

⁷ Wind Europe (2018b)

Approximately 75% of the total cost of energy for a wind turbine is related to upfront costs such as the cost of the turbine, foundation, electrical equipment, grid-connection and so on⁸. The higher capital costs of wind, which are decreasing due to technical developments and maturity in the sector, are offset by very low variable costs, due to the fact that fuel is free, but the investor will only recover those after several years. This is why regulatory stability is so important for the sector.

Development costs for wind farms may also be quite high in some jurisdictions due to stringent requirements for environmental impact assessments, for example, which quite often are more costly than, say, wind resource mapping. The institutional setting, particularly maritime spatial planning and public permitting practices, has a significant influence on whether or not the wind farm is built and at what costs. Even in the most favourable cases permitting costs can range between 5 to 10% of the total costs⁹.

Some countries have set aside large areas as search areas for offshore wind to encourage investment. Theoretically at least, large parts of sea space could therefore become available to offshore wind farming, restricting other uses as a consequence.

1.2. Commercial fisheries

Fishing traditions go back hundreds of years, and historically, fishers were not bound by administrative borders. This still applies to some degree, so for example, many Dutch vessels fish in UK waters and vice versa, although restrictions do apply with respect to territorial waters.

Commercial fisheries represent an important economic sector for coastal regions and communities in many EU countries¹⁰. Gross profit and net profit margins have improved over recent years, possibly due to healthier stocks¹¹ and aided by more efficient vessels and fishing methods. More industrial methods are becoming common in the entire value chain, and new techniques are constantly being introduced to increase the overall catch while decreasing bycatch.

Commercial fishing is really a form of hunting. Although the exact patterns depend on the type of fish, fishers mostly look for shoals which move between different food-rich areas. Fishing vessels therefore move in unpredictable ways and unlike other vessels making use of shipping lanes. Fishers also need to make sure they use their time fishing efficiently as fuel and time is expensive. Costs are a major issue for fishers, especially small-scale coastal fishers whose profit margins have shrunk considerably in the wake of regulation and decreasing stocks.

The most common fishing method is bottom trawling, which is used to catch the majority of commercial species such as cod, haddock, plaice, sole and whiting. Different intensities of bottom

⁸ EWEA (Wind Europe) (2008)

⁹ Ibid.

¹⁰ Altvater et al. (2018)

¹¹ European Commission (2018b)

trawling occur in different sea areas (Figure 2). Fixed gear, including permanent fish traps in coastal areas and bottom and midwater gill nets, is usually anchored to the ground and can be permanently installed or during certain periods of the year. Nets can occupy several square kilometers.

Fishing and vessel traffic are usually prohibited in offshore wind farms, reducing the area available for fishing and also representing barriers to navigation. Offshore wind farms can jeopardise important fish habitats such as spawning and nursery grounds as their location (shallow areas closer to the coast, on sandy banks) are often also areas particularly suitable for offshore wind farms. Preserving spawning and nursery areas is likely to be of increasing importance in the face of climate change. At the same time, offshore wind farms can contribute to preserving fish stocks by offering artificial reefs where fish can feed and cannot be captured.

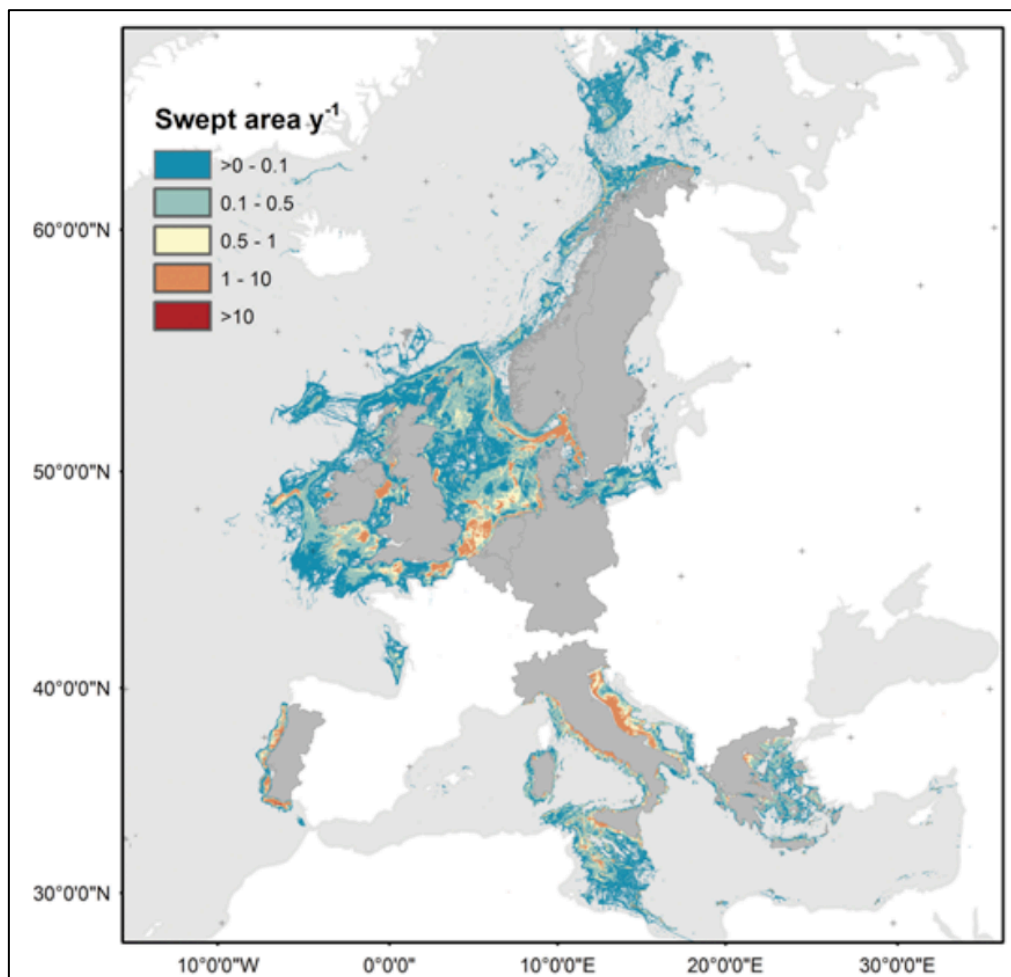


Figure 2: Bottom Trawling Intensity¹²

¹² Eigaard et al. (2017)

2. Conflict description

Seen from one side, conflicts between the offshore wind and fisheries sector are mainly related to accidental damage and ship strikes, while the other side mostly fears exclusion and displacement. Given the growth of offshore wind farming in the North Sea, fishers are afraid of being crowded out, which can lead to protests such as recently in the Netherlands¹³. The main concern is access restrictions for fishers, leading to restrictions of movement for fishers and fears of economic losses. In Belgium, all non-maintenance vessels have to remain at least 500 meters away from wind farms while in the Netherlands, vessels are allowed to transverse but not fish. In some Member States, where law does not require connecting cables to be dug underground, bottom stirring (which is the majority of commercial fishery) is not possible as it might cause damage to cables or to the fishing gear. There are also other safety issues (e.g. Netherland and Germany)¹⁴.

Displacement is a particular issue for coastal and small-scale fisheries as these do not always have the capacity to move to fishing grounds further offshore; nor can they switch to other fishing methods. Due to the many variables in fishing and also offshore wind farming, conflicts are usually case specific, depending on the local geological characteristics, types and intensity of fisheries, and the OWF technology applied. The socio-cultural importance of the fishery for the local community also plays a crucial role in how this conflict plays out. Another escalating factor is that conflicts between offshore wind farming and fishing often overlap with others. A particularly common case in the North Sea is a triple conflict between fisheries, environmental protection and offshore wind. This implies that cumulative effects are a particular issue in this context.

2.1. Conflicting elements

- *Accidental damage, including to subsea cables*

Accidental damage and ship strikes, and the concern that bottom trawling may cause damage to subsea cables is a major concern. Snagging fishing gear is also a serious danger to fishers as it can cause a vessel to tip over or capsize. Fishing gear that snags may have to be cut free and discarded, resulting in financial loss for fishermen. Because of these risks, fishers using many gear types are likely to avoid areas in the immediate vicinity of offshore wind farms.

- *Disturbance of species*

Construction and operation of offshore wind farms can affect commercial fishing through the disturbance of mobile species by noise and also direct damage to sessile species, leading to displacement of or reduction in fish and shellfish resources. Fish roe can be negatively affected during the construction phase on account of turbidity and sedimentation.

¹³ The Guardian (2018)

¹⁴ Lukic, I. et al. (2018)

- *Ecological consequences of spatial exclusion*

Spatial exclusion, even if it is voluntary in terms of risk aversion, can lead to reduction in or loss of access to traditional fishing grounds. This in turn leads to the displacement of activity to other (potentially less profitable and/or less reliable) fishing grounds. Fishing pressure and competition in these alternative areas is likely to increase, and harvesting fish in alternative locations might run the risk of catching vulnerable elements of the stock.

- *Economic consequences of spatial exclusion*

Obstruction of navigation routes to and from fishing grounds can lead to increased steaming times. This and other displacement, in particular of small scale fisheries, increases the costs of operations to maintain the same catch levels which can threaten their livelihoods¹⁵. Some fishing grounds may no longer be accessible for small boats at all. But there are also higher initial costs for developers if they have to agree on co-existence with fishery as a prerequisite to obtain their license.

- *Socio-cultural conflicts*

In some cases, conflicts between offshore wind farming and fishing masks a deeper conflict. Offshore wind farming may be perceived as the last arrival in a long line of restrictions, threatening not only livelihoods but also a traditional way of life. Fishers can therefore be wary of any additional spatial restrictions, and may be sceptical of MSP as a whole if this is perceived as restrictive¹⁶.

Elements of the conflict can occur at different temporal scales:

- Permanent: Loss of seabed habitat and associated ecological assemblages, leading to loss of sessile species and possibly mobile species;
- temporary (e.g. disturbance of habitat or mobile species due to seabed preparation or piling);
- seasonal (arising from the seasonality of catch or the seasonality of ecological processes of relevance for commercial fish species).

2.2. Spatial context

Conflicts related to offshore wind farming and fishing are mainly present in the North Sea, Baltic Sea and Eastern Atlantic, given that offshore wind energy potential is most utilized in these sea basins. Offshore wind farm developments are a particular challenge for smaller vessels that normally operate close to coast as alternative options are limited for them.

¹⁵ Kafas, A. (2017) as cited in Lukic, I., et al. (2018)

¹⁶ Ciołek et al. (2018)

3. Drivers of conflict

The EU, as well as the EU member states have set themselves ambitious renewable energy targets. Offshore wind farming is attractive because of high wind speeds, the growing professionalism of the sector and decreasing costs. As a result, many countries have now decided to start building offshore wind farms. Confidence in offshore wind farming has grown due to technological maturity and falling costs, and expectations are that capacity will continue to increase, including in Europe. A recent forecast assumes 120 GW total installed capacity by 2030, with much of this growth achieved in Europe building on established capacity and proven low cost.¹⁷

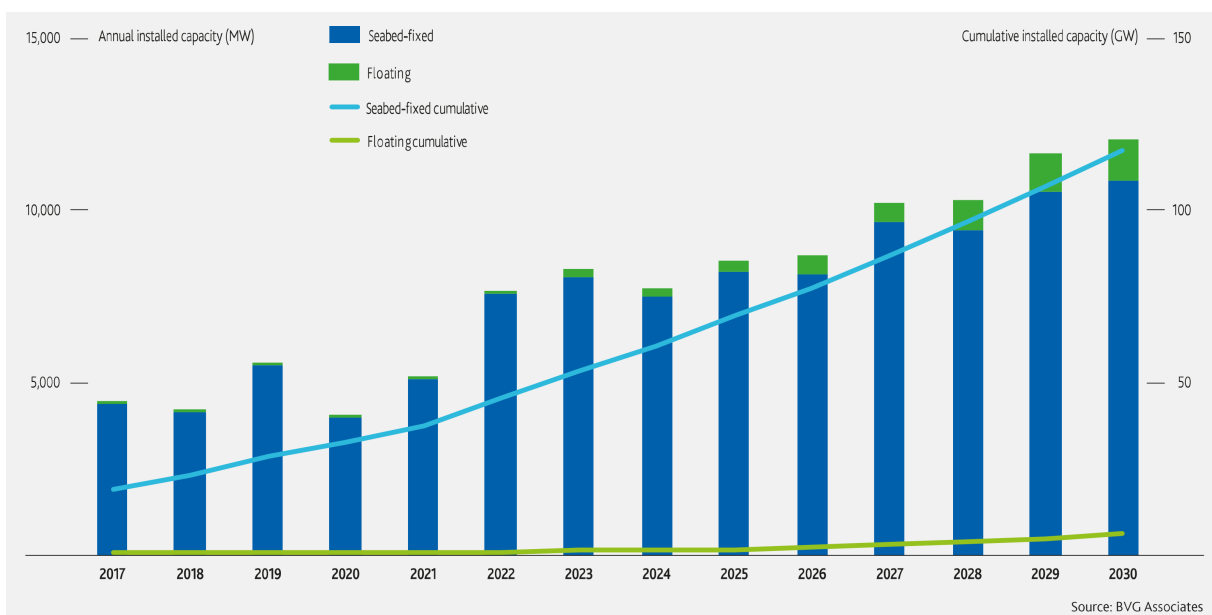


Figure 3: Projections for offshore wind development globally out to 2030¹⁸

Particularly in Scotland, significant OWF developments are expected in the coming years (Figure 4). This is due to ambitious government targets to meet 100% of Scotland's electricity needs from green sources, including offshore wind, by 2020.¹⁹ The future offshore wind developments are also expected to support the attainment of the decarbonisation target of 50gCO₂/kWh by 2030 (to cut carbon emissions from electricity generation by more than four-fifths)²⁰ The Scottish Energy Strategy published in December 2017 sets out the Scottish Government's vision for the future energy system in Scotland. Moreover, the Climate Change Plan published in February 2018, sits alongside the Strategy, and provides the strategic framework for transition to a low carbon economy in Scotland.

¹⁷ GWEC (2018)

¹⁸ Ibid.

¹⁹ Scottish Government (2011)

²⁰ Scottish Government (2015)

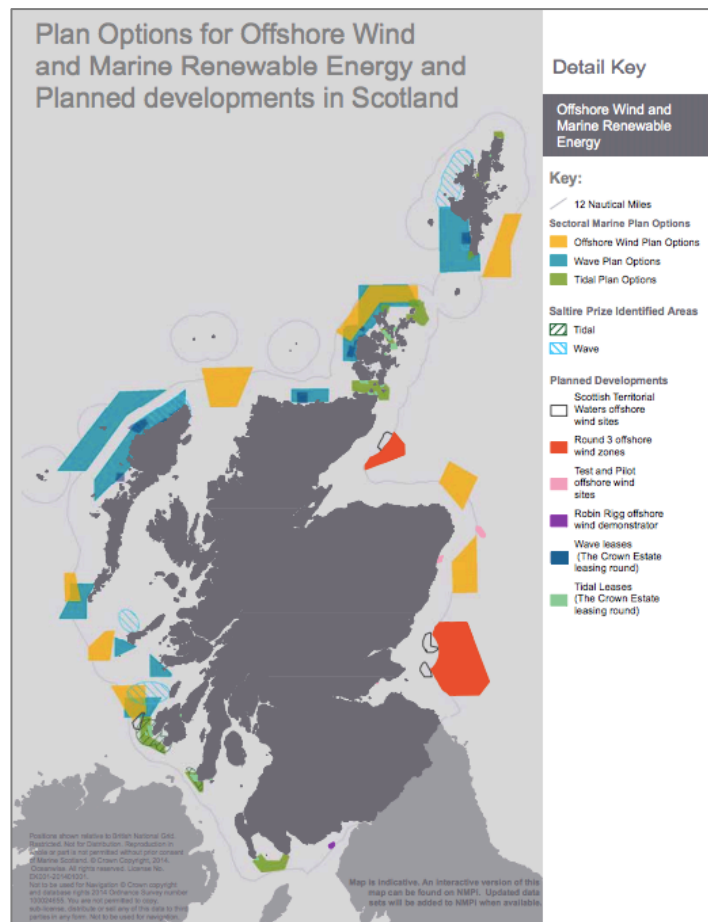


Figure 4: Map of offshore renewable options in Scotland²¹

An important driver of conflict has been that in many countries, fishing vessels are not permitted to enter offshore wind farms. Changes in risk perceptions models may soften these spatial restrictions in future.

Fisheries are expected to remain under economic pressure as a result of quotas, rising costs such as fuel and other fishing restrictions. The occurrence and distribution of species may change in response to climate change, requiring fishers to respond flexibly. Added areas set aside for offshore wind farming are likely to increase pressure on the sector, especially smaller operations working closer to the coast.

A more fundamental question is how to make trade-offs between offshore wind farming and fisheries. Apart from monetary value, non-material value, such as the value of artisanal fisheries for cultural

²¹ For an interactive version of the map see Marine Scotland National Marine Plan Interactive, www.marinescotland.atkinsgeospatial.com/NMPI

identity. Trade-offs are therefore mostly policy-driven and cannot be based on cost-benefit analysis alone.

4. Solutions

Solutions have presented themselves both spatially and non-spatially. Scotland is leading the way in providing integrated solutions to offshore wind - fisheries conflicts. Therefore, many of the examples presented below refer to Scotland.

Generally, a distinction can be made between the following solutions:

1. **Strategic solutions designed to prevent conflicts as much as possible.** This mostly refers to an appropriate and above all agreed planning framework based on a solid evidence base and stakeholder participation.
2. **Solutions that deal with an existing conflict.** This refers to situations where offshore wind farms have existed for some time and created difficulties for fishers, such as displacement. Financial compensation for fishers may fall into this category.
3. **More localised solutions for mitigating conflicts.** This mostly refers to specific offshore wind farm projects yet to be implemented, which may give rise to more localised conflict. These then need to be dealt with on a case by case basis.

Different level solutions are prerequisites for others, or support each other. Strategic approaches, for example, are ideally supported by project level solutions. Solutions that are preventative can also be applied in retrospect as mitigation efforts, so the distinction between the categories can sometimes be arbitrary.

Story 1: Sharing the sea in Scotland

An economic assessment of short-term options for offshore wind energy in Scottish Territorial Waters noted that all OWF sites suitable for short-term development are entirely or partially situated within spawning or nursery grounds for one or more of the commercial species²². This conflict is more relevant in the East coast of Scotland, which is more developed and sea use more intensive than in the West. Consented and proposed offshore wind farms are also found mainly on the East coast. Figure 4 presents examples of the overlap of the two sectors in this area. This is an example of a spatial conflict rather than a general conflict: A 2012 survey found general attitudes of Scottish fishers to offshore wind farming to be neutral or positive²³.

²² Marine Scotland (2011)

²³ Alexander, K.A., et al. (2013)

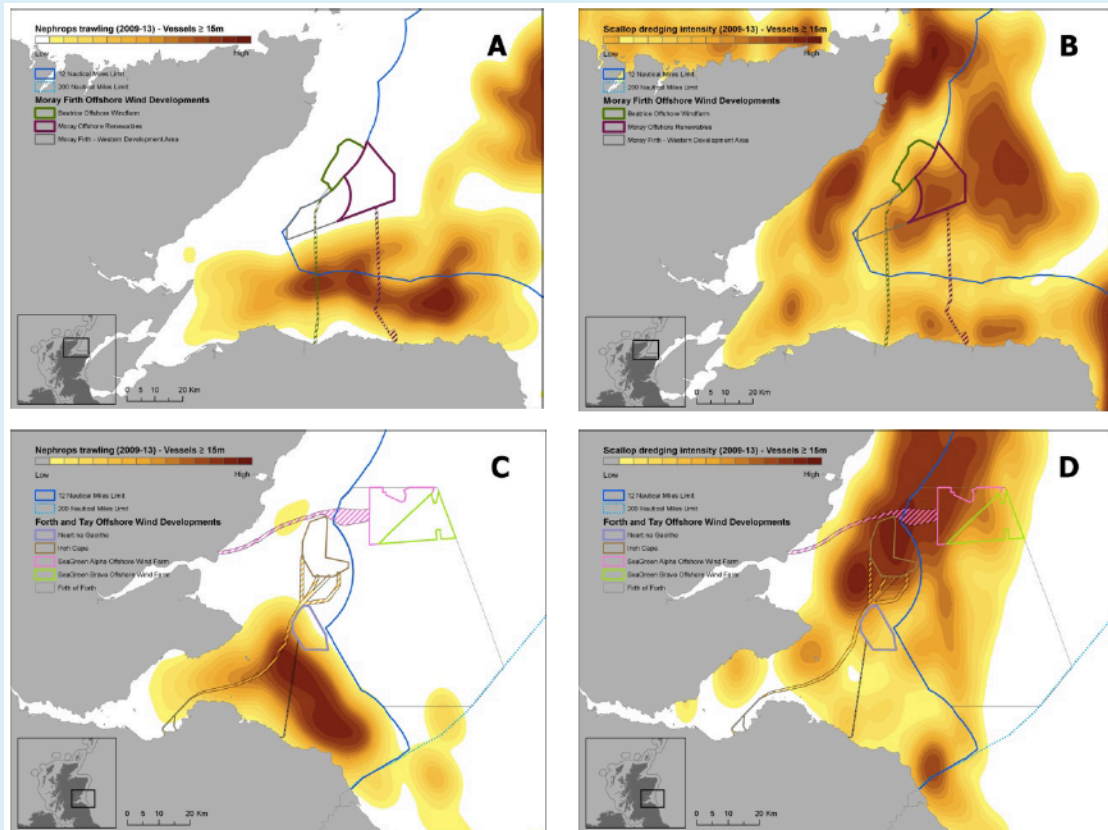


Figure 4: East coast offshore wind developments overlaid with amalgamated fishing activity over the last five years of available data (2009-2013) of the study fleets: nephrops trawling (A & C) and scallop dredging (B & D) in the Moray Firth and Forth & Tay region²⁴

Offshore wind farm developments are a particular challenge for smaller vessels that normally operate close to coast. Impeded by the availability of capital, licenses and quota, fishers whose profit depends on areas designated for potential offshore wind farm development may not be able to operate profitably during and after construction of a wind farm.

Ambitious renewable energy targets led to ten of the offshore wind areas in Scottish Territorial Waters to be allocated zones in 2009. This was before an independent Strategic Environmental Assessment (SEA) was conducted to identify whether the sites are generally suitable. At the time, Scottish LINK (2010), a forum made up of 35 Scottish voluntary environment organisations, recommended to implement a strategy-led consenting process, including the application of Adaptive Management and a Monitor and Deploy Policy, in order to secure benefits to all interests involved.

While comprehensive integrated planning has since been put in place, the conflict is to a certain extent still ongoing, reflecting the specificities of each potential OWF development project. In just the latest example, Scottish trawling fishers operating in the Moray Firth are at risk of being displaced

²⁴ Kafas, A. (2018)

by a development of a new offshore wind farm. Scottish and Southern Energy (SSE) are building 84 turbines about eight miles east from Caithness as part of the £2.6 billion Beatrice development. Fishers face financial losses unless they move into offshore areas, but there they would be in more competition with other larger fishing boats. They are worried about the lack of compensation for lost earnings.

To solve the problem, the developer has been continuing to liaise with the fishermen who work in and around the wind farm and export cable route construction areas to reach agreements on cooperation that are fair to both sides.

Story 2: Fierce negotiations on the final location of an offshore wind farm in France

In the bay of Saint-Brieuc an offshore wind farm is being planned, amounting to 500 MW and spread over an area of 80 km² 16.2 km off the coast. Construction is expected to start in 2018 and the wind farm is scheduled to be operational in 2020. The main economic activities in the bay are commercial fishing and tourism. Because of its history and economic dominance, commercial fishing is particularly important - great scallop is the main commercial species which also has strong heritage value for the region's population.

There have been fierce negotiations on the final location of the wind farm. The results are partly advantageous for the fishermen as the wind farm will be built further offshore than initially envisaged, on less productive fishing grounds. However, the growth of the renewable energy sector in the area was also seen as an opportunity, as reportedly, fairly large amounts of funding are being made available to local fishing associations to develop collective projects designed to improve knowledge of resource dynamics and marketing conditions of local fishery products.

A departmental committee was formed to have a discussion with other marine users and to highlight the importance of the fisheries sector. This was particularly important given that new areas were recently opened for offshore renewable development. With regard to the local fishing industries of Paimpol and Saint Brieuc, a memorandum of understanding was signed between the Departmental Fisheries committee and the developer company, whereby the developer will contribute to the funding of several projects supported by the fishing industry. In Paimpol, the developer supports onshore facilities (known as 'viviers') to improve the marketing of shellfish (especially lobsters). When the wind farms are in operation, regular funding will be obtained from a tax paid by windfarms operators on each megawatt produced. The total tax payment is expected to be EUR 7 million / year over the life span of the wind farm (≈ 20 years). 35 % of this will be set aside for fisheries development projects. Some projects have already started (e.g. a sea tank in Paimpol, lobster tagging, a fishery observatory, scallop stock enhancement) and others will develop.

As part of SIPECHE project, the development of the fishery observatory by the Côtes d'Armor fishing committee will be used to monitor fleet displacements and assess the possible effects on resources.

4.1. Strategic (preventative) solutions

Solution 1: Use high-level policy to ensure impacts are considered

In Scotland, all sectoral objectives and maritime plans reflect the strategic UK High Level Marine objectives²⁵. Scotland created the Marine Scotland Act in 2010 and adopted the UK Marine Policy Statement in 2011 as a framework for preparing integrated Marine Plans and decision making. The Policy Statement commits marine planning authorities to considering the potential social and economic impacts of OWF developments on fishing activity and to encourage opportunities for co-existence between fishing and other activities. In Poland, the MSP process revealed the importance of commonly agreed concrete targets and goals for offshore wind energy. In response, the Polish Parliament has now begun to elaborate a National Programme for the Development of Offshore Wind Energy (Narodowego Programu Rozwoju Morskiej Energetyki Wiatrowej).

Solution 2: Acknowledge the special status of fishers in the MSP planning process

Fishers can be difficult to include in the MSP process as they may be suspicious of MSP as restrictive and conservation-led. This was the case in Poland, for example, where special efforts were made to draw artisanal fishers into the process. Fishers were interviewed in person as a first step. Based on the results, two extra meetings were organised for fishermen during the MSP process. One was focused on general problems of fishers while the second was devoted to discussing solutions for coexistence between fishers and offshore wind farms. This yielded important background information for the planners and helped the development of “fishery friendly” MSP solutions²⁶.

Solution 3: Draw on fishers' knowledge to create an evidence base

Marine Scotland conducted a participatory fisheries mapping project, known as ScotMap. The aim was to improve knowledge of the distribution of fishing activity by smaller vessels without Vessel Monitoring Systems (VMS). Data were collected during face-to-face interviews with 1090 fishers. Interviews identified sea areas that were used for fishing, together with an estimate of the contribution these areas made to vessel earnings in the period 2007-2011. The data collected was used to produce maps showing fishing intensity and socio-economic importance of different sea areas to fishers²⁷. In Poland, a special study was carried out to identify the most important fishing grounds for artisanal fishers. The planning team from the National Marine Fisheries Research Institute contacted small-scale fishers (without VMS) in person. A special map was elaborated based on this information that was fed into the draft MSP planning process²⁸.

²⁵ Department for Environment, Food and Rural Affairs (2009)

²⁶ Ciołek et al. (2018)

²⁷ Kafas, A. et al.(2017)

²⁸ <https://www.msp-platform.eu/practices/economic-valorization-polish-sea-space-related-fishery>

Solution 4: Choose suitable offshore wind farm locations with care

It makes sense to run a careful area selection process to ensure conflicts between offshore wind farms and fisheries are kept to a minimum. This may involve initial scoping exercises and subsequently narrowing down location options in consultation with stakeholders (see Story 3). It could also involve scenario mapping to inform communities of the effects of project construction, operation and maintenance activities, and also to assess the socio-economic and environmental implications of a proposed development. Careful selection processes can make choices more transparent, and stakeholders can be involved from the beginning, building better relations between the sectors.

Story 3: Choosing offshore wind farm locations in Scotland

Scotland's National Marine Plan was developed in 2015 building on sectoral plans. Sectoral Marine Plans reflect Scottish Government policies, and are used to steer the commercial scale of offshore wind development in more detail. A comprehensive process was put in place to ensure minimal conflicts in the locations suitable for OWF developments. Sectoral plans had originally identified twelve areas for offshore wind farm development. The national marine planning process helped to narrow this down to five. It also provided advice on consenting and all other aspects that need to be looked into during OWF project planning. The five areas suitable for offshore wind were identified through a multi-stage process involving:

- A scientific scoping exercise to identify areas of resource and constraint;
- Regional Locational Guidance to detail this information;
- Early-stage consultation to re-define Draft Plan Options;

The Draft Plan Options are then subject to a Sustainability Appraisal (SA), which includes

- SEA,
- Habitats Regulation Appraisal
- Business and Regulatory Impact Assessment (BRIA);
- Statutory consultation prior to adoption.

While the broad spatial areas for OWF are identified within the national marine plan, project proposals are still subject to the licensing process and each application is considered on its own merits²⁹.

²⁹ Scottish Government (2015)

Solution 5: Set up a liaison group for MSP early on

In Scotland, the Fishing Liaison with Offshore Wind and Wet Renewables Group (FLOWW) was set up to foster good relations between the fishing and offshore renewable energy sectors. The group consists of regulatory bodies, offshore wind, fishery and aquaculture sector representatives, individual businesses, research groups and other relevant bodies. A specific output has been the Offshore Renewables and Fisheries Liaison Guidance³⁰ developed by the group.

Solution 6: Use the MSP plan to favour synergies and co-existence

Maritime Spatial Plans can be used to favour OWF project proposals that enable co-existence with fisheries both spatially and temporally. Interaction matrices could be used to identify potentials for coexistence which could then be made a licensing condition. During the planning process, technical solutions can also be discussed with the industries with an aim of identifying potentials for co-location and enhancing synergies (such as access to technical staff, vessel access, port facilities, emergency systems, monitoring systems). The Ocean Multi-Use Action Plan³¹, developed as part of the MUSES (Multi-Use in European Seas) project, provides several examples on how synergies have played out across the EU, what are the particular challenges for their implementation and recommended actions.

4.2. Mitigation

Solution 7: Allow some types of fishing in offshore wind farms under certain conditions

Scotland has experienced successful examples of co-locating specific types of fisheries (especially static gears) and offshore wind farms³². During the offshore wind farm planning process, technical solutions are discussed with the sectors with an aim to identify the potential for co-location and enhance synergies between the two activities. Furthermore, good practice guidance for community benefit³³ for OWF development has been drawn up for developers, which is used where appropriate. Interactions may also include access to the same pool of human resources (e.g. access to technical staff) as well as infrastructure and other technical resources (e.g. vessel access, port facilities).

Solution 8: Support fisheries by designating migration corridors

In Polish MSP, blue corridors were established for the purpose of ensuring safe migration of diadromous organisms. In these corridors, any construction is prohibited that could hamper such migration. While this does not affect offshore wind farms in Poland as they are located outside these

³⁰ FLOWW (2014)

³¹ Lukic, I. et al. (2018)

³² Kafas A. (2017)

³³ FLOWW (2014)

corridors in any case, they can also be used by fishing vessels. They can thus serve as an example of how to mitigate conflicts between fishery and offshore energy.

Story 4: Piloting multi-use solutions in the Netherlands

For a long time, wind farms in the Dutch EEZ were not accessible to fishing vessels. In 2015 the government decided to change this. Multi-use options were to be considered that would allow ships to pass through offshore wind farms and that would also allow some types of fishing to occur.

To answer questions related to the risks of opening up the wind farms, the Dutch Government (Rijkswaterstaat) decided to carry out a risk assessment. A package of mitigating measures was subsequently prepared in consultation with relevant stakeholders, including wind farm owners. The wind farm owners also carried out their own risk analyses and introduced them into the process³⁴. This led to a regulation proposed by the Dutch Government (Rijkswaterstaat) on how to integrate other uses and vessel transit in offshore wind farms. For fisheries the following regulations were proposed, designed to limit hazards while providing opportunities:

- Transit of the wind farm safety zones by professional fishers is allowed when their bottom-disturbing fishing gear is carried in a position above the waterline, where it is visible;
- Bottom-disturbing activities, like anchoring or dragging of fishing gear, are forbidden within the wind farm safety zone;
- Professional fishing is allowed if, and only if, the fishing gear is specified as permissible by the Dutch government. This will be written in a framework in which the risks for wind farms, ecological risks, economical potential and enforcement possibilities are taken in consideration.

In 2016/2017, the Dutch government decided to pilot the new regulations. Three offshore wind farms, OWEZ, Amalia and Luchterduinen, were to be opened for transit for vessels up to 24 meter in length and for multi-use. Bottom trawling was still to be prohibited. It was understood that implementing the regulations would require close cooperation between the Dutch government, fishers and the offshore wind farm owners. However, the wind farm operators and other involved stakeholders could not reach consensus on the costs and benefits of the proposed regulation. Although extensive studies were carried out, the parties were not unanimous in how to interpret the risk assessment. Wind farm operators had the following concerns:

- Who covers the costs of adapting the offshore facilities to the new situation, and how does this relate to the contract between operator and the government;

³⁴ ARCADIS (2018)

- Compensating for commercial aspects related to lost business, damage to wind farm infrastructure and increased operational expenses, which were not part of earlier business plans: Currently, there is no proposal for compensation in case these hazards occur;
- Loss of work time of operational & maintenance (O&M) teams and risks to OWF personnel due to responding to third party safety infringements.

Damage to the image of the offshore wind energy sector and possibly the wind farm owner as a result of accidents and subsequent litigation³⁵. Due to these unresolved concerns, the Dutch Ministry of Economic Affairs and Climate Policy asked for an independent review (second opinion) of all relevant risk studies carried out. This was to assess the residual risk after implementing the suggested management measures. It was also to assess whether risks were properly mitigated, and whether risks might still be under- or overestimated. Once again, the focus of the risk assessment was on the three offshore wind farms to be opened for co-use and transit.

The second opinion was published in early 2018 and provided some new insights. It found no serious research gaps and saw the proposed rules and regulations as sufficient. However, it also identified some additional hazards that could arise to the offshore wind farms from fishing:

- *Fishing with static nets and hook lines.* Risk was identified related to the use of fishing gear and its possible interference with cables and other installations. Lost gear behaves in unpredictable ways, and fishers, attempting to recover their gear, may even cause (further) damage;
- *Fishing with pots and traps.* Similar risk was identified for the wind farm as a result of anchoring and lost gear. Lost gear can move onto subsea cables, causing damage, or a fisherman may damage cables during recovery attempts.

The report recommended that risks should be further investigated, considering new methods of marking of the gear, collecting statistics on the loss of this kind of equipment, finding technical means of recovery without damages to cables, or how to provide compensation for abandoned gear.

Because of the generally positive results of the second opinion, the Dutch government decided to open the offshore wind farms on 1st of May 2018, implementing the restrictions proposed for the activities in the 2015 legislation. The Dutch government has made arrangements with the wind farm owners on monitoring, incident management and policy evaluations. The official pilot will take 2 years, but will be automatically extended. The conditions for multi-use and transit of vessels might be adapted by then based on new insights.

³⁵ Rijksoverheid (2018)

A longer-term solution is that new offshore wind farms will include a corridor which makes it possible for vessels up to 45 meters to transit through. These farms will be built in the period of 2019-2023.

Solution 9: Allow fishing vessels to transit offshore wind farms

Allowing vessels to transit offshore wind farms can help fishers access important fishing grounds. In the Netherlands, transit rules are currently being piloted in three offshore wind farms (see Story 5). Another option is to make available corridors between offshore wind farms or turbines to allow fishing vessels to pass, safely even in bad weather conditions. According to the Polish draft plan offshore wind farms should be navigable for ships up to 50 meters length with the exception of areas in close proximity to offshore constructions. On top of this, the plan envisages some safety passage(s) for larger ships which can also be used by fishers during bad weather conditions. Such a passage between wind farms was placed in front of the important fishing harbour of Ustka, allowing safe navigation to important fishing grounds at Słupsk Furrow.

Solution 10: Align construction phases with fisheries seasons

Temporal closures of the OWF in certain seasons for certain types of fisheries could be an option as to ensure that safety requirements are met and that the impacts on fisheries are reduced. Such closures can be optimised as to coincide with construction works on the OWF, as well as with fishing seasonality. However, for such initiatives, close cooperation and exchange (i.e. what are preferable fishing seasons, when is it easier to have construction works, when is major O&M to take place) between the two sectors is crucial.

Solution 11: Support collaborative arrangements between sectors

Extensive engagement and constructive discussions between the two sectors can result in collaborative arrangements whereby synergies between the two sectors are exploited (e.g. fishing boats used for monitoring during the construction and operation of the OWF). Other examples are to identify trade-offs, mitigation or compensation measures. In France, a memorandum of understanding has been signed between the Departmental Fisheries committee and the developer which will lead to various benefits for the fishing community (see Story 2).

Solution 12: Use an adaptive approach based on coordinated research and monitoring

Information gained from existing OWFs and their effect on fisheries can be used to advise future requirements and restrictions but also possible trade-offs and synergies. The Scottish Offshore

Renewables Research Framework³⁶ provides a collaborative and co-ordinated research programme that informs future marine planning and decision making for OWF developments. A coordinated national, regional and project specific environmental monitoring strategy is also useful to identify potential opportunities for enhancement and recovery of fish stocks in the exclusion zones around OWF sites. Using GIS, socio-economic analysis, research on various specific topics and strategic monitoring can all contribute to improving the knowledge base upon which decisions are based. Such knowledge can be made available as part of Marine Atlases.

Story 5: Turning resistance into opportunity in Scotland

In the case of OWF development on the West coast of Scotland, in proximity to the small island of Tiree, early and frequent consultations and voluntary collaborative arrangements had an important role in solving an offshore wind - fisheries conflict. This is a remote island, with fishing villages, a decreasing population and a long-standing fishing tradition. An Operations and Maintenance base for offshore wind farming was to be built on the island, which was not well accepted by the local community. Their concern was that such base would put too much pressure on the island, including fishing routes and small fish landing ports; it was also perceived as a threat to tourism and the overall economic stability of the island. With early and frequent consultations, an alternative solution was developed, which was to build the base offshore. The conflict thus turned into an opportunity, as this development has brought approximately 30 jobs³⁷ to the local community.

Solution 13: Produce guidance notes and licensing manuals

To lower the potential conflict between offshore wind farms and fisheries policies, licensing manuals and guidance notes can be developed by the authorities and made available to OWF developers. These address developers and decision makers and seek to ensure that all necessary requirements are met before development proceeds. A good example in this regard is Marine Scotland's repository of guiding documents and studies available online³⁸.

Solution 14: Consider technical solutions

On a more technical level, for a specific project, OWF developers can contribute to lowering the risk of conflict by:

- careful siting of offshore wind farm (layout);
- careful timing of construction work;
- configuration of turbines to allow navigation and fishing in between;
- adequate cable burial;

³⁶ Available at: <http://www.gov.scot/Topics/marine/marineenergy/mre/research>

³⁷ Approximate number obtained from the interview source

³⁸ Available at: <http://www.gov.scot/Publications/2018/03/2751/1>

- bunching of cables in corridors;
- appropriate marking and lighting of developments;
- adequate early consultation with the fishing industry³⁹;
- associated safety zone⁴⁰ proposals.

Aspect / Story	Story 1: Scotland	Story 2: France	Story 3: The Netherlands
Main causes of conflict	There is a spatial overlap between fishing and planned offshore wind farms. Fishers are concerned about potential financial losses and the lack of compensation for lost earnings. This is due to possible effects on their normal operations (temporal or permanent) and consequences that move into offshore areas would have (more competition with other larger fishing boats).	Impacts of the proposed location (productive fishing grounds) of the wind farm on fishing activity due to displacement.	Offshore wind sector had a concern regarding the proposed regulation to open three offshore wind farms to transit and multi-use. The two sectors could not reach consensus on interpretation of risk assessment results and the costs and benefits of the proposed regulation.
Role of stakeholders	Conflicts are assessed during SEA and MSP consultations and during consenting phase of the offshore wind farm. Developer is also continuously liaising with the fishers to reach agreements.	Consultation	Consultation

³⁹ Marine Scotland (2011)

⁴⁰ Safety Zone Scheme Regulations (SI 2007/1948) came into force on 6 August 2007. Details of the regulations and the accompanying guidance notes are available at:
<http://www.berr.gov.uk/energy/markets/consents/guidance/page27939.html>

Escalating factors	None	None	Objections from offshore wind sector to a new piloted regulation. Unresolved concerns - the parties were not unanimous in how to interpret the risk assessment.
Solution(s) found	Areas suitable for offshore wind were identified through a multi-stage process, including consultations with fishery community. Project proposals are still subject to the licensing process, while developers are encouraged to use Offshore Renewables and Fisheries Liaison Guidance developed by FLOWW.	As result of negotiations less productive fishing grounds were assigned to offshore wind developments. Financial compensation and cooperation on initiatives of mutual interest for both sectors.	Multiple risk assessment analysis contributed to an agreement between the offshore wind industry and authorities and decision to open the three existing wind farms (3year pilot). New offshore wind farms will include a corridor which makes it possible for vessels up to 45 meters to transit through.
Solution accepted by stakeholders	Yes, but proposals are still subject to the licensing process and issues on the project level can still occur to a certain extent.	Yes	Yes (3 years pilot)

Figure 5: Short analysis of the three conflict stories on offshore wind and commercial fisheries

5. Outlook: Future trends and developments in the sectors (with a view to the likelihood of conflicts arising in the future)

5.1. Future trends in the offshore wind sector

Offshore wind developments in the EU will continue to increase mainly in the Baltic Sea and the North Sea, while the Mediterranean is also expected to have its first developments. However, according to WindEurope, UK offshore market will dominate developments up to 2020⁴¹ with additional 5.2 GW or 42% of the new grid-connected capacity and maintain a leading role in the wind market by 2030⁴².

Floating wind turbines are of interest for the future development of the sector, especially in the deep-sea areas (i.e. Mediterranean and the Atlantic). These are capable of deployment in waters deeper than 35 metres. As such, they can potentially generate large amounts of energy without the constraints associated with turbines in shallower waters or closer to shore. One difference to fixed foundations is the potential for electro-magnetic fields that may be generated from cables within the water column. Better understanding of this is required to assess potential impacts upon electro-sensitive species and with these fisheries⁴³.

5.2. Future trends in the fishery sector

More environmentally friendly fishing practices may mean less bottom trawling as this has major environmental impacts. There is also a fundamental shift within the industry, with fewer persons entering the profession and an overall reduction in the size of the fleet. However, especially local fishing industries will remain important to communities, so there is an incentive to find constructive solutions from both sides. It is uncertain to what degree mariculture might compensate for the decline in fishing, and whether this will lead to new conflicts or opportunities with offshore wind farming.

⁴¹ Wind Europe (2018a)

⁴² Wind Europe (2018b)

⁴³ ORE Catapult (2018)

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