



Sector characteristics

Offshore wind

Offshore renewable energy is the fastest growing sector of the blue economy in Europe.

Although growth is still greatest in northern Europe, offshore wind farms are also being developed in the Mediterranean.

Offshore wind farms affect marine conservation efforts mostly through noise, displacement or habitat alteration.

There is potential for synergy with marine conservation through the creation of artificial reefs.

Area-based marine conservation

Marine conservation can be broadly differentiated into approaches that target overall ecosystem health (such as reducing fishing pressure or reducing pollution), approaches that target specific species (such as marine mammals), and area-based approaches (such as MPAs).

Most issues in the context of offshore wind farming arise over protected species of birds, bats, seals, whales and dolphins, both within and outside of protected areas.

Conflict description

Marine mammals, birds and fish

Constructing large-scale offshore wind farms affects a broad range of species through disturbance, change and loss of habitat. A higher biomass of hard substrate species may result, which could act as a stepping stone for invasive species. Vice versa, offshore wind farming is usually restricted in protected areas.

Impacts during construction

- Noise resulting from pile driving causes marine mammals to avoid the area. In severe cases disorientation may result.
- Birds may lose habitat and avoid areas frequented by construction vessels.
- Cumulative effects may arise as a result of multiple offshore wind farms being constructed, and in connection with other pressures.

Impacts during operation

Noise from operating turbines continues to have an impact on marine mammals. Birds have been shown to avoid areas where wind farms have been constructed. Disconnection of ecological units, such as roosting and feeding sites may result. Birds and bats may also collide with wind turbines and experience barrier effects during migration.

Drivers of conflict

Offshore wind farm expansion

The EU, as well as the EU member states have set themselves ambitious renewable energy targets. This, together with technological developments and cost reductions, leads to the projected expansion of offshore wind farming into larger areas and areas further offshore.

Conservation targets

The Marine Strategy Framework Directive's Descriptor 11 specifies that "Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment". Other drivers are the enlargement of MPAs or other protected areas, as well as species-specific conservation targets.

Uncertainty and the importance of process

Uncertainty is a key driver of conflict, placing emphasis on decision-making processes and integrated policy guidance. Uncertainty is particularly the case for cumulative effects of human activities. Public perception can also add to conflicts, especially involving well-liked species.

Possible solutions

Prevention

- 1 Use GIS-based sensitivity mapping to avoid essential habitats
- 2 Temporarily stop pile driving activities
- 3 Reduce the noise of pile driving
- 4 Choose other technical solutions to prevent harm to animals or reduce noise emission

Mitigation

- 5 Establish multi-use of MPAs and offshore wind
- 6 Carry out environmental monitoring
- 7 Develop a strategic ecological research programme
- 8 Use low cost survey techniques for underwater noise

Future trends

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.

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).

Changes in risk perception and different wind farm design may make it more likely that some types of fishing will be allowed in offshore wind farms.

Member States are required to implement measures to achieve Good Environmental Status (GES) in line with the Marine Strategy Framework Directive (MSFD). It is likely that this will lead to increasing interest in noise mitigation measures.

As offshore wind farms become established, research into artificial reef effects is likely to yield more interesting results that could point to potential synergies and trade-offs.