Overview of cumulative and transboundary impacts

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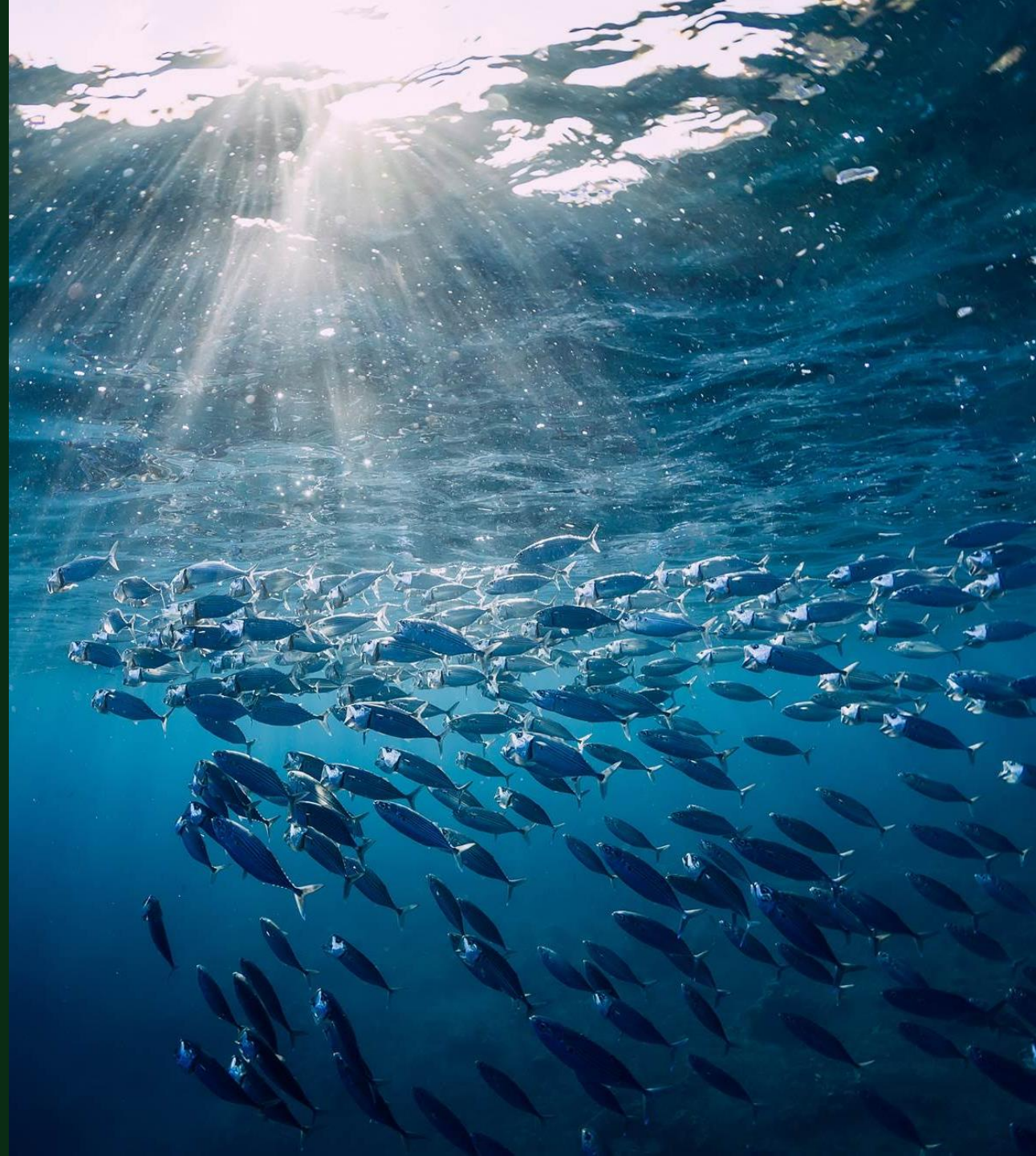


Executive Summary

This report has been submitted to the Government of Jersey to provide an overview of cumulative impact assessment (CIA) in the context of developing offshore wind energy in the region. While this report does not constitute a CIA, it highlights the CIA process, the key receptors considered within a CIA and the potential cumulative impacts associated with offshore wind developments.

This overview of CIA offers a high-level summary of the physical, environmental and socio-economic topics/receptors identified in a typical Environmental Impact Assessment (EIA) for offshore wind projects, and how these topics are considered further in a CIA.

The potential cumulative impacts of offshore wind developments with other projects have been identified, and their applicability to Jersey has been outlined, particularly with consideration of cross-border effects, therefore, facilitating further discussions with neighbouring jurisdictions.

This report aims to outline the CIA process and the potential cumulative impacts of offshore wind developments, thereby informing the Government of Jersey of the relevant considerations and enabling a well-informed and proactive strategy for cross-border considerations during the initial stages of stakeholder engagement.

Introduction

Cumulative impacts and the need for Cumulative Impact Assessment (CIA)

Cumulative impacts are impacts that are additive or interactive in nature, that arise as a result of an impact from a project interacting with impacts from other activities to create an intensified impact.

Overview of CIA

A clear and thorough assessment process for an offshore wind project must consider the impacts of the project cumulatively with other projects in the area.

Assessment of cumulative impacts builds from the assessment of the direct/indirect impacts of a project on physical, environmental and social receptors within an environmental impact assessment (EIA). For example, the following topic areas/receptors are typically considered within an offshore EIA for an offshore wind project, however, this list is not exhaustive and does not include topics typically considered in the onshore aspect of an EIA for an offshore wind project :

- **Physical –** Marine Physical Processes, Water and Sediment Quality, Climate Change, Natural Disasters
- **Environmental –** Benthic Ecology, Fish and Shellfish Ecology, Marine Mammals, Offshore Ornithology, Bats
- **Socio-economic –** Commercial Fisheries, Shipping and Navigation, Other Users, Tourism and Recreation, Seascape, Landscape and Visual Amenity (SLVIA), Aviation and Radar, Cultural Heritage and Archaeology, Major Accidents

Within a CIA, the results of the impact assessment for the above EIA topics are considered cumulatively with other past, present, and reasonably foreseeable future actions (RFFA) potentially affecting resources and receptors.

The ultimate goal of a CIA is to capture the potential cumulative impacts that result from past, present or reasonably foreseeable actions that may be inadvertently missed by evaluating each action individually, together with a project. To encourage informed decision making, the relative contribution of the project and other related projects to the overall cumulative effects are assessed. The CIA describes the additive or combined result of other related project (past, present and reasonably foreseeable) impacts as they potentially interact with impacts from the primary project being considered. It is critical to focus the CIA on meaningful cumulative impact issues, rather than on all conceivable impact relationships.

What does this report consider?

This report is designed to equip the Government of Jersey for upcoming discussions with its neighbouring jurisdictions of France and Guernsey regarding the potential cumulative impacts of the potential Jersey Offshore Wind project. It does **not constitute a full CIA**. Instead, it outlines the **typical cumulative impacts** commonly associated with offshore wind developments, based on current industry understanding, and how these are applicable to Jersey.

A comprehensive CIA would be undertaken at a later stage of project development (typically post-lease award) when project-specific details are more advanced. This would form part of the wider EIA that the developer would be required to submit to the Government of Jersey.

The primary purpose of this report is to inform the Government of Jersey of the range of potential cumulative impacts, supporting a well-informed and proactive approach to cross-border considerations during early-stage stakeholder engagement. As well as gaining an understanding of the potential other projects from past, present or reasonably foreseeable actions that may need to be considered when a CIA is ultimately prepared.

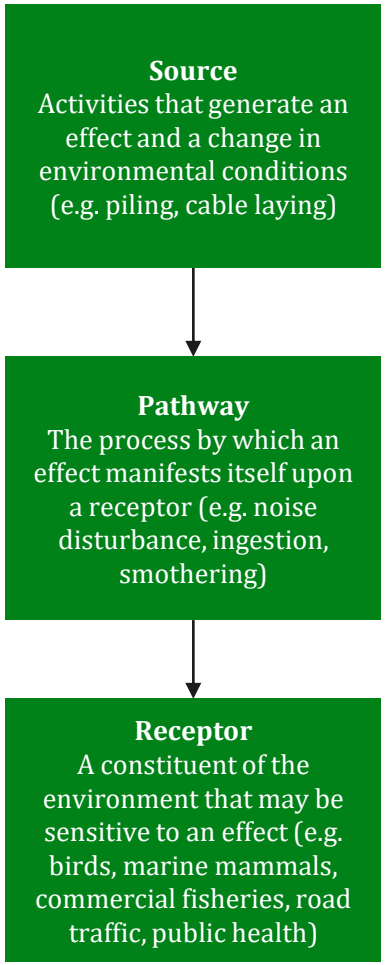
Cumulative & in-combination impacts

Definition of Cumulative Impact
Cumulative impact involves the combined effects of multiple similar projects over time or space, affecting environmental factors additively. Typically considers other developments of the same kind (e.g., multiple wind farms) and how their collective environmental effects add up, typically quantitative. Example: if several offshore wind projects are planned in the same region, their cumulative impact on marine biodiversity or visual landscape would be assessed.

Definition of In-combination Impact
This is the equivalent term for cumulative impacts used in Habitats Regulations Appraisal (HRA), to consider the combined effects of multiple projects affecting protected habitats and species under habitats regulations. Broader than cumulative impact; includes different types of projects and their combined effect on protected sites or species. Often qualitative and precautionary. Example: an offshore wind farm's impact on a Special Protection Area (SPA) might be assessed in combination with nearby port developments, shipping routes, and fishing activities.

Scope and legal context
Cumulative impacts focus on similar projects under EIA Directive; in-combination impacts cover diverse projects under Habitats Regulations.

Importance for decision making
Understanding both impacts is crucial for identifying environmental risks and implementing effective mitigation for sustainable development.



Developer approach to cumulative impact assessment

Shortlisting projects to include and transboundary considerations

In due course a developer will need to consider as part of their environmental impact assessment, how their project will interact cumulatively with other projects. There are standard approaches that have developed over the years in offshore wind as recently demonstrated by e.g. RWE's Dogger Bank South Offshore Wind project ref: Source: 7.6 ES Chapter 6 - EIA Methodology

In the UK, Planning Inspectorate (PINS) Guidance Note 17 helps summarise the process for cumulative effects assessments in the context of Nationally Significant Infrastructure Projects (NSIPs) under the Planning Act 2008.

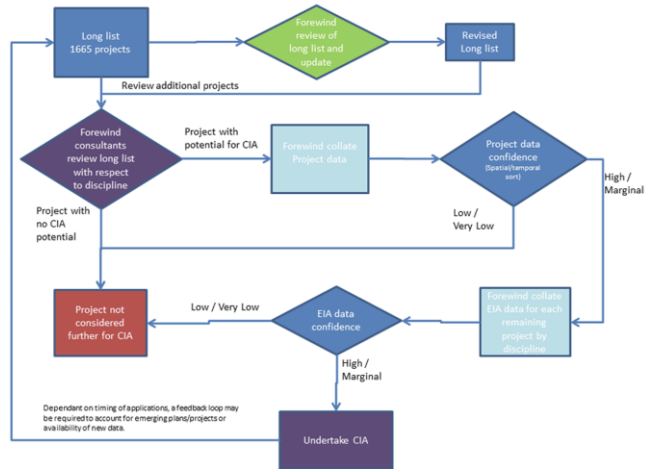
This advice recommends a 4 stage approach:

1. **Stage 1** – Define the reasonable maximum spatial area over which the proposed development can exert an influence (zone of influence, ZOI) and identify a long list of 'other developments'
2. **Stage 2** – Identify a shortlist of 'other developments' based on a set of inclusion/exclusion criteria applied to the long list
3. **Stage 3** – Gather information in relation to the short-listed developments, including location within the ZOI and provide adequate information in order to consider whether there is a potential for cumulative effects
4. **Stage 4** – Undertake the cumulative impact assessment

UK projects applying under the Planning Act 2008 follow a tiered approach to prioritise projects that should be considered in an assessment as follows, and this will be triggered at the time the developer starts to progress its application. 'Traditionally' projects worked on a first come first served basis in terms of environmental head room, but due to the length of consenting processes this has become more nuanced over time. Operational projects are usually considered as part of the baseline environment within the EIA and are therefore not taken forward to the CIA.

Tier	Description
Tier 1	Project under construction
	Permitted applications, whether under the Planning Act 2008 or other regimes, but not yet implemented
	Submitted applications, whether under the Planning Act 2008 or other regimes, not yet determined
Tier 2	Schemes on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted
Tier 3	Schemes on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption), recognising that much information on any relevant proposals will be limited
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward

It is envisaged that Jersey would follow a similar process once the appropriate legislation is enacted.



Example process for selecting cumulative projects
Source: DOGGER BANK

Transboundary effects

The United Nations Economic Commission for Europe Convention on Environmental Impact Assessment in a Transboundary context (referred to as the ESPOO convention) requires that assessments are extended across borders between parties of the Convention when a planned activity may cause significant adverse transboundary effects. This should apply in both directions.

Staged Approach to Cumulative Impact Assessment

Stage 1 – Long List

Stage 1 of a CIA involves identifying a long list of 'other developments' within a defined zone of influence, for consideration within the CIA.

The types of development that may be included in a cumulative long list for an offshore wind farm CIA, include:

- Offshore and onshore wind farms and all associated infrastructure;
- Offshore and Onshore Cable installations;
- Carbon Capture and Storage (CCS);
- Oil and Gas installations and pipelines;
- Seismic Surveys;
- Coastal developments (i.e. Ports and Harbours);
- Solar farms;
- Onshore electrical infrastructure (i.e. electrical substations);
- Aggregate extraction areas; and
- Licensed dredging disposal sites

Stage 2 – Short List

The shortlist of 'other developments' is then identified by applying inclusion/exclusion criteria to the long list.

This usually involves consideration of potential impact pathways and the possibility for spatial/temporal overlap of effects with the project and 'other developments'.

Other operational developments are generally excluded from the CIA during this stage as they are considered as part of the baseline environment in the EIA. However, where other operational developments have the potential for ongoing impacts (e.g. bird collision risk between two offshore wind projects) they should be considered within the short list of 'other developments'.

'Other developments' with insufficient project-level details or construction timelines are generally excluded from the short list in order to ensure the CIA remains fit for purpose.

Stage 3 – Gather Information

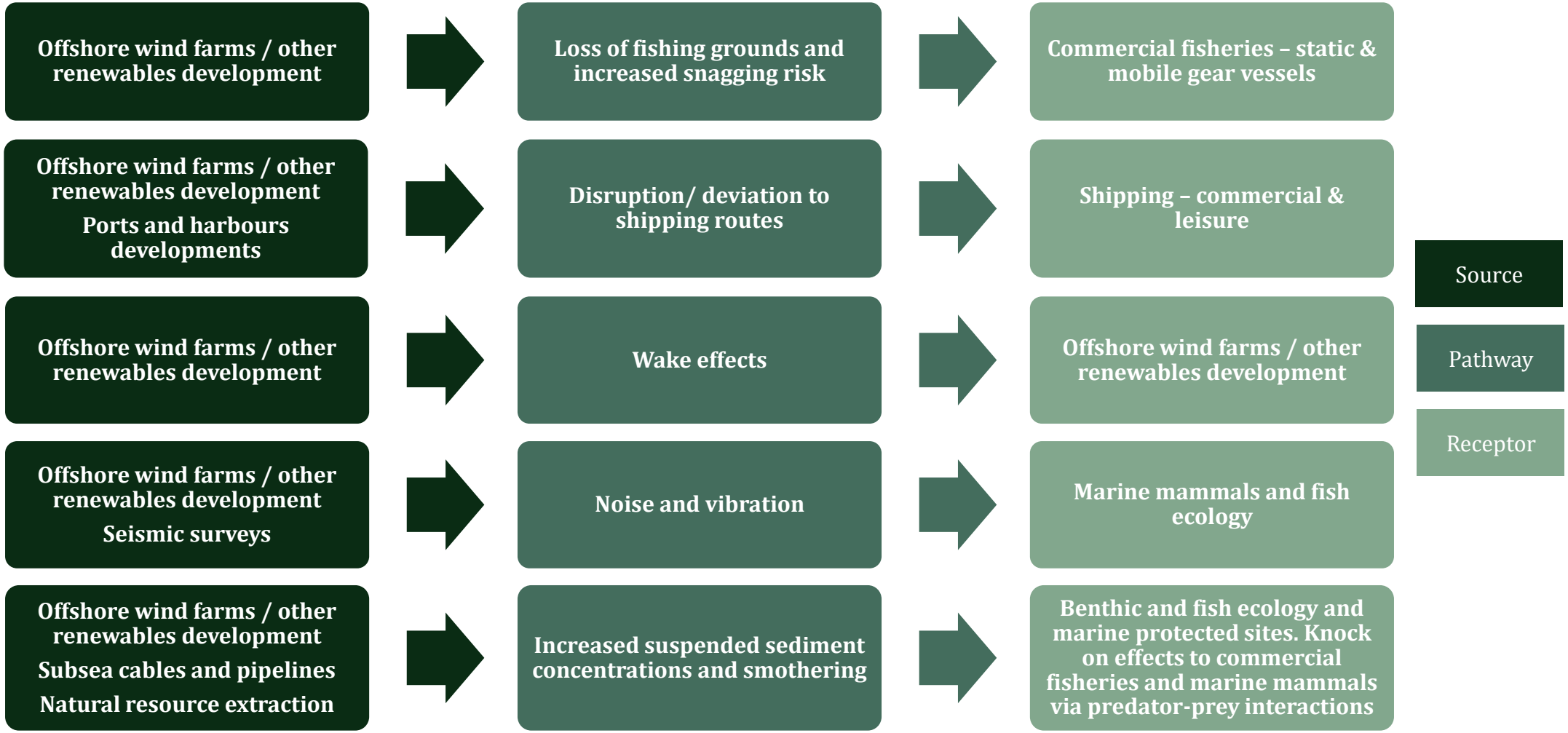
Once the short list has been refined, information on each of the 'other developments' is gathered for the CIA. This includes:

- Location within the ZOI;
- Key design aspects (no. turbines, length of cables/pipelines, project area, installation methods, no. vessels etc); and
- Development timeframes.

Cut-off dates for 'other developments' to be considered within the CIA are usually implemented to allow sufficient time to adequately assess cumulative impacts prior to submission of the application. 'Other developments' which submit an application after the cut-off period are therefore considered but not assessed within the CIA. The cut-off period is usually agreed with the regulators prior to submission.

Typical cumulative impacts in an offshore wind project

ERM have identified priority cumulative impacts that will likely be of particular importance in the context of the Jersey offshore wind farm; however, all cumulative impacts should be considered in a full CIA.



Stage 4 - Receptors for Consideration in CIA

The following topic areas/receptors are typically considered within an offshore EIA for an offshore wind project, and are therefore, considered within a CIA:

Physical	Environmental	Human

• Marine physical processes
• Water and sediment quality
	• Benthic ecology
	• Fish and shellfish ecology
	• Offshore/onshore ornithology
	• Marine mammals
	• Bats
	• Protected sites
		• Commercial fisheries
		• Shipping and navigation
		• Aviation and radar
		• SLVIA/LVIA
		• Other Sea Users including:
		  • Military practice areas
		  • Recreation and Tourism
		  • Other project developers
		• Cultural Heritage and Archaeology

Physical Receptors

Introduction

Marine physical processes are not in themselves receptors, but are, physical 'pathways' which have the potential to indirectly impact other environmental receptors.

Many marine physical processes link to water and sediment quality. For example, currents are part of the sediment transport system; changes to currents as a result of the physical presence of infrastructure can alter erosion rates and sediment flux, which can have knock on effects on scour and coastal and seabed morphology.

Marine physical processes also influence how suspended sediments and potential pollution releases are transported.

It is therefore important to understand how marine physical processes may be changed as a result of the Jersey Offshore Wind project, together with 'other developments' in order to assess the potential for cumulative impacts to environmental receptors.

Potential impacts identified in an EIA

- Increased suspended sediment concentration and turbidity
- Changes to wave and tidal regime and the sediment transport system
- Changes to coastal morphology
- Seabed morphology changes, including scour
- Marine pollution and/or release of contaminated sediments
- Water column processes (mixing and stratification)

Key project types for consideration

- Offshore wind farms and all associated infrastructure;
- Offshore Cable installations;
- Carbon Capture and Storage (CCS);
- Oil and Gas installations and pipelines;
- Coastal developments (i.e. Ports and Harbours);
- Aggregate extraction areas; and
- Licensed dredging disposal sites

Cumulative impacts

In general, changes to wave and tidal regimes and associated sediment transport are not considered within the CIA as these effects are often highly localised in relation to tidal excursion limits and have an extremely low potential for cumulative impacts with other developments.

Installation of other developments concurrently with the Jersey offshore wind project has the potential for cumulative increases in suspended sediment concentrations, changes to water column processes and morphological changes, particularly during construction activities. Changes of use at ports and harbours, such as dredging or other seabed work, can also result in increased levels of suspended sediments. Again, this can contribute to cumulative suspended sediment concentration impacts when considering other nearby ports and harbours.

The physical presence of multiple projects' infrastructure can also have cumulative impacts on scour. Physical infrastructure can disrupt currents, altering erosion patterns and the rate of scour at the seabed.

Applicability to Jersey

The highest active cable density in Jersey is located in the northwest and west of the island. Meanwhile, all of Jersey's subsea transmission cables with France are located in the eastern section of the territorial waters. With respect to the proposed Jersey offshore wind zone, there are two disused cables within the zone and adjacent to the zone. Should turbines and/or subsea cables require micro-siting around existing infrastructure negotiations with other cable operators may be required. Jersey may need to carefully coordinate with neighbouring jurisdiction of maritime authorities on cable routing, shipping corridors, and environmental impact, particularly in shared or adjacent waters.

Several ports and harbours surrounding Jersey have short- or long-term masterplans or other developments in planning, including St Helier, St Peter Port, and St Malo. If seabed work is scheduled in parallel for several of these ports, then the level of suspended sediments could increase temporarily in the region, potentially affecting marine life.

If multiple projects are scheduled simultaneously, coordination with stakeholders in other jurisdictions may be necessary to mitigate impacts. This could result in tensions if projects have time-critical projects or investment plans and could also cause tensions with global shipping stakeholders in extreme cases.

Environmental Receptors

Introduction

Benthic habitats and marine species that rely on them can be impacted by the installation of offshore wind developments via habitat loss and alteration from direct infrastructure placement and indirectly from seabed disturbance, increased turbidity and suspended sediment. For protected sites these impacts can affect the overall conservation objectives and features the site.

Underwater noise may cause harm to local marine animals by interfering or obscuring their ability to hear natural sounds. This can disrupt their ability to navigate, communicate, find food, locate mates and avoid predators. In some cases, noise can also influence migration of species. Impulsive noise is generally considered the most damaging underwater noise and is generated during foundation piling .

The physical presence of infrastructure (both above sea and underwater) can also lead to barrier effects which are particularly important to migratory species. Many marine species migrate to better foraging grounds and to breed; barrier effects can therefore have knock on effects displacing marine species and reducing breeding rates. The rotor blades are also a collision risk to birds.

Potential impacts identified in an EIA

- Habitat loss/ alteration
- Noise and vibration
- Collision risk
- Barrier effects leading to species displacement or increased migration routes
- Introduction of invasive non-native species
- Prey availability

Key project types for consideration

- Other offshore wind developments
- Oil and Gas installations and pipelines;
- Seismic Surveys
- Coastal developments (i.e. Ports and Harbours);
- Aggregate extraction areas; and
- Licensed dredging disposal sites

Cumulative impacts

Concurrent piling from multiple offshore developments presents potential for significant cumulative impacts to marine mammals. Other noise producing projects like seismic surveys, can also contribute to cumulative underwater noise impacts and should be carefully considered. The intensity of the cumulative noise and the distance to the receptor determine the extent of the noise impact on the environment. Minke Whales are susceptible to disturbances within 40km of pile-driving noise, while harbour porpoises and seals are more susceptible at even longer distances.

Multiple developments can present a larger barrier effect to migratory marine mammal, fish and bird species. If multiple developments are also located within key migratory bird routes or foraging areas there may also be significant collision risk to birds.

The intersection of offshore wind developments with subsea cables and pipelines can lead to prolonged and widespread turbidity, which poses risks to benthic habitats, and vulnerable marine species through smothering and habitat degradation. These combined impacts can contribute to cumulative stress on fish populations and benthic invertebrates as well as marine mammals through predator-prey interactions.

Applicability to Jersey

The highest active cable density in Jersey is located in the northwest and west of the island. Meanwhile, all of Jersey's subsea transmission cables with France are located in the eastern section of the territorial waters. With respect to the proposed Jersey offshore wind zone, there are two disused cables within the zone and adjacent to the zone. Should turbines and/or subsea cables require micro-siting around existing infrastructure negotiations with other cable operators may be required. Jersey may need to carefully coordinate with neighbouring jurisdiction of maritime authorities on cable routing, shipping corridors, and environmental impact, particularly in shared or adjacent waters.

If neighbouring offshore wind projects, such as the Roches Douvres zone, are developed simultaneously with the proposed offshore wind farm off the coast of Jersey, cumulative collision risk and barrier effects could be significant. Furthermore, if the construction periods for these offshore wind developments overlap careful consideration will need to be given to the installation methodologies with respect to cumulative underwater noise impacts.

EU-wide limits for underwater noise mean no more than 20% of a given marine area can be exposed to continuous underwater noise over a year. Differences in regulations between regions may lead to disagreements over noise level limitations. By jointly coordinating schedules, noise sources can avoid overlapping activities. However, this would need collaborative discussions to align timetables and negotiations over which survey or construction activity can go ahead when.

Human Receptors

Introduction

Jersey's waters are generally a busy area, with passenger and cargo vessels serving the island as well as other routes passing through mainly related to ports in St Malo, Granville, Guernsey and various in southern England. Wildlife tour operators along the French coast nearest Jersey waters also offer guided boat trips to observe bottlenose dolphin populations, seals and seabirds.

Impacts to human receptors are generally vessel related and include loss of access and displacement leading to increased steaming times. Navigational safety is also a key impact to human receptors, such as collision risk or snagging of fishing gear.

Human receptors like recreational users and tourists can also be susceptible to visual impacts. Where multiple offshore wind projects can be visible from the coastline, this can result in cumulative loss of visual amenity of seascape and landscape character areas and cultural heritage sites.

During operation, wind turbines can also interfere with radar and radio wave communications which can disruption aviation and military operations.

Potential impacts identified in an EIA

- Loss of access to commercial fisheries and other sea users leading to disruption and displacement and increased conflict/use of areas
- Increased steaming times due to vessel route diversion
- Visual impacts to seascape and landscape character
- Visual impacts to the setting of archaeology and cultural heritage sites
- Collision risk and other navigational safety impacts (e.g. snagging of fishing gear)
- Interference with radar/radio communications

Cumulative impacts

The concurrent development of multiple projects can lead to increased maritime traffic, which has the potential for cumulative vessel related impacts and navigational safety risks.

Shipping lanes may need to be rerouted or restricted, potentially causing delays and increased operational costs for commercial vessel owners. Diversion of existing routes may cause congestion with other routes, causing disruptions to journeys. It could also create longer transit times. Diversion of routes may also displace impacts to new areas. The cumulative impact of disruption may cause more significant criticism from the public.

Multiple developments can also introduce a number of cumulative impacts to commercial fisheries, due to the presence of project vessels, exclusion from fishing grounds, construction of infrastructure resulting in displacement and increased snagging risks.

Where multiple projects can be visible from the coastline, this can also result in cumulative loss of visual amenity of seascape and landscape and/or archaeology and cultural heritage sites.

Key project types for consideration

- Offshore and onshore wind farms and all associated infrastructure;
- Offshore Cable installations;
- Carbon Capture and Storage (CCS);
- Oil and Gas installations and pipelines;
- Coastal developments (i.e. Ports and Harbours);
- Aggregate extraction areas; and
- Licensed dredging disposal sites

Applicability to Jersey and Geopolitical Impacts

If neighbouring offshore wind projects, such as the Roches Douvres zone, are developed simultaneously with the proposed offshore wind farm off the coast of Jersey, the cumulative effects on human receptors, and overall disturbance in the area could be significant.

The optimised site proposed by ERM partially mitigates clashes with shipping routes in and out of St Malo, however, impacts to shipping are dependent on final site selection. Depending on the routes that may need diverting, engagement with the French Government, Guernsey Government and shipping stakeholders is advised to fully understand impacts, pushback and mitigations.

The Government of Jersey may also need to investigate potential changes in existing fishing licence arrangements particularly granted to French fishing trawlers particularly with exclusion zones imposed during construction and operations phases of the Jersey Offshore Wind project. The dispute in 2021 between Jersey/UK and France over post-Brexit fishing rights is a good indication of impacts of fishing disputes.

Wake

Whilst not a receptor, given the location of the proposed project area the cumulative impacts of wakes will be crucial. Understanding wake effects in the surrounding vicinity of the Jersey offshore wind zone is essential as the planned French offshore wind projects in the wider area could have significant impacts on the wind resource.

Overview

Wake effect is the scenario where wind speeds are reduced, and turbulence is increased, behind a wind turbine – which significantly impacts the overall energy production across a specific offshore wind zone. The impacts of wakes can stretch for more than 100km, however wind speeds do recover with distance with an effect known as wake recovery. Wake effects are present both internally from other turbines in the wind farm, and externally from other offshore wind projects. Wakes are impacted by a number of factors including turbine spacing and layout, atmospheric stability, neighbouring wind farms and the wind resource.

Technical impacts

- **Decreased output** – the primary consequence of wake losses is the decreased energy output of the offshore wind farm.
- **Increased turbulence** – both from internal wakes and external wakes
- **Turbine fatigue** – wind turbines that operate in wake conditions experience higher loads and increased turbulence. This will increase the project's downtime and additional pressure on blades operations and maintenance costs.
- **Impact on the project's economics** – due to decreased output and increased maintenance costs, this can reduce the project's viability. Lower energy yields and higher costs will lead to longer repayment periods, making the projects less attractive.

Geopolitical impacts

In geopolitics, cross border/project wake effect is colloquially termed as "wind theft." This is an ongoing issue with several wind farm operators over alleged "wind theft." This phenomenon is now raising concerns across countries as they continue to ramp up their offshore wind ambitions.

The recent offshore wind boom in the North Sea could lead to a looming geopolitical dispute as countries might seemingly "fight" over wind. Germany is suffering more wake losses compared to its North Sea neighbours primarily due to its limited coastal waters which are at risk of being overcrowded. Moreover, the proximity between the offshore wind zones of Germany, Denmark, and the Netherlands could exacerbate wake effects across the North Sea.

In this context, Jersey needs careful planning of the layout of its own offshore wind zone, given its proximity of St. Brieuc Offshore Wind farm and the Roches Douvre offshore wind zone in French waters. With the Jersey offshore wind zone located downwind from the Roches Douvre zone (as wind flows comes from the west) wake impacts are expected to be high. There is however a possibility of wake recovery given plans for a potential shipping channel between the two zones which would also act as a buffer for wake recovery. One of the main discussion points between the two governments should be potential mechanisms to address wake losses or disputes about "wind theft."

Receptors

- **Offshore wind developers** are particularly impacted when multiple offshore wind farms are sited adjacent to one another and buffer zones are insufficient to allow wake recovery, resulting in reduced energy yields.
- **Governments** are also a receptor, especially where developers raise concerns or claims for compensation when wake effects limit generation below expected levels.

Thank you