

Consenting Lessons Learned

An offshore wind industry review of past concerns, lessons learned and future challenges.

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RenewableUK is the trade and professional body for the UK wind and marine renewables industries. Formed in 1978, and with over 700 corporate members, RenewableUK is the leading renewable energy trade association in the UK. Wind has been the world's fastest growing renewable energy source for the last seven years, and this trend is expected to continue with falling costs of wind energy and the urgent international need to tackle CO₂ emissions to prevent climate change.

In 2004, RenewableUK expanded its mission to champion wave and tidal energy and use the Association's experience to guide these technologies along the same path to commercialisation.

Our primary purpose is to promote the use of wind, wave and tidal power in and around the UK. We act as a central point for information for our membership and as a lobbying group to promote wind energy and marine renewables to government, industry, the media and the public. We research and find solutions to current issues and generally act as the forum for the UK wind, wave and tidal industry, and have an annual turnover in excess of five million pounds.

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Executive Summary

Offshore wind is a crucial element of the Government's plans to reduce the carbon intensity of the power sector, increase energy security and provide affordable energy to consumers. With 45GW of projects in the development pipeline and 1.5GW currently operating, the UK leads the world in offshore wind and has the potential to secure an offshore wind industry supporting 30,000 direct jobs by 2020. However, critical to achieving this is a consenting system which delivers consents in a timely and flexible manner.

The consenting of offshore wind projects is a complex task. Not only are there a wide variety of environmental factors to be taken into account, but there are technical and engineering challenges to be balanced with the predicted environmental impacts. All this must be achieved within the constraints posed by the challenges of working offshore, and the overriding requirement to develop an economically viable project.

Working within the requirements of the appropriate legislation, the consenting process should ideally deliver consents for offshore wind projects in a timely and effective fashion which facilitates the delivery of the UK's renewable energy objectives. Consent conditions should also be appropriate and proportional to the risks posed by the development of the project, and should allow the delivery of offshore wind projects which are technically and economically viable as well as having acceptable levels of environmental impact.

Analysis of the consenting process for offshore wind farms to date indicates that the time taken for consent determination has been increasing, and that increasing difficulties in resolving environmental impacts have been encountered with nearly 2GW of projects stuck in the planning system. As the industry moves into Round 3, with an increase in the size of projects and increased distances offshore, these challenges will arguably

increase. This must also be balanced with the new requirements and additional uncertainty associated with a new consenting regime and new regulators (IPC, MMO and Marine Scotland). It is no surprise then that a recent survey of developers highlighted consenting concerns as the greatest risk to Round 3 development programmes.

This report has been produced by RenewableUK and its members with the intention of highlighting some of the consenting challenges facing offshore wind, and demonstrating some of the ways in which the industry has worked (and is working) to address some of these challenges. The report also makes recommendations for the way in which these challenges can continue to be addressed in Round 3. The industry is keen to discuss the findings and recommendations of this report with stakeholders and regulators, and to find novel and collaborative ways of working together to achieve more timely and effective consents and practicable monitoring programmes for Round 3 wind farm projects.

The need to address consenting challenges for offshore wind projects

One of the important observations from Rounds 1 and 2 is that the time taken to achieve consent increased substantially. This was largely driven by increases in project size and increases in cumulative effects as more wind farms were developed in the three strategic areas identified by the SEA.³ Much of the deliberation during the consenting process concerns uncertainties over the environmental effects of offshore wind projects. With Round 2 being developed before some Round 1 developments were complete, there was little time available to gather and analyse monitoring data from early projects so that lessons learned could be applied to later projects. Developers have also found it essential to obtain a flexible consent to allow projects to be built economically.

The recent Strategic Review of environmental monitoring of offshore wind farms under FEPA licence conditions (CEFAS 2010) concluded that even now, on the brink of Round 3, monitoring of existing projects has not allowed definite conclusions to be made regarding the environmental impacts of offshore wind, and does not allow relaxation of the precautionary approach taken in consenting and monitoring. This is a disappointing conclusion for the offshore wind industry, which has invested a considerable amount of time and money in monitoring offshore wind developments in compliance with the conditions placed on their consents. The lack of firm conclusions is especially concerning for future offshore wind development, since the complexity of environmental impact assessment will continue to increase throughout Round 3 as wind farms get larger, more numerous and further offshore.

The offshore wind industry (and allied supply chain industries) are reliant on the consenting process in order to develop offshore wind projects, and there is considerable concern that consenting has become a barrier to the delivery of renewable energy capacity in the UK. There is a significant risk that by not addressing the barriers to consent, investment in offshore wind and the associated economic development in the UK will be hindered, and that the UK will be unable to meet its carbon reduction obligations and renewable energy objectives.

The offshore wind industry considers, therefore, that there is an urgent need to address some of the barriers to consenting. There is a need to adopt measures and methods of working to ensure that the twin objectives of environmental protection and renewable energy development are met, and consequently to ensure that the development of offshore wind in the UK is truly sustainable.

Challenges and recommendations

This report has identified and discussed six key consenting challenges which the offshore wind industry, statutory advisors and regulators face in the development of offshore wind projects. Some of these relate to specific consenting systems, in terms of new pre-application approaches and

different scales of consultation. Others relate to the realities of environmental impact assessment, data collection and post-consent monitoring at sea.

The solutions to these problems need to be identified collaboratively between industry, advisors and regulators in order to ensure that the consenting system is compliant with legislative requirements,

achieves environmental protection, and positively enables sustainable development of offshore wind.

This report has identified some recommendations for areas for further work, summarised in the table below.

Key Consenting Risk	Key Recommendation
Adaptation to a new consenting system and regulatory environment	<ul style="list-style-type: none"> • Ensure that there is clear understanding between developers and regulators over the way in which offshore wind projects develop, and the way in which they are assessed. • Consider whether regulators could provide a stronger steer to applicants pre-application, to ensure that developers know that they are on the right track.
The difficulties of data collection in large areas far offshore	<ul style="list-style-type: none"> • A more pragmatic approach to data and data collection – targeted to specific consenting requirements. • Clarity from regulators and stakeholders on the meaning of “scientifically robust” data for stages of development and sensitive receptors. • More effective scoping to allow better targeted data collection programmes.
Uncertainties in the assessment of environmental impacts	<ul style="list-style-type: none"> • Adoption of a more pragmatic, risk-based approach to the assessment of impacts and significance. • Consideration of the wider environmental benefits of offshore wind when considering the risk to one particular species or receptor. • Ensure that stakeholder requirements are clearly defined up-front.
Assessment of cumulative impacts	<ul style="list-style-type: none"> • Encourage open, early and frank dialogue between regulators, stakeholders and developers when discussing cumulative impacts. • Develop improved guidance with standard terminology.
Flexibility in consent and the Rochdale Envelope	<ul style="list-style-type: none"> • Develop techniques for effective consultation on project envelopes as part of the pre-application process. • Allow greater variation or less onerous requirements to vary post consent without impacting construction time scales..
Achieving effective monitoring programmes	<ul style="list-style-type: none"> • Re-evaluate data already collected from monitoring programmes for evidence of gross effect. Where none is found this should contribute to the regulators’ assessment of significance of effects. • Discuss what is and what isn’t practical in terms of data collection in the marine environment, and develop a definition of an acceptable evidence base. • Design monitoring programmes that clearly link pre and post construction monitoring and are suitable for validating the predictions made in the Environmental Statement. • Develop a programme between the developer and the regulator to review monitoring outputs with an adaptive management plan to reduce the monitoring effort and reduce requirements if certain stage gates/requirements are met. • Investigate ways that data from monitoring programmes could be combined with other data gathering programmes to enhance value of outputs.

1. Introduction

1.1 Background

RenewableUK developed the concept for this document in response to a Cefas led report entitled “*Strategic Review of Offshore Wind Farm Monitoring Data Associated with FEPA Licence Conditions*” (Cefas, 2010). The report assessed the data collected by offshore⁴ wind developers during their post-consent monitoring surveys before April 2009. It concluded that insufficient information exists to remove or relax many of the conditions placed on FEPA licences (now Marine Licences, post April 2011).

For the offshore wind industry, which has invested significant resources in the collection and analysis of data relating to the environmental effects of their projects, its findings pose potentially significant development constraints and raise concerns over the merits and scientific validity of the monitoring of offshore wind.

At the same time, more than 2GW of offshore wind capacity in Rounds 1 and 2 remains in the planning system, and there is a significant risk that delays to the consenting of projects in Round 3 could jeopardise the delivery of the Government’s renewable energy targets.

Building on the RenewableUK response to the ‘Strategic Review’, its members have taken this opportunity to expand the scope of its response. It now includes a broader discussion on pre and post-consent concerns facing the regulated offshore wind community and the transfer of knowledge from previous leasing Rounds to a wider audience. The following document is the net result of this expanded response.

1.2 Purpose of Document

The purpose of this document is to inform regulators and their advisors of the challenges facing industry, as development programmes for Round 3 gather pace. It builds on previous consent experiences faced by industry in Rounds 1 and 2, and more recently uncertainties associated with the Round 3 consent process.

This document draws knowledge from projects located within English and Welsh territorial waters, but the lessons and future recommendations presented are equally applicable to Scottish territorial waters. It considers onshore activities associated with the export cable, cable route and connection to the National Grid; although not to the same extent as offshore activities, which is the primary focus of this document. A more comprehensive inclusion of onshore concerns could be a feature for any subsequent iteration and/or revision of this document.

Note that every attempt to capture the concerns and/or lessons learned from industry have been made through the activities of the RenewableUK ‘Consents and Licensing Group’. However, there may be other concerns that are emergent, commercially sensitive or not necessarily captured at the time of writing. Despite this, there is sufficient detail to profile these concerns with regulators and their advisors.

RenewableUK believe that sharing industry experience with regulators and their advisors will help build a better knowledge base that considers the practical and economic constraints experienced by industry. It is timely that developers and regulators

engage in a more meaningful way to balance statutory requirements with the practicalities of working in the marine environment. Only through open discussion between developers and regulators will more collaborative and creative approaches to offshore wind development be reached, thus ensuring practices remain responsible and sustainable. The industry welcomes the recently formed Offshore Renewable Energy Licensing Group as a suitable forum for taking forward the recommendations made in this report.

1.3 Structure of Report

The remainder of this document is set out in the following Chapters:

- **Chapter 2**
Past Concerns and Lessons Learned
- **Chapter 3**
Key Challenges Going Forward
- **Chapter 4**
Conclusion and Recommendation

1.4 Development of Offshore Wind in the UK

The UK's offshore wind industry has developed through a series of leasing Rounds managed by The Crown Estate (TCE).⁵ This approach has seen the industry (and associated technology) develop through an increase in the capacity (and therefore scale) of offshore wind farms, and an increase in the distance of wind farms from shore. In Round 1, launched in 2001, wind farms were located relatively close to shore in English or Welsh territorial waters and were generally small in scale. Similarly, Round 2 wind farms, released in 2003, were all within English and Welsh territorial waters, but were generally larger in scale and slightly further offshore. A later Scottish leasing Round (in 2009) contains projects similar in size to those in Round 2, but located within Scottish territorial waters.

In 2009, some projects in Rounds 1 and 2 were granted capacity extensions to their existing areas.⁶ In all cases, leases were granted for single⁷ projects. Also in 2009, four demonstration sites⁸ were awarded, where offshore wind technologies can be tested and proven prior to deployment further offshore.

TCE launched Round 3 at the end of 2009 and adopted a different approach through the award of nine offshore wind development Zones, rather than the award of individual development sites. Round 3 Zones are within the UK Renewable Energy Zone (REZ) and awarded to successful developers (including consortia) for the development of offshore wind projects. Within each of these Zones, the zone developers have identified a target capacity that will

(in the majority of cases) be developed through a number of individual projects. One of the main advantages to this approach is the ability of zone developers to have more control over the way in which areas of seabed are developed, and to allow them to plan wind farm developments more strategically. This should help to alleviate some of the consenting delays caused by cumulative effects of multiple projects in proximity to each other (e.g. Round 1 and Round 2 projects in the outer Wash) and ensure that stakeholder engagement is more inclusive.

Once a developer has obtained an agreement from the Crown Estate for the use of the seabed, the next step is for the developer to obtain consent.

2. Past Concerns and Lessons Learned

2.1 Introduction

The development of a wind industry in the marine environment has not been easy. In the decade since the commissioning of the first project off Blythe the industry has matured, moving from the demonstration Round 1 through to the commercial-scale Round 2, and is currently in the initial stages of development for its most ambitious Round to date (Round 3).

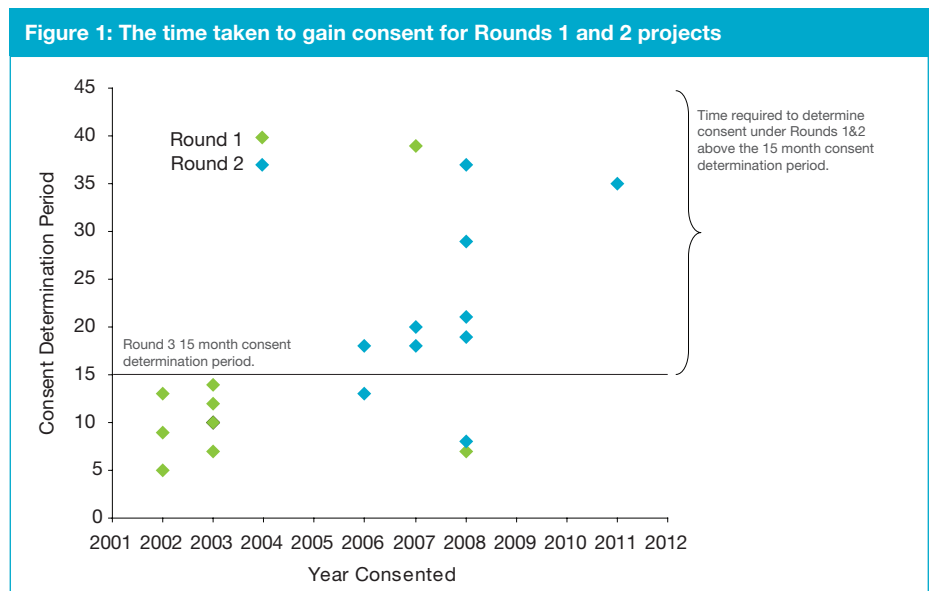
In this Chapter we review the consents gained over the last decade, identifying the key challenges and pulling out some lessons learned that will help inform the recommendations and suggestions we make for the future. We aim to answer the question, “What were the key issues delaying Rounds 1 and 2 and how were they mitigated?” The Chapter is split up into the following sections:

- Section 2.2: Review of Rounds 1 and 2 Consents – review of each project on a case-by-case basis, outlining the time taken to obtain consent and the key concerns
- Section 2.3: Key Concerns That Caused Delays In Consenting – summarises the key concerns drawn from Rounds 1 and 2
- Section 2.4: Lessons Learned – describes a number of lessons learned.

2.2 Review of Rounds 1 and 2 Consents

2.2.1 Introduction

The tables and graph show the amount of time taken for each project to gain consent, which is defined as the time taken between submission of an application to the relevant consenting body and the consent being granted. Such analysis does not take into account the large amount of time taken pre-



application to undertake environmental surveys and produce EIAs, and may mask different levels of engagement and effort put in by developers in this period. However, the figures provide a common measure that can be compared across projects.

As the determination period under the IPC and its successor are mooted to be 15 months, the tables have been split into projects that took less than 15 months to gain consent and those that took longer than 15 months. The mitigation requirements for projects were considered over and above those more commonly associated with other wind farm developments.

Figure 1 shows that the time taken to gain consent in Round 2 is significantly longer than under Round 1. The figure also shows that only one project has gained consent in the past three years which reduces confidence in the UK offshore wind industry.

2.2.2 Round 1

A total of thirteen out of fourteen projects were consented in less than fifteen months and the majority of these within one year.⁹ Of the initial sixteen sites leased by the Crown Estate, Tunes Plateau and Shell Flats were handed back before obtaining consent.

Despite variations in consenting periods, industry recognised that a number of concerns were repeatedly causing delays across projects, namely issues with birds, navigation and commercial fisheries. This recognition led to the formation of several important liaison groups such as COWRIE (discussed in Section 2.4.1).

Table 1: 'Round 1' project examples and consenting timescales, principal causes for delay and consenting requirements (including mitigation, monitoring, conditions etc) categorised by consenting timescales of less than or more than 15 months.

Project/ Owner	Size	Status	Consent-ing period (months)	Principal cause for delays in consenting	Consenting requirements
Barrow / DONG & Centrica	90	Operational	10	Navigation; Birds (common scoter); MOD; Commercial fishing	Standard suite of pre, during and post-construction surveys
Kentish Flats / Vattenfall	90	Operational	7	None	Seasonal restriction on installation of the export cables due to spawning herring; Seasonal restriction on piling between mid-Nov to mid-Mar to avoid disturbance to red-throated diver; Seasonal restriction on export cable landfall installation around high water during period Oct to Apr to avoid disturbance to wading birds
North Hoyle / RWE	60	Operational	5	None	Standard suite of pre, during and post-construction surveys
Rhyl Flats / RWE	90	Operational	9	None	Retrospective piling restriction Apr to mid-May for spawning Sole. Timing restriction on cabling from Oct-Mar for overwintering Scoter - timing restriction reduced to Jan-Mar based on bird monitoring evidence
Lynn & Inner Dowsing / Centrica & EIG	194.4	Operational	14	Birds (Appropriate Assessment for red-throated diver); Aviation (Radar)	Standard suite of pre, during and post-construction surveys
Scroby Sands / EON	60	Operational	13	None	Standard suite of pre, during and post-construction surveys
Robin Rigg / EON	180	Operational	12	No substantial delays but cross border issues (wind farm in Scotland, connection in England)	Robin Rigg Monitoring Group set up involving RSPB, SNH, Marine Scotland, etc and has undertaken, amongst others, migratory fish monitoring. Also condition that if 25 out of 60 turbines do not produce power for 6 months or more then the Scottish Government can ask the site to be decommissioned
Ormonde / Vattenfall	150	Construction	7 (plus 9 months for capacity increase)	Navigation (Search and Rescue); Birds (pink footed geese & whooper swans); Fish (salmon spawning); Underwater Noise (piling noise); Delays surrounding the application to upgrade the capacity to 150 MW.	Additional bird collision monitoring modelling. Acceptance of a 7 day operational shutdown condition in FEPA Licence during bird migration. This was rescinded in June 2010 following a protracted Appropriate Assessment
Gunfleet Sands 1 / DONG	108	Operational	10	PLA Radar update; Different consenting route (TWA)	Standard suite of pre, during and post-construction surveys
Burbo Bank / DONG	90	Operational	10	None	Standard suite of pre, during and post-construction surveys
Scarweather Sands	NA	Consented Handed back	12	Marine mammals (harbour porpoise); Visual impacts	N/A (project never built)
Cromer	NA	Consented Handed back	11	Fishing	N/A (project never built)
Teesside / EDF	62.1	Construction	39	Local Planning Authority requested a public inquiry, which resulted in consenting delays. The Secretary of State did not hold an inquiry but considered the 33 standing objections on visual impacts, birds, navigation, beach replenishment, regeneration of Redcar area, property prices, recreation and tourism, noise and release of contaminants from marine sediments.	Standard suite of pre, during and post-construction surveys. Stringent noise conditions for off-shore construction. No piling period July to mid September to avoid peak period of passage for Sandwich Terns.
Shell Flats	NA	Not consented Handed back	Not consented	Principle cause of delay was birds but ultimately it was military aviation (i.e. flying) that the project failed to resolve	Mitigation agreed for birds was to reduce the site footprint overlapping with the common scoter

2.2.3 Round 2

Round 2 wind farms have taken significantly longer to consent than Round 1, with only two projects out of fourteen consented in less than 15 months (see Table 2). The remainder of the projects have taken between nineteen and thirty-seven months to consent, with four projects still waiting final consent: Race Bank, Docking Shoal, Dudgeon, and Westernmost Rough.¹⁰

There are a number of reasons why Round 2 projects have taken so much longer to consent than Round 1 projects, which include:

- A larger spatial scale in Round 2.
- Less experience of potential impacts from Round 1 than was anticipated, in part resulting from construction delays.
- An increase in the number of European Protected sites since Round 1 leading to a greater

requirement for Appropriate Assessments.

- A greater requirement to consider the potential cumulative and in-combination impacts with other wind farms and users of the sea, leading to, for example, more complex Appropriate Assessment processes.

These factors are also likely to impact Round 3 consenting processes.

Table 2: 'Round 2' projects, consenting time scales, principal causes for delay and consenting requirements (including mitigation, monitoring, conditions etc) categorised by consenting time scales of less than or more than 15 months, as of Oct 1 2011.

Project	Size	Status	Consenting period (months)	Principal cause for delays in consenting	Consenting requirements
Thanet / Vattenfall	300	Operational	13	Fish (spawning); Aviation (Manston airport); Noise (fish & marine mammals); Birds (cumulative impacts on red throated diver);	Fish spawning restriction lifted following survey and modelling; New radar at Manston Airport; Intertidal installation restriction
Gunfleet Sands 2 / DONG	64.8	Operational	8	Birds (Appropriate Assessment for red-throated diver)	Standard suite of pre, during and post-construction surveys
Walney 1 and 2 / DONG	183.6 + 183.6	Operational and under construction	20	Birds (post-consent issues with the intertidal bird populations)	Required additional daily counts of intertidal birds with the risk that an AA would be required if an increase was seen in bird numbers. Surveys did not show a big increase so advice was withdrawn. But sudden concern from NE and the new data caused a lot of problems, uncertainty and money for Walney who had been preparing the work to be carried out in January/February
Sheringham Shoal / Scira	315	Construction	21	Aviation (NATS/cumulative Greater Wash issue); MOD (NATS/cumulative Greater Wash)	Impact on NATS mitigated through NERL solution and update of MoD radar at Trimmingham
Greater Gabbard / SSE & RWE	504	Construction	18	Spawning Fish (noise)	Timing restriction on piling (Feb to mid-May) and cable installation (Oct to Feb) for spawning fish
London Array / DONG, EON & Masdar	630	Construction	18	Birds (red-throated diver); Fish spawning (noise impacts); Commercial Fisheries compensation; Aviation compensation; Ancillary works	Two-phased approach to construction, to mitigate impacts on birds; timing constraints on installation of first 25km of export cable; re-design and development of construction protocol for onshore substation
Lincs / Centrica, DONG & Siemens	270	Construction	19	Birds (Appropriate Assessment for SPA/pink-footed geese); Benthic (Appropriate Assessment for SAC/ reefs & sandbanks) Marine Mammals (pSAC/grey seal); Aviation (NATS)	Additional collision risk modelling and assessment undertaken to inform regulators Appropriate Assessment; developer-funded technical solution to radar problem implemented by NATS; Further risk-based route selection work; timing restriction on cable installation from 15th May – 31st August within intertidal; agreements from local Port Authorities (burial depths) and fishermen

Continued...

Project	Size	Status	Consent-ing period (months)	Principal cause for delays in consenting	Consenting requirements
Gwynt y Mor / RWE, SWM & Siemens	576	Consented	37	Birds (common scoter, red throated diver, Liverpool Bay SPA); Visual Impacts relating to Tourism; Navigation (implementation of TSS)	Timing restrictions for cable laying and vessel routes to and from the windfarm and cable route during construction; specification of working corridor for cable laying to minimise disruption to scoter; piling restriction for fish spawning (sole season)
Humber Gateway / EON	300	Consented	35	Aviation (NATS/cumulative Greater Wash), MOD (NATS/cumulative Greater Wash)	Impact on NATS mitigated through NERL solution and update of MOD radar at Trimmingham
West of Duddon Sands / DONG & Scottish Power	389	Consented	29	Birds (pink footed geese and whooper swan), Commercial Shipping Objections	Birds – none, Fish – timing restriction; standard suite of pre and post construction monitoring
Race Bank / Centrica	620	Submitted	Awaiting consent (33 months)	Birds (SPA/sandwich terns, cumulative), Aviation (NATS/cumulative Greater Wash); MOD (cumulative Greater Wash)	Population Viability Analyses (PVA) undertaken in 2009 and revised in 2010 to inform Appropriate Assessment for terns. AA was contested by NE and JNCC. Developer has undertaken revision to PVA and collision risk modelling, with DECC re-undertaking Appropriate Assessment; impact on civilian radar mitigated through NERL solution; update of radar at Trimmingham undertaken with Greater Wash Developers to mitigate impact on MOD
Docking Shoal / Centrica	540	Submitted	Awaiting consent (34 months)	Birds (SPA/sandwich terns, cumulative), Aviation (NATS/cumulative Greater Wash); MOD (cumulative Greater Wash)	As per Race Bank
Dudgeon / Warwick Energy	560	Submitted	Awaiting consent (27 months)	Cumulative impact on Sandwich tern with (SS, RB, DS); MOD (cumulative); NATS (cumulative); AA / PVA still awaited; onshore substation	Impact on NATS mitigated through NERL solution and update of MOD radar at Trimmingham
West-ernmost Rough / DONG	240	Submitted	Awaiting consent (23 months)	Not available	Not available
Triton Knoll / RWE	1200	Consent application due end 2011	N/A	Birds (Gannet); NATS (cumulative Greater Wash); MOD (cumulative Greater Wash)	N/A (project not yet submitted)

2.3 Key Concerns that Caused Delays In Consent

Building on the key concerns causing consenting delays on a project specific basis, Table 3 provides a more in-depth account of the major concerns that affect offshore development.

Table 3: Major concerns identified in Rounds 1 and 2 that may affect future offshore wind development.

Area of Concern	Comments on the nature of Delay to Consent
Birds	Whilst a number of concerns regarding the potential impacts on birds are recognised, the key issues leading to consenting delays has largely been restricted to a small number of species associated with Special Protection Areas (SPAs). These include red-throated diver in the Thames, Sandwich tern and pink footed geese in the Wash and common scoter, pink footed geese and whooper swans in the Irish Sea. They are all sensitive to wind farm development and the issues surrounding cumulative impacts on these species have been particularly challenging. For example, in the Wash, Docking Shoal, Race Bank and Dudgeon projects have yet to receive consent due (in part) to changing stakeholder requirements and a lack of decision making ability in the ongoing cumulative assessments for Sandwich terns.
Nature Conservation Designations	In parallel with renewable targets, the UK Government has nature conservation targets to meet. The identification of potential Special Areas of Conservation (SACs) and Special Protected Areas (SPAs) has extended the consenting period for projects in both the Wash and North West. Furthermore, the 'higher bar' and evidence-base necessary to meet the requirements of Appropriate Assessment (AA) has had a negative impact on the consenting time scales for wind farm projects close to, or within cable routes passing through designated areas. In addition to this, in some cases, lack of clarity on conservation objectives and management measures hampered the assessment of the significance of impacts. Designated sites may also lead to more onerous requirements on pre-construction or O&M activities.
Ancillary Works and Consent	Ensuring the timely consent of an onshore substation has proven problematic for a number of projects including London Array and, very recently, Dudgeon. This has led to project-wide delays. There have been issues in obtaining minor consents (e.g. drill arisings) when existing consents could have been amended.
Stakeholder Resources	The lack of resources in key stakeholders has led to delays across projects through slow response times and decision making. There have also been examples of inconsistent responses from different statutory bodies.
Safety and Navigation	The increase in project size from Round 1 to Round 2 generated a number of safety and navigation concerns that led to delays in consenting. Examples include the requirement for implementation of a Traffic Separation Scheme (TSS) for vessels in Liverpool Bay and Search and Rescue (SAR) requirements more widely across the industry.
Aviation and Radar	Wind turbines can cause false returns on radar as the rotating blades can trigger the Doppler threshold of the Radar Data Processor and therefore may be interpreted as aircraft movements. This impact can affect all aviation radars (both civil and military). The issue is particularly sensitive offshore as degradation of Air Defence radars is considered (by MoD) as a national security concern. Mitigation is possible but expensive e.g. cumulative MoD radar issues in the Wash took 17 months of hard work to resolve and resulted in developers co-funding a new multi-million pound MoD radar. There are also challenges in dealing with bodies who hold monopoly positions.
Noise on Fish Spawning	The potential impact of piling noise on the spawning success of several noise-sensitive fish species of commercial or ecological value has led to delays in the consenting process. Delays were caused by the need to find agreement over seasonal piling restrictions. To achieve this, additional time and cost was invested by the industry to collect data to inform the extent of spawning seasons - a reduction in the restriction period by several months can save projects tens of millions.
Environmental Monitoring Requirements & Evidence Base of impact levels	Agreeing the scope for environmental monitoring programmes has contributed to delays for a number of projects. Furthermore, the practical difficulties in discharging licensed monitoring requirements, and scientific difficulties in detecting change in environmental receptors pre and post-construction has impacted on the production of an 'evidence base', which has led to delays for projects following, particularly under Round 2 where an increase in 'scientific certainty' in the results of impact assessments was required. This issue is considered in more detail later in this Chapter.
Landscape and visual impacts	Local opposition to visual impacts have delayed a number of projects including Gwynt y Mor , Teesside and Scarweather Sands. At Gwynt y Mor, issues related to the cumulative impacts of multiple wind farm developments on the North Wales coast resulting in a requirement for re-consideration of turbine layout and project extent. Concerns at Scarweather Sands led to a public inquiry.
Marine Mammals	Concerns over noise impacts on marine mammals resulted in license conditions which restricted the piling of foundations, including a requirement for a Marine Mammal Observer, soft start procedures and acoustic monitoring. Although no projects were delayed in Rounds 1 and 2 from this issue, it has the potential to result in serious delays in Round 3.
Impacts on other marine users	Delays have been caused over the need to reach agreement with other marine users, primarily fishing but also the oil and gas and telecoms sectors. On engagement with the fishing sector, there have been challenges in obtaining the ability to survey, agreement of disruption payments and conditions of access after the projects were built.. These issues may also occur post consent as on Lincs.

It is likely that in Round 3 all these issues will have to be resolved, along with many others.

2.4 Lesson Learned from Rounds 1 and 2

2.4.1 Collaborative Working

Despite these challenges, by working together collaboratively with stakeholders and regulators, the industry has managed to work through many of the challenges. This is arguably the key lesson from Rounds 1 and 2; that it doesn't matter how big the challenge may seem, by regulators, stakeholders and developers working together, almost

all of these issues can be overcome. The most notable initiatives are detailed below and include:

- Collaborative Offshore Wind Farm Research into the Environment (COWRIE).
- Nautical and Offshore Renewables Energy Liaison group (NOREL).
- Fishing Liaison with Offshore Wind and Wet Renewables group (FLOWW).
- Developers working groups.

By bringing regulators, stakeholders and developers into regular dialogue, understanding could be better improved, key issues identified and tackled, and opportunities for mutual benefits taken. This allows projects to be consented quicker, with greater buy-in from stakeholders and regulators. These forums (detailed in Table 4) continue, with the exception of COWRIE, and have also been joined by the Strategic Ornithological Support Service (SOSS) and The Crown Estate's 'Strategic Workstream' programme (see Section 3.1).

Table 4: Key collaborative work groups

Initiative	Description
COWRIE	<p>Established by TCE in February 2001 (and re-established as a charity in 2005) to answer a number of questions generic to the offshore wind industry, its mandate was to ensure the delivery of UK Government Renewable Energy targets.</p> <p>Through its working groups, COWRIE provided a unique opportunity for regulators and developers to come together in a forum to achieve consensus on questions addressed through focused environmental research. COWRIE has worked in collaboration with a number of different organisations to discuss issues and explore practical solutions and mitigation measures. Drawing on the best experts in their fields, it delivered results that have been peer reviewed and driven industry best practice.</p> <p>COWRIE's Environmental Working Group commissioned a remarkable number of guidance documents, best-practice standards (for survey and assessment) and priority research during its existence. Notable projects included:</p> <ul style="list-style-type: none"> • The creation of best-practice guidelines for boat-based and aerial platform bird surveys; • The collection of underwater noise data during piling; and • The measurements of electromagnetic fields from power cables <p>The outputs of many projects provided decision makers with the information they needed to allow the industry to move forward on a number of environmental concerns, not least, the potential impact of underwater noise generated during piling. Please see appendix A for full details of COWRIE studies.</p>
NOREL	<p>Established in 2005, its purpose was to act as an independent group involving Government, regulatory advisors, the offshore renewable industry (including wind, wave and tidal), ports interests, commercial shipping, recreational boating and dredging industries. Later the full range of the devolved administrations and their advisors became formal members of the group. Successes include:</p> <ul style="list-style-type: none"> • A study of the potential interference of offshore wind farms on navigational radar which was overseen by the Government and marine regulators and funded by Round 2 developers (BWEA, 2007). It concluded that while there were some impacts on different radar configurations, these were tolerable through existing management practices. • NOREL initiated the debate on safety protocols for Helicopter Search and Rescue (SAR) trials and supported work undertaken by the MCA in developing appropriate SAR procedures. Critically, turbine manufacturers were also involved in meetings with the MCA and regulators to discuss the possibility of a helicopter rescue from the nacelle of a turbine. This involved comparing helicopter performance with the technical specifications of a turbine.
FLOWW	<p>Established by the Department for Climate Change (then DTI) in 2002, its purpose was to help foster cooperation between the fishing industry, renewable energy industry and Government and to act as the focal point for all nationwide fishing and fisheries matters pertaining to the offshore renewables energy sector. Membership includes representatives from the fishing industry, renewable energy industry, regulators, the MMO, Marine Scotland, Sea Fisheries Committees, Cefas and MCA.</p> <p>Whilst FLOWW has produced a number of outputs that help the two industries to engage, the most important contribution has been the development of a set of common standards (BWEA Recommendations for Fisheries Liaison, 2004). These define how wind farm developers work with the fishing industry. FLOWW continues to provide support to the industry and is currently revising the Best Practice Guidance document to take account of Round 3 and the changed regulatory environment.</p>
Developer Working Groups	<p>These groups were established under Round 2 for each of the three Strategic Development Areas. The groups provided a forum for developers to work together on common issues including:</p> <ul style="list-style-type: none"> • Agreement, through workshop and report, with stakeholders of the scope of cumulative and in-combination assessments relevant to the different wind farm projects proposed for the Greater Wash Strategic Area; • Mitigating impacts on shipping and navigation stakeholders in the North West Strategic Area; and • Mitigating impacts on the Wash projects on Ministry of Defence and NATS radar in the Greater Wash.
Stakeholder Groups	<p>Establishment of stakeholder groups and open-working relationships for many projects, for example:</p> <ul style="list-style-type: none"> • Shell Flats and the Common Scoter – The developer worked with Wildfowl and Wetlands Trust who coordinated a regional multiyear survey campaign. Models of distribution and disturbance were created. A very detailed engagement with NE and RSPB over several years sought agreement on acceptable interaction rates and this was incorporated into a smaller relocated project which was acceptable to NE & RSPB. • West of Duddon Sands and Walney. The developers, recognising their sites were adjacent (a few meters apart) and working to similar time scales, worked jointly on the majority of surveys, assessments and meetings with statutory and non statutory consultees. This was primarily to save everyone duplicating time, effort and better facilitating the cumulative assessment and decision making process of the authorities. In terms of birds, navigational safety and landscape & visuals, the consultees and developers, found this a better use of their tight resources.
Consents & Licensing Group	<p>Creation of the RenewableUK Consents and Licensing Group in 2006 and participation by all in a number of cross-party workshops that have been held on the developing IPC process.</p>

2.4.2 Pre-consent – Lessons Learned

A number of lessons have emerged from Rounds 1 and 2 in relation to undertaking pre-consent activities that are applicable to addressing the future consenting concerns within industry. These relate to the assessment of impacts, site selection restrictions and stakeholder engagement, and are summarised in Table 5.

Table 5: Lessons learned from Rounds 1 and 2.

Subject Area	Lessons learned	Solution?
Cumulative impacts	This has been a major issue to the industry under Round 2 and affected consenting timeframes in the Wash, Irish Sea and Greater Thames strategic areas. Indeed, several projects in the Wash are still resolving potential cumulative issues for sandwich terns. Issues with Cumulative Impact Assessment (CIA) include the quality of data required across and between projects that often do not exist and a lack of experience base and guidance across all industries. CIA also requires coordination between developers/other industries, which can be challenging.	Discussed in section 3.5
Need for flexibility in consent	A number of projects were not able to be built because the consent granted was too narrow to allow the project to be financed. Narrow consent envelopes have also led to last minute license variations. On Lincs, considerable costs and delays were experienced in trying to transfer the consent of 6 turbines (which would have been built in the same place) from Lynn and Inner Dowsing to Lincs project teams.	Discussed in section 3.6
Importance of stakeholder resources and engagement	Development of an offshore wind farm requires engagement with a wide range of stakeholders who in turn have to try and marry often conflicting policies and regulations. Ensuring that these stakeholders have sufficient resource and understanding of the issues has been (and continues to be) challenging. Responses between different stakeholders have lacked consistency and practical experience of the industry and marine environment has often been lacking.	Ensure stakeholders have adequate resources and provide consistent decisions across the UK
Lack of flexibility in leasing sites	Lack of flexibility to move sites (beyond 40%) limited scope to meet stakeholder concerns.	Round 3 Zonal approach (see 3.1)
Collaborative Working Groups	Although collaborative working groups have helped the industry to consent projects, these groups could be further improved to help deliver Round 3 through more targeted objectives, better defined actions and performance monitoring.	Clearer measurable objectives

2.4.3 Post-Consent – Environmental Monitoring and Meeting Scientific Certainty

Earlier in this Chapter we identified that the agreement and discharge of environmental monitoring conditions was a key issue causing delays under Round 1 and 2. Initiatives such as COWRIE were instrumental in identifying gaps in monitoring requirements and producing the necessary guidance to enable developers to discharge those monitoring requirements. As a result, post-construction monitoring data from UK wind farms has been generating an impact assessment evidence base since 2006. This evidence base is important for a number of reasons including the potential to streamline and focus scientific and financial programmes associated with the mitigation and monitoring of wind farm projects, in addition to meeting the increasing requirement for scientific certainty over the effects of wind farms.

The “*Strategic Review of Offshore Wind Farm Monitoring Conditions Associated with FEPA Licences*” (Cefas 2010) commissioned by the Marine & Fisheries Agency (which proceeded the Marine Management Organisation) was therefore expected to impact significantly on the industry.

The report, authored by Cefas, Fera and SMRU Ltd aimed to collate and strategically review monitoring reports from ten UK wind farms. The aim of the review was to summarise the monitoring undertaken at each site, compare and contrast the monitoring and licence conditions between sites to distinguish between generic and site specific issues, identify comparability of data sets, to assess which conditions can be removed or require amendment, and where possible to forecast implications of identified effects for future Rounds of offshore wind farm development.

Ultimately, this desk-based review was a first step in providing recommendations and a framework for future monitoring, and it recommended that similar reviews be undertaken in the future as more data becomes available.

The Strategic Review concluded that insufficient evidence from post-construction monitoring programme exists to remove or relax many of the conditions placed on FEPA licences. This was partly an artefact of only having a full three year post-construction monitoring data set available from three wind farms at the time of undertaking the review. For the offshore wind industry, which has invested significant resources in the collection and analysis of data relating to the environmental effects of their projects, its findings pose potentially significant development constraints. In particular, it raised a concern that the tools and methods may not exist with which to practically and economically meet the level of scientific certainty expected by consultees to remove or relax conditions.

In response to industry feedback the Marine Management Organisation and Cefas proposed a tripartite discussion through a workshop between regulators, advisors and developers on how to improve monitoring strategies. Although the workshop was cancelled due to inclement weather, its purpose and the subsequent ‘discussion document’ produced as a substitute to the workshop were welcomed by the industry as a productive way forward on the issues raised by developers. Since then, there appears to have been relatively little progress towards improving the monitoring regime and more work needs to be done.

One of the key lessons to learn from Rounds 1 and 2 is that environmental monitoring of offshore wind farms is an opportunity to strengthen the evidence base for environmental impacts of offshore wind. It is essential that this opportunity is not wasted and that the data collected is used by developers and regulators to inform and streamline consenting processes for future offshore wind developments. Where possible, UK data should be combined with that of other countries to improve the evidence base.

3. Key Challenges Going Forward

3.1 Introduction

In order to consent Round 3 projects in a timely manner, all the challenges previously outlined will need to be overcome, and in addition to this many new challenges have been presented by the increased scale of Round 3 developments, increased distance from shore and ambitious development programmes. However, the offshore wind industry has already implemented a number of initiatives to tackle some of the lessons learned from Rounds 1 and 2. Some of these are outlined in Table 6.

Table 6: A number of Round 3 solutions developed from lessons learned from Rounds 1 and 2.

Initiative	Description
Zone approach to Round 3 (and implementation through ZAP)	The Zone approach to Round 3 under TCE has allowed developers to identify the most suitable locations within each Zone for project development. Although not suitable for all Zones, for those developers that use ZAP, it gives them the flexibility required to site projects using available Zone level data at the site-selection stage. Where there are multiple projects within a Zone, the Zonal approach also allows for better consideration of potential cumulative and in-combination impacts.
The Crown Estate Strategic Workstream Programme	The Crown Estate are investing £11m in a programme of projects to de-risk and accelerate the development of offshore wind in the UK by undertaking programme level actions to assist the activities of developers at project level. Five areas of need have been identified, which have translated into five strategic workstreams: Planning & Consenting, Supply Chain & Skills, Health & Safety, Project Economics & Finance, and Grid & Technology. Of particular relevance to this report is the Planning & Consenting workstream. A range of projects are currently underway – the details of some of these are below.
Strategic Ornithological Support Service (SOSS)	(Part of The Crown Estate’s strategic workstream) A group which brings together regulators, statutory advisors and developers to discuss and identify the main ornithological issues affecting the offshore wind farm consenting process. The group has a budget to commission pieces of work to address the issues identified.
Joint Cetacean Protocol (JCP)	(Part funded by The Crown Estate’s strategic workstream). The JCP is a project commended by the JNCC to draw together cetacean data from UK and European waters, and to analyse it to identify cetacean densities and changes in populations over time. This will be a useful tool for developers and statutory advisors in the assessment of impacts on cetaceans arising from offshore wind developments.
UK Fisheries Information Mapping project (UKFIM)	(Part of The Crown Estate’s strategic workstream) One of the concerns of both offshore wind developers and the fishing industry is that there is a lack of data on the areas in which fishing is important. The UKFIM project aims to address this by collecting data from fishing vessels around the UK to provide a robust overview of the areas where fishing is being undertaken. This will form an evidence base which has been agreed by fisheries stakeholders, and which will be useful to developers in their impact assessments.

Developers of Round 3 wind farms will also need to adapt to a new consenting landscape.

The Planning Act 2008 made a number of significant changes to the consenting of offshore wind farms in England and Wales of 100MW or more. These included the creation of the Infrastructure Planning Commission (IPC), and the requirement to apply for a single Development Consent Order (DCO) for the offshore wind development. The Planning Act also provided for the creation of National Policy Statements which make a clear statement of need for renewable energy development. The decision making period under the Planning Act is 12 months (or 15 months where National Policy Statements have not been designated).

The Localism Bill, introduced by the new coalition Government, will remove the IPC and return the decision making power to the Secretary of State. The IPC will be replaced by a National Infrastructure Directorate within a newly re-structured Planning Inspectorate (PINS), with the decision making period remaining at 15 months. In Scottish waters, Marine Scotland determines consent applications.

Experience from Rounds 1 and 2 suggest that meeting this 15 month target will be challenging and to ensure that it's achieved the IPC has put a strong focus on pre-application, with the expectation that the developer will resolve almost all issues on the development in advance of an application for consent.

The industry welcomes this approach and recognises its potential benefits, namely:

- A more efficient consent determination period.
- An opportunity to capture issues raised by stakeholders early in the pre-consent process and so provision adequately within the EIA and Engineering programmes.

- Assign an appropriate level of risk and better understanding of pre-consent uncertainty.
- An opportunity to account for a more realistic forecast of budget profiles for investors.

At the same time, the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010 have led to the replacement of the long standing FEPA and CPA licences with a new marine licence issued by the MMO in England and Wales, and Marine Scotland in Scotland. The MMO and Marine Scotland also have marine planning responsibilities, which will form the context for the marine licensing process. The MMO have already initiated a programme of Marine Spatial Planning that will deliver marine plans for the East Inshore and Offshore areas by 2012. The MMO also has a key role in the IPC process, drafting and signing off deemed marine licences, acting as a key consultee, and regulating and enforcing development.

The development process for offshore wind has also changed with the advent of Round 3 and the Zonal approach. This has, in part, been designed to overcome some of the issues faced in Rounds 1 and 2 in terms of inflexible site boundaries and cumulative impacts. However, challenges remain over the implementation of these new systems.

In addition to changes in the planning system there are also concerns surrounding Marine Conservation Zones and new marine policies such as the Marine Strategy Framework Directive, the requirement for significant trans-boundary consultation and the potential for greater conflict with both existing industries such as oil and gas, telecoms and fishing, and new ones such as CCS and gas storage.

This Chapter pulls out a number of key challenges that face developers in relation to STW, Round 2.5 and Round

3. This document is not expected to answer all of the questions posed by future developments, but aims to offer suggestions and discussion points that regulators, stakeholders and the industry can helpfully discuss, in the spirit of collaborative working (built up in the earlier Rounds) to allow a more, timely effective consenting process.

Key challenges:

- Adaptation to a new consenting system and regulatory environment.
- Difficulty of data collection for large areas far offshore.
- Uncertainties in the assessment of environmental impacts.
- Cumulative impacts.
- Obtaining a flexible consent and the Project Envelope.
- Designing Effective Monitoring Programmes.

3.2 Adapting to the New Consenting System and Regulatory Environment

The Planning Act introduced significant changes to the way projects are consented. This offers the potential for delay because a detailed understanding of all the key processes and caveats to any system is required from developers, stakeholders and regulators. New processes take time to bed in, and developers are uncertain as to what will constitute compliance under the new

system. Although much work can be done up-front, and some experience can be gained from other sectors, often the pressure points in a system only emerge once the system is tested in reality. This has yet to happen for offshore wind in the IPC system and Marine Scotland has only recently had their first application under the new system from the AREG site.

A number of concerns with the IPC system have emerged, detailed in the table below. It is not entirely clear at this stage which of the following concerns is simply a result of the lack of applications having gone to the IPC and how many are more serious intractable problems with the IPC process.

Table 7: Key Concerns with the New Consenting System

Concern	Description
Consent flexibility and the challenge of varying consents and applications once submitted	(see section 3.6)
Testing of compliance pre-consent and the lack of project specific guidance pre-application	Although the IPC has produced a number of guidance notes, and the IPC will give advice on the process, this often refers applicants back to the Planning Act, or to the way in which the DCO is drafted, and there remains a level of ambiguity as to whether developers are on the right track. Developers would welcome a stronger steer from the IPC on what is or is not acceptable. In addition, the inability of the examining commissioner to discuss the project in the pre-application phase may mean that projects are considered differently pre and post application.
Difficulty of resolving all issues pre-application and deciding when to submit	Under the Planning Act there is an expectation that developers will resolve as many issues as possible in the pre-application phase. However, in reality this will not always be possible and it is not clear how the IPC will deal with unresolved objections. Without precedent or project specific guidance it is very challenging knowing whether to submit an application with unresolved objections or to continue working to resolve the issue. Significant delays in submitting an application to the IPC could risk undermining the validity of the public consultation.
Stakeholder resources	The large amount of pre-application work involved in the IPC process is putting a strain on the resources of already stretched statutory advisors.
HRA Process	There are concerns whether an Appropriate Assessment can be completed in the IPC determination period, particularly given the lack of involvement by the IPC pre-application and difficulties over the interpretation of data.
Understanding new terms and processes	The IPC system has also brought in a raft of new terms including Preliminary Environmental Information, Statement of Community Consultation and various publication and notification stages under Section 42 of the Planning Act. Ensuring that developers and stakeholders understand exactly what is required and how they should respond to each of these new concepts takes time.
Understanding the implications of the new marine licenses	The new Marine Licence covers the lifetime of the project (as opposed to depositional activity under FEPA), with developers holding existing FEPA licenses being asked to apply for a new marine license to cover O+M activities. This causes delay. The Marine and Coastal Access Act has also brought in new requirements to obtain a license for grab sampling and greater listing of vessels on licenses.
Transitional Arrangements	A further concern with the upcoming move to the Planning Inspectorate is the transitional arrangements. This is welcomed by developers but transitional arrangements still remain relatively vague and the impacts may be potentially different (i.e. in terms of 'conditions', timing, pre-consent requirements, fees and potentially conflicting advice). On the other hand, a seamless transition will promote confidence within the offshore wind industry and reduce risks.

Recommendations:

- Clearer guidance from regulators on pre-application requirements, and more effective sharing of 'lessons learned' between developers.
- Ensure that there is clear understanding between developers and regulators over the way in which offshore wind projects develop and the way in which they are assessed – for example the use of the precautionary principle and the project envelope.
- Ensure transitional arrangements (from IPC to National Infrastructure Directorate) do not cause delays to determination of applications.
- Consider whether the Examining Commissioner can begin to engage with the development pre-application.
- Consider whether the IPC could provide a stronger steer to applicants pre-application to ensure that developers know they are on the right track.

3.3 Difficulty of Data Collection for Large Areas Far Offshore

Data is critical for a range of activities when developing an offshore wind farm, including siting the wind farm in the best place and optimising the layout. The collection of environmental information is also an essential first step in identifying sensitive receptors and potential environmental impacts arising from a proposed project. Generally, this baseline information is compiled from a combination of desk study and survey work, and their methodologies informed and advised on by regulators and stakeholders throughout pre-consent.

For Round 3, wind farm developments are further offshore and will have less 'desk study' information available, although the knowledge base will gradually increase as multiple projects are developed in the future. Offshore, survey work becomes more costly, more time consuming and risky from a Health and Safety perspective. These difficulties are compounded by the increased scale of these offshore wind farm developments.

Table 8 details a number of constraints associated with the collection of data in the marine environment. This is not to say that these issues can not be managed, just to highlight the difficulties developers face in collecting data in the marine environment.

The constraints imply that it is challenging to achieve a 'scientifically robust' baseline within the limitations of time and budget, particularly as wind farm areas become larger and further offshore. There is a clear need to ensure that data collected is sufficient, but it is important for regulators and their advisors to understand the constraints on the collection of a "gold standard" data set.

The industry has also struggled somewhat from the lack of detailed survey guidelines in existing guidance, which may mean that developers do not undertake surveys as effectively as possible. On the other hand, environmental survey work needs to remain achievable and there is a need to avoid over prescriptive, not fit-for-purpose and costly methodologies. The offshore wind industry welcomes the forthcoming CEFAS guidance on "Data Collection Methodologies".

A number of new survey techniques have been developed to take account of these difficulties, some with greater success than others, and a related challenge has been approving these

Table 8: Constraints in collecting data in the marine environment.

Limitation	Implication
Area Offshore wind farms cover large areas of sea and as the size and number of offshore wind farm projects increases, the areas covered will increase further.	<ul style="list-style-type: none"> The ability of a survey to achieve a detailed spatial resolution is limited. The ability of a survey to achieve detailed temporal resolution is limited by the area that boats must cover in the time available (i.e. it is not possible to have a 'snapshot in time' for receptors such as birds or marine mammals).
Distance from shore Steaming time to and from site must be factored into survey programmes. As offshore wind developments move further offshore, this time will increase.	<ul style="list-style-type: none"> The amount of time available to undertake a survey may be limited by the amount of fuel carried on the boat. The amount of time available to undertake a survey may be limited by the requirement to work in daylight.
Weather Survey vessels working offshore are limited to periods of suitable weather/ sea state. The suitability of weather windows differs between different types of survey.	<ul style="list-style-type: none"> The ability of a monitoring programme to achieve consistently spaced sampling periods is limited. The ability of a monitoring programme to collect data across all seasons is limited. The ability to use certain equipment/survey techniques consistently may be limited (e.g. hard to get a consistent stable platform for radar studies offshore).
Health & Safety The safety of personnel working offshore and undertaking surveys is paramount. This links to the weather conditions and time periods over which surveys can be undertaken, and also to the availability of suitable vessels to undertake the surveys. This issue is exacerbated for wind farm sites further offshore.	<ul style="list-style-type: none"> Health and Safety considerations contribute to the weather limitations (as above). Surveys must be undertaken on suitable vessels, and the availability of these vessels may be limited. The working hours of surveyors must be within acceptable limits – this means that for large sites it will take longer to survey them and the area limitations (as above) become relevant. Incidents at sea (such as seasickness, injury or loss of equipment) may result in a loss of survey time or the abandonment of a survey.
Cost Survey work is expensive to undertake and the bottom line is that offshore wind developers are constrained by the twin requirements to make projects economically viable and for the projects to achieve a sensible cost of energy.	<ul style="list-style-type: none"> Economically, developers are not able to undertake unlimited numbers of surveys or to carry out unlimited analyses of data. Time at sea is one of the most expensive elements in a monitoring programme, and this will limit the number and length of surveys which are possible. The ability of developers to undertake longer term and/or more frequent surveying is constrained.
Supply Chain The supply chain may not be able to cope with the increased survey demand for Round 3.	<ul style="list-style-type: none"> With more man hours required every year, there are a limited number of experienced survey companies and freelance personnel to undertake surveys. Increased competition with Oil & Gas service companies which were not so apparent in Rounds 1 and 2.

new techniques for use with regulators. COWRIE, mentioned earlier, had a key role to play in this but with its demise there may be a need for new approval schemes to be developed.

Recommendations:

- Improved data collection guidance in collaboration with industry.
- A more pragmatic approach to data and data collection – targeted to specific consenting requirements

- Discussion and acceptance of novel survey technologies.
- Clarity from regulators and stakeholders on the meaning of "scientifically robust" data for stages of development and sensitive receptors.
- More effective scoping of issues to allow better targeted data collection programmes.

3.4 The Difficulty of Assessing Environmental Impacts

In order to develop an offshore wind farm you need to complete an environmental impact assessment for the project, in which you assess, against a baseline, the potential impact of the project. You can then assess the significance of this impact by assessing the magnitude of the impact and the probability of it occurring. This requires various judgements to be made (on the baseline, impact and significance) on the basis of the best available data, which as we saw in the previous chapter is challenging to obtain. Given imperfect information, two approaches are possible. The first is a precautionary approach, the second a risk based approach, with the debate between the two fiercely contested between regulators and developers.

Ecosystem health is characterised by a whole range of criteria and populations are highly mobile and geographically disperse. This means that there are uncertainties over baseline definition and sometimes a lack of evidence to support predictions about potential effects. This uncertainty combined with the picture emerging from operating wind farms, which suggests that offshore wind is unlikely to cause a significant impact for many receptors, leaves us trying to detect a relatively small change in a highly variable environment. Limited stakeholder resources can also make the assessment of impacts difficult.

In response to these uncertainties, regulators have traditionally taken a precautionary approach. This leaves developers to take costly surveys and data analysis, when the risk of a significant impact is relatively small. For example, the impact predicted on a receptor could be 0.01%, but the issue is discussed as if the impact is 30%. A more risk based approach, where the probability of significant impacts is accepted to be sufficiently low, will ensure development is more pragmatic and save time and resources for everyone. It will also avoid the challenge of having to demonstrate “no significant impact on the environment” that can never be proven. At the same time, more weight should be placed upon the growing body of evidence that shows no evidence of a gross effect (see Section 3.6).

Regulators have also failed to take into account the large potential environmental benefits from offshore wind through climate change mitigation.

Instead, they restrict development on the grounds of the potential risk to one particular species. Without effective mitigation, climate change may cause geographical shifts in the location of habitats and species covered by Habitats Regulations. An acceptance from regulators and governments that offshore wind is essentially “good” for the environment would allow developers to maximise the positives and gain consent quicker; provided this is taken in an environmentally responsible manner. In addition, the recently adopted National Policy Statement on Energy provides the policy context and national need for offshore wind.

Recommendations:

- Adoption of a more pragmatic, risk-based approach to the assessment of impacts and significance.
- Consideration of the wider environmental benefits of offshore wind when considering the risk to one particular species or receptor.
- More effective use of Scoping to allow better consideration of potentially significant impacts.
- Consideration of the use of indicator species and other measures of change to replace or complement current practices to evaluate change and impact.
- Ensure that stakeholder requirements are clearly defined up-front.
- Provision of better guidance on the assessment of impacts for different receptors.

3.5 Cumulative Impacts

One of the main challenges facing offshore wind farm developers, regulators and environmental practitioners is how best to undertake Cumulative Impact Assessment (CIA) of major offshore developments. The Humber Gateway, for example, was delayed by 35 months due to cumulative impacts from aviation and MoD issues. In addition, over 1.5GW of projects (Race Bank, Docking Shoal and Dudgeon) are still waiting for consent after more than 27 months delay, due in part to cumulative impacts from birds (SPA/sandwich terns). It is imperative that the new planning process recognises that these types of delays are unacceptable and detrimental to the achievement of the National Renewable Energy targets enshrined in National Policies.

For the larger Round 3 the potential scale of cumulative effects is greater. However, the Zonal approach has given developers more control over the assessment and management of cumulative effects within a Zone, enhancing the previously accepted

building block approach that was accepted for Round 2 projects.

In many cases, cumulative effects will not be restricted to within Zones (intra-Zone) but may occur between Zones (inter-Zone) requiring developers to work together closely in their assessment and management. This is already starting to happen with Forth and Tay Developers Group (FATDOG) and the Southern North Sea Offshore Wind Forum (SNSOWF). For Round 3, the impact assessment of cumulative effects is expected to be informed by the ZAP process.

Failure to address cumulative effects adequately, at these scales, has the potential to result in delays to development. Key areas of delay may occur:

- Through an inability to resolve issues during pre-application.
- Due to regulator uncertainty over subsequent projects.

Ultimately, such delays pose significant risk of projects being reduced in size or refused consent. Both developers and regulators are aware of the potential for

cumulative effects to restrict projects, yet there remain a number of areas of uncertainty over the most effective ways of assessing and managing these effects. It is imperative that these uncertainties are openly discussed and addressed if offshore wind development is to be successful.

Drawing on lessons learned from previous Rounds, a number of limitations have been identified regarding cumulative impact assessments for Round 3 (Table 9).

Recommendations:

- Encourage open, early and frank dialogue between regulators, stakeholders and developers.
- Develop improved guidance with standard terminology.
- Encourage and develop the use of ZAP to facilitate cumulative impact appraisal within and between Zones.
- For the selection of Zone layout options under ZAP, it might be more pragmatic to undertake a high-level cumulative 'appraisal' rather than an 'assessment' in the early stages of development – simply because data limitations are considered the major driver for this approach.

Table 9: The limitations and implication of Cumulative Impact Assessment (CIA).

Limitation	Implication
Cumulative effects and their assessment methodologies still remain unclear for many receptors and better guidance is needed.	<ul style="list-style-type: none"> • Greater diversity and inconsistency of methods used to undertaken cumulative assessments potentially makes decision-making by regulators and statutory advisors more onerous. • Recognised that COWRIE guidance on birds, published in 2009, does provide methods/techniques for CIA, but recognise the importance of scoping to ensuring a robust assessment and the need for clearer guidelines. • It is still unclear how the IPC and MMO will treat the issue of uncertainty when it comes to the complexities of cumulative impacts within and between Zones.
Round 3 projects are far bigger than previous offshore wind projects and have a much larger scope for assessing cumulative effects at EIA, Zone, between Zone and transboundary scales.	<ul style="list-style-type: none"> • Dealing with uncertainties at a larger spatial and temporal scales will require an integrated and evidence-based approach that builds on allegiances between Zone operators (where appropriate). • Scale choice can have important repercussions for the accuracy of any impact assessment, which can be made more serious if not clearly stated. • The crucial stage to determine scale is the scoping study. It is recognised that the choice of an appropriate scale is very circumstantial and depends on many factors such as the type and size of project or plan, the processes being studied, and how heterogeneous or homogeneous the spatial setting is. • Scale issues are likely to affect CIA by influencing the type of impacts found, their magnitude and significance, and the type of mitigation measures recommended.
Using standardised terminology that is consistent with legislation and guidance will aid in understanding and disseminating findings to stakeholders and regulators, but as yet there are no universally accepted standards.	<ul style="list-style-type: none"> • Where terminology differs and/or assessment methods introduce new terms they should be clearly defined and standardised with other developers and/or agreed upon with regulators (where practical) to avoid confusion and inconsistency in decision-making.
Clear definition of the objectives of CIA.	<ul style="list-style-type: none"> • In the early stages of development it is difficult to undertake a detailed cumulative impact assessment due to the uncertainties and available information about potential future projects • Assessing cumulative effects at Zone and between Zone will significantly change over time as more data becomes available, greater experience is gained and levels of uncertainty better understood.
Stakeholder resources	<ul style="list-style-type: none"> • The assessment of cumulative/in-combination effects is still unclear and implementing appropriate methodologies potentially complex - leading to an underestimate of the resources needed by regulators and their statutory advisors to interpret findings

3.6 Obtaining a Flexible Consent and the Project Envelope

The offshore wind industry and its associated offshore and onshore development has a fundamental need for flexibility in key aspects of each project, which is inextricably linked to the ability to bring projects to ultimate delivery.

The Project or Rochdale Envelope approach - whereby the developer assesses the likely significant worst case for each receptor, and then builds out the project within the bounds of this envelope - provides this flexibility.

The approach is essential for the development of viable offshore wind farms as it allows developers to optimise the project post consent, maximising the value of the project to investors and taking account of rapid technological change, within the bounds assessed and imposed by a valid consent. It ensures a low cost of energy and acceptability of renewable electricity costs within the energy market.

Through the publication of Advice Note 9 (*Using the Rochdale Envelope*), the IPC has given a clear signal that, in their view, promoters need to consider the implications of flexibility in their consent to a greater extent than was the case under the previous Section 36 (of the Electricity Act) regime. The Note also identifies that a Rochdale approach 'may be useful' for some applications. However, the industry believes it is absolutely essential for larger offshore wind farm schemes to ensure that a viable 'scheme' exists. Without the ability to implement flexibility in its offshore turbines, foundations and layout, a project may simply become unviable as a consented 'scheme'.

The scale of larger Round 2 and Round 3 offshore wind projects is such that investment is required at a level equivalent to other large scale energy generating projects, inevitably requiring multi-billion pounds of capital investment. At this scale of investment the UK's energy portfolio is competing in a European and world market to attract finance to ensure that projects are continued through to delivery. To secure external investment, offshore wind projects typically need to demonstrate sufficient IRR (Internal Rate of Return) and NPV (Net Present Value). Furthermore, sufficiently high IRR's and mitigation of other project risks need to be demonstrated to investors to allow such projects to capture investment. It is therefore essential to maximise the

opportunities and potential to attract external investment post-consent where it may be required to ensure the delivery of larger offshore wind projects.

Inherent in maximising the IRR and NPV and reducing financial risk of projects is the need to achieve the following:

- The ability to optimise projects post-consent to address short-term variation in costs and availability associated with turbines, foundations and construction plant.
- An essential need to maintain competitive market behaviour in key supply chain areas.
- The potential to accommodate technology development and advancements.

The long time scale between consent application and construction means that changes in techniques or novel methods might develop that were not foreseen at the time of application and the rate of technological change in turbine technology, foundation types and electrical systems design is very rapid. For instance, eight years ago the 2MW turbine with a 80m rotor diameter was the industry standard, evolving to a 3MW 90m rotor five years ago. Currently, the 3.6MW turbine with a 107m rotor diameter is the market leader, although the 125m rotor 5MW class turbine is now being deployed in UK waters, with 7MW class turbines soon to be entering the market. As projects move further offshore and into deeper water, further uncertainties in chosen final design will increase.

Where flexibility is proposed, the Environmental Statement (ES) will need to demonstrate that the potential variants permitted within the consent parameters do not result in greater likely significant effects than those assessed. Furthermore, although the focus is on likely significant effects, greater scrutiny should be placed on flexibility in areas resulting in moderate or major adverse impacts in the ES and high likelihood scenarios.

The industry welcomes the IPC's guidance note 9 (*Using the Rochdale Envelope*) although there remains uncertainty over:

- How big an envelope is acceptable i.e. how much uncertainty is considered acceptable given the many engineering challenges and emerging new wind turbine technologies facing the larger and more offshore projects?
- How effective this concept can be communicated to stakeholders that ensures the environmental effects of

the eventual project are fully assessed during pre-consent and consent determination.

Narrow consent conditions and project envelopes have also meant that developers have requested variations to licenses, often at the last minute, which takes time, resources and can increase cost. This is in part due to a lack of direct offshore engineering and construction experience being considered at the application stage by developers of the earlier projects, but the potential for last minute variations should be considered when pushing for narrow project envelopes. The extremely rigorous variation requirements under the IPC, where any non-material change requires almost a completely new application and consultation, further emphasises the need for wide envelopes to capture almost all scenarios. Time scales associated with making a simple variation should be proportional to the change. It is interesting to contrast the new UK approach, where it is very difficult to vary licenses (which in part supports the use of Project Envelopes) and Germany, where developers are granted a narrow consent but are able to vary them relatively easily.

A further lesson from earlier Rounds is that post consent requirements including Grampian conditions - a condition that prevents the start of the development until off-site works have been completed on land not controlled by the applicant - can be extremely difficult to discharge. Consents should close out issues, where possible, rather than leaving opportunities for further debate. This means that projects take longer to move from consent to construction, increasing cost. Although the IPC has stated that it wants to move away from Grampian conditions, this may be impossible to do completely.

Recommendations:

- Work with regulators to provide clarity on the acceptable size of a project envelope.
- Ensure that the constraints on developers which lead to the requirement for a project envelope are clearly communicated during the consenting process.
- Explore the best ways of presenting and assessing the environmental impacts of a project envelope and develop best practice guidance.
- Develop techniques for effective consultation on project envelopes as part of the pre-application process.
- Allow greater variation or less onerous requirements to vary post consent.

3.7 Designing Effective Monitoring Programmes

In order to gain consent, an environmental monitoring plan needs to be developed. As we saw in Chapter 2, this has delayed projects and the output of which has been relatively unsuccessful at reducing monitoring requirements on offshore wind farms. This Chapter reviews the background, purpose and limitations of monitoring before recommending some points to discuss moving forward.

Since the first offshore wind projects, environmental monitoring requirements have been placed on offshore wind farm projects through FEPA licences. The monitoring programmes have been wide-ranging in scope, and included pre and post-construction monitoring requirements to validate predictions reported in the Environmental Statement, as well as attempting to better understand the environmental impacts of offshore wind projects. Generally, these programmes have lasted for three years post-construction and monitoring reports provided to regulators at regular intervals throughout this period.

Under FEPA (now transferred to the new Marine Licence under the MMO), a significant amount of monitoring data from offshore wind projects has been collected over the last decade. This has required developers to plan and manage surveys and to report on findings, adding considerable cost to the overall development of offshore wind projects. This has implications for the economic viability of these projects when considered alongside other constraints and the eventual cost of energy they produce. Developers often get the impression that they are collecting data for the sake of it, with no clear benefit to monitoring.

As previously stated in Chapter 1, the industry is concerned over the conclusions drawn by CEFAS' recent "Strategic Review of Offshore Wind Farm Monitoring Conditions Associated with FEPA Licences", which indicates that despite a decade of monitoring there is little advancement in understanding the environmental effects of offshore wind projects or knowledge transfer among the statutory consultees. Moreover, there is presently no basis for relaxation of the majority of monitoring requirements on offshore wind farms. This outcome is disappointing for both regulators seeking more information

to reduce the precautionary approach to consenting offshore wind projects, and for developers seeking to reduce the level of monitoring required on their sites.

All sides of the debate acknowledge that the monitoring programme has not been as successful as it should have been and the challenge is now to design a monitoring programme which is fit for purpose for offshore wind projects.

Purpose of Monitoring Programmes

Without a clear understanding of the monitoring objectives, it is not possible to design appropriate data collection programmes, and so the greater risk that the distinction between monitoring and primary research will become blurred. It is also important to consider whether monitoring is needed at all based upon the significance of impacts predicted in the Environmental Statement.

It is clear that there are significant strategic long-term benefits to both developers and regulators in designing and implementing monitoring programmes which deliver the required objectives. Good monitoring programmes delivered across numerous projects will deliver advancement in the understanding of the environmental effects of offshore wind farms and enable developers and regulators to have more certainty in their assessments of future projects. Moreover, it will facilitate a more streamlined consenting process for both developers and regulators with a reduced burden of enforcement and analysis post-consent. Advancement of understanding will also assist developers in designing projects with lower impacts on the environment and in guiding and informing the EIA process.

It is important, however, that monitoring objectives for individual projects are also clearly defined. These objectives are rooted in the FEPA/Marine Licence conditions for specific sites. They have the primary function of testing and validating the predictions made in the ES and will be tailored to the nature of each site and its specific issues. The design of these objectives needs to focus on sites that do not replicate work reported in the ES, but seek to answer the specific issues identified within the EIA process.

The responsibility for undertaking 'primary research' into the environmental effects of offshore wind does not rest with individual developers, and the monitoring programmes for individual sites should reflect this. However,

information provided from the monitoring of individual sites can be built up into a wider picture by the regulator, who has an overview of the monitoring being undertaken and can benefit from this strategic perspective.

Practicalities and Possibilities within Monitoring Programmes

The design of any monitoring programme needs to take into account the questions that need to be answered, the nature of the data required to answer the questions and the way in which the data can be analysed to answer the questions. In a scientific context, such a monitoring programme will have a clear objective and be detailed (both temporally and spatially), statistically robust and designed to provide a high level of certainty in the outcome. However, as we have seen whenever we collect data in the marine environment, there are a number of limiting factors that need to be taken into account. In addition to the limitations detailed in table 9, it is difficult to achieve good temporal resolution of effects on receptors within the (often three year) constraints of a marine licence monitoring programme. These factors limit what is possible in terms of monitoring offshore projects. Limitations will be represented within the design of the monitoring programme and the nature of the data collected. It is important for both regulators and developers to accept these limitations and work within them to achieve acceptable results. This may not result in the same level of certainty that could be achieved from a dedicated research programme. However, the primary purpose of monitoring is not to undertake scientific research but to validate predictions reported in the ES.

Recommendations:

As outlined above, the offshore wind industry recognises its responsibility to undertake monitoring, and is keen to ensure that the full value and benefit of monitoring programmes is achieved. Within the objectives of the monitoring of individual sites, the industry believes that it is possible to achieve the wider benefits of increasing regulator and developer understanding of the environmental effects of offshore wind farms, and provide the regulator more confidence that sufficient control are placed on a project via the consent conditions. The suggestions in this section are aimed at achieving this balance.

3.7.1 Clarification of the Requirements and Outputs of Monitoring Programmes

- Provide clarity on which governmental bodies and NGOs should be involved in agreeing individual site-specific monitoring requirements.
- Undertake a back-to-basics review of what monitoring should be delivering in terms of regulatory compliance, and build up from this baseline to ensure compliance and efficiency. It would be possible to draw on lessons learned from other EU member states in this review, in order to understand how they have addressed the issues of compliance with EIA and Habitats/Birds Directives in the consenting and monitoring of offshore wind projects.
- Recording impact: it is a fundamental tenet of science that a hypothesis of 'no significant effect on the environment' cannot be proven. However, it should be accepted that there is value in the collection of data which fails to disprove such a hypothesis, and that over time continual failures to disprove it builds into more certainty that the hypothesis is correct. On this basis, data already collected from monitoring programmes should be re-evaluated for evidence of gross effect, and where none is found this should contribute to the regulators' comprehension regarding assessment of significance of effects.
- Post-construction monitoring requirements and consent conditions need to be clearly worded. Previous FEPA licenses have created ambiguity over surveys required, methodology, frequency and duration.
- Discussions between developers and regulators about what is and what isn't practical in terms of data collection in the marine environment. This should lead to the definition of an acceptable evidence base, and would allow developers and regulators to work towards achieving this evidence base by setting markers/co-designing studies. This will help to ensure that time and money are not wasted in collecting data that is no use to developers or regulators in helping to bring clarity on environmental effects of offshore wind, or that relates to monitoring of implicitly benign environmental effects.
- Allow design of monitoring programmes that are focused on specific findings of the Environmental Statement, and work towards a situation where monitoring consistently relates to specific risks and is proportionate to the perceived risk, rather than applying a more general broad-brush approach with generic conditions set. Allow scoping out of issues from the monitoring programme where possible.

- Knowledge base: Recognition of the value that developers bring in terms of time and money invested in understanding effects on the marine environment, and a commitment from regulators on the need to reduce the burden on developers as this becomes possible. This should include the development of a clear roadmap for reducing the level of precaution applied to project assessments and monitoring programmes as the level of understanding of the environmental effects of offshore wind increases. This would allow a balance to be struck between what is necessary monitoring versus what is desirable monitoring.

3.7.2 Ensuring that Monitoring Delivers Site-specific and Strategic Objectives

- Monitoring programmes should be designed to clearly link pre- and post-construction monitoring (in terms of aims/objectives/methodologies) to ensure full value is realised. Ideally monitoring should be seen as a stage in the continuum of monitoring that commenced with EIA. Surveys should be designed to collect data that is suitable for answering the specific issues raised within the Environmental Statement.
- Regulators should take a role in the coordination of this at strategic level to ensure link-up between site-specific monitoring programmes and the delivery of the overall strategic objectives of monitoring programmes.
- Explore models for regional (or zone level) monitoring programmes to deliver data at more meaningful temporal/spatial scales. Encourage developers to work together (where possible) to join up data collection programmes, share data and add value.
- Development of a programme between the developer and the regulator to manage monitoring outputs from individual sites and to review them regularly, with a plan to reduce requirements if certain stage gates/requirements are met.
- Completion of the guidance notes for survey methodology/data collection (currently in preparation by CEFAS for the MMO), and additional guidance in data analysis. These guidance documents should help in achieving clarity of requirements and consistency across monitoring programmes, resulting in the provision of more robust overall data sets for regulators to use strategically.

3.7.3 Increasing Efficiency and Output of Monitoring Programmes

- Undertake a regular review of the monitoring data collected, perhaps on a yearly basis, to determine whether

site specific data is still required to be collected if it is agreed that the receptor no longer causes concern.

- Undertake a comparison of best practice in monitoring environmental effects of offshore wind farms across EU member states to see whether there are lessons that can be learned and applied to the UK. The review should consider experience from other sectors where the receptors and effects are appropriate.
- Development of 'smarter' ways of monitoring – for example, rather than exhaustive benthic surveys, marker species could be used. Alternatively, monitor the seabed bathymetry and sediments, rather than the benthos itself. This would be more efficient, cheaper, and as effective in identification of changes. The use of an ecosystem approach to monitoring should also be explored.
- Explore the increased use of new survey techniques more suited to covering large areas or sites that are further offshore, and provide guidance for developers on the application of these techniques. A prime example is high definition aerial survey techniques.
- Investigate ways for developers to link up with each other, or with other organisations undertaking environmental monitoring/surveys, to deliver objectives jointly, thus realising cost and efficiency savings. Build on Round 2 relationships/Irish sea shared bird surveys.

3.7.4 Separation of Monitoring and Research

- Investigate ways of allowing developers to proportionally put money into research rather than the regulators having to rely on building up an evidence base solely through monitoring of individual projects. Building on the success of COWRIE, and acknowledging TCE's strategic workstream programme, this could operate on a model similar to the Aggregate Levy Sustainability Fund (ALSF), or could involve funding of a unit similar to PRIMaRE (Peninsula Research Institute for Marine Renewable Energy).
- Investigate ways that data from monitoring programmes could be combined with other data gathering programmes (e.g. Joint Cetacean Protocol) to increase efficiency of data use and thus enhance value of outputs.
- Ensure that data are stored in an accessible repository to facilitate such studies and encourage academic research to utilise historic data and advancing novel techniques for future data collection and interpretation.

4. Summary of Recommendations

This report has reviewed the lessons learned from Rounds 1 and 2 and discussed a number of challenges the industry faces in Round 3. The main aim of this report is to stimulate discussion between industry, statutory advisors

and regulators, and to encourage the development of actions to address consenting risks for offshore wind development. This report has identified some recommendations for areas for further work, summarised below.

RenewableUK welcomes the opportunity to engage with stakeholders, and looks forward to further collaboration on reducing barriers to the consent of offshore wind projects.

Key Consenting Risk	Recommendations
Adaptation to a new consenting system and regulatory environment	<ul style="list-style-type: none"> • Clearer guidance from regulators on pre-application requirements, and more effective sharing of 'lessons learned' between developers. • Ensure that there is clear understanding between developers and regulators over the way in which offshore wind projects develop and the way in which they are assessed – for example the use of the precautionary principle and the project envelope. • Ensure transitional arrangements (from IPC to National Infrastructure Directorate) do not cause delays to determination of applications. • Consider whether the Examining Commissioner can begin to engage with the development pre-application. • Consider whether regulators could provide a stronger steer to applicants pre-application to ensure that developers know they are on the right track.
The difficulties of data collection in large areas far offshore	<ul style="list-style-type: none"> • Improved data collection guidance, in collaboration with industry. • A more pragmatic approach to data and data collection – targeted to specific consenting requirements. • Discussion and acceptance of novel survey technologies. • Clarity from regulators and stakeholders on the meaning of “scientifically robust” data for stages of development and sensitive receptors. • More efficient scoping out of issues to allow better targeted data collection programmes.
Uncertainties in the assessment of environmental impacts	<ul style="list-style-type: none"> • Adoption of a more pragmatic, risk-based approach to the assessment of impacts and significance. • Consideration of the wider environmental benefits of offshore wind when considering the risk to one particular species or receptor. • More effective scoping out of issues that are not relevant to allow better consideration of potentially significant impacts. • Consideration of the use of indicator species and other measures of change to replace or complement current practices to evaluate change and impact. • Provision of better guidance on the assessment of impacts for different receptors. • Ensure that stakeholder requirements are clearly defined up-front.
Assessment of cumulative impacts	<ul style="list-style-type: none"> • Encourage open, early and transparent dialogue between regulators, stakeholders and developers. • Develop improved guidance with standard terminology. • Encourage and develop the use of ZAP to facilitate cumulative impact appraisal within and between Zones.
Obtaining a consent that is fit for purpose	<ul style="list-style-type: none"> • Work with regulators to achieve clarity on the acceptable size of a project envelope. • Ensure that the constraints on developers that lead to the requirement for a project envelope are clearly communicated during the consenting process. • Explore the best ways of presenting and assessing the environmental impacts of a project envelope and develop best practice guidance. • Develop techniques for effective consultation on project envelopes as part of the pre-application process. • Allow greater variation or less onerous requirements to vary post consent, without impacting construction time scales.
Achieving effective monitoring	<ul style="list-style-type: none"> • Provide clarity on which governmental bodies and NGOs should be involved in agreeing individual site-specific monitoring requirements. • Undertake a back-to-basics review of what monitoring should be delivering in terms of regulatory compliance, and build up from this baseline to ensure compliance and efficiency. • Re-evaluate data already collected from monitoring programmes for evidence of gross effect, and where none is found this should contribute to the regulators' assessment of significance of effects. • Discuss what is and isn't practical in terms of data collection in the marine environment, and develop a definition of an acceptable evidence base. • Design of monitoring programmes which clearly link pre- and post-construction monitoring, and which are suitable for answering the specific issues identified within the Environmental Statement. • Coordinate monitoring at strategic level to ensure link-up between site-specific monitoring programmes and explore models for regional (or zone level) monitoring programmes to deliver data at more meaningful temporal/spatial scales. Investigate ways for developers to link up with each other, or with other organisations undertaking environmental monitoring/surveys. • Develop a programme between the developer and the regulator to review monitoring outputs with a plan to reduce the monitoring effort and reduce requirements if certain stage gates/requirements are met. • Undertake a comparison of best practice in monitoring environmental effects of offshore wind farms across EU member states to see whether there are lessons that can be learned and applied to the UK. • Investigate ways of allowing developers to put money into research rather than regulators having to rely on building up an evidence base solely through monitoring of individual projects. • Investigate ways that data from monitoring programmes could be combined with other data gathering programmes to enhance value of outputs.

Appendix

The following table is a list of studies commissioned by COWRIE. Please see www.offshorewindfarms.co.uk for more details.

Subject Area	Lessons learned
Birds	<ul style="list-style-type: none"> • Predicting the displacement of common scoter from benthic feeding areas due to offshore wind farms. • Marine Bird Survey Methodologies (boat-based and aerial techniques). • Best practice guidance for the use of 'remote techniques' for observing bird behaviour in relation to offshore wind farms. • Potential use of population viability analysis (PVA) to assess the impact of offshore wind farms on bird populations. • COWRIE workshop on the cumulative impact of offshore wind farms on birds. • Developing Guidance on Ornithological Cumulative Impact Assessment for Offshore Wind Farm Developers. • Use of aerial surveys to detect bird displacement by offshore wind farms. • High Definition (HD) video survey of seabirds - trials. • HD video survey for offshore wind farm sites – further trials. • Revised best practice guidance for the use of remote techniques for ornithological monitoring at offshore wind farms. • High Resolution Video Surveys of Seabirds and Mammals in the Rhyl Flats and Norfolk Areas. • High Definition Imagery for Surveying Seabirds and Marine Mammals: A Review of Recent Trials and Development of Protocols. • A Review of Assessment Methodologies for Offshore Wind farms. • High Resolution Video Survey of Seabirds and Mammals in the Moray Firth, Hastings, West Isle of Wight and Bristol Channel Areas in Periods 5, 6 and 7. • Comparison of Visual and Digital Aerial Survey Results of Avian Abundance for Round 3, Norfolk Region. • The migration of whooper swans in relation to offshore wind farms. • Comparison of digital- and model-based estimates of seabird abundance derived from visual, digital still transects and digital video aerial surveys in Carmarthen Bay. • Quantifying the relative use of coastal waters by breeding terns: towards effective tools for planning & assessing the ornithological impact of offshore wind farms.
Marine Mammals and Underwater Noise	<ul style="list-style-type: none"> • Effects of offshore wind farm noise on marine mammals and fish. • Measurement and interpretation of underwater noise during construction and operation of offshore wind farms in UK waters. • Methodologies for measuring and assessing potential changes in marine mammal behaviour, abundance or distribution arising from the construction, operation and decommissioning of offshore wind farms. • Acoustic mitigation devices (AMDs) to deter marine mammals from pile-driving areas at sea: Audibility and behavioural response of a harbour porpoise and harbour seals. • Measurements of Underwater Noise Generated by Acoustic Mitigation Devices. • Implementation of Marine Mammal Monitoring Protocols during installation of foundations.
Cultural Heritage	<ul style="list-style-type: none"> • Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy. • Historic environment guidance for the offshore renewable energy sector. • Offshore Geotechnical investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector.
Data and Physical processes	<ul style="list-style-type: none"> • Establishing best practice for the documentation and dissemination of marine biological data. • A further review of sediment monitoring data. • Coastal process modelling for offshore wind farm environmental impact assessment: Best practice guide.
Fish, Shellfish and EMF	<ul style="list-style-type: none"> • A baseline assessment of electromagnetic fields generated by offshore wind farm cables. • The potential effects of electromagnetic fields generated by sub-sea power cables associated with offshore windfarm developments on electrically and magnetically sensitive marine organisms. • EMF-sensitive fish response to electromagnetic emissions from sub-sea electricity cables of the type used by the offshore renewable energy industry. • Development of spatial information layers for commercial fishing and shell fishing in UK waters to support strategic siting of offshore wind farms. • Effects of pile-driving noise on the behaviour of marine fish. • Options and opportunities for marine fisheries mitigation associated with wind farms. • Developing guidance on fisheries cumulative impact assessment for wind farm developers. • Benefits and disadvantages of co-locating wind farms and marine conservation zones, with a focus on commercial fishing.

End Notes

1. RenewableUK, *Working for a Green Britain* (medium scenario), 2011
2. RenewableUK, *State of the Industry report*, 2011
3. The Strategic Environmental Assessment (SEA) indicated 3 Strategic Areas, Greater Wash, Greater Thames and Irish Sea.
4. Offshore includes all associated export cable, onshore cable routes and sub-station.
5. See www.thecrownestate.co.uk/rounds-one-two.
6. Burbo Bank, Walney, Kentish Flats, Thanet, Greater Gabbard, Race Bank and Dudgeon offshore wind farms.
7. Under Round 3 it is possible that applications may include multiple projects.
8. Demonstration sites are Gunfleet Sands extension – DONG Energy Gunfleet Sands Demo, Blyth Offshore Wind Demonstration site – National renewable energy centre Ltd (Narec), Methil Offshore Wind Farm – 2-B Energy, and European Offshore Wind Deployment Centre – Aberdeen Offshore Wind Ltd.
9. For the purposes of this document, Lynn and Inner Dowsing, Cirrus Array 1,2 & 3 and Robin Rigg East & West are each considered as one project, despite being separate leasing sites.

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