Pentland Firth and Orkney Waters

Enabling Actions report

Rochdale Envelope Workshop – Wave and Tidal

Published by The Crown Estate.

This report is available on The Crown Estate website at: www.thecrownestate.co.uk

The Crown Estate

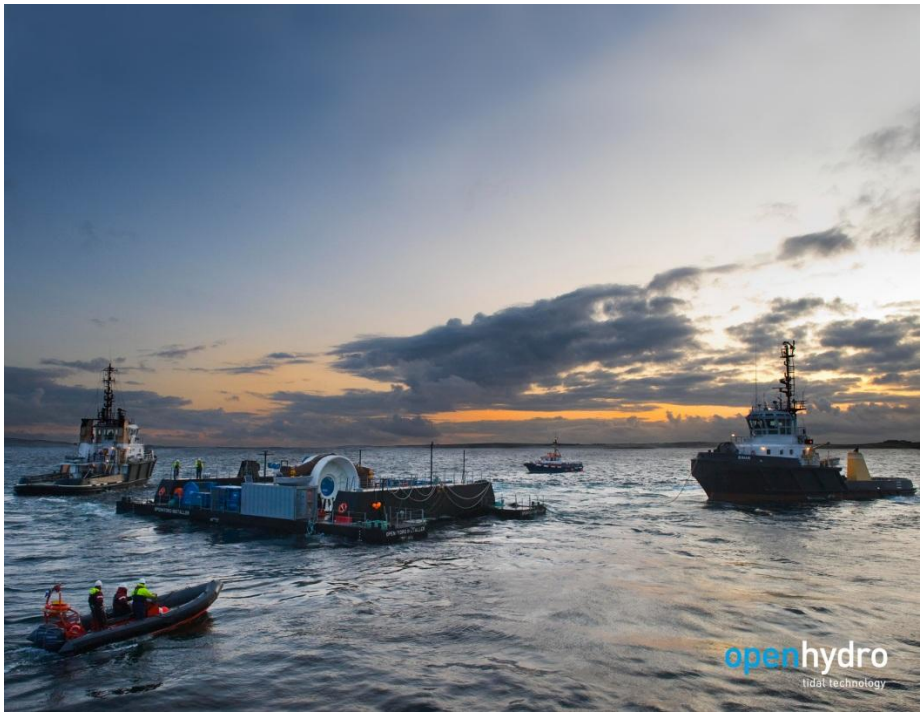


Image used courtesy of Openhydro Tidal Technology

September 2012

Rochdale Envelope Workshop – Wave and Tidal

Project Report

NIRAS Consulting Ltd
Sheraton House, Castle Hill
Cambridge CB3 0AX, UK

Reg. No.: 07470870
England & Wales
www.niras.com/uk

T: +44 (0)1223 370181
F: +44 (0)1223 370040
@: tno@niras.com

Document Control

NIRAS Project Number	N0045
Document Title	Rochdale Envelope Workshop – Wave and Tidal, Project Report
Status	Final
Client	The Crown Estate
Client Project No (if applicable)	
Client Contact Name	Toby Gethin

The following personnel are designated contacts for queries relating to this document:

Name	Job Title	Telephone	Email
Tamsin Watt	Senior Marine Environmental Consultant	01223 370181	twa@niras.com
Rachael Mills	Principal Consultant	01223 370181	rfm@niras.com

Revision Status

	Name	Date
Checked by	Rachael Mills	01/08/2012
Accepted by	Tamsin Watt	30/08/2012
Released by	Emma Clarkson	18/09/2012

Contents

Executive Summary....9

Scoping....9

Consent application....9

Post-consent....10

Summary and Conclusions....10

Recommendations and next steps....10

1. Introduction....11

1.1. Scottish Marine Renewables Policy and current activity....12

1.2. Definition of the Rochdale Envelope....12

1.3. Rationale for wave and tidal workshop....15

1.4. Key aims and objectives of the workshop....15

2. Workshop overview....16

3. Summary of workshop discussion....17

3.1. Drivers of and constraints to defining design information at the scoping stage....17

3.2. Drivers of and constraints to providing detailed design information at the consent application stage 19

3.3. Drivers of and constraints to providing detailed design information post-consent....22

3.4. Summary and Conclusions....23

4. Recommendations and next steps....24

5. References....27

6. Appendices....28

Executive Summary

This report has been produced following The Crown Estate workshop (June 2012) on the use of Rochdale Envelope with respect to Pentland Firth and Orkney Waters (PFOW) wave and tidal projects. The outputs of the workshop are relevant to wave and tidal projects across the UK.

NIRAS Consulting Ltd. facilitated the workshop bringing together developers, regulators and statutory nature conservation advisors to discuss issues associated with adopting the 'Rochdale Envelope' approach in consent applications for PFOW wave and tidal projects. The aim was to reach an agreed view regarding provision of project design information in consent applications to ensure that a robust EIA can be carried out whilst retaining enough flexibility to allow for design evolution and technology advancement, etc. Design information was discussed at three stages: scoping, consent application, and post-consent:

Scoping

The key points raised revolved around the need to strike a balance between providing a clear project description at scoping stage and the cost of survey work to inform the design. Providing clarity about some elements of project design requires detailed site investigations; these are costly and tend to be undertaken as the development process progresses rather than at the outset of a project as often funding for survey work is not available until the consent has been secured. It is important to note that details at the scoping stage are likely to be limited/high-level because much of the information only becomes available as the development process progresses.

Key messages:

- Scoping requests should include as much design information as possible about the technology options;
- It should be possible to define a range to allow the provision of meaningful feedback on the environmental issues to be considered in the ES;
- Lack of detail may result in potentially significant impacts being missed early on, resulting in regulators requesting further information and assessment at a later date – possibly post-submission.

Consent application

Workshop attendees agreed that as much detail as is feasibly possible needs to be provided in the consent application to allow a robust and informed assessment by regulators and advisors. However, because some parameters require detailed site investigation which can only commence following consent being granted, there was also acceptance that that the detail of some elements may remain unknown at the consent application stage.

Key messages:

- Developers to narrow their project envelope to avoid unnecessary assessment work;
- Developers to ensure that the worst case scenario is justified and assessed within the ES to ensure a robust consent can be granted providing flexibility to confirm details post-consent;
- Changes to the project design and assessment to be discussed with the regulator. Developers, regulators and advisors to maintain good communication throughout preparation of the EIA;
- Project funding and protecting procurement costs are fundamental issues that are likely to always limit whether design parameters can be defined in a consent application.

Post-consent

Once consent is granted, developers look to secure financial backing and prior to construction commencing, produce a detailed construction statement, environmental management plan and baselines for impact monitoring and decommissioning strategies requiring final detail on the project.

Developers should be aware that a material change to a project post-consent (that is outside of the original EIA), may require a new assessment and application.

Summary and Conclusions

It was considered highly unlikely that there would be a point where developers would be able to confirm all design parameters prior to a Marine Licence/Planning Permission being awarded.

Project financing was considered to be the primary limiting factor to providing detailed information early in the application process due to the high costs of site investigations and that investors will not commit funding until there is more certainty about a project. There was agreement that a project envelope would be formulated whilst the application develops and would be confirmed in the submitted application; some fixed detailed design parameters could only be identified immediately prior to construction.

Attendees noted that final positioning of onshore infrastructure cannot be confirmed until discussions with landowners have been completed. The need for effective communication was emphasised, to ensure that stakeholder views are taken into account in the project design and to ensure that stakeholders are kept informed as the detailed design progresses (especially post-consent) .

Given the conclusion that detailed design information is unlikely to be fixed prior to consent, it is vital that consent conditions provide the flexibility to enable detailed design information and construction methodologies to be defined later in the process.

Recommendations and next steps

A summary of the key messages and actions are summarised below:

- Consider more design reviews during the pre-application stages, with consent and engineering managers working together throughout the preparation of the consent application. This will help narrow the project envelope earlier in the process.
- Commission studies to identify where similarities exist between technologies and industries which may be comparable to the individual wave and tidal devices proposed. This would help improve understanding of the impacts of the PFOW wave and tidal devices and potentially facilitate a more rapid progress towards bigger deployments.
- Define a standard Rochdale envelope 'template' for developers. MeyGen's approach to defining Rochdale parameters (adapted from the approach used by the offshore wind farm industry) may provide a useful starting point to help establish consistency in consent applications;
- Identify any consistent descriptions of design parameters within project envelopes (e.g. rotor swept volume, area of sea covered by device) that could be used where relevant in all EIAs. Generic criteria for assessment parameters will allow data sets to be comparable, improving understanding of impacts.
- Following publication of Marine Scotland's Draft Licensing Manual, consult with the industry to determine whether additional detailed guidance is required on the use of the project envelope approach and, if so, what key questions wave and tidal developers would like to see answered.

1. Introduction

This report has been produced following the Crown Estate workshop on the use of Rochdale Envelope with respect to Pentland Firth and Orkney Waters (PFOW) wave and tidal projects. The workshop was held on the 11th June 2012 at the Edinburgh Training and Conference Venue. The workshop was organised as part of the Crown Estate's PFOW 'Enabling Actions' programme, which seeks to undertake activities to accelerate and de-risk the development of wave and tidal projects in the PFOW Strategic Area. Although funding through the Enabling Actions programme meant that the workshop was focused on the PFOW projects, the outputs of the workshop are relevant to wave and tidal projects across the UK.

NIRAS Consulting Ltd. (NIRAS) facilitated the workshop bringing together PFOW developers, regulators and statutory nature conservation advisors to discuss, the need for and issues associated with, adopting the Rochdale envelope approach in both marine and terrestrial consent applications for PFOW wave and tidal projects. Objectives for the day included exploring the practical issues associated with providing detailed design information during the consenting process, discussing approaches to using the Rochdale envelope concept for wave and tidal projects and identifying whether further action is needed to facilitate a greater understanding of how the Rochdale envelope approach can best be used.

This report has been published by The Crown Estate as part of our enabling work to support development of the Pentland Firth and Orkney waters wave and tidal projects. This work aims to accelerate and de-risk the development process, looking at a range of key issues. Work is selected, commissioned and steered by The Crown Estate in close discussion with the project developers.

For more information on The Crown Estate's work in wave and tidal energy, see www.thecrownestate.co.uk/energy/wave-and-tidal/ or contact waveandtidal@thecrownestate.co.uk.

1.1. Scottish Marine Renewables Policy and current activity

The Scottish Government has committed to achieving the EU 2020 target – 20% of EU's energy consumption from renewable sources by 2020 – through a target of meeting 100% of Scotland's electricity demand from renewable sources by 2020.

To meet this challenging target, the Scottish Government commissioned a Strategic Environmental Assessment (SEA) for marine renewables in 2007. The SEA assessed the potential environmental effects of the development of wave and tidal devices in the north and west coast of Scotland study area – from Shetland to the Solway Firth to a distance of 12 nautical miles (nm). The study area was subdivided into eight separate development areas – The Northern Isles (Orkney and Shetland), Inner Isles, Pentland Firth, Western Isles, North Coast, Argyll and Bute, Outer Isles and North Channel including the Solway Firth. The SEA identified that between 1000MW and 2600MW of generating capacity could potentially be achieved in the SEA study area, taking into account environmental effects and also the types of technology and size of deployment. The PFOW area was identified as having significant renewable energy resources.

The Crown Estate awarded development rights for eleven wave and tidal stream projects in the PFOW area, following a competitive leasing round for demonstration and commercial scale project sites in 2010. These sites are shown in Figure 1.

1.2. Definition of the Rochdale Envelope

The Rochdale cases provide the basis upon which a project can be described by a series of maximum extents – the 'worst case' scenario - allowing the detailed design of the scheme to vary within this 'envelope' without invalidating the corresponding Environmental Impact Assessment (EIA).

The 'Rochdale Envelope' arises from two legal cases: R. v Rochdale MBC ex parte Milne (No. 1) and R. v Rochdale MBC ex parte Tew [1999] and R. v Rochdale MBC ex parte Milne (No. 2) [2000], which dealt with outline planning applications for a proposed business park in Rochdale. In these cases, the initial planning consent was challenged in the High Court by third parties on the grounds of insufficient evidence. The challenge was upheld and the original decision to issue consent was quashed on the basis that the original application was based only on an illustrative plan. Following this decision, a revised application was submitted and an EIA was carried out for the proposed development, supported by a schedule of development and illustrations proposing parameters for the scheme. The revised application included an extended Environmental Statement (ES), proposed layout and schedule of development and, despite being challenged again, the court decided that the ES was adequate as it had "assessed the likely significant effects of the development, based on details which were tied to the planning permission by conditions"[1].

For permission to be granted for planning applications, the ES must include sufficient detail of the proposed project to facilitate a robust EIA that has assessed all potential impacts. In England and Wales, the Planning Inspectorate's (PINS) Advice Note 9 sets out the key propositions arising from comprehensive consideration and judgement of the approach used in Rochdale. In summary these propositions include:

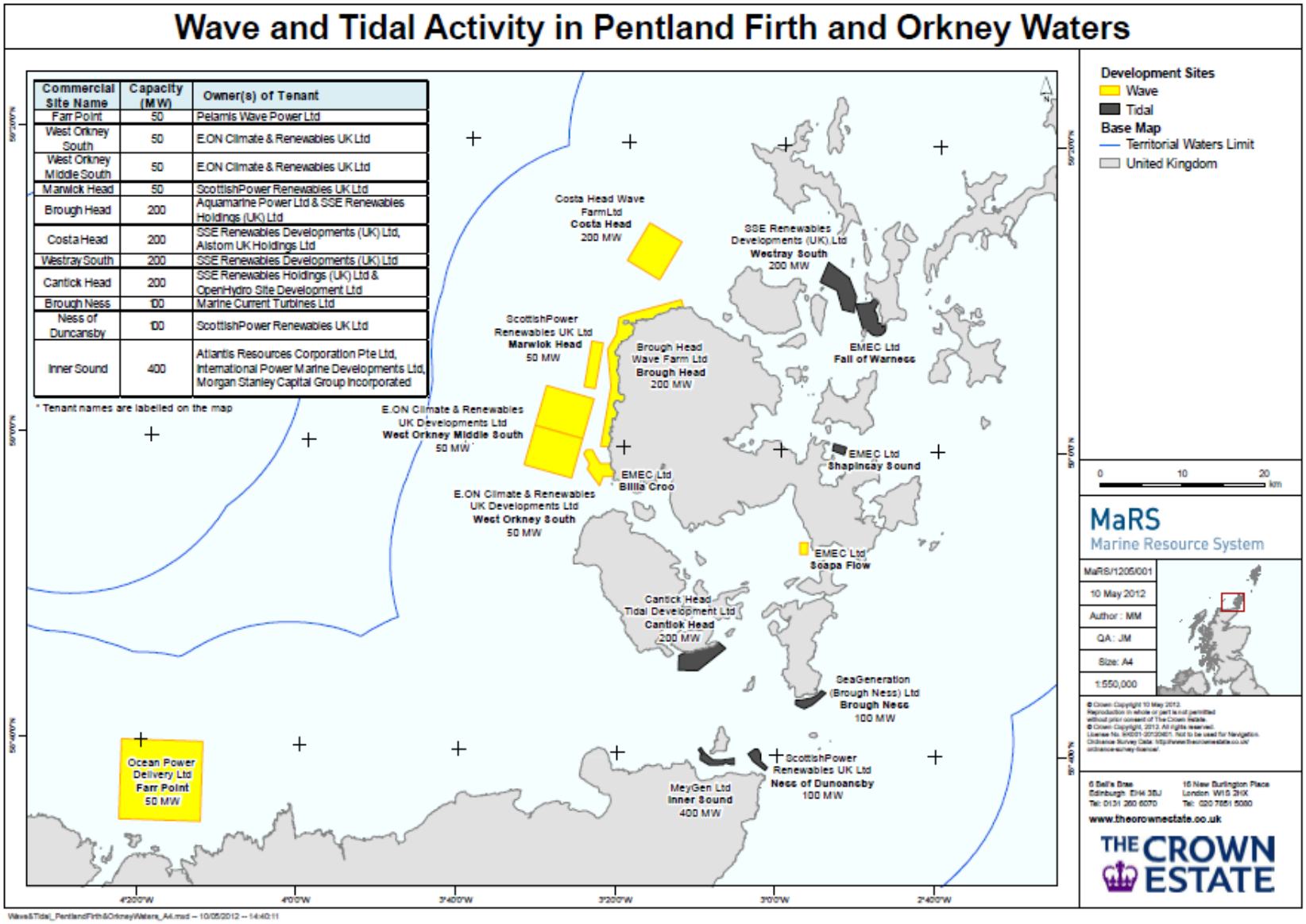
- The outline application must acknowledge the need for the details of a project to evolve over a number of years, but within clearly defined parameters, within which the framework of the development must take place;

[1] Rochdale MBC ex parte TEW [1999], Milne [2000].

- The environmental assessment takes account of the need for such evolution, within those parameters, and reflects the likely significant effects of such a flexible project in the environmental statement;
- The more detailed the proposal, the easier it will be to ensure compliance with the regulations. The level of detail provided must enable a proper assessment of the likely environmental effects and necessary mitigation – if necessary considering a range of possibilities and adopting a 'worst case' approach;
- The 'flexibility' allowed is not to be abused: 'This does not give developers an excuse to provide inadequate descriptions of their projects. If there is an unnecessary degree of flexibility, and hence uncertainty then consent can be refused'.

Developers have suggested that the Rochdale Envelope approach may be useful for both the onshore and offshore elements of offshore renewable energy projects, especially where there are valid reasons why the full details of the whole project are not available when the application is submitted. Such an approach has been used under other consenting regimes in the UK (e.g. the Town and Country Planning Act 1990, the Town and Country Planning (Scotland) Act 1997 and the Electricity Act 1989) where an application has been made at a time when the full details of a project cannot be confirmed. The Rochdale Envelope approach has been adopted for a number of offshore wind farm projects in the UK, particularly in the second offshore wind leasing round (Round 2) where consents were granted based upon the assessment of the proposed project using the 'Rochdale Envelope' approach to describe design parameters.

Figure 1. Pentland Firth and Orkney Waters Round 1 Development Sites



The Scottish Government is responsible for licensing activities in the marine environment in Scottish inshore waters (0-12nm) and also for the Scottish offshore region (from 12-200nm) other than reserved matters. Marine Scotland is responsible for administering the licensing system on behalf of the Scottish Government, – both for the inshore (0-12nm) and offshore (12-200nm) Scottish waters.

The Scottish Government has coordinated a number of activities to support the development of wave and tidal projects in the PFOW areas and more generally. This includes, for example, work to develop Sectoral Plans for wave and tidal and work to deliver the Marine Energy Group's (MEG) Marine Energy Road Map – an industry led document setting out the key challenges and recommended solutions for the industry such as planning, finance and supply chain. Various work has also been commissioned by Marine Scotland, Scottish Natural Heritage and others to gain a more detailed understanding of the potential environmental and socio-economic impacts of wave and tidal projects in the PFOW area.

1.3. Rationale for wave and tidal workshop

Applying the Rochdale Envelope approach to the planning application process for wave and tidal developments allows for evolution of elements of the design, such as turbine technology advancement, site design and layout configuration, following the submission of the consent application. This flexibility is important in the consent application process, particularly because technology is developing all the time i.e. it mitigates the risk that specific technology might become unavailable or is superseded by the time of construction.

The Rochdale Envelope approach is yet to be widely applied to wave and tidal projects (and indeed the approach is still being refined for offshore wind). However, wave and tidal developers need to know how best to approach and apply it in their consent applications. For decision makers, it is important that an appropriate balance is found between the degree of flexibility permitted and adequate detail being provided to enable a robust assessment of consent applications. However, project developers are simply not able to provide precise design details at the time of the consent application because full project investment (and the scale of funding needed for detailed site investigations) is dependent on a consent being granted. Developers also have to contend with the speed at which the technology develops which can mean that available devices may change by the time construction commences.

Without agreement and greater clarity on what can and should be included in a Rochdale Envelope, there is the risk of delays to the consenting process and consequently the delivery of wave and tidal projects in PFOW area and more generally.

1.4. Key aims and objectives of the workshop

The purpose of the Rochdale Envelope Workshop was to bring Marine Scotland, SNH, the local planning authorities (Highland Council and Orkney Islands Council) and PFOW developers together to discuss the limitations and key issues associated with using the Rochdale Envelope approach in consent applications and to identify recommendations to resolve these issues. The overall aim of the day was to help reach a consolidated and agreed view about the issues associated with providing project design information in consent applications to ensure that a robust EIA can be carried out whilst retaining enough flexibility to allow for design evolution, technology advancement and finalisation of specific site layout options etc.

The key aims/objectives for the workshop were to:

- Build a common understanding of the issues faced by industry and decision makers/advisors in terms of what information can or should be presented within an EIA;

- Identify the practical issues for developers associated with identifying detailed design information at the consent application stage;
- Facilitate agreement and a better appreciation of how the Rochdale Envelope approach can be refined and utilised for wave and tidal projects;
- Identify the level of detail required when using Rochdale Envelope approach and potential implications on Environmental Impact Assessment (EIA) outcomes;
- Explore how existing advice can be developed, to provide a clearer definition of the project design information required, to create more certainty in the consent application process for wave and tidal projects in PFOW;
- Identify whether any further action is needed to help facilitate a greater understanding of how the Rochdale envelope approach can be used.

2. Workshop overview

The workshop was hosted by the Crown Estate and facilitated by NIRAS. It was well attended by representatives from the industry, regulators and Statutory Nature Conservation Bodies (a full list of attendees is provided in Appendix 1 and a full workshop agenda is provided in Appendix 2).

Bringing developers and regulators together provided a forum to collectively discuss the Rochdale envelope approach – how the approach has already been used, it's applicability in the assessment of environmental impacts for wave and tidal projects and the challenges the approach presents both for developers and regulators.

The agenda and workshop materials were discussed with key stakeholders prior to the day, including developers, regulators and advisors, to ensure that their views were taken into consideration in the workshop design. The workshop materials included a matrix which was used as a discussion tool and completed by attendees during the workshop. Marine Scotland, Scottish Natural Heritage (SNH), the Joint Nature Conservation Committee (JNCC) and developers including Scottish Power Renewables, SSE Renewables, Pelamis and Aquamarine were all contacted in advance and provided comments on the matrix to ensure that it focused the discussion on the key issues.

The workshop was delivered in two stages: the morning session provided a variety of presentations from different industry perspectives, while the afternoon workshop session focused on completion of the workshop matrix. Attendees were split into two groups for the afternoon session – a wave developer and a tidal developer group. The completed workshop matrices for both groups are provided in Appendix 3 and the slides from each presentation are provided in Appendix 4.

The presentations provided a variety of different views from industry, regulators and advisors and these are listed below:

- An introduction to the Rochdale Envelope approach and lessons learned from the wind industry, from NIRAS;
- A presentation from MeyGen on the need for the Rochdale Envelope in the tidal industry and the key issues faced;
- A regulatory perspective from Marine Scotland on applying the Rochdale Envelope and issues faced when assessing applications;

- A wave and tidal perspective from EMEC, including practical experience on applying the Rochdale Envelope for the development test sites and key lessons learned; and
- A statutory nature conservation perspective from SNH on assessing applications that use the Rochdale Envelope Approach.

The afternoon workshop discussion session was split into two parts. The first part was a high level review of how design information is presented at the different stages of the consent application process. The second part was a more detailed discussion on the limitations to submitting detailed information, the implications of this for regulators and the potential compromises and solutions that could be reached.

3. Summary of workshop discussion

The following sections focus on the workshop matrix (see Appendix 3 for the completed matrices), providing a summary of the main discussion points raised by attendees, the key messages from regulators, advisors and developers and the key outcomes of the day.

The summary of the discussion is presented under the following subheadings:

- Drivers of and constraints to defining the level of design information that can be provided at the scoping stage;
- Drivers of and constraints to providing detailed design information at the consent application stage;
- Drivers of and constraints to providing detailed design information post-consent; and
- Summary and Conclusions.

One of the key issues identified early on in the workshop discussion was that using the term "Rochdale Envelope" was confusing so workshop attendees agreed that a more useful terminology was to refer to it as "project envelope". As a consequence, the remainder of this report uses the term "project envelope" when referring to the presentation of design parameters throughout the consent application process.

3.1. Drivers of and constraints to defining design information at the scoping stage

At the scoping stage, it is very unlikely that any detailed design information will be available. It is therefore critical that there is sufficient flexibility in the application process to allow developers to specify a "project envelope" – a range of design parameters that will be refined as the consent application and EIA process is developed. Not only does this enable the project to develop as more detailed information is gathered about the proposed site and associated impacts, but it also allows stakeholder views to influence the project design. This does, however, need to be balanced with the requirement to ensure all audiences understand the project. A narrower project envelope will mean that the proposed project is easier for stakeholders to understand.

The key points raised during the workshop revolved around the need to strike a balance between providing clarity regarding the proposed project at scoping stage and the cost of survey work to inform the design. Providing clarity about some elements of project design requires detailed site investigations; these come at a high cost and are undertaken as the development process progresses rather than at the outset of a project – very often the funding for this type of survey work is not available until the consent has been secured.

Both wave and tidal groups discussed the differences between a 'technology developer' (a developer with a fixed technology selected) and a 'project developer' (a technology neutral developer who is considering a number of device options). It was felt that the level of design detail that can be given is likely to vary

between these two types of developer. A technology developer is focused on a specific device and may therefore be able to provide more information about the range of design parameters being considered whereas a project developer may be considering multiple device options and may find it difficult even to identify a range of design parameters. These differences were acknowledged during the discussion however, regulators pointed out the risks of submitting insufficient information at the scoping stage. To understand the potential impacts and to provide advice regarding the scope of the EIA, as much detail as possible is needed about all of the options being considered. Without this, there is a high risk that further information and amendments to the ES will be requested later in the application process, which could lead to delays.

Attendees also highlighted the issues from a consultation perspective, of which scoping forms an important part. For example, an apparent lack of information about a proposed project without any explanation about why information is limited (and when more may become available) may lead to potentially unnecessary concerns. These concerns may manifest in pressure groups being formed, particularly where concerns are related to emotive issues such as visual impacts. It was generally agreed that good communication with stakeholders and the general public is critical as the project envelope develops; this will ensure that any changes potentially affecting the scope of the assessment are taken on board as early as possible, allowing the local community to be engaged in the design development process.

Marine Scotland specifically pointed out that the use of the project envelope approach can have implications on staff timing and resource. Regulators need to revisit the original scoping report and opinion to make sure that the necessary issues are clarified and assessed in the application. If a detailed scoping opinion is provided it is much easier to check back against the advice given. If only a broad-scale scoping opinion was given, then it is much more resource intensive to search through the full audit trail of communication throughout the development of the project application.

In general, both wave and tidal groups felt that many design elements would remain unclear at the scoping stage. Regulators highlighted that developers need to provide as much detail as possible at the scoping stage to allow the regulator and their advisors to consider and provide an informed opinion on the impacts that need to be assessed in the EIA. A lack of information about the design parameters may mean that regulators do not fully understand the scope of the proposed project and are therefore unable to fully identify the risk of significant impacts. As a result, scoping advice will only be high level, providing broad scale advice on the issues to address in the ES. When more detailed information is then provided later in the process to the regulator, additional survey requirements and changes to the scope of the EIA may be identified, resulting in delays and increased costs; this problem would be compounded if the developer is quite far advanced with ES production.

Key messages:

- Developers are limited in the amount of detail they can provide about design elements at the scoping stage. Detailed design requires detailed site investigations which come at a high cost, and the required funding is often not available until a consent has been secured;
- Although project developers may be unsure of the device they are considering, scoping requests should include as much design information as possible about the technology options being considered to avoid delays to the consent application process;
- At the scoping stage, it may not be impossible to confirm many design elements however, it should be possible to define a range to allow the provision of meaningful feedback on the environmental issues to be considered in the ES;

- Lack of detail at the scoping stage may result in potentially significant impacts being missed until much later in the process. This could potentially result in regulators requesting further information and assessment at a later date – possibly after an application has been submitted;
- Effective communication throughout the application process is essential in facilitating a good understanding of the proposed project and the project envelope, to allay stakeholder and public concerns and to mitigate the risks of pressure groups being formed to oppose a project.

3.2. Drivers of and constraints to providing detailed design information at the consent application stage

In consent applications, developers are likely to adopt the project envelope approach for many design parameters by identifying a range of parameters for design details such as turbine size and number.

Drawing from the wind farm experience in England and Wales, advice from PINS has been very clear. All technology options being considered must be described in the project application and the impacts of each option must be considered clearly in the EIA. As a result, design parameters for the various technology options being considered must be included in the project envelope.

During the workshop, attendees agreed that as much detail as is feasibly possible needs to be provided in the consent application to allow a robust and informed assessment by regulators and advisors. It was considered that whilst some design elements need to (and can) be fixed, the majority of design elements cannot be fixed and therefore a range should be specified at consent application stage. The design elements identified as those that could be fixed at consent application were similar between both wave and tidal groups and included: type of device; site area and location (albeit not specific locations for the individual devices); width and length of cable corridor; and site parameters for the onshore substation.

Both groups also accepted that the detail of some elements may remain unknown at the consent application stage and these included: number and size of individual devices; suitability of some installation methodologies; operation and maintenance activities; and wider infrastructure requirements to support construction activities (such as detailed traffic management requirements). A cable corridor is typically used in applications because the exact route can only be defined once detailed site investigations have been carried out, and this type of investigation work is only likely to happen once consent has been granted. There are three main reasons for this:

- The Financial Investment Decision (FID)[2] is reliant on the acquisition of a consent. As many of the detailed site investigations come at a high cost, these investigations cannot take place prior to a consent decision;
- The supply chain is limited in some areas so early identification of detailed parameters such as turbine class could confirm which supplier/contractor the developer was likely to commission. The expectation is that the prices could then increase dramatically and therefore potentially make the project unviable; and
- Technology is constantly developing so that the devices that are available on the market at FID may be different to those available at the point of consent application.

Having discussed the specific design elements at the consent application stage, the discussion focused on the implications of a lack of information at this stage. It was generally agreed that it is for developers to decide the level of detail that they are able to provide in their consent application. Where developers are

[2] Financial Investment Decision (FID) is the point at which a decision is taken by investors in a project about how much capital will be spent and debt tolerated in order to take a project forward.

unable to define design information, they must make sure that they have identified the worst case, clearly justified why it is considered to be the worst case and made sure that the impact assessment adequately identifies and assesses all the relevant potential impacts. This approach, (i.e. definition the worst case for each identified impact and provision of justification), has been adopted by the offshore wind industry and was also presented by MeyGen at the workshop. This information is generally presented in tabular format, as presented in Table 1 on the following page.

Table 1. Example of Rochdale Envelope Parameters (extract from) a Marine Mammal Assessment within an EIA (*source: extract taken from Environmental Statement for the MeyGen Tidal Energy Project, 2012)*

Project Parameter relevant to the assessment		'Maximum' Project parameter for the impact assessment	Explanation of maximum Project parameter
Turbines	Number	86 turbines	The encounter modelling considers up to the maximum proposed 86 turbines
	Layout	45m cross-flow spacing and 160m down-flow spacing	An indicative layout for 86 turbines has been used to inform the noise modelling. The indicative layout is based on 45m cross-flow spacing and 160m down-flow spacing. A layout was not required for the encounter modelling. There is presently a lack of knowledge / evidence on how marine mammals navigate through an array of tidal turbines
	Number of blades per rotor	Three blades	Increasing the number of blades increases the surface area which mammals my encounter.
	Rotor diameter	18/20m	As a general rule, increasing the rotor diameter increases the amount of water swept by the moving blades, increasing the likelihood of a mammal coming into contact with the blades. However, the encounter risk modelling shows that either 18 or 20m rotor diameter may be considered worst case (see Table 1.1.16) depending on which species is being considered, due to differences in depth distribution behaviour of different species.
	Maximum height of nacelle above seabed	14.5/16m	This value is used to calculate the depth horizon swept by the turbine, which will have an effect on which species are likely to encounter it, since different species make different use of the water column. This value differs depending on whether the 18m or 20m diameter rotors are being considered.The encounter risk modelling shows that either 18 or 20m rotor diameter may be considered worst case (see Table 11.16) depending on which species is being considered, due to differences in depth distribution behaviour of different species.
	Minimum clearance between sea surface and turbine blade	8m	This value is used to calculate the depth horizon swept by the turbine, which will have an effect on which species are likely to encounter it, since different species make different use of the water column.
	Clearance from blade tip to seabed	5.5/6.5m	The minimum clearance between the turbine blade tip and the seabed is 5.5m for the 18 m diameter rotors and 6.5 m for the 20 m diameter rotors. This value is used to calculate the depth horizon swept by the turbine, which will have an effect on which species are likely to encounter it. The encounter risk modelling shows that either 18 or 20m rotor diameter may be considered worst case (see Table 11.16) depending on which species is being considered, due to differences in depth distribution behaviour for different species.

One key point on which regulators at the workshop were keen to caution developers was the risks associated with defining too wide a project envelope. The wider the project envelope and the more limited the information provided, the bigger and more complex the resulting EIA. There are two key risks:

- The less information an application contains, the longer it takes to assess. In some cases it may not be possible for regulators to determine an application because they are unable to confirm that the impacts have been fully assessed. Such a lack of information may therefore result in a project being refused consent, that could have been granted if more information had been made available, or having more onerous conditions being placed upon any consent awarded; and
- Impacts associated with a wide project envelope (and hence a wider worst case scenario) could, particularly when considered cumulatively with other projects, result in overly onerous licence conditions and extensive monitoring requirements which may increase project costs. In some cases, if the impacts are considered too great (e.g. because the worst case parameters of the range of projects being considered indicates that the potential impacts would be significant), consent will not be granted.

Regulators also highlighted the risks of basing a Habitats Regulations Assessment (HRA) on limited or uncertain information; the risk of impacts to target species may be unknown and may therefore result in more precautionary approach being taken than may otherwise be necessary. The result could ultimately be more onerous consent conditions or worse, the project could be considered impossible to consent.

Key messages:

- Project funding and protecting procurement costs are fundamental issues that are likely to always limit whether design parameters can be defined in a consent application;
- Developers should try to narrow down their project envelope wherever possible. This will help to avoid unnecessary project refusal and/or ensure that the consent, if awarded, does not contain onerous conditions that may affect project viability. This will also help prevent unnecessary assessment work by the developer and the regulator and reduce the time required for determination of the project;
- Developers should ensure that the worst case scenario is fully justified and assessed within the Environmental Statement, to ensure that a robust consent can be granted which provides the flexibility to confirm details post-consent (following more detailed site investigations);
- Any changes to the project design and associated assessment should be discussed with the regulator and their advisors. Developers, regulators and advisors should also keep in regular contact during preparation of the project EIA, to discuss and agree, for example, that the approach to and use of a project envelope is suitable and acceptable.

3.3. Drivers of and constraints to providing detailed design information post-consent

Once consent is granted, developers can then look to secure financial backing, move to the procurement stage, and, prior to construction commencing, produce a detailed construction statement to provide further and final detail on the project.

During the workshop, both the wave and tidal groups considered that at this stage, the majority of design elements would be fixed for both project and technology developers. The only exception is associated with maintenance activities, where it was considered there may still be a range with the maximum extent representing the worst case (i.e. the number of service vessels required and the average vessel trips to site per day). Maintenance issues were discussed during the workshop and it was not considered that these

needed to be fixed before construction, given that maintenance requirements may vary once the project has been constructed.

Flexibility in consent conditions and the ability to amend conditions within the bounds of the project envelope described in the original application becomes critical immediately prior to construction. A more open condition stating maximum extents, such as maximum number of turbines, ensures that the development will not exceed what has been assessed in the EIA. Equally, drafting licence conditions to allow more detail to be approved nearer the time of construction (e.g. submission of a detailed cable installation methodology), ensures that appropriate techniques can be specified once financing has been secured to facilitate more detailed site investigations.

Immediately prior to construction, regulators require a variety of information including: a construction statement; a detailed environmental management plan; baselines for impact monitoring; and decommissioning strategies. The requirement for these documents is generally specified in consent conditions with a minimum time period during which they must be submitted to the regulator for approval before construction can proceed. The construction statement will contain the finalised and detailed project design and is submitted to the regulator for agreement prior to construction commencing to ensure that the design and proposed construction methods and materials remain within the project envelope described in the ES. This is where the level of detail within the EIA and consent application becomes key – the regulator must ensure that the detailed design defined prior to construction fits within the project envelope assessed before confirming that construction can go ahead.

Post-consent, material changes to the project, were also considered by both regulators and developers. A material change is considered something that creates or will create an impact that is outside the scope of the existing ES. The implications of such changes to project design are dependent on the stage of the project process. A material change at application stage may potentially be addressed by producing an addendum to the original ES, supported by additional survey work if required. However, a material change to a project post-consent may require a new application to be made (accompanied by a new ES and resulting in delays to construction timelines) if the change is significant and outwith that assessed in the original application and ES.

Key messages:

- Once consent has been granted and before construction can commence, the majority of design elements need to be fixed for both project and technology developers;
- Regulators require a variety of detailed information (which will essentially fill in the gaps and provide final information about the project) once consent is granted and before construction can commence including a construction statement, a detailed environmental management plan, baselines for impact monitoring and decommissioning strategies;
- Developers should be wary of assuming that it will be possible changes to a consent in the longer term. A material change to a project post-consent, that is outside of the original EIA, may require a new assessment and application leading to delays to project construction timelines.

3.4. Summary and Conclusions

At the workshop, attendees clearly understood the project envelope approach both in terms of its definition and its application in an EIA. One of the key benefits of the workshop was therefore to enable the attendees to develop a common understanding and appreciation of each other's specific issues and approaches to defining and using the project envelope for EIA. There was general agreement that MeyGen's approach (as described during their presentation) may be a useful template to follow (see Appendix 3).

An important message, which ultimately influenced the direction of the afternoon discussion, was that it was highly unlikely that there would be a point where developers would be able to confirm all design parameters prior to a Marine Licence/Planning Permission being awarded. Project financing was considered to be the primary limiting factor to providing detailed information early in the application process. For example, detailed site investigation surveys are costly and investors will not commit funding until there is more certainty about a project. Consent (i.e. a Marine Licence/Planning Permission) is generally required to provide this certainty and is one of the key requirements for FID. As a consequence, project parameters can only be firmed up as the consenting process progresses and the level of detail provided at each stage of the process will be dictated by the level of site investigation that has been carried out. There was general agreement that a project envelope, identifying the range of design parameters being considered by the developer, would be formulated whilst the application develops and would be confirmed in the submitted application; fixed detailed design parameters could only be identified immediately prior to construction.

Funding was not the only issue affecting the availability of detailed design information; procurement constraints and consultation were also considered key issues. Identification of detailed project design information very early on is likely to influence the procurement options being considered, leading to increased infrastructure and material costs. Consultation is a key part of the consent application process and a critical element in the development of project design. Workshop attendees noted that final positioning of onshore infrastructure cannot be confirmed until discussions with landowners have been completed. The need for effective communication was also emphasised, to ensure that stakeholder views are taken into account in the project design and to ensure that stakeholders are kept informed as the detailed design progresses (especially post-consent) .

Given the conclusion that detailed design information is unlikely to be fixed prior to consent, it is vital that consent conditions provide the flexibility to enable detailed design information and construction methodologies to be defined later in the process. Consent conditions for Round 1 and Round 2 offshore wind farm projects used terminology such as “up to” and “should not exceed”. This approach provided the flexibility for design parameters to be confirmed close to construction commencing with the consent remaining valid provided the confirmed design parameters and construction methodologies remained within the specified worst case design parameters identified in the EIA.

Given that the general consensus was that it would be impossible to confirm all design elements prior to a consent application being submitted, much of the discussion focused on defining solutions to de-risking the project envelope approach in the consent application process.

The following section documents a series of recommended actions to take forward as identified during the workshop discussion.

4. Recommendations and next steps

Some key messages were consistently raised during the workshop discussion, specifically focused at de-risking the use of the project envelope approach. These included research-related discussions highlighting the need for more data and more information to facilitate a greater understanding of potential environmental impacts. In general, discussions on this issue followed two key strands: how to make more information available (i.e. how to collect data, who is responsible for collecting it and whether there is more data available than is currently known); and how to better use the information that we currently have (i.e. developing better risk assessment tools that could be applied using the data we have, standardising procedures and exploring lessons learnt from other industries).

The outcomes of the discussions on the approach to and use of project envelope resulted in the identification of some key actions for developers, regulators and advisors and these are highlighted below:

Project/developer level:

- Consider the need for more design reviews during the pre-application stages, with consent and engineering managers working closely together throughout the preparation of the consent application. **Outcome:** Project envelope is narrowed earlier in the application process because key potential environmental effects are identified and considered much earlier;
- Commission studies to identify where similarities exist between technologies and industries which may be comparable to the individual wave and tidal devices proposed for deployment in the PFOW. For example, a comparison study conducted for Pelamis found that there were more similarities with the aquaculture industry e.g. entanglement risks and noise issues. **Outcome:** A guide to a range of other (better known/more developed) technologies and associated impacts that could be used to provide greater understanding and certainty around impacts of the PFOW wave and tidal devices and potentially facilitate a more rapid progress towards bigger deployments.

Strategic/regulator/advisor level:

- Define a standard Rochdale envelope 'template' for developers. MeyGen's approach to defining Rochdale parameters (adapted from the approach used by the offshore wind farm industry) may provide a useful starting point. **Outcome:** Clear guidance on an accepted approach and more consistency in consent applications;
- Review whether there are consistent descriptions of design parameters within project envelopes (e.g. rotor swept volume, area of sea covered by device) that could be used where relevant in all EIAs, thus allowing projects to be more easily compared and facilitating greater understanding about the impacts of wave and tidal devices. **Outcome:** Generic criteria for assessment parameters will allow data from a greater number of devices to be compared to provide increased understanding of impacts.
- Following publication of Marine Scotland's Draft Licensing Manual, consult with the industry to understand whether any additional detailed guidance is required on the use of the project envelope approach and, if so, what key questions wave and tidal developers would like to see answered. **Outcome:** Detailed guidance for the wave and tidal industry.

Wider (i.e. research/impact assessment rather than project envelope specific) recommendations

The following recommendations arise from discussions on the project envelope turning to the wider consenting issues for wave and tidal projects:

- Continue consideration of collaborative data collection programmes e.g. monitoring for birds and marine mammals. **Outcome:** Lower costs for developers and a consistent dataset that can be effectively used for EIA and cumulative impact assessment;
- Identify and prioritise a work programme to define impact thresholds for key species, including those in relation to HRA. **Outcome:** Defining thresholds will help to facilitate the Appropriate Assessment process by ensuring that acceptable limits are set separately and not as part of individual project application decisions;

- Consider commissioning and publishing a review of lessons learnt at the European Marine Energy Centre (EMEC) test sites (and elsewhere) focussing on approaches to impact assessment and what has subsequently been learnt about impacts in practice. **Outcome:** Shared experience of best practice and a single document that wave and tidal developers can refer to as part of their impact assessment evidence base;
- Focus/finalise work on developing industry standards and accepted risk assessment methods alongside the need for data collection, e.g. finalising collision risk models for marine mammal and diving bird collision risk assessment. **Outcome:** The development and adoption of a standard approach to impact assessments for some key species, enabling clearer assessment methods and more consistency in impact assessments and consent applications;
- Develop 'service level agreements' or 'planning processing agreements' to provide a framework for the application process for all regulatory bodies. (NB. SNH have done this providing a guide for when and how often they should be consulted, and agreed response times for advice) **Outcome:** A focused and standardised approach for regulators and developers, providing a clearer understanding of information requirements and timeframes, and a more consistent assessment process;
- Continue to address data gaps through strategic data collection and the establishment of strategic monitoring programmes where appropriate. **Outcome:** Gap filling of key research questions, greater availability of data for impact assessment and more certainty in the significance of impacts identified; and
- Establish a mechanism for centralising and disseminating monitoring information across regulatory bodies and industry. **Outcome:** Greater data availability to feed into impact assessment and a consistent dataset that can be effectively used for cumulative impact assessment.

5. References

Planning Inspectorate. 2011. Advice Note Nine –Rochdale Envelope. Planning Inspectorate

Scottish Marine Renewables Strategic Environmental Assessment (SEA)- Report prepared for the Scottish Executive by: Faber Maunsell and Metoc PLC. March 2007.

MeyGen Tidal Energy, Project Phase 1 Environmental Statement, 2012.

6. Appendices

APPENDIX 1 –Workshop Attendees

Aoife O'Keefe	**Eon**
Dave Collier	**MeyGen**
David Langston	**Marine Turbines**
Douglas Watson	**ScottishPower**
Ed Rollings	**MeyGen**
Erica Knott	**SNH**
George Lees	**SNH**
Ian Davies	**Marine Scotland**
Jennifer Norris	**EMEC**
Laura Carse	**Pelamis**
Louise Burton	**Natural England**
Margaret Gillon	**Orkney Council**
Margaret Tierney	**Marine Management Organisation**
Mark Christie	**Marine Scotland**
Marten Meynell	**Aquamarine**
Megan Richardson	**Aquamarine**
Rachael Mills	**NIRAS**
Richard Morris	**ScottishPower**
Robin Burnett	**SSE**
Roger May	**Marine Scotland**
Shona Turnball	**Highland Council**
Tamsin Watt	**NIRAS**
Tim Norman	**NIRAS**
Toby Gethin	**The Crown Estate**
Tracy McCollin	**Marine Scotland**

APPENDIX 2 –Workshop Agenda

10.15 – 10.30	**Tea and Coffee**
10.30 – 10.50	**Welcome and Introduction** (Rachael Mills, NIRAS Consulting Ltd) An outline of the day and the aims and objectives for the workshop. Introduction presentation: An introduction to the Rochdale Envelope; what it is, a broad overview of its use in consent applications, a review of its application in the wind industry and the key lessons learned.
10.50 – 12.05	**Presentation Sessions**
10.50 – 11.05	**Presentation 1 - The need for Rochdale Envelope in wave and tidal developments** (MeyGen) A perspective from a wave and tidal developer, the need for a Rochdale envelope approach and the key issues faced
11.05 – 11.20	**Presentation 2 – Applying the Rochdale Envelope – A regulatory perspective (Marine Scotland)** An overview of the key issues faced by Regulators when assessing impacts using the Rochdale Envelope approach. Understanding the process from pre-application through application and post consent.
11.20 – 11.35	**Tea and Coffee**
11.35 – 11.50	**Presentation 3 – Applying the Rochdale Envelope – A wave and tidal industry perspective (EMEC)** Practical experience from the wave and tidal development test sites, experience on using the Rochdale Envelope approach and a summary of the issues encountered and lessons learned.
11.50 – 12.05	**Presentation 4 – Applying the Rochdale Envelope - A nature conservation perspective (Scottish Natural Heritage)** An overview of the key issues faced by Statutory Nature Conservation Bodies (SNCBs) in understanding and assessing potential impacts within EIAs using the Rochdale Envelope Approach.
12.05 – 13.00	**Workshop Session – Clarifying Rochdale Envelope requirements and identifying implications for the consenting process** An introduction and overview to the workshop session approach and Rochdale envelope matrix. Opportunity to review matrix and design parameters
13.00 – 13.30	**Lunch**
13.30 – 15.00	**Workshop Session (Breakout Sessions) – Identifying the drivers and constraints with applying the Rochdale Envelope approach** Attendees will be split into two/four groups (wave energy developers and tidal energy developers). Each group will have the opportunity to discuss the key issues identified during the sessions before lunch and to complete the matrix introduced during the morning session. The matrix will enable developers to: • Identify the extent to which detailed design information can be provided in consent applications; • Identify the associated issues that dictate the level of detail that can be provided in consent applications; and • Explore the likely consequences for consent decisions. Each group will be facilitated by an advisor able to provide advice on the likely implications of the information provided for the Rochdale Envelope matrix in each group. Each group should appoint a rapporteur who will feedback and summarise the key discussion elements to the wider group.
15.00 - 15.15	**Tea and Coffee**
15:15 – 15.45	**Group Feedback and General discussion**
15.45 – 16.00	**Summary, Actions and Closing remarks**

APPENDIX 3 – Workshop Matrices

Workshop Matrix – Tidal Group

STAGE 1: TIDAL GROUP	DESIGN ELEMENT																								
	DEVICE					MOORING/ FOUNDATION	OPERATIONS AND MAINTENANCE				INTER-ARRAY CABLING			OFFSHORE TRANSMISSION					ONSHORE CABLING		ONSHORE SUBSTATION	ONSHORE INFRASTRUCTURE		OTHER ANCILLARY INFRASTRUCTURE
	Type	Area and location	Number (MW) layout/ spacing	Specification/c omponents	Installation method	Type	Onsite/ offsite	Maintenance facilities	Service vessels required	Vessel trips to site per day (avg)	Cable type/ length	Installation option/ method	Converter Station (type, foundations)	AC/DC	Maximum number of export cables	Cable corridor size	Installation option/ method	No of cable trenches & estimated burial depth	Number and location of cables	Trench size	Size, location etc	Grid link, local road upgrades etc.		Navigational aids etc
What level of detail can be provided:	The group commented that these will change depending on if your developer is technology neutral or technology specific, due to group member organisations we filled this out as technology neutral but this should be considered in the outputs																								
At scoping stage?		Can vary																				grid	other		
At consent application?																			Location needs to be fixed	may be fixed	multiple options need to be defined			Interaction with stakeholders has to be resolved	
For the construction statement?				Not interested in detail																					
Can be fixed / Range of options / Unknown																									
STAGE 2:	The answers to the following questions were considered general across the project design elements																								
What are the key limitations to submitting detailed information as early as possible?	- Financing is the key driver - The industry is not mature, there are so many types of device it is difficult to come up with any generalisations - Submitting detailed information very early in the process is not commerically astute - Site conditions, for example,F14 resource determine the final design - Any designations also limit your development area - Device spacing may be uncertain - Deployment is iterative following consent, you learn more with each deployment phase - local communities focus is very much onshore and what they can see? this needs detail in order to properly consult																								
What are the consequences of providing limited information/detail?	- Additional cost and time for developing the EIA, the more uncertain the more complex the EIA and the more difficult it is to assess - The vaguer an appication is the longer it takes to assess - vague or uncertain EIA compromises the ability for regulators/stakeholders to advise - Vague applications can result in overly precautious advice - If an HRA is based on limited or uncertain information then the risk of impacts to target species may be unknown and this represents a risk to regulators/advisors - limited detail results in a qualitative assessment, assesing impacts is always a case of qualitative vs quantitative - benefical impacts include more competitive procurement																								
What issues are faced by regulators once detail is confirmed?	- Staff timing and resource limitations - Regulators/advisors need to ensure consistency of assessment when receiving multiple assessments - staff awareness/training, this is a new area for a lot of people including the regulators and advisors - such a wide range of tidal devices means applications can be so different and its very difficult to come up with any standards - material changes can result in a complete change of expected detail - what is a material change? it is something that creates or will create an impact that is outside the scope of what is covered within the existing Environmental Statement - Consent is driven by capacity to assess and by capacity of staff - Some changes to the project/plan depend on what stage of the application you are at. If it is at application stage then it may be possible to cover new impacts with an addendum, however if it is at post consent then its likely for material changes you will need a new assessment.																								
What information do regulators require post consent?	- Construction statement - Detailed environmental plan - Baselines for impact monitoring - Decommissioning strategies post consent																								
What are the potential solutions/compromises?	The group struggled to answer this question at this time and felt that these will come out of further discussions/work looking at the specific issues raised - the discussion here focussed around lack of certainty in key assessments which centered on areas of unknown for the HRA. The group felt at present there is a lack of scientific data/certainty to enable a thorough assessment of the impacts to marine mammals and birds which makes undertaking assessment of impacts very difficult for these elements. Discussion centered around overcoming the lack of scientific data either by addressing these gaps through data collection or compilation and review of exisiting data, or to look at risk assesment tools that best utiliise the data we have at this time - The key issue is behavioural responses and currently it is felt we don't understand behavioural response of different species to the different tidal devices. One suggestion was, Can we assume a type/category of tidal device to allow assessments to be standarised at all?																								
What are the recommended actions?	Target key areas of unknown which includes those elements in relation to the HRA and behavioural response of diving birds, mammals, fish (salmon) and any other species of importance within the area - It was suggested that we look at the existing tools that are applied and accepted elsewhere and for other industries, (for example bird collision risk for windfarms) and think about developing tools for wave and tidal projects. One key question raised is what is an accepted threshold when you have no data? - it was considered that further work on accepted thresholds would be helpful - The group suggested that it would be good to pick up on Meygens work and feedback from this will provide further information on what is acceptable and what might be used as a standard - other suggestions included a guidance note on Rochdale Envelope - Regulators stated they would be interested to hear what developers want - it is also considered important to learn from the monitoring that is ongoing and to learn from other industries that encounter similar issues, such as aggregate extraction, not just wind, oil and gas etc																								
What issues should be considered as part of implementing solutions	One key question raised is should we focus on more data or better risk assessment methods or is it a combination of both? - The key issue is the interaction of birds and mammals and other designations with the devices - The question of behavioural response is much greater than the question of what device is used etc - One suggestion to simplify the assessments may be to categorise devices into type and to produce some thresholds on these but this would need to also consider site specific issues - Key questions remain around collision risk, disturbance/displacement during construction, landscape and visual issues and navigation risk - is there a mechanism to prioritise these key questions? - Can we develop better risk assessment methods/tools using the data we have? - Are we sure we know what data is collected and available for use? If not can we find a way to centralise this? - Another key question is how best to present information within applications? Meygen took a holistic view of what is realistic it involved taking a quantitative assessment where you can (using best available data) and adding a qualitative judgement on that. - It was considered that feedback on this work would be helpful for the industry - Could this work be used as a standard?																								

Workshop Matrix – Wave Group

	DESIGN ELEMENT																							
	DEVICE					MOORING/ FOUNDATION	OPERATIONS AND MAINTENANCE				INTER-ARRAY CABLING			OFFSHORE TRANSMISSION - not applicable to Oyster					ONSHORE CABLING - not applicable to Oyster		ONSHORE SUBSTATION	ONSHORE INFRASTRUCTURE	OTHER ANCILLARY INFRASTRUCTURE
STAGE 1: WAVE GROUP	Type	Area and location	Number (MW) layout/ spacing	Specification/components	Installation method	Type	Onsite/ offsite	Maintenance facilities	Service vessels required	Vessel trips to site per day (avg)	Cable type/ length	Installation option/ method	Converter Station (type, foundations)	AC/DC	Maximum number of export cables	Cable corridor size	Installation option/ method	No of cable trenches & estimated burial depth	Number and location of cables	Trench size	Size, location etc	Grid link, local road upgrades etc.	Navigational aids etc
What level of detail can be provided?:	**It was considered that the following questions should be divided into two groups technology developers (who have fixed technology) and project developers (who are technology neutral)**																						
At scoping stage																							
Project Developers																							
Technology Developers																							
At consent application																							
Project Developers																							
Technology Developers																							
For the construction statement?																							
Project Developers																							
Technology Developers																							
Can be fixed / Range of options / Unknown																							
STAGE 2:	**The answers to the following questions were considered general across the project design elements**																						
What are the key limitations to submitting detailed information as early as possible?	Lack of information at a strategic level or at a site level - Can't commit to doing a fine resolution survey - this is very costly - Industry is very new we are still learning - Procurement issues - confirming detailed design at any stage prior to consent would compromise procurement options and increase costs of infrastructure/materials. This point is the key reason for developers not being in a position to be able to confirm detailed design prior to consent award - Investment decisions - detailed survey are very costly so developers don't want to commit until have certainty - Power output doesn't matter - physical environment impacts is the key - Land negotiations are also key for confirming final area/positioning early on in process e.g. substations. Landowner discussions start at the point of scoping report being submitted and often after that. Final positioning cannot be confirmed until these discussions have been resolved.																					
What are the consequences of providing limited information/detail?	Wider envelope or very limited information means a much bigger/more complex EIA - In some cases regulators are simply unable to provide advice - Unlikely to receive site or device specific advice - If there is a lack of detail at the Scoping opinion stage regulators are not able to understand the risk of significant impacts so opinion is not clear. The result can be that significant impacts are missed and only become apparent at a later stage. There is a risk that additional significant impacts only become evident at the point at which the application is submitted. Consequence of this is that individual applicants will have to go back and do some additional surveys or update their ES - Implications for consultation process - Pressure groups can form as a consequence when the public don't' feel that enough information is provided. e.g. visualisation impacts. Better communication with public is needed. Sometimes even after it has been communicated that there will be a range of design parameters there is still unrest in public. It is better to keep the community engaged and enable them to feel part of the process. The application needs to take account of public views throughout development so that the public fully understand project evolution. BUT there needs to be a balance, don't keep bombarding them with communications (see later comments about solutions to managing consultation about design parameters). Some issues are more important to the public e.g. cabling is often the key issue and consultation needs to take account of this - CARE when scoping methodologies out of HRA. Eg Wash wind farm assured that they could HDD under salt marsh but hadn't carried out enough detailed survey to be certain. When it came to construction, they found that technically they were unable to HDD. No alternatives considered in HRA. lesson LEARNT: BE REALISTIC describe a realistic worst case scenario and be very sure of what is technically feasible. Consequences can be huge, e.g with the need for an additional application and the consequent programme delay - Mistakes - projects not consented that could be or projects not consented. This not just about lack of detailed design info though, it is based on lack of knowledge. E.g. thresholds.																					
What issues are faced by regulators once detail is confirmed?	Regulators need time to go back, check the scoping report, the original response and make sure that issues are understood in the application - Once consent has been awarded, before construction can go ahead, regulators will need time (and resource) to go back and check the EIA to make sure it is still valid for the proposed detailed construction activities - expectation is that this can generate 25% more work - Also need to go through HRA carefully.																					
What information do regulators require post consent?	If a lack of information is given for consent, then consent conditions could be more onerous - More monitoring could be required - developers will be told this (pre-construction monitoring) so it is their choice to either go and get the information and present it as part of the application or to accept the conditions likely to be applied.																					
What are the potential solutions/compromises?	Marine Scotland are already doing some very valuable work by collecting geophysical data and bathymetric data in the Pentland Firth area - PFOW developers are collaborating to group data collection e.g. birds and marine mammals. Marine spatial planning . Marine Scotland guidance - As more devices gain consent and are installed it is likely that certain design elements will be more certain earlier in the consent process. Its important to highlight early what aspects you are worried about - establish early that there is nothing of interest in certain areas - Consortium to develop joint studies? Not sure how useful this would be as there are quite a few different devices. Range of devices are increasing rather than reducing. Are there any approaches we can use to 'standardise'? - Could develop some studies to look at broad areas, like rotor swept volume in general - Monitoring provides opportunities for standardising but also for pooling approaches. Pooling resources may provide more useful monitoring results. Also useful for assessing impacts e.g. strategic approach to Population Viability Analysis (PVA) work - Solutions to consultation issues need to be identified earlier - Results from European project on stakeholder engagement (SOWFIA) - New Marine licensing manual will include more advice about consultation and engagement with stakeholders. Might be benefits to bringing Non statutory and statutory consultees together during the application process . Also Marine Scotland workshop looking at mandatory stages of consultation during the pre-application stages - SNH have produced a Service Level Agreement with developers that states when and how often they should be consulted and states that they will meet a three weeks turnaround - Other examples of approaches to presenting rochdale envelopes? Taken advice from environmental consultants - No framework currently to follow so some have looked at the wind industry - MeyGen's approach seems really useful it might be a good framework to use - Advice from marine scotland and SNH, they have suggested that quarterly meetings are helpful throughout the application process (quarterly meetings organised by developers specifically). BUT they have specified that they must have an agenda and a clear purpose to meeting e.g. to discuss Rochdale envelope, to ensure the meeting is useful and not wasted time for both regulators and developers. Now looking to refine this with developers to cover the period between scoping and consent application. This should move project applications towards being easier to consent (Marine Scotland are working towards a "planning processing agreement" this is a signed agreement by developer and regulator that sets out what you can expect the developer to provide and how regulators will be kept informed through the process - Mistakes - projects not consented that could be or projects not consented based on lack of knowledge. E.g. thresholds. What are they? What's the real impacts? How do you set a specific number? How do you monitor the number of birds killed? What is the worst case scenario? Deploy and monitor - assess what the impacts are? phased development e.g. build 10 and then monitor and assess then go on to develop more. Some not starting from scratch - Monitoring requirements - for benefit of industry, it is critical to build in a strategic review process for monitoring otherwise what is the point of monitoring? Marine licensing manual will implement the strategic oversight of the monitoring - Find more opportunities to learn from other industries e.g. offshore wind, onshore wind.																					
What are the recommended actions?	Learning from other industries e.g. offshore wind. Some work with offshore wind developers has identified the need for more design reviews during the pre-application stages. Consenting managers and engineering managers must work much more closely together. Wind industry starting to drive this forward. Must be more that we can learn from other sectors - Be more novel about comparisons. It is clear that there are many different designs however a comparison study for Pelamis found that there were more similarities with the aquaculture industry e.g. entanglement risks, noise issues. This hasn't been considered before, could developers learn more by looking at the issues faced by their chosen technology and look at other industries that face similar issues rather than just looking within the wave and tidal industry? It may be worthwhile carrying out a strategic study to look at technologies to be used in PFOW. The onus is on developers to bring out in the ES - Learning from early monitoring - become better informed to what are the crucial elements. What can you rule out some elements? - Need a process/system for sharing monitoring data. A strategic review managed by regulators is needed, to ensure that outputs are disseminated - Non technical summary should include a summary of the Rochdale parameters. The non-tech summary is often the only part of the ES that the public read - Keep the process flexible - make sure it doesn't get stuck in process - This workshop has only focused on environmental issues. What about navigational issues? They will become more of a concern for wave and tidal projects - PBR work needs to be taken forward to define thresholds. This is a difficult subject - thresholds will be difficult to define but something needs to be done. Developers can try to define design parameters but what use is it if you don't understand the maximum acceptable impact?																					
What issues should be considered as part of implementing solutions	Can EMEC provide more information on lesson learning? - Practicalities for consulting where design parameters are concerned, what information is needed and at what stage?, How do you manage public expectations?. What is considered good practice? Is there something we can learn from other industries? - Need to remember that this industry is at an early stage and developers and regulators are continuing to learn - Dissemination of information about monitoring - Marine Scotland to review and feed back - Guidance - Is there a best practice example? The systematic way Meygen looked at Rochdale is a good example of how to present work, however it may be too early to identify good practice associated with Rochdale. Marine Scotland is looking to develop a good practice example/guidance for ES development - Keep presentation of design parameters/Rochdale information simple - Procurement - is always going to be the issue. You can't tie yourself to design parameters as that would restrict the project (increase procurement cost - suppliers can guess requirements and push their prices up) - Site selection is THE key issue. That will inform better understanding of impacts (even if you had the most detailed parameters, if you can't specify a site then you aren't going to really understand the potential impacts). - Threshold for a region (PBR) we don't have enough information to work out proper carrying capacity (see difficulties mentioned earlier). How do you understand the natural fluctuations? This needs to be assessed over a number of years. Sea bird colonies etc - fishing etc. This is difficult but need to make a start somewhere to progress these issues.																					

APPENDIX 4 – Workshop Presentations

MEYGEN

THE TIDE OF CHANGE IN CAITHNESS

Rochdale Envelope Workshop

Presentation 1 - The need for Rochdale Envelope in Wave and Tidal Developments

A Developers Perspective

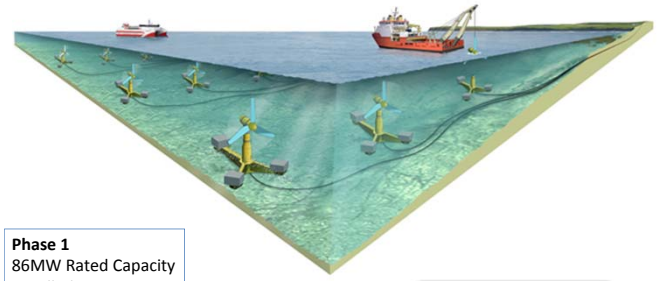
11 June 2012

Agenda

- A review of the various drivers and requirements for a Rochdale Envelope approach in the wave and tidal industry – defining the design envelope.
- An overview of how the Rochdale Envelope approach was used within scoping and consent applications and a review of the key issues faced in providing detailed design information.
- A summary of the key questions faced by developers and recommendations for moving forwards.

MeyGen Tidal Energy Project

Artists Impression



Phase 1
86MW Rated Capacity
Installed over 3 years

Rochdale Envelope Drivers

Why do Developers Need the Approach?

1. To be able to optimise projects in both design and economic terms to ensure that schemes are sufficiently attractive to investors to secure the significant capital that is required to bring projects through to delivery;
2. To allow for detailed design to be refined in the project procurement phase, notably taking into account the evolution of foundation and tidal technology available and variety of installation techniques;
3. An essential need to maintain competitive market behaviour in the supply chain without prejudicing legal procurement rules.

- In summary:
  Managing the Unknown

Rochdale Envelope Implementation

Key Issues

- There may be areas of uncertainty when an application is submitted, → the proposals still need to be of sufficient detail to allow EIA and preparation of an ES.
- The regulating authority must be assured that the environmental effects (including residual effects) of a proposal have been properly assessed → It must be ensured that the maximum potential adverse impacts of a project have been fully assessed and taken into account.
- An assessment of the variations of the proposed project needs to be included in the EIA as well as highlighting areas where certain matters remain unresolved. → Potential variations within a project should be assessed in terms of the likely worst case scenario
- The EIA should also outline the reasons why certain parts of the proposal are not yet finalised → But provide sufficient information to allow potential likely significant environmental effects to be assessed.

MEYGEN

Rochdale Envelope Implementation

Overview

Approach adopted by MeyGen:

1. The Project Description summarises the potential development envelope which has been assessed and why it is required, whilst also presenting the details of what is most likely in practice.
2. Following definition of the project parameters, each EIA study has given careful consideration to the range of potential impacts that may result from the proposed Project, for each parameter, and ensured that the assessment made for each potential impact is reflective of the realistic worst case scenario for the specific parameter under investigation.
3. Each technical section throughout the ES includes definition of what is considered the realistic worst case scenario, and why this is considered to be so.
4. An assessment of the "realistic worst case scenario" in the ES is regarded as the same as the assessment of the "maximum potential adverse impact".

MEYGEN

Rochdale Envelope Implementation

Developer's Experience

- There is limited industry experience to determining which key features that are likely to change, so decisions are mostly driven by the economics of what we know now and what we need to change.
- Every change complicates the EIA and has an associated time and cost consequence so a pragmatic approach has to be taken.
- Determining the "worst case" is not always intuitively obvious so work has to be done in advance to determine what is the "worst case". In some cases a range of cases need to be assessed.
- MeyGen has ensured that only 'realistic' development scenarios have been considered when defining these. Therefore assessment of unrealistic project scenarios and unnecessary duplication of assessment effort is avoided.

Greatest risk:

We haven't correctly selected the range

MEYGEN

Rochdale Envelope Example 1

Tidal Turbine Specification Limits

Turbine Component	Specification
Rated Power	1.0 – 2.4MW
Number of rotors	1
Number of blades per rotor	2 or 3
Rotor diameter	16 to 20m
Maximum blade swept area	201 to 314m^2
Height of structure above seabed (to centre of nacelle)	13.5 – 16m
Minimum clearance from blade tip to seabed	4.5m
Minimum clearance from blade tip to sea surface at LAT	8m
Length of turbine nacelle	12 – 23m
Design options for generation in ebb and flood tides	Mechanical/electrical system to rotate the nacelle into the principal flow direction Thruster in the nacelle tail to rotate the turbine into principal flow direction Bidirectional blades that can generate from flows in opposite directions
Cut in flow speed	approximately 1.0m/s
Cut out flow speed	3.4 – 5.0m/s
Operating rotational speed	8-20rpm (3 bladed) 12-20rpm (2 bladed)
Options for power conditioning equipment	All power conditioning is onshore at the PCC Power conditioning within turbine nacelle and onshore transformer at the PCC
Options for transport of turbine to site location	On deck of dynamic positioning (DP) vessel, or Under tow by an installation vessel
Options for turbine installation	Installation vessel lowers nacelle to foundation, or Nacelle is pulled down onto foundation by a cable

MEYGEN

Rochdale Envelope Example 2

Turbine Support Structure Options

Rochdale Envelope Example 3

Cable Connection to Shore Options

Number of bores	Bore diameter (m)	Bore radius (m)	Cuttings returned to shore			Cuttings discharged to sea		
			Bore length (m)	Volume of cuttings per bore (m^3)	Total volume of cuttings (m^3)	Bore length (m)	Volume of cuttings per bore (m^3)	Total volume of cuttings (m^3)
86	0.3	0.15	1990	140.59	12,091.04	10	0.71	60.76
29	0.6	0.3	690	194.99	5,654.83	10	2.83	81.95

Rochdale Envelope

Range of Variables

- Turbine Parameters
- Turbine Support Structure
- Cable Connection to Shore
- Vessels
- Turbine Layout
- Cable Landfall
- Onshore Project Components
- Onshore Cable Routes

Rochdale Envelope

ES Chapter Summary

Project parameter relevant to the assessment		'Maximum' Project parameter for impact assessment	Explanation of maximum Project parameter
Turbine	Number	86 turbines	The diving bird encounter model is based on a maximum volume of water swept by the turbine blades. This volume is based on number of turbines, rotor diameter and blade thickness. The maximum swept volume for the 86MW project is based on 86, 1MW turbines with 20m diameter rotors and blade thickness of 0.5m. The maximum swept volume of water is (π(10²))*86*0.5m = 13,509m^3 (157m^2 per turbine).
	Layout	n/a	Turbine spacing does not influence the bird impact assessment or diving bird encounter model.
	Rotor diameter	20m	The diving bird encounter model is based on a maximum volume of water swept by the turbine blades. This volume is based on number of turbines, rotor diameter and blade thickness. The maximum swept volume for the 86MW project is based on 86, 1MW turbines with 20m diameter rotors and blade thickness of 0.5m.
	Blade thickness	0.5m	The diving bird encounter model is based on a maximum volume of water swept by the turbine blades. This volume is based on number of turbines, rotor diameter and blade thickness. The maximum swept volume for the 86MW project is based on 86, 1MW turbines with 20m diameter rotors and blade thickness of 0.5m. The maximum blade thickness is 0.5m. The blade thickness decreases down the length of the blade however for the purposes of the assessment the maximum width is used.
	Minimum clearance between sea surface and turbine blade tip	9m	The minimum clearance between the turbine blade tip and the sea surface is 9m. The minimum clearance is used to calculate the percentage of turbine deployment area/water volume taken up by turbines rotors.
	Clearance from blade tip to seabed	4.5m	The minimum clearance between the turbine blade tip and the seabed is 4.5m. The minimum clearance is used to calculate the percentage of turbine deployment area/water volume taken up by turbines rotors.
	Number of blades per rotor	n/a	This Project parameter does not influence the bird impact assessment. The number of turbine blades is not an input parameter to the bird encounter model.
	Rotation speed	n/a	This Project parameter does not influence the bird impact assessment. The turbine rotational speed is not an input parameter to the bird encounter model.
	Operational noise	36 x 2.4MW turbines	The 2.4 MW turbine produces the highest noise and an array of 36 turbines of 2.4MW produces higher noise emissions than an array of 86 turbines of 1MW
	Decommissioning	All turbines removed at decommissioning.	All turbines will be removed at decommissioning.
	Oil fluid inventory	1,500 litres	The tidal turbines will contain an inventory of fluids including oil, hydraulic fluid and coolant. Turbine inventories will be between 645 and 1,500 litres.
Turbine support structure	Maximum drill cuttings released into marine environment	86 monopile TSS	The drilled monopile TSS will result in the maximum release of drill cuttings to the marine environment. Assuming the maximum number of 86 TSSs, the maximum amount of drill cuttings that can be generated from turbine support installations is 17,200m3 (total for 86 TSSs).
	Installation noise	Pin-pile TSS	Pin pile drilling produces higher noise output than monopile drilling based on available data. Pin pile source levels are 178 dB re 1 µPa at 1 m.
	Maximum amount of compressor lubricant released into the marine environment	86 monopile TSS	Monopile drilling operations will take approximately 4 hours per pile. A compressor is used to pump air into the drilled holes to lift cuttings clear. The lubricant will be discharged to sea along with the cuttings at a maximum rate of 6 litres per hour, i.e. 25m³ per monopile and 1,720m³ for all 86 installed over 3 years.
Cable landfall	Maximum drill cuttings released to marine environment	29 HDD bores, drilled from either Ness of Quoys or Ness of Huna	The majority of drill cuttings generated from the drilling of the HDD bores will be returned to shore and not discharged to sea; however it is estimated that the contents of the last 10m of each bore could be discharged to sea and the seabed breakthrough. The greatest potential volume of cuttings discharged to sea at breakthrough will result from last 10m of 29 boreholes of 0.6m diameter 82m2.
Vessels	Installation vessel physical presence	1 DP vessel for the duration of the installation for year 1 and 2 2 DP vessels for year 3 installation	Installation activities will be carried out by a single DP vessel during year 1 and 2; all installation activities to be undertaken using a single DP vessel. If other smaller vessels used to undertake some of the work of the DP vessel, no concurrent multiple vessel activities will take place, i.e. no more than one vessel on site at any one time. Year 3 installation will require a maximum 2 DP vessels for TSS installation. These two vessels may be present on site at the same time during year 3.
	Installation vessel noise	Tug vessel noise	Noise data for DP vessels are currently unavailable. Of the vessel noise data available tugs represent the noisiest vessels and are used to represent the highest possible noise source during installation operations. Tug source levels are 172 dB re 1 µPa at 1 m.
	Maintenance vessel physical presence	1 DP vessel present every 2.8 days	Based on a maximum 86 turbine array, 1 DP vessel will be present a maximum of 130 times (i.e. single stack tide operation) per year i.e. the DP vessel present on site every 2.8 days.
	Maintenance vessel noise	Tug vessel noise	Noise data for DP vessels are currently unavailable. Of the vessel noise data available tugs represent the noisiest vessels and are used to represent the highest possible noise source during maintenance operations. Tug source levels are 172 dB re 1 µPa at 1 m.

Rochdale Envelope

MeyGen Experience & Key Questions

- The MeyGen experience of adopting the process described is:
  - There is no formula for selecting which specifications to vary and by how much.
  - There is a balance between maintaining credible options and incurring additional assessment work, again only time will tell if we got it right
  - During the course of the EIA we needed to change some of the variables, this delayed the assessment
  - We spent a long time finding the best way to explain why the project needed specification options and which combination of options would lead to the "worst case" but credible development option. This also delayed the assessment work.
- Key Questions
  - We believe we have done everything possible to explain our approach in the ES and given sufficient information for the reader to make an informed judgement. Do the reviewers agree?
  - Is there a more straightforward approach?
  - What happens if something comes along we haven't considered ? Is there a mechanism to change some of the variables after consent?

MEYGEN

Sep-12
Confidential and not for distribution

13

"Rochdale Envelope" and the EIA / HRA processes

Erica Knott
Senior Casework Manager – Offshore Renewables
Scottish Natural Heritage

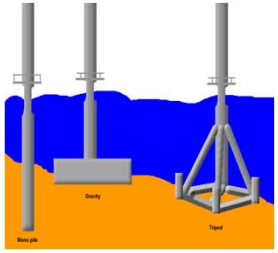
Scottish Natural Heritage

Roles of SNH / JNCC

•SNH provide statutory advice on natural heritage aspects for projects within 12nm to developers and regulators
•JNCC provide statutory advice on nature conservation aspects for projects beyond 12nm.
•Both SNH and JNCC provide joint advice where possible for projects that straddle the 12nm boundary and / or where there are clusters of development on both sides of12nm.
•Pre-application engagement – Screening, Scoping for EIA advice on HRA / EPS issues
•Post-application, pre determination – assessment of application including any EIA / HRA requirements especially advice in respect of any Appropriate Assessment

The "Rochdale / Project Envelope" Approach

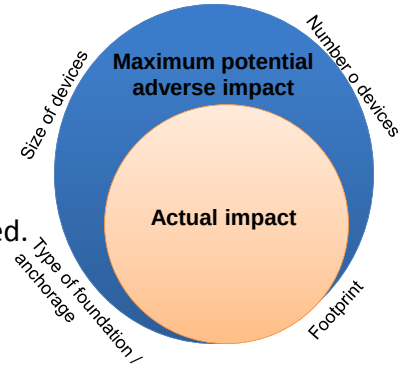
- The Rochdale Envelope approach is a series of **projected maximum extents** to the development for which the significant effects are assessed. The detailed design of the scheme can then vary within this envelope without **rendering the EIA and / or HRA inadequate**.



COWRIE

Rochdale Envelope in EIA

Provides a framework for assessment of potential environmental effects, where the project isn't defined.



MEYGEN

THE TIDE OF CHANGE IN CAITHNESS

Our experience

– Principles enshrined in the Rochdale judgment are not new to SNH and our involvement in casework advice.

–Offshore wind developers are working on Project Envelope principles.

–The use of a Project Envelope does raise some potential issues which need to be carefully explored especially with regard to HRA and post consent for SLVIA.

Consideration of Issues

- Emerging Industries - device development
- Consent required in some cases several years before project build out – R&D. procurement, supply chain.
- Cumulative Impact Assessment requirements
- Communication of project envelope during pre application discussions

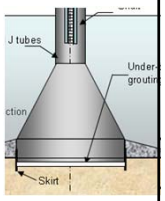
"The more detailed the proposal, the easier it will be to ensure compliance with the Regulations." *IPC Advice Note 9*

Reduced risk of **legal challenge** post-consent

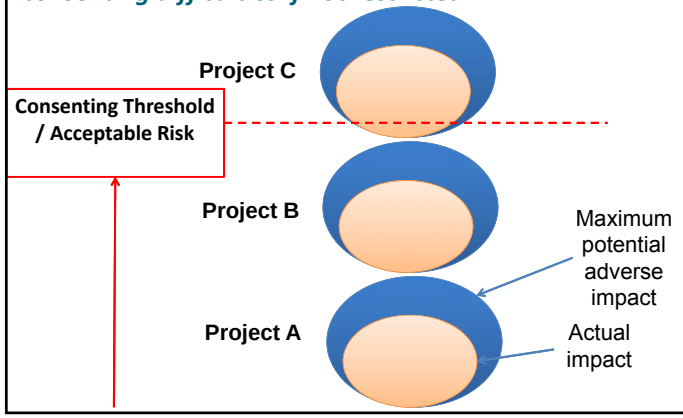
More straightforward EIA / **HRA**

Less chance of delays in project development

- Aims to ensure that no unpredicted effects arise
- Different for different receptors
  - E.g. Foundation types – GBS and piles
- Consider inter-relationship – maximum adverse impact
- Difficult to consider combinations of parameter options – need a consistent methodology



Rochdale Principles and HRA -
consenting difficulties if not restricted



Focus on key consenting risks

- Where there are key consenting risks which may be consented by an acceptable threshold approach, developers should consider early to what extent this will define their design parameters.
- I.e. what are the best design options to:

..reduce the risk to marine mammals / birds during construction?

..minimise collision risk?

..minimise the risk of displacement ?

Remember

- What may be a suitable option for one receptor may require further consideration from another receptor i.e. it may increase the risks or number so scenarios that require to be considered.
- Defining a realistic worst case scenario may be a complex juggling act. Recommendation to keep engaged with both SNH and Marine Scotland during this process.

Seascape, Landscape and Visual Impact Assessment

- Need to consider how visualisations presented during the application process (public exhibitions, ES etc) may not reflect what is consented and built
- Post consent, pre construction visualisations
- Use of conditions

Seascape, Landscape and Visual Impact Assessment

- There will be differences in approach between differing technology types, however one thing everyone will have in common is the need for onshore infrastructure.
- Requirement for design principles?
- Consideration of cumulative impact assessment – collaboration?

Recommendations

- We support developing a consistent and sensible EIA framework using Project Envelope principles
- We support and advocate more collaboration across industry, advisers and regulators, particularly where consenting risks are cumulative
- We emphasise the need to consider key consenting HRA) risks as these could define design options including mitigation
- For consenting multiple projects, realistic quantification of impacts will lead to greater capacity consented.

Recommendations cont'd

- Need to consider further - post consent, pre construction issues surrounding public participation, particularly presentation of visualisations of final design
- Consideration of better use of conditions. Identifying acceptable thresholds and agreed detail between consent and construction.
- Consideration by industry as to what commitments are made in Environmental Statements and follow through into Environmental Monitoring and Management Plans (EMMP).

MEYGEN

THE TIDE OF CHANGE IN CAITHNESS

Rochdale Envelope Workshop

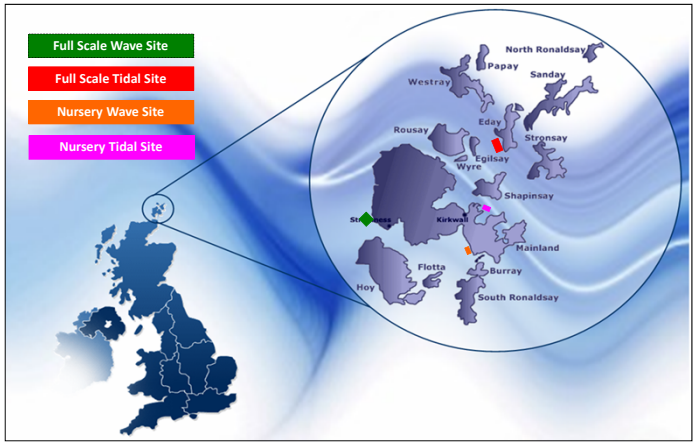
Generic Site Licensing
EMEC Nursery Sites – a Case Study

11 June 2012

Jennifer Norris
Research Director

Achievement

Where is EMEC?

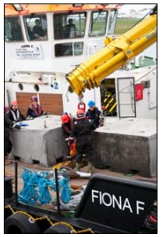


Licensing at EMEC

- Initial hopes for site licences / exemptions
- Device-specific licences still required (developers)
  - Don't always require full EIA
  - Do require supporting device-specific environmental and navigation risk assessments
- Marine Licensing developments give scope for simplification to avoid duplication
- EMEC Nursery (scale) used to test simplified process for site-wide licence
  - Issue site licence to EMEC
  - Issue updating amendment as devices come and go

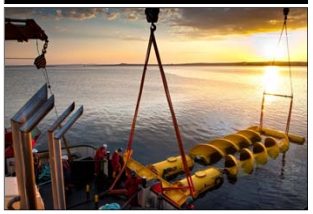
Nursery test sites

- Smaller scale sea trials
- Berths with moorings
- Rehearsal space for deployment techniques etc
- Component testing
- More gentle sea conditions
- Non-grid connected
- Test support buoys record device performance and dissipate electricity
- **Have site Licences**

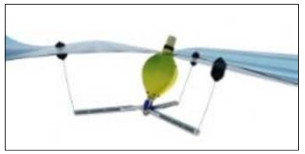


Nursery site activity

Shapinsay Sound



Scapa Flow



‘Generic’ site licences

Application for these licences required

- ‘Envelope’ description
  - Characteristics of devices anticipated
  - Range of operations anticipated (including vessels to be used & typical duration on site)
- Environmental and Navigational descriptions and risk assessments
- HRA for species of special interest
- **Data provided to Marine Scotland for HRA**
  - Used 1-year of EMEC monitoring data
  - Licences to be updated with each deployment
  - Provided project details are contained within ‘envelope’

Device characterisation

- Mass
- Length
- Draft (floating devices)
- Height from seabed (seabed-mounted device)
- **Device type**
- **Position in water column**
- Specification of testing scenarios
  - Deployment methods and mooring arrangements

Operational activities also characterised

- Full range of activities covering installation, testing and decommissioning

Device categories specified

Wave site

- Floating surface structure
- Sub-surface floating (neutrally buoyant) structure
- Seabed-mounted sub-surface structure

Tidal site

- Floating structure with sub-surface blades
- Surface-piercing structure with sub-surface blades
- Sub-surface structure with sub-surface blades

Position in water column

Wave site

- Partially submerged occupying top 0.5 – 1m
- Occupying 1 – 10m from surface
- Occupying significant proportion of water column, possibly extending above surface

Tidal site (statement of the obvious…)

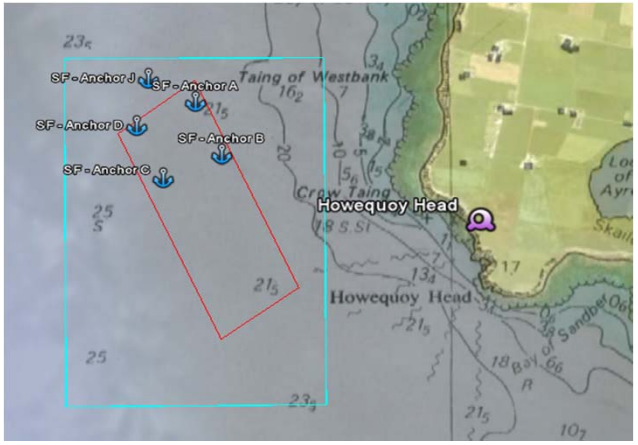
- Any device blades or other energy-capturing surfaces are likely to move within the water column to some extent – ie potentially occupies all of water column

Type of Rotor (tidal site)

Tidal site only

- Blades with exposed tips (may include multiple rotors, on single or multiple axles)
- Blades with enclosed tips (may include multiple rotors, on single or multiple axles)
- Single or multiple Archimedes rotors

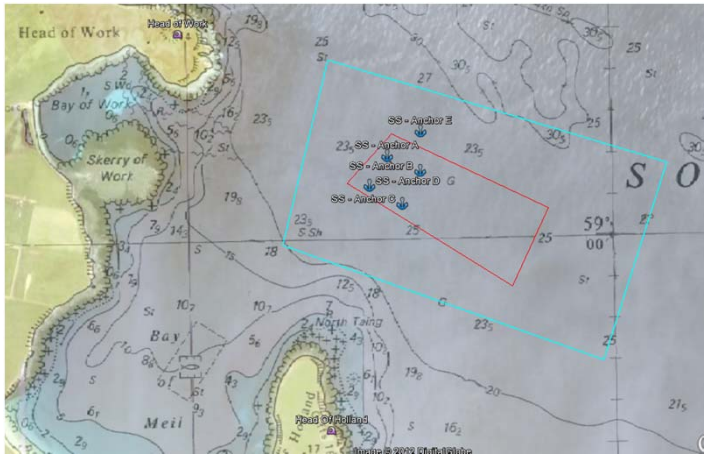
Scapa Flow Wave Site



Wildlife observations at Scapa Flow Nursery Wave Site

- 2 x 2h per week
- Team of 2 observers
- VP = Howequoy Head
- Grid: 5mins birds
  5mins mammals
- Funded by ScotGov

Shapinsay Sound Tidal Site



Wildlife observations at Shapinsay Sound Nursery Tidal Site

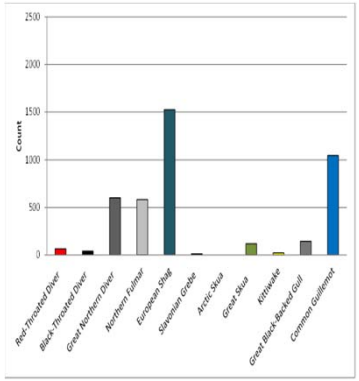
- 4 x 2h per week
- Team of 2 observers
- 2 VPs: Head of Holland
  Head of Work
- Grid: 5mins birds,
  5mins mammals
- Funded by ScotGov

Seabird Species of Special Interest in Scapa Flow (SNH)

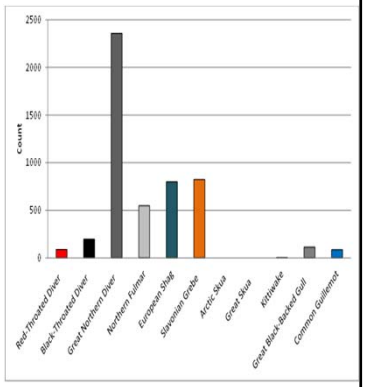
MEYGEN

ID	Common Name	Latin Name	SPA
1	Red-Throated Diver	Gavia stellata	Hoy Orkney Mainland Moors
2	Black-Throated Diver	Gavia arctica	-
3	Great Northern Diver	Gavia immer	-
4	Fulmar	Fulmarus glacialis	Hoy
5	Shag	Phalacrocorax aristotelis	-
6	Slavonian Grebe	Podiceps auritus	-
7	Arctic Skua	Stercorarius parasiticus	Hoy
8	Great Skua	Stercorarius skua	Hoy
9	Kittiwake	Rissa tridactyla	Hoy
10	Great Black-Backed Gull	Larus marinus	Hoy
11	Common Guillemot	Uria aalge	Hoy

Counts of Species of Special Interest in the EMEC Scapa Flow survey area



Summer counts

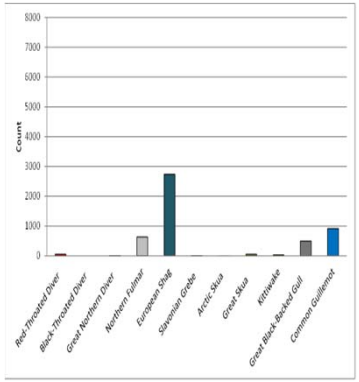


Winter counts

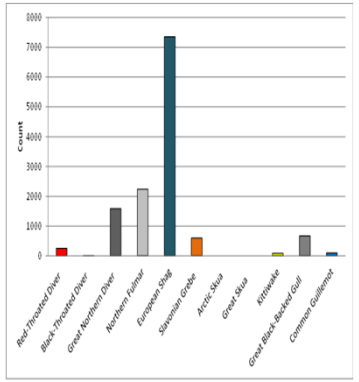
Seabird Species of Special Interest in Shapinsay Sound (SNH)

ID	Common Name	Latin Name	SPA
1	Red-Throated Diver	Gavia stellata	Hoy Orkney Mainland Moors
2	Black-Throated Diver	Gavia arctica	-
3	Great Northern Diver	Gavia immer	-
4	Fulmar	Fulmarus glacialis	Hoy, Copinsay
5	Shag	Phalacrocorax aristotelis	-
6	Slavonian Grebe	Podiceps auritus	-
7	Arctic Skua	Stercorarius parasiticus	Hoy
8	Great Skua	Stercorarius skua	Hoy
9	Kittiwake	Rissa tridactyla	Hoy, Copinsay
10	Great Black-Backed Gull	Larus marinus	Hoy, Copinsay
11	Common Guillemot	Uria aalge	Hoy, Copinsay

Counts of Species of Special Interest in the EMEC Shapinsay Sound survey area



Summer counts

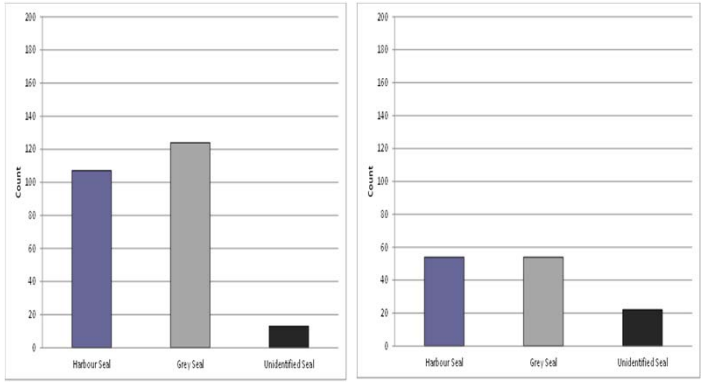


Winter counts

Marine Mammal Species of Special Interest in Shapinsay Sound

ID	Common Name	Latin Name	SAC
1	Basking Shark	Cetorhinus maximus	-
2	Harbour Porpoise	Phocoena phocoena	-
3	Killer Whale	Orcinus orca	-
4	Risso's Dolphin	Grampus griseus	-
5	Harbour Seal	Phoca vitulina	Sanday
6	Grey Seal	Halichoerus grypus	Faray Holm of Faray
7	Unidentified Seal	-	-

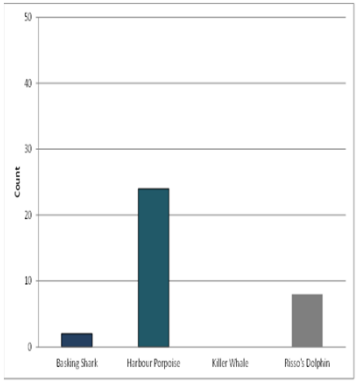
Seal Species of Special Interest in the EMEC Shapinsay Sound survey area



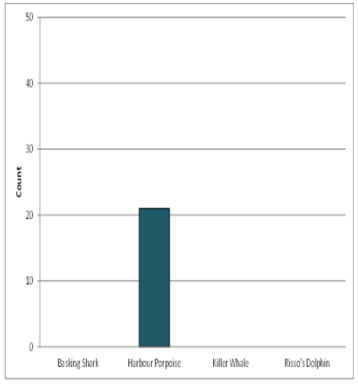
Summer counts

Winter counts

Cetacean Species & Basking Shark in the EMEC Shapinsay Sound survey area



Summer counts



Winter counts

Habitats Regulations Assessment

EMEC provided to Marine Scotland:

- Device characterisation 'envelope' description
- Wildlife data from observations

Marine Scotland undertook precautionary study

- Collision modelling (Band Model)
- Assessing likelihood of key species occupying same physical space as swept area of water column

Concluded no significant risk to key species

Collision Risk Model – Band Model

Combines consideration of

- Physics of Collision
- Behaviour of species of concern, considering (for birds):
  - Size of bird
  - Flight speed
- Characteristics of device blades
  - Size of blades
  - Speed of blade rotation
  - Angle of blades

Thank you for your attention

Jenny.Norris@emec.org.uk

Marine Licensing

The Scottish Government

Roger May
Marine Scotland, Marine Laboratory, Aberdeen

marinescotland

Today's prese

- Design Flexibility (Rochdale Envelope)
- RISK of not covering material /Risks of too large an envelope
- What you finally build
- Effect on Consenting Process
- Cumulative Design Flexibility
- Summary

Design Flexibility (Rochdale Envelope)

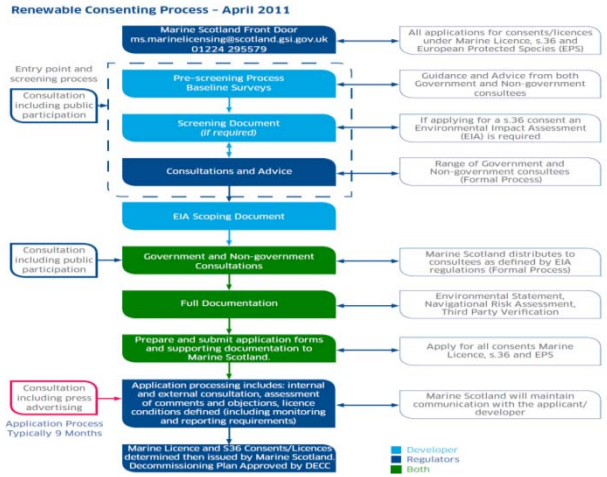
- Reasons for requiring flexibility
  - Supply chain only kicks in after consent. Developer does not wish to tie himself by fixed consent
  - Survey costs. Developer does not wish to incur full survey costs to identify exact location until after consent.
  - Technology Development
- Address any issues which might have a *material* effect
  - It covers everything within your development. Not just ecological impact.
  - Visual Impact- Offshore substation with tidal project.
  - Increased length or size impact on NRA

RISK of not covering material effects/ Risks of too large an envelope

- If you have gravity bases and once consented find you need to pile them. You will be outside your envelope and will not be allowed to proceed. Will need to amend or resubmit for new consent. Possibility that baseline studies are not sufficient therefore two years more studies before can resubmit.
- The risk of too wide an envelope means increased cost for the developer. Instead of one or two problems the ES may identify several making it more difficult to consent a project. There will be additional costs in the surveys required and to produce a larger ES. Potential for MSLOT to allow consent within smaller envelope.

What you finally build

- What you finally build will fall within the design parameters consented.
- It may include a mixture of worst case scenarios ie some gravity and some piled foundations (consideration of different in combination effects should be in the ES).
- It will be built to a Construction Statement finalised at least 3 months before construction starts.
- All phases of the development will be monitored by a Marine Environmental Monitoring Plan
- MSLOT will test the Construction Statement to see that it falls within the envelope originally consented



Effect on Consenting Process

- Refinement of Envelope from Scoping to Consent
- Need to ensure that appropriate ranges are identified at scoping so that suitable surveys and methodologies are put in place for the EIA
- Consent expect reduced envelope with explanation why still required.
- Leads to Consent conditions – Construction Statement, MEMP which are agreed with MSLOT and statutory consultees.
- Construction Statement will be design freeze and will be tested by MSLOT (Wheatcroft test

Cumulative Design Flexibility

- Each project will use up a share of any particular environmental parameter
- Design flexibility will always look at the worst case scenarios.
- The probability that any threshold for a particular receptor will be exceeded is therefore greater.
- There arises for the regulator the possibility of having to refuse consent until MEMP for constructed projects shows a smaller impact before allowing the other developments to go ahead.
- For the regulator there is a continual need to reassess projects
- HRA at Consent, again with construction statement again periodically as MEMP reports come in.

1. Ensure effects fall within predicted levels
2. Identify whether effects are smaller than predicted therefore allowing other developments to go ahead

Summary

- We are looking for one Environmental statement for the whole project. Terrestrial and Marine
- Clearly defines and provides reasons for a Rochdale envelope. Provide ranges of options and identifies and justifies the "Worst case scenario".
- Cumulative Design Flexibility- Developers in their ES must deal with the design envelopes of other projects. Not just renewables.
- Requires co-operation at early stage, exchange of information, shared or compatible methodologies.

end

- Contacts:-
- Marine Scotland – Licensing Operations Team
- Marine Laboratory PO Box 101
- 375 Victoria Road Aberdeen AB11 (DB
- Direct Line +44 (0)1224 285579
- Fax +44 (0) 1224295524
- ms.marinelicensing@scotland.gsi.gov.uk
- Web http://www.scotland.gov.uk/Topics/marine/Licensing/marine/Applications

THE CROWN ESTATE

The Crown Estate
16 New Burlington Place
London W1S 2HX
Tel: 020 7851 5080

www.thecrownestate.co.uk