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UK Wave and Tidal Demonstration Zones Workshop Report

September 2015

Final Report

The Crown Estate

**UK Wave and Tidal Stream Demonstration Zones and Test Sites
Workshop Report**

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Final Report

The Crown Estate

UK Wave and Tidal Stream Demonstration Zones and Test Sites

Workshop Report

For and on behalf of
Natural Capital Ltd

Approved by: Dr Annie Say

Signed: 

Position: Director

Date: 28.9.15

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UK WAVE AND TIDAL DEMONSTRATION ZONES AND TEST SITES WORKSHOP REPORT

SUMMARY AND COLLATED ACTION LIST

1. INTRODUCTION

This document summarises the key findings of a workshop hosted by Welsh Government in Cardiff on the 14th and 15th July 2015. The workshop was facilitated by Natural Capital Ltd on behalf of a Client group of The Crown Estate, the Welsh Government, Natural Resources Wales (NRW), Scottish Natural Heritage (SNH) and Natural England (NE). Other Steering Group partners were Marine Scotland, RenewableUK and the Marine Management Organisation (MMO).

Participants included representatives from a range of government organisations, statutory nature conservation organisations, demonstration zone and test site managers, developers and consultancies.

A facilitated discursive approach was used at the workshop with participants working in small groups and in plenary session (see Chapter 2¹). It was informed by a Discussion Note which included workshop prompts. This was circulated in advance of the workshop (see Annex D).

2. OBJECTIVES OF THE WORKSHOP

The key objective of the workshop was to bring those with an interest in the wave and tidal stream sectors together to discuss and share ideas about some practical consenting and research issues relevant to demonstration zones and test sites and with potentially wider benefits to the wave and tidal stream sectors. These sites provide opportunities to develop and establish joint learning objectives relating to the environment and technical engineering aspects of device and array testing to ultimately de-risk project development and consenting. Joint working has the benefit of reducing the potential for inefficient and duplicated effort, sharing costs and taking a coordinated approach to dealing with shared issues.

Three key themes relating to UK wave and tidal stream demonstration zones and test sites were discussed at the workshop:

- Theme 1: Defining Rochdale envelopes for demonstration zones and test sites.
- Theme 2: Evidence requirements for demonstration zone and test site consents.
- Theme 3: Role of the demonstration zones and test sites in improving the environmental evidence base to de-risk consenting.

3. OUTPUTS

The outputs from the workshop identify principles of good practice and initial guidance which can be used as a framework to develop detailed guidance for the industry (see Chapter 5). These include consideration of how collaborative working can be promoted and approaches best shared.

¹ References in this summary refer to the main Workshop Report

4. SUMMARY OF KEY FINDINGS

Key findings from the workshop and comments on these are included in Chapter 4 of the Workshop Report and a summary is provided below.

1. Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites

Use of the Rochdale Envelope

- The use of a project design envelope or Rochdale Envelope is common in applications for wave and tidal stream projects.
- The use of a well-defined design envelope which clearly distinguishes information relevant to different technologies and different project components allows flexibility to accommodate future developments and different technical parameters.
- If the envelope is not used robustly it can bring risks into the consents process and also in delivering projects on site post-consent.
- The understanding of the history of the envelope and the full implications of its use is variable and project descriptions in environmental impact assessments (EIAs) reflect this.
- The word 'Rochdale' has little relevance to marine projects and workshop participants considered that 'project design envelope' was more suitable terminology to use. At present the terms are used interchangeably.
- Project design envelopes have been used in other sectors and experience from these could benefit the wave and tidal stream industry.

Consents and the Use of the Rochdale Envelope

- The consenting authority must be able to meet the requirements of the EIA Regulations in considering the significant effects of the proposed development including the impacts of developing proposals and changing technologies.
- Different approaches to defining and using project design envelopes have been used in various environmental statements. The more clearly defined the envelope is, the easier it is to be able to consider whether significant effects of likely types of future development have been defined. This presents a challenge when technology is evolving rapidly and when detail at the time of application may change in the future.
- The unknowns of developing technology are hard to define and it will be important for Regulators to focus on those issues which are potentially significant including the potential for cumulative effects.
- A key question will be 'can worst case parameters be developed for projects where technology is under development and where research studies still need to be progressed to understand the levels of impacts that could result'?

What is a realistic envelope? How should it be defined?

- Clear parameters need to be defined within which development can evolve and be built out.
- The envelope needs to be broad enough to accommodate technology unknowns. If the envelope is too narrow whilst presenting some benefits for consenting it may be difficult or impossible to accommodate technological change and therefore the site may be commercially unattractive or even unviable.
- Where the level of flexibility described in an application is too broad it may be difficult to define impacts and consideration of cumulative effects may be even more challenging which together may lead to refusal or to the use of a heavy burden of potentially arduous and expensive consent/licence conditions which could make an area less attractive to developers.

- A realistic envelope should be defined making best use of existing information and be described to remove uncertainty in an application whilst maintaining some flexibility.
- An envelope and commitment to future monitoring measures should not be used to avoid work that is required to inform an adequate assessment of significant effects of a development. The usefulness of future adaptive management measures is acknowledged but these in themselves need to be carefully defined and used robustly.
- The role of all parties in defining and agreeing a realistic design envelope was clearly supported at the workshop. Consultants need to work closely at an early stage with developers and engineers in understanding the variations in technology which might be used and the applicant's team needs to engage with key consultees to ensure that the implications of any definition are fully understood by all sides and a common understanding is gained of what might be an acceptable envelope in principle pre-application.
- This detailed consultation may put additional pressures on regulators in the early stages of delivery on site of projects, but as knowledge and understanding of the sector grows this burden would be likely to reduce.
- Defining 'a worst case project design envelope' may not be a realistic design envelope. The envelope in itself may become restrictive to development by introducing a range of parameters which are too demanding to be helpful in consenting. Understanding and defining a realistic envelope is more helpful and allows mitigation to better be defined which is practical and deliverable.
- A project design envelope can best be defined based on likely significant impacts from the development on key receptors. The understanding of the sensitivity of those receptors to the likely technology variations and various options for technical parameters needs to be understood and can be built up through an iterative process which will allow the project design envelope to become increasingly well defined.
- The focus in defining the project envelope should be on likely interactions between the project and the receptor and not on the sensitivity of the receptor itself. This approach allows focus in defining the envelope on things which matter and can reduce the potential for over complication.
- There is no need for an envelope approach for parameters where the potential for interactions and residual effects is not significant.
- It is also important when undertaking an EIA that the level of detail used is appropriate for assessment purposes. EIA is a relatively crude tool and the level of detail required is that needed to identify the potential for significant effects on the environment (that is effects which should be brought to the decision makers' attention because they could be material).
- As understanding of different technologies and feedback from monitoring and research studies increases the definition of the design envelope for a project will become easier because it can be better evidence based, with greater knowledge available about the potential for interactions of species with various technologies.

Demonstration Zones and the Project Design Envelope

- The use of an appropriate and robust project design envelope will be essential in applications for demonstration zones if consent is sought for an area which could in the future be used for multi-technology projects which are not defined in any detail at the time of application.
- The detail of how the project design envelope can best be used will evolve as the legal consenting approach for demonstration zones is agreed.
- A broad but realistic envelope is likely to be required to accommodate future technologies in the demonstration zone. However it will be important that the use

of over broad envelopes does not result in worst-case scenarios which are unrealistic and restrictive to future development in any zone.

- In any consent it will be important to consider the differences between the sensitivity of receptors to wave and to tidal technologies to ensure that an overly precautionary approach is not taken.
- It will be important for demonstration zone and test site managers to work together to find common ground sharing experience and learning from pilot sites such as the European Marine Energy Centre (EMEC).
- Consent for a site rather than for a project will be challenging until the evidence base from built out projects increases. The key question will always be is sufficient information known to define significant effects and to understand what the implications of these effects might be. A precautionary approach will be likely to prevail until the knowledge of the potential impacts of the industry becomes tried and tested and the effects of different projects better understood although it is important to consider that only sufficient information to identify significant effects under the EIA Regulations is required in considering applications.

Post-Consent Implications

- In defining a project design envelope it is important to consider the whole process including the post consent implications. The conditions of any permission will set the parameters within which development can proceed and the use of an agreed and consented project design envelope could have many advantages and save time in taking development forward.
- Use of an unrealistic project design envelope, however, in an application is likely to be commercially unattractive because the requirements cannot be met or are too restrictive (see above).
- There will be challenges making sure activities within sites and zones fall within the project design envelope under which they were consented if a full pre-consenting approach is found to be acceptable.
- If sites and zones are fully pre-consented there is no regulatory mechanism for checking activities are not 'worse' than what was assessed as no additional permissions would be required. Lessons learnt from elsewhere can be followed to meet this hurdle by using, for example, construction method statements which have to be agreed with the regulator and consultees before development starts on site and is then implemented.
- Defining when a change from a consented envelope is material can also be a challenge and can be perceived differently by parties involved. The consideration of the potential for cumulative effects between different projects can also be challenging. The workshop indicated the differences in views of regulators and developers where regulatory responsibilities may lead to more precautionary approaches.
- Using adaptive management measures will be useful but cannot be used as a catch all for everything if the effects are not first appropriately understood. Again the growing research and evidence base will give more confidence in decisions and may reduce the concern about things which are found to not be material.

2. Theme 2: Evidence Requirements for Demonstration Zones and Test Site Consents

Why Evidence?

- Inadequate characterisation of a site can result in consenting risks.
- It is important that applicants and all involved in the application have a common understanding of why evidence is required and for what purpose and what is required at what time.

- This will include information needed to define the project design envelope by understanding sensitivities and the likelihood of interactions with technology; to undertake EIA; for Habitat Regulations Assessment (HRA) and for consideration of European Protected Species (EPS).

Effective Consultation

- Early interactions with the regulator and the statutory nature conservation bodies (SNCBs) can help ensure best use of existing information (data and knowledge) is made. More pragmatic approaches by regulators will be based on realism and confidence and reduced uncertainty by effective interactions with the applicant's team.
- Regulators need to be realistic and clear about what they are asking for and why, and be aware of the potential limitations of their requests and consequences. Developers need to be aware of what a regulator needs for a competent EIA, HRA or EPS assessment.
- The two parties may not agree and it is important to try and find common ground through the better understanding of the implications of any uncertainties. Effective communications can help find appropriate ways forward when little data may be available.

Sharing Experience

- Collaborative approaches to sharing experiences and to defining helpful research studies are important and the commitments to the Offshore Renewables Joint Industries Programme for Ocean Energy (ORJIP OE) and its action programme has potential to increase the availability of evidence to inform future assessments.
- Effective feedback loops to those involved in applications about information and understanding gained on various projects (in all relevant sectors) and through research and monitoring programmes can reduce the impacts of these uncertainties and help reduce what may be excessive requests for data to inform EIA and future consenting risks.
- A challenge is how developers, regulators, consultants and the public can best keep up with the already available information and that which will become available in the future to inform assessments. It is important that practical means of sharing access to research and monitoring studies are implemented and kept up to date.
- Open discussions and open minds will better allow the use of risk-based approaches by reducing the concerns about uncertainties through shared information. It is important in considering future monitoring and research programmes what data and information can best help de-risk this approach to taking projects forward.
- The evidence that can be gained from deployments in the water is invaluable but commercial sensitivities may at least in these early stages present some challenges in accessing relevant information.
- Experience from other industries too may help in understanding likely impacts or the success of mitigation.

Understanding Sensitivities

- The sensitivities and vulnerabilities of receptors to interactions with technologies are not fully understood and future research and monitoring work will inform this. A challenge is to decide what data are sufficient to meet assessment and consenting needs.

Environmental Impact Assessment

- An EIA can only be a snapshot in time and a dilemma may arise when new information becomes available and better informs the understanding of evidence needs late in the EIA process. The detail of information required to inform EIA is that required to identify significant effects but may be more complex when cumulative assessments, which may be particularly relevant in demonstration zones, are considered.
- The understanding of what is a significant effect may also differ between different consultants or between the applicant's team and the regulator. All projects will have some impacts but the decision is at what point these impacts could be material (significant). Confidence in statistical certainty in modelling approaches may also be open to question on some occasions.
- The use of adaptive management measures as future mitigation poses a challenge and raises the question at what point is this acceptable or not in consenting? It cannot become a catch all for dealing with data and information gaps yet it is an important method of dealing with what may only be perceived risks from development rather than known effects.
- Some projects have gone forward with robust mitigation implemented which may in itself be a barrier to understanding whether an impact would have actually happened if the mitigation was not in place. Development is to be embraced and so mitigation is implemented but this needs to be realistic and reasonable.
- A realistic project design envelope needs to be defined for projects and demonstration zones (see Theme 1). If this is too broad, required extensive mitigation may become restrictive to future development and reduce the ability to learn from such projects. Mitigation to reduce the significance of potentially significant effects will remain important to consenting.

Risk-based and Proportionate Approaches

- A key requirement is to understand whether there are impacts that need to be mitigated and an appropriate evidence base is needed to inform that assessment. Such information should be fit for purpose and proportionate to the scale and likely effects of the development as promoted by the Risk-Based Consenting for Offshore Renewable Energy (RiCORE) project (see Annex D).
- Work by NRW and SMRU Consulting and the ORJIP OE strategic research programme (and other such initiatives) will provide outcomes in the future which will inform assessments and help to take the risks out of the findings of assessments by being better evidence based which in turn will reduce the data gathering needs in some locations.
- Continuing use of the Scottish Government's Survey, Deploy and Monitor policy is also helping ensure a proportionate approach to assessment where information is available to allow a more proportionate approach to characterisation of sites.
- Case law in other sectors (for example, the Cornwall decision²) has shown that significant effects should be identified pre-consent and hence working together to reduce uncertainties, better understand what are real potential impacts and not perceived risks and ensuring that characterisation surveys are fit for purpose is and will continue to be of key importance.
- Defining and agreeing what is an acceptable proportionate approach to evidence requirements is not without challenge.

² Consent was given by Cornwall Council for the extension of a landfill in mines where potential for lesser horseshoe bat was known but surveys had not been undertaken for the EIA. The Council had made it a condition of the planning consent that surveys were to be carried out to discover if bats were present on the site before construction. The judge ruled those surveys should have been carried out prior to the permission being granted in order that significant effects could be determined before the grant of planning permission and the permission was overruled

3. Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife

Research and Monitoring

- Research studies and future monitoring outcomes from demonstration zones have potential to contribute to the understanding of likely interactions between receptors and different technologies and hence to what may be evidence requirements in the future.
- This will better establish the acceptability of risk-based approaches and help promote proportionate approaches to requirements for consenting (see Theme 2). Such information will also inform the definition of a realistic project design envelope (see Theme 1).
- Research studies and monitoring are not necessarily the same thing and this distinction was raised at the workshop. Research needs to be targeted and useful and the collaborative decisions being made through ORJIP OE are to be welcomed.
- In defining monitoring programmes there is a need to consider how to coordinate studies at strategic and project/site levels to ensure the most efficient and co-ordinated approach to monitoring and how to achieve this through regulation.
- The need for appropriate baseline data against which to monitor will be essential before deployment and the examples reviewed and reported in the Discussion Note indicate that these data have been collated well in advance.
- The findings of The Crown Estate and Offshore Statutory Conservation Advisors (OSSCA) group Intelligent Monitoring proposal for offshore renewables should be considered in defining future monitoring requirements.
- It will be important to review findings of research and monitoring studies regularly to identify what baseline data are needed to protect environmental interests.
- As the amended EIA Directive³ is transposed into UK Regulation by May 2017 there may be additional considerations to address in the future and these requirements will need to be addressed in any future guidance.

Sharing Experience

- Experience from EMEC and other test sites and from other sectors will be invaluable in planning the best approaches drawing on lessons learnt. Experience gained from the System Performance, Availability and Reliability Trend Analysis (SPARTA) collaborative project between the Offshore Renewable Energy Catapult, The Crown Estate and offshore wind farm owners/operators may be particularly relevant when considering information exchange in the future from demonstration zones.
- Commercial considerations (including confidentiality and commercial edge) are a challenge, will need to be respected and the best means of sharing data without excessive costs to one developer will need to be agreed as the industry moves forward. What can reasonably be asked of a developer in terms of funding monitoring studies where no significant effects have been identified in the assessments is a question that will need to be addressed or a request could be challenged.

Demonstration Zones

- Third party managers of demonstration zones may be able to facilitate exchange of information in the future. Workshop participants were appreciative of the

³ Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

benefits of working together and sharing information to help de-risk future applications and lead to the evidence needs becoming more proportionate.

- The best methods of encouraging the integration of robust research studies at the new and existing test sites needs to be further considered to ensure that in the longer term the industry benefits from an ongoing increasing evidence base facilitating a proportionate and efficient approach to consenting.
- Future challenges will include how best to monitor multi-device developments and developments where the technologies deployed may evolve and change over the years of consent.
- In addition when the preferred way forward for delivering projects in the demonstration zones is defined this may have implications for the preferred monitoring strategies. If blanket consent for a zone is given the approach to monitoring different technologies within that zone which may at the time of consent not be known will have to be carefully considered.

5. RECOMMENDATIONS

In the Workshop Report (Chapter 5) recommendations are made on the way forward for establishing good practice and, from that, guidance for each theme. The recommendations were made through consideration of project examples (see Annex D) and feedback from the workshop. The themes cannot be considered in isolation in the consents and delivery process and there are interrelationships between them and therefore the recommendations. In this summary recommendations for each theme have been collated and a framework for moving forward is provided.

Strategic Recommendations

Delivery

- It is essential that a means of delivering the actions which have been recommended by the different strands of the industry working together is identified. At present it is not clear how the recommended actions set out below can best be delivered. It is recommended that the opportunity to include the actions in the ORJIP OE Forward Look when it is next revised is explored. It is also recommended that the potential for the Offshore Renewable Energy Licensing Group (ORELG) to be the working group for ensuring actions are delivered is explored.
- The Wave and Tidal Knowledge Network (WKTN) which was originally set up by The Crown Estate and is now run by Catapult should be promoted as the appropriate 'knowledge network' through which ORJIP OE should explore and define how opportunities to share data and experience (including the outcomes of research and monitoring programmes) relevant to each theme can be best achieved.

Terminology

- Some words are used interchangeably and their definitions should be clarified and words used more consistently to avoid any confusion. These include:
 - definition of pilot site, demonstration zone and test site to ensure a common understanding. The workshop highlighted some differences in the level of understanding of what these are;
 - Rochdale Envelope and project design envelope: it is recommended that project design envelope is used which has more relevance directly to wave and tidal projects;
 - characterisation and baseline: whilst characterisation is the word used to describe a site for EIA, baseline is traditionally used for information

gained post consent from monitoring of projects in the water. In fact the terms were used interchangeably to a degree at the workshop. This may be because baseline is an EIA term embedded in traditional good practice methodology. It is recommended that the two terms are clearly defined and used as now intended in marine applications to avoid further confusion;

- impacts; effects; sensitivity; significance and thresholds should all be defined and explained;
 - best and good practice – it is recommended that ‘good’ is promoted; best may not be achievable.
- An industry glossary should be developed and published on, for example, the ORJIP Ocean Energy Website.

Demonstration Zones and Test Sites

- A clear understanding of the consenting process for demonstration zones and test sites should be established as soon as possible building upon experience from existing test sites and technology neutral project applications to allow appropriate guidance to be agreed.
- The evidence requirements for consents in demonstration zones will in part depend on the legal consenting framework that is adopted (consent for a zone or for a site within it). It is important that the industry responds to these requirements when better defined and all guidance updated to take account of future needs.
- Guidance should confirm the approach to consents for demonstration zones and test sites and indicate what type of data are required at what time to inform consents.
- Partners in ORJIP OE should identify how demonstration zones and test sites could contribute to its Forward Look research priorities and agree these with third party managers. Experience from outwith the UK should also be drawn on.
- ORJIP OE should advise how all the studies that are ongoing in the industry can best be integrated and a sound strategy developed for implementation at demonstration zones and test sites.
- The long established test sites offer wide ranging experience and it is important that lessons learnt from these sites are used to benefit the new sites. The Steering Group should consider whether a working group can be established to deliver this, or whether there is a role for existing groups such as the Offshore Renewable Energy Licensing Group (ORELG). Participants at the workshop have close links with for example EMEC but the focus of those links is very varied. Specific commitment to shared learning would be invaluable if this is not found to be too sensitive commercially.
- In moving forward towards consent for the various demonstration zones and test sites good communications between managers should continue or be established to find common ground and share experience. A working group should be established to ensure ongoing discussions and sharing of experience.
- An evidence base for demonstration zones should be established which will allow better definition of realistic project design envelopes.
- Sharing information is not without challenges and this should continue to be explored. The ability of demonstration zone managers to share data part funded by public money should be confirmed.

Good Practice and Guidance

- A summary of feedback on what constitutes good practice in relation to the three themes was collated at the workshop and is summarised below. Good practice for each theme should be established building on that raised in the workshop and guidance developed.
- Guidance should be user friendly, succinct and focussed and presented in one document.
- The guidance should be a web based tool which can easily be updated. It may be appropriate for ORJIP Ocean Energy, which is UK wide with international reach could host this information.
- It should consider the whole process from pre-application including EIA through consents to post consent construction and operation.
- Guidance should build on currently available information and that collated at the workshop.
- Best use of references to other existing information sources and guidance should be made.
- The guidance should include a legislative and policy context and a clear description of why the guidance is important. The guidance should clearly set out any consenting differences for parts of the UK.
- Roles and responsibilities should be set out and procedures and requirements for all stages of a project made clear.
- A database of relevant information should be included.
- Guidance should be developed involving all those with an interest in the consents and site delivery process. The new guidance should focus on what questions should be asked at what point and by whom to whom.
- A set of tools - guidance and checklists have been developed for MS LOT to improve the licensing front-end process including pre-screening; screening; scoping; gatecheck and application. These will be launched on MS LOT website in the near future. It is recommended that the Steering Group, or other appropriate forum, considers whether specific tools for the three workshop themes could be similarly developed and linked directly or indirectly into the MS LOT tools and form a key part of the guidance described above. MS LOT has indicated that this might be acceptable and would be willing to discuss further. The MS Lot tools are listed below:

Set of MS LOT Tools for Use in the Pre Application Process

1	Internal Communications Plan
2	Strategic Engagement Plan with Statutory Consultees
3	Pre-Screening Checklist
4	Screening Guidance & Checklist
5	Screening Guide for Smaller Projects
6	Concise Scoping Guidance and Checklist
7	Data Analysis and Template
8	Outline Specification for EIA and HRA Training
9	Outline Specification for EIA and HRA Guidance
10	Draft Content for a Developer Submission Cover Note
11	Gatecheck Process & Checklist

Some synergies with the topics discussed at the workshop in relation to the three themes were noted to those raised in developing the tools for MS LOT in a series of workshops. The MS LOT tools are tied into a process flowchart and a similar approach could be taken for guidance for the three themes.

- Continuing commitment to increasing the shared understanding of what matters to whom and when, could continue to be developed through developer, consultant, Regulator(s), SNCB events but it is important that recommendations are reviewed and actions and responsibilities are identified and delivered.
- Any guidance should be organic and updated as policy changes or new information becomes available. A web based approach is recommended and this could include the suggested tools.
- A wealth of experience relevant to all three themes is available from other industries including the aggregate industry, aquaculture, offshore wind and onshore master planning development. It is recommended that a joint event is held to better tap into relevant experience at this early stage and to be better aware of any existing relevant guidance.

Environmental Impact Assessment (EIA)

- An early meeting between developers, regulators and SNCBs should be promoted in the guidance. The purpose of the meeting is to establish any showstoppers, begin to agree an appropriate approach to defining the project design envelope and to agree a proportionate approach to data gathering. Applicants should be made aware of what the expectations of the consents process are so that impacts are appropriately assessed to inform the consent decision. EIA, HRA and EPS requirements should be agreed.
- Best use of all available relevant information should be made and this should be agreed at the early consultation meeting.
- Regulators and SNCBs should not use unchecked cut and paste responses about survey and other requirements. Responses should be specific to sites and proportionate to the type and scale of proposed development.
- An EIA can only ever be a snapshot in time. If new information comes forward during the consents process or post consent the best means of sharing this information to benefit the environment and the industry needs to be established through the knowledge network (see above).

Post Consent

- Better feedback is required on what input to characterisation studies has been worthwhile once the development is built out and monitoring implemented (where relevant). This has potential to encourage a more proportionate approach to requirements in the future. Information can be shared through the knowledge network if established.
- Research studies and monitoring findings should also be shared wherever practical using the established knowledge network (see above). Use of existing networks such as the Ocean Energy Systems' Annex IV Tethys database should also be maximised.
- The risks and uncertainties of a risk-based approach will reduce if ideas are exchanged and information shared. This should be an ongoing process encouraged by regulators and bought into by all those with an interest in the successful and sustainable development of the industry.

Specific Recommendations for Guidance for Themes

Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites

- Feedback relevant to good practice for Theme 1 raised at the workshop included:

- 'project design envelope' is a more suitable term than 'Rochdale envelope' - see Section 5.5;
- realistic project design envelopes should be used appropriate to the site and its own sensitivities;
- the definition of a project design envelope should clearly recognise the difference between flexibility in project technology and flexibility in project components and categories/types of machines;
- generally a narrow envelope could be restrictive to development by being commercially unattractive but such an approach could be appropriate in a sensitive environment. A broad envelope can also present consenting risks or even sterilise parts of a site as an over precautionary approach to consents may result;
- the focus should be on definition of a realistic envelope agreed with developers, engineers, regulators and consultees;
- a project kick-off meeting between the applicant and statutory bodies should be undertaken to establish early contact and exchange of information – an initial 'evidence plan' can then be broadened out during the process to inform the definition of the project design envelope;
- the definition of the envelope should therefore be carefully linked in with the EIA process which should take account of information from the developing engineering design from an early stage but also be mindful of future challenges post consent of new and developing technologies;
- sensitivities and vulnerabilities of receptors to the proposed development should be the focus of concern in developing realistic project design envelopes not on the receptors wider sensitivities if these are not relevant to the proposed development;
- in defining the realistic envelope for a demonstration zone or test site it will be important to consider differences in the sensitivities of receptors to wave and to tidal stream technologies and take account of the sensitivities of each specific location;
- the scoping process is a useful tool to define sensitivities and to identify key risks as well as what can be scoped out of the envelope;
- best use should be made of all available information in considering what is important and what should be taken into account including strategic level assessments and plan-level HRAs;
- regulators and SNCBs need to give clear guidance to developers and consultees about the sensitivities of receptors or what is required to help better understand them. Characterisation and monitoring studies should only be asked for where there is a clear need and not for research. Where studies are asked for, it should be made clear where and when the data will be used to inform EIA/HRA and the determination process;
- project design envelopes should be clearly defined in environmental statements (ESs) and used appropriately in the reported EIAs. What is included in the envelope and what has been excluded and why should be clear to the reader. The implications of using different envelope parameters in realistic worst case assessments of impacts on different receptors should be explained and the means these differences in assumptions will be brought together for different technologies or project components in the future clearly explained. It is recommended that more detailed guidance is given on how the project design envelope can best be used in the EIA process.

Theme 2: Evidence Requirements for Demonstration Zones and Test Site Consents

- Guidance for this theme should:
 - encourage an early meeting between developers, regulators and SNCBs to establish any showstoppers and to agree a proportionate approach to data gathering. Applicants should be made aware of the expectations of the consenting process so that impacts are appropriately assessed to inform the consent decision(s). EIA, HRA and EPS requirements should be agreed;
 - discourage Regulators and SNCBs from using unchecked cut and paste responses about survey (and other) requirements in correspondence. Responses should be specific to sites and proportionate to the type and scale of proposed development;
 - promote best use of available information and this should be agreed at an early consultation meeting;
 - advise that required characterisation studies are based on identified sensitivities of receptors to impacts from likely technologies not on data gathering for its own sake;
 - explain that a better understanding of potential impacts and site sensitivities will evolve as scoping and more detailed work is undertaken. Consultation should therefore be an iterative approach and seen as a key part of the EIA and HRA process;
 - advise that sufficient information is required to identify significant effects (including cumulative effects) to reduce future consenting risks. A common understanding of what is significant, for the demonstration zone or test site concerned, should be established and particularly if a risk based approach is to be used;
 - recommend that the risks of relying on a post construction monitoring programme and as mitigation be discussed with the Regulator(s). However the benefits of an adaptive management strategy used in appropriate circumstances (such as where an impact is much more likely to be a perceived risk than an actual impact) should also be understood;
 - advise that the applicant's consultants should agree with Regulators at what point there is a freeze in the approach which has been agreed should be adopted and after which the requirements of any new guidance can be ignored if chosen.

Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife

- The following are of importance to improving the evidence base and should be included in any focussed guidance:
 - identifying appropriate research studies that will add to the evidence base and ensure the findings of these studies are shared;
 - defining monitoring studies that are proportionate to the scale and effects of development – take account of the findings of any past and future review studies;
 - the importance of the Steering Group, or other appropriate forum, discussing lessons learnt from existing test sites and ensuring these are taken into account in future guidance;

- encouraging the sharing of outcomes of research and monitoring programmes through promotion of the existing knowledge network (see Section 5.2);
- ensuring that these outcomes feed back into pre application advice by giving access to the knowledge network information and that proportionate and risk based approaches are taken when the evidence indicates that this is appropriate;
- considering establishing a forum for anonymous data sharing similar to SPARTA as part of the knowledge exchange;
- ensuring Government web sites relevant to marine renewables are up to date and that they provide useful sources of information with good references and links;
- analysing the data that are collected and considering what these indicate and allowing this to feed through into meaningful advice. Data need to be collected responsibly using validated methods for this to be possible – reliance on non-validated data will not be helpful;
- considering how monitoring requirements for a blanket consent for different technologies (which may not yet be known) in a demonstration zone can be identified where risks may be greater or less from different technologies in different areas;
- giving further consideration to how marine licence conditions can best be written to enable/assist effective and more collaborative data sharing and/or strategic monitoring (proportionate to the scale of the project);
- confirming the ability and role of third party managers of demonstration zones and test sites to share data.

6. WAY FORWARD

It is recommended that the impetus and focus achieved at the workshop is not lost and that the means of delivery of the programme to establish good practice and guidance more formally is established as soon as possible. It is important that the recommendations are taken forward quickly to ensure best benefit from the workshop and to the industry is achieved. Responsibilities and action timescales should be agreed once the delivery mechanism is agreed.

It is recommended that the following actions are taken forward as soon as practical:

- The means of delivering the actions which have been recommended by the different strands of the industry working together should be identified. It is recommended that the opportunity to include the actions in the ORJIP OE Forward Look when it is next revised is explored.
- The Wave and Tidal Knowledge Network (WKTN) should be promoted as the appropriate 'knowledge network' through which ORJIP OE should explore and define how opportunities to share data and experience (including the outcomes of research and monitoring programmes) relevant to each theme can be best achieved.
- A clear understanding of the consenting process for demonstration zones and test sites should be established as soon as possible to allow appropriate guidance to be agreed.
- Good practice for each theme should be established building on that raised in the workshop and guidance developed. The guidance should be user friendly, succinct and focussed and presented in one document. It should be a web based tool which can easily be updated.

- The opportunity to extend the set of pre-application tools developed for MS LOT should be explored. These will be launched on MS LOT website in the near future. It is recommended that the Steering Group or ORELG consider whether specific tools for the three workshop themes could be similarly developed and linked directly or indirectly into the MS LOT tools and form a key part of the guidance described above.
- A wealth of experience relevant to all three themes is available from other industries including the aggregate industry, aquaculture, offshore wind and onshore master planning development. It is recommended that a joint event is held to better tap into relevant experience at this early stage and to be better aware of any existing relevant guidance.

1 INTRODUCTION

1.1 THE WORKSHOP

This report presents the outcomes of a workshop focussed on themes and issues relating to wave and tidal stream demonstration zones and test sites hosted by Welsh Government in Cardiff on the 14th and 15th July 2015. A Steering Group of The Crown Estate (the Client lead), Scottish Natural Heritage (SNH), Natural Resources Wales (NRW), Natural England (NE), Marine Scotland, RenewableUK and the Marine Management Organisation (MMO) was responsible for organising the workshop. The funding partners for the work were The Crown Estate, the Welsh Government, NRW, SNH, and NE.

The workshop was held at the Norwegian Church in Cardiff Bay from 12noon to 5pm on the 14th July and from 8.30am to 2.30pm on the 15th July. It was facilitated by Natural Capital Ltd a small environmental and sustainability company with an interest in workshop facilitation. Participants were invited by the Steering Group from a range of government organisations, statutory nature conservation bodies (SNCBs), demonstration zone and test site managers, developers and consultancies to ensure that discussions could be as comprehensive as possible drawing from wide-ranging experience. A list of attendees is included in Annex A.

A facilitated discursive approach was used at the workshop with participants working in groups and in plenary session.

1.2 OBJECTIVES OF THE WORKSHOP

The primary objective of the workshop was that it should address some practical consenting and research issues with potentially wider benefits to the wave and tidal stream sectors.

The Steering Group recognised that the UK wave and tidal demonstration zones and new test facilities around the UK, such as the proposed Perpetuus Tidal Energy Centre (PTEC) on the Isle of Wight represent a major opportunity for the growing UK wave and tidal stream sectors particularly when combined with existing sites. Together the demonstration zones and test sites provide opportunities to develop and establish joint learning objectives relating to the environment and technical engineering aspects of device and array testing to ultimately de-risk project development and consenting. Joint working has the benefit of reducing the potential for inefficient and duplicated effort, sharing costs and taking a coordinated approach to dealing with shared issues.

Three key themes relating to UK wave and tidal stream demonstration zones and test sites were discussed at the workshop:

- Theme 1: Defining Rochdale (project design) envelopes for demonstration zones and test sites.
- Theme 2: Evidence requirements for demonstration zone and test site consents.
- Theme 3: Role of the demonstration zones and test sites in improving the environmental evidence base to de-risk consenting.

The study brief identified the following outputs from the workshop for each theme:

- Theme 1: Principles/good practice/guidance for defining project envelopes for demonstration zones and test sites, identifying opportunities for joint working or shared approaches (see Sections 4.2.1 and 5.2);
- Theme 2: Evidence needs to inform consents (with a focus on zone/site-wide consents) and identification of where there may be benefits in exploring cross zone or site survey designs or sharing data (see Sections 4.2.2 and 5.3);
- Theme 3: Recommendations for collaborative working or sharing data across zones and test sites and the wider wave and tidal sectors. This includes exploring the possible role of test sites and demonstration zones in helping achieve the objectives of the Offshore Renewables Joint Industries Programme (ORJIP) for Ocean Energy (OE) (see Sections 4.2.3 and 5.4).

The outputs from the workshop will provide a framework for taking forward a programme of work including detailed guidance which was outwith of the scope of the workshop given the time constraints.

1.3 DISCUSSION NOTE

Natural Capital circulated a pre-workshop Discussion Note to workshop participants in advance of the workshop to stimulate thought and discussion. The Discussion Note presented a high level review of information from a range of relevant sources including assessments, research studies and guidance relevant to the three workshop themes and provided lists of workshop prompts for each theme.

The Discussion Note is included for ease of reference at the end of this report (Annex D).

1.4 LAYOUT OF THE REPORT

The remainder of the report is structured as follows:

- Section 2: sets out the agenda for the workshop and describes the exercises that were completed;
- Section 3: presents the feedback from the exercises collated in the plenary sessions;
- Section 4: discusses the key feedback from the workshop;
- Section 5: makes recommendations for the framework of future guidance and suggested actions.

The following annexes support the above:

- Annex A: which lists workshop attendees;
- Annex B: presents individual group feedback;
- Annex C: includes copies of workshop and presentation slides; and
- Annex D: provides a copy of the pre-workshop Discussion Note.

2 APPROACH

2.1 INTRODUCTION

The workshop format and agenda are summarised in this section. The topics and questions explored are provided and references given to outputs in Chapter 3 and Annex B.

2.2 WORKSHOP AGENDA

The workshop agenda for each day as designed is presented below in Tables 2.1 and 2.2. Some changes to timing etc were made at the workshop to accommodate travel issues and important ongoing discussions. Some agenda items were covered in plenary rather than group work to allow ideas and experiences to be shared in detail together.

Table 2.1 Agenda Day 1

Tuesday 14 July 2015			
LUNCH on arrival		12.00 noon	
Agenda Item	Lead	Time	
<i>Introduction</i>			
• Introductions and Introduction to Workshop	NC	12.30-12.40pm (~10mins)	
• H & S etc	WG/NC		
• Purpose, Aims and Scope of the Workshop	NC	12.40-12.50pm (~10mins)	
• Discussion Note			
• Workshop Format			
• Agenda			
• Themes and Proposed Discussion Times			
<i>Context for Workshop</i>			
• On-going Initiatives; ORJIP OE etc	SG	12.50-1.00pm (~10mins)	
<i>Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites</i>			
• What do we mean by the Rochdale Envelope?	NC Plenary Discussion	and	1.00-1.30pm (~30mins)
• What works well with approach? In pre-application, consenting and post-consent	Group Plenary	and	1.30-2.10pm (~40mins)
• What goes wrong? What are the risks? In pre-application, consenting and post-consent	Group Plenary	and	2.10-2.50pm (~40mins)
TEA		2.50-3.00pm	
• Defining the way forward – towards best practice Relevant experience – what would work well with Demonstration Zones? Wide and narrow project envelopes	Group Plenary	and	3.00-4.15pm (~75mins)
• Any required further work/ research/consultation?	Plenary Discussion		4.15-4.45pm (~30mins)
<i>Wrap Up Day 1</i>			
• Summary of Day 1 – Key Findings and Outputs	NC	4.45-5.00pm (~15mins)	
• Plan for Day 2			

Table 2.2 Agenda Day 2

Wednesday 15 July 2015		
COFFEE on arrival		From 8.30am
Agenda Item	Lead	Time
<i>Introduction</i>		
<ul style="list-style-type: none"> Agenda for Day 2 	NC	8.45-8.50am (~5mins)
<i>Theme 2: Evidence Requirements for Demonstration Zone and Test Site Consents</i>	NC	
<ul style="list-style-type: none"> What do we need to know and why? 	Plenary Discussion	8.50-9.00am (~10mins)
Visit and Address by the Minister for Natural Resources, Carl Sargeant ~9.00-9.30am		
<ul style="list-style-type: none"> What has worked well and what lessons have been learnt to date? 	Group	9.30-10.15am (~45mins)
<ul style="list-style-type: none"> What are the risks in a 'risk-based' approach? 	Plenary	10.15-11.00am (~45mins)
COFFEE		11.00-11.10am
<ul style="list-style-type: none"> Sharing Ideas Session - What has experience shown you – effectiveness of mitigation? Was the assessment useful? Was the approach robust? Was the output worth the input? 	Plenary	11.10-11.40am (~30mins)
<ul style="list-style-type: none"> Defining a proportionate but robust approach to evidence needs 	Group and Plenary	11.40-12.00pm (~20mins)
<ul style="list-style-type: none"> How can data and experience best be shared in the future? 	Plenary	12.00-12.15pm (~15mins)
LUNCH with COFFEE		12.15-12.45pm (30mins)
<i>Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife</i>	NC	
<ul style="list-style-type: none"> Demonstration zones and test sites and the ORJIP OE programme 	SG	12.45-12.55pm (~10mins)
<ul style="list-style-type: none"> Tackling the R & D barriers? How can sharing evidence best inform the consents programme? What lessons have been learnt to date 	Group and Plenary	12.55-1.35pm (~40mins)
<ul style="list-style-type: none"> Baseline data and future monitoring; monitoring and baseline data – making it work 	Plenary	1.35-1.55pm (~20mins)
<i>Looking to the Future Way Forward</i>		
<ul style="list-style-type: none"> Outputs from the three themes Linkages Summary of Commitments Any Other Discussion Points 	NC	1.55-2.10pm (~15mins)
<i>Concluding Remarks</i>		
<ul style="list-style-type: none"> What happens next? Timescales Workshop Paper 	NC/CE	2.10-2.15pm (~5mins)

2.3 WORKSHOP INTRODUCTION, PRESENTATIONS AND EXERCISES

2.3.1 Introduction

The workshop was designed to be interactive and to provide all participants with opportunities to share ideas, in groups and also in discussion in plenary sessions. The outputs from all workshop exercises were collated on flipcharts during the workshop (participants' contribution in their own words and those from plenary sessions) and are presented in this report (see Chapter 3 and Annex B).

The slides which were used by Natural Capital through the workshop and those used in the three presentations (see below) are included in Annex C.

2.3.2 Workshop Introduction

Participants were welcomed to the workshop and the wealth of joint experience acknowledged. Annie Say gave a brief overview of the background to and purpose of the workshop and introduced the format of the workshop and the agenda for the two days. It was explained that the format was designed to encourage all to participate and that points raised would not be attributed to individual participants unless requested. It was not necessary for participants in groups to all agree with each other's views as all opinions were valid and would be recorded. Participants introduced themselves with an overview of their interest in wave and tidal stream projects.

The three workshop themes were described by the facilitator as fundamental in thinking of the pre- and post- consents process – the Rochdale or project design envelope (Theme 1) and evidence requirements for demonstration zones and test sites (Theme 2) in the application for consents and Theme 3 in considering the role of these zones and sites in improving the future environmental evidence base to contribute to de-risking consenting. The importance of the project design envelope post-consent in considering whether technological and other parameter changes are material was also highlighted.

Uncertainty in use of the project design envelope; in consenting demonstration zones and test sites and in how data could best be shared in the future from monitoring was acknowledged and it was suggested that one means of reducing uncertainty can be to discuss the uncertainties and come to a better shared understanding of the issues.

The key output from the workshop was described as a report (this report) capturing the discussions and recommendations on moving towards good practice for each theme based on joint and integrated feedback from participants. In the time available it was acknowledged that final guidance would not be possible but that an informed understanding of appropriate information and of any other work that was required would be achieved.

2.3.3 Context for the Workshop

Three presentations were given by workshop participants. Copies of the slides used in each are included in appendices in Annex C.

On Day 1:

- Kate Smith, Marine Renewable Energy Advisor at NRW, gave a short presentation which covered UK experience and learning to date; an introduction to wave and tidal groups and initiatives and to introduce some of the challenges and opportunities in the industry to set the context for the

workshop and explain how its outputs fitted into the broad ranging work that is ongoing (see Appendix C.1);

- Sian Wilson of The Crown Estate (Technology Manager) provided an overview of the potential for wave and tidal development in the UK; The Crown Estate's work to date on demonstration zones and test sites and the opportunities the new sites present (see Appendix C.2).

On Day 2:

- Joe Kidd, a Technical Director at Marine Space and part of the secretariat for the ORJIP OE programme gave an overview of the history of ORJIP; its partners and management; objectives and its strategic priorities which have emerged from the Forward Look which has recently been completed (see Appendix C.3).

2.3.4 Address by Welsh Minister for Natural Resources

Carl Sargeant, the Welsh Minister for Natural Resources, addressed the workshop early in the morning on Day 2. The address and question session was positive and stimulating whilst realistic about the challenges which faced the industry. Participants were enthusiastic about the opportunity to discuss issues at a more political level and were grateful for the Minister's inputs.

2.3.5 Day 1: Workshop Exercises¹

This section summarises the exercises which were undertaken at the workshop based on the agenda presented above. Cross references are provided to the group and plenary outputs.

Theme 1: Defining Rochdale (Project Design) Envelopes for Demonstration Zones and Test Sites

Introduction

All participants were familiar with using the design envelope. The facilitator commented that in her experience of reviewing environmental statements (ESs) that it is not always used robustly and also may be used in different ways which could be confusing to the public and to consultees. The rapidly changing technology in wave and tidal stream and the ongoing research findings means that defining a project design envelope for a demonstration zone may present particular challenges and opportunities and so sharing experiences to date will help plan for the way ahead.

An overview of the history of the Rochdale Envelope was provided by the facilitator (see Appendix C.4 in Annex C). The concept whilst offering opportunities can be beset by all sorts of pitfalls if not used appropriately. The challenge to consider is what is appropriate? In looking ahead to recommending good practice and guidance it is important to learn from the past and not lose sight of what has worked well, but also to learn from what has not been successful so ways to work round that can be considered. Initial discussion points are recorded in Section 3.2.1.

Exercise 1.1: What works well?

Participants were asked to think of what had worked well in their experience using project design envelopes (what they had worked with, discussed or read) and

¹ During the workshop it was agreed that project design envelope is a more appropriate term to use than Rochdale envelope and that good practice should be used rather than best practice – as a result there may be some inconsistencies in the text as the original wording is retained when describing the workshop content etc

were encouraged to think of the whole process: pre-application, application; consents and post-consent. They were asked to consider what they had liked and found useful and also to bring forward any experience from other sectors.

Group feedback is collated in Section B1.1 of Annex B. Plenary feedback is summarised in Section 3.2.2.

Exercise 1.2: What hasn't worked well?

In the second exercise participants were asked where the challenges have been in using the project design envelope concept and what had been found to have not been so successful. It is important to be aware of these lessons learnt when moving forward. Again participants were asked to think widely and use experience from other sectors too if that was available.

Group feedback is collated in Section B1.2 of Annex B. Plenary feedback is summarised in Section 3.2.3.

Exercise 1.3: Defining the way forward – towards good practice – what would work well with Demonstration Zones and Test Sites?

Reflecting on what works well and where the challenges have been and on the feedback from particular experiences, participants were asked to consider their recommendations for moving forward - what should be considered best, or good practice in defining project design envelopes for demonstration zones and test sites and why? What might best practice look like? Again groups were asked to think about the whole process from pre-application through to delivering on site.

Copies of the prompts for Theme 1 from the Discussion Note (Box 5.1) were provided to encourage participants to think widely. In particular groups were asked:

- how do we best work with flexible approaches?
- what should an environmental impact assessment (EIA) work with?
- should an envelope be broad or narrow – over the whole zone or part of it?
- how can Regulators best work with variation - what do they need to know?
- Post-consent - when is variation likely to trigger a new application – how can this best be avoided?
- who needs what and when?

The full list of prompts is copied below.

Box 5.1: Workshop Prompts Theme 1: Rochdale Envelope
<p>Terminology</p> <ul style="list-style-type: none"> • Would 'project design envelope' be a more appropriate term than 'Rochdale Envelope'? • Current applications: are they detailed, outline or masterplan? Does this impact on the way the design envelope is used? Are these terms relevant to marine applications?
<p>EIA/HRA</p> <ul style="list-style-type: none"> • Clearly defined parameters: are these clearly set out in EIAs; are they understandable? Will they take account of future technology developments? Do they distinguish between technologies and project components? • Can an EIA adequately assess the impacts of developing proposals and changing technology? Are there risks in consenting? • How can future proposed variations best be assessed in the context of the reported EIA to ensure that the environmental statement (ES) remains competent and in particular for multi-technology sites?

Box 5.1: Workshop Prompts Theme 1: Rochdale Envelope

- How is it best to work with the unknown and define adequate mitigation to assess potentially significant effects? How is worst case defined?
- How can cumulative effects be considered in the EIA when each project may have parameters which are not fixed?
- What level of flexibility is acceptable in project descriptions and how is acceptability determined if the effects are not known?
- Can worst case parameters be developed for projects where technology is under development and where research studies still need to be progressed to understand impacts? Are there risks in the approach?
- How can future technologies to be used at test and demonstration sites best be assessed in EIAs recognising that there may be multiple technologies deployed at the site in the future?

Regulatory Aspects

- What is the role of Regulators and SNCBs when considering the Rochdale Envelope pre-application?
- What challenges have you found in using the Rochdale Envelope and SNH what were the challenges in using it as an SNCB in the Falls of Warness EIA?
- Can the Regulators be responsible/have sufficient technical expertise for ensuring that the developing proposals post-consent remain within the parameters that were assessed?
- How can the public/decision makers best understand the concept of the Rochdale Envelope when each environmental topic assessment may have different worst case parameters - how is all this information brought together in consenting and how can cumulative effects within projects best be checked?
- What level of detail is required to make robust and fair decisions in the framework of the consents Regulations?
- What approach is acceptable to each Regulator? Is it the same? Are there lessons that can be learnt?
- Does adopting a 'broad and flexible approach' to the interpretation of the Rochdale Envelope as argued for by Walker (2012 in Wright 2012²) lead to less robust consenting decisions than those based on narrow envelopes?
- Can consent conditions be written to be flexible but robust? What has experience shown?

Post Consent

- What effect does using the Rochdale Envelope have on management and monitoring of projects and ability to maintain good environmental status etc?
- At what point does change define a different project? How can changes best be assessed and defined as material or not? What is deemed a material change?
- How can the Rochdale Envelope best be used in projects post-consent to ensure a robust delivery of ES commitments/conditions?
- How can proposals best be checked post-consent to ensure that they fall within the agreed Rochdale Envelope?

Moving Forward

- What is the appropriate approach to identifying a Rochdale Envelope for a demonstration zone?
- How is 'best or good practice' in terms of the approach to using the Rochdale Envelope best defined? What is required and by whom and in what form? What can be learnt from other industries?

Group feedback is collated in Section B1.3 of Annex B. Plenary feedback is summarised in Section 3.2.4.

² *Op cit* Full reference included in Discussion Note in Annex D

Exercise 1.4: Further work?

The final plenary discussion on Day 1 considered what else might be needed to get to best or good practice recommendations - any further work or research and who else should be consulted. The plenary feedback is summarised in Section 3.2.5.

2.3.6 Day 1 Concluding Remarks

The key findings of the day were summarised by Annie Say and the plan for Day 2 described.

2.3.7 Day 2: Workshop Exercises

Day 2 focussed on Themes 2 and 3 although it was acknowledged that there was some inevitable overlap between the three themes.

Theme 2: Evidence Requirements for Demonstration Zone and Test Site Consents

Exercise 2.1: What do we need to know and why?

The first session on Day 2 was a plenary brainstorm of why evidence is required to inform consents in demonstration zones and test sites. The output is presented in Section 3.3.1.

Exercise 2.2: What has worked well and what lessons have been learnt?

Participants were asked to draw on their experience and identify in groups what approaches have been successful in taking assessments forward and where have problems arisen? The facilitator asked the groups to think about what are some successful, examples of approaches to underpinning EIAs and Habitats Regulations Assessments (HRAs) they had been involved in - either as developers, consultants, advisors or Regulators? A further question raised was whether current available guidance helped and whether there were any issues with it. Groups were asked to consider where the approach to site characterisation had gone wrong/caused problems and what were the lessons learnt from their experiences. A discussion also explored the use of the words 'characterisation' and 'baseline'.

Group outputs are collated in Section B2.1 in Annex B and plenary feedback in Section 3.3.2.

Exercise 2.3: What are the risks in a risk-based approach?

A plenary discussion followed on what are the risks in a risk based approach and what does current research show. Some ongoing work by NRW and SMRU was described by Kate Smith (NRW)³ and mention was made of the ongoing RiCORE project (see also Section 3.4.1 in the Discussion Note in Annex D). It was asked whether the approach helps the industry or whether it could hold consents up. The advantages of the approach were discussed.

The collated plenary discussions are summarised in Section 3.3.3.

³ Sparling C, Smith K, Benjamins S, Wilson B, Gordon J, Stringell T, Morris C, Hastie G, Thompson D and Pomeroy P (2015). Guidance to inform marine mammal site characterisation requirements at wave and tidal stream energy sites in Wales. NRW Evidence Report Number 82. <http://www.naturalresources.wales/our-evidence-and-reports/guidance-to-inform-marine-mammal-site-characterisation-requirements-at-wave-and-tidal-stream-energy-sites-in-wales/?lang=en>

Exercise 2.4: Sharing mitigation ideas and experience

Plenary discussions continued considering experience of mitigation and what lessons could be learnt.

The findings are included in Section 3.3.4.

Exercise 2.5: Defining a proportionate but robust approach to evidence needs

Workshop participants discussed in plenary a proportionate but robust approach to evidence needs and what this meant to individuals and also in terms of EIA. Other questions considered were whether the risks of such approaches can be taken and how data requirements for developments not yet certain can be defined.

Section 3.3.5 presents the summary of the discussions.

Exercise 2.6: Looking to best practice

The plenary discussions described above were wide ranging and covered this topic in broad terms. Given workshop time constraints it was not possible to cover it in detail. Key questions in looking ahead include:

- what data are needed for zone /site wide consents (assuming this will be the preferred option for zone and site managers)?
- what needs to be known to define appropriate mitigation or adaptive management measures?
- what is the role of a risk-based proportionate approach - can it work and if so how?

Specific good practice recommendations relating to this theme are collated in Section 5.3.

Exercise 2.7: Sharing experience

As part of the Theme 2 exercises described above the following were briefly considered at appropriate points:

- can data and evidence be shared across zones and sites?
- what stands in the way of data sharing? – (for example, cost; commercial confidentiality etc)
- can any principles be established-are these realistic and acceptable to developers?
- have any lessons been learnt from elsewhere - research papers – journals and conferences - different approaches to EIA within the EU?
- is current guidance useful and do people use it?

Feedback is incorporated in relevant exercises and in Section 3.3.7.

2.3.8 Theme 2 Prompts

Prompts which had been given for Theme 2 are included in Box 5.2 in the Discussion Note in Annex D and are repeated here for ease of reference.

Box 5.2: Workshop Prompts Theme 2: Evidence Requirements for Demonstration Zones and Test Sites

What needs to be known?

- How detailed does baseline information need to be to allow potentially significant effects to be identified reliably and appropriate mitigation to be defined?
- What needs to be known about technology to best identify significant effects?
- What risks to consenting or at a later stage after construction are there from not fully understanding effects?
- What does a 'proportionate approach' to EIA mean to you? Do we all mean the same thing?
- How is agreement reached on what is a less sensitive site?
- How can post-development monitoring be mitigation? What should happen if significant effects are found? What is the role of adaptive management – deploy, monitor, manage?
- An ES can only ever be a snap shot in time – how can new information post-application best be dealt with?

Lessons Learnt

- Some EIA is led by Government departments etc rather than developers in other EU countries – is there anything to be learnt from these alternative approaches?
- Is the best practice guidance available useful and what is the feedback? How can it best be updated regularly and ideas discussed and findings shared?
- What can be learnt from implementation of Scottish Government Survey, Deploy and Monitor policy? Has it been a successful approach?
- What can be learnt from other more mature marine industries?

Moving Forward

- How can the industry best prepare for the demands that new consents in demonstration zones will require?
- How can developers, Regulators, advisors, consultants and the public best keep up to date with the wealth of information readily available and best understand that which is most relevant and helpful to particular projects?
- What are the likely timescales for the research findings that have been highlighted as priority? What are the implications of this work? Can interim findings assist in progressing projects or will there be more constraints?
- How can findings of research and from monitoring surveys best be shared?
- What are the constraints to sharing monitoring data to help in characterisation of new sites?

Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife

2.3.9 Prompts for Theme 3

Prompts for Theme Three from the Discussion Note (Box 5.3) are repeated below.

Box 5.3: Workshop Prompts Theme 3: Role of Demonstration Zones in improving the Environmental Evidence Base for Wave and Tidal Stream

Regulatory Issues

- What are the regulatory challenges of an intelligent monitoring approach?
- How can marine licence conditions best be devised to enable/assist more collaborative or strategic monitoring?
- How can conditions best be worded if they are relying on another project to deliver a particular requirement and what happens if that other project doesn't deliver? Are there any lessons learnt to date?
- Are conditions for consented sites best worded to ensure effective monitoring data are collected?
- What monitoring can be considered fair for projects that are consented where no significant effects have been predicted?

Box 5.3: Workshop Prompts Theme 3: Role of Demonstration Zones in Improving the Environmental Evidence Base for Wave and Tidal Stream

- Can we distinguish between ‘monitoring’ required under licence and ‘research’ that can be undertaken at a site, therefore reducing the regulatory burden on the developer whilst promoting opportunities for strategic research?

Lessons Learnt

- What lessons have been learnt to date from test sites?
- Are monitoring commitments in ESs for tidal and wave strong enough?
- How can the disappointing findings of the review of monitoring of offshore wind farm developments be avoided for the wave and tidal industry – how can effective monitoring and research programmes best be developed, organised and shared?

Moving Forward

- What data are required at what time to inform demonstration zone consents?
- How can demonstration zones and test sites contribute to the ORJIP OE updated research priorities?
- How can all the studies that are ongoing best be integrated and a sound strategy developed for implementation at demonstration zones and test sites?
- How can monitoring studies in new sites best be integrated and shared?
- How can intelligent monitoring be delivered?
- What further work is required to ensure monitoring and research studies are as effective as possible and best communicated amongst the industry?

2.3.10 Day 2 Theme 3 Exercises

Exercise 3.1: Looking forward

To consider how future information collated at demonstration zones and test sites can best be used in the future participants were asked the following (working in groups and feeding back in plenary):

- how can the new sites best contribute to the evidence base needed to inform future consents?
- how can R& D in demonstration zones and test sites be seen as a benefit rather than a hindrance?
- how can data be shared?
- how can monitoring commitments inform future characterisation studies?
- how can sharing evidence best inform the consents programme?
- what lessons have been learnt to date?

Group outputs are presented in Section B3.1 in Annex B and plenary feedback summarised in Section 3.4.1.

Exercise 3.2: Baseline data and monitoring

The intended content of this exercise was covered in Exercise 3.1 (see feedback in Section 3.4.1). This included what had worked and what lessons had been learnt; how developments at demonstration zones and test sites can best contribute to learning as they move forward including anything specific on:

- testing and trialling survey approaches and techniques;
- monitoring equipment; and
- validating monitoring.

2.3.11 Day 2: Concluding Remarks and Workshop End

It was explained that the workshop outputs and facilitators' recommendations would be collated in a Workshop Report which would be circulated in draft for all participants to comment on. In addition any additional comments can be incorporated, but it would be made clear in the final report if any comments were post-workshop inputs⁴.

Natural Capital thanked all participants for their very useful inputs and for the stimulating discussions. It was hoped that the outputs would be useful as the industry moved forward.

⁴ Clarifications have been received and incorporated in this report but no specific new comments

3 OUTPUTS FROM THE WORKSHOP

3.1 INTRODUCTION

This section of the report presents the outputs from the plenary sessions. Individual group outputs from the exercises are included in Annex B. Outputs are as recorded at the workshop with a few additions from the facilitator's commentary.

3.2 EXERCISES FOR THEME 1: DEFINING ROCHDALE ENVELOPES FOR DEMONSTRATION ZONES AND TEST SITES

3.2.1 Introductory Feedback: Rochdale Envelope: some general points

Following the introduction to Theme 1 (see Section 2.3.5) a few general points were recorded before the main discussions:

- Which comes first the envelope or the EIA – which informs which? – iterative process
- As a general point there should be care in the use of language
- With regard to baseline and receptors – how do you set the envelope? The envelope may need to respect different sensitivities and be defined to respect these
- The development of project design envelopes with a partnership approach will place a heavy demand on resources for Regulators and advisors

3.2.2 Exercise 1.1: What works well?

The following feedback was given about what worked well in relation to use of the Rochdale Envelope in the plenary session. Group outputs are included in Annex B, Section B1.1.

- Flexibility – which in turn
 - Saves time and cost
 - Is good for future mitigation
 - Facilitates a quick 'feedback loop'
 - Encourages developers to think about the project
 - Can help to eventually remove uncertainty
- Focusing on receptors
 - What we need to know
 - Understood through an iterative process
- Usable envelope
 - Developing a common understanding
 - Allows projects to come forward
 - Can apply for funding with a realistic envelope
 - Approach allows industry to go forward with a commercial 'kick'
- Team approach
 - Helps to avoid confusion
 - Crucial to work with Regulators
- Openness and good communications
- Investing in a project that is technology neutral
- Defining a realistic envelope
 - Encourages adaptive management
 - Potentially reduces extra effort from Regulators
 - Helps to eventually remove uncertainty

3.2.3 Exercise 1.2: What hasn't worked well?

Group feedback about what hasn't worked so well using the Rochdale Envelope is presented in Section B1.2 of Annex B. The plenary discussions are summarised below.

- The term (Rochdale Envelope) itself is a challenge!
- Difficulties with definitions in general – what do words mean for different communities? (e.g. Rochdale or project envelope – what does this mean?)
- If the envelope is too broad it presents challenges for:
 - assessing impacts
 - consenting
 - assessment of cumulative impacts' (the combination of numerous worst case scenarios rendering a project potentially unconsentable due to the notional combined impact)
- If too broad can lead to 'over precaution' and thus more costs and resources
- With narrow envelopes there is less flexibility (although this may be good for the Regulators and advisors)
- An unrealistic or 'unconsentable' envelope will lack commercial attraction
- A broad envelope could 'sterilise' a region if unrealistic – also it could:
 - require a vast array of mitigation
 - encourage more precaution and hence more mitigation
 - take up 'headroom'
- Confusion over whether the envelope should be defined by parameters or impacts?
- Insufficient knowledge on how the 'complexities' within the envelope are brought together and used

3.2.4 Exercise 1.3: Defining the way forward – towards good practice – what would work well with Demonstration Zones and Test Sites?

Feedback in plenary session suggested the following points are important in working towards good practice for project design envelopes in demonstration zones and test sites. Group feedback is included in Section B1.3 of Annex B.

To achieve best practice take on board the following considerations:

- Funnel down wide sets of parameters and impacts, narrow them down into those that are really significant
- Recognise different technologies may come forward
- Recommend appropriate dialogue with engineers to understand what is feasible
- Provide guidance on the purpose of the EIA – addressing risks
- Provide guidance on a phased approach to future build out
- Guidance should not be too long
- Strike a balance between flexibility and detail
- Provide guidance on the project design envelope – not too broad but equally not too narrow
- Recognise the need for guidance from Regulators and advisors on the sensitivity of receptors
- If receptors are sensitive the project will need –
 - a tighter envelope
 - a tighter design
- The need for the Regulator to be flexible on non-limiting parameters (ie where significant impact pathways are unlikely)

- Highlight the benefit of the agreed Project Monitoring Plan and for it to be appropriately detailed and easy to understand for use post-consent
- Need to emphasise the differences between wave and tidal stream
- Highlight the importance of early engagement between developer and Regulators and advisors (eg SNCBs)
- The importance of EIA scoping – and what can be scoped out at an early stage
- The importance of the evidence base:
 - receptors – sensitivity
 - sensitivity versus vulnerability to development
- Strategic advice linked to planning policy
- What really matters
- The design envelope should reflect receptors
- The less sensitive the receptors – the wider the envelope can be?
- The legislative context
- Use experience from other industries/sectors
- Make use of The Crown Estate experience and strategic assessments for leasing (eg plan-level HRA)
- The need to clarify terminology
- Get all the key players together
- Establish what the key parameters are
- Try to bring together what is relevant across all Demonstration Zones rather than what is specific
- Can we not learn from the aggregate sector's experience – eg regional monitoring and individual 'projects' drawing on a shared evidence base?
- Emphasise that the design envelope should be a key chapter in the ES
- Care in the language around defining the envelope

3.2.5 Exercise 1.4: Further work?

In a short discussion following Exercise 1.3 the following were raised when considering how to take good practice for the project design envelope for demonstration zones and test sites forward and what further work was required:

- Defining standards that can be repeated
- The need to recognise the evolution of technology
- Remember the sequence:

Benchmarking > Good Practice > Guidance > Standards

- The need for a UK-wide approach – the demonstration zones provide a good opportunity to develop this
- Challenge of consolidating the knowledge – bringing disparate knowledge together
- Who will manage the data sets? Certainly not the Government!
- The need to bring together shared experiences

3.3 EXERCISES FOR THEME 2: EVIDENCE REQUIREMENTS FOR DEMONSTRATION ZONES AND TEST SITE CONSENTS

3.3.1 Exercise 2.1: What do we need to know and why?

The initial plenary brainstorm which considered why evidence was needed to inform demonstration zone and test site consents (see Section 2.3.7) raised the following reasons:

- To address uncertainty
- To measure change
- Demonstrate compliance with law, for example, EU Directives including European Protected Species (EPS) requirements etc
- Inform management decisions
- Inform the EIA/HRA etc
- Justify the proposal
- Inform the proposal and project design
- Constraints mapping
- Inform the Rochdale (project design) envelope

3.3.2 Exercise 2.2: What has worked well and what lessons have been learnt?

The following plenary feedback was given about what has worked well and lessons learnt in relation to evidence for consents. Group feedback is included in Section B2.1 of Annex B.

Evidence Requirements - Positives

- Evidence for site characterisation versus baseline – being clear what these mean
- Use of existing data:
 - survey/deploy/monitor phased development – risk-based approach
 - can be used and can save time/resources
- Understanding the purpose of the evidence – care in confusion between characterisation versus baseline
- Regulators being pragmatic towards evidence needs
- Use of strategic survey data from Regulators
- Wider area data can help specific sites
- Example of ORJIP – all players working together, collaboration

Evidence Requirements - Negatives

- Leading developers ‘down the garden path’
- Not identifying ‘showstoppers’ at an early stage
- Understanding the limitations of collected data
- Inadequate understanding of the baseline
- Lack of agreement on data requirements
- Timing of evidence – back-end loaded versus front-end loaded
- Agreeing Adaptive Management Plan post consent in absence of full data
- Difficulty in delivering ‘complete’ data sets from field surveys (costs/resources)
- Collision avoidance rate – critical
- How big a risk is collision? Is it more of a perceived risk? Is collecting evidence necessary?
- Evidence about collision
 - is this a real risk?
 - can’t actually tell at the moment
 - uncertainty
- Use of cut and paste data
- Confidence in ‘what is enough data?’ – how much is needed is a real challenge
- At what point do you take on new guidance (and new evidence) in the EIA process?

- Dealing with cumulative assessments

Evidence Requirements – General Points

- Asking the ‘right’ questions – and need to discuss what are the right questions to ask
- Talk about mitigation up front
- Conversations up front about site characterisation
- Avoid data collection ‘for data’s sake’
- Joint decision making on data collection (possible collaboration in surveys and/ or monitoring etc) – there will be a cost benefit
- Sufficient data to address risks
- Rigour in choice of evidence to be gathered
- Is there a real issue?
- Lack of feedback loop from current experience
- SNH Guidance on collision risks (describes three approaches)

3.3.3 Exercise 2.3: What are the risks of a risk based approach?

The plenary discussions are summarised below:

- Ministers could be challenged in the European courts
- The challenge is recognising the risks
- The risk of a challenge (especially if challenge wins)
- Can’t completely de-risk any project
- Reasonableness
- Perceived impacts on marine mammals
- The approach needs to be underpinned by good work
- There needs to be meetings between all the key players to agree the requirements at an early stage
- There is a need to share ideas to de-risk projects

Key points from the overview of the NRW/SMRU Consulting published work⁵ are summarised below.

- A risk-based approach is proposed to identifying marine mammals characterisation survey needs, by identifying the key impact pathways of concern, being proportionate to the ‘riskiness’ of project and taking into account existing data and information. Encourages shared decision making between developer, Regulator(s) and advisors about what type of marine mammal survey should be undertaken (if any) to inform EIA and HRA.
- Project risk differs for different impact pathways and different receptors (mammal species)
- Collision risk and disturbance are the key impact pathways for marine mammals and those that are likely to drive data (survey) requirements
- Technology, project location and sensitivity of mammal populations contribute to the overall riskiness of the project for collision and disturbance
- The work questions what type of data should be collected e.g. should it focus on behaviour of marine mammals in an area rather than just presence/absence?

3.3.4 Exercise 2.4: Sharing mitigation ideas and experience

Mitigation experience was shared in plenary and key points raised were:

⁵ *op cit*

- Intentions and plans for mitigation are often good – but the delivery has been poor
- There is a need for honesty – what can really be delivered?
- Success can't always be measured because the potential impact may be avoided by mitigation so not clear if it would have occurred
- Need to strike a balance in order to permit placing the kit in the water
- Isolating the significant environmental effects and getting mitigation is hard!
- Describing the process clearly can simplify and remove concerns over mitigation
- Mapping the process against behaviour can identify the main pinch points and highlight the changes needed
- Can learn from other industries – Regulators can help here
- Clarity in the nature of the project/process within the early project description could avoid the need for mitigation
- Need the design envelope to be realistic

3.3.5 Exercise 2.5: Defining a proportionate but robust approach to evidence needs

A summary of the plenary discussion about a proportionate approach to evidence needs is collated below:

- Right level of detail for the scale of the project – 'fit for purpose'
- Whose job is it to provide the environmental understanding?
- Who leads on proportionality? Is it shared? Developer + Regulator? SNCBs?
- The approach to evidence requirements should be proportionate to the capabilities/resources of the developer in the context of the scale of the project
- Early communication between all the key players (developer, Regulator, advisors, consultants) is crucial
- Value of collaboration cannot be underestimated
- Everyone is taking a risk:
 - shared risk (all players need to take on some of the risk)
 - who decides on significance?

3.3.6 Exercise 2.6: Looking to good practice

There was no specific exercise completed about good practice because the various discussions included for Theme 2 covered what might currently be considered good practice (see also Sections 4.2.2 and 5.3).

3.3.7 Exercise 2.7: Sharing experience

Some additional points made about sharing evidence and experiences from other projects were:

- Complex for some zones at this time to share information
- Need a 'lessons learnt' exercise
- Need a strategic programme of research to inform assessments

3.4 EXERCISES FOR THEME 3: ROLE OF DEMONSTRATION ZONES IN IMPROVING THE EVIDENCE BASE FOR WAVE AND TIDAL STREAM INTERACTIONS WITH WILDLIFE

3.4.1 Exercise 3.1: Looking forward

Group feedback on this exercise is included in Section B3.1 of Annex B which focussed on looking forward to how research and monitoring in demonstration zones can best contribute to the future evidence base. The plenary feedback is summarised below:

- Need to solve the problem of lots of research having been undertaken but not always helpful or targeted at key issues – need to define a useful programme
- Bring research/applied studies together
- Currently have fragmented industry groups
- Align the research/monitoring for the demonstration zones
- Involve third party managers in decisions on research
- Make sure research is:
 - targeted
 - properly funded
- Need ‘joined up’ research:
 - money is available (tap into EU money)
 - ORJIP OE to respond? – aware of EU possibilities
- Research does not equal monitoring
- Research priorities need to support economic development (for EU Regional support)
- Need a focus on the type of data – what is applicable more widely?
- Demonstration zones – to validate monitoring equipment
- There is leverage to be gained from investing in demonstration zones – could help to unlock other sources of money
- Demonstration zone managers ought to get together more often to share experiences
- Need to build on the experience gained from the test sites (don’t wait for the demonstration zones)
- Need tangible results/data from the research
- Need to analyse the results
- Is there experience from sectors like aggregates that could be tapped into? e.g.
 - collaboration over a wider area
 - pool resources over a wider region
- Look to other project experience to overcome the challenge of data sharing – SPARTA⁶ is a good example from the offshore wind sector
- Mustn’t rely totally on funding from developers for demonstration zones to deliver - some third party and public money is needed to move things on

3.4.2 Exercise 3.2: Baseline data and monitoring

Information relating to this topic was recorded as part of Exercise 3.1 (see Section 3.4.1).

⁶ SPARTA (System Performance, Availability and Reliability Trend Analysis) is a major new collaborative project between the Offshore Renewable Energy Catapult, The Crown Estate and offshore wind farm owner/operators. The project will create a database for sharing anonymised offshore wind farm performance and maintenance data. Owner/operator participants will be provided with robust and reliable benchmarked data for the first time, helping to identify operational improvements and cost reduction opportunities at both company and sector-wide levels

4 KEY WORKSHOP FEEDBACK

4.1 INTRODUCTION

This section summarises the key findings from the study review work and the workshop discussions of particular relevance to future recommendations on principles and guidance for each theme (see Chapter 5).

4.2 SUMMARY OF KEY FINDINGS

4.2.1 Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites

Use of the Rochdale (Project Design) Envelope

The use of a project design envelope or Rochdale Envelope is common in applications for wave and tidal stream projects. It is widely acknowledged that in the early days of a sector, technology will advance rapidly and the understanding of the environmental implications of any technology will grow. The use of a well-defined design envelope which clearly distinguishes information relevant to different technologies and different project components allows flexibility to accommodate future developments and different technical parameters but if the envelope is not used robustly it can bring risks into the consenting process and also in delivering projects on site post-consent.

The understanding of the history of the envelope and the full implications of its use is variable and project descriptions in EIAs reflect this. Some EIAs can be confusing in their presentation of a 'worst case' envelope when the chosen parameters are different for different receptors. This can lead to confusing messages for those reading an ES and also, potentially, difficulties in decision making if it is not clear which combinations of parameters could result in the future. There may be assumptions if the EIA indicates that no technology or technical parameter would result in significant effects, that anything can go forward but this is potentially a simplistic approach to considering the combined effects of the project on any receptor.

'Rochdale' in itself has little relevance to marine projects and workshop participants considered that 'project design envelope' was more suitable terminology to use. At present the terms are used interchangeably.

The Infrastructure Planning Commission (IPC) advice note (Advice Note 9)⁷ on the Rochdale Envelope gives helpful advice on its use but the challenge is interpreting the requirements in a way that stands up to scrutiny of all parties without being unnecessarily restricting to development.

Project design envelopes have been used in other sectors including in masterplan applications and also in the marine environment (for example, offshore wind) and experience from these sectors could benefit the wave and tidal stream sectors.

Consents and the Use of the Rochdale Envelope

The consenting authority (the Regulator) must be able to meet the requirements of the EIA Regulations in considering the significant effects of the proposed development. It will be necessary to decide whether EIA adequately assesses the impacts of developing proposals and changing technologies and whether

⁷ Infrastructure Planning Commission (IPC) Advice note nine: Rochdale Envelope February 2011

consenting risks for Regulators are adequately reduced by use of an appropriate project design envelope.

Different approaches to defining and using project design envelopes have been used in various ESs. The more clearly defined the envelope is, the easier it is to be able to consider whether significant effects of likely development have been defined. This presents a challenge when technology is evolving rapidly and when detail at the time of application may change in the future.

The unknowns of developing technology are hard to define and it will be important for Regulators to focus on those issues which are potentially significant including the potential for cumulative effects. A key question will be: 'can worst case parameters be developed for projects where technology is under development and where research studies still need to be progressed to understand the levels of impacts that could result?'

The experience of SNH using a project design envelope approach in themselves undertaking an EIA for the Fall of Warness will be valuable and sharing experience remains at the heart of taking forward successful consents for wave and tidal stream.

What is a realistic envelope? How should it be defined?

Clear parameters need to be defined within which development can evolve and be built out. The envelope needs to be broad enough to accommodate technology unknowns. If the envelope is too narrow whilst presenting some benefits for consenting it may be difficult or impossible to accommodate technological change and therefore the site may be commercially unattractive or even unviable.

Where the level of flexibility described in an application is too broad it may be difficult to define impacts and consideration of cumulative effects may be even more challenging which together may lead to refusal or to the use of a heavy burden of potentially arduous and expensive conditions which could make an area less attractive to developers.

A realistic envelope should be defined making best use of existing information and be described to remove uncertainty in an application whilst maintaining some flexibility. An envelope and commitment to future monitoring measures should not be used to avoid work that is required to inform an adequate assessment of significant effects of a development. The usefulness of future adaptive management measures is however acknowledged but these in themselves need to be carefully defined and used robustly.

The role of all parties in defining and agreeing a realistic design envelope was clearly supported at the workshop. Consultants need to work closely at an early stage with developers and engineers in understanding the variations in technology which might be used. The applicant's team needs to engage with key consultees to ensure that the implications of any definition are fully understood by all sides and a common understanding is gained of what might be an acceptable envelope in principle pre-application.

It is likely that this detailed consultation may put additional pressures on Regulators in the early stages of the delivery on site of wave and tidal stream projects but as knowledge and understanding of the sector grows (see Themes 2 and 3 below) this burden would be likely to reduce.

Defining 'a worst case project design envelope' may not be a realistic design envelope. The envelope in itself may become restrictive to development by introducing a range of parameters which are too demanding to be helpful in consenting. Understanding and defining a realistic envelope is more helpful and allows mitigation to better be defined which is practical and deliverable.

A project design envelope can best be defined based on likely impacts from the development on key receptors. The sensitivity of those receptors to the likely technology variations and various options for technical parameters needs to be understood and can be built up through an iterative process which will allow the project design envelope to become increasingly well defined.

The focus in defining the project envelope should be on likely interactions between the project and the receptor and not on the sensitivity of the receptor itself. For example, a receptor known in the area may be an EPS (highly sensitive) but if there is no potential for interaction with the project then the scale of any likely impact/vulnerability of the species is greatly reduced when considering the potential for significant interactions. This approach allows focus in defining the envelope on things which matter and can reduce the potential for over complication. There is no need for an envelope approach for parameters where the potential for interactions and residual effects is not significant. It is also important when undertaking an EIA that the level of detail used is appropriate for assessment purposes. EIA is a relatively crude tool and the level of detail required is that needed to identify potential for significant effects on the environment. There will be many possible changes in project component detail which would have no potential for effect at a level that would need to be considered in an EIA (that is one that should be brought to the decision maker's attention because it could be material).

As feedback from monitoring and research studies increases the definition of the design envelope for a project will become easier because it can be better evidence based with greater knowledge available about the potential for interactions of species with various technologies.

Demonstration Zones and the Project Design Envelope

The use of an appropriate and robust project design envelope will be essential in applications for demonstration zones and test sites if consent is sought for an area which could in the future be used for multi-technology projects which are not defined in any detail at the time of application. The detail of how the project design envelope can best be used will evolve as the legal consenting approach for demonstration zones and test sites is agreed.

A broad but realistic envelope is likely to be required to accommodate future technologies in demonstration zones and test sites. However it will be important that the use of over broad envelopes does not result in worst-case scenarios which are unrealistic and restrictive to future development in any zone or site. If applicants were to merge technology options and create a 'hybrid' worst case scenario which does not allow the Regulator(s) and stakeholders to clearly consider the impacts of the various technology options this could result in an application being refused due to the inclusion of one component/technology which results in a design envelope considered to be unacceptable. In any consent it will be important to consider the differences between the sensitivity of receptors to wave and to tidal stream technologies to ensure that an overly precautionous approach is not taken.

It will be important for demonstration zone and test site managers to work together to find common ground sharing experience and learning from pilot sites such as the European Marine Energy Centre (EMEC). Consent for a whole site rather than for a project within it will be challenging until the evidence base from built out projects increases. The key question will always be: is sufficient information known to define significant effects and to understand what the implications of these effects might be? A precautionary approach will be likely to prevail until the knowledge of the potential impacts of the industry becomes tried and tested and the effects of different projects better understood although it is important to consider that only sufficient information to identify significant effects under the EIA Regulations is required in considering applications.

Post-Consent Implications

In defining a project design envelope it is important to consider the whole process including the post-consent implications. The conditions of any permission will set the parameters within which development can proceed and the use of an agreed and consented project design envelope could have many advantages and save time in taking development forward. Use of an unrealistic project design envelope, however, in an application is likely to be commercially unattractive because the requirements cannot be met or are too restrictive (see above).

There will be challenges in making sure activities within sites and zones fall within the project design envelope under which they were consented if a full pre-consenting approach is taken. If sites and zones are fully pre-consented there is no regulatory mechanism for checking activities are not 'worse' than what was assessed as no additional permissions would be required. Lessons learnt from elsewhere can be followed to meet this hurdle by using, for example, construction method statements which have to be agreed with the Regulator(s) and consultees before development starts on site and then implemented.

Defining when a change from a consented envelope is material can also be a challenge and can be perceived differently by parties involved. The consideration of the potential for cumulative effects between different projects can also be challenging. The workshop indicated the differences in views of Regulators and developers where regulatory responsibilities may lead to more precautionary approaches. Using adaptive management measures will be useful but cannot be used as a catch all for everything if the effects are not first appropriately understood. Again the growing research and evidence base will give more confidence in decisions and may reduce the concern about things which are found to not be material.

4.2.2 Theme 2: Evidence Requirements for Demonstration Zones and Test Site Consents

Inadequate characterisation of a site can result in consenting risks. It is important that applicants and all involved in the application have a common understanding of why evidence is required and for what purpose and what is required at what time. This will include information needed to define the project design envelope by understanding sensitivities and the likelihood of interactions with technology (see Section 4.2.1); to undertake EIA; for HRA and for consideration of EPS.

Early interactions with the Regulator and their advisors including the SNCBs can help ensure best use of existing information (data and knowledge) is made. More pragmatic approaches by regulators will be based on realism and confidence and reduced uncertainty by effective interactions with the applicant's team.

Collaborative approaches to sharing experiences and to defining helpful research studies are important and the commitments to ORJIP OE and its action programme has potential to increase the availability of evidence to inform future assessments.

Regulators need to be realistic and clear about what they are asking for and why and be aware of the potential limitations of their requests (for example, costly and time intensive marine mammal monitoring studies which may result in few encounters with limited statistical power). Developers need to be aware of what a regulator needs for a competent EIA, HRA or EPS assessment. The two parties may not agree and it is important to try and find common ground through the better understanding of the implications of any uncertainties. Effective communications can help find appropriate ways forward when little data may be available.

The sensitivities of receptors to interactions with technologies are not fully understood (for example collision risk for marine mammals with tidal turbines) and future monitoring work will inform this (see also Theme 3). A challenge is to decide what data are sufficient to meet assessment and consenting needs. Experience from other industries too may help in understanding likely impacts or the success of mitigation.

An EIA can only be a snapshot in time and a dilemma may arise when new information becomes available and better informs the understanding of evidence needs late in the EIA process. The detail of information required to inform EIA is that required to identify significant effects but may be more complex when cumulative assessments, which may be particularly relevant in demonstration zones, are considered.

The understanding of what is a significant effect may also differ between different consultants or between the applicant's team and the Regulator(s). All projects will have some impacts but the decision is at what point these impacts could be material (significant). Confidence in statistical certainty in modelling approaches may also be open to question on some occasions and it is important to recognise that statistical significance is not the same as a likely significant effect in EIA (ie something which is material to decision making). The use of adaptive management measures as future mitigation poses a challenge and raises the question at what point is this acceptable or not in consenting? It cannot become a catch all for dealing with data and information gaps yet it is an important method of dealing with what may only be perceived risks from development rather than known effects.

Effective feedback loops to those involved in applications about information and understanding gained on various projects (in all relevant sectors) and through research and monitoring programmes can reduce the impacts of these uncertainties and help reduce what may be excessive requests for data to inform EIA and future consenting risks.

Open discussions and open minds will better allow the use of risk-based approaches by reducing the concerns about uncertainties through shared information. It is important in considering future monitoring and research programmes what data and information can best help de-risk this approach to taking projects forward.

Some projects have gone forward with robust mitigation implemented which may in itself be a barrier to understanding whether an impact would have actually happened if the mitigation was not in place (for example, turning machines off if

marine mammals are in proximity). Sustainable development is to be embraced and so mitigation is agreed and implemented in projects that are taken forward but this mitigation needs to be realistic and reasonable.

A realistic project design envelope needs to be defined for projects and demonstration zones (see Theme 1 in Section 4.2.2). If this is too broad, required extensive mitigation may become too restrictive to future development because in combination assessments are too severe due to broad envelopes taking up 'headroom'. Mitigation to reduce the significance of potentially significant effects will remain important to consenting. A key requirement is to understand whether there are impacts that need to be mitigated and an appropriate evidence base is needed to inform that assessment. Such information should be fit for purpose and proportionate to the scale and likely effects of the development as promoted by the RiCORE project (see Section 3.4.1 in the Discussion Note in Annex D) and by work recently published by NRW and SMRU Consulting⁸.

The ORJIP OE strategic research programme (and other such initiatives) will provide outcomes in the future which will inform assessments and help to take the risks out of the findings of assessments by being better evidence based which in turn will reduce the data gathering needs in some locations. The evidence that can be gained from deployments in the water is invaluable but commercial sensitivities may at least in these early stages present some challenges in accessing relevant information. Development of the Scottish Government's Survey, Deploy and Monitor policy is also helping ensure a proportionate approach to assessment where information is available to allow a more proportionate approach to characterisation of sites.

Case law in other sectors (for example, the Cornwall decision⁹) has shown that significant effects should be identified pre-consent and hence working together to reduce uncertainties, better understand what are real potential impacts and not perceived risks and ensuring that characterisation surveys are fit for purpose is and will continue to be of key importance. Defining and agreeing what is an acceptable proportionate approach to evidence requirements is not without challenge.

A further challenge is how developers, Regulators, consultants and the public can best keep up with the already available information and that which will become available in the future to inform assessments. It is important that practical means of sharing access to research and monitoring studies are implemented and kept up to date.

4.2.3 Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife

Research studies and future monitoring outcomes from demonstration zones and test sites have potential to contribute to the understanding of likely interactions between receptors and different technologies and hence to what may be evidence requirements in the future. This will better establish the acceptability of risk-based approaches and help promote proportionate approaches to requirements for

⁸ *op cit*

⁹ Consent was given by Cornwall Council for the extension of a landfill in mines where potential for lesser horseshoe bat was known but surveys had not been undertaken for the EIA. The Council had made it a condition of the planning consent that surveys were to be carried out to discover if bats were present on the site before construction. The judge ruled those surveys should have been carried out prior to the permission being granted in order that significant effects could be determined before the grant of planning permission and the permission was overruled

consenting (see Theme 2). Such information will also inform the definition of a realistic project design envelope (see Theme 1).

Research studies and monitoring are not necessarily the same thing and this distinction was raised at the workshop. Research needs to be targeted and useful and the collaborative decisions being made through ORJIP OE are to be welcomed. In defining monitoring programmes there is a need to consider how to coordinate studies at strategic and project/site levels to ensure the most efficient and co-ordinated approach. Consideration also needs to be given to how this might be achieved through regulation. The need for appropriate baseline data against which to monitor will be essential before deployment and the examples reviewed and reported in the Discussion Note (Section 4.4.3 in Annex D) indicate that these data have been collated well in advance. The findings of The Crown Estate and Offshore Statutory Conservation Advisors (OSSCA) group Intelligent Monitoring proposal for offshore renewables¹⁰ should be considered in defining and designing future monitoring requirements. It will be important to review findings of research and monitoring studies regularly to identify what baseline data are needed to inform consideration of how to best protect environmental interests.

Experience from EMEC and other test sites and from other sectors will be invaluable in planning the best approaches drawing on lessons learnt. Experience gained from the SPARTA collaborative project between ORE Catapult, The Crown Estate and offshore wind farm owners/operators may be particularly relevant when considering information exchange in the future from demonstration zones (see Section 3.4.1).

Commercial considerations are a challenge, will need to be respected and the best means of sharing data without excessive costs to one developer will need to be agreed as the industry moves forward. What can reasonably be asked of a developer in terms of funding monitoring studies where no significant effects have been identified in the assessments is a question that will need to be addressed or a request is likely to be challenged.

Third party managers of demonstration zones and test sites may be able to facilitate exchange of information in the future. It is clear that workshop participants were appreciative of the benefits of working together and sharing information to help de-risk future applications and lead to the evidence needs becoming more proportionate. The challenges of confidentiality and commercial edge were also appreciated.

The best methods of encouraging the integration of robust research studies at the new and existing test sites needs to be further considered to ensure that in the longer term the industry benefits from an ongoing increasing evidence base facilitating a proportionate and efficient approach to consenting.

Future challenges will include how best to monitor multi-device developments and developments where the technologies deployed may evolve and change over the years of consent. In addition when the preferred way forward for delivering projects in the demonstration zones and test sites is defined this may have implications for the preferred monitoring strategies. If blanket consent for a zone or site is given the approach to monitoring different technologies within that area which may at the time of consent not be known will have to be carefully considered.

¹⁰ The Crown Estate Intelligent Monitoring, A Concept Paper, 2015

As the amended EIA Directive¹¹ is transposed into UK Regulation by May 2017 there may be additional considerations to address in the future and these requirements will need to be addressed in any future guidance.

¹¹ Directive 2014/52/EU amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

5 RECOMMENDATIONS

5.1 INTRODUCTION

This section makes recommendations for consideration on the way forward for establishing good practice and from that, guidance for each theme. The recommendations have been made through consideration of project examples (see Annex D: Discussion Note) and feedback from the workshop. Each theme is considered in turn and some further general points are made in Section 5.5. The themes cannot be considered in isolation and there are inter-relationships between the themes and therefore the recommendations. The recommendations are collated and developed in the Workshop Summary Report.

5.2 THEME 1: DEFINING ROCHDALE ENVELOPES FOR DEMONSTRATION ZONES AND TEST SITES

- A clear understanding of the consenting process for demonstration zones and test sites should be established for each part of the UK to allow appropriate guidance to be agreed.
- Long established test sites such as EMEC offer wide ranging experience and it is important that lessons learnt from these sites are used to benefit the new sites. The Steering Group should consider whether a working group can be established to deliver this, or whether there is a role for existing groups such as the Offshore Renewable Energy Licensing Group (ORELG). Participants at the workshop have close links with for example EMEC but the focus of those links is very varied. Specific commitment to shared learning would be invaluable if this is not found to be too sensitive commercially.
- Good practice for defining project design envelopes for demonstration zones and test sites should be established building on that raised in the workshop and guidance developed. It is recommended that guidance should be user friendly and focussed (see also Section 5.5). It should consider the implications of the project design envelope through the whole process from pre-application including EIA through consents to post consent construction and operation. Guidance should be developed involving all those with an interest in the consenting and site delivery process.
- Feedback relevant to best practice raised at the workshop included:
 - ‘project design envelope’ is a more suitable term than ‘Rochdale Envelope’ - see Section 5.5;
 - realistic project design envelopes should be used appropriate to the site and its own sensitivities;
 - the definition of a project design envelope should clearly recognise the difference between flexibility in project technology and flexibility in project components;
 - generally a narrow envelope could be restrictive to development by being commercially unattractive but such an approach could be appropriate in a sensitive environment. A broad envelope can also present consenting risks or even sterilise parts of a site as an over precautionary approach to consents may result;
 - the focus should be on definition of a realistic envelope agreed with developers, engineers, Regulators and consultees;
 - a project kick-off meeting between the applicant and statutory bodies should be undertaken to establish early contact and exchange of information – an initial ‘evidence plan’ can then be broadened out during the process;

- the definition of the project design envelope should therefore be carefully linked in with the EIA process which should take account of information from the developing engineering design from an early stage but also be mindful of future challenges post consent of new and developing technologies;
 - sensitivities and vulnerabilities of receptors to the proposed development should be the focus of concern in developing realistic project design envelopes not on the receptors wider sensitivities if these are not relevant to the proposed development;
 - in defining the realistic envelope for a demonstration zone or test site it will be important to consider differences in the sensitivities of receptors to wave and to tidal stream technologies and take account of the sensitivities of each specific location;
 - the scoping process is a useful tool to define sensitivities and to identify key risks as well as what can be scoped out of the envelope;
 - best use should be made of all available information in considering what is important and what should be taken into account including strategic level assessments and plan-level HRAs;
 - Regulators and SNCBs need to give clear guidance to developers and consultees about the sensitivities of receptors or what is required to help better understand them. Characterisation and monitoring studies should only be asked for where there is a clear need and not for research sake. Where studies are asked for, it should be made clear where and when the data will be used to inform EIA/HRA and the determination process;
 - project design envelopes should be clearly defined in ESs and used appropriately in the reported EIAs. What is included in the envelope and what has been excluded and why should be clear to the reader. The implications of using different envelope parameters in realistic worst case assessments of impacts on different receptors should be explained and the means these differences in assumptions will be brought together for different technologies or project components in the future clearly explained. It is recommended that more detailed guidance is given on how the project design envelope can best be used in the EIA process;
 - an EIA can only ever be a snapshot in time. If new information comes forward during the consents process or post-consent the best means of sharing this information to benefit the environment needs to be established – (see knowledge network below).
- In moving forward towards consent for the various demonstration zones and test sites, good communications between managers should continue or be established to find common ground and share experience. A working group should be established to ensure ongoing discussions and sharing of experience.
 - An evidence base from projects which are developed should be established (see also Themes 2 and 3) which will enable better definition of realistic project design envelopes in the future for projects in demonstration zones and test sites drawing on feedback from the experiences gained. Sharing information is not without challenges and this should continue to be explored. The ability of demonstration zone managers to share data part funded by public money should be confirmed. The Wave and Tidal Knowledge Network (WKTN) which was originally set up by The Crown Estate and is now run by Catapult should be promoted as the appropriate 'knowledge network' through which ORJIP OE should explore and define

how opportunities to share data and experience (including the outcomes of research and monitoring programmes) relevant to each theme can be best achieved.

5.3 THEME 2: EVIDENCE REQUIREMENTS FOR DEMONSTRATION ZONES AND TEST SITE CONSENTS

- Guidance drawing together good practice for establishing a proportionate but robust approach to evidence gathering for demonstration zones and test sites should be established building on currently available information and that collated at the workshop. It is again recommended that any guidance should be user friendly and focussed (see Section 5.2 and also Section 5.5) and further developed involving all those with an interest in the consents process. Information about survey techniques is available. This guidance should focus on what questions should be asked at what point and by whom to whom.
- Guidance should:
 - encourage an early meeting between developers, regulators and SNCBs to establish any showstoppers and to agree a proportionate approach to data gathering. Applicants should be made aware of the expectations of the consenting process so that impacts are appropriately assessed to inform the consent decision(s). EIA, HRA and EPS requirements should be agreed;
 - discourage Regulators and SNCBs from using unchecked cut and paste responses about survey (and other) requirements in correspondence. Responses should be specific to sites and proportionate to the type and scale of proposed development;
 - promote best use of available information and this should be agreed at an early consultation meeting;
 - advise that required characterisation studies are based on identified sensitivities of receptors to impacts from likely technologies not on data gathering for its own sake;
 - explain that a better understanding of potential impacts and site sensitivities will evolve as scoping and more detailed work is undertaken. Consultation should therefore be an iterative approach and seen as a key part of the EIA and HRA process;
 - advise that sufficient information is required to identify significant effects (including cumulative effects) to reduce future consenting risks. A common understanding of what is significant, for the demonstration zone or test site concerned, should be established and particularly if a risk based approach is to be used;
 - recommend that the risks of relying on a post construction monitoring programme and as mitigation be discussed with the Regulator(s). However the benefits of an adaptive management strategy used in appropriate circumstances (such as where an impact is much more likely to be a perceived risk than an actual impact) should also be understood;
 - advise that the applicant's consultants should agree with Regulators at what point there is a freeze in the approach which has been agreed should be adopted and after which the requirements of any new guidance can be ignored if chosen.
- Opportunities to share data and experience should continue to be explored and a knowledge network established (see Section 5.2).
- Better feedback is required on what input to characterisation studies has been worthwhile once the development is built out and monitoring

implemented (where relevant). This has potential to encourage a more proportionate approach to requirements in the future. Information can be shared through the knowledge network (see above).

- Research studies and monitoring findings should also be shared wherever practical (see Sections 5.2, 5.4 and 5.5).
- The risks and uncertainties of a risk-based approach will reduce if ideas are exchanged and information shared. This should be an ongoing process encouraged by Regulators and bought into by all those with an interest in the successful and sustainable development of the industry.
- The evidence requirements for consents in demonstration zones and test sites will in part depend on the legal consenting framework that is adopted (consent for a zone, site or for a project within it). It is important that the industry responds to these requirements when better defined and all guidance updated to take account of future needs.

5.4 THEME 3: ROLE OF DEMONSTRATION ZONES IN IMPROVING THE EVIDENCE BASE FOR WAVE AND TIDAL STREAM INTERACTIONS WITH WILDLIFE

- In considering the role of demonstration zones and test sites moving forward the following are of importance to improving the evidence base and should be included in any focussed guidance (see also Sections 5.2; 5.3 and 5.5):
 - identifying appropriate research studies that will add to the evidence base and ensure the findings of these studies are shared;
 - defining monitoring studies that are proportionate to the scale and effects of development – take account of the findings of any past and future review studies;
 - the importance of the Steering Group, or other appropriate forum, discussing lessons learnt from existing test sites and ensuring these are taken into account in future guidance;
 - encouraging the sharing of outcomes of research and monitoring programmes through promotion of the existing knowledge network (see Section 5.2);
 - ensuring that these outcomes feed back into pre application advice by giving access to the knowledge network information and that proportionate and risk based approaches are taken when the evidence indicates that this is appropriate;
 - considering establishing a forum for anonymous data sharing similar to SPARTA as part of the knowledge exchange;
 - ensuring Government web sites relevant to marine renewables are up to date and that they provide useful sources of information with good references and links;
 - analysing the data that are collected and considering what these indicate and allowing this to feed through into meaningful advice. Data need to be collected responsibly using validated methods for this to be possible – reliance on non-validated data will not be helpful;
 - considering how monitoring requirements for a blanket consent for different technologies (which may not yet be known) in a demonstration zone can be identified where risks may be greater or less from different technologies in different areas;
 - giving further consideration to how marine licence conditions can best be written to enable/assist effective and more collaborative data sharing and/or strategic monitoring (proportionate to the scale of the project);

- confirming the ability and role of third party managers of demonstration zones and test sites to share data.
- Guidance should confirm the approach to consenting for demonstration zones and test sites and indicate what type of data are required at what time to inform consents.
- Partners in ORJIP OE, funding partners and the Steering Group should identify how demonstration zones and test sites could contribute to its Forward Look research priorities and agree these with third party managers.
- In ORJIP OE should advise how all the studies that are ongoing across the industry can best be integrated and a sound strategy developed for implementation at demonstration zones and test sites.
- The industry needs to learn from the experience of other sectors such as aggregates and a data/evidence sharing culture encouraged (see Section 5.5).

5.5 OTHER RECOMMENDATIONS

- Some words are used interchangeably and their definitions should be clarified and words used more consistently to avoid any confusion. These include:
 - definition of pilot site, demonstration zone and test site to ensure a common understanding. The workshop highlighted some differences in the level of understanding of what these are;
 - Rochdale Envelope and project design envelope: it is recommended that project design envelope is used which has more relevance directly to wave and tidal projects;
 - characterisation and baseline: whilst characterisation is the word used to describe a site for EIA, pre-application, baseline is traditionally used for information gained post-consent against which to monitor the impacts of projects in the water. In fact the terms were used interchangeably to a degree at the workshop. This may be because baseline is an EIA term embedded in traditional best practice methodology. It is recommended that the two terms are clearly defined and used as now intended in marine applications to avoid further confusion;
 - impacts; effects; sensitivity; vulnerability; significance and thresholds should all be defined and explained.
- An industry glossary should be developed and published on, for example, the ORJIP OE Website.
- Sections 5.2 - 5.4 include summaries of feedback on what constitutes good practice in relation to the three themes (that is in effect guidance on consenting for demonstration zones and test sites) and makes recommendations for the future. Guidance for the three themes should be developed. It is suggested that this is succinct and focussed in one document and makes best use of references to other existing information sources and guidance including clear cross references where appropriate. The guidance should clearly set out any consenting differences for parts of the UK.
- The guidance should include a legislative and policy context and a clear description of why the guidance is important. Roles and responsibilities should be set out and procedures and requirements for all stages of a project made clear. A database of relevant information should be included. The guidance should be a web based tool which can easily be updated.

- A set of tools - guidance and checklists have been developed for Marine Scotland Licensing Operations Team (MS LOT) to improve the licensing front-end process including pre-screening; screening; scoping; gatecheck and application. These will be launched on MS LOT website in the near future. It is recommended that the Steering Group, or other appropriate forum, considers whether specific tools for the three workshop themes could be similarly developed and linked directly or indirectly into the MS LOT tools and form a key part of the guidance described above. MS LOT has indicated that this might be acceptable and would be willing to discuss further. The MS Lot tools are listed in Table 5.1:

Table 5.1 Set of MS LOT Tools for use in the Pre Application Process

1	Internal Communications Plan
2	Strategic Engagement Plan with Statutory Consultees
3	Pre-Screening Checklist
4	Screening Guidance & Checklist
5	Screening Guide for Smaller Projects
6	Concise Scoping Guidance and Checklist
7	Data Analysis and Template
8	Outline Specification for EIA and HRA Training
9	Outline Specification for EIA and HRA Guidance
10	Draft Content for a Developer Submission Cover Note
11	Gatecheck Process & Checklist

Some synergies with the topics discussed at the workshop in relation to the three themes were noted to those raised in developing the tools for MS LOT in a series of workshops. The MS LOT tools are tied into a process flowchart and a similar approach could be taken for guidance for the three themes.

- Continuing commitment to increasing the shared understanding of what matters to whom and when, could continue to be developed through developer, consultant, Regulator(s), SNCB events but it is important that recommendations are reviewed and actions and responsibilities are identified and delivered.
- Any guidance should be organic and updated as policy changes or new information becomes available. A web-based approach is recommended and this could include the suggested tools.
- A wealth of experience relevant to all three themes is available from other industries including the aggregate industry, aquaculture, offshore wind and onshore master planning development. It is recommended that a joint event is held to better tap into relevant experience at this early stage and to be better aware of any existing relevant guidance.

Annex A

Workshop Attendees

Annex A: Workshop Attendees

Name	Organisation
Tracy Begg	Scottish Natural Heritage
Richard Cook	Natural England
Adam Cooper	Natural Resources Wales
Victoria Copley	Natural England
David Eccles	Welsh Government
Paul Ellsmore	Catapult
Frank Fortune	Royal Haskoning DHV
Clair Gibson	Wave Hub
Charlotte Hawsworth	Natural Resources Wales
Andrew Hill	Natural Resources Wales
Ross Hodson	Marine Management Organisation
Lisa Hopkinson	Natural Resources Wales
Karl James	Welsh Government
Rosie Kelly	The Crown Estate
Joseph Kidd	Marine Space
George Lees	Scottish Natural Heritage
Stuart Lowe	Marine Space
Jim McKie	Marine Scotland
Raeanne Miller	The Scottish Association for Marine Science
Richard Morgan	Natural England
Andrew Nicholas	Welsh Government
James Orme	Menter Mon
Kate Smith	Natural Resources Wales
Shelley Vince	Natural Resources Wales
Alex Whatley	FaB Test
Sian Wilson	The Crown Estate

Annex B

Workshop Outputs

B1 Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites

B1.1 Exercise 1.1: Rochdale Envelope – What works well?

Group A

- Foreshortening timescales by consenting early on with the ability to then attract finance and deal with other barriers to delivery
- Clear understanding of physical parameters and the associated risks (environmental, navigational, etc)
- Flexibility within agreed limits:
 - Allows regulators a level of certainty when awarding consents
 - Provides developers the opportunity to undertake cumulative assessments
- Approach works well with a nascent industry to allow continued development at pace
- Allows the technology neutrality for a consented site
- Reduces the risk of an addendum
- Allows consideration of worst case to build in precaution

Group B

- Commercial benefits in using a broad scale 'Rochdale' envelope – best point
- Evolving technologies and designs benefit from broad envelopes
- There are disadvantages to using a broad envelope though
- 'NEWT' – 'Not Environmentally Worse Than' approach
- Rochdale better enables 'Adaptive Management' i.e. changes in the project as it is progressing
- Flexibility from regulators perspective? No need to re-submit applications due to small changes/evolution of the project
- Sets out the worst case scenario from the outset
- Provides variation at an early stage during the consenting process
- Allows a 'Technology Neutral' approach rather than focusing on one type of technology
- Maximises opportunities to use the data/technology at later dates in the project

Group C

- Clear focus on receptors and impact pathways
- Project description needs to be realistic and informed by engineering
- Design team (engineers) working in parallel with EIA team (biologists talking to engineers early on)
- 'Buildability', 'Consentability', and 'Economicability' – all have to be incorporated in the project description to maximise chances of success
- Need to have a 'one team' approach – can environmental and design team bring advisors and regulators along in the process?
- Clear definitions of realistic worse case scenarios based on views from industry, receptors > defined parameters
- Comprehensive project description
- Knowledge of assessment process and tools likely to be used (e.g. collision risk models) informed by worst case scenario and project design

Group D

- Flexibility influences - time, cost and risk for deployments
- Clear expectations on information required from developers
- Pre-application risk assessment
- Narrow envelopes – accuracy and relevance
- Realistic worst case scenarios
- Feedback and influence on post-consent conditions

Group E

- Flexibility for developers
- This in turn forces developers to think about what projects are trying to deliver:
 - what are the parameters of the project?
 - where will the flexible/uncertain elements be?
- Necessitates looking at the worst case scenario for different key receptors
- Feedback at the end is key – to feedback into the original development plan/estimation of the impact
- An iterative approach is important
- Scoping must be early enough to:
 - shape the project (refine project envelope so not too large)
 - address gaps between what developer wants to achieve and what is realistic
- Consent and conditions
 - clearly define upper limits to specific project elements
 - to feed into realistically achievable monitoring to meet conditions
- Consent - gate check system post-consent to make sure project is within envelope
- Feedback – build out post-consent into consenting process for future development

B1.2 Exercise 1.2: Rochdale Envelope - What hasn't worked well**Group A**

- The broader the envelope the more difficult it is to assess the risks
- Late changes through the process
- Potentially builds in too much precaution = more cost, more mitigation, etc
- Leads to overly long assessments
- Attracts consultation responses about 'Have you defined the envelope appropriately' away from risks
- To do it (consent conditions) well requires a lot of engagement with limited resources
- Introduces more uncertainty
- Potentially overstated economic benefits

Group B

- Too broadly drawn – hard to define impacts and drives worst case scenario
- How to work out level of mitigation if impacts are too vague
- If small number of projects use up some of envelope can skew monitoring/mitigation numbers?
- Ultimately a theoretical wildlife take can limit/sterilise an area
- How do you accurately define strike rate + risk/casualty versus death for device design variations? (likely to end up too broad for regulators)

Group C

- Very narrow design envelope – too tightly defined
- Non ‘one-team’ approaches – not enough communication (between design team + EIA/consenting team)
- Balance of cost between broad project envelope versus tightly defined project having to go through consenting process if something changes
- Is the project attractive to the technical developer market/investors? E.g. mitigation likely to be too restrictive to be financially viable?
- Development without market

Group D

- Broad envelopes – repercussions for impact assessments
- Risk – level of appraisal requires adaptive approach
- Cumulative impacts – especially for future developments
- Baseline information for some key receptors inadequate for:
 - collision risk modelling
 - parameter setting and outputs
 - for HRA

Group E

- Terminology! Use of ‘Rochdale Envelope’ is hard – why not use Project Design Envelope (PDE)?
- Too wide an envelope makes error bars too wide and so consent conditions too harsh and too hard to measure
- But still need to accommodate new technology and design changes
- Too early scoping doesn’t work and can lead to too wide a PDE
- Forgetting to include minor activities in the ES
- Poor definition of the PDE and lack of specificity particularly of small activities
- If PDE is too wide – conditions will be too broad, then it will be hard to discharge the conditions down the line and conditions will be too difficult for developers to meet
- A wider envelope is more resource intensive for SNCBs to deal with – takes a lot of time and specialist/expert input
- Wide envelopes = risk to developer because worst case perceived as too bad
- Narrow envelopes on the other hand reduce flexibility too much
- At the moment communication can be poor – need to develop a common language around PDE and consent

B1.3 Exercise 1.3: Defining the way forward – towards best practice – what would work well in Demonstration Zones and Test Sites**Group A**

- For each application weed out the knowns and unknowns
 - for those unknowns, consider all scenarios
 - agree appropriate flexibility for both
- Process will start at pre-application with having a lot of unknowns but moving through will narrow that band to a more manageable range
- Guidance needs to recognise there are differences both between technologies (wave and tidal) as well as different sites within one or the other
- Differences between Demo Zones and Test Sites
 - data-rich technology stepping up to array (30MW)

- newer solutions with no environmental data yet
- Core Guidance with further specific/bespoke to the above
- An ideal/appropriate level of dialogue with the engineers
- Predefine parameters where possible
- Contextualise what the EIA process is
- A phase approach where parameters should narrow (the funnel effect)

Group B

- Should be referred to as the 'Design Envelope' not the 'Rochdale Envelope'
- No 'shell' applications but a detailed application from the outset to de-risk the project in the longer term
- Opportunity of consent at an earlier stage
- Identification of a development site which can guarantee consent regardless of the technology therefore leaving only financial and technical considerations to consider
- Possible collaboration between developers? (small scale community focused non-profit making groups specifically)
- Site consent rather than project consent
- Still incomplete data at a scoping stage
- Separate guidance for wave and tidal due to technology
- Varies by site/technology/size of development
- Best practice jointly developed by regulators and developers
- Regulator to be more prescriptive with impacts (which factors are to be taken into account that are more critical rather than considering every factor)
- 'Realistic' worst case scenario rather than the worst case scenario to work to
- Resource and capacity within organisations

Group C

- Early engagement – helps to define design and identify show stoppers (pre-scoping)
- Scoping: needs to identify key risks i.e. some things should be scoped out
- Need to reassure developers that scoped out issues won't re-emerge later
- Evidence base: receptors – are they there, are they vulnerable/sensitive?
- Feedback loop to project design
- Flexibility and adaptiveness of design – need an information exchange with regulators and advisors
- Don't forget about the strategic process that has been undertaken e.g. The Crown Estate a plan-level HRA = a useful source of information
- Must be receptor driven throughout
- Energy + Planning Policy embedded within strategic advice
- Joint understanding of 'reasonably foreseeable' what to include in an EIA

Group D

- Include a legislative and policy context – why are we doing it?
- Aims and objectives of test site
- Early discussion – iterative process
- Realistic envelope – operation – impacts (CRM)
- Learn and adapt guidance from other industries
- Terminology – impacts, sensitivity, significance and thresholds all require explanation

- Feedback loop – from Envelope > Post-Consent > Review > Guidance
- Clarity – what is within and what is excluded in Envelope Technology/Device Parameters this will be project specific
- General site-wide impacts and phases of development
- Receptors – Identify and assess impacts specifics at the site. Use baseline and wider data
- Wider data from HRA or EPS can feature in the feedback loop

Group E

- Get all people together -
 - a project 'kick-off' meeting to begin to define project > pre-engagement (applicant, statutory bodies)
 - 'evidence plan' > broaden this out
- Need definition of terms
- For Demo Zones collectively decide what the key parameters/environmental factors are – for individual sites? For Zones as a whole?
- Gives information to developers RE: from a regulator/Govt/SNCB perspective
- Provides framework for developers and others to work to
- Decide upfront how to consent e.g. @ wave, hub, S36 and in review make sure evidence is relevant
- Develop an evidence base for Demo Zones but
 - who pays?
 - do regulators have the responsibility for consistently reviewing the information?
- Baseline Data
 - what is relevant at site level versus across all Demo Zones?
 - aspire to generalised database for all marine developments so that everyone knows what is going on
 - generic elements
 - site specific
 - make it easy to access for wave and tidal
 - form a knowledge network?
- Is there a way to update the ES as more info becomes available?
- Licence for all Demo Zones would be so difficult! A big 'ask' to consent
- Adaptive management of measurement requirements e.g. SeaGen
- Demo Zones can pave the way for addressing uncertainty and less rigid consents
- Understand limitations of what you can measure
- Use guidance and information from other industries e.g. Regional monitoring approach from Aggregates Industry
- Demo Zone monitoring could then become coherent/regional/standardised
- Everyone involved contributes to the monitoring fund
- The challenge is to account for disruptive technologies
- Project Design Envelope (PDE) should be a key chapter in the ES to clearly define implications of project
 - could there be generic text/guidance/language here to help understanding and reduce complexity?
- Regulators and SNCBs are essential as part of an iterative development of the PDE
- Best practice guidance for 'Rochdale Envelopes' (write!)
 - acknowledge roles and responsibilities
 - procedures and requirements (e.g. monitoring)

- include database

B2 Theme 2: Evidence Requirements for Demonstration Zones and Test Sites

B2.1 Exercise 2.2: What has worked well and what lessons have been learnt?

Group A

What works well?

- When the purpose of the evidence is understood by all therefore no wasted evidence gathering
- Strategic assessments – coordination
- When developers work with sensitive areas rather than down play it
- Setting a clear pathway – all engaged understand the journey and requirements/milestones, and these are stuck to where possible
- Shadow the HRA process
- Scoping phase engagement/relationship – keep going throughout

What doesn't work so well?

- Leading developers 'down the garden path'
- Not being specific enough early on
- Outdated guidance – needs to be 'live'!
- Cut and paste from elsewhere – e.g. offshore wind, is not appropriate
- Reluctance to accept risk on the regulator side
- Not common understanding of the best available evidence at any one point
- Not catalogued lessons learned for future use/sharing
- Understanding terminology e.g. site characterisation, baseline etc

Group B

What works well?

- Regulators taking a pragmatic view on data requirement – proportional to risk
- Reasonable use of existing data (strategic surveys, MS/TCE)
- Early consultation to agree data requirement (pre-application)
- 1 year data prior to submission with additional 1 year as addendum – some issues/risks
- Data sharing between projects in same regions
- Strategic data with consultee buy-in
- Guidance under development

What doesn't work so well?

- Practical issues with complying with guidance
 - weather
 - incomplete data set
- Field methods for cetaceans are often ineffective
- Survey timescale are a problem
- Confidence in statistical certainty
- Communication of requirements between different organisations
- Uncertainty on avoidance rate – sensitivity of the approach
- Data sharing practicalities

Group C

Lessons Learnt +ve

- Understanding what the question actually is and knowing exactly what you need to know from the start – having all this well-defined and knowing how your evidence/data will be used to answer the question(s)
- Are we asking the right questions? Should we re-think the questions we're asking?
- Mitigation clear up front, so very focused data collection to inform mitigation approach, rather than general unfocussed collection of data (e.g. for marine mammals)
- Evidence gathering around deployments should be pragmatic and clearly designed to balance risk with getting devices in the water to find out what actually happens

Lessons Learnt -ve

- Gathering data for data's sake – need to be proportionate and receptor/impact pathway specific
- Generic consents which push detail on mitigation to post-consent mean pre-application data collection doesn't have focussed questions to answer

Group D

Evidence – some key questions

- What are the key receptors and impacts on those receptors? – evidence will need to be site and technology specific
- What existing data is available – identify the data gaps
- Is existing data fit for purpose? In terms of:
 - resolution
 - quality
 - method of collection
- Limitations of collection – high energy environment
- Baseline/Site characterisation – flexibility in survey requirements; will be dependent on risk > SDM and site sensitivity > PWP
- Design of characterisation surveys – will these data address questions on receptor density/impacts (e.g. cetacean density for CRM, limitations of VPs)
- Understand limitations of any modelling approaches used – inputs (parameters) + resulting outputs

Group E

What works well

- Definition of 'baseline' versus 'site characterisation'
- Collaborative work – research projects complimented by what developers need
- Evidence plan approach (taken from HRA)
 - Pre-application system where approach is agreed and documented
- Define the expectations of the EIA
 - allows focus and refining of what is needed at the site level
- Define the expectations of the consent so that the impact is appropriately assessed to inform the consent decision
- Significant effects are not necessarily a bad thing but need to identify them (as opposed to not recognising them and trying to conceal them)

What doesn't work so well

- Inadequate baseline leads to problems down the line
- Lack of agreement on level of information needed between developer and regulator

B3 Theme 3: Role of Demonstration Zones in improving the Environmental Evidence Base for Wave and Tidal Stream Interactions with Wildlife**B3.1 Exercise 3.1: Looking Forward****Group A****How can existing sites contribute to the evidence base?**

- It needs to be a network of sites
- Needs to be a central/common platform/database for information etc – aids succession planning (Annex 4?)
- Finding out what's out there and then assessing whether you agree with it and therefore whether it does help!
- Understand terminology (again!) Demo Sites/Demo Zones/Test sites/Nursery sites etc (what does it all mean?)
- Is R&D a help or a hindrance? Issues of deployments of R&D within the vicinity of devices
- Emphasis for this data sharing benefit is on the applicant to better inform the consenting application process

Group B**Points to consider**

- Non site-specific data that can possibly be transferred to other sites? E.g. diving birds, foraging behaviour etc
- Need for devices to be operational in order to gather data
- Testing of the monitoring equipment
- More resource given to publicly funded research – so likely to be more comprehensive and public bodies more likely to share findings i.e. will have to publish
- 'Anonimisation' of device data by developers
- R & D results in 'unpleasant surprises' for developers. Academia interested in becoming better academics rather than assisting the industry
- R & D should be led and directed by industry + TPM
- Commonality in evidence from various sites should be fed into a wider body of evidence
- Practical realities of gathering data at sea
- Third party pay for research, developers pay into a single fund

Group C**Points to consider**

- Mismatch between academic drivers and industrial drivers – needs to be resolved if R&D programmes are being designed around Demo Zones. Data over agreements, etc
- Funders need to be aware of the issues so decisions are sensible
- Third party managers have an important role – academia need the permission of third party managers

- R & D needs to be seen as a benefit rather than a hindrance by tying in directly with industry requirements – gatecheck for proposals
- Data sharing – use existing portals/repositories – make sure funders are aware of the importance of sharing raw data (enforcement of this)

Group D

Points to consider

- Practical application required
- How to bring dispersed initiatives/studies together to inform future deployments
- R & D benefits –
 - de-risks consents
 - accelerates consents (especially for future communications development)
 - provides more information RE - impacts
- Cultural and legislative expectation to deliver e.g. aggregates industry, oil and gas for reviews, reports in set timeframes
- Test sites need to work together – spread of evidence gathering across sites
- Review process via reporting to adapt mitigation/management based on results
- Limited learning to date – in part due to difficulty of detection and equipment
 - limitations/failures e.g. strain on gauges, camera failure
 - cost of equipment deployment

Group E

The way forward

- R & D research is not suitable as a condition (research does not equal monitoring)
- Can regulators encourage (force!) developers to share data (e.g. SPARTA Catapult Project)
- Benefits of this provides industry benchmarking (i.e. get more back in return)
- Use a third party to compile and anonymise data
- Catapult can help this
- Future opportunity of sharing this data with the research community
- For the demonstration zones – there should be a requirement to share data > but this needs carrots
- Set up a Regional Monitoring Programme underpinned by science e.g.
 - set this up outside of the monitoring system
 - reduces the burden on individual developers
- Clear definition of R & D goals between researchers and others, need to be clear on:
 - who is the end user?
 - researchers need to be focussed but everyone needs to be flexible
- To create clear benefits need to:
 - place the research in the context of consenting
 - specifically fill in gaps
- Research > outside – what is proportional and relevant at site level?
 - this leads to the big questions beyond the project level

- not feasible for developers to answer
- these are strategic studies but need to be reported back at the project level

Annex C

Workshop and Presentation Slides

APPENDIX C1: Wave and Tidal Initiatives in the UK

...some further background context

- UK experience and learning to date
- UK W&T groups and initiatives
- Challenges and opportunities



UK learning and experience to date

- Single devices and small arrays
- Commercial arrays and test sites
- Risk based approaches to consenting
- Survey and monitoring
- Mitigation and adaptive management
- Strategic planning processes
- Learning from other sectors (e.g. offshore wind)



...some further background context

- UK experience and learning to date
- UK W&T groups and initiatives
- Challenges and opportunities



Wave & Tidal groups and initiatives

Regulators & advisors

Offshore Renewable
Energy Licensing Group
(ORELG)

Offshore Energy SEA

The Crown Estate leasing
rounds

Offshore Statutory
Conservation Advisors
Group (OSSCA)

UK Agency Working
Groups

Industry

Pentland Firth and
Orkney Waters
Developers Forum

Marine Energy
Pembrokeshire
Working Group and
Consenting Group

W&T project liaison
and science groups

Non UK
Annex IV & Tethys - USA
FORCE - Canada

Evidence & Research

NERC Marine Renewable
Energy Knowledge
Exchange

Crown Estate Marine
Knowledge Network

Renewable UK position
papers

Various research projects
and programmes (e.g.
SpORRAn, SEACAMS)

ORJIP Ocean Energy

...some further background context

- UK experience and learning to date
- UK W&T groups and initiatives
- Challenges and opportunities



Challenges and opportunities

- Uncertainty about impacts continues to be a challenge for industry, regulators & advisors.
- Good time to take stock from experience so far?
- Opportunity to ensure that learning and best practice are applied to test sites and demo zones?
- Opportunity to explore cooperative or partnership working on key issues to complement, not duplicate work across the UK?
- Wider benefits for the wave and tidal sectors?

KEY QUESTION:

Are there things we can do better together than we could as the sum of our parts?



APPENDIX C2: Demonstration Zones and Test Sites

Wave

and Tidal

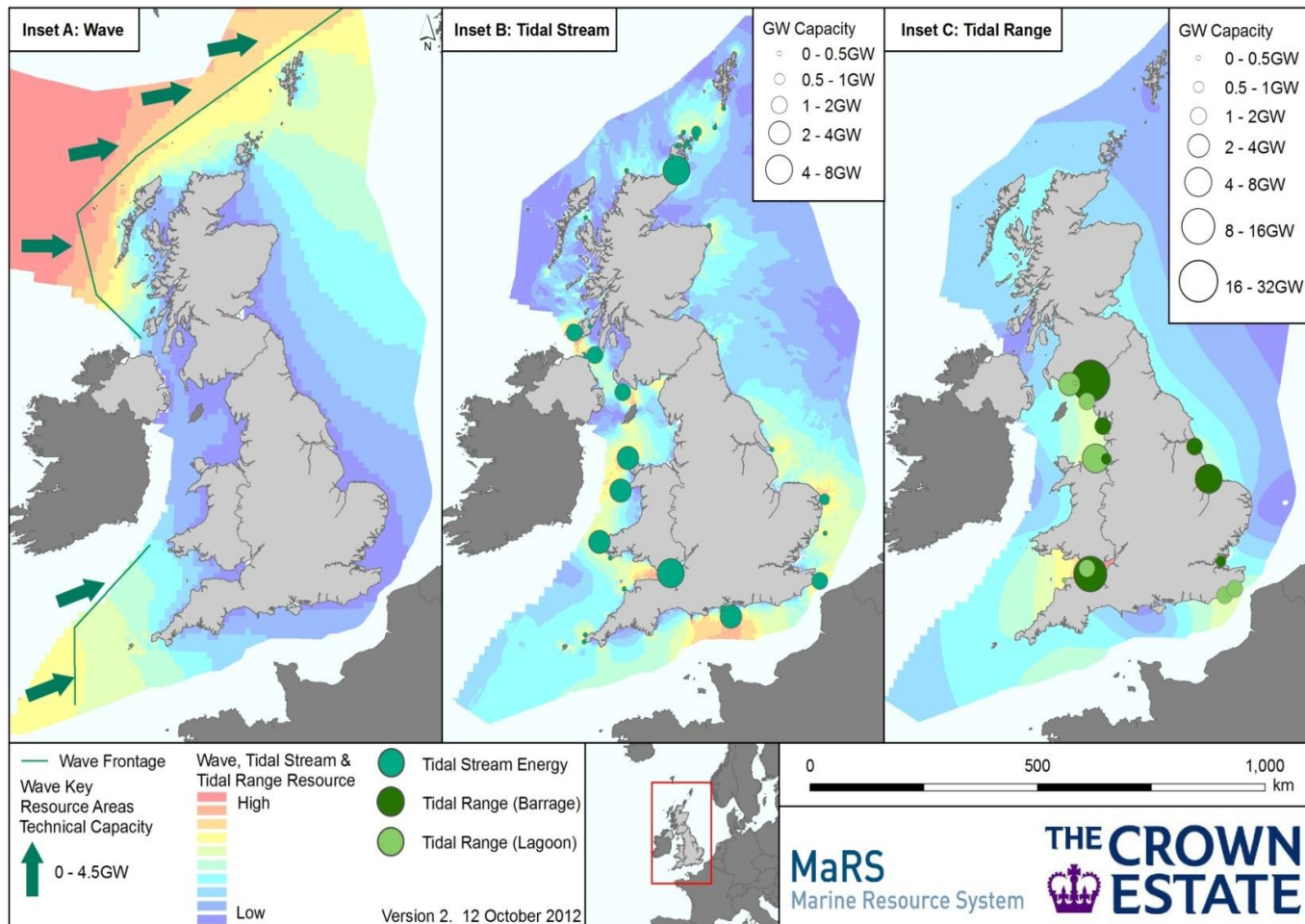
Workshop

14-15th July 2015

contents

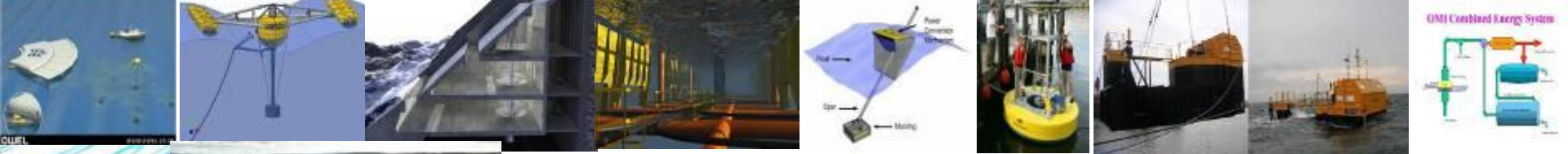
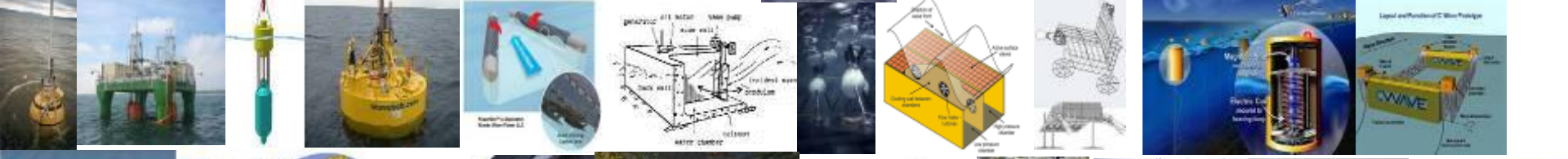
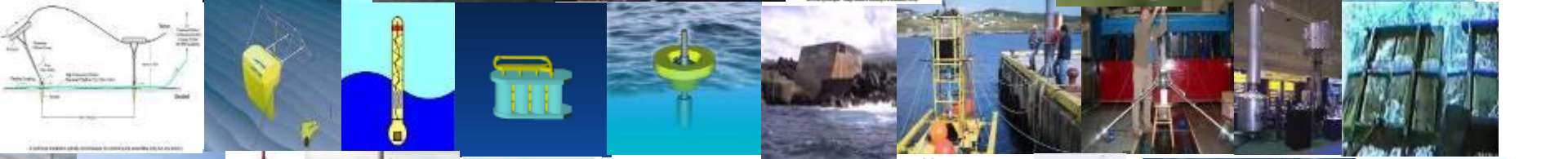
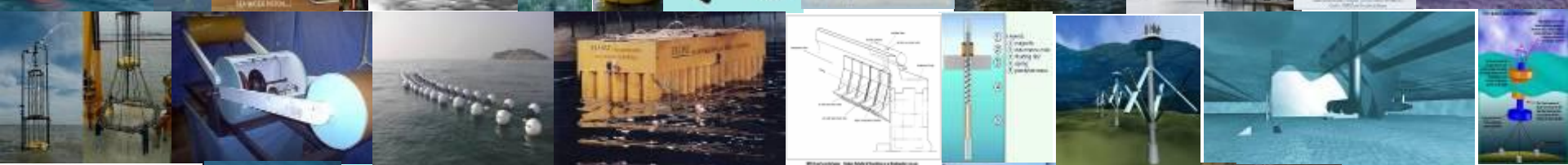
- The Crown Estate view of the wave and tidal world
- Test and demonstration facilities
- Aspirations for the facilities

There is potential for tens of gigawatts of wave and tidal generation projects around the UK



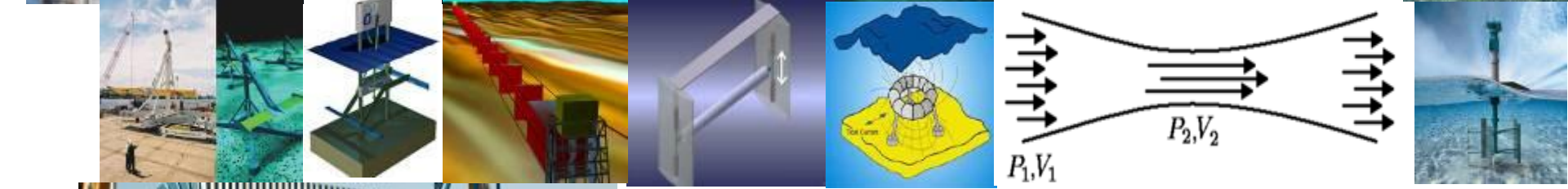
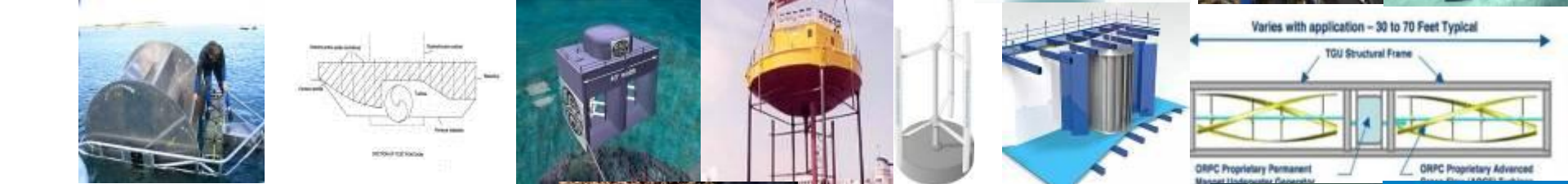


Convergence?



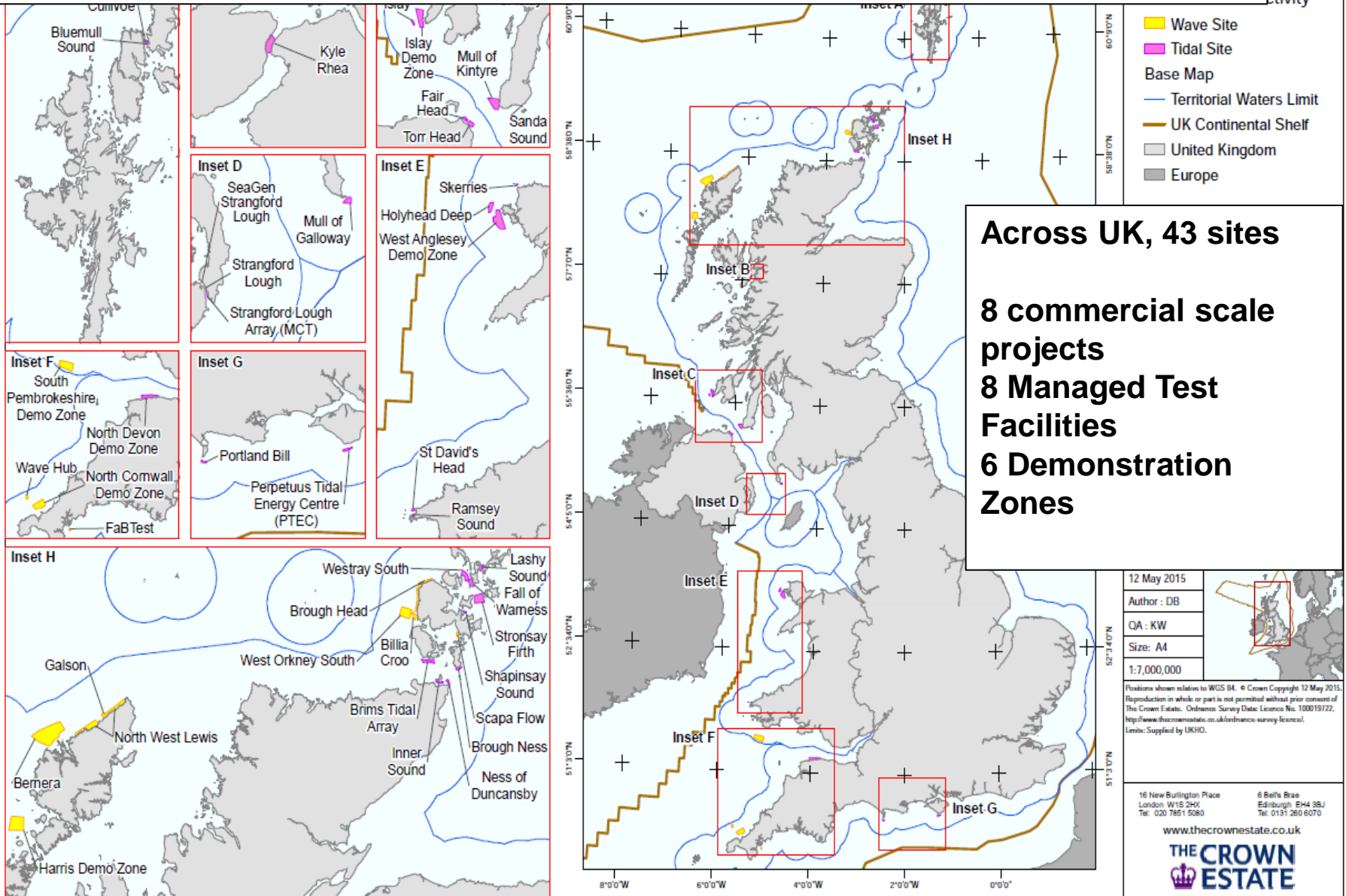
Wave





Tidal Current Technologies

Agreements for Leases and Leases



contents

- The Crown Estate view of the wave and tidal world
- Test and demonstration facilities
- Aspirations for the facilities

Test and Demonstration facilities

Are key to enabling the sector.

The UK is home to some of the best test facilities in the world, including...



3 non-grid connected



2 grid connected



2 demonstration arrays



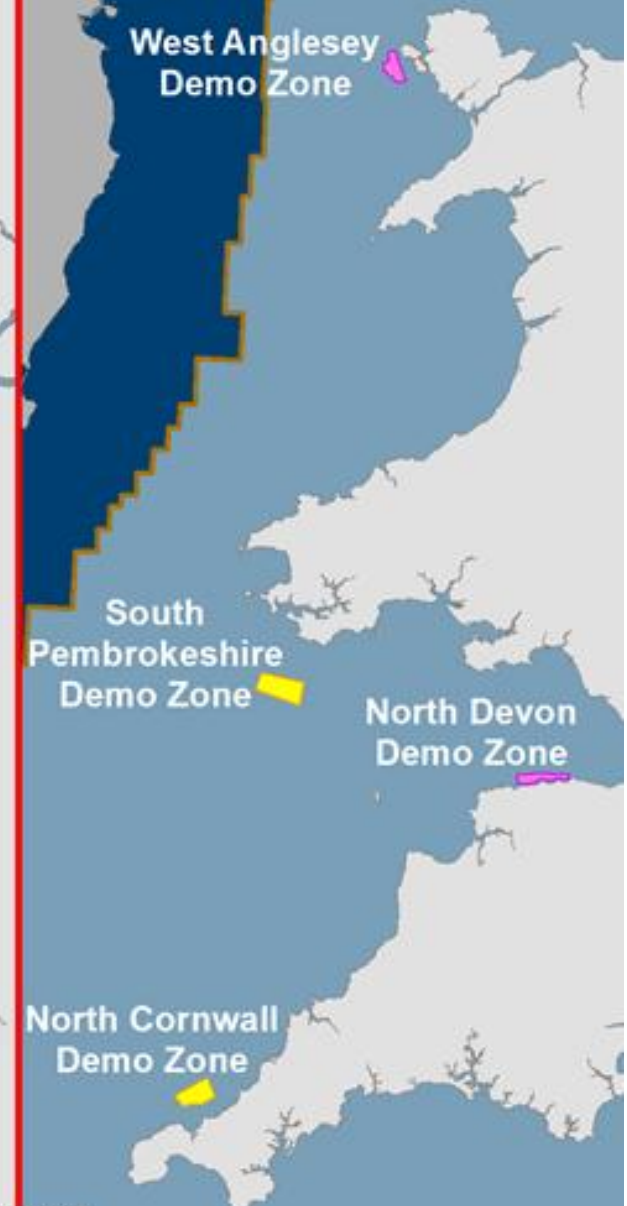
6 demonstration arrays

Demonstration zones selected to meet demand of the sector for a pipeline of demonstration scale projects

Scotland



England and Wales



How the zones were identified

The process for identifying the zones included:

- Desktop analysis using technical criteria (e.g. resource, depth and distance to shore);
- Workshops with governments organisations; and
- Consultation and stakeholder engagement.

As part of the process to help minimise obstacles to development of zones, The Crown Estateⁱⁱ completed a plan-level Habitats Regulations Appraisal (HRA) in parallel with the leasing process.

We also considered other relevant marine plans, policies and assessments, including Strategic Environmental Assessments (across the UK), the emerging marine plans across the UK, the Marine Renewable Energy Strategic Framework (MRESF) for Wales, and Regional Locational Guidance and draft sectoral plans in Scotland.

contents

- The Crown Estate view of the wave and tidal world
- Test and demonstration facilities
- Aspirations for the facilities

Aspirations for facilities

To create a pathway for development, testing and demonstration of technology in the UK.

The model of zones managed by local Third Party Managers is intended to:

- Accelerate progress in testing and demonstration, through efficient utilisation of local knowledge about seabed areas and their specific conditions;
- Support industry learning, through the TPM and developers working in the same zone sharing knowledge; and
- Encourage local supply chains to form or develop further, and help build local stakeholder support for projects.

Questions

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APPENDIX C3: ORJIP Ocean Energy

ORJIP Ocean Energy

Programme Update

14th July 2015



ORJIP background

- Offshore Renewables Joint Industry Programme (ORJIP) is a UK-wide collaborative programme of environmental research with the aim of reducing consenting risks for offshore wind and marine energy projects.
- ORJIP Offshore Wind already established and managed by Carbon Trust.
- ORJIP Ocean Energy was formed in March 2015 following a significant amount of work that demonstrated that a similar programme was needed covering wave, tidal stream and tidal range.
- The programme brings together industry, regulators, SNCB's, academia and other key stakeholders (including funders) to work together on key environmental and consenting issues that the respective sectors are facing.



ORJIP Ocean Energy

- The programme sponsors are The Crown Estate, Marine Scotland and Welsh Government.



- The programme sponsors have commissioned a Secretariat to manage the programme. For the initial 15-month pilot phase the Secretariat is being run jointly by Aquatera, MarineSpace and EMEC.

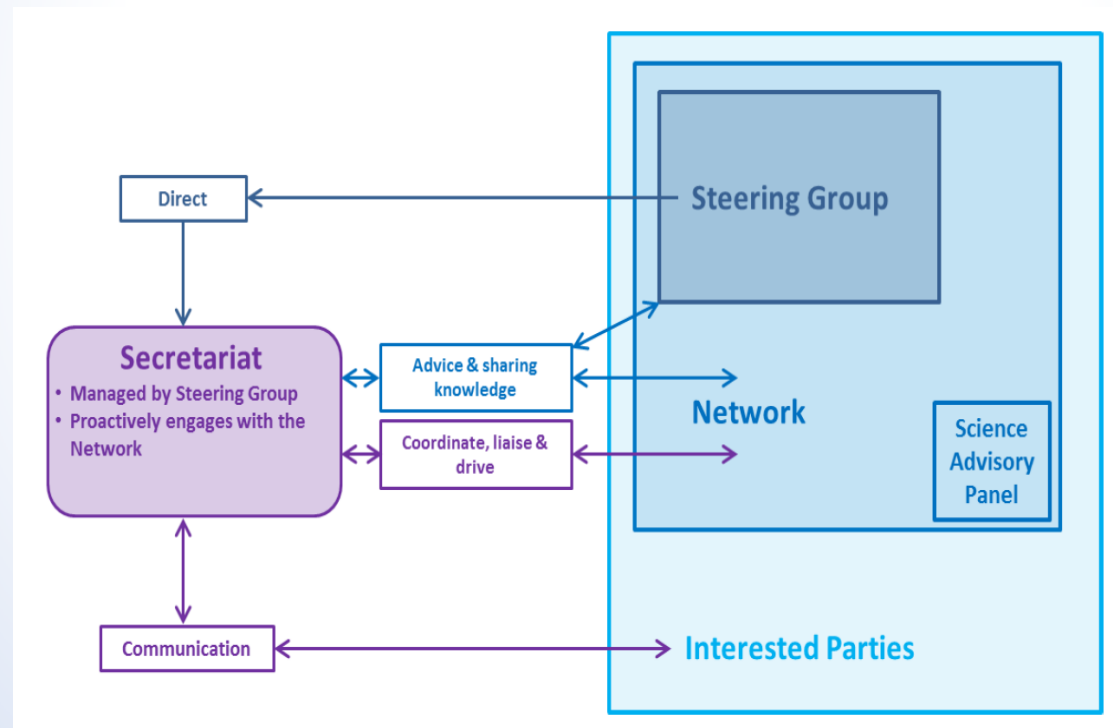


- The Secretariat will seek to stimulate the identification and collaborative commissioning of the priority research projects by identifying project leaders and funders from within the network of members. The Secretariat will be the main point of contact for ORJIP Ocean Energy and be managed by a Steering Group.



Structure & Funding

- The structure and funding of ORJIP Ocean Energy is different to ORJIP Offshore Wind in that the intention is for the projects to be publically funded where possible, given that wave and tidal developers are not currently in a position to contribute significant funds.
- The developers may contribute through the use of project sites and staff resource, etc.



Progress

- Steering Group and Network formed
- Call for evidence carried out with the Network
- First Steering Group meeting in June 2015
- First version of Forward Look complete and high priority strategic research projects identified



ORJIP Ocean Energy projects

Collision Risk

- Project A.1 Near-field monitoring of marine mammals around tidal turbines and first arrays to inform collision risk assessment
- Project A.2 Further research to help understand the possible likelihood, probability and consequence of collision with tidal turbines for marine mammals
- Project A.3 Further development of instrumentation and methodologies for detecting potential collision events around tidal turbines and arrays
- Project A.4 Stranding monitoring scheme to systematically search for, record and establish cause of death of stranded marine mammals



ORJIP Ocean Energy projects

Underwater noise

- Project B.3 Development of noise propagation models to further reduce uncertainty regarding the potential impacts of commercial scale arrays

Displacement

- Project C.1 Development of an agreed approach to assessing the potential effects and consequences of displacement from wave and tidal arrays

Socio-economics

- Project D.1 Further studies and research to understand the potential social and economic opportunities and impacts from the development of marine energy projects in rural communities



ORJIP Ocean Energy projects

General

- Project E.1 Monitoring around operational tidal turbines and first arrays to gather information on the behaviour of diving birds, marine mammals, basking shark and migratory fish around tidal turbines
- Project E.2 Development of mitigation measures for identified and potential impacts of wave and tidal developments
- Project E.3 Further development of instrumentation and methodologies for monitoring wildlife behaviour around tidal turbines and arrays
- Project E.4 Further research to improve understanding of the potential population level effects of protected mobile species from commercial scale wave and tidal current projects
- Project E.6 Review and dissemination of findings of environmental monitoring studies



ORJIP Ocean Energy projects

Regulatory

- Project F.2 Development of methods/processes for identifying and managing environmental risks associated with wave and tidal energy developments within the consenting process
- Project F.5 Development and agreement of methods/processes for developing Project Environmental Management Plans, incorporating mitigation measures and adaptive management strategies, for demonstration and commercial scale wave and tidal arrays

Shipping and navigation

- Project G.1 Development of agreed methods/processes for assessing, mitigating and managing potential impacts on shipping and navigation



Next Steps

- Issue the Forward Look to the ORJIP Ocean Energy Network
- Liaise with Network participants to identify organisations/consortia interested in progressing high priority strategic projects
- Identify potential support mechanisms for each project and liaise with potential funding organisations
- Establish strong links with other research programmes and initiatives
- Maintain research database and 'gap analysis'
- Get website live



Further info

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APPENDIX C4: Natural Capital Workshop Slides



UK Wave and Tidal Demonstration Zones Workshop

The Welsh Government, The Crown Estate, Natural Resources Wales, Scottish Natural Heritage, Natural England

14, 15 July 2015

Purpose of the Workshop

Introduction

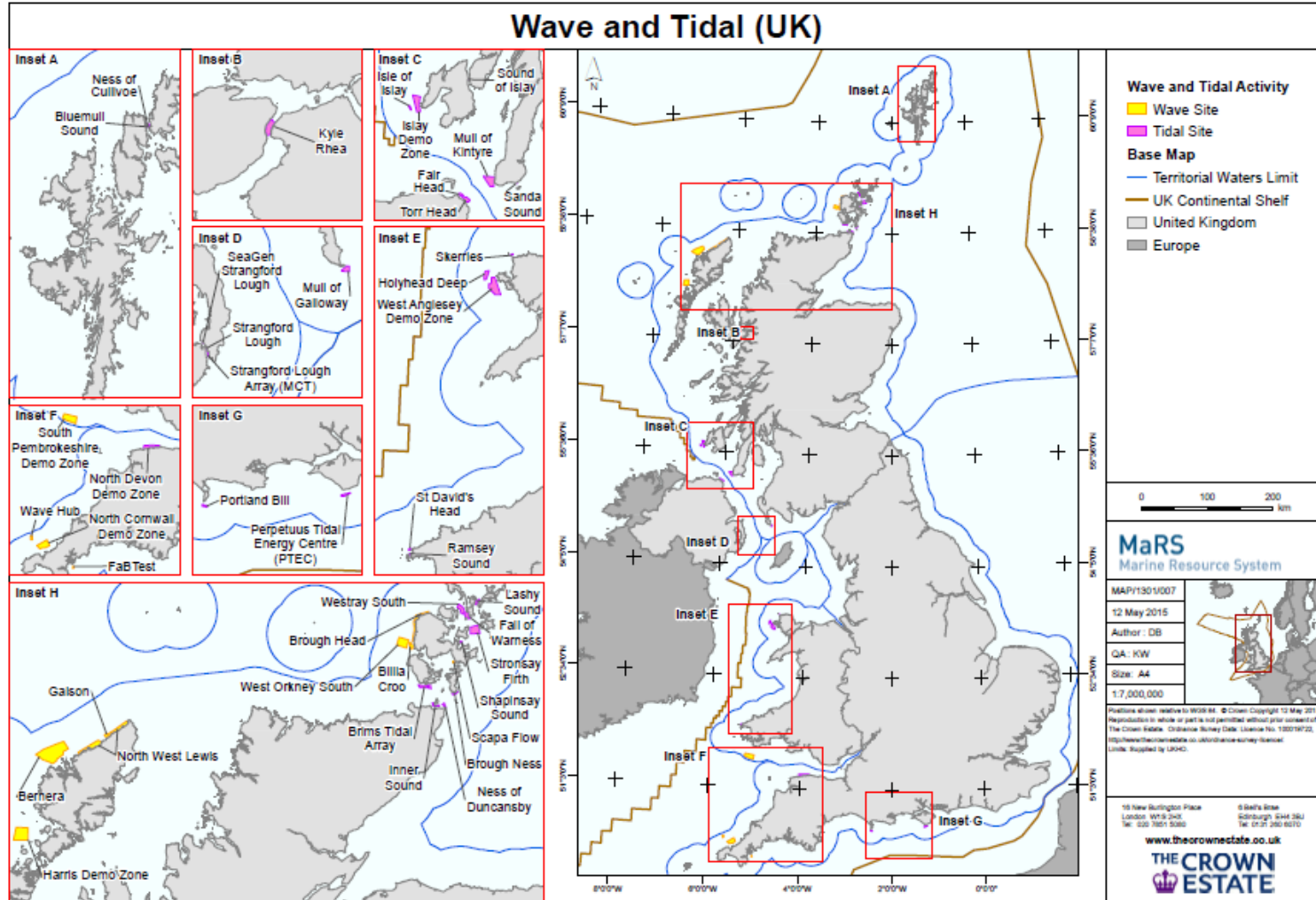
- Introductions
- Health & Safety
- Purpose of the Workshop
- Discussion Note
- Workshop Format and Agenda
- Context – Integration with other Initiatives
- Workshop Outputs



Purpose of the Workshop

- To discuss key themes and share issues relating to wave and tidal stream demonstration zones and test sites
- Address some practical consenting and research issues
- Establish joint learning objectives for Demonstration Zones and new test sites recognising importance of existing sites
- Learn from the past to best benefit the future
- Consider whether issues be addressed jointly across zones and sites or should they be looked at independently
- Contribute to de-risking project development and consenting and ensuring efficient working

Wave and Tidal Activity (UK)



WaveTidal_UK_A4.mxd -- 18/05/2015 -- 13:25:33

Workshop Agenda 14.7.15

Tuesday 14 July 2015		
LUNCH on arrival		12.00 noon
Agenda Item	Lead	Time
<i>Introduction</i>		
• Introductions and Introduction to Workshop	NC	12.30-12.40pm (~10mins)
• H & S etc	WG/NC	
• Purpose, Aims and Scope of the Workshop	NC	12.40-12.50pm (~10mins)
• Discussion Note		
• Workshop Format		
• Agenda		
• Themes and Proposed Discussion Times		
<i>Context for Workshop</i>		
• On-going Initiatives; ORJIP OE etc	SG	12.50-1.00pm (~10mins)
<i>Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites</i>		
• What do we mean by the Rochdale Envelope?	NC and Plenary Discussion	1.00-1.30pm (~30mins)
• What works well with approach? In pre-application, consenting and post-consent	Group and Plenary	1.30-2.10pm (~40mins)
• What goes wrong? What are the risks? In pre-application, consenting and post-consent	Group and Plenary	2.10-2.50pm (~40mins)
TEA		2.50-3.00pm
• Defining the way forward – towards best practice Relevant experience – what would work well with Demonstration Zones? Wide and narrow project envelopes	Group and Plenary	3.00-4.15pm (~75mins)
• Any required further work/ research/consultation?	Plenary Discussion	4.15-4.45pm (~30mins)
<i>Wrap Up Day 1</i>		
• Summary of Day 1 – Key Findings and Outputs	NC	4.45-5.00pm (~15mins)
• Plan for Day 2		

Workshop Agenda 15.7.15

Wednesday 15 July 2015		
COFFEE on arrival		From 8.30am
Agenda Item	Lead	Time
<i>Introduction</i>		
• Agenda for Day 2	NC	8.45-8.50am (~5mins)
<i>Theme 2: Evidence Requirements for Demonstration Zone and Test Site Consents</i>	NC	
• What do we need to know and why?	Plenary Discussion	8.50-9.00am (~10mins)
Visit and Address by the Minister for Natural Resources, Carl Sargeant ~9.00-9.30am		
• What has worked well and what lessons have been learnt to date?	Group	9.30-10.15am (~45mins)
• What are the risks in a 'risk-based' approach?	Plenary	10.15-11.00am (~45mins)
COFFEE		
• Sharing Ideas Session - What has experience shown you – effectiveness of mitigation? Was the assessment useful? Was the approach robust? Was the output worth the input?	Plenary	11.10-11.40am (~30mins)
• Defining a proportionate but robust approach to evidence needs	Group and Plenary	11.40-12.00pm (~20mins)
• How can data and experience best be shared in the future?	Plenary	12.00-12.15pm (~15mins)
LUNCH with COFFEE		
		12.15-12.45pm (30mins)
<i>Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife</i>	NC	
• Demonstration zones and test sites and the ORJIP OE programme	SG	12.45-12.55pm (~10mins)
• Tackling the R & D barriers?	Group and Plenary	12.55-1.35pm (~40mins)
• How can sharing evidence best inform the consents programme? What lessons have been learnt to date		
• Baseline data and future monitoring; monitoring and baseline data – making it work	Plenary	1.35-1.55pm (~20mins)
<i>Looking to the Future Way Forward</i>		
• Outputs from the three themes	NC	1.55-2.10pm (~15mins)
• Linkages		
• Summary of Commitments		
• Any Other Discussion Points		
<i>Concluding Remarks</i>		
• What happens next? Timescales	NC/CE	2.10-2.15pm (~5mins)
• Workshop Paper		

Workshop Themes

- Theme 1: Defining Rochdale envelopes for demonstration zones and test sites
- Theme 2: Evidence requirements for demonstration zone and test site consents
- Theme 3: Role of the demonstration zones and test sites in improving the environmental evidence base to de-risk consenting

Theme 1: Defining Rochdale Envelopes for Demonstration Zones and Test Sites

Objectives

- To consider existing approaches or **best practice in defining project (Rochdale) envelopes**
- To agree principles or guidance for **defining project (Rochdale) envelopes for the demonstration zones and test sites** (assuming zone/site-wide consents will be the preferred option for managers)
- To develop the understanding of the **advantages and limitations of wide and narrow project envelopes**
- To identify any further areas of work which are required, including **opportunities for joint working** across zones and test sites (and sites which are consented or under development) **or shared approaches**

Project Design Envelope: What do we mean?

- Why 'Rochdale'?
- 1999 and 2000 planning case law for outline planning for a business park ensuring compliance with the EIA Directive
- IPC Advice Note 9 lists important points from the judgement relevant to wave and tidal stream projects- listed in Section 2.4.1 of the Discussion Note
- In particular: recognising the need for the project to evolve over a number of years within clearly defined parameters; that the EIA should assess the significance of potential changes and that the effects should be clearly understood; flexibility should not be misused; consent conditions must be carefully drafted to ensure a clear framework within which development can take place

Project Design Envelope (1)

- What works well?
- Think of the whole process:
 - Pre-application – screening; scoping; EIA; Gate Check
 - Consenting including Conditions
 - Post-consenting
- What are the benefits looking ahead for Demonstration Zones and test sites?
- What does experience tell us to date?

Project Design Envelope (2)

- What doesn't work so well?
- Think of the whole process:
 - Pre-application – screening; scoping; EIA; Gate Check
 - Consenting including Conditions
 - Post-consenting
- What are the challenges/issues looking ahead for Demonstration Zones and test sites?
- What does experience tell us to date?

Theme 2: Evidence Requirements for Demonstration Zones and Test Site Consents

Objectives

- To agree principles or guidance for determining **evidence needs to inform consents** (zone/site-wide or individual project), including the role of a risk-based, **proportionate approach**
- To agree principles or guidance for determining evidence needs to inform **decisions about mitigation or adaptive management measures**
- To identify where there may be benefits in **exploring joint working or sharing data** or approaches
- To identify any further areas of work required

Theme 2: Evidence Requirements: What has worked well and what lessons have been learnt?

- Drawing on your experience what approaches have been successful and where have problems arisen?
- What are some successful, examples of approaches to underpinning EIA and HRA?
- Does current guidance help? Any issues with it?
- Where has the approach to site characterisation gone wrong/caused problems - what are the lessons learnt?

Theme 2: Evidence Requirements: Proportionate Approach?

- What does a proportionate approach mean to you?
- What does a proportionate approach to EIA mean to you?
- What principles are important in using this approach?
- Can you take the risk?
- How do you address proportionate data requirements for development you don't yet know?

Theme 2: Evidence Requirements: Best Practice?

- What data are needed for zone /site wide consents?
- What do you need to know to define appropriate mitigation and / or adaptive management measures?
- What is the role of a risk-based proportionate approach - can it work and if so how?

Theme 3: Role of Demonstration Zones and Test Sites in improving the Environmental Evidence Base to de-risk Consenting

Objectives

- To agree in principle the role of demonstration zones and test sites (as well as individual project sites) in **improving the evidence base on interactions with wildlife to inform EIA/HRA and the development of PEMPs** for commercial scale developments
- To identify where there may be benefits in exploring **joint working or sharing data**, or nested or collaborative survey designs across zones and sites
- To identify how the demonstration zones and test sites might help to **deliver** the Offshore Renewables Joint Industry Programme (ORJIP) Ocean Energy (OE) programme (noting the Forward Look which presents **ORJIP OE's strategic research priorities**)
- To identify any **further areas of work** required, including testing / trialling of survey approaches and techniques, monitoring equipment and validation of modelling as being of potential value

Theme 3: Thinking about the Way Forward

- How can the new sites best contribute to the evidence base needed to inform future consents?
- How can R& D be seen as a benefit rather than a hindrance?
- How can data best be shared?
- How can monitoring commitments inform future characterisation studies?
- How can sharing evidence best inform the consents programme?
- What lessons have been learnt to date?

Way Forward: Looking to the Future

- Outputs from the three themes
- Linkages
- Summary of commitments
- Any other discussion points
- What happens next? Timescales
- Workshop Paper



Annex D

DISCUSSION NOTE

Discussion Note

The Crown Estate

**UK Wave and Tidal Stream Demonstration Zones and Test Sites Workshop:
Pre-Workshop Discussion Note**

3 July 2015

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Discussion Note

The Crown Estate

UK Wave and Tidal Stream Demonstration Zones and Test Sites Workshop: Pre-Workshop Discussion Note

For and on behalf of
Natural Capital Ltd

Approved by: Dr Annie Say

Signed: 

Position: Director

Date: 3.7.15

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1 INTRODUCTION

1.1 PURPOSE OF THE PRE-WORKSHOP DISCUSSION NOTE

The purpose of this pre-workshop note is to stimulate discussion at a workshop hosted by Welsh Government organised by a Steering Group led by The Crown Estate composed of key stakeholders including Scottish Natural Heritage (SNH), Natural Resources Wales (NRW), Natural England (NE), Marine Scotland, RenewableUK and the Marine Management Organisation (MMO)). The funding partners for the work are The Crown Estate, the Welsh Government, NRW, SNH, and NE. The focus of the workshop is to explore some key themes and shared issues relating to wave and tidal stream demonstration and test sites (see Section 1.2.1). It is intended that the workshop outputs will address some practical consenting and research issues with potentially wider benefits to the wave and tidal stream sectors. The Discussion Note will be circulated to participants before the workshop.

The Steering Group recognises that the UK wave and tidal demonstration zones and new test facilities around the UK, such as the potential Perpetuus Tidal Energy Centre (PTEC) on the Isle of Wight represent a major opportunity for the growing UK wave and tidal stream sectors particularly when combined with existing sites. Together the zones and test sites provide opportunities to develop and establish joint learning objectives relating to the environment and technical engineering aspects of device and array testing to ultimately de-risk project development and consenting. Joint working has the benefit of reducing the potential for inefficient and duplicated effort, sharing costs and taking a coordinated approach to dealing with shared issues.

The workshop will explore a number of themes (see Section 1.2.1) and consider where there might be benefit in demonstration zones and test sites working together. It will explore whether shared issues would be better addressed independently across zones and sites, or through seeking shared approaches and solutions. Their role in progressing certain key consenting issues can also be explored which could have wider benefits to the marine energy sector including in informing assessments for commercial scale projects.

1.2 WORKSHOP

The workshop will be held in Cardiff on the 14th and 15th of July 2015. It will be facilitated by Natural Capital Ltd, a small environmental and sustainability company with an interest in workshop facilitation. The list of participants has been collated by the Steering Group from a range of government organisations, statutory nature conservation bodies (SNCBs), demonstration zone and test site managers, developers and consultancies to ensure that discussions can be as comprehensive as possible drawing from wide-ranging experience.

1.2.1 Workshop Themes

Three key themes relating to UK wave and tidal stream demonstration zones and test sites have been identified by the Steering Group for discussion at the workshop. These are:

- Theme 1: Defining Rochdale envelopes for demonstration zones and test sites.
- Theme 2: Evidence requirements for demonstration zone and test site consents.

- Theme 3: Role of the demonstration zones and test sites in improving the environmental evidence base to de-risk consenting.

1.2.2 Workshop Outputs

The workshop outputs will include a Workshop Report documenting the discussions in group sessions and plenary from the workshop and in particular specific outputs will include:

- Theme 1: Principles/best practice/guidance for defining project envelopes for demonstration zones and test sites, identifying opportunities for joint working or shared approaches;
- Theme 2: Evidence needs to inform consents (with a focus on zone/site-wide consents) and identification of where there may be benefits in exploring cross zone or site survey designs or sharing data;
- Theme 3: Recommendations for collaborative working or sharing data across zones and test sites and the wider wave and tidal sectors including exploring the possible role of test sites and demonstration zones in helping achieve the objectives of the Offshore Renewables Joint Industries Programme (ORJIP) for Ocean Energy.

1.3 APPROACH

This Discussion Note is not intended to be a fully comprehensive review of the topics of the three workshop themes rather it has been collated drawing on some key information sources, and from these discussion threads have been identified for consideration by participants in advance of the workshop. Natural Capital has benefited from discussions with the Steering Group and support from Ian Hutchison of Aquatera as well as their review of the draft note.

1.4 SOURCES OF INFORMATION

Information to inform this Discussion Note has been drawn from the sources suggested by the Steering Group and from the facilitation team's personal experience of working in environmental consultancy. References are given as footnotes at appropriate points in the text. The list is not comprehensive and there may be some key references which will also be helpful and it is hoped that these will be identified by participants at the workshop.

1.5 LAYOUT OF THE DISCUSSION NOTE

The remainder of the Discussion Note is set out as follows:

- Section 2: presents information relating to Theme 1: the Rochdale Envelope;
- Section 3: considers Theme 2 – evidence requirements for demonstration zones and test sites;
- Section 4: explores Theme 3 - the role of demonstration zones in improving the environmental evidence base for the wave and tidal stream sectors;
- Section 5: provides information about the workshop and includes a collated list of workshop prompts to consider for each theme before the workshop.

2 THEME 1: DEFINING ROCHDALE ENVELOPES FOR DEMONSTRATION ZONES

2.1 INTRODUCTION

This section provides some background information on the Rochdale Envelope and examples of its use. From this information some issues to consider in advance of the workshop have been suggested (see Section 2.5).

2.2 WORKSHOP OBJECTIVES

The objectives for this theme are:

- to consider existing approaches or best practice in defining project (Rochdale) envelopes;
- to agree principles or guidance for defining project (Rochdale) envelopes for the demonstration zones and test sites (assuming zone/site-wide consents will be the preferred option for managers);
- to develop the understanding of the advantages and limitations of wide and narrow project envelopes; and
- to identify any further areas of work which are required, including opportunities for joint working across zones and test sites (and sites which are consented or under development) or shared approaches.

2.3 KEY QUESTIONS

Three key questions have been identified by the Steering Group for consideration within this theme:

- how to define the range of device types and scale and location of development within the zones or test sites?
- will the defined project envelope allow for full zonal consents or partial (i.e. as at EMEC)?
- can any principles or approaches building on experience / best practice elsewhere be agreed?

2.4 BACKGROUND INFORMATION

2.4.1 Understanding the Rochdale Envelope

Planning case law in 1999 and 2000¹ led to the use of the term Rochdale Envelope. These cases dealt with outline planning applications for a proposed business park in Rochdale and the consideration of the environmental impact assessments of these proposals in the context of the outline planning consent to enable compliance with the EIA Directive as transposed by the relevant Regulations in English and Welsh law. The approach has subsequently been used in various consenting regimes where the details of the project are not fully known including offshore renewable energy projects.

Important points from this judgement of particular significance in taking forward wave and tidal projects as set out in an Infrastructure Planning Commission (IPC) advice note² are:

¹ 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]

² Infrastructure Planning Commission (IPC) Advice note nine: Rochdale Envelope February 2011

- the outline application³ should acknowledge the need for details of a project to evolve over a number of years, within clearly defined parameters;
- the environmental assessment must take 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 permission (whether in the nature of the application or achieved through ‘masterplan’ conditions) must create ‘clearly defined parameters’ within which the framework of development must take place..... It is for the local planning authority in granting outline planning permission (for marine projects this will be the Regulator) to impose conditions to ensure that the process of evolution keeps within the parameters applied for and assessed;
- the more detailed the proposal, the easier it will be to ensure compliance with the Regulations;
- the level of detail of the proposals within the defined parameters must be such to enable a ‘proper’ assessment of the likely significant environmental effects of the proposals and for mitigation measures to be described – if necessary considering a range of possibilities; it is consistent with the objectives of the Directive to adopt a cautious ‘worst case’ approach and define mitigation for this worst case in order to optimise the effects of the development on the environment;
- such flexibility should not be misused and does not allow developers an excuse to provide inadequate project descriptions; the consenting authority must decide whether it has ‘full knowledge’ of the project’s likely significant effects on the environment. If it is considered that an unnecessary degree of flexibility and hence uncertainty as to the likely significant effects, has been used then it can require more detail or refuse consent;
- developers and authorities must ensure they have assessed the range of possible effects implicit in the flexibility provided by the permission which may in some cases prove difficult.

2.4.2 Example Use of the Rochdale Envelope

The rapidly changing and evolving technology for marine energy devices has required use of the Rochdale Envelope. It is a recognised way of dealing with an application where details of the project have not yet been fully resolved at the time of application and is now particularly relevant with multi technology sites. A few examples of the approach are introduced in this section in summary form.

PTEC

The proposed Perpetuus Tidal Energy Centre (PTEC) on the Isle of Wight will, if consented, provide the electrical supporting infrastructure to enable tidal stream developers to deploy a number of small arrays (up to 30MW total capacity) at berths within the development site over the project’s 25 year lifetime. The project therefore requires a broad consent development envelope to encompass the range of devices and arrays likely to be installed and operated at the development site. The PTEC Project Description⁴ acknowledged the need for flexibility and a device neutral approach. Characterisation of the Rochdale Envelope focussed on those characteristics known to interact with key environmental receptors (foundations, moving parts, and visible components). Feedback from consultation with a wide range of developers was used to inform the Front End Engineering Design (FEED) and EIA description. Consideration of representative tidal

³ NB the current marine applications are not defined as ‘outline’ or ‘masterplan’

⁴ Perpetuus Tidal Energy Centre, 2014 Royal HaskoningDHV Chapter 5 of the ES Project Description

technologies to identify realistic worst case parameters for each device type and the relevant worst case scenarios for the project as a whole were used in the EIA.

Flexibility is built in to the application in terms of total number of devices; layout of devices within the development site (location, density, array spacing); device types and their mix across PTEC; foundation/mooring types; location of electrical hubs and monitoring equipment; number and routing of inter-array cables and location of navigational aids. Relevant maximum and minimum parameters are provided and worst case assumptions highlighted. Section 5.17 of the ES summarises the Rochdale Envelope and provides a clear overview of all key components of the project description which have been taken forward in the assessments of environmental impacts. The key relevant information is carried forward clearly in the assessment chapters and a worst case assessment made, based on the assumptions. If a particular device was proposed with characteristics which had not been assessed within the Rochdale Envelope the applicant would have to submit additional information to the Marine Management Organisation (MMO).

MeyGen

The EIA for Phase 1 of the MeyGen⁵ tidal energy project adopted a Rochdale Envelope approach to address elements of uncertainty associated with the ongoing design and refinement of tidal technology and the overall design of the project. The project description discusses the options and provides a series of maximum extents or magnitudes for key aspects of the project, for which the significance of environmental effects were assessed during the EIA and HRA. At the start of each ES section the maximum project extents relevant to the specific assessment are defined. Potential variances in the impacts predicated based on the different design options have been summarised qualitatively following the main impact assessment.

The authors of the ES acknowledge that there are clear difficulties in undertaking an accurate EIA if the parameters of the envelope are too flexible /too broad, however *'following in-depth consideration of the potential variances in environmental impact based on current design uncertainties, MeyGen are confident the project design presented here has enabled a robust and accurate EIA'*.

The assessment considered the maximum ('worst case') project parameters. The ES states that identification of the worst case scenario for each receptor (EIA topic) ensured that impacts of greater adverse significance would not arise should any other development scenario be taken forward in the final scheme design. Tables in the ES describe the detail of the project parameters that have been used in the assessment and explain why these are considered to be worst case. The potential impacts from potential alternative project parameters were considered.

Wave Hub

The approach to the design envelope in the Wave Hub ES⁶ is less explicit than that in the PTEC ES, for example, in the project description chapter but more clearly set out in the technical assessment chapters. In this chapter a worst case assessment approach is adopted with detail at quite a high level and uncertainties in predictions described. Differences in technology are described in the project description and there is a commitment that the environmental effects of construction should not be greater than those assessed in the ES (a not

⁵ MeyGen Tidal Energy Project Phase 1 Environmental Statement, Xodus Group, 2013

⁶ South West of England Regional Development Agency, Wave Hub Environmental Statement, June 2006

environmentally worse than (NEWT) approach). Wave Hub was granted consent in 2007 under Section 36 of the Electricity Act 1989 allowing different energy generation technologies to be deployed at the site but developers must apply for their own marine licence drawing on existing environmental and other baseline data.

EMEC: Falls of Warness Tidal Stream Test Site

The European Marine Energy Centre (EMEC) defined a 'project envelope' for the Fall of Warness tidal test site describing the types and characteristics of marine energy converter systems (MECS) likely to be deployed at the site, together with the types of marine operations and activities likely to be associated with their installation, operation and maintenance. The project envelope was prepared by EMEC using its experience of the parameters associated with existing deployments at EMEC, together with those emerging elsewhere.

An Environmental Appraisal was carried out by SNH for deployments at the Fall of Warness test site, based on anticipated deployment activities and parameters described in the project envelope. This appraisal constitutes an HRA/AA for the whole site, and will support any application for a Marine Licence or Section 36 consent, and, where necessary European Protected Species (EPS) and basking shark licences⁷ for deployment at the Fall of Warness. Provided that a project falls within the parameters set out in the project envelope, it will be considered as pre-appraised in terms of its environmental impacts and no further environmental appraisal by Marine Scotland will be required. Developers are, however required to submit a Project Information Summary, an Appendix to the site wide Navigational Risk Assessment (NRA) and a Project Environmental Monitoring Plan (PEMP). Projects falling out-with the envelope may require additional appraisal and/or consultation⁸.

The non-technical summary (NTS) for the Fall of Warness ES⁹ supporting a Section 36 application states *'When the EMEC test site was established, it was not deemed possible to grant generic site licences and consents which could be applied to all devices that might in future be deployed at the test site. This was due primarily to the fact that little was known about the range of types of devices and details of their features, together with the requirement under EU and national legislation to fully consider detailed risks to the environment, with particular emphasis on marine fauna. In that context the Regulator and SNH were unable to adequately assess the extent of any risk to marine species of the tidal energy structures operating in sea areas used by potentially sensitive species'*¹⁰.

Developments since 2006 mean that it now becomes feasible for the Regulator to consider awarding consent for technology-agnostic projects, as long as the key features of the future devices are characterised and assessed. These developments over the last decade include: (1) a much more detailed knowledge of the types of devices and structures that are likely to be used to capture energy from tidal streams; (2) the development by SNH and Marine Scotland of the 'Plan, Deploy and Monitor' approach to mitigation of environmental risk, once all possible

⁷Basking sharks are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are protected against intentional or reckless disturbance or harassment. Applications are made to SNH for licences for research and other purposes to avoid committing an offence

⁸ EMEC, January 2015, Consenting Guidance for Developers at the EMEC Fall of Warness Test Site

⁹ EMEC Fall of Warness Tidal Test Site Section 36 Consent Application Environmental Statement: Non-technical Statement December 2014

¹⁰ The original EMEC ES and the Fall of Warness indicate that a much more general approach was taken to the EIAs (Carl Bro Group Marine Energy Test Centre Environmental Statement, 2002 for Section 36 consent and AURORA Environmental Ltd, EMEC Tidal Test Facility Fall of Warness Eday, Orkney: Environmental Statement, June 2005

other mitigation measures have been applied to a project; and (3) experience, gained largely at EMEC, of the different types of monitoring that can be done in order to gather the data essential to addressing the remaining environmental concerns.

The availability of the environmental appraisal documentation will not remove the requirement for each developer to apply for an individual Marine Licence (and EPS and basking shark licences where required). But it is provided to help inform the assessment process for each project. The anticipated range of potential impacts that could arise from the installation, operation and maintenance of tidal turbine devices at the test site was appraised and conclusions reached, provided that the proposed project fitted within an agreed range of features and activities (the project envelope). The assumptions about the envelope are clearly stated including any parts of a development which are not included.

Sound of Islay Demonstration Tidal Array

The project description in the ES for the Sound of Islay demonstration tidal array¹¹ does not specifically refer to a Rochdale or design envelope. This would apparently allow less flexibility in the final design¹² and the subsequent further requirements in the consent process support this.

There was a reapplication for this project due to a change in cable route¹³ and the Company also decided to reapply in 2014 due to 'material changes' in the project¹⁴.

Marine Scotland issued the original project with a marine licence in May 2011 under the 2010 Act. As the Development differs materially to that of the consented proposal, the decision was made by Marine Scotland for the Company to submit a new application for section 36 consent and deemed planning permission, rather than the Company requesting a variation of the original consent.

West Islay Tidal Energy Park

The ES for the West Islay Tidal Energy Park¹⁵ (the installation of 30MW of tidal energy converters and associated infrastructure including the export cables to landfall on Islay) describes the need for the design envelope approach as being because of changing technology- '*In order to take advantage of this continuous, and at times stepped, improvement of the technology available it is beneficial to retain a degree of flexibility in decision process for final device selection*' and because '*... the EIA and ES are completed before a detailed technical assessment of the site has been undertaken, there remains a degree of uncertainty relating to installation techniques, foundation types, turbine size and specific technology viability*'. Worst case parameters for each topic are defined and the ES states: '*Taking the 'realistic worst case' scenario, it can be assumed if no significant impact is demonstrated at the 'realistic worst case', then no significant impact is likely for any scenario*'.

Anglesey Skerries Array

The Non-Technical Summary (NTS) for the Anglesey Skerries Tidal Stream Array ES¹⁶ confirms the EIA assessed the '*realistic worst case*' within clearly defined parameters that will '*govern or define the full range of development possibilities*

¹¹ SPR Sound of Islay Demonstration Tidal Array, Environmental Statement, July 2010

¹² The decision from Marine Scotland does however state key maximum and minimum assumptions

¹³ <http://tethys.pnnl.gov/annex-iv-sites/sound-islay-demonstration-tidal-array>

¹⁴ <http://www.gov.scot/Resource/0047/00470180.pdf>

¹⁵ DP Marine Energy Ltd (DPME) West Islay Tidal Energy Park Environmental Statement, 2013

¹⁶ The Skerries Tidal Stream Array Environmental Statement Volume 1: Non Technical Summary MCT and SeaGeneration (Wales) Ltd

and has considered the most onerous scenarios for every aspect of the Project. This process defines clearly the potential boundaries of the Project and describes the maximum possible impact'. Baseline monitoring was proposed in the ES because some effects were not known and there were still some parameters that were not explicitly defined.

FORCE

The Fundy Ocean Research Centre for Energy (FORCE) was established in 2009 as Canada's leading test centre for tidal energy technology. FORCE is a non-profit grid-connected in-stream tidal energy test facility in the Minas Passage, Bay of Fundy, intended to allow developers, regulators, scientists and academics to study and demonstrate the performance of in-stream tidal energy turbines and their interactions with the environment. The FORCE site consists of four undersea berths for tidal in-stream energy conversion (TISEC) devices, four subsea power cables connecting the turbines to land-based infrastructure, one subsea data cable, an onshore transformer substation, and a shore-based visitor centre.

New developers who want to test their technology at FORCE are not required to make an Environmental Assessment application to the Province of Nova Scotia or the Government of Canada, as long as the new device:

- occupies one of the four existing berths at FORCE;
- replaces one of the four turbines tested;
- is not predicted to have significantly different environmental impacts from the previous technologies tested.

Developers must however obtain other relevant permits.

2.4.3 Comments on Use

Feedback¹⁷ suggests that committing to a detailed project design at an early stage of a project where construction is not likely to commence for a number of years would be restrictive for the developer and would not allow for continued improvement or for lessons to be learnt from the testing of devices in the intervening period. It would also mean that consenting processes were not based on the best available evidence.

Applications made using this approach are consented which suggests an assumption that Regulators accept the approach. This may be that the level of flexibility in the project description is considered small and that no great variations will be proposed in the future or because the future potential variations are not fully understood because of lack of robust information etc. In considering flexibility it is important to distinguish between distinct technology alternatives and flexibility with regards to certain project components. The role of effective consultation is acknowledged as an integral part of the project development process in several of the documents which have been reviewed¹⁸.

Using the design envelope approach may (as summarised by Wright) allow applications to be processed at an earlier stage than waiting for the detailed design to be complete with less delay to later construction. The alternative could be for applications to be postponed until the detailed designed parameters are defined which could result in longer timescales to reach construction or to the

¹⁷ <http://www.glenwright.net/the-rochdale-envelope/#>

¹⁸ eg Wave and Tidal Energy Market Deployment Strategy for Europe, June 2014, SI Ocean for EU

need for applications for projects which have been consented to have to be resubmitted if the design parameters for the project changed materially in the period from when consent was granted.

The alternative approach may in fact be unrealistic depending on device turnover in test sites and demonstration zones because the technology deployed at Year 1 may not be the same as what is on site in subsequent years up to the lifetime of the site or zone. In addition this approach may significantly hinder progress in the industry because of the uncertainty in return for a developer.

IPC (2011) advises that the developer must ensure the project description is sufficiently clear for those who are consulted to be able to understand the proposals (including where certain parameters are not yet fixed) and therefore the project and its details need to be described as clearly and simply as possible. It is also advised that sufficient detail should be known to allow an environmental statement (ES) to be prepared in accordance with the EIA Regulations and to allow significant residual effects to be reported. The level of information that is provided can evolve through the pre-application process but the need to address the maximum adverse impact in the assessment with the application including variation is advised taking account of inter-relationships between aspects of the development and topic areas.

It is important to consider project information and how it will be used at various stages in the consenting process including at scoping, consent application and post-consent. These were all considered in a specific workshop for the Pentland Firth and Orkney Waters¹⁹ which looked at drivers and constraints to providing information at each stage in the process. It found that developers were unlikely to confirm all design parameters prior to application for consent primarily because of the high costs of site investigations. It was concluded that because detailed design information was unlikely to be fixed before consent, that conditions should provide the flexibility to enable detailed design information and construction methodologies to be defined later in the process.

The use of the Rochdale Envelope is promoted in various ESs as the most appropriate approach in an industry which is evolving rapidly with ongoing improvements in technology, infrastructure and installation techniques. The approach '*provides essential flexibility to enable projects to take full advantage of these improvements*' and of lessons learnt from ongoing work and testing²⁰. However, whilst the approach can be useful when realistic scenarios are used, '*the use of overly broad project envelopes can cause challenges for regulators and developers alike, resulting in worst-case scenarios which are unrealistic and cause particular challenges when it comes to cumulative impact assessments*²¹. It may also be unnecessarily precautionary and restrictive to a developer.

Problems may arise when applicants merge technology options and create a 'hybrid' worst case scenario which does not allow the regulator and stakeholders to clearly consider the potential impacts of each technology option. This could result in an application being refused due to the inclusion of one component/technology which results in a design envelope that is deemed unacceptable.

¹⁹ The Crown Estate, 2012 Pentland Firth and Orkney waters Enabling Actions Report: Rochdale Envelope Workshop – Wave and Tidal Project Report (Niras)

²⁰ Siadar Wave Energy Project Siadar 2 Scoping Report Voith Hydro Wavegen Assignment Number: A30708-S00 Document Number: A-30708-S00-REPT-002 Xodus Group Ltd

²¹ Wave and Tidal Energy Market Deployment Strategy for Europe, June 2014, SI Ocean for EU

In considering an approach which may be most appropriate for demonstration zones and test sites in the future it will be important that the advantages and disadvantages of wide and narrow envelopes are explored at the workshop as well as what area within the zones any envelope should encompass.

In addition, it is important that the regulatory implications of different approaches are explored and what consenting approach is acceptable to the regulators. MMO and NRW Permitting have indicated that it may not be possible in England and Wales to take a split consent approach as has been the case at EMEC and Wave Hub, whereby an umbrella section 36 licence covers the whole site and then developers are responsible for their own marine licences. Both are taking legal advice on this and more information may be available at the workshop.

There will also be a challenge making sure that activities within sites and zones do fall within the Rochdale Envelope under which they were consented (if full pre-consenting is the approach that is taken). If sites and zones are fully pre-consented, there is no regulatory mechanism for checking that activities are not 'worse' than what was assessed as no additional permissions would be required. Construction method statements are required for may consented projects prior to the commencement of work and this system could be emulated for test sites. At EMEC, a short Project Information Summary is submitted to Marine Scotland to ensure that a developer's plans 'fit' within the existing design envelope.

2.5 WORKSHOP PROMPTS

Terminology

- Would 'project design envelope' be a more appropriate term than 'Rochdale Envelope'?
- Current applications: are they detailed, outline or masterplan? Does this impact on the way the design envelope is used? Are these terms relevant to marine applications?

EIA/HRA

- Clearly defined parameters: are these clearly set out in EIAs; are they understandable? Will they take account of future technology developments? Do they distinguish between technologies and project components?
- Can an EIA adequately assess the impacts of developing proposals and changing technology? Are there risks in consenting?
- How can future proposed variations best be assessed in the context of the reported EIA to ensure that the ES remains competent and in particular for multi-technology sites?
- How is it best to work with the unknown and define adequate mitigation to assess potentially significant effects? How is worst case defined?
- How can cumulative effects be considered in the EIA when each project may have parameters which are not fixed?
- What level of flexibility is acceptable in project descriptions and how is acceptability determined if the effects are not known?
- Can worst case parameters be developed for projects where technology is under development and where research studies still need to be progressed to understand impacts? Are there risks in the approach?
- How can future technologies to be used at test and demonstration sites best be assessed in EIAs recognising that there may be multiple technologies deployed at the site in the future?

Regulatory Aspects

- What is the role of Regulators and SNCBs when considering the Rochdale Envelope pre-application?
- What challenges have you found in using the Rochdale Envelope and SNH what were the challenges in using it as an SNCB in the Falls of Warness EIA?
- Can the Regulators be responsible/have sufficient technical expertise for ensuring that the developing proposals post-consent remain within the parameters that were assessed?
- How can the public/decision makers best understand the concept of the Rochdale Envelope when each environmental topic assessment may have different worst case parameters - how is all this information brought together in consenting and how can cumulative effects within projects best be checked?
- What level of detail is required to make robust and fair decisions in the framework of the consents Regulations?
- What approach is acceptable to each Regulator? Is it the same? Are there lessons that can be learnt?
- Does adopting a 'broad and flexible approach' to the interpretation of the Rochdale Envelope as argued for by Walker (2012 in Wright 2012²²) lead to less robust consenting decisions than those based on narrow envelopes?
- Can consent conditions be written to be flexible but robust? What has experience shown?

Post Consent

- What effect does using the Rochdale Envelope have on managements and monitoring of projects and ability to maintain good environmental status etc?
- At what point does change define a different project? How can changes best be assessed and defined as material or not? What is deemed a material change?
- How can the Rochdale Envelope best be used in projects post-consent to ensure a robust delivery of ES commitments/conditions?
- How can proposals best be checked post-consent to ensure that they fall within the agreed Rochdale Envelope?

Moving Forward

- What is the appropriate approach to identifying a Rochdale Envelope for a demonstration zone?
- How is 'best practice' in terms of approach using the Rochdale Envelope best defined? What is required and by whom and in what form? What can be learnt from other industries?

2.6 WORKSHOP APPROACH

- *Theme 1: Defining Rochdale Envelopes for Demonstration Zones*
 - *What do we mean by the Rochdale Envelope?*
 - *What works well?*
 - *What goes wrong?*
 - *Defining the way forward – towards best practice - wide and narrow project envelopes; consenting challenges; the right flexibility*
 - *Any required further work?*

²² *Op cit*

3 THEME 2: EVIDENCE REQUIREMENTS FOR DEMONSTRATION ZONE AND TEST SITE CONSENTS

3.1 INTRODUCTION

Theme 2 focusses on the evidence requirements for robust consenting. This section provides a summary overview of some of the work that has been undertaken and is ongoing but does not specifically look at the range of information in various ESs. It is hoped that such individual examples will be discussed at the workshop in relevant exercises. Some questions are collated in Section 3.5 to help frame the topic issues for the workshop.

3.2 WORKSHOP OBJECTIVES

The workshop objectives for Theme 2 are:

- to agree principles or guidance for determining evidence needs to inform consents (zone/site-wide or individual project), including the role of a risk-based, proportionate approach;
- to agree principles or guidance for determining evidence needs to inform decisions about mitigation or adaptive management measures;
- to identify where there may be benefits in exploring joint working or sharing data or approaches; and
- identify any further areas of work required.

3.3 KEY QUESTIONS

Key questions to be addressed include:

- what data and evidence will be required for zone/site-wide consents?
- what data and evidence will be required for determining appropriate mitigation and adaptive management measures?
- what device specific data might be required to supplement zone or test site data?
- can any principles for applying a risk-based, proportionate approach to identifying evidence needs be agreed?
- is there an opportunity to pool resources across zones, or share data on some receptors to improve data quality?
- can any principles or approaches be agreed building on experience and best practice elsewhere or in other sectors?

3.4 BACKGROUND INFORMATION

3.4.1 Overview

The various EIA Regulations require the likely significant effects of the proposed development on the environment to be reported in the project ES. The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) also require likely significant effects on Natura 2000 sites to be considered. Some initial information may be collated as part of Strategic Environmental Assessments (SEAs)²³ but this information may be broad brush still requiring extensive survey work to be undertaken at project level²⁴.

²³ eg DECC's Offshore Energy SEAs and The Crown Estate's plan-level HRAs of their wave and tidal stream leasing rounds (where required)

²⁴ Wave and Tidal Energy Market Deployment Strategy for Europe, June 2014, SI Ocean for EU

A robust baseline (characterisation of the site) and a good understanding of the project technology are required to assess potentially significant impacts, define mitigation and report residual effects. The assessment will often draw on experience from other projects which have been delivered (of similar type or with likely related effects, for example wave and tidal project assessments drawing on experience from other sectors such as offshore wind, aquaculture or dredging projects).

Undertaking assessments of developing technologies where there may be no direct experience in deployment or operation available presents particular challenges to the developer and to the Regulator and their advisors. Baseline monitoring surveys are sometimes proposed in some EIAs or required by Regulators because some environmental effects are not known at the time of application²⁵. Characterisation surveys undertaken for an EIA may be intensive and expensive and yet do not always provide the information that may be required. For example, marine mammal surveys may result in few or no encounters being registered and the applicant resorting to using available data, for example, SCANS²⁶ data, to inform EIA and HRA.

Undertaking environmental assessments of the development of multi-technology projects at a single site where the detail of these technologies is evolving presents even further challenges. A variety of studies and events have been undertaken to help meet these challenges.

A number of workshop events have been held to consider how best to take forward research to inform the assessment of offshore renewables²⁷. Other discussions and studies have led to the publication of guidance for the industry (see below) and to information being made available about interactions of wave and tidal renewable energy developments on the marine environment²⁸ which can be used to inform environmental assessments. Various papers report past and ongoing research strategies and agreed research priorities²⁹ and allow those involved in taking projects forward to be aware of the current focus of study and the outcomes of research.

Streamlining the consenting processes (that is, making it as efficient as possible without unnecessary complexities) and developing focussed environmental monitoring protocols (that is identifying necessary monitoring measures for any particular project post-consent) are recognised as a means of reducing costs and delays in consenting. Creating flexibility in consenting through use of the Rochdale Envelope (see Theme 1 in Section 2), adopting a more risk-based approach (see below), adaptive management (see Section 4) and phased deployment are described in the SI Ocean Strategy as potentially useful³⁰.

²⁵ For example, the Skerries Tidal Stream ES states that the effects of operational noise are not known and that monitoring will be undertaken

²⁶ As collated by SMRU for the EC funded Small Cetacean Abundance in the North Sea in 1994 and included in the JNCC Cetacean Atlas and under review

²⁷ For example, NERC and EGS-KTN Workshop 'An environmental research roadmap for the growing offshore renewable energy sector' (September 28th/29th 2010, Liverpool)

²⁸ Marine Scotland, 2011, Topic Sheet 63 v4 A review of the potential impacts of wave and tidal renewable energy developments on Scotland's marine environment

Aquatera, 2012 for Marine Scotland IMPACT A Review of the Potential Impacts of Wave and Tidal Energy Development on Scotland's Marine Ecological Environment

²⁹ For example, Marine Scotland 2012 Development of Offshore Renewable Energy in Scotland's Seas Research Implementation Strategy; SNCB Inter Agency Workshop November 2014 and ORJIP, 2015, Ocean Energy The Forward Look; an Ocean Energy Environmental Research Strategy for the UK (draft)

³⁰ Wave and Tidal Energy Market Deployment Strategy for Europe, June 2014, SI Ocean for EU

The Scottish Government, working with other statutory bodies, is trialling a Survey, Deploy, Monitor policy³¹ promoting a novel approach to defining 'project risk' and hence a proportionate level of site characterisation requirements to inform EIA and HRA. The policy proposes a phased approach to licensing development. Under the policy, developers, following pre-deployment monitoring, would undertake deployment and monitoring of a test device or demonstration arrays before seeking consent for larger arrays. This would provide an assurance that those developments that are larger in scale or in more sensitive environmental locations are based upon an evidence based understanding of the impacts of the devices and allow licensing and statutory advisors to base any licensing decisions on greater awareness and knowledge. The approach seeks to allow for a long term policy but takes account of unknown risks and/or the application of precaution in the early years of assessing licensing novel/contentious and potentially risky applications.

SNH and Marine Scotland produced draft guidance in 2011 on survey and monitoring in relation to marine renewables deployments in Scotland. Guidance is provided including options and detailed protocols for undertaking site characterisation surveys and impact monitoring programmes for marine (wave and tidal) renewables developments in Scotland for cetaceans and basking sharks, seals, birds and benthic habitats³². As technology evolves and changes rapidly it is important to discuss how best practice recommendations can best be reviewed and updated and ideas shared within the industry. For example, it is important to ensure that experience of implementing these protocols and guidelines is taken into account in future decisions about their suitability.

NERC has also produced a series of wave and tidal consenting position papers³³ which seek to provide a consolidated understanding of, and consensus on, the current status of knowledge of potential environmental impacts relating to the topic (eg marine mammals). The Scottish Government Impact Assessment Tool (which has been updated recently) provides guidance on monitoring around single devices and demonstration arrays³⁴

The EIMR (Environmental Impacts of Marine Renewables) conference held in 2014 on Lewis and in Orkney in 2012 brought together 200 scientists from around the world to share ideas on the interactions and information gaps of interactions of the marine energy industry with the marine environment³⁵. Information from the conferences in summary form is available on-line. Discussions included what monitoring that should be undertaken around wave and tidal projects³⁶.

Peter Strachan from Aberdeen Business School talked at All Energy in May 2015³⁷ about some of the challenges facing the marine renewables industry including costly and time consuming surveys being required even for perceived lower risk technologies in sites which may not be of highest environmental sensitivity. The consenting of offshore renewable energy is often cited as one of the main non-technical barriers to the development of the sector (together with various political

³¹ The Scottish Government, 2012 Survey Deploy Monitor Policy (Draft)

³² SNH, 2011, Guidance on Survey and Monitoring in Relation to Marine Renewables Deployments in Scotland Volumes 1-5 Royal Haskoning with input from SMRU Ltd, Natural Research Ltd and Graham Saunders Marine Ecology

³³ NERC <http://www.gov.scot/Topics/marine/Licensing/marine/tool> C, 2013, Wave and Tidal Position Papers for example Paper 3, Marine Mammal Impacts

³⁴ <http://www.gov.scot/Topics/marine/Licensing/marine/tool>

³⁵ file:///P:/PROJECTS/341_Crown%20Estate/Background%20Information/Theme%20EIMR%20International%20Conference%202014%20-%20Tethys.html

³⁶ <http://tethys.pnnl.gov/sites/default/files/publications/Annex-IV-2014-workshop-report-final.pdf>

³⁷ Peter Strachan 7th May 2015 All Energy script (accessed from RICORE search)

and financial challenges). A significant aspect of this is the uncertainty inherent in the potential environmental impacts of novel technology. To ensure consents are compliant with EU and national legislation, such as the EIA and Habitats Directives, costly and time consuming surveys are often required even for perceived lower risk technologies in sites which may not be of highest environmental sensitivity³⁸.

To seek to meet the various challenges the RiCORE (risk based consenting for offshore renewables) project has been initiated by a group of project partners including Robert Gordon University, Marine Scotland, University College Cork, WavEC, AZTI-Tecnalia and E-CUBE. The project will run from January 1st 2015 to June 30th 2016 with specific aims to ensure the successful development of offshore renewables in the EU Member States by reducing the cost and time taken to consent projects of low environmental risk. This will aim to be achieved through the development of a risk-based approach to the consenting of projects, which standardises the assessment of key components of environmental risk from offshore renewable energy deployment. The level of survey requirement is based on the environmental sensitivity of the site, the risk profile of the technology and the scale of proposed project³⁹. This project will inform a review of the Survey, Deploy and Monitor Strategy.

The RiCORE project will study the legal framework in place in the partner Member States (to ensure the framework developed will be applicable for roll out across these Member States and further afield. The next stage of the RiCORE project is to consider the practices, methodologies and implementation of pre-consent surveys, post-consent and post-deployment monitoring. This will allow a feedback loop to inform the development of the risk-based framework for the environmental aspects of consent and provide best practice. The project will achieve these aims by engaging with the relevant stakeholders including the Regulators, industry and EIA practitioners, through a series of expert workshops⁴⁰ and developing their outcomes into guidance⁴¹.

NRW and SMRU (Sea Mammal Research Unit) Consulting are undertaking some work to develop criteria and principles for allowing risk-based decisions to be made by developers, Regulators and advisors about the need for and type of marine mammal characterisation surveys to inform EIA and HRA for wave and tidal stream developments. The aim of the work is to ensure that decisions about characterisation survey are informed by, and proportionate to, the potential for wave and tidal projects to result in collision, disturbance or displacement impacts on mammals. The criteria underpinning these decisions will be based on the 'riskiness' of the technology and project, combined with the sensitivity of the relevant marine mammal populations. The work will help developers, Regulators and advisors better understand what is meant by taking a 'risk-based approach to consenting' in practical terms. It should also help developers to make better informed cost-benefit decisions about the need for them to undertake mammal characterisation surveys to inform EIA and HRA processes⁴².

³⁸ <http://ricore-project.eu/>

³⁹ <http://ricore-project.eu/>

⁴⁰ For example: Simas T, Henrichs J (2015) Report on Workshop 1 - Marine Renewables and Environmental Risks Current practices in pre and post consent monitoring, RiCORE Project

⁴¹ As above

⁴² *pers comm*, June 2015 Kate Smith, Natural Resources Wales

SNH promotes a risk-based approach to assessing entanglement impacts from mooring lines on marine megafauna⁴³. The report encourages developers to follow the relative risk assessment process outlined in the report, and to provide details of how moorings etc will be inspected. As part of the consents for any array developers would be required to report any changes in moorings which would increase the risk of entanglement.

A risk-based approach where 'risk' is based on the environmental sensitivity of the location, scale of the development and the type of device(s) to be deployed may result in agreement with Regulators of a less intensive survey approach in less sensitive sites with reduced costs and timescales. A risk-based approach should be used to agree project specific baseline characterisation requirements, impact assessment methodology and development of a Project Environmental Management Plan including any necessary mitigation, monitoring and adaptive management measures. It should not be assumed automatically that baseline marine mammal and bird surveys will help inform EIA/HRA and most importantly, the determination of consents and appropriate assessments for all wave and tidal stream projects. This should be considered on a case by case basis.

3.4.2 Comment

The information that is available to assist in making decisions about gathering sufficient information to undertaking evidence-based assessments is varied. In addition to sources cited above there are the various ESs for projects which have been taken forward or are in the consents process. The various workshop discussions and research strategies indicate where further work is required to better understand the likely impacts of different developments in different environments and where there are gaps in knowledge at present.

It is important to consider how such gaps can best be dealt with in an EIA and to ensure that the approach is proportionate and appropriate to the likely impacts as promoted by the RiCORE project. The ongoing NRW and SMRU Consulting work is likely to be helpful in understanding how proportionate decisions can be made.

Cornwall Decision

In promoting a risk-based approach it is important, however, to be mindful of the implications of the Cornwall decision (and other case law). Consent was given by Cornwall Council for the extension of a landfill in mines where potential for lesser horseshoe bat was known but surveys had not been undertaken for the EIA. The Council had made it a condition of the planning consent that surveys were to be carried out to discover if bats were present on the site before construction. The judge ruled those surveys should have been carried out prior to the permission being granted in order that significant effects could be determined before the grant of planning permission and the permission was overruled.

At the workshop it will be important to consider the relevance of this decision to wave and tidal stream consenting where there is uncertainty around some impacts and where some impacts may be promoted as 'perceived risks' rather than identified impacts and therefore gathering baseline data may not necessarily improve the robustness of an EIA/HRA.

⁴³ Benjamins, S., Harnois, V., Smith, H.C.M., Johanning, L., Greenhill, L., Carter, C. and Wilson, B. 2014. Understanding the potential for marine megafauna entanglement risk from renewable marine energy developments. Scottish Natural Heritage Commissioned Report No. 791

3.5 WORKSHOP PROMPTS

What needs to be known?

- How detailed does baseline information need to be to allow potentially significant effects to be identified reliably and appropriate mitigation to be defined?
- What needs to be known about technology to best identify significant effects?
- What risks to consenting or at a later stage after construction are there from not fully understanding effects?
- What does a 'proportionate approach' to EIA mean to you? Do we all mean the same thing?
- How is agreement reached on what is a less sensitive site?
- How can post-development monitoring be mitigation? What should happen if significant effects are found? What is the role of adaptive management – deploy, monitor, manage?
- An ES can only ever be a snap shot in time – how can new information post-application best be dealt with?

Lessons Learnt

- Some EIA is led by Government departments etc rather than developers in other EU countries – is there anything to be learnt from these alternative approaches?
- Is the best practice guidance available useful and what is the feedback? How can it best be updated regularly and ideas discussed and findings shared?
- What can be learnt from implementation of Scottish Government Survey, Deploy, Monitor policy? Has it been a successful approach?
- What can be learnt from other more mature marine industries?

Moving Forward

- How can the industry best prepare for the demands new consents in demonstration zones will require?
- How can developers, Regulators, consultants and the public best keep up to date with the wealth of information readily available and best understand that which is most relevant and helpful to particular projects?
- What are the likely timescales for the research findings that has been highlighted as priority? What are the implications of this work? Can interim findings assist in progressing projects or will there be more constraints?
- How can findings of research and from monitoring surveys best be shared?
- What are the constraints to sharing monitoring data to help in characterisation of new sites?

3.6 WORKSHOP APPROACH

- *Theme 2: Evidence Requirements for Demonstration Zone and Test Site Consents*
 - *What do we need to know and why?*
 - *What has worked well and what lessons have been learnt to date?*
 - *What are the risks in a 'risk-based' approach?*
 - *What has experience shown – effectiveness of mitigation? Was the assessment useful? – sharing ideas*
 - *Defining a proportionate but robust approach to evidence needs*
 - *How can data and experience best be shared in the future?*

4 THEME 3: ROLE OF DEMONSTRATION ZONES IN IMPROVING THE ENVIRONMENTAL EVIDENCE BASE FOR WAVE AND TIDAL STREAM

4.1 INTRODUCTION

Undertaking research and monitoring in the existing test sites and newly established demonstration zones and project sites has the potential to improve the evidence base to inform assessments (see Theme 2 in Section 3). This section considers some of the previous and ongoing initiatives. Some questions are raised in Section 4.5 for consideration before the workshop, aimed at considering how these various sites can best contribute individually and in partnership to some of the known information gaps by linking project monitoring with needed research.

4.2 WORKSHOP OBJECTIVES

Theme workshop objectives are:

- to agree in principle the role of demonstration zones and test sites (as well as individual project sites) in improving the evidence base on interactions with wildlife to inform EIA/HRA and the development of PEMPs for commercial scale developments;
- to identify where there may be benefits in exploring joint working or sharing data, or nested or collaborative survey designs across zones and sites;
- to identify how the demonstration zones and test sites might help to deliver the Offshore Renewables Joint Industry Programme (ORJIP) Ocean Energy (OE) programme (noting the Forward Look which presents ORJIP OE's strategic research priorities); and
- to identify any further areas of work required, including testing / trialling of survey approaches and techniques, monitoring equipment and validation of modelling as being of potential value.

4.3 KEY QUESTIONS

Key questions listed in the brief to be addressed at the workshop are:

- is there opportunity for the demonstration zones and test sites to assist in delivery of the ORJIP OE programme?
- can the demonstration zones and test sites provide an opportunity to assist in addressing other evidence issues identified by UK statutory nature conservation bodies (SNCBs) at the workshop in November 2014?
- how can it be ensured that R&D is seen as a benefit rather than a hindrance to zones and test sites? Can they be a benefit?
- how can it best be ensured that any data are shared and disseminated across zones, test sites and the wider wave and tidal sectors?
- how can links between site characterisation (Theme 2) and impact monitoring baselines best be made; and
- how can the ORJIP OE programme be aligned with any ongoing work on practical consenting issues (including evidence requirements for EIA / HRA, etc.).

4.4 BACKGROUND INFORMATION

4.4.1 Introduction

The aim of the amended EIA Directive (2014/52/EU) which will be transposed into UK Regulations is to simplify the rules for assessing the potential effects of projects on the environment and improve the level of environmental protection,

with a view to making business decisions on public and private investments more sound, more predictable and sustainable in the longer term. An amendment relevant to this theme relates to monitoring:

'If projects do entail significant adverse effects on the environment, developers will be obliged to do the necessary to avoid, prevent or reduce such effects. These projects will need to be monitored using procedures determined by the Member States. Existing monitoring arrangements may be used to avoid duplication of monitoring and unnecessary costs⁴⁴'.

In July 2014 The Crown Estate announced seabed rights for six new wave and tidal stream demonstration zones which will enable locally-based organisations to manage and sub-let parts of the seabed to a range of wave and tidal stream developers. In addition, seabed rights were also leased to individual companies for five wave and tidal stream project sites (for projects of between 10 and 30MW). It is important that the potential to improve the knowledge base about interactions of different devices with the environment is maximised drawing on experience from existing test sites and individual projects. It is also important to consider how some sample ESs and research programmes have covered the topic of monitoring in order to improve the evidence base and to understand how monitoring plans have been developed to date and how effective these have been.

4.4.2 Example Monitoring Projects and Commitments

FORCE

FORCE installed instrumentation in August-September 2013 at their site including:

- a weather station in cooperation with the Nova Scotia Community College;
- a digital tide gauge; and
- an X-band radar system in a joint project with Acadia University, to generate maps of surface currents and wave fields.

An Environmental Effects Monitoring Program (EEMP) was developed to determine the accuracy of the environmental effects predictions, effectiveness of mitigation measures and compliance with conditions of provincial and federal authorizations and permits. An adaptive management approach to the EEMP has been taken to review outcomes and activities continuously and modify techniques to meet monitoring objectives. An independent Environmental Monitoring Advisory Committee (EMAC), a technical committee with members from academia, fishers, First Nations, government and other recognized scientists, provides advice on the EEMP.

The FORCE website is updated regularly with key results from the monitoring. The second EEM report will incorporate final data analyses for several studies that were conducted as baseline studies with no turbines in the water. These reports will be used by the Environmental Monitoring Advisory Committee (EMAC) in designing future EEM programs at FORCE in anticipation of turbines being deployed.

US Annex IV

A report prepared by Pacific Northwest National Laboratory for the Ocean Energy Systems Initiative (under ANNEX IV on Assessment of Environmental Effects and Monitoring Efforts for Ocean Wave, Tidal and Current Energy Systems)

⁴⁴ <http://ec.europa.eu/environment/eia/review.htm>

summarises an international collaborative project to examine the environmental effects of marine energy devices among countries. The Executive Summary acknowledges that *'numerous ocean energy technologies and devices are being developed around the world, and the few data that exist about the environmental effects of these technologies are dispersed among countries and developers. The purpose of Annex IV is to facilitate efficient government oversight of the development of ocean energy systems by compiling and disseminating information about the potential environmental effects of marine energy technologies and to identify methods of monitoring for these effects'*. The initiative began in 2010 and the three-year effort produced a publicly available searchable online database of environmental effects information (Tethys). The first Annex IV State of the Science Report contains three case studies of specific interactions of marine energy devices with the marine environment that survey, compile, and analyse the best available information in one coherent location. These case studies address:

- the physical interactions between animals and tidal turbines;
- the acoustic impact of marine energy devices on marine animals; and
- the effects of energy removal on physical systems.

Each case study contains a description of environmental monitoring efforts and research studies, lessons learned, and analysis of remaining information gaps⁴⁵. The second State of the Science Report is in production.

Marine Scotland

Marine Scotland has various ongoing monitoring initiatives and data are analysed to help in understanding for other projects and analysis may include using the Crown Estate Marine Resource System (MaRS) GIS tool⁴⁶.

ORJIP OE

Aquatera Ltd⁴⁷ was commissioned by The Crown Estate to undertake a focused consultancy project; 'Consolidation of wave and tidal EIA/HRA issues and research priorities'. The study was informed by consultation and the findings presented in the report represent a consensus as to the key EIA/HRA issues and the current research gaps and priorities relevant to the wave and tidal sectors. The key driver for the project was the recognition of the benefits of a coordinated effort to obtain, translate and share learning, knowledge, experience, information and data from single device and particularly first array projects to larger array deployments. This would ensure through a coordinated approach that the best possible information is available to developers, Regulators, SNCBs and other stakeholders to inform the consenting process and project planning and design activities.

The main aims of this project were to:

- produce a consolidated up-to-date list identifying the key strategic EIA/HRA issues facing the wave and tidal stream sectors;
- identify the priority research gaps relevant to wave and tidal stream demonstration scale arrays and then outline potential approaches to address them; and

⁴⁵ See Tethys database at <http://tethys.pnnl.gov/>

⁴⁶ For example, Marine Scotland Science Potential use of Marine Autonomous Systems for Offshore Renewables applications Rory O'Hara Murray 24 February 2015 MARS Industry Showcase

⁴⁷ Aquatera for The Crown Estate, January 2014, Wave and Tidal Enabling Actions Report Consolidation of wave and tidal EIA / HRA issues and research priorities, Technical Report Final Report

- identify strategic research priorities which could be addressed through a coordinated programme.

ORJIP OE is currently collating its Forward Look which will update the 2014 Aquatera report and outline the updated key strategic research priorities for the wave and tidal sectors⁴⁸. The outputs of the Forward Look, by guiding future research work, will assist with resolving the priority EIA/HRA issues relevant to wave and tidal stream arrays. It will do this by focusing any coordinated approach to research that is developed by ORJIP Wave and Tide and others.

MCT SeaGen

A conditional FEPA marine construction licence was issued in 2005 to Marine Current Turbines Ltd (MCT) for the deployment of the SeaGen device in the Narrows of Strangford Lough. One of the licence conditions was to develop and implement an Environmental Monitoring Plan (EMP) and a number of mitigation measures. Data collection began pre-installation and formed the basis of an Environmental Baseline Report, against which all future monitoring during installation, commissioning and decommissioning could be compared.

The results from each of the monitoring strands of the EMP were evaluated regularly to ensure that any impact of SeaGen on the marine environment in Strangford Lough could be detected at an early stage. Using an adaptive management approach, the data collected has provided evidence to support reduction in mitigation requirements. A small dedicated 'Science' Group was set up to advise on the detailed management of the EMP and mitigation measures, while a wider 'Liaison' Group was established, to whom progress on the project and decisions of the Science Group would be reported⁴⁹.

Wave Hub

Wave Hub, in Cornwall is a fully consented, grid-connected site for the testing and development of marine energy devices providing shared offshore infrastructure for the demonstration and proving of arrays of wave energy generation devices. The Wave Hub team have been working with the universities of Plymouth and Exeter since 2005 to collect information on the site's wave energy resources and to create a baseline for environmental monitoring and impact assessment⁵⁰.

MeyGen

The MeyGen ES⁵¹ makes clear commitments to monitoring. For example, in Chapter 10 of the ES monitoring of benthic habitats and ecology is proposed in order to confirm impact predictions in relation to:

- dispersion of drill cuttings from potential TSS (total suspended solids) pile installation and HDD (horizontal directional drilling) bore breakthrough; and
- to detect any significant changes in habitats due to the presence of the turbines.

The ES⁵² states that surveys *'are expected to be required post-installation and post-decommissioning. Based on current knowledge of the site (extensive baseline surveys and hydrodynamic modelling) and building on the pre-installation*

⁴⁸ ORJIP Ocean Energy, 2015 The Forward Look; an Ocean Energy Environmental Research Strategy for the UK DRAFT, Aquatera Ltd; MarineSpace and EMEC

⁴⁹ Royal Haskoning SeaGen Environmental Monitoring Programme Final Report Marine Current Turbines 16 January 2011

⁵⁰ South West Energy Park Prospectus accessed online 2015

⁵¹ *op cit*

⁵² *op cit*

surveys, it is likely that the benthic monitoring programme would be based primarily on drop down video upstream / downstream of the project such that potential changes to the biotope mosaic in the area could be detected. Reference areas to either side of the turbine array and cable routes could also be sampled’.

The PEMP for MeyGen is currently under development for use during construction and operation.

The Crown Estate Intelligent Monitoring Proposal

The Crown Estate with its partners in the OSSCA group (Marine Licence Regulators and SNCBs) has produced a concept paper on Intelligent Monitoring⁵³ with an aim of making recommendations for maximising the effectiveness of future monitoring. The paper recognises that information has been gathered from monitoring offshore renewables for over 10 years but draws on work by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) on behalf of the MMO⁵⁴ which indicated that there was insufficient data to allow relaxation of monitoring conditions and recommendations were made in the Cefas report about improvements which could be made to monitoring approaches to increase the value of data collected. Such findings of a review study were disappointing given the money invested by the industry in monitoring.

The value of gathering monitoring data, reviewing evidence and allowing this to inform the consenting process is recognised. A more ‘intelligent’ approach to the monitoring of offshore renewables projects, focusing on regular review and deliberate enhancement of the evidence base where this is possible is promoted in the concept paper. Such an approach would involve a move away from monitoring of projects in isolation, and would seek a more coherent approach to the collection of data from projects to provide a stronger evidence base on the environmental impacts of wave and tidal developments. Specific monitoring for any project can be more specific and there would be advantages for the industry in using a more collaborative and strategic approach.

Monitoring at EMEC⁵⁵

EMEC has close links with a range of different developers and types of marine energy devices (wave and tidal) and with academic institutions and regulatory bodies, whilst maintaining independence from any one body. This gives EMEC a unique and important position within the regulatory and research frameworks. The range of possible impacts of the wave and tidal energy industries is recognised as wide and offers the potential for a series of projects and research partnerships between EMEC, developers, academia and other expert bodies. EMEC works with appropriate experts and regulators to establish and encourage best practice and consistent monitoring methods to be associated with devices as they are deployed at the wave and tidal test sites.

Outputs of monitoring projects will initially be for developers who deploy at EMEC, but in the longer term they are expected to serve as an essential resource for developers and regulators in the licensing of future installations as the industries develop into commercial stages.

The EMEC Monitoring Advisory Group EMEC coordinates the ongoing monitoring discussions with regulators and consultees. The project partners are EMEC,

⁵³ The Crown Estate, 2015 Intelligent Monitoring – a concept paper

⁵⁴ Cefas for MMO, 2010, Strategic Review of Offshore Wind Farm Monitoring Data associated with FEPA licence Conditions

⁵⁵ <http://www.emec.org.uk/emec-monitoring-advisory-group/>

Marine Scotland (Science), Marine Scotland (Licensing Operations Team), SNH, SMRU, Scottish Government, and DECC. Other key stakeholders, such as developers or specialist experts are invited to contribute on specific issues as required.

The group meets at least three times per year with the following objectives:

1. *Translate policy requirements into practical monitoring effort to ensure that the EMEC facility is optimised to meet existing and future monitoring and assessment needs for wave and tidal energy converters.*
2. *Oversee the production of relevant monitoring tools and best practice techniques at the EMEC test sites whilst ensuring monitoring effort and methods of data stewardship are compatible with relevant methodologies.*
3. *Exchange knowledge and information relating to similar initiatives so as to avoid duplication and establish links with other relevant research programmes at national and international level.*
4. *Maintain an overview of emerging research and technology and identify new requirements.*
5. *Identify sources of funding available for research and supporting studies.*
6. *Undertake an annual assessment of the strategy and goals for monitoring undertaken at the EMEC test sites.*
7. *Undertake systematic review and QA of project specific Impact Monitoring reports submitted by developers at EMEC to Marine Scotland, and assess the wider implications and relevance of the methods pursued and results obtained to the Marine Renewables sector in Scotland.*

4.4.3 Comment

Some examples of monitoring programmes and studies identifying monitoring and research needs are described in Section 4.4.2. The challenge moving forward will be to coordinate the studies at strategic and project/site levels to ensure the most efficient and co-ordinated approach to monitoring and how to achieve this through regulation. The need for appropriate baseline data against which to monitor against will be essential before deployment and the examples reviewed indicate that these data have been collated well in advance. It will be important to review findings of research and monitoring studies regularly to identify what baseline data are needed to protect environmental interests. Experience from EMEC will be invaluable in planning the best approaches drawing on lessons learnt at that test site.

Commercial considerations will need to be respected and the best means of sharing data without excessive costs to one developer will need to be discussed.

The best methods of encouraging the integration of research studies at the new and existing test sites will need to be considered to ensure that in the longer term the industry benefits from an ongoing evidence base facilitating a proportionate and efficient approach consenting.

Future challenges will include how best to monitor multi-device developments and developments where the technologies deployed may evolve and change over the years of consent. In addition when the preferred way forward for delivering projects in the Demonstration Zones is defined this may have implications for the preferred monitoring strategies.

4.5 WORKSHOP PROMPTS

Regulatory Issues

- What are the regulatory challenges of an intelligent monitoring approach?
- How can marine licence conditions best be devised to enable/assist more collaborative or strategic monitoring?
- How can conditions best be worded if they are relying on another project to deliver a particular requirement and what happens if that other project doesn't deliver? Are there any lessons learnt to date?
- Are conditions for consented sites best worded to ensure effective monitoring data are collected?
- What monitoring can be considered fair for projects that are consented where no significant effects have been predicted?
- Can we distinguish between 'monitoring' required under licence and 'research' that can be undertaken at a site, therefore reducing the regulatory burden on the developer whilst promoting opportunities for strategic research?

Lessons Learnt

- What lessons have been learnt to date from test sites?
- Are monitoring commitments in ESs for tidal and wave strong enough?
- How can the disappointing findings of the review of monitoring of offshore wind farm developments be avoided for the wave and tidal industry – how can effective monitoring and research programmes best be developed, organised and shared?

Moving Forward

- What data are required at what time to inform demonstration zone consents?
- How can demonstration zones and test sites contribute to the ORJIP OE updated research priorities?
- How can all the studies that are ongoing best be integrated and a sound strategy developed for implementation at demonstration zones and test sites?
- How can monitoring studies in new sites best be integrated and shared?
- How can intelligent monitoring be delivered?
- What further work is required to ensure monitoring and research studies are as effective as possible and best communicated amongst the industry?

4.6 WORKSHOP APPROACH

- *Theme 3: Role of Demonstration Zones in improving the Evidence Base for Wave and Tidal Stream Interactions with Wildlife*
 - *Demonstration zones and test sites and the ORJIP OE programme*
 - *Tackling the R & D barriers?*
 - *How can sharing evidence best inform the consents programme? What lessons have been learnt to date?*
 - *Baseline data and future monitoring; monitoring and baseline data – making it work*

5 THE WORKSHOP

5.1 APPROACH

The workshop will provide opportunity to discuss the three themes in detail sharing experience and ideas and seeking to reach consensus on what can be considered good practice and what constitutes useful guidance for the way forward.

A facilitated discursive approach will be used working in groups and in plenary session. It is evident from the list of participants that there will be a wealth of experience in the room at strategic and project specific levels and it will be important to capture feedback from all who attend.

A timed agenda will be provided building on the outlines provided at the end of Sections 2 - 4 but there will be some flexibility to allow for key topics to be discussed in full. All outputs will be recorded and used to inform the final workshop report (see also Section 1.2.2).

5.2 PREPARATION

The purpose of this note is to help prepare for the workshop by raising topics and summarising, at a high level, experience from a range of relevant sources including assessments, research studies and guidance. In addition each theme section includes a list of 'workshop prompts' to help stimulate ideas and views in advance of the workshop. The questions will not be used directly at the workshop but they will be relevant to the discussions that will be facilitated. The prompts are repeated in Boxes 5.1-5.3. These will be provided as handouts at the workshop for ease of reference. Participants may have other important challenges and issues and it is hoped that these can all be discussed together.

Box 5.1: Workshop Prompts Theme 1: Rochdale Envelope**Terminology**

- Would 'project design envelope' be a more appropriate term than 'Rochdale Envelope'?
- Current applications: are they detailed, outline or masterplan? Does this impact on the way the design envelope is used? Are these terms relevant to marine applications?

EIA/HRA

- Clearly defined parameters: are these clearly set out in EIAs; are they understandable? Will they take account of future technology developments? Do they distinguish between technologies and project components?
- Can an EIA adequately assess the impacts of developing proposals and changing technology? Are there risks in consenting?
- How can future proposed variations best be assessed in the context of the reported EIA to ensure that the ES remains competent and in particular for multi-technology sites?
- How is it best to work with the unknown and define adequate mitigation to assess potentially significant effects? How is worst case defined?
- How can cumulative effects be considered in the EIA when each project may have parameters which are not fixed?
- What level of flexibility is acceptable in project descriptions and how is acceptability determined if the effects are not known?
- Can worst case parameters be developed for projects where technology is under development and where research studies still need to be progressed to understand impacts? Are there risks in the approach?
- How can future technologies to be used at test and demonstration sites best be assessed in EIAs recognising that there may be multiple technologies deployed at the site in the future?

Regulatory Aspects

- What is the role of Regulators and SNCBs when considering the Rochdale Envelope pre-application?
- What challenges have you found in using the Rochdale Envelope and SNH what were the challenges in using it as an SNCB in the Falls of Warness EIA?
- Can the Regulators be responsible/have sufficient technical expertise for ensuring that the developing proposals post-consent remain within the parameters that were assessed?
- How can the public/decision makers best understand the concept of the Rochdale Envelope when each environmental topic assessment may have different worst case parameters - how is all this information brought together in consenting and how can cumulative effects within projects best be checked?
- What level of detail is required to make robust and fair decisions in the framework of the consents Regulations?
- What approach is acceptable to each Regulator? Is it the same? Are there lessons that can be learnt?
- Does adopting a 'broad and flexible approach' to the interpretation of the Rochdale Envelope as argued for by Walker (2012 in Wright 2012⁵⁶) lead to less robust consenting decisions than those based on narrow envelopes?
- Can consent conditions be written to be flexible but robust? What has experience shown?

Post Consent

- What effect does using the Rochdale Envelope have on managements and monitoring of projects and ability to maintain good environmental status etc?
- At what point does change define a different project? How can changes best

⁵⁶ *Op cit*

Box 5.1: Workshop Prompts Theme 1: Rochdale Envelope

be assessed and defined as material or not? What is deemed a material change?

- How can the Rochdale Envelope best be used in projects post-consent to ensure a robust delivery of ES commitments/conditions?
- How can proposals best be checked post-consent to ensure that they fall within the agreed Rochdale Envelope?

Moving Forward

- What is the appropriate approach to identifying a Rochdale Envelope for a demonstration zone?
- How is 'best practice' in terms of approach using the Rochdale Envelope best defined? What is required and by whom and in what form? What can be learnt from other industries?

Box 5.2: Workshop Prompts Theme 2: Evidence Requirements for Demonstration Zones and Test Sites**What needs to be known?**

- How detailed does baseline information need to be to allow potentially significant effects to be identified reliably and appropriate mitigation to be defined?
- What needs to be known about technology to best identify significant effects?
- What risks to consenting or at a later stage after construction are there from not fully understanding effects?
- What does a 'proportionate approach' to EIA mean to you? Do we all mean the same thing?
- How is agreement reached on what is a less sensitive site?
- How can post-development monitoring be mitigation? What should happen if significant effects are found? What is the role of adaptive management – deploy, monitor, manage?
- An ES can only ever be a snap shot in time – how can new information post-application best be dealt with?

Lessons Learnt

- Some EIA is led by Government departments etc rather than developers in other EU countries – is there anything to be learnt from these alternative approaches?
- Is the best practice guidance available useful and what is the feedback? How can it best be updated regularly and ideas discussed and findings shared?
- What can be learnt from implementation of Scottish Government Survey, Deploy, Monitor policy? Has it been a successful approach?
- What can be learnt from other more mature marine industries?

Moving Forward

- How can the industry best prepare for the demands new consents in demonstration zones will require?
- How can developers, Regulators, consultants and the public best keep up to date with the wealth of information readily available and best understand that which is most relevant and helpful to particular projects?
- What are the likely timescales for the research findings that has been highlighted as priority? What are the implications of this work? Can interim findings assist in progressing projects or will there be more constraints?
- How can findings of research and from monitoring surveys best be shared?
- What are the constraints to sharing monitoring data to help in characterisation of new sites?

Box 5.3: Workshop Prompts Theme 3: Role of Demonstration Zones in improving the Environmental Evidence Base for Wave and Tidal Stream**Regulatory Issues**

- What are the regulatory challenges of an intelligent monitoring approach?
- How can marine licence conditions best be devised to enable/assist more collaborative or strategic monitoring?
- How can conditions best be worded if they are relying on another project to deliver a particular requirement and what happens if that other project doesn't deliver? Are there any lessons learnt to date?
- Are conditions for consented sites best worded to ensure effective monitoring data are collected?
- What monitoring can be considered fair for projects that are consented where no significant effects have been predicted?
- Can we distinguish between 'monitoring' required under licence and 'research' that can be undertaken at a site, therefore reducing the regulatory burden on the developer whilst promoting opportunities for strategic research?

Lessons Learnt

- What lessons have been learnt to date from test sites?
- Are monitoring commitments in ESs for tidal and wave strong enough?
- How can the disappointing findings of the review of monitoring of offshore wind farm developments be avoided for the wave and tidal industry – how can effective monitoring and research programmes best be developed, organised and shared?

Moving Forward

- What data are required at what time to inform demonstration zone consents?
- How can demonstration zones and test sites contribute to the ORJIP OE updated research priorities?
- How can all the studies that are ongoing best be integrated and a sound strategy developed for implementation at demonstration zones and test sites?
- How can monitoring studies in new sites best be integrated and shared?
- How can intelligent monitoring be delivered?
- What further work is required to ensure monitoring and research studies are as effective as possible and best communicated amongst the industry?

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