

8 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

8.1 Introduction

8.1 This section of the Environmental Statement (ES) describes the Environmental Impact Assessment (EIA) methodology. The approach described meets the requirements of the EIA Regulations.

8.2 It should be noted that the navigational aspects of the Project, as assessed in the Navigational Risk Assessment (NRA) have been conducted in accordance with the Marine Navigational Safety Risks of Offshore Wind Farms contained in the DTI/BERR publication – Guidance on the Assessment of the Impact of Offshore Wind Farms and is required to address the issues raised in the Maritime and Coastguard Agency's (MCA) Marine General Notice 371(M+F) – Proposed Offshore Renewable Energy Installations (OREI) – Guidance on Navigational Safety Issues. This assessment methodology is described within the NRA document and is summarised in Section 15.

8.2 Environmental Impact Assessment and Navigational Risk Assessment Process

8.2.1 Overview of Process

The EIA and associated NRA process require an understanding of the proposed installation, operation and decommissioning of the MeyGen Project and the environment upon which there may be an impact. Fundamental to the process is the systematic identification of issues that could impact the environment, including other users of the environment. Once identified, these issues have to be assessed to define the level of potential impact they present to the environment, so that measures can be taken to remove or reduce such effects through design or operational measures (mitigation). This process also identifies aspects of the proposed project that may require monitoring. Impacts are considered in a cumulative manner as well as in isolation.

8.3 Key stages of the EIA are detailed below:

- Defining the Project;
- Defining why is the Project required and what other alternatives there are;
- Identifying potential environmental issues associated with the Project;
- Scoping stage (EIA Scoping Report and Navigational Preliminary Hazard Analysis (PHA)) to identify the potential effects and how these should be assessed;
- Define the scope of the EIA and NRA based on the responses to the scoping stage;
- Describe the baseline environment and assess the sensitivity of the receptors / resources likely to be impacted;
- Carry out consultation throughout the EIA and NRA processes;
- Assessment of effects:
 - Assess the magnitude of the possible environmental effects;
 - Evaluate the significance of these predicted effects, i.e. consideration of sensitivity of receptors;
 - Develop mitigation measures and establish how they are to be integrated into the Project;
 - Evaluate the significance of the residual effects;
- Assess potential cumulative effects;

- Production of an ES and NRA reports covering all findings and summarise in a non-technical summary; and
- Implement mitigation measures and environmental monitoring as required.

8.4 The assessment process covers all stages of the Project from installation through to the decommissioning phase. All effects are taken into account throughout this period regardless of their duration (e.g. short-term vessel activities to longer term seabed modification effects). The environment is considered to include physical, ecological and socio-economic components and linkages between different aspects of the environment are also considered.

8.5 Impacts to one receptor that may affect another are considered where a clear pathway is identified between the two receptors. This connectivity between receptors has been considered within the assessments in Sections 9 to 24 in order to provide a holistic assessment that assesses all impacts, both direct and indirect. For instance impacts to some benthic species (e.g. crabs and lobsters) or fish species may have indirect effects to the fishermen that target them, affecting their ability to pursue their livelihood.

8.6 The initial impact is assessed in the section which deals with the receptor directly affected. In this example Section 13 Fish Ecology will deal with the direct impact to fish populations. The indirect impacts are assessed in the section relevant to the receptor of the indirect impact, such that the effect the impact on fish populations has on the fishermen that target them is assessed in Section 14 Commercial Fisheries.

8.7 The geographical extent of the environment considered will vary between identified impacts e.g. underwater noise impacts have the potential to cover a larger area than seabed habitat modification caused by the presence of the device.

8.8 The impact of effects has been considered for all three stages of the development. These are:

- The Construction and Installation Phase. This covers all offshore and onshore construction and installation activities associated with the Project;
- The Operational and Maintenance Phase. This phase begins after the installation phase has reached completion; and
- The Decommissioning Phase. The decommissioning of the Project after it has completed its operational life.

8.9 The EIA has not addressed impacts associated with the potential repowering of the Project. Repowering would be subject to a new lease and consent application and therefore falls out with the scope of this EIA.

8.2.2 Issues scoped out

8.10 During the EIA process a number of potential issues were identified but through stakeholder engagement or consideration during the EIA scoping, were considered to be of negligible significance. The following issues were therefore scoped out of this EIA:

- **Atmospheric Emissions** - vessels will have a very localised impact and will be rapidly dispersed. Additionally they will not occur in close proximity to coastal populations;
- **Oil and gas** - there are no pipelines or oil and gas installations within the vicinity of the Project;
- **Military activities** – early consultation with the MoD revealed no concerns with either Military Practise and Exercise Areas (PEXAs) or munitions contamination in regard to the Project; and
- **Waste disposal from vessels** – all waste be disposed of in line with legislative requirements and no waste will be disposed of overboard.

8.3 Significance of Effects

8.3.1 Overview of process

8.11 The regulations require that the EIA should consider the likely significant effects of the development on the environment. The decision process related to defining whether or not a project is likely to significantly impact on the environment is the core principal of the EIA process. The regulations themselves do not provide a specific definition of "significance". However the methods used for identifying and assessing effects should be transparent and verifiable. The method developed here is applicable to both terrestrial and marine based EIA and has been developed by reference to the principals and guidance provided by SNH in their handbook on EIA (SNH, 2009), the MarLIN species and ecosystem sensitivities guidelines (Tyler-Walters *et al.*, 2001), the Institute of Ecology and Environmental Management (IEEM) guidelines for marine impact assessment (IEEM 2010), and the Equator Principles for determining, assessing and managing social & environmental risk in project financing.

8.12 After reviewing various approaches to the evaluation of significance, certain common policies exist which have been taken into account for each of the effects related to the proposed project. These include:

- Environmental significance is a value judgement based on professional experience;
- The degree of environmental significance is related to the specific impact;
- The significance of the impact is related to sensitivity of the receptor and its capacity to accommodate/recover from change;
- The amount of any type of change, (impact magnitude) includes timing, scale, size, duration and frequency / probability of impact;
- Potential effects of the proposed project may be wide ranging in nature, for example they could be direct, indirect; short, medium or long term, permanent or temporary and have positive or negative effects; and
- Even where a specific effect is unlikely to happen or the likelihood is uncertain; the significance may still be ranked high if the consequence is severe or irreversible.

8.13 As the determination of the significance of an impact is subjective, primarily based on professional judgement, this highlights the requirement for an extensive scoping and consultation process throughout the development of the Project. This is something that MeyGen has given particular attention to throughout the Project and details of the consultation strategy employed have previously been detailed in Section 6 of this ES.

8.14 Once the scope of the EIA studies has been established, it is particularly important to standardise the description and assessment of all the effects due to the development. Despite this being a subjective process, a defined methodology, outlined below, is used to make the assessment as objective as possible. As the environmental factors under consideration can vary considerably depending on what is being assessed, there is likely to be some variation in this process. This is evidently the case for this proposed project as effects will occur onshore and offshore, affecting the biological, physical and human environments.

8.15 The following assessments have used a process which has deviated from the standard approach:

- Shipping and Navigation;
- Marine Cultural Heritage;
- Landscape, Seascape and Visual;

- Onshore Cultural Heritage;
- Socio-economic and Tourism;
- Onshore Noise and Dust; and
- Accidental Events.

8.16 Definitions for the sensitivity of receptors and magnitude of change have been developed on a topic by topic basis and are described and presented in each topic section.

8.17 The sensitivity of a receptor to the proposed Project considers the specific nature of the receptor (or group of receptors) and it's (their) capability to accommodate change.

8.18 Assessment of the magnitude of change upon the receptor takes into account the timing, scale and duration of an impact as well as the time it takes for recovery from an impact to occur (as opposed to the ability to recover used to assess sensitivity). In addition, the frequency / probability of an impact taking place is also taken into account when assessing magnitude.

8.3.2 Sensitivity

8.19 Sensitivity is generally a subjective judgement, determined by a receptor's tolerance to an impact, its ability to recover from an impact and ability to adapt to the changes in the environment caused by the Project. Sensitivity may also consider a receptor's environmental designation, rarity, and whether the receptor provides an important ecosystem service (e.g. keystone species or important habitats). For socioeconomic receptors the consideration of value includes economic, cultural and amenity value. The value categories are receptor-specific and have been considered within the baseline sections of each topic specific section. In some instances, taking a precautionary approach, where stakeholder concern exists with regards to a particular receptor this is considered when assessing the sensitivity of the receptor to an impact. In some instances, this may result in a precautionary approach being taken and a higher sensitivity being considered within the assessment.

8.20 Where these aspects are considered within the sensitivity category they are outlined within the relevant criteria tables in each section. By way of illustration, in the marine mammals section the sensitivity categories are determined by the sensitivity of each marine mammal species to the impact being discussed, such as noise (i.e. the sensitivity of a marine mammal to underwater noise generated by tidal turbines).

8.21 It is important to note that the above approach to assessing sensitivity is not appropriate in all circumstances and in some instances professional judgement has been used in developing the sensitivity category used. For instance, there is a degree of uncertainty with regards the sensitivity of many fish species to electromagnetic fields (EMF) and as a result professional judgement based on the available information and previous impact assessments on EMF from other industries has been used to determine the sensitivity of the receptor.

8.22 The sensitivity of receptor categories are as follows:

- Very high;
- High;
- Medium;
- Low; and,
- Negligible.

8.3.3 Magnitude

8.23 For the purposes of this assessment the magnitude of an impact is determined by the duration, timing, scale, size, and frequency / probability of an impact. The timing of an impact will depend on the construction and installation timeline, or whether the impact occurs during construction and installation or during operation. The scale of the impact will be determined by the temporal (e.g. is the impact on a scale of months or years) and spatial scale (e.g. is the impact local, regional or site specific) over which the impact operates. The size of an impact is determined by the actual area the impact covers within the spatial scale that has been defined. This could be an area less than 1km within the Project area, or the number of months or years over which the impact occurs, such as 2 or 3 months. The duration of the impact will depend on how long the impact occurs, whether it is throughout the operational life of the Project or whether following construction the impact ceases to occur.

8.24 In some instances the frequency / probability of an impact is considered as part of magnitude and is used when we consider how often or likely an impact is to occur to a receptor or receptors. The frequency / probability will determine whether a receptor is exposed to an impact rarely, occasionally, intermittently or on a routine basis. For instance a receptor may be exposed to an impact of high magnitude. However, if the frequency / probability of the impact is low then the magnitude may be considered much lower. For biological receptors this may be applied to the proportion of the population that is exposed to the impact, particularly when an impact only affects a small proportion.

8.25 The overall magnitude of the effect is then determined by considering a combination of each aspect and applying professional judgment / past experience. Following this assessment the following magnitude categories are applied:

- Severe;
- Major;
- Moderate;
- Minor; and
- Negligible.

8.3.4 Consequence

8.26 The sensitivity of receptor and magnitude of impact are combined to define the consequence of the impact (Table 8.1).

Magnitude	Sensitivity				
	Very high	High	Medium	Low	Negligible
Severe	Severe	Severe	Major	Moderate	Minor
Major	Severe	Major	Major	Moderate	Minor
Moderate	Major	Major	Moderate	Minor	Negligible
Minor	Moderate	Moderate	Minor	Minor	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible
Positive	Positive	Positive	Positive	Positive	Positive

Table 8.1: Consequence rankings

8.3.5 Impact significance

8.27 The consequence of impacts is then considered by reference to the relevant criteria in the EIA Regulations. The significance of impacts in relation to the EIA Regulations is defined in Table 8.2.

Positive	Positive – to be encouraged	
Severe	Intolerable risk and/or significance	
Major	Highly significant and requires immediate action	
Moderate	Significant – requires additional control measures and/or management	
Minor	Not significant – however will require some management to ensure remains within acceptable levels	
Negligible	Not Significant	

Table 8.2: Definitions of significance rankings

8.3.6 Presentation of impact assessment results in Environmental Statement sections

8.28 Impacts in the ES technical sections have been considered for each Project phase:

- Construction and installation;
- Operations and maintenance; and
- Decommissioning.

8.29 Each identified impact is described in terms of the sensitivity of the receptor under consideration, magnitude of potential impact and the overall consequence of the impact, which in turn determines whether the impact is significant or not under the EIA Regulations. Following this description the assigned ranking is summarised in a colour coded table. Where impacts are deemed as potentially significant and/or mitigation is required in order to ensure the impact remains insignificant this is summarised in the box under the colour ranking table. Residual impacts following mitigation (for potentially significant impacts only) are also summarised in a colour coded table.

8.4 Rochdale Envelope

8.30 MeyGen has adopted the established principle of the Rochdale Envelope for the purpose of preserving essential flexibility within some major elements of the Project. This principle applies a “worst case” approach to the assessment of the different impacts associated with the Project, as established through relevant case law⁷ and has been endorsed by the Scottish Government⁸. These case precedents have established a custom and practice that has evolved in relation to Projects where the final design is not available at the consent application stage. This approach has been confirmed by the courts as enabling the legal requirements of the relevant EIA Regulations to be complied with and will not give rise to a likely significant effect on the environment which has not been assessed.

8.31 Flexibility in project design is required during the pre-application consultation stage (which MeyGen are undertaking for both the onshore and marine elements of the Project) and within the description of the Project in the application documents to allow for comments from stakeholders to be addressed if possible/required. The key drivers for flexibility and the need for Rochdale Envelope are:

- The ability to optimise projects in both design and economic terms to ensure that schemes are sufficiently attractive to investors to secure the significant capital that is required to bring projects through to delivery;

⁷ 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].

⁸ Letter from Scottish Government to Heads of Planning dated 22 November 2007

- To allow for detailed design to be refined in the project procurement phase, notably taking into account the evolution of foundation and tidal technology available and variety of installation techniques; and
 - An essential need to maintain competitive market behaviour in the supply chain without prejudicing legal procurement rules.
- 8.32 The Rochdale Envelope approach recognises that there may be areas of uncertainty when an application is submitted, although project proposals still need to be of sufficient detail to allow EIA and preparation of an ES. The regulating authority (in this case Marine Scotland and The Highland Council) must be assured that the environmental effects (including residual effects) of a proposal have been assessed; in the case of applying the Rochdale Envelope approach it must be ensured that the maximum potential adverse impacts of a project have been fully assessed and taken into account in the decision-making process.
- 8.33 An assessment of the variations of the proposed project needs to be included in the EIA as well as highlighting areas where certain matters remain unresolved. Potential variations within a project should be assessed in terms of the likely worst case scenario. The developer is required to deal with these possible variations within the project in a manner that aids decision making. The EIA should also outline the reasons why certain parts of the proposal are not yet finalised but ensure sufficient information is provided to allow potential likely significant environmental effects to be assessed.
- 8.34 To demonstrate the care and thoroughness with which the flexibility in the Project design has been assessed in the EIA, Section 5 Project Description summarises the potential development envelope which has been assessed, whilst also presenting the details of what is most likely in practice. Following definition of the Project parameters, each EIA study has given careful consideration to the range of potential impacts that may result from the proposed Project, for each parameter, and ensured that the assessment made for each potential impact is reflective of the realistic worst case scenario for the specific parameter under investigation. Each technical section throughout this ES (Sections 9 to 24) includes definition of what is considered the realistic worst case scenario, and why this is considered to be so. An assessment of the "realistic worst case scenario" in this ES is to be regarded as the same as the assessment of the "maximum potential adverse impact".
- 8.35 MeyGen has ensured that only 'realistic' development scenarios have been considered when defining these. For example, whilst turbines with two and three blades are under consideration, there will not be a realistic scenario where both of these would be deployed. This ensures that the level of information provided is sufficient to enable the likely significant effects on the environment to be described and where appropriate quantified and suitable mitigation measures and monitoring requirements identified.
- 8.36 Adopting this thorough approach has ensured that the development permutations which have not been expressly assessed could not give rise to a significant environmental impact above that which has already been assessed. Furthermore, it allows the assessment to remain concise and focused on the realistic worst case scenario (and therefore, likely significant impacts) whilst avoiding assessment of unrealistic project scenarios and unnecessary duplication of assessment effort.

8.5 Cumulative Impacts

8.5.1 Cumulative impact assessment overview

- 8.37 Cumulative impacts are considered throughout the EIA process and have been considered for all phases of the Project. MeyGen has in consultation with Marine Scotland and The Highland Council identified a list of other projects (MeyGen, 2011), which together with the Project may result in potential cumulative impacts.
- 8.38 The general principle for the cumulative impact assessment was to consider only those projects that were at EIA scoping stage (i.e. for which an EIA Scoping Report and requests for a EIA Scoping Opinion have been submitted) and beyond (as of August 2011). However there were other projects which were very close to submitting their EIA Scoping Reports and/or directly relevant to the proposed Project and a decision was made to also include these in the cumulative impact assessment. SHETL is proposing a subsea cable between the west coast of Orkney and Caithness. However, there is very little information

available in the public domain on proposed cable routes and the limited information that is available indicates that this potential project will have no direct relevance to the cumulative impact assessment for the Project.

- 8.39 Details of the projects to be considered for the cumulative impact assessment were provided to all EIA study leads (as listed in Section 2.5). The study leads then considered which of these projects could result in potential cumulative impacts with the Project. This decision was based on the results of the specific impact assessment together with the expert judgement of the specialist consultant undertaking the impact assessment.
- 8.40 Inevitably the assessment of these 'future projects' is dependent upon the level of information available on those projects at the time of undertaking the cumulative assessment. Due to the fact there were different levels of detail available for different projects, the cumulative impact assessment has been undertaken qualitatively. Sufficient data was not available in the public domain to allow a fully quantified cumulative impact assessment.
- 8.41 Each technical ES section contains a sub section which identifies the projects which are relevant on a cumulative basis and an assessment of the relevant cumulative impacts.

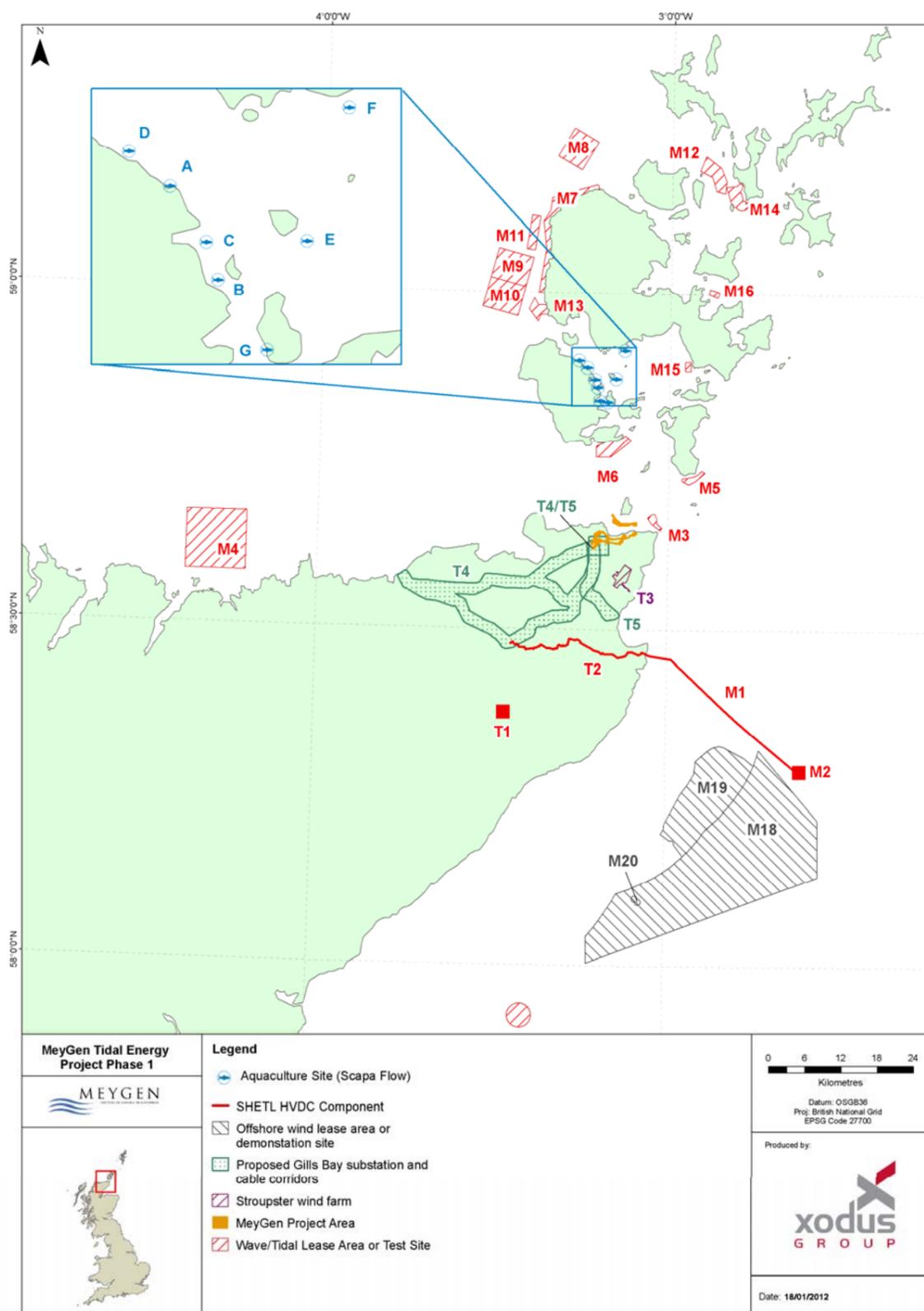


Figure 8.1: Locations of projects considered in cumulative impact assessment (reference numbers correspond to Table 8.3)

8.5.2 Projects considered in the cumulative impact assessment

Figure 8.1 illustrates the projects considered in the cumulative impact assessment. Table 8.3 provides a high level description of the proposed project and also project status as of August 2011.

Map ref	Project name	Project developer	High level description of project	Project status (as at August 2011)	
Onshore projects					
T1	Caithness HVDC Connection Converter station	Scottish and Southern Energy, Power Distribution	600MW converter station and associated substation	Pre-scoping	Pre scoping consultation ongoing; intended to be operational by 2015/16; no information available on when construction will commence
T2	Caithness HVDC Connection Cable	Scottish and Southern Energy, Power Distribution	HVDC buried cable connection to coast from proposed substation	Pre-scoping	Pre scoping consultation ongoing; intended to be operational by 2015/16; no information available on when construction will commence
T3	Stroupster Windfarm	RWE npower renewables	12 wind turbine; 30MW wind farm and associated substation	Consented	Granted consent 08/04/2010; no information is available on when construction will commence
T4	Gills Bay 132 kV / 33 k V Substation - Phase 1	Scottish and Southern Energy, Power Distribution	Connection of the Crown's Estates PFOV leased areas to the electricity network. Construction of a new enclosed substation	Pre-scoping	Pre scoping consultation ongoing; scoping request / report to be submitted October 2011; construction expected to begin April 2013
T5	Gills Bay 132 kV / 33 k V Substation - Phase 2	Scottish and Southern Energy, Power Distribution	New HVDC facility (HVDC converter station and a DC buried cable) connecting to subsea cable to Peterhead (projects T1 and T2 listed above and M1 and M2 listed below – see also map)	Pre-scoping	Pre scoping consultation ongoing; Phase 2 is dependent on the PFOV developers accepting their connection quote
Offshore projects					
-	MeyGen Tidal Energy Project Phase 2	MeyGen Limited	Development of a further 312MW of tidal energy and associated offshore infrastructure	Pre-scoping	Installation will commence in 2017
M1	SHETL HVDC cable	Scottish Hydro Electric Transmission Ltd (SHETL)	Moray Firth HVDC hub, located	Pre-scoping	Intended to be operational by 2015/16
M2	SHETL High Voltage Direct Current (HVDC) cable	Scottish Hydro Electric Transmission Ltd (SHETL)	Connection to the planned HVDC cable to an existing substation near Keith in Moray	Pre-scoping	Intended to be operational by 2015/16

Map ref	Project name	Project developer	High level description of project	Project status (as at August 2011)	
				Project status	Notes
M3	Ness of Duncansby Tidal Energy Project	ScottishPower Renewables UK Limited	95 MW tidal energy development and associated onshore infrastructure	Scoping	EIA Scoping Opinion request submitted; no information available on when construction will commence
M4	Farr Point Wave Energy Project	Pelamis Wave Power	50 MW wave energy development and associated onshore infrastructure	Scoping	EIA Scoping Opinion request submitted; Phase 1 (15 MW) expected deployment date of summer 2014; 50 MW expected to be deployed by 2020
M5	Brough Ness	Sea Generation (Brough Ness) Limited	100 MW tidal energy development and associated onshore infrastructure	Pre-scoping	No information available on when construction will commence
M6	Cantick Head Tidal Energy Project	Cantick Head Tidal Development Limited	200 MW tidal energy development and associated onshore infrastructure	Pre-scoping	EIA Scoping Report in preparation; the majority of construction work is not anticipated to commence until after 2015
M7	Brough Head Wave Energy Project	Brough Head Wave Farm Limited	200 MW wave energy development and associated onshore infrastructure	Pre-scoping	EIA Scoping Report in preparation; construction of the initial phase to commence in 2015
M8	Costa Head Wave Energy Project	SSE Renewables Developments (UK) Limited	200 MW wave energy development and associated onshore infrastructure	Pre-scoping	EIA Scoping Report in preparation; no information available on when construction will commence
M9	West Orkney North Wave Energy Project	EON Climate & Renewables UK Developments Limited	50 MW wave energy development and associated onshore infrastructure	Pre-scoping	EIA Scoping Report in early stages of preparation; no information available on when construction will commence
M10	West Orkney South Wave Energy Project	EON Climate & Renewables UK Developments Limited	50 MW wave energy development and associated onshore infrastructure	Pre-scoping	EIA Scoping Report in early stages of preparation; no information available on when construction will commence
M11	Marwick Head Wave Energy Project	ScottishPower Renewables UK Limited	50 MW wave energy development and associated onshore infrastructure	Scoping	EIA Scoping Opinion request submitted; no information available on when construction will commence
M12	Westray South Tidal Energy Project	SSE Renewables Developments (UK) Limited	200 MW tidal energy development and associated onshore infrastructure	Pre-scoping	EIA Scoping Report in preparation; no information available on when construction will commence
M13	Wave Energy test site (Billia Croo, Orkney)	EMEC	Wave energy device test berths with subsea cable connection to an onshore substation	Operational	Operational
M14	Tidal energy test site (Fall of Warness, Orkney)	EMEC	Tidal energy device test berths with subsea cable connection to an onshore substation	Operational	Operational

Map ref	Project name	Project developer	High level description of project	Project status (as at August 2011)	
				Project status	Notes
M15	Intermediate wave energy test site (St Mary's Bay, Orkney)	EMEC	Intermediate wave energy test site providing more gentle conditions for testing than the main wave test site	Licence applications submitted	The majority of mooring points in position; EMEC awaiting final marine license prior to the first anticipated deployments in autumn 2011
M16	Intermediate tidal energy test site (Head of Holland, Orkney)	EMEC	Intermediate tidal energy test site providing more gentle conditions for testing than the main tidal test site	Licence applications submitted	The majority of mooring points in position; EMEC awaiting final marine license prior to the first anticipated deployments in autumn 2011
M17	Ocean Power Technologies (OPT) wave power ocean trial	OPL	Sea trials are currently underway for the PB150 PowerBuoy	Operational	Operational
M18	Moray Offshore Renewables Ltd (MORL) offshore windfarm	MORL	Approximately 1.4GW offshore windfarm development consisting of approximately 200 turbines	Scoping	EIA Scoping Report was submitted in 2010; application for consent anticipated 2012; first generation anticipated 2016
M19	Beatrice Offshore Windfarm Ltd (BOWL) offshore windfarm	BOWL	Approximately 920MW offshore windfarm development consisting of 142 to 277 turbines	Licence applications submitted	EIA Scoping Report was submitted in 2011; application for consent anticipated 2011/2012; first phase of construction to commence 2014 and to be fully operational by 2016/17
M20	Beatrice offshore Windfarm Demonstrator Project	SSE and Talisman	Two 5MW wind turbines	Operational	Operational
Aquaculture projects					
A	Chalmers Hope salmon cage site	Northern Isles Salmon	Salmon farm	Operational	Operational
B	Pegal Bay	Northern Isles Salmon	Salmon farm	Operational	Operational
C	Lyrawa	Northern Isles Salmon	Salmon farm	Operational	Operational
D	Bring Head	Scottish Sea Farms	Salmon farm	Operational	Operational
E	Cava South	Northern Isles Salmon	Salmon farm	Consented	Planning granted
F	Toyness	Scottish Sea Farms	Salmon farm	Operational	Operational
G	West Fara	Northern Isles Salmon	Salmon farm	Operational	Operational

Table 8.3: Details of projects considered in cumulative impact assessment (reference numbers correspond to Figure 8.1)

8.6 Mitigation and Monitoring

8.6.1 Monitoring strategy

- 8.42 Where potentially significant impacts (i.e. those ranked moderate or higher) are identified mitigation measures have been considered. The intention is that such measures should remove, reduce or manage the impacts to a point where the residual significance is at an acceptable or insignificant level. For some impacts mitigation has been recommended where impacts are considered to be not significant (those ranked minor or negligible). In these instances mitigation is recommended to ensure that impacts remain not significant.
- 8.43 It should be noted that in some cases specific mitigation measures have not been developed due to the early stage of development of the tidal industry as a whole. It is proposed that if the impact cannot be reasonably mitigated or avoided a monitoring programme will be implemented to improve understanding of the processes involved. Monitoring is a key component of the 'Survey, Deploy and Monitor' strategy which will aid the development of the marine renewable industry under the Scottish Government whilst improving understanding of how individual technologies interact with the environment.
- 8.44 Monitoring is also considered an important post-consent tool. This will allow the effects of any mitigation measures to be monitored and also study the accuracy of predicted effects.

8.6.2 Strategic research

- 8.45 Marine Scotland, SNH and The Crown Estate have commissioned a number of research studies that are aimed at informing potential impacts from the emerging marine renewable energy industry. Many of these relate to SNH's Research Strategy 2010 – 2013, and more specifically to Research Priority 5.1, 'Understanding the potential impacts of marine renewable developments on the marine environment'. Strategic research covers the following areas:
- Developing guidance on survey and monitoring;
 - Supporting monitoring of deployed devices;
 - Commissioning or contributing to resource surveys, to inform site selection and subsequent assessments;
 - Supporting development of techniques or technologies to detect and record species present around turbines;
 - Supporting the development of locational guidance;
 - Understanding the significance of potential impacts upon species and habitats and their conservation status; and
 - Identifying approaches for device management and operation that will minimise or avoid environmental impacts.
- 8.46 Where relevant, and where published information is presently available, this strategic research has been used to inform the EIA for the Project. However it should be noted that many of the studies are still ongoing and as yet there are limited published results. MeyGen has used the best available from this strategic work data available at the time of conducting the EIA.

8.7 Habitats Regulations Appraisal Process

- 8.47 To tackle the continuing deterioration of natural habitats and the threats to certain plant and animal species, the European Community adopted Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna. This Directive, known as the Habitats Directive, is transposed into Scots law by the Conservation (Natural Habitats and &c.) Regulations 1994 as amended.

- 8.48 Under the 1994 Regulations, (which are relevant for projects located onshore and in Scottish territorial waters out to 12 nm), a project which could affect a Natura 2000 site (Special Areas of Conservation (SAC) or Special Protection Area (SPA)), must be assessed as to whether it will have a likely significant effect on the integrity of a Natura 2000 site or any of its qualifying interests by the 'competent authority' (in this case Marine Scotland on behalf of Scottish Ministers for the offshore works and The Highland Council for onshore works). The competent authority must consider whether a plan or project has the potential to have an adverse effect on the integrity of a Natura 2000 site. This process is known as Habitat Regulations Appraisal (HRA). Under the Regulations, 'Appropriate Assessment' (stage two of the HRA) is required for a plan or project, which either alone or in combination with other plans or projects, is likely to have a significant effect on a Natura 2000 site and is not directly connected with or necessary for the management of the site. The HRA is separate to the EIA process and is based solely on addressing the impacts in relation to the integrity of a Natura 2000 and its qualifying interests.
- 8.49 The Habitats Directive applies the precautionary principle to these sites and plans and projects can only be permitted when it is ascertained through the four stages of the HRA process (SNH, 2010) that there will be no adverse effect on the integrity of the site(s) in question:
- Screening initially identifies likely impacts from a project or plan, either alone or in combination with other projects or plans and considers whether these impacts may be significant. It is important to note that the burden of evidence is to show, on the basis of objective information, that there will be no significant effect. If there is the potential for significant effects, or the potential is not known, this will trigger the need for Appropriate Assessment;
 - Appropriate Assessment is the detailed consideration of impacts on the conservation objectives and structure and function of the Natura 2000 site from the project or plan, either alone or in combination with other projects or plans. The Appropriate Assessment process determines whether there is objective evidence that adverse effects on the integrity of the site can be excluded. This stage also includes the development of mitigation measures to avoid or reduce any possible impacts;
 - A process of assessing alternative solutions examines alternative ways of achieving the objectives of the project or plan that would avoid adverse impacts on the integrity of the Natura 2000 site. This stage is undertaken in the event that avoidance or mitigation measures would be unable to cancel out adverse effects; and
 - Further assessment is undertaken where no alternative solutions exist and where adverse impacts remain. Plans and projects may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. At this stage an assessment is made as to whether IROPI is applicable. If this is the case then compensatory measures may be required to ensure maintenance of the coherence of the Natura 2000 network.
- 8.50 It is important to note that where priority habitats or species are present, the imperative reasons for IROPI to be applied need to be "...reasons relating to human health, public safety or beneficial consequences of primary importance to the environment, or other reasons which in the opinion of the European Commission are imperative reasons of overriding public interest". For non-priority habitats and species, imperative reasons of a social or economic nature may be acceptable but they must be considered to be sufficient to override any harm that may be caused to the site.
- 8.51 More detailed consideration to determine whether a significant effect is likely to arise as a result of the proposed development should consider, in addition to the specific features and environmental conditions of the protected site, other factors which will have been addressed as part of the EIA process. These may include risk of accidents, quality and regenerative capacity of the natural environment, extent of the impact, duration, frequency, scale and reversibility of the impact (EC, 2000).
- 8.52 The process for determining 'significant' effects on Natura 2000 sites should be carried out in relation to the specific features and environmental conditions of the protected sites concerned. Determination of what is a 'Likely Significant Effect' should be considered on a site by site basis taking into account whether a qualifying feature is likely to be directly or indirectly affected. In either case there is a presumption that a

significant effect is likely. A Likely Significant Effect is any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the site was designated, but excludes trivial or inconsequential effects.

- 8.53 An HRA report has been prepared by MeyGen to accompany the ES and the consent applications. Data gathered as part of the EIA surveys and studies has been used to inform the HRA and provide the information that is used to undertake the assessment. The requirement for an Appropriate Assessment will be determined by the competent authority (Marine Scotland/The Highland Council), following assessment of the information presented in this ES and the HRA report submitted alongside the consent applications. The HRA report contains sufficient information to enable the competent authority to carry out an Appropriate Assessment should it determine that one is required.

8.8 References

European Commission (2000). Guidance on the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

MeyGen (2011). Projects for consideration in the cumulative (and in combination) impact assessment.

SNH (2010). Natura sites and Habitats Regulations. How to consider proposals affecting SACs and SPAs in Scotland. The essential quick guide. <http://www.snh.gov.uk/docs/C284286.pdf> (Accessed October 2011).