SCOTTISH MARINE RENEWABLES

STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

NON-TECHNICAL SUMMARY

REPORT PREPARED FOR THE SCOTTISH EXECUTIVE BY: FABER MAUNSELL AND METOC PLC MARCH 2007

CONTENTS

1: INTRODUCTION

BACKGROUND

In 2004 a report[1] prepared by the Marine Energy Group (MEG) identified that up to 10% of Scotland's electricity generation (about 1,300 megawatts, MW) could come from wave and tidal stream power by 2020. As such, this would contribute significantly to the Scottish Executive's target of 40% of electricity generated in Scotland to be from renewable sources by 2020.

The Scottish Executive commissioned this Strategic Environmental Assessment (SEA) to examine the environmental effects from the development of wave and tidal power and to use the results to inform the preparation and delivery of the Scottish Executive's strategy for the development of marine energy.

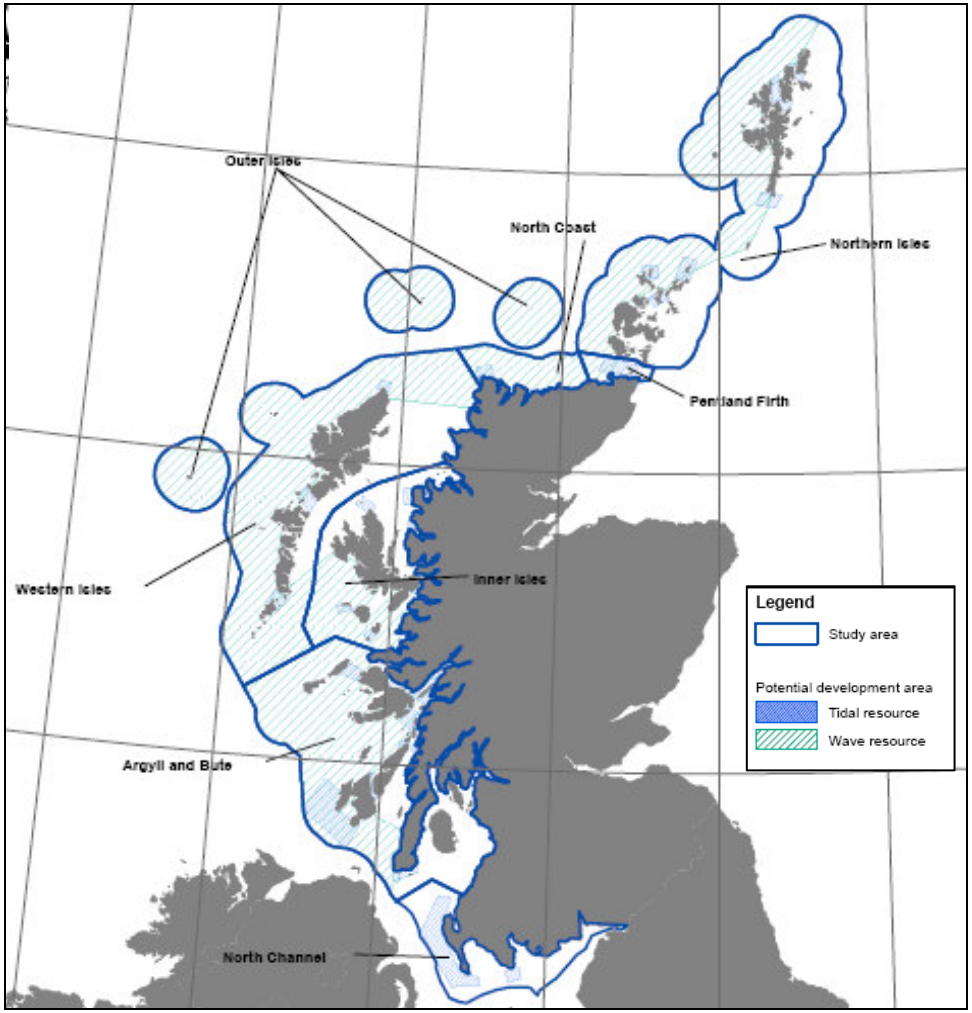
This document provides a non-technical summary of the results of the SEA. The detailed results are presented in the Environmental Report (ER), which can be found at www.seaenergyscotland.co.uk). (Where appropriate, references are made to specific Chapters in the ER where further information can be found.)

THE STUDY AREA

The study area covers the entire west and north coast of Scotland from Shetland to the Solway Firth to a distance of 12 nautical miles[2] offshore (see Figure A). This study area was selected by the Scottish Executive, and subsequently refined, based on where the main wave and tidal resource areas are located and following consultation with developers. A more detailed explanation as to how the study area was identified is provided in the Environmental Report, Chapter A2: Project Description. For the purpose of this SEA, the study area was sub-divided into **eight separate development areas (see Figure A):**

The Northern Isles (Orkney and Shetland)	Inner Isles
Pentland Firth	Western Isles
North Coast	Argyll and Bute
Outer Isles	North Channel including the Solway Firth

Figure A: SEA Study Area and Development Areas



[1] Harnessing Scotland's Marine Energy Potential (MEG, 2004)
[2] The 12 nautical mile (nm) limit represents UK Territorial Waters.

1: INTRODUCTION

THE SUBJECT OF THE SEA

The primary question which has been addressed in this SEA is: *can wave and tidal stream energy contribute towards helping the Scottish Executive achieve its target for producing 40% of its electricity from renewable sources by 2020 without significant effects on the environment, and if so, how can this best be achieved*?

Both MEG and the Scottish Executive recognise that an SEA will play an important role in facilitating the future commercial development of marine renewable energy devices in Scottish waters (MEG, 2004). The findings will be fed into the Scottish Executive's strategy for the development of marine energy to ensure that all environmental issues are taken into consideration and to inform the development of planning guidance for marine renewable energy development.

The legislative requirements identifying the need for an SEA include:

SEA Legislation

On the 20th July 2004 it became a legal requirement that, under the **Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004**, all spatial plans and programmes would be subject to an SEA. The 2004 UK (Scotland) Regulations transpose the requirements of European Directive 2001/42/EC "the assessment of the effects of certain plans and programmes on the environment" (the Strategic Environmental Assessment (SEA) Directive).

In 2005 the Scottish Executive established the **Environmental Assessment (Scotland) Act**. This Act, which came into force on 20th February 2006, replaces the Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 as the transposition vehicle for the SEA Directive. The Act delivers on the Partnership Agreement commitment to widen the scope of SEA, and go further than obliged by the SEA Directive, by including strategies as well as all public plans and programmes.

OBJECTIVES OF THE SEA

At the outset, a number of inter-related objectives were identified for the SEA:

SEA Objectives:

- To assess, at the strategic level, the effects on the environment of meeting or exceeding the Marine Energy Group's estimate of 1,300MW of marine renewable energy capacity around Scotland by 2020
- To advise and support the Scottish Executive in the development and implementation of its strategy for marine renewable energy and to inform future development of planning guidance for marine developers
- To inform the project-level decision-making process for all stakeholders (to include regulators and developers), and
- To facilitate focused investment into the marine renewable energy sector in Scotland.

OTHER FORMS OF MARINE ENERGY

The SEA relates to the wave and tidal stream power technologies summarised in Section 3 below. Offshore wind and tidal barrages have not been included in this SEA. The reasoning behind their exclusion from this SEA is provided in Chapter 2 of the Environmental Report.

1: INTRODUCTION

STUDY LIMITATIONS

Any study which looks 10-15 years into the future is subject to uncertainty. At this early stage in the development of wave and tidal power there are a number of matters for which information is limited or not well understood:

Study Limitations:

- There are **gaps in our knowledge of the marine environment**. The study area is extensive and there is limited information available for certain topics and locations. For example, the location and populations of species at sea (such as seals, birds and fish) is generally poorly understood. Additionally, there were limitations on the data available for some topics including commercial fisheries and shipping (particularly small vessels).
- There are **many types of marine renewable energy device, ranging in development stage from concept, through prototype/demonstrator to pre-commercial**. For this reason the study has identified characteristics which are common to different device types. It has also made assumptions on what comprises an 'array' of a number of devices (see Wave and Tidal Power section below).
- Over the study period (to 2020) marine renewable energy devices will be improved and **new technologies** developed. This may influence, for example, where they are located, how they are constructed and their size – all matters which have a bearing on their potential environmental effects.
- **Our knowledge of the effects of devices** on the environment is not well understood for some topics, such as the likelihood of collisions between fish, birds and mammals with the rotating blades underwater.
- Given the above limitations, there are further uncertainties over the **cumulative effects** of two or more device arrays in any given area.
- Actual **locations of wave and tidal power arrays** have not been determined. The SEA, whilst focussing on the areas identified as being of interest for development (as shown on Figure A), covers a broader region. With future technological improvements it may be possible to locate devices in areas currently not considered suitable and it is therefore not possible to dismiss any part of the study area because of resource constraints.
- Scotland has **limited electricity grid capacity,** i.e. the power lines in the north and west of Scotland are not sufficient to carry more electricity without being upgraded. Furthermore, Shetland is not connected to the national grid. These issues have important implications for the viability of wave and tidal power, and will also influence where devices can be located.
- The SEA has considered the generic environmental effects associated with **onshore grid connections** but has not assessed the environmental effects associated with grid.

2: APPROACH TO THE SEA

This section explains how the SEA was undertaken. It covers:

- What environmental topics were included in the study
- The approach taken to assessing potential effects on these topics, and
- How the SEA examined the effects of achieving or exceeding the estimate provided by MEG of installing 1,300MW of wave and tidal energy capacity.

ENVIRONMENTAL TOPICS COVERED IN THE SEA

The main topics covered in the SEA are listed below. The effects of wave and tidal devices on 'key' SEA topics are summarised below in Section 4: Level 1 Assessment.

Key SEA Topics summarised in Section 4 of this document:

- Marine Birds – including marine noise
- Marine Mammals – including marine noise
- Benthic Ecology
- Fish and Shellfish – including marine noise
- Commercial Fisheries
- Shipping and Navigation
- Seascape
- Recreation and Tourism
- Marine and Coastal Historic Environment
- Onshore Grid Connections
- Protected Sites and Species
- Geology and Energy Extraction (Metocean Processes)
- Seabed Contamination and Water Quality
- Disposal areas
- Cables and Pipelines
- Military Exercise Areas
- Electric and Magnetic Fields

APPROACH TO THE ASSESSMENT

The assessment has been undertaken at two levels:

Level 1: Assessment: The first part of the assessment considers effects of wave and tidal devices on each of the main SEA environmental topics. In summary, the Level 1 Assessment:

- Identifies the characteristics of wave and tidal devices that may cause environmental effects. For example, the moving parts on devices that could result in collision with seals, cetaceans, fish and diving birds; or seabed attachments (such as piles or anchors) affecting seabed habitats.
- Describes the measures to avoid, reduce or offset negative effects (referred to as **mitigation measures**).
- Provides a prediction of the environmental effects which may result, both before and after the mitigation measures have been taken into account.

Level 2: Energy Resource Assessment and Cumulative Effects: Taking into account the results of the Level 1 Assessment, the second part of the assessment examines how much energy (expressed in MW) may be available in each of the eight development areas taking account of the need to minimise environmental effects. This estimate is based on:

- The available wave or tidal energy resource in each area;
- The reduction in this energy resource as a result of the need to avoid certain 'physical constraints'. A physical constraint is an existing development or feature that should be avoided, e.g. shipping lanes, ship wrecks, fish farms, munitions contamination sites, MoD firing ranges, cables, etc; and
- The further reduction in the available energy resource as a result of the need to avoid or reduce potential effects which are judged to be of 'Major' or 'Moderate' significance in the Level 1 Assessment. This part of the assessment also considers the possible cumulative effects of two or more arrays of devices.

Note: This study reflects policy, sector, device and baseline information available as of November 2006.

2: APPROACH TO THE SEA

STEERING GROUP

The SEA has been guided by a Steering Group, with representatives drawn from a broad range of stakeholders. These are listed below:

Steering Group:

- Convention of Scottish Local Authorities (CoSLA)
- The Crown Estate
- European Marine Energy Centre (EMEC)
- Fisheries Research Services (FRS)
- Heriot-Watt University
- Joint Nature Conservation Committee (JNCC)
- Maritime and Coastguard Agency (MCA)
- Ministry of Defence (MoD)
- Royal Society for the Protection of Birds (RSPB)
- Scottish Environment Protection Agency (SEPA)
- Scottish Fishermen`s Federation (SFF)
- Scottish Natural Heritage (SNH)
- West Coast Energy (representing industry)
- Historic Scotland

SCOPING AND INITIAL CONSULTATION

In order to confirm the content of, and approach to, the SEA a Scoping Report was published. A copy can be found at www.seaenergyscotland.co.uk. The key points raised during consultation on the scope of the SEA are summarised in the Environmental Report, Section A3. Prior to the publication of the Scoping Report a workshop was held with developers. The workshop provided information on wave and tidal devices and areas of potential interest for development.

3: WAVE AND TIDAL POWER

ENERGY RESOURCE

A number of studies (see Section 5: Level 2 – Energy Resource Assessment below) have identified that Scotland possesses a huge wave and tidal stream energy resource. **Figure A** shows the location of the **resource areas** identified by developers as **areas of potential interest for development** of wave and tidal arrays.

Generally, the **wave energy resource** covers the open seas where the largest waves are produced from the prevailing westerly winds. This includes much of the study area which is not sheltered by land, although the wave climate varies across this area. Wave power requires high energy waves which typically occur in areas of deeper water. The **tidal energy resource** is clustered around 'hotspots' where tidal flows are strongest. These areas are typically associated with channels and headlands; key locations of interest include the Pentland Firth, around Orkney, Shetland, and the Western and Inner Isles.

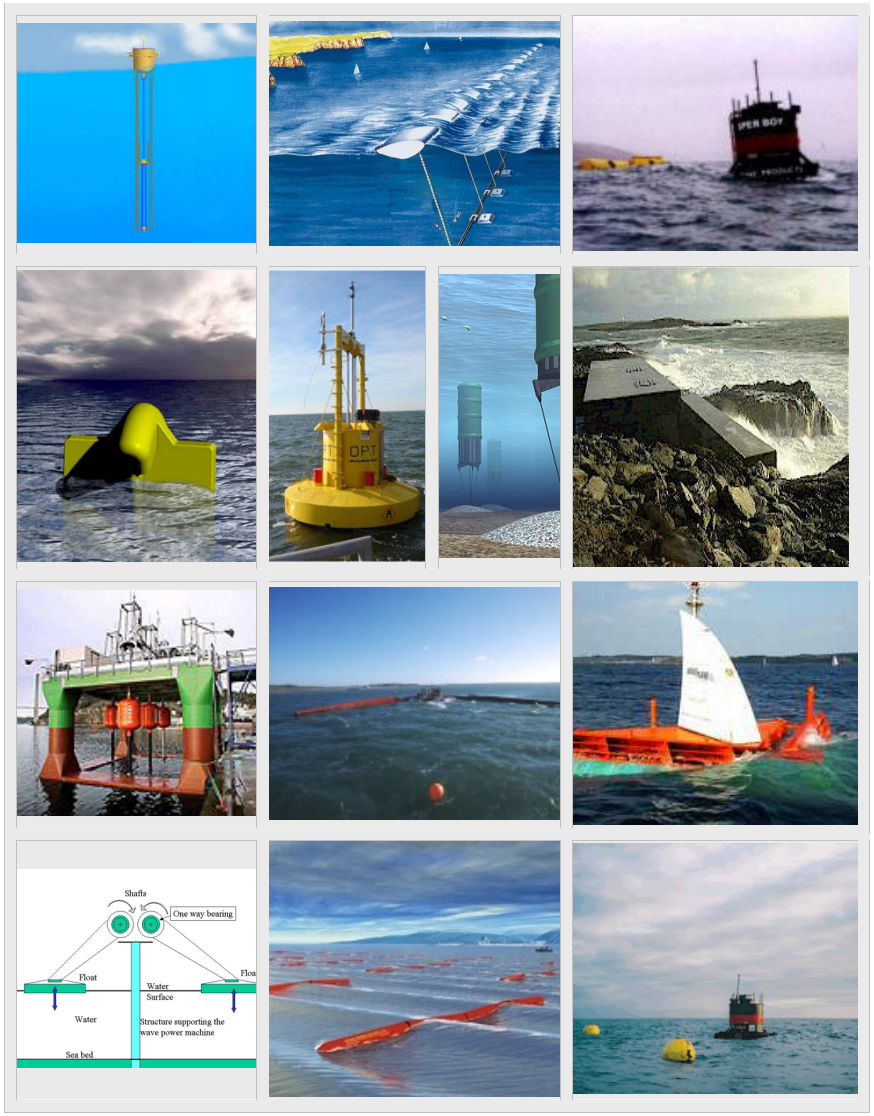
The development of marine renewable energy is constrained by a number of factors including the environment and other marine activities such as shipping. Given the remote locations where devices are likely to be placed, another limitation is the need to connect the devices to the mainland electricity grid.

WAVE AND TIDAL POWER DEVICES

A large number of devices have been (or are in the process of being) developed. Examples are provided in **Figure B** ((Sources: Aqua Energy, AS Ocean Energy, Embley Energy, Fred Olsen, Lancaster University, Ocean Power Technology, Orecon, Seavolt Technologies, Wave Dragon, Wave Star Energy, Wavegen, Waveplane production).

Wave power devices are typically designed for operation in water depths ranging up to 100m and have a minimum operating wave height of 1.5m. Due to the preferred open location of these devices, their positions are not too restricted. Exposed shorelines may also be suitable for wave energy generation.

Figure B: Examples of Wave Power Devices

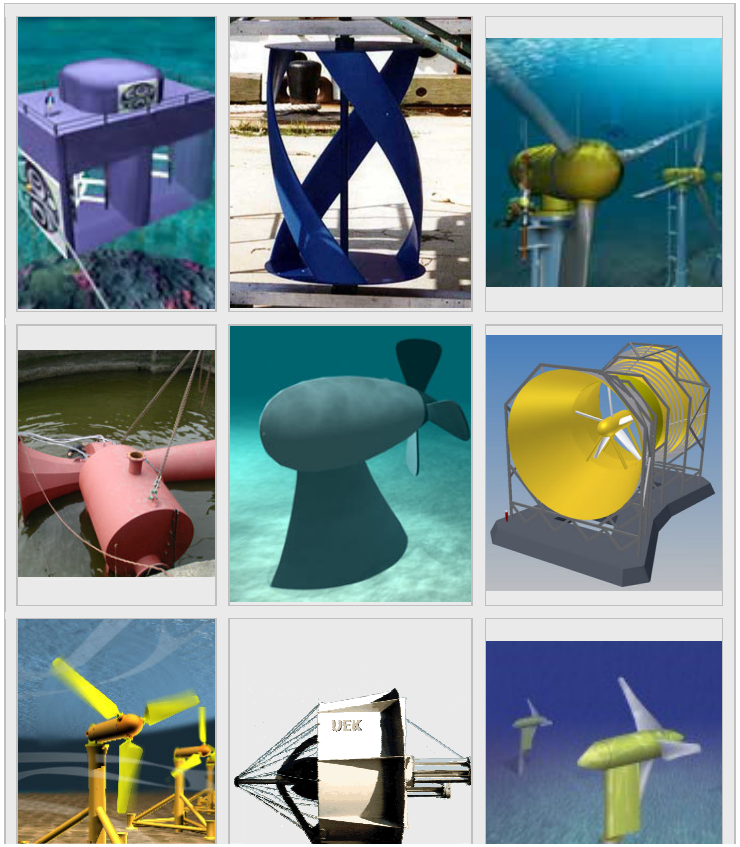


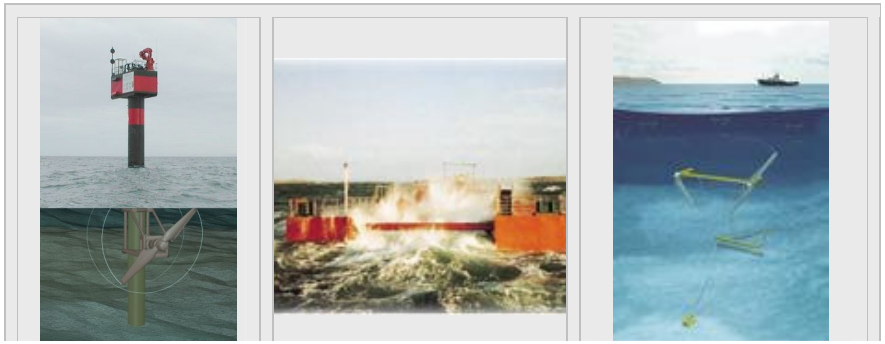
3: WAVE AND TIDAL POWER

Tidal power devices differ from wave power devices as the tidal resource is regular and predictable. Tidal power is more restricted in terms of location as the best places for these devices are channels where water is pushed through narrow corridors resulting in fast flowing tidal currents.

Tidal power devices typically generate power through turning blades, some of which are similar to wind turbines but much smaller in size. Devices are fixed to the seabed via a variety of attachment methods.

Figure C: Examples of Tidal Power Devices:





(Sources: Blue Energy, GCK Technology, Hammerfest Strom, Hydroventuri, Kinetic Energy Systems, Lunar Energy, Marine Current Turbines, Seapower, SMD Hydrovision, Tidal Generation, Underwater Electric Kite, Verdant Power.)

ARRAYS OF WAVE AND TIDAL DEVICES

As with wind farms, marine renewable energy projects are likely to consist of a number of individual devices linked in arrays or farms. For the assessment of the effects of arrays, the 'footprint' of typical-sized commercial arrays is assumed to be as follows:

	Wave Array	Tidal Array
Array footprint (km^2)	4 km^2	0.5 km^2
Number of devices	7 – 100	30 - 50
Potential generating capacity (MW)	15** to 50*	30 - 50

*assumes 7 x 7 MW devices ; ** assumes 100 x 0.15 MW units

In considering the estimated array footprints it should be noted that:

- There is still a great deal of variation in the scale, design and configuration of different devices and arrays.
- The wave and tidal industry is still in its early stages. Therefore, exact information about array size and configuration is limited.
- Devices could potentially be located closer together than is currently predicted, which could increase the effective energy density of an array.

4: LEVEL 1 ASSESSMENT – INTRODUCTION AND METHOD

INTRODUCTION TO LEVEL 1 ASSESSMENT

The main focus of the Level 1 Assessment was to assess the effects that marine energy devices and device arrays would have on the SEA topics listed previously. This assessment involved a number of stages. These are listed below and form the basis of the results presented in pages 9 to 14 of this Non-Technical Summary and in Chapters C1 to C21 of the main Environmental Report.

METHOD

The following outlines the approach used in the Level 1 Assessment:

Assessment Method:

Identification of how marine devices interact with the marine environment

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Identification of the key receptors (key features of a specific SEA topic) that would be affected by marine devices

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Identification of how sensitive the key receptors are to the effects caused by the marine devices

↓

Assessment of **potential effect significance** - how significant the effect would be WITHOUT the use of mitigation

↓

Identification of mitigation measures that could be implemented to reduce the overall significance of the effect

↓

Assessment of **residual effect significance** – how significant the effect would be if mitigation was implemented appropriately

KEY POINTS FOR CONSIDERATION

There are a number of key points that should be taken into account in the review of the results presented in this part of the Non-Technical Summary:

Key points for consideration:

- **SEA not EIA**
  - Level 1 Assessment results are based on a 'strategic' level assessment, not project or site specific surveys or studies
- **Data and knowledge gaps**
  - Level 1 Assessment identified gaps in baseline data and knowledge of how devices interact with the marine environment and how key receptors respond to devices
  - Reasons for gaps in baseline data – very large area to survey, not as accessible as land, fewer developments involving surveys or studies to draw on
  - Reasons for gaps in knowledge – relatively 'new' industry. Only a limited number of devices have been deployed. Monitoring of marine devices is also relatively new and less well developed than for other types of development, e.g. offshore wind
  - Implications for the SEA – reduced confidence in assessment of effect significance and reduced ability to specify certain areas where effects may occur
  - There are opportunities to reduce data gaps through site specific surveys (at project stage – not within this SEA) and through monitoring (see Section 6 of this NTS and Section E of the Environmental Report)
- **Mitigation measures**
  - Mitigation measures identified as part of the SEA are measures that could be used to reduce the significance of an effect or prevent the effect from occurring
  - It is important to take into account opportunities for mitigation as this affects the overall potential for the future development of marine energy
  - However, it is **not possible to guarantee** at this strategic level that the mitigation measure identified will be implemented for individual projects
  - The aim therefore is to recognise where mitigation could reduce or prevent significant effects to inform all those involved in the planning and consenting of projects. The measures also inform the Scottish Executive's strategy for the development of marine energy on how to regulate or promote appropriate implementation of mitigation at the project level

4: LEVEL 1 ASSESSMENT – BIOLOGICAL ENVIRONMENT

MARINE BIRDS

The SEA study area contains nationally and internationally important seabird populations. These are protected under the EC Birds Directive, through the establishment of Special Protection Areas (SPAs), for the conservation of breeding, migrating and wintering birds. In total there are currently 54 SPAs in the SEA study area, of which 38 are designated for the protection of breeding seabirds. Processes are underway to identify further SPAs that include the marine environment. St Kilda (Outer Isles) is a World Heritage Site for breeding bird colonies, containing the largest seabird colony in the British Isles and one of the largest concentrations in the North Atlantic.

As well as considering the effects of wave and tidal devices on seabird breeding colonies, the SEA has taken into account other seabird activities including foraging and loafing (resting) in the marine environment.

Birds: Key Issues

- **Key potential effects on birds include:**
  - Physical disturbance during device installation
  - Noise during construction and from device operation
  - Risk of collision with operating devices during foraging
  - Accidental contamination from device failures, vessel collisions and storm damage
  - Habitat exclusion and species displacement due to device presence and operation
  - Increased mink predation due to the creation of islet chains between islands
- All seabird breeding colonies are sensitive to physical disturbance, noise, and mink predation
- All seabirds are sensitive to collision risk; diving birds and pursuit divers are at greatest risk
- Auks and divers are most sensitive to contamination
- All seabirds are sensitive to habitat exclusion (breeding, foraging and loafing)
- **Key distribution of seabirds:**
  - Main distribution of seabirds is across northern and western part of the study area
  - St Kilda has the largest northern gannet colony in world
  - Orkney and Shetland have 20 seabird breeding colonies
  - Barra and Treshnish Isles are potentially at risk from mink colonisation
- **Key measures to prevent adverse effects include:** avoidance of sensitive sites; avoidance of sensitive seasons (e.g. breeding) during installation; and project-specific studies to help design appropriate mitigation.

MARINE MAMMALS

The SEA study area contains nationally and internationally important populations of marine mammals including seals, whales, dolphins, porpoises and otters. All of these are protected under EC Directive 92/43/EEC on the Conservation of natural habitats and of wild flora and fauna (the Habitats Directive) and the Wildlife and Countryside Act 1981. The study area also contains a number of Special Areas of Conservation (SACs), designated for the conservation of species protected under Annex II of the Habitats Directive.

The study area currently contains 10 SACs designated for grey and common seals (mainly Shetland and Orkney), and 4 SACs designated for otters. Seals, otters, harbour porpoise and bottlenose dolphins are also present within a further 16 SACs. Processes are underway to identify and designate offshore SACs

Marine Mammals: Key Issues

- **Key potential effects on marine mammals include:**
  - Physical disturbance during device installation
  - Noise during installation (particularly piling) and from device operation
  - Risk of collision with operating devices during feeding/travel (e.g. migration)
  - Accidental contamination from device failures, vessel collisions and storm damage
  - Barriers to movement – due to avoidance reactions to noise and risk of collision
- Breeding seal colonies and haul-out sites are highly sensitive to physical disturbance
- All marine mammals are highly sensitive to underwater noise due to sonar disruption and possible physiological effects
- All marine mammals are at risk of collision with underwater devices
- Collision risk and underwater noise can potentially create a barrier to the movement of marine mammals from one area to another; this is most likely in constrained locations
- **Key distribution of marine mammals:**
  - Shetland and Orkney have a high number of breeding seal colonies
  - Seal breeding and haul-out sites (designated and non-designated) are also distributed across the northern and western parts of the study area.
  - Whales, dolphins and porpoises are frequently sighted throughout the study area
- **Key measures to prevent adverse effects include:** avoidance of sensitive sites; avoidance of sensitive seasons (e.g. breeding, moulting); protocols (such as use of Marine Mammal Observers) to ensure noisy construction activities do not occur when marine mammals are in close proximity; and project-specific studies to help design effective mitigation.

4: LEVEL 1 ASSESSMENT – BIOLOGICAL ENVIRONMENT

BENTHIC ECOLOGY

Benthic ecology refers to the flora and fauna that inhabit the seabed and intertidal area. Benthic habitats and species are protected under Annexes I and II of the Habitats Directive. Protection is achieved through the designation of SACs. Benthic habitats and species are also protected under the UK Countryside and Wildlife Act 1981 'as amended' and are subject to specific UKBAP Priority Habitat Action Plans (HAPs).

Benthic Ecology: Key Issues

- **Key potential effects on benthic habitats and species include:**
  - Increased suspended sediment/turbidity from seabed disturbance during device installation and cable trenching
  - Smothering from seabed disturbance during device installation and cable trenching
  - Accidental contamination from device failures and collisions
  - Changes in tidal flow and wave regime due to device presence and operation
  - Substratum loss, caused by attaching devices to the seabed
- All benthic habitats are sensitive to substratum loss
- Maerl beds (UKBAP habitat) are highly sensitive to increased suspended sediment, smothering, and changes in tidal flow and wave regime
- *Modiolus modiolus* (Horse Mussel) (UKBAP habitat) are highly sensitive to smothering, contamination, and changes in tidal flow and wave regime
- Benthic communities unique to areas of high tidal flow which are protected under the Habitats Directive (biogenic reefs) or UKBAP (tidal rapids) are sensitive to contamination and changes in tidal flow
- **Key distribution of benthic ecology:**
  - SACs designated for benthic habitats are present in all parts of the study area except the Pentland Firth and North Coast
  - Absence of designated sites for benthic habitats does not mean that benthic habitats and species are not present in these locations, and the benthic ecology of much of the study area is not well known.
- **Key measures to prevent adverse effects include:** avoidance of sensitive sites; use of devices with attachments that cause smaller seabed disturbance such as anchors and clump weights; effective device design; and project-specific studies for mitigation.

FISH AND SHELLFISH

This section considers the effects of wave and tidal devices on fish and shellfish in the study area. Effects on commercial fisheries are discussed separately. There are a number of different types of fish and shellfish that occur throughout the study area. Of these, the native oyster, common skate, cod and haddock are all listed on the IUCN (The World Conservation Union) Red List of Threatened Species and also as UK Biodiversity Action Plan (UKBAP) species. The basking shark is also a UKBAP species.

Fish and Shellfish: Key Issues

- **Key potential effects on fish and shellfish include:**
  - Smothering from seabed disturbance during installation of devices and cables
  - Noise during installation (particularly piling) and from device operation
  - Risk of collision with devices
  - Accidental contamination from device failures and collisions
  - Habitat exclusion, due to presence of devices
  - Substratum loss, caused by attaching devices to the seabed
- Shellfish and benthic spawners (herring and sandeel) are highly sensitive to smothering, accidental contamination, and substratum loss
- Cod and herring are sensitive to underwater noise pulses; it has been suggested that they can detect loud noise at distances of up to tens of kilometres
- All fish are at risk of collision with underwater devices; larger species, e.g. basking sharks, are at greatest risk
- All fish and shellfish are sensitive to habitat exclusion; the significance of the effect depends on the position of a device within the water column.
- **Key distribution of fish and shellfish:**
  - Main distribution of herring and sandeel spawning areas are in the waters around Shetland and Orkney, Western Isles (herring), and Minches (sandeel)
  - Shellfish species (*Nephrops*, king and queen scallops, crab, mussels, lobster) are distributed throughout study area
  - Herring is distributed in coastal waters (0-20m depth)
  - Cod, haddock, sprat, saithe and basking shark are distributed through study area
- **Key measures to prevent adverse effects include:** avoidance of sensitive areas (e.g. spawning grounds and migration routes); avoidance of sensitive seasons (e.g. spawning during installation); device design, and project-specific studies for mitigation.

4: LEVEL 1 ASSESSMENT – HUMAN ENVIRONMENT

COMMERCIAL FISHERIES

This section considers the effects of wave and tidal devices on commercial fishing and mariculture (fin fish and shellfish). The main commercial fishing grounds include: *Nephrops* (Norway lobster); crab; common lobster; scallops (king and queen); whelks; mackerel; herring; saithe; whiting; haddock; cod and monkfish. The main shellfish farms include: common mussel; Pacific oyster; native oyster; and scallops (king and queen). Fin fish farms include Atlantic salmon with some cod and halibut.

Commercial Fishing and Mariculture: Key Issues

- **Key potential effects on commercial fishing and mariculture include:**
  - Direct disturbance of fishing grounds during installation of devices attached to the seabed and during cable trenching
  - Temporary and long-term displacement from traditional fishing grounds
  - Smothering from seabed disturbance during device installation and cable trenching
  - Accidental contamination from device failures and vessel collisions
  - Substratum loss, caused by the attachment of devices to the seabed
- Commercial shellfish grounds are sensitive to direct disturbance during device installation
- Commercial fishing grounds in spatially-constrained inshore areas are sensitive to displacement (temporary and long-term)
- Shellfish farms are sensitive to smothering, accidental contamination, and substratum loss
- Commercial fisheries using fine fishing gear (e.g. gill nets) are sensitive to debris on the seabed produced during cable trenching and device installation
- Bottom trawl and dredge fisheries are sensitive to the presence of cables as they may constrain the available fishing area
- **Key distribution of commercial fisheries and mariculture:**
  - Commercial shellfish grounds are located around the Outer Isles, Northern Isles, Western Isles Inner Isles, and Argyll and Bute.
  - Important inshore fisheries occur in coastal areas throughout the study area.
  - Shellfish farms are focussed in the Northern Isles, Western Isles, Inner Isles, and Argyll and Bute
- **Key measures to prevent adverse effects include:** identification of key commercial fishing grounds through consultation with the fishing industry and siting to reduce effects on these areas; avoid installation during key fishing seasons; and minimise disturbance during installation.

SHIPPING AND NAVIGATION

This part of the SEA considers the effects of wave and tidal devices on shipping and navigation. The waters around Scotland are used extensively by a range of vessels including tankers; fishing, passenger and dry cargo vessels; and 'other' vessels. Some parts of the study area are recognised sea lanes for international navigation. These include the Pentland Firth, North Channel, Fair Isle, Hebrides deep water route, and the Minches (outside the main wave and tidal resource area).

Shipping and Navigation: Key Issues

- **Key potential effects on shipping and navigation include:**
  - Displaced/increased shipping density
  - Reductions in the safety of navigation
  - Risk of collision with installation vessels and equipment and operational devices
- Shipping areas with high vessel densities and spatially constrained areas, e.g. entrances to ports and harbours, inter-island channels, firths and sounds, are highly sensitive to displaced/increased vessel densities, reduced visibility and collision risk
- Areas where there is a particular dependence on visual navigational aids are sensitive to reduced visibility and collision risk
- Island ports and harbours are highly sensitive to reductions in access as these are often the main lines of communication for local people
- **Key distribution of high vessel density routes and spatially constrained areas:**
  - Key areas of high vessel densities are: Fair Isle; Pentland Firth; North Coast and Cape Wrath; Minches (outside main wave and tidal resource area); Hebrides deep water route; Firth of Clyde; and the North Channel
  - The main spatially constrained areas include: Pentland Firth; Minches; Firth of Clyde and North Channel; and small inter-island channels used by ferries, fishing and supply vessels.
- **Key measures to prevent adverse effects include:** siting devices away from spatially constrained areas and areas with high vessel densities; siting devices in open water; making use of industry guidance on assessment of effects and use of aids to navigation; use of 'Notices to Mariners'; and adhering to appropriate safety regulations. Consideration of device types that are fully submerged and allow shipping to pass over the top of them could reduce effects, but guidance would need to be sought on a case-by-case basis on the level of clearance required.

4: LEVEL 1 ASSESSMENT – HUMAN ENVIRONMENT

SEASCAPE

This section of the SEA considers the effects that wave and tidal devices could have on the seascape resource of the study area. Seascape can be defined as *'the coastal landscape and adjoining areas of open water, including views from land to sea, from sea to land and along the coastline'.*

Seascape: Key Issues

- **Device characteristics** that affect seascape are those which have parts that are on or above the surface of the sea. For the SEA the following were considered :
  - 'Linear' devices, i.e. long devices which are only a few meters above the surface
  - 'Point' structures, i.e. structures which protrude over 10m above the surface
  - Submerged devices
  - Fixed coastal structures

- **Seascape Types**: 10 different seascape types were identified. Some of these are more sensitive to development than others, e.g. sounds and narrows are more sensitive than high cliffs, and low coastal sands and flats are the least sensitive. These sensitivities influence how significant the effects of devices will be.

- **Key potential effects on seascape include:**
  - For linear structures, with devices at 0-5km from the coastline, moderate to major effects may occur for all seascape types. The further from the coast, the less the effect becomes, and beyond 10km the effects are typically minor.
  - For point structures, 8 out of the 10 seascape types are of high sensitivity to these types of device, with potential major or moderate effects occurring at 0-10km from coastline. Moderate effects may also occur at distances over 10km.
  - Submerged structures are likely to have negligible effects on seascape (although marker buoys and lighting may be required)
  - Fixed coastal structures may have moderate effects depending on their design and location.

- **Key measures to prevent adverse effects include:** maximising the distance of devices from shore; reducing the height of devices above the surface; reducing the area of sea occupied by the devices; and modifying the position and layout of devices to suit characteristics of the local seascape.

RECREATION AND TOURISM

This part of the SEA considers the effects that wave and tidal devices could have on recreation and tourism activities. For the purpose of this assessment a distinction has been made between *direct* physical effects (e.g. exclusion from an area used for sailing) and *indirect* effects (e.g. how changes to seascape character may subsequently affect the popularity of tourism and recreation activities, such as walking and sight-seeing). At this strategic level there are uncertainties associated with the latter issue as it deals with human responses to changes in environmental character.

Recreation and Tourism: Key Issues

- **Key potential effects on recreation and tourism include:**
  - Disturbance to wildlife during installation and operation of devices – this could have a knock-on effect on wildlife watching (e.g. birds and seals)
  - Safety and collision risk; there is a risk that recreational sailors could collide with installation vessels and equipment, and with operating devices.
  - Access restrictions – the presence of devices in the water may restrict or reduce access to key recreational sailing areas or other water sports

- Wildlife watching occurs throughout Scotland. Some of the key areas for wildlife watching include: Shetland and Orkney; Outer Isles; Western Isles; and Inner Isles.
- There are a number of RYA (Royal Yachting Association) General Sailing Areas throughout the study area. These include: seas around Shetland and Orkney (except the exposed southeast coast); west coast of Mainland Scotland (including Inner Sound and Sound of Sleat); most of the sounds, lochs and firths off Argyll and Bute; Mull of Galloway; and Solway Firth.
- The main cruising routes that have been identified as having medium to heavy use include: Pentland Firth; North Coast; St Kilda and the Western Isles (south coast); Inner Isles; North Channel (route to Ireland); and Solway Firth
- The localised nature of other watersport activities and diving means that the likelihood of these recreational sectors suffering disturbance from marine devices is low

- **Key measures to prevent adverse effects include:** see sections on shipping and navigation, marine mammals and marine birds for measures to prevent significant adverse effects on each of these topic areas.

4: LEVEL 1 ASSESSMENT – HUMAN ENVIRONMENT

MARINE AND COASTAL HISTORIC ENVIRONMENT

The SEA study area contains a number of marine and coastal features and sites of historic importance. Submarine archaeological remains and historic wreck sites (boats and aircraft) are protected under International conventions and UK legislation, e.g. Protection of Wrecks Act 1973.

There are two World Heritage Sites in the study area: St Kilda and the Heart of Neolithic Orkney. Both are designated for their natural and cultural heritage value. The Ancient Monuments & Archaeological Areas Act 1979 protects the terrestrial historic environment through the scheduling of nationally important 'monuments'. There are 647 Scheduled Monuments located within 1km of the coast of the study area. There are also numerous local and regionally important remains recorded on the National Monuments Record of Scotland (NMRS) and listed buildings.

Marine and Coastal Historic Environment: Key Issues

- **Key potential effects on marine and coastal historic environment include:**
  - Direct disturbance, damage, or destruction of submarine archaeological remains and wrecks during device installation and cable trenching
  - Direct disturbance, damage or destruction of coastal archaeological remains during cable trenching (effects of grid connections are considered separately below)
- World Heritage Sites are highly sensitive to any levels of disturbance, damage or destruction
- Prehistoric submarine archaeological remains are highly sensitive to damage and destruction
- Wreck sites are highly sensitive to damage or destruction
- Scheduled monuments are highly sensitive to damage or destruction
- Remains where there are no other examples are highly sensitive to damage or destruction
- **Key distribution of marine and coastal historic remains:**
  - Prehistoric submarine archaeological remains in seas around the Northern Isles, Western Isles and St Kilda, North West Scotland and North Channel
  - Key wreck areas: Out Skerries (Shetland), Scarpa Flow (Orkney), Sound of Mull, and Firth of Clyde (Argyll and Bute)
  - Coastal remains: Shetland and Orkney, Western Isles (important for prehistoric remains), and Rhum and Skye (Inner Isles)
- **Key measures to prevent adverse effects include:** avoid sites of interest and exclusion zones for protected sites; follow Crown Estates 2007 JNAPC Code of Practice for seabed developers; carry out seabed surveys and walkover surveys prior to installation.

ONSHORE GRID CONNECTION

This part of this SEA identifies the potential environmental effects of connecting wave and tidal devices to the national electricity grid; specifically, the effects of onshore substations and transmission lines (cables and overhead lines). The primary aim of this SEA is to assess the effects of wave and tidal technologies in marine and coastal environments but it is recognised that any wave or tidal device will require additional onshore infrastructure.

Onshore Grid Connection: Key Issues

- **Key components of the grid connection:** The assessment of potential effects was based upon the following key components of a grid connection:
  - Substation – required for switching between marine cables and land cables or overhead lines. These will tend to be located in coastal locations
  - Land cables – these may be used to link the substation to the existing grid network
  - Overhead transmission lines – these may be used to link the substation to the existing grid network. Types of overhead line that may be used include:
    - 11kV or 33kV lines – supported on wooden poles
    - 132kV lines – supported on wooden 'trident' poles or metal lattice towers
    - 275kV or 400kV lines – supported on metal lattice towers
- **Key potential effects associated with grid connections:**
  - Landscape and visual intrusion from substations and overhead lines
  - Habitat and species loss/disturbance during installation of cables and overhead lines and substation construction
  - Disturbance, damage or loss of archaeological remains and sites during installation of cables and overhead lines and substation construction
- **Sensitive environmental features include:**
  - Designated landscapes e.g. National Parks, National Scenic Areas (NSAs)
  - Key viewpoints
  - Local residents
  - Protected sites, habitats and species, e.g. SPAs, SACs and SSSIs
  - Scheduled Monuments, Listed Buildings and NMR sites
- **Key measures to prevent adverse effects include:** carry out detailed routeing studies at project level in accordance with 'Holford Rules' best practice guidance on routeing overhead transmission lines; avoid sensitive sites and areas; provide screening (substations).

4: LEVEL 1 ASSESSMENT – SUMMARY

OTHER ENVIRONMENTAL CONSIDERATIONS

Protected sites and species: key issues

- The effects of wave and tidal devices on protected sites, e.g. Natura sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and SSSIs, are discussed in detail in Chapters C6: Benthic Ecology, C8: Marine Birds; C9: Marine Mammals of the Environmental Report
- The effects of wave and tidal devices on protected species (Annex II Habitats Directive) are discussed in Chapters C6: Benthic Ecology, C8: Marine Birds; C9: Marine Mammals

Geology and energy extraction: key issues

- Key potential effects on geology include:
  - Disturbance or damage to coastal Geological SSSIs and Geological Conservation Review sites (GCRs)
  - Changes in coastal processes due to energy extraction

Seabed contamination and water quality (including disposal areas): key issues

- Key potential effects on water quality include:
  - Disturbance of contaminated sediments during device installation, e.g. disposal sites (silt, sand, rock and gravel sites, fish wastes and sludge); munitions dumps, and weapons ranges

Cables and pipelines: key issues

- Key potential effects on cables and pipeline include:
  - Damage to cables and pipeline during installation
  - Restricted access to cables and pipelines for maintenance works

Military exercise areas: key issues

- Key issues associated with military exercise areas include:
  - Restricted access to certain parts of the study area that are under byelaw review or danger areas, e.g. Cape Wrath, South Uist Ranges and BUTEC ranges

Electric and Magnetic Fields (EMF): key Issues

- Key issues associated with EMF include:
  - Interference with prey location and mate detection by marine species
  - Barriers to migration for EMF-sensitive species

SUMMARY OF PROJECT-LEVEL EFFECTS

The project-level assessment identified the following:

- Potential environmental effects that may occur without mitigation
- Residual environmental effects that may occur after mitigation
- Unknown environmental effects - due to baseline data gaps and knowledge gaps (e.g. interactions between devices and certain aspects of the environment)

Potential Effects:

- All effects discussed previously are potential effects of 'moderate' or 'major' significance
- Most effects could be reduced to 'minor' or 'negligible' significance with implementation of appropriate mitigation. The exceptions are discussed below under Residual Effects

Residual Effects:

- **Key residual effects:**
  - Benthic ecology – effects due to changes in tidal currents and wave regime
  - Commercial fisheries – long-term displacement from fishing grounds
  - Seascape – effects on seascape due to presence of devices on the water and above water surface
  - Shipping and navigation – displaced/increased shipping density, reductions in the safety of navigation
  - Marine noise – effects on marine birds and marine mammals
- All residual effects identified above are of moderate significance
- Most residual effects identified can be further minimised through careful site selection. However, it may not be possible to avoid them completely.

Unknown Effects:

- **Key unknown effects:**
  - Marine birds – habitat exclusion and species displacement due to data gaps in marine bird foraging and loafing habitats
  - Marine birds, fish and mammals – collision risk; there are gaps in understanding about how mobile species interact with marine devices
- **Further surveying, monitoring and research studies** are likely to be required prior to, or as part of, marine energy developments to increase understanding of how devices interact with the environment and key receptors to 'unknown' effects

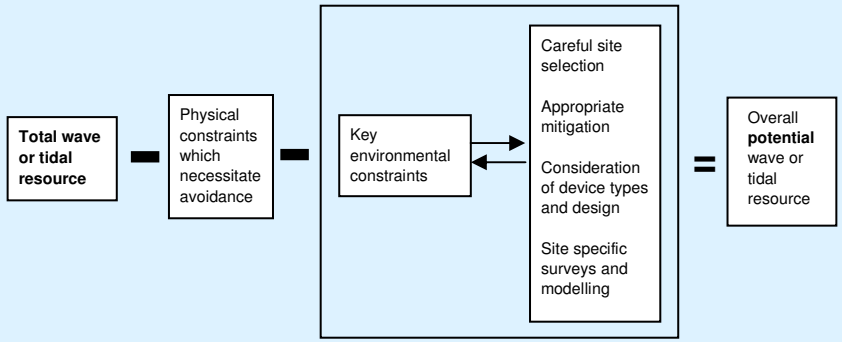
5: 'LEVEL 2' ENERGY RESOURCE ASSESSMENT AND CUMULATIVE EFFECTS

APPROACH

The aim of the resource assessment was to identify how much of the wave and tidal energy resource in the SEA study area could be exploited taking into account the potential environmental effects discussed previously.

The following approach has been used to assess the potential wave and tidal energy resource in the SEA study area:

Figure D: Overview of Approach to Energy Resource Assessment



The approach illustrated above comprises three key stages:

- Identification of available tidal and wave resource. This included
  - Review of DTI resource atlas[3], and Carbon Trust[4] [5]studies
  - Development size assumptions – megawatts and array footprint
- Review of physical constraints – an existing development or feature that would preclude development/necessitate avoidance
- Consideration of other environmental issues identified from the 'Level 1' Assessment

[3] ABPmer, The Met Office, Garrard Hassan and Proudman Oceanographic Laboratory (2004). Atlas of UK Marine Renewable Energy Resources: Technical report. A report to the Department of Trade and Industry.
[4] Black & Veatch (2005) Phase II UK Tidal Stream Energy Resource Assessment. A report to the Carbon Trust's Marine Energy Challenge.
[5] Environmental Change Institute (2005), Variability of UK Marine Resources. Report commissioned by The Carbon Trust

METHOD

The method used to calculate the overall potential achievable wave and energy resource in the SEA study area involved the systematic reduction in the total potential wave and tidal resource areas through the consideration of key constraints and environmental considerations. This process of filtering comprises two stages, as summarised below:

The starting point to the filtering process is the assumption that device arrays can be located in all potential areas of wave and tidal resource.

Primary Filter of Resource Areas:

This stage involves the removal of areas from the total potential wave and tidal resource where physical constraints area present. These include:

- Shellfish and fin fish farms; protected wrecks and other wrecks; cables and pipelines; munitions contamination sites; MoD firing ranges and danger ranges; MoD byelaw areas; disposal sites; and key areas for shipping

Secondary Filter of Resource Areas:

The recalculated energy resource identified during the primary filter was then filtered further to give the 'potentially achievable generating capacity taking into account major, moderate and unknown effects (MW)'. This was achieved by removing areas where there are key environmental constraints or reducing the potential resource area in constrained locations. Key issues include:

- Protected sites (SACs, SPAs, SSSIs)
- Areas close to protected sites designated for mobile species that could be significantly affected by devices e.g. breeding bird and seal colonies
- Areas in highly constrained waters e.g. channels with high vessel densities
- Reduced potential capacity in areas where a number of arrays could form a barrier
- Reduced potential capacity in areas where significant cumulative effects may occur

The filtering applied during the second stage was based on a series of specific assumptions. These are summarised below:

- Sites for the development of wave and tidal device arrays would be carefully selected to avoid any of the key environmental effects identified in the Level 1 Assessment
- Where key effects cannot be avoided it is assumed that appropriate mitigation would be applied, project-specific surveys and studies would be carried out where necessary, and different device types and characteristics would be considered to reduce potential effects
- Mechanisms for the implementation and regulation of mitigation measures would be set out in the Scottish Executive's strategy for the development of marine energy

5: 'LEVEL 2' ENERGY RESOURCE ASSESSMENT AND CUMULATIVE EFFECTS

RESULTS

Table 1: Estimated Marine Renewable Energy Capacity Taking Into Account Environmental Effects

Area	Potentially achievable generating capacity taking into account *physical constraints* for a range of devices (MW)				Potentially achievable generating capacity taking into account *environmental effects* for a range of devices (MW)			
	Wave		Tidal		Wave		Tidal	
	Low	High	Low	High	Low	High	Low	High
Northern Isles - Shetland								
Northern Isles - Orkney								
Pentland Firth								
North Coast*								
Outer Isles								
Inner Isles								
Western Isles								
Argyll and Bute								
North Channel								
Estimated Range	**650 to 2,200**		**650 to 1,100**		**525 to 1,800**		**475 to 800**	

*Resource potential in the North Coast is restricted by a number of factors including MoD activities and navigation channels.

No Resource Identified
< 75 MW
75 – 200 MW
200 – 400 MW
> 400 MW

The table indicates that between 1,000MW (525 + 475) and 2,600MW (1,800 + 800) of marine renewable energy **generating capacity** could potentially be achieved within the SEA study area taking into account environmental effects and depending on the types of technology (including array density) deployed. Annual **energy output** will depend on the device array's average 'load factor'.

However, it should be noted that a large proportion of this capacity is located in the Outer Isles, which are remote from the mainland and would require longer cable routes to shore (as would developments in the Northern Isles and Western Isles). Additionally, the estimated generating capacity has been based on baseline information appropriate to an SEA; project-specific resource assessments, surveys and environmental impact assessment would be expected to refine these estimates.

CUMULATIVE EFFECTS

The assessment of cumulative effects was based on information from the Level 1 Assessment and results of the energy resource assessment.

Due to the strategic nature of this SEA, the assessment of cumulative effects has been based on a number of 'scenarios' associated with the future development of the wave and tidal stream industry. These are summarised as:

- Clustering of a number of device arrays in a specific location
- A number of device arrays all being installed at the same time
- Continuous installation of device arrays over a period of time
- A combination of the above scenarios

Key results from cumulative assessment:

- The clustering of arrays could potentially have moderate to major significant effect on the marine environment, even if the effects of a single array in the same location are negligible or minor. The main potential causes of cumulative effects associated with the clustering of arrays are those identified in the Level 1 Assessment (see Section 4 above)
- The most significant effects associated with the installation of a number of devices at the same time include physical disturbance and marine noise. The effects of marine noise from piling activities could potentially be of major significance if developments are located in constrained areas as this could lead to the creation of barriers to the movement of marine mammals (migratory movements and usual transits)

6: ISSUES FOR THE FUTURE DEVELOPMENT OF WAVE AND TIDAL POWER

The primary question which has been addressed in this SEA is ***can wave and tidal stream energy contribute towards helping the Scottish Executive achieve its target for producing 40% of its electricity from renewable sources by 2020 without significant effects on the environment, and if so, how can this best be achieved?*** In answering this question the SEA identifies a number of issues on how to promote wave and tidal power in a manner which minimises environmental effects.

PROJECT-LEVEL ISSUES

The results of the SEA show that it may be possible to meet MEG's estimate of 1,300MW of marine renewable energy generating capacity around Scotland with, **generally**, minor effects on the environment, although there are notable gaps in our knowledge. There are important exceptions to this general conclusion (as summarised in Section 4 – Summary of Project-level Effects). Furthermore, the likelihood of the more significant effects is very dependent on the particular characteristics of the projects being developed (including the effective use of mitigation measures), in combination with the locations where they are being deployed.

A key issue for the future development of marine renewable energy is, therefore, how to promote individual projects while minimising their environmental effects. Based on the results of this SEA, the key issues for consideration are as follows:

Site location – the choice of site is likely to be the most important factor in determining the environmental effects of a project. It was not the purpose of this SEA to identify specific locations where development would be preferable. However, the study does assist in the site selection process in a number of ways, including:

- Identifying areas which should be avoided.
- Describing the key environmental issues which need to be considered in certain locations, and the potential environmental effects which may result from a development.
- Describing measures that should be considered to mitigate the potential effects that have been identified in this SEA.

Site-specific surveys and studies – whether or not the effects described in this SEA will occur will depend on the environment in which development is proposed and the characteristics of the device to be deployed. There are a number of limitations with the baseline environmental information available for the SEA and developers will still need to undertake project-specific surveys and studies to accurately determine the environmental characteristics of their proposed site. (See Section E of the Environmental Report for details on surveys)

Device characteristics – the SEA identifies those characteristics of devices which are likely to have the greatest environmental effects. These effects should be taken into account when considering device types and designs. In some instances, it may be possible to alter the characteristics of a device, or to select a particular type of device, to avoid or reduce effects.

The need for the monitoring of projects - the uncertainties associated with some of the environmental effects are set out in the Environmental Report and summarised above. Monitoring of new projects will be necessary to provide better evidence on the effects of devices, and is generally required as part of the consenting process to determine whether the actual environmental effects are in line with those predicted in the project EIA. Furthermore, reducing uncertainties will have an important influence in the future promotion of wave and tidal power. (See Section E of the Environmental Report for more information on monitoring).

Mitigation measures – it is important to note that, although mitigation measures have been taken into account in the assessment of the environmental effects, there are no guarantees that these measures will be implemented at the project level. However, the results of the SEA do give an indication of what could be achieved if appropriate mitigation is used.

Obtaining consents - the SEA does not specifically address the process of gaining consent for individual projects but it does identify important environmental issues which are likely to influence the success of an application. Environmental Impact Assessments (EIA) will be required for all marine energy developments that are greater than 1MW (threshold imposed under Section 36 of the Electricity Act). There may also be a need for Appropriate Assessment depending on whether a device is likely to have a significant effect on the conservation objectives of a Natura site (SPA or SAC).

6: ISSUES FOR THE FUTURE DEVELOPMENT OF WAVE AND TIDAL POWER

BROADER ISSUES

Cumulative effects – there is a likelihood that two or more projects may be located in an area, potentially resulting in cumulative effects. This is most likely to occur for tidal power where the energy resource is found in particular hotspots. This further highlights the need for site-specific surveys and further monitoring to better understand the significance of effects on the environment. The clustering of projects around a single location may also occur as a result of the need to connect to the national electricity grid. The potential cumulative effects are summarised in Section 5.

Connecting to the National Grid – As **Table 1** above highlights, much of the available wave and tidal energy is located in the remote northern and western isles. The report *Harnessing Scotland's Marine Energy Potential* (MEG, 2004) identified the capacity of the Scottish electricity grid as a significant constraint to the future development of marine renewables. In fact, the current transmission capacity of the electricity grid in Scotland acts as a significant constraint upon the development of all forms of renewables. In the absence of investment in, and building of, new capacity, the development of marine renewables may not progress significantly beyond the demonstration stage.

Although grid capacity and connections are reserved, the Scottish Executive is fully involved in discussions between stakeholders from the renewables sector and other relevant players, such as the grid owners and operators, industry regulator Ofgem, and the Department for Trade and Industry (DTI). These discussions are ongoing.

The potential environmental effects associated with connecting marine devices into the onshore network are considered by the SEA (see Section 4 above). In addition, there is the potential for developments to cluster around locations where grid connections are available and this could lead to cumulative effects.

Due to limitations in understanding of, how, when and where grid capacity will be increased it has not been possible as part of this SEA to assess the environmental effects associated with upgrading the existing grid network.

7: NEXT STEPS

CONSULTATION

The Scottish Executive and their consultants will be undertaking wide ranging consultation to gain the views of all stakeholders on the results of the SEA. Consultation events will provide forums for all interested parties and individuals to express their views on how the development of planning guidance for marine energy development should be progressed. Consultation will focus on the following topics:

Focus of the Consultation:

- The results of the Environmental Report
- How best to avoid, reduce or offset environmental effects
- Issues associated with identifying sites to locate projects
- Dealing with data and knowledge gaps
- The monitoring of the environmental effects to inform both project development and the strategy for marine energy
- The need for licensing rounds for wave and tidal stream energy projects

The consultation period for the SEA is 12 weeks. During this time the following activities are proposed:

- A public exhibition to be taken to selected locations in the study area: Orkney, Shetland, Western Isles, Argyll and Bute, and Dumfries. This would be combined with targeted meetings with council officers and other stakeholders in these areas.
- A developer, agency and stakeholder workshop.
- The continued involvement of the Steering Group.

Table 2 lists future milestones for the next stages of the SEA, with corresponding dates.

Table 2: Forthcoming SEA Milestones

Expected Date	Milestone
30 March 2007	Publication of the Environmental Report. Consultation commences
Late April/ Early May 2007	Road show of public exhibitions takes place
May 2007	Workshop(s) with stakeholders to discuss the outputs of the SEA
20 June 2007	Final date for receiving comments on Environmental Report
Late Summer 2007	Publication of Post-Adoption SEA Statement, which will: Highlight how the SEA and consultation responses have influenced the development of the Strategy State the framework for monitoring the environmental effects of the Strategy to (a) identify any unforeseen adverse effects at an early stage; and (b) undertake appropriate remedial action

FURTHER INFORMATION

Further information on the SEA can be found at:

- www.seaenergyscotland.co.uk
- www.scotland.gov.uk/enterprise/energy

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