Developing new policies for new technologies ~ tidal energy - UK

1. Policy Objective & Theme

- ADAPTATION TO RISK: Integrating coherent strategies covering the risk-dimension (prevention to response) into planning and investment
- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space
- SUSTAINABLE USE OF RESOURCES: Sound use of resources and promotion of less resource intensive processes/products
- SUSTAINABLE ECONOMIC GROWTH: Balancing economic, social, cultural development whilst enhancing environment

2. Key Approaches

- Integration
- Participation
- Ecosystems based approach
- Technical

3. Experiences that can be exchanged

Policy development in the UK to meet the challenge of the new technology of tidal stream energy generation which is likely to come into conflict with other users of the marine environment.

4. Overview of the case

The UK has an excellent tidal stream resource that is presently untapped. Tidal stream devices can only be installed offshore and this poses a number of policy challenges which are being met in an adaptive manner.

5. Context and Objectives

a) Context

A large number of tidal stream devices are in development. There is a considerable degree of optimism regarding the long-term outlook for these technologies and their ability to make a substantial contribution to combating climate change and improving future energy security. Tidal stream technologies work by extracting some of the kinetic energy from fast-flowing tidal currents and converting it into electricity. They are designed to extract the maximum possible amount of energy whilst still allowing the sea to flow in a normal way. Tidal stream devices are in general modular, stand-alone devices that would usually be installed in large arrays to maximise the potential electricity output. They are, therefore, similar in terms of deployment to on-shore wind turbines.

b) Objectives

To develop a policy process that will allow the development of the marine tidal stream energy sector without hindrance, in order to meet long-term energy targets, whilst avoiding conflict with other marine users and adverse impact on the environment itself.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

The Department of Energy and Climate Change works closely with the energy group of the Department of Business, Innovation and Skills and the Crown Estate which is owner of the seabed. The government has several advisory bodies. The Renewables Advisory Board is a non-departmental, public body to give independent, impartial and authoritative advice on policy programmes and measures. The Sustainable Development Commission is an executive, non-departmental, independent body operating since 2000 to produce evidence-based reports on a range of policy issues including climate change. The Carbon Trust works with business and the public sector to cut carbon emissions and capture the commercial potential of low carbon technologies to help the UK meet its climate change obligations.

b) ICZM tools

Planning and consenting regimes are in place across the UK for pre-commercial marine developments. Frameworks for commercial scale development are not yet in place. The planning and consenting regime is complex, with projects falling under a number of different regimes. Consent is required under the Electricity Act 1989 for any installation in territorial waters with a rated capacity exceeding 1MW. Consents may also be required under the Coast Protection Act 1949, Food and Environmental Protection Act 1985, and the Town and Country Planning Act 1990. However, the Marine and Coastal Access Bill, currently going through Parliament, will simplify projects of 100MW or less in output, with only one application process to consider all aspects of a proposal. Many aspects of the Marine Bill only cover English waters, with devolved administrations responsible for their own offshore territories. New marine planning rules will stretch to England and Wales, with most of the reforms to marine licensing also taking in Northern Ireland. The UK Government position is that a Strategic Environmental Assessment (SEA) will be conducted on the tidal stream resource once the industry reaches an appropriate stage of commercial development. This would probably occur in conjunction with a leasing competition for development rights to the seabed owned by the Crown Estate. Scottish Ministers have devolved responsibility for consenting requirements for tidal stream development and carried out an SEA in 2006-7 to determine if 1,300 MW of wave and tidal energy capacity could be installed around Scotland by 2020.

The provisions of the European Directives on Environmental Impact Assessment, Birds, and Habitats, and the Water Framework Directive, as implemented in UK legislation, will also be relevant to the assessment and consenting of off-shore, tidal stream developments across the UK. Where development is being considered in a designated site, additional regulatory requirements will apply. In particular, a high level of information on environmental effects is required to demonstrate that protected features will not be adversely affected. Before deploying tidal devices, developers must obtain a site lease or licence from the Crown Estate, which has a business plan under which it will consider applications for demonstration-scale tidal projects. A further legal requirement will be the satisfactory decommissioning of tidal devices at the end of their consent period or operational lifetime. The advisory, statutory conservation agencies are already actively considering the potential implications of tidal stream development for the marine environment, and are inputting into the evolving regulatory framework to ensure that any negative effects are identified, and avoided or mitigated.

The construction of tidal energy schemes will require some environmental baseline assessment (and subsequent monitoring) as part of an Environmental Impact Assessment which will also indicate mitigation measures to reduce environmental effects. The scale of each installation (the number and size of the devices installed) and the total number of installations around the coastline will be the key determinants of overall environmental impact. Accordingly, given the relative immaturity of the industry, and the small number of devices being installed, the risk of any significant impacts is at present very low. This is an important point for decision-makers to be aware of as consents are sought for new devices at the testing stage. However, taking a long-term view of the industry also requires that the potential impacts of large-scale deployment in the future are considered now and taken into account in evolving the regulatory framework and in the ongoing development of device designs. This is also a risk issue. As the industry develops and more devices are deployed, the risk and significance of any adverse effects will increase.

7. Cost and resources

A £50m Marine Renewables Deployment Fund was set up by the government in 2004. The demonstration scheme accounts

for £42m of the fund and allows for the provision of capital grants and revenue support to technologies that are entering early commercial deployment. . However, as of June 2009, no money has yet been allocated. Following the release of the 2009 Renewable Strategy, the Government will launch a Marine Renewables Proving Fund (MRPF) providing up to £22 million of grant funding for the testing and demonstration of pre-commercial wave and tidal stream devices. In addition, the UK Government has proposed to invest up to £60 million in UK marine energy infrastructure and technology, including wave and tidal energy testing centres.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

Initial tidal stream farms could generate electricity in their early stages of development at between 9-18p/kWh which could fall to 5-7p/kWh with the installation of 1-1.5GW capacity. These figures would bring tidal stream output close to, or within, the likely base price of electricity. Despite the number of bodies involved there is good coordination between them.

9. Success and Fail factors

The success of earlier Government policies using seed funding in the 1990s is shown by the development of a large number of tidal stream prototypes. The establishment of the European Marine Energy Centre in Orkney is an impressive example of using public funds to create a generic resource to support and stimulate private sector investment. The transference of skills from the offshore oil and gas and wind sector is important as is the participation of marine users in stakeholder workshops to discuss the issue.

10. Unforeseen outcomes

As the industry develops, the framework for strategic planning must be robust, adaptive to change and take a long-term view. By their nature, tidal stream devices are designed to extract energy from the water and their presence may affect the physical, chemical and ecological features of the marine environment. An SEA can integrate interests in marine conservation and potential conflicts of use with fishing, shipping, and recreational activities while pro-actively influencing and supporting appropriate site selection. New, statutory marine spatial planning legislation may also be required. However, there is an export potential in a relatively undeveloped market as an estimated 1-2.5GW of tidal stream capacity can be generated around Europe by 2020.

11. Prepared by

A. H. Pickaver, Coastal & Marine Union (EUCC), The Netherlands

12. Verified by

James Greenleaf, Sustainable Development Commission.

13. Sources

- Future Marine Energy. Results of the Marine Energy Challenge. (2006). Carbon Trust
- Turning the Tide: Tidal Power in the UK (2007) Sustainable Development Commission.
- www.berr.gov.uk
- www.carbontrust.co.uk
- www.renewables-advisory-board.org.ukk
- www.sd-commission.org.uk

Future Marine Energy (1.17 MB)

Turning the Tide (6.46 MB)