



MARINE RENEWABLES

*Wave and Tidal-stream
Energy Demonstration
Scheme*

MAY 2005



The DTI drives our ambition of 'prosperity for all' by working to create the best environment for business success in the UK. We help people and companies become more productive by promoting enterprise, innovation and creativity.

We champion UK business at home and abroad. We invest heavily in world-class science and technology. We protect the rights of working people and consumers. And we stand up for fair and open markets in the UK, Europe and the world.

Wave and Tidal-Stream Energy Demonstration Scheme

1 INTRODUCTION

1.1 Device concepts

Over the past five years the DTI's New and Renewable Energy R&D Programme (now the Technology Programme) has supported the development of a number of wave and tidal-stream energy technologies. Several others are also being developed in the UK and overseas. Developers of some these devices have indicated that R&D is nearly complete and that they are, or soon will be, ready to begin pre-commercial operation to gain more experience through accelerated trials of small numbers of arrays of devices to discover whether feasible cost effective solutions can be developed.

1.2 Emission reduction potential

Wave and tidal-stream energy represents a significant as-yet untapped source of renewable energy in the UK and several estimates have been made of the size of the resource. In common with all forms of renewable energy, every kWh of electricity generated from wave or tidal-stream will save approximately 0.44 kg of CO₂¹ by displacing electricity generated from fossil fuels. Successful exploitation of this resource would result in a reduction of several tens of Mte of CO₂ per year.

1.3 The next stage

The developers' predicted electricity generation costs of these technologies are still much higher than those of many other renewable energy technologies, let alone conventional energy. This means that they cannot operate profitably under current market conditions. However, it is expected that experience gained during the early years of pre-commercial operation will enable developers to reduce electricity generation costs by:

- reducing the capital cost of the devices themselves
- increasing power capture efficiency
- improving reliability

¹ Based on 446 g(CO₂)/kWh lifecycle emissions for Combined Cycle Gas Turbines compared with an assumed 6 g(CO₂)/kWh lifecycle emissions for wave & tidal.

It has been argued that these improvements are more likely to be achieved as a result of learning by doing during the early stages of pre-commercial manufacturing and operation than by carrying out further R&D. Analogy with the development of onshore wind suggests that generation costs sufficiently low to enable commercially viable operation under some future support mechanism might be achieved if the technology develops in a similar way.

1.4 Funding gap

Although these technologies hold out the prospect of good commercial returns in the longer-term future, these returns are still too distant and too uncertain to attract significant private capital today. Also, there are currently no government support schemes that fund early stage pre-commercial demonstration projects in this area. Device developers have identified this situation as a "funding gap" that is holding up the commercialisation of the technologies.

1.5 Bridging the gap

The joint DTI / Carbon Trust Renewables Innovation Review, published in February 2004, identified the need for a support mechanism to fill this gap through accelerated, staged trials to discover whether feasible cost effective solutions can be developed. In August 2004 the Secretary of State for Trade and Industry announced the setting up of a Marine Renewables Deployment Fund that aims to support innovative and visionary businesses to take first class research and development (on wave and tidal-stream energy technologies) to market. The announcement also said that work on the precise mechanism for supporting development of wave and tidal stream is underway. This document sets out the results of that work, incorporating changes that have been made to the originally proposed scheme published in January 2005, in response to stakeholder comments on the scheme.

2 PRINCIPLES OF THE SCHEME

The scheme has been designed in accordance with the following principles:

1. To encourage the development of a sustainable UK wave and tidal-stream industry.
2. To maximise the likelihood of the successful development of cost effective marine technologies in the long-term.
3. The principal rewards to participants should be the enhanced credibility of the technology and the value in the businesses

developing the technology, not large financial returns from individual power generation projects at this stage. The scheme should therefore encourage private-sector investment in these businesses whilst ensuring that any financial returns from the operation of projects under the scheme reflect the value of the credibility, experience, business-value, know-how and intellectual property generated.

4. The scheme will reward success, but also assist with cash flow during the project construction.
5. Projects supported by the scheme should have a high probability of success.
6. Projects included in the scheme should use technologies that have completed their pre-competitive R&D.
7. The scheme will inform the wider community on the economics of the technologies supported under the scheme through monitoring and publication of results.
8. Decisions on technologies to be supported by the scheme should as far as reasonable be left to the market.
9. The benefits of the scheme should be shared amongst several technologies and companies, by supporting a number of different technologies.
10. The scheme should encourage, but not require, the sharing of grid connection costs amongst scheme participants and the use of existing and planned grid connections.
11. It is desirable that the scheme should maximise UK contribution to projects, thereby assisting with the development of the UK supply chain.

3 AIMS & OBJECTIVES

The overall aim of the scheme is to encourage the accumulation of manufacturing and operating experience necessary for the continued evolution of these technologies towards eventual commercial reality and its consequent large greenhouse gas emission reductions through displacing fossil fuel generation. This will be achieved by enabling the early-stage pre-commercial operation and trials of a number of wave and tidal-stream energy devices.

The detailed objectives are:

1. To construct and install a number of early grid-connected wave and tidal-stream power devices.
2. To operate these devices for an extended period.

3. To capture key data on the resource, costs (construction, installation, commissioning, operational and maintenance) and energy performance and revenue.
4. To produce in a clear, transparent and unambiguous report, an economic evaluation of all projects supported by the scheme, whilst maintaining the confidentiality of commercially sensitive information.
5. To undertake rigorous and thorough evaluations of the environmental advantages and disadvantages of the devices supported.
6. To stimulate the UK supply chain.

4 KEY FEATURES OF THE SCHEME

- 4.1 The scheme will support the deployment of multi-device wave or tidal-stream electricity generating facilities connected to the UK grid. It will do this through a combination of capital grants and revenue support.
- 4.2 The capital grant will be 25% of eligible costs as defined in Section 6.3. The maximum amount of capital grant from DTI available to any one "project"² will be limited to £5M. The grant will be payable in instalments on the achievement of specific project milestones such as the completion of device manufacturing, installation and "commissioning"³.
- 4.3 The revenue support payment will be £100/MWh and this will remain in place for a maximum of 7-years from commissioning. In addition to this, projects are entitled to receive the market value of the electricity and Renewable Obligation Certificates (ROCs) that they generate. The revenue support payment will not vary with the market price of electricity or ROCs, nor will it be index linked.
- 4.4 In order to ensure that the benefits of the scheme are available to a number of different technologies, the total funding received by any project under the scheme will be subject to a cap of £9M. On reaching the cap funding will cease even if the 7-year revenue support period has not expired.
- 4.5 Year 1 of the 7-year period will start when the project is declared by the "participant"⁴ to have been commissioned.
- 4.6 The costs of grid connection are eligible for inclusion in project costs. However, grid connection costs may be significantly reduced by projects co-locating to share costs, although it is not a requirement for projects to co-locate.
- 4.7 No separate funding will be given for the decommissioning of devices. The cost of decommissioning will be the responsibility of the project team in accordance with any requirements of consent and The Crown Estate. Decommissioning is not an eligible cost in the project.
- 4.8 The total amount of funding allocated under this scheme is up to £42M.

² See definition at Section 5

³ See definition at Section 5

⁴ See definition at Section 5

- 4.9 Individual projects in the scheme will be supported for a period of up to 2-years (from the acceptance of a grant offer) for commissioning and up to a maximum of 7- years for operation.
- 4.10 The scheme will receive applications at a number of set dates throughout each year and these dates will be notified on commencement of the scheme.
- 4.11 The scheme will be administered by a management contractor appointed by the DTI and overseen by a project board including senior DTI officials.

5 DEFINITIONS

The following terms will have the meaning ascribed to them below:

5.1 Wave energy

Wave energy is the extraction of useful energy from the motion of water in surface water waves on the sea.

5.2 Tidal-stream energy

Tidal-stream energy is the direct extraction of kinetic energy from the motion of water in naturally occurring tidal currents in the sea.

5.3 Participant

- 5.3.1 The DTI will enter into an agreement with a single company. The company with whom the DTI has this agreement will be referred to in the rest of this document as "the participant".
- 5.3.2 If the project is to be carried out by a consortium of companies then the consortium can choose to operate in one of two ways. It can either set up a collaboration agreement or a joint venture.
- 5.3.3 If it chooses to operate with a collaboration agreement then the consortium must nominate one member to be the "lead partner". This lead partner will be the participant.
- 5.3.4 If the consortium chooses to operate via a joint venture company then the joint venture company will be the participant

5.4 Device

The term "device" will be used to mean a single machine that converts wave or tidal-stream energy (as defined in Sections 5.1 and 5.2 above) into electricity.

5.5 Facility

The term "facility" will be used to mean a collection of more than one devices and any associated infrastructure located within a limited geographical area and supplying electricity to the grid via a single connection. Groups of devices distributed over more than one distinct unconnected geographical location will be regarded as distinct facilities.

5.6 Project

5.6.1 The term "project" will be used to mean, the work, costs, funding, payments, timeline and deliverables for the construction and operation of the facility or that part of the facility that is supported by the DTI only under the Scheme.

5.6.2 The project can be all or part of the entire facility.

5.7 Commissioning

5.7.1 Revenue support will be payable once the participant has declared the project to be commissioned. This can be as early as when the first device has supplied its first kWh of electricity to the grid; it can be as late as 2-years after the participant has accepted its offer of DTI grant. The last milestone of the capital grant will be payable on commissioning of the facility.

5.7.2 If the project has not been commissioned within 2-years of admission to the scheme its membership will lapse and any grant payments will become repayable.

5.8 Decommissioning

To avoid the DTI having to keep open its grant until decommissioning of the project for final grant payments, decommissioning costs are not eligible costs within projects. Funding for decommissioning costs will therefore be the responsibility of project participants and will need to meet the requirements of consent and The Crown Estate.

6 OFFER CONDITIONS

Any offer of DTI grant must be accepted within 3 months of offer date. Participation in the scheme will be subject to standard DTI terms and conditions in addition to which the following scheme-specific conditions will apply.

6.1 Eligibility

6.1.1 Applicant Eligibility

- 6.1.1.1 The scheme will be open to businesses or consortia of businesses that except in very special circumstances are legal entities registered in the UK. This includes UK subsidiaries of overseas companies.
- 6.1.1.2 Public sector organisations are not eligible as partners in projects within the scheme and proposals involving any public sector organisation, acting on its own or as part of a consortium, are not eligible.
- 6.1.1.3 Applicants must demonstrate their ability, willingness and intention to commence implementation of their projects immediately.
- 6.1.1.4 Applicants must provide evidence that they have sufficient technical resources and ability to carry out a project of this nature. This could include, for example, evidence of similar work carried out previously. They should also confirm that they have the legal right to all necessary intellectual property.
- 6.1.1.5 Applicants must demonstrate that they operate a credible management accounting system to record all costs incurred during the project. This should be capable of recording all time bookings made on the project and all supplier invoices paid. It should also be able to allocate these to different categories of project expenditure and time periods.
- 6.1.1.6 Applicants must be the legal entities who would hold beneficial ownership of the completed project. This would include equity investors but not financial organisations or individuals lending money to finance a project, even if loans were secured against the project income.
- 6.1.1.7 Consortia proposing to operate through a collaborative agreement must have the collaboration agreement in place at the time they submit their proposal and must furnish a copy of the signed legal agreement with their application. They must also, as part of the

application, nominate a lead partner to whom the grant would be paid on their behalf.

6.1.1.8 Consortia proposing to operate through a joint venture must have the joint venture vehicle in place at the time they submit their proposal and must furnish a copy of the relevant legal agreement(s) with their application.

6.1.1.9 All applicants and each partner in any consortium must provide copies of their annual accounts for the last two years. If the latest annual accounts are more than 12 months old, then the organisation must provide management accounts. If the applicant or each partner has been trading for less than two years then they must submit cash flow forecasts and trading forecasts for the next two years.

6.1.1.10 Each proposal must indicate the funding to be provided by the applicant, and by each partner in a consortium. Loans secured against the project itself or unsecured loans specifically for the project must be shown separately, whether made to a joint venture or to one or more partners in a collaboration or to a single applicant.

6.1.1.11 Proposals for all projects involving loan finance of any amount against the project itself (secured or unsecured) must be accompanied by the following:

- Evidence that a credible prospective lender(s) has reviewed the economics of the project and consider them suitable.
- A statement to the effect that the lender(s) would seriously consider providing loan(s) finance for the project if they were approached today.
- A statement from the lender(s) to the effect that they consider the project applicants possess suitable experience to undertake the proposed project, and the lender's view on the applicant(s) financial strength and technical ability.
- Evidence that an investment committee or equivalent has a positive interim view of the project.

6.1.1.12 Our preference is that applicants should demonstrate to the satisfaction of the DTI that all necessary finance for the project is in place at the time of application to the Scheme. This would be expected to be evidence of firm unconditional commitments from all sources of finance.

However, we accept that in some cases companies may find it difficult to gain an unconditional commitment of private sector finance in advance of securing a grant offer from the DTI for

participation in the Scheme. Consequently, we will accept in these circumstances letters of intent from all those that intend to be private sector funders of projects. These letters of intent should be provided with your application. They must demonstrate that the balance of funding required to fund the project will be provided and this is only conditional upon DTI support to the project. This private sector funding must be secured and unconditional at the time of acceptance of the grant. Failure to achieve this will result in the withdrawal of DTI grant offer.

6.1.1.13 Investors must be made aware that the DTI will not technically assess any of the proposed projects and that admission to the scheme does not represent any form of official endorsement of the technologies involved, does not imply that technologies admitted to the scheme are less risky than any other technologies and is not a substitute for investors own due diligence.

6.1.2 Project Eligibility

- 6.1.2.1 Applications must be for the development of wave or tidal-stream electricity generating projects.
- 6.1.2.2 Projects must be connected to a local distribution network in the UK or the UK national grid.
- 6.1.2.3 The project must employ technology that is significantly different from that employed by other projects already in the scheme. Applicants must demonstrate this and the burden of proof lies with them. Clearly different devices from different device developers will be eligible. Final decisions will be made by the DTI's Board, on advice from the DTI's appointed Independent Assessors.
- 6.1.2.4 The devices that form the project must not have been previously deployed. That is, they must be "new build" constructed specifically for this scheme. However, devices previously built may form part of the facility, but these are not eligible for grant and revenue funding within the scheme i.e. these are not part of the "project".
- 6.1.2.5 Prior to entry into the scheme the technology must have been previously demonstrated, operating at full scale in a representative range of realistic sea conditions for at least 3 months continuously (except for planned shutdown) or 6 months cumulatively in any 12-month period, during which designs, performances and costs of your project have been verified. Your verification evidence must be provided with the application.
- 6.1.2.6 Our preference is that the performance data should be verified by a recognised independent body, e.g. the European Marine Energy Centre (EMEC).
- 6.1.2.7 The project must provide for the deployment of resource energy input measurement equipment at the site (e.g. wave rider buoys and/or tidal current velocity measuring equipment) to collect meaningful resource energy input and intensity data throughout the duration of the scheme, thereby enabling design predictions to be verified.
- 6.1.2.8 Our preference is that applicants should, at the time of application to the scheme, demonstrate that all necessary consents and permissions for their proposed project have been obtained for the full period of operation under the scheme. However, we understand that this is not always practical. Therefore, where applicants cannot meet this requirement, but have met all other eligibility criteria, an application may be submitted for consideration. If successful a conditional grant offer will be made. This offer will require the

applicant to secure all necessary consents and permissions for the project and accept the grant within a specified period. Failure to achieve this will result in the withdrawal of the DTI grant offer.

6.1.2.9 No contribution from other public sources to the project will be permitted.

6.1.2.10 The scheme provides no impediment to public sector providers of investments in business, such as NaREC, the Intermediate Technology Institute and the Carbon Trust, making their legitimate equity investments on their respective commercial basis according to their own EC State Aid approvals.

6.1.2.11 Our preference is that projects should maximise UK content in the design, construction, installation and operation of the projects, and this must be demonstrated when applying to the scheme. Value for money to the UK taxpayer will be a criterion considered when decisions on entry to the scheme are being made.

6.2 Publication of information

6.2.1 On acceptance of the DTI grant, DTI will publish the following information on the project:

- The identity of the participant and its partners
- The number of devices
- Their installed capacity
- The type of technology involved
- Its geographical location
- The size of the DTI grant
- Expected commissioning date
- Expected annual output

6.2.2 On commissioning the following will be published:

The capital cost of building the project broken down into the following categories:

- Physical site preparation
- Grid connection
- Device manufacture
- Installation & commissioning
- Project management

6.2.3 During the contract period for revenue support, the following information for the project must be provided annually by the participant.

- The operating and maintenance costs
- The availability of the devices
- The amount of power generated
- Full characterisation of the site in terms of energy input to the devices including measurements made during the course of the project. Our preference is that the energy input is measured using an agreed, standard method, preferably developed by EMEC or other recognised body.

6.2.4 Participants must agree that the DTI can publish this information annually, as we deem this **not** to be commercially confidential. It is also appropriate that this data and results are published given the proportion of funding DTI is contributing to the cost of projects that are supported by the Scheme, and the desire to ensure the wider industry and investment community benefits from the scheme even if not directly participating.

6.2.5 DTI will not publish information that is in our opinion commercially confidential, such as details of designs, know how, details of manufacturing processes, details of installation procedures, details of operational and maintenance procedures.

6.3 Capital Grant Eligible Costs

6.3.1 The eligible costs are defined as the costs associated with the construction of the project over and above the cost of constructing a combined cycle gas turbine with the same average annual power.

We will take CCGT costs to be £404/kW_{average}, based on £400 per kW_{nameplate} and a 99% availability.

You must include in your proposal your calculation demonstrating the annual average power expected from your project and thereby justifying your claimed eligible capital cost.

6.3.2 Eligible costs include:

- Only costs incurred and defrayed after acceptance of DTI grant and up to and including commissioning of the project;
- Cost of all goods and services and purchases necessary to build and install proposed project;
- Own labour costs, including agreed eligible overheads, for construction, installation, commissioning and project management
- Grid connection costs.

“Own costs” include applicant’s own costs and eligible costs incurred by consortium members and eligible costs incurred by companies connected to any of these. The cost of work contracted to connected companies, to consortium members or to companies connected to consortium members should be on the basis of eligible costs.

6.3.3 If you choose to locate your project at EMEC or similar facility this is clearly permitted and your costs of connection are eligible.

6.4 Capital Grant Payments

6.4.1 The capital grant will be paid in instalments on successful completion of the following milestones:

1. Physical site preparation
2. Device manufacture
3. Installation
4. Grid connection
5. Commissioning

Each milestone will have its own payment limit.

6.4.2 Transfer of funding between milestones will be permitted, provided notice of the desire to transfer is given before costs are incurred; retrospective transfer between milestones will not be permitted.

6.4.3 Grant payment will be made on receipt of reports describing the work undertaken and evidence provided that milestones have been satisfactorily completed, including detailed information on the costs incurred, together with an auditor's report certifying that the reported costs are true and accurate.

6.5 Revenue Payments

- 6.5.1 Our preference is for revenue payments to be made quarterly on receipt of an audited statement of the amount of electricity supplied to the grid in the previous quarter.
- 6.5.2 Each claim must be accompanied by an auditor's report certifying that the reported evidence is true and accurate. The auditor's fees must be met by the participant.
- 6.5.3 We can arrange for revenue payments to be made monthly, but if this is required it should be specified in your application. Information to support claims remains as above.
- 6.5.4 Claims must be submitted at least annually.

6.6 Contractors

Contractors to scheme participants must be selected through competitive tender. A contractor is defined as an organisation that carries out work as part of the project but obtains no benefit from arising intellectual property and is not making any investment of its own cash to the cost of the project.

6.7 Requests for increases

Requests to increase the capital grant (either the percentage or the absolute value in pounds) to projects will not be considered.

6.8 Record keeping

The participant, its partners and other organisations incurring eligible costs must operate a credible management accounting system to record all costs incurred during the project. For each project the following detailed records must be kept, both during the construction phase and the revenue support phase:

- Timesheet bookings of all personnel working on the project
- All supplier invoices and receipts, for design, construction, installation, commissioning and grid connection
- All electricity generated

6.9 Changes in beneficial ownership

- 6.9.1 Entitlement to support under the scheme ceases on change of beneficial ownership, including changes of partners within consortium unless otherwise agreed by DTI. Agreement to any

change of ownership is at DTI discretion and only within the terms of this scheme.

6.9.2 In the absence of written consent from the DTI, the DTI will have the right to revoke its agreement with the participant and any payments may at DTI discretion be recovered.

6.10 Other

6.10.1 Incomplete applications and any containing incorrect or false information will be rejected.

6.10.2 Costs should be denominated in GB pounds. Applicants should indicate where conversion has been made to GB pounds from other currencies and indicate the rate and assumptions used.

6.10.3 Authorised representatives of the applicant and all its partners must endorse the application before submission to DTI. For applications made on behalf of consortia operating through a joint venture, an authorised representative of each partner must endorse the application before submission to DTI and a representative of the joint venture must also endorse the application.

6.10.4 Where an applicant or partner in a consortium is wholly owned by a parent company, an authorised representative of the parent company must endorse the proposal.

6.10.5 Authorised representatives endorsing the application must be the Company Secretary, President, Chairman, Managing Director, Chief Executive, Chief Operating Officer or Finance Director of the organisation concerned.

6.10.6 All signatures required must be on the same side of a single sheet of paper and must be witnessed.

6.10.7 Each applicant and all the partners in any proposal from a consortium must undertake to proceed with the project if the requested grant is awarded [subject to force majeure].

7 HOW TO APPLY

7.1 Application procedures

7.1.1 Getting an application form

Application forms and guidance materials will be made available to download from the DTI's web site www.dti.gov.uk from 22 March 2006.

7.1.2 Submitting an application form

Applicants must return four signed paper copies of your completed application form and attachments to the DTI. They should also enclose an electronic copy on a disc using Microsoft Word.

7.2 Assessment and approval of applications

7.2.1 What we do with applications once we have received them

When we receive your application you will be sent an acknowledgement letter within ten days of receipt. Your application will be assessed and ranked according to value for money using the objective eligibility criteria set out in Section 6.1. If it meets these criteria then, unless there are exceptional circumstances, your application will be approved, subject to the availability of scheme funds.

7.2.2 What happens if your application is successful?

When an application has been approved the DTI's management contractor will carry out the following steps:

1. Write to the applicant informing them that their application has been successful.
2. Seek formal endorsement of the funds from the DTI.
3. Issue grant documentation to the successful applicant. Note: A conditional grant offer may be made where circumstances in paragraph 6.1.2.8 apply.
4. Arrange a project kick-off meeting between the applicant and the DTI.

7.2.3 What happens if your application is unsuccessful?

When an application is not successful the DTI's management contractor will write to the applicant informing them that their application has not been successful and outlining the reasons for rejection.

7.2.4 Complaints about the assessment process

There is no appeal process and decisions are final.

**DTI ENERGY GROUP
MAY 2005**

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