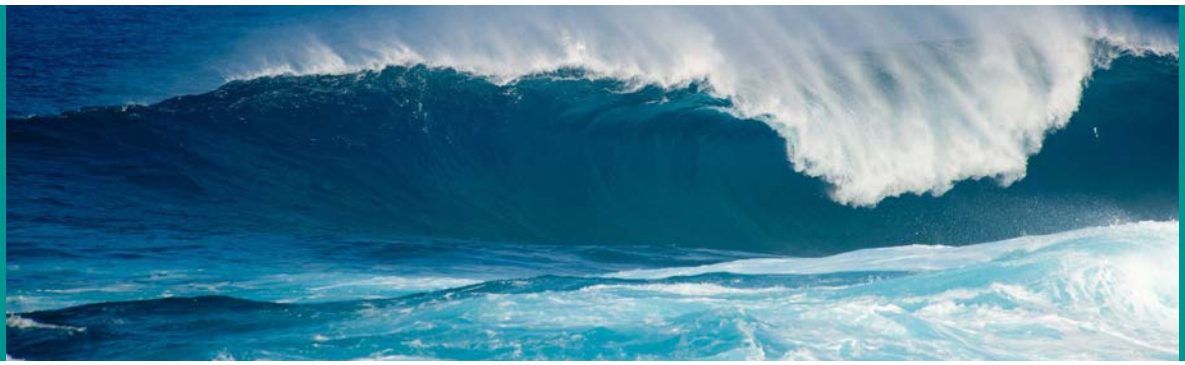
Technology Strategy Board
Driving Innovation



Marine energy: Supporting array technologies

COMPETITION FOR COLLABORATIVE R&D FUNDING
MARCH 2012

Scottish Enterprise

NATURAL ENVIRONMENT RESEARCH COUNCIL

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COMPETITION FOR COLLABORATIVE R&D FUNDING

Summary

The Technology Strategy Board, Scottish Enterprise and the Natural Environment Research Council (NERC) are to invest up to £10.5m in collaborative research and development to support successful deployment and operation of the first series of wave and tidal energy arrays. The Technology Strategy Board will invest up to £6.5m, Scottish Enterprise up to £3m and NERC up to £1m.

The marine energy industry (by which we mean wave and tidal stream energy) is at a critical stage as it moves from single device prototypes towards first arrays of full-scale devices. The industry needs to demonstrate that energy from wave and tidal power can successfully be generated at scale and to reduce the cost of the energy produced. As the industry plans arrays for the first time, new technical barriers are emerging that are common across the industry.

Through this competition, we are encouraging innovation that can address these key common challenges. This will de-risk deployment of early arrays by removing technical barriers and reducing the cost of energy produced.

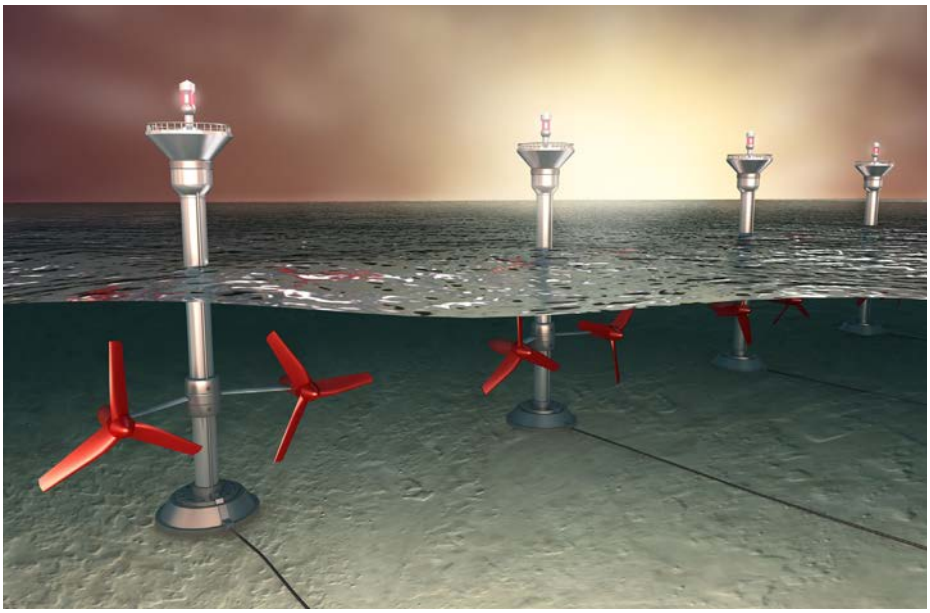
The results of this competition are expected to help UK businesses to build sustainable economic growth by exploiting new innovative technologies in a growing market and by removing barriers to successful array deployment. The competition also aims to facilitate industry joint working in defining and developing the best solutions using expertise from across the supply chain (including parallel sectors), and in disseminating learning and progress from projects.

Proposals must be collaborative and business-led. The competition opens on **5 March 2012**. The deadline for registration is at noon on **10 April 2012** and the deadline for expressions of interest is at noon on **17 April 2012**. Successful projects will generally attract up to 50% public funding. We expect to invest between £500k and £1.5m per project, although projects outside these ranges may be considered.

A briefing event for potential applicants will be held in London on **14 March 2012** and consortia-building events will be held ahead of the competition opening.

Background

The marine energy sector has the potential to provide more than 10% of future electricity in the UK by 2050, and hundreds of megawatts are expected to be deployed by 2020. Exports could also bring high added value to the UK economy over the coming decades. However, breaking the technical barriers to deployment at scale and demonstrating that it can be done at acceptable cost are major challenges.



Tidal range technologies, which use the rise and fall of the tide to generate energy via barrages or lagoons, may provide significant additional generation in the future. Innovation is unlikely to be a key enabler of this, so these technologies are not supported in this competition.

The UK has a global lead in marine energy, with many companies emerging from a strong research and testing environment supported by a strong marine design and operations skill base. Other countries are emerging as key players, however, with Canada, US, France, Spain and Korea all supporting development of technologies. UK businesses will keep ahead by demonstrating that their marine energy systems can produce energy more reliably and cheaply, and that, in the longer term, they can compete with other low-carbon technologies.

Two clear innovation needs are emerging: to demonstrate, through first arrays, that marine energy can generate electricity at scale; and to reduce the cost of energy by reducing system-wide and full lifecycle costs. We aim to stimulate innovation that removes common barriers to early array deployment and reduces costs in the areas of broadest benefit. Collaboration across the UK marine energy industry, and with parallel sectors such as the broader marine, oil and gas, and offshore wind industries is likely to be critical in reducing risks and costs most effectively.

NERC **(www.nerc.ac.uk)** is the UK's main public funder of world-class science that increases knowledge and understanding of the natural world, much of which can help to reduce marine energy costs by de-risking the consenting and deployment processes. NERC is keen to facilitate working collaborations between industry

and environmental scientists to help 'design out' environmental impacts early on.

This competition builds on the Technology Strategy Board's 2010 competitions in device cost reduction and underpinning technologies, on Scottish Enterprise's (**www.scottish-enterprise.com**) 2010 Wave and Tidal Energy: Research, Development and Demonstration Support fund (WATERS) backing for marine energy devices, and on the recent Marine Industries Alliance (**www.ukmarinealliance.com**) roadmap and capability study. It also helps to support programmes of early array deployment and system-cost reduction being run by the Department of Energy and Climate Change (DECC) and the Energy Technologies Institute (ETI)

Scope

This competition will support the applied research, experimental development and demonstration of innovative technologies that solve common issues faced by those developing and deploying the first marine energy arrays. All successful projects will show:

- creation of value across the wave or tidal industry, or both, by breaking existing technical barriers or reducing cost of energy in the marine energy system
- consideration of how the new technology integrates into and improves the overall marine energy system
- consideration of through-lifetime cost of the innovation (in other words, its installation, maintenance and operation as well as capital cost)

Technologies relating to wave and tidal stream arrays will be considered but tidal range technologies are not in scope. We are seeking projects suitable for array deployment over the next three-to-five years so relevant demonstration of the new technology in a suitable environment is expected within three years. Inclusion of marine environmental science in technology development projects is encouraged. NERC will provide funds for the 'translation' of previously funded NERC environmental science into industry-led projects. By this we mean the transformation of existing knowledge, technologies, capabilities, or facilities through, for example, data visualisation or interpretation, technology or model adaptation, or modified application of existing capabilities. Marine science components of a proposal are expected at levels roughly proportionate to NERC's funding of the competition. Fundamental research questions will not be funded.

Consortia are encouraged that involve businesses across the whole supply chain. Projects should include (but need not be limited to) project developers, equipment manufacturers, technology developers and supply chain companies wherever possible. We also encourage collaborations involving parallel sectors such as the marine shipping, oil and gas and offshore engineering industries.

We are looking for proposals that meet the above criteria and address a number of themes.

Theme 1: Tidal array cabling

Projects will target lifecycle cost reduction associated with tidal array cabling. Projects might include innovation in some or all of: cable deployment, retention, protection, monitoring, management and retrieval in high tidal flows. Both inter-array and cables to shore are in scope. Demonstration may be done by retrofitting solutions to existing devices.

Theme 2: Subsea electrical hubs

Projects will target key technical challenges in developing power hubs or associated components where surface-piercing designs are unsuitable. It is likely that subsea hubs will be required to provide control and isolation for multiple devices while stepping up voltage and conditioning power to the grid.

We do not expect projects in this theme to develop a complete hub system but to target key issues in developing a whole system. Projects may include some or all of: electrical component reliability (improvement in mean time-to-failure), installation, operation and maintenance issues including connection and retrieval, heat dissipation and other common technical barriers to subsea hubs.

Theme 3: Installation and maintenance vessels for tidal arrays

Proposals will develop novel technologies that reduce the cost, risks and safety implications of installation, retrieval and maintenance of tidal arrays. Projects may include: improving existing vessel dynamic positioning operating windows in high and variable tidal flows by integration of tidal flow data; improved remote operating vehicles that extend the operating window in high tidal flows; novel vessel designs or adaptations allowing step-change reductions in installation cost and risk through lower vessel cost or shorter deployment times.

Theme 4: Navigation and collision avoidance

Projects will develop novel technologies that enable detection or position monitoring of marine energy arrays and/or emergency response to potential collision with shipping. Projects will identify and solve specific needs of the marine energy industry that are not currently met by solutions found in the offshore wind and shipping industries (for example, improved radar visibility for low-lying devices). Requirements during construction and maintenance are also within scope for this theme. It is likely that consultation with, and agreement of, the coastguard agency and/or harbour authorities will be needed to ensure project relevance.

Theme 5: Anti-fouling and corrosion

Projects will develop novel methods, processes and materials that prevent corrosion or bio-fouling on marine energy systems. Projects must focus on particular needs of the marine energy industry and

should be informed by working across the industry to understand marine energy experience of issues to date and best current thinking on needs. Direct re-application of existing materials or solutions from other sectors will not be considered.

Theme 6: Open theme

Projects will target common marine energy challenges not covered by the above themes. For example, novel environmental characterisation or monitoring technologies and broad application condition monitoring systems are in scope. Projects must show that a significant barrier to array deployment is being addressed, or a step-change reduction in cost or risk of array deployment and operation will result. Projects that focus on specific marine energy devices will not be considered.

Funding allocation and project details

A total of £10.5m is available to fund collaborative R&D projects that are within the scope of this competition.

Projects must be collaborative, be led by a business with at least one partner and can involve science-to-business and/or business-to-business interactions. Academics can apply only as a collaboration partner in a consortium.

We are primarily seeking to fund applied research attracting 50% public funding, but projects may also include significant elements of experimental development, attracting 25% funding. Further details can be found in the *Guidance for Applicants* for this competition (available from **www.innovateuk.org/competitions** after you have registered for this competition).

A briefing event to provide more information to prospective applicants will be held in London on **14 March 2012**.

Applications are assessed on individual merit by an independent panel of experts. We may apply a 'portfolio' approach across the themes, subject to applications meeting the required quality threshold.

All projects will be required to take part in annual dissemination events throughout the project lifetime to share non-commercially sensitive information with the broader industry such as progress, learning and information about the new technologies, their potential and time to market.

Looking for partners to work on your project? Go to **_connect (https://connect.innovateuk.org/web/marine-consortia-building)** to find collaborators and networks and find out about consortium building events.

Application process

This is a two-stage competition that will open for applications on **5 March 2012**. The deadline for registration is noon on **10 April 2012** and compulsory expressions of interest (EOIs) must be submitted by noon on **17 April 2012**. The second stage for invited applicants will open on **14 May 2012** and the deadline for applications is at noon on **27 June 2012.**

Note: all deadlines are at noon.

If you have any queries about the technical scope of the competition or the application process, please contact the Competitions helpline on 0300 321 4357 or email competitions@innovateuk.org

More information

To apply for this competition you must first register with us. You can do this by going to our web page for this competition at **www.innovateuk.org/competitions**. When you register you will get access to all the supporting information you need to read before you apply, including the *Guidance for Applicants* and the application form.

Competition Helpline: 0300 321 4357

Email: competitions@innovateuk.org

Publicity

As part of the application process all applicants are asked to submit a public description of the project. This should adequately describe the project but not disclose any information that may impact on intellectual property, is confidential or commercially sensitive. The titles of successful projects, names of organisations, amounts awarded and the public description will be published once the award is confirmed as final. Information about unsuccessful project applications will remain confidential and will not be made public. E-mail pressoffice@tsb.gov.uk with any queries

Key dates

Competition opens	**5 March 2012**
Briefing event	**14 March 2012**
Registration deadline	**10 April 2012 noon**
Expressions of interest (EOI) deadline	**17 April 2012 noon**
EOI applicants informed	**8 May 2012**
Stage 2 opens (for invited applications)	**14 May 2012**
Deadline for invited applications	**27 June 2012 noon**

The Technology Strategy Board is a business-led executive non-departmental public body, established by the Government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve quality of life.

Collaborative research and development is part of the Government's Solutions for Business portfolio.

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