



Nanotechnology – enabled solar energy harvesting: Building the supply chain

**COMPETITION FOR COLLABORATIVE R&D FUNDING
SEPTEMBER 2010**

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Summary

The Technology Strategy Board and the Engineering and Physical Sciences Research Council have jointly allocated up to £7m to invest in highly innovative, collaborative research projects looking at the use of novel nanoscale technologies to enable the next generation of solar energy harvesting. Up to £2m will be invested by the Technology Strategy Board and up to £5m by the Engineering and Physical Sciences Research Council.

The competition is targeting business-led projects focussed on organic/dye-sensitised solar cells and water splitting devices. This is to address challenges in **building the supply chain** and **scaling up technologies**, from proof of concept laboratory devices to technology demonstration in a representative environment. Projects will be covering basic to applied research and development in nano-enabled technologies.

Our aim is to ensure that the UK can become an early competitive adopter of these novel technologies and rapidly meet the urgent and difficult challenges posed within the global energy sector.

This joint competition builds upon earlier investments by the RCUK nanoscience-programme (led by the Engineering and Physical Sciences Research Council) which invested £6.7m in early stage research in this area. It also builds on investments into researching the challenges of cost reduction and improvements in efficiency through the RCUK Energy Programme in 2008.

The competition is open to business-led consortia who will help develop the UK supply chain and the skills needed to deploy these technologies globally. Participants are expected to build upon previous investments in this area through new and existing collaborations. However, we will consider applications that do not have current or proposed relationships with previous investments, but only if there is a very strong business case to do so.

This activity will contribute strongly to the UK's 2050 targets for renewable energy as well as growing significant business opportunities for UK companies both at home and abroad.

Background and challenges

Energy demand in the UK is set to grow as the economy expands. Current installed electricity generating capacity is approximately 80GW, with demand potentially increasing by up to 50% by 2050. Government targets, meanwhile, demand a 80% reduction in carbon dioxide emissions by 2050¹.

In principle the sun could provide sufficient energy to make up the shortfall, provided new innovative methods of energy capture and storage are discovered, developed and exploited rapidly. This represents a significant opportunity for developing a supply chain in the UK across a range of market sectors including the built environment; micro-generation; and high value applications, incorporating the creative industries.

It will take a coordinated approach to move these technology platforms forward in a highly competitive global landscape. This investment aims to close the gap between potential capacity and actual usage of energy generated from sunlight, stimulating the UK to develop capability in the solar energy harvesting supply chain and positioning UK industry to benefit from the development and manufacture of the next generation of solar energy harvesting options.

The competition is delivering the investment to implement both Technology Strategy Board and cross Research Council nanotechnology strategies translating fundamental science to exploit unique properties found at the nanoscale, creating new products and processes, and addressing societal challenges.

Generating energy using a range of renewable and non-renewable sources is a significant challenge for the UK and will be for the foreseeable future. Solar energy harvesting will need to be a significant part of the mix of renewable technologies for 2050 if we are to achieve a balanced portfolio and secure supply for the future.

Nanoscale technologies can enable new energy harvesting solutions through the generation of novel materials that can be deployed to deliver commercially attractive efficiencies at a low cost and a reasonable lifetime of service.

This competition is intended to link together basic and applied research from academia and industry as part of a staged investment approach in commercialising world-class UK based technologies and builds on earlier investments made by the Research Councils' Grand Challenge programme in nanoscience for solar energy harvesting.

Scope

This competition targets projects that can address the many challenges in **building the supply chain** and **scaling up technologies** from a proof of concept laboratory device to pre-commercial demonstration in a representative environment. The aim is to produce cost effective manufacturable solutions for development of the next generation solar energy harvesting devices and developing a suitable route to market. Nanoscale technologies are required to be at the heart of the project taking into account in-service requirements (e.g. packaging) and the full life-cycle such as re-use of materials/systems.

Through this competition we will support the translation of basic to applied research, focusing on the following:

- demonstration of scale-up in a representative environment for solar energy harvesting solutions, inclusive

1. UK Low Carbon Transition plan – July 2009.



of **organic/dye sensitized solar cells** and **water splitting** devices that may address opportunities in multiple markets

- life-cycle approaches inclusive of design; systems engineering; integration into existing and new systems and issues of recycling, reuse, and energy storage
- development of novel materials and coatings for packaging and longevity in service
- technologies that can address the built environment sector, particularly materials and devices that could be used to retro fit existing homes as well as for new builds.

Crystalline silicon, thin film silicon and thin film CdTe/CIS/CIGS solar cells are **excluded** from this competition unless there is significant opportunity in developing joint technology platforms which address the challenges stated above.

Proposals, especially when dealing with those parts of the project related to the application of nanoscale materials, should consider responsible development initiatives to safeguard against any potential risks or harm to people and/or the environment. Proposals must also explain how the work will help gain a share of the UK and global solar energy markets against other innovative leaders in this field.

Applications are expected to build upon UK world-class, state-of-the-art knowledge in this sector, focusing on emerging developments facilitated through previous investments (inclusive of the Research Council Grand Challenge Programme in nanoscience) demonstrating new and existing collaborations. We will consider applications that do not have relationships with previous investments only if there is a very strong business case to do so. Existing project details can be found at <http://tiny.cc/moy7k>

Funding allocation and project details

Of the £7m invested in this partnership, the Technology Strategy has allocated up to £2m to fund the business components of the project. The Engineering and Physical Sciences Research Council has allocated up to £5m to fund the academic components of the project at 80% full economic costing. Collaborations must be business-led and involve mainly science-to-business as well as business-to-business interactions involving a minimum of two partners (one industrial).

We will invest in collaborative projects which last up to 36 months and require a public sector funding contribution of typically £500k to £2m. We intend to invest in projects that will contain a mix of applied research (attracting 50% public funding), and industry-orientated basic research (75% public funding) provided a strong case is made and that the aim is to demonstrate scale-up in a suitable environment.

Given the international nature of many of the key businesses involved in the low carbon supply chain, non-UK based businesses will be eligible to be consortium members, provided there are a minimum of two UK partners (one of which must be a business) and clear quantified benefits to the UK are identified. However, non-UK businesses cannot lead a project or receive grant funding.

Key dates

Competition opens	13th September 2010
Briefing day	22nd September 2010
Registration of intent to submit (compulsory)	14th October 2010
Deadline for receipt of applications	21st October 2010 (noon)
Inform applicants of decision	19th November 2010

An online area for solar energy harvesting has been set-up in the Technology Strategy Board _connect space to enable discussion on potential ideas and partners to be held.

www.innovateuk.org/connect.

Application process

This single-stage competition opens on **13th September 2010** and applicants must register their intent to submit an application by **14th October 2010**. The application form, including annexes and finance forms, must be formally received by noon on **21st October 2010**. Following an independent assessment process, applicants will be informed of the decision on **19th November 2010**.

The Guidance for Applicants (published at www.innovateuk.org under Competitions) provides full details of how to complete and submit the application form. A briefing event will be held on **22nd September 2010** to explain the application process and competition requirements in more detail. We strongly advise that all applicants attend.



Further information

For more information about this and other competitions and details of how to register and apply, visit **www.innovateuk.org** under Competitions.

For further information on the Research Councils' Nanoscience Programme visit **<http://rcuknano.org.uk>**

Competition helpline:
0300 321 4357

Email:
competitions@tsb.gov.uk

Publicity

The Technology Strategy Board frequently publicises the results of competitions and this includes engagement with the media. All applicants will be given a chance during the competition process to opt out of any publicity. Willing applicants will be asked to provide an agreed form of words for use in publicity material. E-mail pressoffice@tsb.gov.uk with any queries.

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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