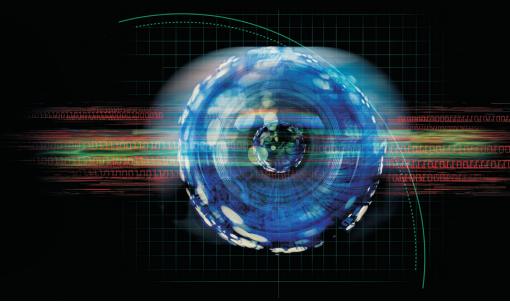
Technology Strategy Board



Materials for Energy

Autumn 2007 Competition for Funding

The Technology Strategy Board and the Engineering and Physical Sciences Research Council have allocated an indicative amount of £12M to fund highly innovative collaborative research proposals in Materials for Energy. Funding is available for industry-led collaborative projects across a range of Technology Readiness Levels, from basic research to applied research and development in materials technologies that will enable the UK to rapidly meet the urgent and difficult challenges posed within the global Energy Sector.

The focus will be on the development of materials technologies for:

- Energy generation
- Energy transmission and distribution
- Energy storage
- Energy conservation

It is also anticipated that materials developments in these areas will have spillover energy-related benefits for other industrial sectors; e.g. transport, including aerospace.

Background

Energy supply and the control of CO_2 emissions represent major environmental and sustainability challenges for the UK. Materials technologies can play an important role in meeting these challenges, within a worldwide context.

Energy demand in the UK is set to grow as the economy expands, with 30-35GW of new electricity generation capacity needed over the next two decades and around two thirds of this required by 2020[1]. This must also be seen in the context of a target to achieve at least a 60% reduction in carbon dioxide emissions by 2050, and a 26-32% reduction by 2020, against a 1999 baseline[1].

In order to meet the increased demand and to minimise both environmental impacts and risks to security of supply, the UK will require a balanced future energy portfolio, potentially including a mix of fossil, nuclear and renewable energy sources. Energy generation in each of these areas, together with storage and power transmission, will continue to need advancement in the development and application of materials technologies.

Materials will also have an important part to play in the more efficient use of energy. For example, in the built environment sector, to meet the 2050 targets for carbon emissions, the thermal performance of the existing housing stock must be dramatically improved. There are 7.7 million non-cavity wall homes in the UK (31% of all homes), and non-cavity wall buildings also exist in the commercial, educational and healthcare sectors. Viable solutions to upgrading the insulation of older and hard to treat properties are urgently needed.

1 UK Energy White Paper - 23rd May 2007

2 Materials for Energy

Overall, the global focus on energy makes it important to sustain research, development and modelling of materials for energy applications in the UK and is a major opportunity for UK industry to examine transferable materials solutions and methods across the complete energy portfolio to attain maximum global competitive advantage.

Building on the recommendations in 2006 of the Materials Innovation & Growth Team, Materials UK has recently undertaken a major industry-led review in this area of technology. They have identified, and developed thinking to address, R&D gaps and considered how to encourage business pull of technology ideas, within a UK Strategic Research Agenda (*www.matuk.co.uk/energy.htm*). This broadly-based call is a first step in facilitating this agenda to develop and apply advanced materials technologies for more efficient and affordable energy solutions.

Scope

This Call will support the research and development of materials technologies which offer either specific or generic solutions to problems within the Energy Sector. The focus will be on the development of materials for:

- Energy generation - including fossil fuel, nuclear and renewables [wind, wave/tidal, solar, fuel cells, biomass].
- Energy transmission and distribution - including electrical and liquid gas
- Energy storage.
- Energy conservation - with a focus on improved insulation materials in the built environment.

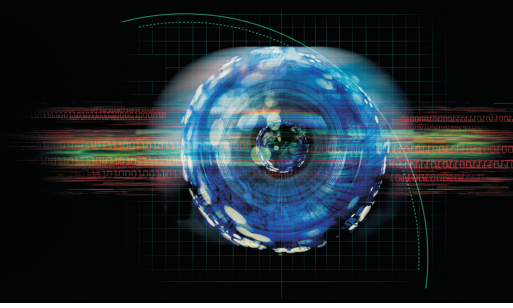
Other applications, for example in the transport, including aerospace, and other industrial sectors, which will derive energy-related benefits from materials developments, [e.g. improved efficiency of power generation equipment via operation at higher temperatures], will also be considered, where exploitation is aimed primarily within the Energy Sector and where appropriate cross-sector collaborations can be identified.

A number of specific high level challenges have been identified, for which solutions are particularly sought:

- Materials for efficient, low emission energy generation, including their application for high durability components operating in increasingly aggressive environments; in particular, those facing the emerging energy technologies of Carbon Capture and Sequestration (CCS), biomass, wind, tidal/wave and solar.
- Innovative technologies (including materials substitution) enabling a significant reduction in full life-cycle costs which are currently a barrier to market entry for emerging energy technologies. This is of particular relevance to materials for photovoltaic and fuel cell technologies.
- Materials which will minimise energy, power and thermal loss during the transmission and distribution process, including both electrical and liquid fuel-based systems.
- Materials for affordable, effective and efficient energy storage and management; in particular, electricity storage and hydrogen production and storage linked to the hydrogen economy.
- Materials for the effective conservation of energy within the built environment; particularly novel insulation materials that can be used to significantly upgrade the thermal performance of the building envelope in existing homes and help meet the energy standards of the Code for Sustainable Homes.

Proposals are welcome which address these challenges in areas such as:

- The development of cost-effective materials and coatings with improved intrinsic and through-life properties, relevant to application-specific environmental conditions, with an emphasis on extreme environments [e.g. very high temperature, corrosive].
- Improved understanding of fundamental materials degradation mechanisms, especially in extreme environments.
- Methods for materials inspection and continuous monitoring.
- Predictive multi-scale modelling of materials intrinsic and through-life properties and performance characteristics - supporting a residual life prognostics capability.



- The improved design and performance of joints and joining techniques, including between dissimilar materials.
- Methods of materials repair and life extension.
- Novel thermal insulation materials; specifically, materials that are thin, cost-effective, easy to apply and acceptable to end-users.
- The application of nanomaterials technologies, including biomimetics, and multifunctional or smart materials and systems to the development of highly innovative and next generation energy materials technologies.
- The development of effective metrology and standards support tools.
- R&D which supports the facilitation of technology transfer between sectors.

All proposals, especially those related to the application of nanomaterials and other novel materials solutions, should consider any potential risks or harm to people and/or the environment.

Funding Allocation & Project Details

An indicative £12M of Technology Programme support, including £2M of EPSRC support, has been allocated to Collaborative Research & Development projects that address one or more of the areas indicated above and involve science to business and business to business interactions. Projects are particularly encouraged that can demonstrate benefits across more than one aspect of the Energy agenda and all projects, including those with other market sector applications, should include at least one partner with defined end-user needs in the Energy Sector and, ideally, other relevant supply-chain organisations, in order that new ideas can be developed and exploited in a timely fashion. Typical projects would have a 2 to 3 year duration, require support of around £500k to £2M, although no project will be rejected on the grounds of size alone, and generally aim to implement significant business change in a 5 to 7 year timeframe.

This programme will complement and underpin other potential related R&D activities within the Energy Sector which might be undertaken, for example, within other Technology Programme Calls, as part of the Energy Technologies Institute future programme, within relevant Innovation Platforms, or international, e.g. Framework 7, programmes.

EPSRC support will be targeted on projects where there is a significant high quality academic component and, in particular, those projects that demonstrate added value to its existing portfolio; by building on or being complementary to existing research programmes. Additional funding may also be available from the STFC, particularly for the provision of facility beam time, for projects which build on or are complementary to its existing research programmes. All bidders should ensure that they address how their proposal relates to existing funded activity in this area.

Proposers of potential projects which are aimed at systems development or integration, or process development addressing specific applications, rather than core materials R&D, are also directed to a parallel programme Call on ‘Low Carbon Energy Technologies’.

Projects can range from small, highly focused Basic Research aimed at establishing technical feasibility, through to Applied Research, and to Experimental Development projects. It is anticipated that most of the funding will be allocated to proposals in the Applied R&D (attracting 50% public funding) or Experimental Development (25% public funding) categories. Projects involving industry oriented Basic Research (75% public funding) will also be considered but a robust case must be made to support the requested level of funding. Definitions of the above categories of research can be found in the Guidance for Applicants - see http://www.technologyprogramme.org.uk

The Technology Strategy Board will require all projects to provide a non-commercially confidential summary, at the start and the conclusion of the project, for dissemination.

If you have any queries about the technical scope of the competition or the application process, please contact the Technology Programme helpline on 01355 272155 or email info@technologyprogramme.org.uk

Application Process

The process for the Autumn 2007 competition is shorter than previously and is intended to offer more opportunity to applicants to discuss their proposals with TSB Technologists. The Collaborative R & D Call opens on 8 November 2007 and closes on 14 February 2008. The Guidance for Applicants explains the process in detail, in short, there is an opportunity to submit a brief outline of the proposal by 30 November 2007, that will be reviewed and feedback will be provided by 10 December 2007. In the week beginning 10 December 2007 there will be limited opportunity to discuss the feedback with Technology Strategy Board officials by telephone; details are to be found at www.technologyprogramme.org.uk. An Applicants' Briefing will be held on 19 December 2007 and there will be further opportunity during the day for discussions with competition officials. Applicants will need to register their intention to apply by 11 January 2008 and accompany this registration with an outline of their proposal, this will be reviewed and feedback given by 21 January 2008 with limited opportunity to discuss the feedback during the week beginning 21 January 2008. There will be a final briefing for Applicants on 30 January 2008 with similar opportunities as above and the competition will close on 14 February 2008.

More information

For more information about this and other events and details on how to register and apply visit **http://www.technologyprogramme.org.uk**

Helpline: 01355 272155

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Key Dates

Competition opens: 8 November 2007
First Review deadline (optional) 30 November 2007
Feedback provided by 10 December 2007
Feedback discussion in week beginning 10 December 2007
Applicants' Briefing (Optional) 19 December 2007
Second Review and Registration of Intent to submit deadline (mandatory) 11 January 2008
Feedback provided by 21 January 2008
Feedback discussion in week beginning 21 January 2008
Applicants' Briefing (Mandatory) 30 January 2008
Deadline for receipt of full applications 14 February 2008
Decision and feedback to applicants: 3 April 2008

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