Technology Strategy Board

Low Carbon Energy Technologies

Autumn 2007 Competition for Funding

The Technology Strategy Board has allocated an indicative amount of £10 million to invest in highly innovative collaborative research in Low Carbon Energy Technologies

The challenge of moving towards a lower carbon economy without an obvious single technology winner, combined with the diverse nature of energy businesses, requires us to develop a portfolio of low carbon energy technologies for the electricity, heat and transport markets.

This competition will support a relatively broad portfolio of low carbon technologies that will focus on specific barriers, which our analysis indicates will need to be addressed if we are to accelerate the development of these technologies to the market. The programme includes intelligent grid integration and management, carbon abatement technologies, hydrogen and fuel cells, microgeneration and photovoltaics and bioenergy.

An indicative £10 million of Technology Strategy Board funding has been allocated for Collaborative Research & Development projects in these areas.

This call is part of a broader range of support from Government for these technologies. Offshore wind and marine are excluded here to ensure complementarity with the competition for funding recently announced by the Energy Technologies Institute.

Background

The Technology Strategy Board is committed to stimulating the development and deployment of technologies, which, as well as contributing to the UK's climate change and energy security goals, also represent major business opportunities for the UK with new markets being created in low carbon energy technologies, with the potential for significant wealth creation in the UK.

Scope of applications and priorities

Applications for innovative proposals are sought in specific priority areas. Applicants are invited to indicate how their proposed collaboration will contribute to achieve government's targets in reducing CO_2 emissions and how their proposed work will contribute to the accelerated and wider deployment of the technology and its impact on the competitive position of UK industry.

Intelligent grid integration and management – As new renewable and other generating technologies are developed with operational characteristics quite different from conventional plant, innovative grid integration technologies and techniques will be required to ensure that network assets are utilised effectively and connections made efficiently. There will also be a need to manage the implications of integrating variable-output and dispersed generation technologies at system level, to ensure optimum performance. The **priorities** for R&D support in this area are:

1. Maximising the utilisation of existing transmission and distribution assets in the face of the increasing deployment of new generating technologies.
2. Facilitating the timely connection of new generation, while maintaining levels of system security and minimising the impact of constraints.
3. Minimising the impact of energy losses.

4. Manage the impacts of variable output caused by intermittency etc at a system level, including applying electrical storage and demand side measures such as 'smart appliances'.
5. Cost-effectively integrating onshore and offshore generation technologies, including innovation to permit Grid Code requirements to be met in the most cost-effective fashion.
6. Cost-effectively integrating micro generation technologies.
7. Developing low carbon network equipment, design, management, operation and control, including active management systems and methodology.

Carbon abatement technologies – The Carbon Abatement Technologies[1] Strategy sets out how fossil fuel based technologies can be used in the transition to a low carbon economy. The report focuses on three groups of technologies: cleaner combustion technologies, fuel switching to lower carbon alternatives and carbon capture and storage. The **priorities** for R&D support in this area are:

1. Improving the efficiency of existing and developing technologies to support the extra demands placed upon equipment operating in increasingly aggressive environments. This includes developments in boiler technologies for efficient coal combustion, steam and gas turbine technologies to accommodate higher temperatures and pressures, and improved gasifiers for syngas production. Associated technologies which support enhanced performance and reliability such as plant asset management and condition monitoring are also within the scope.
2. Further developing CO_2 capture technologies including pre- and post-combustion and oxy-fuel firing, and associated technologies to improve their efficiency and reduce capital and running cost.
3. Developing CO_2 compression and handling technologies for subsequent transport and storage.
4. Developing further technologies for the monitoring and verification of geologically stored CO_2.
5. Developing further technologies associated with the safe transport and storage of CO_2

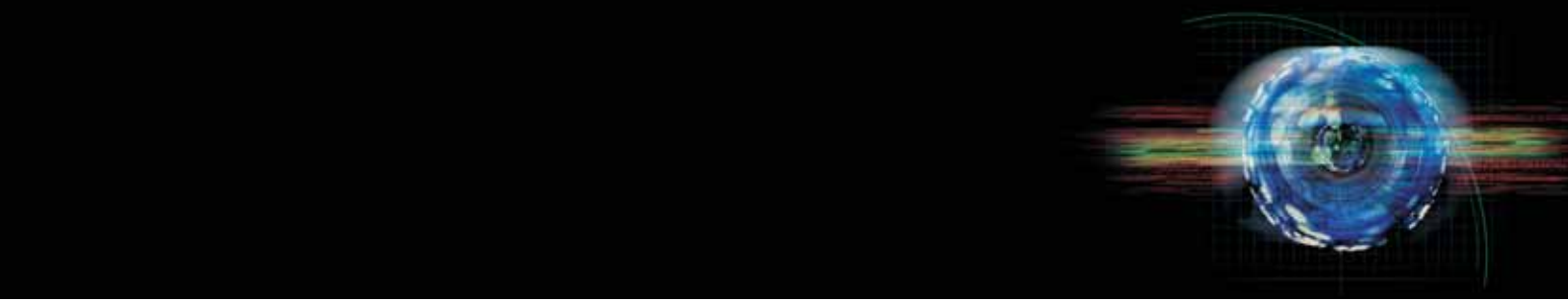
Due to the significant global impact of CATs and the international work being done in this area, proposals which include aspects of international collaboration may be considered providing that clearly quantified benefits to the UK can be demonstrated and at least two UK organisations are involved.

Hydrogen and fuel cells – Hydrogen and fuel cells face significant techno-economic barriers. R&D leading to a step change in performance and reduced cost will greatly improve the prospects for early large scale deployment. The **priorities** for R&D support in this area are:

1. Innovative projects addressing the achievement of a hydrogen economy and\or the widespread deployment of fuel cells, with particular emphasis on the supply chain and the planned route to commercial exploitation of the results in the UK and Europe.
2. Development of novel systems and solutions for hydrogen storage, with low cost and high energy efficiency, in particular offering the prospect that would make them suitable for ready integration with automotive fuel cell systems.
3. Research and development of novel, durable and lower cost systems and manufacturing processes for hydrogen electrolysers and fuel cell systems.
4. Development of innovative components and stack designs for improved efficiency and performance and simplified system design.
5. System development for advanced fuel cells focused on real-world automotive and combined heat and power applications.
6. Design, construction and evaluation of efficient, low cost hydrogen production systems suitable for on-site vehicle refuelling.

For any of the above priorities, the outline proposals must include numerical development targets for the project, and performance and cost targets for the ultimate application. (For direct methanol fuel cells, development target parameters must include low methanol crossover).

1 (http://www.dti.gov.uk/energy/sources/sustainable/carbon-abatement-tech/techstrategy/page19434.html)



Renewables

Microgeneration and photovoltaics – Microgeneration could deliver significant efficiency and CO_2 reductions, through increased use of renewables, utilisation of "waste" heat from electricity generation or renewable heating fuels, and avoidance of losses in the electricity transmission and distribution system. The **priorities** for R&D support in this area are:

1. Proposals for tackling barriers to developing a whole systems approach to integrating microgeneration in buildings. We are particularly seeking proposals which facilitate how different microgeneration technologies work together in order to aid efficient provision of heat and/or electricity.
2. PV technology R&D that significantly reduces costs and improves efficiencies.

Bio-energy – In the Biomass Strategy[2] the use of biomass to replace fossil fuels in heat and CHP applications is recognised as a cost effective means of reducing CO_2 emissions. It also recognises the increased interest in transport fuels and the role that second generation fuels must take in the medium to long term. The development of viable, cost-effective fuel supply chains, and the subsequent use of energy crops in conversion processes, is essential to any substantial and long-term development of bio-energy in the UK. The **priorities** for R&D support in this area are:

1. Development of cost effective advanced biomass conversion technologies with high electrical and overall efficiencies for combined heat and power in process and space heating/cooling applications.
2. Research to improve the understanding of how biomass fuels, and mixtures of fuels, behave in combustion and other thermal processes used for heat and electricity production, and how their physical and chemical properties impact on the reliability and performance of practical equipment.
3. Development of viable, cost effective fuel supply chains – including energy crops and wastes/co-products.
4. Development of processing concepts that improve the overall resource use efficiency of biomass feedstocks by the integrated manufacture of renewable fuels, chemicals and energy.
5. Development of innovative processes for the production of next generation transport biofuels. However, the impact of these fuels on engine performance is excluded from the scope of this call.

2 http://www.defra.gov.uk/environment/climatechange/uk/energy/renewablefuel/pdf/ukbiomassstrategy-0507.pdf

Funding Allocation and Project Details

The Technology Strategy Board advises on the selection of priority technology areas and is a business-led executive non-departmental public body, established by the Government. Its mission 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. An indicative £10 million of Technology Strategy Board funding is allocated to Collaborative R&D projects that address one or more areas outlined above and involve science-to-business and business-to-business interactions.

Additional funding from the Research Councils may be available for projects where there is a significant high quality academic component and in particular for those projects that demonstrate added value to its portfolio; by building on or being complementary to existing research programmes. Projects can range from small, highly focused basic research aimed at establishing technical feasibility, through 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 be considered but a robust case must be made to support the requested level of funding.

Definitions of these 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 Technology Strategy Board Technologists. The competition opens on 19 December 2007 and closes on 27 March 2008. The Guidance for Applicants explains the process in detail; In short, there is an opportunity to submit a brief outline by 11 January; this will be reviewed and feedback provided by 21 January. In the week following there will be some opportunity to discuss the feedback by telephone with Technology Strategy Board officials. An applicants' briefing will follow on 30 January giving a further opportunity for discussion.

Applicants will then need to register their intention to apply and submit an outline of their proposal by 22 February .This will be reviewed and feedback given by 3 March, with some opportunity to discuss during the following week. There will be a final briefing for applicants on 12 March again with discussion opportunities and the competition will close on 27 March.

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: 19 December 2008
First Review deadline (optional) 11 January 2008
Feedback provided by 21 January 2008
Feedback discussion in week beginning 21 January 2008
Applicants' Briefing (optional) 30 January 2008
Second Review and Registration of Intent to submit deadline (compulsory) 22 February 2008
Feedback provided 3 March 2008
Feedback discussions in week beginning 3 March 2008
Applicants' Briefing (compulsory) 12 March 2008
Deadline for receipt of full applications 27 March 2008
Decision and feedback to applicants 15 May 2008

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