

**Technology Strategy Board**

Driving Innovation



# Fuel Cells and Hydrogen Technologies

**MARCH 2009 COMPETITION FOR FUNDING**



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### Summary

The Technology Strategy Board has allocated an indicative amount of £10m to invest in highly innovative collaborative research and development in the area of Fuel Cells and Hydrogen Technologies. These technologies will contribute to tackling the UK and EU climate change targets and security of energy supply challenges, whilst providing significant market opportunities to a strong UK capability base.

The focus will be on the development of technologies and their associated supply chains that will offer significant quantitative improvements in:

- lowering costs and significantly improving reliability, durability and performance levels of low, intermediate and high temperature fuel cell systems (with various fuel sources) for the stationary, transport and portable markets;
- addressing the challenges related to hydrogen generation, storage and utilisation; and
- acceleration of their deployment to market.

### Background and Challenge

Fuel cells and hydrogen technologies have been identified as priorities for direct investment in the Technology Strategy Board's Energy Generation and Supply strategy<sup>1</sup>. These technologies will contribute to tackling the UK and EU climate change targets and security of energy supply challenges, whilst providing significant market opportunities to a strong UK capability base. Projects should make real progress towards meeting the challenging targets set out in the European Strategic Research Agenda of the Fuel Cell and Hydrogen Technology Platform<sup>2</sup>, such as increased durability/performance levels of 5,000-8,000 hours for transport applications and 20,000-40,000 hours for stationary applications, and targeting costs of longer term sustainable hydrogen production of less than 5 Euro/kg.

### Coordination with Other Funding Bodies

The Technology Strategy Board is working closely with other funding bodies in the area of low carbon energy technologies, such as BERR, the Energy Technologies Institute, the Carbon Trust and the Research Councils. This is in order to develop a complementary portfolio of projects which, as well as contributing to UK's climate change and energy security goals, also represent business opportunities for the UK within the new markets being created in low carbon energy technologies, with potential for significant wealth creation in the UK. Companies with an interest in fuel cells might also like to note that the Carbon Trust is considering a targeted call to support cost breakthroughs in polymer electrolyte membrane MEAs. For more information please contact [pipeline@carbontrust.co.uk](mailto:pipeline@carbontrust.co.uk).

### Scope

This competition will address the research and development of fuel cells and hydrogen technologies that will accelerate their deployment, with particular emphasis on the supply chain and the planned route to commercial exploitation of the results. All proposals must explain how the work will help in positioning the UK in the global market and against other global innovation leaders in the area. In particular, the projects should state how they might enable the UK to contribute more effectively to the EC Joint Technology Initiative in Fuel Cells and Hydrogen. Proposals must include quantitative development targets for the project, together with the relevant performance and cost targets for the ultimate application.

Although we recognise the close synergies between the areas of hydrogen and fuel cells and we welcome single proposals that cover both areas, the scope of this competition is described separately for fuel cells and hydrogen.

### Fuel Cells Technologies

This competition will address innovative solutions for fuel cell applications in the stationary, transport and portable power markets. In particular, we welcome proposals that will accelerate deployment of the technology and place emphasis on the development of the supply chain, system integration and user interface issues.

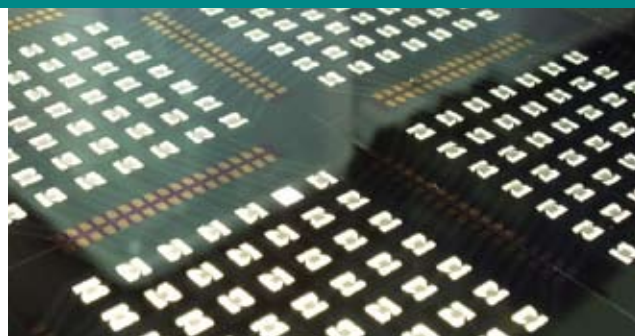
The high level challenges identified are to lower costs and significantly improve reliability, durability and performance levels of low, intermediate and high temperature fuel cell systems (with various fuel sources).

Proposals will address these challenges by focusing on one or more of the following:

- System development for advanced fuel cells focussed on 'real-world' practical applications, for transport, stationary and portable power markets. Systems that include user interface, such as developments integrating fuel cells with control systems and power management are particularly encouraged. Projects which will have full systems operating at appropriate scales and in appropriate environments are welcome.
- Innovative projects addressing fuel cell systems and components that promote their widespread deployment with particular emphasis on developing the supply chain and the planned route to commercial exploitation of the results in the UK and Europe.
- Development of novel materials, manufacturing processes, components and methods, which will not only improve the durability, reliability and quality of fuel cell systems but also make the systems cost competitive with other electricity generating sources. This may include R&D that provides a better understanding of in-service degradation behaviour, lifetime modelling, inspection and accelerated testing. Projects should also consider end-of-life issues.

<sup>1</sup> Technology Strategy Board- Energy Generation and Supply Strategy, May 2008 [http://www.innovateuk.org/\\_assets/pdf/corporate-publications/energygensupply\\_strategy.pdf](http://www.innovateuk.org/_assets/pdf/corporate-publications/energygensupply_strategy.pdf)

<sup>2</sup> European Hydrogen and Fuel Cell Technology Platform <https://www.hfpeurope.org>



- Small scoping studies into the development of certification, codes and standards that will accelerate deployment will be considered if included as part of the scope of a larger project and results made publicly available.

## Hydrogen Technologies

This competition will target technology challenges needed to help drive the UK hydrogen economy and develop a sustainable hydrogen supply, in parallel with other major developing low carbon energy industries such as those in fuel cells, alternative fuels, and carbon abatement technologies.

In particular, through this collaborative R&D competition we are looking to tackle the challenges related to hydrogen generation, storage and utilisation. Proposals will address these in one or more of the following areas:

- Design and development of efficient, low cost hydrogen production systems using innovative technologies, in particular production of 'green' hydrogen from renewable sources. Novel technologies associated with low carbon emission hydrogen production and utilisation from fossil fuel (including hydrogen separation technologies) and distributed hydrogen technologies may also be considered. In terms of transport, this would include innovative on-site vehicle refuelling systems.
- Development of novel systems, materials and solutions for hydrogen storage and transportation, with low cost and high energy efficiency. In particular, projects offering storage solutions suitable for ready integration with automotive fuel cell systems are welcome.
- Projects tackling underpinning technologies relating to materials, condition monitoring, modelling, safety and environment, etc. are welcome within the context of the competition, but must have defined quantifiable benefits to the sector.

## Funding Allocation and Project Details

An indicative £10m of Technology Strategy Board funding is allocated to collaborative research and development projects that address one or more of the areas indicated above and involve science-to-business and business-to-business interactions.

All proposers must indicate how their project will make a significant, step change, overall positive contribution in terms of economic, environmental and social impacts – the triple bottom line – taking into account the full product lifecycle. Projects are particularly encouraged that can demonstrate benefits across more than one business sector and all projects should include a strong supply-chain based collaboration, in order that new ideas can be developed and exploited in a timely fashion. Typical projects would have a two- to three-year duration, require Technology Strategy Board investment of around £250k-1m, and generally aim to implement significant business change in a three- to five-year timeframe.

Where appropriate, this programme will encourage projects that build on existing UK world-class knowledge. Proposals related to the use of the technologies in buildings and in vehicles will be considered in the context of recent and planned future competitions from within the Technology Strategy Board's Low Impact Buildings and Low Carbon Vehicle Innovation Platforms.

Additional funding from EPSRC 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 existing portfolio, by building on or being complementary to existing research programmes.

Projects can range from 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 Competitions at [www.innovateuk.org](http://www.innovateuk.org).

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 [competitions@tsb.gov.uk](mailto:competitions@tsb.gov.uk).

## Application Process

The process for this competition is in line with Technology Strategy Board policy which seeks to give opportunity for applicants to make an initial optional Expression of Interest (EOI) prior to their compulsory application. The optional EOI will be looked at by officials and a response given to applicants within three working days. Applicants may take advantage of this up to one week prior to the compulsory EOI deadline. The key dates for this Competition are the 16th March 2009 when the competition opens and the 23rd April 2009 when the compulsory EOI must be submitted.

The Guidance for Applicants explains the process in detail. In short, applicants need to submit their Expression of Interest by 23rd April 2009 and this will be reviewed and feedback given on 11th May 2009. During the period 16th March to 15th April applicants will be able to submit their outlines and receive initial comment on an optional and no commitment basis. Following the independent panel review, the Technology Strategy Board will then



invite successful applicants to the full stage. For these applicants, in the week beginning 11th May 2009, there will be the opportunity to discuss the feedback with Technology Strategy Board officials by telephone; details can found via the Competitions link at [www.innovateuk.org](http://www.innovateuk.org).

There will be an Information Day in Bristol on 5th November 2008. This will be aimed at applicants for all Technology Strategy Board collaborative R&D Competitions. There will be an optional briefing day specifically for this competition in London

on 1st April 2009. These briefings are optional although potential applicants are strongly advised to attend one of the events if possible.

Applicants invited to submit a full proposal will need to send one representative of their consortium to the compulsory briefing on 20th May 2009. They will also need to register their intention to apply by 18th June 2009 and submit their full application by 25th June 2009. Applicants will be informed of the outcome of their applications by 24th July 2009.

## More Information

For more information about this and other competitions and details of how to register and apply, please see Competitions at [www.innovateuk.org](http://www.innovateuk.org).

Helpline:  
**01355 272155**

Email:  
[competitions@tsb.gov.uk](mailto:competitions@tsb.gov.uk)

## Key Dates

Competition opens	<b>16th March 2009</b>
Optional Briefing Day	<b>1st April 2009</b>
Expressions of Interest deadline	<b>23rd April 2009</b>
Feedback provided by	<b>11th May 2009</b>
Feedback discussion in week beginning	<b>11th May 2009</b>
Applicants briefing (compulsory)	<b>20th May 2009</b>
Registration of intent to submit (compulsory)	<b>18th June 2009</b>
Deadline for receipt of full applications	<b>25th June 2009</b>
Decision and feedback to applicants	<b>24th July 2009</b>

*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 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.*

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