

Technology Strategy Board

Driving Innovation



Design & Decision Tools for Low Impact Buildings

JUNE 2009 COMPETITION FOR FUNDING

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Summary

The Technology Strategy Board has allocated an indicative £4 million to fund highly innovative collaborative proposals in the field of design and decision tools for low impact buildings. The competition is part of the work of the Low Impact Buildings Innovation Platform, and is aiming to help the construction industry respond to regulatory and procurement driven markets for buildings which have less impact on the environment – low impact buildings. The design and decision tools area is characterised by barriers between disciplines and between successive design phases. The design and decision support tools that are currently used are also inadequate to support and inform the design of low impact buildings specifically.

This competition is focused on the development, enhancement and integration of building design and decision support tools to help achieve the Government's targets for zero carbon and low water usage, for new-build housing by 2016 and new build non-domestic buildings by 2019 for England and Wales. Similar targets are being considered for Scotland and Northern Ireland is aspiring to achieve zero carbon new build by 2011.

Background

The UK Government has set a number of challenging targets for improving sustainability, starting with the overarching goal of an 80% reduction in carbon emissions in the UK by 2050.

Some of the largest environmental impacts in the UK come from buildings. These include:

- 45% of total UK carbon emissions (domestic 27%, non-domestic 18%)
- 73% of current domestic emissions arise from space and water heating
- domestic usage accounts for 58% of the public water supply – all other uses account for 24%, with 18% being lost in the system

- 32% of all landfill waste comes from the construction and demolition of buildings

- 13% of products delivered to construction sites are sent direct to landfill without being used.

The UK cannot meet its declared environmental targets without dramatically improving the environmental impact of buildings over their entire lives.

To deliver low impact buildings we must close the loop between building design, operation and performance, ensuring the best guidance is available during the critical process of building design. Tools are required to help designers predict how buildings will perform in use, and to support the construction and operation of buildings. Investigation into current design and decision tools has shown that:

- Designers cannot easily predict the impact of alternative design decisions on building performance and cost – whether capital cost, whole life financial cost or carbon cost.
- Design professionals work in different ways – through sketches, physical models, 2D and 3D computer representations, and analytically – and thus have different requirements for representing and communicating design developments.
- Current tools only address the needs of one specialism or specific phase of the design process.
- Design support at the conceptual stage is particularly poor.
- Many current tools are not 'mainstream' or accessible to professionals in smaller practices.
- Available tools do not help communicate the impact of design options and decisions between professionals or between professional designers and their clients.
- It is difficult to incorporate learning from design outcomes in subsequent designs.

Better informed design, especially at the earliest conceptual stages, will improve

the design of individual buildings.

Better integration across disciplines and feedback of the impact of design decisions will improve understanding of the relationship between design decisions and environmental impact. Better accessibility to high quality design tools will enable better informed design to be delivered across the industry, including through the vast UK base of smaller practices and developers.

Scope for Applications and Key Challenges

Many tools have been and continue to be developed by specialists, software developers and suppliers of materials and components to support specific aspects of building design and the selection of materials and components. However there is still a need for integrated tools that facilitate the progress of a design from briefing, through concept, feasibility and detailed design, to construction, post occupancy evaluation and building management.

Additionally, design environments that enable new knowledge, analytical processes, materials and component data, standards, and design details etc to be incorporated and made accessible to practising professionals rapidly and effectively will improve the capability of the sector as a whole to design predictably low impact building. These are all characterised by requiring a collaborative approach to the development of design and decision tools which may not occur readily in response to market demand. But this can be stimulated and enabled by the funding made available through this competition.

Key challenges this competition seeks to address are:

- tools that provide dramatically better guidance of design decisions to deliver zero carbon and low impact buildings in the UK for 2016 and 2019
- tools that enable designers to make better decisions at every stage of the design process, based only on information typically available at that stage



- significantly improved accessibility to design and decision tools for all practising designers, however small their practice.

We welcome applications for support that involve:

- integration of established tools
- new ways of interacting with users – new interfaces – to encourage wider use
- new business models to encourage less experienced users
- extending the scope of tools to the conceptual phase of the design process
- developing modules that provide information on the cost and carbon impacts of choices of materials and components in the design
- enabling learning from buildings in use to inform later designs
- expanding design tools to provide cost and environmental performance data
- enabling sensitivity analysis of the impact of variations in design and operation
- extending the use of existing tools into the operational phase of the building
- proposals from consortia of users who want to commission software suppliers to tackle barriers to mainstream exploitation of tools.

Proposals will be assessed against the potential impact of the proposed project on creating lower impact as-built buildings, as well as the four Technology Strategy Board criteria:

- Significant UK research capacity to develop and exploit the technology.
- The size of the global market opportunity
 - create value added in the UK, taking account of the global market potential.
- Potential for significant impact in the right timescale.
- A clear Technology Strategy Board role:
 - To add value and address the barriers to achieving the Code for Sustainable Homes (2016) and Non-domestic buildings (2019) targets for as-built buildings.

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. We have allocated an indicative £4 million of Technology Strategy Board investment in this collaborative R&D competition for projects that address one or more areas indicated above and involve science-to-business or business-to-business working relationships. Additional EPSRC funding may be available for projects where there is a significant high quality academic component and which demonstrate added value to the EPSRC portfolio, by building on or being complementary to existing research programmes. In general, projects can range from small, highly focused basic research projects, aimed at establishing technical feasibility, through to applied research and experimental development projects aiming to produce technology demonstrators, or a mixture of these. We anticipate 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. We will consider projects involving industry-orientated basic research (75% public funding) 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 our website www.innovateuk.org under 'Competitions.' We expect most funding will be allocated to projects in the applied research category:

- Projects are typically expected to last 1-3 years, although applications will not be rejected on lengths exceeding 3 years.

- Typically a project would require investment of around £150k – £700k, although no project will be rejected on the grounds of size alone.
- Typically a project would aim to implement significant business change in a 3-5 year time frame.
- Ideally all projects should include at least one partner with defined end-user needs.
- We encourage projects that can demonstrate benefits to a number of business sectors.

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

Application Process

This collaborative R&D competition opens on 15th June 2009 and closes on 15th October 2009.

The Guidance for Applicants explains the process in detail. In short, to apply please submit a brief outline of the proposal on the **Expression of Interest** form for this competition by **23rd July 2009**. This will be reviewed and feedback will be provided by 21st August 2009. The Technology Strategy Board will then invite applicants whose proposal fits firmly within the scope of the competition to the full application stage. For these applicants, in the week beginning 24th August 2009, there will be opportunity to discuss the feedback with the Technology Strategy Board officials by telephone. Details can be found on the Competitions section of the website at www.innovateuk.org



Competition and Related Events

There will be a range of competition and industry-related events to support this competition where the Technology Strategy Board's Low Impact Buildings technologists and competition officials will be available to discuss the technical scope and formal competition process. Additionally representatives of the Modern Built Environment Knowledge Transfer Network will be running a range of industry-related events to provide additional support and networking opportunities for potential applicants. All events will require formal registration and this information will be available on the websites of the organisations concerned.

Forthcoming confirmed events

19th May 2009, London – Modern Built Environment Knowledge Transfer Network Consortia Building Workshop for the

Key dates

Competition opens	15th June 2009
Applicants' Briefing Day (optional)	24th June 2009
Expression of Interest deadline	midday – 23rd July 2009
Feedback provided by	21st August 2009
Feedback discussion (successful applicants only)	week beginning 24th August 2009
Full stage (for invited applicants) opens	1st September 2009
Applicants' Briefing Day (mandatory)	9th September 2009
Registration of Intent to submit deadline (mandatory)	8th October 2009
Deadline for receipt of full applications	midday – 15th October 2009
Decision and feedback to applicants	16th November 2009

Design & Decision Tools for Low Impact Buildings competition – further information is available on: www.mbektn.co.uk. For general enquiries on this event, please contact: information@mbektn.co.uk

24th June 2009, location to be confirmed – Technology Strategy Board Optional Applicant Briefing – Design & Decision Tools for Low Impact Buildings competition. Information and registration will be available from the competition helpline and website at: www.technologyprogramme.org.uk, tel: 01355 272155 or by e-mail to: competitions@tsb.gov.uk

Applicants invited to submit a full proposal will need to send one representative of their consortium to the **mandatory briefing on 9th September**, location to be confirmed. They will also need to register their intention to apply by 8th October 2009 and **submit their full application by 15th October 2009**. You will be informed of the outcome of your application on 16th November 2009.

Further Information

For more information about this and other events and details on how to register and apply visit www.innovateuk.org under 'Competitions'.

Competition Helpline:
01355 272155

Email:
competitions@tsb.gov.uk

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