Technology Strategy Board
Driving Innovation

Results of competition: Scaling up retrofit of the nation's homes

Total available funding for this competition was £5.067m from the Technology Strategy Board.

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
Cambridge Design Partnership (Lead) E.ON New Build & Technology Limited BASF Polyurethanes UK Limited University of Warwick	Development of cost effective foam external wall insulation system for mass adoption in the UK retrofit market	£748,469	£441,521

Project description (provided by applicants)

The UK housing stock presents particular challenges for retrofitting wall insulation in order to reduce carbon emissions and fuel costs. Cambridge Design Partnership is leading a consortium comprising of EON, BASF and University of Warwick to develop a new approach to external wall insulation, initially targeting properties built before 1944 which represent the bulk of the solid wall constructions. The team will be developing a complete deployment system based around BASF's foam insulation material that is applied in-situ rather than in rigid pre-formed boards.

The spray application of foam insulating material has been successfully deployed in the North American timber frame, new build market. The huge potential in the retrofit market has not been realised due to challenges concerning the cost and ease of installation along with difficulties associated with addressing wall penetrations and the intersection of wall to roof and wall to floor. The team will be addressing these challenges to create a system that has an attractive ROI, minimises disruption and is aesthetically pleasing.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Carillion Energy Services Limited (Lead) Birmingham City University Saint-Gobain Weber Limited CivicoLive Lime Technology Limited	Retrofit plus	£1,104,688	£752,143
Project description (provided by applicants)			
Retrofit Plus project comprises of a holistic package of approaches designed for increasing trust, quality and performance, and reducing the price of retrofit. The approaches include rapid assessment using dynamic simulation tools; an expert system for zero carbon solution design; off-site manufacture of insulation panels so as to minimise on-site time, reducing inter-skill barriers, and disruption to householders; ease of disassembly for adaptation to climate change and for ultimate recycling; continuous predictive control and monitoring; smartphone interfaces for real time user feedback; game technology that encourages competition in energy savings between individuals; and after care portfolio monitoring and pre-emptive and rapid response to performance problems. The project facilitates experimental investigation of different solutions for 100% carbon emissions reduction and end-user engagement and change of behaviour. Combined under a new business model, the project is designed to unlock the market potential and deliver substantial scaling up of retrofit.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Carillion Energy Services Limited (Lead) Building Research Establishment Limited Leeds Metropolitan University University of Salford Northern Ireland Housing Executive Collaborative Improvement Tensor Systems Limited VRM Technology Limited	S-IMPLER (S)olid Wall, (I)nnovative Insulation and (M)onitoring (P)rocesses using (L)ean (E)nergy efficient (R)etrofit	£1,647,510	£891,987

Project description (provided by applicants)

S-IMPLER (Solid Wall Innovative Insulation and Monitoring Processes using Lean Energy Efficient Retrofit) aims to develop a solution to the insulation of solid walls in the UK that is more cost effective than current solutions with minimal occupant disruption.

Working with NIHE, S-impler will focus on a specific type of solid wall, 1950s 'Wimpey No-fines' homes of which there are approx 5,000 in NI (300,000 in UK). The outcomes of S-impler will be relevant to many of the UK's 6.9m solid walled homes. Using lean and collaborative improvement techniques, S-impler will integrate several innovations into a single attractive commercial proposition which will be trialled on 5 NIHE homes:

• An innovative surveying tool

• A Building Information Modelling tool to allow client modelling of different options with costs and benefits

• A whole house monitoring system to assess real energy performance

• A new solid wall retrofit Certification scheme to transfer knowledge and assure quality.

We will achieve a 60% reduction in monitored energy costs, for the same capital cost as NI Building Regulations, less disruption, at least 10% faster, without reductions in quality and safety.

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
Encraft Limited (Lead) Beattie Passive Solihull MBC/SCH Coventry University	Simple, off-site, wrap-around approach to large scale retrofit	£667,219	£329,917
Project description (provided by applicants)			
This project aims to develop a rapid, highly replicable, and high quality approach to external insulation of walls and roofs by applying modern methods of construction to retrofit. The project aims to find and demonstrate economic ways to reduce fossil fuel carbon emissions and gas fuel bills by 75% in all types of buildings. New bespoke timber-framed building envelopes to retrofit properties will be designed using techniques developed for new build by Beattie Passive. The benefits of this approach include reduced cost and significantly reduced time on site. Techniques for delivering this approach at scale will be developed and trialled (including aftercare) by Encraft, who bring experience of large scale retrofit programmes, on a low rise accommodation block and two houses owned by Solihull Metropolitan Borough Council (SMBC). Tenant liaison and community engagement will be managed by Solihull Community housing and will be complemented by an 'occupancy skills' programme run by Coventry University. The retrofit will be monitored by Coventry University, with a view to providing a robust evidence base to support commercialisation of the fully costed whole-building solution at scale.			

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Environmental Process Systems Limited (Lead) AND Technology Research Limited Elmhurst Energy Systems Limited National Energy Foundation University of Nottingham Absolute Air and Gas Limited	Development of a novel low pressure technique for measuring the air tightness of buildings	£592,000	£421,000
Project description (provided by applicants)			
This project will develop a more efficient, accurate and assessor and occupant friendly means of determining the air tightness properties of an existing dwelling. This will help improve the accuracy of baseline performance assessments as well as the applicability and impact modelling of upgrade recommendations. The product will also make air-tightness performance and compliance checks more feasible and will fundamentally shift the existing air-tightness testing market from a small scale specialist service offering to one where assessors, advice providers, contractors and building control can all undertake leakage assessments themselves. Whilst fully recognising existing instrumentation, methodologies and other work in the field, this research and development project will be to build on past research undertaken by the University of Nottingham to realise a prototype instrument that provides a quicker, cheaper, more accurate and less disruptive means of testing air tightness in buildings at a low pressure. This will overcome known issues with the existing blower door method and make air-leakage testing much more accessible to wider industry.			

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EnvirUP Limited (Lead) Nottingham City Homes Limited University of Nottingham Church Lukas Limited Eurocell Profiles Limited Nottingham Energy Partnerships	EnvirUp EWI	£682,234	£413,393

Project description (provided by applicants)

This project focuses on increasing the energy efficiency of existing uninsulated UK homes constructed with solid walls (without cavity), which number over 7 million according to the UK Government statistics (2012), helping to reduce the effects of fuel poverty, improve inhabitants' comfort and reduce the impact of rising energy costs.

The overall aim of this project is to present the market with the factory produced EnvirUP external wall insulation, an innovative, practical, efficient and affordable solid wall external insulation solution for retrofit projects. The system is composed of a composite panel, produced in highly accurate extrusion made up of 100% recycled uPVC, filled with insulation and finished in a range of textures and colours. The EnvirUP system is unique compared to currently available systems, as it has a reduced cost, flexibility for final appearance, and ability to be fitted in all weathers. It also requires a lower level of installation skills than current systems, and may be fitted in most homes with solid walls. The project will research the performance and installation methods required to scale up the adoption of the product.

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Innovate at PRP Ltd (Lead) Total Flow Limited Institute for Sustainability Kent County Council Saint Gobain	Improving the process of delivering thermal retrofit to mass housing stock - to considerably minimise capital costs and installation programmes and deliver greater 'in use' performance	£1,148,739	£687,124
Project description (provided by applicants)			
The 'Improving the process of delivering thermal retrofit to mass housing stock' project aims to develop and refine retrofit solutions for housing which address the primary concerns of many householders when considering retrofit: cost, benefit and disruption. The project will develop a commercial solution which considerably reduces the cost of retrofit, minimises the installation time, provides quality work through a dependable and trusted local team and delivers lower heating bills and an improved indoor living environment for the householder.			

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Participant organisation names	Project title	Proposed project costs	Proposed project grant
The Energy Saving Co-operative (Lead) Retrofit Works Limited Penmarock Products Limited Loughborough University Energence Limited Rural Community Council (Leicestershire & Rutland) 2 Save Energy Limited	Co-operating to retrofit	£886,793	£615,018

Project description (provided by applicants)

While external wall insulation technologies are well proven, the installation supply chain is best suited to large social housing estates. Private homes are more diverse and more costly to insulate. Co-operating to Retrofit will combine the mutual co-operative business model, proven community engagement and social marketing principles, and innovative technological tools in a pilot project to roll out external wall insulation to private homes at a minimised cost – working with local community groups and local SME installers to recycle cash through the local economy.

The project is designed to be expandable and replicable in a variety of community and neighbourhood settings. The pilot incorporates a varied demographic and will capture data and case studies that will act as exemplars, and a friendly internet presence will help to disseminate the approach.

The consortium includes the Energy Saving Co-operative, Permarock Products, RetrofitWorks, University of Loughborough, Energence, Owl (2 Save Energy) and Rural Community Council (Leicestershire and Rutland) with local community groups.

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The Facility Limited (Lead) Q-BOT Limited Shadow Robot Company Limited Bristol Robotics Laboratory CityWest Homes Limited BASF Polyurethanes UK Limited Southend Council	Cocoon	£872,215	£515,475
Project description (provided by applicants)			
Cocoon will investigate the use of innovative UK capabilities to the retrofit of insulation, aiming to reduce the requirements for material and workers on-site, eliminate the need for scaffolding and wet trades, improve the speed and quality of construction, and ease the burden on the occupier. The project will result in initial proof-of-concept systems, with a scalable business model to roll out the technology as a new "skilled trade".			