

MISSION INNOVATION

Accelerating the Clean Energy Revolution

Affordable Heating and Cooling of Buildings Innovation Challenge – Progress Summary

Issue

Globally, buildings account for almost a third of final energy consumption, with space heating and cooling (H/C), and the provision of hot water, accounting for approximately half of this consumption. Space cooling is a fast growing sector. The H/C sector is extremely fragmented along: 1) local climatic conditions; 2) technologies; 3) age of installed stock; and 4) energy sources exploited. Most of the energy demand for H/C is currently satisfied with fossil fuels (natural gas, fuel oil and coal) with far less use of renewable energy sources. This is due to various obstacles, ranging from technical, financial, legal, social, and cultural.

Objective

The objective of the Affordable Heating and Cooling of Buildings Innovation Challenge is to make low-carbon heating and cooling affordable for everyone. This will be achieved by developing systems and measures to provide affordable solutions for the decarbonisation of the H/C sector through encouraging increased and better-targeted investment by public and private sector investors, and through the promotion of increased collaboration among the Innovation Challenge Members and between public and private sector investors.

Organization

The Affordable Heating and Cooling of Buildings Innovation Challenge is led by the United Kingdom, the United Arab Emirates, and the European Commission.

Other participating members include: Australia, Brazil, Canada, China, Denmark, Finland, France, Germany, India, Italy, Mexico, Norway, Saudi Arabia, Sweden, the Netherlands and the United States.

Approach

The exploitation of low-carbon energy sources for H/C offers safe, reliable and increasingly cost-competitive solutions. In order to realise this potential, and considering the MI global context, we have agreed to focus on a number of relevant "*cross-cutting*" technologies. In this way, the identified priority areas are specific enough to focus efforts but broad enough to engage all participating members, and be consistent with their diverse heating and cooling demands. These areas are: 1) thermal energy storage; 2) heat pumps; 3) non-atmospheric heat sinks and sources; 4) predictive maintenance and optimization; 5) building-level integration; and 6) physiological studies.

Under these headings, existing research activities will be reviewed and workshops of international experts convened to identify gaps, develop targets to measure success and scope further research needs. The workshops will promote collaboration between members on existing research and develop new research challenges, which will provide targets to track progress and set a framework with investors and industry to transition research and development into deployment in future years.

Progress

The Affordable Heating and Cooling of Buildings Innovation Challenge has focused on building a shared understanding of key issues to address. The Innovation Challenge has undertaken a thorough analysis of technical aspects of the H/C sector, taking into consideration climatic conditions and H/C needs in each geographical area. A number of cross-cutting themes insufficiently addressed by current activities were identified and selected as the focus of the Innovation Challenge:

N°	Priority Area	Relevant for heating	Relevant for cooling
1	Thermal energy storage	***	*
2	Heat pumps	***	**
3	Non-atmospheric heat sinks and sources	*	***
4	Predictive maintenance and optimization	***	***
5	Building-level integration	***	***
6	Physiological studies	**	***

Next Steps

- Establish a register of members' interest in specific priority areas to help identify potential partners for collaboration. (May 2017)
- Collate a record of relevant research being undertaken by members in their priority areas of interest, which can inform MI members' decisions on national activities and inform more detailed discussions on key gaps and opportunities. (End of June 2017)
- Hold workshops for priority areas, bringing together technical experts, private sector actors and policy makers worldwide to further define innovation needs, develop specific success criteria, review existing activities, identify critical gaps, and outline innovation and investment opportunities to innovators. (By the end of 2017)
- Technical workshops will be held to define technical focus areas and relevant targets for each priority area. Through collaboration between member countries, opportunities for new research to meet defined targets will be identified by mid-2018 and further explored. (2018 onwards)
- Members will look to facilitate research activities in their priority areas and report on technical findings and possible improvements. Progress will be tracked against technical targets and the Innovation Challenge will take a strategic approach to raising opportunities presented by developments with government and industry, to transition research and development into deployment. (2019-2020).