

Resilient Cooling

ANNEX 80

Resilient cooling is used to denote low energy and low carbon cooling solutions that strengthen the ability of individuals, and our community as a whole to withstand, and also prevent, the thermal and other impacts of changes in global and local climates, particularly with respect to increasing ambient temperatures and the increasing frequency and severity of heat waves. According to this definition, resilient cooling includes technologies and solutions that:

- reduce externally induced heat gains to indoor environments;
- offer personal comfort apart from space cooling;
- remove heat from indoor environments;
- control the humidity of indoor environments.

This project focused on resilient cooling applications for existing residential buildings, typically with building management systems available and for nearly zero energy buildings. The project encompassed both active and passive cooling technologies and systems. A range of related technologies were evaluated regarding minimisation of energy use, greenhouse gas emissions and other critical environmental and socio-cultural impacts. Furthermore, the project closely connected with activities such as Mission Innovation's Challenge #7: Affordable Heating and Cooling of Buildings, the Kigali Cooling Efficiency Programme and the IEA Global Exchange on Efficiency: Cooling.

ACHIEVEMENTS

The project successfully investigated resilient cooling applications against a variety of external parameters such as climate, building typologies, internal loads and occupancy profiles, various levels of building management systems capabilities and automation, new buildings and retrofitting of existing buildings.

PROJECT OBJECTIVES

- 1 assessing benefits, potentials and performance indicators,
- 2 identifying limitations and bottlenecks and provide guidance on design, performance calculation and system integration,
- 3 researching towards implementation of emerging technologies,
- 4 extending boundaries of existing solutions, including user interaction and control strategies,
- 5 demonstrating the performance of resilient cooling solutions, and
- 6 developing recommendations for regulatory contexts.

The following reports have been published as the official project deliverables:

- comprehensive resilient cooling technology profiles including instructions for successful system design, implementation and operation,
- specific resilient cooling research and development reports,
- well documented case studies and success stories,
- recommendations for the integration of resilient cooling in legislation and standards.

INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established as an autonomous body within the Organisation for Economic Co-operation and Development (OECD) in 1974, with the purpose of strengthening co-operation in the vital area of energy policy. As one element of this programme, member countries take part in various energy research, development and demonstration activities. The Energy in Buildings and Communities Programme has co-ordinated various research projects associated with energy prediction, monitoring and energy efficiency measures in both new and existing buildings. The results have provided much valuable information about the state of the art of building analysis and have led to further IEA co-ordinated research.

EBC VISION

By 2030, near-zero primary energy use and carbon dioxide emissions solutions have been adopted in new buildings and communities, and a wide range of reliable technical solutions have been made available for the existing building stock.

EBC MISSION

To accelerate the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge and technologies through international collaborative research and innovation.



Examples of resilient cooling related features.

Source: Institute of Building Research & Innovation, 2023

Project duration

Completed (2018 - 2024)

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Further information

www.iea-ebc.org