

Energy Resilience of the Buildings in Remote Cold Regions

EBC ANNEX 93

Thermal energy systems' resilience is especially important in extreme climates. While metrics and requirements for availability, reliability, and quality of power systems have been established, similar metrics and requirements for thermal energy systems are not well understood despite the clear need for such metrics in the earth's cold regions.

This project is developing technical, economic, environmental, policy, and societal frameworks that will result in the development of guidelines for improving the resilience of buildings and building communities located in cold and very cold climates through an international research and development project. The project is also considering the interdependent and interconnecting essential services, logistics, and supply chains for materials and services that enable and maintain the resilient critical functioning of buildings and their occupants.



Source: EBC Annex 93

PROJECT OBJECTIVES

- 1** Identifying major threats specific to cold regions that hinder the normal operation of buildings and energy systems; developing definitions, frameworks, and key performance indicators for energy-resilient buildings, communities, and energy supply systems; and establishing requirements for habitability, survivability, indoor air quality, and buildings sustainability levels in cold regions for blue and black skies operations
- 2** Surveying existing buildings and communities, and document case studies with practices that promote resilience and reduce health and infrastructure risks in cold regions
- 3** Assessing concepts of existing and planned net and nearly zero carbon buildings and communities in terms of their technical, social and economic performance and developing guidelines to implement needed technical solutions for energy-resilient buildings and communities in countries with cold regions / climates
- 4** Disseminating best practices for planning and construction of energy-resilient buildings and communities in cold regions through technical papers, conference presentations, and training

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.

The following project deliverables are planned:

- Literature Survey which includes the collection of sufficiently robust and detailed information accumulated across cold regions (policy, climate information, building technical system engineering and mechanical system engineering, impact on occupants, environment, social and economic).
- Impact Assessment Data which includes the overall framework to be developed and collected through stakeholders, projects, etc, to assess the techno-economic, social, and environmental impact.
- Simulation and Real Case Data Collection, Pilot Cases, and Demo Cases. Simulations will be used for detailed analysis using real data and for parametric analysis.
- Stakeholder Engagement through real Annex related projects, workshops, and conferences.
- Evaluation and Analysis based on best practices of resilience in buildings and communities.
- Dissemination through developing and publishing of

Project duration

Ongoing (2024 - 2028)

Co-Operating Agents

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Further information

www.iea-ebc.org