EBC

Energy in Buildings and Communities Programme

Factsheet

# Flexibilisation and Optimisation of Heat Pump Systems in Existing Buildings through Secondary-side Digitalisation

## EBC ANNEX 98

The energy landscape is undergoing a dramatic transformation. Global trends push towards improved energy efficiency, accelerated integration of renewable energy sources, and a reduction in reliance on fossil fuels. This project is focused on the utilisation of digitalisation measures of heat pump systems to optimise the operation of heat pump-based heating systems in buildings and to create safer, more efficient, and environmentally sustainable heating infrastructures.

It is addressing these aims and is focusing on secondary side optimisation of heat pump systems through extensive digitalisation of such systems. This is intended to lower system temperatures on the one hand, which allows for a more efficient and optimised operation of the heat pump system. On the other hand, the utilisation of flexibility potentials through the increased and optimised use of heat pumps in an energy system dominated by fluctuating input from renewable energy sources should be demonstrated.

The following project deliverables are planned:

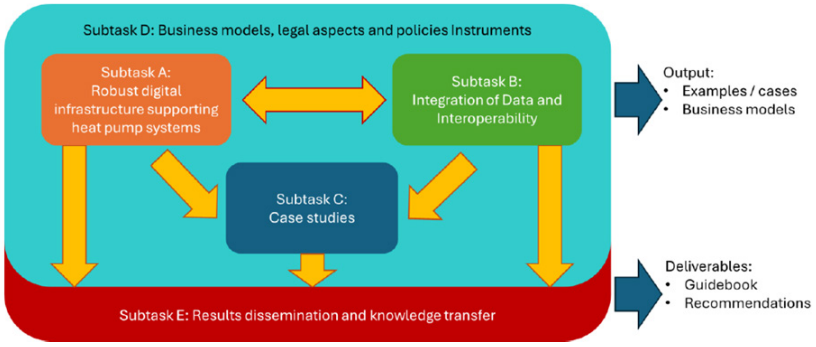
- guidance on resilient digital infrastructure that guarantees secure, seamless communication between heat pump systems and their upstream components, including the deployment of reliable sensor networks, standardised communication protocols, robust cybersecurity measures, and real-time data aggregation;
- guidance on integration of diverse data streams from sensors, control modules, and upstream infrastructures into a unified platform that enhances system resilience through adaptive, real-time control;
- grounding the digital transformation initiative in practical experience by reviewing and benchmarking

### PROJECT OBJECTIVES

1. raising awareness of the advantages of integrating signals and data from several areas to ensure that heat pump systems in buildings operate as efficiently as possible
2. looking into ways to standardise data transmission protocols and ensure interoperability between the upstream infrastructure and the components of heat pump systems
3. evaluating non-technical obstacles and facilitators, such as business models, legal considerations, and policy tools, for the digitalisation of secondary heat pump system processes
4. build on findings from IEA HPT Annex 57, IEA DHC Annex TS4, and IEA DHC Annex TS9 to offer an up-to-date, cutting-edge overview of the digitalisation of heat pump systems and associated secondary-side systems in the form of research and development projects, demonstrations, and case studies
5. disseminating the findings of the project via knowledge transfer activities such as contributing to national workshops and special conferences, developing a guidebook which will be electronically available, and publishing in scientific journals and at conferences

successful case studies from existing research and development projects and demonstration plants or buildings;

- explore market opportunities, legal constraints, and regulatory frameworks necessary for the widespread adoption of digital heat pump systems;
- collect and distribute information on ongoing and finished work, including setting up an information platform and organising seminars and workshops.




*Project structure of EBC Annex 98*

*Source: EBC Annex 98*

**Project duration**
Ongoing (2026 - 2029)

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**Participating countries (provisional)**
Austria, Belgium, Denmark, France, Germany, Italy, Sweden, United Kingdom

**Further information**
www.iea-ebc.org

### 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.

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