

Annex 50

Heat Pumps in Multi-Family Buildings for Space Heating and Domestic Hot Water



The use of heat pump systems in apartment buildings is possible and already practiced, as shown by many good examples from several countries. Nevertheless, there is still no evidence of a wider use of this solution for heat supply; the reasons being both of administrative and technical nature. More standardized solutions are needed.

Key Findings

- 1** The use of heat pump systems in apartment buildings is possible and already practiced, as shown by many good examples from several countries. The variety of multifamily buildings and their characteristics make it possible to apply various technical solutions based on heat pumps.
- 2** At the same time, this diversity leads to individual solutions which are difficult to apply on a large scale. Therefore more standardization of solutions in multi-family Buildings is needed.
- 3** There is still no evidence of a wider use of heat pumps in multifamily buildings for heat supply. The challenge to apply heat pump technologies and renewable energy in multi-family buildings is rather complex. Both administrative (e.g., property rights) and technical challenges stand in the way to a broad implementation of the technology.
- 4** The main technical barriers to overcome are the required heating capacity and supply temperature as well as access to the heat sources for the heat pump.

“Solution matrix”

A general classification of heat pump solutions for multifamily residential buildings was elaborated, see Figure 2 and Annex website. The solutions are described in a standardized way according to eight representative categories. Overall, 13 solutions were identified, ranging from a fully centralized system to a completely decentralized system. The solutions were grouped into five “families”, each grouping specific sub-solutions. The purpose of the solution matrix is to give guidance to designers, planners and installers.

Case studies database

Parallel to the theoretical classification of the solutions, numerous case studies representing implementation of heat pumps in multifamily buildings were collected. The cases show a wide variety of possibilities for use of heat pumps. To reflect the holistic approach and to illustrate the practice, each case study is connected to a corresponding solution in the solution matrix, see Figure 2 and Annex website.



Figure 1. Examples of multi-family buildings described in case study database of Annex 50.

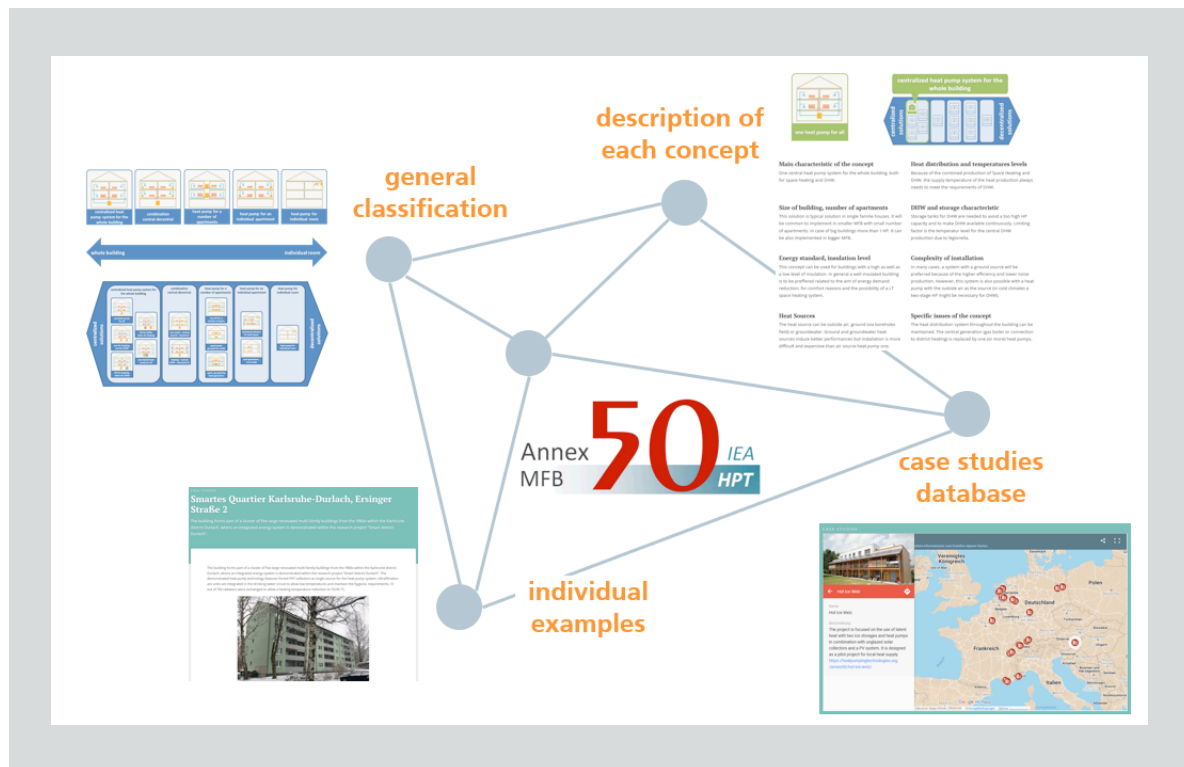


Figure 2. Main elements of the “solutions matrix”, the holistic result of the Annex 50

Background

Annex 50 was covering a comprehensive range of topics that relate exclusively to multifamily buildings. Within this Annex, the variety of key aspects for usage of heat pumps in multifamily buildings have been considered. The outcome of the Annex allows to understand better the technical and non-technical barriers, presents in a comprehensive way different theoretical solutions of heat pumps implementation in multifamily buildings as well as visualises a numerous case studies showing the practical implementation.

The approach of the Annex 50 was to find the way to create a holistic (integrated) method of presenting its results, as well as to work on all Tasks simultaneously. The result of this approach is a “solutions matrix”. Each part of the matrix can be used or presented as a standing alone component and is connected to a specific Task of the Annex.

Objectives

The objectives of this Annex were:

- » Enhancement of heat pump systems and/or heat pump components for their adaptation in multi-family buildings (scalable power range, high-temperature heat pumps, double stage compressors, inverter technology, etc.)
- » Demonstration and monitoring of technical solutions

Further information

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Publications:

Final reports of Annex 50 and Executive Summary of Annex 50, available at <https://heatpumpingtechnologies.org/publications/>

Internet:

[Link to Annex 50](#)