Case Studies

https://heatpumpingtechnologies.org/annex57/

Flexi-Sync, Sweden

Flexible energy system integration using concept development, demonstration and replication

Flexi-Sync aims to optimize the flexibility in the district energy sector, a sector with untapped potential to balance the energy system.

KEY FACTS

RD&D Status:
Demonstration

Type of heat pump:
Decentralized heat pump

Building description:
Two multi-family residential buildings

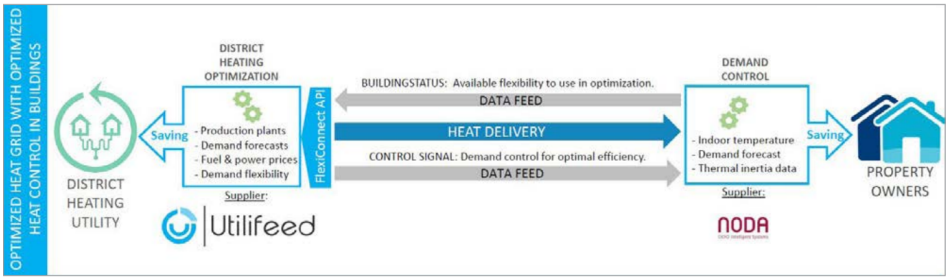
System:
District heating and cooling systems combined with decentralized heat pump

Energy Storage:
Centralized thermal storage and thermal inertia of buildings

Control for the flexible heat pump operation:
On/off heat pump control via sensor override technology from Noda connected to Utilifeed's platform

General description:
Exhaust air heat pump

Source:
Exhaust air



Summary of the project:

The Flexi-Sync project has gathered academics and industry representatives with a shared vision to increase and optimize the use of both demand and supply side flexibility in district heating and cooling systems – an invaluable asset to attain energy system decarbonization. The types of flexibility considered in the project are:

i) Combined heat and power plants, heat pumps, the district heating network, and centralized thermal energy storages on the supply side.

ii) Individual heat pumps and thermal inertia of buildings serving as storage on the demand side.

One of the goals was to demonstrate implementations of optimized flexibility at the demo sites in the project. The primary method for achieving this has been to develop a cloud-based solution that handles the end-to-end (end-user to energy company) optimisation and utilise it in the tests at the demo sites. The work was mainly performed by project partners Utilifeed and NODA in close collaboration with the demo site partners

Case Studies

https://heatpumpingtechnologies.org/annex57/

ANNEX 57

Flexibility by implementation of heat pumps in multi-vector energy systems and thermal networks

Demonstration in Eskilstuna:

One of the demo sites in the project was two buildings in Eskilstuna that have both district heating and individual heat pumps. These buildings were equipped with Noda's control system and through that, connected to Utilifeed's platform. The heat pumps in the buildings could then be turned on or off, based on if the marginal production cost of district heating was cheaper than producing heat with the heat pumps or not. The actual optimizations were performed by the Eskilstuna Energi in Utilifeed's platform, and the control of the heat pumps was made automatically.

Results:

- Operational optimisation with demand flexibility is proven to work in practice, it is economically viable and can significantly reduce CO2 emissions.
- Easy control of building heat pumps by the energy company, with a connection to the flexibility provider.
- Lower total production cost, due to increased flexibility in the heating system.
- An optimization software that can handle demand side flexibility (like building heat pumps).

FACTS ABOUT THE PROJECT

Place:
Sweden / Eskilstuna

Time Frame:
2019-2022

Project owner/leader:
IVL Svenska Miljöinstitutet

Project participants:
Eskilstuna Energi Eskilstuna kommunfastigheter NODA Intelligent Systems Utilifeed (involved in the Eskilstuna demo site, for all project partners in the project, see https://www.ivl.se/projektwebbar/flexi-sync.html)

Published articles:

Selvakkumaran, S et.al. (2021). How are business models capturing flexibility in the District Energy (DE) grid?, Energy Reports, Volume 7, Supplement 4, Pages 263-272, ISSN 2352- 4847 https://www.sciencedirect.com/science/article/pii/S2352484721007484

Other Flexi-Sync publications: https://www.ivl.se/projektwebbar/flexi-sync/publications.html

Contact Information/Links

Filippa Sandgren
+46760103545
filippa@utilifeed.com

https://www.ivl.se/projektwebbar/flexi-sync.html

https://www.utilifeed.com/

IEA Technology Collaboration Programme on Heat Pumping Technologies (HPT TCP)

Delivered by:

Team Sweden

Case Studies

https://heatpumpingtechnologies.org/annex57/

ANNEX 57

Flexibility by implementation of heat pumps in multi-vector energy systems and thermal networks

IEA Technology Collaboration Programme on Heat Pumping Technologies (HPT TCP)

Delivered by:

Team Sweden