

P+D nanoverbund

Work package 5

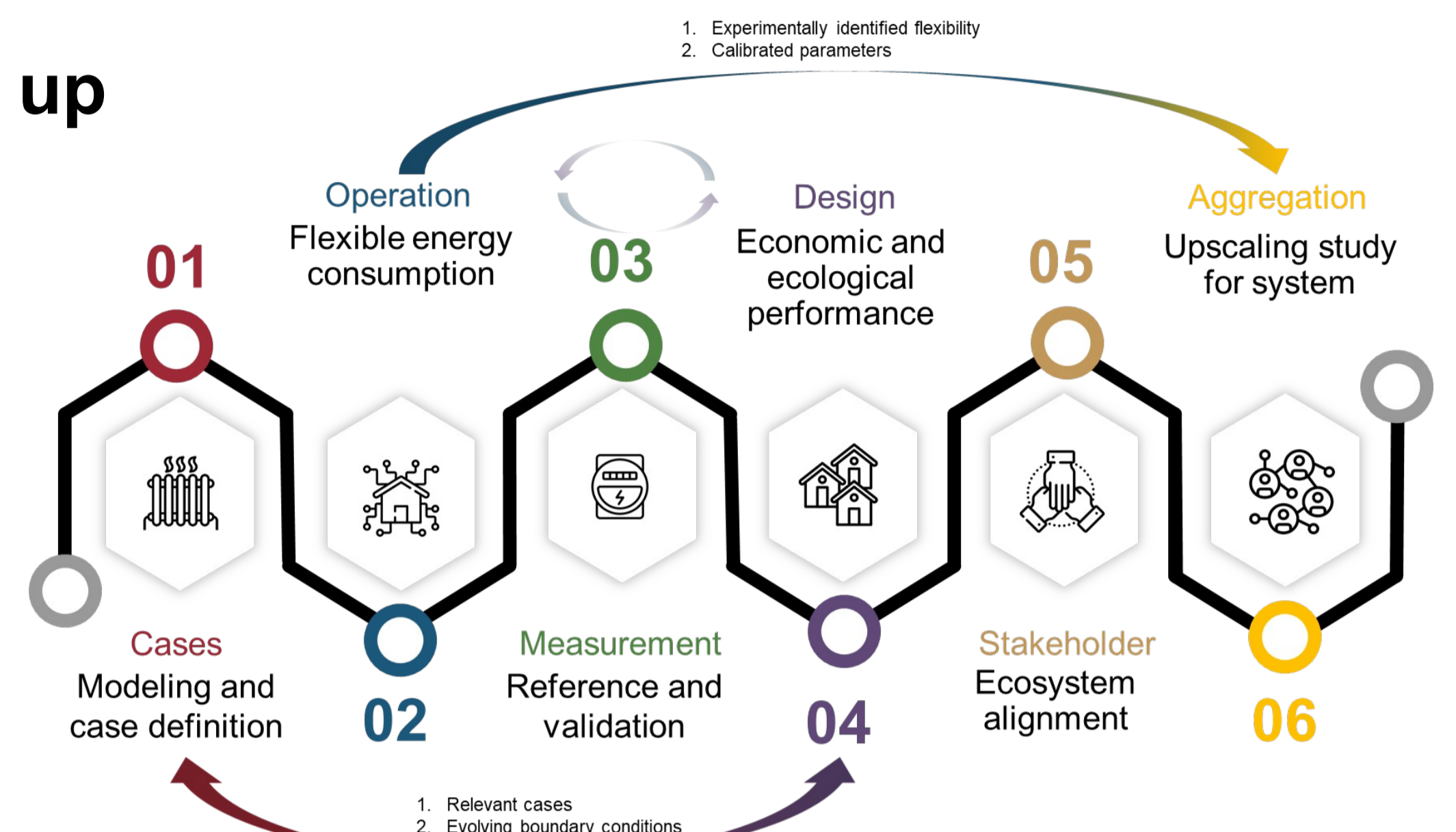
Hanmin Cai¹, Philipp Heer¹, Matthias Brandes¹, Reto Fricker¹, Philipp Schütz², Willy Villasmil², Ueli Schilt², Sarah Schneeberger², Curtis Meister², Lucas Miehé³, Gabriela Hug³, Carlo Tajoli³, Julien Marquant⁴, Dominik Born⁵

¹Empa ⁴Sympheny
²HSLU ⁵IWB
³ETH

Project motivation

The conceptual idea behind a nanoverbund is to **thermally connect close-by buildings**. This thermal connection allows for an energy exchange between already existing heating system of the participating buildings, similarly to "prosumer communities" (ger. ZEV – Zusammenschluss zum Eigenverbrauch) which are exchanging electrical energy behind a common metering point. Especially in cases where the connected buildings **possess different heating systems** and/or renewable energy sources and storages, or differing energy demand profiles, interconnecting individual systems leads to synergies between the buildings, and may benefit the distribution grid operators.

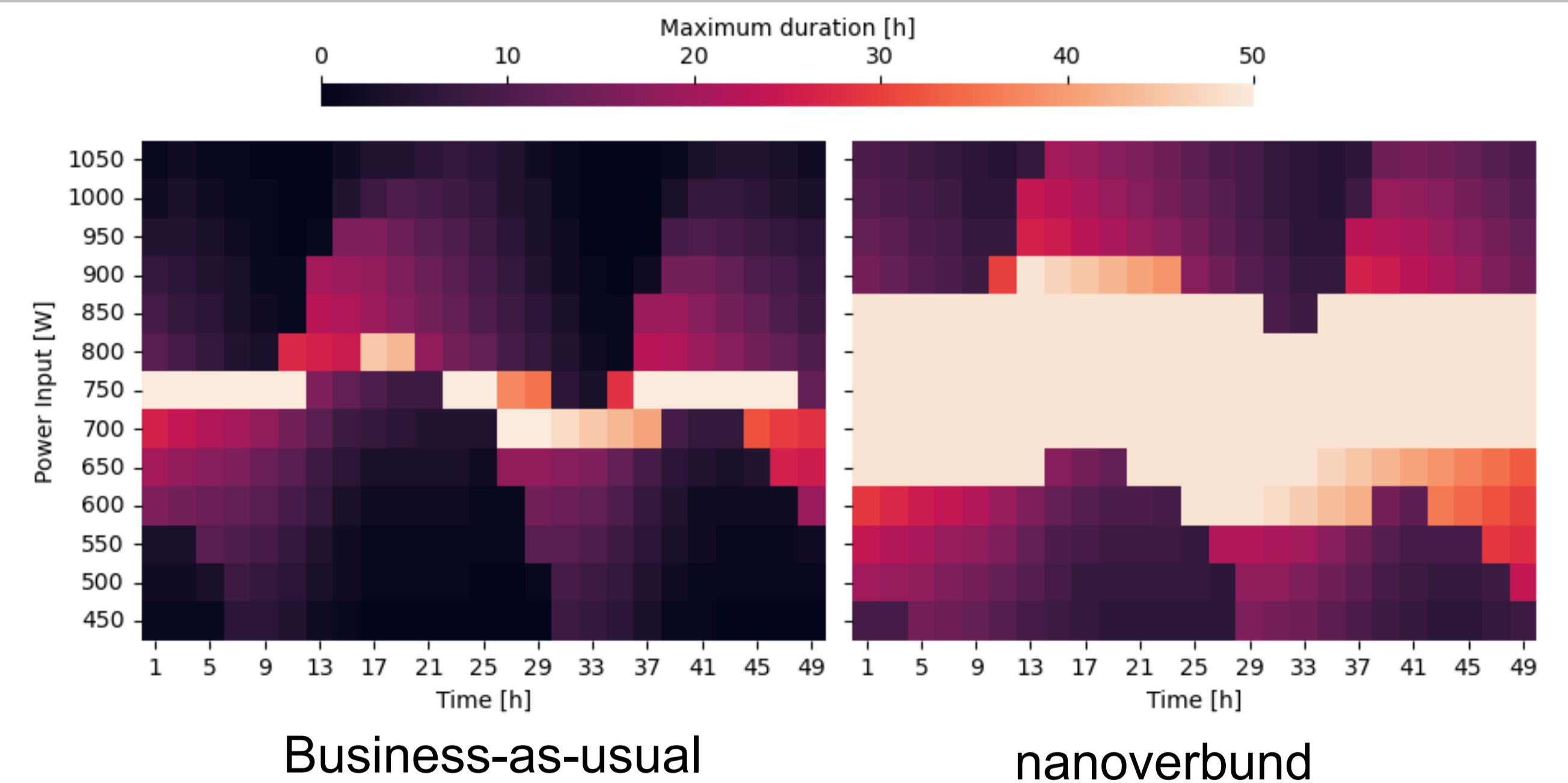
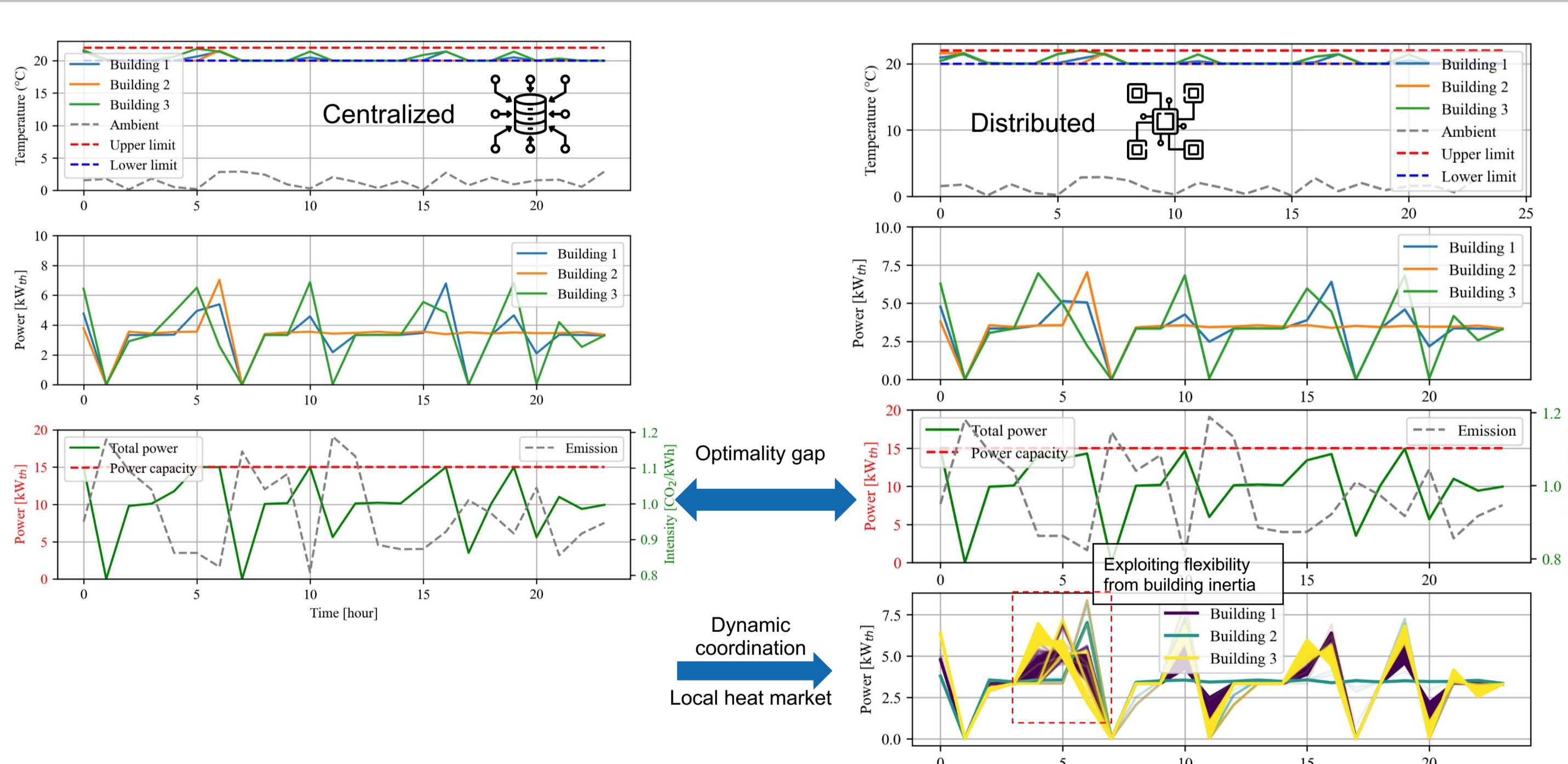
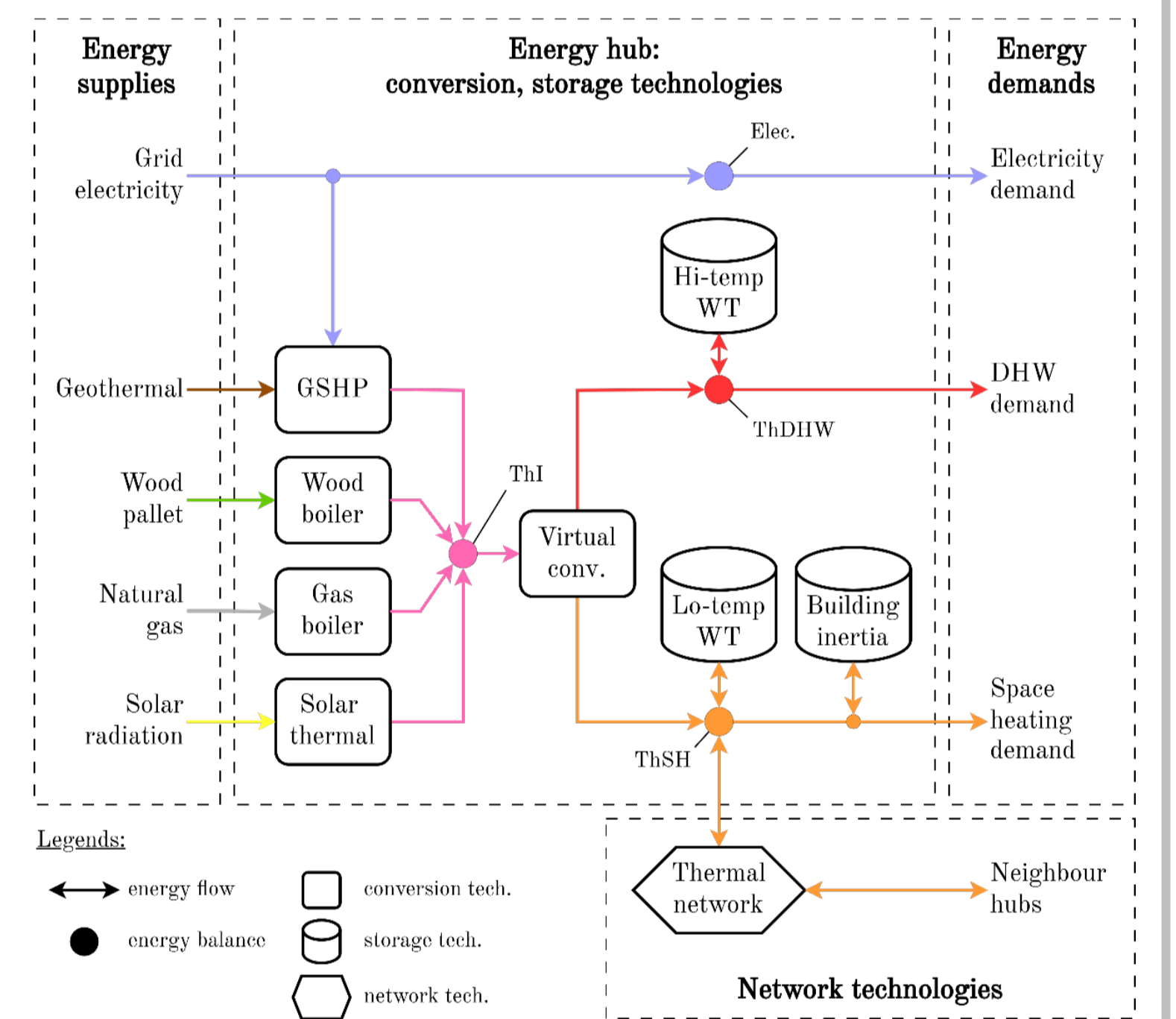
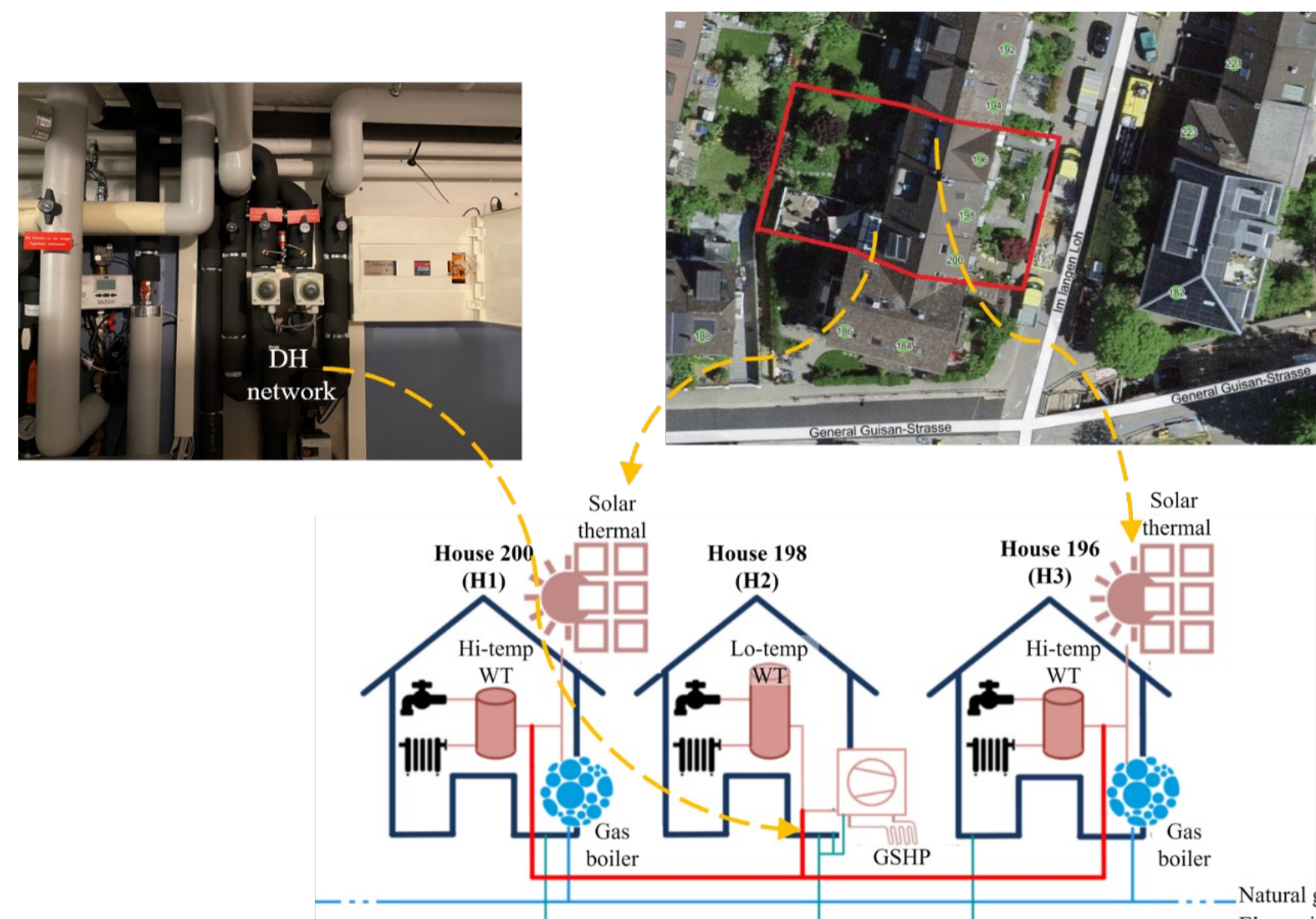
Pilot Set up



Project description

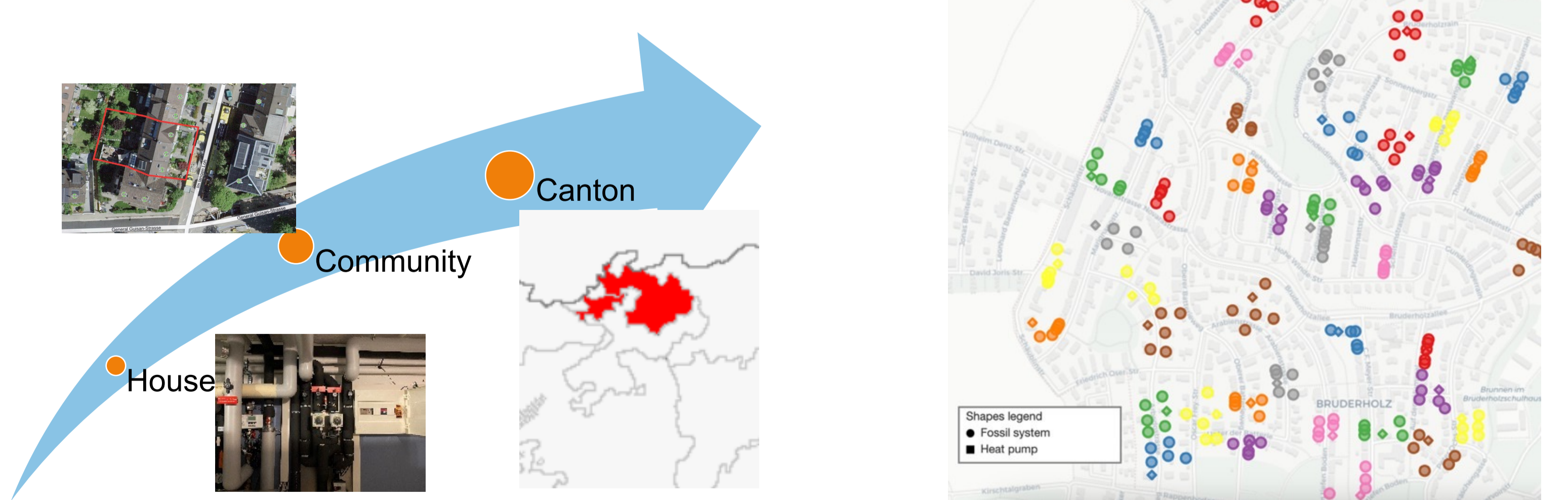
Heating systems in buildings are designed to provide sufficient heating for the coldest expected days of the year. So, for most parts they are **underutilized**. A retrofitted nanoverbund can also provide **more flexibility potential** to upper layer distribution grid operators or energy providers.

Especially in the presence of heterogeneous building energy systems, energy storage and conversion technology can be utilized for the benefit of all parties/stakeholders. A pilot site installation of three buildings in the City of Basel shall be operated by a flexibility aware control scheme in order to demonstrate the potential of the nanoverbund concept.

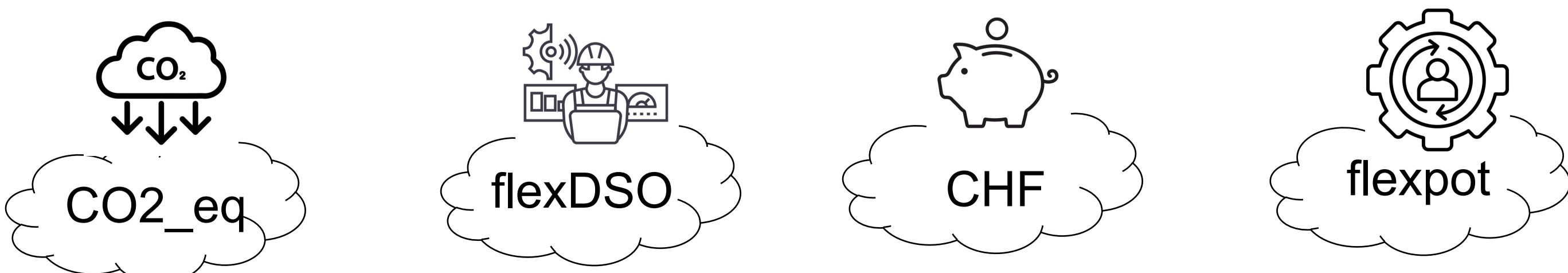


Key takeaway:

- **Coordinating** the move to buildings with shared heating systems **benefits society more than** every building making their own changes **individually**.
- In many cases, **nano heating** system already prove to be more **cost-efficient** than individual solutions.
- Instead of subsidizing heat pumps in every building, adopting a strategic approach by **partially funding both heat pumps and the nano heating network within specific neighborhoods**.



nanoverbund KPIs



CONTACT

Hanmin Cai
Empa
UESL
Phone: +41 58 765 4077
hanmin.cai@empa.ch
www.sweet-pathfndr.ch

ACKNOWLEDGMENTS

This work was sponsored by the Swiss Federal Office of Energy's: "P+D" office and "SWEET" programme.