



## IDEAS4cities

### Integration of Decentralized Energy Adaptive Systems for cities

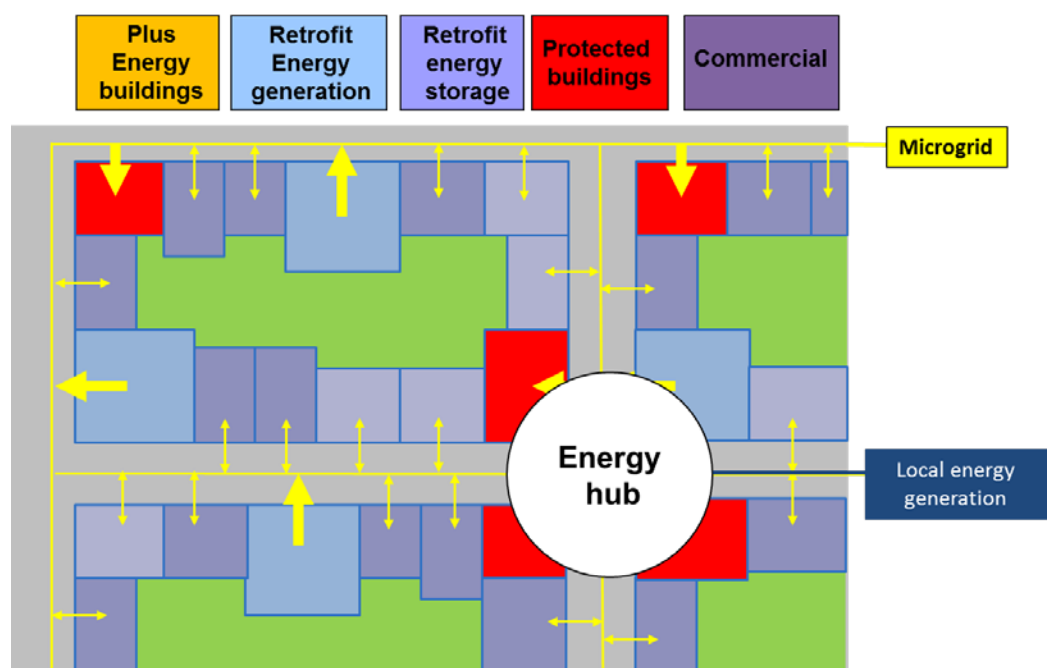
The increasing use of energy from decentralized renewable sources such as solar, wind, or geothermal heat causes an important re-engineering of the energy infrastructure. To efficiently integrate renewables in city quarters or communities, energy systems of the future have to be able to manage fluctuating and distributed power sources, store energy, convert energy from one carrier to another (e.g. electricity to heat, natural gas to heat, thermal solar or bio-mass water heating and hot water storage, etc.) and sufficiently supply electricity, heat, cold, gases or fuels to the community.

The **IDEAS4cities project** aims to convert building quarters and cities to self regulating energy systems by introducing the concepts of the urban energy hub, a facility that manages the energy flows within a city quarter or community, and the urban microgrid, a small-scale urban energy system which integrates electrical and thermal local generation, loads and storage.

In the project simulation models of urban energy hubs and urban microgrids for a cluster of buildings or city quarters will be developed and coupled to city energy models, which simulate the energy demand, generation, storage and management of the buildings in the city.

The goal is to study different cases of implementation such as the development plan of a city quarter, a city centre with historic buildings, or rural communities where an integrated energy-adaptive system could be successfully and profitably implemented.

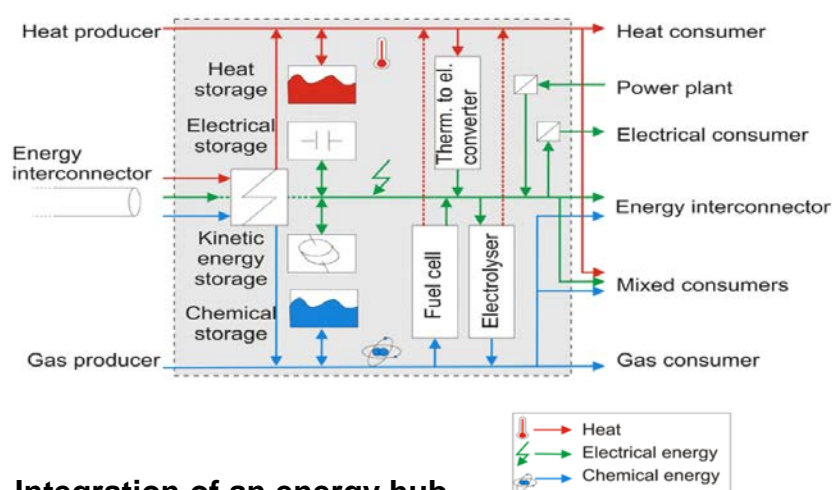
Additionally, the NEST testing facility, which serves as a real scale model for a neighbourhood, and the EPFL microgrid testing facility will be used for validation and demonstration of the IDEAS4cities concept.



**Adaptation of communities towards SELF-REGULATING ENERGY systems**



**NEST testing facility at Empa**



**Integration of an energy hub**

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