

Chalmers – Innovative Energy Management

Participants: Chalmers tekniska högskola, Göteborg Energi, HSB Göteborg

Category: Customer-side systems

Time plan: Started October 2018

Web: <https://www.hsb.se/hsblivinglab/Research/energi/iem-hsb-living-lab/>

Contact person: David Steen, Chalmers

Location: HSB Living Lab, Göteborg

Possible to visit: Yes

Background

In the HSB Living Lab in Gothenburg, HSB together with Chalmers and are trying several different aspects of the smart home in realistic conditions. The building serves as a testbed in several different aspects, where energy is one, and several projects have been initiated to test how new technology interacts with the building, other systems and the people living in the house.

One of the projects in the area of energy is the Innovative Energy Management system, that aims to optimize the energy usage in the building.

Implementation of the project

The system continuously monitors the energy usage in the building and combines this information with forecasts on how the energy usage will look in the upcoming hours. As the building also has access to storage in the form of batteries and warm water tanks as well as heat pumps, these are also included in the management of energy within the building. By using energy forecasts, the system can determine how to use energy from the different sources more efficiently. Loads that can be moved in time are delayed in order to lower the peaks in load within the building.

Benefits

The Innovative Energy Management reduce peaks in the demand by managing the energy use over time and integrating energy storages. Simulations show that the power demand at peaks can be lowered by nine percent, which both decreases the load on the grid and have economic incentives for the customer, as this can significantly cut into the electricity bills.

The combination of forecasts and automation allows for a more robust energy management than systems that relies more on the user. Solutions that are tested in this project, for example delaying the washing machine according to energy availability, is in itself not complicated or new, but can prove more viable as a part of a complete power management system within a building.

Scalability

As the Innovative Management System is still in an early phase, it is not completely clear how scalable it is. As its purpose is to operate within a single building, scalability is rather relevant for several systems connected to each other and their interaction with the grid.

Interoperability

The IEM system is presently tested in a living lab, which has different properties than a regular residential building. This means that the interoperability with other systems is hard to compare, and that this will be needed to be evaluated at a later stage.

Investment horizon

IEM is in an early research stage, which make the investment horizon hard to estimate.

*Examples of smart grid solutions in Sweden,
compiled by Energiforsk for the Swedish Smart Grid Forum, 2019*

International potential

Energy management systems are becoming increasingly common and advanced in new building projects, and useful systems that manage power flows will be in the interest of both property owners and grid operators.