Brf Viva – Smart optimisation and control with battery storage

Participants: Riksbyggen, Volvo Bussar, Göteborg Energi, Brf Viva and Johanneberg Science Park. The energy storage is a part of Riksbyggen's project Positive Footprint Housing. Associate partners are Stena Metall, Chalmers, Västra Götaland region and RISE. The project is partly financed by the EU Horizon 2020 project IRIS, in which seven cities, including Gothenburg, develop and test smart and sustainable energy, mobility and ICT solutions, and share the solutions in Europe.
Category: Renewable and distributed generation integration, Customer-side systems
Time plan: Started in november 2018 and is expected to end in 2023
Web: https://www.riksbyggen.se/globalassets/1-riksbyggen/2-bostad/1-bostadsratter/vastra-gotaland/brf-viva/lagring-av-el-i-begagnade-bussbatterier-i-riksbyggen-brf-viva.pdf
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Location: Gothenburg
Possible to visit: Yes

Background

In the project a battery storage is installed in the residential block Brf Viva, that houses 132 apartments. The battery storage is integrated with the energy system of the buildings, which also includes photovoltaic cells on the roof of the buildings. In addition to this, an intelligent control system manages the power flows within the system.

The project aims to provide a better understanding of how the energy system can be optimised from a residential housing perspective and as part of the larger energy system in Gothenburg. The battery storage stores locally produced solar energy, and this energy can be used within the residential block, for charging electrical vehicles and in connection to the external power grid. During the research project, the electricity storage is one part of the energy system that also includes the photovoltaic cells, the electricity network connection, boreholes, heat pumps, accumulator tanks and district heating. The optimisation and control of the whole system aim to minimise the overall energy costs and environmental impact as well as improve energy efficiency.

Implementation of the project

The battery storage and a third of the solar power energy was installed by November 2018, and additional solar panels will be added in the spring of 2019. Research begins small-scale during 2019 and is developed further by 2020.

In the project, a control algorithm uses available data about the energy system, as well as forecasts regarding for example weather and energy use. Electricity produced in the solar panels can then be directed to residential use, the energy storage, the external grid or to run heat pumps. This also means that there is a link between the electrical power system and the heat system in the buildings, and that energy can be used and stored in the way that is most feasible at that point in time.

Göteborg Energi is responsible for the equipment in the energy storage room and the energy system; research is conducted in cooperation with RISE, Riksbyggen, Volvo and Johanneberg Science Park. Volvo Buses supplies the batteries and Riksbyggen provides infrastructure, solar cells and the physical space for the energy storage. Johanneberg Science Park is the coordinator of the project and keeps communication with similar projects in the area. Volvo has a separate project with focus on second life for batteries together with Stena Metall, Chalmers and the Västra Götaland region.

Benefits

The system is intended to put the generated electrical energy to use in the most efficient way possible, and to manage power peaks in a sustainable manner. Even if power line congestion at the moment is a smaller problem in Gothenburg than in other parts of Sweden, local electricity generation and smart use will be crucial

as more and more electricity will be used. The automatic controlling system will also allow for energy to be used in the most efficient way possible, especially when electricity and heat are interconnected.

Scalability

Future results will give some insights if this particular solution is scalable. In principle the system possibly is scalable in one of two different ways: either by building smaller systems like the one at brf Viva and interconnecting them, or to build larger scale systems that cover a larger residential area. At a later stage, it will be possible to draw some conclusions regarding this.

Interoperability

As the project looks at the infrastructure from several different perspectives, interoperability between different subsystems and with the grid will become evident as time passes.

Investment horizon

No data is available.

International potential

As increased urbanisation is a trend all over the world, the need for and interest in local energy management systems is abundant. Especially if urban areas face increasing challenges to provide enough power at peak hours, local systems will be useful to shave the peaks.