Siedlungsmanagement - energy management system at neighborhood level

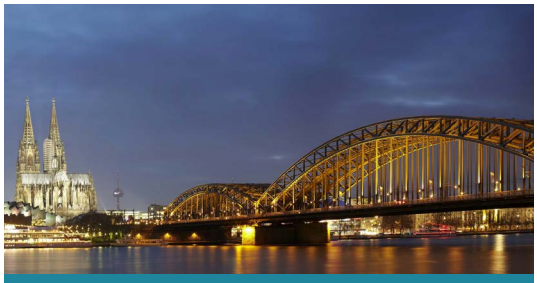
Smart solution 4
Local renewable energy production

Measured impacts

6000
data points every 15 minutes

36H
forecast of all systems

73
energy systems controlled



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What is it?

The solution consists of a virtual power plant (intelligent management system) that connects local photovoltaic production, heat pumps and batteries to outside energy production. The system operates at neighbourhood level and optimizes energy and heat consumption by connecting internal energy producers (photovoltaic, heat pumps, and battery storage) and external ones (district heat). The project leads to a partly self-sufficient energy supply which results in less pressure on energy grids, lower carbon emissions, and better air quality.

What did GrowSmarter do?

The energy company RheinEnergie implemented the Siedlungsmanagement software to maximize the self-sufficiency of the Stegerwaldsiedlung neighbourhood (16 buildings) being retrofitted in GrowSmarter *(See factsheet 8: 'Energy efficient refurbishment..')*. The software manages the performance of 41 heat pumps, 1068

kWp of photovoltaics, district heating for peak loads, and 16 batteries . A charging station for electric vehicles (cars and pedelecs) is also integrated into the settlement.

Meters installed during the retrofitting of the Stegerwaldsiedlung measure and predict energy consumption patterns in each apartment. The system forecasts and optimizes energy consumption for the next 36 hours, updating every 15 minutes.

Lessons learnt

Connecting and controlling power systems to a new external control unit is a challenge. The manufacturers of the systems must provide access to the control unit and the necessary IT protocols.

> It is important to ensure that external control is possible before purchasing any equipment to be integrated with the software.

It is crucial not to underestimate the time required to collect all the requirements for the software and the controllable equipment. In case this measure is performed together with retrofitting works, delays on equipment and software installation may be expected as delays during construction works may be frequent. This must be considered in the planning.

Upscaling & replication potential

This measure is the first of its kind in Germany. Because of this, uncertainty about what must and must not be monitored in all energy flows in the settlement has been found. Discussions with expert lawyers to identify critical points to comply with the new Renewable Energy Act in terms of the interaction with the grid operator were carried out. The outcome of these discussions will be very useful for replication.

How did the measure work?

Technical feasibility

The electricity consumption forecast module of the smart energy management system will not provide so accurate results due to the impossibility of monitoring electricity consumption at dwelling individual level.

Economic feasibility

A larger implementation of this solution would increase the economic feasibility. The target groups are housing agencies and other energy providers. The software can be run based on minimizing energy costs for the settlement, which is beneficial for the settlement‘s manager in case it charges a fixed fee to its tenants.

Replication potential

Most of the manufacturers do not expect their devices to be part of such a complex energy management system. Intense discussions were required with the manufacturers on how their devices can be externally controlled. This should be accounted for replication purposes.

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