



Smart grid in sustainable Lochem

Smart Grid Pilot Projects — Results as of September 2015

Innovation programme commissioned by the ministry of Economic Affairs

- Local electricity grid on DC voltage
- Electric transport and decentralised electricity generation
- Energy-neutral Heijplaat
- Modular smart grid for business parks
- Smart grid and energy transition in Zeewolde
- ProSECco examines four user groups
- **Smart grid in sustainable Lochem**
- Smart heat grid on TU Delft campus
- Your Energy Moment
- Couperus Smart Grid
- Cloud Power Texel
- PowerMatching City II

Goal

- To gain practical experience with incorporating locally generated renewable energy in an existing grid.

Issues

- How can locally generated energy be incorporated in an existing grid?
- How can residents be engaged and encouraged to use less energy and to use renewable energy, so that supply and demand can be more effectively aligned?
- Do the relevant legislation and regulations need to be changed to make a successful smart grid possible?
- What is the potential of Open Platform Network Management and an open data system?
- Can we validate network models and simulations and use these to predict energy supply and demand?

Duration

- January 2012 through September 2015.

Project partners

- LochemEnergie, Locamation, University of Twente, Eaton Industries, Alliander.

Lochem is experimenting with smart grids in an existing residential area. The project is the result of a public initiative and encourages residents to use less energy, to generate their own energy locally with solar panels and to use electric vehicles.

The experiment aims to demonstrate how this affects the demand, supply and manageability of electricity on the grid.

The project group is also investigating how this can be done safely, efficiently and without disruptions.

Results

The pilot project in Lochem lives and breathes sustainability. The residents share seven electric cars, they can invest in three collective solar energy parks and they encourage each other to save energy and generate renewable energy, says Bas Mooijman of Locamation, one of the project partners. "The awareness of sustainability issues has grown strongly since the project started, despite the fact that there was already a lot of commitment thanks to the LochemEnergie public initiative. The collective facilities have created even more social cohesion. The residents have even started purchasing new share cars on their own initiative." The residents can monitor their own energy consumption and generation any time they like with the specially developed app. The app also provides feedback, for example on favourable times for charging the electric cars. It is critical that the residents have access to real-time data from the grid to this end. In the pilot project this data is collected using sensors in the grid and in the residents' homes.

>> *Sustainable. Agricultural.
Innovative. International.*



Bas Mooijman (Locamation) and Paul Stolte (LochemEnergie).

“The system measures the current, voltage and capacity in the grid, and the system operator uses this data to calculate the grid load,” explains Mooijman. “We can influence the residents’ consumption based on this information. The system also gives system operators information about the grid load, so that they can anticipate problems. The pilot project is studying to what degree the grid can safely be overloaded. A 350 A cable can safely handle 580 A under the right conditions. This knowledge is extremely relevant for system operators, who are faced with strongly fluctuating grid loads, in part due to the growth of locally generated energy.”

Lessons

The pilot project included a stress test in Lochem itself to experiment with grid overloads. “We plugged in 17 electric cars simultaneously and switched on a large number of ovens and other electrical equipment in the neighbourhood, including a few heat pumps,” explains Mooijman. “That resulted in a blackout in part of Lochem, which actually received a warm applause! We had warned the residents in advance and the system operator was on standby, so the problem was quickly resolved. Good communication is very important; you have to ensure that people know what to expect. And the relationship between the residents and the system operator has become more intensive, personal and friendly thanks to this experiment.” The aim of the stress test was primarily to identify possible problems. “Now we know what can happen if the grid is overloaded and how such an overload works in practice. The next step is to develop solutions for this, such as variable tariffs and demand response during peak hours. A grid update is the most radical possible solution and one we would prefer to avoid.”

Plans for the future

The pilot project will continue to develop potential solutions for the meantime. The partners also want to increase local generation of renewable energy, says Mooijman. “There are plans to install more collective solar panels on the residents’ roofs. The residents can choose to invest in these. Despite the ‘reduced rate scheme’ (*Regeling Verlaagd Tarief*) that offers a lower energy tax rate for collectives, the business case is currently still unfeasible without additional subsidies. Alongside solar power, we are also considering the use of other renewable sources such as wind and water power.” The knowledge gained in Lochem is also relevant for the rest of the Netherlands, says Mooijman. “We experimented with smart grids and local energy generation in existing buildings. There is scarce knowledge of this field in the Netherlands, while connecting existing buildings to renewable energy systems is by far the greatest challenge for the energy transition. The existing grid may well have much more capacity than we think, and that offers hope for the future.”

More information

Would you like to find out more about the application of smart grids in Lochem? Visit www.in4energy.nl or contact Bas Mooijman of Locamation at bas.mooijman@locamation.nl.

Smart Grid Pilot Projects: energy innovations

The goal of the Smart Grid Innovation Programme (Innovatieprogramma Intelligente Netten – IPIN) is to accelerate the introduction of smart grids in the Netherlands. The Netherlands Enterprise Agency (RVO.nl) carried out the project for the ministry of Economic Affairs. Over the past years, twelve different pilot projects have gained learning experiences with new technologies, partnerships and methods. The pilot phase has now been completed, but most of the projects will be continued. Via RVO.nl they share their experiences, particularly concerning the five key themes involved in smart grids: legislation and regulations, user research and user participation, vision, standardisation and new products and services. The goal is to achieve widespread roll-out via the path of experimentation. More information: www.rvo.nl/intelligentenetten

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This publication was commissioned by the ministry of Economic Affairs.

© Netherlands Enterprise Agency | September 2015

Publication number: RVO-089-1501/FS-DUZA

NL Enterprise Agency is a department of the Dutch ministry of Economic Affairs that implements government policy for agricultural, sustainability, innovation, and international business and cooperation. NL Enterprise Agency is the contact point for businesses, educational institutions and government bodies for information and advice, financing, networking and regulatory matters.

Netherlands Enterprise Agency is part of the ministry of Economic Affairs.