



Smart grid and energy transition in Zeewolde

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
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Goal

- To fully utilise all sustainable electricity (produced in the municipality by the sun, wind and biomass) locally by linking these sources to a demand response system incorporating housing and businesses.

Issues

- How can consumers be encouraged to participate and to use sustainable energy?
- How can we optimise the software for the smart grid with an energy management system, so that information on consumption, output and weather forecasts can be aligned?
- Can a 100% sustainable electricity system be created by deploying a biogas buffer during windless periods and reducing the demand for energy?
- How can we design a system of settlement involving various tariff structures for users, producers, service providers and grid operators?
- Which business model and implementation plan is required to be able to introduce the concept to the market, implement it and foster support for it?

Duration

- January 2012 through September 2015.

Project partners

- Zeenergie, Alliander, Laborelec, Cofely, Raedthuys, LEON Zeewolde. Supported by the municipalities of Almere and Zeewolde and the province of Flevoland.

In Zeewolde, a consortium is cooperating in the Intelligent Network Zeewolde and Energy Transition (INZET) project to find a solution for renewable wind and solar energy that is independent of the weather conditions. Can smart energy management and local buffering of energy surpluses help facilitate the optimum utilisation of locally generated energy? A smart grid manages the energy demand based on the available energy *and* price and takes account of the consumers' requirements.

Results

Is there a way to ensure that locally *generated* energy can also be *used* locally? A pilot project in Zeewolde was set up to tackle this question. "The wind turbines in Flevoland generate 770 MW of electricity, three times as much as the province needs," explains chairperson Henri van 't Erve of Zeenergie. "Suppliers feed all this energy into the electricity grid, but when there is no wind they have to buy energy in. This is a twisted situation, considering there is actually a local energy surplus. Moreover, some energy is lost during transport. There is currently no trigger to align the supply and demand of locally generated energy. Everyone pays a fixed transportation tariff, regardless of the distance the energy has to travel. One solution to this is a variable transportation tariff, so that you pay or save money proportionately. The money saved in this way could be used to finance solutions for the local use of locally generated sustainable energy, such as buffering and storage." As part of the pilot project, a battery was linked to a system for solar and wind energy generation

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



for an urban farm in Almere. “The goal was to be as energy self-sufficient as possible and minimise the transportation of energy. We are currently hard at work measuring and calculating the payback period.” The INZET project also studied various businesses such as offices, cold stores and water boards to find out if the energy demand could be managed. “Office buildings are the most complicated,” says Van 't Erve, “because they are inflexible users. Cold stores and datacenters use energy 24/7, so they offer more leeway. For example, you can temporarily shut down the cooling systems of cold stores when there is no wind, if the temperature margin allows it.”

Lessons

According to Van 't Erve, the biggest bottleneck for implementation is that the legislation and regulations do not encourage participation. “Is it possible to manage the energy demand so that more sustainable energy can be used locally? The answer is yes. There are no technical obstacles to implementation. Buffering, storage and smart grids are all existing technologies. The problem is that the result is largely dependent on human action. Do people actually do what you require of them? Do they actually shut down the cooling system? Currently, a financial trigger is what is lacking. Flexibility has no value in the current energy system because it is completely geared to maximising production. There is much less attention for how the energy is actually used. This currently limits the potential of demand response. Although this is not the result we hoped for, it may have been a necessary eye opener. There is much talk about demand response, but it is not achieving its potential in practice. This is why I am calling on the government to change the legislation and regulations, because only then can we develop earning models for energy flexibility.”

Plans for the future

Although the pilot phase has been completed, the project will continue. The partners are studying how they can develop their

knowledge further and scale the pilot up to a practical application. “We found that local governments were unaware of the problem of the supply and demand imbalance,” says Van 't Erve. “For example, they claim that the province of Flevoland is energy neutral. This is true if you look at the annual balance, but Flevoland still regularly has to buy in energy because of its day-to-day imbalances. Our results have helped raise awareness of this.” The pilot project wants to translate future scenarios for the province into opportunities for flexibility,” says Van 't Erve. “An example could be to attract energy-intensive industry, which is currently underrepresented in Flevoland. If you make the use of locally generated sustainable energy attractive to them then such industries may decide to build new premises in windy provinces. We want to develop new products and services using the knowledge we have developed within the Smart Grid Innovation Programme (IPIN). These will be much needed, thanks to the government’s plans to build another 800 MW of wind turbines in Flevoland.”

More information

Would you like to know more about the smart grid or the energy transition in Zeewolde? Contact Henri van 't Erve at bestuur@zeenergie.nl or visit www.zeenergie.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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