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ENERGY STORY:

How to optimize the energy system with a flexible approach

The DYNAMO Flexmarket project seeks to stimulate a flexible consumption among customers to help solve congestions in the grid

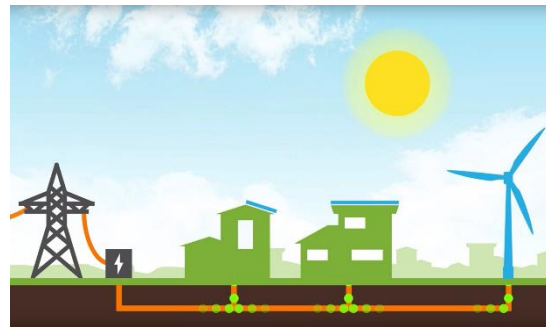
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In order to limit the rise in global temperatures our societies must decarbonise and bring harmful emissions to a minimum. Huge amounts of renewable energy have therefore been installed all over Europe, from large scale windfarm and solar photovoltaic fields, to solar roofs turning households into prosumers. While the prosumers are good news for the energy transition, much can still be done to ensure optimal use of the energy they produce. The problem is that the production from the solar roofs results highest during the day while the average household demand peaks in the evening during weekdays, i.e. after finishing school and work. The excess energy from the prosumers is sent into the grid, where it risks producing congestion if the supply is very high. When the prosumers consumption exceeds its generation i.e. in the evening, energy is sent from larger renewable energy installation, or if not available from less clean sources.

A Universal Solution Tested in the Netherlands

The DYNAMO project aims to reduce the imbalance between demand and supply by tests a *flexibility market* as a solution to the hourly imbalance between electricity supply and demand. During the project, which was initiated by the Dutch electricity distribution system operator (DSO) Liander in 2015, prosumers were encouraged to be more flexible in their electricity consumption. For the prosumers, this means relocating consumption, which is not bound to occur at peak hour, to a moment of the day when the prosumer's own production is high but their consumption low, i.e. at midday. The consumption shift is then offered as a flexibility product to the DSOs on the previously mentioned flexibility market.



For the DSOs the offer of flexibility not only helps smoothen out the imbalance between demand and supply, it is also a viable alternative to costly grid reinforcements. For the flexibility market solution to function, it must be both affordable and reliable in the long term. Thus, the DYNAMO project tested the market model proposed by the Universal Smart Energy Framework (USEF). The idea behind USEF's model is that if we work together playing by the same rules, we can improve the resilience of the energy system and bring down the costs, to the benefit of all.

If we all give a little bit of flexibility

The project involved a trial field consisting of 100 prosumer households in the Dutch town Heerhugowaard. In the participating households, smart devices controlled by a smart IT system were installed. The installed system allowed for automatic and more optimal adjustments of the prosumers' electricity generation and demand. When the prosumer was producing a lot but consuming little or no energy, the IT system could turn on devices, whose consumption is not bound to the peak hours i.e. water boilers. Likewise, during moments of high production of renewable energy, the system would limit the power transfer from the prosumers' solar panels to the grid to ease the pressure and



reduce the risk for congestions. By better matching their own production and generation, the prosumers contribute to an easing of the consumption and production peaks in the energy system.

As prescribed by the USEF model, the link between the prosumer households and the DSOs is provided by an aggregator. The aggregator summons the flexibility offered by the prosumers and forwards the total flexibility offer to the DSOs who uses it solve to congestion issues.in the grid Thanks to the smart energy devices, the aggregator can respond quickly to imbalances in the grid and to the consequent needs of the DSOs by applying the prosumers' flexibility.

Impact

One of the main outcomes of the project is that it proved that the USEF flexibility market model worked. project furthermore showed that by helping to solve upcoming congestion problems in the energy system, flexibility markets created an added value for all involved parties not least for the DSOs.

The test proved that the flexibility market can contribute to mitigating the peaks in energy demand and supply, both in their duration and intensity. By reducing congestions, it also mitigated the risk of power outages.

In the short term, the uptake of large-scale flexibility sources from large consumers such as bigger business, is foreseen. In the long term, the lessons learnt throughout the project will be extended to other parts of the Netherlands via a gradual extension of the Flexmarket.

Keywords: Flexibility market, smart grids, demand response, USEF

More info at: [website](#) + [video](#)

Note: Project Benefits based on specific criteria outlined in [ETIP SNET monitoring exercise](#)

Project Benefits

- Minimizing of congestions in the grid
- Better use of the generated renewable energy
- Reduction of risk of power outages
- Creation of value for all parties



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