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ENERGY STORY:

**FLEXCoop project: Empowering communities to elevate
European energy transition**

Energy cooperatives seeking new ways to manage their consumption in order to provide services for the power grids thus supporting integration of local renewable energy sources

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Imagine a community of consumers – households, small or medium-scale enterprises together – who organize themselves in order to make their power supply sustainable. Some of them install photovoltaic panels on their rooftops, some have electric heatpumps, some others electric cars, others batteries in their basements. All together, they decide to mutualize these assets and to have the biggest positive impact on the grid.

Today, this scenario is not yet an everyday reality. The European research and innovation project FLEXCoop investigated real-life scenarios that could elevate energy cooperatives to the next level. The aim of the project was to exploit flexibility which can be achieved on the demand side. In other words, if energy consumption could be better matched with those time periods when power generation is abundant, it could provide other services either for the community itself or the energy system operators at larger scale.

Power generation resources in these cooperatives are highly dependent on weather conditions – you may not have a lot of electricity from solar powers in cloudy weather, while you have more than enough power from these generators on a long sunny day. Therefore, the capability of energy consumers to adapt their consumption to the varying to the power generation intensity is becoming more and more valuable.

Being able to decrease (or increase) one's consumption upon request can help stabilise the grid (in which supply and demand of power must be perfectly balanced at all times), support the network management, or simply help source electricity at the right time, when it is cheaper and cleaner.

Automatized energy management

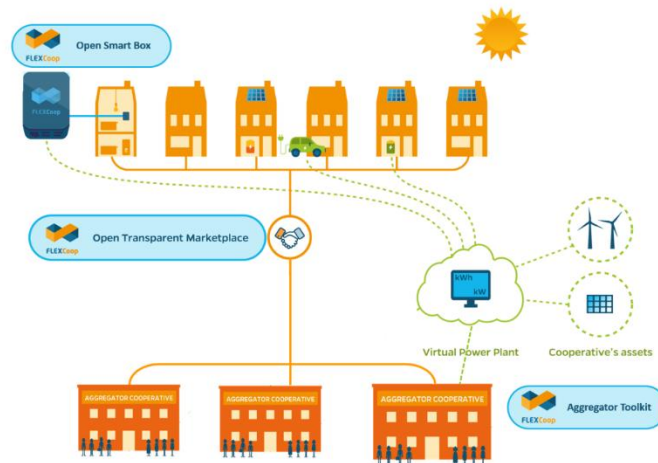
To facilitate these functions, the FLEXCoop project developed a tool which aimed to manage the consumption of one's household or small business and in addition, enable communication with the aggregator ¹who collects all these sources of power and flexibility. Aggregation is key as these sources, when taken singularly, are too small and if the aim is to capitalize on their service to the power grid, larger volumes must be created by aggregation.

¹ An aggregator is a new type of energy service provider which can increase or moderate the electricity consumption of a group of consumers according to total electricity demand on the grid. An aggregator can also operate on behalf of a group of consumers producing their own electricity by selling the excess electricity they produce



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- The tool consists of three major parts. The first is a smart box which was installed on the premises of consumers who had power generation capacity (e.g. solar panels) or manageable consumption (e.g. water boiler or heat pump). The second is an interface for the aggregators to enable them to use the flexibility provided by the consumers. The third is a virtual marketplace between these two parties - described Roland Tual, project manager at one of FLEXCoop's consortium partners, REScoop.eu.

The smart boxes were deployed in two pilot areas each in already existing energy cooperatives in Spain and in the Netherlands. In Spain the aim was to investigate the usage of the consumers' flexibility to optimize their consumption according to the power generation of the local solar panels. One of the advantages of the FLEXCoop tool is that it fully automatizes the consumers' energy system. – *There is no need for human intervention in order to align consumption with power generation, the smart box is able to calculate the optimal consumption curve according to the current and expected power generation and adjust the manageable consumption units* – explained Roland Tual.

In the Netherlands the project investigated how this accumulated flexibility could support the balance of the national grid. Here the cooperatives playing the role of independent aggregator set up use cases in which they can provide balancing services to the power system by shutting down residential heat pumps. Moreover, they cooperated with the national transmission system operator in order to provide similar services with wind generation curtailment. Together, they are looking at the right magnitude at which these sources of flexibilities can be utilized in the power system being compatible to defined service requirements and having a potential impact on the system state.



Impact

Despite certain regulatory barriers, positive impact was eminent throughout the project. The first was to align the quantity of energy consumed more closely with the hours of weather-defined, natural energy production, be it locally through matching roof-top solar power generation, or at system level when matching hours of abundant and cheap energy on wholesale markets.

The second was to support the quality of electricity by assisting overall grid stability. The flexibility provided by the energy cooperatives, securing two of the key parameters of the system – voltage and frequency – could be easier, cheaper and greener, giving cooperative members extra financial benefits.

Thirdly, these kind of services – could reduce the need in infrastructure investment by avoiding ‘peaks’ in consumption. The size of an electric cable – like a water pipeline – should be linked to the maximum flow it will receive; reducing the consumption peaks enables to reduce investment in the infrastructure. Use cases like the above mentioned will support the growing of energy cooperatives which could be key assets for the ongoing energy transition.

Project Benefits

- Improved network management
- Reduced energy bills
- Decreased network costs
- Improved social acceptance

Keywords: energy cooperatives, renewable energy sources, flexibility, prosumers, network management

More info at: <http://www.flexcoop.eu/>+ [project video](#)

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



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