Name: Community-based Virtual Power Plant (cVPP) as a new model for energy system organisation
Award category: Engagement
Organisation: Eindhoven University of Technology
Location: Eindhoven, the Netherlands
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Factsheet:

cVPP - Putting communities in charge of their local renewable energy generation

Community-owned virtual power plants

Europe's energy transition is well underway. Large-scale energy generation is shifting to renewables like wind and solar farms, while the number of small-scale renewable energy producers, like community-owned wind farms, are also on the rise.

Power system managers and grid operators use 'Virtual Power Plants' (VPPs) to manage electricity on a national and regional level. VPPs are smart platforms operated by a power-managing authority. They track the different sources of electricity being produced, for example by a wind farm or a fossil-fuel power station. At the same time, they can track the consumer demand for power. With this information on electricity supply and demand, power-managing authorities can balance the power system to make sure that consumers have power when they need it, and that energy does not go to waste.

Most VPPs are used by operators to allow them to ensure a reliable overall power supply at a national or regional level. However, they do not take into account the interests of community-based renewable energy producers, or 'prosumers', like a small group of village-owned wind turbines or rooftop solar panels. This means that prosumers find it difficult to sell their excess electricity to the national or regional grid, and they cannot negotiate the price at which their electricity is sold.

One EU project is looking to empower small-scale local renewable energy producers and revolutionise the way electricity systems work. They are building a new type of community-led VPP that will give prosumers more say over how their electricity is managed.

"Prosumers are mostly at the mercy of the grid operators and inflexible market energy prices. By bringing all prosumers in a community together, they have the collective power to own, control and sell their power generation to the national or regional electricity grids. ," says Dr. Anna Wieczorek, cVPP project leader and sustainability innovation expert at the Eindhoven University of Technology. "In short, the community decides if and how much electricity and flexibility it makes available for the system at large and how they distribute potential benefits and risks."

Sharing the benefits of renewables

The Interreg NW Europe-funded project has developed 3 cVPPs in communities with already established renewable energy generation infrastructure. They are cloud-based energy management systems that run on a series of algorithms based on decisions taken by the renewable energy producing community.

cVPP designed the systems, established them, built the web applications and trained the local communities. Together, the communities worked on key questions including how they would like the system to be organised and how the risks and benefits would be shared.

“We showed that an alternative, more democratic way of organising the energy system is possible and that many different types of communities, can make a meaningful contribution to the energy transition,” says Wieczorek.

An idea that works for all communities

In Ghent, Belgium, cVPP worked with the energy cooperative EnerGent. EnerGent is a solar power cooperative in the city centre. With cVPP, they improved the way energy produced by the different solar panels is managed and sold. In Loenen, the Netherlands, cVPP collaborated with a wind energy producing village. The cVPP has allowed them to improve the management of the energy they produce.

In Tipperary, Ireland, cVPP worked with a number of different, more spread out renewable energy producers. They use cVPP to sell their renewable energy to themselves or on energy markets through a community owned energy supplier called ‘Community Power’.

The project also developed a business model – called the Mobilisation and Replication ‘MoRe’ model – which will help other renewable energy communities to establish a cVPP. MoRe has already attracted the attention of REScoop.eu, the European federation of 1,500 renewable energy cooperatives, which is working with the project towards making the model accessible to their communities.

With the first stage of the project now over, a second, upscaling stage is already underway with 9 new renewable energy communities in the Netherlands, Belgium and Ireland beginning the process of setting-up a cVPP. As the number of community renewable energy producers grow, cVPP can provide the tools to help them become an important part of Europe’s energy transition.