

Doing more with your energy

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Doing more with your energy

DEFINING ROLES INDIVIDUALS AND COLLECTIVES CAN PLAY IN THE ENERGY SYSTEM

Eindhoven - December 14, 2020

Authors: Laura Van den Berghe, Luc van Summeren & Anna Wieczorek

Contributors (alphabetical order): Gregg Allen, Jeroen Baets, Sylvia Breukers, Stephanie Cummins, Rene van Egmond, John Fogarty, Jet Groen, Randall Hanegraaf, Paul Kenny, Luc Meskens, Ruth Mourik, Maro Saridaki, Geert Verbong, Andre Zeijseink

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Doing more with your energy

In the Interreg NWE funded [cVPP project](#) (no. 588) three communities from Ireland, Belgium and the Netherlands organised themselves and took charge of managing their own-produced energy. Based on the experiences of these communities, many discussions, literature reviews, and interviews carried as part of the Interreg cVPP project, this report summarises several potential ways both individuals as well as collectives can get involved in the energy transition. The report first discusses specific roles individuals and collectives can play in the energy system and then how they can proceed to increase their impact.

Energy transition and citizen engagement

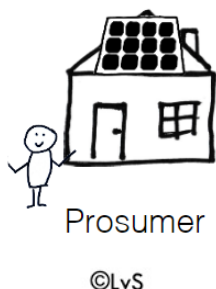
The energy transition is a long-term and fundamental re-organisation of the energy system from fossil fuels towards low carbon energy. Digitalization, renewable energy and empowerment of citizens and communities have been identified as the cornerstones of this process. Such a transition not only requires a change of technology but also policies, infrastructure, markets and behaviour of users. Although it remains a big challenge to organize a radically new energy system with great citizen participation, there are a few ways through which citizens can be empowered and play an active role in the energy transition. They can do more with their energy. Below an overview is given of how citizens can be involved in the electric energy system and what they can do with their electricity.

Passive consumer – consuming energy individually

Traditionally, citizens have acted as passive energy consumers who buy energy from suppliers. As customers, passive consumers can bargain their individual contract conditions. Yet, this is often limited to choosing between the purchase of grey energy, 100% green energy or a mix of both and/or, depending on the country, a single tariff or a peak/off-peak tariff. These conditions give passive consumers restricted and merely indirect influence on the energy mix and the overall transition towards renewables. However, the more individual passive consumers that consciously choose for green energy contracts, the more pressure that will be put on the large energy suppliers to increase the share of renewables in their energy offer.

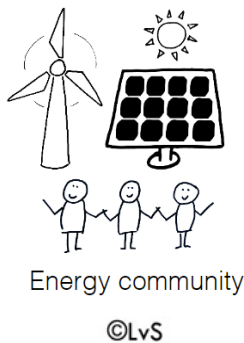


Prosumer – consuming and producing energy individually



When passive consumers install solar panels on their roofs and begin producing their own renewable energy, they become prosumers. The word prosumer is an agglomeration of the words consumer and producer. Prosumers, by using self-produced renewable energy and by delivering its excess to the grid, directly contribute to a renewable energy mix. Through this, they have a larger impact on the energy system compared to the traditional passive consumer. Still, their influence is limited, because it is only exercised at the individual level and because they cannot decide what happens with the energy they sent to the grid.

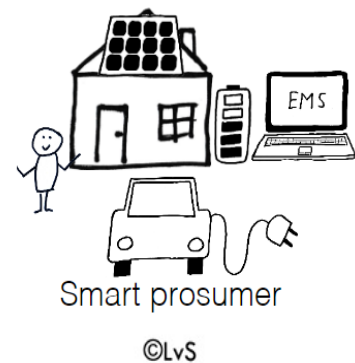
Energy community – consuming and producing energy collectively



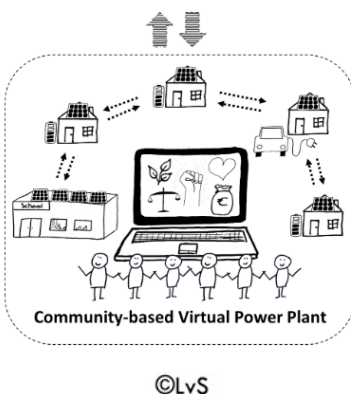
To increase their influence on the energy transition, individual consumers and prosumers can choose to engage in collective initiatives and become part of an energy community. United as a community, individuals not only get a larger voice in the energy system, they can also offer values to and gain benefits from the community itself. These can be: financial (e.g. lower energy bills), environmental (e.g. CO₂ emissions reduction), social (e.g. community building), institutional (e.g. influencing energy policy) and technical (e.g. energy independence). Collective energy production and consumption require communities to be well organised and have a degree of professionalism.

Smart prosumer – consuming, producing and managing energy individually

Individual prosumers may also choose to become smart prosumers. For this they need additional equipment which allows them to not only consume and produce energy, but also smartly manage their energy production and consumption. The equipment generally includes a digital meter and an ICT platform, which together monitor and manage energy flows from various smart home appliances, home battery, electric car, electric heat pump or an electric boiler. By ‘smartly managing’ own energy, the smart prosumer can not only reduce his energy bill but also support the grid in keeping balance and avoiding overloads. These grid problems occur due to sudden energy peaks caused by irregular inflows of renewable energy into the grid, or when the national energy demand exceeds production. ‘Smart management’ at an individual level means, e.g. scheduling laundry or charging the electric car’s battery on a sunny afternoon. Such activities maximize the use of own energy and relieve pressure off the grid. Yet, because management is only conducted at the scale of a single household, impact on the energy system remains rather low.



cVPP – consuming, producing and managing energy collectively



Smart prosumers may choose to get together and collectively consume, produce and manage their energy, while energy communities may decide to acquire additional equipment to become smart energy communities. A community-based Virtual Power Plant (cVPP) is a solution that can help individuals and communities organize themselves in a smart way and exercise collective impact on the energy transition. Smart management at collective level can involve trade amongst the individual members of the cVPP, so called peer-to-peer; selling collective production or scheduling laundry and charging electric car’s battery according to the community’s needs. Such activities add increased financial, environmental, social, institutional and technical value to the community and to other stakeholders in the energy system.

cVPP recipe for non-energy community-based initiatives

1. Start with building a community

A community can take various forms. It can be located in a neighbourhood or it can be formed by likeminded people through a dispersed social network. Communities are thus not necessarily geographically bound. They can include citizens, SME's and municipalities. New European regulation may require that energy communities become legal entities.



2. Organize the community using a community logic

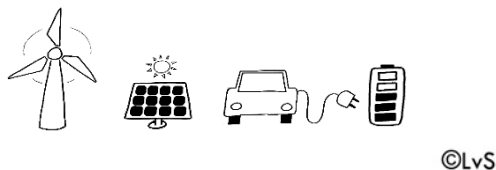
Community-based initiatives are different from the commercial projects because they operate and are organized based on different set of rules, the 'community logic'. That means that:

- These are the community' needs and values that drive the initiative
- The community owns the assets and equipment.
- The community decides how values, costs and risks are distributed in a fair way
- The community collectively makes decisions
- The members of the community are actively engaged
- Decision is made by the community how to include those who are not the members
- The local energy demand defines the scale of the energy generation



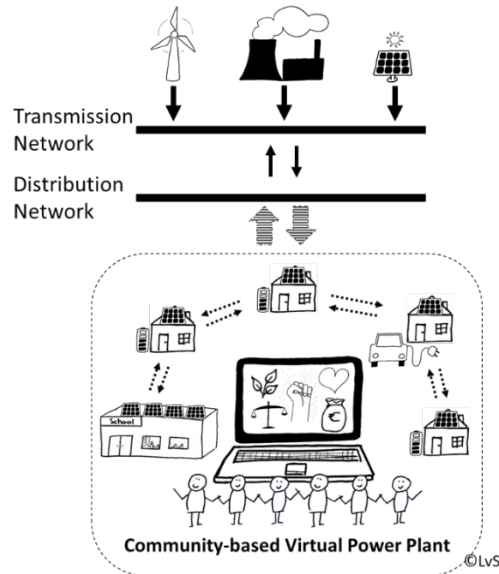
3. Check your technologies

Technologies like solar panels, batteries, electric cars, form the basic infrastructure of a cVPP. Therefore it is important to inventorize which technologies are present in the community, to evaluate how the cVPP could be organized.



4. Connect to the larger system

A cVPP offers value to all kinds of stakeholders: the community itself, passive consumers, grid operators, technology start-ups..., which creates a win-win situation. A cVPP could for example facilitate the roll-out of renewables towards passive consumers through group purchasing or financing support, or it could facilitate energy trading within the community. In addition, a cVPP could act as a supplier and sell its excess of green energy production on wholesale and retail markets. A cVPP could also support the grid operators in their task to balance the grid by performing similar 'smart management' measures as the smart prosumer, but now on a larger scale. These are just a few examples of which roles a cVPP could play in the energy system and how it can offer value to different stakeholders. Many more examples exist.



5. Think of a digital platform

The energy community needs a smart ICT platform, to which all community members and their individual technologies are connected. This ICT platform needs to be designed according to the needs and values of the community and the roles it wants to take upon in the energy system. The platform could be open source, tailor made or off-the-shelf, depending on how advanced it needs to be.



More information about the cVPP project can be found here:

- What is cVPP: https://pure.tue.nl/ws/portalfiles/portal/137675897/4_pager_what_is_cvpp_final_26_03_2019.pdf
- Project websites: <https://research.tue.nl/en/projects/cvpp-community-based-virtual-power-plant> and <https://www.nweurope.eu/projects/project-search/cvpp-community-based-virtual-power-plant/#tab-1>
- cVPP webinar: <https://www.youtube.com/watch?v=ARxVPR-bOG0>