

Homemade energy gets boost to go mainstream

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Viticulture is a good starting point for community-based energy initiatives, according to researchers, as it is both energy-intensive and vulnerable to climate effects. Credit: Esther Marín-González

New rules and initiatives to support communities wanting to produce their own renewable energy could help ordinary people play a key role in the European Union's transition to clean energy.

These moves, which include new EU legislation and the rollout of so-

called living labs around Europe, look set to bolster people's growing push to get involved in producing [clean energy](#).

"We see, now, these seeds of transformation, with a greater focus on citizens as active energy players – or prosumers – organised in collectives such as energy communities and cooperatives," said Dr. Inês Campos, a sustainability researcher at the University of Lisbon in Portugal.

Europe now has more than 3,600 renewable energy cooperatives, up from over 3,400 at the start of the year and 2,400 in early 2015, according to [REScoop.eu](#), the European federation for renewable energy cooperatives. Meanwhile, estimates suggest that [half of the EU's households](#) could produce clean energy by 2050.

As [renewables have become more market-driven](#) and regulation has lagged, however, community-based initiatives have [struggled](#) to compete because of the lack of consistent and clear frameworks to support them.

But things could change following the introduction of [new clean energy rules](#) adopted by the European Parliament in March, which are set to take effect early next year. The rules aim to support people in their efforts to establish their own energy projects and consume, store and sell what they produce. No common EU rules for such 'prosumers' previously existed.

Such community-led renewable energy initiatives could be aided by a project called [PROSEU](#), led by Dr. Campos, which is working to help bring these initiatives into the mainstream.

Central to the project are 'living labs' that are being initiated in nine countries across Europe. The labs bring together civil society, the [business sector](#) and government to examine and discuss potential

opportunities and incentive structures for energy collectives, as well as how to overcome the factors that have held them back.

"What we aim for at the end of this living lab process is that a community has increased its adoption of renewables and has a plan to continue integrating them," said Dr. Campos.

Wine

The main initiatives in the early days of the project, which launched a year ago, have taken place in Portugal. The wine sector in the southern Alentejo region was among the first involved in the labs.

Dr. Campos says viticulture is a good starting point to provide a 'holistic perspective' for helping inspire community-based initiatives, as an energy-intensive sector that is vulnerable to climate effects and keen on cutting emissions and costs.

The sector, she says, is investing in some innovative green technologies, such as creating biomass from the olive stones that some wineries use for making olive oil to produce thermal energy and compost.

"We have found that technology is not the biggest barrier," said Dr. Campos. "The main barriers we've identified so far are regulatory or legal. Of course, there are also financial barriers, but, for instance, most of the wine producers would invest in a good renewables installation if it meant they would save money in the end."

The project is also collaborating with the village of São Luís, where the local administration is pushing to create Portugal's first [renewable energy community](#).

To help make this community inclusive, says Dr. Campos, ideas are

being discussed such as potential crowdfunding schemes to help support investment by villagers in a co-owned solar installation.

The collaborations have just started, but key obstacles to creating green communities are already emerging.

Dr. Campos says that Portuguese regulations make it possible for a local community to co-own a renewable energy installation, but not self-consume the energy that it creates – which would need to be injected into the grid.

The uneven national legal regimes across Europe have also led to Portugal having just one renewable energy cooperative – [Coopérnico](#) – compared with hundreds in Germany, she adds. Dr. Campos believes, however, that the new EU legislation, which lays out rules to help consumers become more active players in the electricity market, could help accelerate the creation of green energy communities in countries where few exist.

'(If citizens are to) be at the centre of the energy transformation, then these collectives should be mainstreamed," she added.

Technologies

These changes and initiatives could also aid the future take-up of new technologies being developed for renewables that help put power in the hands of consumers. A project called [Willpower](#), for example, is developing several pilot systems that capture and use the CO₂ already in the air for heating and other uses in settings such as homes and businesses, as well as for fuel in the transport sector.

Using energy from a renewable source such as solar or wind, Willpower's technology combines captured CO₂ with water and enzymes

in a reactor chamber. A sequence of chemical reactions is then carried out to make methanol.

This methanol-based system can release energy when needed and store it between seasons – something that makes it more feasible for year-round residential use, rather than the shorter-term capabilities of batteries that store solar power, says Antonio Martinez, CEO of Germany-based energy company Gensoric, which runs Willpower.

"We can store the same energy in a 10 or 20-square-metre container that a battery could store on a football field, and perhaps for one-fifth of the cost," he said.

The system operates under low pressure and at body temperature, compared with other CO₂ capture and conversion systems being explored that can require high pressures and temperatures of 500°C or more, says Martinez.

While the project has tested a model roughly double the size of a domestic washing machine to see whether the system works and is safe, Martinez says it's still a few years away from becoming commercially available. The team needs to hone techniques such as customising enzymes to make the system more efficient and find improved ways of capturing atmospheric CO₂.

Martinez believes this technology could eventually lead to the creation of an affordable home version even smaller than a washing machine – and allow communities to create and share energy stores through linked systems.

Connecting these systems in a community-based model would make it possible to store a huge amount of energy and help give consumers a sense of freedom they have not felt before from the traditional big

energy companies, said Martinez.

A push at an EU level will also aid communities keen on getting involved in green [energy](#), he believes. "I think we have a lot of people interested in playing a role in that," said Martinez, "but the regulations and incentives must be there."

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