EXAMPLES OF INNOVATIVE FINANCING SCHEMES

2022

EurObserv'ER

This barometer was prepared by the EurObserv'ER consortium, which groups together Observ'ER (FR), TNO (NL), Renewables Academy (RENAC) AG (DE), Fraunhofer ISI (DE), VITO (Flemish Institute for Technological Research) (BE) and Statistics Netherlands (NL).

Funded by the

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Examples of innovative financing schemes

CASE STUDIES
INNOVATIVE FINANCING SCHEMES

Under the current macro-economic trends, the so far abundant support system for renewables (mainly in the form of feed-in-tariffs and quota systems) has been drastically modified. In many EU countries, companies are trying to find alternative ways to secure financing for their renewable energy projects. Therefore, new ways of attracting private capital for the realisation of green energy goals have to replace the historical public schemes.

The European Green Deal of the EU requires further, enormous investments in demonstration projects and new storage and flexibility technologies, besides generation facilities. In addition, the energy transition will only become a success, if citizens participate. The challenge is to identify the appropriate policy options and financial tools to attract and scale-up private investments. There are, however, already innovative and promising business and financial models to promote the deployment of RES in the EU.

The aim of the EurObserv'ER case studies is to find such examples and describe them so as to put forward the best practices and the replicability of the future promising financing mechanisms. The selection criteria for the choice of case studies should ensure (I) diversity across regions and RES, (II) diversity across finance instruments/mechanisms, (III) success of approach and its potential to be replicated, (IV) and a wide range of the "size" of actors/ investors and the resulting RES investments (capacity).

The current selection also takes into account the fact that there were already some case studies published in 2014, 2015, 2018, 2019 and 2020.

These are also available for download on the project website : www.eurobserv-er.org

EMPOWERING CITIZENS TO DECARBONISE THE HEATING SECTOR

THE IMPORTANT ROLE OF DISTRICT HEATING AND COOLING (DHC) IN DECARBONISATION

As one of the main infrastructures and solutions to decarbonise the heating and cooling (H and C) sector, district heating and cooling (DHC) can make a substantial contribution to emissions reduction by integrating renewable energy sources (RES) and technologies. The availability of district heating (DH) varies from country to country and DH is, in general, more common in cities than in rural areas. This is due to the higher spatial density of heat demand in the city, which results in less transport distance and costs. Nevertheless, many studies proved and suggest that a broad deployment of DH is helpful to decarbonise the heating sector, especially in the long term. In addition, DHC plays an important role in energy system integration by providing demand flexibility for variable renewable electricity generation, such as from wind and solar power, which can achieve even more RES integration and emission reduction.


PIXABAY

Solar thermal panels on a roof

PROSUMERS AND PROSUMERISM

Consumers that actively participate in the energy system can be defined as energy prosumers. These entities include individual people, households, small or medium sized enterprises (SMEs), schools or hospitals, but not industrial companies that produce part of their own energy, including from renewable sources. Energy prosumers can participate through self-generating renewable heat or power or even participate in energy markets. They may provide, for instance, energy system services of reducing, increasing or shifting energy demand based on system needs (flexibility) and energy storage. This enables larger amounts of intermittent RES such as wind and solar energy to be integrated into the energy system. The active participation of citizens in the energy system is prosumerism, which can be implemented individually (single-family homes and individual companies) and collectively (investments in energy technology and infrastructure on-site, e.g. in or on top of an apartment block, or off-site, e.g. a PV plant near a community, or within a neighborhood). In general, all prosumer concepts can be implemented in cities. However, cities have some characteristics that limit and others that widen the scope for prosumerism.

Although many successful examples of prosumerism are commonly found in the electricity sector, it is also feasible in the heating sector. In principle, several concepts of prosumerism in DHC are feasible: I) participation in generation facilities, II) participation in networks, III) participation in the heat supply (generation and network). The type of participation depends on the legal structures of the facility and the associated rights and liabilities.

DISTRICT HEATING IN HVIDE SANDE, DENMARK

Several examples of citizens getting involved in owning and operating the DH infrastructure or networks can be found in Denmark, thanks to the Danish regulatory framework. According to the Danish Heat Supply Act, a DH company that is for sale has to be offered to the consumers (organised as a cooperative) or to the municipality at the market price. Additionally, the DH industry is regulated by a non-profit principle. As a consequence, Denmark's heating is supplied by over 400 utilities, many of which are owned by cooperatives or municipalities, and the largest DH companies are owned by municipalities.

The Hvide Sande Fjernvarme network on the Danish west coast outside of large cities in Denmark is one of the many consumer-owned DH networks. The consumer-owned energy company "Hvide Sande Fjernvarme AmbA", initiated and founded by the Danish District Heating Association in 1963, owns and operates this DH network. The founder, Danish District Heating Association, is a stakeholder group promoting collective prosumption models in the heating sector. The prosumerism involves not only the network infrastructure (pipes, control equipment, etc.), but also two combined heat and power (CHP) units (each 3.6 MW electricity and 4.6 MW heat) and two gas boilers (10.3 MW and 3.7 MW) as well as RES heat generation technologies, including 9 576 m² solar thermal collectors, a 4.65 MW large-scale heat pump and a 6 MW electric boiler. Both of the latter generate heat by utilising renewable electricity, e.g. from the three community-owned local wind turbines.

EXPAND THE SCOPE OF PROSUMERISM IN THE HEATING SECTOR

This prosumer concept can contribute positively from a system perspective and provide a solution to a common problem with district heating. In the case of the monopolist operating the

DH network, it does not have a high incentive to reduce system costs, since DH users have often no other alternatives. Although the prices are regulated in many countries to a certain extent, DH could result in inefficient grid operation and in some cases implies unnecessarily high costs for consumers. In the case of the citizens owning and operating the system themselves (even with the help of a commercial operator), the incentive to reduce system costs is higher since it is in the citizens' interest. By sharing the costs of one joint heat system, consumers profit from low energy prices. Depending among others on the structure of the local heat demand and the distance between consumers, this effect can increase with a growing number of connected consumers in the same heating network. This structure provides a stable ownership environment for consumers over a long lifetime. Another option for citizens to get involved in DH is to invest in heat generation, for example in a solar thermal plant. To be efficient and cost-competitive, such a plant would require a relatively large space which is usually not available within the city boundaries. The plant would therefore have

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to be built in the neighbourhood of the city and feed into the city's DH system. As this prosumer concept requires third party access to the DH grid (unless the grid is owned by the same energy community), which is currently only implemented in some member states and often with several exceptions, there are so far no practical examples.

Municipalities play a key role in local heat planning, as they are in charge of community space planning that in some regions comprises DH plans as well. Hence, they have a tremendous influence on decisions concerning infrastructure and choice of energy carriers and heating technologies. Projects of this type are typically comprehensive and complex (and therefore almost impossible for citizens to realise), as they require a lot of coordination between different actors, various competencies and expertise. This is illustrated by the example of Denmark: even when regulatory conditions favour consumer participation in DH grids, DH in cities is typically realised by municipalities or public companies. □

Skærbæk power station, Denmark

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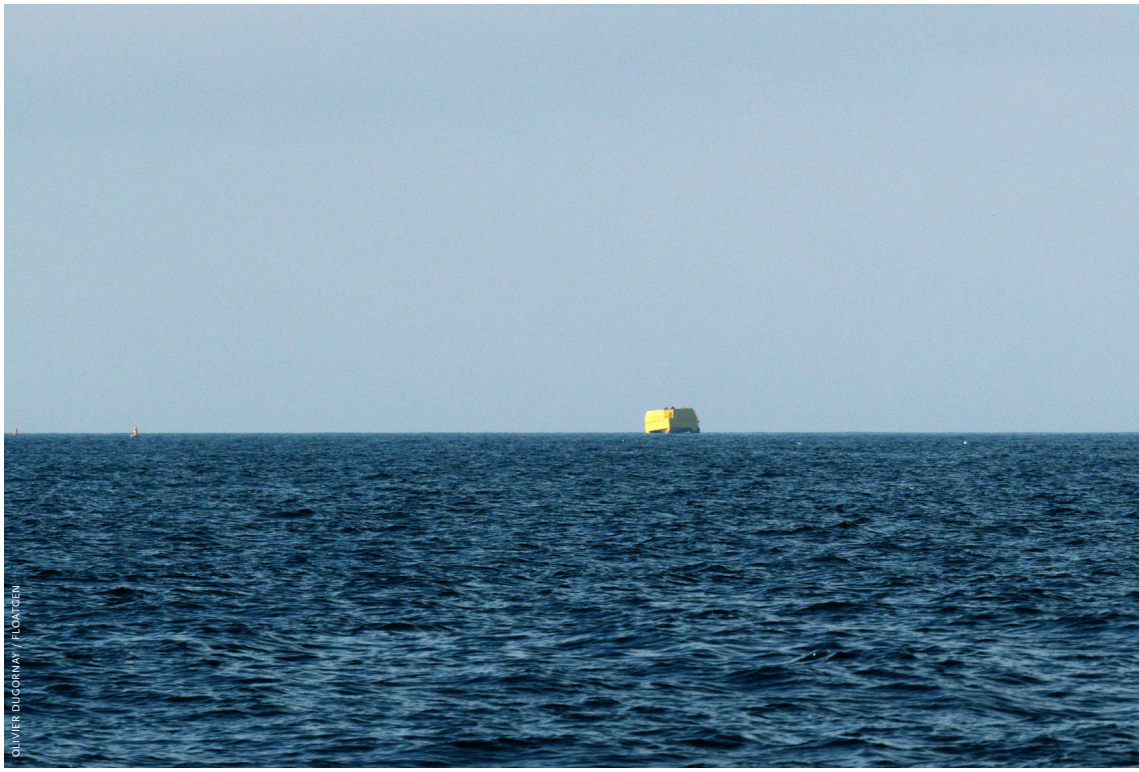
A NEW HORIZON FOR CROWDFUNDING

The energy transition requires colossal investments. The savings of citizens, which are increasingly concerned by environmental issues, represent significant recoverable potential for project leaders. Used for several years for the development of standard renewable energy projects, crowdfunding is also turning to less mature technologies as demonstrated by the Eolmed floating wind project.

A WELL-ESTABLISHED MODEL

Crowdfunding corresponds to a method of project financing that has developed considerably over the past years and which today has become embedded in the economic reality of many countries. The mechanism is that of a fundraising tool, most often via a platform, which allows citizens to participate in the financing of an operation by lending money against an interest rate set in advance. This system allows project promoters to diversify their sources of financing while involving citizens, which is generally beneficial to the acceptability of operations. All types of project leaders, whether they are a private company, an association or even a group of individuals, can use this method of direct financing without going through traditional financing parties. This is referred to as a disintermediated mode of financing. In France, crowdfunding



OLIVIER DUCORNAY / FLOATGEN

is now associated with a large proportion of new onshore wind projects or photovoltaic power plants. Renewable project developer Valorem first used a form of crowdfunding in 2012 to finance part of the Arfond wind farm. The company was inspired by the Danish model which required a minimum citizen participation of 20% of the total envelope for renewable energy projects. Since then, many project developers have understood the interest of crowdfunding, both to finance their project but also to gain proximity with the neighbors of their parks. However, we are talking about mature technologies that present few risks, but in recent years there has been a trend to take crowdfunding off the beaten track.

A NEW TOOL TO SUPPORT INNOVATION

The new aspect is that today crowdfunding is increasingly in demand for operations that involve more avant-garde and therefore less mature technologies. This is notably the case of the French project Eolmed. This operation concerns the development of the very first floating wind farm in the country. Located in the Mediterranean Sea, this 30 MW pilot project is based on three Vestas wind turbines (model V164-10.0 MW) installed on floats designed by one of the project's shareholders: BW Ideol (owner of 5% of the shares of Eolmed). TotalEnergies (20% of the shares) also supported the project. This project is part of the ambition of the Occitanie region, which wishes to become the first European region to become energy positive by 2050. Two commercial parks of 250 MW each should be completed by 2028. From the first stages of the operation, the crowdfunding lever was activated. Indeed, the first crowdfunding campaign was launched in 2018 to finance the LiDAR (Light Detection And Ranging) carrying out wind measurements intended to optimize the future location of the turbines as well as the preliminary financial analyses. 278 eco-savers raised €400 000, thus exceeding the initial objective of €300 000. This

WaveGEM buoy and FLOATGEN floating wind turbine

first bet was successful because it was not easy to think that individuals would be ready to lend money to a pilot operation which by definition is riskier than the more standard profile of a terrestrial site.

In 2022, the second act of Eolmed's crowdfunding took place, this time with a target of 3 million euros. Admittedly, this amount may seem low compared to the cost of the project estimated at nearly 250 million euros, but it is still one of the largest crowdfunding campaigns on the platform. Open from the beginning of May 2022 to residents of the Aude department, then gradually to the whole of France, 728 eco-savers finally committed in the form of a bond with a fixed interest rate (gross before tax) of the order of 5% per year over 4 years. The rest of the debt of the Eolmed project is financed by several major players in the banking sector such as La Banque Postale, Bpifrance (French public investment bank supporting public policies), BCPE Energeco (Company for the financing of energy savings belonging to the BPCE group), as well as organizations such as the European Investment Bank and ADEME (French environmental transition agency), which finances the project through its Future Investment Program. Commissioning is currently scheduled for 2024. This operation was therefore significant in several respects. In addition to its objective of launching the development of the floating wind turbine segment in France, it demonstrated that the participatory development mechanism could also be useful for new technologies, less established and therefore riskier, but just as much in search of financing than the more traditional segments.

A GROWING SECTOR

Although it is still small compared to the crowdfunding market as a whole, the French energy transition crowdfunding market has many players specializing in energy transition financing such as Enerfip, Lendopolis, Lendosphere, Lumo, Wiseed, Tudigo, or even the national energy company EDF, which launched its own crowdfunding site as part of its participatory initiative "EDF Pulse and You". According to the Greenunivers energy transition crowdfunding barometer, 185 million euros were collected in France in 2021 by this type of platform to finance the energy transition (mainly via renewable energy projects), an increase of 85% compared to 2020. Once commissioned, these projects should correspond to a total power of 2.6 GW. In addition, like what was observed on the Eolmed project, crowdfunding is increasingly turning to niche markets or advanced technologies. This is particularly the case of the myOptions platform which, for example, has set up a file to finance the development of marine drones intended for coastal surveillance. Another example is that of the company MiiMOSA, which has been digging its way into agriculture since 2015. In addition to anaerobic digestion, it helps finance the transition to organic farming around the creation of short circuits. Project yields for investors vary between 3% and 7% annually.

Artist's view of the Eolmed project

BEYOND CROWDFUNDING

Although the model is significantly different from crowdfunding platforms, when we talk about renewable energy and crowdfunding in France, we cannot fail to mention the Énergie Partagée network. Unlike these platforms (which mainly raise debt), the Shared Energies cooperative directly captures the savings of its citizen shareholders to participate in the capital of projects. Thanks to the Energie Partagée Investissement fund, 30 million euros in capital from 7,500 citizens have already been raised in recent years. The advantage of this model is that it allows to enter the capital of the projects, and guarantees to the citizens that the projects they support are carried by actors of the territory, public or private, and respect the Charter of Shared Energy. In this model too, a growing propensity to turn to cutting-edge technologies can be observed, proof that citizens are increasingly willing to engage in all aspects of Europe's energy and environmental transition. □

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MAINSTREAMING GREEN POWER PURCHASE AGREEMENTS (PPAS): CO-OPERATIVE PPAS AND DEMAND AGGREGATION

NEW DEVELOPMENTS IN AN UP-AND-COMING MARKET

When it comes to market-driven expansion of renewables, direct electricity supply contracts with dedicated "green" characteristics of the electricity purchased are by no means a new development, but have been a constant for a number of years already in the EU[1]. While there has been a steady surge in demand during the past years, latest developments regarding rising electricity and CO_2 prices have caused the green Power Purchase Agreements (PPAs) market in the EU to pick up speed even further. Big market players in particular, such as large multinational companies or major utilities, are increasingly gaining experience regarding this topic and initial hurdles, e.g. regulatory issues, the novelty of drafting the necessary contracts and inexperience regarding the handling of the associated long-term price risks, no longer seem to represent a major obstacle. Recently, new, smaller players who are interested in directly purchasing their electricity from a generator are entering the market, wanting to hedge themselves against volatile electricity prices, to source renewable electricity from a trusted supplier and to be able to market their products and services as "100% green" with electricity from a known and traceable origin. This includes not only small and medium-sized enterprises (SMEs) that are still rather the exception as PPA contract parties, but also other non-traditional market actors, such as co-operatives or even local authorities.

CO-OPERATIVE PPAS AS A MEANS TO AGGREGATE DEMAND

Compared to larger companies, smaller electricity consumers or utilities tend to have only limited ability to shoulder the associated risks of green PPAs as well as their often significant transaction costs. As such, the merging of several buyers to form electricity purchasing groups can be worthwhile for both sides, as it diversifies risks and minimises transaction costs. This could take the form of mergers of smaller or medium-sized companies with different locations – even across several countries – within the same company group, but also several independent companies that together have a stronger market position and are joining forces to jointly purchase their electricity are conceivable. Similar models already exist in the conventional energy field. A special sub-group of green PPA contracting parties are renewable energy co-operatives, e.g. in the form of housing co-operatives, consumer co-operatives or worker co-operatives. These renewable energy co-operatives often operate their own local or regional plants producing renewable energy, such as solar or bioenergy plants or onshore windfarms. Besides electricity, they often also offer additional services to their customers or members, with different existing models. Long-term green PPAs can enable energy co-operatives to source larger capacities of renewable electricity than they would be able to produce themselves and thereby expand their customer base and open up new segments of customers, e.g. those interested in sourcing electricity from a particular region or even site.

EXAMPLE OF A CO-OPERATIVE PPA IN GERMANY

One such example of a co-operative PPA involves the registered co-operative electricity supplier

1. *Please see also "EurObserv'ER Examples of Innovative Financing Schemes 2019" for information on green Power Purchase Agreements (PPAs) in general as well as a distinction of the different sub-forms.*

Signing of the contract as part of the Federal Congress on the Cooperative Energy Transition in Berlin

for the city Schönau (German: Elektrizitätswerke Schönau eG, EWS Schönau), who concluded the first-ever co-operative PPA in Germany in 2020. The co-operative has its origins in a citizen's initiative that was formed as a reaction to the nuclear energy disaster in Chernobyl 1986. Together with its various subsidiaries, EWS Schönau covers the entire spectrum of energy distribution, grid operation and energy services, also operating its own wind parks. Its customers are located all over the country and no longer limited to the South of Germany. In 2020, EWS Schönau and the registered cooperative energy community InnSalzach (German: Energiegenossenschaft InnSalzach eG, EGIS) came together to sign a green PPA contracting renewable electricity from solar energy, produced by a newly built solar park in Lower Bavaria which was connected to the grid in October 2019. A contractually agreed price for the electricity now applies to the green PPA until the end of 2024. It is expected that every year the solar plant will produce up to 4.7 GWh of renewable electricity that directly benefits the customers from both co-operatives. Both companies regard this as a milestone for their operations and an important stepping stone to conclude additional green PPAs, paving the way for large-scale renewable energy pro-

jects without federal subsidies. In addition to new renewable projects which can thus be financed, co-operative PPAs may also be an option to guarantee the further operation of existing wind parks that no longer qualify for subsidies under the German Renewable Energy Sources Act (German: Erneuerbaren-Ausbau-Gesetz, EEG). In this regard, EWS Schönau has signed numerous contracts with wind farms no longer eligible to receive federal remuneration.

A total of 13 existing wind farms throughout Germany amounting to an accumulated capacity of 50 MW now supply electricity from wind power directly to the cooperative's customers. Even though the wind parks are older than 20 years, they can still profitably produce renewable electricity for a few additional years.

THE ROLE OF INTERMEDIARIES IN "DEMOCRATISING" PPAS

While co-operatives often have enough negotiating power to directly negotiate their PPAs, the significance of other intermediaries is increasing as well. Intermediary entities, such as regional or municipal energy suppliers and utilities or aggregation platforms, have an important bridging function. Having the necessary energy industry expertise and adequate size, regional energy suppliers are increasingly recognising green PPAs as an opportunity to expand their portfolio and offer tailor-made green electricity tariffs specifically aimed at SMEs with high sustainability exigencies that cannot or do not want to conclude their own green PPAs to avoid the associated transaction costs. Electricity tariffs offered in this way and based on green PPAs address

The solar park of EGIS eG in Unterdietfurt in Lower Bavaria

many of the risks associated to PPAs that exist for smaller companies while enabling them to benefit from the many advantages, but they are still, necessarily, standardised products that may not meet a company's each and every need. Furthermore, in order to be able to make attractive offers to SMEs, it is important to refrain from complexity as much as possible. PPA-based electricity tariffs based on local generation are particularly attractive for use in marketing or sustainability reports, so that there is a high potential for identification for the end customer. Municipal utilities as aggregators can also bundle different generators and market them together, which makes sense for smaller companies that cannot do this themselves. Another important development in the field are demand-aggregation platforms which are becoming increasingly popular also in Europe, such as UK-based Zeigo or LevelTen Energy. These platforms match energy sellers and buyers, some of them even automating the process using artificial intelligence.

NEXT STEP: URBAN PPAS?

In light of the current developments that have started to make green PPAs more widespread and open them up to new customer segments, PPAs might soon also become attractive to additional parties, such as municipalities, districts or local communities and their subsidiaries, e.g. public universities, hospitals or other service providers. In this context the public sector has an important function as role model and could enable local deals with renewable energy developers in the region leading to more renewable energy projects materialising. Urban PPAs are already quite widespread in the United States and a part of municipal procurement processes, but not yet established in the EU. ▫

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