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A Business Model Fast Track on Energy Communities—Key Lessons Learned from H2020 EU Projects †

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Abstract: Developing business models for energy communities means that community-based values and goals are to be taken seriously. This paper presents how several European Horizon projects attempt to do so, highlighting the key issues and challenges encountered. The various projects also show diverse ways to support energy community BMs, developing and demonstrating both technological as well as governance tools and support. What all projects point out is that energy communities lack (financial, knowledge, relational) resources, and that the current local, regional and national market and policy frameworks are not conducive for energy community BMs.

Keywords: business model; energy community; inclusive; energy poverty; local flexibility market; end-to-end solutions; interoperability; institutional context; level playing field

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1. Introduction

The introduction of the term *energy communities* in the Clean Energy for all Europeans package (https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en, accessed on 23 November 2021) points out that energy is not just another commodity to be traded, but that access, affordability, control and ownership of both energy generation and infrastructures are crucial for communities to flourish. This has implications for business modelling, which needs to cater for the specific needs and characteristics of these communities. A variety of European Horizon 2020 projects are developing and analysing business models (BMs) for energy communities, and this paper briefly presents these efforts, highlighting some of the key issues and challenges encountered. As such, it aims to reveal the specific BM requirements to help generate value in terms of decarbonisation, grid security and inclusive social and community development.

2. Methodology

Representatives of several H2020 projects that include business modelling for energy communities have exchanged experiences, ideas and challenges based on their work thus far. (These included the following H2020 projects: WHY; DRIMPAC; NEWCOMERS; DECIDE; SocialRES; BEcoop; COMPILE). Some of these projects had just started, others are quite well underway. Some clearly take energy communities as a point of departure; others start from a grid perspective. Below, we briefly present each project's take on energy community business modelling, after which we draw some preliminary conclusions and point toward the lessons learned.

3. Improving Opportunities for Energy Community Business Models

3.1. WHY Project: Innovative and Socially Inclusive Business Models

The WHY project (https://www.why-h2020.eu/, accessed on 23 November 2021) starts from the observation that currently, successful innovative and inclusive BMs for energy communities are difficult to find. Clearly, no "one-size-fits-all" solution exists and any discussion about viable energy community business models needs to address interrelated aspects such as technology and land-use issues, market and revenue streams, regulatory and governance structures and demographics such as socioeconomics and geography. The WHY project explores and aims to develop outcome-based business models that allow those most likely to face energy poverty to directly benefit from the self-sufficiency of energy communities. The focus is on *self-sufficient* BM solutions for communities. To achieve these through helping ease the main barriers of upfront costs, lack of time and expertise, partnerships are crutial, e.g., with cities, municipalities, social housing, ESCOs, etc. These are important to help ease the main barriers of upfront costs, lack of time and expertise. In addition, partnerships that go beyond the local levels contribute to the exchange of knowledge and resources to support a wider uptake of inclusive energy community BMs.

3.2. DRIMPAC: Piloting a New BM Concept: The Flexibility Service Company (FLESCO)

The DRIMPAC project (https://www.drimpac-h2020.eu, accessed on 23 November 2021) aims to enable the participation of small prosumers in implicit and explicit demand response (DR) programs, by proposing an interoperability framework that bridges the gaps along the DSO-prosumer path, through an end-to-end solution connecting the major standards (OpenADR, OneM2M, IEC 61850). A BM is understood as a concept of how the DRIMPAC solution can be applied in an operational environment to generate revenues for a service provider and create an added value for the customers (end-users or prosumers at the building level). The DRIMPAC BMs are currently piloted in four pilot sites in Germany, France, Cyprus and Spain and cover the following three DR approaches: an integrated energy supply and flexibility provision; an independent flexibility provision by a dedicated DR aggregator; and an implicit DR through a so-called flexibility service company (FLESCO) facilitating load profile optimisation behind the meter. The DRIMPAC solution could be an interesting tool for aggregators acting as community managers, for suppliers balancing their portfolio, but especially for technology providers, e.g., manufacturers of building energy management systems, acting as FLESCOS and performing energy optimisation behind the meter to achieve cost savings from dynamic tariffs.

3.3. NEWCOMERS: New Clean Energy Communities in a Changing European Energy System

The NEWCOMERS project (https://www.newcomersh2020.eu/, accessed on 23 November 2021) examines the emergence and operation of new clean energy community business models (EC BMs) across six European countries (Sweden, Germany, Slovenia, Italy, the United Kingdom and the Netherlands), investigating their value to consumers and members, to the energy systems they are embedded within and to wider, societal goals, such as decarbonisation and democratisation. In addition, it enquires into the institutional contexts that enable and/or hinder their potential diffusion.

EC BMs are viewed as dynamic arrangements of technologies, institutions and actors (with associated competencies, skills and knowledge), whose success in creating and capturing value for actors depends on a range of internal and external elements. Based on a review and case study analysis, an EC BM typology is developed, distinguishing between the actors involved and the BM governance arrangements they adopt, with resultant insights on the types of activities each can achieve. For instance, the range of BM activities open to "do it yourself ECs", in which members retain control over the design, management and operation of their BMs, is small. Forming an alliance opens up a wider array of EC BM activities, whilst EC BMs led by non-local, commercial enterprises are likely to have

the most options. This suggests that whilst there are lots of business opportunities for ECs, realising BMs often requires a combination of actors and expertise.

3.4. BEcoop: Business Models for Community Bioenergy

BECoop (https://www.becoop-project.eu/, accessed on 23 November 2021) aims to support community bioenergy, unlocking and activating the underlying market potential of community bioenergy. To this end, BECoop investigates and specifies the community bioenergy market uptake facilitators and barriers, especially in the four participating communities in Spain, Italy, Poland and Greece and, building upon this information, empowers policy makers to introduce enabling frameworks to level the playing field for community bioenergy. Several project tools are co-created, enabling roadmaps and BMs to be adopted and scaled across the EU. These tools include, e.g., the BECoop catalogues, listing technologies, business and organisational models, financing schemes, to provide bioenergy communities with easily understandable business and financial options. The catalogues, along with the other project tools, can be used to identify the optimal (technical, business, financial) solutions and define the necessary services to support BM implementation. It furthermore offers a categorisation of interesting BMs and a list of the most relevant policy and financial instruments/models available to regional authorities and community energy stakeholders. Additional tools include the BECoop inventory of tools, and the yet-to-be-developed BECoop self-assessment tool, the E-market environment, and the Knowledge Exchange Platform.

3.5. Compile: End-to-End Innovative BM to Enable Flexible and Secure Decentralised Networks

COMPILE (https://www.compile-project.eu/, accessed on 23 November 2021) aims to activate and use Local Energy Systems in order to support the fast growth of RES in constrained networks and foster the transition from centralized systems with passive users into flexible networks of active users featuring energy communities. To this end, COMPILE is uniting the efforts of DSOs, market actors and communities of active consumers. A BM is understood as reflecting relations between different stakeholders in a situation where there is a trade based on a product or service. Successful BMs enable all the stakeholders to benefit, be it economically, socially or environmentally.

COMPILE has developed an end-to-end innovative BM, providing tools for energy and community management, while also offering guidance and support to citizens to set up their own energy community. This integrated BM targets diverse actors in the local energy value chain: for energy cooperatives, communities or even municipalities, enabling a wider overall view of the energy parameters of the community members, being able to cluster them and offer them more information about their energy performance, while improving the purchase strategies from the pool market.

A condition for the successful energy community BMs across Europe is not only the support of local administration, but also the development of a supportive frameworks for local flexibility markets.

3.6. DECIDE: Business Models to Create Added Value for a Community

DECIDE (https://decide4energy.eu/, accessed on 23 November 2021) investigates existing and emerging BMs that energy communities and other collective energy actions (initiatives) across the EU use to create added value for their community. As such, one collective energy action or energy community can use more than one BM. DECIDE has been analysing BMs based on the available literature, discussions with 18 DECIDE initiatives and interviews with initiatives across the EU. BMs have been grouped into seven different categories based on the way value is created into: collective generation and trading; collective residential self-consumption; collective commercial self-consumption; a community owned grid; collective investment in a community project; collective investment in an independent energy project; and collective energy services.

Analysis of BMs across the EU requires analysis of the factors influencing BMs such as organizational structures, governance, socioeconomic aspects, regulatory framework and awareness of potential members. DECIDE aims to show how different BMs can be improved or further developed. The extracted best practices and lessons learned from DECIDE and other related projects are exchanged and shared with the public through the Knowledge Hub, Energy Communities Hub and monthly workshops and webinars. These efforts at information sharing and exchange are aimed at supporting the replication of successful initiatives across the EU.

4. Conclusions

Energy communities often lack (knowledge, time, financial, relational) resources. Moreover, the current market and policy frameworks are not conducive to energy community BMs and a level playing field is as of yet absent, which means that energy communities need to rely on other (market) actors.

Not surprisingly, there are hardly any examples of successful energy community BMs except for a number of pilots. However, the projects presented above show the potential to push beyond the piloting phase and provide sustainable BMs—that is, if the institutional framework conditions also change in favour of energy communities in the years to come.

Generally speaking, partnerships with both public and private stakeholders at local and supra-local levels; innovative financing (to tackle upfront investment barriers); and an exchange of knowledge, experiences and lessons learned are important for all energy community BMs.

Different approaches toward developing BMs for energy communities are discernible, based on the projects presented, yet no commonly agreed terms exist. We could pose a continuum with, at one extreme, bottom-up energy communities aiming at self-sufficiency and taking control to the fullest or, at the other extreme end, an externally provided energy community that consists of a physical and ICT architecture enabling participation in new and emerging markets. Both extremes miss out on important elements for a successful BM. In the former case, alliances and partnerships will be needed to obtain necessary resources and access to markets. In the latter, a community development process is needed so that community values and goals become a central element in the BM design and implementation.

Sustainable value propositions are not only about innovation but also about inclusion, control and ownership. We need to keep asking ourselves what is needed to develop democratic citizen and renewable energy communities, and the best way to answer this is to collaborate with energy communities in this effort.

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