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A Social Engagement Fast Track on Energy Communities—Key Lesson Learned from H2020 EU Projects †

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Abstract: Energy communities organise collective and citizen-driven energy actions that will help pave the way for a clean energy transition, while moving citizens to the forefront. The energy market is rapidly transforming and so is the role of the consumer. Yesterday's passive consumers become central actors in today's energy markets. Today, as prosumers, citizens can benefit from their generation, consumption, and storage capabilities. Moreover, by supporting social engagement and citizen participation, energy communities can help provide flexibility to the electricity system through demand response, storage, and peer-to-peer energy exchange. Based on the collective debate from nine H2020 running projects (Renaissance, COMETS, Sender, eCREW, Lightness, ReDream, HESTIA, UP-STAIRS and NRG2peers), several challenges and key lessons learned can be identified for just social engagement. These challenges and lessons are relevant for the present and future development of EU energy communities.

Keywords: energy communities; social engagement; citizen empowerment; P2P energy trading

1. Introduction

Through the clean energy for all Europeans package, the EU has introduced the concept of *energy communities* in its legislation, notably the creation of citizen energy communities and renewable energy communities. On the one hand, the *Directive on Common Rules for The Internal Electricity Market* ((EU) 2019/944) includes new rules that enable active consumer participation, either individually or through citizen energy communities, in all markets, by generating, consuming, sharing, or selling electricity, or by providing flexibility services through demand response and storage. In addition, the revised *Renewable Energy Directive* (2018/2001/EU) aims to strengthen the role of renewable self-consumers and renewable energy communities. EU countries should therefore ensure that they can participate in available support schemes on equal footing with large participants.

2. Methodology

Based on collective debates from the H2020 running projects (Renaissance, COMETS, Sender, eCREW, Lightness, ReDream, HESTIA, UP-STAIRS and NRG2peers), there are several challenges and key lessons learned for just social engagement. Those which have been identified are relevant for the present and future development of EU energy communities.

3. Energy Communities as an Instrument for Just Energy Transitions on a Local Scale: Initial Lessons from the Lightness Project

The Lightness project (https://www.lightness-project.eu/ accessed on 24 November 2021) examines citizen participation in local energy community pilot sites via an online platform in five countries. Assessing *user participation* in the project, it was found that pilot sites differ largely in strength of underlying social infrastructures as a basis for recruitment. Strong formal and informal connections in the pilot site in Italy made recruitment there easy. In the other communities, where the participants must still be recruited, social connections are far weaker.

The project looks into five key environmental justice aspects: recognition, distribution, capacities, responsitilities and learning. Regarding user *recognition*, the assessment suggests that there might be a tension between uniform ICT platform development and considering individual wishes and needs of participants. Furthermore, it is not yet clear if the gaming design currently embedded in the main project ICT platform is appealing to different groups of potential participants. *Distribution and capacities* are further key just engagement points to be considered. Current platform design allows participants to gain 'points' in competition with other participants. It needs to be evaluated to what extent this is considered a just distribution by participants. Also, not all community participants might have the computer skills and capacities to access the platform. *Finally, responsibilities and learning* processes are currently addressed in the project by three main activities: (1) the design of user participation forms that make all responsibilities of project participants transparent, (2) workshops for pilot leads to exchange learning aspects, and (3) installation of a monitoring and evaluation framework that will assess performance regarding these environmental justice aspects during and at the end of the project.

4. A Connected User-Centred Energy Ecosystem: The EU-Funded ReDream Project

The EU-funded ReDream project (https://redream-energy-network.eu/ accessed on 24 November 2021) enables the effective participation of consumers and prosumers in the energy market. The project develops a strategy for the creation of a value generation *ecosystem* based on a service-dominant logic in which services are exchanged. Five core characteristics of this ecosystem aim to foster the social engagement of citizens and consumers: (1) co-design—consumers are involved from the beginning in co-designing the ecosystem; (2) empowerment—the ecosystem shifts the electricity system, balancing responsibility from producers to prosumers, which also helps to mitigate energy poverty; (3) trust and accessibility—the innovative energy services in the ecosystem are reliable and accessible; (4) community—people and their experiences are gathered in an "energy social network"; (5) engagement—gamification is used to continuously recruit consumers. Additional research led to important insights on how to improve consumer participation in the energy transition. Firstly, it is key to restore and develop trust in the energy sector in general, and to formulate common goals such as social, sustainable, or economic impact, to drive participation and engagement. Secondly, the legal framework should support and facilitate decentralised energy production.

5. Co-Creation to Approach Social Engagement: The EU-Funded Sender Project

The Sender project (https://www.sender-h2020.eu/h2020/ accessed on 24 November 2021) is aimed at continuing to drive the development of smart grid technologies, with a special focus on end users implemented right from the start. This reflects the Horizon 2020

call (EC 2021), which specifically mentions that proposals should also bring a perspective from the consumers on the grid and power system, bringing in social science and humanities from the beginning, and not as a separate task. The method employed to approach social engagement within Sender is co-creation [1], which in its business and management origins, have been argued to constitute an entirely new paradigm of business modelling and product development. It is a highly interdisciplinary perspective, but perhaps best known from its application within the realm of business, where it is defined as "the practice of developing offerings through ongoing collaboration with customers, managers, and other stakeholders". This means consumers are placed at the heart of value creation by means of collaborating in testing and development. Co-creation in Sender aims to iterate and evaluate use cases through a co-creation steering group, following up with co-creation workshops. Implementing the co-creation process has already resulted in several benefits for the Sender project. A challenge is doing co-creation that is putting end users and technical stakeholders together for use case brainstorming sessions.

6. Participatory Methods as a Means to Address the Engagement of Householders in Demand Response Initiatives from the HESTIA Project

The HESTIA project (https://hestia-eu.com/ accessed on 24 November 2021) aims to provide a cost-effective solution for the DR services by leveraging residential consumer engagement to create a holistic approach to energy supply and demand side management. A participatory co-creation process key to our consumer engagement. Through surveys, interviews, home tours, workshops, and focus groups, as well as asynchronous research tools from the design toolkit, people are invited and empowered to co-create the business model and user interfaces of the DR platform. In the case of HESTIA, the participatory workshops have so far helped to reveal the dynamics of household management and negotiations of everyday life while also showing the potential for people's engagement. Householders are keen to talk about their everyday energy-related experiences and happy to share them with their communities and other stakeholders. At the same time, the challenges of working at the boundaries of comfort zones have also become apparent: to achieve equal representation of the diversity of people in design cycles, to navigate hidden traps in the process of translating findings from participatory cycles to the final product (who is doing the translation from ideas to technology etc.) and setting expectations for all the stakeholders involved. There is an opportunity to consolidate this approach to participatory design into a fully-fledged methodology that companies, regulators, and energy communities can apply to jointly develop the (digital) solutions of tomorrow's grid.

7. Energy Community without Administrative Burdens: The eCREW Approach

The eCREW project (https://ecrew-project.eu/ accessed on 24 November 2021) aims at activating and fostering the inherent—and so far, underused—forces of community-driven collective action initiatives. Recent European legislation has paved the way for unleashing the potentials of such initiatives by granting them a certain level of support and has set the scene for the establishment of Citizen Energy Communities (CECs) and Renewable Energy Communities (RECs) [2]. The project defines a CREW (Community Renewable Energy Web) as a group of citizens jointly utilizing household-level renewable electricity generation and storage capacities to establish CREWs as the third pillar of the citizens' energy-related cooperation, complementing CECs and RECs. Joining a CREW only requires signing a CREW contract, but involves no up-front investment, no establishment of a legal entity, and low, or no, opportunity costs. CREWs can come in any size, from a few neighbours to whole city districts working together. The cooperation within a CREW will maximize renewables uptake and energy efficiency, jointly and individually, and is enabled through an award-winning smartphone app software system developed and field-tested in the H2020 project PEAKapp (https://www.peakapp.eu/ accessed on 24 November 2021). A total of 240,000 households in different EU countries will be enabled to join a CREW through targeted communication and accompanying actions.

8. Who's Ready for P2P Energy Exchange? A Framework to Assess Readiness Comprehensively from the NRG2peers Project

As part of the NRG2peers project (https://nrg2peers.com/ accessed on 24 November 2021) a readiness level framework (RLF) has been developed to provide a detailed insight into the user-related, organisational, institutional-legal, market, and technological elements that need to be in place for energy communities to start with peer-to-peer (P2P) energy exchange in a manner that generates value for the community. The purpose of the RLF is to provide an assessment tool for energy communities to assess how 'ready' they are for P2P energy exchange. In addition, it can also be used by policy actors to assess how ready a particular context is for P2P energy communities. The applicability of the RLF has been tested in four different national contexts—with diverging types of pilots, differences in regulatory frameworks, energy markets, and policy practices. The true potential of the readiness framework would be that it also provides a process support tool that shows how to improve readiness for a form of P2P that supports the development of energy communities' and the attainment of their goals. The attention for multiple readiness dimensions is also to underline that P2P energy communities should be enabled in achieving their goals (socio-economic regeneration, local employment, enhanced autonomy, etc.) by organising more distributed forms of exchange (e.g., P2P) within energy communities—thereby supporting the grid as well.

9. Inclusive Stakeholder Involvement at the Heart of Energy Community Design and Implementation: The Renaissance Approach

The Renaissance project https://www.renaissance-h2020.eu/ (accessed on 24 November 2021) works to deliver a community-driven, scalable, and replicable approach to implement new business models and technologies supporting the clean production and shared distribution of energy in local communities. The project's approach for energy communities is supported by three innovative tools: the Multi-Actor-Multi-Criteria Analyses methodology to involve stakeholders during the initial phase in the definition of needs, objectives, and the most desirable energy system scenarios; the Renergise optimisation tool to support identifying the preliminary design of the local energy system and roughly estimate layout and investments; the ROP platform (Renaissance Operational Platform). In order to better understand European end users' acceptance of energy communities and keep track of their mindset changes throughout the project. The projects distributed a "Social Acceptance Survey" to more than 150 contacts, deriving a set of predictors of engagement. After receiving the information about the Energy Directive and energy community innovative business models, respondents ranked the traditional ESCO model as the least desirable while the energy community was ranked as favourite, regardless of the age and the population density.

10. Conclusions and Key Takeaways

These H2020 projects demonstrate that there are many aspects to consider and incorporate into this challenging "energy transition" period we are living in. Many concepts are common in all of these projects; however, despite the different specifications and locations, energy communities are facing a reality not yet fully defined that requires many more collaborative efforts to overcome its challenges. In parallel to the technological-digital developments, these projects are evidence of the strong social sciences and humanities approach, and activities that are required to (i) understand human behaviour in a field such as the use of energy at home, and (ii) engage end-users to become part of the solution. Beyond what these projects initially planned, sitting down, and talking to end-users has shown that standard communication and dissemination efforts are important but not enough. Creating energy communities now means that each project is struggling to translate its highly technical-specialised jargon developments into an understandable language to the end-users, potentially failing to effectively communicate the benefits and efficiently manage

their expectations. There is an undeniable truth if we want to achieve our objectives and those of the EU Green Deal; therefore, energy communities are here to stay.

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