

A Social Engagement Fast Track on Energy Communities – key lesson learned from H2020 EU projects[†]

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[†] Presented at the Sustainable Places Conference, 29 September 2021, Rome

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. By supporting social engagement and citizen participation, energy communities can moreover help in providing 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, UPSTAIRS and NRG2PEERS several challenges and key lesson learned for a just social engagement are identified that are relevant for the present and future development of EU energy communities.

Keywords: Energy Communities; Social Engagement; Citizen Empowerment; P2P energy trading

Citation: Lastname, F.; Lastname, F.; Lastname, F. Title. *Environ. Sci. Proc.* **2021**, *3*, x. <https://doi.org/10.3390/xxxxx>

Published: date

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1. Introduction

Through the Clean energy for all Europeans package, the EU has introduced the concept of *energy communities* in its legislation, notably as 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, individually or through citizen energy communities, in all markets, either 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 renewables 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, UPSTAIRS and NRG2PEERS

several challenges and key lessons learned for a just social engagement are identified that 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

In the Lightness project (<https://www.lightness-project.eu/>), while assessing *user participation*, it is found that pilot sites differ largely in terms of underlying social infrastructures as a basis for the recruitment. In Italy, the pilot site consists for instance of one building in which all residents are formally and informally well connected. The other communities where the participants still must be recruited, the social connections are far weaker.

Looking into *user recognition*, the assessment suggests that there is a tension between ICT platform development and considering individual wishes and needs of participants. It is furthermore not clear yet 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 points to be considered. Current platform design allows participants to gain 'points' in competition with other participants. *Responsibilities and learning* processes are currently addressed in the project by three main activities: 1) the design of user participation forms that can make transparent all responsibilities of project participants, 2) by a monitoring and evaluation framework 3) and by workshops for pilot leads.

4. A connected user-centred energy ecosystem: The EU-funded ReDREAM project

The EU-funded ReDREAM project (<https://redream-energy-network.eu/>) 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 engage 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/>) 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. 96
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6. Participatory methods as means to address engagement of householders in demand response initiatives from the HESTIA project 98
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The HESTIA project (<https://hestia-eu.com/>) 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. Key to our consumer engagement is a participatory co-creation process: 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 so far have helped 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 the hidden traps in the process of translating findings from participatory cycles to final product (who’s doing the translation from ideas to technology etc.) and setting expectations for all stakeholders involved. There is an opportunity to consolidate this approach to participatory design into a full-fledged methodology that companies, regulators, and energy communities can apply to jointly develop the (digital) solutions of tomorrow’s grid. 100
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7. Energy Community without administrative burdens: the eCREW approach 118

The eCREW project (<https://ecrew-project.eu/>) aims at activating and fostering the inherent – and so far, underused - forces of community-driven collective actions 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 and establish CREWs as the third pillar of 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/>). 240,000 households in different EU countries will be enabled to join a CREW through targeted communication and accompanying actions. 119
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8. Who’s ready for P2P energy exchange? A framework to assess readiness comprehensively from the NRG2peers project 135
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As part of the NRG2peers project (<https://nrg2peers.com/>) a Readiness Level Framework (RLF) has been developed to provide detailed insight in 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 4 different national contexts – with diverging types of pilots, differences in regulatory frameworks, 137
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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' 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/> works to deliver a community-driven scalable and replicable approach, to implement new business models and technologies supporting 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 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 change throughout the project, the project 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 favorite, regardless the age and the population density.

10. Conclusions and key takeaways

These H2020 projects demonstrate there are many aspects to consider and incorporate in this challenging "energy transition" period we are living in. Many concepts are common to all of them, even though with different specifications and locations, and 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 & Humanities approach and activities that are required to (i) understand human behaviour in a field like 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 have 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-specialized jargon developments into an understandable language to the end-users, 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, Energy Communities are here to stay.

Funding: These projects has received funding from the EU Horizon 2020 research and innovation programme under the grant agreements no: 890345 (NRG2peers), 957823 (HESTIA), 957755 (SENDER), 957837 (ReDREAM), 953020 (Lightness), 890362 (eCREW), 824342 (Renaissance)

Acknowledgement: Juan Martino & Leonor Ruiz (Soulsight) and Carmen Valor Martínez (Universidad Pontificia Comillas), Patrick Rembe (European Science Communication Institute).

Conflicts of Interest: The authors declare no conflict of interest.

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