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Energy Citizenship in New Energy Concepts †

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Abstract: It is assumed by the projects demonstrating Positive Energy District (PED) concepts in cities across Europe that citizens should want and need to be involved in the development of new energy concepts, such as PEDs for these concepts to be deployed successfully. Six different PED research and innovation projects are investigating the types and expectations of citizen engagement. They evaluate the impact of energy citizenship on the success of PED deployment across Europe.

Keywords: energy citizenship; Positive Energy Districts (PED); Smart Cities and Communities; energy democracy

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1. Introduction

The involvement of citizens and energy communities is seen as a key pillar of the energy transition process [1,2]. Citizens interact with the technical energy systems, since they are both the subject and object of social innovation in the energy society, and are emerging economic actors in the energy markets. To design and optimize fair, inclusive, and just energy transition pathways, it is a requirement to have suitable policy making, good collaborations between stakeholders, realistic business models, and citizens who play an active role in shaping and accelerating the energy transition. However, scientific evidence on the relevance of these requirements and the impact on energy citizenship is not sufficient to assess the success of novel energy concepts.

This paper presents and discusses the methods, strategies, and expected impacts for citizen engagement applied in six different European research and innovation projects in the area of Positive Energy Districts. The goal is to find a common definition of energy citizenship and explore the relevance of citizen engagement for the success of inclusive energy concepts.

2. The Emerging Role of Citizens in the Energy Transition

Cities around the world are taking steps to promote renewable energy, support electric vehicles, change to energy-saving streetlights, slash emissions from buildings, and implement a host of other measures. The role of citizens and citizen organisations in both

driving and facilitating the energy transition towards climate neutrality and inclusivity has gained much attention among scientists, local policy makers, and the private sector. It is in this context where the notion of "energy citizenship" arises, as a placeholder for new social roles and responsibilities for citizens in an energy system in constant transformation [3,4]. The term energy citizenship represents the active participation of citizens in the energy system and in the energy economy. It concerns both the actions of individual citizens and collective citizens' initiatives and organizations.

Through engaging and facilitating citizen participation, the role of the citizen transforms from a passive consumer to an active participant in the transition as, for example, the initiator of new, local, energy initiatives, becoming a member of such an initiative or by changing from consumer to prosumer.

3. Energy Citizenship as a Driver for PEDs

Positive Energy Districts (PEDs) are a new concept for energy planning at neighborhood and city scale. PEDs consist of delimited areas of buildings, public spaces, and the infrastructure between them that have a positive total annual energy balance, meaning that the area will deliver, on average, an energy surplus to be shared with its surrounding other urban or peri-urban zones. PEDs require integration of different systems and infrastructures as well as interaction between buildings, the energy users, the regional energy system, as well as mobility and ICT systems, while securing the energy supply and a good life for those in line with social, economic, and environmental sustainability. It is assumed by the projects demonstrating the PED concept in cities across Europe that citizens should want and need to be involved in new energy concepts, such as PEDs, in order for these concepts to be deployed successfully in the long term. There is yet, however, limited scientific evidence that this is the case.

4. Case Studies of Six European Projects

4.1. Amsterdam Bilbao Citizen-Driven Smart Cities (ATELIER)

ATELIER is an EU-funded Smart City project aiming to create and replicate Positive Energy Districts within two lighthouse cities, Amsterdam and Bilbao, and six fellow cities [5]. Co-creation, citizens' energy communities, and behavioral change are the main strategies for citizen engagement. The project with a duration of 5 years is currently in its third year. In this phase, the project's approach and detailed activities are being designed and tested. Ongoing activities include collaboration with previously established energy communities in the district that serve as testing grounds and establishing so-called Innovation Ateliers that serve as a multi-stakeholder platform, addressing upscaling of specific PED innovations.

4.2. +CityxChange: Positive City Exchange

Within +CityxChange, the lighthouse cities Trondheim (Norway) and Limerick (Ireland) are developing feasible and realistic demonstration projects in climate-friendly and sustainable urban environments towards Positive Energy Blocks and Districts [6]. +CityxChange places particular emphasis on the role of citizens as co-innovators in the creation and replication of Positive Energy Blocks and Districts [7]. Main demos towards this are six interconnected CommunityxChange solutions which can operate as an integrated toolkit, focusing on citizen empowerment through measures including citizen observatories in the form of innovation labs and activation of the local innovation ecosystems through innovation playgrounds [8], together forming an urban living lab approach; implementation of open calls for citizen solutions; a Positive Energy Champion Network; and investment and engagement activities to enable citizens to invest in their own buildings for efficiency measures and local energy generation.

4.3. ENERGE: Energizing Education to Reduce Greenhouse Gas Emissions

The ENERGE project will improve recognition among the whole secondary school population of the issues (climate, societal, economic, environmental) associated with excessive greenhouse gas (GHG) emissions [9]. ENERGE addresses this need to engage school actors in low-cost energy efficient solutions, as well as to target behavioral, communal, and organizational interventions. By means of monitoring building sensors (e.g., electrical, indoor climate etc.), sociological studies, and new educational approaches, ENERGE creates a systemic and holistic understanding of how schools engage in energy and GHG mitigation. ENERGE will be demonstrated in thirteen secondary schools in France, Germany, Luxembourg, Ireland, the Netherlands, and the UK. An integrated ENERGE platform puts together novel data interactions and teaching strategies for engaging students and teachers in new energy and comfort practices. Students are involved in the design of the ENERGE solution and at a later stage in the design and execution of energy efficiency interventions, using their schools as living labs.

4.4. MAKING-CITY

MAKING-CITY aims to address and demonstrate the urban energy system transformation towards smart and low-carbon cities, based on the Positive Energy District concept [10]. The implementation and/or replication of the PED concept developed by MAKING-CITY will be applied in two lighthouse cities (Groningen and Oulu), and planned and designed in six follower cities. For the lighthouse cities of MAKING-CITY, a key challenge for PED development is to understand how citizens consider the topic of energy as related to their own lives and other local challenges, such as public green, climate adaptation, mobility, quality of their houses, etc. Oulu conducted an operational model that is founded on community bridges and forums in the major areas which are open to everyone, while, in Groningen, the participation process is carried out by and for the local citizens, supported by local energy initiatives [11]. During this process, citizens learn how to execute the strategy by themselves. In addition, questionnaires and tools regarding energy consumption, generation, flexibility, efficiency, mobility, and local communities are developed by the lighthouse cities which are intended to facilitate the co-creation of PED-designs in the follower cities. The feedback collected from the follower cities will be evaluated as potential indicators for realizing their PEDs.

4.5. mySMARTLife

The mySMARTLife project aims to make the three lighthouse cities of Nantes, Hamburg, and Helsinki more environmentally friendly by reducing the CO_2 emissions of cities and increasing the use of renewable energy sources [12]. As part of an open innovation strategy to engage citizens to demonstrate the possibility of efficiently addressing the energy transition issue whilst keeping high-quality living standards, mySMARTLife explored the topic of raising social awareness and acceptance of change by developing key factors that can help raise awareness for social acceptance and engage citizens directly in the development of the transformation. The project involves citizens in the urban transformation, either as consumers/users or as city "planners". The three lighthouse cities have implemented interventions in the field of energy, mobility, and ICT, exploring the key barriers these cities have encountered during the implementation phase and how they tried to overcome them.

4.6. POCITYF

POCITYF will help historical cities to become greener, smarter, and more livable while respecting their cultural heritage by implementing and testing Positive Energy Districts in two lighthouse cities, Alkmaar and Evora, and six follower cities [13]. POCITYF brings together technology providers, grid operators, policymakers, and local communities to collectively work on integrated innovative solutions across the built environment, energy infrastructure, and e-mobility. A POCITYF's key solution is to have citizens become key

stakeholders in the decision-making process is to incorporate a peer-to-peer (P2P) energy trading platform. P2P energy trading empowers citizens to feel in control of their own energy flexibility and to create economic value in a direct way. P2P energy trading could also be leveraged to enhance a community's social cohesion by stacking non-energy-related services that have been identified as bringing added value to its members and nudge people to adjust their behavior.

4.7. Synthesis of Case Studies

The six projects have different strategies for involving different citizens' populations in the design and implementation of PEDs, from early-stage involvement in the role of "urban planners" in the mySMARTLife project, to becoming active energy traders in the POCITYF project or co-innovators in +CityxChange. The projects have varied ways to measure the impact of their citizen engagement interventions. Furthermore, the positioning of citizen engagement activities in the design of the projects varies. Some projects have separate work packages for citizen engagement, making it a mere isolated activity, where other projects integrate citizen engagement with other, often more technical, activities during the project lifetime.

5. Conclusions

Although there is a common understanding that the active support and involvement of citizens in the design and implementation of new collaborative energy concepts, such as PEDs, is necessary for the success of such concepts, there is no hard evidence yet which supports this claim. Measuring the contribution or impact of citizen engagement on the success of new energy concepts has proven to be difficult. One of the main difficulties is the transdisciplinary nature of the projects and the combination of social, political, and technological interventions that are simultaneously conducted which obscure the impact of a single intervention. Another difficulty is the context-dependent nature of these solutions, which challenges the generalisation of rich yet contextualised knowledge. The lack of a common methodology for assessing the impact of energy citizenship hinders direct comparison of the efficiency of strategies for citizen engagement across projects or cities. A systemic perspective that is sensible to the contextual determinants of each project should contribute to harmonizing the measurement of citizen engagement activities and the related KPIs across the six projects. This is considered a first step towards an understanding of the role and importance of energy citizenship in the energy transition.

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References

1. Seyfang, G.; Park, J.J.; Smith, A. A thousand flowers blooming? An examination of community energy in the UK. *Energy Policy* **2013**, *61*, 977–989. [CrossRef]
2. Arentsen, M.; Bellekom, S. Power to the people: Local energy initiatives as seedbeds of innovation? *Energy Sustain. Soc.* **2014**, *4*, 2. [CrossRef]
3. Devine-Wright, P. Energy citizenship: Psychological aspects of evolution in sustainable energy technologies. In *Governing Technology for Sustainability*; Murphy, J., Ed.; Earthscan: London, UK, 2007; pp. 63–88.
4. Ryhaug, M.; Skjølsvold, T.M.; Heidenreich, S. Creating energy citizenship through material participation. *Soc. Stud. Sci.* **2018**, *48*, 283–303. [CrossRef] [PubMed]
5. Available online: https://smartcity-atelier.eu/ (accessed on 1 October 2021).
6. Available online: https://cityxchange.eu/ (accessed on 1 October 2021).

7. Ahlers, D.; Driscoll, P.; Wibe, H.; Wyckmans, A. Co-Creation of Positive Energy Blocks. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2019; Volume 352, p. 012060. [CrossRef]
8. Fitzgerald, H.; Burón García, J.; Sánchez Mora, M. D3.6: Framework for DPEB Innovation Labs. +CityxChange Project Deliverable. 2020. Available online: https://cityxchange.eu/knowledge-base/d3-6-framework-for-dpeb-innovation-labs/ (accessed on 1 October 2021).
9. Available online: https://www.nweurope.eu/projects/project-search/energe/ (accessed on 1 October 2021).
10. Available online: https://makingcity.eu/ (accessed on 1 October 2021).
11. Olivadese, R.; Alpagut, B.; Revilla, B.P.; Brouwer, J.; Georgiadou, V.; Woestenburg, A.; van Wees, M. Towards Energy Citizenship for a Just and Inclusive Transition: Lessons Learned on Collaborative Approach of Positive Energy Districts from the EU Horizon 2020 Smart Cities and Communities Projects. *Proceedings* **2020**, *65*, 20. [CrossRef]
12. Available online: https://www.mysmartlife.eu/ (accessed on 1 October 2021).
13. Available online: https://pocityf.eu/ (accessed on 1 October 2021).