

## EUA-EPUE Response to SET-Plan Consultation on 'Draft Declaration on Strategic Targets in the context of an initiative for Smart Cities and Communities'

### BACKGROUND

This "Input Paper" provides the perspective of the European Platform of Universities in Energy Research & Education (EUA-EPUE) to the consultative process on the European Strategic Energy Technology Plan (SET Plan) - Key Action No. 3.2 – Smart Cities and Communities.

EUA-EPUE responds to the consultation from the perspective of the universities' role in society. Universities constitute a significant part of the research capacity in Europe. At the same time, they educate the highly skilled work force of our societies. We consider therefore that setting up the SET Plan projects with ensured integration of innovative research with education, including industrial partners, will provide a high pay-off towards achieving the energy system transition that is the objective of the SET Plan.

### GENERAL COMMENTS

- Urban settlements are responsible for 70% of global greenhouse gas emissions. Traditional top-down approaches to reduce emissions at city-level have failed to achieve significant results. Bottom-up community-level actions, especially in the form of (energy) communities, are promising alternatives. Successful bottom-up climate mitigation is dependent on the effectiveness of such communities, and their resilience and adaptability to social, economic, and technological change. As such, the topic of the proposed target is highly relevant.
- That said, the target as proposed in the Draft Declaration of Intent concerns only one small area within the broad theme of smart cities and communities, and is rather one-dimensional, i.e., only focusing on the city as urban area and addressing the technical dimension of the problem. In spite of its (overly) narrow focus, there are many ambiguities in the proposed target. It is therefore difficult to judge the level of ambition and to specify issues potentially hampering the realisation of the proposed target.
- Although the percentage of people living in dense urban settlements is rising, the spatial planning level should be drawn clearly larger, e.g., on the regional level. This is necessary, because the production of renewable energy (especially if a balanced situation between consumption and production is on the future agenda) needs huge potential areas that often will be outside the core of the city.
- Identifying and defining an appropriate "system border" needs thorough ambitions both on the technical-quantitative as well as on the social-qualitative level. Combining both approaches is the key challenge of future "energy governance" and should therefore be prioritised when it comes to EU R&I activities.
- Social innovation aspects should be integrated with technological innovation, genuinely accelerating the energy transition. Incorporating the social dimension not only helps to foster

smart and sustainable neighborhoods, but also builds and/or reconstructs mixed and multi-functional, livable spatial patterns and public spaces, which have often disappeared in many cities over the past decades.

- The policies for changing and converting existing structures (instead of “only” developing new smart settlements from scratch) could generally be more ambitious, because the existing built environment covers at least 90% of the permanent settlement areas.
- The goal to repeat single success stories needs a precise understanding of the (added) value created by smart settlements. This (added) value can (and probably should) vary for different smart settlements, matching the different perspectives of the actor groups involved in the cooperation process, such as politics, administration, economy and civil society. Upscaling conditions and replication criteria of success stories should be a matter of EU R&I activities.

#### Comments to the Section on “Introduction – Smart Cities and Communities”

- The definition of “smart” should be further explored and sustainability aspects should be considered as well. “Smart” would then refer to the use of Information and Communication Technologies (ICT) and to the integration of the Internet of Things (IoT), potentially making the city more efficient and responsive to citizens’ needs. In a similar vein, it is important to further investigate the definition of “community” and how it relates to cities. These appear to be two different units. It would be better to refer to cities and regions. This then would include all kinds of communities within those cities and regions.
- If the original focus and aim of the action is the “community aspect”, then, unlike the focus of the proposed target, there should be much more focus on the social aspects of community energy systems.
  - a. The introduction suggests that the initiative aims at integrating many technologies, while as the name entails, a community initiative should primarily aim at social innovation, responsibilities, values and other social aspects.
  - b. Development of “tools and solutions” has a purely technical orientation, while the name of the initiative, “smart cities and communities”, suggests a more social orientation.
- There are a number of in-depth research articles regarding community energy systems which in fact mostly stem from European universities (see Koirala et al. 2016, Walker 2011, Schreuer and Weismeier-Sammer 2010, Yildiz, Rommel et al. 2014). If Europe is to achieve the proposed target there should be stronger research collaborations to benefit from the full range of expertise in these universities, in particular with regard to the social dimensions connected to smart and sustainable communities (Boons & Dieperink 2014).
- Showcasing economic viability, as is mentioned in the introduction, is only one way to accelerate the transition to smart and sustainable cities. Generating social acceptance, increasing trust and willingness to contribute to community initiatives and managing conflicts are other ways of dealing with this issue (Rothstein 2005, Ostrom 2010). This also entails empowerment of consumers and, particularly, inclusion of weaker social groups.
- The initiative should, moreover, not only be integrative in terms of technologies but also strive for combining technological and social innovation (including legal, political and economic innovation). For it is now commonly accepted that technological innovation cannot be

considered separately from innovation in roles, responsibilities of actors and the relationships between them (Geels 2005).

- Striving for smart and sustainable solutions that can be scaled up and replicated appears efficient. However, given the large differences between local and regional contexts, it can be questioned whether it is always effective. Indeed, a possible factor contributing to success in the energy transition – requiring substantiation through R&I activities - is allowing for variation through providing flexibility.
- It is unclear why the introduction of the target begins with mobility issues, which do not directly relate to community action. Of course, the link could (and probably should) be made but this link would require further elaboration.
- It is understandable that the smart and sustainable cities initiative is not specifically aiming at one technology, but is more integrative in its focus. It remains unclear what is meant with ‘issues’ in ‘but is integrating many technologies and issues’ (page 2, Draft Declaration of Intent).
- In general, the introduction would benefit from a clearer description of the background and a sharper diagnosis and definition of the problem, which would more logically lead to the proposed target.

#### Comments to the Section on “Proposed targets in Smart Cities and Communities”

##### Proposed target in Smart Cities and Communities

1. Be world leader in technology integration for and deployment of flexible Positive Energy Blocks with the aim by 2025 to have at least 100 of them as a synergistically-connected part of the energy system in Europe.

*Definition: Positive Energy Blocks (PEB) consist of at least 3 highly efficient, interconnected buildings (new and retro-fitted) with at least 3 different uses (offices, residential, commercial, schools, universities, hospitals, etc.) that actively manage the energy flow between them and the larger energy system. They make optimal use of advanced materials, local RES, local storage, demand-response, electrical vehicle smart charging, cutting edge energy management (electricity, heating and cooling), and ICT in order to have and a positive yearly energy balance and a positive impact on the energy system.*

*Their concept is intrinsically up-scalable and they are well embedded in the spatial, economic, technical, environmental and social context. They are by design an integral part of the district/city/energy system.*

- In the opinion of the reviewers of this Draft Declaration of Intent, the proposed target needs a higher level of ambition. The proposed target needs to be valuable, feasible and acceptable. It is difficult to determine the feasibility in terms of quantity and timing, given that the Draft Declaration of Intent does not refer to any existing or available experience with flexible positive energy blocks. Therefore, it is recommended to provide a higher level of detail. Main aspects to be further investigated include:

- a. Take account of existing experiences in the field. If there are not, explore the potential impact of realising this target on a European scale, both quantitatively and qualitatively. Find relevant related scientific findings in the area.
  - b. The spatial and social criteria to determine the location of the foreseen 100 Positive Energy Blocks (PEB) should be specified. The target number could be higher as it seems that many more PEBs could be deployed throughout Europe in 10 years.
- As for the acceptability, the draft is ambiguous about who should assume what role and responsibility. This is understandable given that this question is part of the social innovation dimension. It would be better however to make more explicit that this is a question that is inseparable from questions in relation to the technological aspects.
  - The PEB term is somewhat confusing and would need further elaboration and specification.
  - Generally speaking, it seems that the concept of community is downgraded to buildings and their technical connections. If one is talking about community initiatives, it is a matter of citizen collaboration in sustainable production and consumption of energy, independent of buildings (as one form of energy infrastructure) (Koirala et al. 2016).
  - One form of collaboration could be based on the PEB system (i.e. connected buildings). However, there are many other energy infrastructures than can be used (see Integrated Community Energy Systems (ICES) (Koirala et al. 2016) (Integrated Energy Systems and Virtual Power Plants (Manfren et al. 2011), [12] [11], Energy Hubs (Orehounig et al. 2015) and Prosumer Community Groups (Rathnayaka et al. 2015).

**Comments to Section on “Elements to reach the targets and for their monitoring”**

- This section should be more specific. It is recommended to address the following aspects of the implementation plan: a. The type of data and information that is necessary; b. the monitoring system/s (e.g. indicators and timeline)

**Comments to Section on “Next steps”**

- The issues that are to be addressed in the implementation plan are all relevant. However, in order to reduce the ambiguity of the proposed target many of them must have been already (even if briefly) addressed. These would cover two main directions: 1) collaboration with academia and practice, 2) integration of the social aspects of smart cities and communities into the plan from the very beginning of the proposed target.

**References**

- Boon, F. P., & Dieperink, C. (2014). “Local civil society based renewable energy organisations in the Netherlands: Exploring the factors that stimulate their emergence and development”. *Energy Policy*, **69**: 297-307.
- Elzenga, H. and A. M. Schwencke (2014). “Energy cooperatives: aims, operational perspective

- and interaction with municipalities The energetic society in action.” PBL, Netherlands Environmental Assessment Agency Report.
- Geels, F. W. (2005). Technological transitions and system innovations: a co-evolutionary and socio-technical analysis. Edward Elgar Publishing.
- Huybrechts, B. (2013). "The role of networks in gaining legitimacy for hybrid organizations: the case of renewable energy source cooperatives (REScoops)." Quelle transition pour nos sociétés?: 61.
- Koirala, B. P., Koliou, E., Friege, J., Hakvoort, R. A., & Herder, P. M. (2016). Energetic communities for community energy: A review of key issues and trends shaping integrated community energy systems. *Renewable and Sustainable Energy Reviews*, 56, 722-744.
- Manfren M, Caputo P, Costa G. (2010) "Paradigm shift in urban energy systems through distributed generation: Methods and models." *Appl Energy* 2011;88:1032–48. doi:10.1016/j.apenergy.2010.10.018
- Orehounig K, Evins R, Dorer V. (2015) "Integration of decentralized energy systems in neighbourhoods using the energy hub approach." *Appl Energy*;154:277–89. doi:10.1016/j.apenergy.2015.04.114
- Rathnayaka AJD, Potdar VM, Dillon T, Kuruppu S. (2015) "Framework to manage multiple goals in community-based energy sharing network in smart grid." *Int J Electr Power Energy Syst*;73:615–24. doi:10.1016/j.ijepes.2015.05.008.
- Schröder, C. and H. Walk (2013). Local Climate Governance and the Role of Cooperatives. Climate Change Governance, Springer: 105-118.
- Walker, G., & Devine-Wright, P. (2008). "Community renewable energy: What should it mean?". Energy policy, 36(2), 497-500.
- Walker, G. (2011). "The role for 'community' in carbon governance." Wiley Interdisciplinary Reviews: Climate Change, 2(5), 777-782.
- Yildiz, Ö., J. Rommel, S. Debor, L. Holstenkamp, F. Mey, J. R. Müller, J. Radtke and J. Rognli (2014). "Research Perspectives on Renewable Energy Cooperatives in Germany: Empirical Insights and Theoretical Lenses."

## CONTACT

### EUA- EPUE: European Universities in Energy Research and Education

Dr. Lidia Borrell-Damian  
[Lidia.borrell-damian@eua.be](mailto:Lidia.borrell-damian@eua.be)

Lennart Stoy  
[Lennart.stoy@eua.be](mailto:Lennart.stoy@eua.be)

Borana Taraj  
[Borana.taraj@eua.be](mailto:Borana.taraj@eua.be)