

Joint Programming Platform Smart Energy Systems (JPP SES)

POLICY BRIEFS 2021

Summary

INTRODUCTION

The JPP SES Knowledge Community unites scientific experts in smart energy systems. On the basis of their profound expertise, these researchers develop an informed opinion of key aspects which, according to their perspective, should be considered by decision makers for funding programs, policy and business development. With its working groups and knowledge creation processes, JPP SES provides a platform for developing these expert recommendations.

This document is the condensed version of the JPP SES Policy Briefs resulting from work up until early 2021. Especially the **research community, policy makers and regulators are invited to**

- view the full text in the respective online documents on the [JPP SES Knowledge Community platform expera](#) and share their perspective in the discussion fora
- forward the recommendations ([PDF](#)) and
- participate in the [outreach survey](#).

If not an expera expert member yet, access is granted after upgrading active expera follower accounts to expert or [registering here](#).

SYSTEM ARCHITECTURE & IMPLEMENTATION MODELLING AND INTEROPERABILITY & STANDARDISATION

- **Establish energy transition as part of regional development:** The development of integrated regional energy systems does not only aim at more resilience and new business cases on a regional and supra-regional level, it also aims at the welfare of the region itself. Therefore, regional development institutions for business and infrastructure need to be involved in the discussion.
- **Interoperate with sectors beyond energy:** To get to integrated systems for cities, towns and regions, interoperability and efficiency need to be considered across multiple sectors: manufacturing, agriculture, energy, healthcare etc. Intelligent platforms (such as FIWARE) allow for seamless integration and processing of data from many sectors while respecting the privacy rules. However, more attention needs to be given to the combination of data flows with long, short and very short latencies.
- **Model local ICT systems:** ICT architectures to manage regional energy systems may differ from legacy systems. The discussion of developing cellular energy systems should go in parallel with the discussion of establishing regional data hubs and broadband networks (e.g., 5G).
- **Develop a clear terminology for distributed energy systems:** To constructively discuss integrated regional energy systems in relation to the overall energy system, terms such as "integrated", "regional" and "local" need to be clearly defined. Amongst the key terms and models that wait for a commonly used terminology are: regional energy supply, peer-to-peer trading, energy communities (with respect to EC directives), microgrids and energy positive districts.
- **Develop and adopt a common ontology and architecture:** The entire RDI community could benefit more if all projects would use the Extended Smart Grid Architecture Model (SGAM) and the Harmonized Electricity Market Role Model approaches to describe their activities and results. But further steps need to be taken so SGAM allows for fully describing sector coupling with multiple energy carriers and smart grids.
- **Make system and market architecture models comprehensive and easy to use:** More attention needs to be given to describe (the parts of) the complex system in an easy to grasp manner. There is still a need to overcome incompatibilities in terminology of sectors (ICT, energy, governance etc.). Glossaries may not be enough and need to be accompanied by excellent depictions and more opportunities for

oral exchange. Intelligent tools are needed to describe requirements and assess interoperability (such as the validation network with living labs and testbeds that is being set-up for projects in the framework of JPP SES).

REGIONAL MATTERS

- **Provide guidelines for local cooperation and interaction:** As local stakeholders and energy planners are lacking tools to design local energy systems, guidelines how to integrate different customers are required. Since the options are so manifold that restrictive specifications might be problematic, use case specific integration profiles with involved actors, needed actions, transactions and technologies, precautions and conditions could help. Comprehensive methodologies to come to such definitions, which can then be utilized across contexts should be developed.
- **Incentivize users' behaviour and better appreciation of demand flexibility:** The integration of active customers and energy communities on a local and regional level will not happen without proper incentives. Individual response to signals from the DSO and the market may be problematic if not well coordinated. Furthermore, participation mechanisms must ensure that users' behavior is coordinated with the system requirements. Research showed that that public engagement works better with intrinsic instead of extrinsic motivations.
- **Adopt a consistent terminology for Energy Communities (including, but not limited to RECs and CECs):** The definitions of Renewable and Citizen Energy Communities as defined in EC directives are a good start. For practical use in city and regional development processes they should be embedded in a broad, commonly used terminology covering any community of peers who cooperate in energy production and consumption. The scale at which RECs/CECs are deployed will depend upon (i) the attractiveness and coherence of the enabling framework and (ii) the flexibility of the underlying business model to allow for participation of or cooperation with professional actors from the energy sector
- **Foster exchange on RECs and CECs between researchers and local authorities:** By exchanging with projects developing tools, plans and methodologies, local authorities can overcome difficulties when initiating and supporting development of RECs or CECs. Policy makers should support local authorities to uptake R&D output in a situation where project timeframes are in the range of 3 years whereas local authorities plan in 30 years cycles. Policy makers should allow funding

programmes to implement “series-of-projects” in the same city or region, providing mechanisms to follow up activities and provide continuous support.

REGULATORY & MARKET DEVELOPMENT

- **Enable context-based roles and regulation of energy sharing practices in Energy Communities (ECs):** Regulation of energy sharing needs to be dynamic and flexible, adapting to country-specific developments, but security of supply needs to remain a key priority. Multiple configurations of ECs should be allowed (also beyond the definitions of respective EC directives) and the different geographical constraints need to be considered to adapt the concept of quality and security of supply at various grid levels (local, regional etc.), and possibly extend beyond the electricity sector.
- **Offer support schemes for Renewable and Citizen Energy Communities (RECs, CECs):** Incentives are needed to prompt citizens’ engagement. As the business case varies with the use case and with the size and features of the community, different models can be adequate for different situations. Special grid tariffs for shared energy and valuing the energy surplus of a community at wholesale market rates could be valid support schemes. Also, auctions dedicated to RECs and specific tariffs for the energy they produce could be possible options. This logic should ideally be applied also to heat.
- **Implement regulatory sandbox programmes for Energy Communities (ECs):** Innovative concepts need to be investigated, involving both project participants and regulatory authorities, in order to decrease the considerable efforts in engagement, testing, feedback, knowledge sharing and education. Regulatory sandbox programmes should be defined to allow new concepts for ECs to be tested, thus valuing and promoting the extensive application of experimental results.
- **Deploy rules and monitoring practices enabling grid-oriented service provision:** Sharing data between DSOs and market parties should be allowed to lower barriers for small-scale actors to participate in flexibility trading and to allow for flexibility service procurement between DSOs, TSOs and other system responsible parties.
- **Establish local energy and flexibility markets:** Technological interoperability should be promoted and new actors be defined for distributed systems. The relationship between market participants, including concepts and features, different voltage levels and services, ancillary services and remuneration as well as responsibilities within the market, should be defined and clarified, keeping in mind

that a level playing field should be achieved for all. Particular attention should be given to the specific characteristics of energy communities and their members. In this respect, JPP SES appreciates the development of a "Harmonized Electricity Market Role Model" (HEMRM) and recommends to support a qualified discussion in the framework of the respective EC H2020 Bridge action.

STORAGE & CROSS ENERGY CARRIER SYNERGIES

- **Plan energy systems holistically across energy carriers and sectors:** Currently, energy systems are regulated and managed in silos, ignoring possible synergies related to flexibility and system stability. Policy-makers should prioritize the establishment of a level playing field with equal rights for market participants across different technology and business sectors, adding new resources to the flexibility portfolio.
- **Exploit flexibility to stabilize integrated systems:** Energy efficiency and flexibility together with different kinds of energy storage capacities are key factors helping us to manage the transition from coal to gas to hydrogen as quickly as possible. Special attention needs to be given to cross sectoral storages that enable transferring energy from electricity to heat and mobility and back. Several fees and taxes should be reviewed and transformed to encourage rather than detain the needed sector coupling.
- **Plan storage for local energy production:** Distributed renewable energy production needs to be accompanied from the beginning by planning the energy storages needed for balancing. This diminishes the pressure and costs for grid refurbishment. It also helps introducing storages in an open and transparent way, which is key in creating the regulation still needed to enable even more business cases for storages.
- **Enable low-temperature district heating networks:** Adjusting district heating networks to lower temperatures creates great opportunities to utilize waste heat and integrate storages, which can help stabilize other energy systems such as electricity and gas.

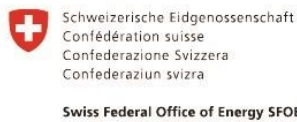
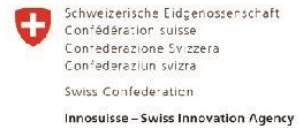
CONSUMER & CITIZEN INVOLVEMENT

- **Include social sciences in RDI programmes and projects:** When building smart energy solutions, tested approaches should be deployed and knowledge used from social sciences and humanities for engaging professional or end-users starting in the early phases of project development. Providers of funding should fund research on the motivations and needs of citizens and businesses related to their (active) participation in the energy system.
- **Employ agile and co-creative technology development approaches:** Applying and testing prototype solutions in everyday life contexts in early stages of a project are crucial for enabling adoption. This requires professional innovation processes integrating many stakeholders and dialogue including actors from the public sector.
- **Integrate consumers smartly and consciously:** Exploiting the flexibility potential of active generation, storage and consumption of energy carriers such as electricity, heat and cold demands smart technology and mechanisms for data exchange. It must be based on the state-of-the-art knowledge on user requirements to ensure minimal bothering and maximum comfort and benefit for the user. It must not compromise data privacy nor personal rights.
- **Shed light on the path ahead with one voice & one direction:** The lack of information, varying or even contradicting messages and opposing actions from different policy levels create confusion among citizens and consumers. In order to motivate broad action, a common message and roadmap of actions is needed.
- **Integrate small businesses as key players in the energy system:** SMEs are a special type of consumers. They can considerably contribute to the efficient use of energy and stabilizing the system. Digitization of infrastructure and processes in SMEs, including monitored consumption and generation measurement data, enable responsive manufacturing control. Mechanisms and market signals are necessary to activate flexibility in the enterprise and foster provision of system services.
- **Provide guidance for establishing energy communities:** Local stakeholders and energy planners lack tools to design local energy systems. Especially, good practice on how to integrate actors, including residential and business consumers and prosumers, are required. A set of options for assigning local grid responsibilities

and market roles should be clearly defined and guidance provided for selecting optimal layouts for specific contexts (actors, use cases, regulations etc.).

- **Leverage energy communities to benefit the vulnerable and deprived:** People with low income and lacking production capacities can significantly benefit from local energy communities. To support local sustainable development (e.g., reducing poverty and/or increasing equality by empowering underrepresented groups), business and interaction models need to be tailored and effectively communicated to the target group(s). Facilitating the active participation of local small and medium-sized enterprises provides further opportunities to strengthen the local community.

JPP SES FUNDING PARTNERS



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