Grand challenge 3: Secure, clean and efficient energy

Smart energy governance

GRAND CHALLENGES :

C3. Secure, clean and efficient energy

C6. Europe in a Changing World – inclusive, innovative and reflective societies

CHALLENGE

Smart energy systems are characterised by the increasing importance of new actors and a new diversified and sustainable energy mix in the energy systems, facilitated by ICT technologies. Decentralised and individualised energy production (prosumers) and highly regulated energy consumption will be made possible through price signals and the availability of cheap renewable energy technologies, leading to distributed investments in the energy system, higher energy efficiency, lower transmission losses, better resilience and energy security, and generally supporting the development towards a low-carbon European energy system, a defining feature of a European Energy Union.

Smart energy systems are at the pilot phase and it seems urgent to begin to focus on the implementation paradigms. However, smart energy systems potentially include serious tensions inhibitory to their implementation. They are dependent upon local management and backup by consumers in their households, but at the same time they may develop to become top-down regimes creating resistance among users. They will be dependent upon investments by consumers, but the rules, including prices (sell and buy), may be set by the big operators in the system. Taxation systems may counteract the intentions on getting the smart systems out into all corners of society, because higher efficiency may result in higher taxes in order for the states to gain constant revenue. Self-sufficient prosumers may be hindered by legislation, because of the needs for them to contribute to the collective systems. Renewable energy production, prosuming and higher efficiency may result in considerably lower costs of energy in the future, which creates a risk for 'hyper-rebound' effects, creating a down-spiraling development towards much higher energy consumption. To be smart the energy systems of the future must live up to a wide range of quality criteria, including making use of ICT and "ubiquitous computing", but also having the right energy mix, being based on sustainable renewables, making clever use of storage options, and making use of existing infrastructures. Adding to this, the smart energy system needs to be attractive to consumers and prosumers, not requiring too high energy system knowledge for them to participate, being socially and economically just and fair, counteracting energy poverty, and involving ownership structures which motivates citizen to contribute and to accept the energy system transition.
These requirements do not necessarily fit well with national energy systems as they are now, many being largely monopolistic and governed by single strong central public agencies.

SCOPE

In order to reduce carbon emissions, combat pollution, nuclear failure and energy poverty, and reduce energy dependency it is urgent to find locally managed, decentralised, fair and democratic energy solutions. A decentralised energy supply system can, however, be severely hampered by even small tensions and lack of trust. Therefore it is important to find participatory modes of governance that balance all interests.

Research should develop, test and make policy discourse about new governance models, which are able to mitigate the tensions around the economic, technical, social and democratic implications of smart energy systems. It should thereby create trust, fairness, justice, avoiding energy poverty, and facilitating democratic governance and public participation. The governance models must have a sector-coupling approach, so that i.e. costs and prices will be distributed fairly in an accountable manner between e.g. heat, power, fuels, and between sources, such as biomass and waste. Further, these models need to create a set of effective incentives including creating motivation for private investments, consumer behaviour, avoidance of rebound effects, and for collective ownership.

Ownership structures should be part of the governance models and should be investigated for their ability to support the development towards broadly accepted smart energy systems. The mobilisation of prosumers and energy conscious consumers should be considered as an important aim for the governance models, as should the future need for "energy communities" in which citizens locally support each other in participatory processes to implement the smart systems, which are the right ones for them and their context. Projects should, thus, provide a definition and validation of tools for transparent, participatory and multi-disciplinary energy governance, enabling multi-layered integration of stakeholders' interests and investigate barriers and success factors for such governance models. Specific attention should also be paid to aspects of security, data handling and privacy in a Big Data scenario to ensure trust among end-users. The research should map and engage the relevant actors, including consumers/ prosumers/citizens, and should be highly active to create policy dialogues nationally and on a European scale, as several European members states should be engaged in the project facilitated discourse. The research is expected to be anticipatory, participatory and highly multi-disciplinary, involving tight collaboration between e.g. smart energy systems experts, system modellers, sociologists, legal expertise, organisational expertise and public education and participation expertise. The consortia will need to have skills regarding policy discourse and implementation.

EXPECTED IMPACT

Online consultation rating ★

- Reconstruction of the notion of smart energy systems to be inclusive, encompassing new governance structures
- Creation of multi-actor dialogues and re-orientation among actors regarding the policy implications of smart energy systems
- Contribute to a cross-European common understanding of the need for smart energy systems, based on a more participatory governance paradigm

9 Smart energy governance

Research topic : Smart energy governance #10.b

Grand Challenges :
3: Secure, clean and efficient energy
6: Europe in a changing world - inclusive, innovative and reflective societies

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Note: The topic may result in a Research and Innovation Action, with components of Supportive Action. If it should cover for example 7-8 member state debates, then a budget of 3 million Euro may be the right level

Online consultation rating: avg. 4,05/5
Nations prioritizing this research area: UK, Netherlands

CITIZENS' VISIONS
[IRE] Vision 1: Community Enrichment through Education
"Sustainable energy systems
o Global collaboration
o Respect for environment, resources"

[GR] Vision 6: Five Pillars for human development
"Surroundings: green thinking and living: environmental awareness through education for a "green" lifestyle and renewable energy sources"

[DK] Vision 3: A sustainable Planet
"The sustainable energy sources are: Wind energy, solar cells, solar panels, heat pumps, biomass fuel which includes household waste, manure and slurry, water power and excess heat from the industry. In 2050 we will not use fossil fuels such as oil and gasoline/petrol. We have invented new forms of sustainable energy, such as waste separation which provides energy for the city. The Industry is the driving force behind the development, because there is a demand for and profits to gain in green initiatives."

Policy recommendations on energy

Ensure an open and fair European Energy Prosumer market

The general development of smart energy systems, characterized by an increase of small scale energy production generating a new diversified and sustainable energy mix, should form an important part of the European Union's energy policy. The successful adoption of such systems is a prerequisite for the success of a European Energy Union enhancing secure, affordable and climate-friendly energy. It is of the uttermost importance that the ongoing technological and structural development of smart systems are met with governance models that ensures a fair and inclusive treatment of the new multitude of stakeholders. It is recommended that actions are taken to establish a transparent, participatory and multi-disciplinary energy governance, enabling multi-layered integration of stakeholders' interests. Attention should also be paid to aspects of security, data handling and privacy in a Big Data scenario to ensure trust among end-users.