

EERA Joint Programme Smart Grids FACTSHEET

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Number of full/associate members	42

Why a Joint Programme on Smart Grids?

The term Smart Grids refers to the progressive evolution of the electricity network towards “a network that can intelligently integrate the actions of all users connected to it – generators, consumers and those that do both, in order to efficiently deliver sustainable, economic and secure electricity supply”. The focus of the development and deployment of Smart Grids initiatives in European countries are linked with the main commitment to achieve the goals contained in the Climate and Energy Package 20-20-20. Priorities are also linked with the three main pillars of the European energy policy that the European Commission has indicated in its Green Book: Competitiveness, Security of supply and Sustainability.

JP Smart Grids – vision and objectives

The present JP, by means of an extended cross-disciplinary cooperation involving many Research and Development (R&D) participants with different and complementary expertise and facilities, aims at addressing, in a medium to long term research perspective, one of the most critical areas directly relating to the effective acceleration of smart grid deployment: smart grids technology, its application and integration.

More information

eera-set.eu/jp-sg



JP on Smart Grids sub-programmes

Sub-programme 1: Technologies and tools for the management of future power systems

Coordinated by Henrik Binder (DTU)

The main objective of this sub-programme is to support power system operators, automation suppliers as well as political decision makers in the transition of the power system towards a more and more decentralized energy system, integrating flexibility to provide services at all network levels. For this reason, systems, simulation environments and methodologies for integrated power system testing are studied. Additionally, new grid control architectures are going to be investigated, taking into account how these influence and change different actors and roles in the power system.

Sub-programme 2: Storage Integration

Coordinated by Seppo Hanninen (VTT)

Low-carbon energy system integrates energy storage and power conversion within the various energy carrier grids. Energy storage implemented with distributed variable and renewable energy generation can improve smart grid performance as a source of flexibility and increased management ability providing system services at all time scales. R&D activities in SP2 are solely related to the integration aspects of storage technologies in different energy sector considering different technologies like power-to-power (PtP), power-to-gas (PtG), power-to-heat (PtH) taking into account direct or indirect interface and interaction to the power networks. SP2 will advance the integration and control of storages providing flexibility in the smart grids, the techno-economics and market evaluations of storages and integration of electric vehicles (EV) into grid.

Sub-programme 3: Distribution Network Flexible operation

Coordinated by Venizelos Efthymiou (FOSS)

The energy transition for achieving the EU clean energy for all Europeans calls for paradigm changes in the energy mix and technologies to be deployed. The distribution network in response of this need will be transformed in the process to a full active grid digitalised smart and adaptive. Flexibility will prevail on all active elements constituting the network and it is in the objectives of Sub Programme 3 of EERA JP for SG to address the technology solutions that will support this transition including the innovative concept of the Web-of-Cells developed within the ELECTRA IRP project and to be further developed within the EERA JP



for Smart Grids activity, where the proposed control scheme is decentralized and based on exchanges of local information.

Sub-programme 4: Consumer and Prosumer Engagement through Digitalization and ICT

Coordinated by Chris Caerts (VITO)

For the energy transition to be successful, an active participation of consumers and prosumers is essential. Next to subscribing to Energy Efficiency initiatives, the costumers can support this transition by investing in local distributed RES (e.g. rooftop PV) and participating in electrification of heating and transport schemes. Through the active control of building level flexible loads and storage, enabled by digitalization and ICT, they can minimize their energy costs and emissions, and offer valuable services to local grid operators, system operators and market stakeholders. In this way, they not only remove barriers to increase the share RES in the energy mix, but also support new ‘demand follows generation’ and ‘use locally produced energy locally’ paradigms through novel resilient distributed control paradigms as the Web-of-Cells that was developed in the ELECTRA IRP. In this SP4, the focus is on specific (instead of statistical) prosumer/building level forecasting, modelling and optimal control, considering buildings as active connection points to the grid, including peer-to-peer energy trading and the bottom-up aggregation of active buildings to form Local Energy Communities that interact with grid and (local) market stakeholders.

Sub-programme 5: Flexible transmission network

Coordinated by Knut Samdal (SINTEF)

The overall objectives of EERA JP SG Sub-programme 5 “Transmission Network Flexible Operation” is to contribute to the development of tools and methods for planning and operation of transmission networks which are needed to achieve a high share of renewable energy sources in the supply mix while maintaining a reliable level of supply in the system.

The sub-programmes will focus among others:

- The definition and highlighting of the most significant challenges to the planning and operation of the Transmission Networks, which should be addressed in order to meet the goals of the European Energy policy.
- What are the needs for new and improved methods and tools suited for expansion planning of the future European power system with high RES share and high level of inter-operability and market integration?

