ERA-Net Smart Grid Plus – Identified areas of interest

Disclaimer: *Please be aware of that the following list of identified areas of interest is based on preparatory work during 2013 leading up to the ERA-Net Smart Grids Plus initiative. Not all areas are necessarily interesting for all funding agencies, and other specific national/regional specific prioritisations may exist (see e.g. Annex A – National/regional requirements for further areas of interest). The Advisory period is an excellent opportunity to confirm a funding agency's interest in certain areas and topics. The list below is non-exhaustive and only meant as a documentation overview of previously identified areas of interest.*

Identified areas of interest		
#	**Area of interest**	**Description of area of interest**
1	**Active Demand Side Management**	Active Demand Side Management (including industrial processes, large appliances), and micro production, balancing of variable production, real time dispatch (with storage), (market) tools for the integration of active demand in the electrical system operations, ancillary services, wide area monitoring and dynamic control.
2	**Standardised and open ICT interfaces**	ICT interfaces for integration of renewable integration, including European standardisation and interoperability, standardised object models and functions towards open source use of standards, implementation of market models, data models, and reference architecture.
3	**Autonomous grid management**	Self-healing, resilient smart grids and grid management (real time monitoring/analysis, state estimation, central/distributed control), autonomous, distributed control systems, autonomous self-controlling and healing grids (dynamic topology, power re-routing) concerning both LV and MV grids.
4	**Reliable and cyber secure communication**	Information and communication needs for smart grids, including smart metering, data processing, reliable communications structures (e.g. for the dispatching of distributed generation from wind and photovoltaic power plants), security (including cyber security) of critical infrastructure, development of mathematical models (simulation) for pilot applications (e.g. for highlighting threats that may occur in the implementation of more information and communication into smart grids systems).
5	**Smart retail market**	End user markets for smart grid related services (including implementation of market models, data models, reference architecture, smart energy market instruments and structures.
6	**Secure integration of RES/DER**	Integration of RES/DER and storage (including voltage, reactive control, infeed management, network management) and DSO tools for LV and MV grids.
7	**Load density driven management of RES**	Renewable energy management and optimisation in rural environments with predominant solar or wind generation and in urban environments. This includes smart grids aspects for different regional types of smart grids (rural vs. urban; levels of penetration of renewable.
8	**Multiple energy-carrier driven management of RES**	Active demand (smart city, smart building, smart transport, storage etc.) for innovative integration with other infrastructures and energy carriers, including integrated energy hubs (for electricity, gas, heat, cold, etc.), ancillary services by combined energy renewable energy power plants, overall energy efficiency gains from integration with smart homes.

9	**Pan-European network and market**	Innovative tools and approaches for pan-European network reliability assessment, new planning approaches (towards an integrated grid+generation+storage minimum cost, maximum security of supply system), compatibility issues between pan-European and national markets and stakeholders, local/national flexibility and capacity markets versus a pan-European commodity market, grid state monitoring and innovative tools for pan-European network observability, for coordinated operations with stability margin evaluation, and for pan-European network reliability assessment.
10	**Next level of smart grid implementation**	Next steps in implementation of smart grids (learning from existing demo and R&D initiatives in the regions/countries), next generation of smart metering applications.
11	**Forecasting techniques for handling of volatility and flexibility**	Advanced forecasting techniques for sustainable operations and power supply, probabilistic techniques for distributed generation.
12	**Smart grids and e-mobility**	Grid and smart grids infrastructures to host electric vehicles (EV) and plug-in hybrid electric vehicles (PHEV)
13	**Capacity allocation and congestion management**	Advanced tools for transmission and distribution grid capacity allocation and congestion management, including the integration of demand side management at DSO level into TSO operations.
14	**Whole system long-term development of transmission and distribution grids**	Transmission system integration of large scale RES, interaction transmission & distribution system (hybrid AC-DC system, DC-grid etc.), e.g. North Sea grid as an extension to pan-European transmission.
15	**From grids to smart grids**	Aggregate/customise/adapt the existing transport & distribution systems to smart grids requirements, including the operative structure for transport and distribution dispatcher and distributed renewable generation (operational, balancing market).
16	**Materials and technologies**	Technology to increase network flexibility and operation means (FACTS, superconducting components etc.).
17	**Smart buildings**	User behaviour: smart buildings, households with active consumer involvement, social acceptance of DSM.
18	**Interactions and responsibilities of DSOs**	Interactions and responsibilities between DSOs and other stakeholders.
19	**Training and education tools and methods**	Tools and methods for smart grids training and education; new tools, simulators, methods and training facilities for operators of smart grids.
20	**Leveraging information flows**	Leveraging smart grid enabled information flows.
21	**Capacity limit handling**	Technical solutions to dynamically changing the transport thermal limit on critical overhead line to allow a maximum production from wind power plants generation capacities (OHL sensors, acquisition/communications systems and associated algorithms to obtain optimal maximum set point in order to reduce in safety operation conditions the production limitation for the power productions from e.g. a wind power plant).
22	**Smart meter benefits**	Smart meter rollout strategies, including cost/benefit analyses.
23	**Open grids/networks**	Open grid/networks and customer driven products.