



Letter of Interest

E-Energy Partners to Contribute to Future Internet PPP

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Many energy and ICT partners are investing in the research and deployment of components of a future Smart Grid. It is widely accepted that information and communication technology are key to leverage energy cost effectiveness, increase security of energy supply and reduce the impact on climate change. Recently, the EU Commissioner for Information Society and Media has launched the Future Internet Public Private Partnership (PPP). The PPP's focus is to initiate and establish cooperation between the industries from different sectors to drive European ICT R&D in such a way that a variety of application areas will be enabled. Smart Grid is one such usage area.

E-Energy is the German way to a Smart Grid. The German Federal Ministry of Economics and Technology (BMWi) in cooperation with the German Federal Environment Ministry (BMU) provide funding to support the development of new information and communication technology, processes and services to manage the future energy supply system from smart generation and smart storage to smart distribution and smart consumption. The results of 6 development and implementation projects will allow for a balance between volatile power generation and fluctuating power consumption. They will considerably ease and speed up the information, communication and transaction processes on the electricity markets, will allow to intelligently monitor, control and regulate the technical energy infrastructure and link this infrastructure to electronic marketplaces. Both ministries in addition support 7 model projects to develop information and communication technology to manage electric car fleets and to integrate hybrid and electric vehicles into the power grid system.

In addition to the "copper plate" (which stands for the existing power grid, where all generators and consumers have seamless access), E-Energy aims to build parts of a "silicon plate". The E-Energy "Internet of Energy" will provide a wide variety of information and communication services to operate a grid in a smart way and to implement new business models related to power supply. On their way to this "Internet of Energy", ICT and energy industry partners have joined forces to identify the major challenges and to come up with reproducible and scalable solutions.



The PPP Future Internet envisages providing the Future Internet basis for "... integrating a massive increase of intermittent energy sources" and "... managing complex interactions between customers and suppliers." With their findings the E-Energy partners are well prepared to contribute to that goal. When analysing the operation of an "Internet of Energy" they found following general requirements for the smart grid usage area of a Future Internet:

- dealing with mass data storages and high bandwidth (e. g. for 60 mio. grid connection points with dozens of appliances alone in Germany and smart meter sampling rates of 15 minutes)
- improving cyber security (including privacy) as a key to success, while many parts are critical infrastructure and suffer from vulnerability due to the distributed system
- defining standards as a prerequisite for investment and user acceptance

For the issues to be addressed during the planned workshop in Brussels E-Energy can give following preliminary input:

(1) Use cases and scenario

The E-Energy use case and scenario comprises

- save and standardized communication and efficient data management services to implement smart monitoring and control for grid operation, e. g. accessing sensors and actuators on the grid as such and in smart homes and enterprises to include a wide variety of renewable energy generators and to implement demand side management
- market platforms to allow for seamless access of IT solutions for new market players in the field of energy brokerage and related business cases, e. g. aggregation of power generators and flexibilities in consumption, provision of forecasts including behaviour of renewable generation and consumption by "prosumers"
- multi-agent architectures to link all technical and market elements from generation through storage and distribution to consumption, including real-time configuration of adaptable balancing-groups crossing international boundaries.

(2) Internet functionality for usage area Smart Grids

From E-Energy experience it would be desirable for the future internet to deliver or support

- management of extended sensor and actuator networks (e. g. 60 mio smartmeters and energy management gateways alone in Germany)
- distributed management of large data amounts (e. g. from realtime measurement of grid parameters or metering data)
- customer and subscription management with seamless cross boundary change of service provider and mechanisms for *enterprise interoperability* and *pay-as-you-go*
- access to and from non-stationary grid users like electric vehicles, i. e. seamless mixture of static and mobile nodes in the Internet of Energy

(3) Functionalities of the core technology platform

For the smart grid usage area the core technology platform should deliver :

- name services for energy domain, address resolution, service discovery and session invocation with critical and non critical infrastructure elements
- secure protocols to meet the requirements of critical energy infrastructure
- tiered realtime services to drive critical grid operation processes.

(4) Experimentation environment

To proof feasibility of solutions transnational testing is necessary:

- We need a Pan-European smart grid test environment, connecting at least three countries with different power supply and grid systems (e. g. Germany, Italy, France) plus two new member states (e. g. Slovenia and Latvia)
- To ease riskless entering of new technologies in the running grid a test bed is needed that allows for simulation of the entire system while gradually replacing simulation with real life elements. First pieces of such a test bed are being developed by E-Energy partner KIT and E-Energy partners in Austria (in the framework of the DACH-cooperation)
- Power supply and grid operation underlie differing regulation in European countries. To test new business cases in a Pan-European framework a closed shop test environment should be defined to allow for experimenting with new business models (including new market roles from and with prosumers) independent from the very regulatory framework

(5) Role of partner organisations in the FI-PPP

We understand that it is in the interest of the EC to build most promising consortia for the task of developing the Future Internet. E-Energy partners bring years of experience in the development of smart grid technology. Partners from energy industry know best about the needs and requirements in the usage area and ICT partners bring their latest research results and solutions from their respective E-Energy projects. Both together can form a core for a European consortium to develop *FI / smart grid*. With their proven E-Energy cooperation experience they will ensure that the initiative moves forward on a collaborative basis.

Following E-Energy partners have indicated their interest to participate in a consortium to identify the requirements and develop and test base services for the smart grid usage area:

- MVV (regional energy provider in the City of Mannheim)
- EWE (regional energy and telecommunication provider in Northern Germany, involved in project eTelligence)
- Siemens (partner in E-Energy project E-DeMa)
- SAP (partner in E-Energy project MeRegio)
- IBM (involved in E-Energy projects MeRegio and Modellstadt Mannheim)

Being powerful organisations all these partners can take a prominent role in the initiative: All can contribute to objectives 1.7, 1.8 EE and 1.9 as well. They are willing to cooperate with partners in all Europe.

In addition the ancillary research consortium of E-Energy has indicated interest to participate in activities of objective 1.10 (Programme Facilitation and Support). That would be another opportunity to link E-Energy findings and results into to the FI PPP. Key partners would be:

- B.A.U.M. Consult GmbH (lead partner of ancillary research consortium)
- incowia GmbH (ICT company, in E-Energy responsible for knowledge management)

Following partners have indicated their willingness to cooperate with German partners and to link E-Energy to respective partners in their very countries:

- Fondazione Politecnico di Milano (mit Verbindungen zu ENEL)
- Institut Polytechnique de Grenoble (mit Verbindungen zu EDF)
- Advanced Learning and Research Institute all'Università della Svizzera Italiana (Lugano)

Some of these partners have been asked to join various FI PPP collaborative groups. They have expressed their openness to contribute in any framework that allows to successfully perform large-scale testing and trials of Smart Grid solutions integrating advanced ICT.

As the head of E-Energy Ancillary Research I am willing to present the approaches of our E-Energy partners as well as their expectations and possible contributions at the FI PPP workshop in Brussels on June 21 & 22, 2010.



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