

## Some Lines of Interest in the Energy Efficiency Domain

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Within this position paper a number of related lines of interest are presented:

Modelling, design, implementation and operation of networked hardware/software smart devices for the electrical distribution application domain and IT platform management domain. Smart systems can be considered to be (Service Oriented Architecture) SOA-ready: They will be able to offer their functionality as one or more web services and be able to cooperate with other devices and services in order to realise distributed monitoring, diagnostics and control. SOA

SOA can provide open interfaces that enable interoperability. Our goal is to realise an ecosystem of services running at device level, at network level and at enterprise level and be able to seamlessly compose more sophisticated services from generic. A related issue is to model, design and implement a comprehensive, flexible and configurable information system, in order to meet the most complex and advanced requirements in Meter Reading and Meter Data Management.

A second line is related to the information system: it can be interesting to achieve a comprehensive, flexible and configurable information system to support the most complex and advanced requirements in Energy Management. This includes the modelling, design and implementation of power quality monitoring and the remote control and smart metering platform. As outcomes: the improvement of the stability of the whole electrical system and the increase of processes automation with the help of better network alarms and management tools. Reliability and consistency of electricity supply is critical to many industrial and service activities, and therefore, when the power quality is inadequate, business suffers. In order to operate the network in a more efficient manner, it is necessary to exploit the data from a huge number of electronic devices involved in control and protection of power systems in a systematic and standardized way. Also, the development of a new conception of network monitoring systems is required to achieve the ambitious goals that are envisioned for the Smart Grids of the future. Related to this, flexible platform that facilitates the continuous monitoring of the network with real time data processing capabilities, supporting a wide range of devices, protocols and technologies will be required.

A third line is to do research on the fundamental elements that will enable the Smart Grids of the future, capable of responding in real time to the massive amounts of information that will be received from the network, as well as the signals that will have to be transmitted to the devices in the field in the new electrical paradigm that is emerging:

- Integration of increasing renewable energy sources at multiple energy levels.
- Larger involvement of final consumers in the active management of electricity demand.
- Higher efficiency levels.

- Bidirectional energy flows brought by the introduction of the electric vehicle and renewable energy sources.

For this network infrastructure (new elements of the electric grid architecture), real time data processing platform and finally, network support structure for the intelligent management and analysis of the grid data must be investigated.