

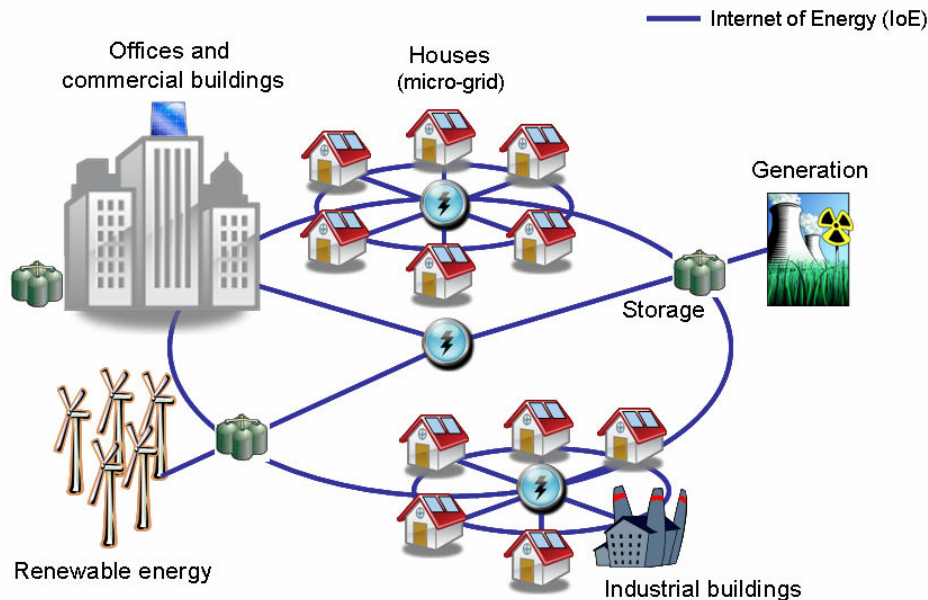
**TOWARDS A FUTURE INTERNET PUBLIC PRIVATE PARTNERSHIP:  
SECOND USAGE AREA WORKSHOP  
BRUSSELS, 21 - 22 JUNE 2010**

**ESI-TECNALIA Position Paper**

Nowadays, depletion of global fossil fuel resources, changes in regulatory environment and the emergence of renewable energy sources are three major factors that have a great impact on the energy sector. These factors are promoting a transition from the current energy system to an **Internet of Energy**, which monitors, controls and regulates the electricity system through intelligent coordination from generation to consumption.

Although, there are available today most of the necessary technologies for the intelligent and efficient renewal of the energy system, there is still a long way to exploit the full potential offered by this Internet of Energy. For this reason, ICT is a key enabler for realizing this future-oriented, intelligent and efficient energy power system, allowing a new range of business models where innovative local and regional small and medium enterprises will play a key role.

Inside this Internet of Energy, the most appropriate and representative scenario is the one related to **smart energy grids**. While the current energy grid is passive and composed of uninformative components, enabling only unidirectional communication, the future smart energy grids will be decentralized and self-healing integrated system that intelligently integrates all the stakeholders in the whole value chain from production to consumption and provides potential for the creation of new energy services. Besides, these smart energy grids will enable an increasingly dynamic and market oriented energy trade, promoting the emergence of new business models (i.e., new pricing mechanisms using variable-tariff-based load and generation rates).



Briefly, the main challenges related to smart energy grids are distributed generation and demand response, enhanced design and integration, real-time response and predictive management and large scale integration of electric vehicles.

The innovative Internet functionalities and technologies that are most important for this smart energy grid scenario are the following ones:

- Context awareness
- Intelligent sensor network, embedding sensing, automation and control capabilities
- Decision support mechanisms, load balancing techniques
- Smart metering and appliances
- Secure and ubiquitous communications and applications
- Demand response capabilities, real-time self-assessment
- Micro-generation
- Visualisation of energy use
- Service oriented energy network design and integration, ad hoc service composition and mash-up

The Future Internet core technology platform should provide the following functionalities in order to support this specific scenario:

- Interoperability and integration management
  - Unified set of interface standard specifications
- Service composition and mash-up methods and tools in order to create new services and applications.
- SOA Support
  - Cloud Computing mechanism applied to resources (RaaS - Resources as a service).
  - Composition and mash-up for creating new services and applications.
- Semantic Support
  - Event and data aggregation, management and processing
- Profiling and context awareness management
- Security management, such as identity, privacy or confidentiality.

This scenario needs some specific functions to be provided by the experimentation environment:

- Easy insertion of distributed generation, with particular emphasis on using renewable resources
- Capabilities to manage demand (via smart communication devices downstream of electricity meters) and intermittent production.
- Capabilities to plug and play smart meters, new positive-energy buildings, hybrid and fully electric vehicles, etc.
- Flexibility to apply different business models with multiple stakeholders (TSOs, DSOs, aggregators, etc.), along with support to different consumer segments.
- Experimentation of new tariff schemes designed to foster changes in consumer behaviour.

Regarding our organization, TECNALIA is a private and independent Technology Corporation created within the Basque technology environment in Spain, with the mission to offer value and wealth to Society in general, and to the Business community in particular, by means of Research and Technology Innovation. It is composed by more than 1400 people, and it is the 1st private entity in the Spanish global ranking of FP7 returns (122 projects, including 20 as coordinators, with a total EC contribution of more than 37 M€). With 10 international offices, TECNALIA has presence in the five continents.

The operational model is based on sector-oriented business units made up of multidisciplinary teams. They optimise the offer to the specific needs of the strategic sectors, providing the required level of expertise and excellence. This means a multidisciplinary approach can be followed in the usage area involving business units like ICT, Energy and Transport.

On the other hand, TECNALIA can also offer a business ecosystem in the Basque Country for the Energy Usage Area. It is a region-wide, coordinated partnership to stimulate innovations for the benefit of citizens, enterprises and administrations with a large-scale platform for a greener, more efficient, safer and designed-for-all smart energy management, based on advanced technologies & communication infrastructures and concepts, bringing together the cross competence of related sectors.

