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Previous answers to the issues and open questions to be addressed during the SECOND USAGE AREA WORKSHOP.

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(1)What use case and scenario in your area would you consider the most appropriate and representative one for large-scale experimentation with the Future Internet platform to be built starting from 2013?

In the area of Energy Smart Grid technology, the **Energy Demand Management** is considered a key use case. This is based on the crucial importance of the adjustment of energy supply and demand to ensure energy security. Unfortunately, so far energy efficiency policy has been excluded on energy security, but energy savings induced by efficiency measures can help to reduce energy needs and to reduce dependences on external energy resources.

But, this future scenario requires **new communications and network capacities and also an increase of intelligence over the current energy grid.** So, in this way, the Future Internet platform should provide the capacities and features needed for the rollout of the comprehensive energy network management.

Some of the final applications that could drive for energy demand management are for instance: automated demand response, balancing services, dynamic pricing or buy/sell power in real time. This kind of measures influences on the demand-side and tries to decrease energy consumption, they have not only application in residential scenario but they have a special opportunity in a future scenario where electric vehicles parkings could represent a big chance to make more flexible energy consumption and to implement easy measures for reliable real-time energy control. Actions as loads shifting or load shedding could become even new energy inputs in energy grid.

(2)What innovative Internet functionality and technologies would you consider important for your suggested use case and scenario (e.g. context awareness, sensor networks, advanced real time processing capabilities handling huge volume of data, ad hoc service composition and mash-up, managed broadband connectivity and services, embedded media support for interfaces easing the interpretation of processed contextual data, etc.)?

Taking into account the current and also the foreseeable greater number of distributed energy resources in the future (energy supply resources and also, energy demand resources), it is essential real-**time interaction** between suppliers, distributors and customers in the grid.

In this area a Service Oriented Platform could provide requirements of **flexibility and versatility** expected for the management of the energy grid.

Also, monitoring and **two ways communications between suppliers and customers are keystone, and so, for example in a platform based on a Service Oriented Architecture should be necessary technologies to support bidirectional communications.**

Security in energy supply just as privacy in the data communications referred to personal or particular data are also important matters.

On the other hand, **features of self-organising and self-healing** in the energy management nodes of the grid are fundamental to manage load dynamic reduction.

Grid intelligence and decision support will become true through the **handling of big amount data in real tim**e and also the knowledge extraction from data.

(3)Which of the identified functionalities would you expect the Future Internet core technology platform to deliver to support your and other usage area scenarios?

Future Internet Platform should support smart services based on access and control of things and objects, as Smart Meters. Due to the large number of objects and devices, new representations and routing and also new processing methods should be addressed. This issue is not considered to be particular of this usage area.

(4)What kind of experimentation environment would you consider necessary for broad large scale testing of the platform to be developed in your use area? What would be needed to experiment new services and applications cutting across use areas (services and application mash-up) and building a new services and application ecosystem around the prototype implementations of the platform?

A good experimentation environment in the use area of Smart Energy Grid, and specifically Demand Management scenarios, could be a city and its electricity facilities and real consumers. Also a region where supply DER (Demand Energy Resource) was present and where a holistic approach to the Smart Grid could be made.

The two main characteristics expected to experiment new services cutting across use areas are the deployment of complete ***self-management services*** and also the ***standarization of the services interfaces.*** These two issues are specially required for Future Internet platform in order to obtain the new and disruptives technologies to support Future Internet capabilities.

Standarization of service and control interfaces is needed in order to services access and in order to create knowledge repositories that could be easily accesible by new application mash-up or new **cooperative** applications.

(5)How do you see the potential role of your organisation in the FI-PPP, in the context of Usage areas taking a prominent role in the Initiative, to ensure an appropriate application driven approach?

Information and Communications Technologies (ICT) and Energy are two of the main research areas of CARTIF. Both together have created a multidisciplinary group focused on the application of ICT in the field of Energy, in particular Energy Efficiency, Energy Saving, Integration of Renewable Energy Systems, Electricity Market, Demand Response, Smart Grid, etc. A great part of our work targets are the application of these issues in housing, in buildings and public spaces. Currently we are taking part in all regional, national and international projects. The two main research areas pursued by this group are the following:

- ICT4EE, particularly developing management middleware tools and services for the integral management of housing (residential), tertiary sector buildings and public spaces under the premises of interoperability, flexibility and standardisation in order to achieve greater energy efficiency and energy savings. This task is mainly focused on energy use optimisation, always bearing in mind the users' comfort, therefore applying techniques based in the "ambient intelligence" (AmI) concept. This involves the following technology areas: Networks (devices), Multimedia integration, Artificial Intelligence, Context-awareness and Multi-modal human-machine interaction.
- RENEWABLE ENERGY: Implantation and optimisation of energy efficiency, energy saving and renewable energy integration in housing, tertiary sector, transport and industry. It is focused on HVAC and lighting systems, electric vehicles on the grid and industrial process with huge energy needs, by means of design, monitoring, control and management actions, such as algorithms, strategies, evaluation and diagnosis tools developed ad hoc for energy services.