5.6 Smart grids

Why invest in smart grids?

Energy security and climate change are becoming increasingly prominent on political agendas worldwide, such that they rank among the highest of EU priorities. The EU is aiming for a 20% increase in energy efficiency, raising the share of energy consumption produced from renewable resources to 20% and reducing greenhouse gas emissions 20%, by 2020.

European Smart Grids will promote the Intelligent Energy Supply Chain that will optimize, control, secure and sustain the procurement and supply of cleaner distributed energy anticipating increased demand till 2020 and beyond. ICT-based innovations will provide one of the potentially most cost-effective means to help Member States achieve the 2020 targets.

Infrastructure renewal and grid modernisation are critical to the economy and economic growth, particularly in a globally competitive environment. The efficient deployment of Smart Grids should exploit synergies between telecommunication and energy operators at infrastructure and services level. Smart Grids offer an opportunity to put broadband infrastructure to dual use (for both broadband and smart energy services), either by the utility itself, or via effective joint undertakings between the energy utilities and telecom operators.

Making use of ESIF will support projects with cost-to-performance ratios that are too high to be attractive for commercial stakeholders. The largest cost component of deploying communication networks (up to 80%) is civil engineering. In addition to facilitating broadband deployment, there is a potential for reducing both costs and environmental impact if synergies are established in the implementation of civil works, for example by the re-use of existing ducts or sharing of infrastructure owned by energy utilities.

On the other hand, to achieve interoperability and interconnection between broadband and energy networks, strong coordination of civil engineering projects and initiatives at European level is essential. The results of studies exploring best practices across Europe will be used in the work of European and international standardisation bodies. In addition, on the basis of best practices, requirements for investments and obligations for co-deployment of infrastructure will be explored. If the right conditions for replicability are put in place, the impact at EU level can be ensured, subject to achieving interoperability.

Barriers & challenges

Smart energy services rely on investments in deployment of broadband infrastructure at national and cross-border level. Defining and exploiting synergies through forming infrastructure partnerships and through cross-service provision will foster the deployment of smart grids. Such arrangements would provide appreciable efficiency gains (faster deployment at a reduced cost, avoiding unnecessary overlapping of broadband infrastructure), market opportunities and scope for utilities and telecom providers to diversify their traditional business models and move into each other’s markets: a win-win situation for all market players and ultimately for EU consumers. However, for various reasons - including uncertainty (esp. for telecom providers) about access to energy consumption data, misgivings of utilities on the capability of telecom providers to offer security and reliability, lack of commercially successful precedents - there is limited market growth to date. If anything, we may end up with a monopoly situation, where utilities build their own data systems and in a process of interoperation is compromised. One approach to alleviate fears regarding the return on investment and other perceived risks is to support a few “lighthouse projects” that can be used as exemplars to encourage stakeholders to consider collaboration.

Fostering new market players, especially through collaboration between telecom providers and utilities, will develop and offer smart energy services in a competitive market. Therefore, a few “lighthouse projects” are needed to convince the two sectors about the benefits of collaboration and investors about the certainty of recovering their capital.

How to act?

Regions wishing to invest in Smart Grids should consider the following steps:

1. Analysis: (a) to carefully analyse the institutional, regulatory and financial setting of the specific city/region, (b) to spot the specific bottlenecks and barriers, (c) to estimate the cost of investments for deploying Smart Grids solutions, to investigate the potential sources of public and private financing and to draw new sustainable business models and (d) to determine the available skills and necessary resources.

A number of calls for proposals in the area of Smart Grids have been published by the European Commission within FP7. In addition there are several initiatives at national level, e.g. E-Energy programme107 of Germany. One approach to alleviate fears regarding return on investment and other perceived risks is to support a few “lighthouse projects” that can be used as exemplars to encourage stakeholders to consider collaboration.

2. Governance/stakeholder involvement: Public - regional and local - authorities are the active and passive actors of the process. They are stakeholders and final users at the same time in order to implement Smart grids into the European single market and to establish a global leadership in the next generation of energy services. Synergies between telecommunication and energy sectors will be analysed and new business models will be defined for the deployment of smart grids in a cost-effective and efficient way.

Estimating the costs for deploying smart energy communication infrastructures needs to be divided between those networks deployed in urban areas and those deployed in rural areas. The costs depend on the distance from the customer premises to the exchange box as well as on the population density. In urban areas, population density does not make a significant difference to the price per premises. The most expensive part of the network is a sparsely populated rural area.

One of the compelling reasons for facilitating the sharing of the core infrastructures of broadband networks and smart energy networks relates to the high cost of network rollout. The reduction in costs due to the use of alternative/shared infrastructure is significant, especially in rural areas. Due to the fact that the utilities’ duct networks are widely available in more rural areas, they will only be able to provide space in existing ducts, so fibre will still need to be installed. Therefore, the costs for optical fibre cables and their installation are assumed to remain unchanged from the base case. The synergies in the networks will cause a reduction of costs up to 50%.

3. Priority setting: (a) The Commission will call for proposals for appropriate lighthouse projects, or projects of common interest, which are to be implemented jointly by utilities and telecom providers; (b) In order to carry out the investments needed for accelerating the deployment of communication infrastructures shared between broadband access networks and smart energy grids, it is important to establish a specific roadmap to reach the defined goals, based on the analysis previously carried out.

4. Policy mix: Different Business models can be considered:

- An energy utility installs broadband infrastructure in parallel to its own infrastructure for energy distribution and deploys it;
- An energy utility installs broadband infrastructure on behalf of a telecom operator;
- An energy utility and a telecom operator jointly install broadband infrastructure and share its use.

Further reading & forthcoming events
http://s3platform.jrc.ec.europa.eu/smart-grids