

Discussing smart grid developments, the project co-ordinator of the GRID+ project, **Michele de Nigris**, speaks to **PEN**

# For a smarter future

**T**he deployment of smart technologies and the development of the European smart grid are seen as pivotal in solving a variety of challenges in the energy sector. It holds the prospect of increased efficiency, reduced climate emissions, improved energy security, and of course can help generate economic goods. Yet a number of challenges exist today – technical and political.

The GRID+ project exists in order to advance activities around ensuring that the European Electricity Grids Initiative (EEGI) advances through 2012-2014. Providing an insight on the dynamics in the area, the project co-ordinator of GRID+, Michele de Nigris, answers PEN's questions below.

## What potential does smart grid technology hold for ensuring a sustainable future for Europe?

A European low-carbon economy is expected to have electricity as the major energy carrier. The role of electricity in achieving lower CO<sub>2</sub> emission targets combines improving energy efficiency of the system; integrating more renewable energy sources (RES); distributed generation while coping with other new forms of user of the electric grid, such as electric vehicles; and enabling new services to all grid users.

Smart electricity grids enable the new applications needed for this. They can ensure a significant growth in transported energy without compromising system robustness and security of supply. Moreover, they provide opportunities to flexibly adapt generation, grid control, storage and consumption to the changing situation in the markets.

Thus smart grids are central to delivering power more efficiently and reliably through demand response and comprehensive control and monitoring capabilities; providing the hosting capacity to safely integrate more renewable energy sources, electric vehicles and distributed generators into the network; using automatic grid reconfiguration to prevent or restore outages (self-healing capabilities); enabling consumers to have greater control over their electricity consumption and to actively participate in the electricity market.

## Why is it important that policy makers, stakeholders, researchers and industry co-operate in this area? How do you feel the European Technology Platform on SmartGrids and the EEGI can deepen this further?

As stated by European Commission representatives, smart grid deployment should be market driven. Innovative strategies shaped by interaction between the energy, ICT and telecoms sectors can create new business opportunities, improve services for consumers, and reduce



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the environmental impact of electricity supply and energy infrastructure vulnerabilities.

Co-operation between industry, policy makers and regulators is the key to achieve a pan-European smart grid that would strongly contribute to a low-carbon economy in Europe. Moreover, Europe needs to find out appropriate policies, regulatory actions and business initiatives addressing the challenges linked to smart grids. All this has to be brought together at EU level through concerted actions of the Commission, industry and member states. For this purpose, the EU is working to provide a stable regulatory framework, where everyone can contribute, and everyone can benefit: network operators, suppliers, producers, regulators and consumers.

## The European Technology Platform on SmartGrids aims to foster the research and development (R&D) of smart grid technologies in Europe...

In line with this, the European Technology Platform on SmartGrids aims to foster the research and development (R&D) of smart grid technologies in Europe by co-ordinating views, projects and initiatives with a focus on their integration. Thus, it works to ensure that EU R&D project calls and smart grid regulation remain consistent with the stakeholders' views and needs in the medium and long-term. The platform aligns technology-related R&D agendas and efforts with other initiatives, namely those related to the European Strategic Energy Technology Plan (SET-Plan).

The SET-Plan establishes smart grids as a priority technology pillar regarding energy and

climate policy objectives for 2020. Therefore, the plan includes an industrial initiative specially focused on smart networks: the EEGI.

The different components of the EEGI community bring together the technology and know-how to enable the development and operation of the future grid. For this purpose, the initiative has defined – using the competences and the organisation of the related support project GRID+ – the priority research and innovation areas through its nine-year roadmap on electricity grids approved by the EU and member states, which is regularly updated.

The innovation players involved in the EEGI field implementation will generate major outcomes over the next ten years and will:

- Improve planning approaches for both transmission and distribution operators, in order to optimise infrastructure investments, and support the pillars of the European energy infrastructure policy;
- Improve real-time co-ordination techniques during daily operations at transmission level, in order to face system security issues which are likely to become more and more severe in the years ahead;
- Demonstrate the electricity system benefits brought by a set of relevant power technologies which increase the overall conversion efficiency, favour RES integration, and reduce the network's environmental impacts;
- Demonstrate potential capabilities for large scale aggregation of small load and generation;
- Improve the interaction between operators in the distribution network at medium and low voltage levels;
- Make technical recommendations for continuously improved market designs and the deployment of demand response in line with market design options.

**As regards international competition – how do you think Europe is performing in comparison to other parts of the world in terms of the development and deployment of smart grid technology?**

Work in the area of smart grids at EU level is already well advanced. So far, €400m has



been invested at the European Community level for grid R&D and demonstration projects over the period 2007-2013.

The US, China and Japan are countries which represent significant research and innovation co-operation opportunities for European researchers and market opportunities for industry. The external dimension of EU energy policy intends to strengthen its excellence and attractiveness as a research partner. A very wide co-operation platform exists nowadays in the frame of the International Smart Grid Action Network (ISGAN) where 25 countries exchange information and best practice in the field of smart grids; Europe is a leading partner in this venture, not only through the European Commission but also thanks to the 12 European countries that are active members of the initiative.

Standardisation is a key issue at international level. A timely development of standards and interoperability for smart grids, smart meters and charging interfaces with electric vehicles is necessary for the market uptake of this technology. In this field, the US was the leader in the past, but nowadays Europe has gained ground and mandates have been issued to CEN/CENELEC, which have delivered the first set of standards for smart grids and smart meters in addition to a reference architecture framework in 2012. Work is still on-going in this area.

**How do you anticipate the next EU research programme, Horizon 2020, will aid the development of smart grid technologies?**

The European Commission is aware that the support of European grid technology excellence and its further development is the key for European industry to stay globally competitive.



The next EU research programme will support the implementation of the SET-Plan. In particular, smart grids will have a central role in the key challenge: 'Secure, clean and efficient energy' under the 'societal challenges' block of Horizon2020. The programme will cover the full chain of innovation to achieve a single, smart European grid. This will be done by supporting activities focusing on "research, development and full scale demonstration of new grid technologies, including storage, systems and market designs to plan, monitor, control and safely operate interoperable networks in an open, decarbonised, climate resilient and competitive market, under normal and emergency conditions".

A new Commission communication on Energy Technologies and Innovation was released in May 2013. It intends to give a European energy technology policy perspective in the follow-up to the Energy Roadmap 2050. In fact, the Communication announces the development, together with the SET-Plan stakeholders, of an integrated roadmap around the priorities identified in the EU Energy Technology and Innovation Strategy by the end of 2013; in this document, electricity networks will certainly have a central role as enablers of nearly all other major green energy technologies. We express the hope that the integrated roadmap will be able to leverage efficiently the very tremendous work already achieved in the smart grid initiatives and platforms, to focus the real priorities for a sustainable deployment of smart grids in Europe.

### **How far away is Europe from realising a truly smart electricity grid? What do you feel are the main obstacles to this, and how are you working to overcome them?**

As for now, in the EU over €5,000m has been invested in about 300 projects to make technologies for smart electricity grids available. But Europe needs further investment in smart networks and energy storage to support a wider adoption of renewable energy, ICT, and the integration of electric and hybrid vehicles. It is estimated that some €1 trillion of investment in energy infrastructure will be needed by 2030. This includes about €200bn in electricity generation, €140bn in electricity transmission and several hundred billion in distribution.

This investment is essential and has to happen in an unfavourable economic climate. Nevertheless, this is not the only significant obstacle

Europe needs to overcome in order to realise a truly smart electricity grid. Stakeholders and policy makers must co-operate in order to overcome barriers which are policy-related, societal and regulatory, rather than technical.

First, there is still the lack of interoperability between standards and equipment suppliers. Regulators should encourage network operators and product suppliers to push standards-based technologies over proprietary solutions.

Second, regulators are also the key to solving the uncertainty over roles and responsibilities in new smart grid applications, and the uncertainty over sharing of costs and benefits – and consequently over new business models. The wide range of national and regional regulatory arrangements hinders the replicability of project results in different countries.

And finally, utilities must face the consumer resistance to participating in the development of the electricity system. This is why several projects focus on studying effective ways to make consumers active players in an integrated energy market, to allow for flexible demand and better control of consumption.

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