

Smart Grid Opportunities in Europe

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1

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The Uniqueness of European Smart Grids

NanoMarkets/Smart Grid Analysis believes that significant new opportunities are emerging for suppliers of Smart Grid equipment and services in Europe. Beneficiaries of these opportunities will include power companies, contractors, equipment suppliers, IT companies, and so on. In part the opportunities reflect the need for major upgrades of European grids. But it also represents the insistence of the EU that Smart Grids are deployed for a variety of public policy reasons. In any case, we see the development of Smart Grids taking place throughout the 27 member states of the EU, as well as the other European countries.

While many of the factors that influence the deployment of Smart Grids in Europe are the same as for Smart Grids anywhere. There are also some significant differences that need to be taken into consideration by any firm that is playing in the European Smart Grid space:

- Strong demographic factors are at work. Throughout Europe the workforce in the sector is aging rapidly and a significant number of engineers and technicians will retire over the next 15 years. Therefore a significant number of new trainees and graduates will have to be attracted to the network companies, plus the contracting, equipment and consulting companies. Many European companies will face challenges in recruiting qualified staff and may have to look to other

parts of the world to fill many vacancies. We believe this opens up opportunities to non-European firms and personal, especially if the Europeans deploy Smart Grids as fast as they say they want to.

- European governments tend to place more emphasis on environmental and climate change issues than (say) in the U.S. Consequently such issues are a greater motivator in the deployment of Smart Grids than in other regions and environmental/climate change issues should therefore play a greater role in the marketing strategies of Smart Grid equipment and service firms playing in the European Smart Grid arena.

The Need to Upgrade Europe's Grids: Outages in Major Cities

Massive investment in Europe's distribution networks took place in the period following the Second War World - particularly during the 1950s and 1960s. Now many of these distribution assets are coming to the end of their natural life. This need for infrastructure renewal provides opportunities to future proof these networks, to create greater flexibility and it allows the incorporation of a range of new technologies.

The need for renewal of the network was highlighted during the last decade when major grid failures occurred - plunging several countries and their capital cities into darkness. Since 2003, there have been outages in Italy, Denmark, London and Athens. These incidents have increased demands for new investment in the electricity network industries of the major European countries. Such outages have an immediacy and importance that tends to eclipse other reasons for Smart Grid deployment.

Somewhat less important in terms of immediacy in influencing the deployment of European Smart Grids is the growing requirement to integrate the high volumes of renewable energy into the European grid networks - including the potential development and integration

of super-grid systems based on renewable energy sources in the North Sea offshore region and potential large-scale solar power networks in northern Africa. While renewable integration is a part of all Smart Grid deployments, the specific geographic requirements are obviously unique to Europe.

In addition to the power infrastructure itself, European network operators will require the installation of sophisticated information, communication and control technologies to monitor and control the electricity systems. These will need to manage the potential unpredictability of greater levels of distributed and embedded generation. The ability for all parts of the system to communicate with one another will be a vital component of smart grids. This will require a highly efficient communications platform, able to meet the requirements of coverage, reliability, responsiveness and security. A range of new communication technologies are being developed throughout Europe which will feature in the commercial deployment of smart grids. In addition, it seems certain that the usual U.S. IT and computer firms can be expected to play a major role in European Smart Grid deployment.

Policy as a Smart Grid Driver: Friendly Political Atmosphere for Smart Grids

Another key driver in this sector has been the development of new policies in the European Union [EU]. The 2006 Green Paper - "A European Strategy for Sustainable Competitive and Secure Energy" - produced by the European Commission, stressed that Europe has entered a new energy era. With this in mind, The EU has set ambitious goals for 2020 and beyond in several key areas - energy efficiency, reductions in carbon emissions, developing renewable energy sources, as well as security of energy supply.

The EU views Smart Grid Deployment as an important part of achieving these goals and so firms entering the Smart Grid space in Europe can expect a fairly friendly political environment:

- As European markets are open to new entrants from other countries and from outside the continent there are significant opportunities for international companies to expand and develop new markets for their products and services.
- The EU seems committed to the creation and expansion of trans-European grid networks, allowing greater cross-border electricity trade. These expanded grid systems will fully exploit the use of large centralised generators and a growing number of smaller, distributed power sources throughout Europe; the latter mainly based on renewable energy sources.

From the perspective of the Smart Grid equipment or services supplier, the buzz words that help to make Smart Grid sales in Europe aren't that different from in other parts of the world. However, the European energy policy tends to stress in particular, sustainability and security of supply. Also a clue to where the money will get spent on European Smart Grids is the European Commission's stress that Europe's electricity networks must be

- Flexible: fulfilling customers' needs whilst responding to the changes and challenges ahead;
- Accessible: granting connection access to all network users, particularly for renewable power sources and high efficiency local generation with zero or low carbon emissions;
- Reliable: assuring and improving security and quality of supply, consistent with the demands of the digital age with resilience to hazards and uncertainties;

Metering opportunities and the EU Energy Package:

Legislation covering the use of smart grid technology forms part of the EU energy package which came into force in September 2009. Because of the importance of EU policy in the European electricity

markets, we believe that this package will be a good guide to where the money will be made in European Smart Grids in the near term future.

With this in mind, we note the emphasis on metering. Both the EU's gas and electricity directives stipulate that the EU's Member States ensure the implementation of intelligent metering systems that shall assist the active participation of consumers in the gas and electricity supply markets. The electricity directive sets a timeline of 80% coverage by 2020 and every EU household must be equipped with smart meters by 2022 (allowing two-way communications and control capabilities). We see these as challenging goals. However, if metering projects are funded and the political will persists, we foresee considerable opportunity in the European metering sector. We will have a lot more to say on this in the main body of this report.

European Commission: The European Commission pronouncements also help to pin down the specifics of where some new opportunities are to be found in the European Smart Grid. These include:

- Network technologies to increase grid capacity and reduce energy losses
- New power electronic technologies will improve supply quality.
- Advances in simulation tools, which will greatly assist the transfer of innovative technologies to practical applications for the benefit of customers and utilities.

Making the Smart Grid Possible: Hurdles to Deploying Smart Grids in Europe

There are a number of barriers that must be jumped before significant revenues can be generated by Smart Grid companies in Europe. These include the following:

Technical challenges: European distribution networks were not designed to accommodate large numbers of small and medium-

sized generators. There are several potential difficulties which have to be tackled - such as accommodating bi-directional electricity flows; maintaining electricity flow at a level that is consistent with the ratings of the equipment; ensuring voltage remains within safe and statutory limits; and ensuring the electricity flows from local generators do not create network faults. All of these technical challenges, while a barrier to Smart Grid deployment as a whole represent an opportunity for innovators who can effectively solve these problems.

Regulatory/standards challenges: Developing a smart grid will create significant regulatory challenges in at least three different areas:

- The introduction of European Union electro-technical standards for all new household appliances will be required to provide the necessary functionality for the development of "smart demand".
- More generally, the regulations and standards in most European countries were designed for the incumbent (often stated-owned) network systems - and these regulations will have to undergo significant changes to accommodate a future Smart Grid environment.
- Incentives will have to be developed to encourage network operators to invest in technologies which would allow their networks to be more actively managed. Distributed generation that is located near to the source of demand may bypass many of these costs and have a higher value than conventional generation. But the potential benefits of distributed generation are not fully recognised within the regulatory frameworks of European countries. How this issue is dealt with by the powers that be will strongly influence how money is made and where it is made in the European Smart Grid market

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