

Trends for Smart Grid Adoption

JUNE 2010

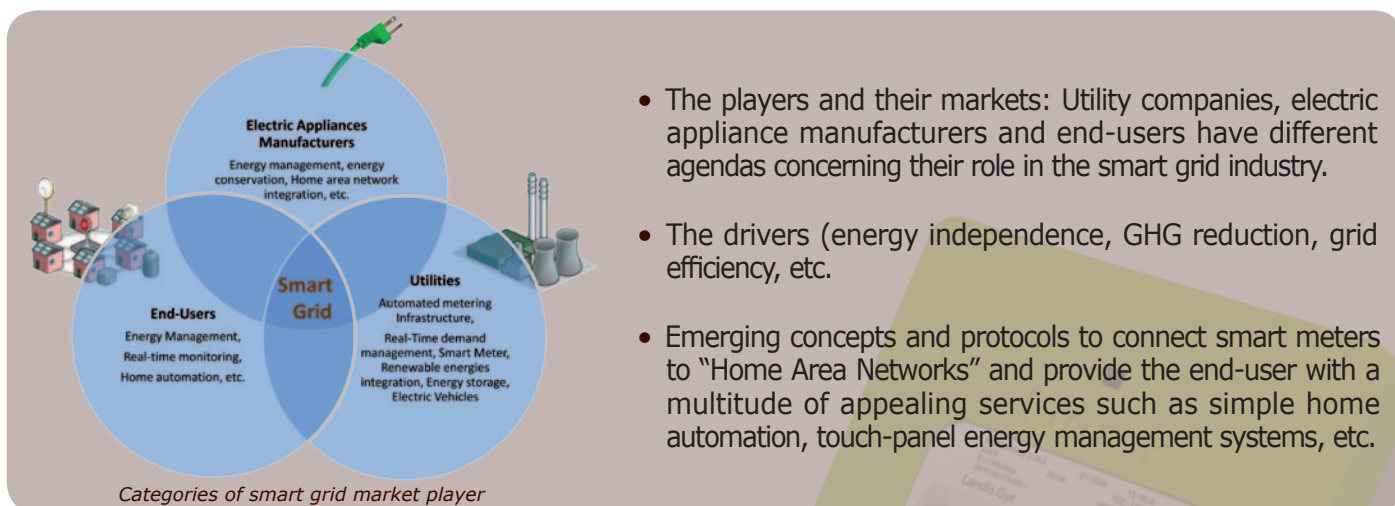
Review of main concepts, technologies, players and markets, from energy T&D to home appliances

DEFINITION

The term "smart grid" is used more and more, but its definition is still subject to controversy since its usage covers a wide range of technical fields. In this report, Yole suggests a three-layer definition for "smart grid": a software layer, a communication & sensors layer and a power layer.

The report provides a global understanding of the smart grid concepts, following two main approaches:

- Smart grid related to new architectures using communication devices and sensors,
- Smart grid related to electricity transportation and distribution platform equipped with power electronics components and modules.



Categories of smart grid market player

REPORT HIGHLIGHTS

This report details how the companies envision business opportunities in the Smart Grid world and covers a broad range of their potential applications. From startups to heavyweights, companies are betting that energy management will be the next big thing. Intel, Google, Cisco & GE, for instance, are all investing in tomorrow's technologies to create the "smart grid momentum".

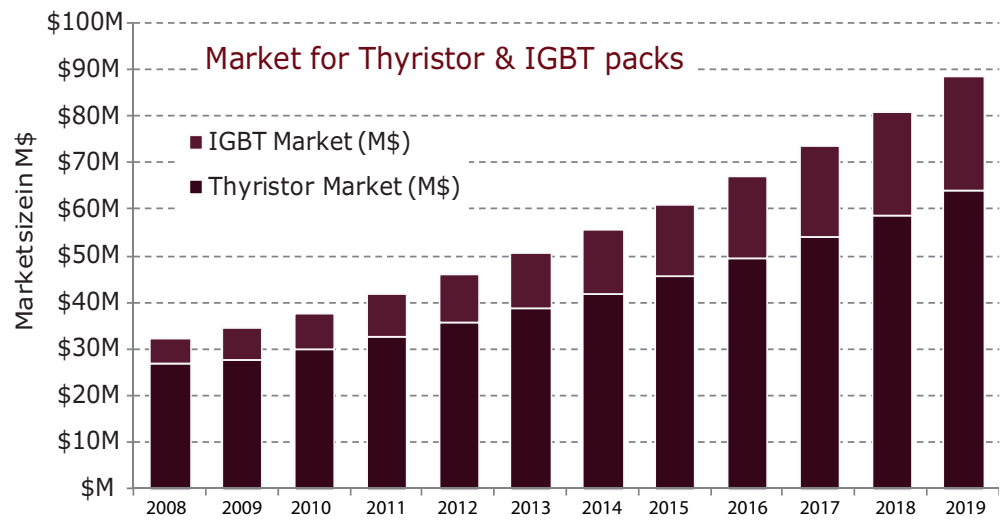
This report will provide you with the key points to understand and decode this fast-paced and emerging industry at the frontier of energy and telecommunications. As the electric grid "2.0" will be based on 3 main layers: Power, Communication, and Applications, we describe how this distribution could create great value and opportunities in the coming years.

Also, as the renewable share of the energy mix is increasing, better integration of renewable and distributed energies (PV, Wind and Biogas energy, etc.) coupled to an evolution of the energy management system will be necessary. Electricity demand and electricity production will have to be well balanced in order to increase the grid efficiency while decreasing the number of power outages, a huge challenge considering tomorrow's electric needs (electric cars, demographic pressure, etc.).

We include an in-depth understanding of the smart meter industry, one of the key drivers of today's smart grid architectures. Many initiatives have already started to promote smart-meter-based architecture in Europe, Asia and North-America where the Recovery and Reinvestment Act supplied a green stimulus of \$3.9 billion. The top 15 North American Automated Measuring Infrastructure (AMI) deployments represent roughly 41.1 million smart meters scheduled to be deployed by 2015.

MARKET TRENDS

With the growing need of power consumption (from 15 400 B kWh in 2000, to 25 000 B kWh in 2015), national grids require more quality and reliability to regulate electricity flows. At the T&D level, smart grid means an electricity delivery system which transports, converts and distributes the power efficiently, avoiding losses as much as possible. Players of the power electronics industry use



thyristors and implement IGBTs in order to improve the conversion efficiency in base stations. The power T&D market is characterized by few but well established players. However, the international and diversified scope of smart grid will encourage the entrance of a multitude of players all across the value chain: power components, system integration, but also communication and sensors and software...

As far as semiconductor-based power component makers are concerned, the recent introduction of grid architectures such as HVDC Light ® (for long DC lines) or STATCOM SVC light (for AC transmission) increases the market penetration of such power devices and enables more efficient, smaller, lower-cost installations.

We estimate the total market for power components – IGBTs and thyristors for both DC and AC electricity transport configuration – to grow from \$30 million in 2010 to \$50 million by 2015; and the equivalent power modules to increase from almost \$60 million this year to \$100 million in 2015.

OBJECTIVES OF THE REPORT

Through this new market and technology report, Yole Développement brings a clear definition of the smart grid, identifying the main activities, drivers and challenges for its adoption.

We have identified the real added value all across the value chain to implement smart grid concept: from the industrial players to the end users.

In the frame of its power electronics department researches, Yole also proposes market size quantification, from energy consumption to power modules revenues.

We also describe the roadmap per country, explaining the different sequential steps for smart grid adoption, in relation to local factors.

This report helps to understand the overall stakes of smart grid adoption, providing an accurate time to market and player challenges to overcome.

In the next 10 years, we also believe that power devices can enter the smart grid market at a more residential level with house power routers, whose goal is to intelligently manage and supply every home appliance by minimizing and redirecting the overall consumption.

Last but not least, smart grid development is country dependent! Effectively, each country has its own grid specifications (voltage, frequency, phases, stability) and local competition can motivate and reinforce technical developments...



Market drivers for adoption of a smart-grid platform

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WHO SHOULD BUY THIS REPORT?

- Power device makers
- Power module makers
- Electricity supplier
- Electricity grid players
- Utility players
- Home appliances manufacturers
- Companies involved in renewable energies
- Start up proposing new solutions
for smart grid adoption
- Investors
- R&D labs
- Engineering services companies

INDEX OF COMPANIES MENTIONED IN THE REPORT:

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BIO



Brice Le Gouic works at Yole Développement on market and technology analysis in the fields of power electronics and related application markets. He was granted a Master of Science degree in semiconductor physics and microelectronics from the National Institute of Applied Sciences in Toulouse, France.

BIO



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