

Summary

Executive summary

Smart grid is one of the latest buzzwords in the energy sector and has become a catchphrase for politicians, academics and industry leaders alike. The vision is to exploit the latest technology to address the immense challenge of securing the energy supply in the 21st century. The concept of smart grids is at times put forward as a revolutionary solution to a wide array of problems, ranging from the West's dependency on Middle Eastern oil to global warming. A more realistic expectation is however that smart grid technology will contribute to improved efficiency and reliability in energy distribution and better optimisation in allocation of resources and utilisation of assets.

Smart metering is widely regarded as the cornerstone for future smart grids. In the history of metering technology, smart metering represents the third stage in a chain of developments spanning more than 100 years. Manually read meters have been around since the advent of the utility industry in the late 19th century. Over the last three decades, automated meter reading (AMR) based on one-way or two-way communication has evolved. Smart metering broadens the scope of AMR beyond just meter readings with additional features enabled by two-way data communication. A smart metering solution generally delivers a range of applications using an infrastructure comprising networked meters, communication networks and data collection and management systems.

Smart electricity meters are being introduced all over the developed world. North America and Asia-Pacific are two of the most dynamic market regions that will see massive projects realised over the next five to ten years. Berg Insight forecasts that the installed base of smart electricity meters in North America will grow at a compound annual growth rate of 22.5 percent between 2010 and 2016 to reach 87.4 million units at the end of the period. Asia-Pacific is projected to see the installed base of smart meters soar from a low level to 378.1 million units by 2016.

North America has the world's highest penetration of automatic meter reading, exceeding 50 percent. Over the past years, many of the largest utilities in the US have embarked on ambitious smart grid schemes where one of the main objectives is to deploy second generation advanced metering infrastructure. AEP, PG&E, Southern California Edison, Southern Company, Florida Power & Light and Oncor are some of the largest utility groups having committed to full-scale rollouts to all customers. Furthermore there are numerous projects among medium sized and small utilities throughout the country. National and state policies play a major role in shaping developments. The US market received a major boost through the Obama Administration's American Recovery and Reinvestment Act that includes US\$ 43 billion ear-marked for the energy sector plus tax incentives. A number of states, including California, Texas, Florida and Pennsylvania have approved utility plans for massive smart meter deployments, while others such as Virginia have turned down major project proposals. In Canada, the provinces of Ontario and British Columbia have introduced mandatory requirements for smart electricity meters for all customers. Hydro-Québec announced Canada's largest project to date in 2011, involving 4.0 million metering points.

East Asia is in the earliest phase of the adoption of smart metering technology. Large-scale rollouts to residential customers have only recently begun in Japan and South Korea, while China remains in the piloting stage. National and industry leaders do however have clear visions for the adoption of the technology over the course of this decade. South Korea has adopted a national plan for the construction of a smart grid by 2020. Japan already has the world's most advanced power grid monitoring systems in place and several of the leading utilities have announced plans for smart meter deployments over the next ten years. China is investing massively in the expansion of the nation's energy infrastructure to keep up with the rapidly increasing power demand. The country has begun deploying a new generation of more advanced electricity meters, which are prepared for two-way communication. China has however not yet decided on any final standards for smart grid networking. Although the country is on track to reach near 100 percent penetration for smart meters that support communication by 2015, there is not yet any infrastructure in place to network them into a nationwide smart grid. Australia and New Zealand began massive installations of smart meters at the end of the last decade. Adoption is driven by regulations in the case of Australia and by the main industry players in New Zealand.