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Smart Meters Account for 80 Percent of Electricity Meters in North America

By: [Johan Fagerberg](#)

Smart grid is a buzzword 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, including global warming. But a more realistic expectation is that smart grid technology will contribute to improved efficiency and reliability in energy distribution and better optimization in the allocation of resources and utilization of assets.



Benefits will in many cases be indiscernible to the general public. These include fewer and less severe outages, reductions in network energy losses, more efficient energy markets, and improved conditions for producers of renewable energy. Behind the hype, energy infrastructure is becoming smarter day by day as utilities invest in remote monitoring systems, intelligent grid management, and smart energy meters. A growing number of IT systems manage ever larger amounts of information to enable process automation and support decision-making at every level of the energy sector. It will take many years yet for this evolving technology to reach its full potential.

Smart grids are envisioned to incorporate a wide range of features in order to perform the required functions. These include load adjustment, demand response support, greater resilience to loading, decentralization of power generation, and price signaling to consumers. Load adjustment and demand response support enable temporary or continuous adjustments of power consumption and generation during unexpected fluctuations in the balance of supply and demand. Both features are widely implemented on core grid assets and among large industrial customers but can deliver further benefits if extended to the entire network. Greater resilience to loading optimizes network utilization to avoid or minimize blackouts. This is achieved through smart grid design and more intelligent operation. Decentralization of power generation allows individual consumers to generate power onsite by, for instance, installing solar panels, and is expected to increase the share of renewable energy. Price signaling to customers is anticipated to promote behavior and technology that lead to reduced power demand during peaks through variable pricing, a phenomenon referred to as peak-shaving. The first step is usually to introduce differentiated day and night tariffs, with a vision to move towards a price structure which could vary by the hour or the minute in the future.

Smart metering is widely regarded as the cornerstone for future smart grids and is currently being deployed all over the developed world, with a growing number of large-scale initiatives now also being launched in developing countries. Asia-Pacific constitutes the largest market by far while North America ranks as the third largest market after Europe. North America and Europe are two highly dynamic market regions that saw a wave of massive smart metering projects being launched or completed during the first half of the past decade. Several major utilities in these regions are thus now preparing for a second-wave of deployments to take off, driven by new smart meter functionalities and smart energy use-cases.

The North American smart metering industry is diverse and dynamic. The combination of a large and relatively homogeneous energy market characterized by high consumption, a world-leading technology sector, and a diversity of players in the utility industry, has created a favorable climate for growth and innovation. Despite some consolidation during the last decade, the demand-side is still characterized by the lack of mega utilities in the high end and a multitude of smaller players at the low end. Around 31 players have 1 million customers or more, and over one hundred have more than 100,000 customers. The vast majority of these have either undertaken smart metering rollouts during the past decade or initiated smart metering plans to be realized in the current decade. At the other end of the scale, there are thousands of smaller cooperative and municipal utilities that are eagerly adopting smart metering, although with different needs than the top investor-owned utilities. This segment constitutes between 25-30 percent of the total market size and offers a significant market opportunity.

Berg Insight forecasts that the installed base of smart electricity meters in North America will grow at a compound annual rate of 3.8 percent throughout the forecast period, from 145.9 million in 2023 to a total of 182.9 million in 2029. The installed base of smart electricity meters in the United States reached 130.6 million in 2023, while the installed base of smart electricity meters in Canada reached 15.4 million in the same year. The penetration of smart electricity meters is higher in Canada compared to the U.S., however this difference is expected to continuously shrink until 2029 when the countries are forecast to have penetration rates of 96 percent and 94 percent respectively.

North America was the first region in the world to move beyond traditional energy metering through the widespread introduction of AMR which started in the 1980s. Today, intelligent grids are becoming an integral part of the development of smart cities, and smart meters' ability to improve the reliability and resilience of the energy supply constitutes an important driver of growth in the region. A significant majority of the large investor-owned utilities in North America are now either fully deployed or in the implementation or planning phases of large-scale projects, and a second-wave of deployments is now on the horizon for the early adopters.

The penetration of smart electricity meters in the region was around 80 percent in 2023 and expected to increase to above 94 percent in 2029, mostly driven by large investor-owned utility projects in the U.S. as the relatively mature market in Canada is only expected to see moderate growth. In terms of total shipments of smart electricity meters, second-wave rollouts for early adopters are ramping up and will grow their share of annual shipment volumes throughout the forecast period, accounting for more than 85 percent by the end of the forecast period.

The market in North America is dominated by the two U.S.-based companies, Aclara and Itron, as well as Swiss-based Landis+Gyr. Itron and Landis+Gyr have a 34 and 32 percent market share respectively of the installed base of smart electricity meters in North America. Aclara is in third place with a market share of 22 percent, and the remaining 13 percent is predominately shared between Honeywell and Sensus. In terms of network endpoints, the largest player is Itron with a market share of 63 percent, followed by Landis+Gyr with a market share of 25 percent, and Sensus with an 8 percent market share.

North America is a technologically advanced market where smart electricity metering is implemented

in the context of the smart grid. Wireless RF technologies are today preferred and account for the vast majority of installations, both in the electricity and the gas sectors. The leading players provide proprietary RF mesh or star topology platforms for the unlicensed 915 MHz ISM band, in addition to licensed sub-GHz spectrum. Wi-SUN-based mesh networks offered by vendors such as Landis+Gyr and Itron are currently the most widespread variant and also account for the majority of shipments. In the North American region, PLC has generally been perceived as inferior in terms of performance and cost, mainly due to the characteristics of the grid, where the ratio of meters per substation is low. Cellular communications have historically enjoyed limited adoption in the region, mainly because of being perceived as too costly compared to RF communications. A few significant cellular deployments totaling less than 5 million meters have, however, been made throughout the past decade.

Among utilities which have already deployed advanced electricity metering infrastructure, interest is now growing for being able to leverage the installed RF network for applications beyond smart metering and to bring a wider array of devices onto the platform. Most network platforms are already designed to support a number of smart grid applications in addition to two-way communications with meters. With the advanced metering infrastructure in place, increasing investments in areas such as distribution automation, distributed energy resources (DERs), electric vehicle (EV) charging infrastructure, and smart street lighting are, however, highlighting the need for further synergies.