



## 2016 Top Markets Report **Smart Grid** Country Case Study

### Japan

Japan ranks third among Top Markets for near-term smart grid export growth, due in large part to electricity sector reforms, energy efficiency objectives and active technology procurements by utilities. While U.S. suppliers face difficult competition in Japan, important in-roads have been made in recent years, and the market is expected to evolve favorably for innovators and entrants to a strong market.



U.S. T&D equipment exports to Japan have increased dramatically over the last decade, peaking in 2012 and seeing a decline in recent years. This corresponds with the nation’s efforts to rebuild and strengthen its electricity infrastructure following the Tōhoku earthquake. A high level of investment is expected to continue, but it has begun shift to the distribution network, including smart grid applications and energy efficiency services.

The break-up of vertically-integrated utilities, creation of a nationwide grid operator, incentives for distributed generation and demand response are among the major overhauls to Japan’s electricity market. Sustained reforms will drive the pace and scope of new opportunities for U.S. suppliers, and strong relationships with Japanese partners will continue to be a requirement in this market.

#### Market Overview

The Japanese electricity market has been dramatically impacted by both the 2011 Tōhoku earthquake and the policy response that followed. The damage resulting from the earthquake and tsunami, including the public concerns over nuclear energy safety, forced Japan to shut down all of its nuclear reactors, which accounted for 30 percent of its electricity supplies

at the time. The Government of Japan also shifted its focus to demand side management and an increased emphasis on energy security and resiliency through smart grid and energy efficiency technologies. This created a spark for technology markets that had long been suppressed and lacked innovation.

Japan’s electricity market is dominated by 10 regional utilities that have historically controlled generation, transmission, distribution and retail. Compared to other mature markets, electricity prices in Japan are high and consumption levels are low. Following the Fukushima disaster and energy crisis, household rates rose as much as 40 percent in some regions, and rate hikes are expected to continue, despite the re-activation of nuclear power, in order to fund continued upgrades to the system and provide relief to debt-laden utilities.

The drive for efficiency and resiliency over the last four years has ultimately forced all utilities to present plans for the installation of smart meters to every household, nearly 80 million in total. The most recent plans set a deadline for 2025 for these installations. Utilities have already begun the procurement process; in 2015, Japan thus surpassed China as the largest smart meter investor.<sup>1</sup>

## Overview of ITA's Analysis: JAPAN

### Strengths

- The Government of Japan is providing strong support for the development of the energy efficiency, smart grid and microgrids sectors
- Increased amount of renewable resources in Japan's energy matrix will continue to support the development of smart grids into the future

### Key Trends

- The 2011 Tōhoku earthquake and the continued transition of Japan's energy supply mix require electricity management and efficiency solutions
- Electricity sector reforms will incentivize utility investment in smart grids and open various segments of the electricity services market to entrants

### Risks

- Japanese conglomerates and local suppliers already hold strong positions in Japan's smart grids sector
- Long project timelines and burdensome technical requirements
- Pace and strength of implementation of electricity sector reforms remain to be seen

Although Japan has begun to re-activate its nuclear supplies, major reforms of the energy sector have continued, culminating in the April 2014 approval of the fourth Basic Energy Plan, which focuses on the policy objectives of energy security, reliability, efficiency, affordability, reduced emissions and increased consumer choice. The full implementation of this plan, including the break-up of many traditional energy sector monopolies and further liberalization of electricity markets, is expected to result in dramatic changes in the technologies and services incorporated in Japan's energy infrastructure.

### Policy and Regulatory Environment

Japan's energy market is overseen by the Ministry of Economy, Trade, and Industry (METI), which is responsible for policy planning, stable supply of electricity and rule-making through the Agency for Natural Resources and Energy. The Japan Fair Trade Commission monitors the state of competition and has been increasingly active in the electricity market since reforms began in the 1990s. By 2011, roughly 60% of the electricity market, including sales to large industrial and commercial customers, had been deregulated.

The 2014 Basic Energy Plan represents a complete overhaul of Japan's energy policy, utility industry and electricity markets. While more nuclear reactors will come back online over the next few years, natural gas, coal and renewable resources will make up a greater share of the nation's energy supply mix in the future. The plan did not set specific targets but did state that the share of renewable resources would exceed the previous policy objective of 20 percent by 2030. The

Plan, however, will likely ease emissions restrictions as it aims to cut emissions by just 3.8 percent by 2020, a lower bar compared to previous policies.

Additional reforms called for by the Japanese government include the establishment of a national grid and the liberalization of retail power markets. The Basic Energy Plan and related regulatory changes will effectively break-up the regional utility monopolies in Japan, opening up the \$67 billion household and small shop retail electricity market to competition in 2016. Japan has awarded over 150 applicants retail licenses. Many of these entities are small firms, but new non-electricity entrants have also applied, suggesting potential for the future bundling of electricity with gas, communications or other services.

In 2015, METI established two regulatory bodies. The first, the Organization for Cross-Regional Coordination of Transmission Operators (OCCTO), was established in April 2015 and is charged with overseeing the construction of cross-regional transmission lines, reviewing utility power supply and demand plans, and prescribing utilities to increase power generation and interchange as necessary.

The second, the Electricity Market Surveillance Committee (EMSC), was established in September 2015. METI has delegated the authority to the five EMSC members to monitor the electricity market, ensure its neutrality and make recommendations to the Minister.

## Market Analysis

In addition to power sector investment in new energy supply technologies, enhanced T&D infrastructure and energy efficiency services, Japan's government is also funding the integration of clean energy technologies and helping drive the development of the market for smart grid applications. METI's 2014 budget allocated \$3.8 billion for energy improvements, a 29 percent increase on the previous year, specifically targeting energy efficiency and demand-side response.

While subsidies targeting energy efficiency grew by 29 percent in 2014, the key program supporting the roll-out of home and building energy management systems has faded out, and the focus of both the public and private sector in Japan is expected to strengthen and remain – on smart grid applications that help integrate renewable resources and manage demand, including demand response and microgrids.

In addition to monitoring the electricity system, EMSC is charged with overseeing the rollout of smart meters. Meter deployments ramped-up in 2015, and Bloomberg New Energy Finance predicts 6 to 10 million installations per year through 2022. As Japan's utilities deploy AMI, investments in meter data management and additional smart grid applications and services are anticipated. By the end of 2016, electricity retail deregulation will come into effect, and most Japanese consumers will have access to live pricing and the choice to select ToU-based tariffs. If this timeline for technology deployments and market reforms is met, Japan will be the largest foreign market for residential smart grid and energy efficiency service providers.

### Opportunities and Challenges for U.S. Companies

While Japanese conglomerates and traditional local suppliers have been largely successful in winning smart metering bids thus far, as Japan's electricity market reform takes shape and its smart grid develops, additional opportunities for entrants are anticipated beyond the market for hardware. As Japan's electricity sector moves to a more customer-oriented and competitive structure, energy efficiency service providers and smart grid innovators with experience in mature markets, such as North America, will be highly competitive.

### Opportunities

- Integration of renewable resources into Japan's grid will require investment in distributed energy management.
- Meeting energy efficiency goals will require increased consumer engagement and improved data management.
- Meeting grid reliability goals will require further investment in outage systems and microgrids.

### Challenges

- The smart grid market remains saturated with major Japanese conglomerates, such as Toshiba, Hitachi and Mitsubishi.
- Projects often have a long approval process, spanning two or more years.
- Japan still employs a burdensome project and technology certification process.

In addition to utility-driven smart grid deployments, Japan's Ministry of Environment has a budget of approximately \$7 million per year for the next three years to initiate programs to develop microgrids that will improve overall system reliability, enhance renewable resources and energy storage integration, and incorporate EVs.

### Know Your Buyer

Smart grid procurers in Japan include the established 10 utilities, but as market liberalization comes into effect, U.S. firms will potentially find new partners among the newly awarded market entrants.

### Summary of Resources

- U.S. Department of Commerce Country Commercial Guide: <http://www.export.gov/ccg/japan090820.asp>
- Japan Ministry of Economy, Trade, and Industry: <http://www.meti.go.jp/english/>
- Japan External Trade Organization: <https://www.jetro.go.jp/en/>

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<sup>1</sup> Bloomberg New Energy Finance, *Q1 2016 Digital Energy Market Outlook*, 25 February 2016.