



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

Brazil

Brazil’s top markets ranking is affected by the nation’s economic and electricity demand growth, as well as by a policy and regulatory environment that may constrain investment and exporter opportunities in the energy sector. Brazil is currently the largest electricity market in Latin America and is an important global emerging market, but smart grid deployments have been slowed by regulatory and technical hurdles. The business environment for U.S. smart grid exporters, where strong local partnerships and longer timelines for investment are usually required of foreign entrants, has been challenging as well.



U.S. exports of transmission & distribution (T&D) equipment have grown in recent years and investments in Brazil’s power infrastructure will need to continue in order to meet growing electricity demand, particularly in urban centers that are distanced from traditional hydropower sources. Brazil’s leadership has intensified its efforts to meet electricity supply challenges, often at the expense of utilities. The utility finance environment has suffered as a result and smart grid ICT investments have been delayed. The unfolding scandal connected to energy giant Petrobras poses another challenge to government and business, increasing uncertainty and creating a drag on growth.

Sustained opportunities for U.S. suppliers of T&D infrastructure are expected in Brazil, along with limited opportunities for technology and solution providers in the Advanced Metering Infrastructure sub-sector. However, given the economic recession, this market will be more difficult for U.S. suppliers in the near term. Continued engagement with key stakeholders on regulatory and commercial issues affecting Brazil’s smart grid market will be required.

Market Overview

Brazil’s electricity market is heavily dependent on hydroelectric power plants with approximately 80 percent of its electricity generated through hydropower in an average year. Droughts, however, can severely restrict the country’s electricity generation. Increased volatility of supply and rising wholesale electricity costs have been the headline-making trends of recent years for Brazil’s power sector. Public officials have focused on short-term funding solutions to these problems, financed mostly through public and utility industry debt, keeping consumer electricity prices relatively low.

Privatization and competition have been limited in Brazil’s power supply and services markets, with the state-owned Centrais Elétricas Brasileiras (Eletrobrás) controlling about one-third of total installed capacity and a handful of state-owned companies generating most of the rest. Transmission lines in Brazil are largely state-owned as well, and the Operador Nacional do Sistema Elétrico (ONS) is a nationwide operator. Privatization and competition have gone much further in the distribution segment, where there are more

Overview of ITA's Analysis: BRAZIL

Strengths

- Investments in new power sources and transmission build-outs to ensure adequate supply are a national priority
- Renewable resources growth is beginning to pick up and will drive further T&D investments and opportunities for more advanced smart grid applications

Key Trends

- Continued investment in transmission despite economic headwinds
- Regulatory, technical and business environment issues holding back growth potential in distribution and smart grid segments
- Droughts which increase the political will and need to explore non-hydropower resources, such as wind and solar energy

Risks

- Utility finance environment requires reforms to support necessary investments in next stages of grid modernization.

than 60 providers across the country. While state governments are allowed monopolies over their electricity markets, many have been privatized. Approximately 70 percent of distribution companies rely to some degree on private capital. A number of distribution company concession contracts have been renewed.

Growth in Brazil's electricity consumption decreased in 2015 and is expected to be slow to resume its growth. It is predicted to increase at an average of 1.3 percent annually between 2015 and 2020,¹ driving a need for further investment in infrastructure. Beginning in 2012, Brazil's government set out on an ambitious plan to increase and diversify its energy mix, with goals to invest approximately \$235 billion and install 36 Gigawatts (GW) of hydropower, 12 GW of biomass and 11 GW of wind over the course of 10 years.

Although Brazil has supported renewable energy projects, particularly wind, transmission infrastructure has been inadequate, delaying a number of projects. Brazil now requires that projects involved in energy auctions prove that they have transmission lines secured prior to participating in the auctions. This will reduce the problems of delays associated with insufficient transmission infrastructure while helping drive the market for T&D equipment.

Poor energy efficiency and average electricity losses in excess of 15 percent are also pressing issues impacting Brazil's market. Aging transmission lines delivering power over long distances combined with rampant electricity theft in segments of the distribution network are largely to blame.

The need to upgrade infrastructure is a common refrain in Brazil, but meeting the need has proved

difficult. In 2012, Eletrobrás announced plans to invest heavily across generation, transmission and distribution over the following two years, but it failed to reach its targets. The company subsequently cut its workforce and cited an imbalance between high generation costs and electricity tariffs that have been largely suppressed by national and state governments.

Policy and Regulatory Environment

Brazil's electricity market is regulated by the National Electricity Agency (ANEEL), and the Ministry of Mines and Energy (MME) leads energy policy developments.

ANEEL regulates public tenders for electricity sold to distribution utilities, sets tariffs for residential consumers in the regulated market, and is responsible for maintaining an economic balance that enables distributors to cover operating costs and recover an adequate return on investment. Meanwhile, a liberalized and unregulated system governs electricity trading between independent energy suppliers, and industrial consumers have the option of purchasing from the unregulated market.

In 2011, Brazil released its "Ten Year Energy Plan" and set a goal of adding 18 GW of renewable resource capacity by 2020. The expanded renewable supply is intended to diversify the energy supply mix and help Brazil meet its goals to reduce greenhouse gases, with a reduction of emissions of 37 percent by 2025 and 43 percent by 2030, compared to 2005 levels as part of its 2015 UNFCCC INDC. Renewable energy projects in Brazil – particularly locally sourced projects – receive favorable financing in Brazil, and electricity produced from renewable sources with capacity less than or equal to 30 megawatts (MW) receives a 50 percent reduction in T&D tariffs.

In December 2015, Minister of Mines and Energy, Eduardo Braga, launched a multi-agency distributed generation initiative (Pro-GD) that hopes to attract \$25 billion in investment by 2030. This included the announcement to install 2.7 million solar units to increase Brazil's non-hydropower renewable resources share from 13 percent to 23 percent, where less than 1 percent is currently derived from solar energy. The initiative is also expected to lower CO2 emissions by 29 million tons to contribute to Brazil's goals of cutting greenhouse gas emissions.

In late 2013, Brazil's first "solar only" energy auction attracted bids among the lowest in the world, bringing Brazil closer to achieving the world's cheapest solar contract prices – without subsidies. Renewable resources auctions have continued to do well throughout 2015 with almost all projects awarded.

ANEEL further predicts that revisions to its net-metering policies instituted of the last year will increase opportunities for aggregation of sources and increase the number of small customer units installed to 1.2 million by 2024, amounting to 4.5 GW of installed capacity. For example, this new rule also enables "shared generation," where interested parties are allowed to create a consortium, or cooperative, to install a micro or mini-distributed generation unit, up to 75 kilowatts or up to 5 megawatts, respectively, to reduce the electric bill of the parties.

Despite the long-standing goal of nationwide deployment, Brazil's smart meter market has experienced a number of false starts and the regulatory environment has not developed favorably to drive deployment. In 2012, ANEEL approved a long-awaited resolution establishing requirements for smart meters, but the regulator limited the classes of consumers for the roll-out. The smart grid market is still eagerly awaiting additional technical regulations from both ANEEL and Brazil's lead standards body, INMETRO, that will finally kick-off deployment.

Brazil's Energy Efficiency Program (EEP) mandates distribution utility spending in energy efficiency, requiring about \$250 million to be invested annually. Restrictive program requirements, however, have limited the effectiveness of spending, and the wider energy efficiency market in Brazil has been stifled by a high cost of capital for financing deals.

Market Analysis

Brazil's electricity needs and investment in large infrastructure projects through the 2013 period of economic growth have been important growth drivers for U.S. suppliers of grid modernization equipment and services. In 2013, U.S. T&D equipment exports to Brazil more than doubled to over \$94 million in revenue. Imports, however, dropped to resume modest growth in 2014 and decreased to \$40.9 million in 2015. Coupled with the increased economic downturn Brazil dropped in the Smart Grid Top Market rankings to #32.

Beginning with the Lula administration, Brazil set ambitious goals for its national smart grid deployment, but the market has been slow to develop. The smart grid regulatory and business environment has fallen short of expectations. Once the technical hurdles are overcome, the market expects significant investment in smart distribution solutions that can solve the problem of electricity theft. While the smart meter market is likely to be limited to an estimated \$500 million in the near-term, some of the larger, urban utilities with higher-income consumer footprints will require advanced smart grid solutions to a range of power management challenges.

Opportunities and Challenges for U.S. Companies

U.S. suppliers continue to find export success in Brazil's T&D sector, where projects are continuing apace though economic and political issues that pose a threat to future growth. Opportunities for transmission to connect areas of energy supply growth, in particular, wind, to growing demand should be a focus. As the integration of new power sources moves forward, many Brazilian utilities will require more advanced power management solutions. Brazil continues to be a challenging market for U.S. firms to do business, and a great deal of upfront work to overcome both cultural and technical issues is required of technology firms in particular.

Opportunities

- Transmission build-outs and solutions to ensure supply/demand balance
- Distributed generation management as sector grows
- Electricity delivery and demand side management solutions as smart grid deployments advance in 2015

Challenges

- Utilities have been forced to shoulder the financial burden of meeting recent electricity demand growth, and an improved regulatory and financial environment will be required to drive future investments.

Know Your Buyer

Brazilian purchasers of U.S. smart grid goods and services include generation, transmission and distribution companies. For example, according to the Brazilian Electric Power Utility Association (ABRADEE), there are 64 electric power utilities in Brazil, with 74.1 million consumer and 2 million new connections every year.

Summary of Resources

- U.S. Department of Commerce, Country Commercial Guide: <http://www.export.gov/ccg/brazil090732.asp>
- Brazilian Ministry of Mines and Energy (MME): www.mme.gov.br
- Brazilian National Electrical Energy Agency (ANEEL): www.aneel.gov.br
- Brazilian Electrical and Electronics Industry Association: www.abinee.org.br
- Eletrobrás: www.eletronbras.com.br
- Empresa de Pesquisas Energéticas (EPE): www.epe.gov.br

¹ Business Monitor International, *Electricity Consumption Projections*.