WANTED: ENERGY INNOVATION

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HOW BRAZILIANS USE electric energy should soon change. Like other countries worldwide, Brazil has been investing in smart grids. These grids apply information technology to electric power systems, integrating them into communication systems and network infrastructure to allow more speed, efficiency, and transparency at all stages of energy production and consumption. Smart grids give consumers a larger role because they will become more aware of the use and consumption of electric energy. As the whole system changes, regulatory and technological capacity issues will arise.

"The smart grid has revolutionized the way electricity is distributed in homes. People will be much better able to control consumption because the system allows for different ways of charging for energy," said Maurício Canêdo, Brazilian Institute of Economics (IBRE) researcher. As examples, he notes that those who have wind or solar power at home may earn discounts or be able to sell excess energy.

Control

Knowing how much they are consuming and at what times, consumers are expected to better control their consumption, shifting their energy needs to periods

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during the day when demand, and therefore rates, are lower. "[The smart grid] will start to be tested next year, with variable rates for electric energy during the day," says Máximo Luiz Pompermayer, superintendent of research and development, National Electric Energy Agency (Aneel). Today, the consumer of low voltage pays a single rate throughout the day, week, and month, even though these costs vary during each period. "When consumers can better manage their use of energy, this will improve energy efficiency generally," Pompermayer says.

The pursuit of energy efficiency will also change how companies deal with electric power network problems. Surveys by the Center for Management and Strategic Studies of the Ministry of Science, Technology and Innovation show that for every 100 kilowatts (kW) of electric energy produced in Brazil, 15 kW are lost between generation and consumption—more than double the world average of 7%. Experts believe that replacing current meters with smart meters that transmit data to companies through fiber-optic cables or by wireless will significantly reduce these losses.

The new networks, says Joisa Campanher Dutra, coordinator, Center for Infrastructure Regulation of the Getulio Vargas Foundation, should increase system responsiveness to stress, avoiding power interruptions as consumers react by changing their demand for energy.

The smart grid will also have a significant positive environmental impact. Luiz Maurer, World Bank energy specialist, points out that the International Energy Agency 2012 report indicates that by 2015 two-thirds of the total carbon dioxide emissions will come from the energy sector, particularly generation and consumption. "Therefore, adoption by electric power and distribution companies of alternative technologies that improve consumption efficiency is of great importance. Smart grids are one of those technologies," he says.

Innovation

Here technological upgrade is crucial. Brazil should invest more in research and technological development and innovation, Pompermayer says: "Undoubtedly it is important to invest more than we invest today in technological innovation, research and development. But above all, it is important that we direct resources to reducing our technological dependence in the power sector."

The recent federal Energy Innovation program (INOVA Energy), may be a move in the right direction. "We will not

immediately have 100% national solutions. What we want is the ability to solve the challenges of deploying the smart grid in Brazil. INOVA is going to accelerate that process," says Alexandre Veloso, head of the Department of Energy and Clean Technologies of the Brazilian Innovation Agency (FINEP). INOVA Energy has US$1.5 billion in funding from FINEP, the Brazilian Development Bank (BNDES), and Aneel to finance projects in the area, especially smart grids.

Changes

The success of the smart grid depends on cultural, structural, and legal changes. "The great challenge is to bring the same evolution we have seen in the power generation and transmission systems since 1990s to the distribution system," says Pedro Jatobá, president, Association of Enterprises Property Infrastructure and Private Telecommunication Systems (Aptel). He points out two solutions: smart metering, a response to the findings by power distribution companies that electric energy losses are the main problem, and automation, where the focus is the quality of energy. "Companies will make their choices according to their needs," says Jatobá, who believes that one of the biggest barriers to advances is how these changes are regulated.

Jatobá stressed that the deadlock in modernizing of electric power distribution is the lack adequate regulation; in contrast, generation and transmission are well-regulated. "Concessionaires fear change because they do not know how the regulator will react," he says. Jatobá believes it is necessary to incorporate the issue of technological revolution into the regulations themselves, as has been done in other countries. He suggests that "We need to make room for power companies to propose modernization and negotiate with the regulator their return on these investments."

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