Energy sector in transition

Regulatory changes are transforming the Brazilian energy sector in ways that raise questions about its future expansion and electricity prices.



Solange Monteiro, *Rio de Janeiro*

SIGNS THAT THE BRAZILIAN GROWTH model based on consumption is exhausted have led the federal government to adopt numerous measures, ranging from tax exemptions to tweaking industrial policy, to improve the competitiveness of the economy. The government's competitiveness cavalcade came to the power sector in September 2012 with the announcement of Provisional Measure 579 (MP579), which provided for anticipation of generation, transmission, and distribution concessions. When the Provisional Measure was converted into Law 12,783, the government sought to respond to an old plea of Brazilian industry: reduce electricity prices, which are among the most expensive in the world.

However, the law, which should benefit consumers and ease the expectations of concessionaries about the possibility of

new bids, has had the opposite effect. Market acceptance was only partial, and decline in hydropower reservoir levels dropped at the end of last year, challenging the reliability of supply and requiring activation of more expensive thermal power generation. In order to reduce electricity prices, the government issued a sequence of decrees and resolutions that caught companies by surprise and triggered a series of court challenges from which the energy industry now needs to recover if it is to return to normal. "There must be a convergence to restore the electricity sector to proper functioning," Paulo Pedrosa, executive president, the Brazilian Association of Large Industrial Energy Consumers (Abrace), said. How to secure the investment required for both expanding the electric sector and supplying industry at competitive prices was the theme of the 3rd Seminar on Brazilian Energy, organized by the Center for Studies in Regulation and Infrastructure of Getulio Vargas Foundation (FGV)and Brazilian Institute of Economics (IBRE) on June 4 and 5 in Rio de Janeiro.

Luiz Fernando Vianna, president, Association of Independent Power Producers, illustrated the damage suffered by the industry after the MP579: "About 8GW of power generation were converted into quotas to meet power distributor needs. This energy, which had been selling at R$100 per MW-hour, is now sold at R$35. Companies like Eletrobras had to adapt to this hard reality," he said. "In power transmission, the 40% reduction in the revenue allowed left distributors cash-strapped. The sector will take time to absorb it all, because the impacts were huge," he said.

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One of the major concerns for power companies was a new regulation of the National Energy Policy changing the calculation of the Price of Settlement of Differences (PLD), which before was mostly paid by consumers. "The new calculation will take into account risk aversion, will raise PLDs, and will surely affect the marginal cost and spot energy prices," said Luiz Eduardo Barata Ferreira, president, Board of Directors, Chamber of Electric Energy Commercialization (CCEE).

The power companies rejected the new calculation. Within the first half of the year, court actions piled up against the determination, paralyzing the activity of the CCEE. For Luciano de Castro, director, Electricity Market Forum, Kellogg School of Management, using the courts means less productive industry dynamics. "Models that lead to legal questioning have harmful consequences," he said, because companies have to focus more on legal issues than on administrative efficiency. "The increase in the number

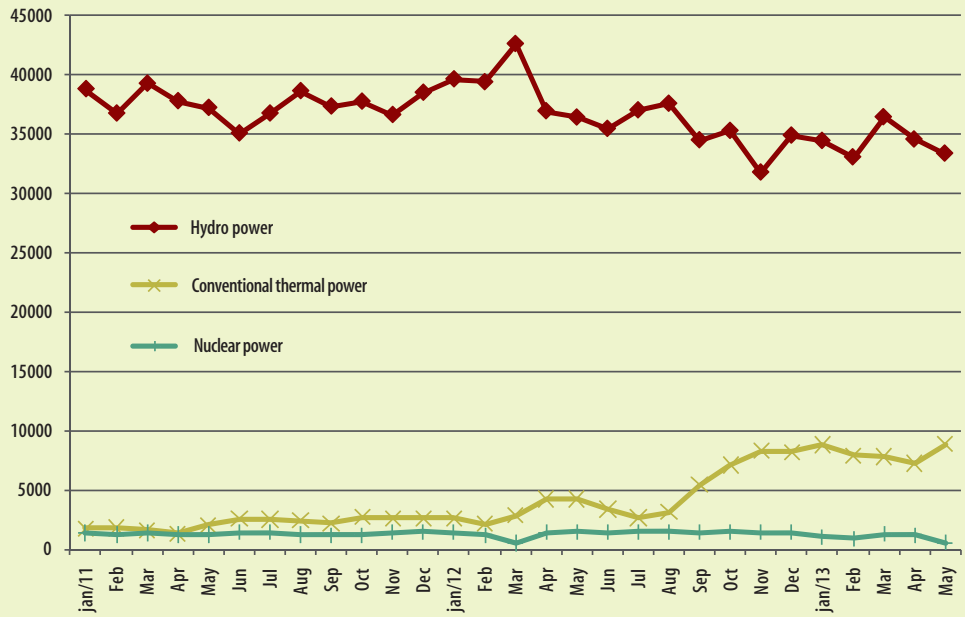
"About 8GW of power generation were converted into quotas to meet power distributor needs. This energy, which had been selling at R$100 per MW-hour, is now sold at R$35."

Luiz Fernando Vianna

of court actions reflects the difficult dialogue between the energy sector and the government. In the end, nobody wins," added Mário Menel, president, Brazilian Association of Investors in Self-Energy (Abiape).

For industrial consumers, who were intended to be the main beneficiaries of the law, the outcome was not satisfactory. "We had very important conceptual gains, such as acknowledgement that energy is a competitiveness factor. But in the case of concessions for power generation, the changes did not reach the free market," Abrace's Pedrosa said. He pointed out that, for captive consumers, which consist of only a very small number of industries, electricity price reductions were 30%. But for most manufacturers, which operate in the free market, the reduction was much lower, between 9% and 18%. "A policy that should have made industry more competitive

Consumption of conventional thermal power has increased as drought has affected hydro power generation. (GWatt-hour)



Source: National System Operator (ONS).

ended up mostly reducing the rates of residential consumers, "said Christopher Vlavianos, president, independent power company COMERC.

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Effects on investment

"We have a big challenge for the next 10 years: increase generation by 6GW to 7GW a year," said Altino Ventura Filho, secretary of energy planning and development, Ministry of Mines and Energy. Since the government announced that it would allow electricity concessions to expire several years early to reduce the rates charged to consumers, however, concessionaires have been pulling back on investing.

The apprehension triggered by Law 12,783 does not mean there is no financing for new energy projects. "So far, financing has been fantastic. In Brazil it is hard to see a project that does not have financing," said Gustavo Gattass, company analyst, BTG Pactual Bank. Felipe Guth, manager of renewable energy, National Bank for Economic and Social Development (BNDES), explained that part of this success comes from auction designs that allow long-term expansion of energy supply based on projected revenue. Most credit to the energy industry is in the hands of BNDES, which represents a significant portion of the capital structure of the market: 30% of the total, with the rest divided between other creditors (15%) and equity (55%). "In the last 10 years, the BNDES has financed about 220 projects in energy alone, and we do not see financing shortages in the short term because energy is a priority," Guth said. However, other sources of financing so far have helped to finance electricity projects. Marcio Prado, partner, Indie Capital, said that the energy sector is second most important in issuing bonds, over 10 years issuing approximately R$10 billion.

Capitalization is a good measure of the value the market assigns to companies. Since mid-2012, however, the outlook for electricity companies has not been favorable for both shareholders and future investment. Since mid-2012, the market capitalization of the electricity sector has declined by US$30 billion. Some companies have increased their leverage two to five times. This means that the capacity of the electricity sector to invest to



THE WAY THE WIND IS BLOWING

Holding great promise among alternative energy sources, wind power generation is also undergoing a transition. Questions about how intermittent generation might restrict wind power expansion and problems caused by lack of transmission lines have brought about some adjustments to the rules for the sector. Projects with no connection to the transmission grid have been barred from the energy auction scheduled for August, and the National Bank for Economic and Social Development has tightened lending conditions for new wind power projects.

Nevertheless, the August auction has attracted 665 projects, with an installed capacity of 16 GW in nine states. "Prospects are excellent," said Elbia Melo, chief executive, Abeeólica. The goal, she said, is to expand installed capacity from 2.5 GW in 2012 to 8.8 GW in 2017 and 20 GW in 2021, at which point wind would account for 12% of the total supply of energy. Enrique de Las Morenas, manager, Enel Green Power in Brazil, confirmed the attractiveness of wind power to Brazil. "A country that has wind power potential of over 250 GW will always offer a great opportunity," he said, adding that at US$2,500 per kW wind power is also cheap to install.

Melo noted, "We hope to have good demand to consolidate the supply chain that we brought to Brazil. Otherwise, when the world economy recovers and resumes investing, Brazil could lose these investors." Melo also pointed out the positive externalities of wind power, which generates 15 jobs throughout the production chain for each installed MW, and its complementarity with other economic activities, such as farming and livestock, bringing in additional income for small farmers.



expand supply is declining; it is not keeping up with growth in demand for energy.

Analysts are convinced that clearer regulation is vital to reverse this situation. "Managing expectations is crucial to reducing volatility, risk, and the cost of capital," Prado said. Fernando de Holanda Barbosa Filho, IBRE researcher, alerted participants to an additional risk: reactions to the public demonstrations that began in June may launch a wave of rate controls, as occurred in Paraná state. "We must ensure return on investment," he said. "It is not possible to invest in the long term without guarantees about the rules for price formation in the short term," Prado added. Changes in how the PLD is calculated have left the electricity market in a limbo..

Gas dilemma

Another concern is the heightened reliance on thermal generation to ensure energy security. Experts believe that Ministry of Mines and Energy efforts to expand hydro, biomass, and wind power will not be enough. "With the growing presence of dams with smaller reservoirs, and the increasing

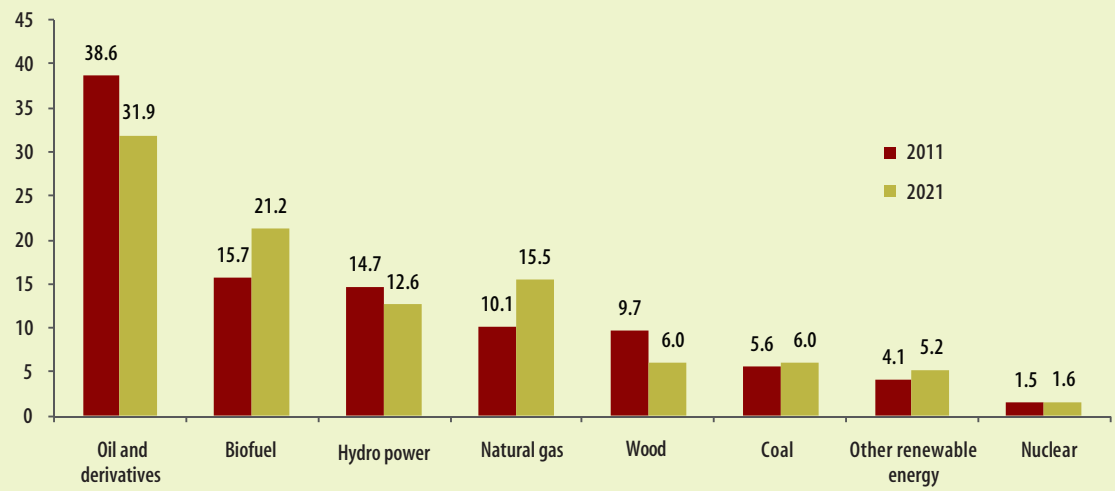
difficulty of environmental licensing for new large hydroelectric projects in the Amazon region, we have lost capacity to store energy," Hermes Chipp, director, National System Operator (ONS), said. "The increase in sources like wind power is good, but we need the thermal power plants," he said, calling for urgency especially in replacing less efficient power plants. This should rekindle demand for coal-fired power plants but not expensive nuclear power projects beyond the Angra 3 plant, scheduled for May 2018. "To generate power at competitive costs, it would be important to have coal plants but also nuclear plants to take advantage of the great potential of our uranium reserves," said Othon Luiz Pinheiro da Silva, president, Eletronuclear. Edvaldo Santana, director, National Electric Energy Agency (Aneel), underlined the importance of creating a favorable institutional environment for expansion. "When the rules of the game change," he said, "we must ensure balance in the distribution of both the benefits and the costs."

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Joisa Campanher Dutra, coordinator, FGV Center for Studies in Regulation and Infrastructure, reminded the audience that expanding thermal power is not problem-free: "Thermal plants have not materialized in the past, and gas still receives inadequate treatment, demanding improvement of its regulatory framework," she said. The

Brazil's current and projected energy supply structure
(% of total)



Fonte: MME.

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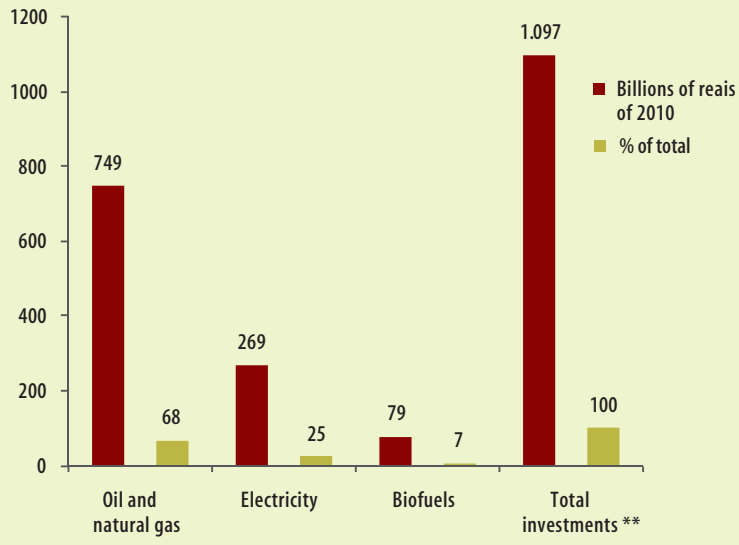
ministry's Ventura Filho acknowledged that the outlook for natural gas depends on a better outlook for volumes and prices but added, "Nevertheless, we are optimistic; thanks to the possibilities of deep sea oil and onshore gas . . . the supply of gas should increase by the end of this decade."

For industrial consumers, however, that time horizon sounds like an eternity compared with the speed of U.S. shale gas exploration. "U.S. gas prices are so low that they will have great influence, improving the competitiveness of U.S. industries like aluminum, ceramic, glass, steel, production of certain goods, not to mention fertilizers and petrochemicals," Sergio Quintella, FGV vice president, said. "We have to bear in mind that we need to produce energy at competitive prices; otherwise we risk a decline in industrial activity."

For Brazilian shale gas exploration, Mauricio Tolmasquim, president, Energy Research Company (EPE), recommended having more conservative expectations. "Until now, shale gas is a U.S. phenomenon. In Poland, which has one of the largest reserves of shale gas, exploitation is much more expensive, almost the price of our liquefied natural gas," he said.

Regardless of the results of shale gas exploration, experts pointed to the need to review how the natural gas industry currently operates. "Today we have an inhibited consumer market, high prices, and gas distributors working on a small scale," said Marcos Tavares, chairman, board of directors, Gas Energy. "Our gas law is a great agreement but the law was not enough to make the Brazilian gas market more competitive," he said, noting that although the law allows entry of new

Brazil's projected investment in energy, 2012-2021



**2.3% of GDP.

Source: Ministry of Mines and Energy.

natural gas producers, it has not eliminated the current monopoly. "The terms of the gas law are slow to give the answer that industry needs," he said.

Despite the numerous problems, there are encouraging examples in Brazil. São Paulo already has a structure for local utilities to buy gas in a competitive market and thus make room for new producers. "We regulated the market in 2011 and have conducted studies to carry out the first auction for utilities in São Paulo state to purchase gas," said Silvia Calou, chief executive, Regulatory Agency for Energy and Sanitation of São Paulo state (Arsesp).

With the entry of new producers and a clear development goal, Tavares insisted that industry could benefit from gas long before 2025: "We could have a boom in gas . . . What we need now is to anticipate the future, to ensure that Brazil has affordable, abundant, and reliable gas."

Diverse and efficient

For analysts, building up the Brazilian energy industry mainly depends on how each source of energy is regulated to ensure that it has its share of Brazil's energy matrix. One example is the great weight of sugar cane biomass. "Our biomass energy potential through 2011 was 4.2 GW, but we were able to tap only 1.4 GW by 2012," said Zilmar de Souza, bioelectricity manager, Sugar Cane Industry Union (UNICA). With problems like crop failure and reduced investment in ethanol production (which was discouraged by the fuel pricing policy), de Souza pointed out, the sector, which has the energy production capacity of four nuclear power plants of 1.1GW, needs a long-term policy to consolidate a sustainable market for bioelectricity, sugar, and ethanol.

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Leonardo Calabró, executive vice president of the Association of Energy Industry Cogeneration (Cogen) emphasized that energy expansion has to be planned in a more integrated way because each source of energy has a benefit to offer. He argued that Brazil should ensure both expansion of energy supply and stimulation of new technologies that promote savings in energy consumption, such as smart grids (see page 21). "We cannot think about increasing power generation alone but also about efficient consumption," echoed Cicero Bley, Jr., superintendent of renewable energy, Itaipu hydro power plant. "We are creatures with an unquenchable need for energy, and resolution of our energy supply problems will also necessitate changing social attitudes about energy consumption."