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Brazil, Neighbors Turn Tentatively Toward Renewable Energy

by LADB Staff

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For all their differences, Brazil and its Southern Cone neighbors share a common challenge as they struggle to balance rising energy demand against resource constraints and environmental concerns. Wind and other renewable-energy sources may well be part of the solution, but so far investment in green technologies has been cautious at best. In size, composition, and structure, the countries' electricity sectors vary tremendously. Brazil, the largest country in the region, boasts what is by far the most extensive power grid in the region, with installed capacity of roughly 100,000 megawatts more than twice the electricity available in nearby Argentina, Paraguay, Uruguay, and Chile combined.

The "sleeping giant" derives much of that electricity (approximately 80%) from large-scale hydroelectric dams but also generates a modest amount of power (roughly 2,000 MW) from a pair of nuclear plants. Paraguay is even more dependent on hydroelectricity, which accounts for basically all the country's installed capacity. The massive dams it shares with neighboring Argentina and Brazil even allow Paraguay to export electricity at least during nondrought years.

Argentina and Chile, in contrast, generate only about 40% of their power from dams, relying chiefly on fossil-fuel-burning generators to provide the rest. The various countries in the region have also pursued very different market models. Paraguay's top-down electricity is controlled by a public monopoly called the Administracion Nacional de Electricidad (ANDE).

The Brazilian state particularly through energy giant Petrobras plays a huge role in its electricity market as well. On the other side of the spectrum is Chile, where electricity production is dominated by just a handful of private companies, most of them foreign.

Taken together, however, Brazil and the Southern Cone countries are consistent in one major regard: with the exception of a handful of state-run nuclear plants in Brazil and Argentina, which account for 2% and 4% of total installed capacity respectively, electricity generation in the region relies on the two-pillar system of large-scale hydroelectric dams and thermoelectric, i.e. fossil-fuel-burning power plants.

Deemed cost effective and reliable, the two classic generating techniques have, nevertheless, certain inherent limitations, especially from an environmental standpoint. Thermoelectric generators rely on fossil fuels specifically coal, natural gas, and oil-based derivatives. Those resources are unevenly distributed throughout the region, can therefore be difficult to access, and are ultimately finite. Thermoplants also produce substantial carbon-dioxide (CO₂) emissions, pollutants that not only affect public health but are also a major contributor to global climate change.

Large-scale hydroelectric dams are clean in that regard yet still have a major impact on the environment, say critics. Dams alter both upstream ecosystems, by flooding river basins, and downstream environments, by cutting the natural flow of water. Such power stations often have a steep social cost as well. An estimated 10,000 people were displaced to make way for the massive 14,000-MW Itaipu dam, the world's second largest, which is shared by Brazil and Paraguay (see NotiSur, 2009-06-19, 2009-07-31).

"Although hydroelectricity is a cleaner energy resource than fossil fuels, it can't really be considered sustainable since it provokes significant and irreversible environmental, social, and cultural impacts. That's been the case with the majority of the region's hydroelectric projects," the international group of nongovernmental organizations (NGOs) Programa Cono Sur Sustentable wrote in a 2004 report. "These megadams favor centralization of production and concentration of the players involved in electricity generation," the book *Desafios para la Sustentabilidad Energetica en el Cono Sur* went on to say.

A case in point is the Itaipu dam, which supplies nearly all the electricity consumed in Paraguay and is a key power source for Brazil as well. A system failure at the dam on Nov. 10 plunged the whole of Paraguay into darkness for approximately 15 minutes. The blackout hit portions of Brazil's Rio de Janeiro and Sao Paulo as well, knocking out street lights, subway trains, and traffic lights.

Winds of change

Far more sustainable and strategic, argue many analysts, are the nonconventional renewable energy (NCRE) sources. Two of the most promising NCREs are wind and solar power, which in recent years have taken off like wildfire in countries such as Spain, Germany, and the US. Between 2005 and 2008, the US nearly tripled its wind-power capacity. It now boasts an installed capacity of more than 25,000 MW (roughly the size of Argentina's entire electricity grid), making it the world leader in wind energy. Germany, with an installed capacity of approximately 24,000 MW, is second on the list, followed by Spain (16,700 MW) and China (12,200 MW), the World Wind Energy Association (WWEA) reported last year.

That trend, however, has been slow to take off in the Southern Cone, despite widespread consensus that the region is naturally endowed with the right conditions for large-scale wind and solar investment. Southern Argentina's Patagonia region, for example, has long been recognized for its huge wind-energy potential, as have areas in Uruguay, Brazil, and Chile.

The Centro Regional de Energia Eolica (CREE) in Chubut, Argentina, estimates Patagonia's potential at some 500,000 MW, raising hopes that it could eventually be the Saudi Arabia of wind energy. Argentina's current wind-power capacity is roughly 30 MW. "There's enough wind to make it a profitable energy source. Theoretically it could cover the needs of the subcontinent," Dr. Erico Spinadel, president of the Asociacion Argentina de Energia Eolica (AAEE), told NotiSur. "For various technical reasons, that's impossible, although it should still be considered an important component of the region's energy mix."

Infrastructure shortcomings are part of the problem. But the real key to jump-starting investment in NCREs, according to Spinadel, is aggressive government leadership: legislation that provides

investors with concrete economic incentives and guarantees. In Germany and Spain, for example, government-set price guarantees known as feed-in tariffs are credited with sparking the rush toward renewables.

The governments in Argentina and in some neighboring countries have begun drafting modest legislation to that effect. Argentina passed a law in May declaring renewable energy of "national interest." In addition to promising fiscal incentives and tax reductions, the law set a 10-year NCRE target of 8%. Currently, renewable-energy sources account for less than 1% of the country's overall electricity consumption. The move appears to be paying off. Already the Spanish company Guascor has announced plans to build a US\$2.4 billion wind park with an installed capacity of between 600 MW and 900 MW. If eventually approved, the project would be a huge leap for Argentina, whose wind-power capacity grew by just 3 MW between 2005 and 2008.

Chile, Brazil, and Uruguay have also implemented recent renewable-energy laws that, like in Argentina, are resulting in some tangible, albeit modest, gains. With the opening last month of a new wind park near the northern city of Ovalle, Chile now has 61 MW of installed wind power, up from just 2 MW in 2005.

Chilean President Michelle Bachelet, who last year signed legislation establishing a 15-year 10% NCRE target, says the country will have approximately 200 MW by March, when her term ends. Brazil now has close to 400 MW of installed wind power, up from just 28.6 MW in 2005. And during the same three-year period, Uruguay went from just 0.2 MW to 20.5 MW.

Still just a drop in the bucket

Yet even with the recent wind-power expansion, NCREs continue to be just a fraction of total electricity production in the Southern Cone nations, which show no signs of turning their backs on traditional thermo- and hydroelectric generation any time soon. Just this year Chile opened its first liquefied natural gas (LNG) receiving and regasification station, allowing it to import the fuel from overseas.

Together with state copper company Corporacion Nacional del Cobre de Chile (CODELCO), French energy giant GDF Suez (the same company that owns the Ovalle wind farm) plans to open the country's second LNG receiving station in the coming months. In recent years, Chilean authorities have also approved a slate of coal-burning facilities. As a result, Chile is expected to soon have the highest per gigawatt hour (GWh) CO₂ emissions in Latin America: 425 tons compared with 227 tons for Argentina and just 61 tons for Brazil (in 2013), according to Brazilian consulting firm PSR.

"Chile's 200 MW of wind is not a whole lot given the potential," said Stephen Hall, head of the Comision Nacional de Energia's Programa Pais de Eficiencia Energetica (PPEE). "They could be moving a lot faster. The average wind-construction company can put up 100 MW every six months at every site. If we were working at several sites, several hundred MW could go up very rapidly."

The Southern Cone electricity sectors have yet to experience the type of "break in the dike" that opened the US and some European markets to a flood of wind and solar investment, explained Hall,

who agrees more top-down government leadership is needed. But the other piece of the puzzle, he said, is energy efficiency. "If we're talking about utility-scale renewables, there are limitations," said Hall. "To go beyond an energy economy that's say 40%-50% renewables, you have to be able to drastically reduce energy waste. Efficiency and renewables go hand in hand. They need each other."

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