

BRINGING FORESIGHT TO BRAZIL'S WHOLESALE POWER MARKET

There's an awful lot of water in Brazil. Or perhaps not. The beauty of the country's natural geography is that it can produce about 80% of its total power through hydrogeneration and other renewables – but not always. Stefan Söderberg, senior hydrologist at Thomson Reuters, looks at the background of Brazil's power sector and explains how the company's new Power Brazil app is giving companies better foresight in pricing short-term delivery

Over the last two years or so, Brazil has experienced a severe and prolonged drought – the worst in living memory, according to some. The inevitable consequence has been less water for generating electricity.

The effects have been particularly felt in Brazil's spot power market, where distributors buy electricity for the week ahead.

Seeing into the short-term market

Finding a fair price for delivering the weekly short-term electricity has been an inexact science – until recently. Much of the negotiation is done in private between the buying and selling parties. The two exchanges where contracts are reported over the counter do not publish their prices to outsiders.

So how does one participate with any confidence? The Power Brazil app on Thomson Reuters Eikon introduces some much-needed transparency. It provides values for all the key drivers of pricing in the week ahead. Users can see regularly updated weather forecasts and more sophisticated views of the amount of water available for generation – not just the water levels in the reservoirs, but the amount of water waiting to run into them, including water stored in the soil.

The user has a rational view ahead without having to wait for the weekly guide price (the differences settlement price (PLD)) published by Brazil's Electricity Trading Chamber (CCEE), the body that oversees trading.

"Having an up-to-date knowledge of important price drivers is key when you are trying to formulate a fair price for next week's physical delivery," my

colleague, Magnus Kober, points out. "For example, the hydro-balance – the amount of stored water that can be used for hydro production compared to normal – as well as wind-power production and power consumption. "As the weather forecasts are updated throughout the day, our models immediately quantify the effect on supply and demand. That gives a close to real-time update of the fundamentals. So now you don't have to wait until Friday to get a good sense of where the CMO (margin price for generating) is heading."

The Brazil app is part of a growing portfolio of apps that find the right focus for a specific power market. Creating a model that interprets all of the fundamental data correctly is essential. Geography and policy ensure that no two power markets are the same, so you can't just present a formula and hope to reveal the full picture – or anything like it – of a specific market.

"You have to understand the fuel types, you have to be able to translate and verify the effect of weather on demand," explains my colleague, Rukes Ahmed. "In Brazil, we give a complete picture of power production and its requirements for fuels – such as liquefied natural gas (LNG). It's all about being able to see the supply stack. Wherever you see one of our apps – in Germany, France or Turkey, for example – that's what we are doing. We show what the power stack looks like and how it is behaving."

A maturing power market

Brazil's power market might best be described as a work in progress.



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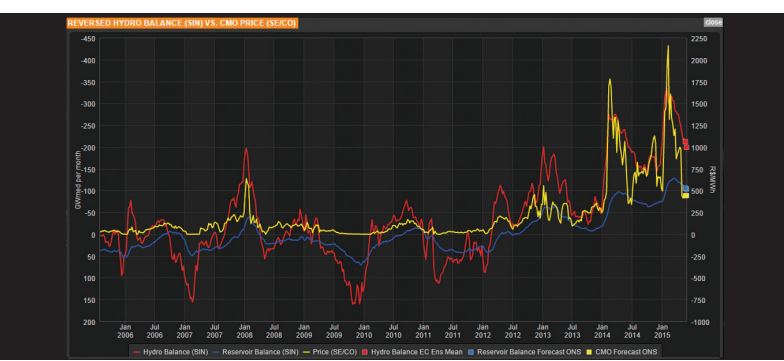
Conceived and originally launched in the 1990s, when the country badly needed investment in infrastructure for power generation and transmission, it ran into trouble at the start of the millennium. The move failed to encourage the required investment and a series of dry seasons resulted in difficulties in supplying electricity to populous regions in June 2001. In order to avoid blackouts, the government took emergency measures to reduce demand. Effectively, power was rationed.

"Aggregated electricity generation in the country grew by only 1.3% in 2014, with only a 0.6% increase in hydropower capacity, while consumption grew by 3.8%," observes Mark Langevin, director of BrazilWorks, a US-based consultancy that advises corporations on Brazilian energy policy. "The decrease in the rate of growth of hydropower, in part due to drought in the south and south east [of the country], challenged supply in the densely populated south east just as Brazilians were cranking up their air conditioners to cope with the summer heat – and thereby spiking demand.

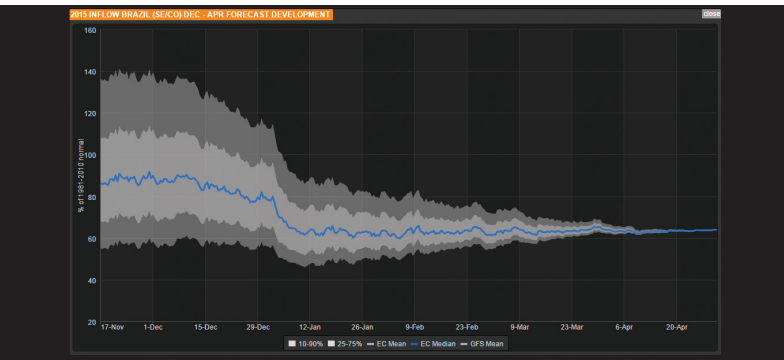
"Despite the fact Brazil's generation normally exceeds overall consumption by approximately 3%, the southeast region ran into short-term supply deficit. The problem was the transmission grid cannot easily get electricity from regions that have plenty of capacity to other regions that have sudden spikes in demand," says Langevin.

More reform

In the immediate aftermath of the 2001 crisis, the Brazilian government introduced major reforms. These created the current framework, where



Reservoir information, along with soil and groundwater information, gives a more accurate picture of the amount of water available for generation. This value (red) – the hydro balance – closely correlates with the marginal price for short-term power generation (yellow)



The long-term forecast of accumulated inflow to reservoirs for December 2014 to April 2015, showing how the forecast has changed since Thomson Reuters started to forecast it in November 2014.

the majority of the country's electricity is generated under long-term contracts based on annual auctions for public and private companies.

The remainder – somewhere around 25%–30% of the country's needs – are traded weekly in advance. Brazil's 67 distribution companies – approximately 60% of which are in the private sector – shop for the best prices from the power generators. A weekly reference price for the week ahead – the PLD – is published by the CCEE.

At first, the prices on the short-term market were only slightly higher than those of the long-term contracts. Then drought returned – and the weaknesses of the system have become apparent.

Hydrogeneration has fallen year on year (16.9% in the 12 months to September 2014, according to the CCEE), and Brazil has heavily increased its imports of LNG and, according to Platts, Brazil increased its annual import of LNG by almost one-third in 2014 to a record 13.5 million cubic metres. Arrangements are in place to import electricity from Uruguay and Argentina later in the year.

The effect on short-term prices has been dramatic. Last year, the government had to cap the PLD at 822.83 reais per megawatt hour (MWh); it has reintroduced a cap this year, currently at 388.48 reais per MWh. This compares to prices of about 130 reais per MWh for annual hydro contracts.

So who pays the difference? Brazilian consumers – homes and businesses. Prices have risen about 30% since January alone. Measures to encourage reduced consumption (with lower prices per unit) and to penalise those who maintain or increase their previous usage rates (higher costs per unit) have been heavily promoted on Brazilian television.

Painful consequences

In a once-flourishing economy that has begun to wilt, there is a more lasting consequence. Reduced consumption is not an option for some businesses. And the increase in costs has had some high-profile casualties.

One of the most obvious has been the closure of the Alcoa/BHP Billiton aluminium smelter at Alumar, on

Brazil's northern coast. Attracted by the low energy prices from hydroelectricity (electricity is a major cost in smelting), this foreign investment first went online in 1984 and expanded rapidly. However, by 2013, according to Andy Home, metals columnist for Reuters, it had become one of the costliest production units in Alcoa's portfolio.

Alumar is the fifth and largest smelter in Brazil to be mothballed since 2009. Only two primary smelting units remain. This represents more job losses for the country and a significant downscaling of a profitable industry.

In terms of keeping the infrastructure up to the task, Brazil's policy is working, with more wind-, gas- and solar-generated power being incorporated into the grid. Smaller-scale hydro plants are being encouraged. "These are only contributing small percentages to the aggregated supply but, if they are correctly positioned, they can play a very effective role in meeting demand spikes (as opposed to supply drops)," says Langevin.

Long-term contracts have created greater stability and resilience, and have generated the investment that is keeping the country broadly on target to being able to meet expected annual increases in demand in excess of 4%.

But, finding better ways of apportioning the costs needs to happen. On one hand, some generators are still smarting from a sudden price reduction imposed by the government in 2013. The share price of Eletrobras plunged at the time, wiping off billions of shareholder value – including government holdings. This was a very negative signal to potential investors. On the other hand, there are very unhappy voices raised against the profits that some companies have made from the short-term market this year.

The country has yet to solve the problem of who pays and when, despite the increased investment. It has yet to balance the needs of those who invest with those who consume, but it has a record of progress. What it needs now is more transparency in price formation.

So Brazil's journey towards generating power consistently and at an acceptable price is not complete, but it is under way.