




- SUBSCRIBE**
- GIVE A GIFT**
- LOG IN** TO ACCESS THE DIGITAL ISSUE
- SIGN UP** FOR AQ UPDATES



ENTER ZIP COD 

SEARCH OUR SITE 

- [Subscribe](#)
- [About](#)
- [Blog](#)
- [News](#)
- [Contact](#)
- [Advertise](#)
- [Archive](#)
- [Partners](#)

ARCHIVE

From issue: **Energy in the Americas** (Summer 2013)

■ AQ FEATURE

Is Brazil the Energy Power of the Future (and always will be)?

BY [Claire Casey](#)

Waiting for the government to send the right signals.

Read sidebars on [wind](#), [solar](#) and [geothermal](#) energy.

Brazil's *pro-álcool* (pro alcohol) policy, which for decades had sought to substitute gasoline with locally produced sugarcane ethanol—a goal once dismissed as folly—suddenly became a world model. Brazil was hailed as the “Saudi Arabia of biofuels,” and massive investment plans were launched.

That year, my firm, Garten-Rothkopf, published the first major study of global biofuels markets, investment, innovation, and infrastructure. We found that Brazil had the conditions for sustained global competitiveness in this nascent industry, but faced multiple hurdles.

Seven years later, that industry is limping along—short on investment and unable to compete in its own domestic market.

The unfulfilled promise of Brazilian ethanol reflects a broader tension in the country's energy policy, a tension that has plagued Brazil's new energy projects—from the exploitation of its massive *pré-sal* (pre-salt) oil reserves to its rich wind resources—and remains a factor in the development of new shale resources.

Brazil can become a net exporter of energy. The abundance of its domestic energy resource wealth, both renewable and fossil, is extraordinary. Yet today, the Brazilian government faces energy supply challenges in both fuels and power, as it struggles with stagnant economic growth and a mix of energy policies that can only be called unsustainable.

Biofuels

In 2006, one of the remarkable (and, from an investor perspective, attractive) elements of Brazil's booming ethanol industry was its private-sector-driven growth. At the same time that the government was seeing biodiesel as a development tool for rural communities, private-sector investment was independently pouring into ethanol development.

The Brazilian government had played a decades-long role in developing the ethanol industry. But by 2006, with the mandated ethanol blend in gasoline established as the baseline, pure ethanol competed with blended gasoline at the pumps, and drivers of flex-fuel vehicles were calculating energy loss on the fly to determine which fuel was cheaper on any given day. (Ethanol has approximately two-thirds the energy content of gasoline.)

At ethanol's peak in 2008, it attracted \$6.8 billion in new investments. By 2009, ethanol represented nearly 50 percent of fuel used by light-duty vehicles (mostly passenger cars). Venture-funded startups were developing new varieties of highly efficient sugarcane, and pipeline projects were put on the table to enable massive exports.

But last year, ethanol made up less than 30 percent of light-duty fuel in Brazil, and new investment only reached \$253 million. Just 2.4 billion liters (.63 billion gallons) in new production are now in development, and the sugar industry is operating at 75 percent of its capacity.

There are external market factors that explain some of this drop. The drying up of investment during the

financial crisis and low replanting rates of sugar cane contributed to the lack of industry growth.

Still, one of the more elegant features of the development of Brazil's cane-derived ethanol sector (compared to U.S. corn-derived ethanol) is the degree of flexibility refiners have to respond to the marketplace. A typical modern mill produces both sugar and ethanol, with the ability to shift production to respond to market prices. But even with slumping global sugar prices and growing fuel demand at home, ethanol now accounts for no more than 50 percent of mill production.

To understand why, one must look to policy. The key factor for ethanol's viability is government management of gasoline prices, which effectively acts as a consumer subsidy. Beyond that policy question, there are a range of decisions required about how to manage an economy to spur growth, bring millions of citizens into the middle class and keep inflation at bay.

Brazilian demand for light-duty vehicle fuel is booming—despite an unimpressive 1 percent economic growth rate last year—partly because the Brazilian government undertook a \$10 billion stimulus in 2012 to shore up the auto industry, which accounts for 25 percent of industrial production. In April 2013, a key tax break was extended another year to guard against a negative impact on sales. Brazil does not prohibit the sale of diesel vehicles, but with flex-fuel vehicles accounting for more than 90 percent of new registrations, demand can be met by either gasoline or ethanol.

And it would be—at least for the next several years—if market pricing were allowed to function. Even in the absence of massive new investment, Brazil's ethanol industry could fill the immediate gap in light-duty fuel supply if ethanol were sold at a reasonable price.



Now unwanted? Ethanol tanks at the Moema sugar cane mill in Orindiuva, Brazil. Photo: Paulo Fridman/Corbis

Like 15 people like this. Be the first of your friends.

Instead, the domestic ethanol industry has been in free fall, while state oil and gas giant Petrobras imported nearly 4 billion liters (1 billion gallons) of gasoline last year, which was sold at a loss.

Tweet 5

32

The government has recognized the problem, as well as the importance of its domestic ethanol industry, and is now seeking to provide some relief. In the first half of this year, the administration of President Dilma Rousseff has reduced payroll and social security taxes for ethanol production to nearly zero; increased the ethanol blend requirement to 25 percent of gasoline sold on the market; increased access to low-cost credit for replanting and other ethanol investments through the state development bank, BNDES; and raised the price of blended gasoline by 6.6 percent to about 15 percent below global market prices.

[Comment on this post](#)

for ethanol production to nearly zero; increased the ethanol blend requirement to 25 percent of gasoline sold on the market; increased access to low-cost credit for replanting and other ethanol investments through the state development bank, BNDES; and raised the price of blended gasoline by 6.6 percent to about 15 percent below global market prices.

Taken together, these policies increase guaranteed demand and effectively offer the industry a five-cent margin for ethanol. This will come at an estimated cost of 970 million *reais* (\$480.95 million), according to the *União da Indústria de Cana-de-Açúcar*, the Brazilian sugarcane industry association.

But what the government has been unwilling to do is offer any certainty or transparency in its gasoline price-setting policy—likely the most important factor in attracting major new investment to the sector. In the near term, we should expect to see an industry on the mend, but long-term growth will depend on whether the government addresses the inefficiencies in its gasoline pricing policy.

Oil

Covering the high cost of subsidized gasoline imports isn't the only factor hitting Petrobras, which, not long ago, was a model for effective public-private energy companies competing in global markets. Ironically, the 2007 *pré-sal* oil discovery that put Brazil on the map as a major oil power was the beginning of a steady decline in Petrobras' share price and reputation.

That might begin to turn around this year, as the country launches its first oil and gas auctions since 2008, opening up vast new blocks of conventional oil, *pré-sal*, and shale gas resources.

For the past five years, the development of Brazil's vast oil reserves has been stalled by three basic issues: how the new wealth generated by these resources would be shared; how the oil discovery could be used as a tool for broader economic growth; and to what degree the country, through Petrobras, would be able to go it alone.

The most contentious domestic issue holding up progress has been a dispute over sharing royalties among Brazil's states. Traditionally, those revenues were enjoyed by the states where production occurred, to compensate for the associated costs and risks. With the discovery of the *pré-sal* reserves in 2007, Brazil faced the question of whether this patrimony ought to be shared more broadly.

Five years later, disbursement of existing royalties is still being battled out in the courts and President Rousseff continues to push for all new revenues to be earmarked for education. A compromise—splitting royalties from new production across all states—has allowed this year's auction rounds to proceed. But while analysts have called the turmoil around royalty sharing a symptom of how deeply politicized the country's energy regulation has become, there is no indication that it is dampening enthusiasm for the 2013 auctions.

The process has been slow and messy—and is not altogether finished—but sufficient clarity had been reached by May 2013 for Brazil to proceed with the long-delayed 11th-round auction, now deemed a major success. The auction raised a record 2.82 billion *reais* (\$1.4 billion) and secured commitments for an additional 7 billion *reais* (\$3.5 billion) in investment.

Notably, winning bids in May were dominated by international oil and gas majors, with Petrobras taking a supporting role—a possible sign that the company, under the leadership of CEO Maria das Graça Silva Foster, is moving into a decidedly more independent stance.

Foster has been quoted as saying that “Petrobras does not see developing the country as its core business.” Unfortunately, many in the government do.

Petrobras’ aggressive, go-it-alone investment strategy over the past several years, coupled with technical hurdles and delays, has left it the world’s most indebted publicly traded oil company. And while it is selling off peripheral assets and taking a back seat in the first auction, Petrobras is required to be the sole operator of any deep offshore development under the 2010 concession law that will govern the *pré-sal* reserves.

Beyond the company’s capacity to undertake such a massive drilling program alone, which is questionable, Petrobras will continue to be burdened with the same requirements now causing significant delays and cost overruns in the company’s existing *pré-sal* program: strict local content requirements.

Intended to help build supporting industries and generate local employment, Brazil’s local content requirements are among the most stringent in the world. The mandate to source ships and platforms on the local market has pushed costs up and led to significant delays over the past several years. Credit Suisse has estimated that the cost of building a mid-range tanker in Brazil is nearly twice as much as in China.

Local industries are expanding their ability to serve the market. But potential activity in the sector after five auction rounds this year will dramatically increase demand—far beyond the capacity of the local outfits.

Petrobras has recognized the need for greater flexibility, requesting in March that the government ease local content requirements on a range of goods. The rules haven’t deterred interest in developing Brazil’s vast new resources, but they still pose a significant hurdle to realizing the promise of these new blocks in a timely and cost-efficient manner, and to reducing the country’s dependence on imports.

Electricity

Brazil’s power sector faces even greater challenges. Even with the sluggish 1 percent economic growth last year and no signs of a takeoff on the horizon, extended drought conditions have left Brazil’s hydroelectric power-dominated energy sector unable to keep up with demand.

Natural gas plants, primarily powered by supplies from Bolivia and liquefied natural gas (LNG) imports, have been filling the gap. With Bolivian imports at pipeline capacity, Petrobras has dramatically increased the share of LNG imports since January 2012 to keep the lights on and the factories running in Brazil.

Those imports reportedly hit prices as high as \$18 per million Btu. To put that in perspective, Bolivian gas comes into the country at \$10 per million Btu, the spot price of gas at Henry Hub in the U.S. currently trades at little more than \$4 per million Btu, and Russian exports to Europe—generally considered by analysts to be criminally expensive—are still just about \$11.5 per million Btu.

And that’s in a down economy. The Empresa de Pesquisa Energética, Brazil’s Energy Research Corporation, has estimated that generating capacity will need to grow by 56 percent in the next decade to keep up with demand and not stifle economic growth.

Some of that will be met by three new major hydroelectric dams—Belo Monte, Santo Antonio and Jirau—

in the next few years. But further expansion of hydropower is limited, and the impact of climate change on long-term generating capacity is not well understood. Nuclear and co-generating biomass can also make a contribution, but the greatest new growth could come from wind and unconventional gas resources.

Wind

Brazil is the second-fastest-growing wind market in the world, driven by resources in the country's arid northeast, government auctions and preferential financing from BNDES. In 2012, Brazil's installed capacity nearly doubled from 1429 MW to 2508 MW. But the rapid growth masks unsustainable policies that mirror the inefficiencies and ideologically driven policymaking that has plagued the development of oil reserves.

To start with inefficiencies, one need only consider the term "installed capacity," which belies the reality of wind generation. Only 15 percent of the 1.8GW of capacity auctioned in 2009 has come online on schedule. Thirty-five percent is in place—and thus qualifies as "installed capacity"—but is not delivering power because the Companhia Hidro-Elétrica do São Francisco (CHESF), a subsidiary of Brazilian state power company Eletrobras, has not established the necessary transmission. The resolution? New projects will be responsible for their own transmission connection, which is expected to drive up the overall cost by approximately 10 percent.

Which brings us from inefficiencies to industrial policy. The Brazilian government has sought to leverage the development of the country's wind resources to deliver broader economic growth and job creation through domestic content requirements.

This past January, these requirements were made more stringent: for new projects, three of the four major components must now be assembled or manufactured in Brazil.

This has, as the government intended, been a boon to manufacturing associated with the wind industry, which will have to grow further if companies intend to meet the new requirements. Brazil could soon have manufacturing capacity 2.5 times the local market demand in a global marketplace that is already oversupplied.

But given labor costs and the overall costs of doing business, Brazilian wind manufacturing will struggle to compete. A number of companies have already indicated they plan to exit the Brazilian market due to the new requirements, which could further reduce competition.

Natural Gas

Brazilian shale hasn't garnered the sort of breathless coverage that the reserves of its southern neighbor has, but this could change in 2013. As development of Argentina's promising Vaca Muerte field is held up by political risk, attention may shift to Brazil's first unconventional gas auction, scheduled for the fourth quarter of this year. And while significant hurdles stand in the way of commercial shale gas production, there are just as significant drivers that could push Brazil out ahead of its competitors in global shale gas development.

In 2011, the U.S. Energy Information Administration (EIA) published its first assessment of global shale reserves. Argentina ranked third in the world, behind China and the United States. Brazil was a distant tenth.

Since then, however, Brazil's *Agência Nacional do Petróleo* (National Energy Agency—ANP) has

undertaken its own estimates of its unconventional gas wealth and come to a far different conclusion. The true scale of the reserves may only be understood after more exploration, as the EIA's estimates captured only one of the five viable basins. (Others, deep in the Amazon, will not be opened for development.) Accounting for the other four basins, Brazil could be home to the fifth-largest shale gas reserves in the world.

Demand is certainly there, but Brazilian shale gas might still not be viable. The challenges make Brazil an important test case for shale development globally.

The pessimistic (and arguably realistic) view is that the factors that enabled shale to develop in the U.S. simply don't exist elsewhere. Beyond demand, these include an abundance of small and midsize independent exploration and production companies, easy access to land and capital, a mature and transparent gas market, and a range of tax benefits. Brazil could test how much these factors are still relevant now that unconventional gas technology and know-how have matured, and demonstrate whether there are alternative paths to shale development.

In the U.S., the coincidence of land and mineral rights gives landowners a direct financial incentive to allow oil and gas companies to drill. In Brazil, the Federal Union is the sole owner of all mineral resources before extraction, but the concessionaire must enter into an agreement with the landowner and set aside between 0.5 percent and 1 percent of the value of their production in royalties. If an agreement cannot be reached, the ANP intervenes and sets binding terms.

While the specific rules of the upcoming shale auction have yet to be released, the overriding structure partially addresses the issue of mismatched incentives and could provide an alternative regulatory model for shale development.

But what about the market itself? Can shale be developed by large companies alone, which have traditionally dominated energy production in Brazil?

Small independent producers are responsible for the shale revolution in the United States. Their lower overhead costs and greater agility allowed for the trial and error that produced the breakthrough of marrying horizontal drilling with hydraulic fracturing, which, in turn, fueled the rapid expansion of the industry.

The Brazilian government has recognized the importance of independents in tapping lower-return assets such as marginal and mature wells, and is designing this year's energy auctions accordingly. However, with shale we'll likely see whether the accumulation of know-how by energy majors—including new models for production that drive efficiencies through what can be best described as a manufacturing approach—can deliver rapid resource development. For now, Petrobras has indicated it is not focused on shale gas production, leaving the field open for these international players.

Of greater interest will be whether the ANP provides any guidance on handling the environmental issues associated with hydraulic fracturing, which have been so controversial in some U.S. states.

Will companies be held criminally responsible for accidents, as in the case against Chevron's oil operation (which was recently dismissed)? Will regulations dramatically slow and drive up the cost of production, as is the case in the country's massive hydro projects? As yet, there is no clarity on how environmental permitting and regulation of hydraulic fracturing will be managed, and it could be the wild card in the development of Brazil's unconventional gas.

It's hard to imagine a future for the Brazilian power sector that does not include a significant increase in its

reliance on natural gas. The uncertainty revolves around the questions of how much and how quickly domestic production of shale gas can come online with a state-centric model, with parcels meted out by auction to major companies and predefined terms to landowners, rather than through the exuberant rush of independents that made U.S. unconventional gas a reality.

Turning the Corner

It's easy to lambast the Brazilian government for embracing economic philosophies that have long been discredited for creating uncompetitive domestic industries. Before doing so, however, it would be wise to examine the free-for-all in the Gulf of Guinea, off the west coast of Africa. In recent years, massive oil discoveries have rapidly come on line as regulatory regimes struggle to keep up. At the same time, little of the new wealth has contributed to the development prospects or the lives of the citizens in the eight oil states bordering the Gulf.

Brazil should more accurately be considered a testing ground for the responsible management of new resources in a manner that assists broader national development. Not all of its policies point in the same hopeful direction. Higher domestic content requirements in the wind industry are a perfect example of not learning from past mistakes. Still, the government is showing a willingness to adapt that is critical to achieving the full promise of its abundant resource wealth.

To read more from *Americas Quarterly*, [sign up for a free trial](#) issue of the print magazine. No risk, no commitment.

1 Comment

Americas Quarterly

 Login ▾

Sort by Best ▾

Share  Favorite 



Join the discussion...



itaia • 4 months ago

Brazil can solve all its energy issues - IF - it mobilizes the national cohesion against the thousands of NGOs from the U.S., Britain and Germany - which subvert against ALL national development in Brazil (and South America in general) Brazil needs to follow the lead of India, which in 2013 prohibited that 4,141 NGOs of the U.S., Britain, Germany, France - which are active in India, can receive further "funds from outside India". Reason: "Diversion of funds against the national interests of India". (Mostly energy projects!) One German "Green" agent was arrested and deported. An intelligence analysis of ABIN (Brazil's domestic intelligence agency. Brazil has no "foreign intelligence" capacity). appeared "leaked" in the national press in 2011, with the names and sources of financing of the most hectic U.S. and British NGOs active against the Belo Monte hydro-electric project. (Search as "CONVERSA AFIADA ABIN ONGS"). Although the document did not mention individual "names" - when one searches for the names of the "sponsors" and the "board of directors" - appear the names of the "backroom" foundations consisting of personalities related U.S. financial institutions

and corporations.

^ | v • Reply • Share ›

ALSO ON AMERICAS QUARTERLY

WHAT'S THIS?

Cuba: Wait, Wait, Let Me Guess What Comes Next

2 comments • 2 months ago

Nick — When you mention that Bush tightened the embargo, you note that the Cuban government ...

Gasping for a Solution to Bogotá's Air Pollution Problem

12 comments • 11 days ago

Gabriela OI — It looks like a good chance to reduce the emissions and to improve the quality of the air ...

Sports: A Tool for Development

1 comment • 2 months ago

Elena Selivan — Great article. Although I live in US, this is such an important discussion here as well. ...

A Tale of Two Cities: Curitiba

1 comment • 2 months ago

Helen Spiegelman — What is the date of this article?

 [Subscribe](#)

 [Add Disqus to your site](#)



SUBSCRIBE TO AQ
1-Year Print, Digital, and New App Subscription for only \$20.95
Save 30%!

Connect with AQ




Venezuela in Depth

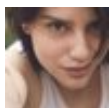
View AQ Online's special in-depth page for updates on the crisis in Venezuela.

» **Read more.**

Sustainable Cities


The Atlantic Cities @AtlanticCities 5m
 How can so many demonstrations accomplish so little? @MoisesNaim asks bit.ly/1oHyS7T
[Show Summary](#)


Next City @NextCityOrg 13m
 “Why are we going to make sacrifices and why does Twitter need a tax break?” bit.ly/1gBop3O
[Show Summary](#)


Sambuka @samnbk 20m
 ☹️👉
 Retweeted by Bernardo Farill
[Expand](#)


Ciudades Sostenibles @CID_Ciudades 15m
 M... .. " " " "

WEB EXCLUSIVES

- [Can Venezuela's Economic Strategy Keep Protests From Spreading?](#)

March 24, 2014

by [Thomas O'Donnell](#)



Thanks to Chinese and Russian loans, Venezuela's new Sicad 2 foreign exchange system may mitigate shortages, but will it keep protests from spreading?

- [Venezuela's Escalating Protests, Violence and Political Instability: The Legacy of Chávez](#)

March 7, 2014

by [Mariana Rodríguez](#) and [Jonathan Hiskey](#)



Data from the Latin American Public Opinion Project show that political instability in Venezuela was a likely outcome after Chávez' death.

[MORE WEB EXCLUSIVES »](#)



[Read our new series of first-person articles.](#)

Most Popular

MOST POPULAR ON AQ ONLINE

Most Viewed

Past: **1 day** [1 week](#) [1 month](#) [1 year](#)

Monday Memo: Costa Rican Elections – U.S. Deportations – Venezuela-Spain Spat – FIFA Delays (180 times)

Brazil's Long To-Do List (169 times)

Colombian Oil: Scraping the Bottom of the Barrel (158 times)

Business Innovator: Lendo, United States and Colombia (157 times)

Challenges facing Hillary Clinton for President (116 times)

[AQ Course Packets: Now Available for Your Classroom!](#)



[Browse our catalogue.](#)

NOW ON AS/COA ONLINE

[Press Release - Unity of Nature: Alexander Von Humboldt and the Americas](#)

11 hours ago

Guest Curators Georgia de Havenon and Alicia Lubowski-Jahn Press Preview and Reception: Tuesday, April 29, 5:00 p.m. New York, ...

[Por qué los precandidatos presidenciales apuestan a Estados Unidos](#)

by Julieta Nassau and Mauricio Caminos - Apr 04, 2014

Los casi 8500 kilómetros que separan Buenos Aires con Nueva York parecen ser insignificantes para los políticos argentinos, ...

[Weekly Roundup: Chile's Earthquake, LatAm's Mega-Cities, Cuban Twitter](#)

Apr 04, 2014

Amid Protests, Maduro Seeks Support from International Community As protests continued this week, Venezuelan President Nicolás ...



AQ MEDIA PARTNER

FINANCIAL TIMES

World

[Picture site Imgur raises funds to expand](#)

Apr 03, 2014

Andreessen Horowitz and community news

platform Reddit are investing \$40m for a minority stake in the five-year-old ...

Companies

[BoE to support lending for exporters](#)

7 hours ago

Chancellor George Osborne believes the central bank's support could cut the cost of private sector export finance loans by 5 to ...