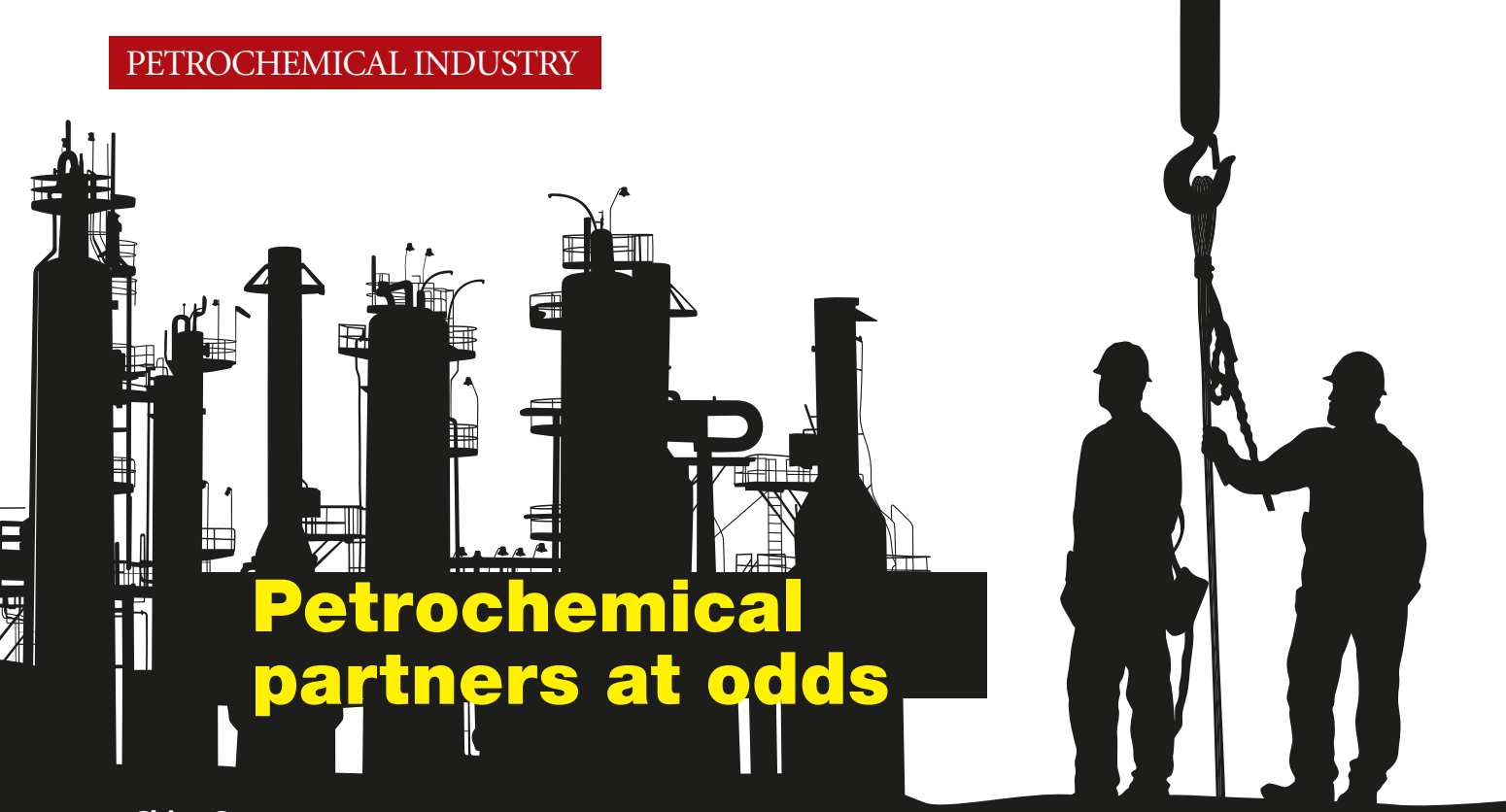


Petrochemical partners at odds

Chico Santos

TOGETHER THE EXPLOITATION of large shale gas reserves in the United States, and the fall in international oil prices have brought the Brazilian petrochemical industry to its knees. In the late 1990s when the sector was successfully privatized, this would have seemed improbable.

Abundant U.S. gas, sold at much lower prices than the naphtha that feeds the main petrochemical complexes in Brazil, has frozen investments here and toppled grandiose projects like the Petrochemical Complex of Rio de Janeiro (Comperj), which today is just a traditional oil refinery. As a result, the interests of the private Odebrecht Group and the state-oil company Petrobras, the leading supplier of raw materials (naphtha and natural gas), have diverged, and the two partners in Braskem company are now in conflict. Since Braskem purchased Quattor in January 2010, creating a petrochemical company that could compete globally, Braskem has become almost the sole Brazilian producer of raw petrochemicals. According to the 2014 Braskem annual report, Odebrecht has 50.11% of the voting capital, Petrobras has 47.03%, and other private shareholders have 2.86%.

Today Braskem and Petrobras are arguing about the long-term price of naphtha, which is used in three of the four Braskem ethylene plants. Ethylene is the basis for such thermoplastic resins as polyethylene and polypropylene. Currently, Petrobras sells naphtha to Braskem based on a formula that is in turn based on prices in the European market, which is usually more expensive.

Braskem wants a more flexible pricing formula that takes into account other markets, such as the U.S., to float the naphtha price in a wider range than it contracted with Petrobras

for in 2009, which is 92.5% to 105% of the ARA (Amsterdam-Rotterdam-Antwerp) price. In February 2014, realizing that it would be more profitable to use its naphtha to produce its own gasoline, Petrobras applied an exit clause in the contract and has since supplied naphtha based on addendums to the original contract without a long-term solution. The current addendum was just signed on October 31st.

Without a long-term formula for pricing naphtha, investments in the sector are highly unlikely. Armando Guedes Coelho, former Petrobras CEO and now president of the Business Council of Energy of the Federation of Industries of Rio de Janeiro State (Firjan), thinks one solution could be vertical integration of the petrochemical industry as is occurring in the fertilizer sector, with Petrobras building plants to manufacture nitrogen from raw materials it produces itself.

If that should happen, either Braskem would have to become a producer of oil and naphtha —which would be hugely expensive and take considerable time—or Petrobras would take control of Braskem—which Coelho also realizes is implausible for strategic and political reasons.

For nearly two years various parties have been seeking an economic and political arrangement to ensure the supply of naphtha to the petrochemical market. The current working group—which has representatives from Braskem, Petrobras, the ministries of Mines and Energy, Finance, and Development, other federal agencies, and the state governments involved, especially Bahia and Rio Grande do Sul—has been looking for a solution that satisfies Petrobras but does not risk disrupting petrochemical projects.

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Possible alternatives?

Since the 1970s naphtha-petrochemical plants have made sense for Brazil; at that time, Europe and Japan, among others, depended on imported oil and produced no natural gas. Moreover, naphtha is richer than gas, so it can be used to make more petrochemicals, such as ethylene, propylene, benzene, toluene, and xylenes; gas basically produces only ethylene. Coelho says, however, that cracking of petroleum in refineries could produce plenty of benzene, toluene, and xylene, which would justify future investments in gas-petrochemical plants.

The only Brazilian gas-petrochemical plant is Rio Polymers (Riopol), originally a joint venture of Petrobras and the National Development Bank (BNDES) but now part of Braskem. It took nearly two decades to build the Riopol plant, which started operations in 2005. Coelho says that it is more competitive than other naphtha-based plants in Bahia,

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São Paulo, and Rio Grande do Sul, because the Riopol gas price is referenced at Mont Belvieu, Texas—the pricing point for North American LNG [liquid natural gas] markets. As a result, Braskem is considering expanding the Riopol plant.

Another Petrobras initiative, Comperj (the Petrochemical Complex of Rio de Janeiro), has not been as successful as Riopol. According to Coelho, Comperj had its origin late in the 1980s in research by Petrobras and partners Ultra group and the Dutch Akzo Nobel in the Carioca Factory of Catalysts (FCC) on producing catalysts for cracking hydrocarbon molecules to produce such refined oil products as gasoline. FCC research suggested that it could be highly advantageous to produce petrochemicals by directly cracking heavy oil from the Campos Basin, Rio de Janeiro without having first to produce naphtha. Petrobras embraced the idea and, although Ultra withdrew, decided to start with an estimated investment of US$8.4 billion, the largest the company had ever made in a single project. The technology was absolutely new, Coelho said; the expectation was that if the project was successful the technology could be later sold to naphtha-dependent European petrochemical plants. However, when the Comperj project was still on the drawing

Braskem's production of petrochemicals fell by 8.5% in 2014.

(metric tons)

Products	2012	2013	2014
Ethylene	3,329,758	3,372,825	3,237,886
Propylene	1,472,488	1,505,595	1,306,636
Butadieno	355,703	389,854	374,827
BTX*	1,246,517	1,217,831	1,013,837
Total	6,404,466	6,486,105	5,933,222

Source: Braskem.
*** Benzene, toluene, para-xylene and ortho-xylene.**

board, light oil of high quality (the lighter the oil, the more associated gas) was discovered along the Brazilian coast. The priority then became to industrialize deep sea oil and gas, changing the purpose of the Comperj project.

Another blow to Comperj was the U.S. launch of large-scale shale-gas production. This caused the Henry Hub natural gas spot price, main reference for U.S. gas prices, to plunge from US$12.69 per million BTUs (units of thermal energy) in June 2008 to US$2.77 in August 2015. With American gas so cheap, Braskem began to press Petrobras to define the benchmark price for deep-sea gas to be supplied to Comperj. Getting no response, Braskem abandoned the Comperj project and Petrobras decided to turn it into a conventional oil refinery. The petrochemical project was put on hold indefinitely. Meanwhile, Comperj construction costs exploded to US$13 billion. To minimize the losses Petrobras is now struggling to get the refinery operating as fast as possible.

New U.S. projects

Meanwhile, in the U.S. the petrochemical industry is expanding rapidly. According to the MaxiQuim consultancy, by 2018 eight more petrochemical plants will be operating, with annual capacity of 9.03 million metric tons of ethylene production —well over twice Brazil's current capacity of 3.95 million tons. However, the steep drop in oil prices since last year is already causing several projects to be reassessed, according to Solange Stumpf, MaxiQuim director.

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Nevertheless, Braskem continues to expand its activities in the U.S. Braskem confirmed that the ethylene plant with an annual capacity of 1 million tons a year that it is operating in partnership with Mexico's Idesa in the Mexican state of Veracruz will start producing in 2016—at which time Braskem's U.S. production will shoot up to over 10 million tons a year within three years. To remain competitive in the international market, since 2010 Braskem has acquired two U.S. polypropylene plants from Sunoco Chemicals and five other polypropylene plants from Dow, three in the U.S. and two in Germany.

As the domestic resin market in Brazil shrank 15% in the first quarter to 1.2 million tons of polyethylene, polypropylene, and PVC, of which Braskem sold 792,000 tons, the company has compensated by increasing its exports by 53%, to a total of 373,000 tons.

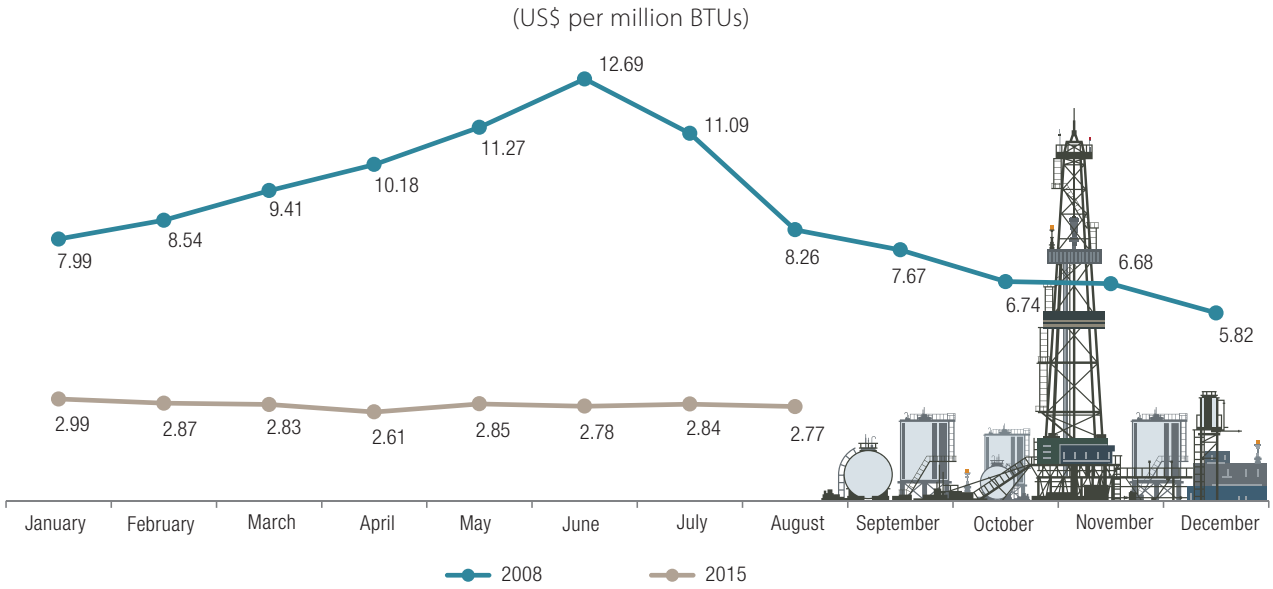
"The petrochemical industry depends on two factors: internationally competitive raw materials and energy. Without both, investment [in Brazil] does not grow."

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At home, Braskem has a new joint project in Camaçari with multinationals Styrolution and Ineono to build an ABS plant (this is a high-strength plastic used in vehicles and home appliances), an investment of US$250 million. ABS plastic is not currently produced in Brazil. However—coming full circle—continuing the project depends on Braskem finding a solution to the standoff with Petrobras about the price of naphtha.

"The petrochemical industry depends on two factors: internationally competitive raw materials and energy. Without both, investment [in Brazil] will never grow," said Fernando Figueiredo, chief executive of the Brazilian Chemical Industry Association. According to Figueiredo, in the last 20 years domestic demand for petrochemicals grew by an average of 25% above gross domestic product (GDP) and, with little domestic production, in the last 10 years imports went up from 10% of domestic consumption to 35%. "Our companies have made the right decision to grow overseas," he said. With ample oil and gas reserves, Figueiredo believes the Brazilian petrochemical industry has "a bright future" once its current problems are resolved—and if

Gas prices in the U.S. market fell significantly between 2008 and 2015 because of the abundant supply of shale gas.



Source: Henry Hub Gas Spot Price.

the companies also do their part by increasing investment in research and development (R & D), which today is just 0.7% of GDP. The international average is 1.5%.

Solange Stumpf believes that not only must the industry deal with the problems that affect all Brazilian industry, such as high taxes, poor logistics, and the high cost of electricity, "the petrochemical industry has its own specific problems. The most critical is its high dependence on a single raw material, naphtha …, which makes the petrochemical industry more vulnerable and therefore unattractive for investment." She adds that Brazil has "a robust domestic market [for petrochemicals] and great growth potential in the long term," and finds it unfortunate that there is no industrial policy to encourage better conditions to make the industry more competitive. Stumpf says that the government needs a strategy to encourage the sector to add value to the new supply of oil from deep-sea oil. She also said that "the relationship of naphtha with other oil products, especially gasoline, affects both the supply and price of naphtha," and that "the absence of a long-term public policy makes the petrochemical sector extremely vulnerable to political influences, since Petrobras controls the supply of oil products."

BNDES petrochemical support program

Recognizing virtual stagnation in the petrochemical industry, the BNDES "has changed focus to support production of chemicals of higher added value that do not depend so much on raw material," said Gabriel Gomes, head of the BNDES chemical industry department.

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The change of direction is the result of a "Study of Potential Diversification of the Brazilian Chemical Industry" commissioned by BNDES and conducted by consultants Bain Company and GasEnergy. Based on the findings, the BNDES, in partnership with the Financing Agency for Studies and Projects (FINEP) drafted a stimulus policy that is scheduled to go into operation this October that is directed to six products: additives to animal feed, silicon derivatives, carbon fibers and composite products for oil exploration and production, personal hygiene products, perfumery and cosmetics, and chemicals from renewable raw materials.

The study looked at 60 sectors and identified 20 as having the most potential. Among them are many related to petrochemicals that may be the object of future BNDES stimulus policies, such as products from butadiene and isoprene, which are used in the tire industry, and polyurethane derivatives. As Gomes summed up the new direction: "The focus of BNDES is to stimulate new fronts to strengthen demand for petrochemical industry products."