

GLOBAL BUSINESS REPORTS



LATIN AMERICA PETROCHEMICALS AND CHEMICALS 2019 RE-RELEASE EDITION

Latin America: **Overcoming Economic Uncertainty**

Middle class expansion continues to offer opportunity for the petrochemicals industry in a region that is home to more than 600 million people

Election years rarely see a boost to economic and industrial growth anywhere, and last year Latin America held presidential polls in its two largest economies, Brazil and Mexico. In Brazil, recent growth rates have not been enough to undo the damage of the recession, with just 1% GDP growth in 2017 and an estimated 1.4% in 2018 (estimations by the International Monetary Fund and Brazil's Central Bank, respectively).

Meanwhile, in Mexico, López Obrador's landslide victory sparked base of approximately 600 million people who are trying to improve fears that the new government could introduce bumps on the country's road to energy reform initiated by the preceding Peña Nieto administration. Adding to the political uncertainty, Mexico had to deal with the renegotiation of the free trade agreement with the United States and Canada, which finally resulted in the new in a significant amount of areas, is not being added, and therefore USMCA agreement.

While Mexico's economy has recorded positive growth since 2010, Eramo added that the region has natural resources available, and expansion levels have plateaued and are expected to be in the 2% to 2.2% range in 2018 and 2019. In comparison, the IMF expects

the world's economy to expand by 3.5% in 2019, according to estimates released in January 2019. This is down from a previous IMF projection of 3.7% growth; the negative effects of the China-U.S. trade tariff war, among other factors, explained the revision.

Looking at Latin America in particular, the overall feeling is that the region could actually perform better if governments were more willing to promote investment: "When you have a large consumer their standard of living, you have the opportunity to create the products that they consume every day," related Mark Eramo, vicepresident for Oil Markets, Midstream, Downstream and Chemicals at market intelligence firm IHS Markit. "The problem is that capacity, the region is still a major net importer."

what is missing is the implementation of the right policies: "From an energy and chemicals perspective, the best prospects are in



Image courtesy of Braskem Idesa

Mexico, Brazil and Argentina. It will come down to government decisions to put policies in place that support or attract foreign investment, as well as stimulate incountry investment," he concluded.

GLOBAL DYNAMICS

By disrupting the previous trade scenario. the disputes over tariffs between the United States and China have also shaken the dynamics of global petrochemical product flows. Stefan Lepecki, CEO of Braskem Idesa, a large polyethylene producer based in Mexico, said that the United States is no longer a big exporter of polyethylene to China as used to be the case, and that, furthermore, the United States is bringing significant new capacity to the market: "All of this is creating new dynamics in trade flows, with an excess of polyethylene inventories here in the [Latin American] region, which is a challenge in the short term. Having said that, the long-term fundamentals are very positive, because global demand for plastics continues to be very strong," Lepecki said.

The shale revolution in North America and the ongoing wave of investments in new petrochemical capacity is poised to compete with any potential new capacity in Latin America in the upcoming years. While development of Brazil's pre-salt hydrocarbons and Argentina's Vaca Muerta is already in motion, it will probably take a few years and substantial increase in demand in the region to have new, sizeable greenfield projects of petrochemical plants in Latin America.

"Latin America represents the shortest distance to market for North American exports," highlighted Eramo of IHS Markit. "Trade flows have been and will continue to be sound as there is ample product in the north and a need in the south. There are, however, pockets of production within Latin America, which can compete within their domestic market."

The most recent flagship investment in the region was indeed the US\$5.2 billion plant by Braskem Idesa in Mexico. Inaugurated in 2016, the operation has been able to perform well despite the feedstock limitations in the country created by Pemex's output decline: "Before Braskem Idesa, 70% of

the polyethylene consumed in Mexico was imported from the United States, and only 30% was produced locally. We managed to stabilize that by replacing some imports and also doing some exports," affirmed Lepecki of Braskem Idesa.

A PUSH FOR NATIONAL CHAMPIONS?

The trend toward the electrification of transport and the gradual phasing out of internal combustion engines has farreaching implications for many industries. In mining, this is pushing long-term demand for copper and other metals, for example. Throughout the hydrocarbons value chain, we could also see significant changes over the next couple of decades, especially in the downstream segment. Eramo of IHS Markit presented the following scenario: "There seems to a consensus that the rate of demand growth of refined products, such as gasoline and diesel, will decline as we progress through the 2020s. By 2030, the incremental growth of refined product demand will begin to flatten out and we will start seeing declines."

As a result of this, refiners may start to redeploy their assets to base chemicals, and that will affect the volumes that the refinery industry can bring to the market each year, explained Eramo. "In my opinion, crude oil to chemical integration is going to happen, but there are only a few large players globally that will be able to compete in this arena from a capital standpoint." Those few large players in the world are companies that can benefit from the synergies created by vertical integration and economies of scale. Federico Veller, executive manager for chemicals at Argentina's state-controlled YPF the country's largest energy company. anticipated that "the petrochemicals industry is the sector that will drive hydrocarbons consumption over the next vears."

"Large oil companies forecast flattened fuel demand, and this is why focus is increasingly placed on the petrochemicals business. Those companies that are vertically integrated, with feedstock production all the way to the downstream business, will be the most competitive ones," concluded Veller.•



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Latin America Petrochemicals and Chemicals 2019 **Pre-Release**

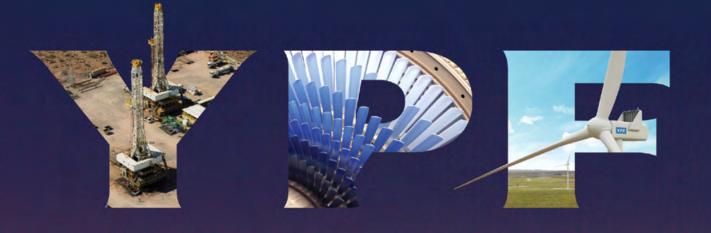
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LEADING ARGENTINA'S ENERGY YESTERDAY, TODAY AND TOMORROW.



One Region, Many Countries

Each of Latin America's national markets presents its own particularities

It is often said that companies should 'think global and act local.' For large chemical producers and distributors involved in crossborder flows globally, this is particularly true. Strategies and policies that serve the purpose in one market cannot simply be replicated elsewhere, as trends in demand, regulatory frameworks and overall uncertainty over legal and business environments force companies to adapt.

In this dynamic context, the Latin American Petrochemical and Petrocuyo's installed capacity is around 300,000 tonnes per year Chemical Association (APLA) will host its 39th annual meeting later this year in Buenos Aires. Executive manager of chemicals for YPF Federico Veller, who will chair the meeting, explained that industry growth through new projects, competitiveness and sustainability will be some of the key themes during the meeting. Delegates will also discuss the particular situation in the region's key markets; the following is a briefing on some of the latest developments in each of them.

ARGENTINA

2018 could be easily described as a roller coaster for several of Argentina's industrial segments, due to the devaluation of the peso and the back and forth over the fiscal regime on exports. Indeed, the local currency lost half of its value against the American dollar between April and September 2018. It was not a smooth process, but rather two strong devaluation 'earthquakes.' By the end of the year the government had managed to tighten the leash on exchange rates, but data on industrial output revealed the effects of instability, with an accumulated 5% decrease year-on-year and a worrying 14.7% contraction in December 2018 alone.

"Unfortunately, in Argentina, you need to dedicate all your efforts to the day-to-day situation," lamented Enrique Flaiban, general

"Argentina does not have the scale to be competitive if compared to foreign players. Argentina's polypropylene market is 330,000 *mt/y, while the United States is adding 3* million mt/y with their investments, Brazil has installed capacity of 1.8 million mt/y, Colombia has capacity for 450,000 mt/y, and Arab *countries have enormous* capacity as well."

-Enrique Flaiban, General Manager, Petrocuyo

manager of Petrocuyo, the polypropylene producer that resulted from the merger between Petroquímica Cuyo and Petroken. "Over the second half of 2018, volumes decreased by 30% virtually across the board. Financially speaking, you could lose all your previous work in one day, like when the U.S. dollar went down from 28 pesos to 42 pesos in a matter of hours. When you source your feedstock in dollars and all your billable is in pesos, the devaluation can cause a mess."

(mt/y) in two plants: Luján de Cuyo and Ensenada.

The Macri administration tried to open up Argentina's market to the world, and this meant the arrival of more imported product. Argentinean producers were forced to look for markets outside, in a move that a posteriori could be seen as a double-edge sword. "On one hand, this helped us during the devaluation, because 30% of our sales were in dollars," said Flaiban.

On the other, the government suddenly reinstated taxes on exports in what was described an 'emergency measure' to tackle the country's deficit. Taxes on exports had already been applied, controversially, by the previous Kirchner administration, and many industries saw them as a big obstacle to preventing new investment into the country. Flaiban explained some of the numbers Petrocuyo had to deal with, considering all these regulatory changes: "The government initially eliminated the refund for exports, which was equivalent to 4.5% of the FOB value. To compete internationally with companies like Braskem, Essentia and the Arab and Korean players, the margins are really low, so this change by the government put our exports at risk. Moreover, after that, the government reestablished the export tax of three pesos per dollar exported, which had an impact of an additional 7%, so overall these two changes had a 12% impact on our exports. The government argues that this has been offset by the peso devaluation, but we buy our feedstock in dollars. Plus, energy costs and financing costs are much higher in Argentina than elsewhere in the region."

The ever-changing situation forced companies to be extremely flexible and creative to maintain their businesses. From the point of view of international players serving Argentina with foreign product, the situation was not easy either: "2018 was a very challenging year from a macroeconomic perspective, while a couple of years ago we also had significant restrictions on imports," said Emilio Nager, commercial manager of international markets at Braskem Argentina. Nager added that, since the company entered Argentina in 2005, they have seen many different economic periods, but 2018's industrial contraction was not good news for importers. Nager explained: "In 2018 the market has experienced some contraction, but generally, Argentina has a polypropylene deficit that is served through imports. In polyethylene, there is a deficit of low density polyethylene, while there is enough capacity in high density polyethylene, and a production surplus of linear polyethylene."





We create our polypropylene in a conscientious manner that prioritizes the environment. By generating new materials that will be recycled and reused later, we transform waste into resources.



Flaiban of Petrocuyo gave more details about the polypropylene market: "Argentina does not have the scale yet to be very competitive, compared to foreign players. Argentina's polypropylene market is 330,000 mt/y, while the United States is adding 3 million mt/y with their investments, Brazil has installed capacity of 1.8 million mt/y, Colombia has a capacity of 450,000 mt/y and Arab countries have enormous capacity as well – so, if these countries bring product to Argentina, they can cause great disruption." The irony, said Flaiban, is that Argentina's macroeconomic instability also acts as an entry barrier to these foreign players.

Leaving aside the political and macroeconomic stability scenario, there is consensus that Argentina's shale potential at Vaca Muerta can mean transformational developments for the country. "Vaca Muerta can be a game changer, not just to meet the local market demand, but also to change trade flows internationally," said Sergio Marcondes, general manager of Braskem Argentina. "Having said that, this has to be treated as a long-term development.

"The industry faces several issues, starting with the cost of energy and raw materials. In some regions, the cost of energy is three times the price you would pay in the United States. Additionally, logistics are difficult: if you are in the state of Sao Paulo it is cheaper to bring chemicals from China than from Bahia. Adding to all that, bureaucracy incurs significant cost for companies."

-Marina Mattar, **Director Institutional** Relations and Sustainability, Abiguim



Large investments will be required for infrastructure such as new crackers."

As global population increases, there is a need to extend the agricultural frontier to feed every single human being. This results in the need for more fertilizers, and, looking beyond nutrition, growing economies will require more chemical product in general. "The region has a deficit of 5 million mt/y of urea, with room for a 3-times world-scale multiplier," assured Federico Veller of YPF.

one world-scale ethane cracker and the associated polyethylene plants to cover the projected deficit in South America, mainly in Brazil. There is also space for a world-scale polypropylene plant, as our current surplus of propane can justify a new propylene plant to produce the associated polypropylene." YPF currently has an installed chemicals capacity of 2.2 million mt/y between its aromatics, fertilizers and methanol business units. Looking upstream, the company is already seeing encouraging results from Vaca Muerta, and it expects non-conventional hydrocarbons production to represent 70% of its output by 2023, versus 30% in 2018.

"Meanwhile, in plastics, there is space for

BRAZIL

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If Argentina is a roller coaster, Brazil, the region's largest economy, is a heavy truck struggling to move up the hill at a decent pace. Two years of annual growth in the 1% range is certainly not enough to catch up with two years of strong recession (-3.6% in 2015 and -3.5% in 2016, according to data from the IMF). Now, with uncertainty about the presidential election finally gone, the forecast for 2019 is 2.5% growth. This means the economy is getting some traction, but at the same time such growth rate is still insufficient to improve Brazil's high debt-to-GDP ratio - at least if the country maintains its high levels of government spending.

In February 2019, controversial new president Jair Bolsonaro unveiled his proposal for pension reform, which is considered to be the critical element in a wider package of economic measures aimed at improving the state of Brazil's public

finances. However, it remains to be seen if the president will obtain the backing of Congress, since its plan requires a majority of three fifths in the Chamber of Deputies, the lower house (which means at least 308 votes out of 513 deputies) and also three fifths in the Federal Senate.

Brazil's economic recession and the issues related to local competitiveness have taken their toll on Brazil's local chemicals industry, which is today the eighth largest worldwide, as opposed to the sixth largest a few years ago. Sales by the local chemical industry have gone down from US\$150 billion in 2011 to less than US\$120 billion in 2017, explained Marina Mattar, director of Institutional Relations and Sustainability of the Brazilian Chemical Industry Association (Abiguim): "The industry faces several issues, starting with the cost of energy and raw materials. In some regions, the cost of energy is three times the price you would pay in the United States."

"Additionally, logistics are difficult," Mattar continued. "If you are in the state of Sao Paulo it is cheaper to bring chemicals from China than from Bahia. In Brazil, most transportation is done by road, which is very costly. Adding to all that, bureaucracy incurs significant cost for companies."

Mattar added that Brazil now offers great potential for the industry due to the oil and gas resources of the pre-salt fields, yet she said the ball is in the government's court: "We are trying to persuade the government to use this oil and gas for the industry, instead of adopting a model of exporting raw materials and importing finished products," she concluded.

Mark Eramo, vice-president at IHS Markit, agreed that it all comes down to the new Brazilian government to promote industrial development: "One would expect Brazil to leverage the price increase and continue to grow with attracting additional investments. Brazil is showing increased hydrocarbons production and they already have the infrastructure in place with respect to refining and petrochemicals. The challenge is if they can pick up where they left off before the recession and leverage their advantages to continue to grow and develop."

Particularly in the petrochemical and chemical segment, the industry in Brazil and across the whole region is awaiting to see the results of LyondellBasell's potential acquisition of Braskem. "[If the transaction is completed], LyondellBasell will be acquiring market access to the Latin American region and, after the acquisition, they will be a fairly sizeable company, maybe even to a point where in some markets they would have to divest some assets. The acquisition can be

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very positive for the petrochemical industry in Brazil." Eramo said.

MEXICO

In Mexico, industry discussions were dominated last year by the long trade talks with their North American neighbors and speculation over what a potential López Obrador government may look like.

> Evonik has more than thirty major production sites in the United States, Canada and Mexico, as well as numerous offices, labs, warehouses and distribution centers in North America, employing about 5,000 people in the region.

> www.evonik.com







After three years of operations, we have contributed to the strong reduction of polyethylene imports in Mexico and to the *improvement of the* economy of our country

"Before, the United States was a significant *exporter of polyethylene to China, but this* is no longer happening. Moreover, they are introducing new capacity, creating an excess of polyethylene inventories in the Latin American region, which is a challenge in the short term. Having said that, the long term fundamentals are very positive, because global *demand for plastics continues* to be very strong."

-Stefan Lepecki, CEO.

Now, López Obrador ('AMLO') has been sworn in as the country's president, and NAFTA has been updated under its new USMCA name. The clouds over global trade are not gone, however, even though the United States and China might finally come to an agreement to end their tariff dispute during 2019.

The deterioration of the performance by national oil company Pemex in the last years is not only creating woes for the owners of chemical capacity in the country; it is also being seen as a risk to Mexico's economy. In January 2019, rating agency Fitch downgraded Pemex's credit rating, creating concern among government officials. The national oil company currently holds US\$106 billion in international debt - the highest of any state oil company in Latin America according to Reuters – and has to make US\$27 billion in debt payments over the next three years. As a result of this downgrading, the Mexican administration announced it will inject US\$3.9 billion into Pemex. "The Mexican government's focus must be to attract foreign direct investment to help develop the natural resources available in the country, in support of energy and chemical development," affirmed Mark Eramo of IHS Markit. "With the current plans to reduce production and eliminate exports, the indications are that it is going to be difficult to attract that investment," he said. Indeed, AMLO has recently stated that Pemex will not sign new joint ventures with private companies until existing projects yield oil production, raising doubts about future auctions and the overall progress of the energy reform.

For Stefan Lepecki, CEO of Braskem Idesa, Mexico has the same geology as Texas, so the country has an opportunity to take oil and gas production back to healthier levels. Yet, he said no one should expect the energy market to radically change overnight: "The energy reform is not a simple task; it takes time to transform the framework from a 70-year old monopoly to an open market. We are currently in that transition, where Pemex still is the main provider of feedstock for the petrochemical industry. Unfortunately, Pemex's lack of investment has made the reform more difficult.

José Luis Uriegas, CEO of Grupo Idesa, joint venture partner of Braskem in the Etileno XXI plant in Coatzacoalcos, defended the need for both public and private participation to promote industrial development: "The López Obrador administration has announced

they are going to give strong resources to Pemex. Independently of the energy reform, which will take a few years, it is very important that Pemex receives strong support, also on the petrochemical front." Idesa is actually one of the companies participating in the opening of the upstream segment to private players through its stake in Tonalli Energía.

While the initiation of ethane imports by Pemex in 2018 was seen by many as a realization of the company's failure to maintain production levels, industry leaders saluted the move for the sake of maintaining a healthy value chain. Uriegas said: "It is good news that Pemex started importing ethane, because their installed capacity in Morelos and Cangrejera can be put to work with very competitive ethane from the United States. Setting up a bigger terminal to import ethane would be good news both for the private players and for Pemex."

Braskem Idesa Lepecki of Braskem Idesa, one of the companies that saw its output affected by the feedstock scarcity created by Pemex, highlighted that certain regions already have the infrastructure to import natural gas, and that this year an underground marine pipeline will reach the area in the southeast near Etileno XXI. "With that infrastructure in place, we can decide whether to buy natural gas from Pemex or to import from other players."

> This leads to one of Mexico's key advantages, which is its easy connection with the world markets. With dozens of free-trade agreements in place, Mexican companies have a variety of choices to pursue, both in terms of importing and exporting. The country has enhanced its visibility not just as a manufacturing center, but it has also emerged as a global hub for innovation in a diverse range of industries.

> "Mexico has 52 free trade agreements, which gives the country access to between 60% and 70% of global GDP," highlighted Martín Toscano, managing director for Mexico at specialty chemicals company Evonik Industries. Toscano was critical of the new USMCA treaty, which he said was "a lost opportunity to modernize the deal," but he added that there continues to be a great flow of investment into Mexico nonetheless: "We have a unique advantage to continue attracting investment in many industries, not just automotive. We see enormous growth in the Querétaro aerospace hub, as well as great opportunity in the medical devices segment."

> Beyond this important niche of medical devices, where Evonik participates through its high performance polymers and healthcare business lines, overall Evonik benefits from Mexico's diversified manufacturing base, which demands a whole range of products, and from the expansion of middle classes in a country with a population of 124 million people. Toscano explained that this creates great opportunity in business areas such as household care and personal care.

> Finally, Toscano described Mexico as a market where any innovative company should have a footprint: "Mexico is different to other emerging markets in that we are seeing multinational companies setting up R&D centers in the country, not just for the Mexican market, for also for exports. This is happening mainly in the automotive industry, but also in others. At Evonik we are already very strong in applied technology, with centers in Mexico dedicated to coatings and animal feed," he concluded.





Braskem Idesa

dem Idesa

"70% of our oil and gas production should come from non-conventional sources by 2023"



Could you provide some background on YPF's chemicals business?

in Argentina, with 2.2 million tonnes (mt/y) of total annual capacity. In aromatics, we have a capacity of 500,000 mt/y, processing virgin naphtha out of our La Plata refinery. Fertilizers, our second business line, is an equal share joint venture with Nutrient for the production of 1.3 million mt/y of urea at Bahía Blanca. Methanol, our third business line, is processed at the The key to unlocking these developments is the stabilization of Huincul plant, with a capacity of 400,000 mt/y. Our market also sees smaller volumes of specialty chemicals such as maleic anhydride, polyisobutylene, linear alkylbenzene for detergents, oxo alcohols, and a wide range of solvents.

Where is YPF focusing its investment pipeline?

Our latest investment was devoted to the expansion of our reforming plant for aromatics in 2012, and now we are accelerating the development of non-conventional feedstock. Back in 2012, YPF was the only player developing Vaca Muerta; and Sustainability task force leadership, we are trying to apply to today, through horizontal and multilateral technologies, Vaca Muerta has become a rich tapestry of companies producing more than 70,000 barrels of oil per day (b/d) and 50 million cubic meters of natural gas (cm/d), with a high five-year forecast increase. Meanwhile, in chemicals, the opportunities are enormous: we have gas and its liquids, good infrastructure with an excellent logistics hub at Bahía Blanca including a deep-water port, and finally we have a great market between Argentina and Brazil.

For which petrochemical products do you see opportunity What is YPF's advantage in the market as an integrated for new plants?

In fertilizers, the region has a deficit of 5 million mt/y of urea, The petrochemicals industry is the sector that will drive with room for a 3-times world-scale multiplier. In plastics, there is space for one world-scale ethane cracker and the associated polyethylene plants to cover the projected deficit in South America, mainly in Brazil. There is also space for a world-scale polypropylene plant, as our current surplus of propane can justify a new propylene plant to produce the associated polypropylene. most competitive ones.

The deficit is even lower for methanol – around 1.5 million mt/y in the region – and Methanex is covering a great part of that from Chile. However, if we are competitive enough in our gas production, we could dream of a world-scale methanol plant to meet the increasing needs of the biodiesel markets in Argentina and Brazil, and use the surplus to export to Asia.

These very large projects will most likely require the participation of partners. For example, in Vaca Muerta we need to establish YPF is the number one chemicals and petrochemicals producer a petrochemical cluster with the participation of the main companies and efficient projects that are capable of competing with American or Middle-Eastern product in our region.

Will Argentina overcome the issue of gas demand seasonality?

gas demand, bridging the gap between summer and winter. In the last two years, Argentina has not suffered gas cuts in winter, and since 2018, we have been exporting gas throughout the year. We need to maximize exports to Chile, restart electricity exports to Brazil, and maximize gas storage projects so we can store gas in summer and sell it in winter. Today, we have one underground storage facility in Diadema, and we are evaluating two more. The gas injection project contributes to our new circular economy principles that, as a result of our B20 Energy, Resource Efficiency our commercial sectors in downstream and upstream.

From summer 2019, YPF is exporting LNG. We are bringing a floating liquefaction unit with a capacity of 2 million cm/d, and we are looking at a fix liquefaction unit on a larger scale that should be operative by 2024. We consider that the tipping point to stabilize our gas demand and unlock the full upstream potential of Vaca Muerta. Today, non-conventional production represents 30% of YPF's total production, and by 2023, 70% of our production should come from there.

national company?

hydrocarbons consumption over the next years. Large oil companies forecast flattened fuel demand, and this is why focus is increasingly placed on the petrochemicals business. Those companies that are vertically integrated, with feedstock production all the way to the downstream business, will be the



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POPULATION

11.8

209.2 MILLION

UNEMPLOYMENT RATE (%)



BRAZIL

1,600

2011

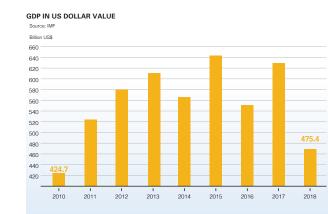
2012

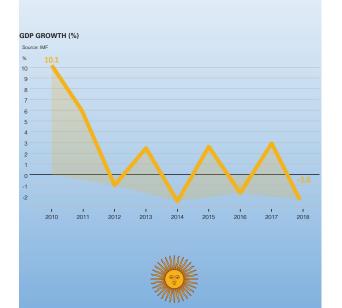
2013

2014



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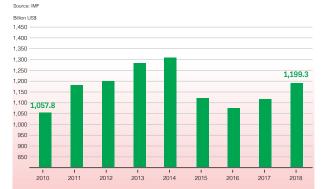


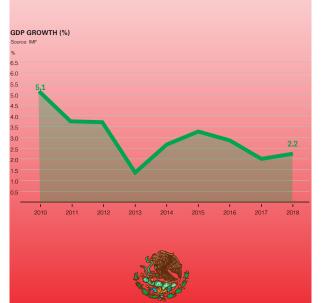


POPULATION 124.7 MILLION **UNEMPLOYMENT RATE (%)** 3.5 SOURCE: IMF, 2018 ESTIMATE

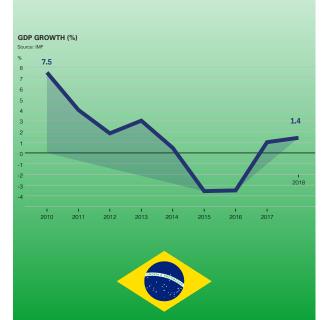
GDP IN US DOLLAR VALUE

MEXICO



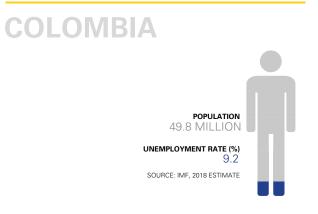






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LATIN AMERICA'S LARGEST ECONOMIES



GDP IN US DOLLAR VALUE

Source: IMF

Billion US\$

380 -

370

370

360

350

330

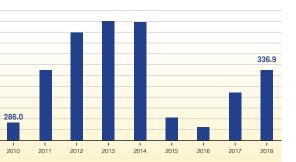
320

310

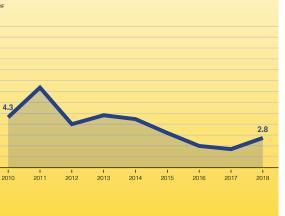
300

290 -

280



GDP GROWTH (%)



The Sustainability Challenge

The industry needs to be proactive in its work with governments and the wider population

In an era marked by rapid change and mass consumption, and with the world's population expected to rise from 7.6 billion people in 2017 to 9.8 billion by 2050, all industries must rethink their impact and the sustainability of their operations. The planet has been sending signals for years, from global warming, to ocean contamination by plastics, to the predation of natural resources. In this context, how can organizations in the petrochemical and chemical industries promote sustainability across different areas through concrete actions and goals? A look at Brazilian giant Braskem's 2017 annual report sheds some light on how big industry actors are approaching the issue.

The company has defined three core priorities (climate change, water and plastic waste), and then further identifies 10 specific areas where they have set 'macro-goals' to be met by 2020. These areas include safety, post-consumption (recycling), development of local communities, climate change objectives and use of renewable feedstock and renewable energy, among others. In nine of the 10 areas delineated, the rate of goal fulfillment was between 73% and 100% by 2017; yet, in post-consumption, only 1% of the 2020 objectives had been met by the end of 2017. This is indicative of the sheer scale of the recycling problem that the industry, together with the rest of its stakeholders, currently faces.

THE CIRCULAR ECONOMY GOAL

The rapid expansion of the plastics industry has caused farreaching consequences, and there is no magic solution to tackle them. The world needs a multi-component strategy, including more stringent regulations, the development of the right infrastructure and handling processes for recycling, education at all levels of society and an innovation push by the industry.

Enrique Flaiban, general manager of Petrocuyo, an important petrochemical player in Argentina, emphasized that a solution cannot be reached without a joint effort: "We participate very actively in Ecoplas, an organization that provides information about the need for recycling. It is a great effort, because in Argentina there is not a strong recycling culture. We give support to some recycling cooperatives through the donation of defective traditional mechanical recycling and the more complex chemical product, but the legislation in Argentina does not help. In Buenos Aires, for instance, there is no separation of waste."

In Colombia, local association Acoplásticos is also involved in wide initiatives to promote a better recycling culture, including the Dale vida al plástico ("Give life to plastic") campaign. Daniel Mitchell, president of Acoplásticos, also commented on the responsibility of both industry and government: "From the design stage, the products need to be recyclable and environmentally sustainable. Then, the authorities need to do selective collection of waste, and

informal recyclers need to be organized to improve their activity." Brazilian chemical association Abiquim is also putting a lot of emphasis on education, working together with Plastivida, an institution that deals with the environmental and social aspects of plastics and implements education programs in schools. "Overall, we believe the most important issue to address in this subject is education. Well-educated people will not cause ocean pollution," said Fernando Figueiredo, CEO of Abiquim.

THE INNOVATION RESPONSE

Achieving a fully circular economy is indeed an enormous challenge, and while banning some products like single-use plastics may have other undesired impacts, change is already happening, and all stakeholders need to see how they can adapt and contribute to it. In Mexico, by the end of 2018, there were already regulatory initiatives in 26 of the country's 32 states to ban the use of single-use plastic bags, straws and packaging.

Miguel Benedetto, general director of Mexican chemical association ANIQ, noted that in parallel to regulatory changes in the country, the resins industry recently made three firm commitments: "The first one is to meet the zero-pellet target across the entire value chain. The second is to assure that 100% of the industry's packaging is recycled or recyclable by 2030. Finally, by 2040 we will have to work with plastic converters and the retail industry to ensure that 100% of all packaging produced in Mexico is recycled or recyclable."

In this context, the largest players must be the agents of change when it comes to promoting recycling and preventing plastic waste from reaching the oceans. Jim Seward, vice-president of Technology, Sustainability, O&P and Joint Ventures at LyondellBasell, said: "The circular economy is particularly relevant for plastics as they are uniquely suited to recycling and have a very long lifespan. Our vision is that, after use, plastics should not become waste but should be viewed as a feedstock or raw material for other uses."

In this respect, companies are working on two main fronts: recycling. In the former, LyondellBasell has created a joint venture company in Europe called Quality Circular Polymers (QCP) in collaboration with waste management specialist SUEZ. Located in the Netherlands, QCP's facility has the capacity to convert consumer waste into 30,000 tonnes per year (mt/y) of polypropylene and high-density polyethylene.

Furthermore, in its work on the chemical recycling option, LyondellBasell has teamed up with Karlsruhe Institute of Technology (KIT) with the aim of developing a new catalyst and process technology to convert plastic waste into feedstock, which could then be reused in polymerization processes. Bob Patel, CEO of LyondellBasell, declared: "This is a bit more long term, but it *in tire production, we contribute to lower* could be a great solution for a more sustainable circular economy *fuel consumption. Also, speaking of* around plastics."

OTHER ASPECTS OF SUSTAINABILITY

Beyond plastic pollution, another key area that needs to be replace fishmeal and fish oil as a addressed in the context of sustainability is carbon emissions. The current international framework is provided by the Paris Agreement, ratified to date by 184 of the 197 parties to the United -Martín Toscano. Nations Framework Convention on Climate Change (UNFCCC). Managing Director, The Agreement's objective is to keep the rise in global temperature in the 21st century below 2 degrees Celsius above pre-industrial levels. During COP24 in Poland in December 2018, the different parties finally approved a range of measures to make the Paris Agreement operational starting 2020.

"We work in the green tire segment: by increasing the use of precipitated silica sustainability, Evonik has a joint project with DSM for the production of Omega 3 fatty acids from natural marine algae to raw material."

Mexico

In Latin America, the countries with the biggest emissions correspond to the largest economies: Brazil and Mexico represent around 2.5% and 1.7% of the world's total emissions, gases by 2030 and a 50% reduction by 2050. In this respect, all respectively. Indeed, this is one of the key issues that the Mexican industrial sectors will have to contribute significantly for Mexico to chemical industry wants to address with the new López Obrador administration, through a focus on the implementation of the Meanwhile Marina Mattar, director of institutional relations carbon credit market in the country.

Association of the Chemical Industry (ANIQ), declared: "The federal

Miguel Benedetto, director general of Mexico's National Industry (Abiquim), assured that the chemical industry was the

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government has committed to a 30% reduction in greenhouse achieve these goals."

and sustainability at the Brazilian Association of the Chemical first industrial sector in the country to take a position on carbon



"The driver for cleaner fuels is not only the regulation to bring sulfur levels down. New truck engines that demand higher quality fuels are pushing the development as well. Haldor Topsoe has developed new technologies for the ammonia, methanol, and hydrogen production segments that are able to reduce the CO2 emission significant energy savings."

Latin America,

pricing. "We are doing a lot of work with regard to carbon pricing, and we have already reduced almost 30% of our emissions in the last 10 years in the chemical sector," she said.

A regulatory push will be key in this respect. The shipping industry, for instance, is ill prepared to deal with the IMO 2020 regulations free and paraben-free have also garnered greater interest. that cap sulfur emissions, but the entry of this new standard into force will drive change. Meanwhile, the industry itself is also improving technologies in order to reduce impact.

Arturo Bettati, managing director of Latin America at Haldor Topsoe, a Danish-based leader in catalysis, gave more details: "The driver for cleaner fuels is not only the regulation to bring sulfur levels down. New truck engines that demand higher quality fuels are pushing the development as well."

As part of this trend, in Argentina YPF has a project for the production of clean fuels, and the company is working with Haldor Topsoe on the basic engineering for two ultra-low sulfur diesel plants at the Luján de Cuyo and La Plata refineries, while Reficar in Colombia is also installing two ultra-low sulfur diesel hydrotreaters with Haldor Topsoe catalysts. "Haldor Topsoe has developed new technologies for the ammonia, methanol and hydrogen production segments that are able to reduce CO2 emissions by about 14%, while also providing significant energy savings," Bettati affirmed.

PRODUCTS FOR A GREENER FUTURE

In addition to recycling, the quest for a circular economy also involves the use of renewable energies and renewable feedstock for the production of chemicals – a transformation that also management. Stefan Lepecki, CEO of Braskem Idesa, concluded: results in a reduction of carbon emissions.

Braskem, for instance, has been producing green polyethylene (PE) from sugarcane ethanol since 2010 at its Triunfo petrochemical complex. Additionally, in October 2018, Braskem launched a new green product – a green ethylene vinyl acetate (EVA) copolymer, also derived from sugarcane.

Jorge Soto, director for sustainable development at Braskem, provided more details on the green PE produced at Triunfo: "This biopolymer is exceptionally eco-friendly, since the process used to produce each ton of polyethylene from the primary raw material removes more than three tons of carbon dioxide from the atmosphere."

As companies feel the pressure by consumers to improve the environmental footprint of all their processes, green chemicals will increasingly have a wider market. Chemical specialties giant by about 14% and with Evonik has also been working on solutions to improve product sustainability. Martín Toscano, president of Evonik Industries de México, explained that by increasing the use of precipitated -Arturo Bettati, silica in tire production, the company contributes to lower fuel Managing Director consumption. He added: "We have a joint project with DSM for the production of omega-3 fatty acids from natural marine algae to Haldor Topsoe replace fishmeal and fish oil as raw material for the salmon and pet food industries."

> Innovation, however, does not stop there and applies to many market segments, reaching the distribution players. Eugenio Manzano, executive director of Mexican distributor Pochteca, explained: "In certain industries like coatings, pharma or printing, there is a growing demand for environmental services, such as recycling and the use of greener chemicals, like VOC-free solvents." He further noted that, in personal care, products that are phenol-

STRIKING THE RIGHT BALANCE

The constant flow of news regarding plastic pollution, including upsetting images of animals choked by plastic, has been damaging to the industry's reputation. Yet, the use of chemicals and plastics is commonplace in daily life, and people are often unaware of the convenience and benefits they afford.

"Plastics, in themselves, are a great sustainability story in terms of how they enable everyday life," said Bob Patel, CEO of LyondellBasell, further mentioning some examples of the day-today applications of the company's products: "With polyethylene, our pipe resins help deliver clean, fresh water, and plastics also keep food fresh for longer. Then, our polypropylene compounding business for automotive helps replace higher weight materials, improving fuel efficiency and reducing carbon emissions."

Jorge Soto of Braskem added further to the list of segments where plastics have a positive impact: "We need to think of healthcare, easy and cheaper mobility and housing, and more resilient infrastructure. Plastics will also bring the possibility of distributed manufacturing through the mass use of 3D printing."

Yet the heads of industry agree that none of this will be possible if humanity cannot find a solution to the problem of solid waste "The industry faces many challenges because society is changing very rapidly, in terms of consumption patterns, sustainability

issues, digital transformation and diversity. Traditionally, the petrochemical industry has been more conservative than that, so as companies we need to become more proactive and agile, and keep a close eye on these developments.".

Distribution and Logistics

Consolidation and blurred lines

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The chemical distribution sector in Latin America is undergoing a renaissance – or a reckoning – of sorts. The shift is observable through the reorganization of the market, as well as a trend towards adding more value for clients through an improved capacity to provide logistical support in a region where infrastructure challenges are often acute.

"Selling a product is part of what we do, but this is really a service for the producers to reach a market that they cannot serve and for the customers who would otherwise not have access to the producer," explained José M. Berges, CEO of GTM Holdings, the -José M. Berges, second largest Latin American distributor.

In 2012, the top 10 chemical distribution companies in Latin GTM Holdings America had a market share of just 21%, according to The Boston Consulting Group, illustrating the severe fragmentation within the region's chemical market. However, a wave of M&A activity Between September 2016 an April 2017, GTM tripled its size through is helping to consolidate the industry, which in turn will help to introduce better practices and raise standards while streamlining company will continue to seek new M&A opportunities, according the development of distribution channels.

"Before, you had guys simply buying something from somebody, storing it, and selling it to somebody else, but these days are over. A real distributor is always adding value to both principals and customers. If you do not do that, you do not have a reason to exist." CEO.

three acquisitions: High Chem, quantiQ and Peruquímicos. The to Berges, who elaborated on how the most recent acquisitions



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"In Latin America. we are a bit behind when it comes to technological development. I still believe that major organizations will procure their logistics services the traditional way, but definitely we are already preparing

ourselves for future trends."

-Martin Sack. Managing Director, Leschaco Mexicana

had improved GTM's capacity and expanded their offering: "Before acquiring High Chem, our position in specialties was very limited. We had a good position in industrial chemicals and in what we call customer solutions, which is basically to elaborate tailor-made blends and formulations for the clients," he said. "Through High Chem and then quantiQ, which had a very significant specialty chemicals operation as well, we became a full line supplier, with both industrials and specialties, and now we are transferring that knowledge from Mexico and Brazil to the other markets."

Multinational conglomerates such as Amazon and Alibaba have disrupted the traditional market further, leveraging their success in e-commerce to access small and medium sized clients. For distribution companies, this translates to a need to introduce practices that add value, and lessening the burden of logistics is a key area identified to create that value. "In countries like Brazil and Argentina, the logistics processes are usually complex, so the flexibility we are able to provide, having both domestic stocks and a flexible access to external sources, is a good add-on," commented Matthias Vorbeck, general manager of Anastacio Overseas, the international arm of Brazil's Química Anastacio.

Learning to better utilize the tools afforded by digitalization is also key to embracing the transformation occurring in the distribution sector. "All going well, we will transition into becoming more of an information provider, where intelligent use of statistics and algorithms can have a very positive impact on monitoring inventories and prices," said Peter Staartjes, CEO of Andino Holdings, which offers distribution services through its Andikem arm. Ultimately, Andino wishes to purse a business model that allows it to "serve the needs of chemical producers, and allow them to reach the final mid to small size customer directly without needing the assistance of a distributor," Staartjes elaborated. Martin Sack, managing director of Leschaco Mexicana, a freightforwarding company focused predominantly on chemicals that also offers tank storage services, commented: "In Latin America, we are still a bit behind when it comes to technological



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development. I still believe that major organizations will procure their logistics services the traditional way, but definitely we are already preparing ourselves for future trends. As a company we are customers who require these."

blurry line between distributors and logistics providers. "Even enormous potential. The oil and gas industry has seen significant though there are good distributors in Latin America, the region needs more dedicated infrastructure," said Eugenio Manzano, of investment and infrastructure to reach the potential a formation executive director of Pochteca, a large Mexican player with a like this should have." footprint in Central America and Brazil. Taking advantage of its Despite a tumultuous 2018, Argentina's economy, the second network of assets dedicated to chemical distribution, Pochteca largest in South America and third largest in Latin America, offers began to offer broader services to suppliers and clients with specialized assets, including storage, blending, dilution, packaging, which already contributes around 12% of the nation's GDP, has labeling, inventory management, and product delivery.

According to Manzano, several industrial verticals are driving opened an office in Argentina to begin its distribution business in growth in the chemicals industry throughout the region, including the country, following requests from regional clients to serve their water treatment, food, animal feed, and agrochemicals. In Argentina in particular, the development of the massive Vaca Muerta shale formation promises to spark a revolution in the located out of the region (mainly in Asia), but also to start the country - if numerous developmental bottlenecks can be overcome. Spanning 7.5 million acres across four provinces, regional manager of Anastacio Overseas. the area is expected to help double Argentina's total oil and gas production to 1 million barrels per day (b/d) and 260 million cubic meters per day (cm/d), respectively by 2030, according to official estimations.

This presents an opportunity for the distribution of chemicals aimed at enhancing hydrocarbon production. Martín Cini, director of Petrolera Copsa, an Argentinean distributor, gave more details: investing heavily in new technologies, offering digital services for "In terms of chemicals, Petrolera Copsa started as a distributor focused on the paints and adhesives business, but now we are The push towards digitalization will contribute to the increasingly dedicating a lot of effort to the oil and gas industry, which offers growth in the Neuquén area, where Vaca Muerta still requires a lot enormous upside. If this trend continues, the chemicals industry, great potential to grow further. Anastacio Overseas recently subsidiaries in other countries of Latin America. "We opened the Argentina office with two goals: to offer products from producers distribution business in the country," said Alejandro Gabrielli,

pochteca Chemical and raw materials solutions for competitiveness Grupo Pochteca serves Mexico, Central America and Brazil with 41 branches strategically located to provide the best service to the general industry and the food processing sector. Pochteca distributes products from more than 200 leading providers to more than 20,000 customers in various sectors ranging from cheese production to high-technology electronics and home appliances. Pochteca's team is committed to service, safety and value creation for both clients and suppliers. If you are looking to sell your products across these segments or need a world-class provider for your local operations, please let us be at your service. BUSINESS SEGMENTS: Specialty chemicals Inorganic chemicals Solvents and blends Food ingredients • Lubricants and greases • Paper and cardboard 3 PL logistic services Contract blending and packaging +52(55)5278-5900 / 01-800-8383-729 (Mexico) www.pochteca.com.mx www.pochteca-english.com www.coremal.com.br www.pochteca.lat

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Nonetheless, from a geographic perspective, Brazil and Mexico remain core markets for distributors as the dominant economies in Latin America, while growth opportunities throughout the rest of Latin America are also promising with total regional economic



growth expected to increase from 1.6% in 2018 to 2.1% in 2019. Countries such as Chile, Peru and Colombia do not offer the same scale for distributors as their larger peers, but boast attractive investment frameworks.

LOGISTICS: THE MISSING LINK

For Latin America to fully recognize the potential of its chemicals industry, achieving a competitive logistics sector will be critical. The region currently lacks comparative cost advantage; poor infrastructure continues to be a politically frustrating obstacle to efficient transportation, and the import-export dynamic across the region has created both challenges and opportunities. An example of this is the liquid storage business.

In this context, chemical distributors often need to invest in Financial Times. several facilities country-wide, to make sure they have a strong network to efficiently serve clients. Martín Cini of Petrolera Copsa said: "Logistics in a country like Argentina are essential. If you do not understand logistics well, costs go up and make many businesses unviable."

Petrolera Copsa has three locations in Argentina: one in Neuquén run by a sister company dedicated to chemicals, petrochemicals and blending for the oil and gas industry; and two in the Buenos Aires province, one for chemicals and one for fuels and lubricants. "We are not only a chemicals distributor, but have our own formulating capacity and our own logistics capabilities, with different types of facilities and trucks. This gives us a competitive

edge, because in Argentina there are chemical distributors on one side, or fuels distributors on the other, but not a distributor that operates in both areas," affirmed Gastón Cini, director of Petrolera Copsa.

In Brazil, which relies heavily on its trucking sector as the primary channel for transport due to a deficiency in rail and waterways, the export economy was expected to experience a boom that was not recognized – largely as a consequence of chaotic conditions in the country's logistics sector. In the context of a slow recovery from the worst recession in its history and following a 10-day driver's strike in May 2018 that produced ongoing disquiet in the trucking sector, exporters have experienced difficulties securing trucks to deliver goods to port, according to a report by the

Consequently, a situation has arisen whereby exporters have been less able to take advantage of the depreciated Brazilian currency and the United States' pivot towards Latin America amid a trade war with China. In addition to the ripple effect on the transport sector months later, the strike also brought the country to a standstill and cost the chemicals industry alone an estimated 2.5 billion Brazilian real (R\$), highlighting the continued impact of political dysfunction on the industry's ability to achieve progress. Another politically challenging issue in the logistics discussion is the lack of capital investments to support the construction of better infrastructure, and specifically who should fund these projects. Talks of public-private partnerships to facilitate trade



between countries have stagnated over In this context, the tank leasing and liquid perennial disagreements between states and the industry as to where to source the heavy capital requirements for such the low price of oil in recent years, many projects.

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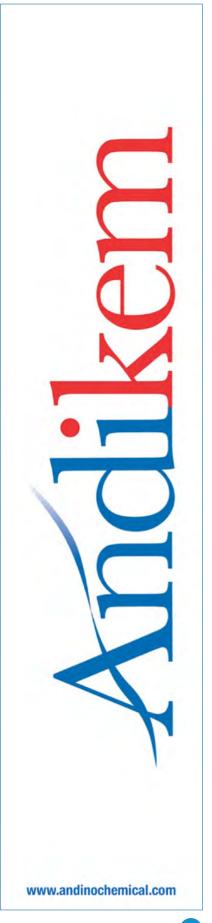
Meanwhile, the region's ports and weak transport corridors continue to be overburdened. "Latin America is one of the most inefficient regions due to the infrastructure deficit and the congestion at the terminals," said Fernando Reinecke, president of the 20th APLA Latin American Logistic Meeting held in 2018, and regional manager Logistics and Customer Service for Methanex Corporation. "This generates demurrages, and beyond that there is a shortage of storage capacity for liquids. In Brazil, with all the problems that Petrobras volumes of product, and the industry has been affected by very high costs, both due to the demurrages and the high port rates."

Despite challenges with infrastructure and disappointing performance on the exports side, imports continue to remain a strong business proposition throughout the region; Mexico and Brazil both fall among the top 10 importers of chemicals worldwide, with a combined value of US\$81 billion, or almost 4% of total global value, according to the World Trade Statistical Review 2018.

In Mexico, energy reforms have allowed for the import of oil and gas, creating consternation as well as opportunity in the management of Mexico's refined fuel deficit for the logistics sector. "Unit trains with gasoline and diesel have become the norm and marine terminals on the east coast of Mexico, currently storing chemicals, are being constantly pressured by gasoline and diesel importers to assist in handling the discharge and much needed storage," said Peter Staartjes, CEO of Andino Holdings. "Our small marine liquid bulk chemical in Tuxpan has suddenly become an attractive option for chemical producers who are frustrated with bad, or sometimes non-existent, railcar service; or have been displaced by a terminal operator who would rather fill tanks with high volume and sometimes higher paying gasoline or diesel."

storage markets have an important role to play. However, taking advantage of companies have invested in liquid storage assets of their own, resulting in a surplus of capacity in the market. Ricardo Diogo, director of business development at Oiltanking, commented, "At Oiltanking we take a long-term view of the industry, so we manage to navigate the ups and downs, but we cannot ignore that there is some extra capacity in certain hubs, and that an extra effort is needed to rent and fill up our tanks. Because of this, I expect to see some consolidation and optimization in the industry over the next five years." Marcelo Scavola, manager for Latin suffered, the country had to import great American at Eurotainer, elaborated on the competition in this sector and his company's efforts to differentiate themselves: "There are several tank leasing companies in Latin America. We are the largest one, but the market is becoming more competitive, especially in Brazil," he said. "Through our partnership with Maersk, an advantage we offer is that we nationalize the tanks in each country where they are needed, so that there are no issues in terms of admission permits." Latin America's competiveness as a chemicals hub will pivot on building capacity to facilitate the storage and, more broadly, the infrastructure to support the efficient movement of materials. There is ample reason to make these adjustments sooner rather than later as sustained economic growth and geopolitical shifts generate more interest in Latin America's rapidly developing markets. Martin Sack, managing director of Leschaco Mexicana, highlighted how freight forwarding companies like Leschaco view the changing relationship between Mexico and its powerful neighbor to the north as a positive signal: "We still see a huge opportunity to grow the business out of the United States, as the current U.S. government is pushing to increase manufacturing capacity. The already signed USCMA agreement shall stabilize and further strengthen the bilateral business between the United States and Mexico."•

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