

With 100 billion barrels of pre-salt oil, Brazil is becoming one of the world's largest producers

The Future Belongs to Brazil

Setting the Pace in the Race for Oil

In the last five years, Brazil has emerged as South America's most promising energy prospect

There's a new energy powerhouse in the southern cone of South America. In a turnaround that no-one would have predicted ten, even five years ago, the discovery of pre-salt resources thousands of meters below the South Atlantic seabed has transformed Brazil into one of the world's fastest growing oil producers.

While Argentina, long the great oil power of the region, is nationalizing its petroleum industry, revoking the licenses of foreign companies and seeing oil production plummet year after year, Brazil has emerged not only as the most exciting new

Meanwhile, in April 2012, President Obama met with Brazilian counterpart Dilma Rousseff and launched a Strategic Energy Dialogue between the two countries. In a joint statement, they emphasized "their commitment to provide opportunities that encourage companies to invest in production and to share their technology and experience in ways that develop capacity in the oil and gas sector."

National oil company Petrobras may be in the driving seat of the national oil industry; flush with the \$70 billion proceeds of the largest stock offering in history, the company is investing

"To provide opportunities that encourage companies to invest in production and to share their technology and experience in ways that develop capacity in the oil and gas sector."

The U.S.-Brazil Strategic Energy Dialogue

frontier since the North Sea, but as a reliable partner for foreign investors and a global leader in deep water technology.

It was the discovery of the 6.5 billion barrel Lula offshore field in 2007 that first uncovered the potential of the pre-salt provinces. The national oil industry regulator, the Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP), estimates that there are some 50 billion barrels of resources in pre-salt structures. Oil executives in Rio de Janeiro say that is too conservative; the figure of 100 billion barrels has become an informal consensus in the industry.

Just in terms of proved oil reserves, in the last ten years Brazil's reserves have risen from 8.5 billion barrels to 14.2 billion barrels. In contrast, Argentinian reserves have dropped from 2.9 billion to 2.5 billion while production has fallen from 830 thousand barrels per day to 651 thousand.

In Brazil, production is forecast to rise to over 7 million bpd by 2020, from 2.1 million currently. By 2020, the country is expected to be the world's fifth largest oil producer, and the second largest in the Americas behind only the US.

The rise of Brazil is now reshaping the global energy map and drawing the attention of the world's leading economic powers, in particular from China; state-controlled Chinese energy firms Sinopec and Sinochem have spent over \$15 billion in the last two years on acquiring stakes in offshore fields in Brazil.



\$220 billion from 2011-2015, the majority of which will go to development of the pre-salt fields.

But foreign investment is also continuing to play a major part in opening up the pre-salt regions and ramping up production. Since 1997, when the market was opened up to foreign producers, the industry has grown to represent some 12% of the country's gross domestic product, up from just 2%.

Brazil's breakneck growth has raised its own challenges, especially in terms of skills shortages, pressures on infrastructure, environmental concerns and regulatory uncertainties. However, as this report will show, the massive potential of the country's oil resources is now becoming a reality that no-one in the industry can afford to ignore.



Q&A

"Rio wants to be a mix of Houston and Barcelona... an oil and energy capital, but also a city of sun and culture, a city that is not only great to visit, but also where it is wonderful to live."

Q: How important is the Oil & Gas sector as a share of the economy of the state?

A: Oil represents around 20% of our GDP. If you include all the economic activities that work around the oil sector, it's 30% of GDP. It's important to note that this is much more than just Petrobras; we have major foreign investors in the state including Statoil, Chevron and BG.

Q: Is investment also going into the downstream?

A: Petrobras's Comperj petrochemical and refinery project is the single largest investment in the state. Comperj will cost

over \$19 billion. Thanks to Comperj, Rio de Janeiro will be the next hub for petrochemicals in Brazil.

with Julio C. Bueno, Secretary of Economic Development, Energy, Industry and Services of the State of Rio de Janeiro

Q: How is shipbuilding expanding in the state?

A: Historically, Rio has a long tradition in shipyards and has always been the center of the business in Brazil. We have many specialized workers, in fact we currently represent 60% of overall employees in the sector for Brazil. Additionally, companies like Petrobras are here; the oil itself is here. If I were an investor in shipyards, I would invest in Rio de Janeiro as we are at the epicenter.

Q: What improvements are you making to infrastructure?

A: There is a major investment program for roads, including a new road around the metropolitan area of Rio, which will reduce traffic in the city and also connect to Comperj. We're modernizing the BR-101, an important road which connects most of the oil regions in Brazil. There are also major investments in ports and in the energy

sector; a new nuclear power plant is being built in the south of the state.

Q: And what is the state doing to improve the supply of labor to the sector?

A: The National Oil and Natural Gas Industry Mobilization Program (Prominp) has a major presence in Rio. We are also developing technological centers in the region, working with the Federation of Industries of Rio de Janeiro (Firjan) and federal organizations to train workers for shipyards, etc. Plus, every year 2 to 3 billion dollars are invested in research in Rio de Janeiro.

Q: What is your vision for Rio's role as a global oil center?

A: We want to be an energy capital, not just an oil city. Oil is very important, but is a limited resource, so it is important to develop services around the oil sector: intelligence, research centers, an industrial base, engineering. "Rio wants to be a mix of Houston and Barcelona... an oil and energy capital, but also a city of sun and culture, a city that is not only great to visit, but also where it is wonderful to live."

Rio Reborn: an Oil City like no other

Rio de Janeiro has become the undisputed investment hub and business center for IOCs, oilfield service companies and equipment manufacturers from around the world who want the best access to Brazil's rapidly growing energy market

Rio de Janeiro has been the gateway to Brazil for explorers, tourists and traders ever since it was founded by the Portuguese almost four hundred and fifty years ago.

Rio suffered a major blow when the capital of Brazil was moved to Brasilia in 1960, but following the discovery of pre-salt oil reserves and the award of the 2016 Olympic Games, this iconic city is enjoying a turnaround in its fortunes and has become one of the most coveted destinations for any oil industry executive.

“Job expansion, especially in the technology sector, provides the underpinnings for growth and opportunity in our state and in our country.”

Sérgio Cabral, Governor of Rio de Janeiro



“The oil industry and the Olympic Games are leading to a rebirth of Rio,” says Eike Batista, the chairman, CEO and founder of Rio de Janeiro-based EBX Group, which owns a number of companies in the upstream and downstream energy sectors.

Mr Batista himself has become Brazil's richest man largely on the back of the resources boom in Rio de Janeiro. According to investment agency Rio Negócios, the state of Rio is currently home to 81% of Brazil's oil reserves and 45% of gas reserves, as well as 85% of oil production and 50% of gas production. Some 70% of pre-salt reserves are located off the state's shores.

In addition to the blessings of geology, Rio also has the institutional and commercial infrastructure to ensure that it makes the most of the oil opportunity. The city is the headquarters not only of Petrobras and Mr Batista's own offshore producer, OGX Petroleo, but also the ANP, the Brazilian Institute of Petroleum, and nearly all the IOCs operating in Brazil. Rio Negócios estimates that 67% of all oil explorers and producers in Brazil are based in the city.

Open for Business

Rio's state and city governments are also investing massively in logistics to improve the business environment, prepare the city for the Olympic Games, and to ease the pressure that economic growth is exerting on transport infrastructure.

These investments are being complemented by a major ramp-up in research and development spending. In recent years, a rapidly growing R&D cluster near the city's international airport has emerged as the world's leading location for research into offshore technologies, especially for ultra-deep water activities.

At this site, Petrobras's own world class research center, Cenpes, stands next to the Technological Park of the Federal University of Rio de Janeiro which is already home to research activities from the likes of Schlumberger, Halliburton and Baker Hughes. According to Petrobras, this location will be the largest research cluster in the southern hemisphere.

BG Group is spending more than \$2 billion on research and development in Brazil, mainly on setting up its own global technology center at the Technological Park and establishing training programs in universities.

And perhaps the biggest vote of confidence in the city has come from global industrial giant General Electric. GE is currently investing \$100 million in establishing its latest Global Research Center at the Rio location, where it will employ 200 researchers and engineers, focusing on advanced technologies for the oil and gas industry among others.

Sérgio Cabral, Governor of the state of Rio de Janeiro, said, “job expansion, especially in the technology sector, provides the underpinnings for growth and opportunity in our state and in our country. GE's investments, including the Brazil Global Research Center, are representative of the types of high-tech operations that we need to ensure that our economy continues to expand.”

While there is a well documented shortage of experienced professionals and technicians in Brazil. In the medium term, these public and private sector investments should ensure that Rio's young and growing population of 5.9 million provides the market with a much greater pool of well trained, highly skilled professionals for the oil industry.

And it is this creative and resourceful population that may be Rio's greatest asset; when people speak about energy in Rio de Janeiro, they're talking as much about the people as the hydrocarbons. It is the people, culture and history of this celebrated and hospitable city that differentiate it the most from all other oil cities around the world and make it a unique place to do business.

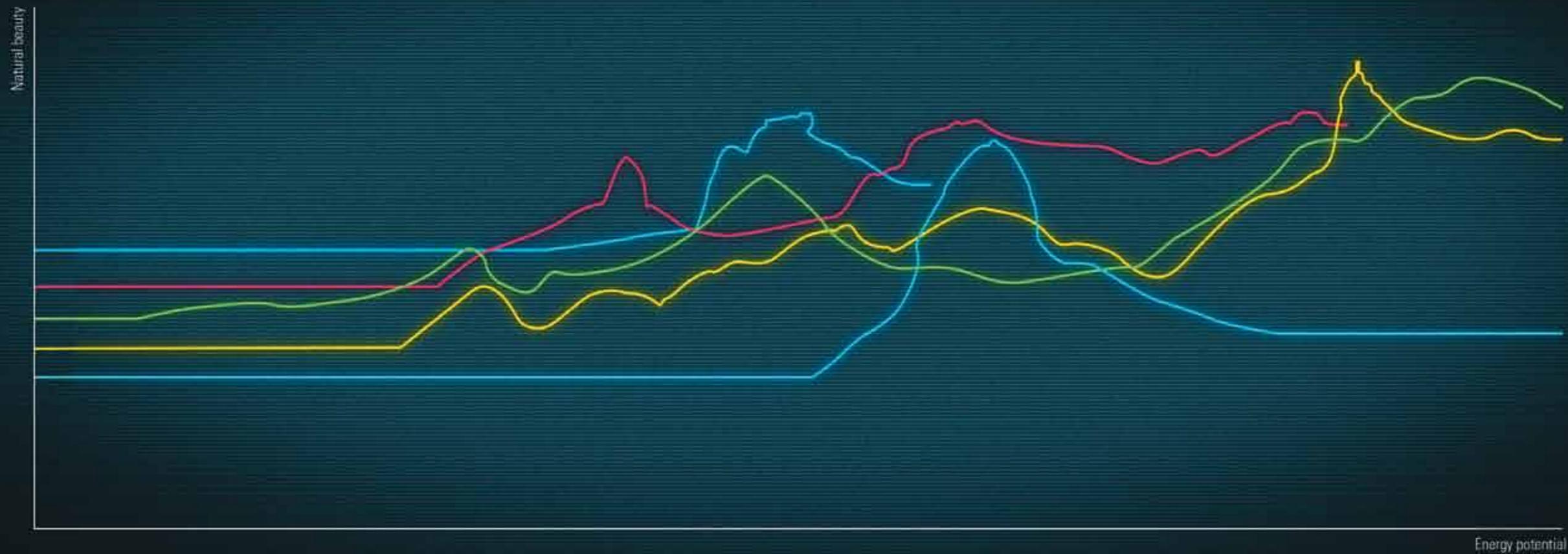


“You cannot expect only revenues; you are investing for the long haul. When we make an investment we want to develop patents, generate more qualified jobs and put Brazil at the forefront of our technology.”

João Geraldo Ferreira,
General Electric Oil & Gas CEO Latin America



Rio de Janeiro at night (Photo: Ricardo Zerrenner)



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RIO DE JANEIRO IS BRAZIL'S POSTCARD.
 BUT WHEN IT COMES TO CONVINCING YOU
 TO INVEST IN ITS ENERGY SECTOR,
 WE PREFER TO CHANGE
 THE IMAGES FOR NUMBERS.



Rio de Janeiro has always been at the center of energy development in Brazil. And the numbers confirm that Rio has a lot of potential for growth in the area. Today, it boasts over 85 energy generating undertakings. It is the location of our atomic plants. It produces 85% of all petroleum in the country. 70% of the pre-salt area is situated within the state. And the main companies in this segment are headquartered here. This scenario shows that Rio de Janeiro is the ideal place for those who want to

invest in the energy sector. Another contributing factor is Rio's willingness to invest in clean energy sources. With the help of research, Rio has been at the forefront of creating and perfecting this new sector segment, demonstrating concern with the people who live here and with the planet as a whole. Find out more about the work being developed by Rio de Janeiro in the energy sector and discover that when it's time to invest, you or your company will not find a better place. Or a prettier one.



SECRETARIAT OF
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JOINING FORCES

Turning On the Tap

From the seabed of the South Atlantic to the depths of the Amazon rainforest, Brazilian and foreign companies are opening up new frontiers for oil production

In May 2011, just four years after the discovery of the Lula field, Petrobras made its first shipment of pre-salt oil for export, sending a million barrels of oil to Chile's national oil company ENAP.

In the coming decade, this trickle of oil will gradually turn into a flood that will have a major impact both on the Brazilian economy and on the world's energy industry.

By 2020, the pre-salt will represent 40.5% of the Brazilian production of Petrobras, from just 2% in 2011. It will also help shift the gravity of world oil markets; according to consultancy Ernst & Young, "conventional long-term forecasts of oil supply and demand see new production from Brazil as the single largest source of new oil supply outside of the OPEC countries over the next 20 – 25 years."

Production at Lula is currently around 90,000 barrels of oil equivalent per day. And at the end of 2011, Petrobras and its partners BG Group of the UK and a joint venture between Repsol of Spain and Sinopec of China were also able to make a Declaration of Commerciality at another pre-salt field, Guar, which has 2.1 billion barrels of recoverable reserves. The field, now renamed Sapinho, should be pumping up to 120,000 bpd in 2013.

Ramping up production in these ultra-deep water conditions, in which oil lies buried up to 7,000 meters below the surface of the sea, requires an investment effort that is often likened to



Map of pre-salt fields of Petrobras

landing a man on the moon. Petrobras's current \$45 billion a year investment program is the largest spending program of any energy company in the world.

Over half of this budget is being devoted to E&P in pre-salt fields, an area that measures 800 kilometers in length and 200 kilometers in width and runs through the Santos, Campos and Esprito Santo basins in southeastern Brazil. In 2011, Petrobras increased the share of E&P in its investment plan to 57% from 53% in its previous plan and increased its target for Brazilian production to 4.9 million barrels of oil equivalent per day in 2020, up from 2.1 million in 2011.

Rising to the Challenge

Statoil has unrivaled experience in complex offshore activities. It is now bringing Norwegian technical know-how and corporate best practice to Brazil

When it comes to deepwater experience and expertise in offshore technology, few oil companies can match Statoil, Norway's leading energy company. It is a reflection of the potential of Brazil's offshore resources that Statoil has made such a major commitment to the country. The largest international oil field that Statoil operates outside of Norway is the Peregrino field 85 km off the coast of Rio de Janeiro, in which Statoil holds a 60% stake. It also has seven exploration licenses in the country, mostly in deepwater areas with water depths of up to 2700 meters. In a five-year period from 2008, Statoil plans to spend \$5 billion in Brazil.

In mid-2012, the Peregrino field is expected to reach full production, producing 100,000 barrels a day and making Statoil the largest international oil company in Brazil. Besides Peregrino, Statoil is also exploring other fields in Brazil in 2012 as it moves towards the company's global goal of producing 2.5 million boed by 2020: Statoil is partnering with Petrobras in two other deepwater licenses in the Campos and Esprito Santo Basins.

In these three areas, Statoil enjoys significant competitive advantages thanks to its experience in Norway of executing major offshore projects, managing reservoirs and processing heavy oil.



Maersk Peregrino (Photo: yvind Hagen / Statoil)

"The great success of the Norwegian oil and gas business is the high recovery rate that we are able to get in the North Sea," Kjetil Hove, country manager of Statoil for Brazil says. "We are now utilizing this technology on Peregrino so that we can get more oil out."

And Statoil is also bringing Norwegian best practice in corporate social responsibility to the country. Among its projects, Statoil is working on environmental capacity building with fishing communities, and training local residents in Health, Safety and the Environment as part of its drive to generate local employment.

Q&A with Kjetil Hove, Statoil Country Manager



Q: Why is Statoil investing in Brazil?

A: We believe we can add value to Brazil because a lot of the things that we have been doing in Norway we can further develop here in Brazil. It is all about utilizing the technology and resource management experience that we have in the North Sea.

Q: What innovations are you bringing to Brazil?

A: In the Peregrino field we have now drilled the longest openhole gravel well in Brazil; if you drill long wells in the reservoir section you get more oil out.

We are also planning to drill multilateral wells, to install downhole valves to prevent water production and to inject polymers in the field – all to get higher oil recovery.

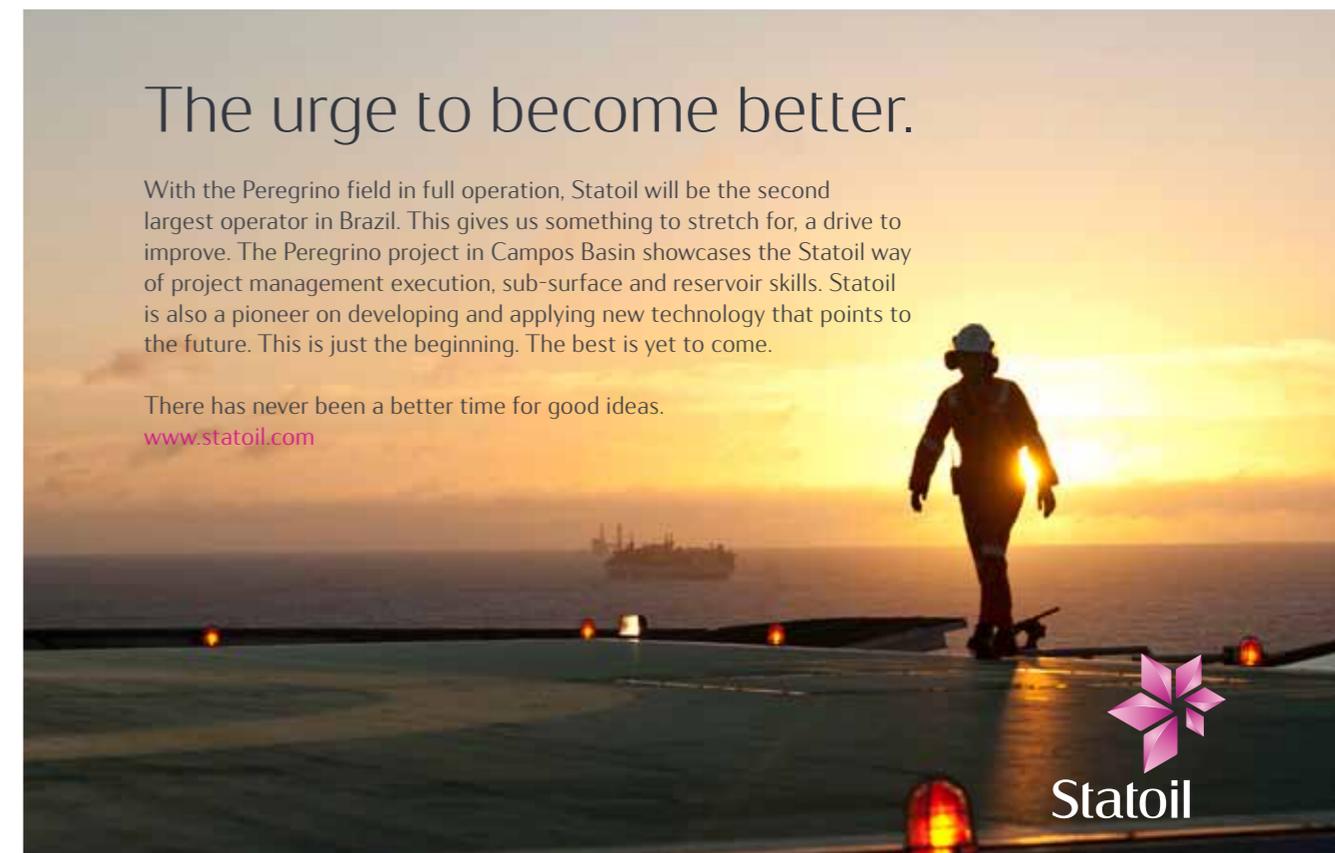
Q: What are your plans for growth?

A: We want to grow and therefore we need new opportunities. For us, having the 11th license round is very important, to use our complex offshore abilities. To have a sustainable exploration effort in the country you have to have continuous drilling targets. We are interested in the offshore areas in the northern part of Brazil.

The urge to become better.

With the Peregrino field in full operation, Statoil will be the second largest operator in Brazil. This gives us something to stretch for, a drive to improve. The Peregrino project in Campos Basin showcases the Statoil way of project management execution, sub-surface and reservoir skills. Statoil is also a pioneer on developing and applying new technology that points to the future. This is just the beginning. The best is yet to come.

There has never been a better time for good ideas.
www.statoil.com



International Oil Companies Fuel Investment Boom

Foreign companies have made a crucial contribution to the discovery of Brazil's pre-salt riches. IOCs from around the world are now rising to the challenge of developing these massive resources

Since Brazil opened its market to foreign oil explorers and producers in 1997, international oil companies have played a major part in the discovery of the pre-salt reserves and in the country's emergence as a major oil power.

The IOCs are now providing essential financial and technical muscle as Brazil moves aggressively to ramp up its oil production.

"In total, we believe that in the next five years there will be around \$400 billion of investments in oil and gas in Brazil," says Luciano Santos Tavares de Almeida, president of São

Paulo state investment agency Investe São Paulo. "Petrobras will represent about 60% of this, but over \$160 billion will come from international oil companies."

It is not only the unrivalled potential of Brazil's hydrocarbon resources that is bringing IOCs here from all over the world. The country's Petroleum Law of 1997 also established an attractive regulatory framework for E&P, especially in comparison with other resource-rich parts of the world.

However, a cloud has hung over the sector since November, when Chevron reported an oil seep of around 3,000 barrels in the Frade field it operates in the Campos Basin. A federal prosecutor has filed criminal charges and lawsuits totalling over \$20 billion against Chevron and drill rig operator Transocean, and a judge has confiscated the passports of seventeen of the two companies' employees.

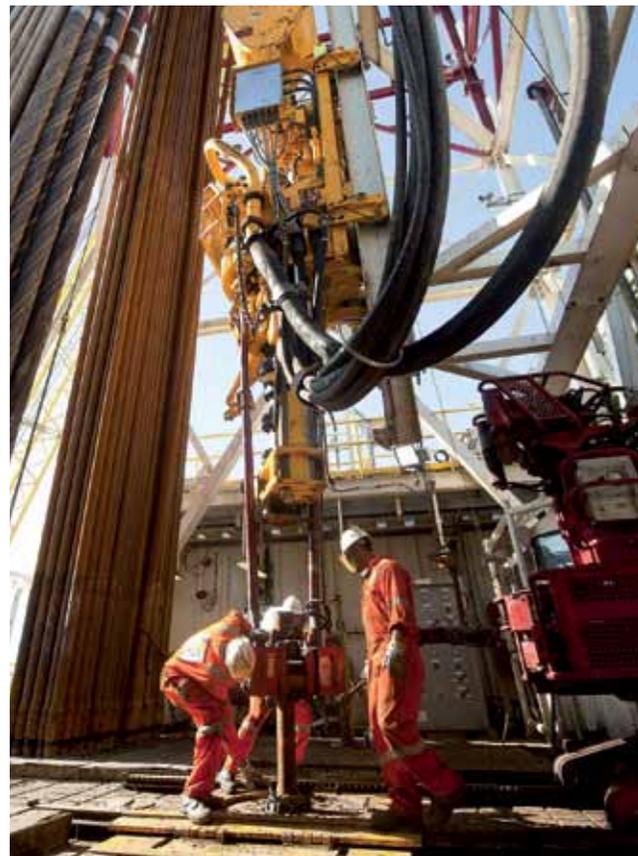
The disproportionate reaction of the Brazilian authorities – the total fine would be equivalent to over \$7 million per barrel – has led to concerns about the depth of Brazil's commitment to foreign participation in its industry.

Nevertheless, the scale of the challenge facing Petrobras means that there is little doubt over the need for continued investments from IOCs; Chevron itself is continuing to invest in its largest project in Brazil, the Papa Terra field, where it is partnering with Petrobras.

Other oil majors such as Exxon Mobil, Shell, BP, and Total are also increasing their operations in the country; BG Group, a world leader in natural gas, plans to invest at least \$30 billion in Brazil by 2020, while Total and other European operators are reported to be weighing a bid for the Brazilian assets of Anadarko.

Meanwhile, national oil companies from China are also targetting Brazil as part of their drive to secure access to natural resources; in November 2011 Sinopec said it would pay \$3.5 billion for a 30% stake in the Brazilian unit of Portugal's Galp.

With rising interest from all corners of the global E&P industry, and new licenses due to be auctioned later this year, the Brazilian oil boom looks set to enjoy the continued participation of some of the world's largest oil companies.



Peregrino A platform (Photo: Øyvind Hagen / Statoil)



Magda Chambriard is sworn in as the new director general of the Agência Nacional do Petróleo - ANP (Photo: Natanael Luis / Brasil Atualidades)

Experience Shapes Brazil's Energy Future

The Brazilian oil industry has run into a series of headwinds in recent months. But new appointments at Petrobras and at the ANP are providing the sector with fresh leadership for the future

It's not been an easy start to 2012 for the Brazilian energy industry. In the upstream, Chevron bore the brunt of more legal proceedings, Petrobras said that it had missed its production target for 2011, and the ANP still hasn't announced a date for the 11th bid round. Meanwhile, in the shipping and oil services sectors, Samsung has pulled out of the pride and joy of the Brazilian shipbuilding industry, the Estaleiro Atlântico Sul, while local equipment supplier Lupatech is desperately trying to restructure its debts.

It's an unexpected scenario for a country that before long should be challenging the US for the title of the largest oil producer in the Western Hemisphere. It's also a salutary reminder of the regulatory and political risks that energy investors face all over the world, and of the challenges that Brazil faces in implementing its very ambitious local content requirements.

But other developments in the year should stand the industry in good stead. In March Magda Chambriard became the new head of the ANP, following a long career at Petrobras

and ten years at the regulator. That came hard on the heels of the appointment of Maria das Graças Foster as the new chief executive of Petrobras itself.

Both women have dedicated their careers to energy. While previous holders of their positions have been essentially political appointments, the new senior figures in the Brazilian oil industry are recognized experts in their fields, experienced engineers who are focused on the operational challenges of increasing Brazilian production, rather than on political point scoring. It is also helpful that they are both close to Brazil's first woman president, Dilma Rousseff, herself a former Minister of Energy.

It's not only their technical experience that is reassuring to investors. It is very unusual for women to play such a high profile in a country's oil industry; but if women really are more patient than men, then as Brazil embarks on what is bound to be a difficult journey to oil superpower status, that patience will be an extremely valuable asset in the years to come.



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The publisher wishes to thank the organizations and individuals whose contributions made this edition possible. Special thanks to Daniel Bernard of Oil & Gas Journal and to the staff of the magazine for their support and cooperation.

Peregrino B platform (Photo: Øyvind Hagen / Statoil)

