REVIEWING THE INTERNATIONAL GAS MARKETS

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Will Ukraine concede a Gazprom-Naftogaz joint venture in return for lower gas import price and volume? – page 4

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Brazil steps up the development of its pre-salt basins

Brazil's pre-salt area is emerging as the most promising exploration and production region after the Middle East. A recent discovery at the Libra field in the Santos basin is estimated to hold 7.9 to 16 billion boe, confirming the paramount role of pre-salt plays as a game changer for the Brazilian oil and gas industry.

These substantially challenging plays require intense capital investment, but Petrobras' latest financial operations and a massive input of foreign investments – especially from China – are expected to help transform the Brazilian energy scene over the next decade. Recent moves in the region herald significant prospects for associated and non-associated gas, which may cater for both the rocketing domestic market, and possible export projects.

The vast geological pre-salt region is located approximately 270 km off the coast of Brazil in the Atlantic Ocean, stretching from Espírito Santo state to Santa Catarina state, some 800-km long and 200-km wide. The region is dubbed "pre-salt" because the oil is held beneath deep and ultra-deep waters, around 3,000 meters of sand and rock, and an additional layer of salt which, in some places, reaches thicknesses of over 2,000 meters. The area is rapidly becoming the most prolific region after the Middle East with estimated reserves at between 50 billion and 100 billion barrels of recoverable crude.

A limited amount of gas may be needed for pressure maintenance and that a significant share can be freed for commercial purposes

Production from pre-salt areas offers a number of technical challenges such as, distance from coast, water depth and salt layer thickness, high-pressure, need for insulated flow lines, sulphur and CO_2. The presence of CO_2 ranges from 7% to 20% and needs careful planning to avoid corrosion issues to processing equipment and pipelines. The potential to utilize CO_2 for enhanced oil recovery appears to be very promising, although sequestering and disposing of the CO_2 in an environmentally way will add to costs. Some heavier oil fields in the basin can benefit by CO_2 injection, meaning that a limited amount of gas may be needed for pressure maintenance and that a significant share can be freed for commercial purposes.

Current project development and production estimates suggest most pre-salt plays need a crude oil price ranging between $55–65 bbl/d in order to be economically viable. Their economic feasibility is very sensitive to technical challenges, and the need for evacuation infrastructure. Overall costs have been hard to define, but the size of planned investments in the pre-salt basins suggests that they are far from negligible. The rapid growth in domestic energy demand stands as one main commercial driver and beyond that, new large-scale LNG projects could well be an option to provide reliable and commercial markets to monetise potentially significant volumes of associated and non-associated gas.

The world's largest energy investment plan

In August, state-owned oil and gas firm Petrobras announced it would invest $33 billion until 2014 in the pre-salt basins. The announcement was made after Petrobras' board approved the world's largest energy investment plan between 2010-2014 totaling $224 billion, an increase of $50 billion over the previous plan. A total of $119 billion is designated for exploration and production activities – including $33 billion for pre-salt basin projects.

By 2014, Petrobras expects to start five floating production storage and offloading (FPSOs) in the pre-salt basins with a combined 540,000 bbl/d production capacity. Three of those FPSOs will be located in the Tupi/Guara cluster. Petrobras expects to produce close to 250,000 bbl/d in 2014, and almost 1.1 million bbl/d by 2020. The potential gas production from these pre-salt plays is estimated to approach 1.4 Bcf/d (39.6 MMcm/d) by 2020, which could support LNG production of around 8 to 9 mtpa.

The remote area, 300 km from the coast, poses a major difficulty, but assuming that a huge volume can be harnessed and transported ashore, there could potentially be up to 4 Bcf/d (113.36 MMcm/d) of gas, enough to feed a large 24 mtpa LNG onshore plant, or offer the potential to feed no less than eight 3 mtpa floating LNG (FLNG) projects.

Libra will be the first of the pre-salt oil fields to be auctioned off under the new production-sharing regime proposed by president Lula

Last month, Petrobras confirmed Tupi's potential of 5 to 8 billion boe of recoverable reserves when drilling the Tupi SW well. Two additional wells are to be drilled before the end of the year, and commercial declaration is to be announced in a ceremony led by Brazilian president Luiz Inácio Lula da Silva. Production volume is expected to gradually increase to the platform maximum capacity by 2012.

BG Group announced last month that production at Tupi's BM-S-11 offshore block at the Tupi field commenced from its 100,000 bbl/d permanent FPSO facility. The Cidade de Angra dos Reis FPSO is expected to produce up to 100,000 bbl/d of oil and up to 177 MMcf/d (5 MMcm/d) – and there is a proposal for a FLNG floating facility if production volumes increase to a level to economically support a floating facility.

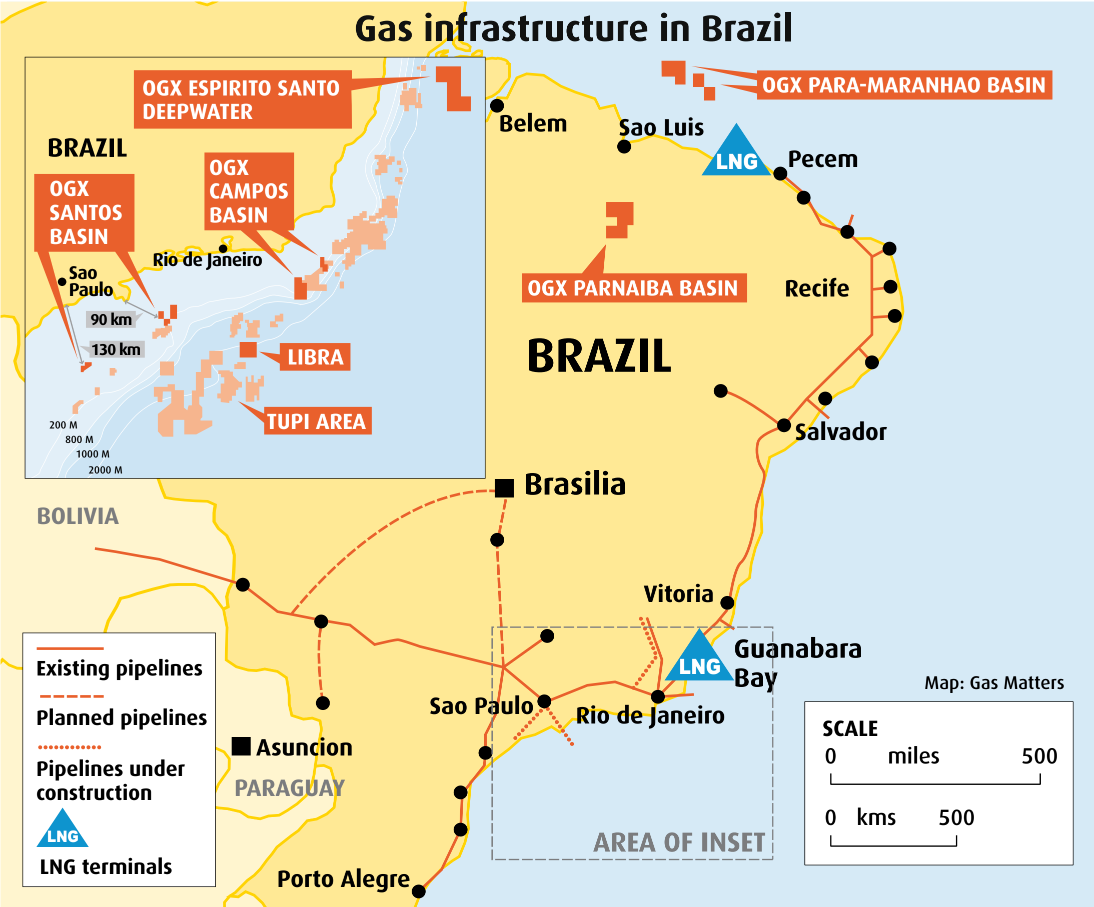
Petrobras, BG, Repsol and GALP Energia last year created a joint venture to study and possibly develop a FLNG project. Front-end, engineering design contracts (FEED) were awarded to three consortia – Saipem, SBM/Chiyoda, and Technip/JGC/Modec in late 2009 and the work is on schedule for completion by the end of this year. The joint venture partners are expected to decide whether they will pursue an FLNG project by the end of first quarter 2011 with start-up of production targeted for 2015, which is a challenging schedule. Shell has been studying FLNG for much longer, and said it is targeting FID on its first project (Prelude in Australia) in 2011 with start of production in 2016.

This option provides partners with the flexibility to supply LNG to Petrobras's two existing LNG floating storage and regasification units (FSRU) with more LNG to be exported to other South American or wider global markets, via long-term or spot contracts.

With the Libra discovery, the total acreage is 100%-owned by Brazil's National Petroleum Agency (ANP) and will be subject to separate plans under discussion by the Federal government at this stage. Libra will be the first of the pre-salt oil fields to be auctioned off under the new production-sharing regime proposed by president Lula, which still has to pass Brazil's Congress. Under the plan, oil blocks would be awarded to the consortium offering to pay the government the largest share of profits but Petrobras must have at least a 30% stake in any consortium.

Will gas volumes grow faster than oil?

Brazilian consumption in 2009 was 18.3 Bcm , according to the 2010 BP Statistical Review, of which 11.9 Bcm was produced domestically. Nearly 8.11 Bcm was imported by pipeline from Bolivia and 0.35 Bcm imported as LNG. From 2005 to 2009, Petrobras domestic gas production grew at the same rate of oil production. With Brazil's current plan, domestic gas production by 2014 is predicted to nearly double 2009 production levels reaching 23.8 Bcm/y whilst oil production is expected to grow by 50% compared to 2009 levels. Out of its total $224 billion investment plan, Petrobras plans to invest $18 billion in gas and power, with 60% of this amount allocated to gas transmission and distribution, as well as natural gas conversion to ammonia and urea for fertilizer production.



The large-scale growth in the Brazilian energy industry requires huge financing

Tapping into Chinese investments

The large-scale growth in the Brazilian energy industry requires huge financing. Over the last eight months, Petrobras raised over $100 billion in new funds. And last month, Petrobras launched the world's largest new stock offer of $70 billion. Earlier in the year, Petrobras successfully raised over $30 billion in loans and credit lines to support current and planned activities: $12.5 billion came from Brazil Development Bank, $10 billion from China Development Bank, $2 billion from US Eximbank and $6.5 billion from various foreign banks.

In 2009, China made an $83 billion commitment to invest in Brazil. Of the $20 billion the Chinese have invested to date, $12 billion was for energy projects. In May, Sinochem Group, China's biggest chemicals trader, agreed to pay $3.1 billion in cash to Statoil for a 40% stake in the Brazilian offshore Peregrino oil field. Earlier this month, Sinopec, China's second-largest oil and gas producer, agreed to invest $7.1 billion in Repsol's Brazilian unit in exchange for a 40% share in the entity. Repsol plans to invest $14 billion through 2019 in the Santos and Espirito Santo basins where the Guara and Carioca fields are estimated to hold 3 billion barrels.

In mid-October, privately-owned OGX announced it was in talks with several potential bidders for a 30% stake after the company found more hydrocarbons than expected (see map). CNOOC and Sinopec were reported to be considering a $7 billion investment in OGX which if confirmed at current market capitalization means approximately a 17% stake.

Such mega-investments from Chinese players demonstrate the strong potential for energy projects in Brazil. With sizeable oil discoveries with significant volumes of associated gas, Brazil's natural gas business could enter a significant period of growth, as domestic industries and power generation absorb increased supply. Brazil will no doubt be a place to watch in the years to come.