

The South American Energy Scenario: Brazil and Peru

Carlos Herrera

South America covers 11.94 per cent of the planet's surface area. The region accounts for 5.87 per cent of the world's population. If Europe were to be superimposed over South America, placing the Iberian Peninsula on the Pacific Ocean coastline, the other tip of the continent would fall within the Amazon jungle.

When we review its energy reserves or production, and we compare them with other regions of the world, it is apparent that South America is a net exporter of energy and is insufficiently explored. In terms of fossil fuel reserves, its share of the world's verified reserves is the lowest of any region, with 3.3 per cent of the world's total. Its share in production is also one of the lowest, with 4 per cent of the world's production. Its reserves to production ratio is below the world's average, indicating that it is among those regions which consume verified reserves at a quicker pace.

The situation regarding hydrocarbons is somewhat different. In the case of oil, the reserves to production ratio is 20 per cent above the world average, exceeding North America, Europe, Africa and Asia Pacific, and solely being surpassed by the Middle East. This means that it is consuming its reserves at a slower rate than a majority of the world's regions.

With regards to natural gas, the reserves to production ratio is close to the world's average. However, the Southern Cone faces the problem of a shortage of supply, and even no supply at all, due to the fact that 70 per cent of the reserves are located in the north of the region, namely in Venezuela.

The following are self-sufficient countries or oil exporters: Venezuela, Colombia and Ecuador in the north; Bolivia and (notably, now) Brazil in the centre; and Argentina in the south, although the latter, if it does not succeed in its exploration operations, could run the risk of being left out of this club in the near future. Chile, Uruguay and Paraguay in the south, and Peru in the centre, are net importers of oil. However, the high price of oil will turn into reserves the resources found in Peru's Amazon region at the end of the

Carlos Herrera, former Peruvian Minister for Energy and Mining.

1990s, thus converting the country into a net exporter. Likewise, Peru expects to find greater gas and oil reserves in the near future thanks to the implementation of a more intensive exploration programme.

With regards to gas, Venezuela, Colombia, Peru, Bolivia and Argentina are self-sufficient or even exporters, although Argentina, as with oil, runs the risk of losing its self-sufficiency. Chile, Brazil, Paraguay and Uruguay are net importers, and not always sufficiently supplied.

The state of reserves and production in South America varies significantly depending on whether or not Venezuela is part of the equation. According to 2006 statistics, Venezuela owns close to 79 per cent of South America's oil reserves, and 69 per cent of its gas reserves. After the discovery of 8,000 million barrels in Brazil, and with the 2 TCF recently announced by Peru, these percentages have changed, falling to 73 per cent and 68 per cent respectively.

The Brazilian example

In November 2007 Brazil announced the discovery of the ultra deep deposit of Tupi, with between 5,000 and 8,000 million barrels of high quality oil. A month later, the same country announced the discovery of a new and important gas reserve in the Espirito Santo field. Both fields are located on Brazil's south eastern coast. Only one year earlier, Brazil had gone from being an importer to a net exporter of oil.

Petrobras, which discovered the oil field, believes that Brazil could become one of the world's top 10 oil producers. Currently its reserves amount to 14,400 million barrels, and the country ranks 17 among oil producers. More than half of these reserves have been discovered during the past five years. With these discoveries, Brazil has become a net exporter of oil.

Extracting this oil from the earth's crust is a formidable challenge. Most of Brazil's oil is located in its continental base, under the sea; however, Petrobras is a leading company in deep water technology. These new reserves place the company above Shell and Chevron, and leave it solely behind Exxon and British Petroleum in terms of reserves.

Brazil's success is due to the state's clear vision in relation to hydrocarbons, and long term work that has begun to bear fruit at the precise moment that oil prices are climbing and reaching historical peaks. Brazil's achievements are remarkable. At the time of the first oil embargo, in 1973, Brazil was an importer of oil. Since then, it has set itself the objective of using more renewable energies and exploring further in search of hydrocarbons. All its goals have been attained: its electric production is essentially based on hydro energy, accounting for around 85 per cent of its needs; in terms of liquid fuels, essential for transport, biofuels like bio-diesel and alcohol

produced from sugar cane are widely consumed, and Brazil has become the world's leading exporter of these products. Natural gas is also used. Petrobras has grown and positioned itself as one of the world's most important hydrocarbon companies. The increase in reserves during the past five years suggests that these will continue to grow in the future.

Energy security

At the end of February 2008, the presidents of Argentina, Brazil and Bolivia met in Buenos Aires with the plan of reaching an agreement regarding the redistribution of Bolivia's natural gas production, by cutting back supply to Brazil in favour of Argentina, which faces serious supply problems, particularly during winter months. But despite the meeting, Argentina failed to persuade Brazil that Bolivia should reassign it part of the gas that it has promised Brazil. Bolivia is committed to supplying 30 million cubic metres per day to Brazil, and 7.7 to Argentina. Currently it is delivering between 27 and 29 Mm³/d to Brazil, and 3 Mm³/d to Argentina.

Meanwhile, Chile is the Southern Cone's most energy-dependent country. During the past few years it has suffered cutbacks in the natural gas quota that it receives from Argentina, which has no production capacity. The supply of gas from Argentina to Chile began in the mid 1990s. At the time, five gas pipelines were built, crossing the Andes mountain range, which borders both countries, and thereby supplying the northern and central regions of Chile. While Argentina is worried about its short-term gas supply and Bolivia's inability to raise the agreed quota, Chile's worries are even greater, given that the deadlock presages a reduction in the quantity of gas that it receives from Argentina.

Over the past few years, energy security has become the main priority of South American countries, especially those in the Southern Cone. A map of their possible needs shows that various countries are considering installing regasification plants in the future, enabling them to import gas from abroad. These countries are also considering extending their nuclear facilities, or developing the nuclear energy sector. Chile has already initiated the process of acquiring two regasification plants: one will be installed in the centre of the country and the other in the north, where the main mining resources are located. Brazil, Uruguay and Argentina have also considered this course of action.

The situation in Bolivia, Colombia, Ecuador and Peru is somewhat different. Bolivia is, after Venezuela, the country with the largest gas reserves. At the start of the current decade, it considered exporting gas to Mexico and California, but would need to build a gas pipeline with a terminal located in the Pacific Ocean to do so. It only had two options: to build it across Chilean

territory, or cross Peru. Both countries showed interest, given that it meant reinforcing energy security. Being the terminal of a Bolivian gas pipeline to the Pacific would place at their disposal considerable reserves of gas.

The company involved in the project chose the outlet through Chile for a variety of different reasons: it meant that the gas pipeline would be shorter, as well as the stability that this meant for the country. However, Bolivians preferred the outlet through Peru due to historic ties between both countries, and in particular because of Bolivia's long-standing demand for the restoration of its coastal territory on the Pacific – which was lost to Chile during the Pacific War of the end of the 19th century. The issue was discussed extensively. Finally, the Bolivian government decided to place the pipeline through Peru and signed an agreement with the latter, but the project fell through. Part of the frustration of exporting Bolivian gas through the Pacific has been the low economic profitability of the project, given that the distance to be covered by land and sea absorbed as a cost a large part of the price of the product in the end market.

However, Bolivia and the surrounding countries believed that it was not necessary to search for such distant markets, given that the region, and Bolivia itself, could substitute these markets. Brazil and Argentina have accepted prices of US dollars 5/MMBTU or even higher; and politically, Bolivian supply to Chile is not any harder than before, although it faces some difficulties in terms of productive capacity, and even in terms of reserves.

Gas has deeply penetrated Colombia's energy mix. During the 1990s, it set itself the objective of attaining the most suitable consumption matrix for the country, substituting high cost energy resources with gas and LPG (liquefied petroleum gas), with a mid-term goal of reaching 3.7 million families. At the beginning of 2007, the number of registered users exceeded 4.2 million.

Currently it produces its own gas, and its reserves to production ratio stands at 11 years. At the beginning of 2007, it had 4.34 TPC of verified reserves. Its supply is guaranteed only in the mid-term.

New reserves in Peru

During the second half of the 19th century, the second oil well in the history of Peru was drilled. Until 1968, the country had been a net exporter of oil, but that year declining production could no longer satisfy domestic demand. The era of the first oil adventure came when the country was a net importer of oil, but its status changed during the 1970s thanks to the oil discoveries within the Amazon jungle and the construction of the Nor Peruano oil pipeline. However, it was not possible to maintain the level of investment in exploration, and at the end of the 1980s Peru was once again a net importer

of oil, with the additional problem that the production stemming from the declining fields of Nor Oriente (Amazon jungle) was of a decreasingly lower API grade. It was necessary to export heavy crude and import light crude so as to have a mixture that could be processed in refineries.

During the 1980s, the only hydrocarbon discovery took place at the Camisea field, where natural gas predominates. During the 1990s, Peru attempted to place a value on Camisea and tried to imitate Colombia by adapting its energy matrix to fuels like natural gas. At the time, Shell and Mobil obtained the concession to the fields and reached an agreement with the Peruvian state. However, the agreement was never finalized, and the reserves remained at Camisea. This occurred at the end of the 1990s, when oil prices declined and reached historical lows.

With significant verified reserves, the Peruvian state opened up a tender process for the exploitation of Camisea. In August 2004, gas from Camisea reached Peru's main consumer market, Lima. There were always fears that a city not accustomed to using heating in winter, and where the electricity matrix had a hydro energy share of 85 per cent, would have no room for gas; there was thus growing interest in exporting the fuel. However, market reaction was favourable, with positive acceptance within the electricity market and industry, and lately there have been requests for gas for the transport of petrochemical products. Peru is enjoying healthy economic growth based on the stability provided by the last four governments. It is a country with large mining resources, and investments in mining require new installations that generate electricity, which due to the current favourable conditions are covered by gas. Economic growth and energy consumption have exceeded the most optimistic scenarios. Deposits near Camisea have been put out to tender, and all have – and expect to have – a specific commercial connection. One of them has already staked out a new reserve to the order of 2 TCF. Additionally, new discoveries are expected.

The existence of gas in Peru and gas needs within the southern region, in particular in Chile, led to the creation of a project called the Energy Ring, through which Peruvian reserves were to be supplied to countries within the Southern Cone. However, this project came to a halt because the gas reserves were not sufficient to supply Peru's own market, due to export commitments, and also because of the demands of neighbouring countries. It is expected that hydrocarbons will play a dynamic role in Peru over the next few years.