

Should we expect a natural gas “boom” in Brazil? Insights from the energy planning tool TIMES-ConoSur.

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Introduction

The start of operation of the 3,150 km of pipelines connecting Bolivia’s gas sources to the south-eastern and southern regions of Brazil in 1999 represented a milestone for the development of natural gas industry in Brazil. Industrial consumption in Sao Paulo and thermal power plants triggered the consumption of gas and by 2005 the so called GasBol pipeline reached its full capacity (30 million m³/day).

In 2006, the Bolivian government, in a renegotiation contract strategy with Petrobras, threatened to cut off the gas supplies to Brazil, exposing the weakness of the Brazilian natural gas supply chain (MARTINS et al., 2016). Aiming to increase the energy security of the country, to deal with both a possible disruption of Bolivian gas supply and severe dry years, Brazil constructed three LNG regasification terminals.

In 2006, Petrobras was successful in drilling and discovering oil through a massive salt layer off the Brazilian coast that stretches from the Campos to the Santos Basin, thereafter known as pre-salt reservoirs. Some pre-salt fields have a high gas to oil ratio, such as Lula and Sapinhoá, with 0.021 Mm³/Mbbbl and 0.029 Mm³/Mbbbl, respectively, based on their production of January (MME, 2016a). Natural gas produced in pre-salt fields comes as associated to oil production, and in the case of offshore fields, it is connected to Natural Gas Processing Plants in the coast through pipelines. This Pre-salt associated gas summed to the post-salt gas production might boost natural gas supply in Brazil.

Methodology

Can this gas ramp-up be absorbed in the domestic market? How can this increase of domestic supply affect Bolivian gas and LNG imports? These research questions are addressed by this paper. For that, an integrated energy modelling tool, TIMES-ConoSur, was used. TIMES-ConoSur is a pioneer energy planning tool for natural gas covering the Southern Cone constructed on the TIMES

platform. It provides the natural gas demand by end-uses and power generation, the domestic natural gas production curves and costs, the trade of natural gas by either LNG or international pipelines, the capacity expansion of technologies, CAPEX and OPEX, and total energy system costs.

As most of natural gas in Brazil comes associated to oil fields, two scenarios are developed: a “High EUR Scenario” and a “Low EUR Scenario”, where EUR means the Estimated Ultimate Recovery assumed to construct Multi-Hubbert curves for Post-Salt and Pre-Salt oil production in Brazil.

Results

Results shows that Natural Gas Gross Production in Brazil under a “Low EUR Scenario” can reach 66 MMm³/d in 2030 whereas in a “High EUR Scenario” the production reaches 110 MMm³/d. Much of gross gas produced in the High EUR Scenario was sent to reinjection as importing Bolivian gas was cheaper than perform additional investment to transport gas from offshore fields to the coast. The higher availability of natural gas was not reflected in significant changes in gas consumption for power generation, resulting in differences of 5% in the demand between the “Low EUR Scenario” and the “High EUR Scenario”, under a cost-minimization perspectives.

Conclusions

It can be concluded that Brazil has the potential to significantly reduce its imports of natural gas, especially LNG, which would be displaced to attend contingencies such as dry years. However, increase the supply is one part of the equation, policies to expand access to gas for industrial and buildings users can help monetizing the Brazilian gas.