

Evaluating the Economic Feasibility Conditions of Unconventional Natural Gas in Brazil

Lion, Manuella B., Msc Economics from UFRJ, manuella.lion@ppge.ie.ufrj.br
Almeida, Edmar L. F. PhD and Professor at UFRJ, edmar@ie.ufrj.br
Losekann, Luciano PhD and Professor at UFF. luciano.dias.losekann@gmail.com

Abstract — One of the most important issue for the future of natural gas industry is the possibility of replication the North American shale gas revolution in others countries. Although there is no doubt about the availability of unconventional resources all over the world, the economic viability goes beyond the geological risk and includes other relevant characteristics that are discussed in this paper. This paper presents a discounted cash flow simulation model where productivity, gas price, opex and capex, are the inputs and Internal Rate of Return (IRR) and Net Present Value (NPV) are the outcomes. As the business model suggests, the dispatch flexibility is the variable that has the major impact in the economic attractiveness of the unconventional resources. The study shows others important issues, like the industry structure and the financial and regulation aspects, that are definitely crucial for the success of the activities.

Keywords - Cash flow analysis, North America Energy Revolution, Sensitivity study, Shale Gas, Unconventional Resources.

1. INTRODUCTION

The exploration and production of onshore natural gas in Brazil face important challenges. Nowadays, more than half of the gas supply in Brazil is imported from Bolivia through the Gasbol (33.3%) and from other countries through LNG (19.7%).

Additionally, the demand of natural gas tends to increase rapidly due to the current crisis of the Brazilian electric sector and the consequent continuous dispatch of the gas

thermal power plants. Additionally, natural gas is a strategic fuel for the transition to a low carbon economy.

The lack of capacity to regularize the hydro reservoir is changing the operation of the Brazilian electric system. Instead of relying predominantly in renewable sources, like hydro, the current trajectory indicates that thermopower plants will have a more important role for energy security. Recently, Brazilian government announced emergency auctions to contract natural gas thermal power plants to be construct near the main consumer centers - Rio de Janeiro, São Paulo and Belo Horizonte (O GLOBO, 2015).

At the same time that Brazilian natural gas demand is growing steadily, and the country experiences an energy crisis, the United States experiences an energy revolution triggered by the unconventional resources.

The term unconventional natural gas refers to the natural gas that is extracted from rocks with low permeability and low porosity. These special rocks characteristics require specific techniques such as horizontal drilling and hydraulic fracturing to produce gas from the fields. Nowadays there are only three kinds of unconventional resources that are economic attractive: coalbed methane, shale gas and tight gas.

The technological innovation related to the combination of hydraulic fracturing and horizontal drilling is frequently pointed as responsible for the technical feasibility of the unconventional resources. However, the success of the unconventional activities is also determined by the US business environment.

The geology indicates that Brazil has a big potential in terms of high volumes of unconventional natural gas. According to the Energy Information Administration, the country is in the 10th position of the ranking