

FUEL SUPPLY CERTIFICATION IMPACT ON E&P EXPENDITURES IN A R2W PROJECT

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Overview

The reservoir-to-wire (R2W) business model is characterized by a set of thermal power plants whose fuel comes exclusively from a natural gas field located in the surrounding areas, in a way that the upstream is completely oriented to attend power plants demand. This business model could be a profitable way to monetize a gas reservoir located at remote areas; nonetheless, the integration between the electricity generation segment and the upstream segment makes each one of them exposed to uncertainties and regulatory specificities from the other segment.

An example of how these regulatory peculiarities may affect the operation of a R2W project comes from the Brazilian energy industry. The Ministry of Mines and Energy act (“*Portaria MME*”) nº 514/11 required that natural gas power plants presented a contract to certify fuel availability in the period which the power plant could be dispatched by the Brazilian electrical system operator. Subsequent norms modified the MME act contents, but still maintained the requirement of a full supply certification.

In response to such regulation, a conventional natural gas power plant would have to negotiate with its third-party supplier a agreement promising enough fuel supply. Differently, a R2W generator would potentially need to increase its investment in E&P in order to discover new gas reservoirs and reach the level of proven reserves necessary to meet the regulation requirements. These expenditures could be significantly higher than the amount that would be charged by a third-party supplier, since it is typically a large dealer, capable to commit to fuel availability with a small marginal cost. Furthermore, the R2W generator ends even more exposed to the uncertainties coming from the upstream. Consequently, this regulation potentially modifies the financial viability of a R2W project *vis-a-vis* its competitors.

If the fuel availability comprovation requires a level of gas reserve greater than the level of gas reserve the company would like to have without this regulatory requirement, it could greatly change E&P expenses. Besides that, the effort to prove gas availability depends on the initial level of gas reservoirs and other parameters

In order to provide a quantitative assessment of the impact of fuel supply certification on E&P expenditures in a R2W project, we propose a model that simulates the upstream activities in onshore gas fields. This model encompass the main investment expenditures and captures the uncertainties inheerents to a gas field exploration. The model was built considering the process to explore and develop a gas field – including activities from the first seismic activities to building the pipeline from the proved reservers to the power plants, based on Eneva’s activities, the main R2W operator in Brazil.

In the context of a R2W project, a correct evaluation of the fuel supply availability requirement impact should compare the E&P expenditures in (i) a scenario in which the gas production just needs to satisfy electricy generation demand and (ii) a scenario in which is required to satisfy both electricity generation and fuel supply certification. This is not a simple comparison since the gas reservers found in the effort to meet electricity generation demand will also be useful to demonstrate fuel availability and *vice versa*. So a investment intended to only increase fuel availability may not be necessary depending on the results of the E&P investments made to satisfy electricity generation. Our model is able to provide E&P expenditures estimatives in both scenarios.

Methods

The proposed model, using Monte Carlo simulation, estimate the E&P expenditures based on the occurrence of different possible events.

Results

Preliminary results shows that additional expenditure associated with fuel supply requirement is very sensitive to the electricity dispatch ratio relative to the power plant capacity and to initial gas reserves. Expected results show the sensibility of E&P expenditures to different parameters and hypothesis specifications.

Conclusions

The reservoir-to-wire business model may be an efficient, if not the unique, way to monetize a gas reservoir. The financial viability of this model depends, among other aspects, on the owner capacity to manage the uncertainty and regulation associated with both the electricity generation segment and the upstream segment. The requirement of a fuel availability agreement with the electricity producer increases the R2W project expenditures in E&P and its exposure to uncertainties associated with the exploration of gas fields. The model proposed provides a quantitative estimative of this additional E&P expenses. The magnitude of this increase depends on a set of initial conditions.

References

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