REGULATORY ASPECTS AND ECONOMIC BARRIERS FOR THE OPERATION OF NATURAL GAS THERMOELECTRIC PLANTS AT THE BASE OF BRAZILIAN ELECTRICAL SYSTEM

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Overview

The Brazilian Electricity Sector (BES) is organized as a hydrothermal system, with a predominance of hydraulic generation, about 66% of total electricity generation. Thermoelectric generation participates as a complementary source in the National Interconnected System (NIS) and account with 25% of the supply. The energy supplied by thermoelectric plants is contracted through auctions, under the availability regime, in which bids are ranked according to the competitiveness of the Cost Benefit Index (ICB). Due to the persistent drought of the recent years, however, thermoelectric plants are being dispatched more frequently than initially planned, generating additional costs for consumers. In addition, it is expected that recurrent thermoelectric dispatch will become increasingly frequent in the future due to: (i) the fact Brazil near the limit of the expansion of the generation coming from hydropower plants with reservoirs; and (ii) the increasing share of intermittent renewable sources in the electricity mix, including watercourses and windpower. In this context, the "complementary generation" function performed by thermoelectric plants may not be the most efficient modality for contracting this type of source, and other modalities deserve to be analyzed. In this context, the objective of this article is to identify the main regulatory issues and economic barriers that prevent thermoelectric plants, particularly those that run with natural gas, to start operating at the base of the NIS.

Methods

A brief review of the Brazilian Electricity Sector (BES) and Natural Gas industry structure is presented in the first section. In the second section offers an overview of the use of NG in thermoelectric plants in Brazil and the main domestic regulatory framework. In the fouth section the paper discusses the contracting instruments for thermoelectric power plants and the impact of recent drought in thermoelectric dispatch. Finally, it is identified the main economic and regulatory barriers that prevent natural gas thermoelectric to operate at the base of the National Interconnected System.

Results

This abnormality of rainfall regime since 2012 has been a problem for thermelectric generators once the plants were not planned to be continuously dispatched and faced technical restrictions of operation and maintenance. According to contracts, those plants that could not dispatch the energy determined by the National Operator System (NOS) had to buy the requested supply in the short-term market in a period of high prices due to water stress. In 2014, the short-term price reached R$814/MWh in the sub-markets South-East/Mid-West and South of the country, i.e about 370% of average price in the last 10 years. Additionally, the rules for the reconfiguration of energy capacity and reimbursements for thermoelectric plants contracted for availability were designed without taking into account the capacity of payment and the economic size of the projects, which made the financial obligations unfeasible.

Moreover, on the supply side, the cost of NG molecule has been high since the country's economic structure lacks long-term interest rates that encourage private agents to engage in NG exploration, production and processing. In Brazil, the Public Sector has been responsible for the major share of investments in the NG industry, through the National Bank for Economic and Social Development (BNDES) and its main state-controlled company, Petrobras. On the demand side, the country has not yet developed a firm long-term demand, creating uncertainties to the investors.

Conclusion

The main conclusions indicate that the current regulatory framework is incompatible with the scenario of water scarcity observed in recent years. The absence of both: (i) a robust natural gas supply, and (ii) a firm demand discourages investments and make the price of the natural gas supply very high. Since one of the NOS goals is to minimize the electricity cost, the current model of contracting and dispatching increases the costs of tariffs for society as a whole and reduces national competitiveness. Due to the way that the regulatory and economic framework is

designed, several barriers are raised in Brazilian NG market. Consequently, the contracting model should be reviewed in order to balance regulatory aspects and economic incentives**.**

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