NATURAL GAS: THE ROLE OF A STRATEGIC RESOURCE FOR THE BRAZILIAN AMAZON

**Gabriel Lobato Cardoso**, Universidade de São Paulo, +55 91 993362274, gabriellobato@usp.br **Estanislau Luczynski**, Universidade Federal do Pará, +55 91 981513004, stasnis@yahoo.com

# Overview

 The natural gas market in the Brazilian Amazon is undergoing a new phase of expansion, which can be seen in the reactivation of exploratory fields and recent commercial discoveries in the Amazonas and Solimões basins, as well as the implementation of new production and disposal infrastructures. Considering this scenario and relating it to paradigms of energy transition, energy security and sustainable development, this article discusses the strategic importance and perspectives for natural gas in this region.

**Methods**

Being part of an academic research, the core of discussions was based on reviews and compilation of data from scientific articles, books, academic papers, technical or executive reports and institutional energy planning. A total of 20 papers and works were considered, all of them written from 2002 to 2024. The analysis of this set of documents enabled a ranking of specific aspects to be discussed, according to the economic, environmental and energy axes, which took into account the Brazilian Amazon’s characteristics related to the complexity of its energy scenario.

# Discussions

The first aspect consists of a group of opportunities related to the natural gas as an input in consolidated industrial activities in the region, being the main one the metallic mining at state of Pará. It is relevant to note the high dependence on diesel in its energy matrix, which leads to a low energy efficiency and higher levels of greenhouse gas (GHG) emissions. In this scenario, natural gas can act as an energy substitute, as well equalizing the energy supply and GHG emissions along with Brazilian decarbonization policies.

A possible share of marketcan be also seen in the steel industry, most of it located at state of Pará. For this sector, natural gas is understood as a possibility of input for alumina, sponge iron or even steelmaking by replacing mostly of pig iron in blast furnaces so contributing to reducing costs. This prospect can also take advantages from recent moves to introduce natural gas into the sector via liquefied natural gas (LNG) supplies, which will be unloaded at terminals in the northeast of Pará.

 At the same time, regional thermoelectric generation also presents attractive projections for the resource due the initiatives at the federal level to contract gas-fired plants to support the Amazonian electricity system. When examining the projections up to 2032, it is possible to see an increasing share of natural gas in the operational security of the national and Amazonian matrix. This is because natural gas has advantages related to its attractive price and its continuous supply, which allows it to support the low local consolidation of renewable sources and boost internal electrification in different parts of the Amazon.

 An example of the such resource for energy security can be seen from the state of Roraima (the only Brazilian state not linked to the grid of the National Interconnected System), since its main thermoelectric plant, Jaguatirica II, will now be supplied via LNG by production from the Azulão field in the Amazonas Basin. In this sense, there is also the possibility of implementing gas-to-wire technology, which will help to monetize reserves in the Brazilian Amazon, so it will allow to reduce logistical costs and to strengthen the regional energy supply. A scenario that may diminish dependence on imports and circumventing price fluctuations due to foreign geopolitics.

 The current production and potential for conventional and unconventional natural gas in the Amazonas Basin, as well as its geologic context, could also contribute to the Brazilian Amazon becoming one of the country's blue hydrogen production centers. This could be made possible by the introduction of Carbon Capture and Storage (CSS) arrangements, considering the potential of the basin's geological formations, such as the Barreirinha Formation, for CO2 sequestration. In addition to the possibility of a new resource for the energy transition in the Amazon and Brazil, this prospect could contribute to the decarbonization of metallic mining and steel industry, as well as other regional industrial activities. Such scenarios will depend of the development of feasibility studies.

**Conclusions**

Natural gas can play a strategic role in socio-economic, environmental and energy market changes in the Brazilian Amazon. The introduction of gas into the regional thermoelectric sector could boost the conversion of current diesel-powered plants thus strengthening the relationship between energy security and transition. In the regional industrial sector, natural gas can contribute to reducing costs and decarbonizing activities, which can be boosted by the CO2 geological storage in the context of blue hydrogen production. Whether in energy production or as an industrial input, the application of the Amazon’s natural gas resources and reserves in favor of sustainable regional development points to a new market model for the region and Brazil as a whole.