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THERMAL POWER PLANTS: THE INEVITABLE CHOICE

- *As building hydroelectric power plants with large reservoirs becomes more difficult, power generation has become increasingly dependent on hydrological regimes.*
- *The increasing share of wind and solar energy in the energy matrix also brings greater instability to the system, as these sources are intermittent and dependent on specific climatic conditions.*
- *Introducing natural gas-fueled thermoelectric plants at the base of the system has the potential to offset the instability of other sources and reduce costs, apart from generating a minimal demand that would make it possible to develop the natural gas market in Brazil further.*

Once a factor that favored the competitiveness of Brazilian industry, electricity is now reducing it due to its high price and low quality. Failures in energy supply cause significant losses to 67% of industrial companies, which mainly use electricity in their production process. Brazil needs to rely on a secure supply and on stable and competitive prices.

The expansion pattern of the Brazilian energy generation matrix, based on hydroelectric sources, has been showing signs of exhaustion. This is due to difficulties to build new plants with storage reservoirs and to the penetration of new intermittent renewable energies, notably from wind and solar sources.

This scenario makes the country more dependent on dispatchable sources, such as on natural gas-fueled thermoelectric plants, resulting in unsustainable costs in increasingly likely scenarios of frequent and long-term thermal dispatch. The reason is that thermoelectric plants in Brazil are traditionally designed to complement hydraulic generation.

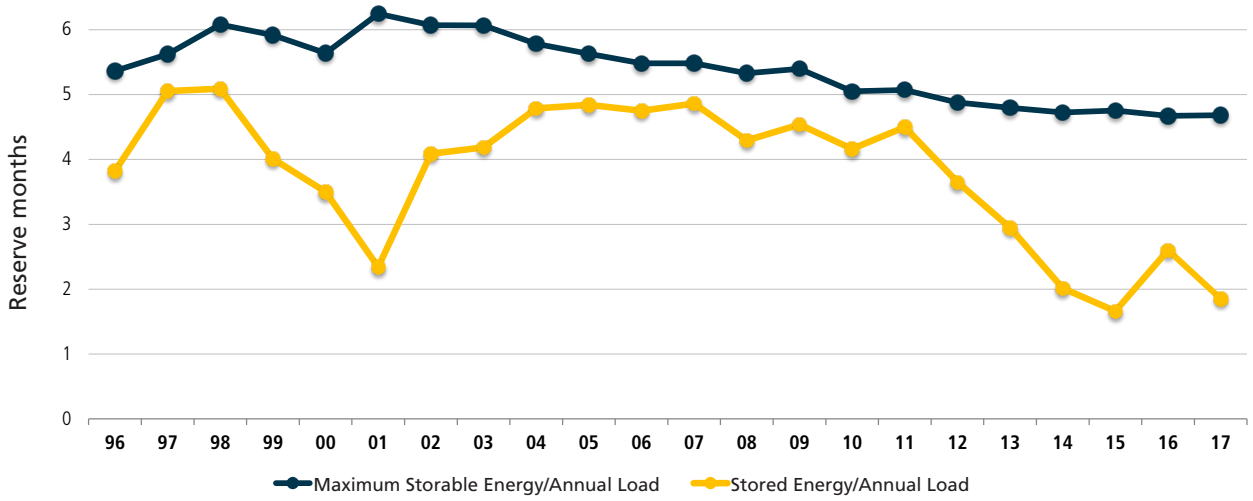
The Brazilian thermal park is mostly made up of flexible units, i.e. reserve or emergency plants, which lack the capacity to ensure the minimum mandatory generation. These are units with low fixed costs but high variable costs and their use for prolonged periods results in high prices.

The high variable cost of flexible thermal plants ends up determining the Difference Settlement Price (PLD, in the Brazilian acronym), which is the price reference for the free energy market, with major impacts on the competitiveness of the industrial sector.

The use of natural gas-fueled thermoelectric plants in the current Brazilian electrical system is hampered by the contracting methodology adopted by the country, which imposes high risks on projects. In addition, the methodology for calculating the Cost-Benefit Index (ICB, in the Brazilian acronym) has a pro-flexibility bias due to the operational paradigm of the Brazilian electricity sector, which prioritizes the use of water reservoirs with the aim of avoiding future overflows and spending on fuel.

The contracted thermoelectric park, which is predominantly flexible, also creates unpredictability for the natural gas sector. Uncertainty about demand for gas undermines the feasibility of exploration, production and transportation projects, which require a stable financial guarantee to dilute investments.

AVERAGE CAPACITY IN MONTHS OF WATER RESERVOIRS IN THE NATIONAL INTERCONNECTED ELECTRICITY SYSTEM



Source: Prepared by CNI based on data from the National System Operator (ONS).

Ensuring the feasibility of more inflexible plants, backed by less costly long-term fuel contracts, is fundamental for the future sustainability of the domestic electricity sector, in addition to contributing to promoting greater use of more competitive domestic gas resources.

Main recommendations

1 Changes in regulation should be made to allow for thermal plants to be introduced at the base of the system by appropriately valuing the important role of water reservoirs, based on the adoption of new operational and renumbering criteria for hydroelectric plants and on the reformulation of the Cost-Benefit Index.

2 The use of structuring thermal plants should be promoted through deterministic planning, selecting thermal projects designed to operate at the base load level and at specific locations consistent with the efficient expansion of the National Interconnected System (SIN) and of the domestic gas pipeline network, contributing to the development of the domestic natural gas industry and reducing energy dependency.

3 The planning of the electricity and natural gas sectors should be integrated by considering potential thermoelectric demands in the planning of the gas transportation sector and in identifying desirable locations for expanding the use of thermal plans in the planning of the electricity sector.

4 The risks of thermal projects should be reduced through regulatory changes such as the following ones: expansion of the limit of operational inflexibility; annual confirmation of rolling reserve for a five-year horizon; review of penalties for temporary non-availability of fuel; review of the ICB methodology; and seasonal adjustment of inflexibility and of the Variable Unit Cost (CVU, in the Brazilian acronym), with annual announcements.

The full version of the document can be accessed through the QR code on the side or at: http://www.cni.com.br/eleicoes2018/downloads/ This summary is part of the series Proposals of Industry for the 2018 Elections comprising 43 documents. The series, which is based on the *2018-2022 Strategy Map for Industry* is a CNI contribution to the new federal administration and presents analyses and proposals of priorities to increase Brazil's competitiveness.

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