BRAZIL 2025 ENERGY POLICY REVIEW: IEA RELEASES ITS ASSESSMENT OF BRAZIL'S ENERGY SYSTEM

Focusing on coordinated expansion planning, the PHBC framework, and demand-side management, the International Energy Agency (IEA) released the Energy Policy Review – Brazil 2025, providing a comprehensive assessment of the evolution of Brazil's energy system. ABIHV has prepared a technical analysis highlighting the direct implications for the development of low-emission hydrogen, with an in-depth discussion of coordinated expansion planning, the extension of the PHBC timeframe, and demand-side management—structural issues currently at the core of discussions with the Energy Research Office (EPE) and other key sector stakeholders.

The data show relevant progress, but also highlight critical challenges that must be addressed to ensure competitiveness, energy security, and regulatory predictability.

Main findings of the report

Explosion of distributed solar generation (DG).

- Growth from **0.2 GW (2017)** to **20.6 GW (2024)**[2].
- The current compensation model increases inequalities, creating the effect of **"rooftop solar taxing the poorer"**
- The IEA classifies the system as **inefficient and risky,** calling for swift reform.

Growing curtailment is already affecting system operations.

- The country is experiencing frequent cuts in solar and wind generation.
- Steeper ramps increase the risk of instability and uncertainty for new investments.

Green Hydrogen: transmission bottlenecks are critical

- Producing **2 Mtpa of hydrogen** would require an increase equivalent to +16% of current electricity generation.

- It would be necessary to **double** the wind and solar capacity dedicated to electrolysis-based hydrogen projects.

- Strategic hubs, such as the **Pecém** hub in Ceará, are already showing signs of structural congestion.

The IEA warns that grid expansion takes at least 7 years, far longer than the deployment timelines for renewable projects or hydrogen plants.

Declining system flexibility

- The hydropower capacity factor has declined from over 50% to approximately 40%.
- Higher thermal dispatch is putting pressure on costs and emissions.

Climate competitiveness remains high

- Brazil's average electricity emissions intensity is approximately **75 gCO_2/kWh**, one of the lowest in the world.
- A decisive advantage for low-emission hydrogen.

[1] Prepared based on the Energy Policy Review 2025 report by the International Energy Agency (IEA).
[2] Data from the Brazilian Electricity Regulatory Agency (ANEEL).

ABIHV
Associação Brasileira da Indústria do Hidrogênio Verde

@abihv_br company/abihv
contato@abihv.org.br abihv.org.br

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ABIHV'S POSITION

ABIHV highlights three immediate priorities:

1. Coordinated expansion planning (PDE, PDT, PHBC, and DR)

IEA data confirm the need for an integrated planning approach—an agenda that ABIHV has already been advancing in collaboration with EPE, as well as other key institutions such as ONS, ANEEL, MME, and the TCU. Hydrogen expansion requires:

Explicit integration of electrolyzers as new structural load centers. Hydrogen projects must be treated as new major load centers, with direct impacts on:

- Transmission planning;
- Expansion of renewable generation;
- Structural investments in hubs such as Pecém, Suape, and Piauí.

ABIHV has been working directly with EPE in this process, contributing through:

- Demand projections by cluster (Pecém, Suape, Piauí);
- Saturation analyses and mapping of critical nodes;
- Integrated Projections of Renewable Expansion and Electrolytic Demand;
- Inputs for Energy and Transmission Modeling.

The interaction between ABIHV and EPE to anticipate planning and ensure the orderly expansion of hubs and transmission assets is vital to prevent network limitations from undermining the projected high demand.

Extension of the PHBC timeframe

The recent extension of the PHBC was a crucial step to:

- Provide predictability for investors;
- Coordinate industrial timelines with the pace of grid expansion;
- Reduce the risk of inconsistencies between permitting, construction, and grid connection;
- Ensure that strategic projects remain viable while awaiting transmission reinforcements.

The deadline extension occurs in a context where Brazil faces a relatively high cost of capital, as highlighted by the IEA—one of the primary challenges for CAPEX-intensive projects, such as low-emission hydrogen.

The extension of incentives is, therefore, a financial risk mitigation tool, contributing to improved project bankability and synchronizing investments with the actual timelines for power infrastructure expansion.

With this extension, the country reduces economic barriers and strengthens its competitiveness in the nascent global market for low-emission hydrogen.

Need for a strategic load prioritization instrument. Coordination between the PDE, PDT, and structural grid reinforcements (MME–EPE–ONS)

H_2 projects cannot compete for capacity through uncoordinated capacity allocation processes. **ABIHV advocates** for a clear, technical, and transparent mechanism to:

- Technically and transparently prioritize projects of systemic and industrial relevance;
- Define "strategic demand";
- Allocate grid capacity in a planned manner;
- Sectoral integration in industrial clusters;
- Avoid the "chaos in access allocation processes," identified by the IEA as a structural bottleneck.

Demand-Side Management (DR/DSM)

Due to its operational flexibility, hydrogen can and should be part of the solution, acting as:

- Flexible industrial load;
- A mitigation mechanism for solar and wind ramping events and system balancing;
- A smart consumer during low-price periods;
- An indirect provider of ancillary services enabled by flexible and dispatchable electrolyzers.

ABIHV advocates for Brazil to advance policies that:

- Establish Demand Response (DR) mechanisms tailored to the industrial sector;
- In line with IEA Recommendation 15, ABIHV advocates the immediate implementation of flexibility auctions and locational price signals, enabling hydrogen production to function as a "virtual battery" for the power system;
- Remunerate electrolytic loads that modulate consumption for the benefit of the power system;
- Integrate electrolyzers as an active tool for managing the National Interconnected System (SIN);
- Include Demand Response (DR) within the PHBC, the PDE, and the regulatory flexibility funding mechanisms.

This is one of hydrogen's greatest competitive advantages and should be incorporated into planning.

Accelerated reform of net metering

Essential to reduce inequalities and preserve the system's economic and financial sustainability.

3. Regulatory framework for flexibility and energy security, including:

- Energy storage
- Demand Response;
- Ancillary services;
- Stabilizing role of hydropower plants;
- Ramp management to accommodate VRE and H_2.

Next steps:

- Further consolidation of technical interactions with EPE on coordinated expansion;
- Joint ABIHV–EPE–ONS proposal to incorporate H_2 loads into decennial planning;
- Structured contribution to the debate on the expansion of the PHBC;
- Preparation of a sectoral dossier by cluster (Ceará, Pecém, Suape, Itaqui).