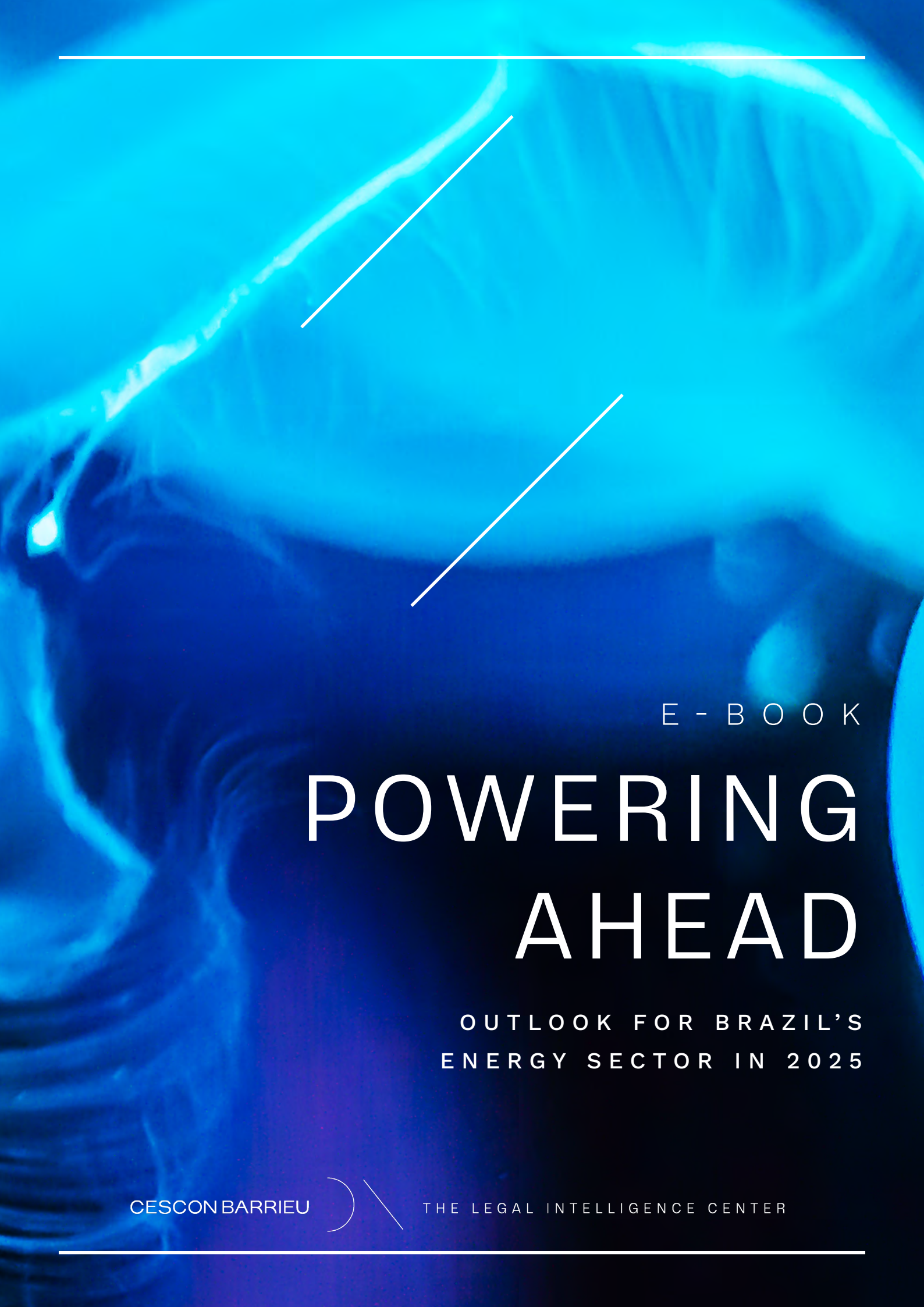

E-BOOK

POWERING AHEAD

OUTLOOK FOR BRAZIL'S ENERGY SECTOR IN 2025

CESCON BARRIEU

THE LEGAL INTELLIGENCE CENTER

INDEX

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1

THE NEW LEGAL FRAMEWORK FOR THE POWER SECTOR IN BRAZIL

MARKET LIBERALIZATION AND REGULATORY CHALLENGES

LUCIANO SOUZA
luciano.souza@cesconbarrieu.com.br

Brazil's electric power sector is undergoing significant transformations in its regulatory framework, with important advancements occurring between 2024 and early 2025. In addition to the anticipated Provisional Measure proposing a comprehensive sector reform, Brazil has approved strategic legislation that strengthens its commitment to energy transition and modernization of the electric system.

Provisional Presidential Measure for Electric Sector Modernization

The Federal Government has enacted Provisional Presidential Measure (MPV) No. 1300 dated May 21, 2025, that proposes a comprehensive reform of the Brazilian electric power sector. This initiative constitutes a governmental agenda aimed at modernizing and enhancing the efficiency of the country's regulatory framework.

The central elements of the MPV are:

1. the gradual opening of the electricity market to low-voltage consumers, who are currently restricted to mandatory contracting with local distribution utilities. As of August 2026, industrial and commercial consumers will have the freedom to select their electricity suppliers, with this option extending to all residential consumers in 2027.

2. changes to the minimum demand and minimum shareholding in self-producing companies, in the case of new self-production structures by equivalence (*autoprodução por equiparação*).

3. limitations on distribution/ transmission system use charges (TUSD/TUST) discounts applicable to renewable energies.

The MPV also addresses the expansion of the Social Electricity Tariff, providing for full exemption from electricity charges for low-income families consuming up to 80 kWh per month, with additional exemption for families with per capita income between one-half and one minimum wage, up to 120 kWh.

Recent Legislative Advancements (2024-2025)

ENERGY TRANSITION ACCELERATION PROGRAM (PATEN)

In January 2025, the federal government enacted legislation establishing the Energy Transition Acceleration Program (PATEN), a strategic initiative that reinforces Brazil's commitment to sustainable development.

PATEN facilitates access to credit for companies holding receivables from the federal government, such as court-ordered payments and tax credits, to finance projects related to energy transition. The Green Fund, created by law and managed by the National Economic and Social Development Bank (BNDES), will serve as the foundation for this financing.

Areas covered by the Program include the development of sustainable fuels, energy recovery from waste, modernization of power generation and transmission infrastructure, and the replacement of polluting sources with renewable alternatives.

REGULATORY FRAMEWORK FOR OFFSHORE WIND ENERGY

In January 2025, President Lula signed into law, with certain vetoes, legislation regulating offshore wind energy production. This legislation establishes a regulatory framework to enable investments in the offshore wind sector.

The text provides for authorization to install wind farms in Brazil's territorial waters, exclusive economic zone, and continental shelf, establishing the requirement for auctions to grant concessions for areas and dividing the process into two phases: assessment and execution.

The regulation of offshore wind energy in Brazil continues to be defined by the Executive Branch. Despite the law establishing the legal framework since January, essential aspects still await regulatory implementation. The Ministry of Mines and Energy (MME) is expected to publish a regulatory timeline in the second half of 2025.

CARBON MARKET REGULATION

In December 2024, Law No. 15,042 was published, regulating the carbon market in Brazil by establishing the Brazilian Greenhouse Gas Emissions Trading System (SBCE).

The Law established a dual structure for the Brazilian carbon market, dividing it into regulated (linked to governmental initiatives) and voluntary (related to private sector initiatives). The most significant impact will fall on thermoelectric power plants, which will face increased costs as they need to acquire carbon credits to offset their emissions.

The implementation of the SBCE is divided into five phases, with the first phase scheduled to begin in early 2025 and last 12 months (extendable for an additional 12 months). During this initial phase, governance and emission limits will be defined, clarifying important aspects such as the application of the stipulated caps.

Regulatory Challenges in Focus

ANEEL'S ROLE IN THE TRANSFORMATION PROCESS

The National Electric Energy Agency (ANEEL) plays a fundamental role in the transformation process of the Brazilian electric sector. In November 2024, the agency approved its Regulatory Agenda for the 2025-2026 biennium, establishing 28 regulatory activities divided into four thematic areas.

Of the 28 planned activities, 17 are considered priorities and are scheduled for regulatory action in 2025. Additionally, ANEEL is conducting a Public Consultation on the issue of curtailment and is involved in discussions regarding the renewal of distribution utility concessions.

Recent Legislative Advancements (2024-2025)

RENEWABLE ENERGY GENERATION CURTAILMENT

One of the most relevant issues in the current regulatory landscape is "curtailment" or "constrained off," which consists of the reduction of electricity dispatch from wind and solar plants by the National Grid Operator (ONS).

With bottlenecks in power transmission, renewable generation facilities continue to face limited output. To address this challenge, the Electric Sector Monitoring Committee (CMSE) decided in March 2025 to create a working group to discuss actions to reduce generation curtailment.

ENERGY STORAGE SYSTEMS

Another significant issue on the regulatory agenda is the integration of energy storage systems into the National Interconnected Grid. ANEEL has included in its 2025-2026 Regulatory Agenda an activity related to this topic, with regulatory action scheduled for 2025.

This regulation is crucial for advancing energy transition in Brazil, as storage systems are fundamental for managing the intermittency of renewable sources.

ELECTRIC GRID RESILIENCE

In response to the increase in extreme weather events, ANEEL has also included in its 2025-2026 Regulatory Agenda an activity related to enhancing the resilience of distribution and transmission systems, with regulatory action scheduled for 2025.

BILLS UNDER CONSIDERATION IN THE NATIONAL CONGRESS

In addition to legislation already approved, several important bills for the electric sector continue to move through the National Congress. Among them:

- Bill 3,864/2022: Establishes financial compensation of 7% on wind and solar power production, allocated to states and municipalities.
- Bill 4,386/2024: Establishes safeguards for environmental licensing of wind and solar projects, seeking to streamline processes and ensure greater legal certainty for investors.
- Bill 671/2024: Prohibits electric distribution utilities and their subsidiaries from owning distributed generation units, aiming to prevent conflicts of interest and unfair competition in the market.

Final Considerations

Brazil is making significant progress in modernizing its regulatory framework for the electric sector, with initiatives aimed not only at market liberalization but also at transitioning to a cleaner and more sustainable energy matrix.

However, important challenges persist, such as the issue of curtailment, the need for investment in transmission infrastructure, and the effective implementation of new regulations. MME and ANEEL have a crucial role in this process, establishing clear and efficient standards.

The scenario presents both opportunities and challenges. Market opening and incentives for renewable energy create a favorable environment for new businesses, but the complexity of the Brazilian regulatory framework requires careful analysis and constant monitoring of ongoing changes.

2

CURTAILMENT

EFFORTS BY INDUSTRY PLAYERS TO TACKLE RENEWABLE ENERGY´S GREATEST CHALLENGE


ANA CAROLINA CALIL
anacarolina.calil@cesconbarrieu.com.br


YASMIN YAZIGI
yasmin.yazigi@cesconbarrieu.com.br


LUIZA MOREIRA
luiza.moreira@cesconbarrieu.com.br

In the context of the energy transition, the contribution of intermittent renewable energy sources to both the Brazilian and global electricity matrix has significantly increased, particularly from wind and solar power projects. The technical characteristics of these sources - combined with the geographic concentration of projects in regions with high solar and wind potential, such as Brazil's Northeast - have added considerable operational complexity to electricity systems. During periods of high renewable generation and low local demand, transmission infrastructure bottlenecks have emerged, limiting the ability to fully utilize renewable energy.

As a result, curtailment - the limitation of energy output from plants that are otherwise capable of generating electricity - has become increasingly common in countries with a high share of intermittent renewables. In Brazil, where the renewable generation potential is enormous, curtailment has become a central issue in electricity sector regulation and a key topic of discussion among stakeholders.

Addressing curtailment effectively requires integrated planning of transmission, generation, and load, involving energy sector agents, government institutions, and regulatory bodies.

To respond to the growing incidence of curtailment, the ANEEL issued Resolutions No. 1,030/2022 and No. 1,073/2023, which introduced a classification system for curtailment events affecting wind and solar photovoltaic plants. These events are categorized as:

1. External Unavailability – related to failures in infrastructure outside the plant.

2. Electrical Reliability Requirements – pertaining to the safe operation of the National Interconnected Grid.

3. Energy Reasons – When available energy exceeds demand, making it impossible to allocate the full output to the load.

Only category (i) – External Unavailability is eligible for financial compensation through sector charges, and only when curtailment exceeds 78 hours for wind farms or 30 hours and 30 minutes for solar farms.

This model has generated concerns within the sector, as the technical difficulty of clearly distinguishing the causes of curtailment - particularly between categories - raises questions about fairness and transparency. Generators argue that the current framework does not provide adequate compensation when the plant is fully operational but still subject to restriction.

As a result, stakeholders are calling for greater transparency in classification criteria, predictability in revenue streams, and improved accuracy in

financial and contractual modeling of renewable energy projects. These concerns are being voiced both through administrative proceedings and in the courts.

In response, ANEEL launched Public Consultation No. 09/2025 (CP 09/25) to revisit and potentially revise the regulatory framework. The proposed changes include replacing the current classification system with one based on objective assessments of plant availability and generator fault. Additionally, the consultation addresses the need for more transparent procedures for recording and auditing events, and for adjustments to compensation mechanisms that better align with the sector's contractual logic.

Significant progress has been made by ANEEL and the MME in discussing how to allocate losses caused by curtailment. CMSE has approved the formation of a working group to propose structural solutions, including technological alternatives such as energy storage systems and smart controllers to improve grid efficiency.

ANEEL is also preparing the regulatory framework for storage systems and for a storage systems auction estimated for the second half of 2025. This auction is expected to address key issues, such as the regulation of new technologies, to support system flexibility.

Beyond regulation, market participants are also developing financial instruments similar to derivatives to allocate and hedge curtailment risk in projects where technical and financial conditions allow it.

It is important to recognize that curtailment is an expected phenomenon in power systems with a high share of intermittent renewables. The associated risks can and should be addressed through coordinated electricity system planning, infrastructure reinforcement, deployment of innovative technologies, and improved grid operations—including energy storage integration.

Structural strategies are also being developed to attract new large-scale consumers — such as data centers, low-carbon hydrogen producers, and other electro-intensive industries — that can take advantage of Brazil's renewable energy surplus. Additionally, upcoming transmission auctions are set to enhance the Northeast region's ability to export renewable energy to other parts of the country, such as the South and Southeast.

While curtailment presents a major challenge, it also offers an opportunity to unlock substantial value in the generation, transmission, and industrial sectors. The current landscape is one of intense regulatory, legal, and market-driven activity aimed at mitigating the economic impacts of curtailment and enabling more sustainable growth of Brazil's renewable energy sector.

In conclusion, curtailment remains a dynamic and evolving issue. The ongoing contributions from public consultations, regulatory reform, and innovative business models are expected to bring greater predictability, transparency, and efficiency, fostering safer and more sustainable investment in the years to come.

3

ENERGY STORAGE SYSTEMS & DATA CENTERS:

ENABLING 24/7 DIGITAL INFRASTRUCTURE


ANA CAROLINA CALIL
anacarolina.calil@cesconbarrieu.com.br


CAROL AUDI
AnaCarolina.Audi@cesconbarrieu.com.br


EDUARDA CARMO
eduarda.carmo@cesconbarrieu.com.br


YASMIN YAZIGI
yasmin.yazigi@cesconbarrieu.com.br


FERNANDA SILVA
fernanda.silva@cesconbarrieu.com.br

The demand for data centers in Latin America has experienced significant grown due to the development of technologies such as Internet of Things (IoT) and Artificial Intelligence (AI). However, these data centers require substantial energy consumption to power and cool their servers. For example, a ChatGPT search consumes ten times more energy than a Google search.

To mitigate environmental impacts and improve energy efficiency, data center companies are adopting a strategy known as ‘greenshoring’, which involves prioritizing the maintenance of their infrastructures in regions that offer substantial access to renewable energy sources, such as wind and solar power.

While clean and sustainable, the inherent intermittency of these sources poses challenges for facilities like data centers that require continuous, 24/7 energy availability.

This issue has drawn growing attention from the energy sector. One of the most promising solutions under consideration is the integration of energy storage systems, particularly Battery Energy Storage Systems (BESS), into the national electricity grid.

The use of BESS to store surplus energy generated by renewable sources for later use presents a viable and increasingly advantageous alternative, as hybrid solar and wind power plants will be able to:

1. Supply energy to the electricity grid even during periods of non-generation, such as cloudy days, at night, or under windless conditions, thus increasing their capacity to meet demand more stably;

2. Obtain extra income by selling the stored energy during peak consumption periods when the energy price is higher, a strategy known as “price arbitrage”;

3. Deliver energy to isolated and difficult-to-access locations through off-grid systems;

4. Participate in capacity markets, where the availability to supply energy is negotiated, in addition to the energy itself.

This solution provides greater control over intermittent generation sources, thereby increasing their value, which has in turn attracted interest from stakeholders within the sector and has been subjected to increased oversight by public authorities.

In 2024, the MME announced the opening of Public Consultation No. 176 to present and discuss with civil society the guidelines for conducting the Capacity Reserve Auction (*Leilão de Reserva de Capacidade na Forma de Potência - LRCAP*) through storage systems, expected to 2025, as part of an effort to align itself with the needs of the electricity sector.

The interest in conducting the auction stems not only from the need to contract additional power to guarantee supply to the system, but also from the desire to introduce storage system technology into the national grid.

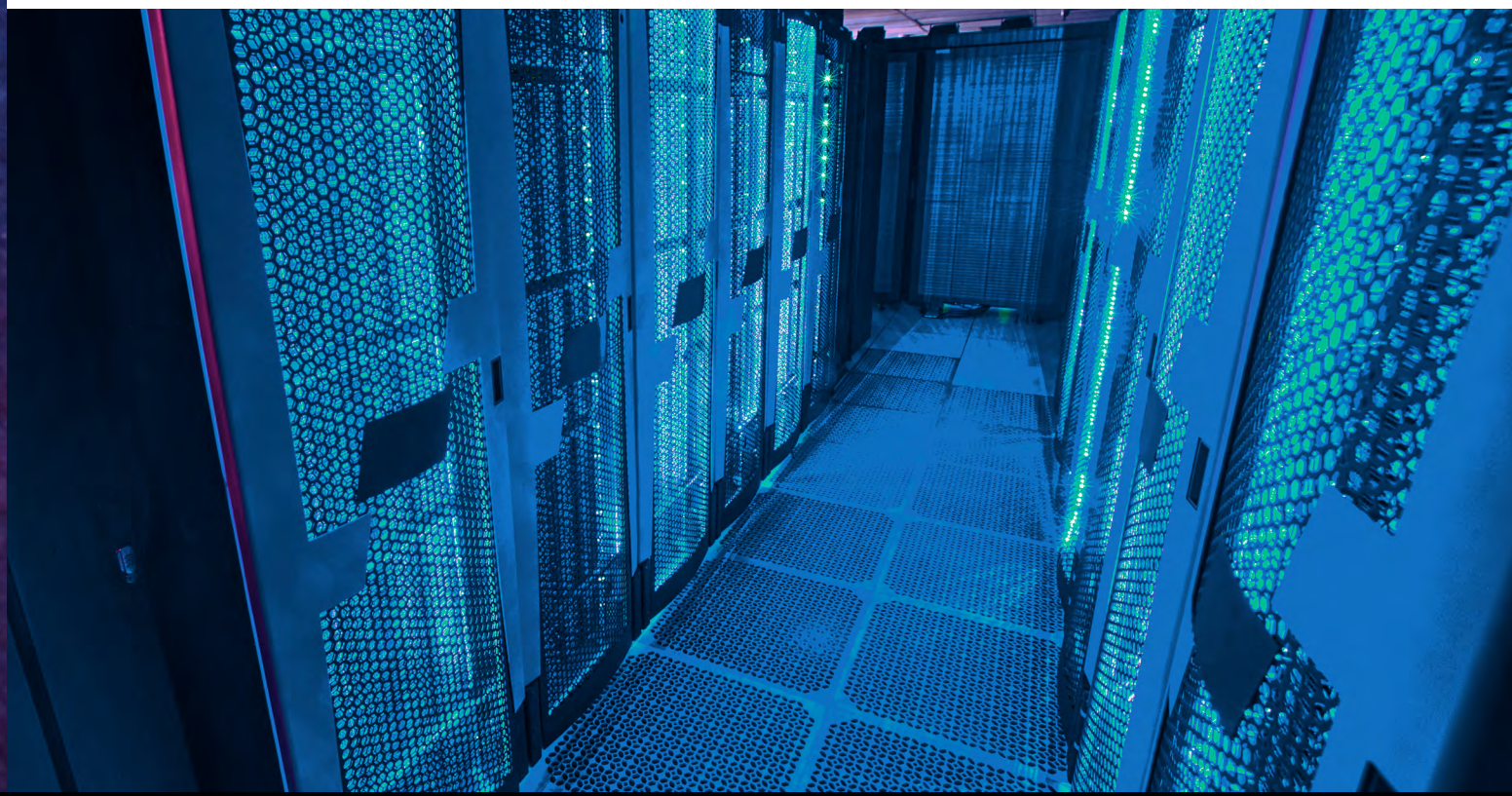
MME plans to hold the auction in 2025, following a new round of public consultation regarding the set of guidelines and the system, including the formula devised to promote lower cost contracting for consumers.

Additionally, in 2024, ANEEL initiated the second phase of Public Consultation No. 39, seeking input on regulatory improvements for electricity storage. This phase addressed normative aspects such as creating and defining the granting method for autonomous storage agents and hybrid generation plants with storage systems, as well as the method of contracting the use of the grid, and improvements on storage systems remuneration. The third and last phase of the Public Consultation is expected to explore more complex topics such as aggregators, simulations within computational models and their impacts, as well as the exploration of new business models.

These regulatory developments are essential for creating a stable and attractive environment for investment in storage technologies, helping align Brazil's infrastructure with emerging digital demands.

Given the growing operational needs of the Brazilian electricity system and the increasing presence of digital infrastructure like data centers, regulatory and normative advancements in energy storage are not only timely - they are essential.

Governmental initiatives to support and scale energy storage will ensure energy security and sustainability for data centers, while positioning Brazil as a leading hub for digital infrastructure powered by clean energy. This transition solidifies the country's commitment to innovation and climate goals, while enhancing its competitiveness in the global digital economy.



4

DISTRIBUTED GENERATION IN BRAZIL

A STRATEGIC PILLAR FOR THE ENERGY TRANSITION


ANA CAROLINA CALIL
anacarolina.calil@cesconbarrieu.com.br


STELLA CUNHA
stella.cunha@cesconbarrieu.com.br


YASMIN YAZIGI
yasmin.yazigi@cesconbarrieu.com.br

The global energy transition has driven the decentralization of power grids and accelerated the adoption of more sustainable and resilient models. Within this context, distributed generation (DG) has emerged as a key component.

DG refers to a model of renewable power production located close to, or at, the point of consumption, through small- or medium-scale units connected to the distribution grid. In Brazil, DG is regulated by ANEEL and encompasses (i) micro GD, with a capacity of 75 kW or less; and (ii) mini GD, with capacity above 75 kW and up to (ii.1) 5 MW (dispatchable sources); (ii.2) 3 MW (non-dispatchable sources). The electricity generated can be used for self-consumption (with surplus injected into the grid) or shared with other consumers through models such as associations, consortia or cooperatives. It is a decentralized model that complements the traditional system and plays a strategic role in the energy transition by reducing losses, diversifying the energy mix, and promoting the use of renewable sources.

DG represents a structural shift in the power sector by bringing generation closer to consumption, minimizing transmission losses, and enhancing overall efficiency. According to ANEEL, Brazil surpassed 38 GW of installed DG capacity by the first quarter of 2025, as a result of continuous growth fueled by public policies, tax incentives, and regulatory advancements. In the first three months of 2025 alone, more than 2 GW were added through

new installations. Globally, countries such as Germany and Australia have already consolidated robust decentralized models, with DG playing a significant role in national power supply.

Historically, the financial structuring of DG projects in Brazil faced significant challenges, particularly with respect to the strength of the security package offered to lenders. Unlike traditional centralized generation projects—typically backed by long-term power purchase agreements (PPAs) with defined off-takers — many DG models, especially those focused on remote self-consumption or shared generation, operate through lease agreements or rights-of-use contracts. From a lenders' perspective, this showed a weakness of the security structure, as payment

We would like to thank Amanda Arêas for her contribution to this material.

flows were not underpinned by predefined PPAs, making credit risk harder to assess and price.

As a result, DG projects were often limited in their ability to secure financing, relying on capital markets structures such as receivables securitization or high-cost private placements. This limited access to competitively priced debt had a direct impact on projects attractiveness.

In 2024, however, the publication of Decree No. 11,964 marked a turning point by recognizing mini-GD as a priority infrastructure activity under Law No. 12,431. This recognition enabled mini-DG projects to qualify as priority projects, allowing issuers to raise debt instruments with tax benefits for investors - such as income tax exemption for individuals - and, more importantly, to access capital at more competitive rates.

We are seeing a growing trend of refinancing previously developed DG projects that relied on more expensive debt or equity capital. This refinancing - now supported by more efficient and long-term capital - not only improves the financial profile of these transactions but also enhances the attractiveness of DG assets in the secondary market. It increases demand from institutional investors and helps foster a virtuous cycle of sector consolidation. The maturing of the model also enables the development of standardized structures for small-scale projects, paving the way for DG expansion with greater stability, liquidity, and return predictability.

This evolution contributes to the sector's overall maturity and increases the feasibility of new developments by enabling more standardized, scalable, and financially sustainable project structures.

Looking ahead, as the regulatory environment continues to consolidate, incentivized debentures are expected to become one of the main financing pillars for DG in Brazil, attracting private capital to scale sustainable projects aligned with energy transition goals. From an institutional perspective, Brazil has signaled strong support for the sector. BNDES now offers dedicated credit lines for DG projects under favorable conditions and regional banks such as Banco Regional de Desenvolvimento do Extremo Sul (BRDE) have also implemented specific programs.

States like Minas Gerais, Bahia, and Paraná have maintained key tax incentives, such as ICMS exemptions for compensated energy, since the energy produced by DG gives credits to consumers, which are used after to deduct from electricity bill, reinforcing a business-friendly environment. The convergence of these factors—sophisticated financial instruments, tax benefits and favorable regulation—creates a window of opportunity to accelerate the expansion of the DG segment.

The DG market in Brazil already shows a high level of technical and regulatory maturity but still faces barriers to fully unlocking access to financing, especially for smaller-scale projects. To overcome these challenges, it is essential to reduce legal and operational complexity and to increase the adoption of financial technologies such as digital platforms, asset tokenization and standardized funding solutions. These innovations can enable new capital-raising models and broaden access to credit, fostering a more inclusive and competitive environment.

DG represents an attractive investment opportunity, with relatively manageable risk and strong alignment with ESG principles. Properly structuring the financing of these projects ensures not only financial feasibility but also corporate leadership in building a clean, resilient, and decentralized energy matrix in Brazil.

5

OVERVIEW OF RECENT EVENTS AND TRENDS IN M&A TRANSACTIONS IN THE BRAZILIAN ENERGY SECTOR VIS-À-VIS REGULATORY ENVIRONMENT


EDUARDO LANNA
eduardo.lanna@cesconbarrieu.com.br


CAROL AUDI
AnaCarolina.Audi@cesconbarrieu.com.br


GABRIEL MARIANO
gabriel.mariano@cesconbarrieu.com.br


LUCAS DONATI
lucas.donati@cesconbarrieu.com.br

The electricity sector is and has been over the years a recurring target for foreign investors, both strategic and financial players, consolidating the Brazilian energy sector as a proven grounds destination, which is both solid and resilient and which continues to offer many opportunities. That is why in recent years, the Brazilian electricity sector has experienced an environment marked by intense dynamism and a high number of mergers and acquisitions (M&A) transactions, reflecting a combination of technological, economic, and regulatory factors.

According to *Estadão*, a record 72 completed transactions were registered in 2024, marking a 41% increase compared to 2023. The strong deal activity has continued into 2025, with several noteworthy deals already completed, many of them driven by recent regulatory changes. In addition, numerous transactions remain under negotiation, as market players remain alert to opportunities in an environment characterized by rapid transformation and evolving dynamics.

The attractiveness consists not only in regulatory solidity, mainly conferred by the role played by the sector regulator (ANEEL), but also in the country's growth potential, which remains expanding, especially in light of the prospects for transformation of the energy matrix and the intensification of the free energy market.

Distribution

The distribution segment is on the verge of the expiry of twenty concessions between 2025 and 2031. Thus, Decree No. 12,068, of June 20, 2024, was enacted to regulate the possibility of extension of the concession agreements for additional 30 years, as long as the concessionaries meet certain performance obligations, economic sustainability, and service improvement. The draft amendment to the concession agreements regulating the extension of the grants was already approved by ANEEL and has brought important improvements, such as guidelines for data sharing and service quality, standards for network resilience and the economic-financial sustainability, measures for energy losses control in areas with operational restrictions and pricing flexibility.

This scenario gained prominence as a key factor for structuring businesses in Brazil and also pushing M&A transactions in the sector, including entry of new investors/players and also the divestment by the current concessionaires – the uncertainty prior to the extension approved recently by ANEEL impacted certain potential deals and delayed related plans – by improving contractual predictability and risk management.

Transmission

At the same time, the transmission segment is also facing the imminent expiry of nineteen concession agreements between 2025 and 2030.

In addition to the M&A opportunities arising from the renewal period described above, there are also great opportunities arising from the need to build new transmission assets. Due to the dizzying growth of new solar and wind power plants in the last years, the sector is facing difficulties with the outflow of power. Aware of this issue, the Federal Government, together with the Energy Research Company (EPE), has been planning the expansion horizon for this segment and conducting concession auctions for new transmission facilities.

Also in the transmission segment, a recent trend has emerged where operators are leveraging their industry expertise by partnering with financial players. Examples include the collaboration between Brookfield and Cymi, as well as the joint venture between Neoenergia - controlled by Spain's Iberdrola - and Singapore's sovereign fund GIC.

Generation

For the generation segment, in light of the proposed sector reform under discussion, the coming weeks and months will require close monitoring of the potential new rules, including with respect to transition rules and, considering that the reform is being implemented through Provisional Measure No. 1,300, of May 21, 2025, what changes will be proposed and approved in the National Congress when it is analyzed, including possible modulation of the effects of the Provisional Measure vis-à-vis the final text of the law to be passed. In this environment of uncertainty, which should extend for a good part of the year, it is important that companies involved in generation projects and/or M&As in this segment be aware of the resulting impacts on pricing and risk allocation.

Additionally, following recurrent growth over the years, the renewables market is facing certain challenges related to energy price and curtailment events. In 2024, Brazil added 10.9 gigawatts to the electrical matrix, with 91% of this new capacity coming from renewable sources, according to ANEEL. Nevertheless, considering Brazil's characteristics and abundance of renewable energy sources, generation is and will continue to be an active sector and it is expected to regain speed as trending opportunities starts to evolve, including:

1. BESS, as intermittent renewable sources like solar and wind continue to greatly expand their share in the energy matrix, with ANEEL's increased focus on storage-related frameworks further catalyzing investor interest;

2. offshore wind project and regulation, due to the extensive coastline and strong, consistent wind resources. While the regulatory framework is still taking its final form, recent moves by the Federal Government signal institutional support for unlocking the sector;

3. strengthening of ESG goals, with the continuous driver of the energy transition, net zero goals green shoring and evolving technologies (including data centers);

4. expansion and consolidation of the free energy market, coupled with the digitalization of networks and the "consumer-producer" model, favors the modernization of processes and the incorporation of new technologies.

Expansion Opportunities and Recent Trends

All the trends highlighted above help to make M&A transactions (including acquisitions and also strategic partnerships) particularly attractive for gaining scale and tapping into new markets, assets or types of projects, for both national groups and international companies that wish to expand or diversify their portfolios.

This evolving landscape presents M&A opportunities for first movers with technical and financial capacity to secure project pipelines, access strategic infrastructure, and partner with local players. Several cross-border investors with relevant expertise are well-positioned to drive the emerging market, with potential for large-scale deals.

Although the Brazilian regulatory landscape offers significant opportunities, it also presents complexities inherent to a constantly evolving market. The sector reform, under discussion in the Government and National Congress, may require adjustments in contracting models and in the energy trading regime, generating impacts on the formulation of M&A, PPA and project financing strategies. Nevertheless, Brazil maintains economic indicators relatively aligned with an expansion perspective, with emphasis on the high potential for renewable generation, which reinforces the interest of international investors.

Conclusions

In summary, the Brazilian power market offers great potential for growth, partnerships and consolidation through acquisitions, provided that careful monitoring and assessment of continuing changes (including current regulatory reforms) are essential. Despite the challenges, the country has favorable characteristics that can considerably increase the competitiveness of companies that position themselves strategically in this market and aptly navigate its intricacies.

6

DEFAULT RATES IN THE BRAZILIAN ENERGY SECTOR

IMPACTS BEYOND PPAS AND PATHS TO RESILIENCE


ANA CAROLINA CALIL
anacarolina.calil@cesconbarrieu.com.br


JOÃO VICTOR SALOMÃO
joaovictor.salomao@cesconbarrieu.com.br


YASMIN YAZIGI
yasmin.yazigi@cesconbarrieu.com.br

The Brazilian power sector is currently undergoing a sensitive period of instability, driven by a troubling and significant number of contractual defaults, particularly within the free market (ACL) where power trading companies operate as key intermediaries between generators and consumers. Recent high-profile cases have amplified market concerns with regards to the potential systemic risks that extend far beyond PPAs, threatening the broader financial and operational balance of the sector.

What was once perceived as isolated credit events has now evolved into a pattern of non-compliance, raising red flags for all market participants. This wave of defaults is no longer confined to bilateral disputes; it is triggering a domino effect of corporate bankruptcies, judicial reorganizations, and liquidity constraints that are impairing the regular flow of energy transactions, compromising access to credit, and undermining the creditability of the supply chains across the sector.

In response to these developments, the industry has been compelled to engage in a broader and more urgent dialogue. Market specialists, sector players and regulatory authorities are now assessing eventual solutions and actions that might be undertaken by them to prevent these defaults from bursting into a major systemic crisis in the ACL. Discussions increasingly point to the need for structural reforms, often pursuing different solutions, namely enhanced credit safeguards and regulatory interventions that can restore confidence and preserve market functionality.

Increasingly Defaults and Market Liquidity

In October 2024, the sector experienced a record high in defaults, reaching nearly BRL 178 million. This unprecedented level of non-compliance was predominantly driven by power trading companies struggling to manage the financial pressures arising from sharp spot price (PLD) volatility in the ACL. The major consequence of that has been a relevant deterioration in market liquidity, with trading activities in the ACL coming to a near standstill due to fears of a cascading default effect.

The situation reached a critical point with the financial distress of one of the five largest power traders in the country. Facing severe cash flow constraints, the company has been engaged in delicate negotiations with creditors in an effort to restructure its obligations and prevent a potential collapse. Such difficulties have served as a red flag to the market, underscoring the systemic risks associated with concentrated exposures and insufficient risk mitigation mechanisms in energy trading.

We would like to thank Amanda Arêas for her contribution to this material.

This confluence of operational and regulatory challenges has created a perfect storm, exposing vulnerabilities across the energy sector and raising critical questions about the existing contractual and regulatory frameworks and their fittings towards assuring market stability. As this could be caused by several reasons, it is hard to point out one specific that stands out.

Some of the factors behind this recent contractual default wave lie in:

1. the fluctuation of the PLD throughout the years due, for instance, to climate restrictions, detaching from the price negotiated in the PPAs;

2. issues relating to the decision making of power traders in the context of negotiation of PPAs; and

3. the growing incidence of curtailment measures, that is mandatory reduction in power generation by the ONS due to transmission constraints or operational needs. Although intended to safeguard the technical balance and security of the national grid, these interventions have produced significant financial repercussions for energy generators. By limiting the distribution of contracted energy volumes, curtailment directly impacts the revenue streams of renewable energy producers, often forcing them to repurchase energy at elevated market prices to fulfill existing contractual commitments. The financial toll of such practices is far from negligible. Recent estimates indicate that the wind sector alone estimated losses of BRL 700 million over 2023, while the solar sector faced an estimate loss of BRL 50 million until July 2024, a burden that not only compromises the economic viability of affected projects but also underscores the default risk across related commercial and financial agreements.

The increase in defaults in PPAs has broader implications for project financing and other contractual agreements. From a credit risk perspective, financial institutions and investors tend to be now faced with a perception of relevant exposure, which has prompted a tightening of financing conditions. This new environment is marked by increased scrutiny, more restrictive covenants, and a general recalibration of risk premiums, including the application of higher interest rates to compensate for the perceived credit deterioration, as well as robust security packages.

Energy companies are encountering growing challenges in securing the funding necessary to develop, expand, or even maintain their operational infrastructure. The ripple effects of this credit contraction are particularly harming capital-intensive renewable projects, whose financial models often rely on long-term, stable cash flows underpinned by PPAs, precisely the agreements now at the epicenter of market concerns.

Compounding this scenario is the activation of cross-default clauses embedded in project finance agreements. In many cases, a default event under a power purchase agreement (PPA) constitutes an automatic default under financing contracts, exposing project sponsors to immediate acceleration of debt obligations and enforcement risks. This legal interconnection amplifies the systemic impact of individual defaults, threatening not only the viability of specific projects but also the broader financial balance of the energy sector.

Thus, what might initially appear as isolated contractual breaches within PPAs has the potential to trigger a chain reaction of adverse financial and legal consequences, underscoring the critical importance of robust contractual structuring and proactive risk management strategies.

Discussions regarding potential solutions to the default crisis in the Brazilian power sector remain diverse and specialists are far from coming together. One school of thought advocates for a structural overhaul of trading mechanisms through the establishment of a central counterparty (CCP) to intermediate future PPAs[1]. Under this model, instead of settling payments only after the completion of supply periods, daily margin adjustments would be implemented to

[1]The Energy Trading Chamber (CCEE) is suggested as CCP in Provision Measure No. 1,300/2025.

mitigate the impact of sharp market fluctuations. Such a framework would be supported by robust safeguard mechanisms, including the participation of a clearing member and mandatory collateral deposits from market participants, effectively limiting each party's exposure to the value of their posted guarantees. Proponents of this approach stress that introducing a CCP would enhance market resilience by containing credit risk within manageable levels, preventing isolated defaults from escalating into broader liquidity crises.

On the other hand, there are those who argue that a regulatory response is the most appropriate path to address the sector's growing vulnerabilities. From this perspective, enhancing the regulatory oversight of market participants' exposure is seen as crucial, particularly in light of the increasing number of companies facing financial distress. This view underscores that many of these companies lack tangible assets that could serve as a buffer or be liquidated to meet their obligations, thereby amplifying the systemic risk posed by their defaults. For those, regulatory reforms aim to tighten entry barriers, improving transparency, and enforcing more stringent capital and guarantee requirements, which are seen as essential measures to restore confidence and ensure the long-term stability of the sector.

Even though there is no agreement toward a single solution, the fact is that the surge in non-compliance within Brazil's power should benefit from comprehensive regulatory reforms and enhanced financial oversight. Addressing curtailment issues, improving grid infrastructure, and implementing effective risk mitigation strategies are essential steps to reinforce confidence and stability in the market.

7

IMPACTS OF THE TAX REFORM ON THE BRAZILIAN POWER SECTOR


ANDRÉ MELO
andre.melo@cesconbarrieu.com.br


FERNANDA STOECKLI
fernanda.stoeckli@cesconbarrieu.com.br

In December 2023, the Constitutional Amendment 132/2023 (EC 132) introduced to the Brazilian legislation the Indirect Tax Reform, that aims to simplify the current Brazilian consumption tax framework. The main goal is that five existing consumption taxes will be fully replaced until December 2032 for a dual value-added tax framework, as follows:

1. at the federal level, PIS and COFINS (social contributions on gross revenue) will be replaced by the Brazilian Contribution on Goods, Services, Rights, and Intangibles (CBS);

2. at the state and municipal level, the State VAT (ICMS) and municipal service tax (ISS) will be replaced by the Tax on Goods, Services Rights, and Intangibles (IBS);

3. the tax on industrialized products (IPI) will be eliminated in 2027, except for products produced in the Manaus Free Trade Zone.

Besides those taxes, the Federal Government will be allowed to charge the *Imposto Seletivo* (IS – a type of excise tax) on goods and services considered harmful to the environment and health. The legislation expressly excluded electric power from the incidence of the IS.

EC 132 will be regulated through Complementary Laws. The first Complementary Law (No. 214/2025), which introduces the general rules for IBS, CBS, and IS, has already been enacted by the Congress in January 2025.

Many changes have been implemented in the Brazilian tax system, impacting the electric energy sector. Without the intention of exhausting the subject, among the general taxation rules for the power sector, the legislator was concerned with sectoral particularities and attempted to solve some inconsistencies in the current model, specially the mismatch between the contractual flow of goods (sector reality) and the physical flow (which has so far guided the normative texts imposing the tax obligation), as well as the existence of multiple rules applicable to the same fact[2].

The new system has the advantage of standardizing the application of tax rules, eliminating - or at least reducing (pending verification of practical application) - situations of doubt regarding the applicable tax rule, whether due to lack of clarity in the norms or the possibility of applying more than one rule to the same situation depending on the location and parties involved.

The main rules introduced by Complementary Law

[2]As occurs, for example, with the assignment of liability rules for ICMS purposes. Currently, ICMS Agreements (Convênios ICMS) 83/00, 15/07, 77/11, and 10/2012 are in force, with each state internalizing the rules that best suit its needs.

No. 214/2025 are:

- **Destination-based taxation:** IBS and CBS will be due at the location of the operation. This location is defined as either the place of delivery or availability for operations intended for consumption, or the main establishment of the purchaser[3] for the provision of transmission, generation, distribution, or trading services. For multilateral acquisitions of power, the location of the operation is considered to be the establishment or domicile of the agent with a debtor energy balance.
- **Taxable event:** will be considered to occur at the moment the payment becomes due.
- **Collection of IBS and CBS:** will occur only upon supply, either for consumption or to a taxpayer not subject to the regular IBS and CBS regime. For transmission services , the supply is considered to happen at the moment the payment for this service becomes due.
- **Tax base:** will be the value of the operation, which includes the full amount charged by the supplier, without requiring the inclusion of the taxes themselves in the tax base.
- **Tax rate:** the applicable rate will be defined by ordinary law and will be uniform.
- **Responsibility** for the collection of IBS and CBS related to generation, trading, distribution, and transmission of power will be exclusively assigned as follows:

  1. by the power distribution company in the sale of power in the regulated market (ACR);

  2. by the seller in the sale of power on the ACL provided that the buyer uses the energy for its own consumption or when the purchaser is not subject to the regular IBS and CBS regime;

  3. by the buyer as the responsible party for power intended for consumption in multilateral acquisitions; and

  4. by the power transmission company for the provision of transmission services to a consumer directly connected to the main transmission network.

In general, the Tax Reform delivers the promised simplification. Although the new system still needs to be tested, the rules introduced by Constitutional Amendment 132/2023 and Complementary Law No. 214/2025 are more aligned with the needs and reality of the power sector.

[3]Defined in the terms of § 4 of Article 11 of Complementary Law No. 214/2025: "Art. 11. § 4 In acquisitions carried out centrally by a taxpayer subject to the regular IBS and CBS regime who has more than one establishment and is not subject to the prohibition of credit appropriation:

I - the services referred to in item IX of the caput of this article will be considered provided at the principal domicile of the purchaser; and

II - for the purposes of the provisions of item X of the caput of this article and item I of this paragraph, the principal domicile of the purchaser is considered to be the location of their head office."

COMPARATIVE FRAMEWORK OF PRE AND POST TAX REFORM REGIMES

	PRE-TAX REFORM	POST TAX REFORM
LOCATION	Destination-based taxation: In interstate operations, the tax will not be charged by the state of origin (tax immunity). However, it may be required by the destination state when the purpose is not trading or industrialization, that is, when it is sold to the final consumer.	Destination-based taxation: IBS and CBS will be collected to (i) the place of delivery or availability for operations intended for consumption; and (ii) the location of the main establishment of the buyer for the provision of transmission services and other operations, including generation, distribution, or trading.
TRIGGERING EVENT	At the moment the power is dispatched, with the tax being due in the month following consumption (special regime).	At the moment the payment becomes due.
TAX BASIS	The price of the transaction (including Energy Charge (TE), distribution/ transmission system use charges (TUSD/ TUST) and other charges) plus the gross-up of the taxes levied.	The price of the transaction, which includes the full amount charged by the supplier, without requiring the inclusion of the taxes themselves (no gross-up).
TAX RATE	PIS/COFINS: according to the tax regime to which the taxpayer is subject (3.65% or 9.25%). ICMS: variable, depending on the state of consumption.	To be defined.
DEFERRAL	In most cases, internal operations with electric power are subject to the deferral of the state tax until the moment it is dispatched to the final consumer. However, not all states adopt this rule.	The collection of IBS and CBS will occur only upon supply for consumption or to a taxpayer not subject to the regular IBS and CBS regime.
RESPONSIBILITY	The responsibility for tax payment may be assigned to power generation or distribution companies in internal and interstate operations, either as taxpayers or as tax responsibility, from generation or importation to the final operation. The tax calculation is based on the price practiced in the final operation, ensuring its collection by the state where this operation should occur (art. 9, § 1, II of LC 87/96). ACR: ICMS Agreement No. 10/12 ACL: ICMS Agreements No. 83/00, 15/07, and 77/11 (each agreement imposes different responsibilities and there is no uniformity in internalization).	The responsibility for the collection related to generation, trading, distribution, and transmission will be exclusively: (i) by the power distribution company, in case of sale in the ACR; (ii) by the seller, in the sale of power on the ACL provided that the buyer uses the energy for its own consumption or when the buyer is not subject to the regular IBS and CBS regime; (iii) by the buyer, as the responsible party, for power intended for consumption in multilateral acquisitions; (iv) by the power transmission company, for the provision of transmission services to a consumer directly connected to the main transmission network.

8

FREE, PRIOR AND INFORMED CONSULTATION

ILO CONVENTION 169 AND POWER GENERATION AND TRANSMISSION PROJECTS


ROBERTA JARDIM
roberta.jardim@cesconbarrieu.com.br


CAROLINA PIÑEIRA
carolina.pineira@cesconbarrieu.com.br


PATRIK ANDRADE
patrik.andrade@cesconbarrieu.com.br

Convention No. 169 of the International Labour Organization (ILO 169), adopted by Brazil in 1989, stands as a landmark normative framework for the protection of the rights of indigenous and tribal communities. It establishes international standards to ensure, among other rights, the realization of Free, Prior and Informed Consultation (FPIC) regarding legislative or administrative measures that may directly affect such communities.

According to the ILO 169, indigenous and tribal peoples must be consulted whenever measures are likely to affect them directly. For this purpose, the Convention defines:

1. tribal peoples in independent countries whose social, cultural, and economic conditions distinguish them from other sections of the national community, and whose status is regulated wholly or partially by their own customs or traditions or by special laws;

2. peoples in independent countries who are regarded as indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present state boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural and political institutions.

It is important to note that the right to FPIC is conditioned upon the existence of a direct impact on the affected community, as already recognized by the Superior Court of Justice (STJ) in Brazil. In this regard, Interministerial Ordinance No. 60/2015 establishes a presumption of interference in indigenous and *quilombola* lands based on the distance between a community and a project.

	LEGAL AMAZON	OTHER REGIONS
TRANSMISSION LINES	8 km	5 km
POINT-SOURCE PROJECTS SUCH AS THERMOELECTRIC PLANTS	10 km	8 km
HYDROPOWER PLANTS	40 km or reservoir + 20 km downstream	15 km or reservoir + 20 km downstream

The distances outlined above are a presumption of interference and not a presumption of impact, which merely indicates the area to be considered in the project's environmental assessment, rather than constituting a definitive delineation of its direct impact area. This interpretation is reinforced by Article 3 of the Ordinance, which refers to

the beginning of the environmental licensing procedure, specifically to the stage of preparing the Project Characterization Form.

In other words, such area refers to the scope of the environmental study to be undertaken by the developer, but the actual area of direct impact shall be subsequently determined by the environmental authority, pursuant to its discretionary powers and its role as coordinator of the licensing process as provided by CONAMA Resolution No. 01/1986.

In this context, it is essential to highlight that the FPIC procedure is not binding, since its primary purpose is to ensure meaningful engagement and dialogue with the affected communities, without conferring upon the affected communities the power to veto the implementation of the project. The Federal Supreme Court (STF), in its decision on the Petition No. 3,388/RR (Raposa Serra do Sol case), held that consultation with indigenous peoples does not imply that governmental decisions are formally dependent on the communities' acceptance.

Thus, the FPIC procedure has been the subject of ongoing legal disputes and administrative debates throughout the environmental licensing process. Notably, some states have enacted legislation on the matter. For instance, it is worth mentioning that Environmental Administration Agency of the State of Paraíba has recently adopted the Federal Prosecution Office's recommendation to require FPIC for all renewable energy projects located in indigenous, *quilombola* or traditional community territories that are subject to an Environmental Impact Assessment (EIA) and Environmental Impact Report (RIMA) or Simplified Environmental Report (RAS).

In parallel, the State of Minas Gerais issued a decree attempting to define the term "Indigenous Land" and to restrict FPIC obligations only to communities officially recognized and certified by competent authorities. However, the STF has suspended the effects of such decree, and ruled that it infringed upon the Federal Government's exclusive legislative competence and that an international convention incorporated into Brazilian domestic law could not be limited by state-level regulations.

In sum, the FPIC under ILO Convention 169 is being subject of numerous disputes particularly in the context of energy generation and transmission projects. While the procedure is not binding, it represents a critical step in ensuring transparency, inclusion, and the consideration of social and environmental impacts. As renewable energy and transmission projects continue to expand across the country, respecting FPIC not only fulfills legal obligations but also contributes to building more sustainable and socially responsible development practices and avoiding liabilities.

9

GAS-FIRED POWER PLANTS

REGULATORY LANDSCAPE AND ROLE IN BRAZIL'S ENERGY TRANSITION

RAFAEL BALERONI
rafael.baleroni@cesconbarrieu.com.br

Brazil's energy transition is accelerating, driven by the rapid growth of wind and solar power. While this shift advances decarbonization goals, it also creates challenges for grid stability and energy security due to the intermittency of renewables. In this context, gas-fired power plants play a critical role by providing flexible, dispatchable generation that complements renewables and supports system reliability – especially during hydrological shortages or peak demand periods.

Unlike most international markets, where gas-fired plants are typically connected to pipeline networks, Brazil has seen a rise in disconnected models such as LNG-to-power and reservoir-to-wire projects. Recent policy developments highlighted the regulatory debate over tariffs, expansion of infrastructure and energy security, and market design will be critical in shaping the future role of gas in Brazil's energy transition.

However, gas-fired power plants still represent an interesting opportunity to foreign investors into Brazil.

The Growing Importance of Grid Stability

Brazil's electricity sector has witnessed a dramatic evolution over the past decade, driven primarily by the rapid growth of intermittent renewable sources such as wind and solar power. For instance, from 2016 to 2023, the installed capacity of photovoltaic energy sources increased from 81MW to 37,843MW (average of 140.8% per year), according to EPE. While this surge in clean energy generation advances the country's sustainability goals, it also creates new challenges related to grid stability, reserve capacity, and energy security. In this evolving context, besides BESS, gas-fired power plants emerge as an essential complement to renewables -providing reliable, flexible backup power that supports the integration of variable energy sources.

While energy storage systems, notably BESS, are gaining traction, they currently face limitations related to regulatory framework, duration, scale, and cost. Natural gas-fired power plants, on the other hand, offer a practical solution by providing flexible, dispatchable generation that can ramp up or down quickly to balance supply and demand. Moreover, natural gas is often touted as a "transition fuel" in the global energy transition, producing lower greenhouse gas emissions compared to other hydrocarbons when combusted. For Brazil, whose power matrix is heavily reliant on hydropower, gas plants also serve as important reserves during droughts and hydrological variability.

Gas to Power Projects in Brazil: LNG-to-Power and Reservoir-to-Wire Projects

Worldwide, most gas fired power plants are connected to gas transmission networks. Interestingly, most recent gas-fired power projects in Brazil have been developed disconnected from the traditional gas pipeline transmission system. Instead, these projects rely on alternative supply arrangements that circumvent complexities and costs associated with pipeline transportation tariffs. Two main types of projects dominate:

- **LNG-to-Power Projects:** They use floating storage regasification units (FSRUs) to import liquefied natural gas. The LNG is regasified and fed directly into power plants. Examples include the Celse LNG-to-power project located in Ceará and operational since 2020, the Gás Natural Açu (GNA) project in Rio de Janeiro and operational since 2021, and the Barcarena project located in Pará and operational since 2024. Only later some of them planned to connect to the gas transmission network, also allowing the sale of regasified LNG to other consumers connected to the grid (for example, Celse's terminal connection in TAG's network was inaugurated in 2024 and GNA is yet to determine where to connect to the gas network).
- **Reservoir-to-Wire Projects:** These involve gas production fields located near the power plants, allowing gas to be supplied directly from the reservoir to the plant via short pipelines. The pioneer project was Eneva's Parnaiba Complex, which began operations in 2013. Another notable project is also Eneva's Azulão-Jaguatirica, an interesting hybrid case, where gas from the Azulão field is liquified, trucked across 1,100 km, regasified and then supplied to the power plant, bypassing both transmission and distribution pipelines.

This strategic disconnection reflects a response to the tariffs and regulatory hurdles associated with transporting natural gas through Brazil's existing pipeline infrastructure, which controversy was recently highlighted in connection with the 2025 Capacity Reserve Auction.

The Capacity Reserve Auction (LRCAP) and Its Impact

The Capacity Reserve Auction (*Leilão de Reserva de Capacidade – LRCAP*) illustrates the growing recognition of gas-fired plants' strategic role. The LRCAP aims to procure additional capacity to guarantee system reliability and reserve power, particularly in the context of rising intermittent renewables. Gas-fired plants have been included as eligible technologies in this auction, sparking renewed interest and debate about the linkages between the electricity and natural gas sectors.

The auction not only incentivizes investments in new power plants but also highlights the need for coordination between gas supply infrastructure and electricity generation projects. This intersection is critical because the economic viability and operational flexibility of gas-fired plants depend heavily on their access to reliable and cost-effective natural gas supply.

Tariff Controversies and Current Regulatory Debate

Transmission tariffs and strategic disconnection have become a significant point of contention between gas shippers, pipeline operators, power generators, and regulators.

Gas shippers advocate for tariff reviews and reductions, arguing that high pipeline tariffs discourage the use of the transmission system, fragment the market, and ultimately raise costs for consumers. They argue that tariff revisions are late, that the value of assets taken into account for tariff formation is overvalued and that legacy contracts (transportation contracts in place before the privatization of transmission companies) would be overpriced.

Conversely, transmission companies contend that connecting power plants to their pipeline networks enhances energy security by integrating dispatchable generation within the grid. They further claim that increased throughput will lead to tariff reductions through economies of scale and sharing of costs among users, benefiting all stakeholders, and would be fundamental for the interiorization of gas transmission networks beyond the current concentration in the coastline.

Gas transmission companies also criticize that LNG-to-power projects relying on FSRUs represent investments on mobile assets, which do not contribute to long-term capital formation in the country, as pipeline construction. They also raise concerns about the sustainability of relying heavily on floating units, especially in terms of strategic national infrastructure, regulatory oversight, price risk variation arising from imports of LNG and increasing geopolitical risks to certainty of supply. These would conflict with the very goal of increasing the energy system reliability.

One particularly noteworthy regulatory proposal under debate has been the idea of removing gas transmission tariffs from the energy price comparison basis in auctions like the LRCAP. This would mean that gas transmission costs are passed to energy consumers rather than being incorporated into the plant's bid price, potentially leveling the playing field between connected and disconnected projects.

Investment Trends and Regulatory Complexity

Despite ongoing controversies, the reality is that disconnected gas-fired power projects dominate Brazil's new gas-to-power generation investments. These disconnected projects have been the most attractive opportunities for foreign investors looking at gas-to-power projects in Brazil's energy market. However, they face their own regulatory complexities:

1. LNG-to-power projects backed by FSRUs must navigate maritime and port regulations for FSRU operations, including environmental licensing and import logistics.
2. Reservoir-to-wire projects face challenges around local pipeline connections, trucking logistics, and coordination between gas production and power generation licenses.
3. Participation in the LRCAP and other auctions requires compliance with operational and contractual criteria to ensure dispatchability and reliability, adding layers of contractual complexity.

For example, the LRCAP mandates that gas-fired plants demonstrate secured fuel supply contracts and capacity commitments, operational flexibility compatible with grid needs, and environmental compliance before being eligible.

Conclusions

As Brazil's power sector transitions towards a more renewable and decentralized model, the role of gas-fired power plants remains crucial for ensuring grid stability, reserve capacity, and energy security. The sector's recent evolution, marked by the proliferation of LNG-to-power and reservoir-to-wire projects, reflects responses to the high costs and regulatory challenges of traditional gas transmission systems.

The ongoing tariff and regulatory debates will shape the future balance between connected and disconnected projects. Transparent, balanced policies that foster investment, reduce distortions, and promote coordination between gas and electricity sectors are essential.

Ultimately, gas-fired power plants – whether connected to pipelines or not – will continue to play an indispensable role in Brazil's energy transition, supporting the integration of renewables while providing reliable, flexible power for a resilient grid.

10

DISPUTES INVOLVING THE ECONOMIC-FINANCIAL BALANCE OF ENERGY SECTOR CONTRACTS


EDISON FREITAS
edison.freitas@cesconbarrieu.com.br


PAULO MACEDO
paulo.macedo@cesconbarrieu.com.br

The Brazilian legal system upholds the economic and financial balance of administrative contracts. This principle, as established in the Federal Constitution, is based on the assumption that the original content of a proposal selected through public bidding process must be protected against exceptional and unforeseeable events (such as force majeure) and government actions that may alter the contract's economic viability (e.g., government authority act or *factum principis*).

In the electricity sector, this principle has underpinned a range of disputes aimed at preserving contractual balance. One notable example occurred between 2001 and 2002, when Brazil underwent electricity rationing due to a hydrological crisis. In response, end-user tariffs were revised to compensate distributors for extraordinary losses arising from reduced revenues and the need to purchase additional energy to meet demand.

Beginning in 2014, numerous lawsuits related to the so-called Generation Scaling Factor (GSF) were filed to address the decline in profitability experienced by power generators following governmental measures that redistributed hydrological risk among hydroelectric plants.

More recently, during the Covid-19 pandemic, regulatory restrictions that prevented service interruptions for consumers in default led to significant financial imbalances for energy companies. These were later addressed through the creation of the Covid-Account, a sectoral financial mechanism designed to mitigate cash flow mismatches faced by utilities companies during the pandemic.

Currently, a key area of legal contention concerns the application of discounts on the revenues of transmission concessionaires (*Receita Anual Permitida* - RAP). These discounts are imposed in cases of operational delays (*Parcelas Variáveis por Atraso* - PVA) or service interruptions (*Parcelas Variáveis por Indisponibilidade* - PVI), even when such events are allegedly caused by government-related factors (e.g., delays in environmental licensing) or third parties (e.g., vandalism or sabotage).

Under Article 19 of Law No. 13,360/2016, the granting authority may extend the concession term if such events are deemed to exclude the concessionaire's liability. However, ANEEL has been adopting a restrictive interpretation of these exclusions, which tends to give rise to disputes.

Another emerging area of conflict involves the increasing occurrence of curtailment/ constrained-off events, primarily caused by the substantial

expansion of renewables intermittent generation without corresponding investment in transmission infrastructure. The growing frequency of such events has triggered lawsuits challenging ANEEL's regulations, which condition financial compensation on whether the events are classified as external unavailability that exceeds a set annual hour thresholds. A decision on a preliminary injunction related to one such lawsuit is currently pending before the Superior Court of Justice (STJ).

Given the volatility in energy prices and the growing impact of climate change on energy generation and trading, the number and complexity of contractual balance disputes in the sector are expected to increase in the coming years. In this context, the principle of economic and financial rebalancing remains a cornerstone for attracting investment in Brazil's electricity sector. It serves as a legal mechanism that promotes investor confidence through legal certainty, while also safeguarding the public interest in the continuity and quality of essential services.

11

THE ROLE OF CRITICAL MINERALS IN ENERGY TRANSITION

OPPORTUNITIES AND PERSPECTIVES IN BRAZIL

DANIEL SOUZA
daniel.souza@cesconbarrieu.com.br

Recent technological innovations in the energy sector have been driven by the need to restructure the way energy is produced and consumed, focusing on the progressive replacement of fossil sources with renewable and low-carbon alternatives — a process widely known as energy transition. In this context, critical minerals — such as lithium, cobalt, nickel, and rare earth elements — gain prominence as strategic inputs, essential for the development of decarbonization technologies, such as wind turbines, solar panels, BESS and electric vehicles.

The growing demand for these minerals positions Brazil as a strategic player in the global scenario. With vast territorial extension, still unexplored areas, and notable geological diversity, the country has favorable conditions to expand its participation in the international market for critical minerals. In addition to holding important reserves of nickel, copper, manganese, niobium, and graphite, Brazil has also been highlighted by recent lithium discoveries in the Jequitinhonha Valley (MG), a region already known as the 'Lithium Valley'

According to data from the National Mining Agency (ANM), in the 8th Round of Area Availability held in 2024, 800 areas with geological potential for the extraction of strategic minerals aimed at energy transition were offered, out of a total of 1,755 areas suitable for availability in stock – which highlights the country's vast mineral potential.

To make this promising scenario viable, substantial investments in research, development, and innovation are needed, as well as advances in the regulatory field. Brazilian legislation on critical minerals is in an incipient phase but is evolving rapidly to keep pace with market demands and international trends – with the objective of providing legal security, encouraging innovation, and regulatory agility.

In light of these findings, Bill No. 2,780/2024 was presented, which establishes the National Policy for Critical and Strategic Minerals (PNMCE) and creates the Critical and Strategic Minerals Committee (CMCE). Its purpose is to foster a

favorable scenario for the development of projects related to critical and strategic minerals in the country, as well as drive and catalyze investments in the sector. Among the planned instruments, the following stand out: (i) support for the environmental licensing of qualified projects; and (ii) priority in the analysis of projects with the Ministry of Mines and Energy and the ANM.

Along the same lines, in January 2025, BNDES, in partnership with the Funding Authority for Studies and Projects (Finep), launched a public call aimed at financing Business Plans that include investments in productive capacity and in research, development, and innovation (RD&I) for the transformation of strategic minerals.

The selected projects will receive support that may include, in addition to credit and financing instruments, activities and expenses related to technological development research, investment structuring, and technical and economic-financial feasibility studies. According to Valor Econômico, the Public Call received 124 business plans, totaling R$85.2 billion in proposals.

Given this scenario, Brazil positions itself as a strategic agent in the global supply chain of critical minerals, bringing together competitive advantages that include, in addition to abundant natural resources, legislative initiatives and financing mechanisms aimed at innovation and sustainable development. To consolidate this position, it is essential to ensure articulation between the public and private sectors, institutional strengthening, and the promotion of coordinated policies that enable the responsible and strategic exploitation of these resources.

12

COMPETITION DISCUSSIONS RELATED TO THE ENERGY RETAIL TRADING ACTIVITIES

JOYCE HONDA
joyce.honda@cesconbarrieu.com.br

ARTHUR MOREIRA
arthur.moreira@cesconbarrieu.com.br

General Context and Regulatory Basis

The process of expanding retail electricity trading activities within the ACL has sparked debate over potential competitive impacts, particularly when economic groups operate across multiple segments of the electricity sector - most notably in distribution and trading (also referred to as wholesale and retail energy companies, respectively).

In this context, on May 28, 2024, ANEEL launched Public Consultation No. 14/2024 to gather stakeholder contributions regarding regulatory enhancements and the monitoring and oversight of competition-related aspects in the retail trading environment.

Current legislation — including Law No. 9,427/1996, Law No. 10,848/2004, and Law No. 12,529/2011, among others — establishes the respective roles of ANEEL and the Administrative Council for Economic Defense (CADE) with regard to sector regulation and competition oversight. While ANEEL is responsible for regulating and supervising the electricity sector, CADE oversees merger control and is tasked with preventing and sanctioning antitrust violations.

Traditionally, the definition of the relevant market for competitive analysis in the energy trading sector, according to CADE case law, tends to be national, and not restricted to the concession area. In practice, the regulation of the sector and the pulverization of independent generators and traders have contributed to fostering rivalry in the ACL, reducing the risk of practices such as discrimination or market foreclosure. Even so, ANEEL, in its Technical Note prepared for the Public Consultation No. 14/2024, has raised the possibility of imposing immediate and subsequent measures, such as marketing restrictions and a ban on infrastructure sharing, aimed at addressing alleged anti-competitive practices that could exist when distributors also operate in the retail electricity market through companies that belong to the same economic group.

Constitutional Issues and Jurisdiction

Free enterprise and free competition are fundamental principles of the Brazilian economic order. In regulated industries, specific rules may be created to address market failures. There is therefore a natural caution against impositions that limit the dynamics of the market, such as restrictions on the activities of verticalized groups. More radical approaches, such as compulsory de-verticalization or legal separation, would exceed the bounds of regulatory authority and require legislative action.

The Technical Cooperation Agreement (ACT) between ANEEL and CADE, published on August 2, 2024, reinforces the commitment to joint and complementary action. However, it does not remove CADE's exclusive authority to enforce competition law. In the same spirit, Law No. 13,848/2019 — which governs the functioning of regulatory agencies — underscores the importance of conducting studies and ensuring stakeholder participation in the development of regulatory policies.

Main Competition Matters of ANEEL Public Consultation 14/2024

METHODOLOGY AND MARKET DEFINITION

Based on HHI[4] calculations by concession area, ANEEL concluded that 20 out of 34 areas in Brazil present moderate to high levels of market concentration. However, CADE has consistently upheld a national-level assessment of the supply market in past decisions, recognizing that the National Interconnected Grid may facilitate broader competition among generators and suppliers beyond the confines of concession boundaries. Moreover, CADE typically focuses on the change in concentration resulting from specific M&A transactions (such as mergers and acquisitions or long term partnerships), rather than relying on static snapshots that broadly generalize potential competitive risks across the entire sector.

VERTICAL INTEGRATION AND EFFICIENCIES

Vertical integration can lead to economies of scale, lower transaction costs, and more efficient resource allocation, potentially benefiting consumers. CADE acknowledges that even in scenarios involving high market shares the sector's strong regulatory framework and generally low barriers to entry tend to mitigate serious competition concerns. In cases involving isolated complaints of anticompetitive conduct — such as discriminatory practices or market foreclosure — CADE retains its investigative role but intervenes only when clear and robust evidence of harm is established.

MEASURES PROPOSED BY ANEEL

The material prepared by ANEEL´s technical departments proposed the following recommendations to companies that operate in a verticalized way (as wholesale and retail trading companies):

1. restrictions on the use of branding and marketing campaigns;

2. structural separation between distributors and trading companies; and

3. limitations on customer prospecting efforts. It also considers the implementation of rules for switching suppliers, such as invoice standardization, restrictions on penalties and switching fees, and the publication of a centralized database of ACL customers.

EXISTING REGULATION AND PROSPECTS FOR IMPROVEMENT

A regulatory framework is already in place to address anti-competitive practices in the energy market (e.g., ANEEL Resolutions 846/2019, REN 957/2021, and Submodule 1.6 of the Trading Procedures). As such, the introduction of new regulatory barriers — such as prohibitions on the use of trademarks or the imposition of legal separation — could result in additional costs and potential market distortions.

To foster free choice and promote a dynamic market, it is recommended that ANEEL focus on the following priorities:

- **Consumer education:** Launching awareness and information campaigns (e.g., *Open Energy*) to reduce informational asymmetries and empower consumers;
- **Transparent regulatory planning:** Ensuring that any proposed behavioral interventions are subject to public consultation and are supported by robust Regulatory Impact Assessments (RIAs).

[4] "HHI" means the Herfindahl–Hirschman Index, a commonly accepted measure of market concentration. For more information, see https://www.justice.gov/atr/herfindahl-hirschman-index, accessed on 28 May 2025.

Conclusions and Recommendations

When examining ANEEL Public Consultation No. 14/2024, there is, at this stage, no robust evidence of anti-competitive practices that would justify structural interventions or broad restrictions on vertical distribution and trading activities by the same group. Moreover, it is worth noting that:

1. No Legal Prohibition on Verticalization: Brazilian Antitrust legislation does not deem vertical integration inherently anti-competitive; rather, it recognizes that, depending on the context, it may generate efficiency gains;

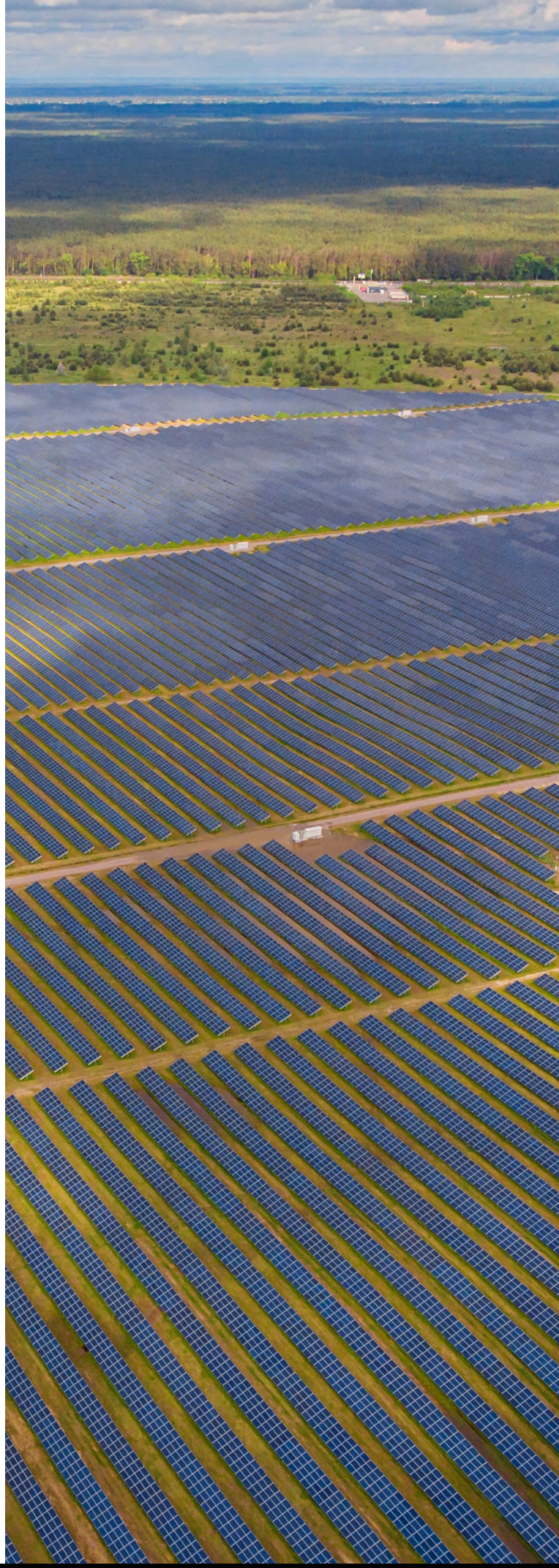
2. CADE's Primary Jurisdiction: Cases involving potential anti-competitive conduct fall primarily within CADE's jurisdiction, and any complementary action by ANEEL should remain within the scope of its regulatory mandate;

3. Need for In-depth Study: The methodology adopted by ANEEL (HHI by concession area) presents technical limitations and may not fully reflect the competitive dynamics of the ACL at the national level;

4. Existing Sectoral Oversight Mechanisms: Regulatory instruments already in place and actions by CCEE provide adequate monitoring to prevent abusive practices;

5. Importance of Consumer Awareness: Information campaigns and initiatives like Open Energy are effective tools to foster competition and promote transparency.

In summary, competition concerns should be addressed through effective oversight, consumer education, and transparent regulatory dialogue rather than broad and inflexible restrictions. A balanced approach to market opening — grounded in the constitutional principles of free enterprise and free competition — can help ensure that regulatory measures are both proportionate and aligned with the sector's long-term efficiency and sustainability, avoiding unnecessary distortions for market participants and consumers alike.



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LEGAL ASPECTS OF RURAL LAND USE FOR ENERGY PROJECTS IN BRAZIL


MARCOS PRADO
marcos.prado@cesconbarrieu.com.br


IVANA BOMFIM
ivana.bomfim@cesconbarrieu.com.br


MARIA GUATIMOSIM
maria.guatimosim@cesconbarrieu.com.br

The Brazilian energy sector offers significant opportunities, especially as it transitions toward cleaner and more sustainable energy solutions. However, one of the most frequently raised concerns by foreign investors involves the challenges related to the use of rural properties for the development of power generation projects. Despite the sector's strong potential, issues surrounding land access, ownership, and regulatory compliance continue to pose obstacles to project implementation.

While the current legal framework does not establish a specific contractual model regulating the use of rural land for power projects, in practice, acquiring rural property is generally not the preferred alternative for power projects, due to the high costs involved and the typically long-term financial returns. Moreover, the legal instruments currently provided by legislation are not always compatible with the legal, technical, and contractual specificities of these projects, which impose additional challenges to their structuring.

Rural Lease vs. Lease under the Brazilian Civil Code

There are relevant judicial discussions regarding the (im)possibility of using rural lease agreements to implement power projects, since the Land Statute (Law No. 4,504/1964) provides for a restrictive list of purposes for such agreements, limited to agricultural, livestock, agro-industrial, extractive, or mixed activities.

In addition, not all Real Estate Registries Offices accept the registration of rural lease agreements on the property's record, which constitutes a significant obstacle – especially considering that such registration is commonly required by financial institutions, such as BNDES, for financing purposes.

Given these limitations, alternatively, the lease may be structured under the general provisions of the Brazilian Civil Code, which may allow for greater contractual flexibility. However, this option also requires careful risk allocation and attention to legal certainty, including, in such cases, the recommendation to register the agreement in the property's record to ensure publicity and secure the right to remain on the property in case of its transfer to third parties.

Despite this recommendation, leases governed by the Brazilian Civil Code do not provide for statutory rights such as the right of first refusal, rent review actions, or lease renewal actions. Therefore, each case must be assessed individually, including consultation with the local Real Estate Registry Office to verify its specific interpretation and requirements.

Restrictions on the Acquisition and Rural Lease of Rural Properties by Foreigners

Pursuant to Law No. 5,709/1971 and the legal opinion issued by the Office of the Attorney General (*Advocacia-Geral da União* – AGU) in Opinion No. LA-01/2010, foreign legal entities authorized to operate in Brazil, as well as Brazilian companies considered equivalent to foreign entities (i.e., those under direct or indirect foreign majority control), may only acquire or lease rural land upon prior authorization from the National Institute for Colonization and Agrarian Reform (INCRA), subject to compliance with specific requirements set forth in the applicable legislation[5].

In practice, the authorization process proves to be slow, complex, and surrounded by uncertainties, especially in cases involving legal entities due to the lack of concrete precedents of approvals by INCRA in similar situations. Although there are ongoing judicial discussions and legislative bills aimed at relaxing these rules[6], under current law, any direct or indirect acquisition or lease of rural land conducted in violation of the applicable legislation is deemed absolutely null and void.

In light of this context, in order to enable the use of rural properties by foreign or foreign-controlled companies, alternative legal solutions have been explored through instruments that are not prohibited under current legislation and are accepted by financial institutions – such as BNDES – for the purposes of financing and structuring projects in the energy sector (such as the atypical land use transfer agreement, the lease agreement ruled by the Brazilian Civil Code and constitution of other in rem rights except the ownership that is prohibited, as usufruct or surface rights).

Accordingly, it is imperative that companies interested in investing in power projects in Brazil seek specialized legal counsel to conduct a case-by-case analysis. Such analysis is essential for identifying the most appropriate contractual instrument, considering the specific characteristics and status of legal regularity of the property, the project and the investor's profile, as well as for mitigating risks and ensuring the legal and registral compliance of the transaction.

Legal Modernization and New Investments in the Energy Sector

Despite the alternative legal solutions which have been successfully employed to mitigate legal barriers and enable energy sector projects, a broader and more structural regulatory update is still needed. The current restrictions on the acquisition and rural lease of properties reflect an outdated legal framework that is misaligned with Brazil's growing appetite to attract foreign investment aimed to expanding the energy sector.

[5] **(i)** Foreign legal entities may only acquire rural properties intended for the implementation of agricultural, livestock, industrial, or colonization projects related to their corporate purposes. These projects must be approved by the Ministry of Agriculture, after consultation with the competent federal agency responsible for overseeing regional development in the area of the intended acquisition (Article 5 of Law 5,709/71 and Article 11 of Decree 74,965/74); **(ii)** The total area of rural properties owned by foreign individuals or legal entities may not exceed one-quarter (¼) of the surface area of the municipality where such properties are located, as verified through a certificate issued by the Land Registry Office (Article 12 of Law 5,709/71). The acquisition of rural areas beyond the established limits will require prior approval from the President of the Republic; **(iii)** Companies or individuals of the same nationality may not hold, within the same municipality, more than 40% (forty percent) of the limit mentioned in item (ii) above, which corresponds to 10% (ten percent) of the total area of each municipality (Article 12, § 1, of Law 5,709/1971); **(iv)** The acquisition of an area exceeding 100 (one hundred) undefined development modules (which may vary according to the characteristics of each region in Brazil) will require prior approval from the National Congress (Article 23, § 2, of Law 8,629/93); and **(v)** The acquisition must necessarily be formalized through a public deed (Article 3 of Decree 74,965/74).

[6] Bill No. 2,963/2019, currently under review in the National Congress, aims to ease the restrictions on the acquisition of rural properties by foreigners, establishing new parameters and control criteria. At the level of the Federal Supreme Court, noteworthy cases include those that question the constitutionality of applying the restrictions set forth in Law No. 5,709/1971 to Brazilian companies controlled by foreign capital, particularly Direct Action of Unconstitutionality No. 4,417 and Allegation of Violation of a Fundamental Precept No. 342, both still pending final judgment.

14

SMART GRIDS AND DATA PROTECTION

OPPORTUNITIES AND CHALLENGES FOR THE ENERGY SECTOR IN THE AGE OF DIGITAL TRANSFORMATION


TANIA LIBERMAN
tania.liberman@cesconbarrieu.com.br


LARA MARTINS
lara.martins@cesconbarrieu.com.br


GABRIELA LAUAND
gabriela.lauand@cesconbarrieu.com.br

As the power sector embraces digital transformation through the implementation of smart grids (computerized electrical networks), new opportunities emerge for greater efficiency, sustainability, and innovation. However, this evolution also brings complex legal, ethical, and technical challenges in Brazil and worldwide, especially regarding the protection of personal data. Therefore, understanding how data flows through this evolving infrastructure is critical to ensuring compliance, public trust, and responsible innovation.

Smart grids rely on real-time data collection and analytics to optimize energy generation, distribution, and consumption by enabling faster detection of network faults and helping to restore the power supply more efficiently. The implementation of smart meters is a prerequisite for the smart grid as it relies on combined information from users of that grid to plan the supply of electricity more effectively, enabling the improvement of billing accuracy, dynamic pricing, monitoring of consumption patterns, and other energy efficiency initiatives. In this sense, when linked to identified or identifiable individuals (when smart meters are installed in people's homes), smart meters may accurately depict household routines, such as when residents are present, their sleep patterns, and even the use of specific appliances, tracking their behavior within the privacy of their own homes.

The matter is likely to become even more relevant in the coming years, given the growing complexity of the electricity sector, mainly due to the expansion of the ACL as well as renewable and decentralized generation sources. The groundbreaking projects for the implementation of smart grids or smart meters in Brazil took place within the scope of RD&I and energy efficiency projects, notably due to the obligation for power distribution concessionaires to invest 1% of their net operating revenues annually in such projects, in accordance with Law No. 9,991 of July 24, 2000.

While smart grid innovations promise improved efficiency, cost savings, better integration of renewable sources and the development of new market opportunities for the supply of products and services to consumers, they also pose challenges from a data protection and privacy perspectives. Considering the Brazilian Data Protection Law (LGPD), some key data protection concerns are:

Purpose Limitation and Legal Basis

An essential element in safeguarding consumer data lies in clarifying the legal basis for any collection and processing of personal information. Thus, a clear distinction should be drawn between objectives requiring data for core functions (such as billing, fraud detection, and grid maintenance) and

other purposes (such as offering products based on the individual's profile) that required a distinct and explicit consent. This segmentation ensures that consumers understand when and why their data is being processed, enabling them to exercise meaningful control over their information.

Data Minimization Principles

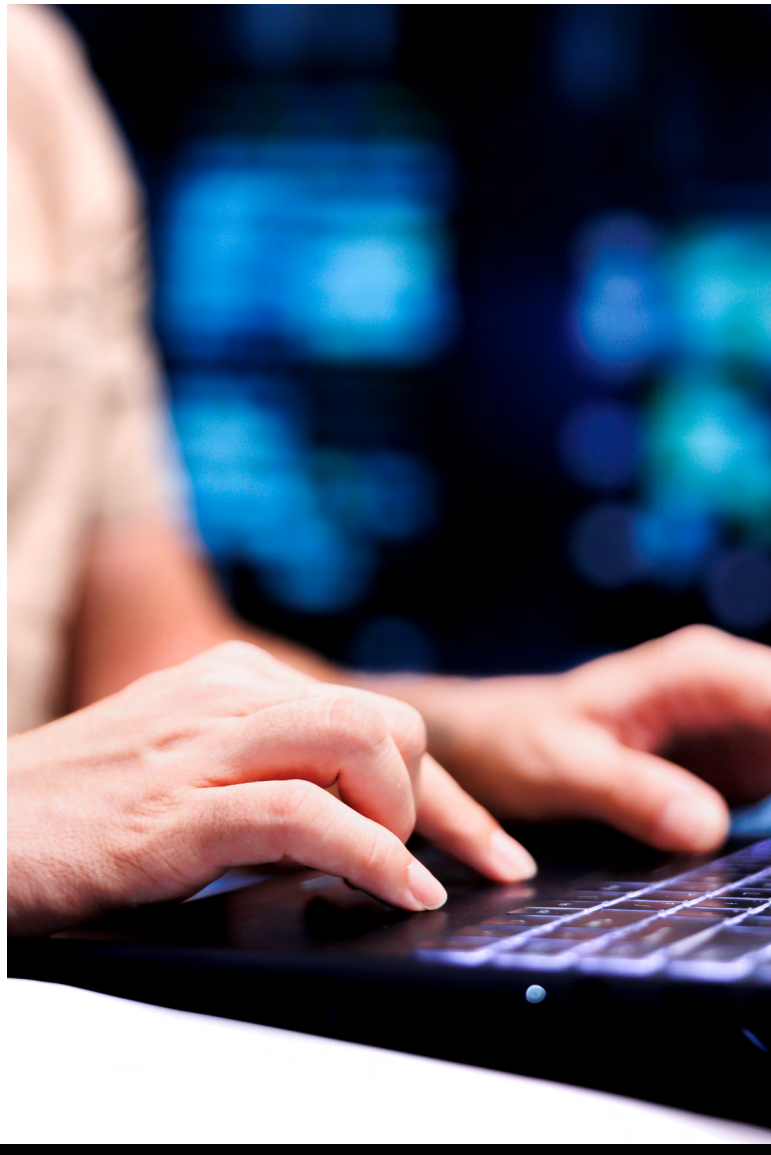
Data minimization is another critical pillar of privacy protection. The LGPD highlights that only the data strictly necessary for the intended purpose should be collected, with clear boundaries on frequency and retention. Sampling techniques, aggregation, and privacy-enhancing technologies (PETs) can be employed to avoid storing or transmitting non-essential detailed data. Implementing these technical and organizational measures ensures that utility providers and other third parties handle personal data responsibly and proportionately.

Retention and Security

Under the LGPD, storing information longer than necessary undermines the privacy rights of individuals. Data obtained with the use of smart meters can, in principle, be held only until the billing cycle or dispute period ends, unless consumers expressly consent with a longer retention period so that additional services may be rendered. The same caution applies to data security. Highly granular information can be a lucrative target for cybercriminals researching personal behaviors, which is why data breach notification is generally recommended for entities that process data obtained with the used of smart meters.

The successful deployment of smart grids depends on a delicate balance between innovation, market forces, and privacy protections. In particular, the adoption of a data protection impact assessment (DPIA) methodology by the stakeholders that process personal data from smart meters may assist in the identification of potential risks and in the implementation of solutions that fully respect data protection principles. A well-structured DPIA template will indicate the party responsible for preparing the document, how to map specific risks involved in the project, measures to mitigate risks, and how to conduct a robust evaluation of the technological landscape.

Smart grids represent a milestone in the digital evolution of the energy sector. However, companies need to address data protection challenges to ensure that innovative technologies and services uphold strong privacy standards at every stage of the energy supply process. By prioritizing legal clarity, robust data minimization practices, and transparent accountability throughout the energy chain, stakeholders can harness the benefits of smart grids while safeguarding individual privacy.



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LABOR CHALLENGES AND WORKFORCE REGULATION IN BRAZIL'S ENERGY TRANSITION PROJECTS

DARIO RABAY
dario.rabay@cesconbarrieu.com.br

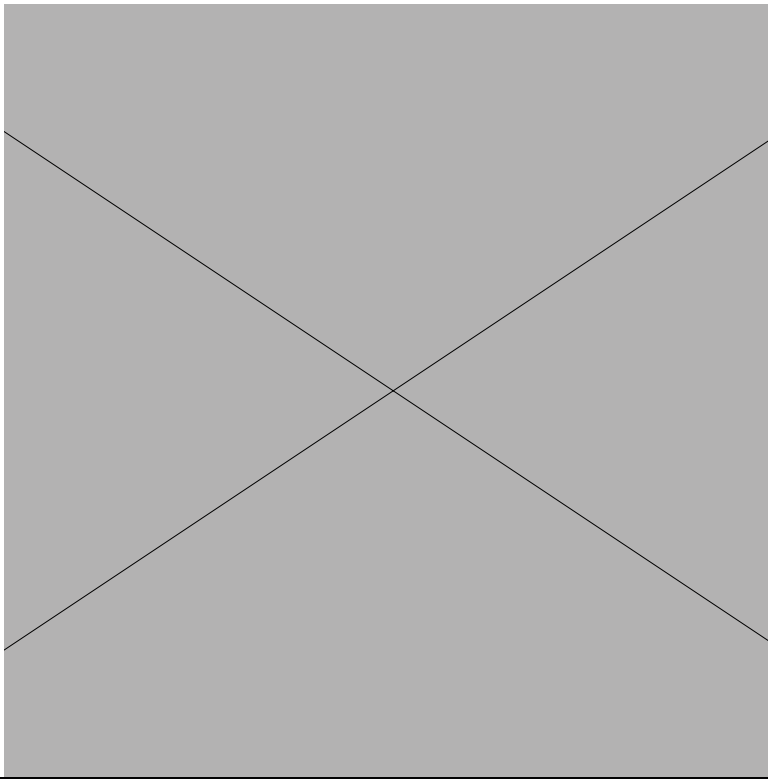
As Brazil advances its shift toward a cleaner and more decentralized energy matrix, the rapid growth of renewable energy infrastructure has brought key labor law issues to the forefront. From solar farms in the Northeast to offshore wind and smart grid initiatives nationwide, labor-related risks and obligations have become critical to the successful and sustainable development of energy projects.

Outsourcing and Working Conditions in Renewable Energy Construction

Large-scale renewable energy projects often depend on outsourced labor during construction and maintenance phases. Contractors typically engage a combination of specialized and non-specialized workers through service provision agreements. While Brazilian labor law plainly allows for outsourcing, hiring companies have joint liability responsibilities and must ensure that safety, health, and working condition requirements—outlined in the Brazilian Labor Code (CLT), applicable Regulatory Standards (*Normas Regulamentadoras* – NRs), and collective bargaining agreements—are fully observed.

Challenges such as excessive working hours, substandard accommodation in remote areas, and lack of access to sanitation facilities are frequently reported in infrastructure projects located in rural regions. Employers and contractors share legal responsibility for ensuring adequate working conditions, particularly when workers are temporarily housed near the worksites.

Additionally, outsourcing support services—such as security, cleaning, or food services—requires extra diligence. If the contracted service provider fails to meet its labor obligations, the hiring company may be held secondarily liable. To mitigate this risk, companies must closely monitor compliance with key obligations, including payment of the severance fund (FGTS), social security contributions (INSS), and proper payroll documentation.



Exposure to Occupational Risks: Heat, Height, Electricity, and Noise

Workers involved in the construction and maintenance of renewable energy facilities are routinely exposed to significant occupational hazards. Solar and wind farms, particularly in the Brazilian North and Northeast, subject workers to intense heat over long periods. Wind turbine maintenance involves work at elevated heights, increasing the risk of falls. Electrical installations and high-voltage equipment pose a constant risk of electrocution, while noise pollution from turbines and substations may lead to hearing loss or other health issues.

Brazilian safety regulations—especially NR-1 (General Provisions and Occupational Risk Management), NR-6 (Personal Protective Equipment), NR-9 (Environmental Risk Prevention), NR-10 (Electrical Installations and Services), and NR-35 (Work at Heights)—establish rigorous employer responsibilities for identifying, evaluating, and mitigating these risks. Employers must perform detailed risk assessments, provide job-specific training, and supply appropriate protective equipment. These measures must be part of a comprehensive Occupational Risk Management Program (PGR), designed and implemented by qualified specialists in accordance with legal requirements.

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