WHITEPAPER

STORED POTENTIAL

THE LEGAL ARCHITECTURE OF BATTERY ENERGY STORAGE IN BRAZIL

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SUMMARY

INTRODUCTION

This white paper examines the development of Battery Energy Storage Systems ("BESS") in Brazil, analyzing the opportunities and challenges facing this emerging technology within the Brazilian energy sector.

The analysis covers the contractual frameworks being developed, bankability considerations for project financing, as well as environmental and tax views, and the evolving legal and regulatory initiatives that will shape the market.

As Brazil's renewable energy matrix expands rapidly, particularly with intermittent sources like solar and wind, BESS emerge as a critical solution for grid stability, energy security, and economic optimization. This comprehensive review provides legal practitioners with essential insights into the regulatory landscape, business models, and contractual structures that will define the Brazilian BESS market.

APPLICATIONS, ADVANTAGES AND RISKS

Energy storage technology has been in the global market, with widespread domestic use. The BESS proposal, which makes it possible to store electrical energy from the power grid for later use, extends the application of this well-known technology to the electricity sector.

Among the possible applications, BESS can be used in the following ways:

INDUSTRIAL/COMMERCIAL

industrial and/or commercial enterprises can integrate BESS into their infrastructure with a view to: **(i)** meeting decarbonization targets through aggregation with renewable energy sources; **(ii)** ensuring stability and continuity in energy supply; and **(iii)** energy cost management.

RESIDENTIAL

ordinary consumers can benefit from installing BESS by guaranteeing: **(i)** energy storage, in the case of homes that have solar panels installed, which indirectly contributes to reducing electricity bill costs; and **(ii)** continuity of energy supply in times of blackouts.

GRID SERVICES (STANDALONE)

standalone BESS projects can be deployed to provide services directly to the electricity grid, independently of any associated generation or consumption asset, including: **(i)** ancillary services, such as frequency regulation and voltage support; **(ii)** capacity reserves, through participation in dedicated capacity auctions; and **(iii)** energy arbitrage, by storing energy during off-peak periods and injecting it into the grid during periods of high demand or price volatility.

In this context, the multiple ways in which BESS can be applied highlight its versatile and multifunctional nature. When incorporated into electricity grids, this technology not only increases operational flexibility, but also enables significant gains in terms of efficiency, reliability and sustainability. The main benefits associated with its integration include the following:

STABILITY AND RELIABILITY

BESS systems guarantee continuity in the energy supply in times of instability or blackouts, which is essential for hospitals, data centers and certain types of industry;

RENEWABLE SOURCES

the use of BESS allows greater integration of renewable sources into electrical systems by mitigating the effects of intermittent natural sources such as wind and solar irradiance, which indirectly contributes to the reduction of greenhouse gases and the energy transition;

CURTAILMENT

as the penetration of renewable energy sources in the electricity system grows, so does the risk of generation curtailment. BESS can mitigate this risk by decoupling the time of energy generation from the time of injection into the grid, enabling generators to shift delivery to periods of available system capacity and thereby prevent curtailment events. This approach has the potential to generate financial benefits for both market participants and consumers;

COST REDUCTION

Energy storage makes it possible to choose when to use the stored energy, enabling it to be consumed precisely at times when supply from the grid is cheaper;

ANCILLARY SERVICES

BESS can be used to provide ancillary services, to guarantee the stability and operational flexibility of the electricity system;

ISOLATED SYSTEMS

Energy supply in isolated systems — areas disconnected from the main electricity grid, predominantly in remote regions — remains a significant challenge in terms of both cost and reliability. BESS, when combined with solar photovoltaic generation, can effectively address this challenge by enabling cost-effective and continuous energy supply, even during periods of low solar irradiance or at night.

However, for BESS to be deployed to its full potential and deliver its expected benefits, several operational, regulatory and institutional challenges must first be overcome. These are examined in the sections that follow.

BRAZIL OPPORTUNITIES FOR BESS

Brazil's electricity sector presents a distinctive environment for BESS development, characterized by a renewable-dominated energy matrix. Also, the deployment of BESS addresses several key market opportunities, including curtailment reduction, price arbitrage strategies, offshore wind, and integration solutions for isolated systems in remote regions, such as in Brazil's North region. Additionally, Brazil's position as Latin America's largest data center market, with significant projected growth in power demand, creates substantial synergies with battery storage technologies that can provide essential ancillary services and cost optimizations benefits.

This section will examine the key market opportunities emerging from Brazil, as well as challenges that must be overcome.

RENEWABLE ENERGY SOURCES

In 2024, Brazil's energy matrix reached 50% renewable energy share, significantly higher than the global average and that of OECD countries. As of July of 2025, Brazil's total installed capacity, including both operational plants and projects under construction, stood at 212,526.6 MW, of which 84.44% corresponds to renewable sources. Looking ahead, the projected expansion of Brazil's energy matrix by 2031 — encompassing both greenfield and ongoing projects — amounts to an additional 138,039 MW, with approximately 133,000 MW expected to come from variable renewable energy sources, namely solar and wind.

The problem of intermittency, however, means that energy generation from these sources is dependent on exogenous and uncontrollable factors, such as natural resources. The injection of energy produced by photovoltaic solar plants ("UFVs") and wind power plants ("EOLs") into the electricity grid is therefore compulsory and in general cannot be controlled by the agent, as in the case of thermal power plants ("TPP") and hydroelectric power plants ("UHEs"), whose operation can be programmed by National Grid Operator ("ONS" in portuguese).

As the country continues to expand its wind and solar capacity, the intermittent nature of these sources has generated new market dynamics that position energy storage as a critical component for system optimization and stability. Batteries stand out as an alternative to mitigate this risk, since surplus generation can be stored and used later.

This time shift is extremely valuable because it adds an element of control to intermittent generation, enabling EOLs and UFVs to:

01. inject energy into the grid at times when generation is not possible, for example on cloudy days, at night, or when there is no wind, increasing the capacity of these sources in the market;	02. earn additional income by injecting the surplus during peak load times, when the price of energy is higher, a mechanism known as “price arbitrage”;
03. supply energy to isolated locations where access to the National Interconnected Grid (“SIN” in portuguese) is yet not possible, in systems known as “off-grid”; and	04. participate in capacity markets in the form of power.

OFFSHORE WIND

Law No. 15,097/2025, enacted on January 10, 2025, provides for the granting of concessions for the exploration of offshore energy potential and establishes rules for the leasing of areas for the development of offshore wind projects.

Beyond solar and onshore wind projects, offshore wind represents an emerging segment that stands to benefit significantly from integration with BESS, since these projects are subject to intermittency challenges — as are other renewable energy sources.

Within this context, Brazil is at the forefront of the clean energy transition, with renewable energy currently accounting for 50% of its energy matrix and projections indicating that the country could achieve carbon neutrality by 2050 and increase the share of renewable energy sources to 81% by 2055. Against this backdrop, BESS technology emerges not merely as a complementary tool, but as an essential infrastructure component for maximizing the economic and operational potential of Brazil's renewable energy investments.

LITHIUM AS A STRATEGIC MINERAL

The industrial use of lithium has become widespread globally, driven by the technological revolution of the 21st century. As a key component in the manufacturing of electronic devices — such as mobile phones, tablets, and computers — as well as energy storage systems, lithium enhances the efficiency and performance of these technologies. Against this backdrop, demand for lithium reserves has grown sharply and continues to rise.

In 2023, global lithium reserves totalled approximately 30 million tonnes (Mt), of which 590,000 tonnes were located in Brazil, primarily in Minas Gerais. In terms of production, 203,910 tonnes were extracted worldwide that year, with Brazil accounting for 7.5% of total output, followed by Chile (30.8%) and Argentina (13.2%) — underscoring South America's prominence in global lithium production.

In July 2025, Brazil hosted the Lithium Business 2025 event, further consolidating the country's role in the global lithium extraction and production landscape. At the event, the Brazilian Ministry of Mines and Energy

(Ministério de Minas e Energia, or "MME") highlighted the development of the Lithium Valley, located in the Jequitinhonha Valley in Minas Gerais, as one of the most promising regions for lithium production. Beyond Minas Gerais, Brazil also holds lithium deposits in Paraíba, Rio Grande do Norte, Ceará, Bahia, and São Paulo.

Given lithium's critical role in the manufacturing of BESS and electric vehicle batteries, Brazil is emerging as an attractive hub for both domestic and international investment, positioning itself at the forefront of this new mining cycle.

CURTAILMENT REDUCTION AND PRICE ARBITRAGE

In 2025, power generation curtailments, a phenomenon known as constrained-off, increased by 230% from January to August in Brazil, according to data from the ONS. Curtailments averaged 3,256 MW in 2025, compared to 150 MW in 2023, resulting in the loss of 17.2% of all wind and solar generation nationwide.

Generation curtailments are determined by National System Operator (ONS in portuguese) and stem from two primary causes: **(i)** excess power generation relative to demand, accounting for 57% of cases; and **(ii)** operational unavailability of transmission infrastructure, comprising the remaining instances. In either scenario, energy that cannot be dispatched is effectively lost. These increasingly frequent events impose substantial losses on generators, who may fail to fulfil energy delivery commitments due to circumstances beyond their control."

Since 2021, accumulated financial losses for solar and wind power generators have reached R$ 5.8 billion. The scale of these losses has given rise to persistent legal disputes within the Brazilian electricity sector.

In this context, curtailment reduction represents one of the most immediate opportunities for BESS in Brazil. BESS integration enables the mitigation of these curtailments by storing excess energy during surplus periods and releasing it when grid capacity becomes available, thereby functioning as a "virtual escape route" for congested transmission flows.

Consequently, BESS deployment reduces financial losses for renewable power generators whilst mitigating associated sectoral disputes. In doing so, it provides greater financial and operational stability for the renewable power sector, while also contributing to increased legal certainty for market participants.

Beyond curtailment mitigation, BESS facilitates price arbitrage strategies. These systems can charge during low-price periods and discharge when prices increase, generating additional revenue streams. In the US market, approximately 59% of large-scale battery capacity was utilized for arbitrage in 2021, compared to 17% in 2019. By integrating BESS with solar and wind installations, operators can capture substantial profits by selling during peak hours when these sources often provide virtually cost-free electricity to the market.

This strategy benefits both power generators and consumers alike, since either party can select and store low-cost energy for consumers, whether sourced from the grid or their own generation facilities — for deployment during higher-pricing periods. Consequently, BESS enables cost optimization across both the supply and demand sides of the electricity value chain.

In this sense, BESS technology emerges as a comprehensive solution that addresses multiple sector inefficiencies simultaneously. By enabling curtailment reduction, facilitating price arbitrage, and providing operational flexibility for both generators and consumers, BESS represents a strategic intervention that can transform grid constraints into economic opportunities. The technology's dual capacity to mitigate financial losses whilst creating new revenue streams positions it as an essential infrastructure investment for achieving a more resilient and economically viable renewable energy sector in Brazil.

ISOLATED SYSTEMS INTEGRATION

Isolated systems refer to electricity networks that operate independently of Brazil's SIN. Approximately 270 such systems exist nationwide, predominantly concentrated in the northern region, collectively serving an estimated 3 million people.

Electricity generation in isolated systems relies primarily on thermal power plants, with diesel-powered generation constituting the dominant energy source. This approach presents significant economic disadvantages, as diesel-based generation incurs substantially higher costs compared to renewable energy alternatives.

The integration of renewable energy sources in isolated systems, particularly in remote areas of Amazonas, Acre, and Rondônia states, faces considerable challenges due to the intermittent nature of solar and wind generation. BESS offers a viable solution to this limitation by capturing excess energy produced during periods of favorable weather conditions and discharging it during periods of low generation. This capability enables renewable sources to provide consistent and reliable electricity supply.

Government initiatives such as "Mais Luz para a Amazônia" and regional utility programs have begun incorporating BESS technology alongside renewable generation. These projects demonstrate the dual benefits of BESS deployment: enhanced environmental sustainability and improved grid reliability.

As government programs increasingly adopt this approach, isolated systems can transition from polluting, expensive diesel dependency to cleaner, more cost-effective renewable energy solutions, thereby aligning regional electrification efforts with broader national energy transition goals whilst ensuring reliable electricity access for millions of underserved citizens.

DATA CENTER MARKET SYNERGIES

Data centers are specialized facilities designed to house servers, data storage infrastructure, and critical IT hardware necessary for processing and storing information. These facilities underpin artificial intelligence ('AI') and numerous other technologies integral to the daily operations of modern businesses and economies. In Latin America, Brazil stands as the largest data center market, hosting 159 facilities — including the fifth-largest data center complex in the world.

Data centers require substantial energy resources to operate. A medium-sized facility consumes electricity equivalent to approximately 1,000 homes, whilst larger installations may consume the equivalent of 10,000 to 50,000 homes—comparable to the energy demand of a small city. Based on information from International Energy Agency, global electricity consumption from data centers is estimated to reach approximately 415 terawatt-hours (TWh) in 2025, representing approximately 1.5% of total global electricity consumption in 2024. In addition, the expansion of artificial intelligence technologies has further intensified power demand; for instance, generating a single AI image requires energy equivalent to fully charging a mobile phone.

In Brazil, data centers consumed 740 MW of electricity in 2024. According to projections from the Ministry of Mines and Energy, this demand is expected to reach 2.5 GW by 2037, reflecting the sector's anticipated growth trajectory.

In combination with high energy consumption, data centers require 100% power supply availability, demanding robust connection facilities to avoid interruptions that can damage equipment and create fire risks. In this sense, BESS provides essential ancillary services including frequency control, voltage regulation, and emergency backup capabilities. Since electric power represents over 60% of data center operating costs, BESS enables cost mitigation through demand response mechanisms and peak shaving strategies.

Beyond that, BESS can be integrated with renewable sources to promote the energy transition of these facilities and thus reduce dependence on more costly and polluting sources, beyond the uninterrupted power supply.

Consequently, the integration of BESS into data center infrastructure represents not merely an operational enhancement but a strategic imperative for the sector's sustainable expansion. As Brazil's data center market continues to grow in response to increasing digitalization and AI adoption, the deployment of energy storage systems will prove critical in ensuring grid stability, operational resilience and economic viability.

The convergence of rising energy demands, the need for uninterrupted power supply, and cost optimization objectives positions BESS as an essential component of next-generation data center architecture, enabling the sector to meet both current operational requirements and future sustainability targets.

ANCILLARY SERVICES

To operate at full capacity and ensure the quality of energy in the SIN, certain technical parameters must be observed through supplementary mechanisms known as "ancillary services", the purpose of which is to maintain the operational security of the system and the parameters of frequency, voltage, synchronism and emergency response (self-restoration or "black start").

In Brazil, ancillary services, notably those relating to frequency control, are predominantly provided by hydroelectric power plants, owing to the technical attributes of these facilities. The significant expansion of intermittent energy sources in the electricity grid has triggered a substantial increase in ancillary service costs. Unlike conventional generation, these sources lack the necessary technical attributes to provide such services themselves and, by their nature, operate in a manner that places greater demands on grid stability. Consequently, UHEs have been deployed with increasing frequency to provide operational flexibility to SIN[1].

In this regard, BESS are also capable of providing ancillary services. While it is necessary to modernize Brazilian regulation so that these services can be offered in a competitive market as a differentiated product from energy supply, there are precedents for the use of batteries by transmission and distribution agents seeking to achieve greater stability in their respective networks.

01. The large-scale adoption of lithium-ion BESS by ISA CTEEP was pioneered and authorized by National Electric Energy Agency (“ANEEL” in portuguese)[2] to form part of the transmission function of the concession to meet emergency electricity demand. According to the agent, "[t]he suggestion to adopt BESS at the time proved to be an innovative and rapidly deployable solution, which aimed to reduce demand peaks and maintain the safe performance of the system under normal operating conditions". In return, the transmission company received an increase in its permitted annual revenue[3].

[1]Contribution No. 145/22-030825 to MME Public Consultation No. 145/2022
[2]ANEEL Authorization Resolution No. 10,892/2021
[3]Contribution No. 160/24-042699 to MME Public Consultation No. 160/2024

02. As a result of a research and development ("R&D") project conducted with ANEEL, CEMIG developed a system that uses a battery bank, operating remotely, to support the distribution network by regulating voltage levels during peak hours and reducing power supply interruptions[4].

ANCILLARY SERVICES REGULATION

The provision of ancillary services in Brazil is governed, at its core, by ANEEL Normative Resolution No. 1,030/2022 ("REN 1,030/2022")[5] , which sets out the conditions for the provision and remuneration of ancillary services within the SIN. Under this framework, authorized agents to provide ancillary services, historically, and predominantly, UHEs, must execute an Ancillary Services Provision Agreement with ONS as a condition for accessing the associated remuneration. Financial settlement is operationalized through the Short-Term Market (Mercado de Curto Prazo — "MCP"), managed by the Energy Trading Chamber (Câmara de Comercialização de Energia Elétrica — "CCEE").

The broader institutional debate around this issue had begun in 2022, when the MME opened Public Consultation No. 145/2022 to receive contributions on the provision of ancillary services across the SIN, covering planning, operation, regulation, cost allocation and risk distribution[6]. Although that consultation did not produce targeted regulation for storage at the time, it signaled growing institutional awareness of the need to adapt the ancillary services framework to a matrix increasingly dominated by intermittent renewable sources.

On the regulatory side, the decisive structural step was taken by ANEEL through Normative Resolution No. 1,062/2023 ("REN 1,062/2023"), which created a formal legal basis for ANEEL to authorize ONS to use a regulatory experimental environment (sandbox) to test alternative ancillary service products. The activation of the sandbox was conditioned on a prior ONS technical study identifying the priority service to be tested. Following that study, ONS identified reactive power support for voltage control as the priority ancillary service for the first experimental cycle.

To discuss the specific design of the competitive sandbox mechanism for reactive power support, ANEEL opened Public Consultation No. 44/2023[7]. That deliberation resulted in the enactment of ANEEL Resolution No. 16,539/2025 ("REA 16,539/2025"), issued on 21 October 2025, by which ANEEL formally authorized ONS to contract, under the sandbox, alternative reactive power support products for voltage control, additional to the minimum requirements set out in the Grid Procedures, in order to meet needs identified through the medium-term system planning process (PAR/PEL) or dedicated studies[8].

The structure of the mechanism, as established by REA 16,539/2025, operates as follows.

Eligible participants include power generating plants, free consumers and other technologies meeting the technical and economic criteria defined by ONS in the specific competitive procedure;

Agents in the transmission and distribution categories, as well as those in the micro and mini distributed generation category, are expressly excluded from participation[9];

Qualified winners of the competitive procedure are entitled to variable remuneration based on the quantity of reactive energy actually delivered, valued in accordance with their winning bid (R$/Mvarh);

Dispatch follows economic merit order, based on contracted price and an effectiveness factor, also determined pursuant to an ONS technical study, that reflects each agent's electrical contribution to voltage control at the target substation[10]. Financially, amounts due are calculated by CCEE in the month following the reference month of dispatch and inserted into the corresponding MCP settlement; sandbox results participate in the regular default allocation of MCP financial settlement, with no separate bank account required[11].

CCEE is required to publish aggregate sandbox results monthly on its platform[12].

[4]https://www.cemig.com.br/release/sistema-de-armazenamento/
[5]ANEEL Normative Resolution No. 1,030/2022, of 26 July 2022
[6]MME Public Consultation No. 145/2022, opened pursuant to Ministerial Order No. 10/GM/MME/2022. See also Contribution No. 145/22-030825 to MME Public Consultation No. 145/2022
[7]ANEEL Public Consultation No. 44/2023. The consultation received 37 contributions between 7 December 2023 and 22 January 2024
[8]ANEEL Resolution No. 16,539/2025, of 21 October 2025, Art. 1, caput and §1
[9]ANEEL Resolution No. 16,539/2025, Art. 3, caput and §1
[10]ANEEL Resolution No. 16,539/2025, Art. 3 §5 and Art. 4
[11]CCEE Provisional Grid Procedures, Module 9, items 3.5, 3.6 and 3.7
[12]CCEE Provisional Grid Procedures, Module 9, item 3.8

The first competitive procedure under this framework was conducted by ONS in late 2025. According to industry press reports, it resulted in the contracting of 338 effective Mvarh for voltage control concentrated in specific 500 kV substations in the state of Minas Gerais, at an average discount of approximately 21% relative to the price ceiling[13]. The CCEE Provisional Grid Procedures for the sandbox (Module 9) entered into force on January 2026, and further competitive procedures are anticipated from 2026 onwards[14].

The sandbox was structurally experimental and was designed to generate operational experience to inform future permanent regulation. In line with that purpose, REA 16,539/2025 requires ONS, with CCEE's support, to submit annual technical reports to ANEEL covering results obtained, difficulties encountered, solutions adopted and suggestions for regulatory improvement, with a view to informing the revision of ancillary services contracting and remuneration rules[15].

In parallel, and directly relevant to BESS, the regulatory debate conducted within ANEEL's Public Consultation No. 39/2023 produced a final normative outcome. On June 25 2026 ANEEL published Normative Resolution No. 1,162/2026, expressly providing that ancillary services may be performed by autonomous storage systems or by power generating plants with co-located storage systems, subject to requirements to be established by ONS[16] in the Grid Procedures and by CCEE in the Trading Rules and Procedures. This provision resolves the prior gap by formally recognizing storage as an eligible provider of ancillary services under the general framework, thereby opening a concrete remuneration path for BESS operators.

Finally, a broader policy signal also emerged with CNPE Resolution No. 8/2026, which established guidelines for the study and contracting, through auctions or other competitive mechanisms, of services provided by Hydraulic Storage Systems (Sistemas de Armazenamento Hidráulico — "SAH") in the SIN, explicitly enumerating ancillary services and operational attributes, including voltage control, frequency regulation, ramping, fast-start and black start capability, among the services such systems may provide[17]. Whilst focused on hydraulic storage, the resolution points to the direction of sector policy: progressively more competitive and technology-neutral mechanisms for ancillary services contracting. With the formal recognition of BESS as eligible ancillary service providers now enacted through REN No. 1,162/2026, that trajectory has materially advanced, and the economic case for BESS projects in Brazil is correspondingly stronger.

BRAZILIAN MARKET CHALLENGES

The development of the Brazilian market for BESS unfolds in parallel with the need to address a set of structural challenges inherent to introducing an innovative technology into a traditionally generation-centric electricity sector. While recent regulatory initiatives and investment activity confirm the growing relevance of storage in Brazil's energy transition, the large-scale deployment of BESS depends on overcoming technical, infrastructure, economic and financial constraints that affect project feasibility, system integration and investor confidence. In this context, the following sections examine the main challenges currently shaping the Brazilian BESS market.

TECHNICAL AND INFRASTRUCTURE CHALLENGES

BESS is, in fact, an innovative technology with the potential to significantly contribute to the global energy transition. However, the implementation of this technology requires overcoming several barriers to break with the traditional structure of the Brazilian electric sector and to accommodate these new facilities with safety and efficiency. Among the challenges to be addressed, the following stand out:

[13] Industry press reports indicate that the first competitive procedure resulted in the contracting of 338 effective Mvarh at an average discount of approximately 21% relative to the price ceiling, with delivery concentrated in specific 500 kV substations in Minas Gerais (including Pirapora 2, Itabira 5, Itabirito 2, São Gotardo 2, Bom Despacho 3 and Poços de Caldas)
[14] CCEE Provisional Grid Procedures, Module 9, Revision 1.0 (effective 1 January 2026); ANEEL Authorising Resolution No. 16,539/2025, Art. 2 §9
[15] ANEEL Resolution No. 16,539/2025, Art. 9
[16] ANEEL Public Consultation No. 39/2023
[17] CNPE Resolution No. 8/2026

TECHNICAL INTEGRATION

Integrating BESS into power generation plants and transmission and distribution grids requires ensuring compatibility between this new technology and existing infrastructure, as well as technical expertise from ANEEL and ONS to define the technical requirements for energy injection into the grid in a manner that preserves the efficiency of both new and existing facilities.

GRID COMPATIBILITY

The time-shift capability provided by BESS affects the traditional operation of transmission and distribution networks by redistributing load over time, which calls for improvements in the operational performance and coordination of network use.

SUPPLY CHAIN

The growing demand for BESS has intensified competition for the inputs needed for their manufacturing, particularly lithium, an essential component in conventional technologies and with limited global reserves.

The challenges listed above create uncertainties for new investors in this emerging technology, underscoring the need for strategic planning to ensure that BESS can be deployed at scale and fulfill its role in supporting a more secure, efficient, and sustainable energy system.

ECONOMIC AND FINANCIAL BARRIERS

Despite the strong technical rationale for BESS in Brazil, economic and financial barriers remain among the most relevant challenges to large-scale deployment. High initial capital expenditures continue to be a critical entry barrier. Although global battery prices have followed a downward trajectory over the past decade, storage solutions still require substantial upfront investment under current Brazilian market conditions.

This challenge is compounded by the absence, to date, of fully consolidated business models for utility-scale and front-of-the-meter BESS projects in Brazil. As a result, project bankability often depends on bespoke contractual arrangements, hybrid projects, or long-term offtake structures, which increases transaction costs but also opens space for innovative financial engineering and legal structuring.

Another relevant economic factor is the tax burden imposed on imported battery systems and components. Recent decisions by Brazilian trade authorities increased import tax rates for batteries, BESS and related equipment to levels that significantly affect project economics. When combined with other federal taxes and state-level charges, the cumulative tax incidence materially inflates the landed cost of storage solutions. While this context poses short-term challenges, it also elevates the strategic importance of tax planning, customs classification analysis, and the pursuit of special tax regimes and incentives as core elements of project development.

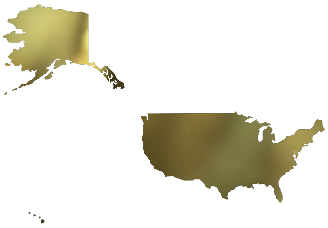
In addition, Brazil's current reliance on imported technology — particularly from Asian suppliers — further exposes BESS projects to supply chain risks and foreign exchange volatility. However, this dependency simultaneously creates opportunities for localized assembly, strategic partnerships, and, in the medium term, domestic manufacturing initiatives. From an investor's perspective, early positioning in projects that integrate localization strategies or benefit from future industrial policy measures may provide competitive advantages as the market matures.

Conversely, these economic barriers do not negate Brazil's long-term attractiveness for energy storage investments. On the contrary, they highlight the need for sophisticated legal, regulatory and financial solutions. As the tax, regulatory and market frameworks continue to evolve, investors who engage early, with well-structured projects and robust legal support, are likely to benefit from first-mover advantages in what is poised to become one of the most dynamic BESS markets in Latin America.

INTERNATIONAL OVERVIEW

International experience provides valuable guidance for Brazilian regulatory development in the BESS sector. The most advanced regions in BESS development include China, United States, European Union and Latin America, which use BESS mainly for ancillary services and price arbitration.

Below, we outline some of the governmental policy initiatives that have been adopted by those countries:



USA:

In the United States, generators added 10.4 GW of new battery storage capacity in 2024, making it the second-largest source of new generating capacity after solar. With this increase, the country’s total utility-scale battery storage capacity surpassed 26 GW in 2024.

CHINA:

China demonstrates clear leadership in this sector through comprehensive regulations that encourage energy storage integration into new photovoltaic plants. The country's dominance is reflected in its control of 85% of global battery cell production capacity and over half of the world's lithium processing capabilities. Furthermore, China plans to inaugurate a mega sustainable power generation plant in 2025, combining wind turbines, solar panels, and energy storage via batteries, highlighting the country's innovative approach to integrated renewable energy systems.

LATIN AMERICA:

The Latin American Energy Organization (“OLADE”) is an intergovernmental public body which aims to promote the integration, conservation and defense of the region’s energy resources. Regarding energy storage, OLADE published in 2025 the Technical Note No. 10 about “Energy Storage in Latin America and the Caribbean – Current Status, Challenges and Strategic Recommendations”.

The Technical Note shows that Chile, Brazil, and Mexico are among the countries leading the way in energy storage. Brazil, in 2024, accumulated 685 MWh of installed energy storage capacity, with 70% of this capacity serving isolated systems and Mexico, in turn, has 192 MW of installed energy storage capacity. Energy storage capacity in Latin America is 60% represented by lithium-ion batteries, which are mainly used in hybrid solar systems, microgrids, industrial backup, and auxiliary services, largely due to their widespread availability — a strategic opportunity for the region — and technological maturity.

Chile has emerged as an attractive battery investment hub in Latin America, with 2 GW of installed storage capacity, driven by its growing solar generation capacity and the need to address curtailment challenges. The 2024 inauguration of Latin America's largest battery energy storage park - BESS Coya Battery Park with 638 MWh capacity and 139 MW installed capacity - exemplifies successful regulatory implementation in the region and demonstrates the viability of large-scale lithium battery storage projects. This development positions Chile as a regional leader in battery energy storage deployment and provides valuable lessons for other Latin American markets.

BRAZIL:

Brazil has experienced a notable increase in investment initiatives related to BESS. Until 2035, a growing volume of announced and ongoing projects across utility-scale, commercial and industrial applications is expected, as well as integration with renewable generation assets.

Planned expansions in installed storage capacity reach several hundred megawatt-hours over the coming years, supported by multi-year investment programs and structured financing initiatives. These efforts include the expansion of existing storage portfolios, the development of new hybrid projects combining generation and storage, and the creation of financial mechanisms specifically designed to support energy storage deployment. Collectively, these initiatives point to a market that is transitioning from isolated projects to a more robust and scalable investment environment.

EUROPEAN UNION:

The global landscape also features strategic international cooperation initiatives aimed at strengthening national lithium production supply chains for battery manufacturing.

The 8th Annual Meeting of the European Battery Alliance in 2024 focused on implementing actions to ensure Europe's leadership in innovation, sustainability, and competitiveness in the face of increasing international competition, particularly from the United States and China.

The global movement is clearly geared towards the development of battery technology, particularly lithium-based systems, with the international outlook being favorable for expanding and supporting projects using such technology, whether integrated with power plants or operating independently. This international experience underscores the importance of battery technology in addressing energy challenges and offers valuable lessons for Brazil's continued development of a competitive and sustainable energy storage market.

LEGAL AND REGULATORY INITIATIVES

REGULATORY FRAMEWORK DEVELOPMENT

Regulating energy storage systems presents a structural challenge that sets it apart from the regulation of conventional electricity assets: unlike generation or transmission, storage is inherently bidirectional — it consumes energy from the grid and reinjects it — and can simultaneously perform functions associated with different segments of the electricity sector. This dual nature means that storage does not fit neatly into the existing legal categories of the Brazilian electricity sector, which were designed around technologies with a single, well-defined function.

This regulatory ambiguity has real consequences. The classification of a BESS project, whether as a generator, a consumer, a transmission asset or an entirely new category, determines its licensing regime, applicable tariffs, sectoral charges, access rights and revenue streams. Resolving these questions is not merely a technical exercise; it conditions the economic viability of projects and, ultimately, the ability to attract the private capital necessary to scale the technology in Brazil.

Against this backdrop, two institutions have been advancing the regulatory agenda along complementary but distinct tracks: ANEEL, through a structured roadmap aimed at defining the technical, licensing and tariff rules applicable to storage systems; and the MME, through the use of capacity reserve auctions to contract storage capacity in parallel with, and, in part, ahead of, the full maturation of the regulatory framework. The interaction between these two tracks reflects a deliberate policy choice to capture investment opportunities early.

ANEEL'S ACTIVITIES

Law No. 15,269 of November 24, 2025 ("Law No. 15,269/2025") delegated to ANEEL the responsibility for regulating and supervising electricity storage activities, confirming the role the agency had already been playing with regard to energy storage systems since 2020, when BESS was introduced into ANEEL's sectoral discussions via Public Hearing No. 11/2020, which aimed to gather input for the drafting of proposals for the regulatory adjustments necessary for the integration of storage systems into the Brazilian electricity sector. That process culminated in the conclusion of the first cycle of ANEEL's regulatory roadmap: on on June 25, 2026 ANEEL published the regulatory package, composed of Normative Resolution No. 1,161/2026 ("REN 1,161/2026") and Normative Resolution No. 1,162/2026 ("REN 1,162/2026"), together with revisions to Modules 1, 2, 3 and 5 of the Transmission Service Rules. This regulatory package represents the most significant milestone to date in the integration of battery storage into the Brazilian electricity sector.

Following an analysis of the contributions to Public Hearing No. 11/2020, ANEEL adopted a roadmap strategy: the debate on storage systems was divided into three cycles in order to address the complexity of the subject within a reasonable timeframe.

In this scenario, ANEEL launched, in October 2023, the first phase of Public Consultation No. 39/2023, which focused on gathering input and additional information to improve the regulation of electricity storage, including reversible hydroelectric power stations, thereby also marking the start of the roadmap. A second public consultation phase was opened in December 2024, with contributions accepted through January 2025. ANEEL's technical teams consolidated over 650 submissions across eleven thematic areas. Following that process, the Board deliberated the regulation proposal on June 2, 2026, resulting in the publication of REN Nos. 1,161/2026 and 1,162/2026.

Those publications concluded the first regulatory cycle, which addressed the conceptual definition of storage systems, their authorization regime, network access and use, and the removal of regulatory barriers to ancillary services and capacity auctions.

First Cycle of the Roadmap

The first cycle of ANEEL's regulatory roadmap was concluded with the publication, on June 25, 2026, of REN No. 1,161/2026 and REN No. 1,162/2026. These instruments enacted the key outcomes that had been under discussion since 2023, covering the following main topics:

I. CONCEPTUAL DEFINITION OF ENERGY STORAGE SYSTEMS ("ESS"):

According to REN No. 1,161/2026, ESS is "a set of equipment, devices and technologies that store energy in any device, for subsequent consumption, injection of energy into the grid or provision of services to the electricity system". The same definition was incorporated into the distribution framework regulation.

Furthermore, the concept defines the possible technologies that may be used to store energy, including batteries — the focus of this analysis — as well as reversible hydroelectric power stations and other forms that may yet emerge; the list is therefore not exhaustive.

The establishment of a formal concept standardized technical and regulatory understanding and facilitates the application of the rules across the sectoral normative framework.

II. REGULATORY CLASSIFICATION OF ESS:

REN No. 1,161/2026 establishes the modes of operation and interaction of storage systems with the Brazilian electricity sector:

> **(i)** as an autonomous storage system ("autonomous mode"), operating independently and absorbing power exclusively from the network for subsequent injection or provision of services. In addition, REN No. 1,162/2026 formally created the "autonomous storage operator" as a new category of electricity sector agent within the distribution rules, supplementing the pre-existing categories of consumer, generator and importer/exporter; or
>
> **(ii)** as a co-located storage system, installed adjacent to a power generating plant and capable of absorbing energy from the plant itself or from the grid.

A) AUTONOMOUS MODE:

Under REN No. 1,161/2026, autonomous energy storage systems are authorized to operate exclusively using energy drawn from the National Grid System and are subject to an authorization regime analogous to that applicable to Independent Power Producers ("IPP"). A specific register will be created within the ANEEL system for storage service licenses, separate from the registers applicable to power generating plants.

Authorizations issued by ANEEL have a term of 35 years and must be requested by the agent's legal representative, accompanied by the certain qualification documents indicated by the applicable regulation. The authorizing act establishes a maximum period of 54 months, counted from the date of its publication, for the commencement of commercial operation of all storage units.

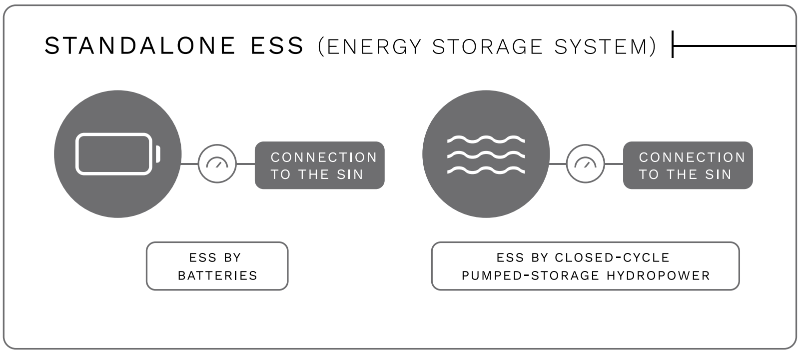
In line with the approach taken for power generation projects, ANEEL created, within the framework of REN No. 1,161/2026, the Dispatch of Registration of the Authorization Request for Storage Systems ("DRO-ESS"), a facultative instrument available to prospective operators prior to formally requesting an authorization. The DRO-ESS has a validity period of four years without extension and does not confer any right of priority, exclusivity or guarantee of authorization; its principal purpose is to facilitate the obtaining of environmental licenses and compliance with requirements of public authorities or financial agents.

REN No. 1,161/2026 restricts the autonomous mode regime to corporations and consortia, excluding individuals. Licenses to individuals remain available only for power generating plants operating as self-producers; such equivalence is considered inappropriate for operators running projects under the autonomous mode model, given that the autonomous mode regime is structured around the sale of services to the system rather than self-supply.

Unlike the micro and mini distributed generation regime, which exempts small-scale power generation from the authorization requirement, REN No. 1,161/2026 does not provide an equivalent exemption for energy storage systems of reduced capacity. The provision of autonomous energy storage services must therefore always be subject to an authorization granted by ANEEL, regardless of the project's installed capacity.

As operational accommodation, ANEEL will monitor the construction works, through its systems, only in relation to ESSs with an installed capacity exceeding 5,000 kW. For smaller projects, the authorization requirement remains, but the intermediate milestone monitoring obligation does not apply.

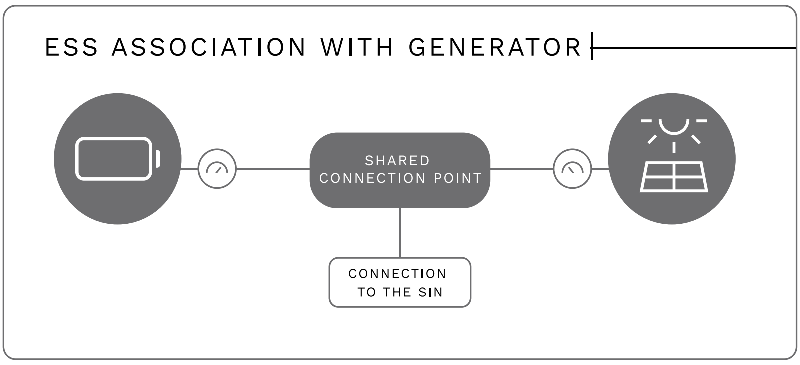
licenses concessions have been aligned with those applicable to power generation agents.



In addition to the autonomous model, REN No. 1,162/2026 expressly provides the possibility of linking an autonomous ESS authorization with a generating plant, through the association mechanism. Under this configuration, the power plant and the ESS hold independent authorizations, maintaining legal and operational autonomy.

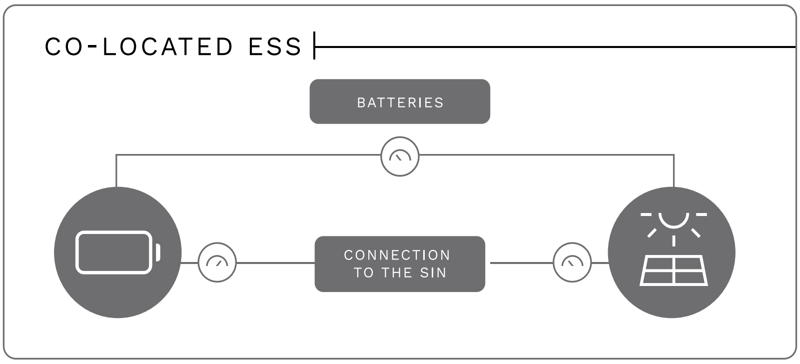
Under the association model, metering is carried out separately for each authorization, and the autonomous ESS may not be charged directly by the power generating plant. Charging must therefore take place through the purchase of energy via the market. This segregation requirement ensures the traceability of energy flows and their correct accounting within the CCEE settlement framework.

The distinction between the association model and the co-location model is therefore one of authorization architecture: where the ESS operates under its own separate authorization alongside a power generating plant, the interaction is indirect, with segregated metering and formalized energy purchase contracts; where the ESS is included within the power generating plant's own authorization, it is treated as a technical modification of that authorization, with shared infrastructure and direct charging permitted.



B) CO-LOCATION MODEL:

When co-located, the ESS is integrated with the power generating plant via ESS installed in an adjacent area, connected to the power plant or to the distribution or transmission network, and capable of absorbing electrical energy from the power generating plant itself or from the electricity grid for subsequent injection, internal consumption or the provision of services to the electricity system. Under REN No. 1,162/2026, the inclusion of a co-located ESS must be formalized as an alteration of the technical characteristics of the power generating plant's existing authorization, requiring the agent to present to ANEEL the documentation set out in Annex II of REN No. 1,161/2026. The co-located ESS does not require separate authorization; it forms part of the host plant's authorization. However, it is registered under an individual and specific Unique Plant Code ("CEG"), separate from the CEG of the power generating unit, enabling distinct identification and monitoring within ANEEL's databases.



III. ACCESS TO THE ELECTRICITY SYSTEM:

REN No. 1,162/2026 introduced specific network contracting requirements for energy storage projects:

A)

For a power generation plant or an autonomous ESS that uses the same connection point to both consume and inject energy into the grid, a single Distribution System Usage Agreement ("CUSD") must be entered into on a permanent basis.

B)

In addition, in the case of a power plant or an autonomous ESS centrally dispatched by the National Grid Operator ("ONS"), a Transmission System Usage Agreement ("CUST") must be entered into with the ONS. Where applicable, a Regulated Power Purchase Agreement ("CCER") must also be entered into.

REN No. 1,162/2026 clarifies that, in the case of ESSs co-located within a consumer unit without micro or mini distributed generation, power injection into the grid is not permitted, and the contracted injection demand must be defined as zero.

IV. CONTRACTING OF THE TRANSMISSION OR DISTRIBUTION SYSTEM USAGE AMOUNT ("MUST/MUSD"):

REN No. 1,162/2026 established that, for power generating plants with co-located energy storage systems, the contracted injection demand must correspond to the greater of: **(i)** the maximum power injectable into the system by the power generating plant, which may be reduced by the maximum charge power of the energy storage system; and **(ii)** the maximum discharge power of the ESS, which must be greater than or equal to the difference between the maximum discharge power of the energy storage system and its own load.

ANEEL also enacted the possibility of reducing the contracted power range (MUST/MUSD) for power generating plants that install co-located storage. For new projects, REN No. 1,162/2026 permits a reduction of up to 30% of the maximum injectable power of the power plant, provided that technical compatibility is demonstrated in the Access Opinion, subject to a free annual reduction limit of 5% of the original contracted injection power (considering the configuration without the energy storage system).

Also, regarding connection in the distribution system, on the first occasion of reduction following the connection of the co-located ESS, the 5% annual ceiling does not apply.

Otherwise, in transmission system, reducing more than 5% per annum is subject to charges, without the limitation of a first occasion. Besides that, power generating plants with a co-located energy storage system, as well as associations with a stand-alone SAE, are required to contract MUST in the consumption modality at a value ranging between zero and the maximum electrical power demandable by the system at each contracting period.

These provisions ensure that both new and existing projects can benefit from capacity contracting reductions through the installation of co-located storage. The rules are intended to provide legal and operational certainty, enabling a reduction in constrained-off events by allowing a reduction in the amounts of use already contracted and, consequently, ensuring greater availability and capacity of the transmission and distribution systems.

V. DEFINITION OF THE SYSTEM USE TARIFF APPLICABLE TO ESS:

REN No. 1,162/2026 established the tariff treatment applicable to autonomous ESS as follows:

A)

For ESS fully dispatched by ONS, the use of system tariff (MUST) in the consumption modality is considered zero and the system load is not included in their own load, recognizing that in this operational configuration the system itself coordinates the charging cycle;

B)

For autonomous ESS that do not operate under full ONS dispatch, the transmission and distribution use of system tariffs apply in both the consumption and injection modalities, reflecting the bidirectional use of the infrastructure;

C)

For co-located power generating plants with an ESS, REN No. 1,162/2026 provides that the applicable tariff discounts for renewable incentive purposes must be proportionable, considering any recharging energy sourced from the Basic Grid.

ANEEL acknowledged that a more granular causal cost analysis would be required to define a fully tailored tariff structure and indicated that further development is anticipated in subsequent regulatory cycles.

VI. SECTORAL CHARGES APPLICABLE TO ESS:

The definition of charges applicable to ESS, in the autonomous category, considered the regulatory framework adopted under Public Consultation No. 39/2023; that is, autonomous ESS are subject to the same legal regime as Independent Power Producers.

In terms of sectoral charges, the following apply to autonomous ESSs:

the Electricity Services Inspection Fee (“TFSEE” in portuguese) — which applies to both autonomous and co-located ESSs — and	Research, Development and Innovation (“PDI” in portuguese).

Charges applicable to final energy consumption, such as the Incentive Programme for Alternative Sources of Electricity (“PROINFA” in portuguese) and the Energy Development Account (“CDE” in portuguese) were excluded from the autonomous ESS. The exclusion of these charges is due to the Agency's understanding that autonomous ESS do not engage in final consumption of electricity, since the energy drawn from the grid is not intended for the agent's own use, but rather reinjected into the system or used in the provision of services to the electricity sector. To that extent, consumption by the ESS is not to be confused with that intended for end-use by consumers, which removes the triggering event necessary for the imposition of charges whose burden falls on end-use.

Additionally, REN No. 1,162/2026 provided for infringements specifically applicable to energy storage operators, such as failure to comply with registration obligations; failure to analyse or record incidents; non-compliance with electromagnetic field exposure limits; failure to separately account for investments, revenues and costs attributable to storage activities; and operation of storage installations without the required metering systems.

For the purpose of calculating fines, regulation now provides a specific formula for ESS: the base value corresponds to the estimated annual revenue, calculated as the product of the estimated annual injected energy and the applicable Annual Reference Value in force at the time of the infraction notice.

Subsequent Cycles

With the conclusion of the first cycle, ANEEL has revised the scope of the second and third cycles to incorporate additional topics identified during Public Hearing No. 39/2023. The second cycle, anticipated to commence still in 2026, will address the following topics:

(i) Final adjustments to the first-cycle rules and implementation instructions;

(ii) Updates to the Grid Procedures and Distribution Procedures (“PRODIST” in portuguese) and to the Trading Rules and Procedures, incorporating the provisions of REN No. 1,161/2026 and 1,162/2026 — for which ONS and CCEE were given 180 days from the date of publication of REN No. 1,162/2026 to submit proposals to ANEEL;

(iii) Regulatory treatment of the ESS to mitigate curtailment and constrained-off events, with the objective of enabling the use of energy storage to alleviate the growing financial losses associated with wind and solar generation curtailments;

(iv) Regulatory treatment of ESS as assets of the distribution and transmission segments, addressing whether and how storage systems may be incorporated into the regulated natural monopoly framework, including their remuneration and planning criteria;

(v) As current regulations do not provide for traders to operate physical assets, ANEEL confirmed that an in-depth analysis of how to integrate the ESS into traders' authorizations will be addressed in the second regulatory cycle; and

(vi) ESS systems co-located with consumer units, covering the commercial and operational conditions applicable to energy storage systems installed at consumer premises, including participation in demand response and the provision of ancillary or flexibility services; and

(vii) Evaluation of regulatory sandboxes for distributed storage, building on the experience accumulated under the reactive power support sandbox.

MINISTRY OF MINES AND ENERGY’S ACTIVITIES

The MME, in parallel with ANEEL, has been advancing in connection with the integration of energy storage systems through capacity reserve auctions.

On June 3, 2026, the MME published Ordinance No. 136/2026, establishing the definitive guidelines and procedures for conducting the first Brazilian storage capacity reserve auctions. The publication of this instrument, combined with the enactment of ANEEL's regulatory package on June 25, 2026, marks the transition of the Brazilian BESS market from a preparatory phase to one of active contractual implementation.

The framework established by Ordinance No. 136/2026 provides for the realization of two distinct auctions. The first, the 2026 LRCAP — National Storage, is scheduled for December 2, 2026 and is reserved exclusively for projects satisfying minimum national content requirements. The second, the 2026 LRCAP — Regular Storage, is scheduled for December 4, 2026 and is open to all eligible storage systems regardless of national content. The volume to be contracted in the open auction will be determined after accounting for the results of the national content auction, in order to complement supply needs.

With respect to 2026 LRCAP — National Storage, Ordinance No. 136/2026 introduces a notable innovation: eligibility to participate in the auction is conditional upon the project satisfying the minimum national content requirements set out in the BNDES credentialling regulation for stationary battery storage systems. Furthermore, the execution of the Contracted Reserve Capacity Agreements (“CRCAP”) is subject to the prior presentation of a valid BNDES credentialling certificate. Throughout the implementation phase, the project developer is required to demonstrate periodically to BNDES that the credentialled battery system was effectively deployed; failure to do so may give rise to contractual penalties, including potential termination of the agreement. It is worth noting, however, that the credentialling requirement does not oblige the developer to draw on BNDES financing — project developers remain free to source capital from any other funding available.

Below, we present the main legal and regulatory aspects of the 2026 LRCAP, as proposed in the Ordinance.

2026 Capacity Reserve Auction

A) STRUCTURE OF THE 2026 CAPACITY RESERVE AUCTION

The draft defines a single product called "Storage Capacity", whose delivery commitment consists of the availability of power in megawatts, not the delivery of energy itself.

Ordinance No. 136/2026 sets out the eligibility criteria governing participation. Projects that fail to meet the applicable technical requirements — and will therefore not qualify — include those that:

(i) have a Variable Unit Cost (“VUC”) greater than zero;

(ii) have a maximum power availability of less than 30 MW;

(iii) have a continuous operating capacity with maximum power availability of less than four consecutive hours;

(iv) have a candidate busbar with remaining capacity for power dispatch lower than the respective injected power and that required for recharging;

(v) have a Round-Trip Efficiency (“RTE”) of less than 85%, referenced to the Individual Measurement Point (“PMI”), across the contractual horizon;

(vi) have a maximum complete recharge time exceeding six consecutive hours; or

(vii) do not meet the minimum technical connection requirements defined in the ONS/EPE Joint Technical Note on Minimum Technical Requirements for the Connection of Battery Energy Storage Systems (EPE-DEE-NT-095/2025, as revised), including the grid-forming requirements.

Registration and technical qualification of projects is conducted by EPE through the Energy Generation Project Monitoring System (“AEGE” in portuguese) and other documentation specified in Ordinance No. 102/2016. Ordinance 136/2026 set the registration window from 15 June 2026 to 31 July 2026.

B) PROPOSED OPERATIONAL REQUIREMENTS

Ordinance No. 136/2026 establishes the detailed operational parameters applicable to contracted projects. In terms of dispatch compliance, project holders must follow ONS's load and discharge instructions in full, both in daily scheduling and in real-time operation. The contractual delivery commitment is structured around complete cycles of four hours of power availability, with up to two complete cycles permitted per day and a ceiling of 366 complete cycles per year. ONS retains the discretion to dispatch a resource for periods exceeding four hours per cycle, up to a maximum of twelve hours, provided that the delivered power is proportionally adjusted to reflect the energy actually available.

In addition to dispatch obligations, project winners are required to maintain the grid-forming functionalities set out in ONS/EPE Technical Note EPE-DEE-NT-095/2025 on a continuous basis, including during periods in which the system is neither charging nor discharging.

C) LOCATION CRITERIA AND BONUS

One of the key innovations of the auction framework is the introduction of location criteria to guide the allocation of storage systems within SIN. Ordinance No. 136/2026 introduces the location bonus constant (β), applied to recognize additional electrical benefits arising from the installation of ESSs at strategic points in the SIN. Projects connected at substations specified locations capable of generating systemic benefits will benefit from a β factor of 0.9, effectively reducing their competitive price for ranking purposes, whilst all other projects carry a factor of β equal to 1.0.

The list of eligible bonified substations, published in Annex II[18] to Ordinance 136/2026 based on studies elaborated by EPE, covers substations in the states of Alagoas, Bahia, Ceará, Minas Gerais, Paraíba, Pernambuco, Piauí and Rio Grande do Norte, concentrated in regions of high variable renewable generation and lower electrical robustness.

D) PROPOSED CONTRACTUAL REQUIREMENTS

Ordinance No. 136/2026 establishes the contractual framework applicable to project winners. Contracted Reserve Capacity Agreements (CRCAPs) will have a term of 15 years with supply commencement set for August 1 2028 for both products. In consideration for the availability of the contracted capacity, project holders will receive a fixed annual revenue, payable in twelve monthly instalments, which may be subject to reduction based on the monthly assessment of operational performance. The fixed revenue is intended to cover the full lifecycle costs of each project, encompassing investment and financing, operation and maintenance, grid connection and use charges, insurance, taxes, decommissioning, and any reinvestments required to sustain power availability and round-trip efficiency throughout the contract term, including potential battery module replacements.

Furthermore, the draft stipulates the requirement to contract grid capactiy sufficient to enable full dispatch and recharging of the ESSs, thereby avoiding grid constraints. The remaining transmission margins of the SIN will be considered as a criterion for classifying the projects.

[18] Disponível em: Nota Técnica EPE-DEE-NT-086/2025

E) SOCIO-ENVIRONMENTAL FLEXIBILITY

Ordinance 136/2026 maintains flexibility on environmental licensing: the requirement to present a Preliminary License, Installation License or Operating License for the storage system does not apply as a condition for technical qualification by EPE. The auction notice shall define the deadline by which winning ESSs must obtain the applicable environmental licenses. This approach, designed to facilitate broad participation at the initial project structuring phase, reflects the pioneering nature of the auction and the current absence of established environmental licensing practice for autonomous battery storage projects in Brazil.

F) PROPOSED LRCAP COSTS

In addition to Ordinance No. 136/2026, Law No. 15,269/2025 established rules applicable to contracting ESS in the form of a capacity reserve, stipulating that the costs arising from capacity reserve contracting shall be apportioned exclusively amongst power generators, in accordance with ANEEL regulations (paragraph 6 of Article 3-A of Law No. 10,848/2004).

This legislative provision altered the logic of cost allocation, burdening power generators rather than consumers, which also means that entities classified as autonomous ESSs — given the regulatory similarity between them and power generators, as per ANEEL's understanding — are also subject to this cost allocation.

The 2026 LRCAP auction notices are now under discussion within specific Public Hearings conducted by ANEEL.

BRAZILIAN INITIATIVES

Brazil has entered a decisive phase of BESS market development, marked by the simultaneous enactment of a comprehensive regulatory framework and the launch of the first dedicated BESS auctions. Rather than remaining at a conceptual or pilot stage, energy storage has been formally integrated into the Brazilian electricity sector's normative structure, creating the legal and contractual conditions for market-scale deployment.

However, even before a defined regulatory framework was in place, Brazil already had pioneering BESS projects under development, which are highlighted below:

BAHIA FIRST CO-LOCATED STORAGE SYSTEM:

In April 2026, ANEEL authorized the country’s first co-located Energy Storage System in Uibaí, Bahia, allowing the installation of a [-] MW battery system alongside a power generation plant with shared grid connection facilities. Under this configuration, energy generated can be stored and later injected into the system according to operational needs, enhancing flexibility and efficiency.

The regulatory approach adopted for this first authorization treated the storage system as a modification of the technical characteristics of the power generation project, applying the existing regulatory framework applicable to power generating plants. This approach was subsequently formalized as the general rule for co-located ESSs under REN No. 1,162/2026 — which requires co-located ESS inclusion to be formalized as an alteration of the host plant's authorization — confirming that the institutional practice established in April 2026 anticipated the enacted regulatory framework.

USE OF BATTERIES IN TRANSMISSION INFRASTRUCTURE:

Brazil also presents concrete examples of energy storage systems being deployed as part of transmission infrastructure, anticipating the regulation envisaged in ANEEL's second regulatory cycle, commented on above. ANEEL has previously authorized battery installations classified as transmission assets, integrated into substations to provide operational support, system reliability and flexibility services.

This application positions BESS as an infrastructure solution embedded within the regulated transmission network, contributing to system stability and optimized network performance. The use of batteries in transmission reflects an institutional understanding of energy storage as a strategic grid asset, aligned with international trends that incorporate flexibility solutions into network planning and operation.

BESS CONTRACTUAL FRAMEWORK

BUSINESS MODEL STRUCTURES

Up to this moment, the Brazilian BESS market is developing around three primary business models, each with distinct contractual structures and risk allocations (in addition to the LRCAP business model as detailed above). These models differ fundamentally in terms of ownership structure, revenue mechanisms, regulatory requirements, and financing implications, requiring careful consideration of the legal and commercial framework applicable to each structure.

MODEL 1

BROWNFIELD GENERATION - OWNED AND USED BY DEVELOPER

This structure involves BESS owned by the developer for use with its own brownfield plants for energy sales, representing the most straightforward integration of storage technology with existing generation assets. This model allows for revenue stacking, maximizes the use of existing infrastructure, and can be a solution to curtailment in renewable energy power plants.

Additionally, approval from existing lenders may be required for BESS implementation, requiring careful review of existing financing documentation and potential amendments.

In terms of tax benefits, the structure allows access to tax benefits from debt financing for BESS associated with power generating plants, including incentivized and infrastructure debt[19], as well as Special Regime of Incentives for Infrastructure Development ("REIDI") benefits. The ability to access tax-advantaged financing can materially impact project economics and overall cost of capital.

MODEL 2

ENERGY-AS-A-SERVICE (EAAS)

This model involves BESS provided by a third party as a service to the client. The services provider oversees operations and maintenance of the BESS system, and the client makes monthly or performance-linked payments as a result.

Such model enjoys high esteem among large ACL consumers. Technological risks are not undertaken by the client, and there is no Capital Expenditures ("CAPEX") investment required from the client. Given its structure, it can be applied to strategic areas, such as mining (fewer supply interruptions) and agribusiness (replacing diesel generators).

[19] Please note that although the legislation classifies BESS projects as a priority for the purposes of the tax incentive, the applicability of these incentives to stand-alone BESS projects still depends on regulation. At present, based on our analysis, the incentives are granted only in connection with other already regulated projects, such as energy generation projects. This is in line with our legal interpretation of the applicable regulatory framework and does not bind the position of the competent authority, which has not yet formally expressed its understanding on this matter.

MODEL 3

BUILD-OPERATE-TRANSFER ("BOT")

This structure involves BESS built by a third-party, operated by such third-party for a set period, then transferred to the client. It requires supply contracts, Operation and Maintenance ("O&M") agreements, and management/energy efficiency contracts. The supply contract must address technology transfer, warranty provisions, and performance guarantees.

The BOT structure presents unique financing dynamics, as the developer must secure construction financing for the initial build phase, with repayment from sale proceeds, while also structuring long-term revenue streams from ongoing services. The developer's revenue comes from ongoing service contracts with customers, creating long-term contractual relationships.

KEY CONTRACTUAL CONSIDERATIONS

Regardless of the business model selected, certain contractual considerations are fundamental to the structuring of bankable BESS projects. These considerations span technical performance requirements, risk allocation mechanisms, and revenue optimization strategies, all of which must be carefully addressed in the project's contractual documentation.

PERFORMANCE AND AVAILABILITY STANDARDS

BESS contracts must establish clear performance metrics, including charging and discharging efficiency requirements, response time specifications for ancillary services, availability guarantees and penalty structures, as well as degradation curves and capacity maintenance obligations. These parameters form the foundation of the project's economic model and are subject to intense lender scrutiny.

The establishment of appropriate performance standards requires careful consideration of the specific battery technology, intended use cases, and realistic degradation expectations. These parameters are essential for project financial modelling and for establishing realistic expectations with lenders regarding revenue generation throughout the asset lifecycle.

RISK ALLOCATION

Critical risk allocation issues include technology risk and warranty provisions, force majeure provisions and regulatory change, grid connection risks and curtailment, and environmental compliance and waste disposal obligations. The allocation of these risks among project participants is heavily negotiated and directly impacts project bankability.

Technology risk is particularly significant given the rapid evolution of battery technology and limited operational track record. Adequate allocation of these risks among contractual parties is fundamental to enabling project financing, as lenders carefully analyse risk distribution to determine the structure's bankability. Lenders require that each material project risk be allocated to the party best able to manage it, with appropriate contractual protections.

Regulatory change risk is particularly acute in the Brazilian BESS market given the evolving regulatory framework. Contracts must address how the parties will respond to regulatory changes that impact project economics, including mechanisms for renegotiation, compensation adjustments, or termination rights in the event of material adverse regulatory changes. This is especially important for projects with long-term contracts that may span multiple regulatory cycles.

REVENUE OPTIMIZATION

Contracts must address multiple revenue streams, including energy arbitrage opportunities, ancillary services provision, capacity market participation, and demand response mechanisms. The ability to access and optimize multiple revenue streams is critical to economic viability.

The possibility of revenue stacking is particularly relevant to project economic viability, requiring contractual flexibility to adapt to future changes in the regulatory framework. The contractual framework must balance operational flexibility with lender security requirements through careful structuring of dispatch rights and revenue waterfalls.

BANKABILITY DISCUSSIONS

The bankability of BESS projects in Brazil presents unique challenges that reflect both the nascent stage of the market and the inherent complexities of energy storage technology. Understanding these challenges and the potential solutions is essential for developers, investors, and lenders seeking to participate in this emerging sector.

FINANCING CHALLENGES

The bankability of BESS projects in Brazil faces several structural challenges that impact project financing and investment decisions. These challenges span regulatory, technological, and market dimensions, each requiring specific mitigation strategies to achieve bankable project structures.

REGULATORY UNCERTAINTY

The primary bankability concern for BESS projects had historically been regulatory uncertainty. As of June 2026, this concern has been materially addressed. The publication of REN Nos. 1,161/2026 and 1,162/2026 resolved the key first-cycle questions: the legal characterisation of storage systems, the authorization regime, grid access rules and the formal authorization of ancillary service provision.

The publication of Ordinance 136/2026 further defined the auction structure, contract terms (15-year CRCAPs), eligibility criteria, and the grid-forming requirements that must be embedded in project design.

Residual regulatory uncertainty continues to exist in areas that remain open within the second and third cycles of ANEEL's roadmap. Revenue stacking — the ability of a single BESS asset to simultaneously earn revenues from multiple sources — has not yet been fully addressed in a manner that enables reliable financial modelling of all potential income streams. The update of the Grid Procedures and PRODIST by ONS and CCEE is pending within the 180-day deadline set by REN No. 1,162/2026 and will determine the detailed technical operating obligations for storage systems. Time-of-use tariff reform, which is necessary to unlock the behind-the-meter storage economics at low voltage, remains within the tariff modernization roadmap through 2028. In this environment, whilst lenders can now underwrite with greater clarity on authorization and grid access, the structuring of financing for projects that depend on merchant ancillary service revenues or on distributed consumer-facing business models will still require conservative financial modelling and, where possible, contracted revenue support.

TECHNOLOGY AND PERFORMANCE RISKS

Lenders express concerns regarding battery degradation over project lifecycles, technology obsolescence risks, equipment supplier performance guarantees, and long-term operation and maintenance costs. These technology-related concerns reflect the relative immaturity of large-scale battery storage technology and the limited operational track record available for lenders to assess performance risk.

Battery degradation is a fundamental concern because it directly impacts the revenue-generating capacity of the project over time. Unlike conventional generation assets where degradation is typically gradual and predictable, battery systems experience capacity fade that accelerates with cycling, temperature exposure, and other operational factors. The rate of degradation determines the effective economic life of the battery and the timing of potential battery replacement or augmentation, both of which have significant financial implications.

Technological risks can be mitigated through the implementation of contractual instruments, depending on the specific risk identified. In the event of accelerated cell degradation, EPC contracts can be implemented to guarantee the financier a minimum performance percentage, thereby allocating the risk to the developer. In addition, it is recommended that BI insurance be obtained in the event of critical inverter failure, as well as a reserve stock of priority modules for the financier.

Such concerns require comprehensive due diligence on technology selection, robust warranty packages, and experienced operation and maintenance providers. From a project finance perspective, it is essential to establish conservative degradation curves in financial modelling and ensure that EPC and equipment supply contracts contain long-term performance guarantees with counterparties of adequate credit quality. Lenders will scrutinize the technical specifications of the selected battery technology, the track record of the manufacturer, and the comprehensiveness of performance warranties to assess technology risk.

REVENUE PREDICTABILITY

BESS projects typically depend on multiple revenue streams, creating complexity for financial modelling, as energy arbitrage revenues depend on price volatility and market conditions, capacity market participation opportunities are still being defined, and curtailment reduction benefits vary by location and grid conditions.

This multiplicity of revenue sources, while potentially beneficial for return optimization, makes it difficult to structure financing on traditional project finance bases, which assume predictable and contracted cash flows. Lenders tend to require that a significant portion of revenues be contracted through long-term offtake agreements or that mitigation mechanisms (such as sponsor guarantees or more robust debt service reserve account structures) be in place to compensate for merchant revenue volatility.

In order to enhance the bankability of the project, it is essential that the model incorporates a guaranteed revenue contract. Depending on the customer's specific characteristics, various contractual instruments can be adopted for this purpose. For critical consumers, such as data centers, the provision of BESS as "backup-as-a-service" is a reliable indicator of the project's profitability. In such scenario, take-or-pay clauses or credit insurance or corporate guarantee are recommended in mitigate the risks of default.

In the case of ancillary services, the optimal approach is to base remuneration on response capacity and load modulation.

FINANCING STRUCTURES AND SOLUTIONS

Despite the challenges outlined above, various financing structures and solutions are emerging to support bankable BESS projects in Brazil. These solutions leverage available tax incentives, develop appropriate security packages, and employ credit enhancement mechanisms to mitigate risks and attract debt financing.

TAX INCENTIVE UTILIZATION

Different business models present varying opportunities for tax-advantaged financing: brownfield integration models can access incentivized and infrastructure debt benefits[20]; standalone and lease models face difficulties accessing these benefits.

The availability of tax-advantaged debt, particularly incentivized securities, represents one of the most significant financing advantages available in the Brazilian market. These instruments allow investors to receive interest payments free from income tax, enabling issuers to achieve materially lower funding costs compared to conventional corporate debt. For BESS projects that qualify for these benefits, the reduction in financing costs can be the defining factor for purposes of assessing bankability.

This tax differentiation has a material impact on project economics and financing structuring. The possibility of using incentivized debentures, for example, can significantly reduce the project's cost of capital, while uncertainty regarding the applicability of these benefits in certain structures may require detailed tax analysis and, eventually, formal consultations with the Federal Revenue Service to mitigate the risk of future challenges.

For projects that cannot access tax-advantaged debt, alternative financing sources must be considered, including commercial bank debt (which will be more expensive), development bank financing (such as BNDES, which may offer longer tenors and lower rates but with greater procedural requirements), export credit agency financing (for projects using imported equipment), or international capital markets (for sponsors with investment-grade credit ratings or projects of sufficient scale).

REIDI has been extended to BESS projects by Law No. 15,269/2025, effective since January 2026. The tax relief aims to promote energy transition as well as the modernization and stability of the power sector, and is capped at R$ 1 billion per fiscal year, subject to inclusion in the annual budget law. The benefit remains valid through December 2030. For solar power generation systems, including micro and mini distributed generation, the use of chemical storage systems is required in order to qualify for the benefit. Separately, the CRCAP contracts to be signed by winners of the December 2026 auctions will run for 15 years, a development that improves the long-term cash flow visibility underpinning senior debt servicing.

It should be noted that, while Law No. 15,269/2025 expressly includes BESS in REIDI, the existing implementing Ordinance MME No. 318/2018, which governs the categories of projects that may apply to ANEEL for REIDI qualification, does not yet expressly list autonomous storage projects among the eligible categories. ANEEL's technical analysis within CP No. 39/2023 proceedings acknowledged that a formal MME determination and an update to the REIDI system would be required before ANEEL can process autonomous ESS REIDI applications. Projects seeking REIDI classification as autonomous storage developments are therefore advised to seek formal guidance from the competent authorities rather than relying solely on the statutory text of Law No. 15,269/2025.

SECURITY PACKAGE DEVELOPMENT

Bankable security packages must address security over physical assets (batteries and related equipment), assignments of revenue flows from multiple contracts, step-in rights for operation and maintenance, and insurance coverage for technology and performance risks.

The structuring of the security package in BESS projects presents particularities compared to traditional generation projects. The technological nature of the assets and their potential obsolescence require more conservative recovery value analyses. Additionally, when BESS is integrated with existing brownfield projects, it is necessary to coordinate the security package with existing liens, which may require subordination, pari passu, or other intercreditor agreement structures between original lenders and new creditors of the storage component.

[20]The tax incentives are still subject to regulation and may not yet be fully applicable.

CREDIT ENHANCEMENT MECHANISMS

To improve bankability, projects may require partial risk guarantees from development banks, revenue support mechanisms during initial operating periods, technology insurance products, and guarantees from experienced sponsors.

The participation of development institutions such as BNDES, multilateral banks, or export credit agencies can be particularly relevant in this initial phase of the Brazilian BESS market, where operational track record is limited. These institutions can offer not only credit lines with longer tenors and competitive rates but also risk mitigation instruments (such as partial guarantees) that enable the participation of commercial lenders.

BNDES has a credit line entitled "More Innovation" (Mais Inovação) , which offers support to projects focused on scientific and industrial innovation. This financing model was adopted for the construction of a BESS factory in Itajaí, Santa Catarina, with a contribution of R$ 280 million from BNDES. The project was approved under a Public Call, in a joint action with Finep (Public Funding Agency for Studies and Projects).

In addition, the More Innovation – Energy Transition – Round 2 (Mais Inovação – Transição Energética - Rodada 2) will be accepting proposals until August 2026. This project aims to promote the development of technologies essential for energy transition, including electricity generation and energy storage, and has a budget of R$ 500 million.

It is also worth mentioning the Mais Inovação Brasil – Transformação Mineral – Round 2 (More Innovation Brazil – Mineral Transformation – Rodada 2) project, which is open between February and August 2026. Its purpose is to support initiatives which promote mineral transformation and contribute to safe energy transition. The project has a budget of R$ 200 million.

Furthermore, the Global Energy Storage Program (GESP), an international fund dedicated to supporting large-scale renewable energy storage in developing countries, funded by the Climate Investment Fund (CIF), participated in financing the project "Battery Energy Storage Systems (BESS) to Increase the Reliability of Energy Systems in Brazil." The project, which was approved in 2021, aims to stimulate the development of the BESS market, demonstrating its viability for micro-enterprises and mini-grids.

MARKET DEVELOPMENT REQUIREMENTS

Despite the challenges outlined above, various financing structures and solutions are emerging to support bankable BESS projects in Brazil. These solutions leverage available tax incentives, develop appropriate security packages, and employ credit enhancement mechanisms to mitigate risks and attract debt financing.

STANDARDIZATION NEEDS

The market requires standardized performance testing and certification procedures, common contractual templates and risk allocation frameworks, established operation and maintenance standards, and uniform financial modelling approaches.

The development of market standards and documentation is fundamental to reducing transaction costs and structuring time. In more mature markets, the existence of model contracts and consolidated market practices significantly facilitates negotiation among parties and reduces lenders' risk perception. In the Brazilian BESS context, the work of industry associations and working groups involving developers, lenders, and legal advisors can accelerate this standardization process.

MARKET LIQUIDITY DEVELOPMENT

Bankability will improve with the increase in the number of operational projects providing performance data, development of secondary markets for BESS assets, standardized asset valuation methodologies, and development of the insurance market for storage-specific risks.

Market liquidity is a critical factor for lenders, as it impacts both collateral valuation and refinancing and exit possibilities in stress scenarios. As the market matures and establishes a track record of operational projects, lenders are expected to gain greater comfort with performance and degradation assumptions, potentially resulting in more favourable financing conditions (higher leverage levels, longer tenors, more competitive spreads). The development of performance indices and market benchmarks will also contribute to greater transparency and comparability among projects.

TAX INCENTIVES

The tax framework for BESS in Brazil presents both opportunities and challenges that significantly impact project economics and investment decisions. Key concerns identified by industry stakeholders encompass the risk of double or undue taxation when injecting and absorbing power from the grid, as well as the lack of clarity surrounding the applicability of tax incentives during CAPEX structuring. These issues create uncertainty regarding the tax treatment of energy storage operations, requiring careful consideration in both project structuring and financial modeling.

Regarding CAPEX, the financial viability of BESS projects relies on access to specific tax benefits. Key mechanisms include the Ex-Tarifário regime, which reduces import duties on foreign equipment, and REIDI, which suspends PIS (“*Programa de Integração Social”*) and COFINS (“*Contribuição para o Financiamento da Seguridade Social*”) contributions (and, in the future, IBS and CBS)[21] on capital investments.

However, the availability of these tax benefits may vary depending on the business model adopted. In general, these incentives remain pending further regulation to achieve full applicability.

- **Ex-Tarifário:** Pursuant to current legislation, the Executive Branch is authorized to reduce import duties on BESS and its components. To date, however, this tariff reduction has not yet been implemented in practice.

- **REIDI:** The applicability of this incentive depends on specific regulations from the Ministry of Mines and Energy (“MME”), which have yet to be issued. Projects that integrate BESS with generation facilities face a smoother path to securing REIDI benefits, as the storage unit is considered an asset of an already regulated generation project. Conversely, standalone BESS projects or developments operating under lease structures face challenges. The lack of clear regulatory guidelines regarding autonomous storage projects creates hurdles in accessing REIDI, a limitation that directly affects project economics.

Please note that accessing incentivized infrastructure debt (infrastructure debentures) for BESS projects faces the same regulatory obstacles as REIDI. The issuance of these incentivized instruments remains contingent upon further normative acts by the Executive Branch to become fully applicable to energy storage, particularly for standalone projects.

Another discussion within industry involves the need for ICMS (State Value-Added Tax) exemptions or reductions for storage equipment, mirroring the benefits already granted to solar and wind generation assets. At present, there is no comprehensive ICMS framework applicable to BESS across the Brazilian states.

On the operational front, a controversy lies in the legal classification of BESS activities. It remains legally unclear whether energy storage will be treated as an autonomous service or as an electrical energy operation.

This distinction is crucial, especially in light of the ongoing Brazilian Tax Reform. If characterized as a service, the operation could attract immediate taxation, along with the possibility of credits being taken by the recipient (not the service provider). Alternatively, if legally recognized as a transaction involving electrical energy, BESS projects

[21]The CBS and IBS operate as a dual VAT mechanism applicable to the provision of goods and services, introduced by Constitutional Amendment No. 132/2023. This new regime will replace the current PIS, COFINS, IPI, ICMS, and ISS taxes. Following a phased-in transition period from 2027 through 2032, the new system will become fully applicable in 2033

would benefit from the specific deferral mechanisms created for the energy sector under the new dual VAT system (*Imposto sobre Bens e Serviços* - IBS and *Contribuição sobre Bens e Serviços* - CBS). Applying this tax deferral rule would prevent double taxation risk during the absorption and injection cycles.

DOMESTIC MANUFACTURING AND THE SUPPLY CHAIN

To address some of the hardware costs and promote domestic battery manufacturing, the Brazilian government has been designing industrial incentives. The Ministry of Development, Industry, Commerce, and Services (“MDIC”), in conjunction with the Ministry of Science, Technology, and Innovation (“MCTI”), established the Basic Production Process (“PPB”) for BESS through Interministerial Ordinance No. 54 of May 2024. This initiative stimulates the local manufacturing of lithium-ion and lead batteries by offering reductions — potentially affecting the IPI (Tax on Manufactured Products) and ICMS (State Value-Added Tax) — for companies that meet the established parameters for producing energy modules, inverters, and auxiliary automation systems.

The legislative landscape continues to evolve to create additional incentives for the battery storage sector. In July 2024, Bill No. 2,780/2024 was proposed to establish the National Policy for Critical and Strategic Minerals (“PNMCE”). This legislation specifically addresses the supply chain of minerals linked to the energy transition, proposing tax benefits for companies developing projects related to lithium, nickel, and graphite.

These tax considerations are particularly relevant given Brazil's competitive position in the global battery market. The country possesses abundant lithium reserves in the State of Minas Gerais, along with other raw materials essential for the battery supply chain. The strategic use of tax incentives could help Brazil develop not only a robust energy storage market but also a domestic battery manufacturing industry, driving vertical integration and value chain development.

In conclusion, the evolving tax framework requires careful coordination among private sector agents, the Executive and Legislative branches, and competent regulatory agencies to ensure that market participants receive fair remuneration for their operations while maximizing the benefits of this emerging industry. As the regulatory environment develops, clear tax guidelines on CAPEX incentives and operational classification will remain critical to determining the commercial viability and investment attractiveness of BESS projects across different market segments.

ENVIRONMENTAL ASPECTS

ENVIRONMENTAL CONSIDERATIONS

The environmental implications of battery energy storage systems present both challenges and opportunities that must be carefully addressed throughout project development and operation phases. Under the Brazilian environmental legal framework, the lifecycle impacts of BESS — from extraction of critical raw materials to manufacturing, operation, and end-of-life disposal — are subject to comprehensive legal requirements under federal and state environmental legislation.

The integration of battery storage systems into the electrical grid presents significant opportunities to reduce reliance on fossil fuel thermal generation, thereby contributing to greenhouse gas emission reduction targets established both voluntarily and pursuant to Brazil's commitments under the Paris Agreement. This positions BESS as a potentially eligible technology for carbon credit mechanisms and may represent a competitive operational advantage for project developers.

BESS also presents significant operational advantages in the context of increasing energy demand from data processing and artificial intelligence applications. The operational requirements of artificial intelligence infrastructure result in substantial power consumption. Studies indicate that generating 1,000 images could produce carbon dioxide emissions equivalent to approximately 6 kilometers of travel in a gasoline-powered vehicle[22]. This escalating energy demand reinforces the relevance of integrating renewable energy sources - which constitute Brazil's primary energy matrix - with storage technologies.

In this context, the General Law on Environmental Licensing, Federal Law No. 15,190 of August 8, 2025, establishes that if the entrepreneur adopts new technologies or other measures that achieve better sustainable standards and criteria, the licensing authority may, through a reasoned decision, establish special conditions in the environmental licensing process, including prioritized review and extended license renewal periods.

From a legal perspective, the manufacturing, sale, and use of battery storage technologies must be accompanied by robust environmental compliance measures addressing the legal requirements applicable throughout the entire supply chain.

A critical legal obligation applicable to BESS projects concerns the reverse logistics system for batteries and their components. Pursuant to the National Solid Waste Policy (Federal Law No. 12,305/2010) and CONAMA[23] Resolution No. 401/2008, manufacturers, importers, distributors, and retailers of batteries are subject to mandatory reverse logistics obligations, which require the establishment of collection, transportation, and environmentally appropriate disposal or recycling systems. IBAMA[24] maintains regulatory oversight of battery waste management, and non-compliance may result in administrative sanctions, civil liability for environmental

[22]Information available at: https://mittechreview.com.br/ia-e-consumo-de-energia/ Access on August 05, 2026.
[23]National Environment Council ("CONAMA", in portuguese), an advisory and deliberative body of the National Environmental System in Brazil (Sistema Nacional do Meio Ambiente – "SISNAMA", in Portuguese), established by Law No. 6,938/1981, is tasked with the advising the Government Council, proposing environmental guidelines, and deliberating on regulations consistent with ecological balance; it possesses regulatory authority. Its responsibilities include defining criteria and standards regarding environmental licensing and its related instruments, as well as establishing pollution control standards, with the goal of protecting the country's natural resources and promoting environmental preservation.
[24]Brazilian Institute of the Environment and Renewable Natural Resources ("IBAMA", in portuguese), established by Law No. 7735/1989, is a federal autonomous agency in Brazil, attached to the Ministry of the Environment. Its purpose is to implement and ensure compliance with the National Environmental Policy, promoting the preservation, conservation, rational use, inspection, and control of natural resources. Its responsibilities include exercising environmental enforcement authority, carrying out federal licensing and environmental control activities, authorizing the use of natural resources, and carrying out supplementary actions on behalf of the federal government.

damages, and criminal liability under the Environmental Crimes Law (Federal Law No. 9,605/1998). Project developers must ensure that contractual arrangements with equipment suppliers adequately address these end-of-life obligations and allocate responsibility for compliance with reverse logistics requirements.

In addition to the reverse logistics obligations described above, BESS manufacturers, importers, and operators must observe and comply with various other environmental requirements applicable to energy storage systems, as detailed in the following sections. Compliance with these requirements is essential to ensure the environmental viability of BESS projects and to mitigate legal risks associated with environmental non-compliance throughout the project lifecycle.

ENVIRONMENTAL LICENSING AND REGULATORY COMPLIANCE FRAMEWORK

The environmental licensing framework for BESS projects involves several unresolved regulatory issues and compliance requirements:

- Environmental licensing procedures under federal, state, or municipal competent environmental body (Complementary Law No 140/2011, CONAMA Resolution No 237/1997, etc.);
- Hazardous waste management requirements applicable to lithium-ion and other battery chemistries, including transportation, storage, and disposal protocols in accordance with ABNT technical standards and applicable state environmental regulations;
- CADRI (*Certificado de Movimentação de Resíduos de Interesse Ambiental*) and MTR (*Manifesto de Transporte de Resíduos*) requirements in states where applicable, including final destination certificates (*Certificado de Destinação Final* - CDF) documenting the environmentally appropriate disposal or recycling of battery components and hazardous materials (Ordinance MMA No. 280 /2020);
- Registration before IBAMA´s Federal Technical Registry of Potentially Polluting Activities (CTF/APP) and payment of Environmental Control and Inspection Tax (*Taxa de Controle e Fiscalização Ambiental* - TCFA) for developing potentially polluting activities;

CONCLUSION

The development of BESS in Brazil has reached a decisive inflection point. The enactment, in June 2026, of a comprehensive regulatory package — comprising Normative Resolutions Nos. 1,161 and 1,162 published by ANEEL, the ONS/EPE Technical Note establishing minimum technical connection requirements, and the MME's definitive auction guidelines set out in Ordinance No. 136/2026 — resolved the most fundamental legal uncertainties that had previously constrained project structuring and financing. Battery storage is now formally recognized as a distinct regulated activity, with its own authorization regime, a defined place within the electricity sector's agent structure, a clear network access framework, and an established path to ancillary service remuneration.

The opportunities are substantial and multidimensional: curtailment reduction, price arbitrage, isolated system integration, ancillary services provision and data center market synergies each represent viable and increasingly concrete avenues for BESS deployment in Brazil.

The first battery storage capacity reserve auctions, scheduled for December 2026 with 15-year contracts and commencement of supply in August 2028, will translate these opportunities into the first wave of contracted large-scale projects. Significant challenges remain, but their nature has shifted: whilst regulatory incompleteness was the dominant concern during the drafting of this white paper, the challenges today are more granular — the development of revenue stacking rules, the formalization of distributed storage dispatch mechanisms, the update of the technical regulation by ONS and CCEE, and the resolution of the behind-the-meter tariff economics at low voltage.

On the contractual front, the framework is evolving around three primary business models, each with distinct risk allocations and financing implications. The enacted regulatory package has materially changed the calculus: authorization pathways are now defined, the capacity contracting reduction framework creates new contracting opportunities for co-located projects, and the 15-year CRCAPs provide a contracted revenue anchor for utility-scale developments. Bankability concerns continue to center on residual regulatory uncertainty in revenue stacking, technology risks and revenue predictability for merchant-revenue components, requiring financing structures and credit enhancement mechanisms that, in the absence of standardized market documentation and an established operational track record, must continue to be engineered on a project-by-project basis.

The legal and regulatory initiatives enacted in 2025 and 2026 will be determinant for market development. The enactment of Law No. 15,269/2025 marked the first formal legislative recognition of energy storage as an instrument of the national industry. The publication of REN Nos. 1,161/2026 and 1,162/2026 and Ordinance No. 136/2026 in June 2026 operationalized that recognition, translating it into a comprehensive authorization framework, a set of grid access rules, a formal ancillary services eligibility provision, and a first set of auction instruments designed to bring large-scale contracted storage capacity to the SIN from 2028. Taken together, these milestones confirm that Brazil has moved decisively beyond exploratory discussions and into a phase of practical implementation. The December 2026 auctions will represent the most concrete test of that transition.

The consolidation of storage as a viable and efficient solution requires, beyond the technical advances and the enacted regulatory framework, the completion of the second regulatory cycle — particularly the formalization of ESS as a distribution and transmission asset, the update of the Grid Procedures and PRODIST within the 180-day deadline established by REN No. 1,162/2026, and the development of rules enabling true revenue stacking. Addressing these remaining gaps and enabling tariff signals at low voltage that make behind-the-meter storage economically viable, will be determinant for ensuring that batteries fulfil their full potential in building a more resilient, sustainable electrical sector aligned with the requirements of the energy transition.

For legal practitioners, the evolving BESS market presents both significant opportunities and genuine complexity. Understanding the regulatory landscape, contractual frameworks and financing structures will be essential for advising clients in this dynamic and rapidly developing sector. The intersection of energy law, environmental regulation and technology innovation creates a demanding but promising practice area that will continue to evolve as Brazil's energy storage market matures, and as the regulatory architecture that underpins it is progressively completed.

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