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Direct and Indirect Tax Incentives for Alternative Sources of Electrical Energy in Brazil: An Overview in 2025

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Abstract. The diversification of Brazil's electricity grid is driven by direct and indirect tax incentives that encourage investment in renewable energy sources. These tax benefits enable cost reductions, facilitate financing and increase the sector's attractiveness to investors, fostering economic and technological development. In 2024, renewable sources accounted for approximately 68% of Brazil's installed capacity, with significant solar and wind energy growth. Public policies, such as the National Biofuels Policy (RenovaBio) and the exemption of ICMS and PIS/Cofins on renewable energy equipment, are important for this expansion. Historical programs, including Proálcool, PROCEL, and PROINFA, have also contributed to Brazil's leadership in clean energy production. The ongoing transition to a more sustainable grid reduces greenhouse gas emissions and strengthens energy security in line with the Paris Treaty. However, the continued expansion of renewable energy depends on maintaining favourable policies and incentives. The study highlights the importance of tax incentives in advancing Brazil's renewable energy sector, emphasizing their role in economic viability, attracting investment and mitigating climate change.

Keywords: Renewable energy, fiscal incentives, electricity matrix, Brazil.

1. Introduction

Electricity has been fundamental in driving social and economic development, acting as an engine for progress and innovation. It is intricately linked to the functioning of all sectors, from industry to health and education. With the advent of electricity, societies experienced significant productivity and quality-of-life transformations. In this context, clean energy sources, including solar, wind, and other renewable options, have grown in Brazil over the past decades. Government policies aimed at promoting unconventional renewable energy have driven this progress. Fiscal incentives also serve as key mechanisms to enable investment in clean technologies, reducing costs and increasing the sector's competitiveness. These incentives offer economic and environmental benefits, contribute to diversifying the energy matrix, and help mitigate the impacts of climate change.

Direct and indirect fiscal incentives can reconfigure and expand the Brazilian electrical matrix, notably by increasing the share of renewable sources, such as solar, wind, and hydroelectric. By reducing taxes and facilitating access to financing, these tax benefits act as catalysts for the economic viability of new ventures, increasing attractiveness for investors and enabling the advancement of innovative technologies [5]. In the Brazilian context, where energy matrix diversification is a growing need, these incentives are key in promoting environmental sustainability, reducing greenhouse gas emissions, and strengthening energy security [19].

Brazil implements various fiscal incentives to encourage investments in infrastructure for energy generation from renewable sources, such as wind, solar, biomass, and biofuels. A central aspect of these benefits is tax relief aimed at facilitating the acquisition of equipment for harnessing these energies, including solar heaters. Additionally, the country offers exemptions for importing essential equipment and provides tax reductions on profits for companies engaged in such projects. The tax reform approved in 2023 also introduced tax changes, simplifying the collection process and expanding the fiscal incentives available for the renewable energy sector [1].

This article aims to provide a comprehensive overview of direct and indirect tax incentives for alternative sources of electrical energy in Brazil, with an updated perspective for 2025. To address this topic in a structured manner, the following sections present the Brazilian energy matrix, highlight the history of government programs and incentives, and analyze current incentives. This article maps the incentives the government has provided over the past decades to identify the strategies adopted to mitigate climate change and promote a more sustainable and diversified energy system.

2. Brazilian Electric Matrix

The Brazilian electricity matrix in 2024 reflects the significant predominance of renewable sources, with hydropower standing out, accounting for 48.7% of the total installed capacity, followed by wind energy (12.9%) and solar energy (7.5%). Figure 1 shows the percentage share of each source in Brazil's electricity matrix, highlighting the dominance of clean and renewable sources such as hydropower, wind, and solar, which account for over 68% of the installed capacity. This configuration reflects one of the world's most considerable potentials for renewable energy generation,

an important factor for sustainability and reducing greenhouse gas emissions [6].

Over the past decade, Brazil's electricity matrix has undergone a process of diversification and expansion of renewable energy sources, especially with the growth of solar and wind energy. The expansion of renewable sources is directly linked to public policies encouraging investment in this sector, such as energy auctions and a tariff system favouring solar and wind energy. In the case of solar energy, installed capacity increased from 0.5 GW in 2014 to 18 GW in 2024, showing extraordinary growth [11]. This growth results from several factors, including decreased generation costs and technological improvement. Wind energy, which represented around 2% of the electricity matrix in 2014, reached about 13% in 2024 [1].

Additionally, the presence of fossil sources such as natural gas and coal, which represent 7.9% and 0.9% of the matrix, respectively, remains significant but is smaller than that of renewable sources. This scenario demonstrates the ongoing transition to a cleaner matrix, although it still depends on non-renewable sources to ensure the stability of the electricity system. Nuclear energy, for its part, maintains a modest share of 1.5% [2].

Implementing both direct and indirect tax incentives has been an important factor in Brazil's growth of renewable energy. The National Biofuels Policy (RenovaBio) and encouraging distributed solar energy generation through tax exemptions and reductions in regulatory charges have been fundamental instruments in this process [19]. Direct tax incentives, such as the exemption of ICMS on solar energy in several states, and indirect incentives, such as the exemption of PIS/Cofins on generation equipment, have contributed to reducing the cost of deploying these technologies. Since 2012, with the introduction of the Solar Energy Universalization Policy, Brazil has significantly invested in solutions that make renewable energy more accessible and competitive in the market [15]. Impact studies, such as those conducted by Silva and Santos (2023), indicate that tax incentives increase the competitiveness of the renewable energy sector, driving technological innovation and attracting international investments. Moreover, the development of a carbon credit market and Brazil's participation in international climate-related agreements have also boosted the demand for clean energy, consolidating the country's position as a global leader in renewable sources.

Therefore, the importance of continuing to evolve Brazil's electricity matrix toward renewable sources is directly linked to the need to reduce greenhouse gas emissions and meet the climate goals of the Paris Agreement. Therefore, the continued expansion and promotion of these renewable sources is essential to ensuring a sustainable and economically viable energy future for Brazil [13].

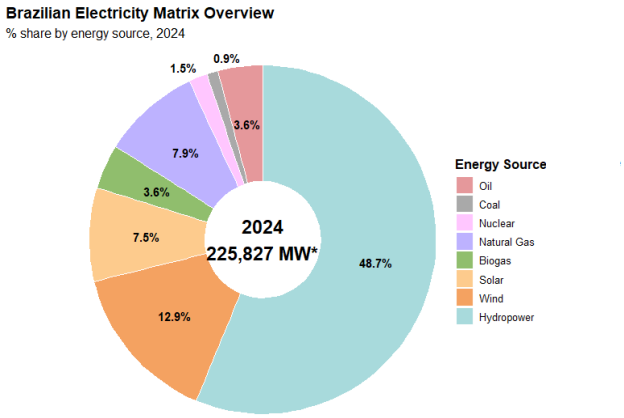

Fig 1. Brazilian electrical matrix

Source: Prepared by the authors based on the data analyzed

The expansion of Brazil's electricity matrix has been marked by the growing adoption of renewable sources, with the incorporation of new power plants and the installation of significant capacities in various regions of the country. In 2024, the electricity matrix surpassed the 7-gigawatt (GW) mark in new installed plants, with the commissioning of 203 units by August, totaling 7,096.55 megawatts (MW) of capacity. This growth includes the addition of 93 solar photovoltaic plants (3,558.04 MW), 90 wind farms (3,057.20 MW), 13 thermoelectric plants (441.52 MW), as well as small hydropower plants and hydropower generators [3]. The distribution of these new plants covers 15 states across all regions of Brazil, with emphasis on Bahia, Rio Grande do Norte, and Minas Gerais, which together represent a significant portion of this expansion (Figure 2).

This process of expanding the electricity matrix reflects an important movement toward diversifying Brazil's energy supply, with a strong emphasis on renewable sources such as solar and wind energy. The importance of this diversification is linked to environmental sustainability, the reduction of greenhouse gas emissions, and the strengthening of the country's energy security [7]. However, the continuation of this expansion depends on favorable conditions, which can be substantially influenced by appropriate public policies, such as tax incentives aimed at renewable sources.

Both direct and indirect tax incentives play a fundamental role in fostering the expansion of Brazil's electricity matrix, particularly in renewable energies. These incentives aim to reduce the costs of implementing new plants and facilitate financing projects involving newer and more efficient technologies. The reduction of taxes on energy generation, such as the exemption of ICMS on solar energy in several states, and tax exemptions on generation equipment, are examples of how these policies contribute to the economic viability of these projects [19]. Furthermore, tax incentives are also important for stimulating private investment in the renewable energy sector, driving technological innovation and the development of more efficient solutions.

The positive impact of tax incentives on the sector's growth can be observed in the 2024 data, in which the addition of 570.80 MW to Brazil's electricity system in

August was made possible by the entry of new wind and solar plants, which represent the fastest-growing energy sources in the country [2]. Bahia, which had the largest expansion with the installation of 16 new plants and an addition of 299.30 MW, illustrates how tax incentives can effectively attract investments and ensure these ventures' success. The consolidation of solar and wind energy as key components of Brazil's electricity matrix has proven to directly reflect the combination of appropriate public policies and the reduction of economic barriers for the sector (Institute of Applied Economic Research [11].

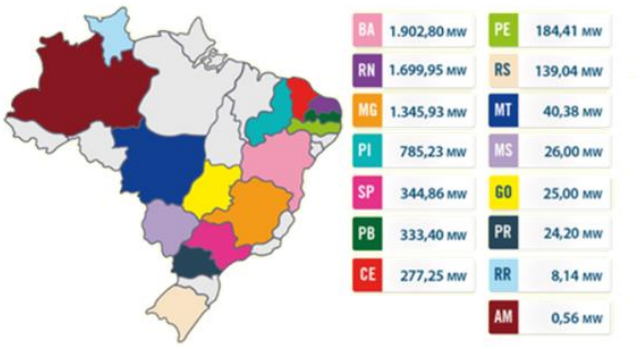

Fig 2. Expansion in 2024 by State
Source: Based on the National Electric Energy Agency (2024)

3. History of Brazilian Government Programs and Incentives

To mitigate the negative effects of the oil crisis (Conflict between Israel, Egypt, and Syria in September 1973), the Brazilian government focused on research to find a renewable energy alternative to replace oil. They proposed programs with direct incentives, such as the National Alcohol Program (Proálcool), launched in 1975. This program aimed to encourage the production and use of ethanol as an alternative fuel. According to the Ministry of Mines and Energy[1] (2024), since Brazil implemented Proálcool, ethanol has enabled the country to save energy equivalent to more than 2.5 billion barrels of oil. This has resulted in savings of approximately 205 billion dollars in gasoline imports over the past five decades. This financial impact highlights ethanol as a strategic energy source for the country. It strengthens Brazil's position as a global leader in the production and use of biofuels by investing in alternatives with a lower carbon footprint.

In 1985, the Ministry of Mines and Energy (MME) established and coordinated the National Program for the Conservation of Electric Energy (PROCEL), executed by the Brazilian Company for Nuclear and Binational Energy Participation (ENBPar). Officially instituted by Interministerial Ordinance No. 1,877 on December 30, 1985, the program aims to reduce electricity consumption in Brazil. Its mission is to promote efficient energy use, significantly contributing to the country's energy and environmental sustainability. According to ANDRADINA (2024), PROCEL operates in various areas, covering industry, commerce, public and private buildings, public lighting, and household appliances.

It offered technical, financial, and advisory support to companies and public agencies interested in adopting energy efficiency practices. Thus, PROCEL went beyond just electricity consumption, encompassing reducing greenhouse gas emissions, preserving natural resources, and promoting long-term economic sustainability.

Notably, the PROCEL program, created in 1985, remains active today. Its significance lies in its consistent contribution to promoting energy efficiency and environmental sustainability in Brazil.

In 2002, Brazil launched the Alternative Sources Incentive Program for Electric Energy (PROINFA), established by Law No. 10,438, on April 26, 2002. PROINFA aimed to increase the share of renewable sources in Brazil's energy matrix by promoting the development of small hydropower plants, wind farms, and biomass plants. The program set financing conditions and long-term energy purchase contracts, encouraging investments in renewable energy and contributing to diversifying the country's electricity generation sources.

The program remained active until the end of 2022 when it was transferred to ENBPar. PROINFA contributed to the diversification of the country's energy matrix through the utilization of local energy sources, adding a total of 131 new projects to the National Interconnected System (SIN), divided into 60 small hydroelectric plants (1,159.24 MW), 52 wind farms (1,282.52 MW), and 19 biomass thermal plants (533.34 MW), totaling an installed capacity of 2,975.10 MW. Notably, from the operation of the first project in February 2006 until the end of 2022, PROINFA's contribution to the system in terms of the energy generated was approximately 135.9 million MWh. In 2022, the program generated about 11.2 million MWh with an approximate cost of R$ 5.8 billion.

2017 the government launched RENOVABIO (National Biofuels Policy) through Law No. 13,576/2017. According to Andrade (2024), to participate in RenovaBio, biofuel producers must undergo a voluntary certification process and meet the established eligibility criteria (MME, 2017). In this process, an inspection firm accredited by the National Agency of Petroleum, Natural Gas, and Biofuels (ANP) evaluates data related to the production and importation of biomass and biofuels. The assessment considers energy efficiency and lifecycle, measured by RenovaCalc, the program's carbon intensity calculator. The result is used to calculate the efficiency score and issue the Certificate of Efficient Biofuel Production.

The RENOVABIO program, created in 2017, is currently in effect. Its main contributions include establishing national decarbonization targets for the fuel sector, aiming to encourage the increase in production and the share of biofuels in the country's transportation energy matrix. Consequently, it contributes to reducing greenhouse gas emissions, which are the primary drivers of climate change.

[1] https://www.gov.br/mme/pt-br/assuntos/noticias/programa-nacional-do-alcool-completa-49-anos-com-impactos-positivos-na-economia-e-no-meio-ambiente

The transition from direct incentive programs, such as Proálcool and PROINFA, to a structure of indirect fiscal incentives reflects the evolution of energy policies in Brazil over the decades. While Proálcool and PROINFA focused on directly promoting the production and use of renewable energy sources through subsidies and specific contracts, the approach expanded to include fiscal mechanisms that broadly encourage energy efficiency and renewable use. It is important to note that in Brazil, indirect incentives primarily apply to Corporate Income Tax (IRPJ), Social Contribution on Net Profit (CSLL), social contributions on gross revenue (PIS and Cofins), and Tax on the Circulation of Goods and Services (ICMS).

Before discussing the identified tax benefits, it is helpful to outline the central taxes involved, their taxable events and applicable rates. Corporate Income Tax (IRPJ) and Social Contribution on Net Profit (CSLL) can be calculated based on annual or quarterly taxable income. Taxpayers may calculate IRPJ and CSLL using the actual profit method, based on total taxable income, or in some cases, using the presumed profit method.

PIS and Cofins are monthly federal social contributions levied on gross revenue. These are non-cumulative taxes, and PIS and Cofins credits can be recognized for acquiring specific inputs and services.

The Tax on Industrialized Products (IPI) is a non-cumulative federal tax due monthly, charged on manufactured and imported products according to the product tariff code established by the Federal Revenue Service. IPI is triggered by local market transactions involving manufactured goods, characterized by the dispatch of products from entities legally

The Import Duty (II) is a federal tax charged on the permanent importation of goods into Brazil. Rates vary according to the product's tariff code, found in the Mercosur Common Nomenclature (NCM), based on the Harmonized System (HS).

The Tax on the Circulation of Goods and Services (ICMS) is a non-cumulative state tax applied to the movement of goods, supply of electricity, provision of transportation services between states and municipalities, and communication services, even if the transaction or service originates from another country.

Law No. 9,532, dated December 10, 1997, regulated by Decree No. 4,213, dated April 26, 2002, established a 75% reduction in Corporate Income Tax (IRPJ) for companies investing in priority activities, such as renewable energy, especially in the North and Northeast regions. Below is a table with tax incentives by tax type and energy type.

The suspension of PIS and Cofins on acquiring machines, equipment, and services intended for energy infrastructure began in 2004 with the publication of Law No. 10,865 on April 30, 2004. The zero PIS and Cofins rate for importing parts used in wind turbines, excluding blades, started with the publication of Law No. 13,169 on October 6, 2015. This measure aimed to reduce the tax costs of wind energy projects in Brazil.

The deferral of ICMS for operations related to machines, equipment, and materials intended for the capture, generation, and transmission of solar and wind energy, incorporated into fixed assets, began in several Brazilian states starting in 2015, based on CONFAZ ICMS Agreement No. 101/1997 (National Council for Finance Policy). This agreement authorizes states to grant tax benefits to foster the renewable energy sector, but its practical application depends on specific regulations in each state, as demonstrated in Table 1.

Table 1 - Tax Incentives Available at Federal and State Levels

TAX	BRAZILIAN REGION	ENERGY TYPE	TAX INCENTIVE
IRPJ	North and Northeast	Priority renewable energy	75% reduction in corporate income tax and non-refundable surcharges on operational profit for up to ten years.
PIS and Cofins	All of Brazil	Energy infrastructure	Suspension of PIS and Cofins on the acquisition of machines, equipment, and services intended for fixed assets.
PIS and Cofins	All of Brazil	Wind energy	Zero rate on the importation of parts used in wind turbines, except blades.
ICMS	All of Brazil	Solar and wind energy	Deferral for operations involving machines, equipment, and materials for the capture, generation, and transmission of energy, incorporated into fixed assets.
ICMS	All of Brazil	Solar and wind energy	Exemption for operations involving equipment and components for energy use, such as turbines and solar heaters.
ICMS	Minas Gerais	Solar and wind energy	Exemption for intra- or interstate operations involving equipment for solar or wind energy use.
ICMS	Piauí	Solar and wind energy	Deferral and presumed credit for power plants considered relevant for the state.
ICMS	São Paulo	Biofuel energy	Reduction of the tax base on intra-state operations of biogas and biomethane, resulting in an effective reduced rate of 12%.
ICMS	São Paulo	Biomass energy	Deferral for the sale of goods destined for thermoelectric power plants.
ICMS	São Paulo	Solar and wind energy	Exemption for operations involving related products, such as turbines and solar heaters.
ICMS	São Paulo	Wind energy	Suspension on importation and deferral for intra-state operations involving goods used as inputs in the manufacture of products for wind energy generation.
ICMS	São Paulo	Biomass energy	Suspension on the importation of goods for incorporation into fixed assets without domestic equivalents.
ICMS	São Paulo	Biomass energy	Full and immediate credit utilization for ICMS on direct purchases of goods from local manufacturers.

Source: Prepared by the authors

As seen in Table 1, the indirect tax incentives provided for the renewable energy sector in Brazil cover different taxes and regions, standing out as tools that promote the country's energy transition. In the case of the Tax on the Circulation of Goods and Services (ICMS), benefits such as exemptions and deferrals are widely applied, especially for solar and wind energy. For instance, Minas Gerais has an exemption for intra- or interstate operations involving equipment intended for solar or wind energy use. In São Paulo, incentives include reducing the tax base for biofuels, resulting in an effective rate of 12%, and deferral for biomass operations destined for thermoelectric plants. These mechanisms encourage the adoption of clean technologies and strengthen the sector's competitiveness in domestic and international markets.

4. Current Incentives

Regulated by Laws No. 14,948/2024 and No. 14,990/2024, the new programs named Rehidro and PHBC are part of the Special Incentive Regime for Low Carbon Emission Hydrogen Production. The main objective of Rehidro[2] is to foster technological, industrial, and sustainable development, promoting competitiveness and innovation in national production chains. Starting January 1, 2025, Rehidro will be applied for five years, benefiting companies involved in

[2] Low Carbon Emission Hydrogen (H2): This refers to hydrogen used as a fuel or industrial input with greenhouse gas (GHG) emissions less than or equal to 7 kg of CO_2 for each kg of H_2 produced.

producing, distributing, or commercializing low-emission hydrogen and those engaged in renewable energy generation or biofuel production for this purpose.

Rehidro offers significant tax incentives, building on benefits already provided under the Special Incentive Regime for Infrastructure Development (REIDI). Key advantages include the suspension of PIS/Cofins when acquiring or importing machinery, equipment, and construction materials for fixed assets. Additionally, debentures issued by beneficiary companies for fundraising to implement or expand projects are exempt from income tax for individuals, while corporations enjoy a reduced rate of 15%. These measures aim to reduce costs and attract investments in the clean energy sector.

To benefit from the Rehidro program, companies must meet specific requirements, such as using a minimum percentage of goods and services of national origin, except in cases of domestic market insufficiency, and investing in research, development, and innovation (R&D&I) activities. Additionally, they must allocate a minimum percentage to sustainable energy transition projects in Brazil and maintain fiscal regularity. The program also includes companies located in Export Processing Zones (ZPEs), expanding its reach and reinforcing Brazil's commitment to transitioning to a low-carbon economy.

On the other hand, the Low Carbon Emission Hydrogen Development Program[3] (PHBC) was designed as a strategic resource to facilitate Brazil's energy transition, focusing on low-carbon emission hydrogen. Set to begin on January 1, 2028, and last, for five years, the program's main goals include the development of renewable hydrogen technologies, support for energy transition, setting targets to strengthen the domestic market, and decarbonizing hard-to-transition industrial sectors such as fertilizers, steel, cement, chemicals, and petrochemicals. Moreover, the program aims to encourage using low-emission hydrogen in heavy transport, promoting a cleaner and more sustainable economy.

One of the main incentive mechanisms of PHBC is the grant of a Social Contribution on Net Profit (CSLL) tax credit, corresponding to up to 100% of the difference between the estimated cost of low-emission hydrogen and the price of its substitutes. This benefit will be awarded through a competitive process, regulated by technical criteria, to select the most qualified projects. The program's global funding will have a progressive annual limit, ranging from R$ 1.7 billion in 2028 to R$ 5 billion in 2032, ensuring consistent resources to stimulate sector development.

To be eligible for PHBC benefits, projects must meet at least one of the following criteria: contribute to regional development, mitigate and adapt to climate change, stimulate technological diffusion, or diversify the Brazilian industrial park. Additionally, companies or consortia interested in participating must have been beneficiaries of Rehidro, in the case of producers, or purchase low-emission hydrogen from Rehidro-qualified companies, in the case of buyers. The competitive qualification process will last a maximum of 90 days, promoting agility and transparency in project selection.

As mentioned, the PROCEL program, created in 1985, remains active today. According to PROCEL[4] (2024), since 1986, 240 billion kWh of electricity have been saved, with 22.10 billion kWh saved in 2022 alone. These savings in 2022 represented 4.35% of Brazil's total electricity consumption, avoiding costs of R$ 4.144 billion. Additionally, these measures prevented 942,000 tons of CO_2e emissions, equivalent to 323,000 vehicles per year. The energy saved corresponds to the annual electricity consumption of 11.16 million households, emphasizing the substantial impact of these efforts on energy efficiency and environmental preservation.

The RENOVABIO program, created in 2017, is currently in effect. At the end of 2024, the National Agency of Petroleum and Gas (ANP) made public the preliminary targets for 2025 regarding the reduction of greenhouse gas emissions applicable to all fuel distributors, considering the period from January to October 2024 as established in Article 4 of ANP Resolution No. 791, dated June 12, 2019. The preliminary targets were set in Decarbonization Credits (CBIOs) units, calculated based on the annual mandatory target defined by CNPE Resolution No. 14, dated December 10, 2024, for 2025, which is 40.39 million CBIOs[5].

The RENOVABIO program contributes to fulfilling Brazil's commitments under the Paris Agreement. It promotes the appropriate expansion of biofuels in the energy matrix, emphasizing the regularity of fuel supply. Furthermore, it ensures market predictability by driving energy efficiency gains and reducing greenhouse gas emissions in biofuel production, commercialization, and use.

Currently, the indirect tax incentives outlined in Table 1 are entirely in effect, demonstrating Brazil's commitment to the sustainable development of the energy sector. These fiscal policies, which include reductions, exemptions, and suspensions of taxes such as IRPJ, PIS, Cofins, and ICMS, stimulate the use of renewable sources in various regions of the country. By reducing costs and increasing the attractiveness of investments in clean energy, Brazil strengthens its position in the global context of energy transition.

5. Conclusion

This article employed an investigative and research-oriented methodology, where we conducted a systematic analysis of information from diverse sources. To compile the presented data, we consult renowned academic articles, official government documents, and reports from state agencies. This approach enables a comprehensive and well-founded understanding of the subject, ensuring more accuracy and relevance in the information conveyed by the present article.

This article discussed the evolution of Brazil's electricity matrix in 2024, highlighting the significant predominance

[3] This program is designed to support the transition to cleaner energy sources by promoting the use and development of hydrogen that meets these stringent emissions criteria.

[4] http://www.procelinfo.com.br/resultadosprocel2023/

[5] https://www.gov.br/anp/pt-br/assuntos/renovabio/metas-preliminares-para-2025-de-reducao-de-emissao-de-gases-causadores-do-efeito-estufa

of renewable sources, with hydropower representing 48.7% of the total installed capacity, followed by wind energy at 12.9% and solar energy at 7.5%. This configuration underscores Brazil's potential for renewable energy generation, a key factor for sustainability and reducing greenhouse gas emissions. Solar energy's installed capacity grew from 0.5 GW in 2014 to 18 GW in 2024, demonstrating growth driven by factors such as reduced generation costs and technological improvements. Wind energy, which accounted for about 2% of the electricity matrix in 2014, reached approximately 13% in 2024.

This article emphasized the significance of direct and indirect tax incentives in advancing alternative electrical energy sources in Brazil, particularly with regard to 2025. The Brazilian energy matrix has largely changed over the past few decades due to government initiatives and incentives that encourage the use of greener and more sustainable technology.

Brazil's energy policies have progressed in promoting renewable sources over the past decades, driven by programs such as Proálcool, PROCEL, and PROINFA, which laid the foundation for diversifying the energy matrix. The evolution of these initiatives to include indirect tax incentives, such as those applied to ICMS, PIS, and Cofins, underscores the country's commitment to reducing greenhouse gas emissions and increasing clean energy generation capacity. These incentives have been crucial in attracting investments and enhancing the competitiveness of the renewable energy sector.

Brazil's recent energy policies, exemplified by the implementation of the new Rehidro and PHBC programs, highlight the country's ongoing commitment to a sustainable and low-carbon future. These initiatives, regulated by Laws No. 14,948/2024 and No. 14,990/2024, offer significant tax incentives to foster innovation and competitiveness in the clean energy sector. Starting in 2025, Rehidro targets the production of low-emission hydrogen and renewable energy, while PHBC, beginning in 2028, focuses on developing low-carbon hydrogen technologies to support energy transition in hard-to-transition industrial sectors. Both programs aim to attract investments, reduce costs, and promote sustainable practices, reinforcing Brazil's leadership in renewable energy. Additionally, longstanding initiatives like PROCEL and RENOVABIO contribute significantly to energy efficiency and emissions reduction, aligning with Brazil's climate goals under the Paris Agreement.

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