

Energy Transition in Brazil

*Successes and Opportunities
from Brazil's G20 Presidency*

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Rebeka Tatham



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ENERGY TRANSITION IN BRAZIL: SUCCESSES AND OPPORTUNITIES FROM BRAZIL'S G20 PRESIDENCY

Rebeka Tatham

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75007 Paris, France

committeelandalus@gmail.com

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committee-al-andalus.com

Author:

Rebeka Tatham

Acknowledgments for their research contributions:

Tarun Ruschmeier, Alexandre Sera, Mouna El-Graoui, Felicitas Nagler

Design:

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Abstract

This report examines Brazil's leadership in the global energy transition, focusing on its G20 Presidency's emphasis on sustainability, inclusiveness, and innovation. With 89% renewable electricity generation and the lowest per capita power sector emissions for over a decade, Brazil offers a compelling model for emerging economies to meet growing energy demands sustainably. The analysis centers on three pillars: accelerating financing for energy transitions in the Global South, integrating a social dimension to ensure equitable energy access, and pioneering innovations in sustainable fuels. Key initiatives include South-South collaboration to mobilize climate finance, policies like the Social Biofuel Seal to promote inclusivity, and advancements in biofuels despite challenges such as land-use concerns. While domestic implementation reveals mixed success, Brazil's proactive adaptation of policies underscores its commitment to global energy leadership. This report highlights lessons from Brazil's experience, providing recommendations for scalable strategies to foster a just and sustainable global energy revolution.

Contextualization: G20 Presidency

Brazil's 2024 G20 Presidency centred on the theme of "building a just world and a sustainable planet," a reflection of the nation's envisaged role as an international leader in sustainable development and the energy transition (Brazil Foreign Ministry 2023). Enacting recent biofuel legislation, aptly named "Fuel for the Future," Brazilian President Lula de Silva declared that Brazil stood "at the forefront of the new economy, the green economy," "set to drive the world's largest energy revolution" (Brazil Foreign Ministry 2024). Within the G20, Lula's leadership in the energy transition is clear – Brazil boasts the highest percentage of renewable electricity generation (89%), and the lowest per capita power sector emissions for over a decade (Rangelova 2024).

Within the global energy transition, Brazil's status as an emerging economy is especially significant.

The Global South accounts for 85% of future energy demand, and the success of the global energy transition thus hinges largely on the ability of developing economies to meet their growing energy needs with low carbon sources (Arcelli 2024).

Brazilian National Energy Consumption (TWh) and Renewable Energy Generation (%)

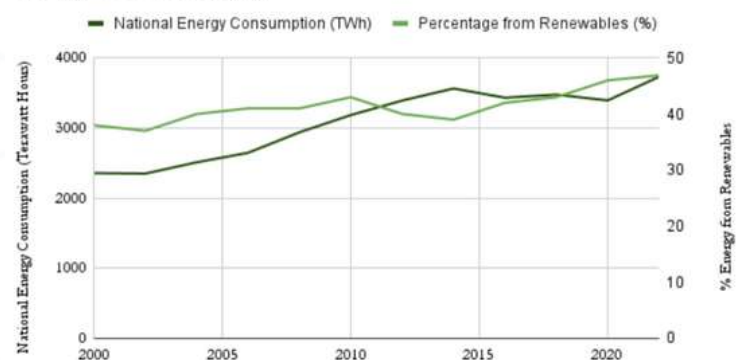


Figure 1. Brazilian National Energy Consumption (TWh) and Renewable Energy Generation (%) Data Sourced from Our World in Data, Graphic by Al-Andalus Committee

It is therefore necessary to analyse the tenets of Brazil's energy transition policy framework, evaluating the transferability of key policies to emerging economies seeking to pursue a sustainable model of economic growth. Within its G20 Presidency, Brazil categorised its vision for a global energy transition according to three tenets: accelerating the financing for the energy transition in emerging markets and developing markets, adding a social dimension to the energy transition, and bringing innovative perspectives on sustainable fuels ("Country Work - Brazil" 2024). This report therefore aims to analyse key domestic and international initiatives within each of these areas, aiming to derive the principal lessons in energy leadership to be learnt from Brazil's remarkable transition.

Accelerating the Energy Transition Financing

During the October 2024 G20 Energy Transition Ministerial Meetings, the Brazilian Presidency of the G20 met with Ministers from the African Union, Ghana, Kenya, Nigeria, Sierra Leone, and Zambia for a Dialogue on South-South Cooperation for Just and Equitable Energy Transitions ("SEforALL at G20 Energy Transition" 2024). The meeting acknowledged insufficient investment in energy transitions in developing countries, particularly for eradicating energy poverty, expanding access to clean energy technology, and promoting clean cooking solutions. Much of Brazil's G20 Presidency has focused on South-South cooperation strategies, such as the G20 Energy Transition Working Group and the Roadmap for Clean Cooking.

The meeting concluded with a pledge to mobilize financial resources to support the formulation and implementation of country-level energy transition plans within the African Union. Brazil's advocacy for increased financing is crucial to achieving Sustainable Development Goal #7– Ensuring Access to Affordable, Reliable, Sustainable, and Modern Energy for All.

International Climate Finance has encountered limited success in bolstering South-South cooperation and financing towards developing economies; South-South climate finance accounts for under 2% of total flows, and less than 3% of the climate finance is delivered to least developed countries (LDCs) (Buchner et al. 2023). Despite these statistics, LDCs are the most vulnerable to a changing climate and most in need of climate adaptation financing. Brazil's efforts to catalyse South-South climate investment signal a necessary redirection in global climate finance architecture, and reflect the significance of Brazil's energy leadership given its status as an emerging economy. The coming years will be significant in monitoring Brazil's progress on converting these collaborative goals into actionable success.

Adding a Social Dimension to the Energy Transition

Brazil's energy transition has been positioned as an engine for the nation's economic growth, and this tenet of Brazil's energy leadership seeks to further position the engine for economic equity, uplifting prosperity and quality of life.

As G20 President, Brazil has launched the GlobalEnergy Compact, which endorses ten principles promoting an inclusive energy transition. According to Alexandre Silveira, Brazilian Minister of Mines and Energy, the pact signifies Brazil's wish "to establish itself as a great ally of countries in this essential fight for a fairer and more sustainable future," centralising the fight against energy poverty (Kennedy 2024). The principles include Social Dialogue and Stakeholder Participation, Respecting Indigenous Rights, and promoting Sustainable and Inclusive Economic Growth for All. Enacted in October 2024, it is too early to assess the Pact's international success, however, Brazil's domestic policies demonstrate a mixed record on delivering these principles.

In 2010, a \$12 billion deal between Shell and Brazilian biofuel producer Cosan was linked with the forced eviction of Guarani indigenous peoples from their protected land. The incident attracted the attention of UN Human Rights Observers who issued concerns over "the allegations of violence against the Guarani people and the severe impact of that aggressive policy of governments in the past to sell large tracts of indigenous land to non-Indigenous farmers."

However, despite this deal, Brazil has issued successive policy frameworks aiming to promote social inclusion through renewable energy. The Social Biofuel Seal provides accreditation to biofuel producers sourcing a mandated portion of their biomass from smallholder farms in economically vulnerable regions of Brazil. The seal has attracted mixed reviews in regards to effectiveness, with a recent study uncovering that biofuel production in the most economically vulnerable regions of Brazil has

decreased since the policy's inception (Oliveira et al. 2019, 121). Nonetheless, the Biofuel Seal introduces a policy framework with the principal aim of utilising energy as an engine for economic equity, and the government continues to issue successive adaptations to the seal with the aim of bolstering its effectiveness.

The G20 Energy Compact principles reflect Brazil's bold vision for energy— a means of promoting inclusive and sustainable economic development, alongside positive environmental outcomes. On the domestic scale, it must be noted that these principles have been applied to varying degrees of success, particularly with regard to indigenous rights. Nonetheless, the Compact works to shift the rhetoric on the energy transition— from an obligation, to an engine for inclusive development. Brazil's willingness to create and adapt policies such as the Social Biofuel Seal reflect a dedication to leading the way in rhetoric, as well as action, towards an inclusive energy transition.

Bringing Innovative Perspectives on Sustainable Fuels

Biofuel comprises roughly 70% of Brazil's renewable energy matrix, primarily used for transport fuels (IEA 2023). Behind the United States, Brazil is the world's second largest biofuel producer, and thus a leader in international biofuel technology and policy. Brazil's "Fuel for the Future" legislation seeks to increase biodiesel and ethanol blending requirements in gasoline, with the ultimate goal of mandating Sustainable Aviation Fuel (SAF) by 2027. While the use of SAF is predicted to decrease aviation emissions by up to 80%, biofuel remains controversial (Airbus 2022).

This controversy stems from their role as principal energy source in Brazil and internationally.

Central to biofuel controversies is the issue of land-use, which is often diverted from food sources, for the production of biofuel produce. For example, American SAF plans will require 114 million acres of land, 20% more than the total land currently planted in the United States for corn (Lashof and Denvir 2023). In Brazil, these land use concerns are especially poignant given the use of Amazonian forest— once a principal global source of carbon sequestration— for agribusiness. This deforestation led Maik Marahens of T&E to comment:

“ —
 | Let's remember why governments introduced biofuels
 | in the first place. They did it to save the planet. What
 | has been achieved is the opposite. The Brazilian
 | Amazon is being razed, bringing the Earth's lungs to
 | the tipping point. (Marahens 2024)
 — ”

Brazil's energy leadership within this tenet (bringing innovative perspectives on sustainable fuels), must therefore focus on innovative ways to limit the land-use and deforestation costs of biofuel. Solutions such as the use of waste products for biofuel, and the combination of carbon sequestration and storage (CSS) in combination with traditional biofuel modes of production offer a truly sustainable innovation model. Biotechnos, for example, partners with schools in Brazil to convert leftover cooking oil into usable biofuel (“Bioplanet Programme | Brazil” 2023). So far, Biotechnos has established 28 sustainable biofuel plants and created 1,500 indirect and direct jobs. These statistics pale in comparison to the level of biofuel production required for Brazil's ambitious

targets, though they propose a community-centred model of biofuel production that is highly transferable; leftover cooking oils are an abundant and low-cost resource with the potential to create usable energy.

Therefore, while biofuel has significantly contributed to Brazil's energy transition, it brings with it land-use and carbon emissions concerns hindering its transferability to other emerging economies. Biofuel solutions are most effective when they use waste products and incorporate carbon sequestration, such as the model provided by Biotechnos.

Recommendations

Thus far, this report has aimed to provide a brief overview of policies underlying each of Brazil's three tenets of energy leadership. Through these policies and others, Brazil has established itself as a leader in the global energy transition, particularly notable based on the nation's status as an emerging economy. Below are key recommendations for further international South-South collaboration based on the three principal policy areas:

1. **Partnerships between Biotechnos and/or similar initiatives** and schools in emerging economies for the application of cooking waste products as a small-scale sustainable fuel source.
2. **Furthering South-South climate finance collaboration** through the expansion of the New Development Bank's (NDBs) issuance of an initial green bond, valued at USD \$1.25 billion (New Development Bank 2023). The proceeds from the green bonds should be applied towards inclusive poverty eradication initiatives, a crucial aspect of climate adaptation in the Global South.

3. **Expansion of the Social Biofuel Seal in Northern Brazil** to ensure the policy benefits Brazil's most vulnerable. Following domestic reform, the potential for international working groups to consider the policy's transferability in other emerging economies with a high biofuel output, such as Indonesia.

Conclusion

Brazil has centralised the energy transition in the very theme of its G20 Presidency, "building a just world and a sustainable planet." In doing so, it has divided its energy work into three central tenets, which together prioritise development, inclusiveness, and innovation.

Brazil's own success in these areas is mixed, with the Shell/Cosan deal highlighting challenges in achieving inclusiveness. However, within the international community, Brazil emerges as a leader in renewable energy development, and has been unafraid to position itself under Lula's presidency as an international advocate of a just and inclusive energy transition. Lula's government has responded actively to its international goals with domestic policies such as the Social Biofuel Seal modelling the inclusiveness it seeks to catalyse at the international scale. It is precisely this willingness to adapt that will be necessary to enact and deliver on the ambitious goals of Brazil and the international community.

Brazil's role as an energy leader cannot be separated from its status as a principal emerging economy. It will not be the ability of developed countries to convert existing energy supplies that dictates the success of the global energy "revolution". Rather, it will be the ability of developing economies

and the Global South to develop their economies leveraging renewable sources. Per capita energy usage in America is tenfold that of most individuals in Latin America and Africa. Economic growth necessitates raising energy consumption in the global south, and Brazil seeks to lead the way in doing so. Thus, though several of Brazil's policies, notably biofuel initiatives, require adaptation before implementation on the international stage, the scale of energy demand and the costs of inaction necessitate international focus towards each of the three tenets, to achieve Lula's ultimate goal of "driving the global energy revolution" (Brazil Foreign Ministry 2024).

ABOUT THE AUTHOR



Rebeka Tatham is a student in the Sciences Po Paris - Columbia University Dual Degree Program, set to earn bachelor's degrees in Economics and Sustainable Development in May 2026. Passionate about opportunities working to finance the energy transition.

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