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CHINA AND THE ENERGY TRANSITION IN SOUTH AMERICA

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CONTENTS

INTRODUCTION

The global transformation of energy systems is simultaneously changing industrial supply chains and international power dynamics. Although it is often presented as a process driven by climate goals and technological advances, its scope extends far beyond the reduction of greenhouse gases. The competition for critical minerals, the control of strategic technologies, the reconfiguration of investment flows and the search for energy security have made this transformation one of the main scenarios of geopolitical competition of the 21st century.

Against this backdrop, South America occupies a unique position. The region concentrates some of the world's largest reserves of lithium, copper and other minerals essential for the electrification of economies; it has abundant renewable resources, including some of the best hydroelectric, solar and wind potential on the planet; it has significant hydrocarbon reserves that will continue to play a relevant role over the coming decades; and it has a strategic geographical location between the Atlantic and Pacific oceans. These assets make South America a strategic space for the global energy transition.

However, the region's relevance does not, on its own, guarantee economic benefits or greater political autonomy. South American history teaches us that the abundance of natural resources can coexist with low levels of industrialization, limited regional integration and an integration into the global economy based mainly on commodity exports. The energy transition therefore raises a fundamental question for South American countries: will they be able to use this new opening to strengthen their productive and technological capacities? or will they instead fall back into historical patterns of economic dependence?

China's growing presence is central to this discussion. Over the past two decades, Beijing has established itself as one of South America's leading trade partners, investors and funders. Their demand for minerals, food and energy has helped to redefine trade and investment patterns. In the last decade, the international expansion of Chinese companies linked to renewable energy, power grids, electric mobility, energy storage and critical-mineral mining has deepened that relationship, increasingly integrating South America into the industrial and technological ecosystems associated with the transformation of energy systems.

However, Chinese participation takes different forms depending on national contexts. The opportunities, risks and impacts of this relationship are shaped by domestic factors such as institutional quality, regulatory frameworks, economic structure, availability of infrastructure and public policy priorities. Consequently, understanding the relationship between China and the South American energy transition requires going beyond the general narratives of dependence or cooperation to analyze how these dynamics play out in each country.

This comparative study examines China's participation in South America's energy transition through a comparative analysis of six countries: Argentina, Brazil, Chile, Colombia, Ecuador and Peru. Through a risk-focused approach, it examines the conditions under which Chinese participation can either advance or undermine the development and energy transition goals of recipient countries.

The findings are based on fieldwork conducted between April and October 2025, including fifty interviews with policy makers, academics, private sector representatives and civil society actors, complemented by documentary analysis, national regulatory frameworks and project and investment databases.

The study starts from a central premise: The energy relationship between China and South America should not be understood solely as a relationship of dependence, nor as an automatic development opportunity. Rather, it is a relationship of asymmetric interdependence that develops in a context of growing geopolitical competition among the major global powers. How South American countries manage their strategic resources, develop regulatory capacities and articulate long-term policies will determine whether the energy transition becomes a platform for capturing local value and driving sustainable development or whether, instead, it cements new forms of technological, financial and industrial dependence.

The document is organized into four chapters:

- **Chapter 1:** Examines why South America has become a strategic space for global energy transition and how regional fragmentation shapes its ability to capitalize on that position.

- **Chapter 2:** Analyzes the national energy transition trajectories and the different modes of Chinese engagement across the six countries analyzed.

- **Chapter 3:** Identifies regional patterns, recurring mechanisms of Chinese involvement and the main factors that explain their differentiated outcomes.

- **Conclusions:** Offers reflections on how to interpret the energy transition in South America from a South American perspective.

The study is aimed at academics, policymakers, private sector actors, civil society organizations and decision makers interested in understanding the political economy of the South American energy transition from a regional perspective.

Rather than offering a reading focused exclusively on China, the study seeks to contribute to national debates on how South American countries can manage the risks, opportunities and tensions arising from the involvement of one of the leading industrial and technological actors in the global energy transition.

Through its development and publication, the Andres Bello Foundation - Latin American-Chinese Research Center seeks to bring this research into a broader public conversation, providing empirical evidence and comparative analysis to a debate that is usually dominated by external frameworks or excessively geopolitical approaches. The aim is to offer an analytical tool for interpreting China's presence not as an isolated phenomenon, but as part of the broader challenges facing the region: strengthening institutional capacities, capturing greater local value, diversifying strategic partners and defining a more autonomous position in the low-emission economy.

Chapter 1

CHINA AND THE GEOPOLITICS OF THE ENERGY TRANSITION IN SOUTH AMERICA

Author: Parsifal D'Sola Alvarado

This chapter examines the role of South America in the global energy transition and the implications of its growing ties with China. First, it analyzes the strategic assets of the region, including its abundant mineral, energy and renewable resources, as well as the geographical and economic advantages that position it as a significant actor in the processes of decarbonization and reconfiguration of global supply chains.

It then addresses regional fragmentation as one of the main constraints to fully harnessing that potential. The chapter examines the deficits in economic integration, infrastructure and political coordination that reduce South American countries' capacity to act collectively and strengthen their bargaining position toward external actors.

Finally, it analyzes China's model of engagement in South America, its strategic motivations, and the mechanisms it uses to expand its economic and technological presence. This includes the opportunities and challenges that this relationship poses for the development of the region in the context of energy transition and global geopolitical competition.

SOUTH AMERICA IN THE ENERGY TRANSITION

South America's role in the energy transition is defined, first and foremost, by its extraordinary endowment of natural resources. Three countries—Argentina, Bolivia and Chile—concentrate between 55% and 60% of the world's proven lithium reserves, placing the so-called "Lithium Triangle" at the center of the battery economy.[1] Chile and Peru together account for approximately 40% of the world's production of copper, an essential metal for electromobility and the expansion of power grids.[2] The region also has smaller but growing reserves of rare earths, which reinforces its role in global supply chains for critical minerals.[3] Brazil leads in biofuels, producing close to one third of the world's sugarcane ethanol.[4]

In terms of conventional fossil fuels, Venezuela has the largest proven oil reserves in the world.[5] Brazil was transformed by the discovery of vast pre-salt deposits—offshore reserves located beneath thick layers of sea salt—which turned the country into a global energy power.[6] Guyana's deep-water oil findings are rapidly redefining its export profile,[7] while the Vaca Muerta formation in Argentina is positioned as one of the largest shale reserves, with significant unconventional gas potential.[8]

Beyond natural resources, the region has an extraordinary renewable potential that has yet to be harnessed. The Atacama Desert and the Altiplano region, which span roughly 105,000 km² across Chile, Peru, Bolivia and Argentina (see Figure 1), are recognized as the area with the highest surface solar irradiation on the planet. Likewise, the wind corridors of Patagonia and the region of La Guajira in the Caribbean, shared by Colombia and Venezuela, are among the best in the world for onshore wind energy development, while offshore wind resources along Brazil's Atlantic coast are vast and largely unexplored (see Figure 2).

Fig. 1

Global Wind Atlas.
South America's wind capabilities.

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Source

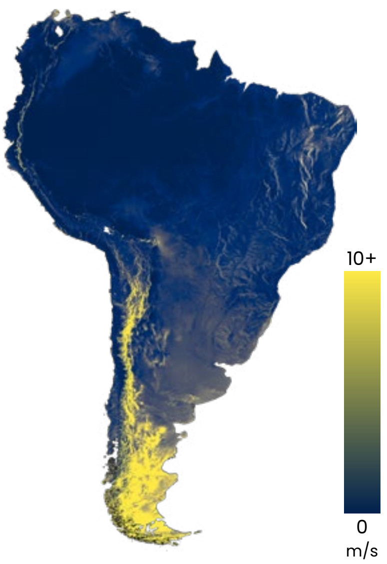
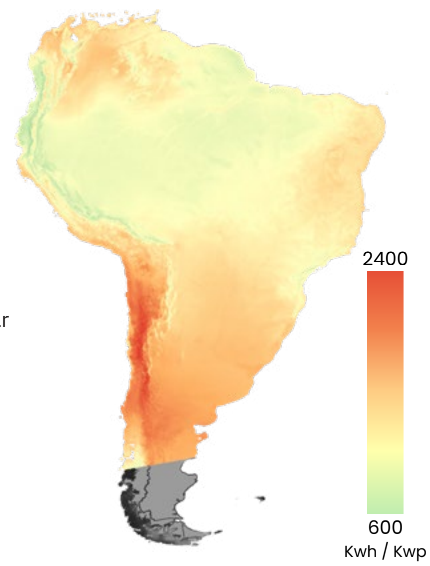


Fig. 2

Global Solar Atlas.
South America's solar capabilities.

—
Source



Similarly, South America's geography reinforces its strategic relevance in the energy sector. Its access to both the Pacific and Atlantic Oceans positions it as a future energy corridor linking exports of renewable energy, critical minerals and supply chains with Asia, North America and Europe. This dual connectivity, combined with extensive port and commercial infrastructure, gives the region a logistical advantage as new low-carbon trade routes take shape, particularly in a context of growing geopolitical instability affecting major global maritime corridors. The Amazon basin, in turn, remains a global climate stabilizer and a key case for balancing development and conservation in a decarbonizing world.

With approximately 440 million inhabitants, South America represents both an important energy-consumer market and a testing ground for the clean technologies it seeks to deploy. Its average income profile places affordability, reliability and social equity at the heart of energy transition policy. Consequently, policies that combine decarbonization and economic development are more likely to achieve legitimacy and success.

At the political level, South America remains largely democratic, with Venezuela as the main exception. The absence of large-scale interstate conflicts and a basic level of stability set the region apart from other resource-producing regions. This relative predictability creates favorable conditions for long-term investment in renewable energy, power grids and critical minerals, conditions that international partners increasingly value as they diversify their supply chains.

Success or failure in managing these assets will not only shape its own development trajectory but will also influence the feasibility and cost of the energy transition on a global scale.

REGIONAL FRAGMENTATION: THE STRUCTURAL CONSTRAINT

South America remains significantly behind in terms of economic and political integration. On the one hand, few regions of comparable size and population share so many elements of cohesion: A common colonial history, mutually intelligible languages such as Spanish and Portuguese, a predominantly Catholic tradition and the absence of large-scale interstate wars since the independence movements of the 19th century.

Intuitively, these factors should have laid the groundwork for solid integration. However, South America has the lowest levels of intraregional trade in the world. Only about 13% of its trade takes place within the region,[9] compared to about 60% in the European Union and 40% in Asia. Cross-border infrastructure is equally weak. There are no regional rail networks, air transport is costly and fragmented, and energy interconnections remain limited.[10]

The recurrent failure and dysfunction of regional integration schemes—from the Andean Pact[11] to more recent groupings such as UNASUR[12] and CELAC[13]—reflect chronic discontinuity, shifting political priorities, weak bureaucracies and divergent national models.

In addition to slowing economic development, this fragmentation has direct consequences for South America's energy transition. In the absence of common standards on tax, environmental or local-content matters, countries compete with each other to attract investment, often under favorable conditions for external actors. The result is a race-to-the-bottom pattern, in which concessions are granted in exchange for short-term capital, weakening collective bargaining power over resources critical to global decarbonization.

Mercosur, a trade bloc made up of Argentina, Brazil, Paraguay, Uruguay and Bolivia—Venezuela is a member although it has been suspended since 2017 due to the breakdown of the democratic order in the country—stands out as a partial exception.[14] Despite recurring disputes among its members and limited impact on intraregional trade, it has proven to be more durable than most regional integration efforts. In fact, under the current uncertain geopolitical environment, the bloc has also taken on renewed strategic relevance.

Negotiations for the trade agreement between Mercosur and the European Union began in 1999 and spanned more than two decades, culminating in a political agreement in December 2024. The agreement's revival was catalyzed by Russia's war against Ukraine, which exposed Europe's vulnerabilities in energy and supply chains and led Brussels to diversify its sources, moving away from both Russian hydrocarbons and certain dependencies on China. Therefore, Mercosur's performance as an integration mechanism—the very rationale behind its creation—has increasingly taken a back seat to its function as a strategic platform for engaging external actors at a moment when global rivalries are reshaping trade and investment patterns.[15]

Institutional asymmetry further deepens these constraints, as the strength of governance and regulatory institutions varies considerably across the subcontinent. Some countries have well-established regulatory institutions and a strong rule of law, while others rely on discretionary decisions by the executive branch or on opaque negotiating channels. Even within countries, subnational governments can set the tone, with some provinces applying stricter environmental and social standards and others prioritizing speed and flexibility. An unequal institutional environment favors external actors willing to operate through discretionary or opaque mechanisms. A project that would face rigorous scrutiny in one jurisdiction may move forward with limited oversight in another, fragmenting the regional landscape and making it difficult to consolidate common standards.

Fragmentation, paradoxically, is not an obstacle for external actors, but an opportunity. By adapting their strategies to national and subnational contexts, international actors can ensure flexible and direct agreements without facing a unified negotiating position. For South America, the cost is strategic: The region dilutes the value of its resource endowment and weakens its capacity to define the rules of engagement.

Through repeated boom-and-bust cycles, South America has missed successive chances to climb global value chains, remaining largely a rentier region. The energy transition provides yet another opening to shift from this peripheral, rule-taking position toward a more collective role in shaping the rules of engagement.

CHINA'S MODEL OF ENGAGEMENT IN SOUTH AMERICA

From the Chinese perspective, South America is a strategic supplier of critical minerals, food and energy, as well as a relevant space to consolidate the diplomatic recognition of the People's Republic of China (PRC) over Taiwan. Although the region occupies a peripheral geographical position relative to East Asia, these overlapping incentives have raised its importance within Chinese foreign policy.

China's foreign policy is often described as "pragmatic" or "non-ideological," particularly because Beijing engages with democracies, hybrid regimes, and authoritarian governments without tying its relationships to conventional left-right alignments, or liberal criteria regarding democracy and human rights. China does not lack ideology; rather, its foreign policy is organized around its own ideological framework that structures international relations differently from the conventional political categories employed in the West and Latin America.

That framework is increasingly organized around a division between an "us"—presented as the Global South—and a "them," associated primarily with the West. Within this narrative, China projects itself as a representative and partner of countries historically marginalized by colonial and post-colonial dynamics. Latin America clearly fits into that "us," while the United States occupies the place of the main "other" in the hemispheric context.

This ideological framework guides China's actions in practice. Beijing offers financing, trade and investment with few explicit political conditionalities, avoiding the demands for transparency, governance or institutional reform commonly associated with Western actors and multilateral organizations. At the same time, it promotes its own diplomatic priorities, including the one-China principle, alternative human rights definitions and normative preferences in multilateral forums.

In operational terms, China acts through state banks, construction companies, manufacturing companies, technology firms and provincial governments. Its model favors direct contact with national and subnational elites, which allows it to negotiate projects at multiple levels of government and accelerate decision-making processes. While the first phase of engagement, in the early 21st century, focused mainly on the national level, subnational entry points have gained relevance, particularly in federal countries such as Brazil and Argentina. By establishing agreements with local authorities, Chinese companies and entities can bypass slower national bureaucracies and maintain continuity even amid political volatility in the central government.

In the financial sphere, China's comparative advantage is difficult to match. Over the past two decades, public policy banks such as China Development Bank and Export-Import Bank of China have provided more than USUS$120 billion in loans for energy, mining and infrastructure projects[16]—a figure comparable to the cumulative approvals of the Development Bank of Latin America (CAF) during the 2010s, which averaged between US$9 billion and US$13 billion per year and totaled around US$110–120 billion over the same period.[17]

In practice, Chinese banks have not replaced multilateral institutions such as CAF, the Inter-American Development Bank (IDB) or the International Monetary Fund (IMF). Rather, they have become an additional pillar in the region's development finance architecture, expanding the availability of long-term capital to governments with persistent infrastructure needs.

Minerals form the next tier of the relationship. Copper, lithium, iron ore and oil support South American exports of natural resources to China and are central to Beijing's industrial agenda, including "Made in China 2025"[18] and the "dual circulation" strategy.[19] Far from reducing its dependence, China's drive toward technological self-sufficiency has deepened its dependence on South American inputs. Agreements with companies such as Ganfeng Lithium in Argentina or Jiangxi Copper in Peru illustrate how critical minerals and energy transition are integrated into Beijing's broader strategic calculus.

Although the first wave of Chinese expansion in the region was dominated by state-owned enterprises, today the private sector has taken on at least equal importance. Its presence closely follows the industrial priorities defined by the Chinese state and extends Beijing's influence through market mechanisms. The fastest growing companies are those aligned with strategic domestic sectors: Electric mobility, batteries, telecommunications, cloud services, fintech, surveillance and smart city systems.

As the United States and Europe restrict the participation of Chinese suppliers in sensitive technology sectors, South America—which has largely avoided securitizing its relationship with China—is emerging as an attractive destination for the relocation of sales, services and digital infrastructure. The result is a gradual integration of Chinese technology ecosystems in the region, from electric vehicles and batteries to networks, data platforms and digital services. This trend can generate gains in connectivity and investment, but also reinforce long-term dependencies on Chinese standards, suppliers, and technology architectures.[20]

At the diplomatic level, the Chinese approach to Latin America remains strongly bilateral. Although the China-CELAC Forum provides a regional platform, it functions primarily as a consultative and declarative mechanism, without operational capacity comparable to that of a robust regional institution. In practice, most relevant agreements are negotiated directly with national governments, subnational authorities, political parties and elites. This approach allows Beijing to take advantage of the lack of coordination in Latin America and tailor its ties to the preferences of each government. On the other hand, it also exposes Chinese projects to electoral cycles, leadership changes and breaks in administrative continuity.

When it comes to soft power, it plays a more limited role than is usually assumed. While Confucius Institutes, scholarship programs and Chinese state media have a presence in the region, their impact is modest compared to the organic cultural influence of the United States, Europe or even South Korea and Japan. What is most appealing to South American countries is not Chinese culture or its political system, but its development trajectory.

China's transformation from an agrarian and poor economy to a global industrial and technological power is a compelling benchmark for public policy makers in South America. Its track record in infrastructure, industrialization and poverty reduction offers a particularly persuasive narrative in a region that, despite levels of economic and social development higher than China's during the 1960s and 1970s, failed to achieve a comparable structural transformation.

This attraction, however, generates obvious tension. The Chinese model is based on an authoritarian one-party system, while most South American countries are formally organized around democratic and republican frameworks. Even in contexts of democratic backsliding, such as Venezuela, political traditions and social demands oriented toward the restoration or strengthening of democracy persist. Thus, China's appeal rests less on cultural or political affinities than on its material performance, its state capacity and its promise of accelerated modernization.

Overall, the relationship between China and South America is often analyzed in terms of the latter's dependence on the former. The reality is much more complex. As Beijing deepens its technological and industrial transition, its access to critical minerals, energy and food from the region becomes increasingly important. This interdependence does not eliminate existing power asymmetries, but it does give South American countries greater bargaining room than is often assumed. The central question is whether the region will be able to turn that strategic relevance into a development agenda of its own: integrating into new production chains, attracting higher value-added investment, and participating more actively in defining the rules that will shape the next stage of the global economy. In a context of growing competition between China and the United States, South America should not merely accept rules designed by others, but use this moment to expand its autonomy and bargaining capacity.

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Chapter 2

CHINA IN SOUTH AMERICA'S ENERGY TRANSITION

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This chapter explores the energy transition in Argentina, Brazil, Chile, Colombia, Ecuador, and Peru through an assessment of the political, regulatory, economic, and institutional factors that influence how their energy sectors evolve.

For each case, it analyzes the main governance frameworks and public policies related to the energy transition, as well as the composition of their energy and electricity matrices. The chapter also identifies the main national challenges, opportunities and constraints that influence decarbonization processes and the transformation of energy systems.

Finally, it examines China's engagement in each country, including its presence in sectors such as energy infrastructure, renewable energies, mining, power grids, electric mobility and financing. Through these national profiles, the chapter offers an insight into how the domestic characteristics of these countries shape both their energy transition trajectories and their forms of engagement with China.

DEFINITION OF THE ENERGY TRANSITION

The study deliberately avoids adopting a single definition of "energy transition". One of its main objectives is to document how this concept is understood and applied in the specific context of each country.

Data collected during fieldwork revealed that the meaning of the concept varies considerably depending on national priorities, institutional capacities and sectoral perspectives. In some countries, it is closely linked to environmental sustainability and decarbonization; in others, it is linked to energy security, industrial policy or technological modernization.

Recognizing this diversity of interpretations was essential for developing a contextualized analysis that reflects the multiplicity of approaches across South America. It also highlights that energy transformation processes throughout the region are determined not only by global energy trends, but also by different political, economic and social realities.

ARGENTINA

Energy / capita	Electricity / capita	CO2 / capita	Electrification rate
21.514 kWh	**2.822** kWh	**3,59** Mtoe	**100%**
Source: Our world in data	Source: IEA	Source: IEA	Source: World Bank
Year: **2024**	Year: **2024**	Year: **2024**	Year: **2024**

Table 1

ENERGY SUPPLY — IMPORTS

Total: **7.830 Ktoe** · Year: **2024** · Includes primary and secondary energy sources

Nuclear fuel	2,900 Ktoe · 37.04%	Natural gas	2,293.2 Ktoe · 29.29%
Electricity	872 Ktoe · 11.14%	Coal	717 Ktoe · 9.16%
Diesel/gas oil	694.4 Ktoe · 8.87%	Naphtha (gasoline)	210.9 Ktoe · 2.69%
Non-energy use	82 Ktoe · 1.05%	Other naphthas	29 Ktoe · 0.37%
Fuel oil	19.6 Ktoe · 0.25%	Kerosene and jet fuel	12 Ktoe · 0.15%

Argentina imports ~7,830 Ktoe of energy per year and exports ~17,499 Ktoe, making Argentina a net energy exporter, 2024.
Fuente: Balance Energético Nacional de la República Argentina.
Notes:

- Natural gas: Includes blends of domestic processed gas, imported pipeline gas, and regasified LNG

GOVERNANCE AND ENERGY POLICY

Argentina's energy transition is unfolding in a context marked by dependence on hydrocarbons, macroeconomic instability and a heterogeneous institutional configuration. Unlike countries such as Brazil or Chile, where decarbonization has been established as a state policy,[1] Argentina's trajectory has been marked by the government in office.

In the case of Javier Milei's administration, energy policies have focused on the expansion of hydrocarbons, economic deregulation and the development of Vaca Muerta, one of the world's largest unconventional hydrocarbon formations and the country's main energy bet.[2] Several of those interviewed described the current government as "absent" or even "hostile" to the energy transition.[3]

This approach reflects, in part, the difficulties the Argentine energy sector has faced in recent years, including restrictions on foreign exchange to import energy, the rising cost of subsidies to electricity and natural gas, and episodes of stress in the electricity sector.[4] On this basis, the expansion of hydrocarbon production and energy exports became central to the government's economic strategy, both for its potential to generate foreign exchange and for the fiscal constraints that exist in sustaining policies to promote renewable energy.

Notwithstanding, the approach adopted by the current government contrasts with the existence of a solid regulatory framework for the energy transition. Since the 1990s, Argentina has built regulatory instruments that, at least formally, favor the development of clean energy. Among the most relevant measures is Law 27.191 on Renewable Energy (2015), which raised the participation targets of renewable sources to reach 20% electricity consumption by 2025 and created the Fund for the Development of Renewable Energy (Fondo para el Desarrollo de Energías Renovables, FODER) to facilitate financing for projects in the sector.[5] Furthermore, the auctions promoted by the RenovAr initiative (2016–2019) became the main mechanism for renewable energy expansion, allowing its participation to grow from less than 1% to about 16% in electricity generation in a few years.[6]

The regulatory framework also includes measures such as the Renewable Energy Term Market (Mercado a Término de Energías Renovables, MATER),[7] which enables direct contracts between large consumers and generators; the Distributed Generation Act (2017),[8] aimed at encouraging self-consumption and distributed solar energy; and the Biofuels Act (2021),[9] which maintains mandatory blending requirements.

Argentina also implemented a carbon tax in 2017, one of the few in South America, although with limited scope.[10] In environmental matters, the General Environmental Law (2002) and the Escazú Agreement establish mechanisms for impact assessment and public participation;[11] that said, their implementation has been uneven and shows marked differences across provinces.[12] At the international level, Argentina maintains fairly ambitious climate commitments, including an emissions cap for 2030 and the carbon neutrality target for 2050.[13]

Conversely, because of the country's complex federal political system, putting public policies and regulatory regimes into practice has proven challenging. The provinces have constitutional control over natural resources, which gives them a decisive role in guiding energy and extractive policies.[14] Some jurisdictions, such as Jujuy, have promoted ambitious renewable energy projects in partnership with Chinese capital, while others, such as Neuquén, have deepened their commitment to non-conventional gas and oil from Vaca Muerta. At the same time, provinces such as Córdoba have promoted their own initiatives of distributed generation and solar energy development, shaping energy trajectories that are autonomous from national priorities.[15] This fragmentation explains why certain projects can move forward even in the absence of a coherent national strategy. As one of the interviewees summarized: "the framework exists, but macroeconomic conditions and infrastructure block its implementation."[16]

In short, the Argentine case suggests that the energy transition is still treated as a contingent undertaking, not as a sustained state commitment. Under the government of Javier Milei, the priority given to macroeconomic stabilization, the generation of foreign exchange and the expansion of Vaca Muerta has shifted the energy transition to a secondary place on the public agenda. Considering that much of the country's climate commitments are not legally binding, questions remain about Argentina's ability to meet the emission reduction and carbon neutrality targets it has set for the coming decades.

ENERGY MATRIX

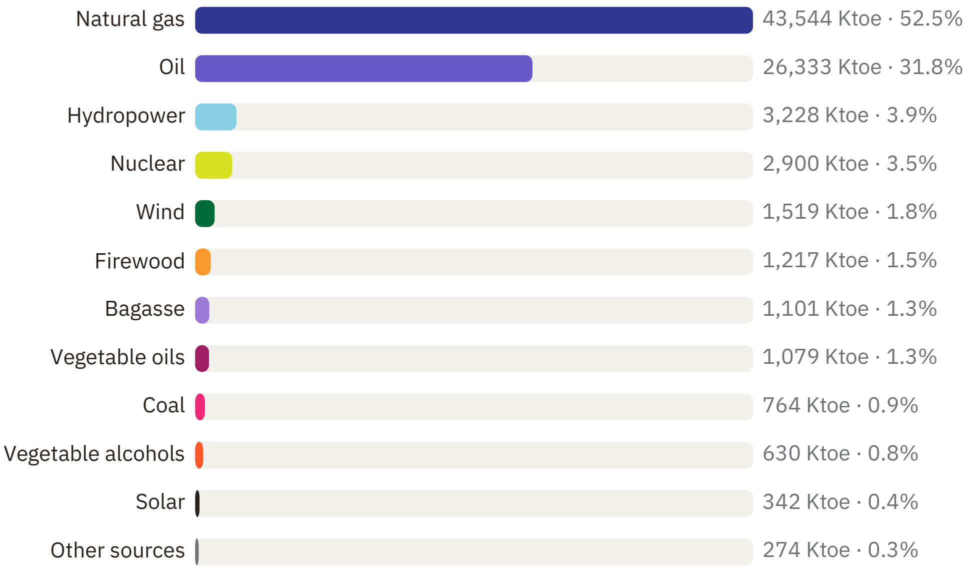
*The data and percentages used in this section are drawn from **Tables 2** and **3**.*

Table 2

TOTAL PRIMARY ENERGY SUPPLY SOURCES (TPES) — 2024

Total: **82.931 Ktoe**

Defined as domestic production plus imports minus exports (and, when available, adjusted for inventory changes and international bunkers).



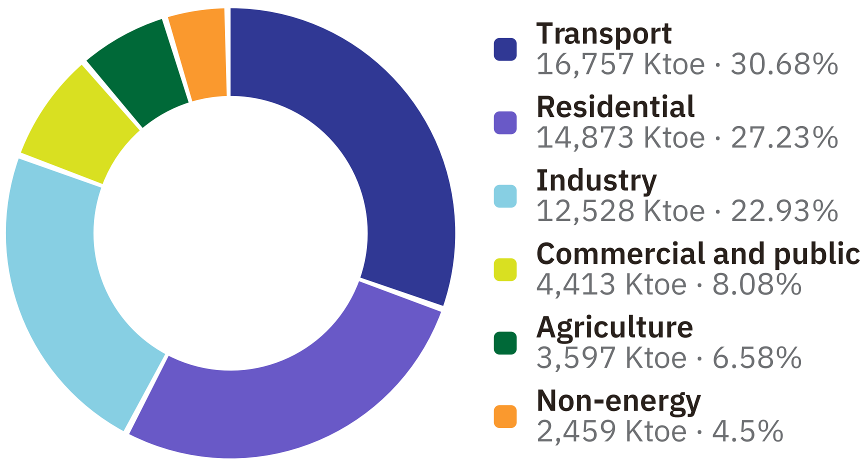
Source: Author's calculations based on data from Balance Energético Nacional de la República Argentina, 2024.

Table 3

ENERGY USE DISTRIBUTION — 2024

Total: **54.627 Ktoe**

Energy delivered to end-use sectors only. It excludes the energy consumption by the energy industry itself in conversion and processing activities.



Source: Author's calculations based on data from Balance Energético Nacional de la República Argentina, 2024.
Notes:
- Non-energy: Use of energy products as raw materials rather than for energy purposes.

In 2024, natural gas and oil together accounted for more than 80% of the total primary energy supply, consolidating a structure highly dependent on fossil fuels. Natural gas alone contributed approximately 52.5% of the national energy supply, one of the highest shares among the six countries analyzed, second only to Peru. Oil accounted for 31.8%, while coal had a marginal share of just 0.9%, limiting the possibility of achieving rapid emission reductions by substituting coal with gas, as was the case in other economies. Unlike most countries in the region, Argentina also had a significant contribution from nuclear energy (3.5%), reflecting a long tradition of developing scientific, technological, and industrial capabilities associated with the sector.[17]

As a result, renewable sources maintained a reduced share. Hydroelectricity accounted for about 3.9% of the primary matrix, followed by biomass (4.9%), wind (1.8%) and solar, with only 0.4%. As can be seen in the statistics, although the growth of renewable energies was significant during the last decade, its impact on the overall structure of the energy system remained limited.

The sectoral structure of energy consumption helped explain the persistence of this dependence on hydrocarbons. Transport was the main consumer sector, accounting for approximately 30.7% of total energy demand and relying almost exclusively on petroleum derivatives. The residential sector accounted for 27.2%, followed by industry with 22.9%. The remainder corresponded to commercial and public sectors (8.1%) and agricultural sectors (6.6%), while electrification of transport and industrial processes was still marginal.

Natural gas was the backbone of the Argentine energy system, not only in electricity generation, but also in heating, industry and residential consumption. Thus, the expansion of the sector would no longer displace more polluting fuels, such as diesel or fuel oil, whose share had declined considerably, but could end up displacing renewable alternatives such as wind and solar energy.

Moreover, the electrification of fleets remains virtually nonexistent. Consequently, Argentine decarbonization is subject to transforming energy consumption patterns. Electrification of public transport, logistics fleets and certain industrial processes emerge as the main bridge between a cleaner electrical matrix and moving toward a low-emission economy.

In sum, Argentina’s energy transition cannot be understood only as a problem of renewable energy supply. Without policies that actively change energy demand—especially in transport and industry—even accelerated growth in renewable energy will have limited effects on the development of a cleaner energy matrix.

ELECTRICITY MATRIX

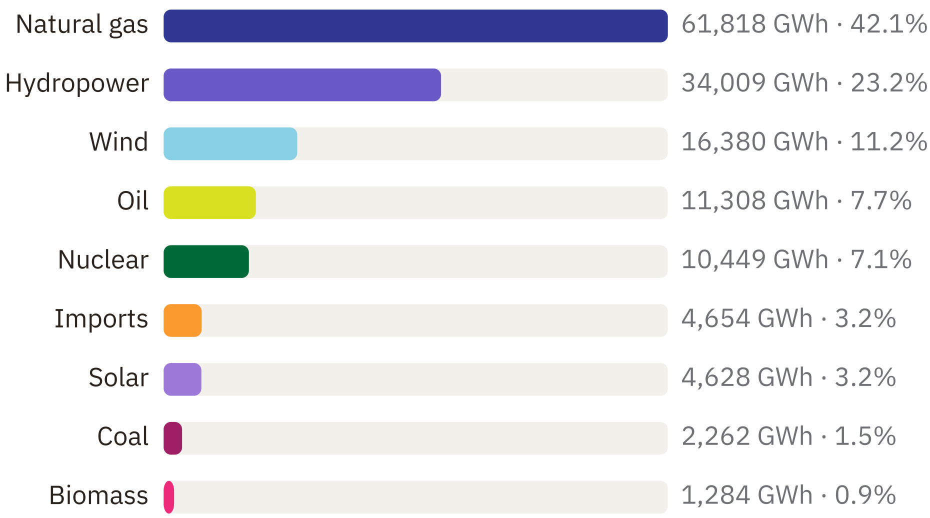
*The data and percentages used in this section are drawn from **Tables 4** and **5**.*

Table 4

ELECTRICITY SUPPLY SOURCES — 2024

Total: **146.792 GWh**

Grid-delivered electricity disaggregated by primary generation source.

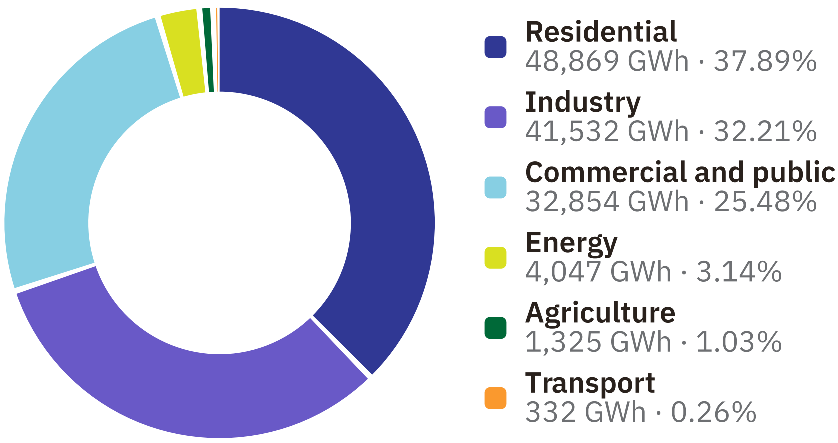


Source: Author's calculations based on data from [CAMMESA – Informe Anual 2024.]
Notes:
- Natural gas: Informe Anual 2024 de Cammesa only offers the aggregate total of Gas, Oil, and Coal (75,388). The share is based on the percentages of these categories from 2021 latest available percentage use data.

Table 5

ELECTRICITY USE DISTRIBUTION — 2024

Total: **128.959 GWh**



Source: Author's calculations based on data from [CAMMESA – Informe Anual 2024.]
Notes:
- Energy: Electricity consumed by the energy industry itself in the process of producing, processing, and delivering energy.

Argentina's electricity matrix is considerably more diversified than the overall energy matrix, although it relies heavily on natural gas. In 2024, fossil fuels accounted for just over half of total electricity generation: Gas contributed 42.1%, oil 7.7% and coal 1.5%. Non-fossil sources generated approximately 45.6% of the electricity, distributed among hydroelectricity

(23.2%), wind (11.2%), nuclear (7.1%), solar (3.2%) and biomass energy (0.9%). Electricity imports accounted for 3.2% of total generation.

This combination gives Argentina a comparatively clean electricity system by international standards. However, this low carbon intensity depends heavily on natural gas, whose presence in the energy matrix is among the highest in South America, second only to Peru. Instead of playing a complementary role—as in Brazil, Colombia and Chile—in Argentina, gas is the cornerstone of electricity generation and residential and industrial consumption.

Electricity consumption was led by households, which accounted for approximately 37.9% of total demand, followed by industry (32.2%) and the commercial and public sector (25.5%). Agriculture accounted for just over 1%, while electricity transport maintained a marginal share of only 0.26%. Unlike other countries analyzed, where electricity demand is usually concentrated in one or two dominant sectors, Argentina presented a balanced distribution between the residential, industrial and commercial segments. This configuration suggests a widely distributed electricity consumption base across the economy, which could facilitate the gradual incorporation of new consumption associated with electrification of transport, air conditioning and certain industrial processes without relying on the transformation of a single consumer sector.

Taken together, hydroelectricity, wind and nuclear power give Argentina a low-carbon power generation base. Within this set, wind energy has been the fastest-growing source over the past decade, positioning the country among the regional leaders in installed capacity. Solar energy, on the other hand, maintains a minimal share despite the extraordinary potential of northwest Argentina, one of the areas with the highest solar radiation in the world. The country's macroeconomic constraints notwithstanding, inadequate transmission infrastructure is currently the main barrier to expanding and integrating new renewable projects.

CHINA'S ROLE

To a large extent, Beijing and Chinese companies have filled the spaces opened up by the relative retreat of Western and multilateral financiers, aligning their industrial and strategic interests with Argentina's liquidity and investment needs. Its presence ranges from large hydroelectric and solar projects to lithium mining, transmission infrastructure and technologies associated with the electricity system, adopting different forms depending on the sector and the province.

Energy cooperation in the 2010s

Beginning in the 2010s, energy cooperation between Argentina and China developed through large hydroelectric infrastructure projects. Among them are the Néstor Kirchner and Jorge Cepernic dams, located on the Santa Cruz River, considered one of the most emblematic projects of the bilateral relationship. The works were awarded to a consortium led by the Chinese state-owned company Gezhouba Group and financed mainly by loans from Chinese policy banks. Originally conceived to provide approximately 1,740 MW of installed capacity to the national electrical system, the project was subsequently redesigned during the administration of Mauricio Macri to reduce its environmental impact, reducing its expected capacity to around 1,310 MW.[18]

Efforts to expand bilateral energy cooperation also reached the nuclear sector, albeit without materializing. In 2014, Argentina and China agreed to advance the construction of Atucha III, a new nuclear power plant based on Hualong One technology of the China National Nuclear Corporation (CNNC). The project advanced to the signing of a commercial contract in 2022, but difficulties in securing a definitive financing scheme, compounded by growing geopolitical pressure from the United States over the use of Chinese nuclear technology, led to successive renegotiations before the initiative was finally abandoned.[19]

These projects embody the state-to-state cooperation model characteristic of the past decade, based on financing from Chinese state banks and the participation of public companies from both countries. Implementation revealed, however, several vulnerabilities in the scheme: Execution delays, recurrent contractual revisions and a marked dependence on Chinese disbursements, whose interruption went so far as to compromise the continuity of the works.[20] From this perspective, the difficulties observed can be interpreted as the result of the convergence between the logic of Chinese state financing and Argentina's macroeconomic and institutional constraints, rather than as a consequence attributable exclusively to any of these factors separately.

Renewables and mining: Sectoral expansion and transactional logic

Beyond hydroelectric power plants, China's presence has expanded into renewable energy and mining. In the renewables sector, the Cauchari solar complex in Jujuy[21]—financed by

China Exim Bank and built by Shanghai Electric Power Construction, a subsidiary of the state-owned PowerChina—became one of the most prominent cases in the RenovAr program. With a current capacity of around 300 MW and expansion plans toward 500 MW, Cauchari ranks among the largest solar projects in Latin America. The project also included local training and assembly mechanisms.

These experiences suggest a fundamentally transactional relationship, in which Chinese companies occupy spaces that the State and the domestic private sector cannot cover due to financial or technological constraints, or a combination of both. Provincial governments, for their part, use Chinese financing as a lever to advance strategic projects. As Juan Carlos Villalonga pointed out, “When China negotiates with a provincial governor, the difference is always in the financing they can offer.”[22]

A diplomatic component adds to this provincial logic. Several interviewees indicated that the provinces sometimes act as a point of entry, while the Chinese Embassy plays a role of validation and coordination.[23] It can be inferred that this decentralized modality has allowed projects to thrive even in times of ambivalence or neglect on the part of the national government.

In terms of mineral resources, lithium constitutes the most sensitive and strategic dimension of China’s presence in Argentina. Large reserves in the north of the country have attracted investments from companies such as Ganfeng Lithium, Zijin Mining and Tibet Summit Resources, which combine private capital with Chinese state backing. These companies are involved in some of the country’s major lithium projects, including Cauchari-Olaroz in Jujuy and Tres Quebradas in Catamarca.[24]

Beyond the influx of foreign investment and the expansion of extractive capacity, the development of lithium has given rise to a broader debate about the sector’s development model. Recurring themes include local industrialization, battery production, technology transfer, rent capture by provinces and mechanisms of coordination among producing jurisdictions.[25] These discussions reflect a persistent concern to maximize the economic benefits of the resource beyond the extraction and export of raw materials.

In recent years, China’s presence has expanded beyond equipment imports to include local manufacturing and assembly activities in certain provinces. In San Juan, the first national solar panel assembly plant is preparing to start production using machinery and inputs mainly from China, with the ambition of gradually moving toward higher value-added stages.[26] The province currently obtains more than 60% of its installed capacity from solar sources thanks to the high levels of radiation in northwestern Argentina and seeks to position this industry as a complement to its mining economy. Technological dependence remains evident, but the possibility of localizing part of the value chain also emerges.

Regulatory asymmetries

The differences in regulatory and institutional capacities between provinces, reinforced by the decentralized nature of the Argentine federal system, generate significant variations in the conditions of supervision and application of standards between jurisdictions.

These regulatory inequalities seem to influence the levels of transparency and oversight observed in some projects developed by Chinese companies. Among those interviewed, several noted that initiatives funded by multilateral or European actors, standards related to community consultation, environmental assessment and monitoring mechanisms tend to remain consistent across provinces.[27] In contrast, in several projects linked to Chinese companies, the results appear to be more closely correlated with the strength, or weakness, of local regulatory frameworks. In provinces with greater institutional capacity, monitoring and compliance standards tend to be higher; where that capacity is weaker, so are the conditions of oversight and transparency.

The differences between Jujuy and Salta clearly illustrate this pattern. While Jujuy has developed greater local oversight and coordination capabilities around lithium and solar projects, in Salta certain operations have functioned as enclaves with little integration into local economies. Similar tensions have also emerged in Catamarca, where the Tres Quebradas lithium project, operated by Chinese company Zijin, has faced sanctions for various regulatory, environmental and social violations.[28]

Geopolitics, Milei and the future of the energy relationship with China

While Milei's government has prioritized economic growth and the expansion of extractive sectors, it has shown limited commitment to renewable energies.[29] Nonetheless, to the extent that renewables continue to attract investment, create jobs, and support exports, their development—including projects financed by Chinese firms—is likely to persist, though not at the speed observed in the past decade.

With regard to China, the country's model of engagement is going through a reconfiguration phase. Over the past decade, China's presence in strategic sectors—energy, mining and infrastructure—was tied to a combination of state financing, intergovernmental agreements and Argentine macroeconomic needs. The currency swap agreement between the People's Bank of China and the Central Bank of Argentina served as a pillar of cooperation. Established in 2009 and renewed on several occasions, the mechanism reached a line equivalent to approximately US$18,5 billion and included the activation of a US$5 billion tranche renewed during the administration of Javier Milei. The continuity of this mechanism reflects China's relevance as a source of external liquidity and financial support for Argentina's macroeconomic stability.[30]

Under the Milei, that framework faces new political limits. His government has explicitly pursued closer ties with Washington, reinforced by the US$20 billion financial agreement with the United States and its ideological affinity with U.S. conservative sectors. This orientation aims to reinsert Argentina within the economic and geopolitical orbit of the United States.[31]

However, the political shift has not entailed an interruption of Chinese energy, mining and infrastructure projects. Many continue to move forward with long-term contracts, well-established business partnerships and provincial actors interested in sustaining investments capable of generating jobs, exports and foreign exchange. This logic could also be extended to new projects linked to natural gas, including initiatives to develop liquefaction capacity and LNG exports from Vaca Muerta, in which Asia—and potentially China—are among the main destination markets.[32] The relationship with China, therefore, does not disappear with the change in political alignment; it is transformed.

The key point is that the Sino-Argentine energy relationship operates less and less as a strategic agenda directed by governments and increasingly as a transactional dynamic, conditioned by economic incentives, regulatory frameworks and market opportunities. This transition marks a significant departure from the model that prevailed during the 2010s, especially during Cristina Fernández de Kirchner's second term, when the relationship with China was more closely tied to bilateral agreements, concessional financing and negotiated infrastructure between states.[33]

The creation of the Large Investments Incentive Regime (Régimen del Incentivo para Grandes Inversiones, RIGI) in 2024 deepens this transformation. The regime offers tax, customs and currency benefits, as well as guarantees of regulatory stability for large-scale projects in sectors such as mining, energy, hydrocarbons and infrastructure, areas where Chinese companies already have a consolidated presence.[34] In fact, projects linked to Chinese capital, such as the Cauchari-Olaroz expansion operated by EXAR, have already obtained the approval of the tax regime.[35] From this perspective, the RIGI does not exclude Chinese capital; on the contrary, it can provide it with an even more favorable framework provided that its investments conform to the economic logic of the new government.

This dynamic helps explain the apparent paradox of Milei's foreign policy: A government that is geopolitically aligned with the United States can,[36] at the same time, preserve or even expand spaces for Chinese capital in strategic sectors. The key lies the convergence between the interests of Chinese companies, the fiscal and external needs of Argentina, and an economic policy aimed at attracting private investment without necessarily discriminating on the basis of national origin.

On energy matters, this approach clearly favors an agenda focused on the exploitation of hydrocarbons and on the infrastructure needed to expand natural resource exports. While the government has not formally abandoned the renewable energy incorporation targets, it has promoted deregulation measures that reduce state support instruments and has allowed part of the incentives that underpinned the sector's growth over the last decade.[37]

For example, according to the draft Budget Law 2026, subsidies to the supply of hydrocarbons reach ARS 651,600 million, while the budget items linked to renewable energies and the Fund for the Development of Renewable Energies total ARS 37,075 million. In other words, resources allocated to renewables equate to just 5.7% of those allocated to the hydrocarbon sector, a budget disparity consistent with the government's priority on hydrocarbon development.[38]

What distinguishes the Argentine case in this study is not simply macroeconomic instability or dependence on hydrocarbons, traits that it shares in varying degrees with other countries analyzed. What is distinctive about Argentina lies in the gap between the instruments it has built to boost the energy transition and its ability to sustain them over time.

The country has a strong regulatory framework, abundant renewable resources and institutional expertise in energy transition, but these advances have been subject to shifts in political direction that drive them forward, slow them down or even reverse them depending on the government in office. This discontinuity raises questions about the feasibility of Argentina's climate commitments, particularly in a context where the expansion of oil and gas exports is central to the economic growth strategy.

As a result, the Chinese presence will likely continue to respond more to concrete opportunities than to a long-term strategy. Progress is likely where there are conditions of profitability, regulatory certainty or urgent needs for financing and foreign currency, regardless of whether projects contribute to the energy transition or strengthen the existing fossil fuel-based matrix.

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BRAZIL

Energy / capita	Electricity / capita	CO2 / capita	Electrification rate
18,486 kWh	**2,916 kWh**	**1.97 Mtoe**	**99.8%**
Source: Our world in data	Source: IEA	Source: IEA	Source: World Bank
Year: **2024**	Year: **2024**	Year: **2024**	Year: **2024**

Table 6

ENERGY SUPPLY — IMPORTS

Total: **67.366 Ktoe** · Year: **2024** · Includes primary and secondary energy sources

Oil	13,375 Ktoe · 19.85%	Metallurgical/thermal coal	11,921 Ktoe · 17.70%
Diesel	10,870 Ktoe · 16.14%	Natural gas	7,105 Ktoe · 10.55%
Other oil products	5,736 Ktoe · 8.51%	Naphtha (petrochemical feedstock)	4,967 Ktoe · 7.37%
Uranium	3,962 Ktoe · 5.88%	Gasoline	2,110 Ktoe · 3.13%
Liquefied petroleum gas (LPG)	2,063 Ktoe · 3.06%	Non-energy oil products	1,809 Ktoe · 2.69%
Electricity	1,212 Ktoe · 1.80%	Coal coke	1,200 Ktoe · 1.78%
Kerosene	921 Ktoe · 1.37%	Fuel oil	59 Ktoe · 0.09%
Ethyl alcohol	56 Ktoe · 0.08%		

Brazil imports ~67.366 Ktoe of energy per year and exports ~107.006 Ktoe, making Brazil a net energy exporter, 2024.
Source: Ministério de Minas e Energia - Balanço Energético Nacional Ano base 2024.

GOVERNANCE AND ENERGY POLICY

Brazil, home to most of the Amazon and with more than 210 million people, holds a prominent position in the global debate on the energy transition. Out of the six countries analyzed in this study, Brazil has the most advanced energy system in terms of incorporating renewable sources and attracting investment in clean technologies. At the same time, the large size of its economy and industrial base, together with its significant oil and gas production, make the Brazilian energy transition a particularly complex case.

The Brazilian experts interviewed agreed that the government currently maintains an active agenda to modernize and decarbonize its energy matrix, driven by both climate goals and industrial-policy and energy-security strategies.[1] At the domestic level, for example, the New Industry Brazil (Nueva Industria Brasil, NIB) initiative seeks to promote sustainability, technological innovation and green reindustrialization. Its goals include increasing the share of biofuels and electrification in the transport energy matrix by 50% by 2033.[2] On the international stage, Brazil has consolidated itself as one of the main regional spaces for the discussion of public policies related to climate change and renewable energies, hosting regular summits, forums and high-level multilateral meetings, such as the COP30 held in Belém in 2025.[3]

Within this broader energy-transition agenda, biofuels occupy a particularly prominent role. A global pioneer and leader in their development and deployment, Brazil has made biofuels a central and distinctive component of its energy strategy. Since the creation of the National Alcohol Program (Proálcool) in 1975, launched in response to the oil crises of the 1970s, Brazil has developed a sustained policy aimed at reducing dependence on imported fuels, strengthening energy security and promoting domestic production chains linked to the agricultural sector. The expansion of flex-fuel vehicles in the 2000s, mandatory ethanol and biodiesel blending requirements and the consolidation of a broad agro-industrial chain reinforced this model, which simultaneously integrates the goals of energy sovereignty, agricultural development, industrial policy and emissions reduction.[4]

More recently, initiatives such as RenovaBio[5] and the Fuel of the Future Law (Ley del Combustible del Futuro)[6] have deepened this trajectory through incentives for lower-carbon-intensity sources and new decarbonization targets for sectors such as aviation and heavy transport. On the whole, this evolution has placed Brazil in an unusual position at the international level, since biofuels do not play a merely complementary role within its energy matrix, but have instead become a structural pillar with strategic implications for the economic development and competitiveness of the country.

Brazil's ability to attract capital to sectors linked to the energy transition has also gained global relevance. According to Bloomberg Energy Transition Investment Trends 2025, Brazil was the world's seventh-largest energy-transition investment destination in 2024, with an influx of US$ 37.1 billion and comprising the leading market in Latin America in this area.[7] This highlights the international perception of Brazil as a stable energy power with great potential for renewable expansion.

However, Brazil's positive international image tends to hide significant structural tensions. Although its electricity matrix is one of the cleanest in the world, the total energy matrix is significantly dependent on fossil fuels. At the same time, a substantial share of Brazilian emissions originates outside the energy sector, particularly from agriculture and land-use change, both closely linked to the expansion of agribusiness and central to international concerns over the country's environmental performance. This twofold contradiction stems in part from the economic and political weight in the country of both the hydrocarbon sector and the agro-export complex.

Petrobras, the Brazilian state-owned oil and gas company, together with international partners such as Shell and Repsol Sinopec, are key actors in the country's energy supply and economic planning.[8] Although its direct economic weight is equivalent to approximately 17%

of Brazil's industrial GDP, the hydrocarbon sector maintains a significant influence in terms of its contribution to exports, employment, royalties, and tax revenues.[9]

Most of the Brazilian specialists consulted indicated that actors linked to oil, gas and coal defend interests aimed at prolonging the life cycle of fossil fuels.[10] Among the most frequent strategies, they identified attempts to loosen environmental regulations, weaken oversight mechanisms and promote subsidies or contracts favorable to thermal generation, particularly during legislative debates related to offshore wind energy.[11] Several of them also described vested interests within the Ministry of Mines and Energy as "developers," prioritizing oil and thermal generation over renewable energies.[12]

Unions linked to the oil, petrochemical and coal industries have also expressed concern about the potential impacts of the energy transition on workers. Rather than opposing the expansion of renewable energy, they often demand just transition mechanisms that include job protection, worker retraining and worker participation in the design of energy policies.[13]

In addition to these tensions, interviews revealed that energy-transition projects themselves can also generate significant social and environmental risks.[14] Large hydroelectric dams have historically caused the displacement of indigenous and riverbank communities snf the flooding of forests and disruption of ecosystems.[15] Similarly, logging associated with forest plantations has contributed to processes of deforestation and land grabbing, generating conflicts with small farmers and traditional communities.[16]

More recently, research on the expansion of large-scale wind and solar projects has warned that these technologies can also intensify land disputes through processes of appropriation and privatization of territories previously used by rural and traditional communities.[17] As noted by several Brazilian specialists,[18] These impacts have fueled resistance from social movements such as the Landless Rural Workers Movement (Movimento dos Trabalhadores Rurais Sem Terra, MST),[19] reinforcing the need for renewable expansion to be accompanied by mechanisms capable of mitigating its social and territorial costs.

Although Brazil has developed robust environmental regulatory frameworks—the Brazilian Forest Code is often cited as an international reference—[20] its implementation tends to be lax and inconsistent. According to the Brazilian Forest Service, only 3.3% of the property registrations required by the Forest Code had been fully reviewed between 2012 and 2024.[21] This gap reflects chronic limitations of operational and financial capacity within regulatory bodies. Additionally, the interviews reveal that governance risks are not limited to problems of state capacity, but include corruption, low transparency and a long history of infrastructure megaprojects marked by cost overruns, inefficiency and deterioration of public confidence.[22]

Finally, Brazil's energy landscape is also shaped by its relatively closed and historically protectionist economy, which remains less integrated into international trade than many of its Latin American peers.[23] Rather than seeking only to attract foreign investment or import technology at competitive prices, Brazil also uses sectors associated with the energy transition as tools for industrialization and the strengthening of domestic manufacturing. The promotion of biofuels as a state policy is a clear example of this.

The nuclear factor

Alongside Argentina, Brazil possesses one of Latin America's most developed and diversified nuclear programs, while the breadth of its technological capabilities and ambitions arguably makes it the region's leading civil nuclear power. In Brazil, beyond its potential as a source of low-emission electricity generation, nuclear energy has historically been conceived as a tool for energy security, industrial development and technological autonomy.[24] Its current configuration began to take shape during the 1970s, when oil crises spurred a long-term strategy aimed at developing national capacities in areas such as uranium enrichment, fuel manufacturing and nuclear research.[25]

In the context of the energy transition, nuclear energy has regained relevance as a firm, low in emission source complementary to a highly renewable electricity matrix, but vulnerable to droughts and hydrological variability. The National Energy Plan 2050 contemplates nuclear expansion scenarios of approximately 8 to 10 GW by mid-century, including the completion of the Angra 3 nuclear power plant, the evaluation of new reactor sites and the possible future incorporation of small modular reactors.[26] In parallel, the Brazilian government has set the goal of strengthening the entire nuclear chain, from mining and uranium enrichment to fuel manufacturing and electricity generation.[27]

However, the nuclear sector also reproduces several of the governance problems identified in other segments of Brazil's energy infrastructure. The Angra 3 nuclear power plant, whose construction began in the 1980s, has accumulated decades of interruptions, cost overruns, institutional disputes and questions about its economic viability. This is compounded by regulatory, financial and social challenges related to nuclear safety, radioactive waste management and public trust.[28]

ENERGY MATRIX

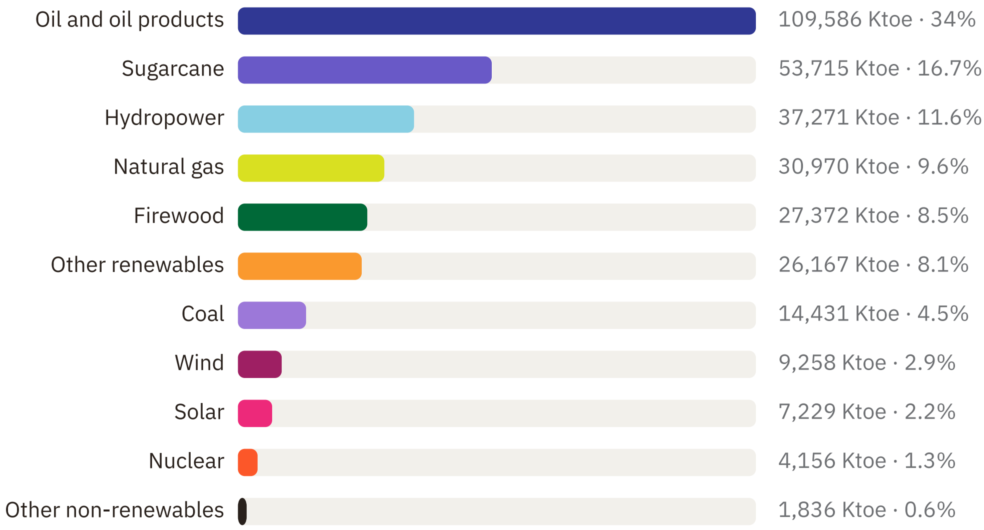
*The data and percentages used in this section are drawn from **Tables 7** and **8**.*

Table 7

TOTAL PRIMARY ENERGY SUPPLY (TPES) — 2024

Total: **321.991 Ktoe**

Defined as domestic production plus imports minus exports (and, where available, adjusted for stock changes and international bunkers).



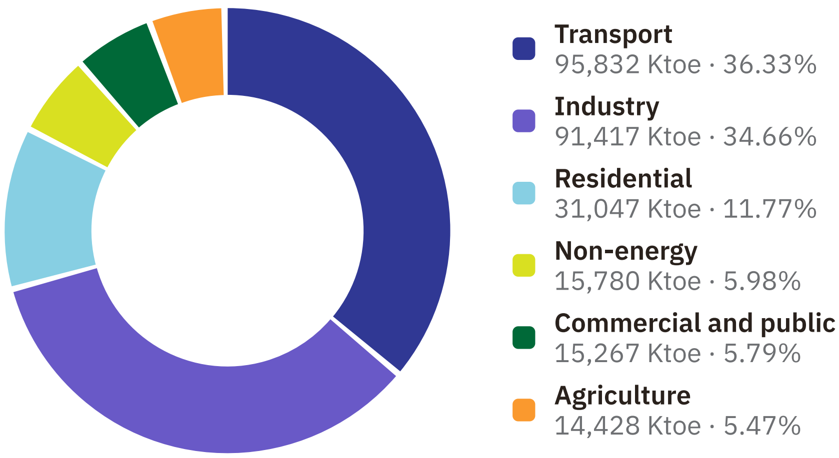
Source: Author's calculations based on data from Ministério de Minas e Energia - Balanço Energético Nacional.
Notes:
- Hydropower: Includes electricity imports originated from hidraulic sources.
- Firelwood: Includes Firewood and charcoal.
- Coal: Includes Mineral coal and coke.
- Other non-renewables: "Other non-renewables" is a residual basket for minor fossil fuels and secondary products not captured in the main categories (oil, natural gas, coal, uranium).

Table 8

ENERGY USE DISTRIBUTION — 2024

Total: **263.771 Ktoe**

Energy delivered to end-use sectors only. It excludes the energy consumption by the energy industry itself in conversion and processing activities.



Source: Author's calculations based on data from Ministério de Minas e Energia - Balanço Energético Nacional.
Notes:
- Non-energy: Use of energy products as raw materials rather than for energy purposes.

The Brazilian energy matrix has a balanced composition compared to international standards. In 2024, approximately half of the total primary energy supply came from renewable sources, making Brazil the country with the highest share of clean energy among the six cases analyzed in this study. This attribute is particularly significant considering the scale of the Brazilian economy and the weight of an industrial base dependent on high levels of energy consumption. In contrast to other large Latin American economies with substantial industrial sectors, such as Mexico, whose energy matrix is overwhelmingly dominated by oil and gas (~85%),[29] Brazil has developed a more diversified energy matrix that is considerably less dependent on hydrocarbons.

Still, petroleum derivatives made up 34% of the matrix, while natural gas contributed around 9.6%. Hydrocarbon consumption is concentrated mainly in the transport and industrial sectors, which accounted for approximately 36.3% and 34.7% of the final energy demand, respectively.

Biomass also played an important role, representing 33.3% of the total primary energy supply, a share far higher than that observed in other economies of the region and comparable—among the countries analyzed—only to that of Chile. Sugarcane-derived products alone contributed 16.7% of the national energy supply, a reflection of more than five decades of state promotion of biofuels.

The rest of the renewables presented smaller shares, although significant. Hydroelectricity covered approximately 11.6% of the primary energy matrix. Fuelwood and charcoal contributed 8.5% of the total energy supply, a reflection of its use in rural areas and in industrial sectors such as steel. In recent years there has also been an expansion of biodiesel, biogas and solar energy. For its part, nuclear energy contributed about 1.3% of the total energy supply.

Unlike many countries, where the energy transition is concentrated mainly in the electricity sector, the Brazilian experience shows a broader diversification of renewables, including fuels capable of replacing oil products directly in transport, such as biofuels.

Brazil also has significant geographical advantages to continue expanding renewable energies. The potential wind capacity far exceeds what is currently installed, and solar expansion is favored by its geographical location and its extensive territory.

In general terms, the composition of the Brazilian energy structure suggests that, since the country already has a clean electricity matrix, the main margins for deepening decarbonization are concentrated outside the electricity sector. Transport represents the main bottleneck, while electrifying the industry and developing new technology chains emerge as central challenges for the coming decades.

ELECTRICITY MATRIX

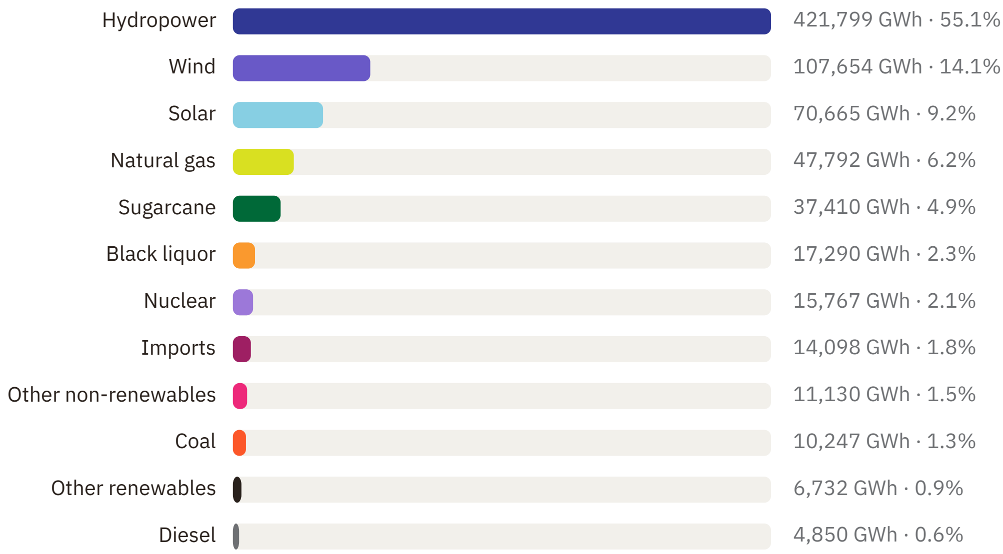
*The data and percentages used in this section are drawn from **Tables 9** and **10**.*

Table 9

ELECTRICITY SUPPLY SOURCES — 2024

Total: **765.434 GWh**

Grid-delivered electricity disaggregated by primary generation source.

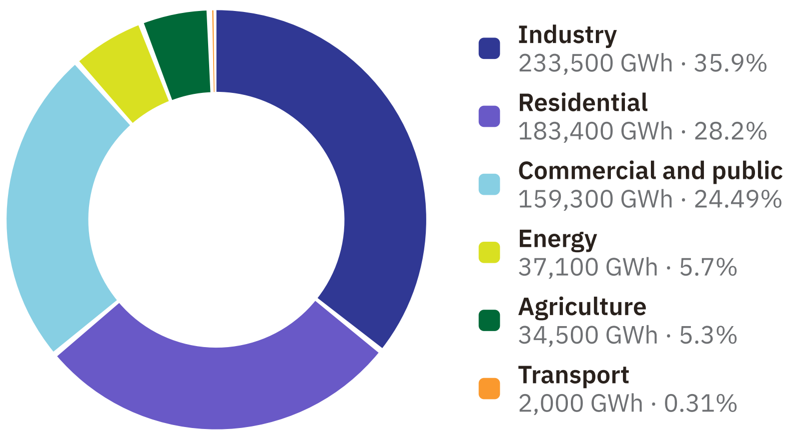


Source: Author's calculations based on data from Ministério de Minas e Energia - Balanço Energético Nacional.
Notes:
- Imports: Paraguay (Itaipú), Argentina, Uruguay y Venezuela.
- Other non-renewables: Fuel oil, coke oven gas, other secondary fossil fuels/products, small unclasified fossil energy flows.
- Coal: Includes steam coal.
- Other renewable: Biodiesel, biogas, other solid biomass products not covered elsewhere.

Table 10

ELECTRICITY USE DISTRIBUTION — 2024

Total: **650.400 GWh**



Source: Author's calculations based on data from Ministério de Minas e Energia - Balanço Energético Nacional.

In 2024, approximately 86% of electricity generation came from renewable sources, the highest proportion among G20 countries. Hydroelectricity was the central pillar of the system, providing 55.1% of the total generation. Wind (14.1%) and solar (9.2%) have expanded rapidly over the last decade, while biomass played a significant role thanks to the energy use of agricultural by-products. Fossil fuels played a limited role, led by natural gas (6.2%).

Brazil's electricity consumption patterns reflect the size and diversification of its economy.

Industry accounted for the largest share of demand, with 35.9% of total consumption, followed by the residential sector (28.2%) and the commercial sector (17.1%). Brazil also showed significant shares in agriculture (5.3%), public sector (7.4%) and energy activities (5.7%), reflecting an electricity demand distributed across multiple productive and service segments. Transport, on the other hand, accounted for just 0.3% of the electricity consumption, showing that the electrification of transport remained marginal. This configuration suggests that Brazil's electrification potential is not concentrated in a single sector, but in the gradual expansion of electrical uses in transport, agro-industry, urban services and industrial processes, based on an already broad and diversified demand base.

This structure is the result of strategic decisions taken since the 1970s, when Eletrobras, backed by a favorable regulatory framework, promoted the large-scale construction of hydroelectric dams, making use of the country's extensive river basins.[30] Several interviewees indicated that this historical dependence on hydroelectricity is mainly due to geographical and economic factors rather than environmental considerations.[31]

However, like other South American countries with a high hydroelectric share, Brazil remains vulnerable to droughts and hydrological variations. The electricity crisis of 2001–2002 exposed these risks and prompted a strategy to diversify the matrix, including the launch of the Alternative Electricity Sources Incentive Programme (PROINFA) in 2002 to promote investments in wind energy, biomass and small hydroelectric plants.[32]

During the 2000s and 2010s, competitive renewable energy auctions helped unlock the extraordinary wind potential of Brazil's northeast, a process that accelerated as the costs of wind and solar technologies declined.[33] Solar expansion received an additional boost through the ANEEL Resolution 482/2012 (2012), which created a net-metering system for distributed generation and facilitated the rapid growth of residential and commercial photovoltaic installations.[34]

Today, solar energy is one of the fastest-growing segments in installed capacity. The combination of regulatory incentives, abundance of natural resources and reduced technological costs has allowed a sustained expansion of variable renewables within the Brazilian electricity system.

The result is an exceptionally clean and progressively more diversified electricity system. Although hydroelectricity dominates generation, the expansion of wind, solar, biomass and nuclear energy (in process) has reduced systemic vulnerabilities and expanded the country's renewable base.

CHINA'S ROLE

Beginning in the 2010s, China gradually became one of the most important players in Brazil's energy sector, driven by large-scale investments led by Chinese state-owned enterprises and policy banks.[35] Today, its participation extends along the entire energy value chain, from electricity generation, transmission and distribution, to equipment manufacturing and low-emission transport, cementing Brazil as China's leading energy partner in Latin America.

Brazil has become an attractive destination for Chinese investment tied to the energy transition and low-emission manufacturing. The combination of a broad consumer base, a predominantly renewable electricity matrix and industrial policies aimed at strengthening domestic manufacturing, such as New Industry Brazil (NIB), [36] has increased the country's appeal to Chinese companies seeking to expand value chains linked to renewable energy, electric mobility and decarbonization technologies.[37] This alignment of interests has contributed to the sustained growth of Chinese investment in sectors considered strategic to Brazil's energy transition and helps explain the growing presence of Chinese companies in higher-value-added manufacturing activities.

Most of the Brazilian specialists interviewed agreed that international cooperation is essential for Brazil's energy transition. However, they also warned that excessive dependence on a single external partner, such as China, generates strategic vulnerabilities and limits the country's technological and industrial autonomy.[38]

Chinese state-owned enterprises have acquired particularly significant positions in critical infrastructure. State Grid and China Three Gorges have substantial holdings in major hydroelectric generation and electricity transmission and distribution assets. Brazil has also become a key destination for the international expansion of both companies, accounting for most of their energy assets outside China.[39] For example, State Grid currently operates some of the largest ultra-high voltage lines in the country, connecting renewable-rich regions of the north and northeast with the major industrial centers of the Brazilian southeast.[40] This gives a Chinese state-owned company a structural presence in one of the most sensitive and strategic sectors of the national energy system.

Interviewees noted that these investments have helped expand connectivity and transmission capacity efficiently.[41] At the same time, they also raised questions about supervision, the concentration of ownership of critical infrastructure and long-term technological dependence.

In the renewable sector, China's participation is mainly concentrated in manufacturing and technology supply. Although Brazil has made progress in regulatory frameworks and renewable energy expansion, it still faces difficulties developing local manufacturing capacities that accompany the energy transition. The limited domestic industrial capacity in solar components and energy storage appears as one of the main vulnerabilities identified by the interviewees.[42]

This situation has generated significant opportunities for complementarity with Chinese investments, particularly in sectors linked to renewable energy, storage and electric mobility. In fact, the industrial decarbonization and green reindustrialization goals promoted by the New Industry Brazil (NIB) initiative coincide with areas where Chinese companies have significantly increased their presence in recent years.

Chinese financial institutions have also played a decisive role. For example, China Development Bank, Industrial and Commercial Bank of China and Bank of China have provided credit lines on highly competitive terms,[43] reducing risks for Brazilian partners and allowing Chinese companies to compete aggressively in energy auctions.

The electrification of transport is another growing area of cooperation between Brazil and China. BYD began domestic production of electric vehicles in 2025 at the Camaçari plant in Bahia, with an estimated capacity of 300,000 vehicles per year,[44] while Great Wall Motors (GWM) openned a plant in the state of São Paulo with an initial capacity of 50,000 vehicles per year with plans to expand to 100,000.[45] Several interviewees pointed out that these investments have both an energy and an industrial dimension, as electric vehicles could redefine the future of the Brazilian automotive industry in a context of global transformation of supply chains.[46]

In turn, Chinese diplomacy complements the expansion of its companies in the country. The China-Brazil High-level Coordination and Cooperation Committee (COSBAN), created in 2004, is the main mechanism for dialog between the two governments and plays an important role in coordinating strategic projects and promoting investment. Through subcommittees dedicated to economic, financial, trade and environmental issues, COSBAN facilitates coordination between public and private actors and helps identify priority areas for bilateral cooperation.[47]

Hydrocarbons have also been central to bilateral economic ties. In the first quarter of 2026, Brazilian oil exports to China reached record levels, driven by rising offshore production and disruptions to supply lines in the Middle East. [48] This continued expansion underscores the role of oil in Brazil-China relations even as Brazil advances its climate agenda and energy transition.

At the same time, China's growing presence in strategic sectors of the Brazilian economy has also raised concerns over governance, regulatory oversight and social and environmental sustainability.

The Belo Monte dam is emblematic of these challenges. Located in the Amazon, the project was promoted by the Brazilian government as a major component of the country's energy infrastructure and was later connected to transmission lines operated by the state-owned State Grid Corporation of China. Its construction and associated infrastructure generated considerable controversy over the displacement of local communities,[49] forest flooding, ecosystem disruption and shortcomings in the environmental licensing process.[50] Social and environmental organizations also alleged that political pressure to accelerate the project weakened consultation mechanisms and regulatory oversight.[51]

More recently, labor and regulatory disputes have also emerged. The most visible case has been the construction of the BYD electric vehicle plant in Bahia, where Brazilian labor prosecutors denounced "slavery-like" conditions for hundreds of Chinese workers subcontracted by construction companies linked to the project, including alleged excessive working hours, passport confiscation, restrictions on movement, and degrading housing conditions.[52] This episode has garnered attention from authorities, reinforcing public concerns about regulatory capacity, state oversight, and compliance with labor standards in large-scale projects linked to foreign capital.

Taken as a whole, Brazil represents one of the deepest and most complex cases of Chinese participation in South America's energy transition. Unlike in many other countries in the region, Brazil's relationship with China extends beyond economic ties to a broader agenda of political cooperation, reflected in forums such as BRICS and in shared positions on global governance reform, stronger multilateralism and reduced dependence on Western-dominated financial institutions. This depth of engagement also presents Brazil with a strategic dilemma. The same industrial, technological and financial capabilities that make China an increasingly important partner may also complicate Brazil's efforts to develop its own technological capabilities, strengthen domestic industry and achieve greater productive autonomy.

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CHILE

Energy / capita	Electricity / capita	CO2 / capita	Electrification rate
26.245 kWh	**4.303** kWh	**3,6** Mtoe	**100%**
Source: Our world in data	Source: IEA	Source: IEA	Source: World Bank
Year: **2024**	Year: **2024**	Year: **2024**	Year: **2024**

Table 11

ENERGY SUPPLY — IMPORTS

Total: **27.734 Ktoe** · Year: **2024** · Includes primary and secondary energy sources

Oil	9,765.6 Ktoe · 35.21%	Diesel	6,972.5 Ktoe · 25.14%
Natural gas	4,681.3 Ktoe · 16.88%	Coal	3,021.7 Ktoe · 10.90%
Liquefied petroleum gas (LPG)	1,700.1 Ktoe · 6.13%	Gasoline	717.8 Ktoe · 2.59%
Kerosene	674.6 Ktoe · 2.43%	Naphtha	142.1 Ktoe · 0.51%
Fuel oil	58.6 Ktoe · 0.21%		

Chile imports ~27.735 Ktoe of energy per year and exports ~1.770 Ktoe, making Chile a net energy importer, 2024.
Source: Energía abierta Chile.

GOVERNANCE AND ENERGY POLICY

Among the countries analyzed, Chile stands out for combining a long-standing liberalized energy market with one of the most advanced and legally binding climate frameworks in South America. Among these regulations, the 2022 Framework Law on Climate Change (Ley Marco de Cambio Climático)[1] is one of the pillars of this institutional framework. The law commits the country to achieving carbon neutrality by 2050 and establishes obligations to incorporate the climate variable in the design and implementation of public policies at different levels of the State.[2] On decarbonization, the framework is reinforced by the 2021 Energy Efficiency Law (Ley de Eficiencia Energética)[3] and the coal phase-out plan,[4] which targets a full shutdown of coal-fired plants by 2040 and has already taken several units offline. This legislative base has helped maintain continuity among governments of different political orientations and to consolidate Chile's reputation as a stable and favorable environment for investment in renewable energies.

Institutions are a defining feature of Chile's regulatory framework. The Ministry of Energy leads long-term planning;[5] the National Energy Commission (CNE) defines policies and tariffs;[6] and the National Electricity Coordinator (CEN) operates the grid and manages electricity dispatch.[7] Together, these entities provide a degree of technocratic isolation from political cycles and have made it possible to implement competitive tenders that significantly reduced the costs of solar and wind energy. In parallel, CEN has promoted expansion studies aimed at strengthening the transmission infrastructure needed to integrate variable renewable energies nationwide.[8]

At the international level, Chile has aligned its energy strategy with multilateral climate frameworks. The country has incorporated the deployment of renewable energy, storage and energy efficiency as pillars of its climate policy, reflected both in its Nationally Determined Contribution (NDC) under the Paris Agreement and in its Long-Term Climate Strategy 2050.[9] Chile's role in the Powering Past Coal Alliance and its leadership at COP25 underscore the country's commitment to the energy transition and global climate governance.

In the energy agenda, green hydrogen (GH2) has emerged as one of the country's main bets. Launched in May 2024, the Green Hydrogen Action Plan 2023–2030 outlines 81 measures to help Chile produce green hydrogen at competitive prices by 2030, rank among the top three global exporters by 2040, and install 5 GW of renewable capacity for electrolysis by 2025.[10] As for the destination of future green hydrogen exports by sea and in the form of ammonia, the Chilean government is cooperating mainly with European partners, with the ports of Rotterdam and Hamburg being the privileged destinations.[11]

Nonetheless, numerous studies have noted that the pace of implementation has been slower than initially expected, particularly with regard to port infrastructure, financing, high production costs under current technology, and the development of commercial-scale projects.[12] Much of this strategy is concentrated in the region of Magallanes, in the extreme south of the country, whose world-class wind resources are estimated to generate up to 13% of the global supply of green hydrogen.[13]

Broadly speaking, the main challenges Chile faces in its energy transition seem to be less related to governance than to the structural characteristics of the energy system itself. Chile's elongated geography, the distance between major generation and consumption centers, its more limited hydroelectric availability compared to several South American peers, and its strong dependence on imported hydrocarbons all shape national energy security. These structural constraints make the expansion of transmission infrastructure and the deployment of renewable sources core necessities of the country's energy strategy, contributing simultaneously to decarbonization goals and to reducing vulnerabilities associated with dependence on imported fuels.

ENERGY MATRIX

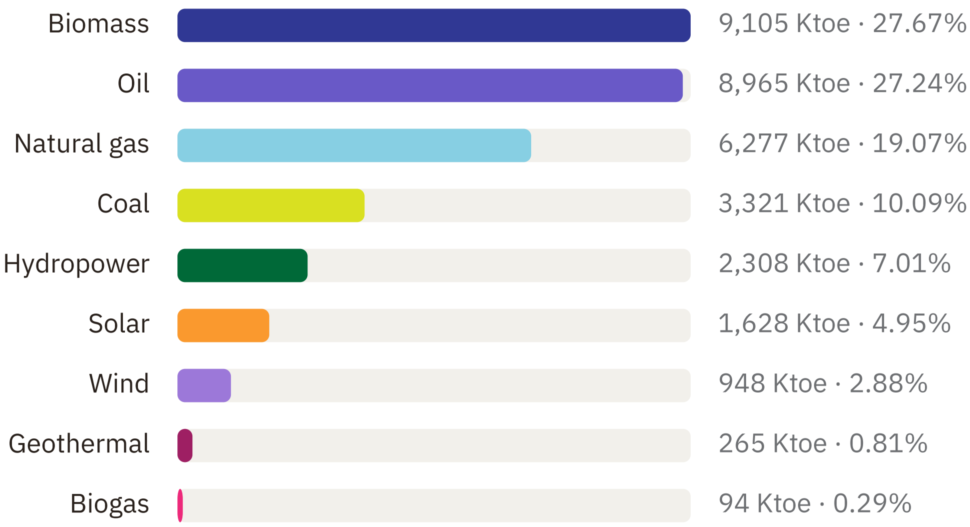
*The data and percentages used in this section are drawn from **Tables 12** and **13**.*

Table 12

TOTAL PRIMARY ENERGY SUPPLY (TPES) — 2024

Total: **32.911 Ktoe**

Defined as domestic production plus imports minus exports (and, where available, adjusted for stock changes and international bunkers).



Source: Author's calculations based on data from Comisión Nacional de Energía - Balance de Energía.
Notes:

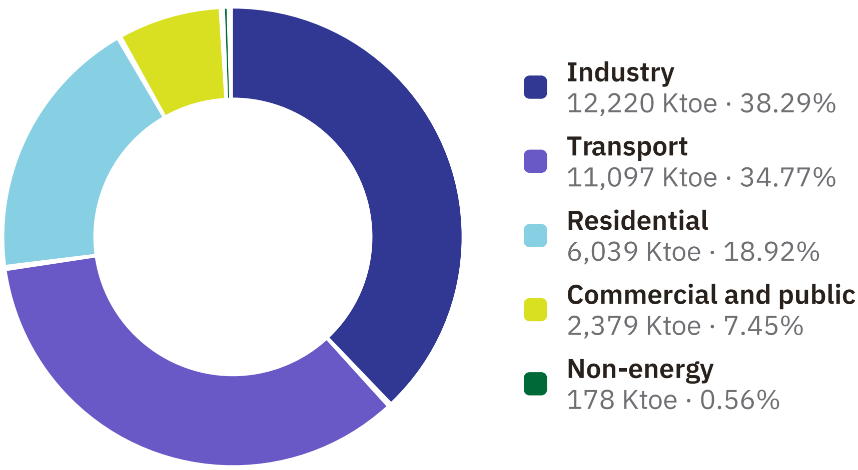
- The category Biomass includes black licor and biomass pellet.
- Biogas: Produced from anaerobic digestion of organic matter (agro-waste, landfills, sewage).

Table 13

ENERGY USE DISTRIBUTION — 2024

Total: **31.913 Ktoe**

Energy delivered to end-use sectors only. It excludes the energy consumption by the energy industry itself in conversion and processing activities.



Source: Author's calculations based on data from Comisión Nacional de Energía - Balance de Energía.
Notes:

- Official statistics in Chile do not have an independent category for "Agriculture", it is included in "Industry".

Despite its strong environmental regulations, Chile's matrix is still dominated by fossil fuels. In 2024, oil was the main component at 27.2%, followed by natural gas at 19.1% and coal at 10.1%. This composition reflects Chile's strong structural dependence on imported hydrocarbons, resulting from the limited availability of national oil and gas reserves.

Renewable sources, in turn, accounted for just over 40% of the primary energy matrix. Biomass was the main contributor, combining traditional fuels such as fuelwood and charcoal with industrial byproducts like black liquor, together representing 27.7% of total supply. Along with Brazil, Chile stands out among the six focus countries for the structural weight that biomass maintains within its energy matrix. Hydroelectricity contributed 7%, while solar (5%) and wind (2.9%) maintained modest shares within the primary matrix, despite their rapid growth in the electricity sector. Geothermal and biogas were marginal, with less than 1% each.

On a different note, sectoral consumption patterns help explain the divergence between a low-emission electricity matrix and an energy matrix that is still fossil-fuel-intensive. The industry accounted for the largest share of final energy consumption (38.3%), driven mainly by mining, cement and steel activities that require coal and natural gas for high temperature processes.

Unlike the other countries in this study, where the transport sector was the main consuming sector, in Chile energy demand was led by industrial activity. This configuration reflects the weight of mining within the Chilean economy. As the world's leading copper producer and second-largest lithium producer,[14] after Australia, Chile concentrates a significant share of its energy demand in energy-intensive extractive and industrial activities, many of which supply critical inputs for the supply chains of the global energy transition.

Transport was the second-largest consuming sector (34.8%), holding a strong dependence on imported diesel and gasoline. Although the residential sector had a lower share of total consumption (18.9%), the widespread use of liquefied petroleum gas (LPG) and biomass for heating and cooking played a significant role in the country's energy demand. Finally, the commercial and public sectors accounted for 6.2% and 1.3% of final consumption, respectively.

For Chile, the path toward a low-emission energy matrix runs mainly through the transformation of the transport and industry sectors, which make up most of the country's fossil fuel consumption.

ELECTRICITY MATRIX

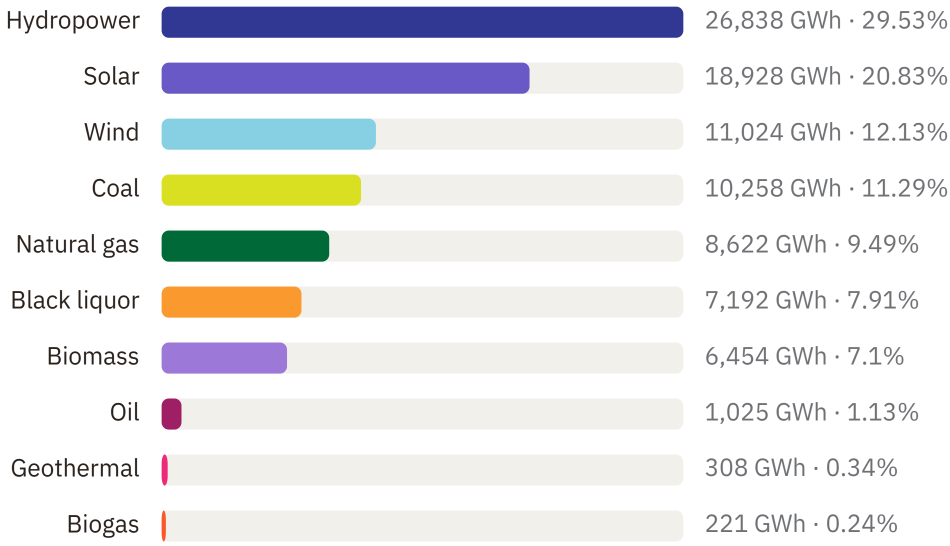
*The data and percentages used in this section are drawn from **Tables 14** and **15**.*

Table 14

ELECTRICITY SUPPLY SOURCES — 2024

Total: **90.872 GWh**

Grid-delivered electricity disaggregated by primary generation source.

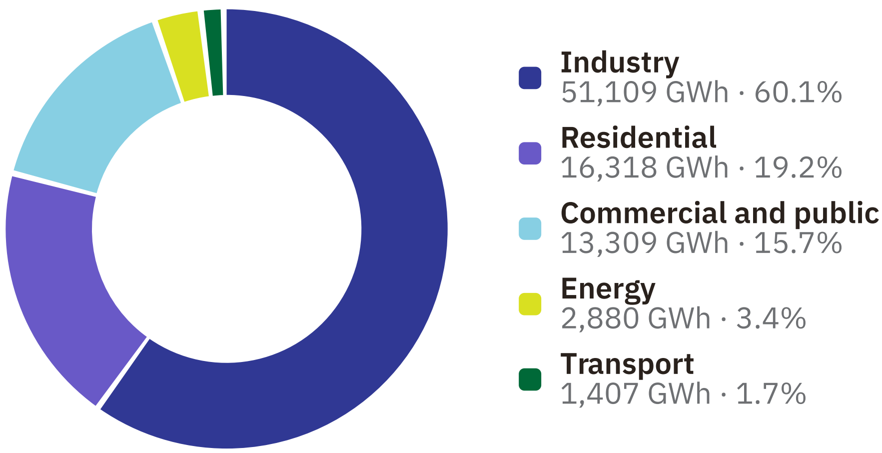


Source: Author's calculations based on data from Comisión Nacional de Energía - Balance de Energía.
Notes:
- Oil: Refined petroleum fuels, including diesel, fuel oil, liquefied petroleum gas (LPG), and other minor liquid hydrocarbons.

Table 15

ELECTRICITY USE DISTRIBUTION — 2024

Total: **85.023 GWh**



Source: Author's calculations based on data from Comisión Nacional de Energía - Balance de Energía.
Notes:
- Official statistics in Chile do not have an independent category for "Agriculture".

Chile has built one of the electricity systems with the highest share of renewable energy in the world, despite lacking the ample hydroelectric endowment that characterizes many of its regional peers. In 2024, 78.1% of the electricity delivered to the grid came from renewable sources, led by hydroelectricity (29.5%), solar energy (20.8%) and wind energy (12.1%), followed by black liquor (7.9%), biomass (7.1%), geothermal energy (0.34%) and biogas (0.24%). Fossil fuels accounted for just over a fifth of electricity generation, mainly from coal (11.3%) and natural gas (9.5%), while petroleum derivatives maintained a marginal share of less than 2%.

Chile's electricity consumption patterns reflect the weight of productive activities within the national economy. The industrial sector, which in official statistics also includes agricultural activities, accounts for 60.1% of total electricity demand, the highest proportion among the focus countries. The residential sector accounted for 19.2% of consumption, followed by the commercial and public sector at 15.7%, while transport accounted for just 1.7% of the electricity demand.

An advisor at G-Advisor in Chile noted that the country's progress on energy stems from public-policy decisions sustained across several consecutive governments.[15] Chilean governments have used competitive tenders, long-term contracts and clear grid-planning signals to attract private investment and accelerate renewable deployment.

The country's geography has also favored the development of non-hydroelectric renewables. The Atacama Desert's extraordinary levels of solar radiation, combined with strong wind corridors in the north and south of the country, allowed a rapid expansion of solar and wind generation (see Chapter 1, Figures 1 and 2). As a result, solar energy already exceeds gas and coal in electricity generation, although a decade ago its contribution to the system was virtually non-existent.[16]

This development has been particularly significant in the north of the country, where much of the Chilean mining activity is concentrated. The expansion of large-scale solar projects has created significant links between the energy sector and the mining industry, making the latter one of the main drivers of demand for renewable electricity.[17]

Meanwhile, wind energy, although still smaller in total generation, has expanded steadily and adds complementarity to the system at different times of the day and year, helping to diversify the electricity matrix.

Despite the rapid expansion of renewables, one of the main challenges for Chile's energy transition is electricity transmission infrastructure. The grid spans almost 3,000 kilometers, yet much of the solar and wind generation lies at the country's extremes, whereas electricity demand is concentrated in the central zone.[18] This configuration has led to recurrent problems of congestion, renewable energy spill and operational vulnerabilities in critical transmission corridors, a situation that has become evident during recent episodes of national power outages.

These limitations have shaped the pace of the energy transition. Although coal plants are being gradually withdrawn, the process has slowed down due to concerns about system reliability, keeping some units in strategic reserve status.[19] At the same time, natural gas plays a significant role as a source of backup and operational flexibility, helping to stabilize the electricity system and compensate for both the variability of renewable energies and the effects of periods of drought on hydropower generation.

CHINA'S ROLE

The involvement of Chinese companies in Chile's energy transition has expanded rapidly over the past decade, consolidating their presence in one of the most open, competitive and institutionally stable energy markets in Latin America. Chile combines strong regulatory frameworks, transparent tenders and diversified funding sources, limiting the ability of any foreign actor to dominate the sector. Within this environment, Chinese companies have established themselves as relevant actors in renewable generation, transmission, distribution and electrification of transport, mainly thanks to competitive costs, rapid implementation and attractive financing terms.

China's presence in Chile's energy sector has expanded across multiple segments, following two distinct modes of engagement. On the one hand, companies such as JA Solar and Goldwind are mainly involved as suppliers of equipment and technology for solar and wind projects, especially in northern Chile and the Atacama Desert. Moreover, companies such as SPIC, State Grid and China Southern Power Grid have strengthened their presence through the acquisition and operation of strategic generation, transmission and distribution assets, such as Pacific Hydro, CGE and Chilquinta. This differentiation reflects a broader pattern in which Chinese involvement combines integration into global renewable-technology supply chains with investments aimed at controlling and managing existing energy infrastructure.[20]

Moreover, transmission infrastructure has become one of the most strategic areas of Chinese participation in Chile. State Grid Corporation of China's acquisition of the Compañía General de Electricidad (CGE) gave China's state-owned company control over the country's largest private electricity distributor, with a presence in 14 regions and a share of more than 40% of the national distribution market.[21] The transaction also reflected the gradual replacement of European capital by Chinese capital in strategic segments of regional energy infrastructure, given that CGE was previously owned by the Spanish energy company Naturgy.[22]

The acquisition also triggered a broad public debate over the implications of a foreign state-owned company controlling a significant share of Chile's electricity infrastructure. The Chilean Consumers and Users Organization (ODECU) tried unsuccessfully to challenge the approval of the transaction by the National Economic Prosecutor's Office (FNE), while a group of deputies introduced a constitutional reform bill aimed at establishing mechanisms to review and oversee foreign investment in strategic sectors. In this sense, State Grid's acquisition of CGE marked one of the first episodes in which Chinese investment began to be discussed in Chile not only from an economic perspective, but also in terms of security, strategic autonomy and geopolitical considerations.[23]

Also worth mentioning is the Kimal–Lo Aguirre transmission line, developed by the Transelec consortium together with China Southern Power Grid.[24] Considered one of the most important electrical integration works in the country, the line seeks to resolve connection and distribution challenges between the areas of high solar generation in the north and the main urban and industrial hubs in central Chile, facilitating the incorporation of new renewable capacity into the national electricity system.[25] Several of the interviewees pointed out that this type of investment positions Chinese companies within particularly sensitive segments of Chile's energy infrastructure.[26]

In the electric mobility sector, there is also a significant presence of Chinese manufacturers, especially in urban public transport. The expansion of the electricity fleet in Santiago and some provincial cities has been associated with a wide range of Chinese companies, including Zhongtong, Yutong, King Long, BYD, Foton and Fencer. According to recent studies, in 2025, Zhongtong and Yutong jointly concentrated more than 70% of electric bus sales in Chile.[27]

On this point, 85% respondents directly linked electromobility to energy transition, while 71% identified China as the most influential foreign actor in this sector. They also noted that Chinese suppliers have been instrumental in the development of large-scale electrified public transport. At the same time, some interviewees warned that the increasing concentration of Chinese technology on buses, batteries and charging infrastructure could limit technological diversification and reduce space for local industrial development.[28]

Although Chinese companies play a significant role in Chile's energy sector, it is more diversified in terms of foreign participation than those of many neighboring countries. European companies such as Engie,[29] Celeo Redes[30] and Elecnor[31] maintain relevant positions in energy generation, transmission and infrastructure, while institutional investors such as the Dutch fund APG hold significant shares in some of the country's main transmission assets.[32] This diversity of investors helps to avoid excessive dependence on a single partner, even as Chinese companies expand their presence in critical segments of Chile's energy infrastructure.

Given the importance of copper both for the Chilean economy and for the global supply chains tied to the energy transition, it is also worth considering the Chinese presence in this sector. In Chile, this presence is manifested through trade, demand for raw materials and integration into supply chains, rather than through direct ownership of mining assets. Although this pattern reflects a combination of historical, regulatory and business factors—and not necessarily a deliberate strategy of exclusion—it contrasts with the case of Peru, where Chinese companies control some of the country's major copper projects. This difference highlights the diversity of ways in which China participates in South American mining, as well as the specificity of the Chilean model of governance and market openness.

On the financial side, China plays a far less prominent role in Chile—a clear contrast with countries such as Argentina, Brazil and Ecuador, where Chinese bank financing has maintained an active and substantial presence. Specifically, recent research shows that, in terms of energy infrastructure, Chile did not record any loans from Chinese banks between 2001 and 2020, while it did receive financing from US-led banks and multilateral organizations. [33] However, most respondents pointed out that the main comparative advantage of Chinese companies in

Chile lies not in direct access to finance or political influence, but in their ability to combine competitive costs, large-scale manufacturing and integrated packages that include supplier-linked financing and engineering, procurement and construction (EPC) services, helping strengthen their position in infrastructure and energy tenders. [34]

In summary, Chile's case reveals a form of Chinese integration different from that observed in other South American countries. Unlike Argentina, Ecuador or Brazil, where Chinese state financing and intergovernmental relations have played a significant role in the expansion of energy projects, China's presence in Chile has developed mainly through market mechanisms and business competition. Although Chinese companies have secured significant positions in renewable generation, electricity transmission and electromobility, they have done so within an environment characterized by stable rules, competitive tenders and a high diversity of foreign investors. A notable difference is that, unlike in several neighboring countries, Chinese companies in Chile have not been associated with major corruption cases or environmental controversies, reinforcing the perception of a more regulated and predictable investment environment. As a result, China's participation in Chile's energy transition has derived mainly from its companies' ability to compete on costs, technology and scale, shaping a pattern of economic integration closer to market logic than to the dynamics of intergovernmental cooperation that have characterized its presence in other countries of the region.

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COLOMBIA

Energy / capita	Electricity / capita	CO2 / capita	Electrification rate
11.645 kWh	**1.591 kWh**	**1,71 Mtoe**	**98.7%**
Source: Our world in data	Source: IEA	Source: IEA	Source: World Bank
Year: **2024**	Year: **2024**	Year: **2023**	Year: **2023**

Table 16

ENERGY SUPPLY — IMPORTS

Total: **7.270 Ktoe** · Año: **2024** · Includes primary and secondary energy sources

Gasoline	2,684 Ktoe · 36.92%	Natural gas	1,845 Ktoe · 25.38%
Diesel	1,455 Ktoe · 20.01%	Oil	827 Ktoe · 11.38%
Alcohol	187 Ktoe · 2.57%	Liquefied petroleum gas (LPG)	164 Ktoe · 2.26%
Kerosene	67.9 Ktoe · 0.93%	Coal	35 Ktoe · 0.48%
Fuel oil	5 Ktoe · 0.07%		

*Colombia imports ~7,270 ktoe of energy per year, and exports 71,977 ktoe, making it a net energy exporter, 2024.
Source: Balance Energético Colombiano 2024.

GOVERNANCE AND ENERGY POLICY

Colombia's energy transition unfolds in a context of structural tensions common to several South American countries. A very clean electricity matrix in, based mainly on hydroelectric generation, coexists with an energy matrix still hydrocarbon-intensive and with an economy where oil and gas play an important role as a source of tax revenues, exports and economic activity.

At the regulatory level, Colombia has a comprehensive legal framework to promote the incorporation of renewable sources into the energy system. Law 1715 of 2014 established the legal foundations for incorporating solar and wind energy into the electricity system through tax incentives, tariff and VAT exemptions,[1] as well as the creation of the Non-Conventional Energy and Efficient Energy Management Fund (FENOGE), all intended to facilitate the financing and promotion of sustainable energy projects.[2]

Subsequently, Law 2099 of 2021 broadened this framework by incorporating energy storage, hydrogen, smart metering and demand-response mechanisms, in addition to strengthening FENOGE and introducing mechanisms for the identification and evaluation of strategic projects.[3] These measures act as complements to the 2021 Hydrogen Roadmap,[4] Law

1964 of 2019 on electric mobility and the 2022 regulatory framework (Resolution 40284) for offshore wind energy.[5] Taken together, these initiatives underscore the continuity of an energy-transition agenda sustained across successive administrations.

At the international level, Colombia has also sought to consolidate its profile as a climate actor. The country hosted the 2024 Biodiversity COP16,[6] joined the Global Methane Pledge and maintains active cooperation with institutions such as the OECD and the International Energy Agency (IEA).[7]

Notwithstanding, the Colombian energy transition is constrained by the structural role of hydrocarbons within the national economy. Ecopetrol, the state-owned oil company, accounts for about 60% of crude oil production and dominates hydrocarbon refining, transportation and logistics activities.[8] Additionally, the company generates revenues equivalent to about 2% of national GDP and is one of the main sources of fiscal revenue through taxes, royalties and dividends.[9]

This oversized economic role limits the government's room for maneuver, as any attempt to reduce hydrocarbon production poses risks to macroeconomic stability. Although Ecopetrol has announced investments in hydrogen and renewable energies, its business portfolio continues to concentrate predominantly on hydrocarbon exploration, production, refining and transportation.[10]

Another structural constraint lies in an electricity system dominated by hydroelectricity. While hydroelectric generation—which provides about two-thirds of the country's electricity—[11] allows it to have one of the lowest carbon-intensity electricity matrix, it also increases its exposure to prolonged droughts and hydrological fluctuations.

In recent years, prolonged droughts associated with the El Niño phenomenon significantly reduced reservoir levels in Bogota, forcing the implemented of water rationing measures for about a year.[12] At the same time, the reduced availability of water resources increased the dependence of the national electricity system on backup thermal generation to ensure the supply reliability.[13] This vulnerability is reinforced by the high concentration of hydroelectric generation in large complexes such as El Guavio and San Carlos, which are responsible for supplying a significant part of the electricity demand in Bogota and Medellin. As the country's main economic centers, any interruption in these plants can affect the reliability and safety of the national electrical system.

Institutional and socio-environmental tensions also complicate the expansion of renewables. Hydroelectric projects have left a history of displacement, environmental damage and conflict with local communities. The most emblematic case is Hidroituango, in Antioquia, the most ambitious hydroelectric project in the country, with a projected capacity of 2.4 GW. Initially presented as a pillar of national energy security, the project has accumulated delays, cost overruns, the partial collapse of the dam in 2018, and persistent disputes over compensation for the affected communities. The project has also been associated with displacement, flooding and security threats linked to illegal armed groups.[14]

Colombia's case is marked by a persistent gap between its energy-transition ambitions and its ability to implement them. Although the country has developed regulatory instruments, public policy goals and an official narrative supportive of decarbonization, project execution is hindered by bottlenecks in electricity infrastructure, subnational funding constraints and governance and security challenges in many of the territories where renewable resources are concentrated.

This gap also reflects a highly centralized governance model. As Colombian scholar Camilo Defelipe pointed out, unlike countries like Argentina or Chile, where subnational governments play a more active role in the development of energy projects, in Colombia decisions "have to go through the center" before being implemented at the subnational level.[15] This concentration of powers reduces the capacity to adapt to local realities and slows project execution, particularly in regions where institutional constraints and territorial conflicts already pose major obstacles to the country's energy transition.

ENERGY MATRIX

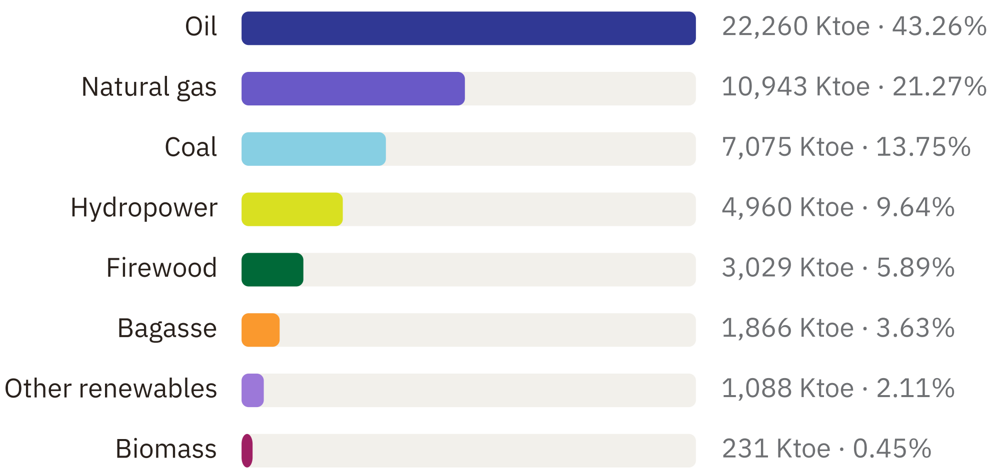
The data and percentages used in this section are drawn from ***Tablas 17*** *and* ***18****.*

Table 17

TOTAL PRIMARY ENERGY SUPPLY (TPES) — 2024

Total: **51.452 Ktoe**

Defined as domestic production plus imports minus exports (and, where available, adjusted for stock changes and international bunkers)



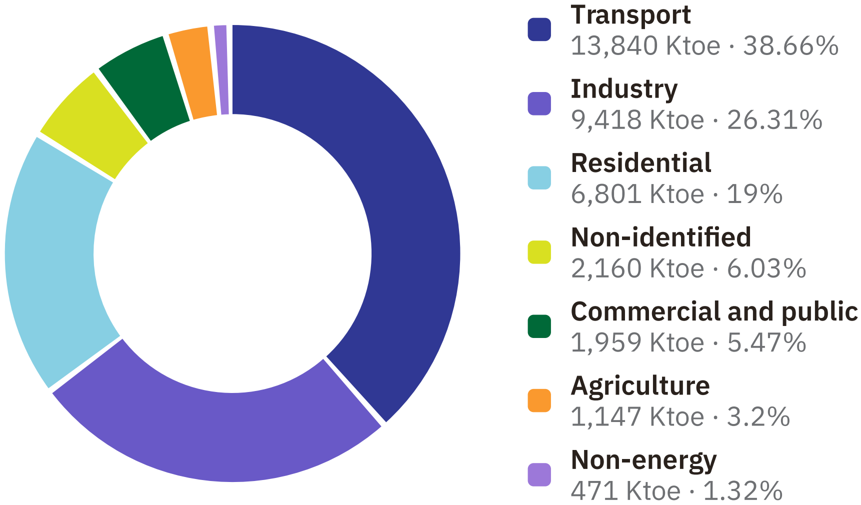
Source: Author's calculations based on data from Balance Energético Colombiano 2024.
Notes:

- Biomass: Residual biomass and "recoveries" used as direct fuel: agro-forestry residues, the biogenic fraction of municipal solid waste (MSW) and sludge, and other organic residues used without passing through a commercial secondary product.
- Other renewable: Non biomass renewables other than hidro: solar, wind, geothermal

Table 18
ENERGY USE DISTRIBUTION — 2024

Total: **35.796 Ktoe**

Energy delivered to end-use sectors only. It excludes the energy consumption by the energy industry itself in conversion and processing activities.



Source: Author's calculations based on data from Balance Energético Colombiano 2024.
Notes:
- Non-identified: Unallocated final energy use.

Fossil fuels dominate Colombia's energy matrix, accounting for more than three quarters of total primary energy supply. Oil alone constitutes 43.3%—the second-highest share among the six focus countries, surpassed only by Ecuador—while natural gas (21.3%) and coal (13.8%) make Colombia the only case in which all three major fossil fuels retain substantial weight. Renewable energies represent 21.7%, driven primarily by hydroelectricity (9.6%) and traditional biomass such as firewood and bagasse (10%).

Colombia's energy demand is similarly concentrated in fossil-intensive sectors. Transport is the largest consumer at 38.7% of total demand, relying almost entirely on gasoline and diesel. Industry and agriculture together account for 29.5%, with extensive use of natural gas for thermal processes and fossil fuels for heat-intensive activities such as cement and steel. The residential sector represents 19%, driven by high LPG consumption for cooking and electricity for household uses. The prevalence of liquid fuels in transport and natural gas in industry illustrates why fossil dependence is so firmly embedded in Colombia's energy system.

ELECTRICITY MATRIX

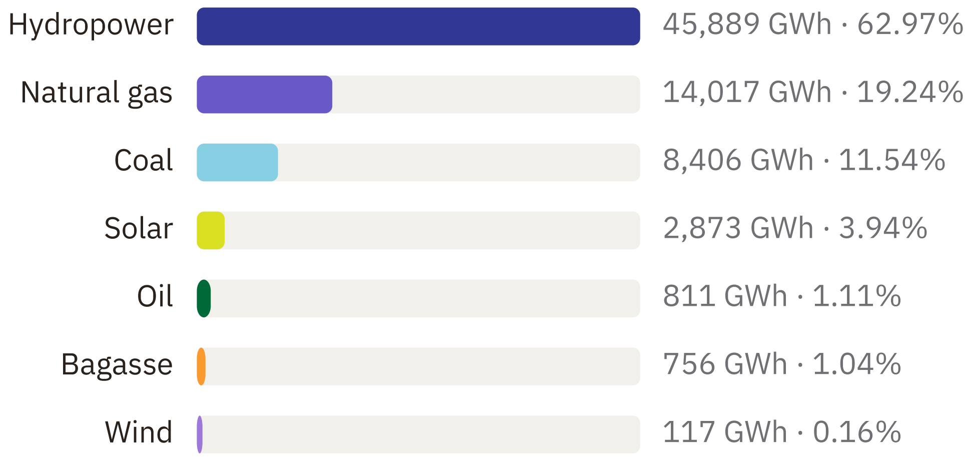
The data and percentages used in this section are drawn from ***Tables 19*** *and* ***20****.*

Table 19

ELECTRICITY SUPPLY SOURCES — 2024

Total: **72.869 GWh**

Grid-delivered electricity disaggregated by primary generation source

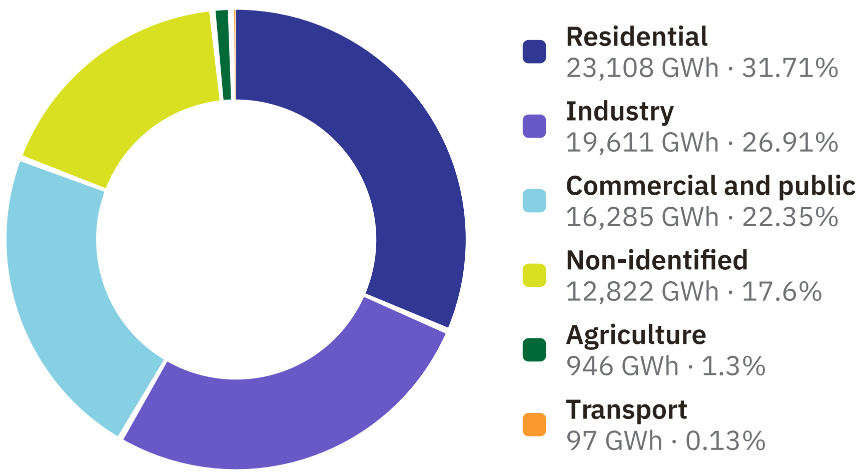


Source: Author's calculations based on data from Balance Energético Colombiano 2024.
Notes:
- Oil: Includes diesel, fuel oil, GLP, and crude.

Table 20

ELECTRICITY USE DISTRIBUTION — 2024

Total: **85.023 GWh**



Source: Author's calculations based on data from Balance Energético Colombiano 2024.
Notes:
- Non-identified: Unallocated final energy use.

Hydroelectricity remains the backbone of Colombia's electricity system, contributing around 63% of total generation in 2024. Fossil fuels account for most of the rest, led by natural gas (19.2%) and coal (11.5%). Wind energy continues to be marginal at less than 1%, whereas solar—though still modest—has grown rapidly and now represents about 4% of electricity generation.

Electricity consumption is distributed relatively evenly across the residential, industrial and commercial/public sectors, a trait Chile shares with Argentina among the focus countries. The residential sector accounts for 31.7% of total demand, followed by industry at 26.9%, while the commercial and public sector represents 22.9%. This distribution aligns with the balanced weight of these sectors in the national economy. Transport is still marginal at just 0.13% of electricity demand, underscoring that the electrification of mobility is one of the main areas for potential expansion. It should be noted, however, that official statistics also report 17.6% of consumption under “unidentified use,” an unusually high proportion in energy use statics, which limits a more precise characterization of electricity demand by sector.

Beyond hydroelectricity, the incorporation of other renewable sources has progressed at a considerably slower pace. Although solar and wind projects are beginning to expand—such as floating solar power in Córdoba and community wind projects in La Guajira—[16] their contribution is still marginal within the national electricity system.

Most interviewees noted that transmission infrastructure has fallen behind the pace of project development, creating bottlenecks that slow the addition of new capacity and reinforce reliance on backup thermal generation. “The panels are ready, but the network is not,” as one specialist remarked. [17] Fully exploiting Colombia’s solar (≈30 GW) and wind (≈32 GW) potential will require sustained investment in transmission expansion, storage and grid modernization. [18]

Looking at the overall picture, electricity consumption patterns show considerable room to advance the electrification of transport and industry, as well as greater incorporation of non-hydroelectric renewables. This potential is especially visible in La Guajira, which concentrates the best wind and solar resources in the country.[19]

CHINA'S ROLE

Chinese companies' involvement in Colombia's energy sector has centered on hydrocarbon, renewable energy, electric mobility and transmission infrastructure projects. While their presence remains more limited than in other Latin American markets, it has become increasingly visible over the last five years.

In solar energy, the state-owned PowerChina has participated in the development of ten photovoltaic projects totaling roughly 567 MW, making it one of the most visible Chinese actors in Colombia's renewable energy market. [20] Although this figure includes projects at different stages of development and does not correspond entirely to installed, operating capacity, it nonetheless helps gauge the company's significance in a country that, as of May 2026, had approximately 3,300 MW of solar photovoltaic capacity in operation. [21] Among these projects, the 108 MWp Tepuy solar park in Caldas stands out as one of the largest-scale solar developments led by a Chinese company in Colombia. [22]

As in other countries in the region, the expansion of solar energy in Colombia has been accompanied by a strong presence of Chinese suppliers along the supply chain. As Defelipe noted: "Almost 100% of Colombia's photovoltaic panels are Chinese, the technology, the entry, everything, and that already implies dependence on maintenance and operation."[23] The development of domestic industrial capacities in this area is virtually non-existent.

With regard to electric mobility, interviewees identified the transport sector as one of the main long-term decarbonization challenges due to its heavy reliance on petroleum derivatives.[24] Although Colombia has a national strategy to promote electric mobility supported by instruments such as the 2019 Law 1964[25] and the National Strategy for Electric Mobility,[26] the most visible advances have been concentrated in Bogota and Medellin, where local governments have led the electrification of public transport.[27]

Chinese companies have played a central role in this process. BYD, for example, supplies around 96% of the electric buses in operation in the country,[28] which has helped position Colombia among the Latin American leaders in public-transport electrification.[29] More recently, the Chinese automaker announced the assembly of electric buses and trucks in Colombia through partnerships with local companies, an initiative that aims to incorporate higher levels of domestic value added and reflects a gradual evolution beyond the mere importation of vehicles.[30]

China's presence also extends to the modest private market for electric vehicles. In 2025, BYD alone accounted for 52.4% of new national electric-vehicle registrations, while other Chinese manufacturers, such as Chery, have expanded their share.[31]

Chinese involvement also extends to major electricity-infrastructure projects. The most emblematic case is Hidroituango, the country's largest hydroelectric plant. As mentioned above, the project has been marked by years of delays, accidents, cost overruns and public controversy. Although its development has been led by Colombian actors, Chinese companies and financial institutions have played an important role at different stages of the project. Its financing structure included the participation of the Industrial and Commercial Bank of China (ICBC) through a vehicle managed by the Inter-American Development Bank (IDB).[32] The most recent expansion was likewise awarded to the consortium made up of China's Yellow River and the Colombian firm Schrader Camargo, reflecting the gradual expansion of Chinese involvement in strategic segments of Colombia's energy infrastructure sector.[33]

It is worth noting that, as all interviewees in Colombia emphasize, the vast majority of Hidroituango's governance and operational problems long predated Chinese involvement.[34] However, the project illustrates how Chinese companies have ended up associated with highly politicized, high-visibility infrastructure projects, inheriting not only commercial opportunities, but also reputational risks generated by fragmented governance structures and recurring conflicts surrounding large infrastructure projects.

This dynamic can also be seen in Line 1 of the Bogota metro, awarded in 2019 to a consortium led by China Harbour Engineering Company (CHEC) and Xi'an Metro.[35] It is a long-awaited project for a city of around eight million inhabitants that, despite registering some of the highest levels of traffic congestion in the world,[36] does not have a metro system. Precisely for that reason, the project has become deeply politicized, with recurring delays, design disputes and tensions between local and national authorities that have intensified scrutiny over Chinese participation.

Interviewees noted that the main risks surrounding these projects stem less from the conduct of Chinese companies than from Colombia's weak institutional coordination, fragmented regulatory structures and inconsistent mechanisms for environmental and community consultation. As one interviewee summed up: "Chinese companies deliver fast and cheap, but our institutions are slow and fragmented. The risk is not China; it is our inability to manage complexity."[37]

The situation in the La Guajira department provides an illustrative example of these challenges. Conflicts with indigenous communities, complex environmental licensing processes and security risks associated with illegal armed groups have delayed numerous wind and solar projects. [38] The region also faces transmission limitations, having historically been peripheral to the national electricity system, which hinders the integration of new large-scale renewable capacity.

Interviewees noted that Chinese companies face essentially the same operational challenges as other foreign companies. Despite this, due to China's growing geopolitical visibility in a country historically aligned with the United States, delayed or controversial projects with Chinese participation are often interpreted through a geopolitical lens rather than as manifestations of Colombia's structural governance weaknesses. At the same time, some specialists warned that greater technological dependence on Chinese companies in sectors such as energy, mining and transportation could eventually complicate relations with the United States.[39]

Overall, Colombia's energy sector shows wide diversification in terms of foreign participation. European companies such as Enel maintain relevant positions in renewables and transmission, while Isagen, backed by Canadian capital, controls major hydroelectric assets such as San Carlos. The United States, for its part, has focused primarily on technical cooperation rather than direct investment. Within this context, China remains an emerging rather than dominant actor. Nevertheless, its rapid expansion in electric mobility, solar generation, and strategic infrastructure gives it a visibility that increasingly exceeds its current market share and points to significant potential for future expansion.

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ECUADOR

Energía / capita	Electricidad / capita	CO2 / capita	Electrificación
12.722 kWh	**1.676** kWh	**2,21** Mtoe	**98.7%**
Source: Our world in data	Source: IEA	Source: IEA	Source: World Bank
Year: **2024**	Year: **2023**	Year: **2023**	Year: **2023**

Table 21

ENERGY SUPPLY — IMPORTS

Total: **8.903 Ktoe** · Year: **2024** · Includes primary and secondary energy sources

Diesel	4,573 Ktoe · 51.36%	Gasoline/naphtha	2,633 Ktoe · 29.57%
Liquefied petroleum gas (LPG)	1,382 Ktoe · 15.52%	Petroleum coke	147 Ktoe · 1.65%
Electricity	109 Ktoe · 1.22%	Aviation fuel (jet fuel)	59 Ktoe · 0.66%

Ecuador is a net energy exporter: exports 18,544 ktoe vs. imports 8,902 ktoe → net exports 9,642 ktoe.
Source: Balance Energético Nacional 2024.

GOVERNANCE AND ENERGY POLICY

Over the past two decades, Ecuador's energy policy has been shaped by a sustained bet on hydroelectric expansion as the backbone of energy security and infrastructure development. This strategy enabled a rapid increase in electricity-generation capacity, but it also concentrated a large share of the system in a small number of dams and tied it closely to external sources of financing, particularly China's state-owned banks. The result was a model capable of delivering critical infrastructure in the short term, yet vulnerable to climate shocks, fiscal constraints and governance problems.

This trajectory cannot be understood separately from the financial conditions of the country. Since the late 2000s, Ecuador's limited access to international credit markets, recurrent fiscal deficits and high sovereign risk led successive governments to rely on external creditors to sustain public investment.[1] This dynamic deepened after the 2008 debt default, when Rafael Correa's government turned to alternative financing mechanisms, including resource-backed loans, oil pre-sales and direct agreements with the Chinese government.[2] These instruments enabled large investments in energy, infrastructure, and public works, but also consolidated a model marked by low transparency, discretionary contracting and a growing dependence on future revenues from oil sales. To date, the consequences of this model continue to shape Ecuador's energy policy.

Post-Correa governments inherited a framework in which fiscal urgency often took precedence over long-term planning, while external financing was increasingly linked to strategic sectors such as energy, mining and infrastructure.

After 2019, Ecuador's external financing structure diversified alongside a greater role for multilateral institutions, including International Monetary Fund (IMF) programs and development financing linked to economic, governance and climate reforms.[3] That said, Ecuador continues to operate within a fragmented financial environment, marked by debt pressures, institutional fragility and a permanent search for external capital under restrictive fiscal conditions.

The electricity crisis of 2023–2024 clearly exposed the system's accumulated vulnerabilities. The droughts recorded during that period—described by authorities and international media as the most severe in 61 years—[4] drastically reduced reservoir levels, which fell to critical lows. As a consequence, several hydroelectric plants had to be partially or fully disconnected, which resulted in massive blackouts across the entire country and electricity rationing that, in 2024, extended up to 14 hours per day.[5] Given this situation, President Daniel Noboa declared a 60-day national state of emergency in April 2024, citing a "serious internal upheaval and public calamity" affecting the electricity sector.[6]

In response, Ecuador enacted the Organic Law on Energy Competitiveness and Decarbonization (LOCE) in 2024,[7] aimed at opening the sector to private capital through competitive auctions, public-private partnerships and clearer cost-recovery mechanisms. The LOCE built on earlier reforms introduced by the 2015 Organic Law on the Public Electricity Service (LOSPEE),[8] which redefined the institutional nature of Ecuador's electricity sector and established the planning, regulatory, and operational mandates for the national electricity system. On this basis, new regulations issued in 2025 updated the sector's technical standards and incorporated mechanisms designed to facilitate the integration of new generation projects and greater participation of private actors.

For much of the past two decades, the priority was to build large hydroelectric projects. Recent reforms, on the other hand, aim to prepare the system for a more diversified matrix, with a greater presence of distributed generation, new renewable technologies and more flexible ways of operating the network. They do not necessarily imply a deep liberalization of the sector, but rather a regulatory modernization aimed at integrating new actors and technologies into the national electricity system.

Taken together, these measures have helped establish a clearer framework for private and foreign participation in the sector. They have also been reinforced by international financial support: in 2024, the Inter-American Development Bank (IDB) approved a US$ 600 million[9] loan and in 2025 a US$ 77 million guarantee line to support the energy-transition framework, linking the credibility of the reforms to multilateral oversight mechanisms,[10] —something largely absent during the Correa years. In parallel, the updated Nationally Determined Contributions for the 2026–2035 period,[11] the 2024 Biennial Transparency Report and the 2024–2070 PLANMICC reflect a growing alignment between domestic energy policy and Ecuador's international climate commitments.[12]

That said, the strengthening of the regulatory framework still contrasts with persistent limitations in implementation and transparency. New instruments such as the National Energy Efficiency Investment Fund (FINEE),[13] designed to finance electromobility and energy efficiency measures, have progressed slowly and with little operational clarity. More than a year after its announcement, the fund remains practically inactive, with no defined budget, disbursement records, or clear operating guidelines.[14] This gap between regulatory ambition and implementation capacity encapsules one of the main problems of Ecuadorian energy governance: translating legal reforms into effective changes within the energy system.

Ecuador's energy transition unfolds in a context where energy security, fiscal stability and political governance are tightly intertwined. The heavy concentration of electricity generation in hydropower exposes the system to increasingly frequent and intense droughts, and structural constraints on replacing that capacity quickly have increased reliance on thermal generation based on imported fuels. This dependence on refined oil derivatives heightens exposure to supply interruptions, international price volatility and pressures on public finances. Subsidies for diesel and liquefied petroleum gas (LPG) further sustain high consumption levels and make any reform attempt politically sensitive. As a result, Ecuador's energy challenges extend well beyond questions of resource availability or infrastructure. Climate risks, external energy dependence, fiscal restrictions and political costs reinforce one another, complicating efforts to build a more resilient and diversified energy system.

ENERGY MATRIX

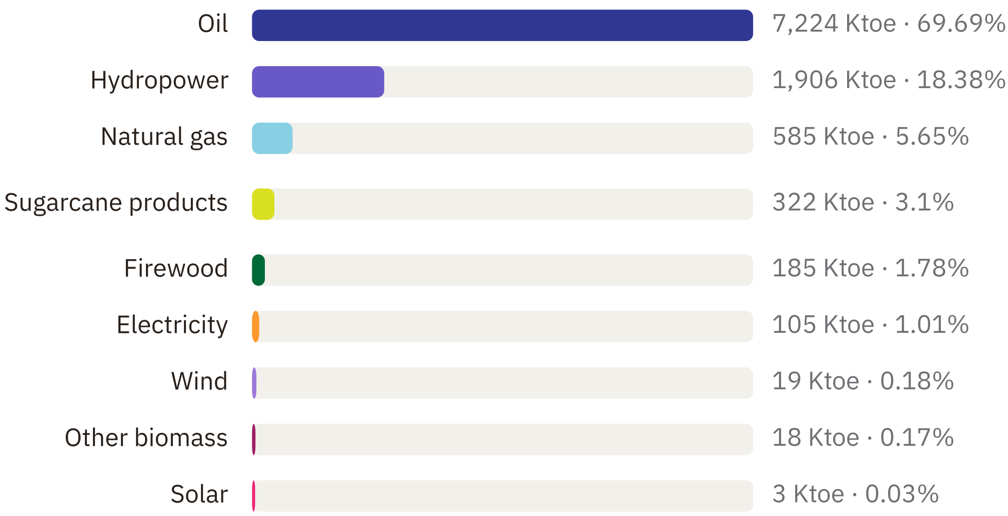
*The data and percentages used in this section are drawn from **Tablas 22** and **23**.*

Table 22

TOTAL PRIMARY ENERGY SUPPLY (TPES) — 2024

Total: **10.366 Ktoe**

Defined as domestic production plus imports minus exports (and, where available, adjusted for stock changes and international bunkers)



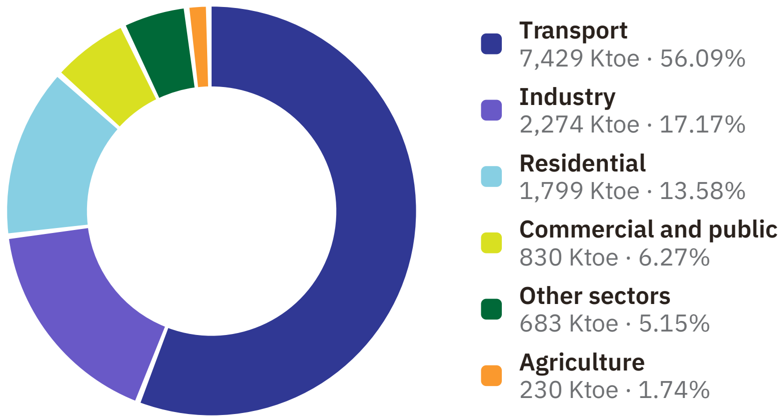
Source: Author's calculations based on data from Balance Energético Nacional 2024.
Notes:
- Oil: Includes oil derivates.
- Electricity: Corresponds to the net trade of electricity (Imports-Exports).

Table 23

ENERGY USE DISTRIBUTION — 2024

Total: **13.244 Ktoe**

Energy delivered to end-use sectors only. It excludes the energy consumption by the energy industry itself in conversion and processing activities.



Source: Author's calculations based on data from Balance Energético Nacional 2024.
Notes:
- Agriculture: Ecuador measures agriculture and mining in one category, in contrat to all other countries where mining is included in the "Industry" sector.
- Other sectors: Includes energy consumption from construction activities and possibly other smaller sectors not included in the above.

Ecuador's total primary energy supply is heavily dependent on fossil fuels. In 2024, oil and its derivatives accounted for about 70% of supply—the highest share among the countries examined and well above the regional average. Colombia, the next most oil-dependent case, obtained 43% of its primary energy from oil, while Argentina and Peru also rely heavily on fossil fuels but with consumption centered primarily on natural gas. Ecuador thus stands out as the most oil-intensive profile in the comparison. Hydroelectricity contributed 18.3%, natural gas

5.7%, and all other renewable sources combined—biomass, solar and wind—barely reached 5.3%.

In terms of consumption patterns, transport accounts for more than half of Ecuador's final energy demand (56%), the highest proportion across the cases analyzed. Peru follows with 44%, while the remaining countries fall below 40%. This concentration reflects the weight of road transport and its heavy dependence on diesel and gasoline, making the sector the main driver of domestic consumption of petroleum products. The industrial sector comes next with 17.2%, driven by energy-intensive activities such as cement, food processing, ceramics and manufacturing, all of which rely heavily on fossil fuels for thermal generation and industrial processes. Residential consumption, at 13.6%, is the lowest among the countries considered.

This consumption structure has important implications for the country's energy security. Although Ecuador is a net exporter of hydrocarbons and has a robust oil industry, it still relies heavily on refined fuel imports to meet domestic demand. The apparent contradiction stems primarily from structural limitations in national refining capacity. Ecuador mainly produces and exports heavy crude oil from the Amazon region,[15] while domestic consumption is concentrated in refined products such as diesel, gasoline and LPG. However, the country's major refineries face problems of technological obsolescence and frequently operate below capacity,[16] limiting their ability to efficiently process domestic crude and supply the domestic market for petroleum derivatives.

ELECTRICITY MATRIX

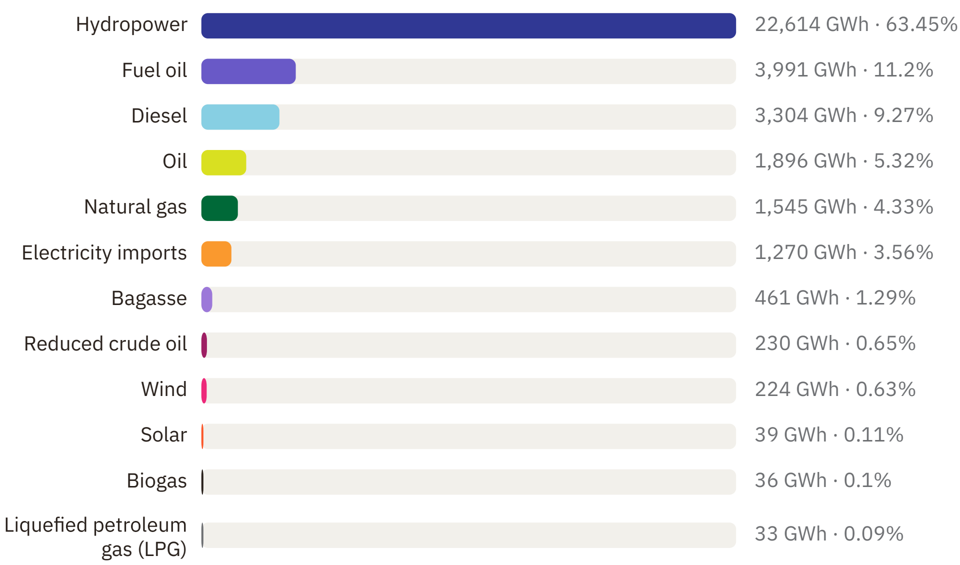
The data and percentages used in this section are drawn from ***Tablas 24*** *and* ***25****.*

Table 24

ELECTRICITY SUPPLY SOURCES — 2024

Total: **35.643 GWh**

Grid-delivered electricity disaggregated by primary generation source

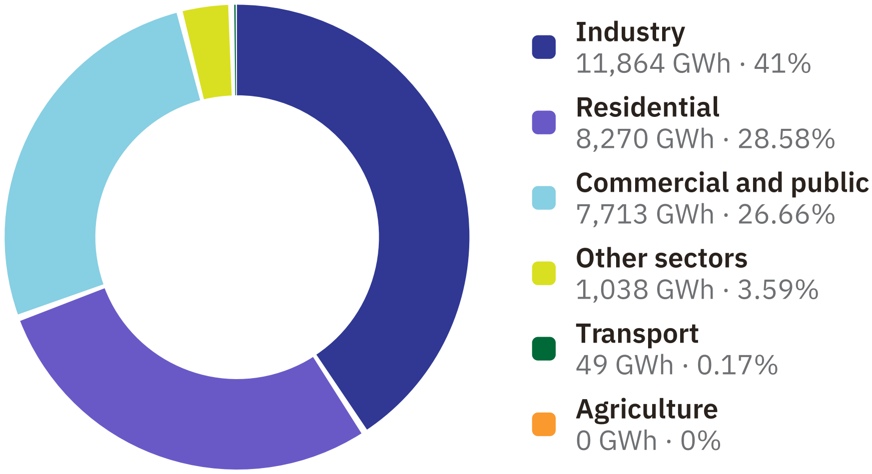


Source: Author's calculations based on data from Balance Energético Nacional 2024.

Table 25

ELECTRICITY USE DISTRIBUTION — 2024

Total: **28.934 GWh**



Source: Author's calculations based on data from Balance Energético Nacional 2024.
Notes:
- Industry: For industrial consumption, this includes generated energy not available for public service and energy delivered to large consumers.
- Commercial and public: The commercial, services and public administration sectors cover the demand for public, commercial and other lighting.
- Other sectors: Includes energy consumption of construction activities and eventually other minor sectors not included in the above.
- Agriculture: Includes minning activities: Electricity consumption in Agricultura & Mining is negligable

Ecuador's electricity sector presents a relatively favorable outlook. In 2024, 65% of national supply came from renewable sources. Hydroelectricity, which provides 63.5% of total generation, remains the backbone of the system, while other renewables—including biomass—account for only 1.5%. Hydrocarbon-based generation reaches 30.86%, distributed among fuel oil (11.2%), diesel (9.3%), petroleum (5.3%), natural gas (4.3%) and other derivatives (0.7%). Imported electricity—mainly from Colombia—adds a further 3.6% to national supply.

Ecuador's electricity consumption patterns reveal a mix of industrial predominance and diversified demand. Industry accounts for 41.0% of total electricity use, followed by the residential sector (28.6%) and commercial and public activities (26.7%), while transport represents only 0.17% of electricity demand. This distribution becomes particularly relevant when contrasted with the national energy matrix, where transport absorbs more than half of final energy consumption. The gap underscores that most productive and urban activities already rely on electricity, whereas mobility remains almost entirely dependent on petroleum fuels. From an energy-transition perspective, this suggests that the greatest opportunities for expanding electricity use lie in the electrification of transport, rather than in the sectors that currently dominate electricity demand.

As noted above, Ecuador's electricity system relies heavily on a small number of large power plants. With 1,500 MW of installed capacity, Coca Codo Sinclair is the country's largest hydroelectric facility. However, its effective contribution to generation varies with hydrological conditions, available flow, operational restrictions, sediment accumulation and the technical problems that have emerged since it entered operation in 2016. For this reason, it should be assessed not only by its installed capacity but by its actual availability and the energy it effectively produces.

In 2024, Coca Codo Sinclair contributed approximately 31.7% of the national hydroelectric generation. Together with the Paute Integral Complex—composed of the Mazar, Molino and Sopladora plants—it accounted for more than two thirds of the country's hydroelectric generation. Combined with a nearly 20% share of thermoelectric generation based on fuel oil and diesel, Ecuador's electricity system exhibits a high vulnerability to hydrological shocks and to volatility in international fuel markets.

Paradoxically, Ecuador has an important solar and wind potential that is still underdeveloped. Over the past decade, factors such as limited investment, regulatory uncertainty and difficulties in bringing new projects to fruition slowed the expansion of these technologies.[17] That said, signs of greater dynamism have emerged in recent years. Among them is the La Ceiba photovoltaic project, located in the province of Loja, designed to reach a total capacity of up to 1,500 MW, with its first phase providing for the installation of 200 MW. If completed, it would become the largest solar plant in the country.

Despite these advances, alternative renewable energies continue to have a limited presence within Ecuador's electricity system, while their prospects for long-term expansion remain uncertain.

CHINA'S ROLE

The convergence between urgent fiscal needs, political affinities and opaque financing mechanisms helped consolidate a particularly close relationship between Ecuador and China during the years of President Correa (2007–2017). The bilateral relationship was structured mainly through state-to-state agreements that facilitated the financing and execution of large infrastructure projects, in a context where negotiation and decision-making were heavily concentrated in the Executive Branch.[18]

What began as an alternative source of financing and a partner aligned with Correa's international strategy gradually evolved into a broad and expanding presence in the construction of strategic road and energy infrastructure. Today, Chinese companies and banks operate across virtually the entire value chain of Ecuador's electricity sector—from financing and building power plants to developing transmission infrastructure and new solar and wind projects.[19]

First, Chinese state-owned enterprises played a central role in Ecuador's hydroelectric expansion. Sinohydro built the Coca Codo Sinclair dam;[20] China Gezhouba Group took part in the construction of the Sopladora plant;[21] and a subsidiary of the state-owned Three Gorges was responsible for the civil works of Toachi-Pilatón.[22] As Carolina Viola states, these projects were structured through turnkey contracts that bundled design, procurement, construction and, in some cases, financing by Chinese state-owned firms.[23]

Although this model transformed Ecuador's electricity infrastructure and rapidly expanded hydropower capacity, it also consolidated a strong dependence on Chinese suppliers and technology. At the same time, the combination of large-scale contracts, deficient oversight mechanisms, and a high concentration of decision-making in the national executive branch facilitated the emergence of controversies related to cost overruns, construction defects, labor disputes, corruption allegations and environmental degradation.

According to the NGO Fundación Mil Hojas, "the economic and technological risks associated with China's participation in Ecuador's energy transition are reflected in the systematic presence of cost overruns, with projects whose budgets are doubled or even tripled," as well as in a total technological dependence that prevents any effective transfer of knowledge".[24] Mil Hojas also pointed out that the poor construction quality forced the Ecuadorian State to allocate additional resources to repair or complete projects, citing the Toachi-Pilatón plant as an emblematic case in which the Chinese contractor failed to deliver, leaving a Russian company with the task of completing the work.[25]

This non-compliance contributed to prolonged delays in the complex's schedule. Part of the infrastructure, corresponding to one of the two plants (Sarapullo), went into operation a decade later than originally planned, while the completion of the second plant (Alluriquín) was delayed by roughly fourteen years.[26]

Chinese policy banks played a key role in these projects. Between 2010 and 2020, Ecuador received more than US$ 18 billion in loans, a significant part of them linked to energy and infrastructure projects. The Export-Import Bank of China and China Development Bank provided credit lines with fewer governance constraints than multilateral creditors, often using repayment mechanisms tied to oil exports.[27]

The natural-resource-backed financing modality not only restricted Ecuador's fiscal room for maneuver, but also contributed to a refinancing dynamic in which new loans became increasingly necessary to manage existing obligations.

The most symbolic and controversial case has been the Coca Codo Sinclair project. Built by Sinohydro and financed by Chinese policy banks, it was conceived as a flagship example of bilateral Sino-Ecuadorian cooperation. Despite this, as the Ecuadorian scholar Carolina Viola points out, the project became an "emblematic case of the environmental and structural impacts stemming from Chinese involvement in Ecuador."[28] The project was implemented in an ecologically sensitive area, causing significant damage to local ecosystems and indigenous communities, as well as severe erosion of the Coca River basin that has affected transport routes to the Amazon.

The plant has also faced persistent technical problems, including cracks in turbines and sediment abrasion, which led the Ecuadorian government to initiate an international arbitration against Sinohydro.[29] For Viola, this case illustrates some of the tensions inherent in the China-Ecuador relationship, particularly when large infrastructure projects are developed under opaque contractual arrangements and with limited oversight capacities.[30] In this context, social, environmental and financial costs tend to fall disproportionately on the host country.

In April in 2026, Ecuador dropped its legal dispute with the Chinese construction firm after reaching an agreement that includes compensation of approximately US$ 400 million, of which US$ 200 million would be in cash and US$ 200 million would be allocated to electricity generation projects,[31] in addition to transferring the operation and maintenance of Coca Codo Sinclair to the Chinese company for a period of 25 years. Under the agreement, PowerChina—the parent company of Sinohydro—would undertake the repairs associated with the structural failures detected at the plant.[32]

Additionally, in the case of energy projects, financing conditions frequently encouraged or required the hiring of Chinese companies and suppliers. This arrangement enabled the rapid mobilization of resources and technical capacities, but it also reduced competition in procurement processes and reinforced dependence on technology, equipment and specialized expertise from China. Interviewees consistently identified this combination of financing and execution as the main advantage over other international actors, but also as the main risk of

China's involvement.[33]

As Chinese companies expanded beyond large hydroelectric projects into areas such as solar power, electric mobility and other components of the energy transition, China's institutional and diplomatic footprint in Ecuador grew in parallel. This evolution turned the energy relationship into an increasingly visible pillar of bilateral ties. As Viola notes, "Chinese diplomacy plays an active role in promoting its companies in Ecuador through official sponsorships, agreements and media strategies. Government agencies fund visibility campaigns to improve the image of Chinese companies and projects."[34]

The coordination between the Chinese Embassy, state-owned enterprises and the Chinese media illustrates how Beijing deploys a state-to-state model that combines investment promotion, political messaging and development assistance. While the model helped mobilize capital quickly, it also deepened the opacity of bilateral agreements and blurred the line between trade and political participation.

In Ecuador, there is a clear disconnect between official transparency commitments, public oversight and actual procurement practices in the way large energy contracts with China have been managed. Most of the agreements with Chinese policy banks and companies were negotiated directly through executive channels, bypassing ordinary mechanisms of public procurement and parliamentary oversight. This concentration of power weakened oversight, accountability and public trust. Notwithstanding, assessing this relationship exclusively from its institutional deficits offers an incomplete picture.

Despite all the problems and controversies documented, plants built by Chinese companies significantly expanded the country's electricity generation capacity, reduced electricity imports and allowed seasonal energy exports to Colombia and Peru. As a result, hydroelectricity today represents approximately 70% of Ecuador's electricity generation, placing Ecuador well above the global average in renewable generation.

The result was a profound transformation of the energy sector that strengthened the country's generation capacity, but also consolidated long-term vulnerabilities in fiscal stability, technological autonomy, institutional transparency and environmental governance. These vulnerabilities emerged from the interaction between the financing and investment modalities promoted by China and the institutional weaknesses that characterized the planning, procuring and oversight of Ecuador's strategic projects.

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PERÚ

Energy / capita	Electricity / capita	CO2 / capita	Electrification rate
10.941 kWh	**1.595 kWh**	**1.71 Mtoe**	**96.2%**
Source: Our world in data	Source: IEA	Source: IEA	Source: World Bank
Year: **2024**	Year: **2023**	Year: **2023**	Year: **2023**

Table 26

ENERGY SUPPLY — IMPORTS

Total: **12.229 Ktoe** · Year: **2023** · Includes primary and secondary energy sources

Oil	5,654 Ktoe · 46.23%	Diesel	4,417 Ktoe · 36.12%
Gasoline	1,185 Ktoe · 9.69%	Liquefied petroleum gas (LPG)	478 Ktoe · 3.91%
Aviation fuel (jet fuel)	308 Ktoe · 2.52%	Coal	186 Ktoe · 1.52%
Electricity	1 Ktoe · 0.01%		

Peru imports ~11.389 ktoe of energy per year, but exports 7.792 ktoe, making it a net energy importer.
Source: Balance Energético Nacional 2024.

GOVERNANCE AND ENERGY POLICY

Peru has a solid regulatory framework for low-emission energy development, one rooted in a market-oriented economic model that has remained remarkably stable despite prolonged political instability. Since the 1990s, the energy sector has been open to private investment and foreign capital, with concessions awarded through competitive processes and predictable tariff rules. As a result, the sector's evolution has been driven more by market signals and private investment decisions than by coordinated state planning.

Two technocratic institutions have been instrumental in sustaining policy continuity. On the one hand, the Supervisory Agency for Energy and Mining Investment (OSINERGMIN) acts as an independent regulator responsible for defining and overseeing tariffs and technical standards.[1] On the other hand, the Committee for the Economic Operation of the National Interconnected System (COES) manages the electrical dispatch and the system's operational planning.[2] Taken together, these institutions have helped maintain a stable regulatory environment even during periods of heightened political uncertainty.

The regulatory architecture underpinning this model was consolidated through the opening of the generation, transmission and distribution segments to private investment, the strengthening of competitive procurement mechanisms, and the introduction of renewable-energy auctions with long-term price signals.[3] These reforms made it possible to build a simple but consistent institutional framework, capable of attracting domestic and foreign investment for more than three decades.

Despite this institutional continuity, the development of Peru's energy transition has been shaped by a limited capacity of the Executive branch to sustain long-term policies. The constant turnover of presidents and Energy ministers over the past decade has generated cycles of progress and stagnation in the implementation of regulations, auctions and strategic projects. As several interviewees noted, Peru's energy transition has been driven largely by external actors.[4] In the words of one of them, "foreign companies are the ones that have truly pushed the transition," while another stated that "Peru will not carry out an energy transition on its own or by its own decision."[5] These perceptions reflect the weight of international markets, global supply chains, multilateral organizations, and foreign investors in shaping the country's energy priorities.

Economic conditions have also helped to guide the evolution of the sector and associated industries. The sustained growth in electricity demand associated with mining, the vulnerability of hydropower generation to extreme weather events and the need to expand transmission infrastructure have favored technologies capable of offering competitive costs and reduced exposure to market risks.[6] The severe drought recorded in 2023 exposed these limitations by triggering significant increases in electricity prices and reinforcing the need to expand the transmission grid and accelerate the incorporation of renewable sources complemented by storage and backup capacity.[7]

At the international level, Peru has formally aligned its energy policy with its commitments under the Paris Agreement through its Nationally Determined Contributions (NDC) and its long-term climate strategy 2050.[8] In addition, the country joined the Powering Past Coal Alliance in 2020 and held the presidency of the Andean Electric Interconnection System (SINEA)[9] during the 2023-2024 period with support from the Inter-American Development Bank (IDB). As the host of APEC 2024,[10] Peru also advanced the Lima Declaration on clean energy technologies, including hydrogen.

Although these spaces do not directly determine Peru's energy policy, they do help shape incentives and priorities for the sector's development. That said, the country's ability to advance its international commitments depends on an energy structure marked by significant asymmetries between public and private actors.

Unlike other oil-producing countries in the region, where state-owned hydrocarbon companies play a dominant role, Petroperú's influence in Peru is limited relative to the private Camisea consortium—made up of Pluspetrol, Hunt Oil, and Repsol—which controls the country's natural gas production.[11]

The modernization of the Talara refinery clearly illustrates these tensions. Conceived to expand refining capacity, improve fuel quality, and reduce dependence on imports, the project accumulated cost overruns, delays, and management problems that severely deteriorated Petroperú's financial situation. [12] Although Talara is now one of the country's most modern energy assets, its operational and financial difficulties have led the government to transfer its management to the private sector, underscoring the limits of the state-owned company in consolidating itself as a competitive actor within Peru's energy system.

Structural limitations

Although the sector benefits from stable regulation, Peru's energy transition remains constrained by structural problems These challenges go beyond institutional design and respond to more complex dynamics of the country's political economy.

The first is the marked and growing dependence on natural gas. Several interviewees described gas as the true backbone of Peru's energy economy and as a resource that is politically difficult to replace.[13] This perception is reflected in proposals aimed at expanding access to gas and reviving projects such as the South Peru Gas Pipeline, justified on the grounds of energy security and affordability. Despite this, the strategy also faces growing questions about its long-term sustainability. The decline in proven reserves has reinforced the need to attract new investments in exploration and production to ensure future supply, while several interviewees warned that a deepening dependence on natural gas could crowd out investment in renewable energy and storage, as well as increase the economic and political costs of future decarbonization.[14]

The second challenge concerns the growing pressure on water resources. Much like in Colombia, Peru and Brazil, Peru's high reliance on hydropower makes its electricity system increasingly vulnerable to droughts and extreme climate events. This vulnerability became evident during the 2023 drought associated with the El Niño phenomenon, which sharply reduced hydropower output and forced the system operator to rely more heavily on backup thermal generation, raising system costs and increasing dependence on fossil fuels.[15]

This pressure on water resources also appears in the country's mining regions. The expansion of copper mining has intensified disputes over water access and use in vulnerable Andean regions. In many of these areas, communities associate mining activity with reduced water availability, higher risks of contamination, and insufficient environmental oversight.[16] As a result, water governance has become an increasingly important factor for the political and social viability of Peru's energy transition.

The third challenge concerns the socio-environmental conflicts that characterize much of Peru's extractive activity. In the Camisea area, nearby communities continue to report unequal access to energy benefits and limited positive impacts at the local level. [17] Similarly, high-profile conflicts around Las Bambas—Peru's largest copper mine—have highlighted the economic and political costs stemming from persistent disputes over land, benefit-sharing and environmental impacts.[18] Recurrent blockades and operational interruptions have underscored the limitations of state mechanisms to prevent and manage this type of conflict.

These tensions are further aggravated by persistent weaknesses in environmental governance and citizen participation. Various international bodies and specialized organizations have documented cases of intimidation, criminalization and harassment against environmental defenders, as well as a significant gap between existing formal mechanisms for consultation, participation and protection and their effective implementation in the territories.[19] As several interviewees noted, consultation procedures exist formally, but their application is often insufficient and dialog with communities frequently intensifies only once conflicts have already reached critical levels.[20]

ENERGY MATRIX

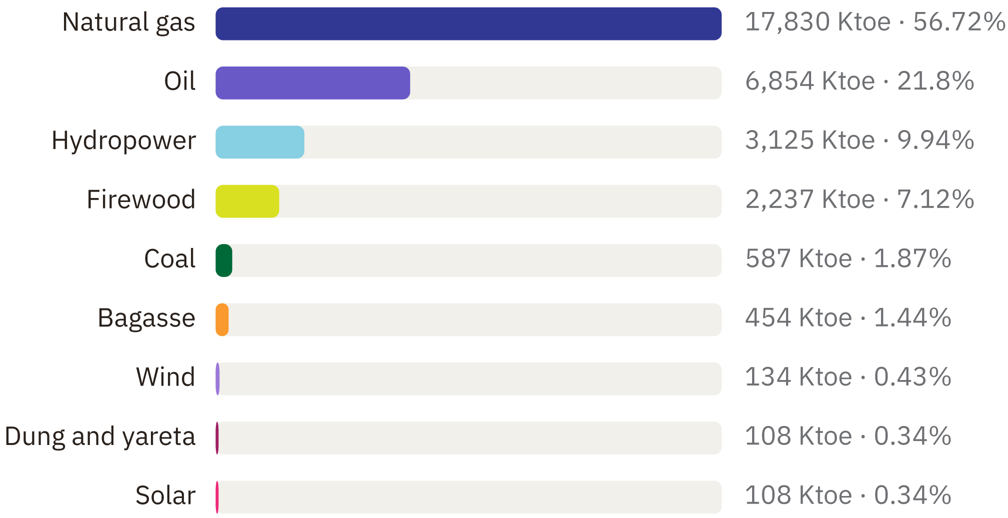
*The data and percentages used in this section are drawn from **Tables 27** and **28**.*

Table 27

TOTAL PRIMARY ENERGY SUPPLY (TPES) — 2023

Total: **31.437 Ktoe**

Defined as domestic production plus imports minus exports (and, where available, adjusted for stock changes and international bunkers)



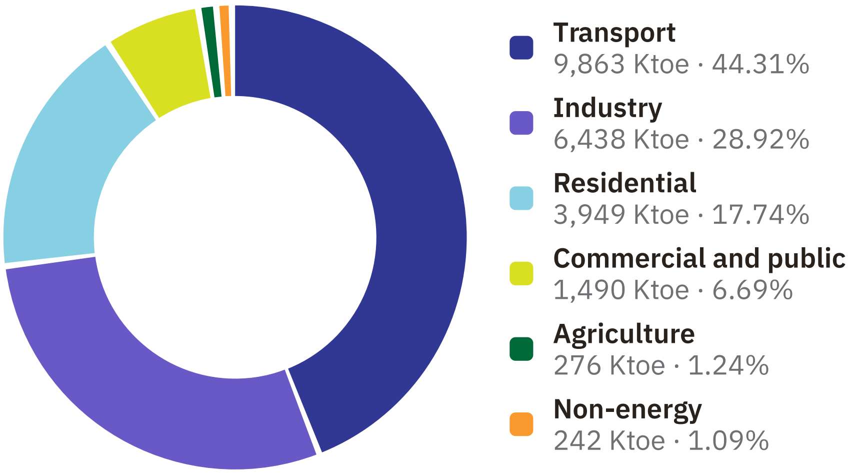
Source: Author's calculations based on data from Balance de Energía Nacional 2023.
Notes:
- Natural gas: Includes natural gas and NGLs.

Table 28

ENERGY USE DISTRIBUTION — 2023

Total: **22.258 Ktoe**

Energy delivered to end-use sectors only. It excludes the energy consumption by the energy industry itself in conversion and processing activities.



Source: Author's calculations based on data from Balance de Energía Nacional 2023.
Notes:
- Industry: Includes the mining industry.
- Agriculture: Includes the fishing industry.

In 2023, Peru's energy matrix was dominated by fossil fuels, which accounted for about 80% of the total primary energy supply. Natural gas and liquids associated with its production constituted the main component of the national energy supply, contributing approximately 56.7% of the total, the highest share among the six focus countries. Oil and its derivatives accounted for 21.8%, while coal maintained a marginal presence of just 1.9%. This configuration made Peru, together with Argentina, one of the two cases in the study where dependence on fossil fuels was structured primarily around natural gas rather than oil.

The centrality of natural gas is primarily the result of the development of the Camisea complex, the country's main gas field and one of the most important energy projects of the past decades. Domestic gas production has partially reduced Peru's exposure to volatility in international hydrocarbon markets. That said, the country's limited refining capacity entails a significant dependence on imported fuels, albeit at levels lower than those observed in Ecuador.

Renewable sources accounted for about one fifth of the total primary energy supply. Hydroelectricity contributed 9.9%, while biomass accounted for around 8.9%. However, much of this biomass corresponded to traditional sources such as fuelwood, charcoal and bagasse, used mainly in rural households and low-efficiency industrial activities. Wind and solar energy maintained marginal shares within the energy matrix, with only 0.43% and 0.34%, respectively. Similar to Colombia, the share of renewable energy within the primary energy matrix was considerably lower than what the weight of hydropower in electricity generation might suggest.

Sectoral consumption patterns help explain the persistence of this dependence on fossil fuels. In 2023, transport represented the main consuming sector, concentrating approximately 44.3% of total energy demand, the second highest share among the six countries analyzed, surpassed only by Ecuador. Industry and mining jointly accounted for 28.9% of final consumption, driven mainly by the use of natural gas for thermal processes and energy-intensive productive activities. The residential sector absorbed 17.7% of energy demand, while the commercial and public sectors accounted for 5.4% and 1.3%, respectively. This consumption structure shows that Peru's the main decarbonization challenges are concentrated in transport and energy-intensive industrial sectors.

ELECTRICITY MATRIX

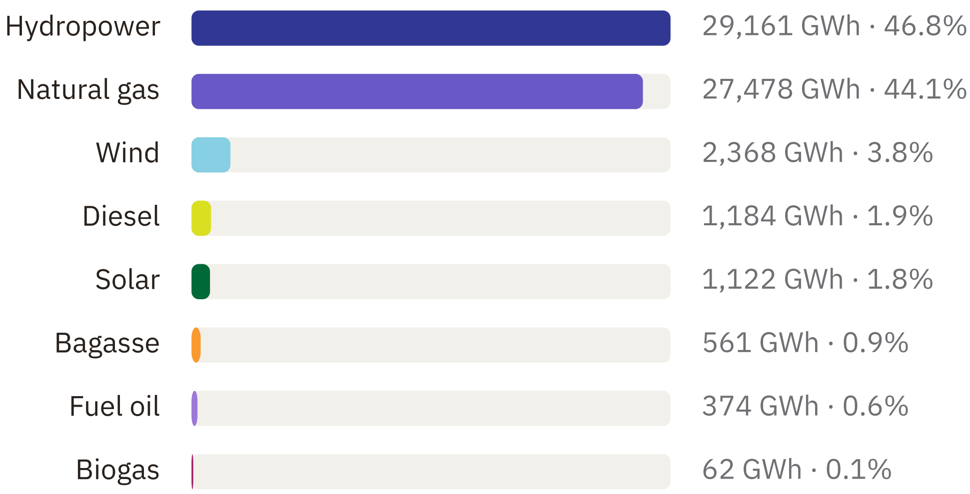
*The data and percentages used in this section are drawn from **Tables 29** and **30**.*

Table 29

ELECTRICITY SUPPLY SOURCES — 2024

Total: **62.209 GWh**

Grid-delivered electricity disaggregated by primary generation source.

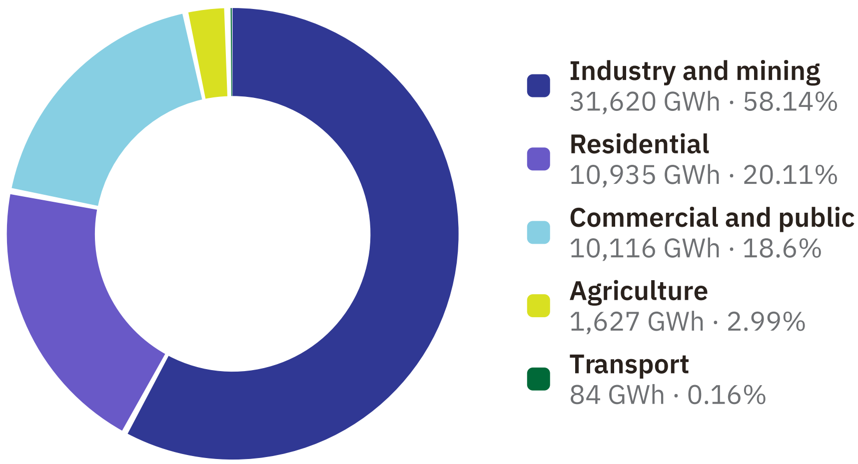


Source: Author's calculations based on data from Balance de Energía Nacional 2023.

Table 30

ELECTRICITY USE DISTRIBUTION— 2023

Total: **54.382 GWh**



Source: Author's calculations based on data from Balance de Energía Nacional 2023.
Notes:
- Agriculture: Includes the fishing industry.

Peru's electricity matrix is considerably more diversified and less carbon-intensive than its energy matrix. In 2023, renewable sources accounted for 53.4% of national electricity generation. Hydroelectricity was the main source, contributing 46.8% of the total, followed by wind (3.8%), solar (1.8%) and biomass (1%). Fossil fuels made up the remaining 46.6%, almost entirely dominated by natural gas, which supplied 44.1% of the electricity generated. Diesel and fuel oil maintained marginal shares of 1.9% and 0.6%, respectively.

Electricity consumption patterns reflect the weight of productive activities in Peru's economy.

In 2023, industry and mining jointly accounted for 58.1% of total electricity demand, making them by far the main consuming sector. The residential sector represented 20.1% of demand, followed by commercial activities with 18.6%. By contrast, transport used only 0.2% of the electricity consumed in the country, underscoring the very limited electrification of mobility in Peru.

The high share of industry and mining sets Peru apart from most of the countries analyzed and reflects the importance of the extractive sectors within its economy. This structure has made large mining companies increasingly relevant in the evolution of the electricity sector, particularly through their demand for new generation capacity and long-term supply contracts. At the same time, the limited participation of transport in electricity consumption highlights the considerable scope for advancing the electrification of mobility as part of a broader strategy to reduce greenhouse gas emission.[21]

CHINA'S ROLE

China's presence in Peru's energy transition is reflected primarily in its growing participation in mining, electricity distribution and technology supply chains. This trajectory has unfolded in parallel with the deepening of economic ties between the two countries, particularly since the entry into force of the Peru-China Free Trade Agreement (FTA) in 2010.

The tariff preferences established under the FTA have contributed to the growth of bilateral trade, especially in minerals and metals, reinforcing the centrality of extractive sectors within the economic relationship between the two countries.[22] However, several interviewees noted that the agreement lacks modern environmental and social provisions and that any future update should incorporate more robust on sustainability, transparency and governance.[23]

Mining is the main meeting point between China's presence and the Peruvian energy transition. Copper and zinc exports generate a significant portion of the country's tax revenues, while mining activity absorbs approximately one third of the national electricity demand. This makes the sector one of the main engines of the Peruvian economy and, at the same time, a central actor in any energy-transition strategy.[24] Chinese companies such as MMG at Las Bambas and Chinalco at Toromocho occupy key positions in this sector.

The most emblematic case is the Las Bambas copper mine, operated by MMG since its acquisition in 2014 from Glencore, the Swiss commodities and mining multinational.[25] Located in the south of the country, it is one of the largest copper mines in the world, with a production capacity of close to 400,000 tons per year and a contribution of approximately 15% to the national copper production.[26] The transfer of ownership took place in a context marked by unresolved social and environmental disputes. For its part, the Peruvian State allowed the operation to proceed without adequate oversight mechanisms or prior consultation with the affected communities, a failure that, as detailed below, led to prolonged conflicts.

As one of the interviewed experts explained, "in the Peruvian context, the energy transition exposes deep structural tensions linked to China's presence and to emblematic cases such as Las Bambas, where the change in ownership without prior consultation sparked prolonged conflicts and revealed the State's inability to ensure a just transition."[27]

It should be noted that this dynamic is not exclusive to Chinese companies. It reflects how extractive industries from different backgrounds operate in contexts characterized by persistent governance deficits, unmet social expectations and inadequate conflict-management mechanisms. What distinguishes the Chinese case is the combination of state-backed financing and diplomatic coordination that often accompanies these projects, integrating them into a broader bilateral relationship.

As Cynthia Sanborn, a specialist in Peru-China relations, points out, "The Chinese are present in mining; they have seven significant projects in the Ministry's portfolio, five of which are already operational. They also hold solar and wind assets in Marcona through the acquisition of Luz del Sur, which already had renewable projects."[28] This observation illustrates how China's presence in Peru links activities that are often analyzed separately. Mining, renewable generation and electricity infrastructure are part of the same network of investments linked both to the production of strategic minerals and to the energy supply required for their extraction and processing.

China's expansion has also reached strategic segments of the electricity sector. In 2020, China Yangtze Power, part of the Three Gorges group, acquired Luz del Sur from the U.S. company Sempra Energy. Four years later, China Southern Power Grid completed the acquisition of Enel Peru, including its operations in Lima. This operation was the largest Chinese acquisition in the Peruvian energy sector to date and gave Chinese state-owned companies control of the capital's two main electricity distributors.

As Sanborn summarizes, "the two main distributors and generators in Lima are now under Chinese control."[29] Beyond market share, these assets provide stable regulated income and a long-term strategic position within the country's most important electricity market. At the same time, they allow Chinese companies to consolidate their presence in one of the most profitable and politically significant segments of the Peru's energy system.

Their presence is concentrated mainly in specific hydroelectric and solar projects, often developed through engineering, procurement and construction (EPC) contracts led by companies such as PowerChina. These arrangements typically combine financing, construction and technology supply, reducing costs and accelerating execution timelines.

Their competitive advantage does not lie solely in costs. As journalist Jack Lo argued: "They're more tolerant of risk and more flexible in practice. Going back to Las Bambas, what businessperson wants to invest in a venture full of problems, even if it's one of the largest copper mines in the world? They take on the risk, adapt to local conditions, and if they see a chance to make money, they go after it anyway."[30] This readiness to operate in environments characterized by political uncertainty, social conflict or institutional weaknesses has enabled Chinese companies to expand into sectors where other international investors tend to be more reluctant.

China's presence is also visible in supply chains associated with the energy transition. Like all the other countries in the study, Peru relies heavily on solar modules and other components manufactured in China.

Despite their large presence in the electricity distribution sector, Chinese companies do not dominate the sector. Peru's transmission infrastructure, one of the main bottlenecks for integrating new renewable energy, remains largely controlled by Colombian, Spanish and Brazilian companies such as ISA, Redeia, Acciona, Alupar and Atlantica.[31] This diversification of operators limits the ability of any foreign actor to exert decisive influence over the long-term planning of the system.

Overall, China's presence does not, by itself, redefine Peru's energy transition, but it does amplify the tensions inherent in a model centered on resource extraction and limited state capacity. Rather than acting as a disruptive external force, China functions as an accelerator of dynamics already in place: sectoral concentration, dependence on strategic minerals and persistent governance vulnerabilities. Ultimately, Peru's energy transition is shaped largely by foreign companies from multiple countries competing for market access, in combination with the country's own political shortcomings and structural economic constraints.

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Chapter 3

COMPARATIVE PATTERNS OF CHINA'S PRESENCE IN SOUTH AMERICA'S ENERGY TRANSITION

Author: Gabriel Mariano Varón

This chapter draws on the quantitative data collected from 42 structured interviews conducted in the six focus countries. The data comes from standardized questionnaires completed by a diverse group of actors—government officials, academics, private-sector representatives and civil-society organizations—all of whom are directly or indirectly involved in energy-transition processes. The responses provide a systematic and comparable view of how China's role is perceived in the political, economic and institutional spheres of the region.

In addition to the 42 structured interviews, the fieldwork included 8 semi-structured interviews aimed at understanding the political, economic and institutional context of each country. These interviews complemented the research by providing qualitative elements for interpreting the results, but they were not incorporated into the dataset used for the quantitative analysis presented in this chapter.

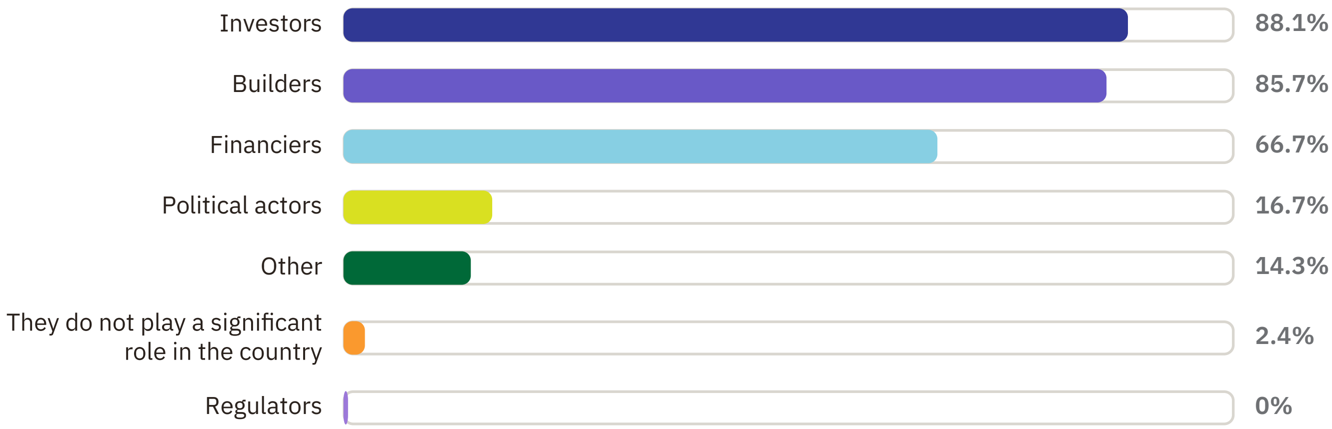
Following the same approach as the previous chapter, the analysis applies a risk-based analytical lens to interpret the findings. It outlines regional patterns of how Chinese capital, technology and diplomacy interact with local governance structures, investment priorities and competing foreign actors. In doing so, it goes beyond country-specific dynamics to identify broader geopolitical and economic trends that define China's growing influence on South America's energy transition.

MODES OF CHINESE ENGAGEMENT

According to the interviewees' perceptions, China's participation in the energy transition is exercised primarily through capital, technology and infrastructure construction. Interviewees consistently identified Chinese actors, first as investors (88.1%), second as builders (85.7%) and third as financiers (66.7%). Only 16.7% associated China's involvement with political actors, and none identified them as regulators.

ROLE AND PRESENCE OF CHINA IN THE ENERGY TRANSITION

What significant roles do Chinese actors (public and/or private) currently play in your country?



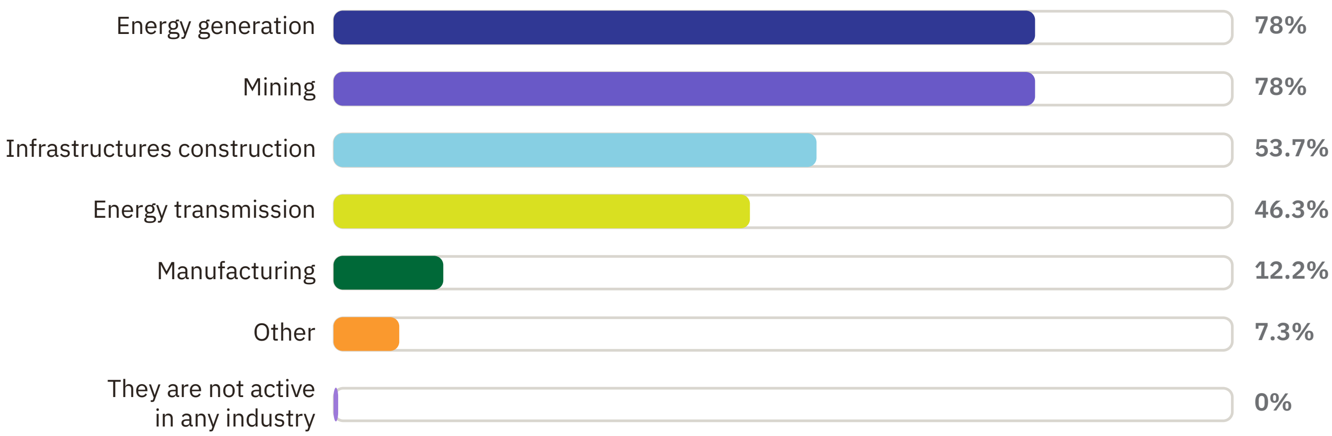
Chinese companies, occupy positions that anchor national energy systems to Chinese supply chains, engineering, and financing. Its visibility is therefore perceived as material rather than political.

As described by the participants, this pattern suggests a functional division of labor between the state and companies—both public and private—operating within a strategic framework defined by the Chinese Communist Party (CCP). China's overseas energy engagement is carried out by development banks, embassies and firms that respond to broad state-driven priorities, but without direct or continuous coordination among them. In this environment, actors may cooperate, compete or act independently, yet still move within the same overarching framework. The result resembles a form of embedded state capitalism,[1] in which diplomacy and business intertwine within an architecture of influence that blurs the boundary between commercial competition and strategic positioning.

SECTORS WHERE CHINA LEADS

China's sectoral footprint, according to the perceptions collected, mirrors its global comparative advantages. Across the six countries, its participation is seen as most prominent in energy generation and mining (78% in each case), followed by infrastructure construction (53.7%) and energy transmission (46.3%). By contrast, its role in manufacturing (12.2%) is viewed as marginal, suggesting not only the region's continued dependence on imported equipment but also the limited interest of Chinese companies in developing manufacturing capacity locally.

ROLE AND PRESENCE OF CHINA IN THE ENERGY TRANSITION
In which industries are Chinese actors most active in your country?



Although China's presence shows common features across the region, the perceptions collected reveal marked differences in how it manifests in each country. In Brazil, interviewees describe China as integrated across all segments—from hydroelectric plants and transmission lines to electric vehicles and battery production—within a framework of institutional cooperation.

In Argentina and Ecuador, its influence is seen as rooted in financing and turnkey delivery, substituting for domestic capital with limited capacity to fund and execute large-scale projects. In Chile and Colombia, participation is viewed as more diversified but still decisive in technological terms, particularly in solar and transport electrification. In Peru, interviewees note that control over mining and electricity distribution could give China direct influence over the country's energy base.

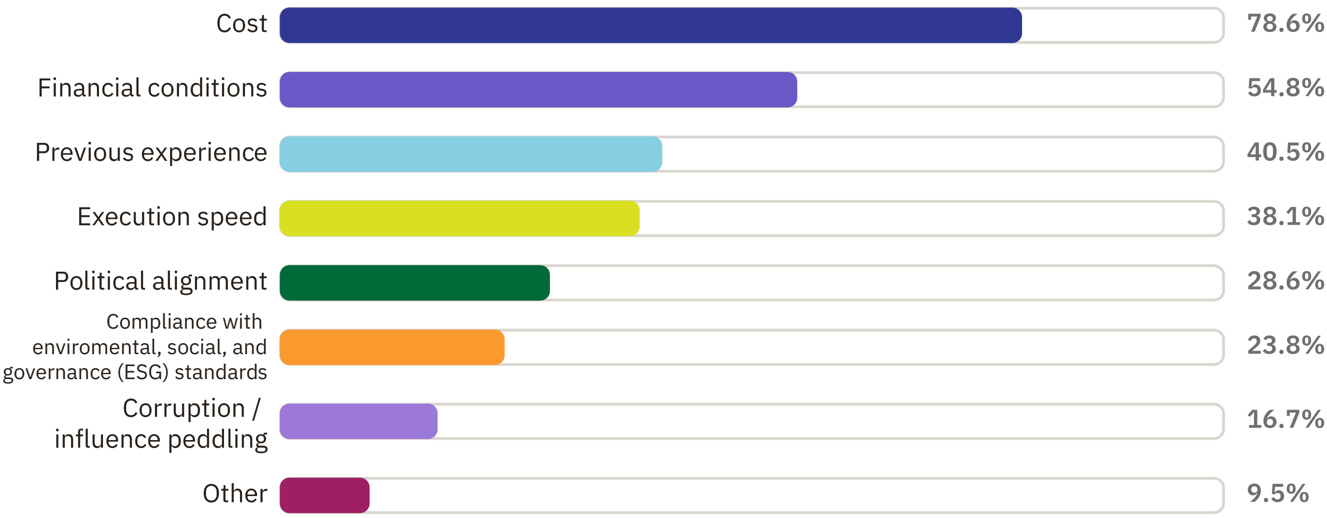
Taken together, these national trajectories point to a regional ecosystem of dependence in which China has become both a supplier and a creditor. The region's transition could then depend on infrastructure built by China and Chinese-sourced technology and services, creating a single point of vulnerability shared by multiple countries.

COMPETITIVE ADVANTAGES OF CHINESE COMPANIES

When asked what factors determine which foreign companies—regardless of their country of origin—secure domestic energy projects, almost 80% of respondents mentioned cost as the main criterion, followed by financing conditions (54.8%), previous experience (40.5%) and speed of execution (38.1%). Only one in four respondents indicated that ESG standards play a relevant role in these processes. It is equally noteworthy that political alignment received only 28.6%, while just 16.7% considered corruption or influence peddling to be decisive factors. Overall, these results suggest that, at least for foreign firms, there is no widespread perception that their success in the region depends on improper practices or extra-institutional political factors.

DECISION-MAKING AND INSTITUTIONAL FRAMEWORK

What do you consider to be the main factors influencing the selection of foreign companies for the development of energy and/or infrastructure projects in your country?

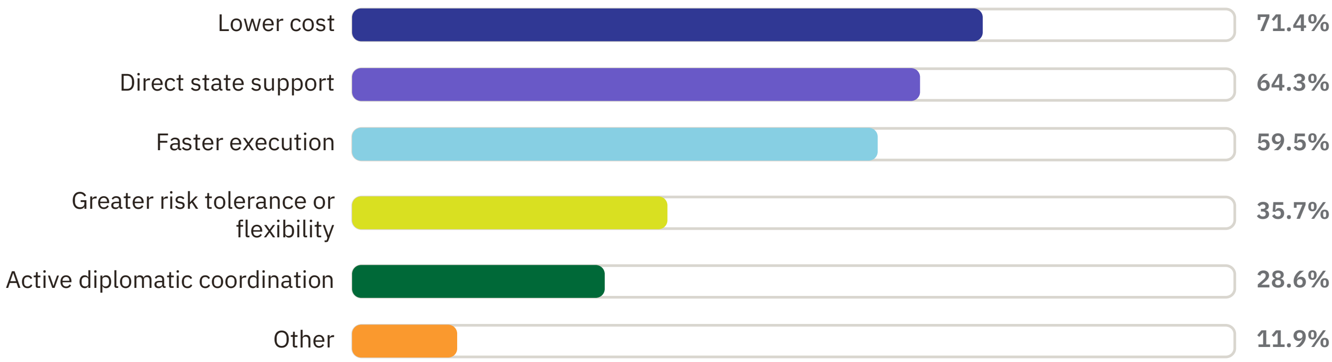


When asked about the competitive advantages of Chinese companies, interviewees highlighted low costs first (71.4%), followed by direct state support through financing and other guarantees (64.3%) and faster project execution (59.5%). It is notable that greater risk tolerance or flexibility toward local conditions received only 35.7%, suggesting that nearly two-thirds of respondents do not view Chinese firms as assuming significantly different levels of risk than their international peers. Likewise, all interviewees attributed at least a couple of competitive advantages to Chinese companies compared with other foreign actors; none stated that they lacked advantages.

These criteria align with the strengths typically attributed to Chinese companies in the region: competitive prices, state-backed financing, and rapid execution capacity. Engineering conglomerates such as PowerChina, State Grid or China Three Gorges Group are described by the interviewees as actors who, in their view, do not stand out for offering the highest governance or social-performance standards, but rather for their ability to deliver complete projects—design, financing, and construction—more quickly and affordably than many of their international competitors.

DECISION-MAKING AND INSTITUTIONAL FRAMEWORK

What competitive advantages do Chinese companies appear to have over other foreign actors in the energy and infrastructure sectors?



The compatibility between these competitive advantages and the priorities of South American governments can generate effects that go beyond strictly commercial competition. When countries' needs—particularly in terms of cost, financing and speed—align with the capabilities of an external actor, that actor tends to consolidate structural positions within the system. In this reading, Chinese companies would not only secure contracts but also embed themselves in the institutional logic of governments that prioritize affordability and operational continuity over more demanding regulatory processes, resulting in a form of structural anchoring.

Perceptions of governance vary significantly across countries. In Chile and Colombia, interviewees did not report substantive problems beyond those inherent to the sectors in which Chinese companies operate. By contrast, in Ecuador and Peru more pronounced tensions are documented, linked to cost overruns, transparency issues or socio-environmental impacts, while in Brazil and Argentina the experience depends largely on the state or province involved.

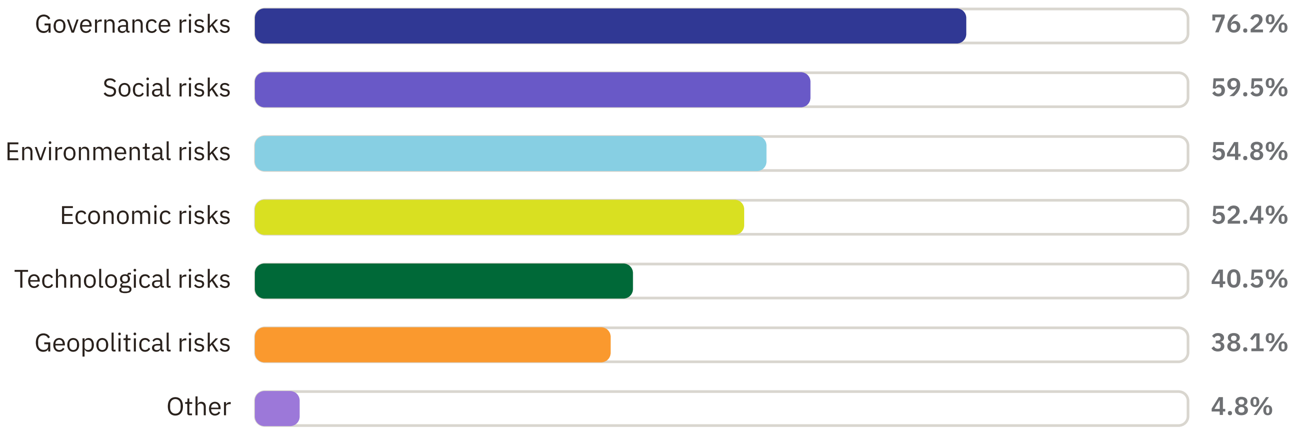
Rather than a uniform pattern, interviewees describe Chinese companies as adapting to heterogeneous institutional environments: they thrive where bureaucratic capacity is limited, yet also manage to operate without major frictions in more robust regulatory frameworks. This variation suggests that the interaction between Chinese firms and local governance depends less on intrinsically "Chinese" factors—such as operational capabilities or corporate standards—and more on how state and business actors position themselves within the specific institutional conditions of each country.

GOVERNANCE AND RISK

According to the interviewees, the main risks associated with the energy transition are not technological or geopolitical, but institutional. Governance risks (76.2%) and social risks (59.5%) are perceived as more decisive than concerns about foreign dependence or political interference.

RISKS, OPPORTUNITIES, AND STRATEGIC PERSPECTIVES

What do you consider to be the main risks associated with the energy transition in your country?



Interviewees frequently described unstable institutions, overlapping mandates, and policy discontinuity as the most serious threats to investment. Social risks, in turn, are associated with the exclusion of communities from decision-making, which generates recurrent conflicts over land use and benefit distribution. In this context, projects financed or built by Chinese companies often emerge as focal of tension not because of their country of origin, but because they operate in environments where safeguards are weak or inconsistent.

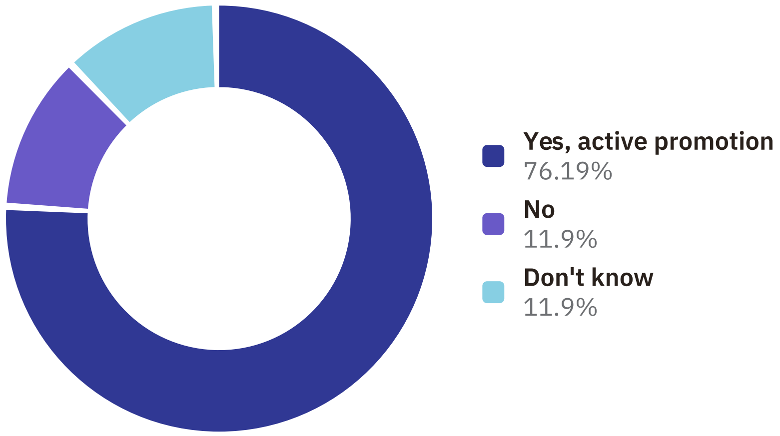
It should be noted that technological dependence was rarely considered a dominant risk. Only 40.5% of interviewees mentioned it, and most interpreted it as an economic rather than a strategic issue. Chinese technology is viewed as accessible and affordable, and the associated dependence is perceived as inherent to the development of capabilities that the region does not produce locally, rather than as a specific risk stemming from the supplier's origin. For many South American actors, technological dependence is structural and expected; in sectors linked to the energy transition, it simply happens to fall on China, but could just as well fall on any other foreign supplier. This contrasts with debates in the Global North, where China's role is often framed in security terms. In South America, according to the evidence gathered, a reading of pragmatic interdependence predominates.

DIPLOMATIC COORDINATION

Beyond price and performance, interviewees emphasized that China's success in the region is reinforced by diplomatic coordination. More than three-quarters (76%) said that Chinese embassies or government agencies actively promote and support the operations of Chinese companies. According to respondents, this sustained diplomatic engagement gives Chinese firms an advantage that companies from other countries can match.

ROLE AND PRESENCE OF CHINA IN THE ENERGY TRANSITION

Do the Chinese embassy or other Chinese government agencies actively promote Chinese companies in your country?



According to the responses, embassies facilitate introductions to ministries, resolve bureaucratic disputes and help secure financing guarantees from state banks. In several countries, interviewees noted that Chinese diplomats play an active role in local media and public communication, framing Chinese projects as contributions to sustainable development and modernization. This visibility, in the view of some interviewees, enhances political legitimacy and social acceptance, particularly in countries with limited state capacity for public communication.

The combination of diplomatic support and financial integration gives Chinese firms the ability to sustain long-term commitments even when political conditions change. In Brazil and Chile, it helps them navigate complex regulatory systems. In Ecuador and Peru, it compensates for institutional volatility. Across the region, this fusion of diplomacy and commercial activity could turn China's corporate presence into a lasting geopolitical instrument.

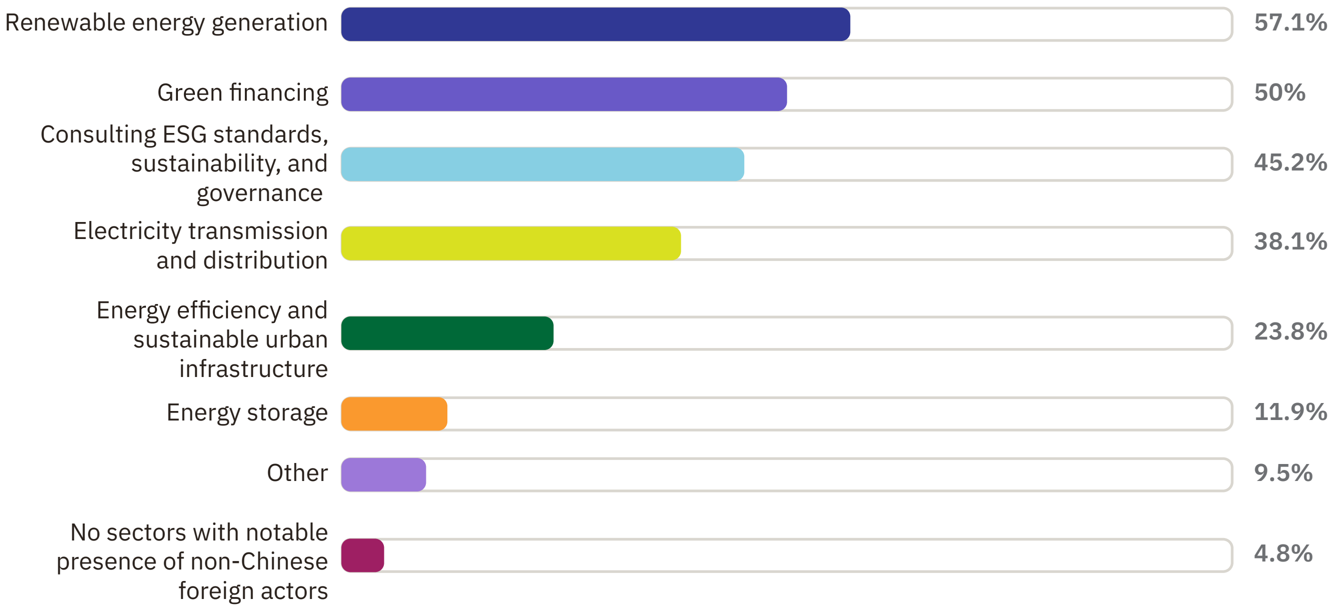
To be sure, the promotion of national companies is part of the routine functions of any embassy. However, the activities of the Chinese diplomatic corps in the region appear to go a step beyond what is typically observed in other representations. The regular presence of Chinese ambassadors and senior officials at corporate project inaugurations, the frequency with which they publish opinion pieces in local media, and the visible coordination between embassies and companies in sponsorship and promotional activities constitute practices that, while not exclusive to China, are deployed with an intensity and visibility rarely seen in other diplomatic services. This difference does not imply a normative judgment, but it does help contextualize why interviewees perceive Chinese diplomatic backing as offering a comparative advantage that is difficult for other countries to replicate.

OTHER FOREIGN ACTORS AND THE ABSENT COUNTERWEIGHT

China's active presence does not imply the absence of other foreign participants. Western, multilateral and regional actors continue to play a significant role in several niches, particularly in renewable generation, financing and sustainability consulting. Interviewees most frequently associated non-Chinese international partners with renewable energy projects (57.1%), green finance mechanisms (50%) and ESG or sustainability advisory services (45.2%). Their presence declines in more capital- or infrastructure-intensive segments, such as transmission (38%) and storage technologies (12%).

OTHER FOREIGN ACTORS AND COMPARATIVE VALUE

In which sectors related to the energy transition do non-Chinese foreign actors have a notable presence?



According to the perceptions collected, this distribution reveals a functional division of labor. European and multilateral institutions are described as more influential in shaping norms, financing frameworks and environmental standards, whereas Chinese companies dominate the material and technological execution of projects. In this reading, Western engagement—especially European—would tend to shape the regulatory environment, while China configures the physical landscape.

Attitudes toward greater participation of non-Chinese actors are mixed. More than half of interviewees (55%) expressed interest in greater involvement from other partners, while 40% did not consider it necessary. National patterns diverge. In Chile, where the system is already diversified, most viewed the entry of additional foreign actors as unnecessary. In Ecuador, however, there was a clear demand for diversification, with calls for greater participation by European and US companies to balance China's influence. Argentina, Brazil and Peru showed divided views, whereas Colombia generally framed the issue as an opportunity for complementarity rather than competition.

Across the region, interviewees consistently pointed to the limited role of the United States. Despite its political influence in South America, U.S. presence in the energy transition is perceived as weak. Interviewees repeatedly contrasted the visibility of European—mainly Spanish and Italian—and Chinese actors with the relative absence of U.S. engagement, which in practice creates a competitive void at a moment when the region's energy systems are being redefined.

NOTES

1. ‘Embedded state capitalism’ refers to the insertion of Chinese business activity into the state’s diplomatic and financial networks, intertwining commercial and strategic interests. For more detail, see Barry Naughton (2018) and Peter Evans (1995).

Chapter 4

ANALYSIS AND POLITICAL IMPLICATIONS

Author: Parsifal D'Sola Alvarado

CHINA'S STRATEGIC LOGIC

The empirical analysis presented in this report reveals a consistent pattern in China's participation in South America's energy transition. Across the six countries analyzed, Chinese actors systematically concentrate their activity in clearly defined sectors. Far from reflecting isolated investment decisions, this pattern points to a long-term strategy driven by relatively stable priorities that guide the behavior of Chinese actors abroad.

In the specific case of Latin America and the Caribbean (LAC), these priorities are articulated explicitly in China's third Policy Paper on LAC, published in December 2025.[1] In the Chinese political system, this type of document serves a function that goes beyond mere statement of intent. Its main purpose is to communicate the strategic priorities of the Party and to guide the decision-making of different political and economic actors toward those objectives. Although these actors retain some agency in deciding how to pursue those objectives, their room for maneuvering is clearly constrained in advance.[2]

The evolution of China's private sector reflects how this model operates. Subsidies, preferential financing and other forms of state support are concentrated in sectors deemed strategic for China's national development and international presence. It is therefore no coincidence that Chinese companies have secured positions of world leadership in industries such as electric vehicles, batteries and solar panels. It should be noted that the dynamism of these sectors does not reflect an absence of competition; on the contrary, competition among Chinese firms is intense.[3] What distinguishes this model is that such competition unfolds within an incentive structure that channels private capital toward the sectors defined by the Party, even at the cost of introducing certain distortions into the market.[4]

China's Policy Paper for LAC also performs an important outward-facing function: it presents Beijing's lines of action through language that resonates with the needs and aspirations of Latin American countries. The document makes no reference to concepts traditionally associated with Western foreign policy, such as democracy, human rights, or institutional reform. Instead, its discourse is structured around infrastructure development, industrialization, energy production, technological innovation, and supply chains. In other words, it is a development "sales pitch".

This formulation aligns remarkably well with the findings from the fieldwork. Interviews show that, for many of South America's public and private actors, energy transition is understood less as a climate objective than as an opportunity to promote national development. In this sense, China has crafted an energy-transition discourse that is in tune with the prevailing perception in the region.

Understanding why Beijing structures its relationship with the region in this way requires moving beyond the content of the discourse and examining the political logic that underpins it. This, in turn, demands shifting the focus away from conventional conceptions of national interest and toward the priority that organizes China's political system: preserving the Chinese Communist Party's monopoly on power. As former Australian Prime Minister Kevin Rudd points out: "What are the core priorities of Xi Jinping's administration at home and abroad? They intersect in this institution called the Party. The interest of the Chinese political leadership is for the Party to remain in power. That is the No. 1 priority, the No. 2 priority and the No. 3 priority."[5] From this perspective, many of the policies that Beijing presents as sectoral objectives—from industrial modernization and technological leadership to energy security or decarbonization—take on a different meaning. Rather than ends in themselves, they function as instruments to reinforce the Party's capacity to sustain its legitimacy and ensure its continuity as a hegemonic actor within the political system.[6]

This distinction is not merely conceptual. Asking the question "What are China's interests?" often leads to broad and sometimes ambiguous responses. A more useful analytical framework is asking how a given policy, investment or project contributes to the Chinese Communist Party's strategic objectives. In the context of the energy transition, for example, the relevant question is not only why China invests in lithium, power grids or electric-vehicle manufacturing, but how these sectors strengthen the Party's capacity to sustain economic growth, technological leadership and, ultimately, it's political legitimacy. This shift in perspective makes it possible to interpret more clearly the selection of sectors, the behavior of the different Chinese actors and the priorities that guide their engagement in the region.

Understanding this logic does not imply assuming that China acts as a monolithic actor or that all its projects stem from centralized planning. It means recognizing that, behind the diversity of actors and initiatives, there is a shared political and institutional framework that guides their behavior. For South American countries, adopting this analytical lens makes it possible to understand more precisely the logic underpinning China's engagement beyond the energy transition and to formulate public-policy responses better adapted to that reality.

WHAT SHOULD SOUTH AMERICA EXPECT?

Understanding the foundations of China's political organization has practical implications that go beyond explaining its international behavior. It also provides a more solid basis for anticipating the overall direction of Beijing's actions. For South American governments, this means shifting the focus away from individual projects and foreign direct investment toward China's strategic priorities, which give those projects continuity. Actors, technologies and investment opportunities may change over time; the Party's strategic priorities will not. Starting from this premise would facilitate designing a long-term foreign policy toward China, rather than reacting in isolation to each immediate circumstance.

Critical minerals illustrate this logic clearly. For Beijing, resources such as lithium, copper, rare earths, and nickel are strategic inputs for industrial modernization, technological leadership and the strengthening of China's position within global value chains. Their importance therefore lies in the fact that they simultaneously contribute to long-term economic growth, reduce external vulnerabilities—particularly in relation to the United States—and reinforce the capabilities on which the Party's competitiveness and legitimacy rests.

The same logic applies to electricity infrastructure. The country-level analyses in this report show that China's participation has systematically expanded beyond electricity generation into transmission, distribution and, increasingly, the digitalization of electricity systems. This pattern reflects a strategy aimed at strengthening its presence in infrastructure essential for the expansion of renewable energy, electrification and long-term energy security. The acquisition of hydroelectric assets in Colombia by Three Gorges Corporation, China Southern Power Grid's interest in modernizing Ecuador's transmission network, Huawei's smart-grid solutions, the fiber-optic networks integrated by State Grid into transmission lines in Brazil and Chile, and Goldwind's wind projects with proprietary control systems in Argentina all constitute distinct expressions of this underlying model.

The research suggests that China's participation in South America is gradually expanding from extractive activities toward industrial development. Although mining will remain a pillar of the commercial relationship, China's main comparative advantages are concentrated in industries associated with the energy transition. Electric vehicles, battery manufacturing, photovoltaic technologies, and digital infrastructure form part of an industrial ecosystem that Chinese firms are steadily expanding worldwide. This trend, illustrated in the region by the recent investments by BYD and GWM in Brazil, aligns with the priorities set out in the 2025 Policy Paper.

CHINESE INSTITUTIONS, INCENTIVES AND ACTORS

A more strategic engagement with China depends on interpreting Chinese actors within the institutional environment from which they emerge. This requires situating those actors in the political context that shapes their incentives, constraints and relations with the CCP.[7]

In practice, analyses of Chinese actors tend to oscillate between two equally limited interpretations. The first conceives them as mere instruments of the Party-State, assuming that state-owned enterprises operate under direct political instructions from Beijing and that private firms function as simple extensions of the CCP. The second treats them as conventional market actors, comparable to companies operating in open markets under liberal democratic institutions.

The most useful analytical approach lies between these two extremes. Chinese companies compete, seek profitability and make business decisions. However, that autonomy operates within boundaries defined by China's political system. Economic logic retains some latitude, but it does not override the Party's political priorities when the two come into conflict.

This is precisely why, in the case of China, the categories of State-owned and private enterprises lose part of their explanatory power. A state-owned firm such as State Grid or China Three Gorges cannot be analyzed as the functional equivalent of Petrobras or Ecopetrol solely because they are all state-owned enterprises. Similarly, a Chinese private company like Huawei cannot be interpreted under the same analytical assumptions as a comparable firm operating under a democratic regime.

Dispute resolution illustrates this difference well. When commercial disputes arise with firms operating in democratic market economies, their counterparts can typically rely on relatively independent judicial systems, corporate governance structures with a greater degree of autonomy, and established mechanisms for dispute resolution.

In China, by contrast, the authority exercised by the CCP over the institutions responsible for regulation, oversight, and the administration of justice—together with the close relationship between the Party-state and firms deemed strategic—means that commercial disputes become intertwined with broader political and diplomatic considerations.

These institutional differences become even more important because the energy transition is no longer confined to energy infrastructure. It increasingly relies on digital infrastructure, intelligent grid-management systems, data platforms, and other technologies with regulatory and national-security implications. In this context, understanding the institutional environment in which Chinese actors operate is essential for defining technological standards, governance frameworks, and data-protection mechanisms that align with states' strategic interests.

Adopting this analytical framework does not imply that cooperation with Chinese actors should be ruled out. Nor does it prescribe confrontation or disengagement as default political responses. Rather, it applies a basic principle of comparative political analysis: institutions shape behavior. Just as governments routinely take into account differences in legal systems, regulatory traditions, and corporate governance when working with foreign partners, they should also consider the distinctive institutional features of China's political economy and system of governance. Doing so provides a more realistic basis for assessing risk, negotiating agreements, and formulating long-term development strategies.

TOWARDS A STRATEGIC APPROACH

The analysis of China's presence in South America would benefit from a fundamental shift in perspective. Debates on this topic are often framed in terms of false dichotomies: whether the Chinese presence should be welcomed or rejected; whether it represents an opportunity or a source of dependence; whether it poses a risk to national security or not. These approaches are of limited use for policymaking because they are based on overly reductive analytical frameworks. China's involvement in South America is a structural reality that governments must manage. Moreover, dependence—on China or any other international actor—is not a condition that can simply be avoided, but a structural feature of global production chains and South America's historic reliance on foreign technologies, capital and expertise. The relevant question, therefore, is how governments can engage with China in ways that maximize opportunities for national development while minimizing the risks and vulnerabilities arising from that relationship.

First, governments should shift their approach, moving from attracting investment to building value chains. The goal should not be to maximize the volume of Chinese capital entering the region, but to identify components of China's industrial strategy that can contribute to national capabilities. Policies focused exclusively on foreign direct investment risk reinforcing South America's traditional role as a supplier of commodities. Conversely, policies that prioritize manufacturing, technology transfer, supplier development, workforce training, and industrial ecosystems are more likely to generate lasting economic benefits.

Second, the relationship with China is usually analyzed almost exclusively through the lens of South America's vulnerabilities. This approach overlooks the fact that Beijing also faces important structural constraints. China's development model requires secure access to critical minerals, food, energy, external markets, and reliable trade routes, precisely the areas in which South America holds comparative advantages. As strategic competition with the United States intensifies and restrictions on Chinese technologies and exports widen across the West, South America's importance to Beijing increases. Consequently, although the relationship remains one of asymmetric interdependence, the evolving international environment tends to strengthen South America's bargaining position.

Third, the energy transition can no longer be addressed as a sectoral policy. Its scope extends beyond the Ministries of Energy and Environment and requires coordination of industrial policy, foreign policy, and national security. Consequently, managing it requires a whole-of-government approach that aligns these areas around common long-term development goals rather than treating them as isolated sectoral issues.

Fourth, the renewed interest of other advanced economies in South America widens the region's room for maneuver. The U.S. national security policy published in late 2025 explicitly places the Western Hemisphere—and competition with China—among its main strategic priorities. The European Union, for its part, accelerated negotiations on the Mercosur–European Union Agreement in a context marked by growing geopolitical competition and the search for access to strategic resources and critical value chains. Australia offers extensive experience in mining governance and in managing a complex economic relationship with China. Seizing these opportunities can broaden the options available to the region and prevent any external actor from securing a dominant position in sectors strategic to South American development.

Finally, the region's political fragmentation should not prevent the development of new forms of cooperation. South American governments have historically struggled to sustain ambitious integration initiatives, and there is little reason to expect this pattern to change in the short or medium term. Nevertheless, the absence of effective political coordination does not mean that economic integration dynamics are absent. Companies are already building regional supply chains; universities are collaborating on research; industry associations are exchanging technical knowledge; electricity companies are coordinating cross-border systems; and mining clusters face increasingly similar technological and regulatory challenges. These networks offer a more pragmatic basis for advancing integration mechanisms than recurring attempts to build political blocs without institutions capable of ensuring continuity. In this respect, a bottom-up strategy, focused on developing industrial ecosystems and driven by the private sector, may prove more resilient than schemes led exclusively by governments, precisely because it depends less on electoral cycles and shifts in political direction.

By way of conclusion, this study highlights a fundamental asymmetry. China's approach toward South America is grounded in relatively stable priorities and in an increasingly deep understanding of each country in the region. In much of South America, by contrast, the relationship with China continues to be managed in a predominantly reactive manner and through analytical frameworks that oversimplify the nature of Chinese actors and the interests that guide their actions. If the region aspires to engage with China on better terms, it must start by designing a strategy of its own and developing the technical and institutional capacities needed to sustain it.

NOTES

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APPENDICES

METHODOLOGY

This section presents the theoretical framework, the research approach and the procedures followed during the fieldwork.

DEFINITION OF ENERGY TRANSITION

The study deliberately avoids adopting a single definition of “energy transition”. One of its central goals was to document how the concept is understood and operationalized in the specific context of each country.

The evidence gathered during the fieldwork revealed that the meaning of the energy transition varies considerably depending on national priorities, institutional capacities, and sectoral perspectives. In some countries, the concept is closely linked to environmental sustainability and decarbonization; in others, it is framed around energy security, industrial policy, or technological modernization.

Recognizing this diversity of interpretations was essential to developing a contextualized analysis that reflects the range of approaches present in South America. It also highlights that energy transformation processes in the region are shaped not only by global trends in the sector, but also by different political, economic, and social realities.

GENERAL GUIDELINES

The report employs a mixed qualitative-quantitative methodology that combines descriptive and analytical tools. The descriptive component identifies the main actors, regulatory frameworks, investment patterns, and perceptions that shape the regional energy transition. The analytical component examines the relationships, tensions, and strategic implications that emerge from these dynamics, with particular attention to China’s role in financing, infrastructure development, and energy governance.

From a qualitative perspective, the study draws on semi-structured interviews with policymakers, private sector representatives, researchers, and other relevant actors, complemented by a review of academic literature, policy documents, institutional reports, and specialized media coverage. These sources were used to identify and compare the political, economic, and institutional factors that shape national transition strategies and China’s involvement in the associated sectors.

The quantitative component supports the analysis through the collection and comparison of official data on national energy profiles, foreign participation, investment flows, natural-resource extraction, and energy production projects. In parallel, structured questionnaires were administered to interviewees, and the responses were processed using descriptive statistical methods to identify percentages, distributions, and response trends. The protocols used for this quantitative analysis are detailed in the corresponding subsection. Taken together, these data allow comparisons across countries and sectors, as well as the identification of convergences and divergences in China's involvement in the region.

The research was conducted in three phases:

1. **Documentation:** A review of the literature and secondary sources aimed at contextualizing the regional transition dynamics as defined by local actors, building national energy profiles, and mapping the presence of China and other extra-regional actors in sectors linked to the transition process.

2. **Fieldwork:** Conducting structured interviews and collecting empirical data in selected countries, in order to identify perceptions, institutional dynamics, and strategic positioning surrounding the energy transition.

3. **Data analysis:** Systematization, classification, and triangulation of the information gathered during the previous phases. At this stage, the results of the interviews, the energy profiles, and the documentary sources were integrated to identify common patterns, national differences, and regional trends related to the transition to a low-carbon economy and China's involvement.

Taken together, this mixed strategy combines empirical evidence with interpretive analysis, offering a comprehensive understanding of the technical, political, and social dimensions that shape the transition processes in the region and China's involvement in the associated sectors.

SCOPE AND GEOGRAPHIC COVERAGE

The research focused on the South American subcontinent, limiting its scope to six strategically selected countries: Colombia, Ecuador, Chile, Argentina, Brazil, and Peru. Together, these countries embody diverse economic, political, and energy contexts, offering a representative cross-section for comparative analysis.

The specific rationale for including each country is as follows:

- **Argentina:** With vast untapped renewable potential—particularly wind resources in Patagonia, solar in the northwest, and extensive lithium reserves—Argentina stands out as a prospective renewable energy leader in the Southern Cone. Its evolving regulatory environment and its engagement with global partners reinforce its relevance.

- **Brazil:** As Latin America's largest economy, Brazil's predominance in hydroelectricity, biofuels, and offshore wind positions it as a central actor in regional and global energy trends. Moreover, its extensive collaboration with Chinese state-owned enterprises offers essential insights into the intersection between energy development and geopolitical factors.

- **Chile:** A world leader in lithium extraction and renewable energy deployment, especially solar and green hydrogen, Chile exemplifies a proactive national policy on the energy transition and plays a decisive role in shaping regional standards.

- **Colombia:** With untapped wind and solar potential – particularly in the La Guajira region – and growing interest in critical minerals such as copper and lithium, Colombia is emerging as a rising actor in the energy transition, combining resource potential with a favorable regulatory framework.

- **Peru:** Its vast water and solar resources, together with deep Chinese investment in the country's energy and mining sectors, make Peru a key case for examining the relationship between local development, governance, and foreign influence.

- **Ecuador:** The country's strong hydroelectric base and its growing interest in renewable diversification have made it a prominent recipient of Chinese investment. Its experience illustrates both the opportunities and the governance challenges associated with external financing and state-led energy development.

This geographic scope provides a coherent subregional framework that encompasses approximately 82% of South American territory and 85% of its population. The decision to focus on South America — rather than Latin America as a whole — reflects significant structural differences within the broader region. In comparative terms, South American countries share greater similarities in territorial scale, energy resource endowment, infrastructure needs, and institutional frameworks than the states of Central America and the Caribbean, whose smaller economies and particular energy dynamics often require a distinct analytical treatment. Mexico was also excluded on account of its distinctive economic and geopolitical configuration, shaped largely by its proximity to the United States and its integration under the USMCA/T-MEC framework. These factors generate energy, trade, and investment dynamics that differ substantially from those observed in South America.

Special case: Colombia

Although efforts were made to maintain methodological standardization during fieldwork, Colombia presented characteristics that required a differentiated approach. These differences stem from the country's specific relationship with China and the still-limited scope of bilateral cooperation in the energy sector.

Previous research initiatives by the Andrés Bello Foundation – Latin American-Chinese Research Center had identified that Colombia's engagement with China is at an early stage and is only beginning to expand into areas such as renewable energy. China's involvement is notably less significant than in the other countries analyzed, as reflected in the smaller number of strategic projects and financing arrangements.

From a methodological standpoint, the Colombian case warranted a differentiated treatment. The smaller number of interviews—focused mainly on government officials and academics—corresponds to the relatively low intensity of bilateral exchanges in the energy sector. Despite these limitations, this variation enriches the regional comparison by introducing nuance about the asymmetry of China's presence and influence in South America.

Given the small number of interviews, the available material did not allow for the construction of quantitative matrices or statistical distributions equivalent to those developed for the other countries. Consequently, when reference is made to the interview data, citations refer collectively to "the interviewees" or, where appropriate, by name and institutional affiliation. In cases where anonymity was requested, only the respondent's professional sector is indicated (e.g. journalist, government official, academic, or official source).

ENERGY PROFILES

In parallel with the interviews, national energy matrices were developed for each of the six countries based on official data from the respective governments. These matrices included information on:

- **Sources of total primary energy generation:** All energy resources used in their initial state, prior to transformation, including fossil fuels (oil, natural gas, coal), renewable sources (solar, wind, hydro, biomass), nuclear energy, and other minor sources such as geothermal or waste-to-energy generation.

- **Sources of energy imports:** All imported energy resources used prior to processing, including fossil fuels, renewables, and nuclear energy.

- **Total electricity generation:** Electricity supplied to the grid, disaggregated by primary source.

- **Main energy-consuming sectors:** Economic and social sectors where final energy use is concentrated after transformation and transport losses.

The triangulation of these quantitative data with the qualitative evidence obtained through the interviews made it possible to develop comprehensive national energy profiles. Each profile examines how the country combines hydrocarbons and renewable energies in its energy matrix, and identifies the main opportunities and constraints associated with diversification.

The profiles also include a synthesis of the national regulatory framework, an overview of the electricity and total primary energy matrices, and an assessment of the main risks and challenges associated with the energy transition, including China's involvement in each area. Although all the profiles follow a common analytical structure, the specific experiences and priorities of each country determine their particular emphases. This methodological flexibility seeks to account for national specificities and to support an analysis anchored in the local context.

FIELDWORK AND INTERVIEWS

The fieldwork in each country aimed to capture the perceptions of relevant actors, institutional dynamics, and strategic positioning surrounding the energy transition and China's growing role in it. A total of 50 interviews and contextualization consultations were conducted across the six countries, spanning a broad spectrum of actors, including current and former government officials, private-sector executives, specialized journalists, civil-society representatives, academics, former policymakers, and members of the diplomatic community.

The interview process combined three complementary instruments.

First, 42 interviews were conducted using a structured questionnaire designed to generate comparable responses across countries. These interviews formed the basis of the report's quantitative analysis. The distribution of interviews was as follows: Ecuador (11), Brazil (8), Chile (7), Peru (7), Argentina (5) and Colombia (4). The complete list of interviewees, with names and institutional affiliations where consent was granted, appears in the appendices.

The questionnaire included 23 questions organized into six analytical categories:

1. **Definitions and perceptions of the energy transition:** Identification of key sectors, national priorities, and the predominant narrative frameworks surrounding the energy transition.

2. **Decision-making and institutional frameworks:** Examination of the mechanisms for selecting foreign partners, as well as transparency, quality, and coordination of regulatory frameworks.

3. **Standards and social impact:** Assessment of the mechanisms for community participation, consultation, and civil-society involvement in the oversight of energy projects.

4. **Risks, opportunities, and strategic perspectives:** Mapping of the economic, social, environmental, technological, and geopolitical risks and opportunities associated with the transition process.

5. **China's role and presence in the energy transition:** Analysis of China's sectoral footprint, its competitive advantages, and its operating models in the region.

6. **Other external actors and comparative value:** Assessment of the presence of other international actors, identifying areas of complementarity, cooperation, or competition.

These categories provided a common analytical framework that facilitated cross-country comparison and made it possible to identify convergent and divergent trends in actors' perceptions of the risks and opportunities associated with the involvement of Chinese actors. Before each interview, participants signed an informed consent form specifying whether the conversation could be recorded and how they wished to be cited in the study: with full identification, with partial anonymization, or with complete anonymity. These forms are archived and referenced in the appendices. This procedure ensured compliance with the ethical standards of transparency, confidentiality, and informed consent at all stages of data collection.

Second, eight open-ended semi-structured interviews were conducted to obtain contextual and interpretative perspectives that could not be captured through standardized questionnaires alone. These interviews focused on national policy dynamics, institutional conditions, governance challenges, actor's perceptions, and each country's specific understandings on the energy transition and China's role in the sector. They were used primarily to strengthen the qualitative analysis and situate quantitative findings in their local contexts.

Third, the research was enriched by five exploratory background conversations with specialists and actors with extensive knowledge of the sector. These exchanges were not treated as part of the formal analytical dataset and were not included in the statistical processing of responses. Instead, they contributed to actor mapping, the identification of additional interviewees, the selection of material from relevant sources, and the general contextualization of national dynamics.

SOURCES AND REFERENCES

All references follow the Chicago Manual of Style, 17th edition, Notes and Bibliography format, with full footnotes at first mention and shortened notes thereafter. For online sources, the publication date is used instead of the access date.

Primary sources

- **Interviews:** Conducted between April and October 2025 under informed consent. Identified interviews cite the interviewee's name, position, interview format, and date. Partially or fully anonymous interviews cite only the respondent's professional category, city, and month/year.

- **National energy and electricity matrices:** All figures were compiled directly from national government sources, primarily energy ministries, planning commissions, market operators, and regulatory bodies (for example, the Ministry of Energy, ONS/CAMMESA/CENACE/COES/UPME, as applicable). Each data point is referenced in a footnote with its source publication, bulletin, or statistical portal.

Secondary sources

- Data sets and policy documents of multilateral organizations (IEA, ECLAC, World Bank, IDB, IMF, CAF).
- Peer-reviewed articles and academic working papers (Scopus, JSTOR, ScienceDirect).
- Leading news media and specialized publications, used selectively to contextualize specific projects.

DATA PROCESSING FOR THE ENERGY AND ELECTRICITY MATRICES

Provenance: The numerical data were transcribed from official national publications and statistical portals. Where multiple official series existed, priority was given to regulators and system operators for operational data, and to ministries or planning agencies for data on the structural composition of the matrix and installed capacity.

Harmonization: Units were standardized to gigawatt-hours (GWh) for electricity variables and kilotonnes of oil equivalent (ktoe) for energy variables. Monetary values were converted to US dollars (USD) where necessary, with the corresponding base year indicated in the relevant tables. Any methodological break or difference in definition is noted in the footnotes of the national appendices.

Quality control: All entries were verified by a second researcher against the original publication in PDF format or the source portal. When discrepancies were detected between two official series, the hierarchy described above was applied, and the rationale for the final selection is indicated in the corresponding footnote.

Transparency: The values in the infographics are traceable to the source-labeled tables included in each national appendix. Readers can verify the calculations directly from these tables and the cited government documents.

TRIANGULATION AND HIERARCHY OF SOURCES

Where national official data conflict with the compilations of multilateral organizations, national sources prevail for the energy matrices and system operation data. Multilateral sources are used to verify trends or fill information gaps and are referenced in footnotes accordingly.

INTERVIEW INSTRUMENT

PART A - Closed-ended questions (to be completed before the interview): this section includes closed-ended questions (multiple choice, scales, or yes/no) that we kindly ask you to complete prior to the interview. Please maintain the original format of the questionnaire when entering your answers, as this information will be used for quantitative analysis and must be comparable across interviewees.

PART B - Open-ended questions (for prior review ahead of the interview): this section contains the questions that will be addressed during the in-person interview. We share them in advance so that you may review the key topics, and, if you wish, prepare arguments, examples, or insights you would like to contribute to the conversation.

SECTION 1: DEFINITIONS AND PERCEPTIONS OF THE ENERGY TRANSITION

1A. What types of projects and/or sectors are primarily associated with the green energy transition in your country? (Check all that apply)

[ ] Renewable energy (solar, wind, hydro, geothermal, etc.)
[ ] Nuclear energy
[ ] Electric mobility or sustainable transport
[ ] Electrical infrastructure
[ ] Manufacturing of energy transition-related products (batteries, solar panels, electric vehicles, etc.)
[ ] Other: ________________________

1B. Please explain your selection: Why do you consider these sectors or projects to be central to the energy transition in your country? Include examples or specific references if possible.

2A. How important is the energy transition in your country's governmental agendas?

(0: Not relevant – 10: Highly relevant): ________________________

2B. Please explain your selection: What concrete elements support your perception? For example: public policies, civil society pressure/involvement, specific projects, indicators.

3A. Which actors are actively driving the energy transition in your country? (Check all that apply)

[ ] Ministries or government agencies
[ ] Subnational governments

[ ] State-owned enterprises
[ ] National private companies
[ ] Foreign companies
[ ] Civil society / NGOs
[ ] Multilateral organizations
[ ] Other: ________________________
[ ] None

3B. Describe the role of the selected actors: In what ways are they participating in the transition?

4A. Are there actors who resist or lobby against the energy transition?

( ) Yes ( ) No ( ) Don't know

4B. If yes, identify who these actors are and explain their interests, motivations, or forms of influence. If possible, mention recent episodes or relevant documents.

SECTION 2: DECISION-MAKING AND INSTITUTIONAL FRAMEWORK

5A. What do you consider to be the main factors influencing the selection of foreign companies for the development of energy and/or infrastructure projects in your country? (Check a maximum of three options)

[ ] Cost
[ ] Execution speed
[ ] Financial conditions
[ ] Political alignment
[ ] Previous experience
[ ] Compliance with environmental, social, and governance (ESG) standards [ ] Corruption/ influence peddling
[ ] Other: ________________________

5B. Justify your selection: Which factors tend to be prioritized and why? Are there any examples where one of them was decisive?

6A. How would you rate the environmental laws and regulations in your country?

(0: Very poor – 10: Excellent): ________________________

6B.01. Justify your answer.

6B.02. Which entities or official agencies are in charge of overseeing and supervising the implementation of these laws and regulations? Do you consider these institutions to be independent and sufficiently equipped with the means and mechanisms to enforce them?

7A. How publicly accessible is information regarding the participation of foreign companies in the country?

(0: Not at all public – 10: Very public): ________________________

7B. Justify your evaluation: How can this information be accessed?

8A. What role do subnational governments (provinces, states, municipalities) play in the decision to partner with foreign actors in energy or infrastructure projects? (Check all that apply)

[ ] Actively participate in partnership decisions
[ ] Implement projects defined at the national level
[ ] Can veto or block projects
[ ] Have no significant role
[ ] Other: ________________________

8B. Justify your answer with relevant examples or cases, if known.

SECTION 3: STANDARDS AND SOCIAL IMPACT

9A. To what extent are local communities considered in the planning and approval of large-scale projects (e.g., job opportunities, environmental impact, displacement, among others)?

(0: Not considered at all – 10: Always considered): ________________________

9B. Justify your answer.

10A. In the context of large-scale project development, are there effective consultation or grievance mechanisms available for local communities?

( ) Yes ( ) No

10B. Justify your answer.

SECTION 4: RISKS, OPPORTUNITIES, AND STRATEGIC PERSPECTIVES

11A. What do you consider to be the main risks associated with the energy transition in your country? (Check all that apply)

[ ] Economic risks (investment costs, financial sustainability, technological dependence)
[ ] Environmental risks (ecological impacts, degradation due to energy infrastructure)
[ ] Social risks (conflicts with communities, job losses in traditional sectors)
[ ] Governance risks (lack of transparency, corruption, weak regulation, institutional disruption)
[ ] Geopolitical risks (dependence on a single country or provider, international tensions)
[ ] Technological risks (obsolescence, lack of local capacity to operate new technologies)
[ ] Other: ________________________

11B. Justify your evaluation: Can you provide specific examples or references of the identified risks?

12A. Do you believe there is a dominant presence of foreign companies from a particular country in any of the following sectors? (Check all that apply)

[ ] Renewable energy (solar, wind, hydro, geothermal, etc.)
[ ] Nuclear energy
[ ] Electric mobility or sustainable transport
[ ] Electrical infrastructure
[ ] Manufacturing of products related to the energy transition (batteries, solar panels, electric vehicles, etc.)
[ ] Other: ________________________
[ ] You do not believe there is a dominant presence of foreign companies from any particular country.

12B. Justify your answer.

13A. How important do you consider international cooperation to be for the energy transition?

(0: Not important at all – 10: Extremely important): ________________________

13B. Justify your assessment: What specific benefits does international participation offer? Are there successful experiences you can mention?

14A. Are there regional or subregional dynamics that influence the country's energy policy?

( ) Yes ( ) No

14B. Describe these dynamics: Is there cooperation or competition with neighboring countries? What regional projects or agreements are relevant?

SECTION 5: ROLE AND PRESENCE OF CHINA IN THE ENERGY TRANSITION

15A. What significant roles do Chinese actors (public and/or private) currently play in your country? (Check all that apply)

[ ] Investors
[ ] Builders
[ ] Financiers
[ ] Regulators
[ ] Political actors
[ ] Other: ________________________
[ ] They do not play significant roles in the country

15B. Justify your answer: How is this role manifested and what examples illustrate Chinese participation in the country?

16A. In which industries are Chinese actors most active in your country? (Check up to 3)

[ ] Energy generation
[ ] Energy transmission
[ ] Mining
[ ] Manufacturing
[ ] Infrastructure construction
[ ] Other: ________________________
[ ] They are not active in any industry

16B. Describe the industries where Chinese companies have the strongest presence. What types of projects do they lead? Include any concrete examples you are aware of.

17A. Are there substantial differences between how Chinese companies (public and/or private) operate compared to other foreign companies?

( ) Yes ( ) No

17B. If yes, what are those differences? Include concrete examples if possible.

18A. What competitive advantages do Chinese companies appear to have over other foreign actors in the energy and infrastructure sectors? (Check up to three options) [ ] Lower cost

[ ] Faster execution
[ ] Direct state support (financing, guarantees, etc.)
[ ] Active diplomatic coordination (embassies, MOUs, etc.)
[ ] Greater risk tolerance or flexibility regarding local conditions
[ ] Other: ________________________
[ ] No perceived competitive advantages

18B. Justify your answer: Why do you believe these advantages are effective? Have you observed any cases that demonstrate this?

19A. Do the Chinese embassy or other Chinese government agencies actively promote Chinese companies in your country?

( ) Yes ( ) No ( ) Don't know

19B. If yes, describe how this promotion takes place. (Examples: Political lobbying, tied financing, diplomatic events, support for signing agreements, other mechanisms)

SECTION 6: OTHER FOREIGN ACTORS AND COMPARATIVE VALUE

20A. In which sectors related to the energy transition do non-Chinese foreign actors have a notable presence? (Check up to 3 options)

[ ] Renewable energy generation (solar, wind, hydro, etc.)
[ ] Electric transmission and distribution
[ ] Energy storage (batteries, emerging technologies)
[ ] Green financing (green bonds, sustainable investment funds)
[ ] Consulting on ESG standards, sustainability, and governance
[ ] Energy efficiency and sustainable urban infrastructure
[ ] Other: ________________________
[ ] There are no sectors with notable presence of non-Chinese foreign actors

20B. If applicable, provide concrete examples of non-Chinese foreign presence in these sectors: What projects do they lead or participate in?

21A. Are there non-Chinese foreign actors in sectors associated with the energy transition whose presence you would like to see more of?

( ) Yes ( ) No

21B. If yes, which actors and in which sectors?

22A. Are there non-Chinese foreign actors in sectors associated with the energy transition

whose absence you find striking?

( ) Yes ( ) No

22B. If yes, which actors and in which sectors?

23A. Have you observed collaboration or tensions between Chinese and non-Chinese foreign actors? (Select one option)

[ ] Only collaboration
[ ] Only tensions
[ ] Both
[ ] Neither
[ ] Don't know

23B. Describe one or more cases of collaboration or tension between Chinese and non-Chinese foreign actors. What do they reveal about power relations, coordination, or competition?

CLOSING QUESTION: Is there any aspect related to the energy transition and the participation of foreign actors in your country that we have not addressed and that you consider important for this study?

We sincerely thank you for your time, willingness, and the valuable information shared during this interview. Your perspective is essential to better understand the challenges and dynamics of the energy transition in the region. All information will be treated confidentially and used exclusively for research purposes.

INTERVIEWEE PROFILES

The following section presents concise profiles of the interviewees, prepared in accordance with their expressed preferences regarding anonymity, as indicated in the informed consent forms signed before each interview. These profiles reflect the level of identification authorized by each participant and are included to provide contextual understanding of the diversity of perspectives gathered. For further details regarding the consent instrument and its structure, readers may refer to the sample document provided in the annexes.

In total, the study comprises 50 interviews conducted across the six countries analyzed. Additionally, a series of interviews were conducted in the United Kingdom to inform the section of the report specifically focused on UK-South America cooperation.

FULL DISCLOSURE: INTERVIEWEES WHO AGREED TO HAVE THEIR PROFILES MADE PUBLIC

1. **Camilo de Felipe** is a Professor of International Relations at Pontificia Universidad Javeriana. He holds a PhD from East China Normal University and researches the Belt and Road Initiative's discourse in Latin America and China's role in Colombia's energy transition.

2. **Carlos de la Torre** is an Ecuadorian sociologist and political scientist, currently Director of the Center for Latin American Studies at the University of Florida. His research focuses on populism, democracy, and political change in Latin America, with extensive work on Ecuadorian politics and discourse analysis.

3. **Carlos Renato Ungaretti** is a Brazilian researcher and PhD candidate at UFRGS. He serves as an assistant researcher at IPEA and a senior fellow at Observa China, specializing in energy, sustainability, and Brazil-China strategic relations.

4. **Carolina Viola** is a political scientist and Director of the Socio-environmental Observatory on Chinese Investment in Ecuador and Latin America at PUCE, where she also teaches. Her research focuses on energy transition, governance, geopolitics, and the socio-environmental impacts of Chinese investments in the region.

5. **Cesar Felipe Gutierrez Peña** is a mechanical engineer and former President of Petroperú (2006–2008). A prominent energy analyst and columnist, he is known for his expertise in hydrocarbons, public utilities, and energy regulation, as well as for advocating transparency and reform in state-owned enterprises.

6. **Claudio Coloma** is a Chilean scholar and Assistant Professor at Universidad de

Las Américas, specializing in critical international relations theory. His research examines Latin America–China relations through post-Marxist and discourse analysis frameworks, focusing on ideology, pragmatism, and global power shifts.

7. **Cynthia Sanborn** is a political scientist and Director of the Center for China and Asia-Pacific Studies at Universidad del Pacífico. With a PhD from Harvard, she is a leading expert on Latin America–China relations, focusing on extractive industries, sustainable development, and governance of natural resources.

8. **Diego Luna Quevedo** is a Uruguayan environmental governance specialist based in Chile and a Senior Policy and Governance Advisor at Manomet Conservation Sciences. With over two decades of experience, he promotes inclusive conservation and biodiversity governance across Latin America through multi-stakeholder collaboration.

9. **Edison Andres Pogo** is an Ecuadorian energy expert and Electrical Advisor at CELEC, as well as a Future Energy Leader with the World Energy Council. He has led energy transition initiatives with USAID and held advisory roles in Ecuador's Ministry of Energy, with experience spanning hydroelectric, oil, and automation projects.

10. **Exequiel José Lello Ivacevich** is an Argentine lawyer and Director of JEMSE, Jujuy's state-owned energy and mining company. Formerly Minister of Economic Development and Production, he has been central to advancing Jujuy's lithium and renewable energy strategy through public-private partnerships and sustainable investment.

11. **Fundación Mil Hojas** is an Ecuadorian investigative journalism organization dedicated to promoting transparency, accountability, and access to public information. It focuses on uncovering corruption, environmental issues, and abuses of power through data-driven, independent reporting.

12. **Igor Patrick** is a Brazilian journalist and China analyst with dual Master's degrees in Global Affairs (Tsinghua University) and China Studies (Peking University). A Schwarzman and Yenching Scholar, he serves as the South China Morning Post's first full-time Latin America correspondent, focusing on China's media influence and soft power in the region.

13. **Jack Lo Lau** is a journalist and Director of the Journalism Program at PUCP. With over twenty years of experience, he has worked across major media and environmental initiatives, focusing on sustainability, extractive industries, and environmental communication.

14. **Javier Nicolás Lewkowicz** is an Argentine journalist with a degree in Economics

from the University of Buenos Aires. He specializes in international trade, industrial policy, and China–Latin America economic relations.

15. **José Antonio de Echave Cáceres** is an economist and co-founder of CooperAcción, specializing in environmental governance and mining policy. A former Vice-Minister of Environmental Management, he is a key voice on socio-environmental conflicts, transparency, and community participation in Peru's extractive sector.

16. **Juan Enrique Serrano Moreno** is a Chilean academic and legal scholar at the University of Chile, specializing in international political economy and Latin America–China relations. His research explores the geopolitical and regulatory dimensions of Chinese investment, with a focus on energy, infrastructure, and regional integration.

17. **Juan Manuel Saldarriaga** is a journalist specializing in mining, hydrocarbons, and energy. As Economic and Business Reporter at Día1 of Grupo El Comercio, he provides in-depth coverage of extractive industries and Chinese investment, contributing to national debates on transparency and energy transition.

18. **Juan Sebastián de Mesa Zapata** is an economist with a master's degree in Economic Sciences from the National University of Colombia. He has experience in preparing environmental licenses for projects such as power transmission lines and hydroelectric plants, including the Ituango Hydroelectric Project, where he worked on resettlement and rights restitution for affected communities. Currently works for the National Planning Department of Colombia and the Inter-American Development Bank.

19. **Juliana González Jáuregui** is an Argentine political scientist and researcher specializing in China–Latin America relations. She focuses on foreign policy, international cooperation, and the geopolitical dimensions of China's engagement in the Southern Cone.

20. **Laura Urrejola** holds a PhD in International Relations from the University of Brasília, specializing in China's infrastructure investments in Latin America. Her research and professional experience center on Chinese engagement in the energy and logistics sectors, complemented by her work as Environmental Manager at Transnorte Energia.

21. **Maia Bárbara Seeger Pfeiffer** is a Chilean journalist and Executive Director of Sustentarse, specializing in environmental governance, human rights, and accountability in extractive industries. She engages in national and international forums on transparency, ESG compliance, and civil society participation in

development finance.

22. **María José Alzari** is an Argentine legal and sustainability expert and Coordinator of Transparency and Social License at CEADS. With over twenty years of experience, she advises companies on ESG compliance, human rights due diligence, and stakeholder engagement in the mining, energy, and infrastructure sectors.

23. **Maurício Santoro** is a Brazilian political scientist with a PhD in Political Science from Iuperj. He is an Assistant Professor at the State University of Rio de Janeiro (UERJ), where he researches Brazil's foreign policy, South-South relations, and the geopolitics of China's engagement in Latin America.

24. **Niklas Weins** is an Assistant Professor at Xi'an Jiaotong-Liverpool University. He holds a PhD in Environment and Society from the State University of Campinas and Master's and Bachelor's degrees from universities in Brazil and Germany, specializing in environmental sociology, development studies, and political economy.

25. **Nikolas Carneiro** is a researcher at FGV Energia specializing in Brazil's electricity sector. He holds a degree in Economics from Unicamp and is pursuing a master's in International Political Economy at UFRJ, focusing on energy research and data analysis.

26. **Pablo Bergese** is an Argentine chemical engineer and Coordinator of Mining Sustainability for Jujuy's Secretariat of Mining and Hydrocarbons. With nearly twenty years in public service, he focuses on sustainable lithium extraction, environmental monitoring, and policy coordination between government, communities, and industry.

27. **Pablo Fernando Palomares** is Secretary of Regional Integration and International Relations for the Government of Jujuy, Argentina. He leads the province's cross-border cooperation and international engagement strategy, promoting regional development, energy diplomacy, and subnational participation in global sustainability efforts.

28. **Pablo Hidalgo** is an economist specializing in data analysis, market research, and international economic cooperation. His work bridges academia and applied research, with expertise in data science, social and solidarity economy, and evidence-based policy design.

29. **Renato Carlos Sersale di Cerisano** is an Argentine diplomat and former ambassador to the United Kingdom and South Africa. With over four decades of

experience, he is recognized for his leadership in international diplomacy, global governance, and Latin America's foreign policy and energy integration.

30. **Xabier Cobeña** is a PhD candidate in International Studies and a researcher at FLACSO Ecuador. With experience in public administration and academia, his work focuses on territorial planning, extractivism, energy transition, and environmental politics in Latin America.

PARTIAL ANONYMITY: INTERVIEWEES WHO CHOSE NOT TO DISCLOSE THEIR NAMES PUBLICLY

Interviewees who requested partial anonymity are identified with the letter P (for Partial Anonymity) followed by a unique number (e.g., P1, P2, P3).

1. **P1:** An academic specializing in ecological economics, focusing on the relationship between economic systems and environmental sustainability. Their work explores social metabolism, extractivism, and the transition toward equitable, knowledge-based development models.

2. **P2:** Ecuadorian lawyer and President of the Anti-Corruption Foundation. A professor at the International University of Ecuador, he specializes in philosophy of law, legislative and electoral law, intellectual property, and transparency in public governance.

3. **P3:** Ecuadorian engineer and former Minister of Energy and Hydrocarbons (2017-2019). With over forty years in the oil and gas industry, he led key reforms to attract private investment, diversify energy partnerships, and modernize Ecuador's hydrocarbon sector..

4. **P4**: Chilean energy and environmental advisor and Regional Lead for Latin America at G-advisory (Grupo Garrigues). With over twenty years of experience, he specializes in regulatory strategy, ESG risk management, and sustainable energy and infrastructure development across the region.

5. **P5:** Peruvian economist and professor at the Universidad Nacional Mayor de San Marcos, specializing in Asian and international economics. With a PhD from Kobe University, he is a leading expert on Asia-Latin America relations, trade, and China's economic engagement with the region.

6. **P6:** Colombian professional with a background in Government, Public Affairs, and Economics from Universidad de los Andes, and a master's degree in Environmental Policy (iMEP) from Duke Kunshan University. His work spans

environmental policy and climate change, with experience across academia, civil society, and multilateral organizations.

FULL ANONYMITY:

Furthermore, 14 additional interviewees requested full anonymity; therefore, their profiles have been omitted from this report in accordance with confidentiality agreements.

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