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CHINA AND THE ENERGY TRANSITION
IN SOUTH AMERICA

METHODOLOGY

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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.



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This report underwent a peer review process by independent specialists.

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The reviewers commented on preliminary versions of the manuscript. Responsibility for the final content of this publication lies exclusively with the authors.

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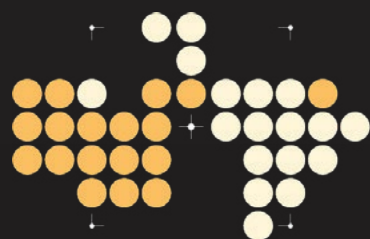
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