TECHNICAL NOTE
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TECHNICAL NOTE N°18
Legislation for the energy transition in Latin America and the Caribbean

MAY 2026

This document was prepared under the direction of the
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May 2026.

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Legislation for the Energy Transition in Latin America and the Caribbean

1. Introduction

Latin America and the Caribbean (LAC) is at a strategic juncture in energy matters. It has significant comparative advantages — an electricity matrix with a high share of renewable energies, abundant critical natural resources and great potential for regional integration. At the same time, the region faces challenges that condition its ability to translate these assets into economic power, sustainable development and geopolitical influence.

The energy transition is directly linked to economic growth strategies, job creation, the creation of new value chains and the international insertion of the region in a global situation marked by the decarbonization of the economy.

In this context, parliaments play a central role. The energy transition is not only a technological or market process. It is, fundamentally, a political and institutional process that requires solid regulatory frameworks, strategic vision and regional coordination.

This role is decisive in the legislation that enables and promotes energy transition, in the allocation and supervision of the use of public resources, in the regulatory harmonization at the regional level and in the monitoring and implementation of public policies in the sector. The quality, coherence and predictability of these legislative decisions directly condition the capacity of countries to transform their energy advantages into sustainable economic and social development.

This document aims to provide a framework for the analysis and design of regulations related to energy transition, organized around three key axes:

- Status of renewable energy in LAC
- Challenges of the Just Energy Transition
- Future of Energy in LAC

Through this Technical Note, we seek to contribute to a shared framework for parliamentary dialogue, identify existing regulatory challenges and barriers, and support the development of regional consensus around the energy transition.

The need to advance specific legislation and regional energy integration is emphasized as pillars to consolidate a sustainable and equitable energy transition.

1.1. Purpose and Scope

In this regard, the document aims to provide a framework for the design and updating of regulations related to the energy transition in LAC, with special emphasis on the need to move towards common regulatory criteria, harmonized principles and shared standards that strengthen regional energy integration.

The energy transition poses challenges that transcend national borders and that, in the absence of aligned and consistent rules, risk dividing regional efforts, limiting infrastructure integration and increasing asymmetries between countries.

In particular, the document is aimed at:

- Identify the main regulatory and institutional obstacles that hinder regional energy integration.
- Identify areas were legislative harmonization, the adoption of common standards or the development of regional framework standards can generate shared benefits.
- Reflect on the role of parliaments in the construction of stable, predictable rules that accompany the energy transition process.
- Explore mechanisms to ensure that the costs and benefits of the transition are equitably distributed among countries, territories and social sectors.

The diagnoses, data and projections presented in the following chapters should be read as inputs for political and legislative deliberation, aimed at supporting decisions on policy coordination, regional integration and definition of common principles.

The scope is limited to the discussion of general guidelines, shared regulatory criteria and common legislative challenges, respecting the sovereignty of the States in the definition of their national energy policies and recognizing the diversity of realities, institutional capacities and energy development trajectories existing in the region.

2. Status of renewable energy in LAC

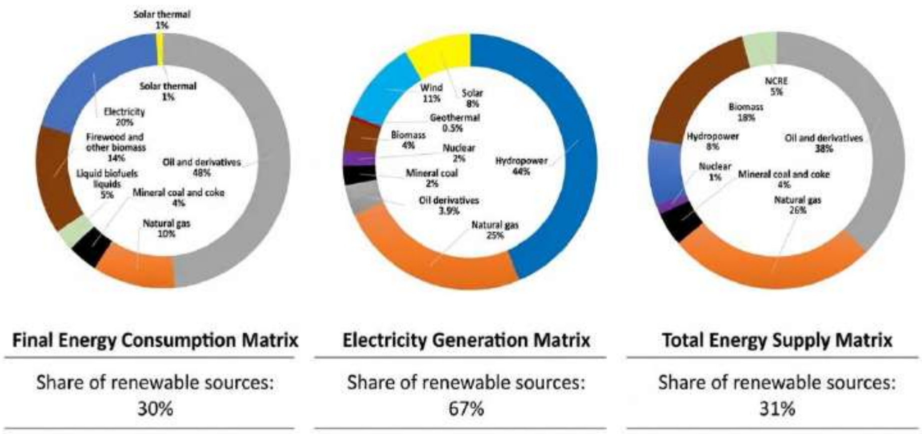
2.1. Overview

LAC has one of the cleanest electricity matrices in the world, with approximately 70% of generation coming from renewable sources, mainly hydroelectric, but with a sustained growth in solar and wind energy in the last decade.

This positioning is no less important in a global context where decarbonization has become a fundamental axis of the international economy. And where the uncertainty of international crude oil prices has grown enormously.

Regarding the share of renewable energy sources in the LAC energy matrix, as can be seen in Figure 1, this type of source represented 30% of final energy consumption by 2025 and contribute 67% of electricity generation and 31% of the total energy supply.

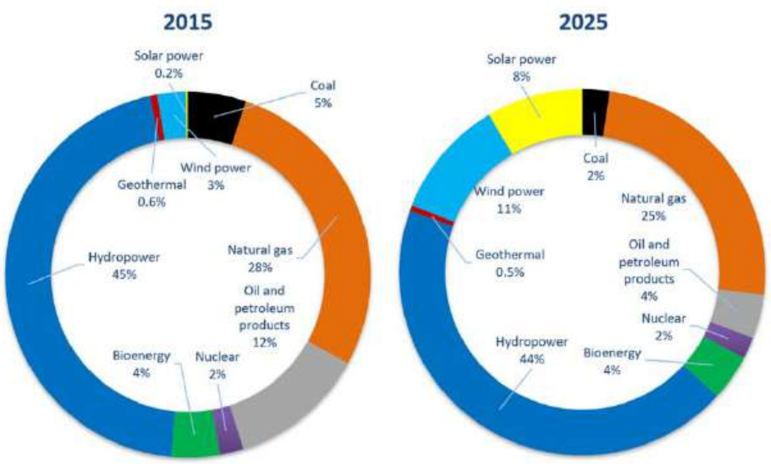
Figure 1 Participation of renewable energy sources in the LAC energy matrix (2025)



Source: Energy Outlook for Latin America and the Caribbean, 2025, OLACDE

Over the past decade, since the adoption of the Paris Agreement, Latin America and the Caribbean (LAC) have shown a clear trend toward the decarbonization of its energy matrix, particularly its electricity generation mix. Non-conventional renewable energy sources, such as wind and solar, have gained significant prominence, as shown in Figure 2.

Figure 2. Evolution of the electricity generation matrix in LAC in the last decade



Source: sieLAC – OLACDE 2026

The share of renewable sources in the final consumption structure reaches just 30%, which shows a significant opportunity to advance from the demand side and accelerate the adoption of clean energy in the different economic sectors.

This situation reveals a structural decoupling between an increasingly renewable electricity generation supply and a final demand that continues to be dominated by fossil fuels, especially in sectors such as transport, industry and residential use.

The great challenge is how to expand and grow electricity demand in order to take advantage of a generation matrix in which almost 70% comes from renewable sources. In our region, this clean energy is often curtailed due to insufficient demand or inadequate transmission infrastructure. The key question is how to best capitalize on that available renewability.

This performance positions LAC as one of the regions with the highest penetration of renewable energies worldwide. However, having a predominantly clean electricity mix has not automatically led to a structural transformation of the broader energy system, underscoring the fact that the main challenges today are not only technological, but also institutional, regulatory, and planning-related.

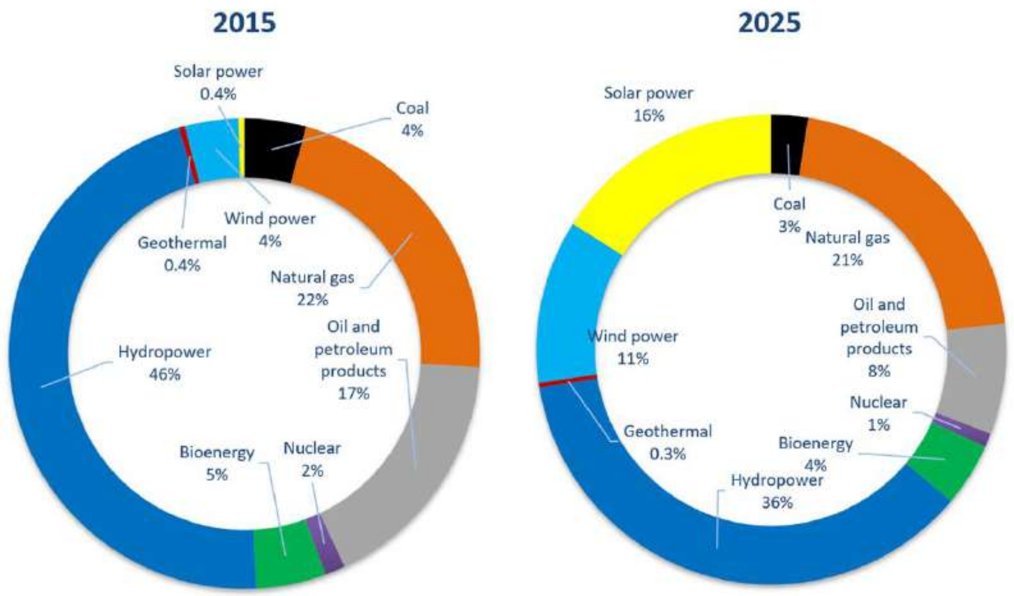
2.2. Recent advancements

The rapid expansion of wind and solar energy can be attributed to several factors, including supportive public policies, declining technology costs, greater private sector participation, and, more recently, the nascent development of energy storage solutions.

As can be seen in Figure 2, the share of wind energy in the region's electricity generation mix has increased from 3% in 2015 to 11% in 2025, representing a growth of 8 percentage points. For its part, solar energy went from representing just 0.16% of this matrix in 2015 to 8% in the same period. These advances reflect the growing commitment of the countries in the region to the energy transition process.

Similarly, installed electricity generation capacity from renewable sources has grown significantly. In 2015, installed wind and solar capacity amounted to 13.8 GW and 1.4 GW, respectively, representing 3.7% and 0.4% of total installed electricity generation capacity. However, the electricity generation mix has undergone a substantial transformation, the installed capacity of wind energy was 63.2 GW and 89.9 GW of solar in 2025, which represented 11.2% and 16.0% respectively of the total installed capacity, as shown in Figure 3.

Figure 3. Evolution of installed capacity in LAC in the last decade



Source: sieLAC – OLACDE 2026

These advances show a significant transformation of the regional electricity generation matrix. However, the speed of expansion of non-conventional renewable energies has, in many cases, exceeded the adaptive capacity of infrastructure, regulation and electrical systems, generating new operational and planning tensions.

In general, the countries that have made the most progress in the diversification of the electricity generation mix have done so with precise regulatory frameworks to open up that possibility and have transformed energy policy into State policy. Enabling legislation in this regard is therefore necessary.

2.3. Structural constraints

Despite the advances presented in the previous point, structural limitations persist that condition the energy security of the region. One of the most relevant is the high dependence on hydroelectric generation. In recent years, climatic variations, including prolonged droughts in different subregions, have reduced the availability of water resources and limited electricity generation capacity from hydraulic sources, generating tensions in the supply of the electricity system.

Although hydroelectric energy has decreased its share in the installed electricity generation capacity in the region, from 46% in 2015 to 36% in 2025, it continues to play a central role in the regional electricity matrix and in the provision of base energy. This high dependence exposes electricity systems to increasing climate risks and highlights the need to further diversify the generation matrix.

On the other hand, there is an infrastructure deficit, but mainly in transmission, which causes many countries in the region to face limitations in terms of energy security.[1] This situation is reinforced by the scarce electrical interconnection between countries. It is estimated that in 2023 electricity exchange between South American countries accounted for approximately 3.7% of regional electricity demand, a figure considerably lower than that observed in Europe, where cross-border electricity trade stands at between 10% and 15% of demand. In Central America, although there is a greater degree of interconnection, electricity exchange reached about 4% of regional demand in the same year.[2] This greater degree of integration is due to the existence of the Electrical Interconnection System for the Central American Countries (SIEPAC), which is an interconnection of the electrical networks of most Central American countries. In addition to the physical infrastructure, SIEPAC is based on a common institutional and regulatory framework, including the Regional Electricity Market (MER), which establishes harmonized rules for the operation, dispatch and cross-border trade of electricity. This combination of infrastructure, shared governance and homogeneous standards explains why Central America has achieved a higher level of integration than the rest of LAC.

[1] Brichetti, J. P., Mastronardi, L., Rivas Amiassorho, M. E., Serebrisky, T., & Solís, B. (2021). The Infrastructure Gap in Latin America and the Caribbean: Estimating Investment Needs through 2030 to Progress Towards Meeting the Sustainable Development Goals (IDB Monograph; 962). Inter-American Development Bank. https://interactive-publications.iadb.org/La-brecha-de-infraestructura-en-America-Latina-y-el-Caribe

[2] Comisión Económica para América Latina y el Caribe (CEPAL). (2025, 7 de octubre). Energy Integration and Just Transition in Latin America and the Caribbean: Opportunities and Challenges Towards 2050. https://www.cepal.org/es/enfoques/integracion-energetica-transicion-justa-america-latina-caribe-oportunidades-desafios-2050

These values reflect the structural limitations of energy integration in the region, which limit the ability of electricity systems to take advantage of complementarities between countries and in this way, more efficiently manage the variability of renewable energies and respond to extreme weather events. In this context, the strengthening of transmission infrastructure and regional interconnections is presented as a key factor to improve energy security and move towards a more resilient and integrated energy transition.

Together, these structural limitations configure a scenario in which, despite the high weight of renewable energies, the energy systems of the region continue to be vulnerable to extreme weather events, infrastructure restrictions and a low coordinated response capacity at the regional level.

The region today has a solid renewable base, but it faces structural and institutional limits that condition its use.

3. Challenges of the Just Energy Transition

The energy transition cannot be limited only to replacing fossil fuels with renewable energies, it must involve a total change in the system, in the economy and in society.

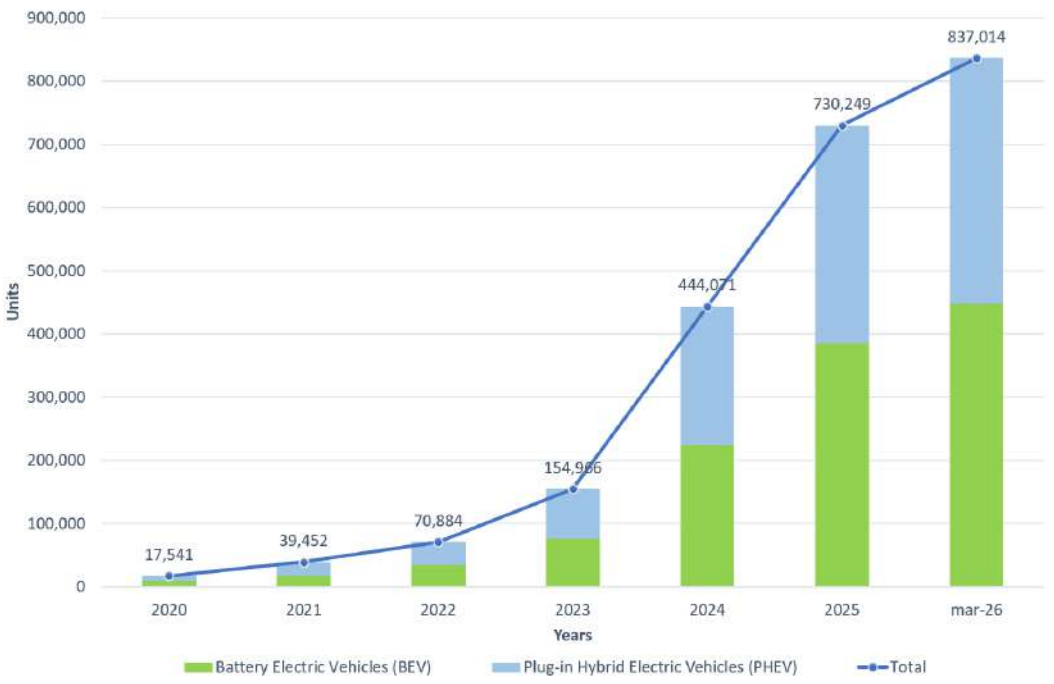
In addition, it is important to highlight that, if this process does not consider vulnerable communities, workers and sectors, it risks deepening existing inequalities. Therefore, the just energy transition poses the challenge of harmonizing environmental protection with social equity and inclusive development.

3.1. Challenges in electromobility

These significant advances in clean generation open many opportunities. One of the most relevant is electromobility.

In 2020, there were 17,541 pure electric and plug-in hybrid light vehicles circulating in the region. As of 2026, 837,014 were circulating. While this growth has been exponential, it remains modest compared to the overall vehicle fleet, reflecting both the significant potential for further expansion of this technology and the structural challenges that continue to hinder its widespread adoption.

Figure 4. Evolution of the Circulating Electric Light-Duty Vehicle Fleet



Source: sieLAC – OLACDE 2026

This significant increase in the vehicle electric fleet poses important challenges to cities, the electrical system, generation, transmission and distribution.

Within the framework of the energy transition, electricity generation is positioned as a key axis, the electrification of transport is only effective if the energy used comes from renewable sources. Otherwise, it would be a contradiction to replace fossil fuels with electricity from the same source. However, it is not possible to analyze this process in isolation, since the transmission, distribution and development of charging infrastructure are fundamental components of the system.

Ultimately, the scale of the energy transition in the transport sector involves a range of factors that require countries to adopt a broad, cross-sectoral, and long-term perspective. Consideration must be given not only to infrastructure, but also to training and other key factors related to both vehicles and the transport system, whose economic and social impacts are evident.

Based on the data analyzed, it is possible to develop a ranking of countries according to their performance. By 2025, there is significant progress in Brazil and Mexico in electrified cars and buses, followed by Colombia, Costa Rica and Uruguay.

In the electric bus segment, Chile stands out for its leadership. This country ranks second in the world, after China, in terms of the number of electric buses in its fleet. It is followed by Colombia, Brazil, Mexico and Uruguay.

On the other hand, charging infrastructure is key to encouraging the use of electric vehicles, since it is not enough to be able to charge the vehicle at home, but also to have a public charging network capable of providing the user with freedom and autonomy to move around the territory. In this regard, the countries that have made the most progress are Brazil, Mexico, Chile, Colombia and Uruguay.[3]

It is no coincidence that these countries appear in these rankings, since they have promoted policies for the acquisition of electric vehicles and the installation of charging infrastructure.

Furthermore, interoperability is an essential aspect that requires urgent attention. It is necessary to design regional policies and regulations so that users can charge their vehicles and pay for the charge simply and quickly in any country. This would provide the user with autonomy to circulate between countries, making the electric vehicle a viable option for international land trips, either by own vehicle or by bus. In addition, as is known, there are different types of chargers worldwide that, for the most part, are not compatible with each other. This situation generates significant challenges when designing a public electric charging network. Therefore, it is necessary to have regional regulations that integrate all countries or subregions and allow unification of criteria.

[3] For more information, see the White Paper on Sustainable Mobility in Latin America and the Caribbean *2025* https://www.olade.org/publicaciones/libro-blanco-de-la-movilidad-sostenible-en-america-latina-y-el-caribe-2025/

Figure 5. Types of Electric Vehicle Chargers

Source: sieLAC – OLACDE 2026

Figure 6. Types of Electric Vehicle Chargers Most Used in LAC

Source: sieLAC – OLACDE 2026

On the other hand, one of the main challenges facing the region is the equitable affordability of light electric vehicles. Currently, electric vehicles involve a significantly higher upfront cost than comparable internal combustion engine vehicles, which limits access for lower-income households that, although able to purchase a vehicle, may not be able to bear the initial cost of an electric alternative.

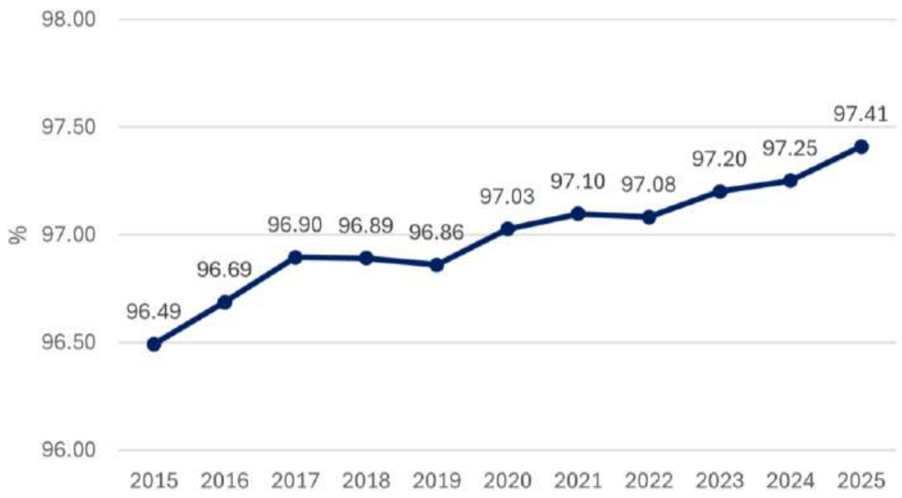
Although the higher upfront cost can be offset over time through greater energy efficiency, this payback period is often not feasible for many households, creating a barrier to access to electric vehicles. In addition, it is estimated that more than 80% of electric vehicle users charge their vehicles in their homes, which implies not only having adequate space, but also assuming the additional cost of the charger (if it does not come with the car) and having a quality electricity supply.

In this context, to achieve fair and transversal access to personal electric vehicles, it is necessary to implement comprehensive public policies that reduce accessibility barriers and encourage the purchase of the electric vehicle by the user. Such as tax reductions, soft credits or preferential financing, reduced electricity rates or non-monetary benefits such as exclusive traffic lanes or preferential access to parking lots. However, provisions must be made for the implementation of these policies that not only benefit middle-income families, but also guarantee social benefits and do not generate permanent dependence.

3.2. Access to Energy

Another of the structural challenges facing the region is electricity coverage. As shown in Figure 7, there has been sustained progress in this area, reaching an electrical coverage of more than 97%. While this is encouraging, around 17 million people still do not have access to electricity. It is also important to highlight that, in many countries in the region, substantial disparities in access to electricity remain between rural and urban populations, with nearly three-quarters of those lacking electricity access living in rural areas.

Figure 7. Electricity coverage index



Source: sieLAC – OLACDE 2026

Moreover, electricity coverage alone does not necessarily ensure the provision of quality service. In many cases, access is unstable, with low voltage, limited power or other restrictions that reduce the reliability of the supply and affect its effective use.

This remains a central challenge for the region, which must take advantage of the energy transition, the growing momentum of renewable energies and the development of distributed generation as an opportunity to definitively close this gap.

Within this framework, in LAC there are about 78 million people who use firewood and other polluting fuels to heat their homes or cook daily, representing approximately 11% of the population. This situation has significant negative impacts, especially in terms of health, due to exposure to particulate matter and other pollutants, in addition to affecting the quality of life of households.

In this regard, 12 countries in the region have committed to the goal of reducing the use of these types of fuels, with the aim of ensuring that, by 2035, only 5% of the population relies on them for cooking and heating.[4] In this context, policies should be developed with consideration for safe fuels, such as natural gas, LPG,

[4] Ver: https://www.olade.org/wp-content/uploads/2025/10/LV-DECLARACION-CONJUNTA-COCCION-LIMPIA-EN-LAC.pdf

and biogas, as well as distributed generation. Policies must be designed based on the resources and infrastructure available in the countries.

On the other hand, lower-income households spend a significantly higher proportion of their income on energy than higher-income households. This is evidenced in remote areas or irregular settlements where approximately 20% of the population lives.[5] Consequently, higher-income groups consume more energy and benefit disproportionately from fiscal incentives, underscoring the need for more targeted policies that effectively ensure access to energy for disadvantaged households.

However, access to safe energy should not only be assessed in households, but also in small and medium-sized enterprises, which depend on energy to be able to produce and develop. Ensuring reliable and affordable access to energy for these productive sectors would contribute significantly to the reduction of the existing social and economic gaps in the region. This is why it is necessary to view energy not only as an end, but also as a means of production.[6]

In activities such as construction, or the agricultural sector, access to safe, quality and clean energy is essential to improve productivity, reduce costs and promote more sustainable practices. A strong investment in energy infrastructure is necessary, as well as the implementation of public policies that promote the development of those areas that do not yet have adequate basic services.

3.3. Employment and Gender

The energy transition also implies a productive transformation. Traditional industries must modify their productive structures to incorporate technological changes and advance in the use of clean energies. This process inevitably entails a reconfiguration of employment and training of the workforce. In this regard, it is essential to actively involve communities and workers in the transition process, so that it is truly fair and inclusive.

[5] International Energy Agency (IEA). (2023). IEA, Latin America Energy Outlook, 2023 Paris: IEA. Available at: https://iea.blob.core.windows.net/assets/878e705f-43e0-4858-9c5a-6349447ed669/LatinAmericaEnergyOutlook_Spanish.pdf
[6] Ídem

Likewise, the energy transition must be understood as an opportunity to address structural problems in the region, such as the high labor informality, which in the Lac economies reaches close to 50%.[7] This process can contribute to improving the quality of employment and strengthening regional productive development. The incorporation of new technologies generates the creation of new jobs, which require properly trained workers. This is where the central challenge lies: the design and implementation of public policies and training programs that benefit workers, the most vulnerable communities, and local industry. Within this framework, investment in human capital becomes key, since it constitutes a fundamental engine for the expansion of job opportunities and sustainable development.

Another of the challenges facing the region is the gender gap. In the energy sector there is a low representation of women, especially in technical, operational and leadership areas. In renewable energy, women occupy approximately 32% of the workforce, while in the oil and gas sectors the figure is even lower, at 22%. This shows that although in renewable energies women have gained ground, there is still a long way to go.[8]

This gap is not only evident in representativeness, but also in remuneration. Studies indicate that women in the energy industry receive lower remuneration than men. For this reason, gender policies are essential to address this problem and continue advancing in a just energy transition.[9]

3.4. Structural challenges for the fulfillment of climate and energy commitments

The adoption of the United Nations Sustainable Development Goals (SDGs), particularly SDG 7, together with the commitments undertaken by the signatories to the Paris Agreement, has fostered global and regional initiatives aimed at transitioning toward cleaner and more efficient energy supply and consumption systems. These efforts seek to replace fossil fuels and contribute to maintaining

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[7] Ídem
[8] See https://www.olade.org/wp-content/uploads/2025/03/Nota-Tecnica-Genero-MARZO-2025.pdf.
[9] Ídem

global warming within limits that do not pose a threat to the well-being and prospects of future generations by mid-century.

To advance these objectives, countries have developed their respective Nationally Determined Contributions (NDCs) and energy development roadmaps aimed at increasing the share of renewable energy sources in their energy mixes, improving energy efficiency, and expanding access to modern energy services. In this context, in LAC, during the last decade, there has been evident progress in the decarbonization of the electricity generation system, with a significant increase in the share of renewable energy sources, mainly wind and solar, as mentioned above. However, to achieve the decarbonization targets committed in the NDCs, it is necessary not only to accelerate the penetration of renewable energies in the electricity generation mix, but also to extend traction to other segments of energy systems such as the most polluting final consumption sectors such as transport and industry. This implies a roadmap, which will undoubtedly mean benefits in different ways, but which may also face technical and socio-economic challenges, such as the following:

1. The largest component of intermittent energy sources in the electricity generation mix requires adequate support from firm energy sources or energy storage systems.
2. It is necessary to strengthen transmission and distribution systems to avoid the dumping of renewable energies (*curtailments*).
3. The transformation of the energy system requires investment and involves capital costs, which should not be transferred to end users of energy, since they would affect the affordability of this service for the most vulnerable sectors, increasing energy poverty.
4. Although the energy transition can become a factor in the generation of jobs, it could also displace more intensive economic activities in the demand for labor and supply of jobs.
5. New energy consumption schemes in the energy transition could face resistance to change by some consumers, due to ignorance or disinterest in the associated benefits.
6. Companies must innovate and adapt to take advantage of opportunities in the production, distribution and storage of renewable energy.

7. With the introduction of new technologies for the energy transition, it is necessary to update the study plans in universities and research centers, to train own human capacities of technological management and reduce the dependence on external technical support to the region.
8. Adverse impacts on land, air, water, and the biosphere should be minimized throughout the construction, sitting, and operation of infrastructure associated with the energy transition, considering its full life cycle.

4. Future of Energy in LAC

The analysis presented throughout this document clearly shows that Latin America and the Caribbean (LAC) start from a position of strength in the energy transition process. However, it also faces structural, social, and institutional challenges that constrain its ability to fully capitalize on this advantage. The region has a mostly renewable electricity matrix, significant potential for the expansion of new technologies, and a strategic opportunity in the context of global decarbonization. However, these advantages do not automatically translate into economic development, social equity or greater energy resilience.

The future of energy in the region is not determined only by the availability of resources or technological evolution, but fundamentally by the political and institutional decisions taken in the coming years. The energy transition poses complex dilemmas that involve rhythms of transformation, cost and benefit distribution, regional integration models, financing modalities and state capacities to plan and regulate increasingly complex and interdependent energy systems.

In this context, the debate on the energy future of Lac is presented as an opportunity to reflect on the possible development trajectories of the region, preventing the energy transition from reproducing pre-existing inequalities or generating new territorial and social gaps. At the same time, it opens the possibility of strengthening regional competitiveness, promoting new value chains, generating quality employment and consolidating greater energy integration between countries.

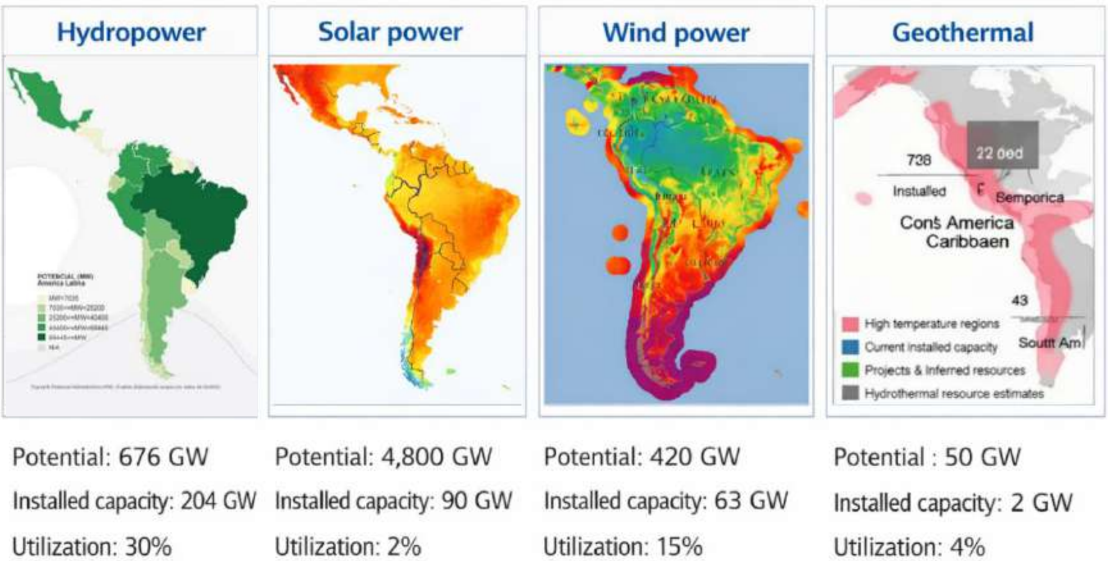
This scenario gives parliaments a central role in building a long-term energy vision. The definition of regulatory frameworks, regional regulatory harmonization, the allocation of public resources and the monitoring of energy policies are key instruments to transform the opportunities identified into concrete results. From this perspective, the future of energy in LAC should not be understood as a predetermined technical horizon, but as a deliberate political process that requires consensus, regional coordination and a constant commitment to sustainable development.

4.1. Clean Power Generation

As this document has shown, the region is not starting the energy transition from scratch. However, the challenge lies in consolidating these advances and preventing them from translating only into passive advantages without capturing value.

LAC has significant potential for renewable energy resources and although it is a relatively clean region compared to other regions of the planet, the percentages of use of this potential are still low, mainly for renewable electricity generation as shown in Figure 8.

Figure 8. Renewable electricity generation potential in LAC



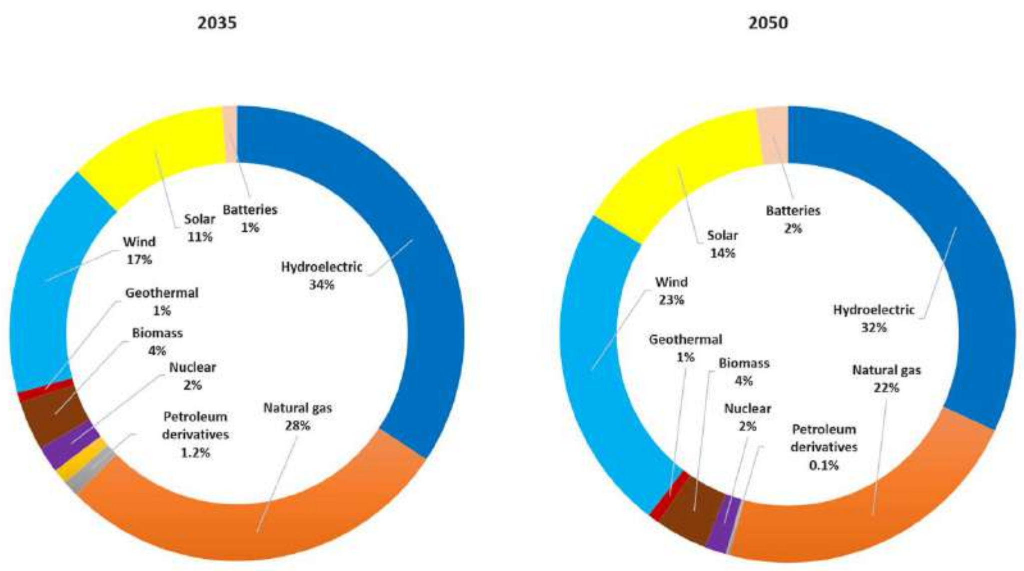
Source: sieLAC – OLACDE 2026

This shows that the region has a very large potential for energy generation from renewable sources and that today it is not used to the full, highlighting solar and geothermal energy as the least used.

In this context, the NET0 scenario is proposed as a deliberate deviation from the trend scenario (BAU). While the BAU projects the continuity of current dynamics without structural changes, the NET0 introduces, from 2026, a set of political, regulatory and technological decisions aimed at an accelerated decarbonization of the energy matrices in each subregion.

For this reason, OLACDE's projections for the future of energy in the region suggest that the decarbonization of the electricity generation mix will accelerate, driven by a greater share of non-conventional renewable energy sources, supported by energy storage systems and natural gas-fired thermal generation. As illustrated in the charts in Figure 9, this transition is expected to completely displace coal- and petroleum-based power generation by 2050. It is worth noting that, although non-conventional renewable energy sources such as wind and solar are expected to play an increasingly important role in the energy mix, hydropower will remain the dominant source of electricity generation.

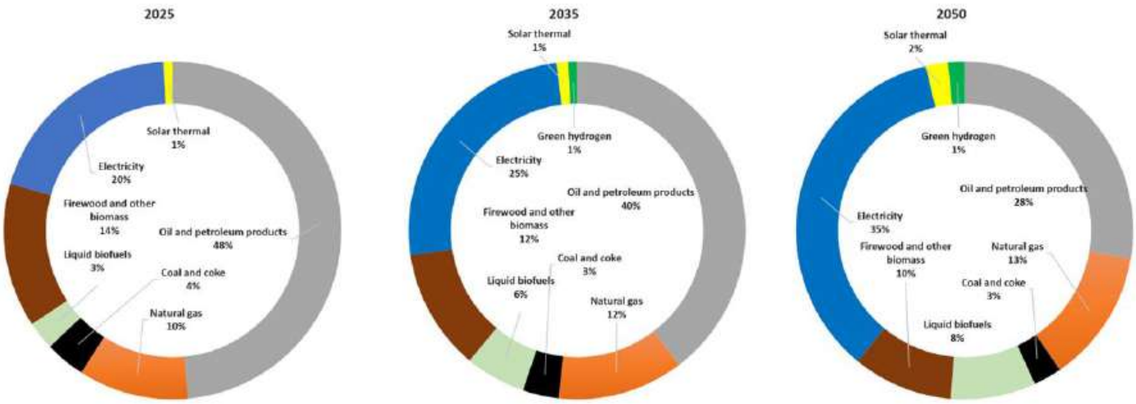
Figure 9. Projection of the electricity generation matrix in LAC to 2035 and 2050 in the NET0 scenario



Source: Energy Outlook for Latin America and the Caribbean, 2025, OLACDE

Regarding the final energy consumption matrix, although in the past there have been no significant changes in its structure, with petroleum products remaining predominant sources, it is expected that in the medium and long term electricity will become more important, as well as liquid biofuels. At the same time, a new energy carrier such as green hydrogen is expected to begin playing a visible role in the energy mix. See Figure 10.

Figure 10. Projection of the final energy consumption matrix in LAC to 2035 and 2050



Source: Energy Outlook for Latin America and the Caribbean, 2025, OLACDE

This perspective shows that it is necessary to implement policies to increase energy generation from renewable sources and take advantage of the potential that nature has provided to the region. This will not only allow countries that still face vulnerabilities to move towards greater energy security but will also help those that have already achieved it to consolidate and sustain it over time.

4.2. Green hydrogen

The potential presented in the previous point open the possibility of another type of energy use. A clear example is the hydrogen industry. One of the sustainable ways to produce hydrogen is through electrolysis, a process in which water is split into hydrogen and oxygen using electricity. If this electricity is generated from renewable sources, the hydrogen produced by it is known as green hydrogen.

Hydrogen has various uses in industry, as an input for production (steel, fertilizers, plastics, among others) to as an energy vector. This latter application holds significant potential in the energy sector, as hydrogen can play an important role in sectors that are difficult to electrify directly. In mining, for example, it can be used in heavy transport, high power machinery or processes where autonomy and energy density are required. In the steel industry, hydrogen can partially replace fossil fuels as a reducing agent, enabling the production of low-emission steel. It can also be the basis for new energy products, such as synthetic fuels. These products are relevant to maritime transport, aviation and other sectors where eliminating fossil fuels faces greater technical limitations. However, the use of hydrogen as an energy vector requires production systems and specific infrastructures, both in renewable electricity generation and in energy transport, storage and distribution.

In the energy field, hydrogen can be used in combustion processes, generating water vapor as the only emission. It can also react through other chemical routes to produce energy without generating pollutants, which positions it as a low-emission energy vector. However, the production of green hydrogen through electrolysis involves the intensive use of water, which, in contexts of water stress, present in several regions of LAC, requires careful planning to avoid socio-environmental impacts and conflicts over the use of the resource.[10]

Although hydrogen is born as an opportunity, its development will depend on the market, when demand establishes it as a viable energy vector, in this way, the infrastructure will be developed. In this regard, current production costs and uncertainty about international demand represent one of the main challenges for its development, generating the risk that the region will be limited to a role of primary supplier if productive chains and local added value are not promoted.

With this objective in mind, OLADE has developed a number of initiatives. One of them is to demystify hydrogen, its validation of green production and its export process. The organization has developed, together with the European Union and the Chilean Agency for International Development Cooperation, a document called "Low-Emission Hydrogen Certification: The Green Passport of Latin

[10]United Nations Development Programme (UNDP) (2024). Quedándonos secos: abordando el estrés hídrico en América Latina y el Caribe. New York: UNDP. Available at: https://www.undp.org/es/latin-america/blog/quedandonos-secos-abordando-el-estres-hidrico-en-america-latina-y-el-caribe

America and the Caribbean to Global Markets."[11] Where the demands of the potential export markets of this energy are studied. In addition, OLACDE has also developed a hydrogen project evaluation platform, where the company can simulate the project data and will be able to know where said project is accepted and what things must change to be accepted.[12]

For the development of hydrogen, not only is technological and market advancement necessary for it to become a viable option, but also the implementation of long-term public policies. These include clear regulatory frameworks, regulatory stability, financing instruments, investment in research and development, and the formation of human capital, aspects in which the role of the Executive and Legislative Powers is central.

In this context, green hydrogen represents a strategic opportunity for the energy transition in Lac, provided that its development is inserted in a vision of a just, sustainable and territorially balanced transition, avoiding the reproduction of extractive schemes and promoting economic, social and environmental benefits for the region.

4.3. Needs for consolidation

Although progress has been made in consolidating the energy transition, there are still many structural and institutional challenges that must be addressed to ensure its sustainability over time.

First, the need for public policies that are sustained in different periods and become state policies, that are independent of the political ups and downs and natural electoral cycles of each country. This requires stable regulatory frameworks, broad political consensus and institutional mechanisms that provide long-term predictability, especially in investment-intensive sectors such as energy.

Second, public policies must be developed in a coordinated manner in the region. While each country defines its own domestic public policy priorities, regional

[11]https://www.olade.org/wp-content/uploads/2026/04/Libro-H2R-OLACDE-AGCID-UE.pdf
[12] Consult: https://certificacionh2.olacde.org/

integration is fundamental to advancing the energy sector. This includes infrastructure planning, regulatory harmonization, electrical interconnection, technological cooperation and the exchange of good practices. The energy transition is not just an internal process, it is an environmental process and this involves the entire region, for this regional cooperation and integration is necessary. Therefore, interconnectivity and the development of coordinated standards is essential.

Accordingly, legislation approved by parliaments should be as broad and flexible as possible, since technological development tends to outpace regulatory frameworks. In other words, highly specific regulations designed around the technologies available at a given point in time may become obsolete within a few years, as technological development evolves in new directions. Therefore, it is essential that legislative action focuses on principles, objectives and general safeguards, rather than on rigid technological prescriptions.

On the other hand, storage systems are emerging as a necessity in the face of variations in unconventional renewable energy sources. As is known, solar energy only produces electricity during sunshine hours, while wind energy generates electricity only when the wind speed is within an adequate range. Storage becomes an essential component to ensure the stability, reliability and safety of electrical systems in scenarios of high penetration of renewable energies. OLACDE has been actively engaged in this area and developed *the White Paper on Energy Storage in Latin America and the Caribbean 2025*, which addresses this challenge.[13]

Overall, the consolidation of the energy transition in LAC requires coordinated political decisions, stable regulatory frameworks and a long-term strategic vision. Parliaments play a central role in converting energy and climate objectives into sustainable, equitable public policies that are adaptable to future technological challenges.

[13] https://www.olade.org/publicaciones/libro-blanco-del-almacenamiento-en-america-latina-y-el-caribe-2025/

4.4. Mining opportunity

One of the industry's most directly affected by the energy transition is the mining sector, as the technologies required for decarbonization, such as renewable energy, electric mobility, energy storage, and digitalization, depend on a specific set of critical minerals, including copper, lithium, silver, molybdenum, nickel, zinc, and rare earth elements, among others. Unlike previous technological transitions, the energy transition is characterized by a high demand for minerals, positioning the mining sector as a strategic pillar of economic and geopolitical development.

LAC has a structurally favorable position, since it concentrates a significant proportion of the global reserves of many of these critical minerals, as seen in Table 1. In particular, the region excels in copper, lithium, silver and molybdenum, minerals essential for electrification, renewable generation and battery manufacturing.

Table 1. Critical minerals, reserves and the main producers of LAC.

MINERAL	LAC Reserves (%)	First	Second	Third
Copper	38	Chile	Peru	Mexico
Lithium	52	Chile	Argentina	Brazil
Silver	39	Mexico	Peru	Chile
Molybdenum	38	Chile	Peru	Mexico
Nickel	17	Brazil	Guatemala	Cuba
Bauxite	15	Brazil	Jamaica	Guyana
Gold	14	Mexico	Peru	Brazil
Tin	20	Peru	Bolivia	Brazil
Zinc	17	Peru	Mexico	Bolivia
Iron	20	Brazil	Peru	Mexico

Source: "Critical Minerals for the Energy Transitions of Latin America and the Caribbean" – OLACDE 2024

These data underscore the region’s substantial mining potential, positioning Latin America and the Caribbean as a central actor in the global supply of strategic resources required for the energy transition. This condition opens a historical window of opportunity to insert LAC more actively in the global value chains associated with the green economy.

However, taking advantage of this opportunity requires going beyond the growth of primary extractive activity. Historically, the region has participated in global value chains in a subordinate manner, concentrating on the initial links of extraction, with low technological content, little local added value and limited dragging capacity over the rest of the economy. In this context, the energy transition offers the possibility of promoting scaling in global value chains. This upgrading can take many forms, including mineral processing and refining, the production of intermediate goods, the development of technology providers and specialized services, and the manufacture of end-use components for clean energy technologies. For this process to be successful, the role of the State is essential, both in strategic planning and in creating enabling conditions.

Within this set of minerals, lithium acquires particular relevance. This mineral is a critical input for lithium-ion batteries, which are essential for electromobility and energy storage. LAC concentrates the world's largest reserves, especially in the area known as the Lithium Triangle, made up of Argentina, Bolivia and Chile. This geographical concentration represents a unique opportunity for the region to build a common strategy that goes beyond the mere export of lithium carbonate or hydroxide.

In this context, the challenge is not merely to increase production volumes, but to strengthen industrial, technological, and regulatory capacities that enable the capture of greater economic value, the creation of skilled jobs, and the development of local and regional productive linkages. It is also essential to incorporate environmental and social sustainability criteria, as the extraction of critical minerals can have significant impacts on land, water resources, and local communities.

From the perspective of public policies, the energy transition requires that the States assume an active role in the definition of national and regional strategies on critical minerals, articulating the mining policy with the energy, industrial and environmental agendas. This implies strengthening institutional and regulatory capacities, promoting investments that incorporate greater local added value and ensuring high socio-environmental standards in the development of the activity.

In this context, the regional dimension is central. The scale of the markets and the growing global competition for strategic minerals make it essential to avoid disparate strategies.

From OLACDE we publish a document that further develops this topic called *Critical Minerals for the Energy Transitions of Latin America and the Caribbean*.[14] And more recently, the Technical Note called *Energy Potential & Consumption of the Mining Sector of Latin America and the Caribbean.*[15]

4.5. Energy districts

Energy Districts are integrated energy systems that intelligently combine production, recovery, storage, and distribution of energy within urban areas, industrial zones, or interconnected groups of buildings. These systems allow the supply of energy services such as heating, cooling, hot water, electricity and other thermal and industrial services, integrating renewable energy, waste heat, energy storage and high-efficiency solutions.

In the context of the energy transition, energy districts represent a strategic solution to move towards more efficient, resilient and low-emission energy systems. Its implementation makes it possible to optimize the use of energy, reduce losses, reduce greenhouse gas emissions, integrate renewable energies and reduce the pressure on electrical systems, particularly in cities with increasing demand for cooling and in industrial areas with high thermal demand.

Internationally, energy districts have experienced significant growth in cities in Europe, Asia and North America, especially through district heating and cooling

[14]https://www.olade.org/wp-content/uploads/2024/02/Minerales_Criticos_ALC_OLADE.pdf
[15] Ver: https://www.olade.org/wp-content/uploads/2026/04/Potencial-Consumo-Energetico-del-Sector-Minero-de-America-Latina-y-el-Caribe-OLACDE-2026.pdf

networks, integration of thermal storage and waste heat use. Relevant experiences already exist in Latin America and the Caribbean that demonstrate its potential. Chile has developed pilot district heating projects associated with energy efficiency and reduction of air pollution, while Colombia has promoted cooling districts in Medellín under schemes that integrate energy efficiency, private participation and sustainable urban planning.

Energy districts also represent an opportunity to strengthen energy security, develop local value chains, drive new energy business models, and promote urban and industrial energy communities. They can also contribute to reducing urban energy poverty through more efficient, reliable and affordable energy services.

However, its expansion will require specific regulatory frameworks, adequate financing mechanisms, integrated energy and urban planning, as well as the strengthening of technical and institutional capacities. In this regard, parliaments in the region can play an important role by promoting regulatory frameworks that facilitate the development of thermal infrastructure, the use of waste heat, energy efficiency and the integration of renewable energies in cities and industries.

Under this framework, in March 2026, OLACDE and the *United Nations Industrial Development Organization* (UNIDO), through the *Global Energy Districts Programme* (GEDP), signed a cooperation agreement to promote the development of energy districts in Latin America and the Caribbean. This agreement seeks to strengthen regional capacities, develop market analysis, promote regulatory frameworks and encourage energy district projects as a solution to accelerate the energy transition, improve energy efficiency and support urban and industrial decarbonization in the region.

OLACDE has prepared Technical Note No. 15 on District Energy (2026), which documents the advances of Chile and Colombia in district heating and cooling and highlights their potential to improve urban energy efficiency and reduce emissions in the region.[16]

[16] https://www.olade.org/wp-content/uploads/2026/02/Nota-Tecnica-No.15-Energia-Distrital-Avances-en-Chile-y-ColombiaVersion-final.pdf

4.6. Energy Efficiency

The concept of energy efficiency has evolved over time and, therefore, does not have a single universally accepted definition. It is generally understood, however, as using less energy to provide the same outcome or service.

Different methods have been defined to evaluate energy efficiency, the best known and simplest to calculate is the energy intensity indicator, which is defined as the amount of energy required to generate one unit of gross domestic product (GDP).

In practical terms, energy intensity does not discriminate between sectors and encompasses all branches of the economy. This implies that changes in the productive structure can alter the indicator without there being an effective improvement in efficiency. An example of this is growth in non-energy-intensive sectors, that is, if low-energy-intensive economic activities, such as services or trade, growth, energy intensity will decrease, even if the country has not implemented technological improvements or efficiency policies. In other words, a reduction in energy intensity does not always reflect a more efficient use of energy but can simply be the result of structural economic transformations.

Regional data shows that energy efficiency must be a strategic priority for LAC. Between 2010 and 2021, the rate of improvement in energy efficiency in the region was just 0.65% per year, well below the global average of 1.65%. In addition, the pandemic reversed part of the progress made, since from 2020 energy intensity reversed its decreasing trend, having a clearly increasing trend as seen in Figure 11.

Figure 11. Evolution of energy intensity in LAC

Source: Energy Outlook for Latin America and the Caribbean, 2025, OLACDE

Energy efficiency is not only a key tool to reduce emissions and relieve the pressure on electrical systems, but also a fundamental mechanism to improve competitiveness, reduce costs for homes and companies and move towards a more just and sustainable energy transition. In a region where lower-income households spend a greater proportion of their budget on energy, efficiency measures directly contribute to reducing energy poverty and improving the quality of life. Likewise, energy efficiency promotes technological modernization, generates qualified employment and strengthens the resilience of energy systems in the face of external shocks, consolidating itself as a key instrument for a fair and inclusive energy transition.

Ultimately, energy efficiency is the most cost-effective tool to reduce demand, improve energy security and reduce costs for homes, companies and states. Despite its relevance, the region has significant lags in energy efficiency, especially in buildings, transport, and industry. The absence of minimum standards, the low penetration of efficient technologies and the limited availability of financing make their adoption difficult.

That is why the delay in improving energy efficiency in LAC shows the need to move towards regional legislative frameworks that establish common standards, coordinated incentives and comparable monitoring mechanisms. Among the most widely used instruments at the international level are minimum energy performance standards, mandatory labeling, efficient building codes and energy audit programs.

Although several countries adhered to the regional goal[17], the importance of parliaments promoting standards that harmonize criteria and allow accelerating progress is highlighted. The region requires legislation that establishes minimum energy performance standards, harmonized labeling systems, energy efficiency programs for SMEs and buildings, and accessible financing mechanisms for households and businesses. Regional legislative coordination would reduce asymmetries, take advantage of economies of scale and strengthen energy integration, ensuring that energy efficiency becomes a structural pillar of sustainable development.

OLACDE plays a central role in the promotion of energy efficiency in the region, acting as a technical articulator and facilitator of cooperation between countries. For this reason, the technical report *Regional Energy Efficiency Targets was prepared.*[18] In addition, the creation of the Energy Efficiency Working Group (GTO) constitutes a significant institutional advance, consolidating a permanent space for the exchange of experiences, technical coordination and consensus building.

Energy efficiency must be consolidated as a cross-cutting pillar of the energy transition, complementing the expansion of renewable energies and contributing to the reduction of emissions and costs.

5. Conclusions

The energy transition in LAC is at a turning point. The region has a solid renewable base and significant potential to move towards cleaner, more resilient

[17] https://www.olade.org/wp-content/uploads/2024/12/Declaracion-Conjunta-Meta-de-Eficiencia-Energetica_vf.pdf
[18] https://www.olade.org/wp-content/uploads/2025/01/Nota-Tecnica-Metas_de_Eficiencia_Energetica_Regionales_Diciembre_2024.pdf

and integrated energy systems. However, the energy systems of the region continue to be vulnerable to extreme weather events, infrastructure restrictions and a low coordinated response capacity at the regional level. This shows that today's challenges are not only technological, but deeply institutional and regulatory.

Parliaments play a strategic role. Energy transition is, above all, a political process that requires stable, flexible and long-term regulatory frameworks. Therefore, for countries to transform their energy advantages into sustainable development, it is essential that parliaments have the technical capacities necessary to understand the complexity of the contemporary energy system.

The speed of technological change, from energy storage to electromobility, through green hydrogen and smart grids, demands that standards be based on general principles and not on rigid prescriptions that quickly become obsolete.

Therefore, legislative training has become a central pillar of the energy transition. Without legislators trained in areas such as regional integration, energy planning, sustainable finance, just transition, international standards, and emerging technologies, the region risks adopting regulatory frameworks that are either insufficient or misaligned with the real needs of the process. The quality of legislation will determine the capacity of countries to attract investment, reduce inequalities, guarantee universal access to safe energy and move towards a more diversified and resilient matrix.

It is essential to strengthen the technical capacities of parliaments. The breadth and complexity of issues related to the energy transition, ranging from infrastructure and regulation to technological innovation, sustainable financing and regional integration, require properly trained legislators and parliamentary teams. Therefore, it will be highly beneficial to promote a regional program of parliamentary training in energy transition, which allows updating knowledge, sharing good practices and developing tools for the development of modern, flexible regulatory frameworks aligned with current challenges.

Finally, consolidating the energy transition in LAC requires strategic vision, regional cooperation, and modern regulatory frameworks. Most importantly, it requires legislators equipped to lead this process. Supporting their training is not a complementary element; it is an enabling condition for the region to translate its energy potential into economic development, social inclusion, and long-term sustainability.

6. Bibliography

Inter-American Development Bank (IDB). (2023). Towards sustainable integration: the potential of electromobility in Latin America and the Caribbean. Washington, D.C.: IDB. https://publications.iadb.org/publications/spanish/document/Hacia-una-integracion-sostenible-el-potencial-de-la-electromovilidad-en-America-Latina-y-el-Caribe.pdf

Inter-American Development Bank (IDB). (2024). A Framework for the Fiscal Impact of Electromobility. Washington, D.C.: IDB. https://publications.iadb.org/en/publications/english/viewer/A-Framework-for-the-Fiscal-Impact-of-Electromobility.pdf

Brichetti, J. P., Mastronardi, L., Rivas Amiassorho, M. E., Serebrisky, T., & Solís, B. (2021). The Infrastructure Gap in Latin America and the Caribbean (IDB Monograph; 962). Inter-American Development Bank. https://interactive-publications.iadb.org/La-brecha-de-infraestructura-en-America-Latina-y-el-Caribe

Economic Commission for Latin America and the Caribbean (ECLAC). (2025, October 7). Energy Integration and Just Transition in Latin America and the Caribbean: Opportunities and Challenges Towards 2050. https://www.cepal.org/es/enfoques/integracion-energetica-transicion-justa-america-latina-caribe-oportunidades-desafios-2050

International Energy Agency (IEA). (2023). IEA, Latin America Energy Outlook, 2023 Paris: IEA. https://iea.blob.core.windows.net/assets/878e705f-43e0-4858-9c5a-6349447ed669/LatinAmericaEnergyOutlook_Spanish.pdf

Latin American and Caribbean Energy Organization (OLACDE) (2024). |||UNTRANSLATED_CONTENT_START|||Metas regionales de eficiencia energética. |||UNTRANSLATED_CONTENT_END|||First edition OLADE. https://www.olade.org/wp-content/uploads/2025/01/Nota-TecnicaMetas_de_Eficiencia_Energetica_Regionales_Diciembre_2024.pdf

Latin American and Caribbean Energy Organization (OLACDE) (2024). Critical Minerals for the Energy Transition in Latin America and the Caribbean. Quito: OLACDE. https://www.olade.org/wp-content/uploads/2024/02/Minerales_Criticos_ALC_OLADE.pdf

Latin American and Caribbean Energy Organization (OLACDE) (2025). Gender and Energy in Latin America and the Caribbean: Technical Note 2025 Quito: OLACDE. https://www.olade.org/wp-content/uploads/2025/03/Nota-Tecnica-Genero-MARZO-2025.pdf

Latin American and Caribbean Energy Organization (OLACDE) (2025). Electric Mobility in Latin America and the Caribbean Quito: OLACDE. https://www.olade.org/wp-content/uploads/2025/05/Nota-Tecnica-Movilidad-electrica-en-America-Latina-y-el-Caribe-Cifras-2024_May15.pdf

Latin American and Caribbean Energy Organization (OLACDE) (2026). Potential and energy consumption of the mining sector in Latin America and the Caribbean (Technical Note No. 17). OLACDE. https://www.olade.org/wp-content/uploads/2026/04/Potencial-Consumo-Energetico-del-Sector-Minero-de-America-Latina-y-el-Caribe-OLACDE-2026.pdf

Latin American and Caribbean Energy Organization (OLACDE) (2026). sieLAC – Sistema de Información Energética de América Latina y el Caribe. Quito: OLACDE.

United Nations Development Programme (UNDP) (2024). Quedándonos secos: abordando el estrés hídrico en América Latina y el Caribe. Nueva York: PNUD. https://www.undp.org/es/latin-america/blog/quedandonos-secos-abordando-el-estres-hidrico-en-america-latina-y-el-caribe

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