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Energy in Latin America and the Caribbean: access, renewability and efficiency

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Energy is central to addressing almost every major challenge and opportunity in the region, whether it be reducing poverty, producing and cooking food, boosting employment, improving security, using digital services or raising incomes. However, the current energy model with its heavy use of fossil fuels jeopardizes environmental equilibrium, as it is a major contributor to greenhouse gas (GHG) emissions.

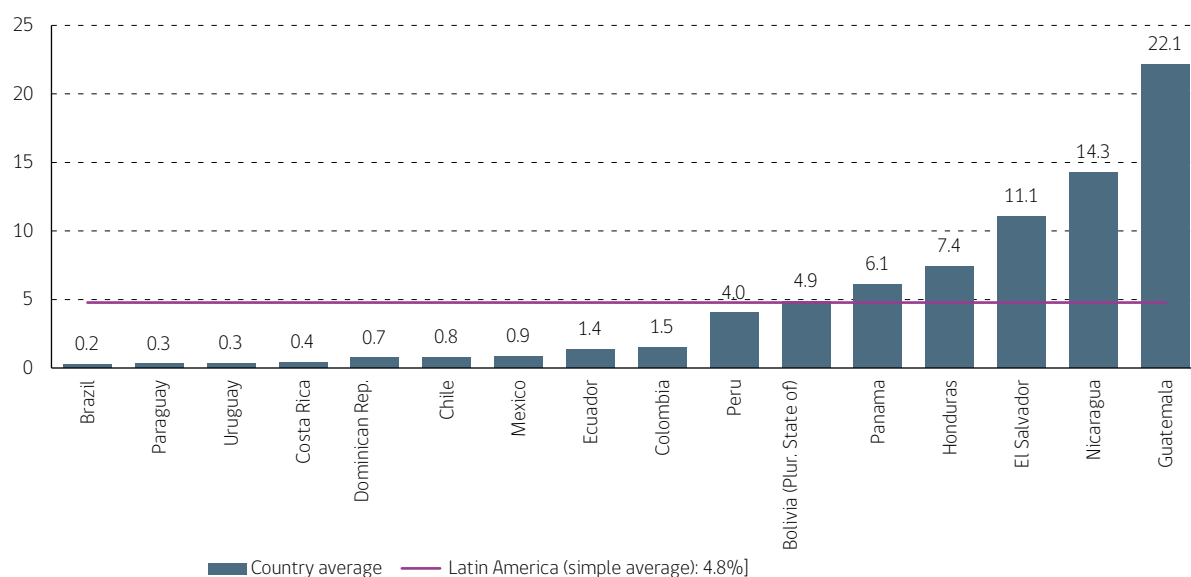
Sustainable Development Goal (SDG) 7 seeks to ensure access to affordable, secure, sustainable and modern energy. To this end it sets three targets, the first concerning access to energy, the second energy renewability and the third energy efficiency. In what follows, these three aspects will be analysed from a statistical point of view, while the contribution of energy to GHG emissions will be dealt with separately in view of its great relevance to what Alicia Bárcena, the former Executive Secretary of the Economic Commission for Latin America and the Caribbean (ECLAC), has described as the biggest market failure in history.

1. Despite major improvements in recent decades, certain social groups and certain areas still lack access to electricity

Latin America and the Caribbean has seen substantial improvements in electricity access since 2000, with the proportion of households that have access to electricity rising from 87% in 2001 to 95.1% in 2019.¹ Progress has been particularly strong for households in rural areas, where the proportion with access increased by more than 20 percentage points (from 65.3% to 87.5%). However, as the graphs below show, these very positive figures may mask highly significant differences in access between subregions, countries and social groups.

» Figure 1. Latin America (16 countries): proportions of the population without access to electricity, latest year available

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Household Survey Data Bank (BADEHOG).

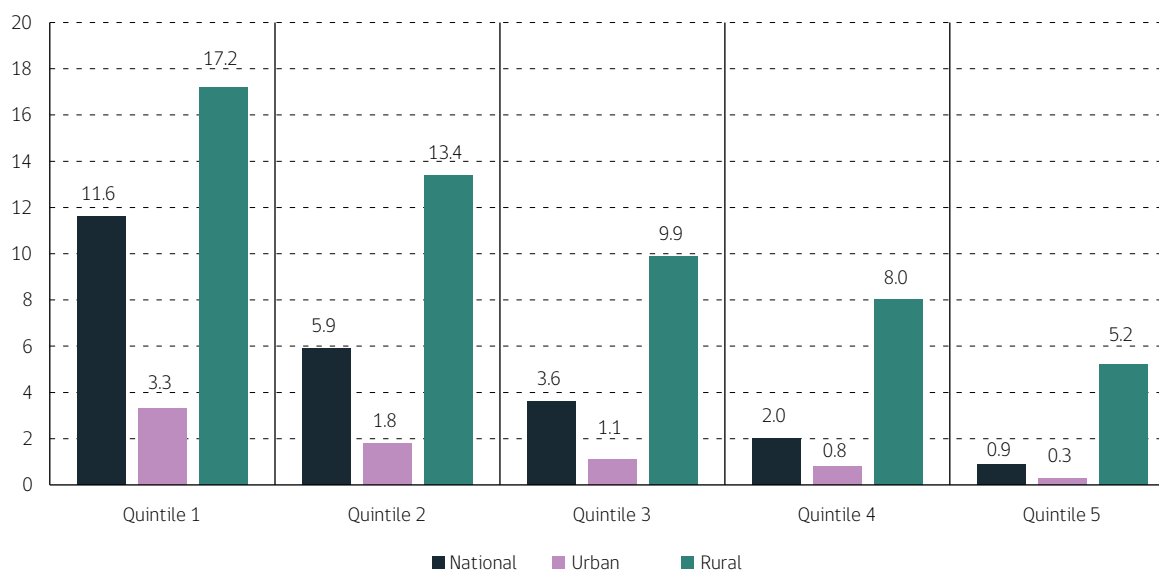
Note: The Latin American average is calculated from the household surveys conducted by the countries in the year concerned; where there is no information for that year, the most recent previous year is taken.

Brazil, Paraguay, Uruguay and Costa Rica are the countries with the least deprivation in electricity access, with rates of between 0.2% and 0.4%. The situation is much less encouraging in four Central American countries, with 22.1% of the population lacking access to electricity in Guatemala, 14.3% in Nicaragua, 11.1% in El Salvador and 7.4% in Honduras. Besides country of residence, other key factors of inequality for electricity access are geographical area and ethnicity.

¹ See Economic Commission for Latin America and the Caribbean (ECLAC), CEPALSTAT, "Households with availability of basic facilities in the dwelling, by urban and rural areas" [online] <https://cepalstat-prod.cepal.org/cepalstat/tabulador/ConsultaIntegrada.asp?idIndicador=260&idioma=s> [accessed on 24 July 2020].

» **Figure 2. Latin America: proportion of the population without access to electricity, by income quintile, 2019**

(Percentages)



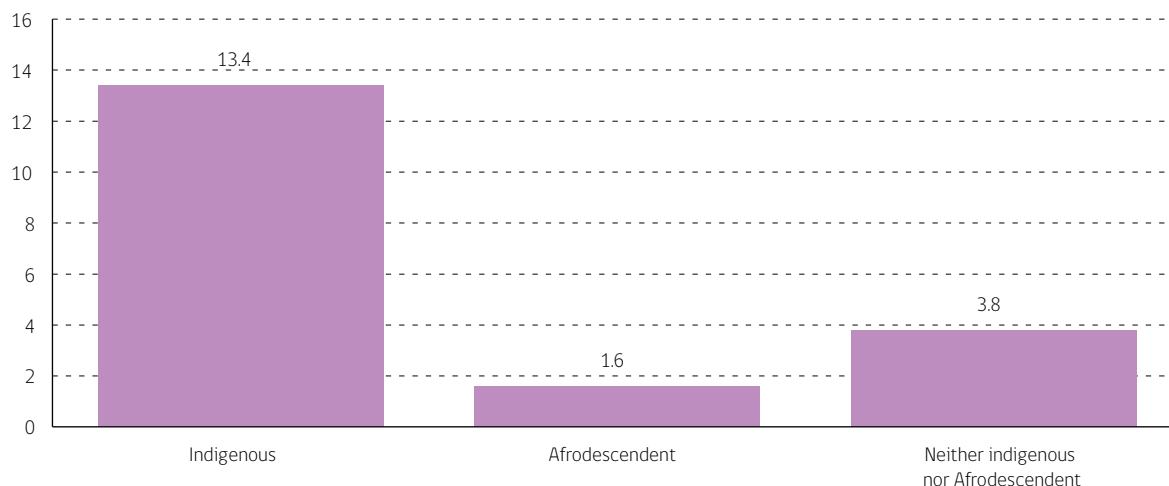
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Household Survey Data Bank (BADEHOG).

Note: The Latin American averages are calculated from the household surveys conducted by the countries in the year concerned; where there is no information for that year, the most recent previous year is taken.

With respect to inequalities by geographical area, figure 2 shows that it is the inhabitants of rural areas who have the least access to electricity in all income quintiles. It can be seen that rates of non-access to the service are 2% and 0.9% for the highest-income households, i.e., those in quintiles 4 and 5, while the lowest-income quintiles, namely 1 and 2, have averages of 12% and 6%. When it comes to inequalities in access by ethnic group, figure 3 shows that 13% of those identifying as indigenous have no access to electricity, versus 4% for those who do not identify as indigenous or Afrodescendent. It should be stressed that only 10 countries in the region have included a question on ethnicity in their household surveys, which are the data source for this indicator.

» **Figure 3. Latin America: proportion of the indigenous population, Afrodescendent population and rest of the population without electricity, 2019**

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Household Survey Data Bank (BADEHOG).

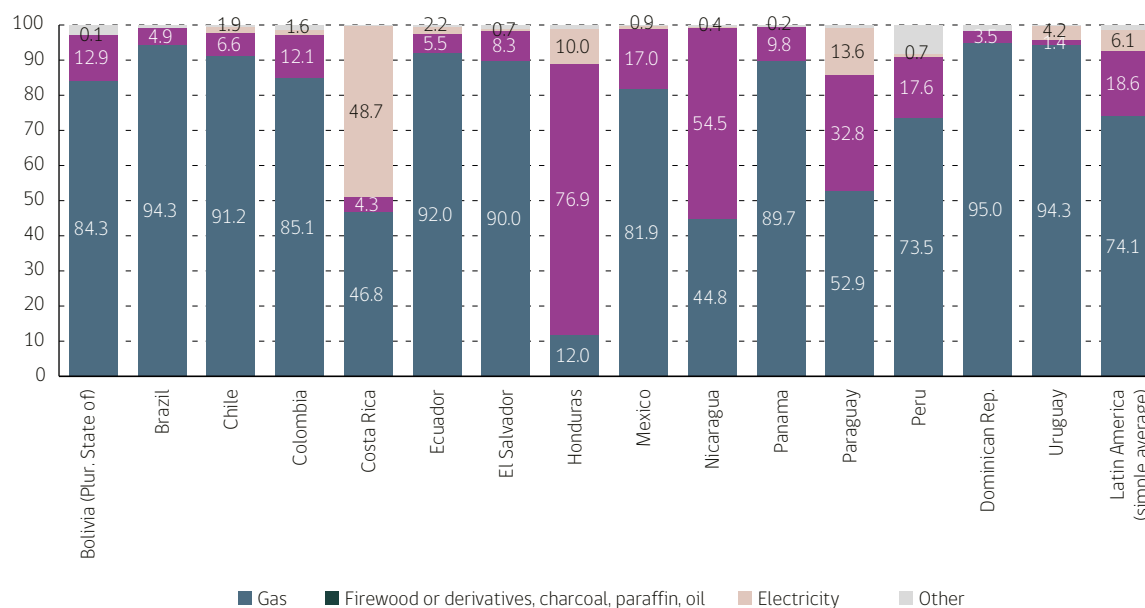
Note: The Latin American averages are calculated from the household surveys conducted by the countries in the year concerned; where there is no information for that year, the most recent previous year is taken.

Apart from access to electricity, another important aspect of energy inequality concerns the type of fuel used for cooking. The use of certain fuels, such as wood, charcoal, paraffin and oil, can have negative impacts not only on people's health (especially women's) because of smoke emissions in particular,² but also on the environment because of the pressure on natural resources, including forests.

The Dominican Republic, Uruguay and Brazil are the countries in the region where the highest proportions of households use gas for cooking, with rates of 95%, 94.3% and 94.3% respectively. In Honduras, 76.9% of households use firewood, charcoal, paraffin or oil for cooking. Costa Rica presents an atypical situation, as it has the highest proportion of households cooking with electricity in the region (48.7%), followed by Paraguay with 13.6%. Paraguay is also an exception in South America in that 32.8% of households still cook with wood, charcoal, paraffin or oil.

² See World Health Organization (WHO), *WHO guidelines for indoor air quality: household fuel combustion*, Geneva, 2014 [online] https://apps.who.int/iris/bitstream/handle/10665/141496/9789241548885_eng.pdf.

» Figure 4. Latin America (15 countries): cooking fuels, latest year available
(Percentages)



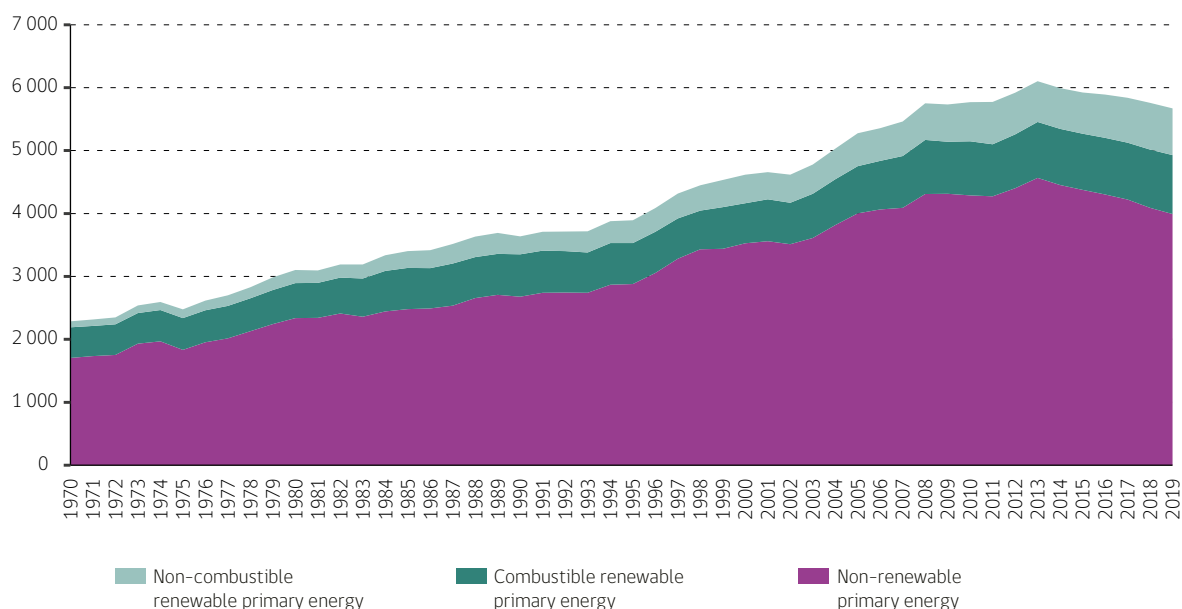
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Household Survey Data Bank (BADEHOG).

2. Despite a sharp increase in the supply of non-combustible renewable primary energy, the share of fossil fuels in the energy mix is still very high

As figure 5 shows, the non-renewable primary energy supply increased by a factor of 2.3 between 1970 and 2019, from 1.703 billion barrels of oil equivalent (BOE) to 3.990 billion BOE. Over the same period, the renewable primary energy supply increased by a factor of 2.87 from 0.584 billion BOE to 1.679 billion BOE. The decrease in the non-renewable primary supply from 2013 might be explained by the 52% decrease in the primary supply of oil from the Bolivarian Republic of Venezuela, which fell from 63 million BOE to 30 million BOE.

» **Figure 5. Latin America and the Caribbean: renewable primary energy supply (combustible and non-combustible) and non-renewable primary energy supply, 1970-2019**

(Million tons of carbon dioxide equivalent (MtCO_{2e}))



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook for Latin America and the Caribbean, 2021 (LC/PUB.2021/20-P), Santiago, 2021.

By 2019, the primary energy supply derived from fossil fuels (oil, gas and coal) was 70% of the total in Latin America and the Caribbean, close to the global average of 75.19%,³ with oil accounting for 32%, natural gas for 33% and coal for just 5%. The high shares of oil and natural gas and the smaller one of coal relative to the global percentages can be attributed to the character of the region's industrial and services infrastructure and to its levels of oil, natural gas and coal reserves. It is important to note that the share of fossil fuels varies greatly by sector. In the transport sector, it is 99%, while in the electricity generation sector it is estimated at 55%.⁴

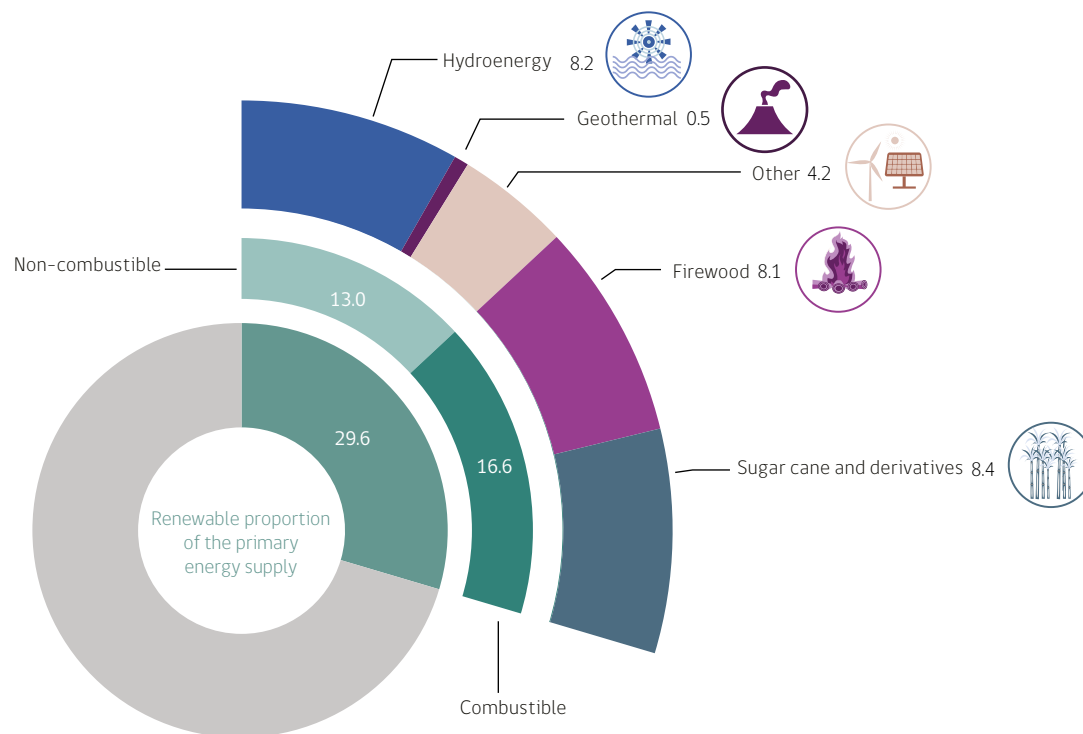
According to the Latin American Energy Organization (OLADE), and as figure 6 shows, the total share of the renewable primary energy supply in Latin America and the Caribbean is 29.6%. The distribution of the renewable primary energy supply by energy source can be grouped into two main categories according to their environmental impact. Combustible energy sources represent 16.6% of the primary energy supply, divided between sugar cane and derivatives (8.4%) and firewood (8.2%), while non-combustible energy sources (i.e., sources that do not emit pollutants into the air people breathe when energy is produced) account for 13%.

³ See L. Rivera Albarracín, "El cambio climático y el desarrollo energético sostenible en América Latina y el Caribe al amparo del Acuerdo de París y de la Agenda 2030", Documentos de Trabajo, No. 15, Madrid, Fundación Carolina, 2019.

⁴ See Economic Commission for Latin America and the Caribbean (ECLAC) and others, "Policy Brief 11: SDG 7 in Latin America and the Caribbean region", *Accelerating SDG 7 Achievement: SDG 7 Policy Briefs in Support of the High-Level Political Forum 2019*, United Nations, 2019.

» Figure 6. Latin America and the Caribbean: renewable primary energy supply by energy type, 2019

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook for Latin America and the Caribbean, 2021 (LC/PUB.2021/20-P), Santiago, 2021.

The 8.2% share of hydroenergy reflects its historical importance in the region as a power source. Figure 7 shows how the distribution of sources in the renewable primary energy supply has evolved over time and reveals significant changes between 2000 and 2019, with a decrease in the share of firewood from 39% to 27.5% and of hydroenergy from 35% to 28%. Conversely, the share of wind and solar energy in particular was up,⁵ rising from 4.1% to 14.4%, while that of sugar cane also increased, from 19.5% to 28.4%.

⁵ This also includes other non-combustible renewable energy sources such as tidal energy. For more information, see Latin American Energy Organization (OLADE), *Panorama Energético de América Latina y el Caribe 2019*, Quito, 2019 [online] <http://biblioteca.olade.org/opac-tmpl/Documentos/old0434b.pdf>.

» **Figure 7. Latin America and the Caribbean: renewable primary energy supply (combustible and non-combustible), by source, 2000–2019**

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook for Latin America and the Caribbean, 2021 (LC/PUB.2021/20-P), Santiago, 2021.

3. The energy intensity of GDP is decreasing in the region, which means that efficiency is improving

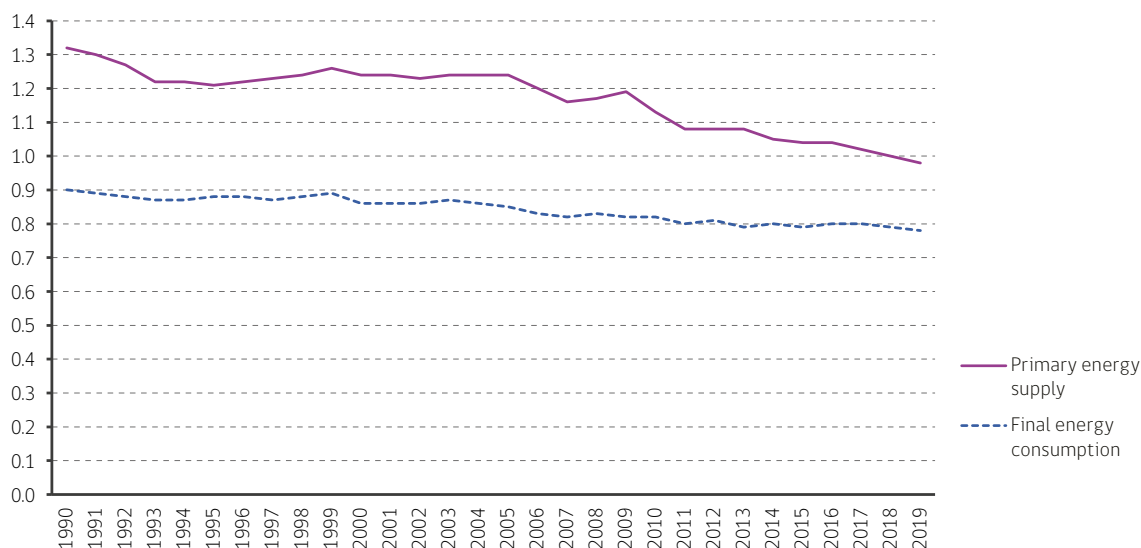
The energy intensity of GDP is an indicator of how much in the way of energy resources a country needs to generate one unit of gross domestic product (GDP). A low ratio indicates that less energy is used to produce each monetary unit of economic output, and a higher ratio that more energy is required. While the ratio can indicate the level of efficiency with which an economy uses energy resources, there are also other factors that influence this indicator and that are not necessarily related to efficiency, such as climate or changes in the sectoral composition of GDP.

Figure 8 shows two energy intensities: one calculated in relation to the primary energy supply and one calculated in relation to final energy consumption.

Although there are variations between years, Latin America and the Caribbean emerges as one of the world regions that are least intensive in final energy consumption, with intensity declining by 13% over the last 30 years from 900 BOE per million dollars of GDP (at constant 2010 prices) in 1990 to 780 BOE per million dollars of GDP in 2019.

» Figure 8: Latin America and the Caribbean: energy intensity of gross domestic product (GDP), 1990–2019

(Latin America and the Caribbean: energy intensity of gross domestic product (GDP), 1990–2019)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Statistical Yearbook for Latin America and the Caribbean, 2021* (LC/PUB.2021/20-P), Santiago, 2021.

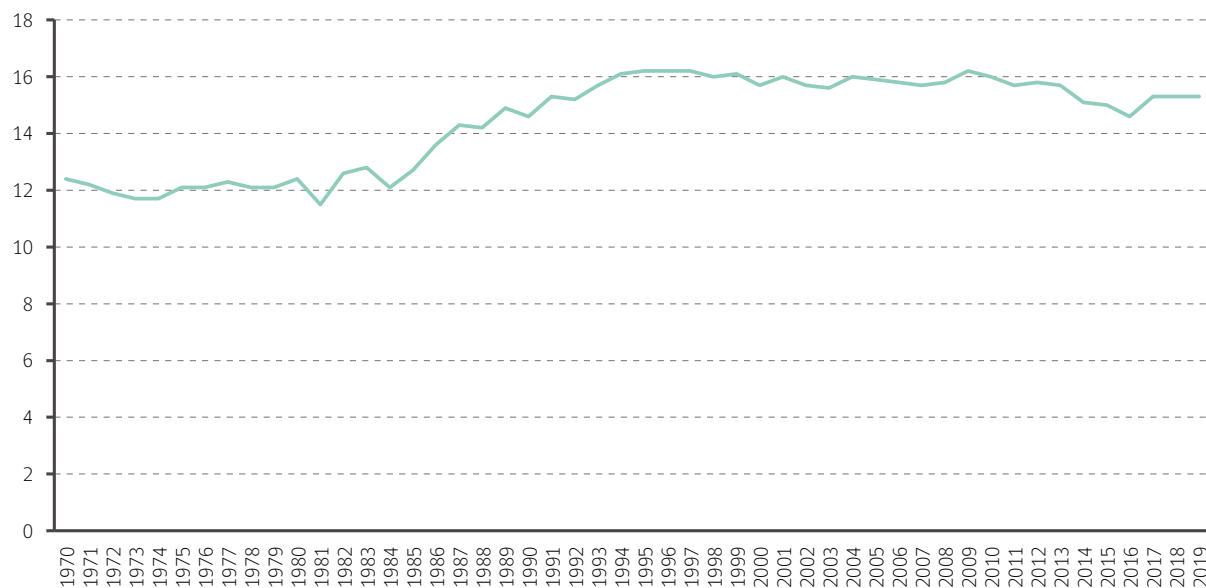
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A second key indicator for measuring energy efficiency is the ratio of electricity losses to electricity supply. Electricity losses, whether technical or non-technical, represent the amount of electricity that is lost as it moves through the energy chain, from origin to final consumption. Losses occur in storage, transformation, transmission and distribution. Among the reasons for technical losses are wastage due to natural heating of the transformers and conductors that transport the electricity from the power plants to where it is consumed. Non-technical losses include losses due to administrative errors, metering anomalies, self-connecting users and energy theft.⁶

⁶ For more information, see Latin American Energy Organization (OLADE), *Panorama Energético de América Latina y el Caribe 2019*, Quito, 2019 [online] <http://biblioteca.olade.org/opac-tmpl/Documentos/old0434b.pdf>.

» Figure 9: Latin America and the Caribbean: electricity sector losses as a proportion of the total electricity supply, 1970–2019

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook for Latin America and the Caribbean, 2021 (LC/PUB.2021/20-P), Santiago, 2021.

Despite the efforts made by governments and energy companies, it can be seen in figure 9 that the proportion of electricity lost increased from 12% to 16% between 1970 and 1994. This level remained stable as of 2019, although a slight decrease to 14.6% can be observed in 2016. This means that 16% of the electricity generated by the region's energy system is wasted, a high level compared to that in the OECD countries (6%).

It should be stressed that there are significant differences between countries and subregions, with upward of 20% of electricity being lost in the Caribbean and some Central American countries.

4. The energy sector is estimated to account for 55% of greenhouse gas emissions in Latin America and the Caribbean

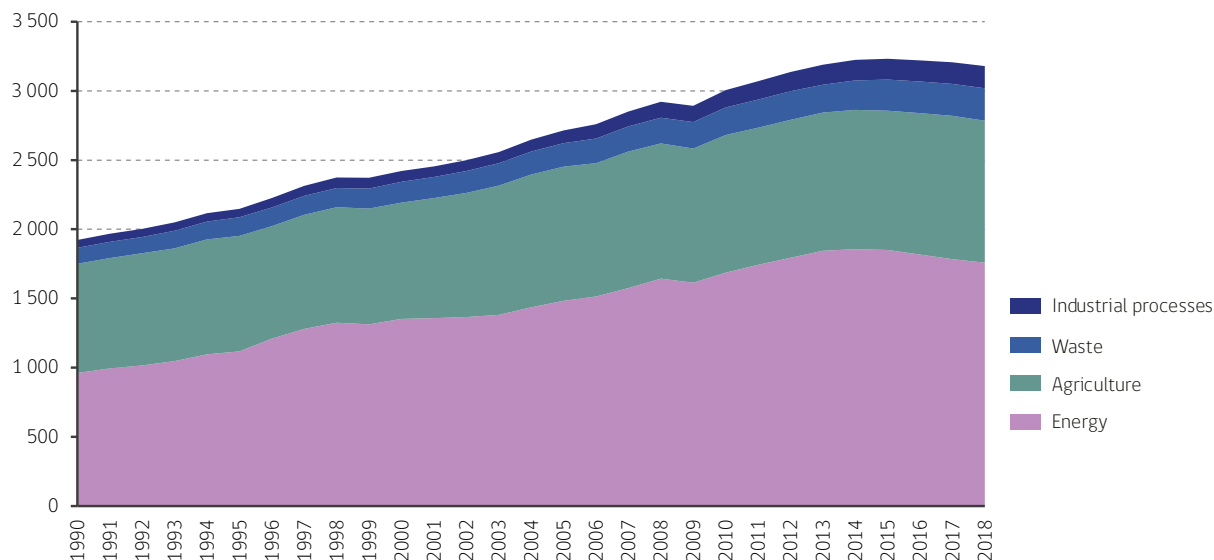
The availability of basic energy statistics and appropriate, reliable and timely energy accounts is essential for estimating GHG emissions and designing public policies to mitigate climate change. Energy statistics are the main source of data for calculating energy-related GHG emissions.⁷

Figure 10 shows that the structural trend of the data indicates an increase in total GHG emissions in Latin America and the Caribbean. From the historical data for the period 1990–2018, it can be affirmed that total GHG emissions in the region increased by 80% over that time. It should be noted that emissions from land use change and boiler fuels are not included.

⁷ See L. Rivera Albarracín, "El cambio climático y el desarrollo energético sostenible en América Latina y el Caribe al amparo del Acuerdo de París y de la Agenda 2030", Documentos de Trabajo, No. 15, Madrid, Fundación Carolina, 2019.

» **Figure 10. Latin America and the Caribbean: greenhouse gas emissions, by sector, 1990–2018**

(Millions of tons of carbon dioxide equivalent)



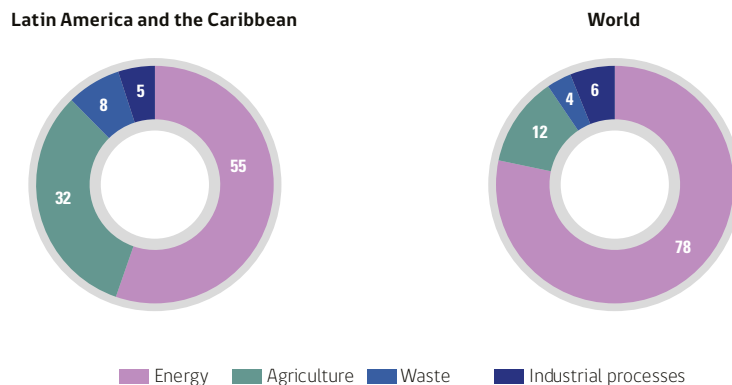
Source: Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook for Latin America and the Caribbean, 2021 (LC/PUB.2021/20-P), Santiago, 2021.

Figure 11 shows how specific the region’s behaviour is compared to that of the world, where 78% of global GHG emissions are attributed to the energy sector, 23 percentage points more than in Latin America and the Caribbean (55%).

It is important to note that Latin America and the Caribbean contributes a small share of the global total. In 2018, the region contributed 3.179 billion metric tons of carbon dioxide equivalent (tCO₂eq), which represented approximately 7% of total global GHG emissions.

» **Figure 11. Latin America and the Caribbean and rest of the world: greenhouse gas emissions, by sector, 2018**

(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Statistical Yearbook for Latin America and the Caribbean, 2021 (LC/PUB.2021/20-P), Santiago, 2021.

5. Conclusions:

While the region has made great progress towards SDG 7 in respect of access, renewability and efficiency alike, there are still critical challenges requiring very substantial investment.

The recommendations formulated by ECLAC⁸ for the next steps can be summarized as follows:

- a. Target access efforts on informal settlements and remote areas;
- b. Reduce electricity bills for poor households;
- c. Pursue convergence between electricity prices and the cost of electricity production;
- d. Establish public policies to promote renewable energies as policies of State;
- e. Promote the use of clean ovens in countries where wood-burning will continue to be widespread in the coming years;
- f. Establish regulatory frameworks for energy efficiency and national energy efficiency policies;
- g. Invest in the production, use and dissemination of high-quality energy statistics;
- h. Promote the use of low-energy equipment.

⁸ See Economic Commission for Latin America and the Caribbean (ECLAC) and others, "Policy Brief 11: SDG 7 in Latin America and the Caribbean region", Accelerating SDG 7 Achievement: SDG 7 Policy Briefs in Support of the High-Level Political Forum 2019, United Nations, 2019.

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The views expressed in this document, a translation of a Spanish original which did not undergo formal editing, are those of the authors and do not necessarily reflect the views of the Organization or the countries it represents.

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