Scientific Cooperation and Domestic Policies for Decarbonizing Economies in Latin America. The cases of Colombia and Argentina

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Introduction

According to the latest report of the Intergovernmental Panel on Climate Change (IPCC), presented on 9 August 2021 and prepared by scientists from all over the world, the climate crisis 'is widespread, rapid and intensifying'.[1] Some of the effects such as the rise in the sea level will take thousands of years to reverse, and others like accelerated warming and the increase in global average temperatures will be irreversible unless effective and urgent measures are taken.

This is the framework for the variety of measures that governments around the world are beginning to adopt to contribute to the decarbonization of their economies, focused both on establishing international scientific cooperation links in environmental matters and on modifying the domestic production matrix. In this article, we briefly review the central policies of two Latin American countries, Colombia and Argentina, to encourage the decarbonization of their economies. It would need international cooperation and sustained efforts to reduce greenhouse gas (GHG) emissions. Table 1 depicts the annual CO_2 emissions from the burning of fossil fuels for energy and cement production in South American countries.

Table 1. South American countries annual carbon dioxide (CO_2) emissions (million tonnes) from the burning of fossil fuels for energy and cement production and per capita CO_2 emissions (tonnes) (Data source, 2019: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions)

	Brazil	Colombia	Argentina	Peru	Venezuela	Chile	Ecuador	Bolivia	Paraguay	Uruguay	Guyana	Suriname
Annual CO_2 emissions	465.72	102.20	178.94	54.53	116.69	84.27	40.54	22.57	8.27	6.38	2.39	2.61
Per capita CO_2 emissions	2.21	2.03	4.00	1.68	4.09	4.45	2.33	1.96	1.17	1.84	3.05	4.48

Colombia: Advancing Energy Transition through Science Diplomacy and International Cooperation

Colombia is a leader in Latin America in the energy transition[2] and by 2022, it aims to generate 12% of its electricity from solar, wind, and biomass projects. About 69% of its annual electricity generation is from hydropower. However, diversification towards non-conventional sources of energy will require the adoption of new technologies and regulatory frameworks for its implementation.

In 2014, Law 1715 was enacted which encourages the integration of non-conventional renewable energies to the Colombian energy mix, incentivise private capital investment in renewable energy integration and provides alternative energy options even to non-interconnected areas of Colombia. Following this law, the Government of Colombia (2018-2022) has shown its interest in designing a proposal to modernize the institutional and regulatory framework that facilitates the country's energy transformation, through the incorporation of new agents, technologies, and transactional schemes in the energy markets. This has been expedited by Colombia's interest in 4.0 technologies, oriented towards transformed and innovative industries.[3] In 2019, Law 1964 was sanctioned which aims to generate schemes to promote the use of electric and zero-emission vehicles. Colombia's UPME (Mining and Energy Planning Unit) conducted its first renewable energy auction in 2019 and awarded contracts for solar and wind projects with an aim to increase its renewable energy sources capacity to 2250 MW. These auctions context, design and results were analysed by USAID and International Renewable Energy Agency (IRENA).

In 2021, Colombia received two important international recognitions thanks to its interest in advancing towards the energy transformation of its territories. Colombia was invited by the United Nations to lead the Global Dialogue on Energy Transition along with nine other countries, in the High-Level Dialogue on Energy in September 2021.[4] Moreover, at the General Assembly of IRENA, it was chosen as the main member of its Council representing Latin America.[5]

Colombia has developed policies and roadmaps with international support through science diplomacy schemes and international cooperation. In 2020, with the financial support from the World Bank and the Inter-American Development Bank (IDB), Colombia organized an international mission for energy transformation, creating alliances between national and international experts, to advance towards a roadmap to implement the required adjustments in the electricity market.[6] Specifically, the mission aimed at solving two central questions: How to ensure that the regulation allows innovation or the introduction of new technologies with sufficient agility without compromising reliability, and what should be the institutional and regulatory framework to ensure that the market benefits the user and generates efficient prices for the demand? This

Mission has provided answers, especially regarding the modernization of distribution networks, also in terms of coverage and subsidies as well as the opening of new markets.[7] In 2021, the country also signed an international cooperation agreement with Denmark to boost and promote technical cooperation and joint implementation of programs and activities in energy efficiency, renewable energy and electric mobility.[8]

Yergin[9] states that Colombia has projected an increase in its share of non-conventional renewable energies from less than 1% to more than 12% in the energy matrix by 2022; as well as reducing GHG emissions from 20% to 51% by 2030. In 2021, Law 2099 was enacted, which aims to modernize current legislation and dictate other provisions for the energy transition, the promotion of the energy market through the use, development and promotion of non-conventional energy sources.[10] The public and private bodies need to explore new financing mechanisms to make viable projects in solar, wind, biomass, geothermal and tidal energy. A 2020 report suggests options for commercial and industrial companies to procure renewable electricity in Colombia. Although Colombia has advanced regulations and documents with guidelines, thanks to international cooperation with various entities and experts to support the transition to cleaner energies, only the next few years will tell us if these regulatory advances will have an impact in line with the diversity of regions and challenges the country faces in energy matters.

Argentina: Domestic and International Initiatives for the Decarbonization of the Economy

Argentina is the third-largest economy in Latin America, after Brazil and Mexico. It signed the Paris Agreement on Climate Change at the UNs Framework Convention on 22 April 2016 and ratified it on 21 September 2016. Argentina with its Nationally Determined Commitment (NDC) pledged to adopt a low-carbon agenda while maintaining its economic growth, food and job security for the population.

Argentina has been raising the environmental issue agenda for some years now. Since 1994, the National Constitution recognizes the right to enjoy a healthy environment and its preservation in Article 41. However, the issue has recently gained greater prominence in public policy. So much so that 2017 was declared the year of renewable energies, and in recent years, several policies aimed at the decarbonization of the economy have been promoted, demanding increased participation of scientists. To reduce its net emissions by 2030, Argentina is focusing on its energy sectors, agriculture, forests, transport, industry, health care and waste. In February 2021, Argentina became the first country in the world to include health care decarbonization in its global climate commitment.

In July 2021, the Argentinian Ministry of Production presented the 'Green Productive Development Plan' to decarbonize the economy and achieve an ecological transition. It contemplates the replacement of hydrocarbon energies through renewable energies, hydrogen, lithium, electric vehicles, etc., and it also seeks to generate macroeconomic and social conditions of sustainability. To this end, it proposes to allocate 10 billion pesos (more than 100 million USD) and implement policies such as financing for green small and medium enterprises (SMEs), training, technical assistance, Good Trade seal, and business rounds.[11]

This Plan had as immediate antecedent, the forum 'Towards a National Hydrogen Strategy 2030' held in May 2021, attended by politicians, government officials, businessmen, scientists, and ambassadors from countries such as Germany, Japan and South Korea. Also, as part of this strategy, an increase in the participation of nuclear energy is sought. In this sense, the future installation of two more nuclear power plants that will double the existing atomic energy participation was announced.[12] Argentina is also running a project with support from Global Fuel Economy Initiative (GFEI) to improve fuel efficiency in the vehicle fleet.

In turn, the foreign policy has increased environmental, scientific and technological cooperation with countries having experience in this area, especially Germany, with whom the environmental issue has been

defined as a central axis of bilateral cooperation. Thus, in January 2020, the Argentina's Ministry of Science, Technology and Innovation (MSTI) signed a scientific cooperation agreement with the European country to study oceans, biomass, and environmentally friendly production models.[13] Likewise, in June of this year, the 'Future Forum', a bilateral cooperation initiative between both countries, was launched. This forum focuses on two main axes: Industry 4.0 and the development of renewable energies.[14]

Argentina's agriculture and livestock (along with forestry and other land uses) emit ~ 46% of total national GHG emissions. The livestock sector is responsible for 41% of the direct methane and nitrous oxide emissions in agriculture. Being the world's third-largest producer of soybean and the sixth-largest producer of beef, these sectors require special attention. The associations of agricultural producers introduced a private sector initiative 'The Argentine Carbon Neutral Agriculture Programme (PACN, as per its Spanish acronym)' that aims to export food, beverages and bioenergies that will reduce and compensate for the amount of GHGs emitted during their life cycle. Finally, some of the scientists who participated in the United Nations IPCC report drafting are presently policy advisors to the national MSTI that facilitates the dialogue between the scientific community and public policies design.[15]

However, one of the obstacles we have to overcome to implement these initiatives effectively is a national productive matrix strongly based on the extractivism of natural resources. This implies deepening debates on incorporating more productive actors in the decarbonization of the economy and considering international cooperation practices that take into account local needs, overcoming the adoption of technological solutions not adapted to our realities.

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