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TABLE OF CONTENTS

ACRONYMS	5
EXECUTIVE SUMMARY	6
INTRODUCTION	7
I. ENERGY OVERVIEW AND ENERGY TRANSITION IN LATIN AMERICA AND THE CARIBBEAN.	9
1. Sources of energy in Latin-America	9
2. Global energy mix	11
3. The Latin America energy mix	12
4. Context by countries	15
5. Natural gas and energy transition	20
II. UPDATE ON REGIONAL GAS INDUSTRY: TRENDS, POST-PANDEMIC CONTEXT & ENERGY TRANSITION.	22
a. Proven Reserves	24
b. Production	26
c. Gas Flaring	30
d. Consumption	31
e. Exports and Imports	36
f. Transportation and storage infrastructure	38
g. Organization and regulation	43
h. Supply Chain	44
i Final Reflections	45

III. ANALYSIS OF KEY ACTORS IN THE LATIN AMERICAN GAS MARKET	46
Public Actors	46
Private Actors	49
Third Party Actors	52
Corporate Capture of the State in Gas Industry	57
CONCLUSIONS AND RECOMMENDATIONS	59
BIBLIOGRAPHY	62
ANNEXES	70

ACRONYMS

bboe Billion barrels of oil equivalent

bcm Billion cubic meters

CAF Latin American Development Bank

CCS Corporate Capture of State

CELAG Latin American Strategy Center for Geopolitics

CENACE Energy Control National Center

CEPAL Economic Commission for Latin America and the Caribbean (ECLAC)

CFE Mexican Electric Company

CO2 Carbon Dioxide

EIA Energy Information Administration

ENARGAS National Gas Regulation Agency

GDP Gross Domestic Production

GHG Greenhouse Gas

IADB Inter-American Development Bank

IRENA International Renewable Energies Agency

LAC Latin American and the Caribbean

LNG Liquefied Natural Gas

MW/h Mega Watt per hour

OLADE Latin America Energy Organization

PDVSA Venezuelan Oil and Gas Company

PEMEX Mexican Oil and Gas Company

SENER Mexican Energy Ministry

SIELAC Latin America and the Caribbean Energy Information System

SOE State Owned Enterprise

WB World Bank

YPF Argentinean Oil and Gas Company

EXECUTIVE SUMMARY

The use of natural gas use is a topic of debate. On the one hand it is considered a non-renewable source the combustion of which produces almost 50% less greenhouse gases (GHG) than coal or oil combustion. So in this sense it is a relative clean burning fossil fuel according to the Energy Information Administration (EIA). At the same time, natural gas leaks are very common within hydrocarbon exploitation wells producing a strong GHG called methane. It is therefore a highly pollutant source of energy. In addition, the modern gas industry requires a great volume of water supply and land to develop the value chain. Where there is no supply chain, some oil producers prevent accidents by burning the gas leaks at well sites (gas flaring), affecting the environment and the communities surrounding these projects.

Industry developers and the owners and managers of gas reserves, along with financial institutions are implementing an international agenda to promote natural gas production to become the keystone for energy transition.

For some countries in the Latin America and the Caribbean region (LAC), natural gas is a strategic resource for obtaining revenues or promoting foreign investment. For multinational companies, it is a strategic resource to maintain long-term business, but it requires high safety standards and technological advances in order to make this, a profitable transition.

Only four countries in the region have large exporter status (Argentina, Bolivia, Trinidad&Tobago and Venezuela). The largest importer is Mexico which buys natural gas from the U.S. These trends are reflected in the number of pipelines built across the continent. More than a regional integration, they constitute a distribution network to supply all the reserves available for electricity generation and industrial purposes.

Despite the Covid-19 pandemic restrictions, natural gas consumption increased across the region with the exception of Colombia. There was also the impact, albeit minor, caused by the war in Ukraine which was reflected in international prices of oil and gas. In the long-term this impact will likely be higher for those non-producer countries.

There is a particular concern about natural gas production within national oil companies due to the low amounts compared to multinational companies' standards. This is reflected in countries' low level of interest in developing technological capacities to transform gas into electricity, with the exception of Mexico and Brazil, where the SOE's capacities are the largest in LAC.

The private companies became principal actors in production and transformation via gas power plants. Twenty-three private projects hold 76% of the region's total capacity. There is also a trending in public-private joint ventures to exploit, transform and distribute gas, derivatives and electricity.

In this debate, the perspectives from social and community stakeholders are lacking. Civil society organizations' capacities on the issues are still developing and civic space in the region is shrinking for human rights advocacy and territorial and environmental defenders. There is an urgent need to develop the space and narrative for a "just energy transition".

INTRODUCTION

The world's energy sector, particularly in Latin America, has been strategically relevant for individual countries. For a long time, the sovereignty of states was primarily based on their ability to manage their resources, including natural resources. A sector entirely open for private initiative runs the risk of being subjected to private interests over the common interest and respect for human and workers' rights: what some academics from the World Bank (WB) have called corporate capture (CCS). This is expressed in the excessive influence of the business sectors granted to them by neoliberal policies and through the cooptation of the institutions and bodies in charge of public policy. Workers, affected communities, and civil society organizations will therefore be key actors in the sector's transition.

In addition, there are factors imposed by global warming and its effects on climate change. The climate crisis makes the need to transition to schemes that are less dependent on fossil energy sources to reduce the emission of greenhouse gases more urgent, which will undoubtedly have repercussions on the global and regional energy sector.

Latin American countries contribute to the world energy matrix mainly through fossil fuels, though there has been a gradual increase in other renewables sources. Some primary energy sources are fossil fuels (oil, coal, and gas), nuclear and renewable (wind, solar, geothermal, and hydro). Most of these are processed to generate electricity, a secondary energy source.

Since 1990, the trend shows a growth in energy supply in Latin American countries, which by 2019 represented about 150%. Although oil and its derivatives continue to be a significant source on which the regional matrix rests, representing more than 50% of the total energy sources, in recent years, it has experienced a significant contraction, coupled with a substantial growth in natural gas and biofuels.

During the Covid-19 pandemic, the gas consumption in the LAC region experienced a slight decrease, especially the industrial, commercial and service sectors due to the lock down policies and mobility restrictions. In the case of residential use of gas, this decrease was lower because of the change in the commodities prices.

In the regional financing mechanisms and investment patterns, the most common financial flows are from the private to the public sector, from the public to the private sector, and from the private to the private sector. This categorization does not imply that in all cases, an exclusive type of flow is observed; in some cases, the flow in an energy project may start between private parties and later have a public partnership or alliance.

In different analyses, the challenges of digitalization are presented as opportunities to increase consumer access to goods and services. Large outsourcing companies such as Manpower Group have registered a boom in employment from the digitization of the production chain. However, the disadvantage will be the skills and knowledge necessary for workers to complement the machines.

The energy transition has become one of the most relevant issues in recent years in Latin America and worldwide. This is because, during the last decades, the impact of the emission of certain gases, mainly from the combustion of fossil fuels such as coal, oil and na-

tural gas, has been apparent. The implementation of policies aimed at protecting the climate will have an impact on workers in the energy sector. It will therefore be essential to ensure the adaptation of vocational and educational systems, and active labor market policies aimed at job creation, training and lifelong learning. This must be part of the measures taken by States and companies.

Different sources of information were used for this research including documents and semi-structured interviews with experts in the field of energy and natural gas were included. This part of the investigation included the perspective of former public officials, academics, and civil society organizations, who brought first-hand information to the analysis.

This study was conducted by PODER's research team based on qualitative research methodologies, with a corporate research perspective that incorporates a human rights approach. The team reviewed document sources such as academic and journalistic articles, studies from national and regional organizations related to the energy sector, and reports of companies and international financial institutions. Several energy data bases were reviewed and their data were compared, although there may be some variations among them, due to the way in which the governmental entities of the countries present the information and the timing with which they do so.

This research focuses on the following countries for the analysis: Argentina, Brazil, Bolivia, Colombia, Peru, Mexico, Trinidad and Tobago, and Venezuela. Those countries were selected based on their relevance for the regional natural gas sector. Official websites and institutional sources of information from these countries were reviewed.

The report is structured in three chapters. The first chapter provides an overview of energy in the Latin American region. It discusses the role of the energy sector in the global mix and the composition of the regional energy mix. The second part describes the gas industry in the region and analyzes the value chain. The last chapter analyses the largest and more relevant companies which take part in the regional market.

The report shows how in 2020 the lock-down resulting from the pandemic signified a decrease in international energy markets. However, by 2021 there was a slight recover which was bigger in the case of natural gas projects. Additionally, the war in Ukraine, although it does not have a direct impact on the gas industry in Latin America, did have an indirect effect through its prices. The increase in gas prices could have positive effects on exporting countries such as Bolivia, Trinidad and Tobago and Peru. This research also shows that some key players in the gas industry are private companies, but also state-owned companies. This has been determined by the policies of some countries that tend to open up the market, while others promote greater state control of natural gas operations. This context allows us to observe the deepening of the sector in the coming years, so it will be crucial to have a strong regional energy system in order to adequately contribute to the energy transformation, which implies guaranteeing people's rights and avoiding phenomena such as corporate capture.

I. ENERGY OVERVIEW AND ENERGY TRANSITION IN LATIN AMERICA AND THE CARIBBEAN

KEY FINDINGS

- Latin America's energy matrix is based on the production of fossil fuels such as oil and natural gas. Unlike the world matrix, coal in Latin America has a smaller presence in countries such as Colombia, Chile, Peru or Mexico, while hydro-energy seems to have a greater potential in the region, and renewable energies such as solar and wind power continue to have a smaller share.
- In Latin America, natural gas is mainly used for electricity generation, which in turn is oriented to cover industrial and residential needs. In addition, another part of natural gas is directed in its original form to the industrial, residential, public services and small commercial sectors.
- During the 2020 lock-down resulting from the pandemic caused by Covid-19, there was a
 decrease in international energy markets, caused by a decrease in demand from the industrial sectors. However, by 2021 a slight recovery was experienced, which was greater in the
 case of natural gas.
- Natural gas is seen as an alternative energy source, the usage of which would allow guaranteeing supply in the region with low emissions of GHG into the atmosphere, while the supply of renewable energies is developed.
- Latin America imports natural gas produced in North America, especially in the US, which
 has been increasing its market in recent years. Argentina, Bolivia, Trinidad and Tobago and
 Venezuela are the main markets for export of natural gas in the region, while Mexico is the
 largest natural gas importer.
- Natural gas will play an important role in the implementation of the energy transition thanks
 to the low GHG emissions. However, it is essential to have further information on the impacts of natural gas use on the environment and human rights of the population.

1. Sources of energy in Latin-America

Energy is usually defined as the ability to do work and is essential for humankind's livelihood. Depending on the region, it can be obtained from several sources. Depending on the process they are submitted in order to be transformed, they can be classified as primary, secondary or tertiary sources. Primary sources are those in their original form before any transformation. For instance, coal can be a primary source; however, it can be converted to synthetic gas, which can be converted to electricity. In this case, coal is the primary source, synthetic gas is secondary and electricity is tertiary. In the Latin American mix we can find the following sources: crude oil, natural gas, coal, nuclear, geothermal, wind, solar, hydro-power, biomass, organic waste and other primary sources.

¹ U.S. Energy Information Administration, "Glossary - U.S. Energy Information Administration (EIA)", consultado el 6 de noviembre de 2022, https://www.eia.gov/tools/glossary/index.php?id=Primary%20energy.

DESCRIPTION SOURCES Crude oil We call crude oil and petroleum fossil fuels because they are mixtures of hydrocarbons that formed from the remains of animals and plants (diatoms) that lived millions of years ago in a marine environment. Over millions of years, the remains of these animals and plants were covered by layers of sand, silt, and rock. Heat and pressure from these layers turned the remains into what we now call crude oil or petroleum. The word petroleum means rock oil or oil from the earth. Coal Coal is a combustible black or brownish-black sedimentary rock with a high amount of carbon and hydrocarbons. Coal is classified as a nonrenewable energy source because it takes millions of years to form. Natural gas Natural gas is a fossil energy source that formed deep beneath the earth's surface. Natural gas contains many different compounds. The largest component of natural gas is methane, a compound with one carbon atom and four hydrogen atoms (CH4). Natural gas also contains smaller amounts of natural gas liquids (NGLs, which are also hydrocarbon gas liquids), and non hydrocarbon gases, such as carbon dioxide and water vapor. Geothermal Geothermal energy is a renewable energy source because heat is continuously produced inside the earth. People use geothermal heat for bathing, to heat buildings, and to generate electricity. **Nuclear** Atoms are the tiny particles in the molecules that make up gases, liquids, and solids. Atoms themselves are made up of three particles called protons, neutrons, and electrons. An atom has a nucleus (or core) containing protons and neutrons, which is surrounded by electrons. Protons carry a positive electrical charge, and electrons carry a negative electrical charge. Neutrons do not have an electrical charge. Enormous energy is present in the bonds that hold the nucleus together. This nuclear energy can be released when those bonds are broken. The bonds can be broken through nuclear fission, and this energy can be used to produce (generate) electricity. Hydro- energy Using the force of water flowing in streams and rivers to produce mechanical energy. Hydro-power was one of the first sources of energy used for electricity generation. **Biomass** Biomass is renewable organic material that comes from plants and animals. Biomass contains stored chemical energy from the sun. Plants produce biomass through photosynthesis. Biomass can be burned directly for heat or converted to renewable liquid and gaseous fuels through various processes. Wind Wind is caused by uneven heating of the earth's surface by the sun. Because the earth's surface is made up of different types of land and water, it absorbs the sun's heat at different rates. Today, wind energy is mainly used to generate electricity The sun has produced energy for billion of years and is the ultimate source for Solar all of the energy sources and fuels that we use today. People have used the sun's heat for very basic activities Over time, people developed technologies

Source: Own with information from US Energy Information Administration

to collect solar energy for heat and to convert it into electricity.

There are two other categories in which energy sources are classified. Renewable energies such as wind and solar are considered unlimited. Non-renewable energies come from fossil fuels such as oil, natural gas and coal; those energies are limited, so they are considered unsustainable because they generate a high impact on the environment due to the emission of greenhouse gases (GHG)², which are responsible for global warming and climate change.

Energy has also been categorized according to its cleanness. In theory, clean energies do not contaminate the environment and do not produce or they produce a small amount of greenhouse gases emissions into the atmosphere (wind, solar or hydro energies) in contrast with fossil fuels (oil, coal and natural gas), which are highly polluting sources of energy.

Natural gas has lower GHG emissions than other fossil fuels, so it has become an alternative as a critical source in the current energy transition agenda worldwide. However, natural gas has significant impacts that need to be critically reviewed. These should be widely publicized for the purposes of transparency and in order to let people and communities know how their extraction and usage could impact their own territories, environment and human rights. In this context, it is important to start by checking the regional energy mix in Latin America in order to properly assess the role natural gas plays in our countries and abroad.

2. Global energy mix

The energy mix in this report is understood as a quantitative representation of energy production and consumption in a specific region.³ As a result of the Covid-19 pandemic's lockdown, we observed a slight contraction in energy production and consumption during 2020 (graphic 1), the year in which restrictions were the most severe. According to Enerdata, world energy production experienced a 4% reduction in 2020. However, in 2021 it grew back 3.4%.⁴

In the LAC region energy consumption continues to relay on fossil fuels, which are the top most consumed energy sources worldwide, with almost 80% out of the total mix.⁵ Oil is in the first place, coal in second and natural gas in third. The next significant source is hydro-power and then in the last years there has been an increase in consumption of other renewable sources like solar, and wind. In this landscape, natural gas consumption reached its highest peak in 2021. Of all fossil fuels, natural gas has experienced the most extensive growth, so it seems it will continue in the mid and long-term. In order to understand the role natural gas has in Latin America, we need to review the regional energy mix.

² Carbon dioxide (CO2), methane and nitrous oxide are the major greenhouse gases.

³ Pablo Bertinat, "Transición energética justa.l Pensando la democratización energética", diciembre de 2016, 6.

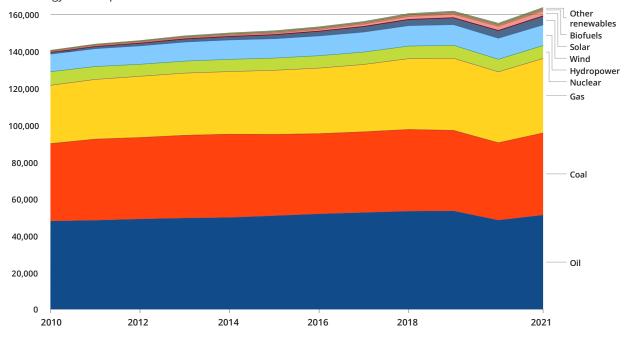
⁴ Enerdata, "Producción primaria de energía mundial", 2022, https://datos.enerdata.net/energia-total/produccion-energetica-mundial.html.

⁵ Hannah Ritchie, Max Roser, y Pablo Rosado, "Energy mix", Our World in Data, el 27 de octubre de 2022, https://ourworldindata.org/energy-mix.

GRAPHIC 1.

ENERGY CONSUMPTION BY SOURCE IN THE WORLD

Primary energy consumption is measured in terawatt-hours (TWh). Here an inefficiency factor (the 'substitution' method) has been applied for fossil fuels, meaning the shares by each energy source give a better approximation of final energy consumption.



Source: Ritchie et al., Our world in data.⁶

3. The Latin America energy mix

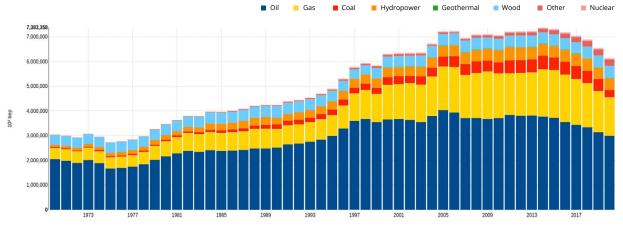
The energy mix in Latin America reflects how vital fossil fuels are and how dependent this region has historically been on oil and its related fuels. In terms of production, natural gas has gradually gained space in recent years as the second most relevant source just behind oil. In contrast to the global mix, in Latin America hydro-power occupies the third place and is one of the most relevant energy sources in the region. According to the Latin America Development Bank (CAF), this region holds nearly 33% of the world's renewable water resources; however, only 23% of its hydroelectric potential has been developed. Coal is situated just below hydropower and biomass, but still fossil fuels have a majority role in the regional mix. Other renewable sources have been growing in the last decade, like wind, solar, biofuels and organic waste (see graphic 2).

⁶ Ritchie, Roser, y Rosado.

⁷ Uribe, Carlos, "Por qué es importante la hidroenergía y cuál es su potencial en América Latina", enero de 2017, https://www.caf.com/es/conocimiento/visiones/2017/01/por-que-es-importante-la-hidroenergia-y-cual-es-su-potencial-en-america-latina/.

GRAPHIC 2.

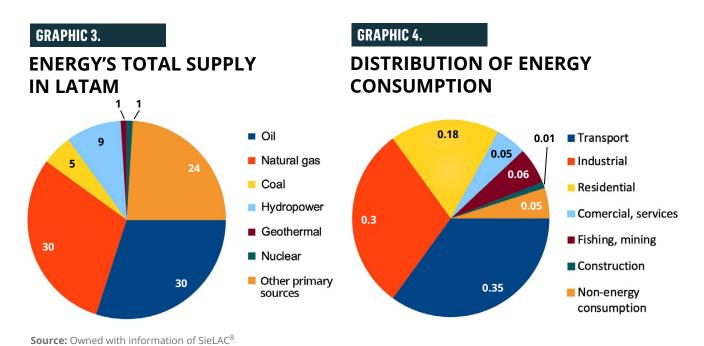
ENERGY PRODUCTION



Source: SieLAC

The total energy supply in Latin America results from the production + imports – exports, which is represented in graphic 3. In 2020, crude oil and natural gas shared the most considerable amount, with 30% each. Other primary sources represent 24% of the region's total. This category encompasses several sources such as wind, solar, biogas, organic waste and firewood. Then 9% of the region's mix is supplied by hydro-power and 5% by coal. Only 1% comes from nuclear sources and the rest 1% comes from geothermal sources.

How is this energy consumed in Latin America?



⁸ Organización Latinoamericana de Energía, "Sistema de Información Energética de Latinoamérica y el Caribe - SIELAC", 2022, https://sielac.olade.org/Web-Forms/Reportes/InfogramaEvolucionEnergeticosFlujos.aspx?

Almost 50% of the total energy required in the region comes from crude oil and its derivatives. A vast majority goes to transport sector, and a smaller proportion goes to industry, residential, mining, fishing, public services and construction. On the other hand, electricity represents 20% of the total consumption, while 15% is from other primary such as solar, wind, biogas and organic waste. The remaining 15% comprises natural gas used in its original form as well as other primary sources. With regards to secondary sources, oil derivatives accounted for nearly 66% and electricity reached 29%, while the remaining 5% was distributed among other energies derived from coal and other renewable sources.

Hydro-power and natural gas are the primary sources to produce electricity in addition to coal, oil, geothermal, wind, solar and nuclear. Natural gas has become an essential fuel in the production of electricity with fewer impacts on the environment.

How natural gas is converted into electricity

This process can be done through combined cycle power plants which convert thermal energy from natural gas into electricity using two mechanisms: a gas turbine and a steam turbine. Natural gas is used to generate a high-pressure combustion process whose gases activate a turbine connected to a generator that converts mechanical energy into electricity. Combined cycle plants are more efficient than coal-fired power plants and produce fewer greenhouse gas emissions.

Source: Laura Navarro, 2022.¹¹

Another amount of natural gas goes directly to industry hubs and residential use. The principal sector that requires energy is transportation, followed by industrial and residential, and lastly, public services, mining, fishing and construction.

Global demand for natural gas increased more than other fossil fuels during the first year of the Covid-19 pandemic and rose another 5% in 2021: twice its average growth rate over the past decade. Russia's invasion of Ukraine in February 2022 had a considerable impact on an already fragile global gas balance. European Union efforts to fill gas storage ahead of the winter have run up against Russia's strategic withholding of the gas supply and the prospect of possible supply shortages bringing higher market volatility and prices. ¹³

⁹ Organización Latinoamericana de Energía.

¹⁰ Organización Latinoamericana de Energía.

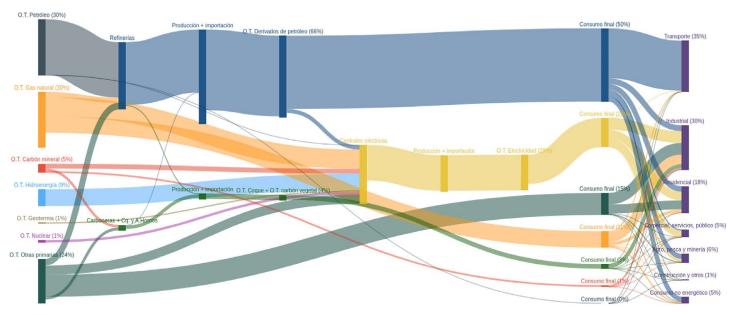
¹¹ Laura Navarro, "En las entrañas del gas natural: así se usa para conseguir energía eléctrica", Newtral, el 27 de junio de 2022, https://www.newtral.es/gas-natural-energia/20220627/.

¹²Birol, Fatih, "World Energy Outlook 2022 - IEA", 2022, 358.

¹³ Birol, Fatih, "World Energy Outlook 2022 - IEA".

GRAPHIC 5.

ENERGY BALANCE IN LATIN AMERICA



Source: SieLAC¹⁴

4. Context by countries

For this report we selected eight countries: Argentina, Brazil, Bolivia, Colombia, Peru, Mexico, Trinidad and Tobago and Venezuela. In this part we look at each of these countries in order to show their role in the gas industry and how they participate in the regional energy mix.

Argentina, Bolivia, Trinidad and Tobago and Venezuela are the largest exporters of natural gas. As a region, Latin America's figures indicate that imports are larger than exports of natural gas. Mexico is the largest natural gas consumer (almost 31% of the total LAC demand), while Trinidad and Tobago is the largest exporter followed by Bolivia and Peru.¹⁵

The worldwide gas exporting markets are Russia, Africa, North America, the Middle East and Asia Pacific, the biggest and most dynamic market in the world. North America is the most relevant natural gas seller for Latin America, particularly the United States which increased its exports from 2020 to 2021.¹⁶

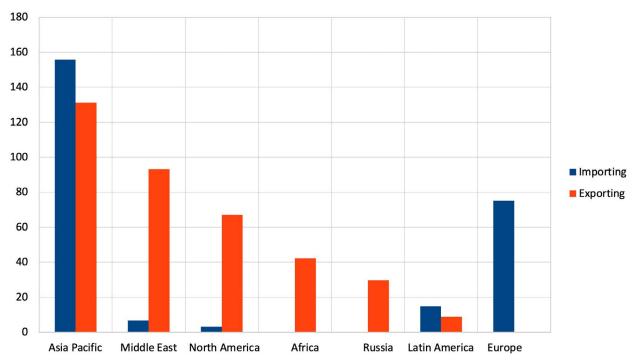
¹⁴ Organización Latinoamericana de Energía, "Sistema de Información Energética de Latinoamérica y el Caribe - SIELAC".

¹⁵ United Nations Environment Programme, Is Natural Gas a Good Investment for Latin America and the Caribbean? From Economic to Employment and Climate Impacts of the Power Sector, 2022, 35, https://wedocs.unep.org/xmlui/handle/20.500.11822/40923.

¹⁶ International Gas Union, "World LNG Report 2022", IGU (blog), 2022, 11, https://www.igu.org/resources/world-lng-report-2022/.

GRAPHIC 6.

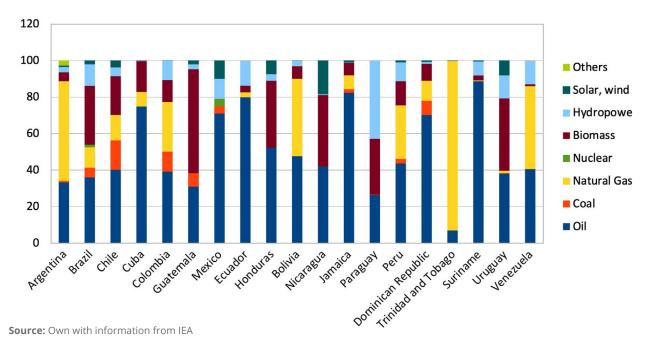
EXPORTING AND IMPORTING REGIONS IN MT, 2021



Source: Own with information from International Gas Union. 17

GRAPHIC 7.

ENERGY SUPPLY BY COUNTRY, 2019



¹⁷ International Gas Union, 23.

Argentina

Argentina has a population of about 45.8 million inhabitants,¹⁸ and is one of the largest economies in Latin America, with a Gross Domestic Product (GDP) of approximately USD 490 billion. Economic activity recovered faster than expected: a 10.3% increase in GDP in 2021, after a 9.9% drop in 2020 in the context of the Covid-19 crisis.¹⁹

Argentina is one of the countries with the highest natural gas production in the region. Out of its total energy supply, natural gas accounted for 59%, while crude oil accounted for 27%. This means that 86% of its total supply is based on fossil fuels, while only 9% is divided between hydro-power and renewable sources such as solar, wind and other primary energy sources.²⁰

The government of Argentina recently presented the guidelines of the country's Gas Plan. It provides for the substitution of imports for 30,804 Mm3, foreign currency savings of approximately 9,274 million dollars and tax savings of 2,574 million dollars up to 2024; an increase in tax revenues at national, provincial and municipal levels of 3,486 million dollars, with equal participation of all producing regions. The new Gas Production Stimulus Plan, announced the start of drilling activities in YPF's Rincón del Mangrullo field, within the Vaca Muerta formation, a block in which YPF carried out two unconventional developments.²¹



In 2021, the total population in Brazil reached 213.9 million inhabitants.²² Despite the severity of the Covid-19 pandemic, economic activity did not fall in Brazil as much as in other countries. GDP closed 2020 with a decline of 3.9%. In 2021, GDP at market prices was 4.6%. This growth, favored by the excellent performance of the industry and the services sector, made it possible to recover the losses in GDP growth caused by the pandemic in a single year.²³ Brazil instituted the Oil and Natural Gas Exploration and Production Bidding Improvement Program (BidSIM) with an Inter-ministerial Executive Committee, focused on increasing the competitiveness and attractiveness of the areas to be offered in the bidding rounds.²⁴

Brazil's total energy in 2020 reached 2,352,889,819 bep, of which more than 1 million correspond to crude oil. The remaining amount comes from other primary sources and hydropower, representing more than 50% out of its total supply. Even though Brazil's gas production is not that relevant, electricity is produced using hydropower, natural gas and in a minor proportion wind and solar.

The Federal Government of Brazil launched the "More Light for the Amazon" Program, intending to guarantee clean and renewable energy to 70,000 families living in remote areas of the Amazon. The program's installation aims to promote the social and economic development of these areas, most of which are riverine, indigenous, and quilombola communities. To this end, photovoltaic panels will be installed in communities that do not have access to conventional distribution networks. This initiative will reduce the consumption of fossil fuels, help establish traditional communities and preserve the environment.²⁵

¹⁸ World Bank, "Población, total - Argentina | Data", consultado el 6 de noviembre de 2022, https://datos.bancomundial.org/indicator/SP.POP.TOTL?en-d=2021&locations=AR&start=2021&view=bar.

¹⁹ World Bank, "Argentina | Data", 2022, https://datos.bancomundial.org/pais/argentina.

²⁰ OLADE, "Panorama Energético de América Latina y el Caribe 2021", abril de 2022, 67, https://biblioteca.olade.org/opac-tmpl/Documentos/old0442a.pdf. ²¹ OLADE, 15.

²² World Bank, "Brasil | Data", 2022, https://datos.bancomundial.org/pais/brasil.

²³ Oficina de Información Diplomática del Ministerio de Asuntos Exteriores, "Ficha País - Brasil", septiembre de 2022, 14.

²⁴ OLADE, "Panorama Energético de América Latina y el Caribe 2021", 284.

²⁵ OLADE, 19.



With a population of 12 million people,²⁶ Bolivia occupies the 96th position in the world economies ranking. The health crisis caused by Covid-19 plunged the economy into a recession that led to a rebound in poverty. The Government deployed different initiatives to protect the most vulnerable, including emergency cash transfers and the deferred payment of utility bills and credits. In 2021, the economy staged a significant recovery owing to improvements in the international environment and the relaxation of lock-down measures.²⁷

Bolivia's Gross Domestic Product (GDP) registered a growth rate of 3.97%. In the first quarter of 2022, concerning the same period of 2021, the economic activities that registered the highest growth were transportation and storage with a positive variation of 11.09%, electricity, gas and water, which reported an increase of 8.82%, and construction, with 7.07%.²⁸ By 2020, Bolivia had proven natural gas reserves for 15 years.



Colombia

Colombia has a population of approximately 51 million people and ranks as the 45th economy in the world.29 As a result of the lock-down measures, the Colombian economy shrank 7% in 2020. GDP rebounded by 10.7% in 2021 and is expected to grow by 7.1% in 2022.30 The primary sector of the economy accounted for 14.1% of GDP in 2021. Colombia's main agricultural products include: coffee, bananas, flowers, sugar cane, cattle and rice. Colombia's mining and energy resources include coal, oil, natural gas, iron ore, ferronickel and gold. Its most significant energy production is concentrated in oil, followed by coal and finally, natural gas.³¹ Colombia's Mines and Energy Ministry has vowed to push ahead with plans to increase gas imports as part of broader efforts to phase out domestic fossil fuel production.³²



Peru has a population of almost 33 million inhabitants and ranks 51st in the list of countries according to GDP,33 and 93rd based on per capita GDP ranking.34

The Ministry of Energy and Mines (Minem) of Peru signed an inter-institutional agreement with the Urban Transport Authority for Lima and Callao (ATU), aimed at joining efforts to promote projects to replace traditional fuels with natural gas, as an economical, cleaner and environmentally friendly fuel. Through this alliance, the Minem seeks to implement the expansion of the BonoGas Ve-

²⁶ World Bank, "Bolivia | Data", 2022, https://datos.bancomundial.org/pais/bolivia.

²⁷ World Bank, "The World Bank in Bolivia - Overview", Text/HTML, World Bank, octubre de 2022, https://www.worldbank.org/en/country/bolivia/overview.

²⁸ Insituto Nacional de Estadística, "La economía boliviana registró un crecimiento de 3,97% al primer trimestre de 2022 consolidando su retorno al crecimiento económico", INE (blog), el 9 de septiembre de 2022, https://www.ine.gob.bo/index.php/la-economia-boliviana-registro-un-crecimiento-de-397-al-primer-trimestre-de-2022-consolidando-su-retorno-al-crecimiento-economico/.

²⁹ Datos Macro, "Colombia: Economía y demografía 2022", Datosmacro.com, 2022, <u>h</u>ttps://datosmacro.expansion.com/paises/colombia.

³⁰ Ministerio de Comercio, "Colombia.pdf", abril de 2022, https://www.mincit.gov.co/getattachment/1c8db89b-efed-46ec-b2a1-56513399bd09/Colombia. aspx#:~:text=Colombia%20gener%C3%B3%20un%20PIB%20corriente,1%25%20del%20PIB%20en%202021.

³¹ Organización Latinoamericana de Energía, "Sistema de Información Energética de Latinoamérica y el Caribe - SIELAC".

³² BNamericas, "Colombia moving forward with gas import plans - BNamericas", septiembre de 2022, https://webcache.googleusercontent.com/search?q=cache:LHjCNgrBDb8J:https://www.bnamericas.com/en/news/colombia-moving-forward-with-gas-import-plans&cd=2&hl=es&ct=clnk&gl=mx.

³³ Datos Macro, "PIB de Perú 2021", Datosmacro.com, 2021, https://datosmacro.expansion.com/pib/peru.

³⁴ Datos Macro, "Perú: Economía y demografía 2022", Datosmacro.com, 2021, https://datosmacro.expansion.com/paises/peru.

hicular program to finance the conversion of public transport buses to natural gas instead of diesel. This measure that will make it possible to save more than 50% in fuel costs.³⁵

Some markets exported less volume in 2021 than in 2020 due to technical issues, declining feed gas production, and a lack of commercial progress on backfill projects. The most significant drops in export levels in 2021 were seen in Nigeria (-4.1 MT), Trinidad & Tobago (-3.9 MT), Norway (-2.9 MT) and Peru (-1.2 MT).³⁶ Peru's proven natural gas reserves reach almost 22 years.³⁷



Mexico has nearly 130 million inhabitants. In 2013, a constitutional amendment opened the door to private capitals to invest in the electricity and hydrocarbons sectors. Currently, Mexico has an energy mix based on crude oil produced by state-owned company PEMEX, which is used to supply transportation and industry sectors. In second place is the production of natural gas destined to generate electricity. Another relevant source of electricity production is hydropower. However, in 2020, Mexico's total energy supply used a significant amount of natural gas, of which more than 50% came from imports, with the United States as the largest supplier. Between 2000 and 2021, natural gas imports from the United States grew at an average annual rate of 15.5%. In 2020, Mexico developed a natural gas transportation network of more than ten thousand kilometers of pipelines and proven reserves are for five years, according to OLADE. 40



Trinidad and Tobago's population is around 1.5 million people and its GDP reached USD 21 billion in 2021.⁴¹ The economy is primarily based on oil and gas production, with the petroleum and petrochemical industries accounting for about 37% of GDP and ores and mineral fuels over 70% of exports.⁴²

Even though Trinidad and Tobago is one of Latin America's key export markets, considerable reductions in LNG exports were recorded in 2020 and 2021 (-3.9 MT) due to feeding gas depletion and the lack of backfill projects. ⁴³ In December 2020, the National Gas Company of Trinidad and Tobago (NGC) signed an agreement with Trinity aimed at maximizing expectations for access to compressed natural gas, renewable energy options, stranded gas assets and other opportunities in Trinity's existing assets. ⁴⁴

³⁵ OLADE, "Panorama Energético de América Latina y el Caribe 2021", 16.

³⁶ International Gas Union, "World LNG Report 2022".

³⁷ El Peruano, "Perú tiene reservas de gas natural para 22 años", octubre de 2022, https://elperuano.pe/noticia/195783-peru-tiene-reservas-de-gas-natural-para-22-anos.

³⁸ Diaz, Diego y Ocampo, Oscar, "Gas Natural para la transición energética y competitividad de México", agosto de 2022, https://imco.org.mx/wp-content/uploads/2022/08/Gas-Natural-Competitivo-en-Mexico.pdf.

³⁹ Secretaría de Energía, "Prontuario Estadístico", septiembre de 2022, https://www.gob.mx/cms/uploads/attachment/file/767155/202209_En_elaboraci_n_ Formato_-_Accesibilidad.pdf.

⁴⁰ Organización Latinoamericana de Energía, "Sistema de Información Energética de Latinoamérica y el Caribe - SIELAC"

⁴¹ World Bank, "Trinidad y Tobago | Data", 2022, https://datos.bancomundial.org/pais/trinidad-y-tobago.

⁴² World Bank, "The World Bank in Trinidad and Tobago - Overview", Text/HTML, World Bank, 2022, https://www.worldbank.org/en/country/trinidadandto-bago/overview.

⁴³ International Gas Union, "World LNG Report 2022", 19.

⁴⁴OLADE, "Panorama Energético de América Latina y el Caribe 2021", 16.

Venezuela

The Bolivarian Republic of Venezuela comprises more than 900 thousand kilometers in extension and almost 29 million inhabitants. Under the Gas Law, a project may be handled directly by a private investor, including a foreign investor. However, as part of the conditions for granting the license. PDVSA may request to participate in the project. Venezuela has vast reserves of natural gas, including major reservoirs under the sea-bed (the Urdaneta Project, under the north-western shores of Venezuela and the Mariscal Sucre Project in the northeast of Venezuela) some shared with neighboring Trinidad and Tobago.⁴⁵

Venezuela is a producer and exporter of energy and is also a world leader in the export of natural gas, liquefied gas, butane and propane.⁴⁶ Venezuela is one of the countries with the world's largest proven reserves of oil and natural gas. It has oil reserves for next 800 years, and 245 years of natural gas supply, making it a key player in the supply of natural gas in the region and other regions in the context of the energy transition.⁴⁷

Despite the Venezuelan government's virulent anti-U.S. rhetoric, the United States remains Venezuela's largest trading partner. Moreover, the United States continues to be one of the main buyers of Venezuelan oil. In recent years, China has also positioned itself as one of the Caribbean country's main clients in the oil market. The exchange of oil loans has proven to be a "good" business for both parties.⁴⁸

5.Natural gas and energy transition

Currently, the Asia Pacific region is the biggest market, exporting a total of 131.2 MT in 2021, in line with total exports in 2020.⁴⁹ On the other hand, Latin America's proven natural gas reserves guarantee the region's supply for at least 33 years. The region used natural gas to supply 25 per cent of primary energy consumption in 2019. The main consumers were Argentina, Brazil, Bolivia, Colombia, Mexico, Trinidad and Tobago, and Venezuela. Venezuela is estimated to have around 70 per cent of the proven reserves in the region.⁵⁰

Since natural gas has been sold as a fossil fuel with a minimum environmental impact and lower greenhouse gas emissions to the atmosphere, it is considered a viable alternative for electricity generation and industrial activities. This has led to increase in natural gas trade among the world's regions, with Asia Pacific being the most dynamic region for the total trade of this fuel.

However, the debate is still on methane's impacts on the atmosphere, since it is considered the second biggest contributor to global warming after carbon dioxide, which would have to be reduced by 33% by 2030. Measured over a century, methane has a global warming potential around 30 times that of CO2.⁵¹

⁴⁵ Global Legal Group, "International Comparative Legal Guides", Text, International Comparative Legal Guides International Business Reports (Global Legal Group), United Kingdom, consultado el 6 de noviembre de 2022, https://iclg.com/practice-areas/oil-and-gas-laws-and-regulations/venezuela.

⁴⁶ Repsol, "Repsol en Venezuela - Producción de gas y petróleo", REPSOL, 2022, https://www.repsol.com/es/conocenos/repsol-en-el-mundo/america/venezuela/index.cshtml.

⁴⁷ Organización Latinoamericana de Energía, "Sistema de Información Energética de Latinoamérica y el Caribe - SIELAC".

⁴⁸ Christian Huebner, "El camino de Venezuela hacia una política energética sin sentido", Diálogo Político (blog), el 1 de julio de 2017, https://dialogopolitico.org/debates/el-camino-de-venezuela-hacia-una-politica-energetica-sin-sentido/.

⁴⁹ International Gas Union, "World LNG Report 2022", 19.

⁵⁰ Programme, Is Natural Gas a Good Investment for Latin America and the Caribbean?, 33.

⁵¹ Programme, 5.

We define the energy transition as the process that seeks to replace fossil energy sources with energies that generate less impact on the environment, since the former emit high concentrations of carbon dioxide and greenhouse gases, which have accelerated climate change with severe consequences for the environment.

It is well known that some proposals promote natural gas as an alternative energy, which will consolidate the energy transition to renewable and zero-emission energies; however, it is essential to consider some aspects. The first has to do with the impacts that using natural gas will have on the environment. It is important to generate information that allows us to know the actual impacts of natural gas exploration, extraction and processing, and the projects involving its transportation. All these projects imply impacts on the land and territory, and the human rights of the communities that inhabit them. One of the most critical challenges is ensuring that this transition process respects the human rights of the communities.

Secondly, the energy transition is a limited process that starts from understanding energy as a commodity that responds to corporate logic rather than satisfying human needs from a conservationist approach. According to Bertinat "energy, as a commodity, is configured as an essential tool for the reproduction of capital".⁵²

In this sense, beyond understanding energy as a commodity, it is essential to reasses the value of energy and understand it as a human right to which all people should have affordable and universal access. It is a broader process with a transformative approach that puts the conservation and protection of human rights at the center above business and wealth increase. This implies appreciating natural assets from a patrimonial perspective so as to understand that their conservation will allow the subsistence of humanity. On the contrary, their excessive exploitation under a purely mercantilist logic will accelerate their depletion.

The energy transition proposed by companies and governments is planned along the lines of deepening the extractive model, and especially the extraction of minerals and the so-called transitional energies such as natural gas, in addition to the use of hydropower and the construction of hydroelectric dams. Therefore, it is essential to discuss on the type of transition required from the voices of civil society, communities and people historically excluded from this debate.

⁵² Bertinat Pablo, Transición energética justa. Pensando la democratización energética, 2016, Friedrich Ebert Stiftung, https://library.fes.de/pdf-files/bueros/uruguay/13599.pdf

II. UPDATE ON REGIONAL GAS INDUSTRY: TRENDS, POST-PANDEMIC CONTEXT & ENERGY TRANSITION

KEY FINDINGS

- There is a general trend in the reduction of proven natural gas reserves, which may be increased by the discovery of new fields or by the application of technical advances that convert probable reserves into proven reserves. In some cases, this implies the use of hydraulic fracturing, as is the case in Argentina, or the exploitation of offshore fields, with the irreparable implications this may have on ecosystems and water sources. In the event that gas sources are found, it is estimated that the time to be able to exploit it is at least 7 years, time in which a greater dependence on gas imports is generated, which require major infrastructure works, either by pipelines or through LNG regasification plants.
- Increased dependence on gas imports, as in Mexico, may generate greater vulnerability
 to price shocks, as is currently happening due to the war in Ukraine. In the case of Mexico,
 supply is assured in principle by long-term contracts, however, in the face of severe droughts that may affect the region as occurred in Brazil and Argentina in 2020, Latin American
 countries must compete for imported gas with large importers from European and Asian
 countries. Because of this competition, access to LNG regasification technology has become
 more expensive, further limiting access to LNG in Latin American countries.
- The flaring and venting of natural gas has serious effects on CO2 emissions and methane release, which calls into question whether natural gas can be treated as a bridge fuel for the energy transition. Venezuela and Mexico are among the top 10 countries with the highest volume of flared gas and high methane leakage. There are also countries that have reduced and generated public policies to limit this practice as in the case of Colombia.
- The volume of exports is much lower than the volume of imports due to the growing dependence on natural gas in the region, which cannot be supplied solely by domestic production. As a result, there are few natural gas exporting countries (Bolivia, Trinidad and Tobago and Peru) and few LNG plants. There is currently one LNG plant under construction in Mexico and 14 more projects have been announced. Although Mexico imports 80% of the natural gas it consumes, it intends to become an exporter of natural gas from the USA through the existing pipeline network. It has also announced the construction of an LNG plant in Argentina to export gas from Vaca Muerta, one of the most important unconventional natural gas fields in the region.
- Important gas pipeline networks have been extended throughout the continent that transport gas within countries and also important international connections such as Mexico-USA, Brazil-Bolivia, Argentina-Bolivia, Argentina-Brazil, Argentina-Chile and Argentina-Uruguay. However, efforts to build more gas pipelines at the national level and those that seek the commercial integration of the region run the risk of becoming stranded assets or remaining underutilized in the event that efforts to move towards renewable energies, which tend to reduce their cost and put pressure on the entire natural gas chain, are intensified.
- Gas regulations in the countries studied depend to a large extent on the phase of the production process in which they are found. For activities associated with the exploration and production of natural gas (upstream), there is a strong state presence where it is established that the subsoil and non-renewable resources are the property of the state, although most

of the reforms carried out since the 1990s include the participation of private companies in these activities through concessions or exploitation rights. In most cases there is no specific legislation to regulate natural gas, as is the case in Mexico, Trinidad and Tobago, Colombia and Brazil. This has occurred in this way because gas was initially thought of as a residual fuel resulting from oil production. This has been changing little by little, as natural gas has become an increasingly relevant hydrocarbon in the energy matrix of the countries. The regulations of Argentina and Venezuela, which have explicit laws regulating the exploitation of non-associated gas, are interesting in this regard.

- The pandemic did have a significant impact in terms of job losses, a drop in income, an increase in poverty indicators and a deepening of the structural inequalities historically experienced in the region. However, the gas industry was not affected; production increased in all countries except Mexico (-3.8%) and Trinidad and Tobago (-15.9%). Natural gas consumption increased in all countries except Colombia (-3.5%), LNG exports increased in Peru (0.7%) and in Trinidad and Tobago (1.8%) and LNG imports increased particularly in Brazil and Argentina due to severe droughts that limited hydroelectric generation capacity. On the other hand, gas contracts are long-term and most are of the take and pay type, which are paid regardless of whether they are consumed or not.
- The war in Ukraine, although it does not have a direct impact on the gas industry in Latin American countries, has indirect effects through its prices. The increase in gas prices could have positive effects on exporting countries such as Bolivia, Trinidad and Tobago and Peru. However, this will have a significant impact on countries that import this resource, such as Mexico, Brazil and Argentina.
- As for the effects of the invasion of Ukraine on energy transitions in the region, two scenarios can be observed. It could either boost the use of renewable energies, particularly in countries that do not have gas sources, or it may delay the transition of hydrocarbon producing countries, due to the incentives generated by higher prices in tax revenues and increased investments in the sector.

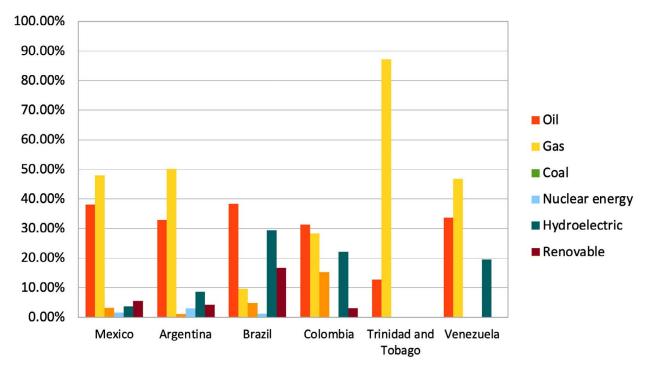
Latin America possesses important resources for energy generation, among which natural gas occupies a central place. If we consider data from CEPAL⁵³, we find that oil contributes 45.2% of primary energy production, followed by natural gas at 23.4%, cane products at 7.5%, firewood at 7.1%, hydro-power at 6.9%, mineral coal at 4.6% and others 3.9%.

In terms of energy consumption, we observe that at the aggregate level, gas is the second most used fuel after oil (40.05%) in the region's energy matrix with a share of 25.56%. However, in some countries gas is the most consumed energy source, as in Mexico (47.97%), Argentina (50.23%), Trinidad and Tobago (87.28%) and Venezuela (46.83%).

⁵³ CEPAL, "Producción de energía por tipo de energía (primaria). En Perfil regional ambiental - CEPALSTAT Bases de Datos y Publicaciones Estadísticas", 2020, https://statistics.cepal.org/portal/cepalstat/perfil-regional.html?theme=3&lang=es.CEPAL.

GRAPHIC 8.

ENERGY CONSUMPTION DURING 2020 BY SOURCE IN EXAJOULES (EQUIVALENT INPUT) AND % OF THE TOTAL



Source: BP Statistical Review.⁵⁴

Taking into account the importance of natural gas in the region's energy mix, in this section we seek to elucidate the role of gas in the energy transition in the context of the post-pandemic and the current war in Ukraine. We consider the situation of reserves, gas production, gas flaring, consumption, imports and exports, transportation and storage infrastructure (pipelines, liquefaction and regasification plants), the organization and regulation of the sector and the supply chain.

a. Proven Reserves

Proven reserves are those that "geoscience, engineering and economic data demonstrate with reasonable certainty that they will be commercially recovered in future years from known reservoirs, under economic conditions, operating methods and government regulations existing at a specific date". ⁵⁵ In Latin America, proven natural gas reserves are recorded in Mexico, Argentina, Ecuador, Bolivia, Brazil, Colombia, Peru, Trinidad and Tobago and Venezuela, with total reserves estimated at 8.08 bcm by 2020, which represents 4.29% of proven reserves worldwide. ⁵⁶

⁵⁴ British Petroleum, "Statistical Review of World Energy 2022", 2022, 60.

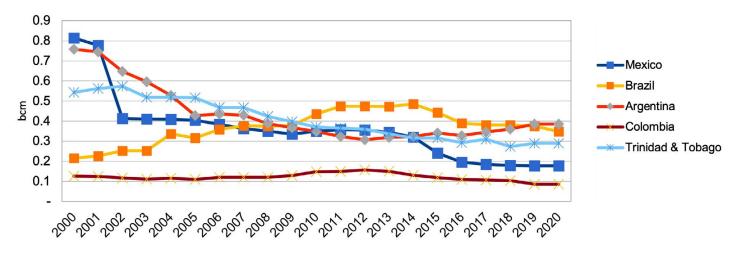
⁵⁵ Comisión Nacional de Hidrocarburos, "Reservas de Hidrocarburos en México. Conceptos fundamentales y Análisis 2018" (México: Comisión Nacional de Hidrocarburos, 2018), 17, https://www.gob.mx/cms/uploads/attachment/file/435679/20190207._CNH-_Reservas-2018._vf._V7.pdf.Comisión Nacional de Hidrocarburos, 17.

⁵⁶ British Petroleum, "Statistical Review of World Energy 2022".

We observed the following behavior in terms of proven reserves from the year 2000 to 2020:

GRAPHIC 9.

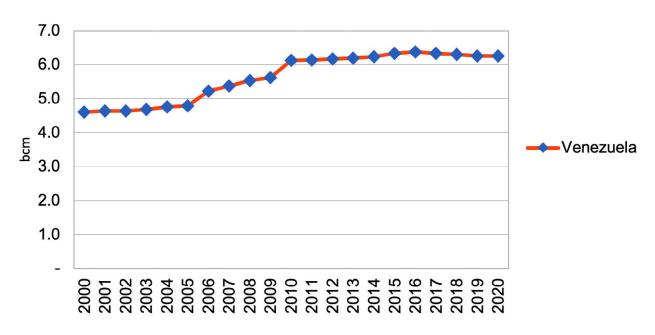
PROVEN RESERVES 2000-2020 MEXICO, BRAZIL, ARGENTINA, COLOMBIA, TRINIDAD AND TOBAGO



Source: British Petroleum Statistical Review.⁵⁷

GRAPHIC 10.

VENEZUELAN RESERVES



Source: British Petroleum Statistical Review.⁵⁸

⁵⁷ British Petroleum.

⁵⁸ British Petroleum.

In all the countries analyzed, proven reserves were reduced, except in the case of Argentina and Venezuela. Looking at the growth rates in the last decade, we see that in Mexico proven reserves fell by 6.1%, in Brazil by 0.1%, in Colombia by 4% and in Trinidad and Tobago by 3.1%.

Although there was a significant decline in proven reserves of conventional gas wells in Argentina, this trend has been reversed beginning in 2013 with the exploitation of unconventional wells. The Vaca Muerta field placed the country as the world's second shale gas reserves and fourth in unconventional oil.

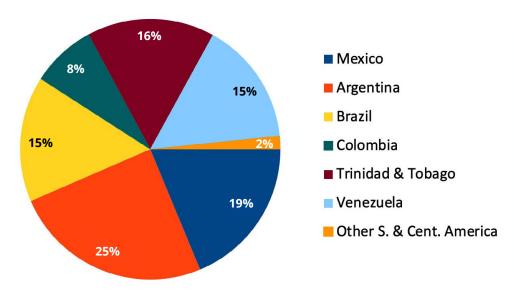
Venezuela's reserves have increased since 2010 due to the discovery of the Perla field, recognized as one of the largest offshore fields in the world. In 2020, Venezuela ranked tenth in the world in proven reserves with 6.3 trillion cubic meters of gas⁶⁰, representing 70% of the region's proven reserves.⁶¹ This situation contrasts with its production capacity, as we will see in the following section.

b. Production

Natural gas production in Latin America amounted to 182.94 billion cubic meters (bcm) in 2020, representing 4.75% of total world production.⁶² The following chart shows the countries with the highest natural gas production in the region by 2021, and their share of total production in Latin America.

GRAPHIC 11.

NATURAL GAS PRODUCTION 2021 (BCM)



Source: British Petroleum Statistical Review⁶³

⁵⁹ British Petroleum.

⁶⁰ British Petroleum.

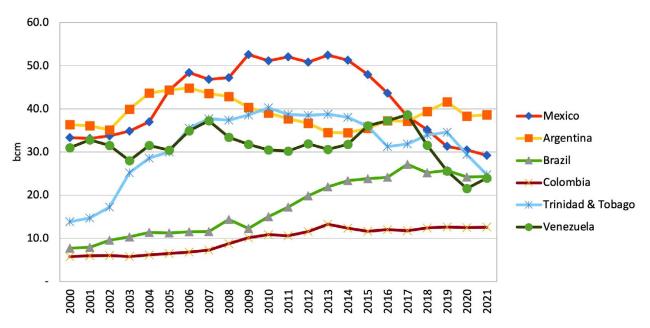
⁶¹ Dan Welsby et al., "Falsas expectativas: reservas de gas natural varadas y sus ingresos fiscales asociados en América Latina y el Caribe" (Washigton, D.C: Banco Interamericano de Desarrollo Sector de Cambio Climático, 2022), https://publications.iadb.org/publications/spanish/document/Falsas-expectativas-reservas-de-gas-natural-varadas-y-sus-ingresos-fiscales-asociados-en-America-Latina-y-el-Caribe.pdf. Welsby et al.

⁶² British Petroleum, "Statistical Review of World Energy 2022".

⁶³ British Petroleum.

GRAPHIC 12.

NATURAL GAS PRODUCTION 2000-2021 (BCM)



Source: British Petroleum Statistical Review 64

In the case of Argentina, production increased steadily until reaching its highest point in 2004 with a production of 43.6 bcm. At this point a significant decline began in the context of the hydrocarbon crisis occurred as a result of the breakdown of convertibility, which generated speculation by concessionary and licensee companies that acted more like financial companies than hydrocarbon producers, a situation that jeopardized the domestic supply of fuel and prompted imports from Bolivia and Venezuela. In 2014, production reached its lowest with 34.5 bcm. Since then, it increased continuously until 2019, reaching a level of 41.6 bcm, but still under the levels of 2004. This increase in production was due to the increase in unconventional gas production, especially in Vaca Muerta which accounted for 41% of total gas production in 2019.

Regarding gas production in Mexico, although natural gas production was growing until 2009, when it reached a historical maximum with 52.6 bcm, a significant contraction continued until reaching 29.2 bcm in 2021, representing a drop of 44.4% in gas production. Between 2020 and 2021 alone, gas production fell by 3.8%, possibly due to the pandemic but also to the trend observed in the last decade.

Mexico is the second largest natural gas producer in Latin America after Argentina. Gas is the most consumed fuel in the country. Production declined beginning in 2009 because hydrocarbon policy has focused on exploiting oil, which is more profitable due to the generation of foreign currency and tax revenues, besides being a fuel that is logistically easier to operate. This explains why gas production has been predominantly associated gas (79.7%) rather than non-associated gas (20.3%).

⁶⁴ BP, "BP Statistical Review of World Energy", 2022, https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html.BP. ⁶⁵ Roberto Kozulj, "Crisis de la industria del gas natural en Argentina", marzo de 2005, 76.

⁶⁶ Jonathan Raed, "Vaca Muerta hoy: ya produce el 40% de petróleo y el 50% del gas de todo el país", elDiarioAR.com, el 13 de junio de 2022, https://www.eldiarioar.com/economia/vaca-muerta-hoy-produce-40-petroleo-50-gas-pais_1_9077616.html.

According to the opinion of one of the experts consulted for this study, although there are gas reserves, there is no policy to promote its production in the country. It is treated as a by-product that is not sufficiently exploited because there are high flows of venting and flaring of gas on platforms, as we will see below.⁶⁷ Likewise, there are no incentives for its domestic production, due to the supply of natural gas from the United States, which is the cheapest in the world, as a result of the technological change that made hydraulic fracturing possible in that country since 2005, which substantially increased production as of 2009.

Although Brazil was not one of the largest producers of natural gas at the beginning of this century, with a production of 7.7 bcm in 2000, it has increased over the last few decades, more than tripling to 24.3 bcm in 2021. Although it has increased, the primary consumption of this fuel is 9.63%, below energy from renewable sources and hydroelectric energy.⁶⁸ This increase in production was the result of the implementation of the Plan de Antecipação da Produção de Gás Natural in 2006 as a result of Evo Morales' decision to nationalize gas reserves and to exercise control over companies in the sector in Bolivia, on which Brazil depended. This plan anticipated gas projects that were expected to be exploited more in the medium and long term, which increased gas production, and also strengthened commercial ties with both Bolivia and Argentina. Brazil had new oil discoveries, particularly in off-shore fields, such as the discoveries in the Santos Basin.⁶⁹

Trinidad and Tobago has witnessed a steady increase in gas production during the first decade of the 2000s. This trend had been building since 1993 when Trinidad and Tobago's economy shifted from dependence on oil to dependence mainly on gas production, becoming the first natural gas-based economy in the world. 70 Indeed, in terms of primary energy consumption, the main fuel consumed in 2020 is natural gas (87.28%), followed by oil consumption (12.72%).71 This growing trend in gas production reached its highest level in 2010, with a production of 40.3 bcm representing an increase of 191.33% concerning production in 2000. The discovery of large gas fields has driven the increase in infrastructure to produce liquefied natural gas to be exported to the United States and Europe since 1999, as well as its essential petrochemical industry, particularly for the production of methanol, ammonia and urea. After 2010, it lowered its production with two important drops, the first with a production of 31.3 bcm in 2016, due to the "natural decline of the fields plus the shutdowns for deep maintenance in the production platforms".⁷² Although this situation improved slightly in the following years, it fell again in 2021 to 24.7 bcm, representing a 15% drop in production compared to 2020. This decrease in production is due to the depletion of energy resources, the exhaustion of reserves and the fall in oil prices exacerbated by the pandemic, and has generated severe difficulties for the country's economy in recent years.

At the beginning of 2000, Venezuela was the third largest gas producer in Latin America. Despite being the country with the largest proven reserves in Latin America and the tenth largest in the world, it is currently the fifth largest producer of natural gas behind Argentina, Mexico, Trinidad and Tobago and Brazil. In 2000 it had a production of 31 bcm, which increased annually until reaching one of its highest points in 2007 with 37.2 bcm.⁷³ This implied a 20% increase in

⁶⁷ García.Alcocer. Interview. September, 2022.

⁶⁸ British Petroleum, "Statistical Review of World Energy 2022".

⁶⁹ Rosélia Piquet y Elis Miranda, "A indústria de gás no Brasil: implicações territoriais, incertezas e perspectivas", Revista Universitaria de Geografía 18 (el 1 de junio de 2009): 163–77.

⁷⁰ Trevor M. Boopsingh y Gregory McGuire, From Oil to Gas and Beyond: A Review of the Trinidad and Tobago Model and Analysis of Future Challenges (University Press of America, 2014); Roger Hosein, "Natural Gas Production", en Oil and Gas in Trinidad and Tobago. Managing the Resource Curse in a Small Petroleum-Exporting Economy (Suiza: Palgrave macmillan, 2021), 75–86.Boopsingh y McGuire, From Oil to Gas and Beyond; Hosein, "Natural Gas Production".

⁷¹ British Petroleum, "Statistical Review of World Energy 2022".

⁷² Nicolás Di Sbroiavacca et al., "Rol y perspectivas del gas natural en la transformación energética de América Latina", 2019, 29.

production due to the rise in investments by the Venezuelan state within the so-called "Socialist Gas Revolution".⁷⁴ After 2007, production declined to 2002 levels. In 2015 there was a new rebound in production which was maintained until 2017, when it reached the highest level with 38.6 bcm due to the production of the Perla field by PDVSA in consortium with ENI and Repsol.

Colombia is the sixth largest producer of natural gas in the region. It had a 5.7 bcm production in 2000, equivalent to 15% of Argentina's production. Since that year, it has maintained a growing production trend with a peak in 2013 with a production of 13.2 bcm, which represented an increase of 43% in relation to 2000, due to the increase in production from the Guajira and Cusiana fields which contributed 83.9% of the national production. However, since 2013, there has been a downward trend in natural gas production, reaching 12.6 bcm in 2021 due to the depletion of the resource in these large fields. Added to this a lack of increase in proven reserves, which will possibly imply a supply deficit for the next ten years.⁷⁵

Considering the proven reserves and production information, we calculate the ratio between reserves and production (R/P), which is one of the most used indicators in the oil and gas industry. This indicator seeks to know the remaining amount of the non-renewable resource based on current production rates. When performing this calculation we found that Latin America has 43 years, a little below the global estimated in 48 years. The country with the highest R/P ratio for 2020 is Venezuela with 291 years due to a large number of reserves and low production, followed by Brazil (12.40), Argentina (10.44), Trinidad and Tobago (10.17), Colombia (8) and Mexico (6.56 years). These prospects result from the reduction of proven reserves in most countries, as mentioned before.

CHART 1.

020 RESERVES VS PRODUCTION RATIO (R/P)

COUNTRY/REGION	PROVEN RESERVES 2020 (MMm3)	PRODUCTION 2020 (MMM3)	RATIO R/P
Mexico	200,000	30,500	6.56
Argentina	400,000	38,300	10.44
Brazil	300,000	24,200	12.40
Colombia	100,000	12,500	8.00
Trinidad andTobago	300,000	29,500	10.17
Venezuela	6,300,000	21,600	291.67
Total Latin America	8,100,000	185,794	43.60
World total	188,100,000	3,861,515	48.71
Latin America as % of World Total	4.31%	4.81%	

Source: British Petroleum Statistical Review⁷⁶

⁷³ British Petroleum, "Statistical Review of World Energy 2022".

⁷⁴ Gas Natural, "Venezuela invertirá 18.000 millones de dólares para elevar producción de gas", Gas Natural (blog), el 18 de septiembre de 2007, https://naturalgas.wordpress.com/2007/09/17/venezuela-invertira-18000-millones-de-dolares-para-elevar-produccion-de-gas/.

⁷⁵ Carmenza Chahín et al., "Consultoría en apoyo a la misión de transformación energética en los temas deabastecimiento, comercialización, transporte, almacenamiento, regasificación, demanda, aspectos institucionales y regulación de gas natural" (Bogotá: Banco Mundial, el 22 de enero de 2020), https://www.minenergia.gov.co/documents/7683/2._El_Rol_del_Gas_en_la_Transformaci%C3%B3n_Energ%C3%A9tica.pdf.Chahín et al.

⁷⁶ British Petroleum, "Statistical Review of World Energy 2022".

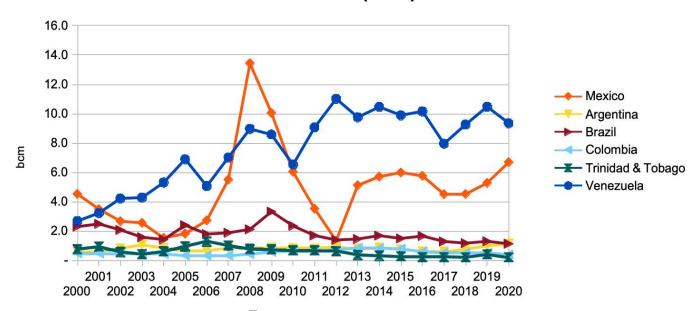
c. Gas Flaring

Natural gas flaring is a common practice associated with oil extraction. It is done for a variety of reasons, among which we can mention the following:

- 1) Economic: It is more economical to burn the gas than to invest in infrastructure for its storage and transportation, a situation that is exacerbated when its prices are very low, volume is low or the wells are far from the transportation infrastructure.
- 2) Gas quality: In some cases the gas has a high concentration of sulfur, which makes its purification costly.
- 3) Safety reasons: This is done as a safety method to reduce the pressure through the gas outlet to avoid possible fires.

GRAPHIC 13.

NATURAL GAS FLARING 2000-2020 (BCM)



Source: British Petroleum Statistical Review⁷⁷

According to data from the World Bank, some 144 billion cubic meters of natural gas was flared in 2021. This gas could supply the consumption needs of the whole of sub-Saharan Africa. Additionally, the volumes at which this practice is carried out are highly polluting if we consider that "each cubic meter of associated gas flared results in about 2.8 kilograms of CO2 equivalent emissions, which means more than 400 million tons of CO2 equivalent emissions per year". And when it is not burned and only vented, methane is, according to the IPCC, 80 times more potent than CO2 in generating global warming within 20 years. Each of the IPCC, 80 times more potent than CO2 in generating global warming within 20 years.

⁷⁷ British Petroleum.

⁷⁸ World Bank, "What Is Gas Flaring?", Text/HTML, World Bank, consultado el 20 de octubre de 2022, https://www.worldbank.org/en/programs/gasflaringre-duction/gas-flaring-explained.World Bank.

⁷⁹ World Bank.

⁸⁰ World Bank.

Mexico and Venezuela are the two Latin American countries with the highest levels of natural gas flaring, which also belong to the group of 10 countries with the highest global gas flaring.⁸¹ (See Graphic 13) For the last 10 years, Venezuela, together with Syria and Yemen, are recognized as the countries that burn the most gas per barrel of oil. In 2010 they burned 6.5 bcm and in 2020 9.4 bcm, which represents an increase of 44% in that period and is equivalent to Iraq's production in 2021.⁸² In the case of Mexico, there were significant declines between 2000 and 2004. However, there was a high increase in 2008 when it reached 13.4 bcm, equivalent to 28% of that year's production.

In response to this situation, the National Hydrocarbons Commission issued a series of "technical provisions to avoid or reduce gas flaring and venting in hydrocarbon exploration and exploitation works", which possibly contributed to the reduction in gas flaring. Mexico is a case of concern because its accelerated raise in gas flaring levels despite having committed to "(a) not routinely flaring gas in any new oil fields, and (b) ending routine flaring in existing oil fields as soon as possible and no later than 2030". Between 2018 and 2020 alone, gas flaring increased from 4.5 bcm to 6.7 bcm which represented a 48% increase, which is too high considering that its production has declined substantially and that it is highly dependent on imports from the United States, as we will see below.

Despite the above, there are also countries in the region that, although they do not burn large volumes of natural gas, have managed to generate public policies to limit this practice, as in the case of Colombia. It is estimated that 0.7 bcm was burned in 2010 and 0.4 bcm in 2020⁸⁵ which represents a decrease of 42.85% as a result of regulations that prohibit and monetarily sanction any unauthorized gas consumption. It is also a result of the fact that the national oil company Ecopetrol has a gas flaring reduction policy linked to the achievement of Colombia's Nationally Determined Contribution (NDC) within the framework of the Paris Agreements.

Since 1996, technological advances and legislative changes have been made to take advantage of natural gas instead of flaring or venting it. In 2015, the World Bank and the UN launched the Zero Routine Flaring by 2030 initiative.⁸⁶

d. Consumption

Natural gas consumption in Latin America in 2021 amounted to 251,570 bcm, corresponding to 6.3% of global consumption.⁸⁷ In all the countries analyzed, consumption increased in the last two decades except in Venezuela. By 2021, the country with the highest natural gas consumption in the region was Mexico with a 39% share, followed by Argentina (20%), Brazil (18%), Venezuela (11%), Trinidad and Tobago (7%) and Colombia (6%). During the pandemic (2020-2021), gas consumption increased in all countries except Colombia, which had a decrease of -3.5%. The behavior for each of these countries over the last two decades has been as follows:

⁸¹ World Bank, "2022 Global Gas Flaring Tracker Report" (Washigton, D.C: World Bank, 2022), https://thedocs.worldbank.org/en/doc/1692f2ba2bd6408db-82db9eb3894a789-0400072022/original/2022-Global-Gas-Flaring-Tracker-Report.pdf.World Bank.

⁸² British Petroleum, "Statistical Review of World Energy 2022".

⁸³ World Bank, "2022 Global Gas Flaring Tracker Report", 6. World Bank, 6.

⁸⁴ British Petroleum, "Statistical Review of World Energy 2022".

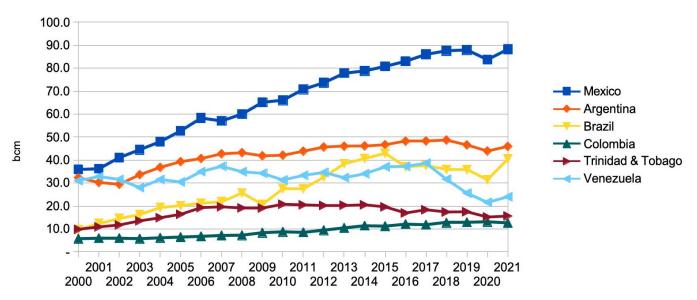
⁸⁵ British Petroleum.

⁸⁶ World Bank, "What Is Gas Flaring?", Text/HTML, World Bank, consultado el 7 de noviembre de 2022, https://www.worldbank.org/en/programs/gasflaringreduction/gas-flaring-explained.

⁸⁷ British Petroleum, "Statistical Review of World Energy 2022".

GRAPHIC 14.

NATURAL GAS CONSUMPTION 2000-2020 (BCM)



Source: British Petroleum Statistical Review⁸⁸

As we can see in the graph above, in 2000 Mexico, Argentina and Venezuela had similar gas consumption levels. However, Mexico's natural gas consumption increased much faster than the other countries, becoming one of the most important players at a global level in terms of natural gas consumption. Between 2000 and 2010 natural gas consumption in Mexico increased by 81.61%. Between 2010 and 2021 by 33.63%, mainly due to its increase in the electric power generation industry, particularly in combined cycle thermoelectric plants, which accounted for 64.91% of the total gas consumed, followed by the oil sector (23.23%), which has the highest share if we consider the other countries in the region, and the industrial sector (11.47%).

Taking into account this structure of natural gas consumption in Mexico, experts in the field point out that the most important company for understanding the gas industry is not Pemex but the CFE, since it is the company that consumes most of the gas in the country. The increase in Mexico's natural gas consumption has been accompanied by a decrease in its production, generating a deficit that has been solved by importing natural gas from the United States, as we will see below. We calculate that the percentage of natural gas consumption covered by national production is only 33.11% (See Chart 3), the lowest among Latin American countries.

⁸⁸ British Petroleum.

⁸⁹ E. Prud'homme. Interview. August 2022.

⁹⁰ E. Prud'homme. Interview. August 2022.

CHART 2.

NATURAL GAS CONSUMPTION BY SECTOR 2021 MEXICO, COLOMBIA, TRINIDAD & TOBAGO, BRAZIL AND ARGENTINA

DEMAND BY SECTOR 2021	MEXICO	COLOMBIA	TRINIDAD & TOBAGO	BRAZIL	ARGENTINA
Oil sector	23.23%	14.00%		11.01%	
Industrial sector	11.47%	30.00%	1.60%	23.41%	28.40%
Electric Generation	64.91%	23.00%	9.10%	46.06%	37.80%
Residential sector	0.84%	20.00%		1.23%	22.70%
Service sector	0.47%	5.00%		0.37%	2.70%
CNG	0.01%	6.00%		5.13%	5.50%
Petrochemical sector		1.00%	37.90%		
LNG			44.60%		
Others			2.20%	0.58%	2.90%
Energy sector				12.21%	

Source: National Energy Agencies⁹¹

The second largest consumer in Latin America in 2021 was Argentina, which reached 45.9 bcm, compared to 52% of Mexico's consumption. In 2000, it had a consumption of 32.3 bcm, from which point it had an increasing trend until it reached 42.1 bcm in 2010, corresponding an increase of 30.34% in that period. Due to the economic recovery after the 2001 crisis, the increase in power generation using turbo gas and combined cycle plants and CNG consumption. Pafter 2010, the growing trend in the consumption of this hydrocarbon continued at a lower rate in comparison to the period between 2010 and 2021 (+9%).

In Argentina, the primary sectors using gas were electricity generation (37.80%), the industrial sector (28.40%) and the residential sector (22.70%). Together with Colombia, it is one of the most representative sectors within natural gas consumption, unlike the other countries in the region where it is marginal (See Chart 2). If we consider production and consumption in 2021, domestic production covers 84.1% of total consumption (Chart 3), the remaining amount will have to be obtained through imports as we will see below.

⁹¹ Empresa de Pesquisa Energética (EPE), "Versión Interactiva del Balance Energético Nacional", 2021, https://www.epe.gov.br/pt/publicacoes-dados-abertos/publicacoes/balanco-energetico-nacional-interativo; ENARGAS, "Datos operativos de Transporte y Distribución de Gas. Gas Entregado, por Tipo de Usuario", 2021, https://www.enargas.gob.ar/secciones/transporte-y-distribucion/datos-operativos-subsec.php?sec=3&subsec=2&subsecord=02; Gestor del Mercado de Gas Natural de Colombia y Bolsa Mercantil de Colombia, "Informe Anual. Mercado de Gas Natural" (Bogotá: Gestor del Mercado de Gas Natural de Colombia-Bolsa Mercantil de Colombia, 2021), https://www.bmcbec.com.co/sites/default/files/2022-03/Informe%20anual%202021.pdf; Government of the Republic of Trinidad and Tobago, "Review of the Economy 2022. Tenacity and Stability in the Face of Global Challenges" (Government of the Republic of Trinidad and Tobago, 2022), https://www.finance.gov.tt/wp-content/uploads/2022/09/Review-of-the-Economy-2022.pdf; SENER, "Balance nacional de gas natural. Prospectivas.", 2021, ttps://datos.gob.mx/busca/dataset/prospectivas.Empresa de Pesquisa Energética (EPE), "Versión Interactiva del Balance Energético Nacional"; ENARGAS, "Datos operativos de Transporte y Distribución de Gas. Gas Entregado, por Tipo de Usuario"; Gestor del Mercado de Gas Natural de Colombia y Bolsa Mercantil de Colombia, "Informe Anual. Mercado de Gas Natural"; Government of the Republic of Trinidad and Tobago, "Review of the Economy 2022. Tenacity and Stability in the Face of Global Challenges"; SENER, "Balance nacional de gas natural. Prospectivas."

⁹² Liliana Cerioni y Silvia Morresi, Perspectivas de evolución del mercado de gas natural en Argentina. Posibles impactos sobre la economía local (Universidad Nacional del Sur. Departamento de Humanidades, 2021), https://repositoriodigital.uns.edu.ar/handle/123456789/5522.

PRODUCTION/CONSUMPTION RATIO 2021

	PRODUC- TION 2021 (MMm3)	CONSUMP- TION 2021 (MMm3)	PRODUC- TION SHORTFALL 2021	CONSUMP- TION % COVERING PRODUC- TION 2021
Mexico	29,200	88,200	-59,000	33.11%
Argentina	38,600	45,900	-7,300	84.10%
Brazil	24,300	40,400	-16,100	60.15%
Colombia	12,600	12,600	0	100.00%
Trinidad and Tobago	24,700	15,600	9,100	158.33%
Venezuela	24,000	24,000	0	100.00%
Total Latin america	182,570	251,570	-69,000	72.57%
World total	4,036,900	4,037,500	-600	99.99%
Latin America % of world total		6.23%		

Source: Own calculations based on BP⁹³

Brazil was the third most representative consumer in the region in 2021 with a consumption of 40.4 bcm, which generates a deficit that is covered by 60.15% of domestic production and the rest through imports (Table 3). In 2000, consumption of this hydrocarbon was 9.4 bcm, which has implied increases of 113% between that year and 2010, as a result of the implementation of the Priority Thermoelectricity Program (PPT), to take advantage of surplus natural gas from Bolivia for electricity generation. ⁹⁴ Between 2010 and 2021 the trend of natural gas consumption continues to increase in Brazil, but with a less accelerated growth (46.7%) resulting from the increase in electricity generation. In fact, since 2011, a negative correlation has begun to be observed between gas-fired power generation and hydroelectric power generation due to water scarcity conditions resulting from droughts. ⁹⁵ By 2021, gas consumption will be oriented to electricity generation (46.06%), followed by consumption for the industrial sector (23.41%) and the oil sector (11.01%). Brazil has a very low share of residential consumption, as in Mexico (Chart 2).

Despite being the owner of the largest gas reserves in the world, Venezuela has reduced its consumption to reach 24 bcm in 2021, equivalent to the levels observed in 1990. In 2000 it consumed 31 bcm and by 2010 it consumed 31.3 bcm, which implied a practically

⁹³ British Petroleum, "Statistical Review of World Energy 2022".

⁹⁴ Mathias, Melissa y Cecchi, José, "Industria de Gas en Brasil: Pasado, Presente y Futuro", 2009, https://www.ariae.org/sites/default/files/2017-04/ANP.industria%20gas%20natural%20brasil%20.pdf.

⁹⁵ André do Amaral et al., "Mercado de gás natural no Brasil- desafios para novo ciclo de investimentos", septiembre de 2015, https://web.bndes.gov.br/bib/jspui/bitstream/1408/9614/2/BNDES%20Setorial%2042%20Mercado%20de%20g%c3%a1s%20natural%20no%20Brasil-%20desafios%20para%20novo%20ciclo%20de%20investimentos PBD.pdf.

null increase. Between 2010 and 2021 there was a 23% reduction. PDVSA is the company that produces and distributes gas in Venezuela through its subsidiary PDVSA Gas Comunal, which is sold at a regulated price that is higher than the cost of production, which has made its production and domestic consumption unviable.

A 2018 U.S Energy Information Administration report mentions that 38% of natural gas is consumed by the oil industry in Venezuela. It is estimated that other large consumers of gas in the country are thermoelectric plants and, the industrial and petrochemical sectors. Although domestic consumption is not very representative, there is a gas supply crisis because only 7% of households have access to piped gas, 89% to cylinder supply, and the remaining 4% must use firewood and kerosene. This crisis has worsened due to the reduction in the production of propane gas; also the impossibility of importing it for the sanctions imposed on PDVSA, the lack of operation of the filling plants, the operational failures of the trucks to transport lp gas and the shortage of cylinders for distribution. This is especially worrisome considering the high levels of natural gas flaring in Venezuela noted in the previous section.

The fifth largest consumer of natural gas in 2021 is Trinidad and Tobago with 15.6 bcm, the only country on the continent that consumes less gas than it produces. If we consider the balance between production and consumption (Chart 3) the country produces 58% more than it needs to cover its consumption needs. In 2000 it had a consumption of 9.8 bcm, which increased by 111% in 2010 when it consumed 20.7 bcm. After that year, it slightly decreases with a reduction in consumption between 2010 and 2021 of 26.63%.

In addition to the above, it has a different consumption structure than the other countries analyzed. The main consumer of natural gas in Trinidad and Tobago is the lique-fied natural gas industry (44.6%), followed by the petrochemical industry (37.90%), 19.2% of which is for methanol production and 18.7% for ammonia production. After the petrochemical industry, of which it is one of the main producers worldwide, gas consumption is dedicated to electricity generation (9.10%), gas processors, cement, ammonia derivatives and small consumers (2.2%) and finally the industrial sector with (1.60%) which is destined to the production of iron and steel.

Finally, Colombia is the sixth largest consumer of natural gas in the region in 2021, with a consumption of 12.6 bcm. In 2000, consumption was 5.7 bcm, which had a growing trend reaching 8.7 bcm in 2010 and a growth rate in that period of 52.63%. This growing trend is maintained between 2010 and 2021 with an increase in consumption of 44.82%. In addition to the above, by 2021 consumption is equivalent to domestic production, making it less dependent on external sources to ensure domestic consumption (see Chart 3).

In terms of consumption structure, we see that the main consumer is the industrial sector (30%), followed by electricity generation (23%), the residential sector (20%), the oil sector (14%), auto-transportation (6%), services (5%) and petrochemicals (1%). Unlike Mexico and Brazil, where electricity generation is the main consumer of natural gas, Colombia's industrial sector is the largest consumer. Regarding residential supply, in Colombia eight of

⁹⁶ Energy Information Administration, "Country Analysis Brief: Venezuela", junio de 2018, 21. Energy Information Administration.

⁹⁷ OEP Venezuela, "Falta de gas doméstico obliga a familias venezolanas a deforestar para obtener leña", Observatorio de Ecología Política de Venezuela (blog), el 17 de septiembre de 2020, https://www.ecopoliticavenezuela.org/2020/09/17/falta-de-gas-domestico-obliga-a-familias-venezolanas-a-deforestar-para-obtener-lena/.OEP Venezuela.

⁹⁸ OEP Venezuela, 2020.

every ten households have access to natural gas, representing more than 10 million households. This number is the result of the massification program implemented since the 1990s. At this period, two large gas pipelines were built to facilitate distribution and consumption.

Despite this success in increasing household coverage and the increase in its use in the industrial sector, natural gas rationing is expected to occur between 2024-25 due to the decline of these significant supply sources and the lack of regasification plants to supply this hydrocarbon in the event that it is necessary to import it. As pointed out by an expert on the subject interviewed for this research: "We do not have enough supply to continue supplying those 10 million consumers, and let's say that this is a critical point here in the country. Although we have new discoveries, especially offshore in the Caribbean coast... 6 or 7 years may pass between the moment of the discovery of a gas find and the moment it is available for consumption, so we are going through a supply situation". 99

e. Exports and Imports

Considering the information available for 2021, imports in Latin America reached a total of 91.91 bcm.¹⁰⁰ Among the main importers in the region are Mexico (64.93%), followed by Brazil (18.76%) and Argentina (8.89%).

Of Mexico's total imports (59.68 bcm), 98.42% come through pipelines from the United States and the remaining 1.58% corresponds to liquefied natural gas (LNG) imported from the United States (46.84%), Trinidad and Tobago (10.63%) and Indonesia (42.53%). In 2021 Mexico's consumption was 88.2 bcm, whereas 67% of such consumption was imported gas from US. If we subtract what the oil industry consumes, imports support 90% of natural gas demand.

Mexico is the world's second largest natural gas import market after Germany and is the main recipient of exports from the United States, which grew 546% between 2010 and 2021 as a result of favorable prices that encouraged a sustained increase in demand and reduced incentives for domestic production. Imports from the USA represent between "6.5% and 7.5% of the total produced in that country and come mainly from Texas". During the pandemic, the flow of imports did not stop but even increased by 8.22% between 2020 and 2021.

Mexico is considered atypical because it depends on 90% of natural gas imports. There is no other country with high dependence on imports more than "52% from a single source; Mexico generates more than 60% of its electricity with gas, others no more than 45%; 70% of the external supply enters through the border between Texas and Tamaulipas and 60% through only two interconnections". 104

⁹⁹ C.Chahin, Interview. September 2022

¹⁰⁰ British Petroleum, "Statistical Review of World Energy 2022". British Petroleum.

¹⁰¹ Energy Information Administration, "U.S. Natural Gas Exports by Country", 2022, https://www.eia.gov/dnav/ng/ng_move_expc_s1_a.htm.Energy Information Administration.

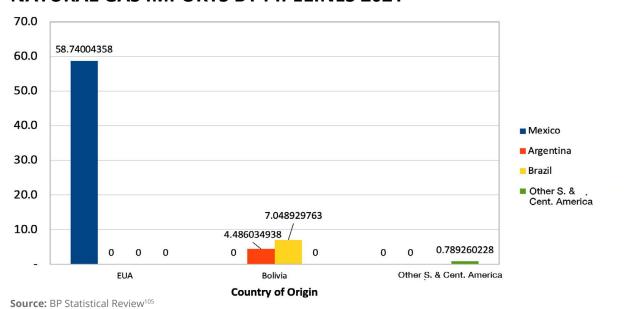
¹⁰² Javier H. Estrada, Víctor Rodríguez, y Víctor Hugo Ventura Ruiz, "El gas natural en México: impacto de la política de autosuficiencia, seguridad y soberanía en la transición y la integración energética regional", el 12 de julio de 2022, https://repositorio.cepal.org/handle/11362/47981.

¹⁰³ British Petroleum, "Statistical Review of World Energy 2022". British Petroleum.

¹⁰⁴ Estrada, Rodríguez, y Ventura Ruiz, "El gas natural en México", 11.

GRAPHIC 15.

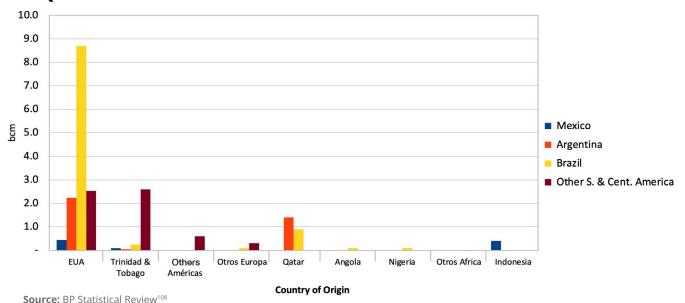
NATURAL GAS IMPORTS BY PIPELINES 2021



In 2021 Brazil imported 17.24 bcm of natural gas, corresponding to 42% of gas consumption that same year. Of these imports, 41.25% were delivered by pipelines from Bolivia (7.05 bcm) and Argentina (0.06 bcm). The remaining 58.75% corresponds to LNG from the United States (8.68 bcm), Qatar (0.9 bcm), Trinidad and Tobago (0.2 bcm), Angola (0.1 bcm) and Nigeria (0.1 bcm). LNG imports from the U.S. were not affected by the pandemic, but increased by 175% between 2020 and 2021 mainly due to the drought that has negatively impacted hydroelectric power generation(Varley, 2021 . 107 (See graph 15).

GRAPHIC 16.

LIQUEFIED NATURAL GAS IMPORTS 2021



¹⁰⁵ British Petroleum, "Statistical Review of World Energy 2022". British Petroleum.

¹⁰⁶ British Petroleum, "Statistical Review of World Energy 2022".

¹⁰⁷ Kevin Varley, "Crece la importación de gas natural licuado de EEUU en Sudamérica por las graves sequías", Bloomberg Línea, el 29 de julio de 2021, https://www.bloomberglinea.com/2021/07/29/crece-la-importacion-de-gas-natural-licuado-de-eeuu/.

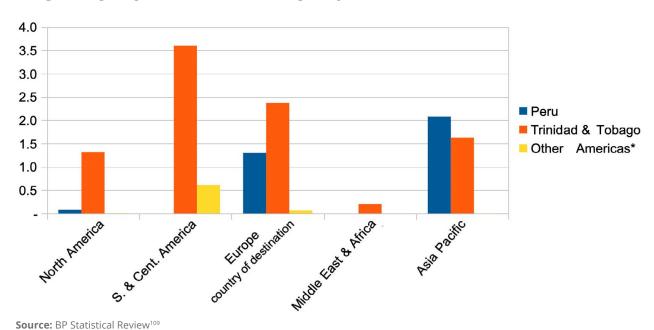
¹⁰⁸ British Petroleum, "Statistical Review of World Energy 2022".

Argentina imported 8.17 bcm in 2021, equivalent to 17.79% of consumption for the same year. Of the total imports, 54% were transported by pipeline from Bolivia (4.49 bcm) and 45% as LNG from the United States (2.2 bcm), Trinidad and Tobago (0.1) and Qatar (1.4 bcm). As in the case of Brazil, LNG imports from the USA increased by 453.81% between 2020-2021 due to the intense drought that is limiting hydroelectric power generation.

On the other hand, Latin America exported a total of 25.65 bcm in 2021. The leading exporting country in the region is Bolivia from where 11.5 bcm was transported by pipeline to Argentina and Brazil. Bolivia is followed by Trinidad and Tobago (9.1 bcm) and Peru (3.5), which exported gas by LNG tankers. The advantage of LNG is that it can be exported to distant places, unlike gas pipelines whose infrastructure is expensive, as shown in Graphic 17.

GRAPHIC 17.

LNG EXPORTS IN LATIN AMERICA 2021



During the pandemic (2020-2021) Trinidad and Tobago and Peru increased LNG exports by 1.8% and 0.7%, respectively. 110

f. Transportation and storage infrastructure

GAS PIPELINES

Based on information from Global Energy Monitor, there are currently 89 pipelines in operation that transport natural gas from or to the countries studied, totaling 60,004 kilometers in length, equivalent to circling the earth 4.7 times (See Annex 1).

Mexico has the highest concentration of gas pipelines with a 27% share, followed by Argentina (18%), Brazil (16%), gas pipelines from the USA to Mexico (10%), Venezuela (8%), Trinidad and Tobago (6%), gas pipelines from Argentina to Chile (6%), Colombia (3%) and gas pipelines from Bolivia to Argentina (2%) and Bolivia to Brazil (2%) (See Chart 4).

¹⁰⁹ British Petroleum.

¹¹⁰ British Petroleum.

GRAPHIC 18.

GAS PIPELINES TO AND FROM MEXICO, COLOMBIA, VENEZUELA, TRINIDAD AND TOBAGO, BRAZIL AND ARGENTINA 2022



Source: Global Energy Monitor 2022¹¹¹

¹¹¹ Global Energy Monitor, "El Portal Energético para América Latina", 2022, https://portalenergetico.org/es/.Global Energy Monitor.

LIQUEFACTION PLANTS

In Latin America there are currently 4 Liquefaction plants operating to transform natural gas into LNG for export. These plants are located in Peru and Trinidad and Tobago as shown in the following table:

CHART 4.

LIQUEFACTION PLANTS. PERU AND TRINIDAD AND TOBAGO 2022

COUNTRY	TERMINAL PROJECT	OWNER	YEAR	CAPACITY (MTPA)	LOCATION
Perú	Peru LNG Terminal	Hunt Oil Company [50.00%]; SK Group [20.00%]; Shell [20.00%]; Maru- beni Corporation [10.00%]	2010	4.45	Pampa, Melchorita, Lima
Trinidad & Tobago	Atlantic LNG Terminal T2	Shell [57.50%]; BP [42.50%]	2002	3.4	
	Atlantic LNG Terminal T3	Shell [57.50%]; BP [42.50%]	2003	3.4	Point Fortin
	Atlantic LNG Terminal T4	Shell [51.10%]; BP [37.80%]; NGC Trinidad [11.10%]	2007	5.2	

Source: Global Energy Monitor 2022¹¹²

In addition to these existing liquefaction plants, the Costa Azul Export Terminal plant, located in Ensenada, Mexico, is currently under construction. The plant is owned by Sempra Energy (83.40%) and TotalEnergies (16.60%), and it will have a capacity of 3.25 mtpa starting operations in 2024.¹¹³

The construction of more liquefaction plants has been announced in Mexico, to be located in: Salina Cruz-Oaxaca (1), Puerto Libertad-Sonora (8), Ensenada-Baja California (1), Topolobampo-Sonora (1), Veracruz-offshore (1), Altamira, Tamaulipas-offshore (2), totalling 14 liquefaction plants. While these are just announcements of future LNG export projects, their construction may be accelerated by the demand from Asia and the increased demand from Europe, due to the war in Ukraine that has reduced the supply of natural gas, particularly in Germany. In this context, that the Mexican government is considering using pipeline infras-

¹¹² Global Energy Monitor, "El Portal Energético para América Latina".

 $^{^{\}rm 113}\,\text{Global}$ Energy Monitor.

¹¹⁴ Global Energy Monitor.

tructure to transport gas from the U.S., liquefy it and export it, profiting from the fact that the construction of these plants has been rejected in the U.S., both at the local and state levels. In addition to these projects announced in Mexico, the construction of the Vaca Muerta LNG terminal, owned by YPF has also been announced. This plant would have a capacity of 7.3 bcm per year, and it would be located in Bahia Blanca, in the Buenos Aires province.

REGASIFICATION PLANTS

Regasification plants are those used to transform imported LNG into Natural Gas. In the countries comprised in this study there are currently 12 plants in operations, three have been canceled, three are under construction (Brazil) and 13 projects have been proposed. The regasification plants currently in operations are the following:

CHART 5.

REGASIFICATION PLANTS. PERU AND TRINIDAD AND TOBAGO 2022

COUNTRY	PROJECT	OWNER	PARENT	YEAR	CAPACITY (Mtpa)	LOCATION
Argentina	Bahia Blanca FSRU	Excelerate Energy; Gas Natural; Repsol; YPF.	Excelerate Energy; Gas Natural; Repsol; YPF.	2008	3.8	Bahía Blanca, Buenos Aires
Argentina	Escobar FSRU	UTE Escobar [200.00%]	Enarsa [50.00%]; YPF [50.00%]	2011	6.1	Puerto Escobar
Brazil	Guanabara Bay FSRU	Petrobras [100.00%]	Petrobras [100.00%]	2009	8.05	Guanabara Bay
Brazil	Pecém FSRU	Petrobras [100.00%]	Petrobras [100.00%]	2008	1.88	Porto de Pecém
Colombia	Cartagena FSRU (Colombia)	Sociedad Portuaria El Cayao (SPEC) [200.00%]	Promigas [51.00%]; Vopak [49.00%]	2016	3.8	Cartagena

¹¹⁵ GNL Global, "México planea convertirse en un centro de exportación de GNL con gas de EE. UU.", el 14 de agosto de 2022, https://gnlglobal.com/mexico-planea-convertirse-en-un-centro-de-exportacion-de-gnl-con-gas-de-ee-uu/.GNL Global.

^{...} ¹¹⁶ Global Energy Monitor, "El Portal Energético para América Latina".Global Energy Monitor.

COUNTRY	PROJECT	OWNER	PARENT	YEAR	CAPACITY (Mtpa)	LOCATION
Mexico	Altamira LNG Terminal	Vopak [60.00%]; Enagás [40.00%]	Vopak [60.00%]; Enagás [40.00%]	2006	5.7	Altamira Port
Mexico	Manzanillo LNG Terminal	Mitsui Group [37.50%]; Samsung [37.50%]; KOGAS [25.00%]	Mitsui Group [37.50%]; Samsung [37.50%]; KOGAS [25.00%]	2012	3.8	Manzanillo
Brazil	Sergipe FSRU	New Fortress Energy [100.00%]	New Fortress Energy [100.00%]	2020	5.6	Porto de Sergipe
Brazil	Porto do Açu FSRU	Prumo Logistica [46.90%]; Siemens [33.00%]; BP [20.10%]	EIG Global Energy Partners [46.90%]; Siemens [33.00%]; BP [20.10%]	2021	5.6	Port of Açu
Mexico	Pichilingue LNG Terminal	New Fortress Energy [100.00%]	New Fortress Energy [100.00%]	2021	3	Port of Pichilingue
Mexico	Costa Azul LNG Import Terminal	Sempra Energy [100.00%]	Sempra Energy [100.00%]	2008	7.6	Ensenada
Brazil	Bahia FSRU	Petrobras [100.00%]	Petrobras [100.00%]	2014	5	4 km west of Ilha dos Frades

Source: Global Energy Monitor 20221¹¹⁷

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¹¹⁷ Global Energy Monitor, "El Portal Energético para América Latina".

The regasification plants currently under construction are located in Brazil. These projects are Celba FSRU, owned by New Fortress Energy (100.00%) in Pará; Cosan FSRU, owned by Cosan (100.00%) in Sao Paulo and; Terminal Gás Sul FSRU owned by New Fortress Energy (100.00%) in Santa Catarina.¹¹⁸

In terms of natural gas storage, none of the countries analyzed have public policies oriented to that end. In Mexico, a storage policy called "Política Pública en materia de Almacenamiento de Gas Natural" was formulated in 2018.¹¹⁹ However, with the arrival of the new government it has not been applied. This absence in the application of a natural gas storage policy became evident with the paralysis of natural gas imports from Texas, due to the February 2021 frost when the governor of that state, Greg Abbott, ordered natural gas suppliers not to ship fuel out of his state.¹²⁰

According to one of the experts interviewed: "We do not have storage in Mexico, what we do in Mexico is that we use the pipelines themselves as a form of storage, you accumulate the gas and as you increase the pressure you can store part of the gas that is moving in your pipeline network, if you remove the pressure then the gas is no longer stored or saved.¹²¹

g. Organization and regulation

Gas regulations in the countries included in this study depend to a large extent on the phase of the production process in which they are found. For activities associated with the exploration and production of natural gas (upstream), there is a strong state presence: the subsoil and non-renewable resources are defined as state property. However, most of the reforms carried out since the 1990s include the participation of private companies in these activities through concessions or exploitation rights. Generally these activities are regulated by the Constitution and specific laws, such as the Hydrocarbons Law (Argentina) or the Petroleum Code (Colombia) (See Annex 2).

The trend in the region is towards the privatization of activities related to transportation, refining, distribution and commercialization (downstream), although in some contexts a state presence remains, particularly in regulatory bodies such as the Energy Regulatory Commission (Mexico) or the National Petroleum Agency (Brazil). In some cases, such as in Colombia and Argentina, natural gas is recognized as a public service that can be provided by private agents and regulated to favor access to the industrial and domestic sectors. In the downstream sphere, gas is recognized as both an economic activity and an essential public service. As an economic activity, competition is promoted both in the supply and demand of gas. Different mechanisms are generated to allow free access to these facilities for transportation and distribution of hydrocarbons. As a public service, natural gas legal frameworks are based on quality and efficiency criteria that allow access to the highest possible number of people, with quality, efficiency and uninterrupted service provision. 122

In most cases there is no specific legislation to regulate natural gas, as in Mexico, Trinidad and Tobago, Colombia and Brazil. This has occurred because gas was initially thought of as a residual fuel resulting from oil production. This has been slowly changing, as natural gas has become an increasingly relevant hydrocarbon in the energy matrix of these countries. The regulations in Argentina and Venezuela, which have specific laws regulating the exploitation of non-associated gas, are interesting in this regard.

¹¹⁸ Global Energy Monitor.

¹¹⁹ Secretaría de Energía, "Política Pública en materia de Almacenamiento de Gas Natural", gob.mx, 2018, http://www.gob.mx/sener/articulos/presenta-cion-a-consulta-de-la-politica-publica-en-materia-energetica-aplicable-a-la-constitucion-de-almacenamiento-de-gas-natural?state=published.Energía.

¹²⁰ Forbes, "Helada paraliza sector de energía en Texas por sexto día, con afectación a México", Forbes México, el 18 de febrero de 2021, https://www.forbes.com.mx/economia-helada-energia-texas-sexto-dia-afectacion-mexico/.Forbes.

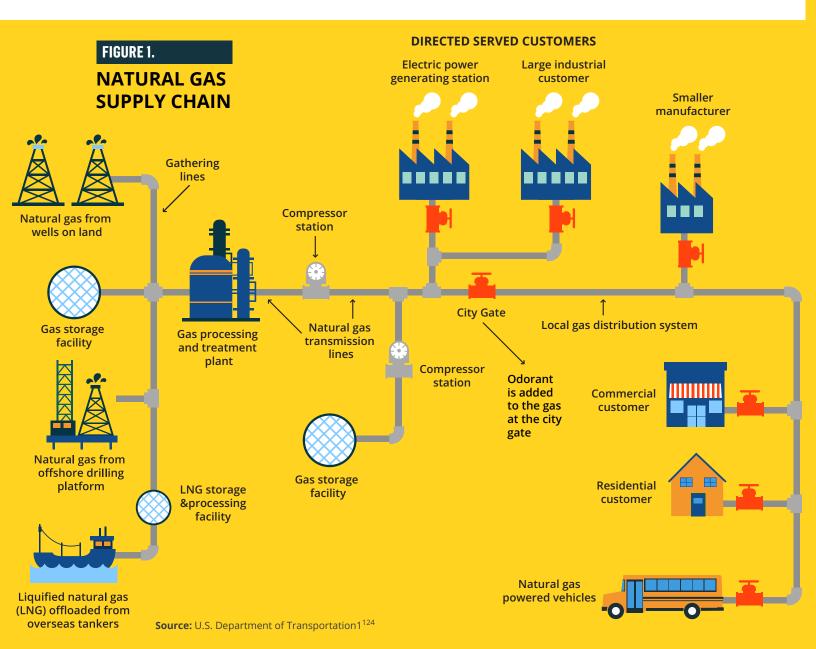
¹²¹ García Alcocer. Interview. September 2022.

¹²² Ana Paola Gutiérrez Rico y Lyndon Winston Jay Huffington, Los mercados de gas y su regulación en Iberoamérica, 2021, https://es.scribd.com/book/597332597/Los-mercados-de-gas-y-su-regulacion-en-Iberoamerica.Gutiérrez Rico y Jay Huffington.

It is also worth noting Brazil's experience in creating an independent agency for the administration of hydrocarbons in 1997, with the creation of the National Petroleum Agency (1997), which has been replicated in other countries. The creation of this type of agency made it possible for state-owned companies such as Ecopetrol, Petrobras and YPF, among others, to move to mixed schemes to compete with private companies in the sector.¹²³

h. Supply Chain

The natural gas supply chain is organized in three stages. The first stage upstream, comprises all onshore and offshore exploration and production activities. Before moving to the second stage, some of this gas is flared, sold or re-injected into the oil fields. The second stage, midstream consists of all those transportation, storage and wholesale marketing activities. Finally, the downstream stage corresponds to all those activities oriented to reach the final consumers, mainly for electricity generation, the oil industry, the industrial sector, the petrochemical industry, the commercial sector, for domestic use and CNG. A portion of this gas can be transported through pipeline networks or taken to liquefaction plants where it is cooled and loaded onto ships for export.



¹²³ Gutiérrez Rico y Jay Huffington, Los mercados de gas y su regulación en Iberoamérica. Gutiérrez Rico y Jay Huffington.

¹²⁴ US Department of Transportation, "Pipeline Safety Update Oct 2012.pdf", septiembre de 2012, https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/Pipeline%20Safety%20Update%20Oct%202012.pdf.

i. Final Reflections

Before the pandemic, Latin American countries had been experiencing slowing economies and almost zero growth since 2014. This crisis deepened in 2020 due to the pandemic, generating significant job losses, falling incomes and increased poverty indicators which exacerbated the historical structural inequalities existing in the region. This resulted in a drop in regional GDP by -3.5% and 6.31% between 2019 and 2020. The region's economy registered a growth of 5.2% in 2021 and a 2.9% is expected by the end of 2022. An economic slowdown is expected for 2023 with a grow rate of 1.4%, which reflects the exhaustion of the post-pandemic recovery. This scenario is accompanied by rising inflation and the fiscal crisis generated by policies to address Covid-19 and its social consequences.

Despite this situation, the gas industry was not affected by the restrictions imposed in the context of Covid-19. The production of this hydrocarbon increased throughout the continent, except for Mexico (-3.8%) and Trinidad and Tobago (-15.9%). This reduction in production was generated by the decline of existing fields and the decrease in reserves. In the case of Trinidad and Tobago, this drop was also due to the maintenance of production platforms and the drop in oil prices, which had a greater impact on gas prices, since this is a country whose economy depends on natural gas. We have also pointed out that natural gas consumption increased in all countries except Colombia (-3.5%). LNG exports increased in Peru (0.7%) and in Trinidad and Tobago (1.8%) and LNG imports increased particularly in Brazil and Argentina due to severe droughts that restricted hydroelectric generation capacity.

"The energy industry never does badly". A specialist commented when we asked about the impacts of the pandemic on the gas industry. And added the following:

It was complicated because the landfills led to the closure of several industries, and naturally the gas consumption of the industrial sector is an important part of the demand for this energy, but ...most of the supply contracts are taken and pa., What does that mean? You pay me whether I consume it or not. Let's say that this protected the producers... Transportation was not affected either because in the transportation charges there is a large fixed component and a small variable component, and you pay that fixed component because you pay it, so it was not affected either, I would say that the part that was most affected was distribution because they have a prescap methodology, that is, I charge for the volume of what I distribute; however there was a small compensation, I am not saying that it was enough to neutralize the drop in the demand of the industrial sector, but it helped in part... The confinement brought people to their homes, people had breakfast, lunch and dinner at home, and that made the residential demand increase, not enough to compensate the fall in the industrial sector, but it did help, at least partially. 127

Regarding the war in Ukraine, hydrocarbon prices have risen due to supply risks from Russia. Because of the strategic role that Russia and Ukraine play in energy supply, this situation has generated uncertainty about the impact the war may have on gas and oil supply chains around the world. This situation does not directly impact Latin American countries because there are no natural gas imports outside our region, even though there are indirect effects

¹²⁵ CEPAL, The recovery paradox in Latin America and the Caribbean Growth amid persisting structural problems: inequality, poverty and low investment and productivity (CEPAL, 2021), https://www.cepal.org/en/publications/47059-recovery-paradox-latin-america-and-caribbean-growth-amid-persisting-structural.

¹²⁶ CEPAL, "Latin America and the Caribbean Must Redouble Efforts to Transform Development Models and Put Policies for Productive Transformation and Diversification at the Center", Text (CEPAL, el 23 de octubre de 2022), https://www.cepal.org/en/pressreleases/latin-america-and-caribbean-must-redouble-efforts-transform-development-models-and-put.

¹²⁷ C. Chahin. Interview. September 2022.

¹²⁸ CEPAL, "Repercussions in Latin America and the Caribbean of the War in Ukraine: How Should the Region Face This New Crisis?", el 3 de junio de 2022, https://repositorio.cepal.org/handle/11362/47913.

related to the prices of raw materials and other commodities.¹²⁸ The increase in gas prices may positively affect net export countries, such as Bolivia, Trinidad and Tobago and Peru. However, this will impact on importing countries like Mexico and more recently, Brazil and Argentina due to severe droughts in the production of gas.

As for the effects of the war in Ukraine on the region's energy transitions, two scenarios can be observed. It can boost the use of renewable energy sources, especially in countries that do not have fossil fuel sources. It can also delay it in hydrocarbon-producing countries, due to the incentives generated by the increase in prices, which mean an increase in investments and tax revenues.¹²⁹

III. ANALYSIS OF KEY ACTORS IN THE LATIN AMERICAN GAS MARKET

KEY FINDINGS

- Private and State Owned Companies are the key actors in the gas industry in the LAC region.
- While SOEs own the gas in the LAC region; multinational companies have control over production and commercialization links of the gas value chain.
- 23 companies (SOEs and private companies) have control over 76% of the Gas Power Plants in the LAC region. 4 of them are SOEs with direct control, the rest are owned by private multinational and national capitals.
- The national contexts on oil and gas industries have direct impact on private companies'
 participation on gas resources and management. Those countries with rich reserves usually
 have stronger SOEs and legal frameworks to centralize the State's participation regarding
 resources and profit. Those countries with less infrastructure, have stronger presence of
 multinational corporations in different aspects of natural resource governance.
- SOEs in the region have been experiencing economic crises for the last two decades. This trend gives opportunities to multinational and national companies to invest and participate on secondary links of the value chain.

The gas market in Latin America is organized around two big players Public and Private Actors supported by investment banks, international organizations and other constituencies with specific interests in the industry.

Public Actors

As stated throughout this study, the Latin American gas market has had a key role in the development of different industries and clusters for manufacturing and commodity exploitation in the region since the beginning of the 20th century, when strengthening State Owned Enterprises (SOE)

¹²⁸ CEPAL, "Repercussions in Latin America and the Caribbean of the War in Ukraine: How Should the Region Face This New Crisis?", el 3 de junio de 2022, https://repositorio.cepal.org/handle/11362/47913.

¹²⁹ CEPAL, "Repercussions in Latin America and the Caribbean of the War in Ukraine".

became a main public policy to advance the industrialization processes and social objectives.¹³⁰ In the case of the energy sector, the largest oil companies are SOE's and have control over the 50% of oil and gas production.¹³¹

The SOEs first model experienced an economic crisis in the 1980's, when budget deficits and hyperinflation episodes led oil production countries to privatize their SOEs, like YPF in Argentina and YPFB in Bolivia which were re-nationalized in 2012 and 2006 respectively. Some SOEs remained under governmental control after the neoliberal reforms and some others experienced a mixed ownership model. In any case, this backup SOEs have from governments produce competitive distortions in home markets caused by: special tax policies; ad-hoc regulatory frameworks; privileged market positions; prior access to information and bankrupcy rescue policies.¹³²

PETROBRAS (Brazil), PEMEX (Mexico), PDVSA (Venezuela) and Ecopetrol (Colombia) are the largest SOEs with significant influence over the production of oil and gas in Latin America.

CHART 6.

STATED-OWNED ENTERPRISES OF GAS IN LATIN AMERICA IN 2020

SOE	COUNTRY	RESERVES (billion cubic feet)	NET SALES (million USD)	INVESTMENTS (million USD)
Petrobras	Brazil	7,580	53,683	607
PDVSA	Venezuela	-		-
Pemex	Mexico	6,984.2	953,661.844	600.756
Ecopetrol	Colombia	2.88	10,136.5	2,674
PetroEcuador	Ecuador	-	-	-
YPF	Argentina	2,447	291,846	690.68
YPFB	Bolivia	7,810	4,630	71.11
National Gas Company	T&T	-	1.6	.028

Source: SOEs financial reports¹³³ ¹³⁴ ¹³⁵ ¹³⁶ ¹³⁷

¹³⁰ Luisa Palacios, "The Petroleum Sector in Latin America", septiembre de 2002, 29.

¹³¹ International Monetary Fund, "State Owned Enterprises: The other government", abril de 2020, 49, https://www.imf.org/-/media/Files/Publications/fiscal-monitor/2020/April/English/ch3.ashx.

¹³² International Monetary Fund, "State Owned Enterprises: The other government", abril de 2020, 50, https://www.imf.org/-/media/Files/Publications/fis-cal-monitor/2020/April/English/ch3.ashx.

¹³³ Petrobras, "Annual Report and Form 20-F", diciembre de 2021, https://api.mziq.com/mzfilemanager/v2/d/25fdf098-34f5-4608-b7fa-17d60b2de47d/2741b9b8-e6d8-4d84-0458-43d96f085287?origin=2.

¹³⁴ Petróleos Mexicanos, "Consolidated Financial Statements - 2020", diciembre de 2020, https://www.pemex.com/ri/finanzas/Documents/2020_Pemex_FS.pdf.

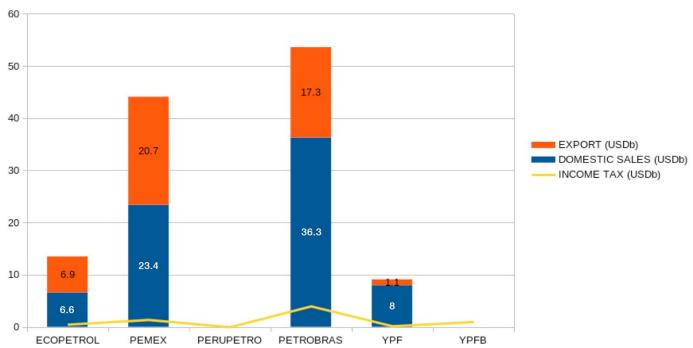
¹³⁵ YPF Sociedad Anónima, "20-F Form - 2021", diciembre de 2021, https://www.ypf.com/english/investors/Lists/InformeAnualForm20/20-F-2021.pdf.

¹³⁶ YPFB, "Resultados Financieros YPFB - 2020", 2021, https://www.ypfb.gob.bo/es/component/phocadownload/category/17-financiero-gestion-2020.

¹³⁷ Ecopetrol, "Resultados Financieros 2020", 2020, https://www.ecopetrol.com.co/wps/wcm/connect/363573c6-6783-44b9-b0b8-274f19d1296f/Reporte+-4T20+FINAL+4+PM.PDF?MOD=AJPERES&attachment=false&id=1614117349394.

As seen in Chart 7, in 2020 SOEs gas reserves were led by YPFB – Bolivia (7810 Bcfs), followed by Petrobras – Brazil (7580 Bcfs), Pemex – Mexico (6984 Bcfs) and YPF – Argentina (2447 Bcfs). Graphic 19 shows the top 3 sellers in 2020, led by Petrobras with USD 53.6 billion, followed by Pemex with USD 44 billion and Ecopetrol with USD 13.5 billion. Petrobras and YPF gas sales were higher in the domestic field. Conversely, Pemex and Ecopetrol sales had more balance between exports and domestic consumption. Unfortunately there is no updated information to compare with Venezuelan SOE PDVSA, which controls all gas production in this country.

GRAPHIC 19. SOE'S LAC 2020



Source: NRGI - National Oil Companies monitor. 138

PETROBRAS (Brazil)

Petróleo Brasileiro S.A. (PETROBRAS) was created in 1953. It has 20 direct subsidiaries. Petrobras conducts prospecting, drilling, refining, processing, trading and transporting activities and holds control of the Brazilian pipeline infrastructure. The company also manages oil and gas wells in the United States, Mexico, Nigeria, Argentina, Colombia and Bolivia. Its national gas pipeline network (2,643 kms) transports 103.6 million m3/d of natural gas, Bolivian gas and other LNG sources to transform gas into electric power.

It was partially privatized in 1997. The company is listed on the Sao Paulo and New York Stock Exchanges.

During the last three administrations, the company was highly indebted due to the business expansion into energy operations. Under Bolsonaro's management, the company returned to oil exploration and production segments. The company is increasing the use of gas and avoiding flaring to a "Zero Routine Flaring" by 2030, which is far from a climate change strategy.

According to its 2018 sustainability report, the company had 61.7 million tons of CO2 emissions. So far, there is no signal to commit to the standards in the Paris Agreement.

¹³⁸ NRGI, "National Oil Company Database", National Oil Company Database, consultado el 28 de octubre de 2022, https://www.nationaloilcompanydata.org/indicator.NRGI.

ECOPETROL, S.A. (Colombia)

Ecopetrol is under the supervision of the Ministry of Mines and Energy in Colombia. It participates along the hydrocarbon chain which includes exploration, production, transportation, refining and commercialization. The company is listed in the New York Stock Exchange, its biggest shareholder is the Republic of Colombia with 88.49% of its shares.

PEMEX (México)

Petróleos Mexicanos (PEMEX) was created on June 7th, 1938. In August, 2014, in the context of the so-called "Energy Reforms", PEMEX changed from being a decentralized public entity to becoming a productive state-owned company. With 30 subsidiaries, Pemex Exploration and Production (PEP), Pemex Industrial Transformation (PIT) and Pemex Logistics are Subsidiary Entities that can own property and carry on business in their own name, subject to the direction and coordination of PEMEX. The remaining subsidiaries are known as "subsidiary companies" which are controlled, directly or indirectly, by PEMEX.

PEMEX holds control of the country's reserves and transportation infrastructure.

The company has been in an economic crisis due to the fall in production and international prices of the oil and gas market.

The most significant Pemex CO2 emissions (36.5 million tons) come from gas flaring. Pemex also signed the World Bank Zero Routine Flaring program. The company committed to reduce CO2 emissions on exploration and production stages, but there is a lack of strategies around commercialization and distribution stages. There is no scope on indirect emissions coming from the company's products.

The energy transition agenda and moving towards clean energy industries doesn't seem to be a priority.

Private Actors

After SOEs, the second reserves controllers are multinational companies which hold national and international resources around the world. The private companies with the highest value in the stock markets and the largest number of sales in the region are, Total Energies (France), British Petroleum (BP, United Kingdom), ExxonMobil (U.S.) and Shell (United Kingdom).

As seen in Graphic 20, the largest private gas reserves are owned by BP (7.5 bboe) and Total Energies (7.3 bboe) followed by ExxonMobil (6.7 bboe), Chevron (5.3 bboe) and Shell (4.6 bboe).

The largest seller is Total Energies, which sold natural gas for a total USD 17.6 billion in 2020. The second company was BP whose revenues were up to USD 10.7 billion; in third place is Chevron with USD 7.2 billion, followed by ConocoPhillips (USD 6.9 billion) and Shell (USD 6.2 billion).

On production, ExxonMobil was the largest gas producer in 2020 with 3.7 million barrels of oil equivalent per day (mboe/d); the second largest producer was Shell with 1.5 mboe/d; followed by Chevron (1.29 mboe/d); Total Energies (1.28 mboe/d) and BP (1.092 mboe/d). There is no direct correspondence between reserves, revenues and production. Each company has different business models to make profit on different steps of the value chain, which produce a particular scenario depending on legal and economic factors.

TOTAL ENERGIES SE (France)

This is a french public company created in 1924 with presence in the New York Stock Exchange (NYSE). This company has committed to reduce methane emissions by 80% by 2030 and believes that natural gas has a key role in the energy transition.

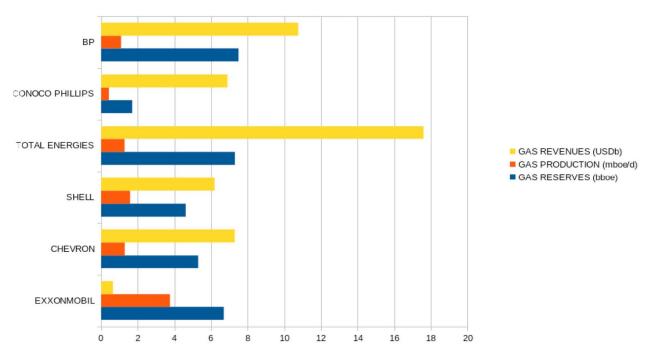
Total looks forward to integrating the entire gas value chain from production and trading, including gas-fired power plants and distribution. It has a strong presence in Africa, Asia, Oceania and North America. Its regasification terminals are in Europe, Asia and Panama in Central America. Its medium and long-term sales are located in Asia, Central and South America.

BRITISH PETROLEUM PLC

In 1901 Mr. D'Arcy, founder of British Petroleum, received an oil concession to exploit in Persia (Iran). Now, BP's production spots are in Trinidad and Tobago, North Africa, Mauritania & Senegal, Middle East, India and Asia-Pacific. The company produces 296 mboe/d of gas in Louisiana and Texas in the United States; in Trinidad and Tobago, BP holds 15 offshore platforms and two onshore facilities to produce gas. In Argentina, Bolivia and Mexico, BP shares equity to produce gas. In 2021 the LAC region production was 1,544 million cubic feet per day, which represents 19.5% of the annual production.

GRAPHIC 20.

GAS PRIVATE COMPANIES. 2020



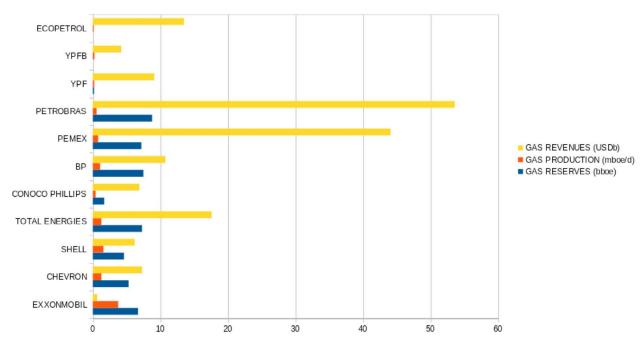
Source: Companies Annual Reports

On Graphic 21, private companies and SOEs are compared with the same criteria in the same year. We can notice a significant difference in revenues and sales numbers, where SOEs get the most considerable profit because of the production costs, which are not the same as those of a multinational company settling in different national contexts.

On reserve amounts, we can see a tiny gap between private and public actors, because multinational companies hold different stock reserves around the world, putting them on at the same level as an SOE whose reserves are only at the national level. Petrobras is still in the first place, followed by BP, Exxon Mobil, and Total Energies. Pemex comes fifth, followed by Chevron and Shell.

Another difference between companies is in production amounts, where multinationals lead on this activity, compared to SOEs, whose business model is based on exportation. This is also another factor to consider when we see the infrastructure and technological aspects of the value chain and profits.

GRAPHIC 21. GAS OWNERS OUTLOOK



Source: Companies Annual Reports

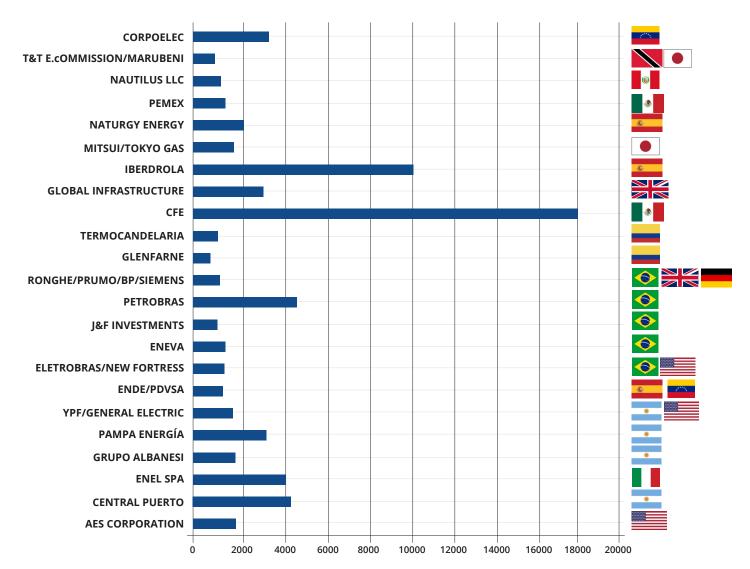
Finally, we observe the participation of private interests in gas transformation into electrical energy. This transformation occurs in gas power plants. Taking the Global Energy Monitor data on Infrastructure, we can observe who owns the most considerable capacity to produce energy from gas, and Graphic 22 shows the panoramic view of this transformation.

The most extensive transformation capacity owner is the SOE in Mexico called Comisión Federal de Electricidad (CFE), with +18,000 MW/h, followed by the private Spanish company Iberdrola with almost 10,000 MW/h. In third place comes Brasilian SOE Petrobras, followed by an Argentinian private company called Central Puerto SA and Italian multinational ENEL SPA.

According to GEM, these 23 companies hold over 76% of the capacity in LAC region to transform gas into electricity. In this group, we can only see 4 SOEs; the rest are national and multinational private capitals. Some of them are joint ventures between SOEs and private companies, as in Bolivia where Venezuelan PDVSA is associated with ENDE as well as in the case of YPF with General Electric in the Argentinian electrical industry

GRAPHIC 22.

GAS POWER PLANT OWNERS



Source: Global Energy Monitor, 2022.

Third Party Actors

INVESTMENT FUNDS

Investment funds are highly relevant in companies operating in the energy sector in Latin America, as they allocate important flows of capital into the projects. Based on their participation in the companies, they can have a certain degree of influence in their decisions. Some of the investment funds that have the most salient presence in the sector are BlackRock. Vanguard Group Inc., the Norwegian government pension fund, Norges Bank Investment Management, Capital Research & Mgmt Co. and the French investment fund Caisse des Dépôts et Consignations, among others.

In South America and the Andean region, private and public-private financing is recurrent. For example, in hydrocarbons, at the end of 2018 Argentina awarded 38 exploration and exploitation blocks in the Austral Marina, Malvinas Oeste and Argentina Norte basins to private companies. The Fortín de Piedra project operated by Techint E & C located in Vaca Muerta, ¹³⁹ a sedimentary formation in the Neuquen basin, is the world's second largest unconventional gas reserve. ¹⁴⁰

In Brazil, the oil companies Shell, Chevron, Exxon Mobil, Qatar Petroleum International, BP international Ltd., China's CNOOC Ltd. and Colombia's Ecopetrol bought the four blocks offered in the fifth Pre-Salt Production Sharing round.

In 2018, Ecuador's Petroamazonas signed contracts reaching a private investment of USD 1,622 million. The state oil company also foresaw a private investment of USD 727 million under the "Integrated Specific Services" contracting, which has contractor financing for the "execution of drilling activities, reactivation and completion of wells and construction and expansion of facilities required for the oil fields". Petroamazonas agreed to pay the contracted company a rate established by the international marker of West Texas Intermediate (WTI) crude oil, which averages USD 60 per barrel.¹⁴¹ Contractors include Schlumberger and Techint.

In Peru, as a result of the law that creates the Hydrocarbon Energy Security System, an Energy Social Inclusion Fund (FISE) has been implemented as a system of energy compensation and provision of residential and vehicular natural gas services focused on vulnerable, rural and urban populations. One of the main companies managing the provision and generation of these services is the Italian company Enel S.p.A.

There has also been a trend towards public-private financing in the Caribbean region. In 2018, the National Gas Company of Trinidad and Tobago Limited established a commercial agreement with Global Petroleum (GPG), a company with operations in Grenada. This contract is part of an agreement between the two countries called the Energy Sector Development Framework Agreement. In the same year, BHP Biliton identified gas fields off the coast of Trinidad and Tobago.

The Dominican Republic has signed production sharing contracts and oil block auctions granting exploration and exploitation rights to private companies. This contract model contains a fiscal scheme approved by the Ministry of Finance and the non-reimbursable financial support of Canadian cooperation.¹⁴²

In Mexico and Central America, financing is similar. For example, in Guatemala, the Las Cumbres wind farm is financed by Transportadora de Energía de Centroamérica S.A. Trecsa, a subsidiary of Grupo Energía de Bogotá. In Mexico, the investment of 429.4 million dollars for the largest photovoltaic plant in the Americas has been assigned under contract to Enel Green Power Mexico. The Mexican Federal Government currently has the Energy and Infrastructure Investment Trusts (FIBRA E) with which it finances brownfield projects, i.e. projects that already have assets in operation. 144

¹³⁹NRGI, "National Oil Company Database", National Oil Company Database, consultado el 28 de octubre de 2022, https://www.nationaloilcompanydata.org/indicator.NRGI.

¹⁴⁰ Ministerio de Economía, "Historia de Vaca Muerta", Argentina.gob.ar, el 27 de agosto de 2018, https://www.argentina.gob.ar/economia/energia/vaca-muerta/historia.Ministerio de Economía.

¹⁴¹OLADE, "Panorama Energético de América Latina y el Caribe. 2019", noviembre de 2019, 12, https://biblioteca.olade.org/opac-tmpl/Documentos/old0433a. pdf.OLADE, 12.

¹⁴² OLADE, 12.

¹⁴³ CENACE, "Subasta Eléctrica de Largo Plazo (SLP-01/2015) Parque Solar Villanueva – Proyectos México", noviembre de 2020, https://www.proyectosmexico.gob.mx/proyecto_inversion/576-cenace-subasta-electrica-de-largo-plazo-parque-solar-villanueva/.CENACE.

¹⁴⁴Banobras, "Financiamiento – Proyectos México", 2022, https://www.proyectosmexico.gob.mx/como-invertir-en-mexico/financiamiento/.Banobras.

DEVELOPMENT BANKS AND INTERNATIONAL INSTITUTIONS

Another financing scheme is through loans and grants from multilateral financial organizations such as the Inter-American Development Bank (IADB) and the World Bank (WB). Such financing may be granted per project or in specific amounts to central governments through pipelines that channel investments; this mechanism is usually used in public-private partnerships.

In its active portfolio for Latin America and the Caribbean, the IADB has 193 non-re-imbursable financing projects and grants (USD 291.6 million); 33 projects financed through sovereign guaranteed loans (USD 5.04 billion), i.e., delivered to governments and government-controlled institutions; 4 projects without sovereign guarantee delivered to the private sector (USD 8.1 million) and in the category of credit lines and programs (USD 1.7 billion).¹⁴⁵

Grants are mainly directed to the sub-sector of "Energy Efficiency and Renewable Energy in End Uses", "Institutional Strengthening and Capacity Building in Energy" and "New Oil and Gas and Extractive Industries". The sub-sectors with the most sovereign guaranteed loans are "Energy Efficiency and Renewable Energy", "Energy Sector Rehabilitation and Efficiency" and "New Electricity Distribution and Transmission Projects". Non-sovereign guaranteed loans are directed to "Energy efficiency and renewable energy end-uses", "Low carbon energy technologies" and "New oil and gas and extractive industries". Finally, the majority of loans are directed to "Institutional strengthening and capacity building", "Energy efficiency and renewable energy end-uses" and "New electricity distribution and transmission projects". 146

The World Bank reports 157 projects in the LAC region: 21 are active, 132 are closed, and four have been dropped. The sub-sectors are "Energy, generation and distribution", "Oil and gas", "Other energy and extractive projects", "Public administration, energy and extractive projects", "Biomass renewable energy", "Geothermal renewable energy", "Hydro renewable energy", "Solar renewable energy" and "Wind renewable energy".

Financing through philanthropic international cooperation funds and intergovernmental organizations is also recurrent. For example: In October 2021, the Rockefeller Foundation, in partnership with the IADB announced the creation of "a financing instrument aimed at expanding energy access, supporting energy transition and protecting the climate in Latin America and the Caribbean". Aother example is the IADB's partnership with the International Renewable Energy Agency (IRENA), which will seek financing for renewable energy projects and energy transition.

Other existing and similar financing mechanisms in the region include the bilateral agreement between the government of Ecuador and the Korean Institute of Development and Technology (KIAT) for constructing a photovoltaic system. Or the Caribbean-Emirati Arab Emirates Renewable Fund (CREF) which granted a solar photovoltaic project in Grenada.¹⁵¹

¹⁴⁵ Inter-American Development Bank, "PERSPECTIVA GENERAL | IADB", 2022, https://www.iadb.org/es/sectores/energia/perspectiva-general.Inter-American Development Bank.

¹⁴⁶ Inter-American Development Bank.

¹⁴⁷ World Bank, "Projects", World Bank, 2022, https://projects.worldbank.org/en/projects-operations/projects-list.World Bank.

⁴⁸ World Bank.

¹⁴⁹ Inter-American Development Bank, "BID y Fundación Rockefeller anuncian alianza en materia de energía | IADB", octubre de 2021, https://www.iadb.org/es/noticias/bid-y-fundacion-rockefeller-anuncian-alianza-en-materia-de-energia.Inter-American Development Bank.

¹⁵⁰ Inter-American Development Bank, "El BID e IRENA impulsan un futuro de energía sostenible en América Latina y el Caribe | IADB", marzo de 2021, https://www.iadb.org/es/noticias/el-bid-e-irena-impulsan-un-futuro-de-energia-sostenible-en-america-latina-y-el-caribe.Inter-American Development Bank.

¹⁵¹ OLADE, "Panorama Energético de América Latina y el Caribe. 2019", 23.OLADE, 23.

FINANCIAL FLOWS

According to Van Hoogstraten, in a previous report published by PODER, the characteristics of financial flows in the energy sector are: 1) the production model implies their depletion; 2) they require a significant investment amount and an extended amortization period and; 3) the resources are public property. Based on the information identified on financing mechanisms and regional investment patterns, the most common financial flows are from the private to the public sector, from the public to the private sector and from the private to the private sector. This categorization does not imply that in all cases an exclusive type of flow is observed; in some cases the flow in an energy project may start between private parties and later have a public partnership or alliance.

In flows from the private sector to the public sector, private companies participate in all phases of the operation of a business,¹⁵³ for example with the purchase of oil blocks in Brazil or the acquisition of Chinese and the US companies to develop renewable energy projects. They can also be financing for development with non-commercial objectives, as in the case of international cooperation grants or IADB donations and loans.

In flows from the public to the private sector, alliances or associations in which both capitals are combined and rights over public resources or assets are transferred to the operating company are recurrent. Some examples are auctions and project awards in Mexico or the contract for Specific Integrated Services, with which Petroamazonas pays Schlumberger and Techint a tax per barrel of oil.

In the third case, assets flow between two or more private actors, through contractual payments for goods and services, equity investments, the sale of securities between companies, or the acquisition of debt with a bank.¹⁵⁴

Finally, it is important to mention the existence of illicit flows in the energy sector involving the circulation of money in contravention of local legislation, for example tax evasion, corruption or criminal activities. There are also other activities that are not illegal but might be ethically questionable as they also affect the public interest to the benefit of the private sector.¹⁵⁵

In Colombia bribery practices have been denounced in the hydrocarbons sector with the purpose of contractually benefiting companies, as well as patterns of laxity within the companies to counteract it.¹⁵⁶ In Mexico, the Tax Administration Service (SAT) has condoned tax debts to companies in the energy sector. Generally, a pattern of opacity when trying to access information on project contracts in the sector has been denounced.¹⁵⁷ Another severe aspect is the recurrence of energy and hydrocarbon companies in the systematic violation of human and environmental rights.

¹⁵²van Hoogstraten, Julia, "Marco Teórico para Flujos Financieros en el sector extractivo", junio de 2015, 6, https://poderlatam.org/wp-content/uploads/2020/02/Marco Teórico Plujos Financieros.pdf.van Hoogstraten, Julia, 6.

¹⁵³ van Hoogstraten, Julia, "Marco Teórico para Flujos Financieros en el sector extractivo".van Hoogstraten, Julia.

¹⁵⁴van Hoogstraten, Julia, 7.

¹⁵⁵ van Hoogstraten, Julia, 20.

¹⁵⁶ Corporación Transparencia por Colombia, "Estudio sobre practicas para contrarrestar el soborno en un grupo de empresas del sector hidrocarburos", noviembre de 2013, https://transparenciacolombia.org.co/Documentos/Publicaciones/empresa-mercado/ESTUDIO_SOBRE_SOBORNO_EN_EL_SECTOR_DE_HIDROCRABUROS.pdf.Corporación Transparencia por Colombia.

¹⁵⁷ Ocaranza, Claudia, "SAT Condonó Casi 41 Mil Millones de Pesos a 41 Empresas", PODER, octubre de 2019, https://poderlatam.org/en/2019/10/sat-condono-casi-41-mil-millones-de-pesos-a-41-empresas/.Ocaranza, Claudia.

As an example, there is the case of the Cerrejón coal exploitation project in Colombia, carried out without community consent and in which the companies BHP, Anglo American plc, and Glencore are linked to the forced displacement of indigenous communities. Other examples are the assassination of social leaders who opposed hydroelectric projects in Honduras and the concession of water to hydroelectric projects in Chile affected public and community water supply. 158

According to the Latin American Strategic Center for Geopolitics (CELAG), the Latin American energy market has a geostrategic character for North American and Chinese investments. Specifically the infrastructure sector, which is estimated to be worth USD 829 billion, backed by approximately 6% of the regional GDP.¹⁵⁹

According to CELAG, most of the private capital for infrastructure has come from banks: Santander with USD 12 billion between 2012 and 2017 and; BBVA with USD 2 billion during the same period. It is worth mentioning that BlackRock, the mega asset manager is one of Santander's main shareholders along with State Street Bank, The Bank of New York Mellon Corporation, Chase Nominees Limited, EC Nominees Limited, BNP Paribas and Caceis Bank.¹⁶⁰

At the regional level, we find financial institutions such as the Development Bank of Latin America (CAF), which in the last year has financed the sector for an amount of USD 4.4 billion, representing 15.6% of its investment portfolio. In 2020, CAF funded 13 energy projects, of which 6 were for electricity transmission (USD 903 million), 3 for gas transportation (USD 429 million); and 4 for electricity generation (USD 808 million). This bank has promoted training activities on energy integration and service efficiency. Its focus is very much associated with the electricity supply services issues but it is also promoting regional energy integration studies in Argentina, Panama, Colombia, Paraguay, Brazil, Chile and Mexico with the Interoceanic Corridor of the Isthmus of Tehuantepec. 162

Although there are traditional investors in the Latin American energy financial markets, in the last 25 years, the presence of Asian capital has deepened and accelerated. According to calculations by the Inter-American Development Bank (IADB), between 1990 and 2013 Chinese investments increased from USD 4.5 million to USD 613.6 million worldwide. In the case of Latin America, China has boosted its investments through three funds: 1) the Industrial Investment and Cooperation Fund (CLAI) with USD 30 billion; the China-LAC Cooperation Fund (CLAC) with an estimated USD 10 billion and; the Special Program for China-Latin America Infrastructure whose purse amounts to USD 20 billion. According to China's Ministry of Commerce, the countries that most attract Chinese investment are Brazil, Venezuela, Argentina, Jamaica, Peru and Mexico.

¹⁵⁸ Dora, Arias, "Utilidad privada, despojo público", octubre de 2021, https://semillas.org.co/apc-aa-files/5d99b14191c59782eab3da99d8f95126/informe-regional-utilidad-privada-despojo-publico.pdf.Dora, Arias.

¹⁵⁹ Romano, Silvina y García, Aníbal, "EE. UU. y la disputa por la infraestructura en América Latina", CELAG (blog), el 25 de mayo de 2019, https://www.celag.org/eeuu-y-la-disputa-por-la-infraestructura-en-america-latina/.Romano, Silvina y García, Aníbal.

¹⁶⁰ Banco Santander, S.A., "Annual Report", diciembre de 2020, https://www.rns-pdf.londonstockexchange.com/rns/2068X_1-2021-4-30.pdf.Banco Santander, S.A.

¹⁶¹ CAF, Informe Anual CAF 2020 (CAF, 2021), 99, https://cafscioteca.azurewebsites.net/handle/123456789/1707.CAF, 99.

⁶² CAF, 83

¹⁶³ Espinasa, Ramón, Marchán, Estefanía, y Sucre, Carlos, "Financiando la nueva ruta de la seda: Inversion asiática en los sectores energético y minero de América Latina y el Caribe", julio de 2015, https://publications.iadb.org/publications/spanish/document/Financiando-la-nueva-ruta-de-la-seda-Inversion-asi%-C3%A1tica-en-los-sectores-energ%C3%A9tico-y-minero-de-Am%C3%A9rica-Latina-y-el-Caribe.pdf.Espinasa, Ramón, Marchán, Estefanía, y Sucre, Carlos.

¹⁶⁴ Ding Ding Zhou Fabio Di Vittorio, Ana Lariau, Yue, "Chinese Investment in Latin America: Sectoral Complementarity and the Impact of China's Rebalancing", IMF, 1, https://www.imf.org/en/Publications/WP/Issues/2021/06/07/Chinese-Investment-in-Latin-America-Sectoral-Complementarity-and-the-Impact-of-Chinas-50217.

Since 2005, the IADB has identified the energy sector as the main target for Chinese investment. Oil companies such as China National Petroleum Corporation (CNPC), China Petroleum & Chemical Corporation (Sinopec), China National Offshore Oil Corporation (CNOOC) and the Sinochem Group have invested nearly 70% of Asian investments in the sector.¹⁶⁵

Corporate Capture of the State in Gas Industry

As we can see in previews chapters of this paper, the presence of corporations in the LAC region depend on how strong and articulated are the SOEs. In the case of Brazil, Mexico and Venezuela, we can observe a centralized participation of SOEs over reserves, transport and capacity transformation. In other national contexts, where gas reserves and oil are low, we observe a stronger participation of multinational corporations. And, in some other contexts where SOEs experienced privatization processes under the neoliberal period, we observe the participation of national private companies, especially in the rest of the value chain.

Based on the above, we can foresee that in the coming years there will be, on the one hand, an attempt by some countries such as Mexico, Venezuela and Argentina, to maintain some control of the energy sector through their SOEs. On the other hand, countries with governments more in favor of business groups could advance in the privatization of the energy and electricity sector, as it has been happening in the cases of Ecuador and Brazil.

In this regard, it is important to note that there are risks in both schemes. A sector that is completely open to the private initiative risks being subjected to private interests over the public interest, respect for human rights and workers' rights: what many experts, including analysts from the World Bank (WB) have called corporate capture of the State (CCS). 166 CCS occurs through different mechanisms, including: lobbying, that is, the influence that business groups exert in the design of regulatory frameworks to obtain advantages; revolving door practices, which occur when company high level personnel become public servants within regulatory bodies , which allows them to access privileged information on how, to obtain concessions, permits, technical environmental and social studies, among others. In addition, the financing of electoral campaigns to allow some people who are aligned with the interests of the company or the corporate group to gain access to elected office in order to benefit from this relationship, and in some cases even bribery and corruption at different levels of government. 167

According to Hellman and Kaufmann, once a country has fallen into a state capture economy, foreign direct investment can exacerbate the problem. In high capture economies, for some types of foreign investors - those with partners and headquarters within the transition country - the likelihood of engaging in state capture activities is almost twice as high as for domestic firms. Whether through the unbridled influence of the business sectors granted to them by neoliberal policies, or through the cooptation of the institutions and bodies in charge of directing public policy, the role of workers, affected communities and civil society organizations will be fundamental in the sector's transition.

¹⁶⁵ Espinasa, Ramón, Marchán, Estefanía, y Sucre, Carlos, "Financiando la nueva ruta de la seda: Inversion asiática en los sectores energético y minero de América Latina y el Caribe", 3.Espinasa, Ramón, Marchán, Estefanía, y Sucre, Carlos, "Financiando la nueva ruta de la seda: Inversion asiática en los sectores energético y minero de América Latina y el Caribe", 3.Espinasa, Ramón, Marchán, Estefanía, y Sucre, Carlos, 3.

¹⁶⁶ Hellman, Joel y Kaufmann, Daniel, "La captura del Estado en las economías en transición", septiembre de 2001, https://www.imf.org/external/pubs/ft/fandd/spa/2001/09/pdf/hellman.pdf.

¹⁶⁷ Francisco Durand, "La captura corporativa del Estado en América Latina", 2019.

¹⁶⁸ Hellman, Joel y Kaufmann, Daniel, "La captura del Estado en las economías en transición", 33.

In 2021, Global Witness and other NGO's documented 503 fossil fuel lobbyist's participating in the UN Climate Change Conference (COP26). On this analysis, almost 100 oil and gas companies were represent in the negotiations with 27 country delegations. 169

According to Open Secrets, in Q1 of this year, the budgets for lobbying of the major oil & gas companies are bigger than last year. The top lobbying companies are Koch Industries (USD 3.3 million), Occidental Petroleum (USD 2.8 million), Exxon Mobil (USD 2.1 million), Chevron (USD 1.9 million), Shell (USD 1.3 million) and, the American Petroleum Institute (USD 1.2 million). These companies are concerned about President Biden's gas leasing restriction policies and export facilities to supply Europe in the middle of the war in Ukraine. A staff memo from the Chairperson of the Committee on Oversight and Reform in the US Congress says the four major oil and gas companies spent USD 374.7 million to ask for lower taxes instead of Paris Agreement or carbon pricing standards. This companies use 40 lobbyists per year and have filed 1,670 lobbying reports of which 938 were on tax reforms. The property of the companies of the companies of the companies of the companies use 40 lobbyists per year and have filed 1,670 lobbying reports of which 938 were on tax reforms.

The war in Ukraine is putting the LAC gas markets on the spot as potential suppliers for Europe and Asia. In this context, multinational companies can increase their investments to develop infrastructure and exploration assets.

In the LAC region, national climate policies are crucial for public and private interests. The implementation of the Escazú Agreement is under way in twelve countries and it represents a big opportunity in terms of environmental rights and corporate accountability. This is a binding instrument and it has faced a strong opposition from the business community; for example, the Centro Democrático in Colombia send a letter to president Duque to reject the ratification of the Agreement in September 2020.¹⁷²

In countries were SOEs have a central role in the energy sector, like Brazil and Mexico, the business associations are keen to open up private participation on the value chain. In Mexico, the legal reforms on energy sector to centralize the electric market unleashed reactions on different sectors like the Business Coordinating Council (CCE);¹⁷³ and the U.S. government who expressed its concerns on restrictions against U.S. private companies on electric energy production.¹⁷⁴

Along with corruption scandals, weak institutions and constrains to the civic space, the corporate capture in the energy sector should be a permanent issue in the agenda of civil society.

¹⁶⁹ Global Witness, "Flooding the Zone: Hundreds of Fossil Fuel Lobbyists Granted Access to COP26", Global Witness, noviembre de 2021, https:///en/campaigns/fossil-gas/flooding-zone-hundreds-fossil-fuel-lobbyists-granted-access-cop26/.

¹⁷⁰ Open Secrets, "Top Oil and Gas Companies Increase Lobbying Spending amid Global Energy Crisis", OpenSecrets News, el 21 de abril de 2022, https://www.opensecrets.org/news/2022/04/top-oil-gas-companies-increase-lobbying-spending-amid-global-energy-crisis/.

¹⁷¹ Maloney, Carolyn, "Analysis of the Fossil Fuel Industrys Legislative Lobbying and Capital Expenditures Related to Climate Change - Staff Memo (10.28.21). pdf", octubre de 2021, https://oversight.house.gov/sites/democrats.oversight.house.gov/files/Analysis%20of%20the%20Fossil%20Fuel%20Industrys%20Legislative%20Lobbying%20and%20Capital%20Expenditures%20Related%20to%20Climate%20Change%20-%20Staff%20Memo%20%2810.28.21%29.pdf.

¹⁷² Fedegan, "Consejo Gremial pide al Congreso no ratificar el Acuerdo de Escazú | Fedegán", septiembre de 2020, https://www.fedegan.org.co/noticias/consejo-gremial-pide-al-congreso-no-ratificar-el-acuerdo-de-escazu.

¹⁷³ Reuters, "Mexican Energy Changes Hurt Jobs, Investment - Business Lobby", Reuters, el 23 de abril de 2021, sec. Energy, https://www.reuters.com/business/energy/mexican-energy-changes-hurt-jobs-investment-business-lobby-2021-04-23/.

¹⁷⁴ U. S. Mission to Mexico, "Statement from Ambassador Salazar on Mexican Supreme Court Decision on Electricity Industry Law", U.S. Embassy & Consulates in Mexico, el 8 de abril de 2022, https://mx.usembassy.gov/statement-from-ambassador-salazar-on-mexican-supreme-court-decision-on-electricity-industry-law/.

CONCLUSIONS AND RECOMMENDATIONS

- The energy matrix in Latin America is still highly dependent on hydrocarbons, particularly oil and gas. The use of coal has been reduced, but there has been an increase in the consumption of natural gas. Gas has been considered a "bridge" fuel in the energy transition processes in the region.
- The consumption of natural gas is primarily oriented towards the generation of electricity. It has been considered a means to ensure the continuity of its supply under the assumption that it produces fewer carbon emissions than other fuels. To this end, combined cycle thermoelectric power plants have increased to replace coal and fuel oil. Combined cycle power plants have also strengthened electricity systems in countries dependent on hydroelectric power that have been affected by severe droughts, such as Colombia, Brazil, and Argentina.
- Despite the positive publicity about the benefits of natural gas in the context of the energy transition, governments must generate adequate information on the impacts of the use of natural gas on the environment. Governments must also ensure the highest human rights standards throughout the natural gas supply chain.
- The flaring and venting of natural gas have severe effects on CO2 emissions and methane release, which calls into question whether natural gas can be treated as a bridge fuel for the energy transition. Generating information that lets us know the actual impacts of natural gas exploration, extraction, and processing is essential.
- The increase in natural gas consumption has been accompanied by significant deposits
 of this fuel and the construction of the necessary infrastructure for its industrial, commercial, and domestic use. However, with the reduction of its reserves, production will
 be affected, generating a greater dependence on imports of this hydrocarbon and the
 exploitation of non-conventional sources.
- In general, there has been an increase in natural gas imports from the United States and an increase in the export potential of countries such as Bolivia, Argentina, Trinidad and Tobago and Venezuela.
- Various initiatives to exploit unconventional sources of natural gas are being promoted despite the well-known devastating impacts on water sources and the environment.
 More transparency is needed to better understand the projects using hydraulic fracturing (fracking) for exploration and exploitation of natural gas in the region.
- Although the use of renewable energies such as solar and wind energy has increased, it
 is still much lower than hydrocarbon-based energy. Although the region's high potential
 for using this type of energy has been pointed out, there are limitations to storing the
 energy produced and providing continuity in the energy supply from these sources. It is
 also critical to review the feasibility of this initiative to be adapted to the reality of each
 country.

- Gas, unlike oil, has a regulation that is more open to private initiatives. This generates important risks for private interests to prevail over the public interest. It is, therefore, necessary to strengthen the role of industry workers, affected communities and civil society organizations, which need access to timely information and adequate information on the subject. This will be essential to strengthen public debate, transparency and accountability regarding the energy transition and the role of hydrocarbons. Broad sectors of society should be included in this debate and not only specialists from companies and governments, as it is currently happening.
- It is necesarry to recognize that non-renewable resources such as gas and oil are running out. Therefore, a mercantile logic should not prevail to exploit these sources with non-conventional methods, but rather the environmental, social, and human rights impacts should be highly considered.
- This also implies discussing what kind of transition is required in our countries, not only
 from the voice of specialists but also from civil society, affected communities, working
 people, and people who have been excluded from this debate.
- Increased dependence on natural gas imports has generated greater vulnerability to price shocks, as occurred with the war in Ukraine. This implies greater competition for imports to Europe and Asia.
- Gas pipeline networks have been extended across the continent, favoring national and regional transportation. However, this type of infrastructure are in risk of becoming stranded assets, as renewable energies become more important in the continent's energy mixes. Only some initiatives are bound to employ such infrastructure, which is generally built through public-private partnerships to the detriment of the public budget.
- The pandemic had a very significant impact in the economies in the region, but the gas industry was less affected. Although gas consumption was reduced at the industrial level, it increased at the domestic level. Likewise, production and transportation contracts were not affected, as they are take-or-pay contracts.
- The war in Ukraine has indirectly impacted gas prices in the continent. This may favor exporting countries such as Bolivia, Trinidad and Tobago, and Peru. Nevertheless, it can adversely affect countries dependent on natural gas imports, such as Mexico, Brazil, and Argentina.
- As a result of the increase in international gas prices due to the war in Ukraine, the
 energy transition may be boosted in countries that do not have gas sources. However,
 it may also be delayed in those countries that depend on gas and can strengthen their
 production by taking advantage of the incentives generated by the increase in prices and
 tax revenues.
- It is necessary to consider private and state-owned companies, which are central players in the gas industry in the region. While SOEs own the gas in the LAC region, multinational companies control the production and commercialization hubs of the gas value chain.

- Twenty-three companies (SOEs and private companies) have control over 76% of Gas Power Plants in the LAC region. 4 are SOEs with direct control, and private multinational and national capitals own the rest.
- The national contexts regarding the oil and gas industries directly impact the participation of private companies in gas resources and management. Those countries with rich reserves usually have stronger SOEs and legal frameworks to centralize State participation over resources and profits. Those countries with less infrastructure and which have a stronger presence of multinational corporations, have an enhanced risk of Corporate Capture.
- SOEs in the region have been experiencing economic crises for the last two decades. This trend gives multinational and national companies opportunities to invest and participate in secondary links of the value chain.

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ANNEX I.

Gas pipelines to and from Mexico, Colombia, Venezuela, Trinidad and Tobago, Brazil and Argentina 2022.

Available here: https://share.mayfirst.org/s/axXQSppNTDQRM6T

ANNEX II.

Legal Framework and Institutional Arrangements in the Gas Industry



ADEQUACY OF THE REGULATORY FRAMEWORK

1995:

- Opening to foreign capital of gas transportation, storage, distribution, export, import and commercialization activities
- CRE is transformed to supervise and regulate liberalized activities
- PEMEX: retained exclusivity in exploration, production and first-hand sales

2004:

 Mechanisms were generated for the private sector to participate in the exploration and extraction of hydrocarbons.

2013-2014:

- Constitutional changes are made to open up oil and gas exploration and production activities
- Regulatory adjustments were made to accelerate downstream competition.
- Five-year plans for infrastructure expansion are implemented.
- New powers are established for the National Hydrocarbons Commission (CNH), the Energy Regulatory Commission (CRE) and the Ministry of Energy.
- The Agency for Safety, Energy and Environment (ASEA) is created".

Formulation of Specific Policies:

Development of the natural gas market (2016)

- Strategic and operational storage (2018)
- Creation of the Energy Sector Regulators System (CNH, the CRE and the ASEA)

INSTITUTIONS

Exploration, Production and Processing: PEMEX

Regulatory Authorities:

National Hydrocarbons Commission (CNH) and the Energy Regulatory Commission (CRE).

Technical/Administrative Authorities:

Ministry of Energy

Transportation:

Sistema de Transporte y Almacenamiento Nacional Integrado de Gas Natural (Sistrangas) Managed by Centro Nacional de Control del Gas Natural (CENAGAS).

¹⁷⁵ Source: (Estrada et al., 2022)

Current Government:

 Rescue of state-owned Pemex and CFE, without an explicit policy on natural gas.



Constitution of 1991

- Art. 332 establishes that: "The State is the owner of the subsoil and non-renewable natural resources, without prejudice to the rights acquired and perfected in accordance with pre-existing laws".
- Intervention of private companies is allowed throughoncessions
- Art 361.Fondo Nacional de Regalías (FNR)
- The model of free competition is introduced in the provision of public services in which the participation of private parties is allowed to provide public services who enter into competition with state companies. A model of organized competition is established.
- It does not have a general gas law. Its regulation is contained in two norms: 1) Law 401 of 1997 established that its regulation as a fuel will be subject to the domiciliary public services regime 2) for exploration and production it is regulated through the Petroleum Code, Legislative Decree 1056 of 1953, its complementary norms.

1994

Law 142, which establishes the legal framework for public utilities, where natural gas is incorporated as a public utility. The activities that define it as a service (transportation, distribution and commercialization), the need to create a transportation system independent of producers, marketers, distributors and the creation of the CREG

2003

 The ANH is created and Ecopetrol is transformed into a public joint stock company linked to the Ministry of Mines and Energy

2015

Sole Regulatory Decree of the Administrative Sector of Mines and Energy, which brings together the rules that were scattered and includes provisions on natural gas.

State-owned company for exploration, production, refining and marketing:
Ecopetrol. In 2003 it became a public company by shares, linked to the Ministry of Mines and Energy

Regulatory Authorities:

Superintendencia de Servicios Públicos Domiciliarios (Downstream)

- Comisión de Regulación de Energía Eléctrica y Gas (CREG) In charge of regulating electricity and gas services as established in Law 142 and 143 of 1994. It was created to regulate the activities of public utilities. (Downstream)
- Agencia Nacional de Hidrocarburos (ANH). Responsible for the administration of the nation's oil resources and the allocation of hydrocarbon areas for exploration and exploitation.collects the royalties and monetary compensations that correspond to the State and distributes them to the entities that have rights over them in accordance with the legal provisions. (Upstream)

Technical-Administrative Authorities:

- Ministry of Mines and Energy.charge of formulating and implementing public policy on energy matters
- Unidad de Planeación Minero Energética (UPME)

Belongs to the Ministry of Mines and Energy. It focuses on coordinated planning with public and private entities of the mining and energy sector, the development and use of energy and mining resources and the production and dissemination of the required mining and energy information.

Environmental Authorities:

- Ministry of the Environment
- National Environmental Licensing Authority.
 Authority that grants environmental licenses for the development of activities that affect renewable natural resources

Natural gas market manager:

The CREG delegates the function of managing the commercialization and information mechanisms by means of a bidding process. In 2014, the Bolsa Mercantil de Colombia was selected as the entity that continues to perform this task.



1992

Downstream

- Natural Gas Regulatory Framework (MRG) approved by Law
- 24076. Regulation of natural gas transportation and distribution activities, which are classified as public utilities. It establishes that "the transportation and distribution of natural gas

State-Owned Company

 Yacimientos Petrolíferos Fiscales (YPF), which before 1992 was in charge of the upstream, was privatized in 1999 and is currently a mixed company, in which the Argentine State owns 51

¹⁷⁶ Source: (Kozulj, 2000)

must be carried out by private legal entities authorized by the Executive Branch through licenses, concessions or permits" (Kozulj, 2000)

- · Creation of ENARGAS.
- Regulatory limitations to vertical integration, but in practice it does occur (Kozulj, 2000).

1993

 Gas del Estado is privatized and subdivided into ten companies, two transporters and eight distributors (Kozuli, 2000).

Upstream

Hydrocarbons Law No. 17 319 and its amendments aimed at oil deregulation (Decrees No. 1 055, No. 1 212 and No. 1 589 of 1989 and Law No. 24 145 of 1992, for the federalization of hydrocarbons and privatization of YPF)

1994

 The constitution is amended to state that "the provinces have the original domain of the natural resources existing in their territory".

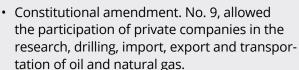
1999

YPF is acquired by Repsol and becomes Repsol-YPF

2012

· YPF is nationalized

1995



1997

- Law No. 9478. Allows the association of Petrobras with private companies
- The National Petroleum Agency (ANP) is created to manage NG exploration and production rights
- In transportation Petrobras is a partner of Transportadora Brasileira de Gas (TBG)
- Creation of the Energy Policy Council (CNPE)

1999

 Privatization of Distribution: Distribution concessions to private capital companies to import NG from Bolivia. % of the shares and the remaining 49 % is listed on the Buenos Aires and New York Stock Exchanges.

Transportation and distribution of natural gas through networks:

 Ente Nacional Regulador del Gas (ENARGAS). downstream

Technical-administrative authorities:

Secretary of Energy

Semi-public oil company:

 Petrobras: Mixed-ownership company with private foreign participation

Regulatory Agencies

National Petroleum Agency (ANP): Responsible for granting exploration and production concessions and licenses, authorizing transportation and import activities and establishing criteria for gas tariffs

Technical-administrative authorities:

 Ministry of Mines and Energy.

¹⁷⁶ Source: (Kozulj, 2004)



1999

- Opens the sector to foreign investment in exploration and production, distribution, transmission or commercialization
- Gas Law: Decree No. 310 of 1999

Associated Gas: Organic Hydrocarbons Law (2006)

- Initial exploration, extraction, collection, transportation and storage (primary activities) are reserved to the State.
- Refining and marketing activities and may include carried out by the State and private parties, jointly or separately. Private parties must have a license from the Ministry of Energy and Petroleum.
- Ministry of Energy and Petroleum will delimit the geographic areas where the operating companies(state or mixed) will carry out the primary activities.

Non-associated gas: a Ley Orgánica de Hidrocarburos Gaseosos (Decree 310 of 1999)

- Exploration activities in search of non-associated gaseous hydrocarbon deposits and the exploitation of such deposits, as well as the collection, storage and utilization of non-associated natural gas resulting from such exploitation, as well as gas produced in association with oil or other fossil fuels; the processing, industrialization, transportation, distribution, domestic and foreign trade of such gases, may be carried out by the State directly or through entities owned by the State or by private national or foreign persons, with or without the participation of the State.
- The transportation and distribution of hydrocarbon gases for collective consumption constitute a public service.

State-owned company:

- Petróleos de Venezuela, SA (PDVSA): is a state-owned company engaged in the exploitation, production, refining, marketing and transportation of oil and gas, as well as petrochemicals and coal. -
- PDVSA Gas S.A., through its subsidiaries PDVSA Gas Comunal (LPG) and PDVSA Gas (Methane), is responsible for the distribution and commercialization systems of methane gas and liquefied petroleum gas (LPG)

Technical-administrative authorities

Ministry of Popular
 Power for Petroleum and
 Mining: It is the gover nmental institution in
 charge of the regulation,
 formulation and follow
 up of policies, planning,
 execution and supervi sion of hydrocarbons and
 mining in general.



 The ownership of natural gas reserves is vested in the state, which issues licences to explore for and to produce natural gas.

1969

 "The petroleum industry is governed primarily by the Petroleum Act (the Act) and the PetroThe Ministry of Energy and Energy Industries (MEEI): is responsible for the overall management of the oil, gas and mineral sectors in Trinidad and Toba-

go. It is also responsible for

¹⁷⁷ Source (Furness-Smith et al., 2021)15

leum Regulations (the Regulations). Together, they address the grant of exploration and production licences (E&P licences) and production sharing contracts (PSCs) for upstream onshore or offshore exploration and production and several other petroleum operations...The Act and the Regulations do not address specific gas-related issues, nor do they address unconventional petroleum exploration (such as fracking or shale gas). As a result, specific gas-related issues are normally dealt with by more detailed provisions included in the relevant PSC or E&P licence."

2000

 A certificate of environmental clearance (CEC), issued under the Environmental Management Act 2000, must be obtained for the carrying out of natural gas exploration and production activities. monitoring, controlling and regulating the energy and mineral sectors of Trinidad and Tobago (which includes the monitoring of drilling and production activities).

National Gas Company of Trinidad and Tobago (NGC): Monopolizes the purchase, transportation and sale of natural gas produced by upstream producers for resale to local downstream natural gasbased industries (excluding

the LNG industry)

 The Ministry of Energy and Energy Industries (MEEI), the NGC and the National Energy Corporation of Trinidad and Tobago Ltd (NEC) set the government's policy regarding the utilisation of the natural gas resources, which is targeted at the domestic market in the first instance and then on exports.







