



Annual Investment Report 2021

Climate Investment in Latin America

Sectoral policies for scaling
up low-carbon investments
in Argentina, Brazil and Peru
– Analysis of a dynamic
and ongoing process

October 2021

NEW
CLIMATE
INSTITUTE

Climate Investment in Latin America

Sectoral policies for scaling up low-carbon investments in Argentina, Brazil and Peru – Analysis of a dynamic and ongoing process

Authors:

Lukas Kahlen, Mia Moisio, Julie Emmrich, Markus Hagemann, Frauke Roeser.

Contact:

l.kahlen@newclimate.org

Acknowledgement:

The compilation of this report was supported with discussion and inputs from a number of practitioners and experts. We are particularly grateful for inputs from Hernán Carlino (Fundación Torcuato di Tella), Max Horstink and Rocío García (SouthSouthNorth), Camila Yamahaki (Fundação Getúlio Vargas), Veronica Hector, Gustavo De Vivero, Katharina Luetkehermoeller, Leonardo Nascimento and Sofia Gonzales-Zuñiga (all NewClimate Institute).

Design & Layout:

Libélula

This report was funded by the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) supports this initiative based on a decision adopted by the German Bundestag.



Federal Ministry
for the Environment, Nature
and Nuclear Safety



Summary Report

To strengthen the global response to climate change and to limit global temperature increase to below 1.5°C above pre-industrial levels, as agreed under the Paris Agreement, global CO₂ emissions need to fall to net zero by 2050, with other greenhouse gases on a similar trajectory shortly thereafter.

Achieving this goal requires a significant increase in low-carbon investments across all sectors of the economy, to initiate and sustain a rapid and unprecedented transformation of our economies and societies. In addition to unlocking and mobilising increased investments, it is important to shift investments from climate-damaging technologies and activities to climate-friendly alternatives. The message from science is clear: investments in new fossil fuel projects must end in order to maintain the temperature increase within

globally agreed limits to avoid catastrophic climate change. Electricity generation needs to be rapidly decarbonised and coupled with an electrification of end-use sectors, such as buildings, industry and transport. Net deforestation must be drastically reduced, and the emissions intensity of agricultural production needs to decline.

Following the agreed principle of common but differentiated responsibilities and respective capabilities, developed countries must provide significant technical and financial support (through capacity building and climate finance) to developing countries for them to achieve decarbonisation pathways similar to, or at least not significantly slower, than those of industrialised countries. To date, developed countries, however, have not complied with their commitments to lead climate

action and to make available adequate amounts of international public finance. Apart from ensuring that sufficient international climate finance is made available by developed countries, it is also essential to foster favourable conditions and absorption capacity in the recipient countries to catalyse public and private finance for the implementation of climate adaptation and mitigation activities.

There are a broad range of factors that determine the investment climate in a country and/or sector. This report, the first in a series of three, builds on the assumption that a long-term vision in line with the Paris Agreement, underpinned by a comprehensive policy framework and incentives, is crucial to provide investors with the planning certainty to mobilise private capital. The report therefore focuses primarily on the policy landscape using a standardised framework that includes a set of good practice policies at sectoral and national levels that have been successful in triggering sectoral transformations. This framework is used to analyse the policy landscape in the report's focus countries of Argentina, Brazil and Peru. While this approach facilitates a standardised assessment of the maturity of the policy landscape within the focus countries, it is also important to emphasize that the specific country context and development challenges in each country may influence the efforts of governments and other stakeholders to promote ambitious sectoral policies and initiatives for climate action. The report incorporates findings from the Latin American and the Caribbean (LAC) region to complement the analyses. It also provides a brief description of the current general investment environment and analyses factors that influence international climate finance flows.

As a region highly vulnerable to the impacts of climate change, Latin American countries have demonstrated their commitment to the goals of the Paris Agreement to reduce global greenhouse gas emissions. Most of the countries have formulated and updated NDCs and are working towards their mitigation and adaptation goals.

With respect to decarbonisation pathways, the LAC region has some key advantages over other regions. Its abundance of renewable energy resources, for instance, can not only support the energy sector transition but also facilitate the move towards decarbonisation across end-use sectors. Latin America is also home to around a third of the world's forests, half of the tropical forests and one fourth of mangroves, which act as major carbon sinks as well as biodiversity assets.

On the other hand, the region faces significant challenges to decarbonise. These include economic, political and social challenges to varying degrees in the region. The COVID-19 pandemic has hit the region hard, with some countries reporting an economic contraction of over 10% in 2020, which has exacerbated existing challenges, including an increase in poverty and income inequality in a region already the most unequal in the world before the pandemic.

Consequently, it is paramount to make sure that the transition to a zero emissions society is inclusive and aligned with the Sustainable Development Goals. The task in the coming years and decades, to which both the public and the private sectors must contribute, will be to stabilise and significantly reduce emissions while ensuring social and economic development.

The scale of investments needed can only be achieved through concerted actions of -and collaboration between- governments and the private sector as neither can shoulder or drive this alone. An enabling policy framework that fosters innovation, reduces risks and increases incentives to investment as well as disincentivises high carbon activities is crucial for the transformation. This is the main subject of this report, which in its first edition takes an economy wide and hence broader perspective. Future editions of the series will focus on investment conditions and opportunities that have the potential for transformational change to net zero emissions in specific sectors.

The Summary Report is divided into two main sections followed by concluding remarks. First, information on the status quo of low-carbon investments at the sector is presented. The second section provides, for each of the three focus countries, information on the general investment environment, the policy landscape and factors that influence climate finance. For the full detailed analysis please refer to the main report.



Low-carbon investments and key sector trends



Economy-wide

The region presents significant investment opportunities associated with abundant renewable energy sources and a need to drive sustainable agriculture and land use practices. While economic pressure to continue high carbon activities continues, it is important to highlight the transition risks associated with these investments as well as the positive impacts of low carbon development, including for example the potential creation of 15 million net jobs by 2030 as global research shows.

The emissions structure in the LAC region is very different compared to global emissions (Figure A). The agriculture, forestry, and other land use (AFOLU) sector plays a major role in the LAC region, whereas energy is the dominant source of GHG emissions at a global level. This is partly due to the power sector having a lower emissions intensity level in the LAC region, as a result of vast hydropower resources (now threatened by climate change), but also due to the important role of agriculture as the LAC region is one of the main exporters of agricultural products globally.

In particular the livestock sector is a major driver of emissions, contributing to high levels of deforestation in some countries.

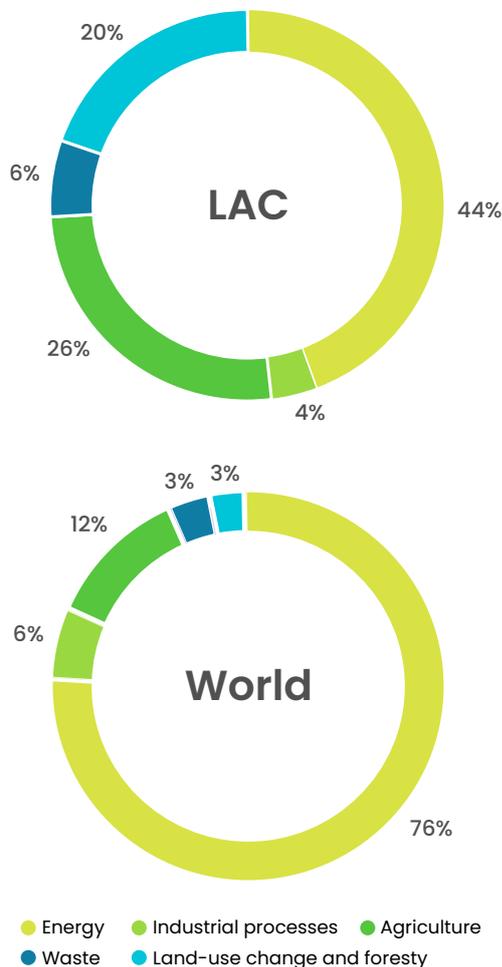


Figure A: Share of emissions across sectors in Latin America and the Caribbean and the world in 2018 (WRI, 2021)

There are a number of low carbon investment opportunities in the region. Many countries are endowed with abundant renewable energy resources, including wind and solar as well as hydropower and bioenergy. The high renewable energy availability and other enabling resources, including lithium for battery production for example, also create opportunities for an integrated energy transition in the power, transport, buildings, and parts of the industry sectors. This, combined with the vast potential for carbon sinks in the AFOLU sector, could enable decarbonisation across the region. On the other hand, the LAC region is also home to vast fossil fuel reserves, particularly oil and natural gas. Increasing energy consumption and the need for export revenues could put additional pressure

on exploiting these resources, albeit under Paris-compatible scenarios investment into new production of fossil fuels must be phased out.



Power

Latin America has one of the world's lowest emissions intensities in the electricity sector. In a context of rising demand, the challenge will be to ensure that new investments support further decarbonisation, as power-related emissions need to decrease to zero before other, harder to abate, sectors.

In Latin America, the power sector is less emissions-intensive than in many other parts of the world, due to a large share of renewable energy (particularly hydropower) and a relatively low share of coal. Natural gas also plays an important role, making up around a fifth of electricity production, and to a lesser extent, oil.

Electricity demand is expected to grow significantly over the coming decades. This presents an important opportunity for new investments, but also a challenge to increase capacity while continuing to decrease the emissions intensity of the sector. While part of this increase is expected to come from renewable energy, major investments are also planned in conventional technologies and thermal power plants.

Investments in renewable energy systems have grown considerably in Argentina and Brazil, and, to a lesser extent, Peru, largely triggered by government-initiated auctions. Most of the investment in the past decades has flowed into capital intensive hydropower, and more recently also into other renewable energy technologies, such as solar, wind and bioenergy. In 2019, USD 18,5 billion was invested in renewable energy (excluding large hydropower) in the region, which represented an all-time high. In addition to the renewable energy capacity, major investments are also needed in grid upgrades and interconnection capacity to integrate renewable energy to the grid. As the share of variable renewable energy increases, investment in storage capacity will also be required.

However, there are a number of challenges to scaling up renewable energy investment. The cost of capital remains

high in most countries in the region, increasing the financing cost of projects and thereby also the levelized cost of electricity (LCOE), a key metric in investment decisions. In some countries, hydrocarbon production, particularly natural gas, competes with the development of renewable energy.

In response to these challenges, the governments in the three focus countries have introduced renewable energy targets and implemented a series of successful policies as well as financial instruments, such as energy auction schemes. In order to further develop a stable framework for renewable energy investments, existing efforts need to be paired with credible and transparent sector planning, both in the short- and long-term. This includes a plan to phase-out coal and oil, or policies to promote system integration of variable renewable energy.



Transport

Despite favourable preconditions to reduce emissions, transport continues to be the sector with the highest fossil energy consumption in the region. This indicates that initial efforts and technology uptake, for example for electric vehicles, are not yet sufficient, and significant public and private investment is needed.

The region has seen a strong shift to individualised transport in recent decades, and historically strong rail networks (especially in Argentina and Brazil) have been neglected over time, resulting in a reduced share of rail in passenger and freight transport. The transport sector also has the highest fossil fuel consumption of all sectors in the region. Consequently, emissions in the transport sector in Latin America have grown and accounted for 15% of all regional GHG emissions in 2018.

At the same time, due to a lower emission intensity of the power sector, the region has favourable conditions to reduce emissions from the transport sector by switching to electrified modes. While most of the countries in the region have started to acknowledge the importance of electrified transport, penetration of electric vehicles still lags far behind that of other regions of the world. The situation is different with regard to the biofuel development, where the region has been traditionally more advanced than other regions, particularly in Brazil

where around three quarters of all cars utilise biofuel. There are, however, serious sustainability concerns of biofuels related to deforestation and competing land use where arable land is removed from food production.

Investments in low carbon transport in Latin America have historically focused on increasing the share of biofuels and, more recently, on strengthening public transport options, such as BRT, MRT or railways. The latter is predominantly financed with public funds, for example from national or regional governments. Considerable additional investment is needed however, to develop safe and modern public transport options as well as rail infrastructure, thus avoiding further passenger shifts to individualised transport. Another area financed primarily with public funds, but still insufficiently developed, is the expansion of charging infrastructure for electric vehicles. Generally, electrification of passenger transport is accompanied by the provision of new services and technologies, presenting opportunities for the private sector. The fact that there is a relatively large informal transport sector in the countries within the region, usually consisting of small vehicles owned and operated (or leased) by a single person, also poses a challenge for investment in the sector. This should be considered by governments when implementing sector-specific policies.

Governments in the focus countries have already launched key policies such as financial support schemes for the purchase of electric vehicles (EVs), public transport and railway infrastructure investment programs. In order to encourage further necessary investments, it is important to expand these efforts in the near future, for example by introducing national EV targets, plans to phase out the sale of new internal combustion engine vehicles or minimum efficiency standards for light- and heavy-duty vehicles.



Buildings

Investment in green buildings has so far been limited and is mostly driven by voluntary labelling schemes. Governments need to introduce and enforce mandatory building standards to avoid stranded assets and to ensure that the large amounts of capital that will flow into the fast-growing construction sector in the future are invested in sustainable (zero emission) buildings.

In 2018, buildings accounted for 24% of total final energy consumption in Central and South America, and 21% of total process-related CO₂ emissions. The main drivers for building-related emissions in the region are urbanisation, with over 80% of the population living in cities, and a continuous expansion of the middle class, representing one-third of the population. Most of the future building stock has yet to be built with total floor space in LAC expected to grow by 65% by 2050 (3-5% per year). Without expanding the currently low coverage of mandatory building codes, 98% of the floor area expected to be built through 2050 would not be regulated by mandatory buildings standards. The very low turnover rate of the buildings sector exacerbates the risk of locking in investments for decades to come.

Due to the high demand for new construction in the region, a shift to sustainable building construction would not require large additional capital flows. In addition, the majority of low-carbon investments in the sector show net economic benefits, largely due to significant energy savings.

Although, the green building market in the three focus countries has grown in recent years, it is still in an early stage of development. Consequently, a significant investment gap remains. Private capital is required to fill this gap, which is expected mainly from real estate investors and developers with the exception of publicly funded buildings.

Challenges that have prevented investments at the required scale include long payback periods and a deficit of upfront investments, combined with high interest rates. Also, split incentives between building owners and tenants and limited visibility and awareness of actual costs for heating, cooling, or electricity have hindered investments into energy efficiency measures in the sector.

Some important policy measures have already been implemented in the three focus countries. These include, for example, financial support schemes for renewable energy diffusion in buildings or minimum energy performance standards for appliances. However, to complement the policy framework, and thus steer investments to low-carbon construction, zero emissions targets for buildings and renovation, as well as ambitious mandatory building codes would still need to be introduced.



Industry

Current investments, largely driven by the private sector, have only led to incremental changes and have not yet resulted in large improvements in reduced energy intensity levels. This is also a consequence of limited policies and incentives to reduce emissions in the industry sector and to foster the development and deployment of new technologies. Significant innovation potential remains.

Latin America comprised 6% of global industrial emissions in 2010, and industry represented 24% of the region's GDP in 2018. Emissions grew at a relatively slow pace in recent years, at around 2% yearly between 2000 and 2018.

There are two main sources of emissions in the industry sector: energy use and industrial processes. As is the case at the global level, energy use in the industry sector among Latin American countries is spread across a broad set of industrial sub-sectors. The largest industry sub-sector in Latin America in terms of energy use is the 'food and tobacco' sector, and in particular the food processing sector, followed by the 'iron and steel' and 'paper, pulp and printing' sub-sectors. These three sub-sectors alone diverge in the type of mitigation measures to be deployed and hence the type of policy needed.

The production of iron and steel is the most emission and energy-intensive sub-sector in the region and is generally considered one of the 'hardest to abate' sub-sectors. Major investment opportunities in this sub-sector, both globally and in the region, include Research, Development and Deployment (RD&D), recycling of steel, carbon capture and sequestration or utilisation (CSS/U) or hydrogen-based steel production. Initiatives to reduce emissions in the sector, develop new technologies and stimulate investments for low-carbon solutions are currently largely driven by the private sector. However, these initiatives have only led to incremental changes.

There are isolated policy measures in place in the three focus countries, such as financial incentives for energy efficiency measures in industrial production or support schemes for renewables. However, to mobilise the necessary investments, especially in the early stages of technology development, a long-term vision towards net-zero emissions is needed. For emissions-

intensive sub-sectors it is of utmost importance to avoid investments that lead to a lock-in in high-carbon technologies that exacerbate transition risk and are likely to lead to stranded assets and a loss of competitiveness. To drive investments in innovation and the development of new technologies such as novel cement, CCS/U or green hydrogen, more support is needed from both national governments and international donors. Measures that governments should take to this end include, for example, the implementation of RD&D support schemes for hard to abate sub-sectors, the development of a strategy for material efficiency or the introduction of minimum energy performance and equipment standards.



AFOLU

The AFOLU sector plays a critical role for sustainable development in the LAC region and in reaching global climate goals. Efforts to halt deforestation, protect and restore critical landscapes as well as to promote sustainable agricultural practices and food systems need to be scaled up significantly. This requires a major shift in investments from carbon intensive practices to sustainable and climate-resilient ones.

The LAC region is home to around a third of the world's forests, half of its tropical forests and one fourth of its mangroves, and hence represents an important global carbon sink and store of biodiversity. At the same time, agriculture is a key pillar of national economies in the region, supporting millions of livelihoods as well as providing one fourth of the world's food exports. With growing populations and growing food demand, already high demand for arable land is set to further escalate tropical deforestation. The critical role of the AFOLU sector to achieving sustainable development as well as global climate goals requires a significant shift in the way land is used and invested in. In essence, in order to achieve the goals of the Paris Agreement the sector needs to become a major net sink before 2050 to compensate for residual emissions in other sectors while maintaining food security and livelihoods.

The governments of Argentina, Brazil, and Peru have all invested in afforestation and reforestation programmes, but despite this, on balance, there is still significant net deforestation in all three countries, particularly in Brazil in

recent years. The expansion of agricultural land is one of the main causes of deforestation, particularly of tropical forests. Investments need to shift away from activities that lead to increased deforestation, including agriculture as well as other industries such as mining and timber.

Whilst some investments have been made to reduce direct emissions from agricultural activities there are opportunities to increase their scope and reach. These include investments into sustainable agricultural practices to improve crop efficiency, decrease livestock emissions and further increase carbon sequestration. Agroforestry, silviculture and silvopasture present significant sustainable development benefits. Also, there are important opportunities to take advantage of the rapid growth in demand for plant-based meat alternatives and food waste reduction strategies.

Some progress has been made in this area in the focus countries, for instance, policies to support sustainable forest management and incentives to reduce GHG emissions from agricultural activities exist. Beyond this, however, it is important that governments scale up efforts to turn the AFOLU sector into a net sink and communicate a clear timeline for achieving net-zero deforestation, supported by sound policies and systems to halt deforestation.



Waste

Existing policies and incentives have led to investments and positive developments in certain areas of the sector, including waste collection, but other areas such as recycling of waste or prevention of open dumping are not yet sufficiently developed and need increased attention.

The waste sector in LAC is responsible for 6% of total GHG emissions in the region, which is a higher share of total emissions than the world average. The region generates approximately 10% of all global waste. The main drivers for a persistent increase of waste generation in the region are population growth, an increasing trend towards urbanisation, economic growth, a growing middle class and unsustainable consumption and production patterns.

Although waste collection and management systems have progressively improved in recent decades, more

than 40 million people in the region still lack access to a basic collection service, and about a third of all waste generated ends up in open dumps, causing serious impacts on health and the environment.

To date, only a few countries in the region have the formal infrastructure required to sort and recycle municipal solid waste, and the recovery of recyclable materials is mostly performed by the informal sector. Recycling rates in the region are therefore still low, with approximately 90% of the recovered municipal waste ending up in landfills.

Due to decades of investment and development backlog in waste and water management, there is a great need for modernisation and expansion of numerous technologies and services. In particular, investments are required to modernise landfills and construct treatment plants for household waste and hazardous waste, coupled with improving waste management systems at subnational and national level. While both private and public capital providers play a role in the sector, waste management, including collection and disposal, is mostly undertaken by public actors, while private investors are predominantly involved in waste to energy projects.

The challenges leading to insufficient investment levels in the sector across the region include prevailing financially unsustainable management schemes, uncertainty about direct and indirect costs of waste management, limited diversification of delivery models and difficulties in the service charging schemes.

Existing policy frameworks and implementation strategies for integrated waste management in the three focus countries have led to investments and positive developments in certain areas of the sector, such as the collection of waste, as evidenced by the relatively high proportion of the population with access to these services (Peru 84%, Brazil 98% and Argentina 99%). The fact that areas such as the recycling of waste or the avoidance of open dumps are not yet sufficiently developed suggests that existing policy approaches are either not ambitious enough, not fully enforced or do not cover these areas adequately.





Climate investment in Argentina

An already challenging investment environment in Argentina is exacerbated by the COVID-19 pandemic affecting investment activity and access to finance, particularly for the private sector.

As the third largest economy in the region in terms of GDP and member of the G20, Argentina plays a key role in driving transformation in the region and beyond. Before the COVID-19 pandemic, however, the Argentinian economy intermittently experienced years of negative growth and never fully recovered after the economic crisis and default two decades ago. In 2019 GDP contracted by 2.1% and inflation reached 54%. The macroeconomic difficulties have contributed to

a challenging investment environment. Of the three focus countries in this report, Argentina has the lowest sovereign credit, which is indicative of the country's high investment risk profile and translates into low investment activity and difficulty for companies to access finance. Private sector loans have been increasing, however, they remain insufficient, in particular for small and medium sized companies.

Investment into low emission infrastructure and activities have so far been focussed on renewable energy and improvement in public transportation infrastructure as well as afforestation and reforestation. However, total investment levels remain low compared to continued

investments into high carbon activity, particularly in the energy sector, rather than into activities needed to drive the transformation of these key sectors of the economy. In the finance space, green debt markets are emerging, and there have been some nascent steps to

increase the awareness of the private sector and capital markets about integrating environmental and climate risks into investment decisions. However, overall green and climate risk awareness in the investment community is still limited.

Table A: Overview of macroeconomic and investment-related indicators in Argentina

Indicator	Unit	Value in 2019	Difference to 2018
1 Population	Million	45	↑
2 GDP level	USD billion (current)	445	↓
3 GDP growth	Average annual growth rate of GDP	-2.1%	↓
4 Inflation (historical)	Average change in consumer price index	54%	↑
5 Sovereign credit rating	Rating	CCC	↔ ¹
6 Ease of Doing Business	Ranking	126 / 190	↓
7 FDI restrictiveness	Index 0 (open) 1 (closed)	0.03	↔ ²
8 Corruption perception index	Ranking	66 / 180	↑
9 Political stability index	Percentile rank among all countries, ranges from 0 (lowest) to 100 (highest) rank	43	↓
10 Regulatory quality index		34	↓

¹ For the sovereign credit rating the latest value is from 2021 and is compared to a previous assessment by Fitch Ratings in 2020.

² Please note that a lower value for this indicator represents an improvement.

National policies and targets needed to create the enabling environment to guide and mobilise low carbon investments are emerging, however, continued public support for fossil fuels conveys mixed signals to investors.

At the economy wide level, the updated NDC and the climate neutrality target announced by the President, and expected to be formally communicated in the country's Long-term Strategy (LTS) later in 2021, provides a general framing and perspective for investors on the direction of travel. To serve as a sufficiently strong signal, this will need to be underpinned by concrete and decisive policy action. While the carbon pricing scheme introduced by the government is a laudable first step it only covers 20% of

the country's GHG emissions and exempts key activities, in particular natural gas, aviation and shipping. Argentina has not announced that it will phase out of fossil fuels. On the contrary, recovery measures to stimulate the economy have focussed on high carbon activities in the form of direct subsidies to the oil and gas sector as well as monetary transfers to households and companies.

Fragmented policies and incentives at the sector level improve the investment situation for certain technologies and activities but lack the ambition and scope, particularly with regard to long term investor signals, to steer investments from high to low carbon practices across all sectors.

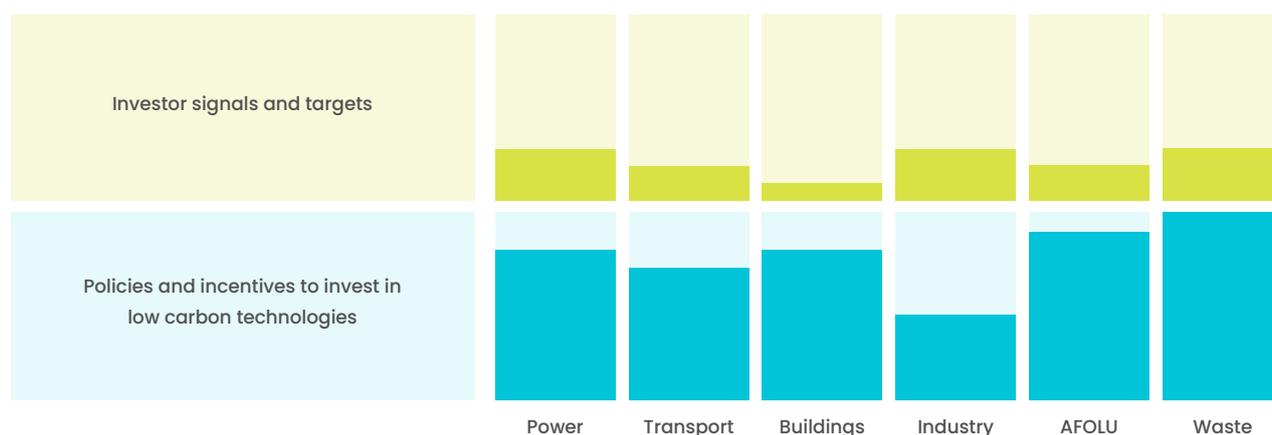


Figure B: Overview of the coverage of targets as well as policies and incentives for low-carbon investment in Argentina

Note: A full bar implies that the targets and policies considered in this assessment framework are fully (100%) covered. For more details, see the relevant sector section in Chapter 3 of the main report.

In the **power** sector, short and medium-term targets as well as schemes to incentivise renewables, including an auction scheme, have driven investments into these key decarbonisation technologies and associated infrastructure. To enable a decarbonisation of the economy, the targets would have to become more ambitious. Also, the reversal in the support scheme and continued public support for fossil fuel exploration exacerbate transition risks and are a source of uncertainty for low carbon investors affecting their appetite and ability to commit finance. Due to their competitiveness, renewables, especially onshore wind and utility scale PV, are poised to expand rapidly on a level playing field.

Despite a large railway network which has seen a resurgence of investments and plans for extension, in particular for freight, **transport** is dominated by road both for passenger and freight. There has been some investment into urban public infrastructure (e.g. BRT) and support schemes to incentivise the purchase of low emission and e-vehicles. However, for a full transformation, these approaches would need to be significantly scaled up. The introduction of long-term targets, which are currently mostly missing, would also send clear signals to investors. This includes, for example, the phase out of internal combustion engines as well as a comprehensive policy and public investment scheme that shifts towards no- and-low carbon modes and electrification.

Although during the pandemic activity in the **building** sector contracted by 23% in Argentina significant investment activity in the future can be expected in

new construction driven by population growth and urbanisation. The building stock efficiency, which is twice as high as the global average per capita, and the very low share of green new buildings (2%) could be increased by introducing comprehensive building codes for all segments as well as energy efficiency requirements. There are already some approaches to incentivise building integrated renewables, such as soft loans for materials, appliances and refurbishments or net metering. In order to more effectively mobilise finance, comprehensive regulatory measures as well as long term targets and policies are needed. Known barriers to investment in the sector, including split incentives, access to capital and awareness, are not sufficiently addressed through the existing schemes.

Albeit only small contributors to emissions in Argentina, the **industry** and **waste** sectors play a key role for the overall decarbonisation of the economy. At present, policies and plans have been rather scarce resulting in low climate related investor activity. The waste sector lacks clear emission reduction and waste management targets. A strategy for material efficiency in industry is included in the Climate Change Action plan and some energy efficiency and waste to energy support schemes are in place, however, there are no RD&D schemes, for example, for CCS/U technologies or novel cement and steel technologies. Ultimately in industry, technology transformation will be driven by international developments, however, a strategic approach can present economic opportunity. The recently launched hydrogen plan for the country is a move in this direction, although if not clearly

limited to green hydrogen may counteract long term decarbonisation efforts and investments.

As one of Argentina's main source of emissions, the **land-use** sector is critical to achieve the long-term climate neutrality goal. Whilst some policy efforts have been made to reduce deforestation and support afforestation and reforestation, there is no zero-deforestation target in place, and enforcement of existing laws and regulations can be improved. The **agriculture** sector, with its decreasing but still high emission intensity at twice the global average, has seen the implementation of some RD&D initiatives to reduce emissions as well as measures to increase soil carbon sequestration and reduce food waste. In order to incentivise a low carbon transformation of the sector and drive associated investments, long-term comprehensive plans need to be introduced. Given its critical role for the economy and export orientation, a longer-term climate aligned strategy would help to safeguard investments and future proof revenues in the sector.

The emerging climate finance governance framework and strategy needs to be underpinned by capacity and knowledge development in key institutions as well as clearly formulated investment needs in different sectors to attract international support and complement domestic resources.

Argentina's climate change law and related structures, including the creation of the National Climate Change Cabinet, contribute to the establishment of a comprehensive governance framework to coordinate, monitor and foster climate finance. These developments are likely to contribute to further aligning climate finance with development priorities; likewise, improving the mainstreaming of climate considerations in the budget planning of line ministries and access to climate finance. However, additional efforts are needed to operationalise newly formed institutions and build associated capacities, knowledge and awareness amongst relevant actors, for which financial and technical support is needed.

Argentina has a long history of accessing international climate finance from a variety of sources. These include international climate funds, multi- and bi-lateral agreements, which have supported climate action at project level. The country would benefit from a more strategic approach to access the larger volumes of climate finance needed to support the country's transition to a low carbon economy.

Argentina's latest NDC and biennial update report (BUR) submissions provide generic guidance on how the country plans to meet its climate target. Relevant ministries and secretariats are currently engaged in the drafting of more detailed mitigation measures, including the definition of implementation plans and investment needs. Argentina has not yet communicated information about the level, type and purpose of climate finance; however, a climate finance strategy is soon to be released and should provide more clarity once launched.



Climate investment in Brazil

As one of the largest economies in the world, Brazil is an important player in combating climate change regionally and globally. Economic recessions and a difficult macroeconomic investment environment, coupled with a lack of concerted policy action, has hindered low carbon investments and led to a backsliding in climate change efforts.

Brazil is not only the largest and most populous country in the LAC region. It is also the world's ninth largest economy, and its GDP represents a third of the LAC region. However, Brazil's GDP has shrunk since it reached an all-time high at USD 2.6 trillion in 2011. Brazil's economic recession in 2014 to 2016 has accentuated the decline in GDP, and the

COVID-19 pandemic led to a contraction of the economy by around 4% in 2020. This figure is lower than in other countries in the region, due to a relatively large stimulus package and limited restrictions in response to the virus.

Although Brazil has a large and diverse economy, it is heavily dependent on commodity exports, and economic productivity has declined in the past. Brazil's macroeconomic and investment environment has been negatively impacted by political uncertainty, relatively high levels of corruption, legal insecurity, social inequality, and high debt levels. This is also reflected in the country's credit rating ("elevated vulnerability to default risk"). Private sector investment has declined in

recent years, due to high debt interest rates from private banks, limited access to long term capital for small and medium enterprises (SMEs) and high competition barriers due to subsidies.

Low-emission investments in Brazil have mainly focused on the uptake of renewables in the energy sector, with a booming corporate procurement market for renewables and the support of targeted instruments such as capacity auctions in the power sector and the ethanol or biodiesel mandates in the transport sector. The approach of the current administration, which has opposed several existing climate policies and weakened the legal and institutional framework to address climate change,

has not helped to ensure that further investments in climate-friendly measures in other sectors are made to the necessary extent.

However, several initiatives have been in place for some time in the Brazilian financial sector that have the potential to steer investment decisions towards low-emission alternatives. Financial institutions and the Brazilian pension fund, for instance, are required to publish environmental, social and corporate governance (ESG) strategies and incorporate climate change-related criteria and risk assessments into decision-making processes for investments.

Table B: Overview of macroeconomic and investment-related indicators in Brazil

Indicator	Unit	Value in 2019	Difference to 2018
1 Population	Million	211	
2 GDP level	USD billion (current)	1840	
3 GDP growth	Average annual growth rate of GDP	1.1%	
4 Inflation (historical)	Average change in consumer price index	3.7%	
5 Sovereign credit rating	Rating	BB-	 ¹
6 Ease of Doing Business	Ranking	124 / 190	
7 FDI restrictiveness	Index 0 (open) 1 (closed)	0.08	 ²
8 Corruption perception index	Ranking	106 / 180	
9 Political stability index	Percentile rank among all countries, ranges from 0 (lowest) to 100 (highest) rank	25	
10 Regulatory quality index		48	

¹ For the sovereign credit rating the latest value is from 2020 and is compared to a previous assessment by Fitch Ratings in 2018.

² Please note that a lower value for this indicator represents an improvement.

With a few exceptions, the government has not set adequate national policies and targets that could guide and incentivise low-carbon investment.

Brazil is the only one of the three focus countries where the updated NDC does not include an increase in

ambition levels compared to its previous submission. On the contrary, it has effectively weakened its climate action targets for 2025 and 2030. Apart from non-binding announcements to achieve climate neutrality by mid-century, there is no sign of a long-term strategy, underpinned by concrete policies, being developed in

Brazil. This creates considerable uncertainty for investors about the future direction of the Brazilian economy.

Based on past performance, it appears likely that the current Federal Government will continue to disregard the urgent need for climate action in Brazil. Although the government has reduced fossil fuel subsidies, no clear phase-out plan has yet been formulated. The government has also not pursued a green economic recovery in response to the COVID-19 pandemic. While this can be seen as a missed opportunity to channel public funds from the large stimulus package into climate-friendly

investment opportunities, private investors can benefit from a comparatively wide range of public leverage instruments, including green debt and equity instruments as well as risk transfer instruments. As one of the first countries in the region to publish green bond guidelines, Brazil is now the largest green bond market in the region.

At sector level, low-emissions targets and plans exist for some but not all sectors. Correspondingly, policies to incentivise investments in low-carbon alternatives are patchy, with some sectors well covered yet others leaving room for further action.

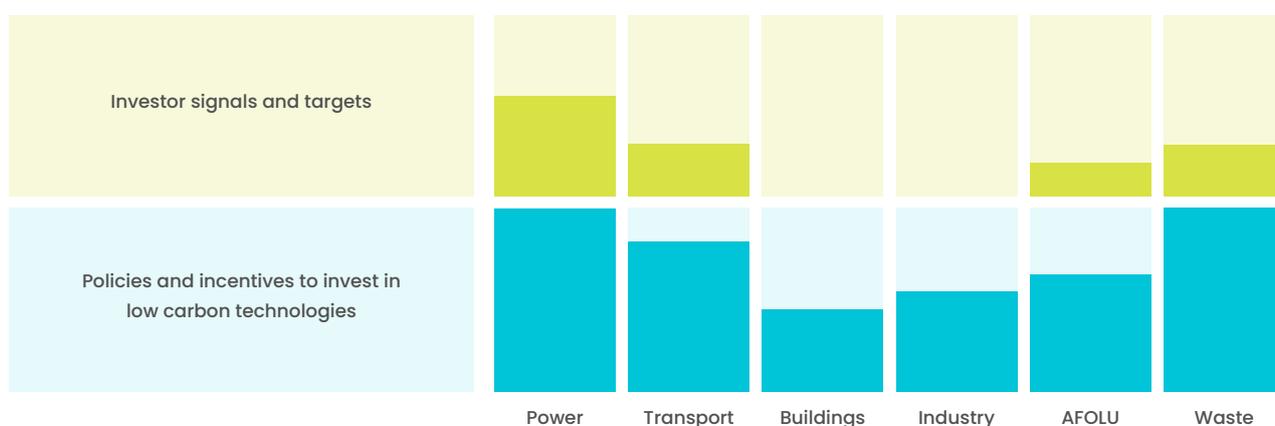


Figure C: Overview of the coverage of targets as well as policies and incentives for low-carbon investment in Brazil

Note: A full bar implies that the targets and policies considered in this assessment framework are fully (100%) covered. For more details, see the relevant sector section in Chapter 3 of the main report.

Market trends in Brazil's **power** sector are heading in the right direction, with a steady increase in renewable power generation (82% of the generation mix). This is also reflected in the latest Renewable Energy Country Attractiveness Index, in which Brazil moved up from 15th place in 2020 to 11th place of the world's most attractive markets for renewable energy. Key for this development have been clear investor signals, including a long-term emissions reductions and renewable energy target. There is also relatively stable support for renewable energy. The latter includes policies to incentivise large scale renewable energy installations (such as energy auctions, tax benefits, etc.) and incentives to promote distributed renewable energy generation as well as the integration of variable renewable energy (VRE). These policies are complemented by dedicated funding mechanisms, such as investor guarantees for renewable energy projects. On the other hand, Brazil is an important exporter of fossil fuels, mainly crude oil, and the government has

announced plans to expand the extraction of fossil fuels in the future.

The **transport** sector in Brazil is dominated by road transport. Car ownership increased significantly in recent decades and the role of public transport has decreased. Although both passenger and freight transport have increased in recent years, railways play a minor role. The historically strong rail networks have been neglected. With the exception of a medium-term emissions reduction plan, important investor signals such as a target for EVs, a plan to phase out the sale of internal combustion engine vehicles or binding emissions performance standards are largely missing. On the other hand, there are financial incentives in place to support the purchase of low emissions vehicles, and there are a number of public transport as well as railway infrastructure investment programmes. Even though sustainability issues exist, it is worth mentioning that

support programmes for biofuels, such as RenovaBio and the former Proálcool programme, have been successful.

Brazil can be considered a regional leader in terms of voluntary green **buildings** certification. Corresponding governmental support, for example through policy measures or incentives, can be significantly improved. Consequently, the overall share of green buildings of all new buildings in 2019 was still very low, at around 5%, and investments in green buildings account for a relatively small share of total projected investments in the building sector in 2025 (between 8% - 10%). To be able to further attract low-carbon investments in the sector, clear targets should be set for zero emissions buildings or the renovation of the existing building stock. In addition, introducing and enforcing an ambitious and mandatory building code that covers all building types, as complement to existing minimum energy performance standards for appliances, is essential to ensure the sector becomes more sustainable and climate future proof. To counteract investment barriers in the sector, these policies should be complemented by financial support schemes. With few exceptions, such as a net metering scheme for distributed power generation, these are largely missing.

To date, investments in the **industry** sector in the LAC region have not led to a reduction of energy intensity levels. This is also the case in Brazil, where, for instance, the emission intensity per output of cement has increased since 2005. Reducing current emissions intensity levels cannot be addressed exclusively by relying on fuel switch, such as to bioenergy, but will require clear signals and incentives to trigger transformational investments. The absence of clear emissions targets and mitigation plans – currently only available for the mining sector – led to few investments and as a result only incremental improvement. Support schemes have contributed to a displacement of fossil fuels by biomass to a considerable extent in the sector. Isolated policy measures can, however, not hide the fact that a long-term vision towards net zero emissions is lacking and that there is therefore still a considerable lack of investment.

In the **forestry and other land-use** sector, the government has basically dropped all reference to stopping illegal deforestation, restoring forests and enhancing native forest management. Consequently, Brazil remains by far the country with the largest tropical forest loss worldwide.

The Brazilian **agricultural** sector is also of great importance beyond the national level, as it is heavily

geared towards exports, making Brazil the leading exporter of agricultural goods and food in the region. While there is a medium-term plan to reduce emissions in the sector, there is none for the long-term. National plans, such as the Low-Carbon Agriculture (ABC) Plan, which includes various measures to reduce emissions from agriculture and R&D programmes to stimulate emission reductions in the sector, are expected to have a positive impact on investments in the sector. Areas where policy support could be improved include, for instance, the creation of incentives to reduce post-harvest loss and food waste.

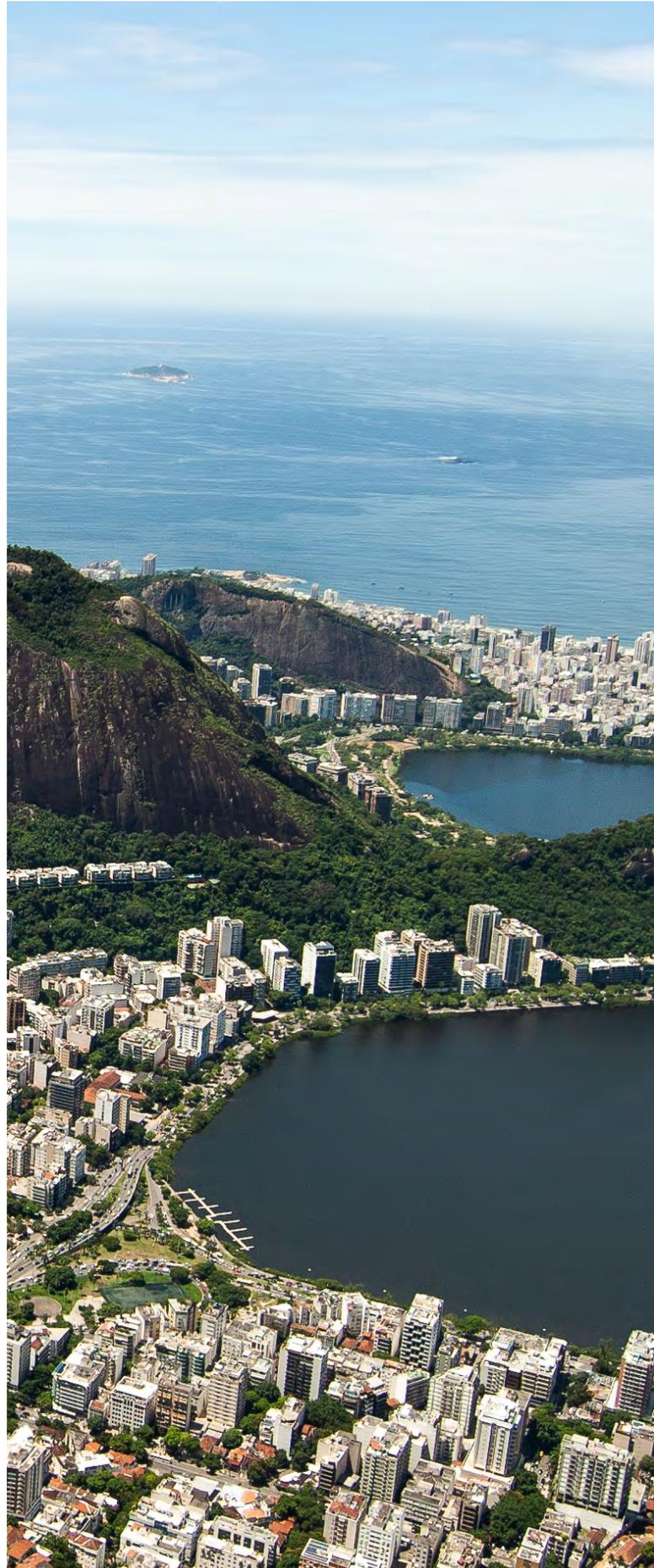
In Brazil, emissions from the **waste** sector are higher than emissions from the power sector. Main drivers for the continuous increase of waste generation are population growth, increasing urbanisation, economic growth, and unsustainable consumption and production patterns. To give clear investor signals an emissions reduction target or a national target for recycling municipal waste should be established. Some policies to incentivise investments in a low-emissions waste sector exist, such as the National Policy on Solid Residues or the National Zero Dump Programme, which include several financial support schemes. To trigger additional investments in the sector, these need to be scaled up and existing implementation issues resolved.

While Brazil established a governance structure around climate action and, more specifically, climate finance as early as 2007, the current government has continuously weakened these structures in recent years.

Brazil introduced a climate change law as early as 2007, and it has a significant track record of channelling climate finance in recent decades from various sources. These include international climate funds, and bilateral or multilateral support initiatives. Notably, the country channels climate finance through its National Climate Fund and the Amazon Fund. Brazil's development bank, BNDES, leverages significant investments for low-carbon development through green credit lines as well as green bonds.

However, climate finance channels have decreased and spending on climate mitigation has generally been cut sharply in recent years. The former is, in part, due to the Amazon Fund being largely inactive as some of the largest contributors to the fund have halted their support since 2019, due to concerns over forest management as well as a change in the fund's governance structure.

There is also limited evidence that climate finance is integrated into sectoral climate change plans or the national budget. The government has not presented clearly defined NDC mitigation measures at the sector level and, accordingly, there is limited information on how individual mitigation measures will be financed. In the absence of governmental guidelines, some private sector stakeholders have committed to voluntary climate action such as through the Brazil Green Finance Initiative (BGFI).





Climate investment in Peru

Peru has been one of the fastest growing economies in Latin America in recent decades and is set to recover GDP growth in 2021 after the recent pandemic-induced economic dip. Generally, an investor friendly regulatory framework and a relatively stable macroeconomic situation have led to high private sector participation in climate related investments. However underlying issues of political instability, corruption and challenges for SMEs to access credit, prevent the capital markets from reaching their full potential to drive low carbon investments.

Peru has been one of the fastest growing Latin American economies in the past twenty years with GDP per capita

rising steadily until the onset of the coronavirus crisis. As a result of the COVID-19 pandemic's economic impacts, Peru's GDP declined by 11% in 2020. However, with an estimated GDP growth of around 5% in 2021, Peru is expected to be the country with the second highest growth rate in the region. The country's economic development in recent decades and positive prospects for a recovery from the pandemic can be attributed to its relatively stable macroeconomic situation, robust levels of international currency reserves, and a controlled fiscal deficit. This is also reflected in the positive assessment of government debt, where Peru scores best of the three focus countries. Peru is also relatively open to trade with its neighbours, and the rest of the world, and is the fourth

largest recipient of foreign direct investment (FDI) in Latin America. This relatively investor-friendly environment has also led to private investment accounting for two-thirds of all investment in Peru. At the same time, significant barriers to investment in Peru remain, such as a high vulnerability to commodity prices, a growing informal sector, political instability, corruption and obstacles to accessing credit, especially for SMEs, which play a crucial role in the economy. Overcoming these barriers is a prerequisite for the capital market to reach its full potential and tap into opportunities related to low-carbon and resilient investments.

Low-emissions investments have traditionally focused on renewable energy although these have started

stagnating since 2018. Some investments were also made to improve public transport and rail infrastructure as well as increased afforestation and reforestation measures. However, to achieve an economy-wide transformation towards climate neutrality, both private and public investments in climate-friendly technologies need to be scaled up significantly. Positive developments in the financial sector that may contribute to the transition include the take-off of the green bonds market in recent years and the introduction of mandatory ESG reporting for all listed companies. To date, however, climate-related criteria and risk assessments are still not sufficiently incorporated into financial modelling and decision-making processes for investments.

Table C: Overview of macroeconomic and investment-related indicators in Peru

Indicator	Unit	Value in 2019	Difference to 2018
1 Population	Million	33	
2 GDP level	USD billion (current)	227	
3 GDP growth	Average annual growth rate of GDP	2.2%	
4 Inflation (historical)	Average change in consumer price index	2.1%	
5 Sovereign credit rating	Rating	BBB+	 ¹
6 Ease of Doing Business	Ranking	76 / 190	
7 FDI restrictiveness	Index 0 (open) 1 (closed)	0.08	 ²
8 Corruption perception index	Ranking	101 / 180	
9 Political stability index	Percentile rank among all countries, ranges from 0 (lowest) to 100 (highest) rank	42	
10 Regulatory quality index		48	

¹ For the sovereign credit rating the latest value is from 2020 and is compared to a previous assessment by Fitch Ratings in 2018.

² Please note that a lower value for this indicator represents an improvement.

National policies and targets needed to create the enabling environment to guide and incentivise low carbon investments are emerging but could be strengthened and extended to incorporate a long-term perspective.

Peru updated its NDC strengthening the 2030 target compared to the previous NDC and providing more insights into government priorities for the short to medium-term. A long-term strategy, including a net-zero commitment for mid-century, is being developed

and is expected to be published before the end of 2021. This could, if underpinned by policy packages in the individual sectors, make an important contribution to providing investors with the certainty they need to plan future activities and investments.

Although only a small proportion of Peru's recovery spending in response to the COVID-19 pandemic can be considered 'green', it is one of the few countries in the region where government officials referred to a 'building back better' approach, taking sustainability and climate

change concerns into account. These positive efforts could be significantly strengthened by, for example, a commitment to phase out fossil fuel subsidies or introducing a carbon pricing scheme.

At sectoral level, medium-term targets and incentives exist for a few sectors; to give clear signals to investors, however, corresponding policy measures need to be introduced consistently for all sectors and complemented by long-term targets and plans.

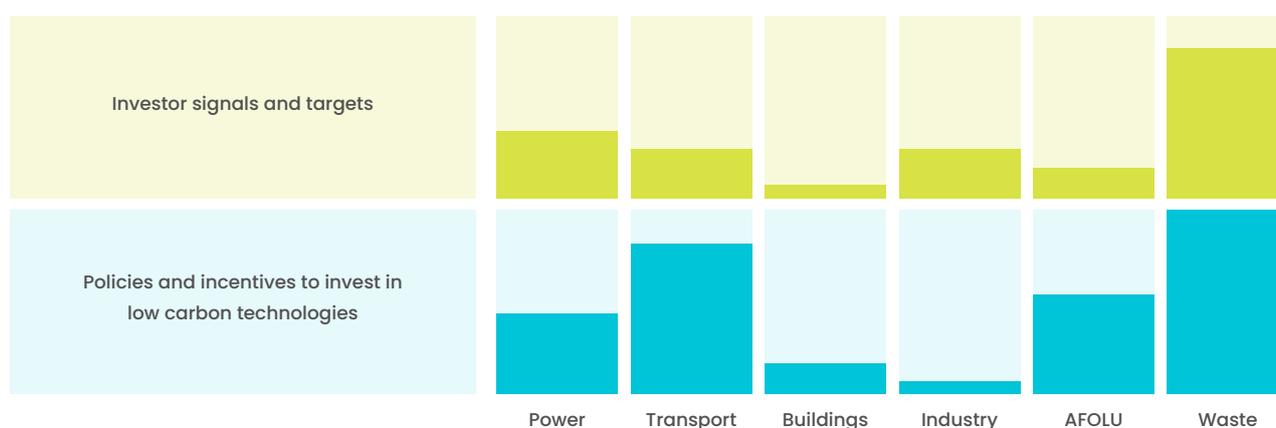


Figure D: Overview of the coverage of targets as well as policies and incentives for low-carbon investment in Peru

Note: A full bar implies that the targets and policies considered in this assessment framework are fully (100%) covered. For more details, see the relevant sector section in Chapter 3 of the main report.

In the **power** sector, Peru has formulated specific plans for the period until 2030, such as an emission reduction plan as part of its NDC and a renewable energy target. However, there is limited certainty for the period beyond. A draft law foresees that the share of renewables in the energy mix should be 50% by 2040, which would not be enough to successfully decarbonise the economy, in particular given the need to electrify demand sectors. A series of renewable energy tenders have attracted nearly USD 2 billion in investment over the past decade, which is reflected in a steady increase in capacity through 2018. In the absence of further auctions, virtually no new solar and wind capacity has been added in recent years, keeping total capacity at relatively low levels. A further expansion of these efforts, which has already partly taken place again in 2020, is as important for promoting further investments in renewables as the creation of incentives to promote decentralised systems as well as technologies and infrastructure to enable the integration of variable renewable energy sources.

Peru's **transport** sector is dominated by road transport in terms of both traffic volume and public investment. On a positive note, medium-term emission reduction targets have been formulated and a goal has been set for 5% of light vehicles and buses to be electric by 2030. In support of the latter, the government has put in place tax incentives to promote the purchase of hybrid or electric vehicles, and some public investment went into improving public transport and railways. A tax on fuels and restrictions on vehicular traffic in metropolitan areas can have a positive impact on the sectoral transformation. The Peruvian Government, led by its Ministry of Transport and Communications, is also developing the TRANSPerú NAMA with a broad range of measures designed to reduce greenhouse gas emissions in the transport sector. For all the aforementioned measures to bear fruit, and for a transport sector transition to be possible, investments need to be redirected and increased significantly. The share of public investment in the sector is currently only about 1%, with three quarters of the funds going to road transport. A phase-out plan for the sale of vehicles with

combustion engines could also be considered to give the industry and investors more planning certainty.

Even though economic growth has driven constant investment in the **building** sector over the past decades, green buildings represent only a fraction of the total building stock in Peru (around 2%). This could be improved through the introduction of clear signals and policies to promote low-carbon investments in the sector. As part of the recovery from the economic impact of the pandemic, which is expected to significantly shrink Peru's construction output in 2020, the share of green buildings should be increased quickly and steadily. For this, the voluntary Code for Sustainable Construction could be complemented by an ambitious and mandatory building code covering all building types and by minimum energy performance standards for appliances. Furthermore, financial and regulatory measures could be implemented to counteract investment barriers in the sector such as split incentives and longer payback periods. Concessional loans for the renovation or construction of houses that are linked to certain sustainability criteria (such as those from Fondo MiVivienda) can be seen as a step in the right direction. Given the large investment gap in green buildings, such initiatives need to be significantly expanded and scaled up.

Despite its important role in decarbonising the economy and its complex structure with a wide range of technologies and sub-sectors, the **industry** sector in Peru has so far received little attention in the implementation of climate-friendly regulatory and policy measures. Although the country's NDC includes individual mitigation measures in the industry sector, adequate incentives or policy measures are limited. Key instruments such as support schemes for renewable energy or a strategy for material efficiency (steel, cement, aluminium, etc.) should be introduced alongside financial incentives for energy efficiency measures in industrial production as well as for CCS and low-carbon hydrogen. A nationally appropriate mitigation action (NAMA) on cement has been helpful to support the development and deployment of some technical solutions in this hard-to-abate sub-sector, with more of these initiatives being needed.

As in the entire region, the **AFOLU** sector plays an important role in the Peruvian economy, which is reflected, for instance, in its contribution to the national GDP and employment but also in its higher share of emissions compared to world average levels.

Although there are some policy measures in place to support sustainable forest management (restoration,

reforestation, afforestation), emissions from deforestation are still projected to increase by more than 80% between 2012 and 2030, a growth rate not seen before in Peru's history. This expected development does not seem to be in line with the government's goal of reducing deforestation in the Peruvian Amazon by 30% by 2030.

Investment in **agriculture** is likely to increase in the coming decades, due to an expected population increase and the country's role as an exporter of agricultural products. Government action and resources in the form of policies and regulations, monitoring and enforcement, as well as financial incentives are key to steer capital flows in the right direction. Some elements like incentives to reduce GHG emissions from agricultural activities and policies to reduce post-harvest loss already exist, however, these could be complemented by additional measures, including RD&D support for sustainable low-emissions agricultural practices or incentivise to promote agricultural practices that increase soil carbon sequestration.

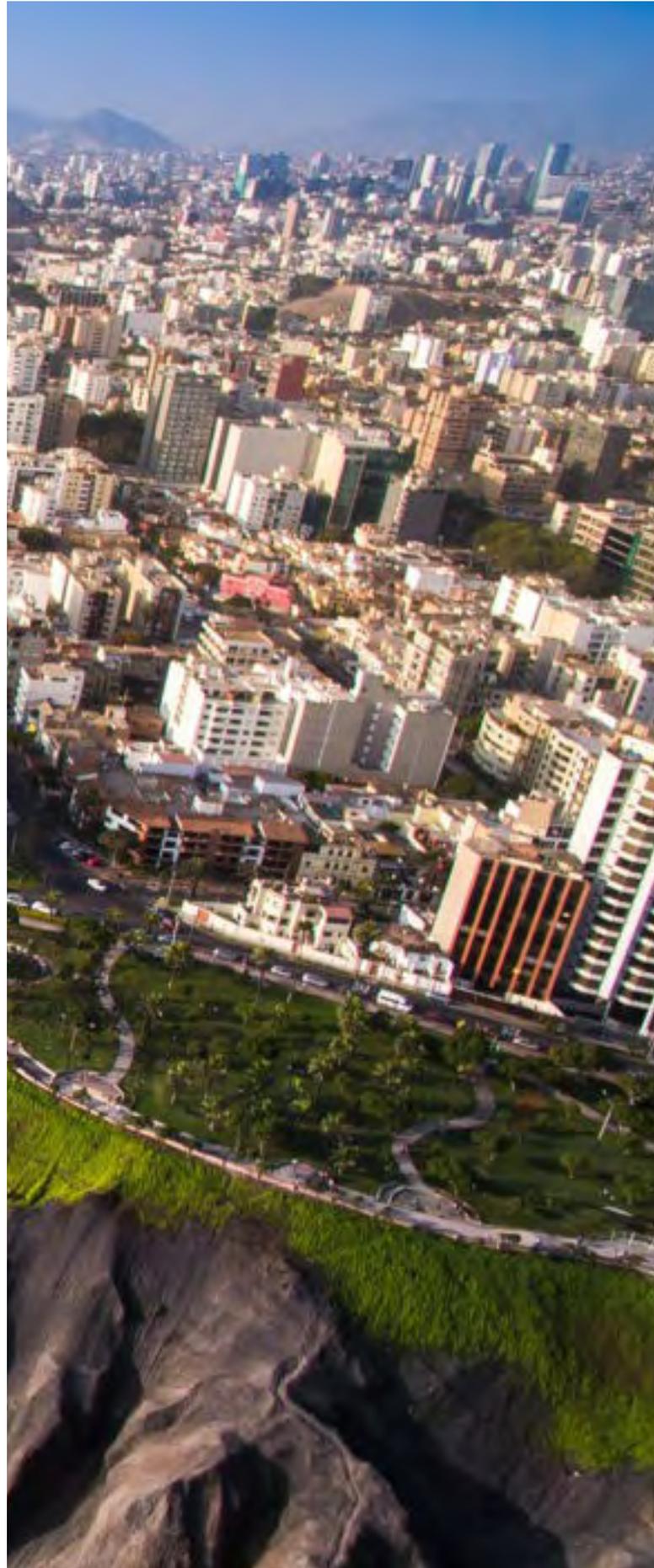
Similar to the other countries in the region, the recycling rate of municipal **waste** in Peru is still comparatively low and a significant share of waste ends up in open dumps causing serious impacts on health and the environment. In response to this, Peru has identified the waste sector as one of the priority sectors in its updated NDC and established a clear national target (100% recycling of reusable waste by 2024) for the management of solid waste, accompanied by an integrated solid waste management strategy. Financial incentives such as those offered through the National Solid Waste Investment Fund, and other tax incentives that have been introduced, will be key to stimulate the significant amount of investments needed to achieve this ambitious target and thus contribute to the protection of soil, air, water and human health.

Peru has taken important steps towards establishing comprehensive governance and planning structures to coordinate and foster climate finance; whether the expected results will materialise will only become clear when these are fully implemented.

The Peruvian government has taken important steps in the field of climate finance governance, particularly with regard to legislation and institutionalisation. However, the structures have not been in place long enough to assess whether the expected results will materialise, for example, with regard to aligning and mainstreaming climate finance considerations into sector plans and budgets or increasing private sector engagement.

In the past, Peru has catalysed significant climate finance volumes through a range of channels, including multi- and bilateral agreements, international climate funds, as well as alternative funding sources such as a voluntary carbon credit agreement.

With clearly defined measures for individual sectors, Peru has laid an important foundation for successful climate finance planning. In addition, the Peruvian government is working on a national strategy for climate finance, which, together with sector roadmaps, should provide more clarity regarding the financing of individual mitigation measures.





Key messages

In the near future, it will be important for governments to follow their national climate plans, including updated NDCs, with clearly defined mitigation measures and sector-level targets that are aligned with medium- and long-term decarbonisation goals. This will help to define financial support needs and budget implications (important to attract international financial flows), and it will provide both public and private finance providers with clear investment signals and predictability.

Sector-specific plans need to be embedded and aligned with an economy wide, long-term vision to reach national objectives and those of the Paris Agreement, including as part of the long-term

strategies communicated to the UNFCCC. This will help to ensure that short-term policies and investments are in line with long-term objectives, thereby decreasing the risk of stranded assets and enabling a smoother transition. An economy-wide perspective can also help to highlight synergies and linkages between sectors; for example, the coupling of energy supply and increased electrification of end-use sectors, and practices such as agroforestry.

Constrained domestic budgets and public support measures need to be aligned with climate goals to send clear signals to investors and incentivise decarbonisation rather than counteract ongoing

climate efforts. The allocation of public funding to high carbon activities is a missed opportunity. Governments should ensure that domestic budget and investments, for example to lift countries out of economic recession, are spent in a way that aligns with sustainable development and climate change goals. Out of the three focus countries, only Peru has earmarked a small proportion of its recovery spending for climate-friendly measures, while the recovery measures in Argentina and Brazil have been rather high-carbon weighted.

Clearly communicated commitments by governments to phase-out high carbon technologies and harmful policies, including, fossil fuel subsidies, give planning certainty to investors and can act as a stimulus for innovation and new business models. None of the focus countries has made a clear commitment, for example, to phase out fossil fuels, end deforestation or declare a moratorium on conventional engines. Fossil fuel subsidies, although declining in recent years, continue to be part of the policy mix in Argentina and Brazil and counteract positive developments towards decarbonisation in key sectors. Developments in other countries suggest that clear and robust phase out goals and targets do not hinder but stimulate economic activity and innovation.

The public and private sectors need to work hand in hand. Governments play a key role to create a stable enabling environment to steer and foster private sector investment as well as protect investments from future risks. The private sector is crucial in its role as provider of technology and services, as well as source of investment and employment. Improving sectoral policy packages and strengthening the capacity to implement them, promotes innovation and development to tap into the vast number of investment opportunities in low-emission areas; and simultaneously avoid investments into less efficient, more expensive and polluting technologies or industries. In many areas, international market dynamics have already led to increasing sustainability and emissions standards, and as the sectoral transformations required to meet the Paris Agreement become more evident, such dynamics should then become increasingly common. It is in the interest of all involved to help shape the transformation and work together to promote solutions to a net zero future.



The image features a large array of solar panels in a field. The panels are tilted and arranged in rows, extending into the distance. The sky is a vibrant green, and the grass in the foreground is also green. The overall scene is bathed in a green light, creating a clean, modern aesthetic. The text 'Table of Contents' is overlaid in the center in a bold, white font.

Table of Contents

Table of contents

Summary Report	III
List of figures	XXIX
List of tables	XXX
Abbreviations	XXXI
Introduction	1
Investment environment	3
2.1 Argentina	6
2.2 Brazil	9
2.3 Peru	12
Sectoral policy framework for low-carbon investments	15
3.1 Economy-wide	18
3.2 Power	25
3.3 Transport	34
3.4 Buildings	42
3.5 Industry	51
3.6 AFOLU	60
3.7 Waste	68
Climate finance readiness	74
4.1 Argentina	80
4.2 Brazil	85
4.3 Peru	90
Conclusion	95
References	101

List of figures

Figure 1: Share of emissions across sectors in Latin America and the Caribbean and the world in 2018	18
Figure 2: Electricity supply mix globally and in Central and South America in 2018	25
Figure 3: Electricity emissions intensity in Argentina, Brazil, Peru, and world average in 1990–2019	27
Figure 4: Share of renewable electricity generation (including hydropower) in Argentina, Brazil, Peru, and world average in 2000–2019)	28
Figure 5: Cumulative renewable energy capacity additions (excluding hydropower) in Brazil in 2016–2020	28
Figure 7: Cumulative renewable energy capacity additions (excluding hydropower in Peru in 2016–2020	30
Figure 8: Road transport biofuel/ electrification share	36
Figure 9: Public investment shares in the transport sector in Argentina (2016), Brazil (2019) and Peru (2016) as share of total public investments in the sector and share of GDP	37
Figure 10: Buildings emissions intensity (per capita) in Argentina, Brazil, Peru and world average	46
Figure 11: Energy use by industrial sub-sector in Latin America in 2018	53
Figure 12: Emission intensity in cement in Brazil – historical data, projections and Paris compatible benchmarks	55
Figure 13: Agriculture emissions intensity in Argentina, Brazil, Peru, and the world in 1990–2014	64
Figure 14: Total global climate finance flows 2012-2019 (blue line) compared to annual investments needed in a 1.5°C scenario (green area)	76
Figure 15: Filling the gap in developing countries – the need for technical and financial support from developed countries	77
Figure 16: Climate finance volumes by use of proceeds in the LAC region in 2018	79
Figure 17: Climate finance volumes in the LAC region in 2018, by investor type	80
Figure 18: Climate finance volumes in the LAC region in 2018, by finance instruments	80

List of tables

Table 1: Overview of macroeconomic and investment-related indicators in Argentina	7
Table 2: Overview of macroeconomic and investment-related indicators in Brazil	10
Table 3: Overview of macroeconomic and investment-related indicators in Peru	13
Table 4: Policy framework assessment – economy-wide	20
Table 5: Investment areas and main sources of capital in the power sector	26
Table 6: Policy framework assessment for the power sector	30
Table 7: Investment areas and main sources of capital in the transport sector	35
Table 8: Policy framework assessment for the transport sector	38
Table 9: Investment areas and main sources of capital in the buildings sector	44
Table 10: Policy framework assessment for the building sector	47
Table 11: Low carbon manufacturing benchmarks	52
Table 12: Investment areas and main sources of capital in the industry sector	54
Table 13: Policy framework assessment for the industry sector.	56
Table 14: Investment areas and main sources of capital in the AFOLU sector	63
Table 15: Policy framework assessment for the AFOLU sector	66
Table 16: Investment areas and main sources of capital in the waste sector	70
Table 17: Policy framework assessment for the waste sector	72

Abbreviations

AFOLU	Agriculture, forestry, and other land use
APCI	Peruvian Agency for International Cooperation (Agencia Peruana de Cooperación Internacional)
BECCS	Bioenergy with Carbon Capture and Storage
BF-BOF	Blast furnaces to basic oxygen furnace route
BGFI	Brazil Green Finance Initiative
BMZ	German Federal Ministry of International Cooperation
BNDES	Brazil's National Development Bank
BNEF	Bloomberg New Energy Finance
BREF	Best Available Techniques reference document
BRICS	Brazil, Russia, India, China, and South Africa
BRL	Brazilian real
BRT	Bus Rapid Transit
BUR	Biennial Update Reports
BYMA	Bolsas y Mercados Argentinos
CAF	Development Bank of Latin American (Corporación Andina de Fomento)
CAGR	Compound annual growth rate
CANCC	High-level Commission for Climate Change (Comisión de Alto Nivel de Cambio Climático)
CAT	Climate Action Tracker
CBI	Climate Bond Initiative
CCS/U	Carbon Capture and Storage or Utilisation
CDM	Clean Development Mechanism
CEBDS	Brazilian Business Council for Sustainable Development
CEPAL	United Nations Economic Commission for Latin America and the Caribbean (Comisión Económica para América Latina y el Caribe)
CIF	Climate Investment Funds
CIM	(Brazil's) Committee on Climate Change
CNI	Brazilian National Confederation of Industry
CNV	(Argentina's) National Securities Commission (Comisión Nacional de Valores)
COFIDE	Development Finance Corporation (Corporación Financiera de Desarrollo)
COP	Conference of the Parties
COVID-19	Coronavirus disease
CPI	Climate Policy Initiative
CTF	Clean Technology Fund

ENGIRSU	National Strategy for the Comprehensive Management of Urban Solid Waste (Estrategia Nacional para la Gestión Integral de Residuos Sólidos Urbanos)
EOR	Enhance Oil Recovery
ESCO	Energy service company
ESG	Environmental, social and corporate governance
ETS	Emission Trading Scheme
EU	European Union
EUR	Euro
EV	Electric vehicle
EY	Ernst and Young
FAO	Food and Agriculture Organisation
FDI	Foreign Direct Investment
FGS	Sustainability Guarantee Fund
FI	Financial institutions
FNECBN	(Argentina's) National Fund for the Enrichment and Conservation of Native Forests
FODER	(Argentina's) Fund for the Development of Renewable Energy
FODIS	(Argentina's) Fund for Distributed Renewable Energy Generation
GBC	Green Building Council
GCCA	Global Climate Change Alliance
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse gas
GIS	Geographic information system
GIZ	German Society for International Cooperation (Deutsche Gesellschaft für Internationale Zusammenarbeit)
GTM-NDC	(Peru's) High Level Multi-Sectorial Working Group for the implementation of the NDC
GW	Gigawatt
HDV	Heavy duty vehicles
HVAC	Heating, ventilation, and air conditioning
ICE	Internal combustion engines
IDB	Inter-American Development Bank
IEA	International Energy Agency
IFC	International Finance Corporation
ILO	International Labour Organization
IMF	International Monetary Fund

INTA	(Argentina's) National Agricultural Technology Institute (Instituto Nacional de Tecnología Agropecuaria)
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
LAC	Latin America and the Caribbean
LDV	Light-duty vehicle
LEED	Leadership in Energy and Environmental Design
LMCC	Framework Law on Climate Change (Ley Marco sobre Cambio Climático)
LTS	Long-term low greenhouse gas emission development strategies
MADS	Ministry of Environment and Sustainable Development
MDB	Multilateral Development Banks
MDV	Medium-sized vehicles
MEPS	Minimum energy performance standards
MINAM	(Peru's) Ministry of Environment (Ministerio del Ambiente)
MINEM	(Peru's) Ministry of Energy And Mines (Ministerio de Energía y Minas)
MoU	Memorandum of Understanding
MRT	Mass Rapid Transit
MRV	Measurement, Reporting and Verification
MW	Megawatt
NAMA	Nationally Appropriate Mitigation Actions
NDC	Nationally Determined Contributions
NZEB	Near zero energy buildings
OECD	Organisation for Economic Co-operation and Development
PDE	(Brazil's) Ten-Year Plan for Energy
PIECAS	Comprehensive Strategic Plan for the Conservation and Sustainable Use
PNE	(Brazil's) National Energy Plan 2050
PPA	Power purchase agreements
PPP	Public-private partnerships
PV	Photovoltaic
RECAI	Renewable Energy Country Attractiveness Index
REDD+	Reducing emissions from deforestation and forest degradation
SDG	Sustainable Development Goals
SME	Small and medium enterprises
TWh	Terawatt-hour
UFI	(Argentina's) International Financing Unit (Unidad de Financiamiento Internacional)
UN	United Nations

UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
USD	US dollar
WGI	World Governance Indicators
ZEB	Zero Emissions Buildings

About the Annual Investment Report in Latin America and the Caribbean

This report is the first of a series of three reports looking into investments needed to meet the climate mitigation objectives of the Paris Agreement in Latin America and the Caribbean (LAC). The report series focuses on private sector investment, and public policy instruments that can incentivise it, as private sector finance will need to be significantly scaled up to meet the investment needs of a transition to net zero emissions.

The report incorporates findings from Latin America and the Caribbean when it comes to certain data points but focuses predominantly on three countries of the region: Argentina, Brazil, and Peru. The analysis is mostly conducted on these three countries, but findings from the broader LAC region help to provide context and highlight success stories for low and zero emissions developments.

This first edition focuses on the policy landscape needed to enable the transition, identifying key policies at a sectoral and national level to support investments towards a zero emissions pathway in Argentina, Brazil, and Peru. It also considers the required enabling conditions in countries for receiving and using international climate finance flows.

Beyond Chapter 4, we do not exclusively focus on (international) climate finance but rather on all investments, in line with climate objectives. Nevertheless, we also point out specific areas where action is needed to redirect investment from high emissions to low and zero emission activities.

The analysis for this report was mostly conducted between February and May 2021. Developments occurring after this period have mostly not been included. Future editions of this report series, to be released in 2022 and 2023, will focus on investment opportunities that have the potential for transformational change to net zero emissions in specific sectors.



1

Introduction

Reaching the objective of the Paris Agreement to limit global temperature increase to below 1.5°C above pre-industrial levels requires transformational changes in all countries and across all sectors of the economy. Global carbon dioxide (CO₂) emissions need to decrease to net zero by 2050, with other greenhouse gases (GHG) on a similar trajectory shortly thereafter (IPCC, 2018).

This deep transition will require major investments and efforts to make “finance flows consistent with a pathway towards low GHG emissions and climate-resilient development”, as stipulated in Article 2.1 of the Paris Agreement (UNFCCC, 2015a). Globally, investments into clean energy would need to triple during this decade, compared to recent levels, to have a chance to limit warming to 1.5°C (IEA, 2021g). A rapid rechanneling of investments to “shift the trillions” is therefore needed to avoid a lock-in of high emissions infrastructure. In this context, policy signals are fundamental to drive investments in the right direction (IEA, 2021e). Beyond the energy sector, low-emission investments also need to increase drastically across all other sectors, while funding for research and development needs to be promoted, particularly for ‘hard to abate’ mitigation areas.

In this context, a long-term vision in line with the Paris Agreement, coupled with a clear policy framework and incentives are crucial to drive the necessary investments. In parallel with incentivising low and zero- emissions investments, policies are also needed to ensure that investments do not flow into technologies and activities that are not compatible with the objectives of the Paris Agreement. The global message is clear: investment into new fossil fuel projects must end. Electricity generation needs to be rapidly decarbonised and coupled with electrification in end-use sectors. Net deforestation has to be drastically reduced and the emissions intensity of agricultural production needs to decline.

The scale of investments needed is such that public institutions alone will not be able to shoulder it. The private sector will need to play an important role in the move towards net zero emissions. To support this, governments should create an enabling policy environment by providing certainty to investors in the form of clear short- and long-term plans, as well as incentives for mitigation technologies and activities that have not yet reached market maturity.

Governments should create an enabling policy environment by providing certainty to investors in the form of clear short- and long-term plans, as well as incentives for mitigation technologies.

The Latin America and the Caribbean (LAC) region has some advantages when it comes to energy transition and the move to net zero emissions across various sectors. There is an abundance of renewable energy resources, with well-developed hydropower infrastructure, a high availability of bioenergy, and rising investments into wind and solar power. Similarly, the agriculture, forestry and other land use (AFOLU) sector, the region's largest GHG emitting sector, has major mitigation potential.

There are also challenges, however. The LAC region is one of the regions with the highest levels of inequality in the world (IDB, 2020b). There is also a high level of informality, which can render policy implementation more difficult. Additionally, the COVID-19 pandemic has had a severe impact in many countries of the region, adding more pressure onto low-income households (IDB, 2020b). Consequently, there is a need to make sure that the transition to a zero emissions society is inclusive and aligned with the sustainable development goals. The joint task of governments and the private sector in the coming decades will be to stabilise and further reduce emissions while improving living standards for everyone.

The report explores these topics in the following order:

- **Chapter 2** provides a brief description of the current investment environment in Argentina, Brazil, and Peru. This chapter serves to provide context for the chapters that follow, which focus on the conditions and policies for low-carbon investments. Investments typically depend on multiple factors. These include considerations on the national level, such as country risk, as well as context-specific ones, in this case particularly, sector and technology-specific risks. We also consider structural conditions at the national level and describe some of the enabling conditions and barriers against investments.
- **Chapter 3** looks at investment conditions and policies that can support the transition to a low carbon economy in the following six sectors: power, transport, buildings, industry, agriculture, forestry, and other land use (AFOLU), and waste. In this chapter, we analyse the policy environment that may enable (or disincentivise) low-carbon investments in these sectors. In addition, the section provides a general introduction into the global developments needed to meet the Paris Agreement objectives as well as recent developments in the LAC region.

Note: we use the sector breakdown provided by the International Panel on Climate Change (IPCC), except for the energy sector, which we have broken down into power and end-use sectors (transport, buildings, industry) for more specific analysis on policy needs and the developments needed under the Paris Agreement. We have excluded aviation and maritime transport from our analysis. We occasionally refer to the energy sector as a whole (for example when communicating sectoral emissions) if we do not have sufficient data or information broken down into the end-use sectors.
- Last, in **Chapter 4** we examine the main characteristics of the current climate finance architecture in the LAC region, including the sources of climate finance, their magnitude as well as the end-use of funds. We review the governance and planning aspects related to climate finance, as well as existing channels to access climate finance for Argentina, Brazil, and Peru.

Although finance for adaptation and resilience is not included in the scope of this report, it is important to mention that these are also areas where additional investments are urgently needed, both domestically and as part of the international climate finance that is provided to developing countries. While the focus of the report is on investment for mitigation actions, the findings from Chapter 4 can be relevant for adaptation finance as well.



2.

Investment environment

This chapter provides an overview of characteristics related to the investment environment and the financial systems in Argentina, Brazil, and Peru. To this end, it analyses some of the macroeconomic, financial, and political conditions that have an impact on the investment environment, including low-carbon investments. Some of the common indicators can be compared across countries, although this is not the primary objective. The central aim of this chapter is to shed light on the country-specific context under which low-carbon investments could take place.

While some of these conditions are primarily relevant for foreign investors (such as the restrictions around foreign direct investment), many of them are also relevant for domestic investors, as they reflect important aspects of the economy. We have selected indicators to depict these conditions, as listed below.

1. General and macroeconomic indicators, including the following:

- Population, using data from the United Nations (UN). This indicator puts the other macroeconomic and financial indicators into perspective, with Brazil having a population over six times that of Peru and almost five times that of Argentina.
- Gross domestic product (GDP) and GDP growth, with data from the World Bank. High GDP or increasing GDP gives an indication of economic activity in the country. Higher economic activity tends to lead to more opportunities for investment.
- Inflation, using data from the International Monetary Fund (IMF). The lower the inflation rate is, the more attractive it is for international investors to make investments in the local currency, thanks to a lower exchange rate risk. High levels of inflation could indicate short- or medium-term imbalances in the economy. On the other hand, high inflation can in some cases be conducive to some types of investments for domestic investors, particularly when it comes to physical assets, such as real estate, that can provide a hedge against inflation.

2. Indicators linked to the financial, business, and political environment, based on renowned indices and rankings:

- Sovereign credit ratings, which assess the credit worthiness of a government, i.e., its ability to pay back its debt. A country's sovereign credit rating is an important factor that investors consider when investing in sovereign bonds particularly, but international investors often use the sovereign credit rating as an indication of country risk in general. The main rating agencies are Moody's, Standard & Poor's, and Fitch Ratings. In this report, we present ratings by Fitch Ratings.
- Ease of Doing Business, an internationally well-known and recognised ranking for private businesses showing investment and business conditions on a country level, determined by sorting the aggregate scores on ten equally weighted topics, such as starting a business, dealing with permits, protecting investors, etc.
- Gross domestic product (GDP) and GDP growth, with data from the World Bank. High GDP or increasing GDP gives an indication of economic activity in the country. Higher economic activity tends to lead to more opportunities for investment.
- Foreign Direct Investment (FDI) restrictiveness index by the Organisation for Economic Co-operation and Development (OECD). FDI rules and restrictions are an important determinant of a country's attractiveness to foreign investors. This index looks at foreign equity restrictions, some discriminatory screening or approval mechanisms, restrictions on key foreign personnel and operational restrictions.
- The corruption perception index by Transparency International. High levels of corruption and a lack of transparency can lead to investors shying away from investing.

- The political stability index, which is part of the World Governance Indicators (WGI) database of the World Bank. The political stability index measures the perceptions on the likelihood of political instability, violence, terrorism, which in turn could influence the perceived safety of investments.
- The regulatory quality index, which is also part of the World Bank's WGI database. This index measures the perception of a government's ability to formulate and implement sound policies and regulations to promote private sector development.

After the overview of the indicators mentioned above, we provide a brief description of the financial system in each of the three countries, with details on the different sources of financing for the private sector and low-carbon investments, where available. Most of the elements discussed in this chapter are structural in nature and although they also impact climate-related investments, they are typically beyond the realm of climate policy interventions. Understanding the general barriers to increased investment can however help shape more effective policy interventions. Chapter 3 looks in more detail at various policy interventions to foster low-carbon investments.





2.1 Argentina

Investment environment

With a population of around 45 million, Argentina is the fourth largest country in Latin America after Brazil, Mexico and Colombia and has the third largest GDP in the region. At USD 9,900 in 2019, Argentina's GDP per capita is slightly above the average in Latin America and the Caribbean (USD 8,900 in 2019), and is the highest among countries assessed in this report (World Bank, 2021a). Before the COVID-19 pandemic, the Argentinian economy intermittently experienced years with negative growth. In 2019, it contracted by 2.1% and inflation reached 54% (see indicators in Table 1).

At USD 9,900 in 2019, Argentina's GDP per capita is slightly above the average in Latin America and the Caribbean.

The economic impact of the COVID-19 pandemic has been significant in Argentina, with GDP decreasing by 9.9% in 2020, the highest drop since the 2001–2002 crisis (World Bank, 2021a). As a result, socioeconomic conditions have also worsened. Urban poverty is high, reaching 41% of the population in the first half of 2020, and extreme poverty reached over 10% and child poverty stood at 56% (World Bank, 2021b). The government has put forward substantial economic measures to counter the negative impacts of COVID-19, representing 6% of GDP in 2020. None of these measures explicitly targeted a sustainable, low-emissions recovery (Climate Action Tracker, 2020a).

The economic impact of the COVID-19 pandemic has been significant in Argentina, with GDP decreasing by 9.9% in 2020, the highest drop since the 2001–2002 crisis.

The national debt and interest burden of Argentina is high, but its fiscal position improved somewhat, following a debt restructuring process that was initiated in 2020. In 2020, Fitch gave Argentina a 'CCC' sovereign credit rating, a rating that was maintained in early 2021, despite the debt restructuring. This rating reflects a 'substantial credit risk' with a possible defaulting risk. In the World Bank's 2020 Ease of Doing Business assessment, Argentina ranked 126 out of 190 countries evaluated, just behind Brazil and Paraguay. Argentina performed poorly particularly under the categories 'paying taxes', 'dealing with construction permits' and 'starting a business' but ranked in the top third of countries for protecting minority investors.

The Argentinian government has few restrictions around foreign direct investment. Despite this, inflows have been relatively unstable in the past years, notably due to macroeconomic imbalances. In 2019, FDI inflows decreased from roughly USD 12 billion in 2018 to USD 6.7 billion, and represented 1.5% of GDP (World Bank, 2021i). Analysis by the UN Environment Programme estimated total sustainable FDI at USD 4.9 billion in

2017, representing a little over a third of all investments classified as sustainable (i.e., excluding oil and gas, mining and carbon-intensive manufacturing) and close to half of total net FDI inflows to Argentina in that year (UNEP, 2018). It is however important to note that this definition of sustainable FDI is not necessarily in line with transformations required to decarbonise the economy.

Political and regulatory considerations also have a significant impact on investment decisions and

the investment environment overall. **Corruption in Argentina is still perceived to be relatively high, although it has steadily decreased over the past years** (Transparency International, 2020). Argentina ranks comparatively low when it comes to political stability, and is well behind neighbouring Chile and Uruguay (World Bank, 2020d). It also ranks low in terms of regulatory quality, a factor that is partly also reflected under the Doing Business index.

Table 1: Overview of macroeconomic and investment-related indicators in Argentina

Indicator	Unit	Value in 2019	Difference to 2018
1 Population	Million	45	↑
2 GDP level	USD billion (current)	445	↓
3 GDP growth	Average annual growth rate of GDP	-2.1%	↓
4 Inflation (historical)	Average change in consumer price index	54%	↑
5 Sovereign credit rating	Rating	CCC	↔ ¹
6 Ease of Doing Business	Ranking	126 / 190	↓
7 FDI restrictiveness	Index 0 (open) 1 (closed)	0.03	↔
8 Corruption perception index	Ranking	66 / 180	↑
9 Political stability index		43	↓
10 Regulatory quality index	Percentile rank among all countries, ranges from 0 (lowest) to 100 (highest) rank	34	↓

¹ For the sovereign credit rating the latest value is from 2021 and is compared to a previous assessment by Fitch Ratings in 2020.

Domestic public finance currently represents a large source of sustainable finance (defined by UNEP as finance in line with the sustainable development goals) but private finance will need to substantially increase to meet the sustainable investment needs for decarbonising the economy, given government fiscal constraints and the scale of investments needed (UNEP, 2018).

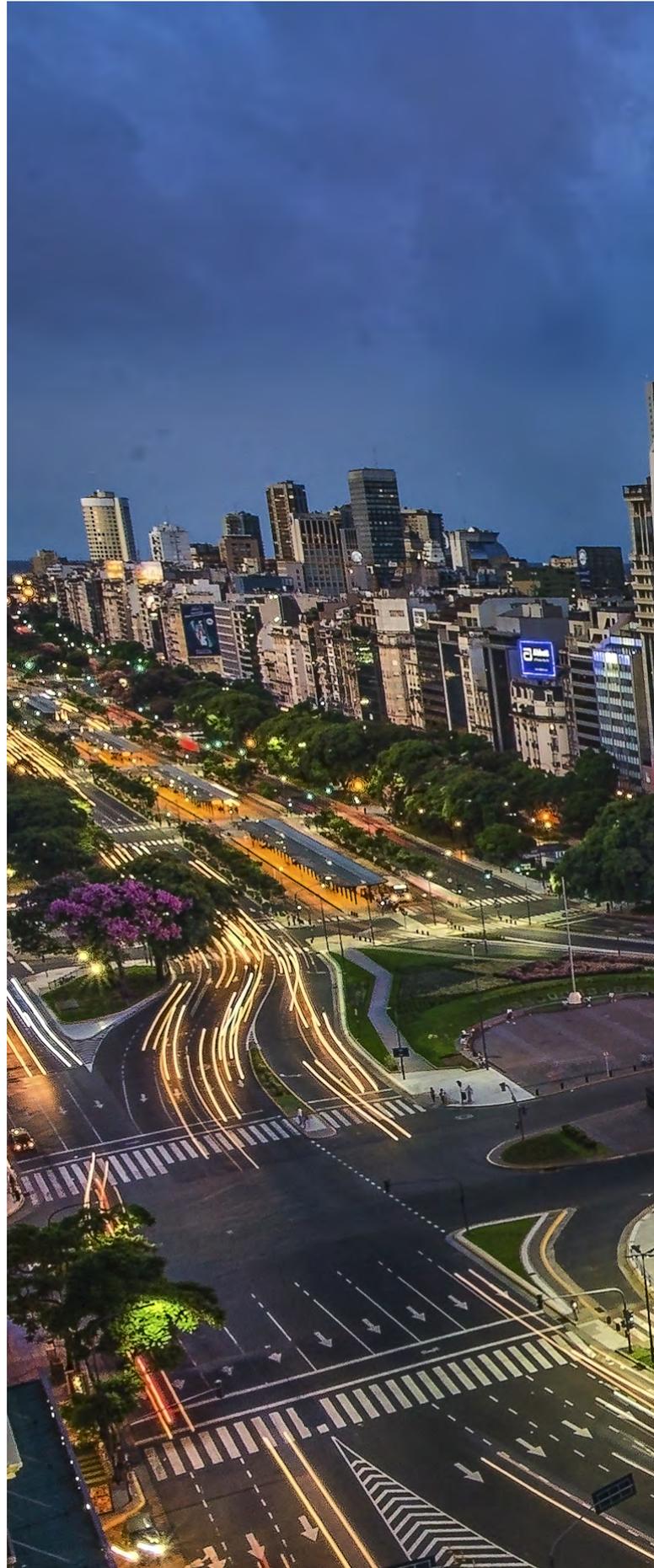
In order for private investment to increase, a well-working financial system is needed. The major actors

in Argentina's financial sector are banks and the Sustainability Guarantee Fund (FGS), the country's sovereign pension fund and largest institutional investor. **Credit from banks extended to the private sector has been increasing, but at around 15% of GDP, it remains low compared to a regional average of roughly 40% of GDP** (UNEP, 2018). Total credit to the private sector, based on economic activities include primary production (17%), industry (14.6%), services (15.7%), commerce (9.7%), construction (2.6%), and electricity, gas and water (2.1%), with the rest constituting

finance to private individuals and households (Central Bank of Argentina, 2021).

Corporate bond issues, mostly by large corporates, rose momentarily in 2016–2017 but have since decreased again. Credit to SMEs is particularly scarce and these firms largely rely on their own equity to fund their investments. Argentina also has comparatively small capital markets, with stock market capitalisation at roughly 12% of GDP in 2018 (UNEP, 2018).

The identification and management of climate-related risks is still at an early stage in the financial sector. In 2019, a group of 19 banks, providing 75% of all bank loans in Argentina, launched the Sustainable Finance Protocol to better incorporate economic, environmental and social factors and move towards sustainable finance (BNamericas, 2019). In 2017, the stock exchange BYMA joined the Sustainable Stock Exchange Initiative, which requires companies to report on environmental, social and corporate governance (ESG) information, but it is unclear to what extent BYMA requires companies to report on climate-related risks, if at all. In 2019, the National Securities Commission (CNV) presented guidelines for the issuance of green, social and sustainable bonds.





2.2 Brazil

Investment environment

Brazil is the largest and most populous country in the LAC region, with over 210 million inhabitants, or a third of the region's population (World Bank, 2021k). It is the world's fifth largest country by area and the sixth most populous. Brazil is an upper middle income country, with a GDP of more than USD 1.8 trillion in 2019 and GDP per capita of around USD 8,700 (World Bank, 2021j).

Brazil has a GDP per capita of around USD 8,700—close to the average in Latin America and the Caribbean.

It is the world's ninth largest economy, and its GDP represents a third of the LAC region. However, Brazil's GDP has been on a downward trend since it reached an all-time high at USD 2.6 trillion in 2011. Brazil's economic recession in 2014 to 2016 has accentuated the decline in GDP (World Bank, 2021j).

The COVID-19 pandemic hit Brazil severely and it still faces the challenge of getting the sanitary situation under control. In 2020, its GDP contracted by 4.1% (World Bank, 2021j). This is lower than in other countries of the region, mainly thanks to a large stimulus package amounting close to 12% of its GDP (IMF, 2021).

Brazil released emergency financial aid to the low-income population in the form of monthly payments amounting to USD 830 (BRL 4200) in 2020; and another four payments of USD 55 (BRL 275) on average in 2021. This has resulted in government expenses in the order of close to USD 60 billion (BRL 293 billion) in 2020 and USD 9 billion (BRL 44 billion) in 2021.

The government announced that it may extend the COVID-19 financial aid further in 2021 if required, as the constitutional mechanism of acknowledgement of public calamity could waive the public budget expenditures cap. The aftermath of the 2014 economic recession and the COVID-19 pandemic are leaving more Brazilians in poverty now than there were in the decade before and they have accrued social inequality (World Bank, 2020c; Economia, 2021; Reuters, 2021b). The country does not seem to pursue a green economic recovery (Climate Action Tracker, 2020b).

Brazil has a large and diverse economy, however it is also dependent on the export of commodities and economic productivity has been declining (Reuters, 2019; FitchRatings, 2020). Its GDP per capita is slightly above average values for upper middle income and BRICS countries and its inflation rate has been relatively stable since 2017 (between 3.3% and 3.7%) (FitchRatings, 2020; World Bank, 2021g).

GDP contracted by 4.1% in 2020—less than in other countries of the region, thanks a large stimulus package.

However political uncertainty, a certain level of corruption (including several corruption scandals and impeachments in the past years), legal insecurity, social inequality, and high debt levels (government debt accounted for 89.3% of GDP by the end of 2020), negatively impact Brazil's macroeconomic environment (see indicators in Table 2) (FitchRatings, 2020; Reuters, 2021d). Furthermore, the exchange rate of the Brazilian real to the US dollar depreciated by

about 30% in 2020, despite interventions by the central bank to stabilise it (IMF, 2021).

As a result, Brazil has a credit rating of “BB-”, or an “elevated vulnerability to default risk”. Despite expectations of an economic recovery in 2021, debt levels that remained high led to a negative outlook (FitchRatings, 2020).

In the World Bank’s 2020 Ease of Doing Business assessment, Brazil ranks 124 out of the 190 countries evaluated. Brazil performs relatively well in ‘protecting minority investors’ and ‘enforcing contracts’, but performs poorly under the categories of ‘paying taxes’, ‘getting credit’, resolving ‘insolvency’ and ‘dealing with construction permits’ (World Bank, 2021e).

Table 2: Overview of macroeconomic and investment-related indicators in Brazil

Indicator	Unit	Value in 2019	Difference to 2018
1 Population	Million	211	
2 GDP level	USD billion (current)	1840	
3 GDP growth	Average annual growth rate of GDP	1.1%	
4 Inflation (historical)	Average change in consumer price index	3.7%	
5 Sovereign credit rating	Rating	BB-	 ²
6 Ease of Doing Business	Ranking	124 / 190	
7 FDI restrictiveness	Index 0 (open) 1 (closed)	0.08	 ³
8 Corruption perception index	Ranking	106 / 180	
9 Political stability index	Percentile rank among all countries, ranges from 0 (lowest) to 100 (highest) rank	25	
10 Regulatory quality index		48	

² For the sovereign credit rating the latest value is from 2020 and is compared to a previous assessment by Fitch Ratings in 2018.

³ Please note that a lower value for this indicator represents an improvement.

With Brazil's government in need of a fiscal consolidation to address its high debt levels, many see a stronger role for the private sector to boost investments for an economic recovery (Reuters, 2019; BNamericas, 2020a; Hammad, 2020). The government has launched a Privatisation and Concessions Program and actively seeks to spur private investments (BNamericas, 2020a). In Brazil, private investments were historically associated with public investments, either through public-private partnerships (PPPs), or through subsidised (concessional) debt, mainly disbursed by the National

Development Bank (BNDES) (Yamahaki et al., 2020). Subsidised debt, in combination with low savings in the private sector has crowded out private debt (public funds outcompete private funds), leading to higher interest rates for private funds (Hammad, 2020). More recently, companies have turned to emerging capital markets (equity financing) to raise funds (BNamericas, 2020c). The current government decided to reduce the prominent role of BNDES and to open more space for private funds; notably through bond issuance for infrastructure projects (Ministry of Economic Affairs, 2021, p. 23).

Brazil was the ninth largest recipient of foreign direct investment (FDI) volumes worldwide in 2019 (UNCTAD, 2020). Brazil's regulatory framework is generally open to FDI⁴. The LAC region, including Brazil, has largely received FDI for its extractive industries, and with falling commodity prices, FDI volumes decreased by 40 to 55% in the region in 2020 (UNCTAD, 2020). Nevertheless, FDI in Brazil also includes investment flows to energy utilities and services, such as the tourism sector, and the LAC region became a hotspot for FDI in renewable energy in 2019 (UNCTAD, 2020).

Unfavourable investment conditions and an unfavourable business environment impeded private sector investments, both for domestic and international investors. This led to the cancellation or postponement of investments such that private sector investment has been generally declining (UOL, 2021). High debt interest rates from private banks, limited access to long term capital for small and medium enterprises (SMEs), high competition barriers through subsidies or entry and trade barriers, and deficiencies in the legal and judicial system did not provide the required investment environment to spur private sector investments (Hammad, 2020).

There is evidence that climate change-related risks are understood in Brazil's finance sector, but the extent to which such considerations influence investment decisions is unclear. Since 2014, the National Monetary Council (CMN) has required financial institutions to publish environmental and social governance (ESG) strategies and thus report their exposure to social and environmental risks (Resolution CMN No. 4,327) (Central Bank of Brazil, 2021). ESG reporting was further strengthened for Brazilian pension funds in 2018 (Resolution No. 4,661) (Government of Brazil, 2018). In 2021, the Central Bank released a new regulation for public consultation about stress tests to be met by financial institutions incorporating ESG and climate criteria (public consultation No. 85/2021) (Government of Brazil, 2018; Central Bank of Brazil, 2021). Furthermore, **some of Brazil's financial regulators are important actors in international sustainable finance initiatives, such as the G20 Sustainable Finance Study Group or the Sustainable Banking Network**. Brazil's finance sector has also launched voluntary initiatives to redirect finance flows towards sustainable, climate-friendly

investments. For instance, Brazil's stock market is one of the five founding members of the Sustainable Stock Exchanges initiative and Febraban, the Brazilian banking association, has released a green taxonomy (IDB, 2019a; Febraban, 2021).

4 On a scale from 0 (open) to 1 (closed), all of Brazil's economic sectors score under 0.1, with the notable exceptions of 'media', 'radio & TV broadcasting' and 'other media', which all score above 0.4.



2.3 Peru

Investment environment

Peru is the third largest country in terms of land area in South America, after Brazil and Argentina (EY, 2020a). With 33 million inhabitants, it is among the five most populous countries in Latin America.

Peru has been one of the fastest growing Latin American economies in the past twenty years. The poverty rate decreased from 52% in 2005 to 22% in 2018 and the per capita income constantly increased, reaching **nearly USD 7,000 in 2019**, slightly below the levels of Argentina and Brazil (World Bank, 2020b; Macrotrends, 2021). It's important to mention that income growth did not reduce aggregate inequality problems, especially among regions since 2012 (BCRP, 2020). Its Gross Domestic Product (GDP) averaged 6% growth from 2002 through 2013, then slowed to 2.5% then grew to 4% between 2014 and 2018, and in 2019 grew by 2.2%, above the 0.8% regional average (see indicators in Table 3) (USAGov, 2020; World Bank, 2020a).

Peru's GDP per capita has been steadily increasing, reaching nearly USD 7,000 in 2019.

As a result of the COVID-19 pandemic's economic impacts, Peru's GDP declined by 11% in 2020 (World Bank, 2021d). The government announced a USD 27 billion stimulus plan to jump start the economy, which amounted to 12% of GDP (USAGov, 2020). While the domestic budget is prioritising rescue and stabilisation measures, country partners such as KfW are supporting green recovery measures through a EUR 250 million loan with the national development

bank COFIDE to promote climate-friendly investments to support SMEs (COFIDE, 2020a). The IMF projects a rebound in 2021, with an estimated 5.2% GDP growth, which would be the second highest rate in the region (USAGov, 2020). The projected growth is expected to come mostly from the construction sector and related activities supporting infrastructure development.

As a result of the COVID-19 pandemic's economic impacts, Peru's GDP declined by 11% in 2020.

Peru's economic development in recent decades and positive prospects for a recovery from the pandemic can be attributed to its macroeconomic stability, considering its relatively low inflation rate (of 2.1%) in 2019, robust levels of international reserves (of USD 68.3 billion), a controlled fiscal deficit (of 1.6% of GDP) and public debt (with government debt as a percentage of GDP of 26.8% in 2019) (EY, 2021a). The key for this development has been the steady prudent fiscal policies, structural reforms and sound macroeconomic policies of the last 20 years (USAGov, 2020). This is also reflected in the country's average to good government debt rating which is used by investors to gauge the credit worthiness of a country. The rating indicates, however, that problems can be expected if the overall economy deteriorates.

Peru ranked 76 out of 190 in the World Bank's 2020 Doing Business Report, and sixth in the Latin America and Caribbean region, and is, together with Colombia, the only South American country in the top ten in the

region. However, this is a decline when compared to the previous year when Peru ranked 68th globally. In 2020, Peru performed particularly well when it came to 'protecting minority investors' and 'registering property'. In a regional country comparison, Peru performs relatively poorly in the category of 'starting a business' and 'trading across borders'.

In 2019, private investment comprised more than two-thirds of Peru's total investment (USAGov, 2020). The government plans to further spur private investment through fiscal measures equivalent to 20% of GDP (EY, 2020a).

Table 3: Overview of macroeconomic and investment-related indicators in Peru

Indicator	Unit	Value in 2019	Difference to 2018
1 Population	Million	33	
2 GDP level	USD billion (current)	227	
3 GDP growth	Average annual growth rate of GDP	2.2%	
4 Inflation (historical)	Average change in consumer price index	2.1%	
5 Sovereign credit rating	Rating	BBB+	 ⁵
6 Ease of Doing Business	Ranking	76 / 190	
7 FDI restrictiveness	Index 0 (open) 1 (closed)	0.08	
8 Corruption perception index	Ranking	101 / 180	
9 Political stability index	Percentile rank among all countries, ranges from 0 (lowest) to 100 (highest) rank	42	
10 Regulatory quality index		48	

⁵ For the sovereign credit rating the latest value is from 2020 and is compared to a previous assessment by Fitch Ratings in 2018.

To promote investment in all sectors of the economy, the government established an enabling environment to attract foreign and domestic investment in equal conditions.

Peru is relatively open to trade with its neighbours and the rest of the world, and is the fourth recipient of FDI in Latin America. According to the United Nations Conference on Trade and Development (UNCTAD), FDI inflows increased from USD 6.5 billion to USD 8.9 billion between 2018 and 2019 (UNCTAD, 2020). In addition to the favourable legal and fiscal environment, Peru's natural resources and the mining sector, were the main reasons for the increased investment in recent years, and these

also attracted nearly 25% of FDI (Santander, 2021). Peru is the world's second copper producer and its extractive industry accounts for over 15% of its GDP (Reuters, 2021c).

Some potential barriers to investing in Peru include a high vulnerability to commodity prices, a lack of infrastructure, political instability, and corruption (Santander, 2021).

At the time of publication of this report, Peru is experiencing a period of political uncertainty. Between 2016 and 2020, two presidents were removed on corruption charges. After a political turmoil with three presidents in one week in 2020, general elections were

held in April 2021, leading to a runoff election in June between the socialist Pedro Castillo and Keiko Fujimori, a free-market proponent and daughter of ex-President Alberto Fujimori, who is currently in prison for human rights crimes and graft (Reuters, 2021c).

At the moment, Peru has a relatively favourable investment environment. However, there are still some considerable challenges related to low-carbon investments. Although all listed companies and issuers were required to provide ESG reporting from 2015 onwards, there is still a lack of incentives and regulations to incorporate climate-related criteria and risk assessments in financial modelling and in the decision-making process for investments (MEF, 2015; EY, 2017). The Climate Change Law, adopted in 2018, and other regulations may help by providing the necessary guidelines to incorporate climate criteria into policy and planning tools. The Superintendency of the Securities Market (SMV) expresses its support for initiatives such as the recommendations of the Task Force on Climate-Related Financial Disclosures which proposed to organisations to adopt a voluntary and flexible disclosure framework on the implications of climate change for their business. There are also private initiatives coming from the financial sector (Protocolo Verde, Programa de Inversión Responsable), looking to promote the best practices regarding climate risk management and the financing of mitigation and adaptation through the development of new products and services.

In addition, a very important part of the economy is dependent on credits through the intermediary market (banks, microfinance institutions, etc). However, there are several obstacles in place such as relatively high levels of collaterals to access credits that prevent the capital markets from developing their full potential and tap into opportunities related to low-carbon and resilient investments. Infrastructure investment, which can be considered a major engine for economic and social development, currently accounts for less than 2% of GDP (Infralatam, 2019). Excluding the effects of the Reactiva Peru Program, which the government initiated in response to the pandemic, total credit to the private sector would have fallen by 6.8% year-on-year. However, due to the above mentioned program, credit to the private sector grew by 9.3% year-on-year in April 2021 (Andina, 2021).

Finally, Peru needs to address the financial inclusion challenge which is closely linked to its relatively highly informal economy to further spur low carbon

investments. **Even if SMEs employ almost 50% of the employable population, and their sales represent almost 20% of the GDP, less than 7% of SMEs access credit via banks** (World Bank, 2019a). In addition, it is worth highlighting that the topic of climate change is relatively unknown among SMEs and there are currently limited incentives or targeted policies to spur low-carbon investments by these actors.



3. Sectoral policy framework for low-carbon investments

Background

Reaching the long-term temperature targets under the Paris Agreement requires unprecedented systemic transformations and action across all sectors. Policies are fundamental for incentivising investments and creating markets for new technologies, as well as ensuring that externalities are accounted for (Gupta et al., 2007). This chapter of the report focuses on policies that have the potential to contribute to decarbonising the economy. Often, single policies do not suffice, and comprehensive policy packages need to be put in place to kick-start a rapid and wide-ranging system transformation (Hagemann et al., 2017). Policy intervention can thus support reaching so-called transformation points, which describe the moment when a previously novel technology, behaviour or market model achieves critical mass and is about to become the new normal. However, even after the transformation point is reached, some

effort (e.g., policy support or financial incentives) may be needed to speed up the take-off and market penetration to avoid sliding back to the old system (Climate Action Tracker, 2019).

Only a few mitigation technologies have reached the transformation point. One example is renewable energies in the power sector where generation costs of (certain types of) renewable energy (in some countries) plus storage reached parity with either new or existing fossil fuel sources (Climate Action Tracker, 2019). Even there, however, policy frameworks such as auctioning schemes still play a significant role in creating a level playing field. There are numerous examples of mitigation technologies which are at an infant stage of development, such as the electrification of freight vehicles or zero energy buildings. Other options such as the electrification of passenger

vehicles are a bit more advanced. However, they are still far from reaching up-front cost parity with conventional cars. As only few technologies have reached full market maturity yet and/or face barriers; a concerted policy effort at the national level and the design of sector-specific policy packages is still needed across all sectors to trigger public and private investments. This is particularly important as the individual technologies and policy instruments to achieve these transitions already exist in many sectors, but have often not been brought together in ambitious policy packages (NewClimate Institute, 2019; REN21, 2020).

Methodology

This section presents an array of overarching and sector-specific good practice policies⁶ that have to date been most successful at triggering the sectoral transformations, and corresponding investments, needed to decarbonise our economies; in line with the 1.5°C temperature goal of the Paris Agreement (Climate Action Tracker, 2019). In addition to one cross-cutting, economy-wide section, the section covers the power, transport, buildings, industry, waste and agriculture, forestry, and other land use (AFOLU) sectors.

For each sector we assess policies across three categories:

1. Investor signals and targets.
2. Policies and incentives for low-emissions investments.
3. Support for divesting from fossil fuels or high-emissions activities.

⁶ These policies have been informed by the good practice policy menu in the Climate Policy Database (NewClimate Institute, 2019) and the Allianz Climate and Energy Monitor (Allianz Climate Solutions, NewClimate Institute and Germanwatch, 2018), along with various sector-specific reports.

These categories cover different instrument types⁷, such as:

- Target setting at the national or sectoral level (e.g., for economy-wide emissions or the share of renewable energy), which has proven to play an important role in providing signals for actors on where to invest in the medium- to long-term.
- Regulatory instruments, such as standards or binding quotas, that set a clear development trajectory for technologies.
- Fiscal and financial incentives that provide direct support for technologies that have reached the deployment phase but are not yet competitive with incumbent technologies.
- Research and development (R&D) instruments, that are often needed for mitigation technologies which are not yet commercially viable.
- Carbon pricing and high-carbon subsidy removal, which are fundamental to levelling the playing field and addressing externalities.

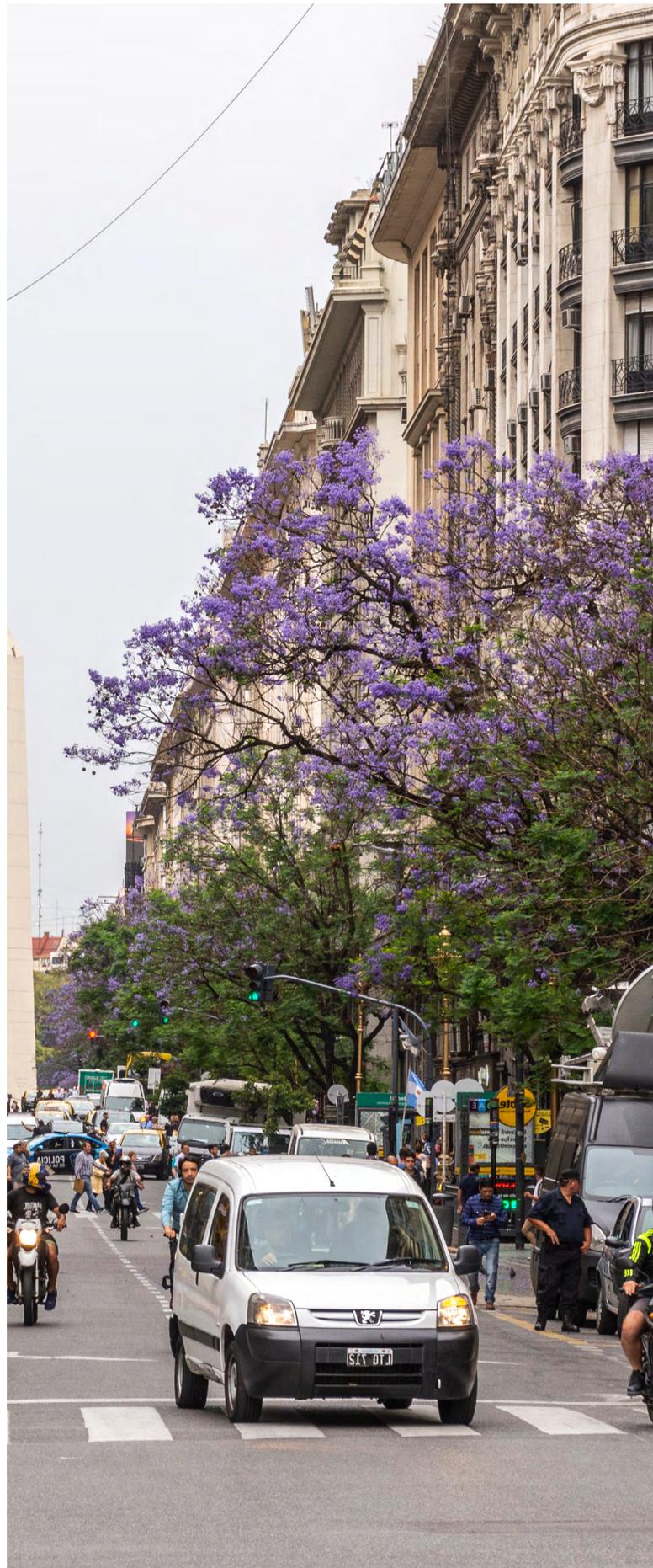
Most policies are assessed on a simple 'yes/no' basis (i.e., either the policy is in place or not). For some policies where further detail is necessary, we have applied a medium scale to capture policy coverage for example. In most cases, we do not analyse the quality or ambition of a policy, as this would require more in-depth sectoral analysis. This level of analysis is planned to be done in subsequent editions of this report (the 'deep dives'). In addition, we consider only national policies in our assessment and accordingly do not include sub-national, local policies or instruments in our assessment.

Please note that we do not include policies that have a more indirect impact on investments, such as information instruments, even though these can also play an important role in policy packages. We also focus on policies that are needed for transformational changes in the various sectors. As such, we do not focus on policies to support bridge fuels and technologies (e.g., natural gas). In addition to the overview of the policy landscape,

⁷ See for instance (Whitley et al., 2018).

the section aims to provide an indication of the ongoing investor activity and past and projected future sectoral developments in the three countries. Since the type of investment needed to decarbonise differs for each sector and since investment data is not always available or is difficult to obtain, we use proxies for the uptake of low-carbon technologies (such as installed capacities for renewable electricity, the number of electric vehicles in new car sales, etc.), or emissions intensity trends in the sectors to describe the status of investment of each sector. To complement the overview of the status of low-carbon investments, we include a broad mapping of the main low- and high-emissions assets across each sector, pairing them with actors that typically invest in them.

A concerted policy effort at the national level and the design of sector-specific policy packages is needed across all sectors to trigger public and private investments.





3.1 Economy-wide

Global overview

In pathways limiting global warming to 1.5°C with limited or no overshoot, **global CO₂ emissions should reach net zero around 2050, and decrease by around 45% by 2030**, compared to 2010 levels (IPCC, 2018). Other GHG emissions also need to rapidly decrease by mid-century. This will require substantial transformations and investments across all sectors. **For the energy transition alone, around USD 4 trillion would need to be invested yearly in 2021–2050, up from USD 820 billion yearly in 2017–2019** (IRENA, 2021b). This includes, among others, investments in renewable energy systems, electricity grids, storage capacity and energy efficiency in transport, buildings, and industry. With a global economy strongly affected by the COVID-19 pandemic, sustainable recovery packages are needed to steer investments in the right direction and avoid the lock-in of high-emission infrastructure. The packages put forward so far have, however, not sufficiently focused on low-carbon activities and technologies (IRENA, 2021b).

Overview in Latin America

The emissions structure in Latin America and the Caribbean is very different compared to global emissions. **The agriculture, forestry, and other land use (AFOLU) sector plays a major role in the LAC region, whereas energy is the dominant source of GHG emissions at a global level.** This is partly due to the power sector having a lower emissions intensity level in the LAC region, thanks to vast hydropower resources, but also due to the important role of agriculture, with livestock being a major driver of emissions, as well as high levels of deforestation in some countries, as the LAC region is one of the main exporters of agricultural

products. The emissions share of the waste sector (6 is also double that of global levels (3%). On the other hand, the share of industry emissions (4%) is somewhat below global levels (6%).

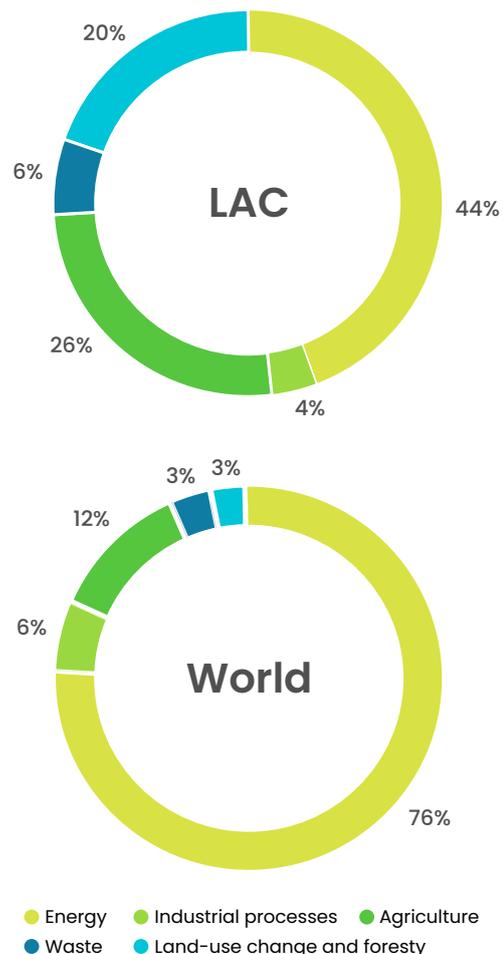


Figure 1: Share of emissions across sectors in Latin America and the Caribbean and the world in 2018 (WRI, 2021)

Moving to net-zero emissions can and needs to happen in line with the sustainable development goals. Research shows that a net-zero pathway can be economically beneficial. A coupled net-zero transition in the power and transport sector, for example, could save around USD 620 billion yearly by 2050, thanks to reduced costs for electricity, transport and healthcare (UNEP, 2020). The International Labour Organization (ILO) and Inter-American Development Bank (IDB) estimate that a net-zero transition could create up to 22.5 million jobs in Latin America and the Caribbean by 2030 (Saget, Vogt-Schilb and Luu, 2020). With 7.5 million jobs lost in fossil fuel-related activities and animal-based food production, the net employment gains would amount to 15 million. There are also a number of opportunities for investing in low emissions areas. Many countries in the region have abundant renewable energy resources, including hydropower but also wind, solar and bioenergy (for more details see section 3.2 on the power sector). The high renewable energy availability and other enabling resources, including lithium for battery production for example, also create opportunities for an integrated energy transition in the power, transport, buildings, and parts of the industry sector. On the other hand, the LAC region is also home to vast fossil fuel reserves, particularly oil and natural gas. In Paris-compatible scenarios, investment into new productions of fossil fuels however needs to be reduced and phased out, together with plans to minimise negative impacts on public finances and employment, for example in conjunction with a long-term strategy (IDB and DDPLAC, 2019).

A net-zero transition could create up to 15 million net jobs by 2030.

Low-carbon investments and developments in Argentina, Brazil, and Peru

Key developments and investments across the six sectors analysed under this chapter can be found in the corresponding sector sections below.

In Argentina, Brazil, and Peru, low-emissions investments have focused on renewable energy, primarily hydropower and bioenergy (the latter particularly so in Brazil), and more recently, other sources such as wind and solar. Each of them have also invested substantial funding into afforestation or reforestation, but there have also been challenges with deforestation. All three countries have also made major investments into public transportation. Green bonds have been one of the most visible economy-wide instruments to attract finance to low-carbon investments in Argentina, Brazil, and Peru, although total investment levels remain low compared to investment needs. Brazil in particular has seen a surge in the issuance of green bonds in the past decade, amounting to USD 5 billion by 2019 (CBI, 2019). It is however important to mention that not all green bonds are necessarily compatible with the Paris Agreement's climate objectives. Green bonds certified as 'climate bonds' by the Climate Bonds Initiative are labelled as consistent with the 2°C temperature limit, but there is at this stage no certification for bonds consistent with the 1.5°C temperature limit. Another important economy-wide instrument is carbon pricing. At this stage, only Argentina has put a carbon tax in place (see Table 4).

Policy framework

Economy-wide policies and incentives are important to complement sector specific policies and incentive⁸. Table 4 gives an overview of economy-wide investor signals, targets, policies and incentives for low-carbon investments in Argentina, Brazil, and Peru.

⁸ One instrument that can either be applied on a cross-sectoral or a sectoral level is (green) public procurement, which public authorities can use to meet their environment-related targets, set an example to private consumers and raise awareness among the society of environmental issues.

Table 4: Policy framework assessment – economy-wide

Policy	Assesment			
Investor signals and targets				
National climate strategy and action plan	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Short- to medium-term target or plan in place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> Medium and long-term target and plan in place			
Net-zero emissions commitment	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Announcement has been made	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place			
National renewable energy plan and target	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Target in place but no plan	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> Target and plan in place			
National energy efficiency plan and target	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Target in place but no plan	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> Target and plan in place			
Policies and incentives to invest in low-carbon technologies				
Green COVID-19 economic recovery package(s)	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for one sector or a specific technology	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place for multiple sectors			
Public leveraging tools to attract private investment to low-carbon technologies	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> At least one tool in place or under development	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place			
Economy-wide national carbon pricing scheme, or covering at least 80% of emissions	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place covering less than 80% of emissions	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place covering at least 80% of emissions			

Policy	Assesment			
Policies and incentives to divest from fossil fuels				
Clear plan with measures to phase out fossil fuel subsidies	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Policies and incentives to enhance carbon sequestration and negative emissions				
Policies and incentives supporting the development of BECCS	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support for low-emission and negative emission RD&D	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for one technology	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for several technologies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Investor signals and targets

All three countries have a **medium-term climate strategy**, included in the countries' updated Nationally Determined Contributions (NDCs), submitted as part of the 2020 NDC update process. While the NDC submitted by Argentina and Peru contain stronger targets, Brazil did not increase its ambition compared to the previous NDC (Climate Action Tracker, 2021a).

While none of the countries has a long-term strategy in place, Argentina and Peru are working towards a **net-zero commitment**, as part of the long-term strategy that both countries plan to present at the 26th Conference of the Parties (COP26). While there is no evidence of a long-term strategy being developed in Brazil, its updated NDC entails an announcement, that the "current [medium-term] target is consistent with an indicative long-term objective of reaching neutrality by 2060" (Government of Brazil, 2020a). In April 2021, Bolsonaro announced that Brazil would reach emissions neutrality by 2050 (Reuters, 2021a). There are examples of sub-national net zero commitments, such as in the City of Rio de Janeiro, which however is not included in this assessment.

National renewable energy as well as **energy efficiency plans, and targets** play a significant role in informing investment decisions. When backed by supportive policy and investment frameworks, they can provide long-term visibility to industry and other stakeholders, a critical ingredient in stimulating deployment at scale. Renewable

energy and energy efficiency targets contribute to developing a clearer vision for the development of the sector and enable stakeholders to allocate resources more effectively (IRENA, 2015).¹⁴

 Argentina has set a renewable energy target of 16.3% over final energy consumption for 2030 and an energy efficiency target of 0.098 ktoe/million ARS for 2030 (Government of Argentina, 2020d). There is also a National Energy Efficiency Plan under development (CAT, 2019).

 Brazil is the only country out of these three, that has both a national renewable energy plan and a target in place. The country's NDC and 10-Year Energy Expansion Plan 2030 targets a share of 45% renewable energy in the primary energy mix by 2030 (Climate Action Tracker, 2020c; Ministry of Energy and Mines, 2020). The country's National Energy Plan 2050 (PNE) builds on this, setting a target of reaching 45-50% renewable energy in the primary energy mix by 2050 (Ministry of Mines and Energy of Brazil, 2020). There is no national economy-wide energy efficiency target in force, but a plan is included in the 2030 and 2050 National Energy Plans (Ministry of Energy and Mines, 2020; Ministry of Mines and Energy of Brazil, 2020).

 Peru has announced that by 2040 renewable energy resources will represent 20% of energy produced in the country, without however presenting a clear plan to reach that target (CMS, 2021). The country's National Energy Policy 2010-2040 promotes energy efficiency and development of renewable energy but makes no reference to a specific target (MINAM, 2010). The country's Reference Plan for the Efficient Use of Energy 2009-2018, which established a target of 15% reduction in energy consumption by 2018, is outdated (MINAM, 2009). The Energy Plan 2014-2025 includes a chapter on energy efficiency that can be considered as the country's plan towards 2025. It also gives a rough estimate of the emissions impact of energy efficiency measures in its climate change section, but does not include a specific target for energy efficiency (MINEM, 2014).

Policies and incentives to invest in low-carbon technologies

The way governments shape **economic recovery from the COVID-19 pandemic** has a significant impact on low-carbon transition. While some countries or regions have made announcements focused on green investment and climate ambitions, others have announced plans for stimulus to support carbon-intensive business activities that risk locking in high emissions for decades to come. Such plans are at odds with limiting global warming to well below 2°C. While a small proportion of Peru's recovery spending can be earmarked green, Argentina and Brazil can be assigned to the latter category of countries in which recovery has been rather high-carbon (O'Callaghan and Murdock, 2021).

 In Argentina, the government has not introduced any 'green' measures in its recovery stimulus plans but instead, has introduced measures that constitute direct subsidies to the oil and gas sectors (see fossil fuel subsidy section below) (Climate Action Tracker, 2020a).

 Brazil's response to the pandemic has further weakened environmental regulations. It appears likely, to be based on past performance, that the current Federal Government will continue to disregard the urgent need for climate action in Brazil, and will not take up the opportunity to pursue a green economic recovery (Climate Action Tracker, 2020c).

 Government representatives in Peru have in several instances referred to a 'building back better' approach, taking into account sustainability and responding to climate change. In this context, Peru received the largest individual loan that the KfW Development Bank has ever granted to a Peruvian institution (EUR 250 million). It is meant to help small businesses and their employees to survive the current economic crisis and, once the economy begins to recover, the funds will be used to promote climate-friendly investments (COFIDE, 2020a).

Substantial amounts of capital will be required to fund a low carbon transition in the years to come. Public funds alone are far from sufficient, but can be used to mobilise the necessary resources, especially from private and institutional investors. For this, various **public leveraging tools to attract private investment to low-carbon technologies** can be used. **Leverage instruments exist in all three countries, with Brazil leading the way in terms of the number and diversity of tools.**

 In Argentina, the National Securities Commission (Comisión Nacional de Valores, CNV), the organ that regulates the national capital market, has elaborated and published a guide for issuing Green and Sustainable Bonds. The regulator's Sustainable Finance Programme further includes principles of raising awareness among capital market actors about integrating environmental, social and governance factors into investments, as well as generating structures that advance sustainable financing in the country. In April 2021, CNV also approved a special regime for the placement of funds earmarked for environmental and social projects or activities, in accordance with its sustainable investment guidelines and the standards of the United Nations Development Programme (UNDP) (Government of Argentina, 2021d). There are several different types of issuers, such as state-owned entities (e.g., Empresa Provincial de Energía de Córdoba), local governments, banks (e.g., Banco de Inversión y Comercio Exterior or Banco Galicia) and private companies (e.g., Central Puerto S.A. or Plaza Logística) (CBI, 2019).

 The range of leveraging instruments in Brazil is wide and includes green debt and equity instruments as well as risk transfer instruments. The National Development Bank (BNDES) is an important player and has several debt instruments in place to leverage investments in low-carbon technologies, including green bonds and a Sustainable Energy Fund, structured towards the acquisition of renewable energy debentures carrying a green label (IDB, 2019b). **Brazil is also the largest green bond market in the region, in terms of number of bonds, number of issuers and amount issued.** As one of the first countries in the region, Brazil published Green Bond Guidelines in 2017 to support issuers and the development of the green bond market (IDB, 2019b).

 Peru published its national Green Bond Guidelines in 2018 and COFIDE, the country's National Development Bank, issued its first green bond in the country in 2019 for PEN 100 million (around USD 30 million). Green bond resources will fund climate change mitigation projects, with a focus on renewable energy projects (COFIDE, 2019). In addition, Peru's Climate Change Law mandates the establishment of a guarantee fund for the promotion of investment in renewable and clean energy, food security, ecosystem services as well as research and technological development in climate change adaptation (El Peruano, 2019).

In addition to country-specific initiatives, there are also regional approaches related to green bonds, such as the Latin American Green Bond Fund (LAGREEN), the first green bonds fund in Latin America. Its main purpose is twofold: to finance climate- and resource-friendly investments and to mobilise local and international private capital towards the issuance of more green bonds in Latin America (Laif, 2020).

For the private sector, a **national economy-wide carbon pricing scheme** provides the policy clarity needed to shift its focus from immediate returns that harm the environment and the resources they rely on to a longer-term perspective that supports sustainability. It can drive investment toward a low-carbon economy and help investors and businesses to identify risks, as well as opportunities for new low-carbon investments or business lines. None of the three countries has a national economy-wide carbon pricing scheme in place, which covers more than 80% of national GHG emissions, however:

 **Argentina is the only country out of these three that has a carbon price of 6 USD/tCO₂ in place** (World Bank, 2021h). The tax is estimated to cover 20% of the country's GHG emissions. Natural gas is exempted from the tax, as is compressed natural gas and fuel consumption in international aviation and shipping, as well as the export of these fuels (Climate Action Tracker, 2020a).

 In Brazil, there is no carbon pricing scheme in place. So far, however, some voluntary experiments were done by the private sector on an Emission Trading Scheme (ETS) (ICAP, 2020).

 In Peru, there is a bill under preparation for carbon pricing. For the purpose of project evaluation for public investment, Peru has established a social price of carbon (World Bank, 2021c).

Policies and incentives to enhance negative emissions

None of the three countries has **policies or incentives in place supporting the development of Bioenergy combined with Carbon Capture and Storage (BECCS)**. It is worth mentioning that there are incentives and policies in place, particularly in Brazil and Argentina, to promote bioenergy, which can be considered a necessary step towards encouraging BECCS. Also, there is no **support for low-emission and negative emission research, development and deployment (RD&D)** in the three countries. In Brazil, support schemes for CCS/U exists but are currently only used for Enhanced Oil Recovery (EOR) projects.

Policies and incentives to divest from fossil-fuels

Fossil fuel subsidies can inhibit sustainable economic development by creating a burden on government budgets, reducing or inefficiently allocating resources that could be put to more sustainable use within the economy, decreasing the competitiveness of key industries, including low-carbon businesses; by discouraging investment in renewable energy and energy efficiency and ultimately hindering the transition toward a climate-resilient economy (European Parliament, 2017). **A clear commitment by governments to phasing out fossil fuel subsidies can thus be considered a key policy to combat climate change and achieve sustainable development.**

Government spending on subsidies for fossil fuels has been declining in Argentina since 2016, the peak year of fossil fuel subsidies within the last decade. While in 2016 fossil fuel subsidies totalled USD 15.7 billion, corresponding subsidies amounted to only USD 4.1 billion in 2019 (OECD, 2019a). The latter corresponds to 0.9% of the country's GDP (World Bank, 2021f). In response to the COVID-19 pandemic, the government artificially fixed the domestic oil price at a minimum of USD 45 per barrel for 2020, irrespective of the fact that international oil prices remain considerably lower. Although the new government has justified this intervention to protect jobs and the entire energy industry in the context of the COVID-19 crisis, this measure constitutes a direct subsidy to rescue the oil and gas sector in Argentina. The government also capped electricity and gas tariffs to December 2019 levels until the end of 2020 (Climate Action Tracker, 2020a). Recent announcements made by the government indicate that both household electricity rates and gas tariffs will increase this year (La Nacion, 2021).

In 2019, fossil fuel subsidies in **Brazil** amounted to USD 8 billion, which is equivalent to 0.44% of the country's GDP (OECD, 2019a; World Bank, 2021f). The highest amount spent on subsidising fossil fuels in the last decade was in 2012, with subsidies amounting to USD 27.4 billion. Since then, **overall spending on fossil fuel subsidies have been falling steadily**, with the amount remaining almost the same in 2018 and 2019, indicating that the decline has stagnated (OECD, 2019a). Most subsidies were related to the consumption of fossil fuels (68%), the rest to their production. The highest amount of quantified subsidies was for petroleum at USD 5.9 billion (74%), followed by natural gas at USD 1.9 billion (24%) (Climate Transparency, 2020). A negligible share of 2% of total fossil fuel subsidies targeted coal (OECD, 2019a). When taking into account estimates by the Institute of Socioeconomic Studies (INESC), which assessed both fossil fuel incentives and subsidies, the total amount in 2019 reached USD 25 billion, including direct expenditures, tax expenditures and other waivers (inesc, 2020). The wider scope and different methodology may partly explain the large discrepancy between this figure and the one above.

One of the principal instruments to subsidise fossil fuels in **Peru** is the Fuel Stabilisation Fund (FEPC). The FEPC was created in 2004 to prevent the high volatility of international oil prices from being passed on to Peruvian consumers. The measure was to create a price band with a maximum and minimum price to limit fluctuations in international prices. In case of high international prices, the state paid the difference between the international price and the maximum price with resources from

the fund. When the international price was below the minimum price, the consumer paid the minimum price and the other part accumulated in the FEPC. However, given the continued high price of oil and its derivatives, pay-outs have generally been higher than revenues, and governments have become indebted to refiners (IPE, no date). Since 2008, there have been a series of reforms to the FEPC, including the removal of a number of oil products from the scheme (APEC, 2015). The number of subsidised products has been reduced over the last decade, due to the high debt the government has built up through the FEPC. Until recently, only industrial oils for electricity generation in isolated systems have been covered by the FEPC (Andina, 2020). In 2021, diesel for vehicular use was included again for 90 days to keep these prices stabilised, thus preventing the high volatility of international prices from being passed on to final consumers in the fuel supply chain (Gestion, 2021a). In addition, there are targeted subsidies for low-income groups; for example, the Electrical Social Compensation Fund (FOSE), a subsidy for electricity bills in the Peru Amazon area, where electric generation uses fossil fuels. This subsidy is intended to promote access and sustainability of electricity supply for all residential users whose monthly consumption is less than 100 kilowatt hours per month. These subsidies amounted to around USD 23.5 million in 2019. On average, around USD 22.3 million in subsidies was paid out annually through this fund between 2009 and 2019 (Osinergim, no date). However, no quantitative data on the total amounts of fossil fuel subsidies spent in Peru is publicly available. This may be one of the reasons why the IMF's global fossil fuel subsidy database does not show pre-tax fossil fuel subsidies⁹ in Peru in recent years (IMF, 2019).

⁹ Pre-tax subsidies occur when people and businesses pay less than it costs to supply the energy. Post-tax subsidies add to pre-tax subsidies an amount that reflects the environmental, health and other damage that energy use causes and the benefit from favourable VAT or sales tax treatment (WEF, 2015).



3.2 Power

Global sector overview

The Intergovernmental Panel on Climate Change (IPCC) finds that for limiting warming to 1.5°C and reaching net-zero CO₂ emissions by 2050, globally, reductions in energy demand, a decarbonisation of electricity, and an electrification of energy end use are needed (IPCC, 2018). In 1.5°C pathways with little or no overshoot, renewable energy would make up 59–97% of electricity supply and electricity would reach 34–71% of primary energy by 2050. This means that the power sector has an important role to play in the decarbonisation of the economy, as sectors such as transport, buildings and industry will increasingly depend on the supply of zero-emissions electricity to decarbonise.

The power sector is the energy sub-sector with the highest CO₂ emissions (IEA, 2019a; Climate Action Tracker, 2020f). With a global emissions intensity of 510 grams of CO₂ per kWh generated in 2015, the emissions intensity would need to go down to 50–125 by 2030 and to below zero by 2050, to be compatible with the objectives of the Paris Agreement (Climate Action Tracker, 2020f).

Investments in the electricity sector have increasingly moved towards decarbonised sources—although more still needs to be done. At USD 130 billion in 2020, investments in renewable power in advanced economies were over 4.5 times higher than those in fossil power, which totalled USD 28 billion. In developing economies (excluding China), investment in renewable power (USD 66 billion) overtook investment in fossil power (USD 62 billion) in 2020 compared to 2019, during which time investments in fossil power were still USD 8 billion higher (IEA, 2020c).

Overview in Latin America

In Latin America, the power sector is less emissions-intensive than in many other parts of the world, thanks to a large share of renewable energy (particularly hydropower) and a relatively low share of coal, as shown in Figure 2. Natural gas also plays an important role, making up around a fifth of electricity production, and to a lesser extent, oil.

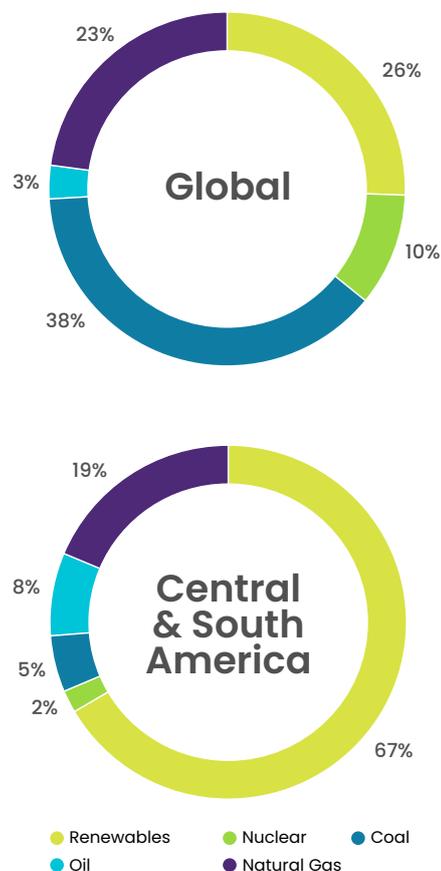


Figure 2: Electricity supply mix globally and in Central and South America in 2018 (IEA, 2020f, 2021a)

Some countries have already reached nearly 100% of renewable-based power generation, such as Costa Rica, Paraguay, and Uruguay. They all have large shares of hydropower and in some cases, benefit from interconnection with neighbouring countries. Renewables other than large hydropower play an increasingly important role and have reached very high shares in some countries, including Chile and Uruguay. Electricity consumption is steadily increasing in the region and is expected to roughly double from 1550 TWh to 2800–3500 TWh per year by 2040 (Yépez-García et al., 2018), and this figure could even be higher, depending on electrification trends in the transport, buildings and industry sector. Given the rising electricity demand, the region faces the challenge to increase capacity while continuing to decrease the emissions intensity of the sector. While part of this increase is expected to come from renewable energy, major investments are also planned in conventional technologies and thermal power plants.

Renewable energy has become increasingly competitive against fossil sources of electricity, and **in some Latin American countries onshore wind and solar photovoltaic (PV) no longer need subsidies to compete with conventional sources**. The region has some advantages when it comes to renewable energy development, including an excellent resource availability, particularly for wind and solar (FS-UNEP Centre and BNEF, 2020), and a high availability of hydropower and bioenergy in many countries, which can facilitate the integration of intermittent sources of renewable energy. When it comes to renewable energy (excluding large hydropower), USD 18.5 billion was invested in Latin America and the Caribbean in 2019, which represented an all-time high (FS-UNEP Centre and BNEF, 2020). Brazil, Chile, and Mexico saw the highest levels of investment—with USD 6.5, 4.9, and 4.3 billion, respectively. With an investment of USD 2 billion, Argentina came in fourth but was also the only out of these four countries where investment declined.

USD 18.5 billion was invested in renewable energy Latin America and the Caribbean in 2019.

There are however also continued challenges to renewable energy investment. The cost of capital remains high in some countries of the region, increasing the financing cost of projects and thereby also the levelized cost of electricity (LCOE), a key metric in investment decisions (BloombergNEF, 2020). In some countries with significant hydrocarbon production, particularly natural gas, the availability of domestic fuels for the power sector seems to curb the development of renewable energy. In addition to the renewable energy capacity, major investments are also needed in grid upgrades and interconnection capacity to integrate renewable energy to the grid. As the share of variable renewable energy increases, investment in storage capacity will also be required.

Low-carbon investments and developments in Argentina, Brazil, and Peru

Argentina, Brazil, and Peru have all made significant investments in hydropower capacity in the past decades, and more recently also in other renewable energy such as solar, wind and bioenergy. Table 5 gives an overview of some of the various low- and high-emissions assets in the power sector, pairing them with typical capital providers or asset owners.

Table 5: Investment areas and main sources of capital in the power sector – non-exhaustive list

Asset / activity	Capital provider / asset owner
Low emissions investment areas	
Renewable energy generation capacity development	Project developers, utilities
Generation component manufacturing facilities	Manufacturers
Renewable energy generation capacity operation	Utilities, other off-takers

Asset / activity	Capital provider / asset owner
Grid infrastructure	Grid operators
Storage capacity development	Utilities, governments
Storage capacity operation	Utilities, governments
High emissions investment areas	
Coal / oil / gas generation capacities and operation	Project developers, utilities
Grid infrastructure connected to centralised fossil fuel plants	Grid operators

The prevalence of hydropower translates to a well below world average emissions intensity for all three countries, and high shares of renewable energy, compared to the world average. As of 2019, Brazil, Peru and Argentina

had an electricity emissions intensity of roughly 100, 200 and 300 grams of CO₂ per kWh respectively, compared to a world average of around 480 (in 2018), as shown in Figure 3 (IEA, 2020a).

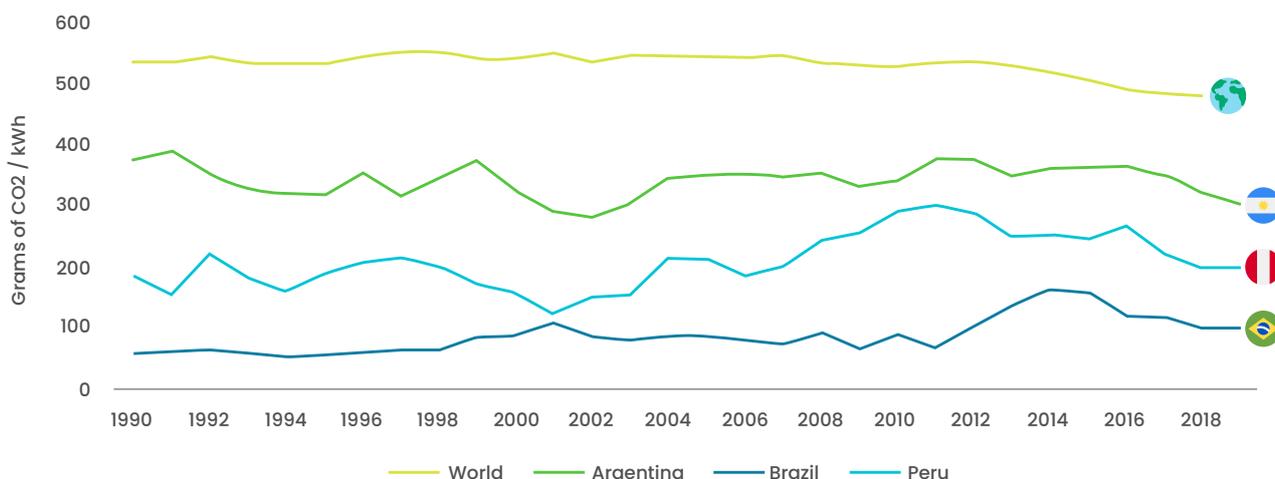


Figure 3: Electricity emissions intensity in Argentina, Brazil, Peru, and world average in 1990–2019 (Climate Action Tracker, 2020d; IEA, 2020a)

As of 2019, the share of renewable energy in the electricity generation mix was also well above the 2018 world average of 25% in Brazil (82%) and Peru (60%), and equal to the world average in Argentina (25%) (IEA, 2020f). This is largely due to a large share of hydropower; the

development of other renewable energies such as wind and solar has mostly started to pick up in the past few years. This has contributed to the recent rise in the share of renewable electricity, as shown in Figure 4.

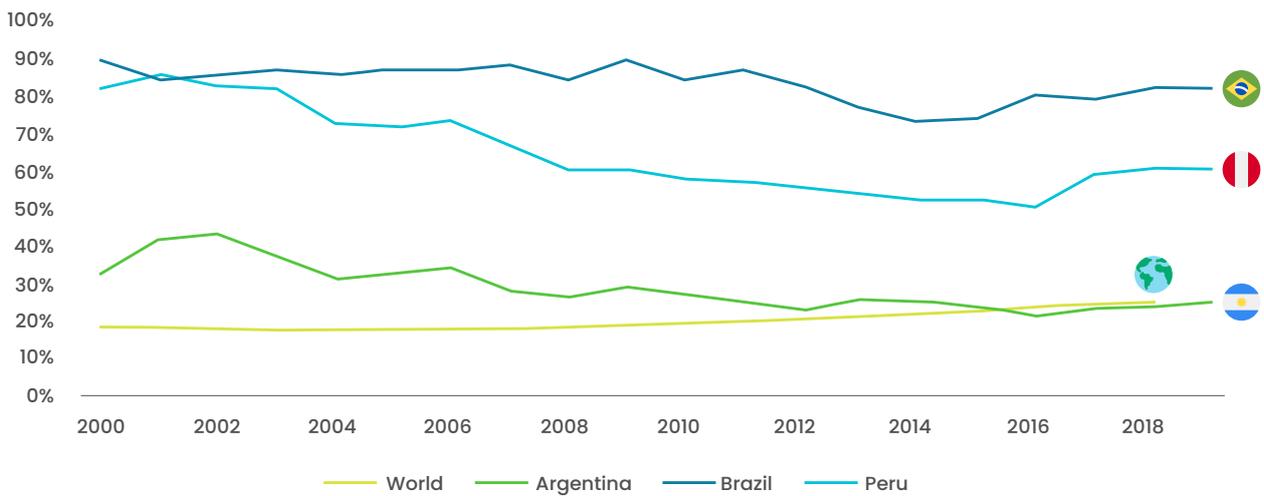


Figure 4: Share of renewable electricity generation (including hydropower) in Argentina, Brazil, Peru, and world average in 2000–2019 (Climate Action Tracker, 2020d; IEA, 2020f)

Despite a later start, Argentina has recently made successful strides in developing newer renewable energy sources such as wind and solar through the RenovAr auction scheme. In the first rounds of RenovAr, around 4 GW of renewable energy capacity was contracted. A third round of auctions was held in 2019, during which 260 MW were contracted, but some of the contracts that remained unsigned were reportedly cancelled in March 2021 (BNamericas, 2021). As of 2020, there was 2.6 GW of installed wind capacity and nearly 0.8 GW of solar capacity, both of which rapidly increased from very low values in previous years (IRENA, 2021a). In total there was 3.7 GW of renewable capacity, excluding hydropower. When accounting for 510 MW of small hydropower (CMMESA, 2021), the 2020 installed renewable capacity would go up to 4.2 GW.

A total of USD 2 billion was invested in renewable energy—excluding hydropower above 50 MW—in 2019, down 18% compared to the previous year (FS-UNEP Centre and BNEF, 2020). Challenges to investment in renewables include a high cost of capital. In addition to increased investment in renewable energy, more investment is needed in grid infrastructure and storage infrastructure to enable higher shares of variable renewable energy integration (Hagemann et al., 2020). Beyond renewable energy, new investments are also made in fossil fuel-fired power generation, particularly tied with the hopes of continued and increased domestic production of natural gas.

In 2021, Argentina ranks as the twenty-third most attractive market for renewable energy, down from nineteenth in 2020 (EY, 2020b, 2021b). Lack of progress on new renewable energy auctions could further impact this ranking in the future.

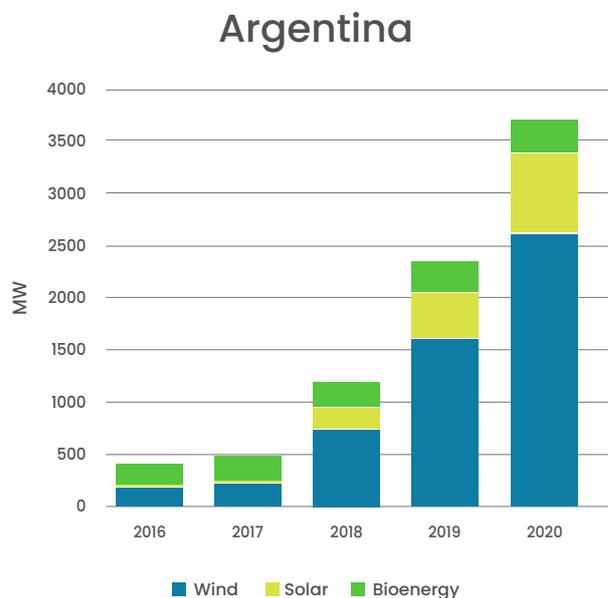


Figure 6: Cumulative renewable energy capacity additions (excluding hydropower) in Argentina in 2016–2020 (IRENA, 2021a)



Brazil has seen the most significant investments in renewable energy systems, starting with wind and bioenergy many years ago, and more recently also in solar energy. Brazil now has over 40 gigawatts (GW) of installed renewable energy capacity, excluding hydropower, as shown in Figure 5. In the latest Renewable Energy Country Attractiveness Index (RECAI) from May 2021, **Brazil ranks as the eleventh most attractive market for renewable energy globally, up from fifteenth in 2020** (EY, 2020b, 2021b). In 2019, investment in renewable energy—excluding hydropower above 50 MW—increased by 74% to USD 6.5 billion (FS-UNEP Centre and BNEF, 2020). This notably included significant increases in distributed solar generation. Investments in bioenergy, using mostly sugar cane residues and wood, led to an increase in capacity from 7.9 GW in 2010 to 15.6 GW in 2020 (IRENA, 2021a). Wind capacity has seen the starkest increase in the past years, from less than 1 GW in 2010 to 17.2 GW in 2020. The solar PV capacity jumped from less than 100 megawatt (MW) in 2016 to 7.9 GW in 2020. In total, Brazil expects BRL 365 billion (~USD 72 billion) to be invested in the electricity sector in 2021–2030, down from an expected investment of BRL 456 billion (~USD 90 billion) in the previous 2020–2029 plan (Ministry of Energy and Mines, 2019, 2020). While a large share of this will likely be dedicated to renewable sources, the capacity of fossil thermal power plants is also expected to increase substantially. It is also worth noting that the total investment in the electricity sector is only one sixth of that expected in the oil, natural gas, and biofuels in the same timeframe (BRL 2.3 trillion or around USD 460 billion).

Brazil and Argentina rank eleventh and twenty-third top markets respectively in the latest Renewable Energy Country Attractiveness Index.

Brazil

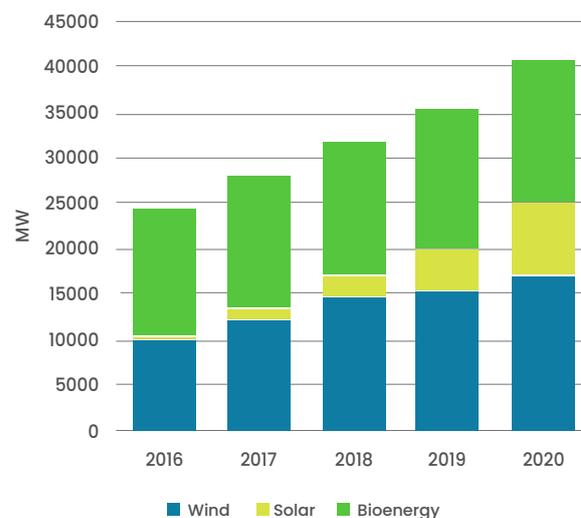


Figure 5: Cumulative renewable energy capacity additions (excluding hydropower) in Brazil in 2016–2020 (IRENA, 2021a)



Peru started investing into renewable energy (other than hydropower) at a relatively early stage. Four renewable energy tenders organised between 2009 and 2015, attracting USD 1.9 billion in investment (Oxford Business Group, 2019), led to capacity additions between 2012 and 2015 and again in 2018. In the years 2019–2020 practically no new solar and wind capacity was added, and the total capacity remains relatively low. As of 2020, wind capacity totalled less than 0.4 GW and solar just over 0.3 GW (IRENA, 2021a). While Peru still ranked as the thirty-eighth most attractive renewable energy market under the Renewable Energy Country Attractiveness Index in 2019, and in 2020 and 2021 dropped out of the top forty list in the index. Some investments have also been made into hydropower capacity, which went from 3.4 GW in 2010 to 5.7 GW in 2020.

After the Camisea gas fields started operating in 2004, Peru started building more thermal power plants (CIER, no date). This led to an increase in the emissions intensity of the electricity sector in the following years, as well as a decrease in the percentage share of renewables in the electricity mix (see Figure 3 and Figure 4).

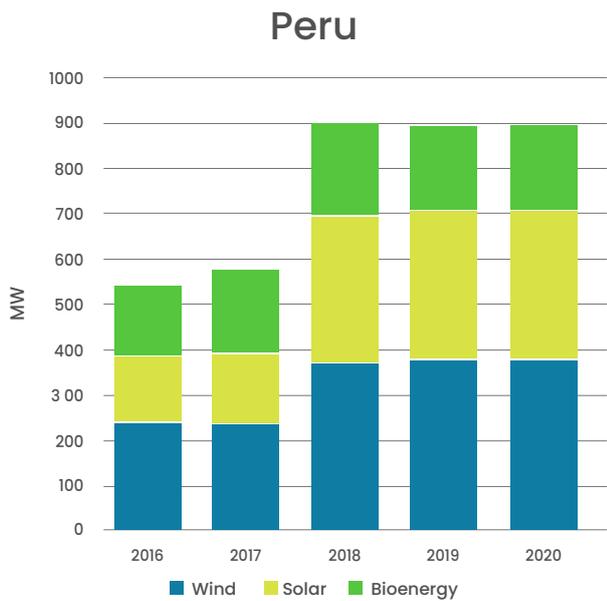


Figure 7: Cumulative renewable energy capacity additions (excluding hydropower) in Peru in 2016–2020 (IRENA, 2021a)

Policy framework

While the power sector has generally seen a stronger development of decarbonisation policies than in many other sectors, particularly when it comes to auctions for large-scale renewable energy, continued and dedicated policy support is needed. This is the case for large-scale and distributed renewable energy but also for the adequate system integration of new and variable renewable energy, such as storage, grid development and flexibility mechanisms. On the other hand, a long-term decarbonisation plan and policies to move away from high-emission electricity sources are also important. Table 6 provides an overview of key mitigation policies in the power sector in Argentina, Brazil, and Peru.

Table 6: Policy framework assessment for the power sector

Policy	Assesment			
Investor signals and targets				
Emissions reduction plan and target for the sector	Not in place			
	Short- or medium-term target or plan in place			
	Both medium and long-term targets and plans in place			
Renewable electricity target	Not in place			
	Short- or medium-term target			
	Both medium and long-term targets in place			
Stable renewable energy support	Occurrence of government policy reversal in past 10 years			
	No policy rollback but also little to no further development			
	No policy rollback, further policy development taking place			
Coal and oil phase-out plan	Not in place			
	In place, or no coal and oil used for power generation			

Policy	Assesment			
Policies and incentives to invest in low-carbon technologies				
Policies for large-scale renewable energy installations	 Not in place			
	 In place for some technologies			
	 In place for all major renewable energy technologies			
Policies for distributed renewable energy	 Not in place			
	 In place			
Policies to promote system integration of variable renewable energy	 Not in place			
	 In place			
Dedicated funding mechanism and / or investor guarantee for renewable energy	 Not in place			
	 One or several mechanisms in place			

Investor signals and targets

An **emissions reduction plan and target for the sector**, both in the medium- and long-term, is important to give clear signals to investors and project developers. Brazil is the only country out of the three that currently has both a medium-term (2030) and a long-term (2050) plan for the electricity sector. While Brazil has an economy-wide emissions reduction target in its NDC, it is worth noting that there is no specific emissions reduction target for the electricity sector. Peru and Argentina’s long-term plans for the sector are still in the making. In the same way, targets for key decarbonisation technologies, such as a **renewable electricity target**, are important to provide certainty for investors. All three countries have short- or medium-term renewable energy targets, but only Brazil has a long-term plan for renewable energy development.

Brazil has a 2050 plan for the electricity sector, coupled with a renewable energy target. Peru and Argentina’s long-term plans are under preparation.

 Argentina aims to generate 20% of its electricity with renewable energy (excluding large hydropower) by 2025, and 25% by 2030. As of 2020, renewable energy covered 10% of electricity demand (CAMMESA, 2021).

 Brazil aims to generate 88% of its electricity with renewable energy (including hydropower) by 2030, up from 85% in 2020 (Ministry of Energy and Mines, 2020). While the long-term energy plan (PNE 2050) includes various scenarios for the development of different energy sources, including renewable energy, it does mention an intention to maintain the share of renewable energy in the electricity mix at 80 to 85% by 2050.

 Peru has set an objective of 15% of renewable energy (excluding large hydropower) by 2030. As of 2019, this share was at just over 5% (IEA, 2020f). The national energy plan 2014–2025 foresees all renewable energies reaching a share of at least 60% by 2025—this value was reached in 2019.

Stable renewable energy support is another important component to attract investors. None of the countries have formally rolled back policies, but there have been

instances of cancelled auctions or contracts and slowed developments. In Argentina, the government recently cancelled the fourth round of the RenovAr auction scheme for energy and transmission. In addition, some of the unsigned power purchase agreements that were awarded under the third round of RenovAr were also cancelled, and there is no clear sign of future developments (BNamericas, 2021). In Brazil, the auctions scheduled for 2020 were cancelled due to the reduction in electricity demand forecasts. In Peru, four auction rounds have been organised but there has been little development in the past few years.

Coal and oil need to be phased out of electricity generation, with varying timeframes, in all countries under pathways compatible with the Paris Agreement. The Climate Action Tracker (2020b) estimates that unabated coal should decrease to 0–2.5% of electricity generation globally by 2030 (and to zero shortly thereafter). In many countries, including Brazil for example, the Paris-compatible benchmark is zero coal by 2030. Coal plays a minor role in Argentina, Brazil and Peru, making up less than 3% of the electricity generation mix in each country (IEA, 2020f).

Oil-based electricity generation has decreased in more recent years and made up less than 5% of electricity generation in all three countries, as of 2019 (IEA, 2020f). In Argentina the decline has been most pronounced. Whereas oil still contributed 10 to 15% of the electricity mix ten years ago, this share has decreased to an average of 3.5% over the past three years in 2018–2020 (CAMMESA, 2021). In Brazil and Peru, oil plays a marginal role (1 to 2%) in the electricity generation mix (IEA, 2020f; EPE, 2021a). While it may seem less relevant for these countries, given the low contribution of coal and oil, planning for a phase out remains important in all countries to set the right direction for power sector investment; one that is arguably easier to implement in countries with lower shares. While there is no formal phase-out commitment yet, Peru has been part of the Powering Past Coal Alliance since 2020 and is working on a new national energy plan, which will likely confirm a coal phase-out. Brazil's 2050 Energy Plan still makes reference to coal, which is clearly not compatible with the objectives of the Paris Agreement, and gives investors a wrong signal. In the shorter term (by 2030), the coal capacity is however expected to decrease, as is the fuel and diesel-oil based capacity (Ministry of Energy and Mines, 2020).

Policies and incentives

Policies to support large-scale renewable energy installations are increasingly moving from feed-in-tariffs to auctions, both globally and in Latin America. Auctions are highly dependent on political will – they

need to be coupled with credible renewable energy targets and transparent and stable electricity sector planning. Auctions are also the main policy instrument for incentives towards large-scale renewable energy in Argentina, Brazil, and Peru:



Argentina: RenovAr auction scheme in place. The first two rounds were successful; a third, smaller round of auctions was held in 2019. No further rounds are currently planned.



Brazil's latest auction for new electricity generation capacity was organised in 2019. Both conventional and renewable energy capacity were allowed to participate in this auction—with solar energy participating in a national auction for the first time. Around three fourths of the capacity was allocated to renewable energy (Climate Action Tracker, 2021c).



Peru: four renewable energy auctions took place to date between 2009 and 2015. The fourth auction also considered power generation through biomass. There was also an off-grid auction in 2014 (Osinergmin, no date).

In addition to policies supporting large-scale renewable energy, Argentina and Brazil have implemented a net-metering policy for **distributed renewable electricity generation**. This is not yet the case for Peru, although it has taken measures to promote small-scale renewable energy systems to connect remote villages to the grid.

Policies and incentives to promote system integration of variable renewable energy, including demand-side management, storage, and other flexibility options, are still largely missing. In Brazil, the energy expansion plan to 2030 includes a comprehensive section on grid development, to incorporate new capacity into the grid, including solar and wind. The considerations around grid development and storage are also taken into consideration when estimating the investment costs of new generation capacity.

Dedicated funding mechanisms and guarantees for renewable energy can reduce risks of investments. Guarantee schemes or dedicated funding mechanisms have been put in place in all three countries. In Argentina, a guarantee supported by the World Bank was set up to secure investment under the RenovAr scheme. Also, concessional finance from the Green Climate Fund

(GCF) was granted for the Promotion of Risk Mitigation Tools and Investment Financing in Renewable Energy and Energy Efficiency with a focus on SMEs through the NDB (Banco de Inversión y Comercio Exterior). In Brazil, the national development bank BNDES participates in many of the renewable energy projects. Peru does not have an investor guarantee per se, but it has recently experimented with green bonds to finance renewable energy projects.

Summary and conclusions

The power sector will have to cope with rising demand across Latin America, both due to economic and population growth, and increased electrification across sectors such as transport, buildings, and industry. This will not only require major investments but also clear targets and policies to ensure this growth is compatible with full decarbonisation by 2050.

Investments in renewable energy systems (excluding large hydropower) has considerably increased in the past years in Argentina, Brazil and to a lesser extent in Peru, largely thanks to government-initiated auctions. However, auctions alone are not sufficient to guarantee a stable framework for renewable energy investments; they need to be paired with credible and transparent sector planning, both in the short- and long-term, including renewable energy targets. As the share of variable renewable energy and electrification in other sectors (such as transport and buildings) increases, it is increasingly important for governments to invest in flexibility options, storage capacity and grid upgrades, which are often still at a very early stage or missing.

Rising electricity demand in Latin America will require major investments, but also targets and policies to ensure this growth supports further decarbonisation.





3.3 Transport

Global sector overview

While global CO₂ emissions from fossil fuel combustion, including the transport sector, should reach net zero by 2050 according to the IPCC special report on 1.5°C, the emissions in the transport sector are still growing at the global level (Climate Action Tracker, 2020f). Transport contributes to 24% of global CO₂ emissions from fuel combustion, with road transport contributing almost 75% of the emissions. **While emissions reductions in part of the sector require efforts at the international level (aviation and shipping), the majority of emissions can be regulated at the national level.**

Emissions have to be significantly reduced in all parts of the sector. For example, the share of electric vehicles in overall vehicle sales has to reach 100% in 2040 and between 75% and 95% in 2030, a significant increase from the 4.2% reduction today (Climate Action Tracker, 2020f; WEF, 2021). The emissions intensity of passenger vehicles (car, bus, rail) needs to reach levels of 0–30 g CO₂/pkm by 2040). By comparison, the average emissions of new cars (with cars making up a share of 80 % in EU transport) in 2019 in the EU, one of the most progressive regions, was 122 g CO₂/pkm, with an average occupancy of less than two passengers per car (Statista, 2014; Eurostat, 2021).

The share of electric vehicles in total vehicle sales should increase from the current level of around 4% to 100% in 2040.

While these figures suggest that significant acceleration in implementing measures to reduce emissions is still needed, these are the first signs that the transformation in the sector is slowly picking up, especially with regard to the electrification of the vehicle fleet and the railway system (IEA, 2020f). Especially in the EU and China electric vehicle sales have soared recently to 5.3% and 6.5% respectively, with electric car sales overtaking those of hybrid and internal combustion engines. **Norway remains the front-runner country with full-electric cars accounting for 54% of all new cars sold in 2020** (Europe Autonews, 2021).

Other parts of the sector, especially aviation and shipping are significantly behind. As a result, the investment required varies widely within the sector - while R&D investment is required in all areas, the focus in some areas has shifted to investment in dissemination, significantly increasing the need for investment.

Overview in Latin America

Although electric transportation has evidenced a slow-paced adoption in the region, the electricity demand in the transportation sector has multiplied tenfold in the last six years. The decarbonisation of the transportation sector has moved more towards improving energy efficiency and carbon emissions standards. Similarly to the global level, **emissions in the transport sector in Latin America have been growing constantly and accounted for 15% of all regional GHG emissions in 2018**. This makes transport the sector with the highest fossil-fuel energy use in the region (UNEP, 2020).

The transport sector in Latin America, however, differs from the global picture in some significant ways. On the one hand, the transport sector in Latin American countries has historically seen more biofuels development than in other regions, with Brazil as front-runner, having developed an industry around bio-fuelled cars for decades. On the other hand, the penetration of electric vehicles lags far behind that of other regions of the world (UN Environment, 2018a). However, it is worth mentioning that at the same time, **thanks to a lower emission intensity of the power sector, the region has good conditions to reduce emissions from the transport sector by switching to electric vehicles.** Brazil (1st) and Argentina (6th), for instance, rank high among the top ten countries globally, when it comes to renewable energy share over final energy consumption (IEA et al., 2021).

The region has seen a strong shift to individualised transport in recent decades. Private vehicle ownership went up 60% in the period between 2005 and 2015 (OICA, 2018). Historically strong rail networks such as in Argentina or Brazil have been neglected over time, and the share of railways in passenger and freight transport has been significantly reduced (UN Environment, 2019). **Although public transport accounts for 68% of passenger travel in cities, significant investments are needed to ensure high-quality transport to avoid further passenger shifts to individualised transport.** In a business-as-usual

scenario, emissions in the transport sector are projected to increase by 150% by 2050, compared to 2020 levels (UNEP, 2020). Additionally, investments are needed to address the large suppressed demand that is poorly serviced by public transport (e.g., servicing informal settlements at the border of the cities) (Yañez-Pagans et al., 2019).

Private vehicle ownership in LAC went up 60% in the period between 2005 and 2015.

Low-carbon investments and developments in Argentina, Brazil and Peru

Table 7 summarises some key low-carbon investment areas in the transport sector and indicates the typical source of capital for each of the assets.

Table 7: Investment areas and main sources of capital in the transport sector – non-exhaustive list

Asset / activity	Capital provider / asset owner
Low emissions investment areas	
Railway infrastructure	National railway companies, private railway companies
Car/other vehicle manufacturing (low emission vehicles)	Manufacturer
EV/Hydrogen charging infrastructure	Utility companies, car manufacturers, PPP (cities etc.)
EV/Hydrogen Car/Bus/Truck manufacturer	(International) car manufacturer
EV/Hydrogen Car/Bus/Truck	Companies (private and public), individuals
Marine infrastructure	National governments (waterways), companies (vessels)
Urban infrastructure	National governments (streets, etc.), real estate investors (buildings)
Public transport infrastructure	Public/private companies (e.g., buses), national/regional governments (e.g., metro lines, BRT lines)

Asset / activity	Capital provider / asset owner
Walking/Cycling infrastructure	National/regional governments
Biofuel refinery	Public/private companies
High emissions investment areas	
Oil refineries	Refining companies
Gas stations	Companies, operators
Downstream and upstream gas	Downstream/upstream gas companies
Fossil fuel, especially oil extraction (if it exists)	Fossil fuel companies

Investments in low carbon transport in Latin America have focused on strengthening public transport options, such as BRT, Mass Rapid Transit (MRT) or railways, as well as historically, in increasing the share of biofuels (see Figure 8) (Yañez-Pagans et al., 2019).

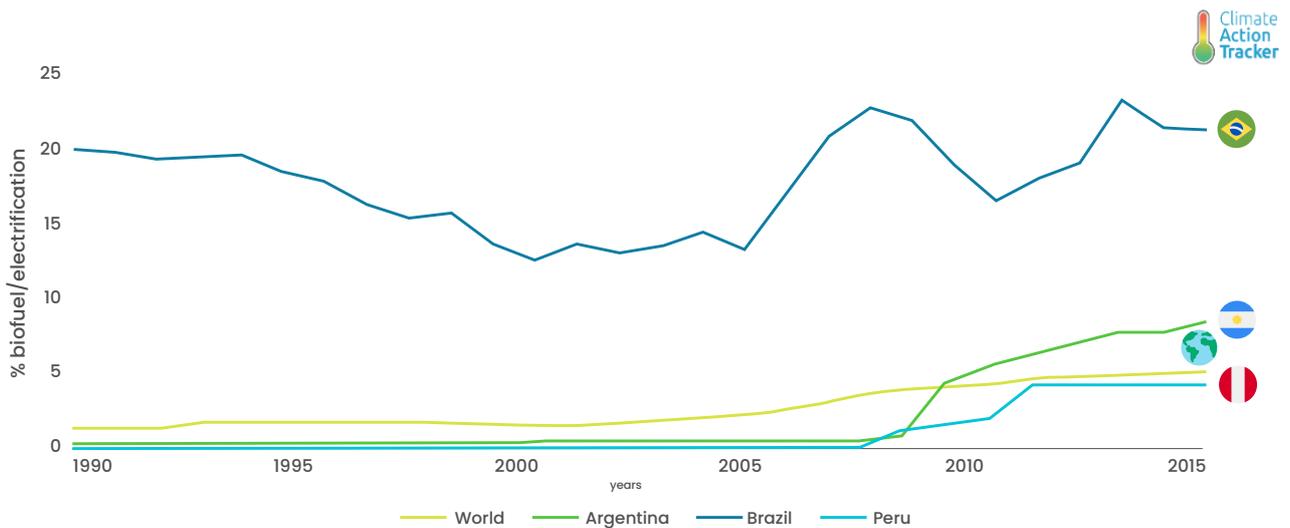


Figure 8: Road transport biofuel/ electrification share (Climate Action Tracker, 2019a)

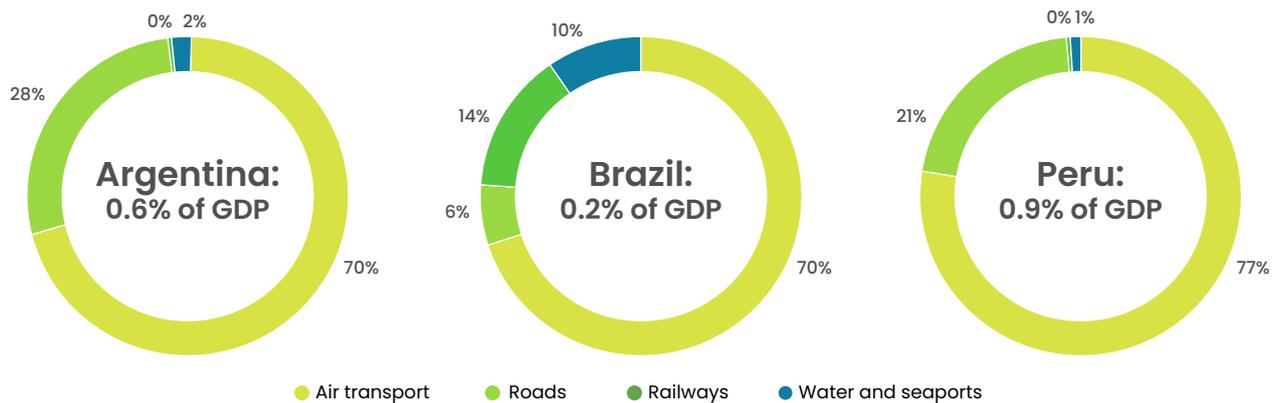


Figure 9: Public investment shares in the transport sector in Argentina (2016), Brazil (2019) and Peru (2016) as share of total public investments in the sector and share of GDP (Infralatom, 2019)

Road transport dominates in Argentina with a share of 85% in passenger and a share of 97% in freight transport, even though the country has the sixth largest railway network globally (CIA, 2018a). Emissions intensity for personal vehicles has decreased but this has not been incentivised by policies, and their reductions are far from sufficient. The number of EVs on Argentinian streets is negligible. General public investments in the sector are accordingly low.

As can be seen in Figure 9, road investments have been the major focus of national public investment (Government of Argentina, 2018). **The country has, however, also seen a recent resurgence of investments into railways and has made major plans for extending the freight railways** (Government of Argentina, 2020c). However, some of this extension aims at enabling shale oil gas extraction, and is thus not compatible with the Paris Agreement (GI Hub, 2018). Successful low carbon investment initiatives, aside from electrified rail, can also be found in the public transport sector but are still limited to date.

They include a BRT system that was put in place in Buenos Aires and has – since 2011 reached 104,7 kilometres as well as the metro system and commuter trains, that have different electrification levels (City of Buenos Aires, 2019). Low carbon financing gaps remain, especially in the investment of low carbon road transport vehicles (e.g., electric) but also in safe, modern public transport options as well as the railway system.

In March 2021, President Alberto Fernández announced in front of the Argentinian Congress that his administration was preparing an Electromobility Bill which would be sent to Congress. It comprises a package of measures that aims at promoting the manufacture of electric cars

in Argentina and also the local production of lithium-ion batteries. These plans will fall under the so-called Institute of Mobility (Instituto de Movilidad), which will seek to favour investments of USD 5 billion (Portal Movilidad, 2021).

The transport sector in **Brazil** shows a very similar pattern: **Car ownership increased significantly between 2005 and 2015 to around 70% and the role of public transport has decreased**, accounting for only 36% of passenger kilometres in 2015, down from 45% in 2005 (IEMA, 2015). Railway plays a minor role; although both passenger and freight traffic increased significantly between 2005 and 2015, with the former almost doubling.

Brazil has the ninth-largest rail network in the world. Unlike the other two countries, Brazil has successfully managed to reduce emissions in the road transport sector, through the introduction of biofuels. Support for biofuels has traditionally been a success in Brazil, including the latest program, *RenovaBio* and the previous *Proálcool* program. Today 73% of the cars in Brazil are bio-fuel cars and can use ethanol as well as gasoline.

Nearly three-quarters of all cars in Brazil are biofuel vehicles.

Public investments are also dominated by those in road transport, but rail transport plays a smaller role than in Argentina and shipping and aviation plays a significantly larger one (Figure 9). Successful low carbon investments have been seen in the railway system: For freight rail the government is currently looking to attract US 11 billion

(Bnamericas, 2021). **The story of biofuels in Brazil is an example of how clear government policy that is gradually phased in can spur low carbon investments.** In this case especially, in car manufacturers, sugarcane farmers and ethanol distillers – overall, the program cost USD 30 billion but also saves USD 30 billion every two years (Rapid Transition Alliance, 2018).

Just as in the other two countries, **the transport sector in Peru is dominated by road transport, both in terms of transport volume and public investments.** The number of vehicles nearly doubled between 2000 and 2014. The share of railroad is very small (Peru has the 76th largest railway network), which can partially be attributed to its geographical location.

Collective transportation relies on motorised vehicles, many of whom are associated with informal and unsafe practices. There is a strong focus on extending and maintaining roads, including the paving of largely unpaved roads, which makes up around 75% of the current road network with a significant share coming from the public budget (AC&A; CENIT, 2020).

The share of biofuels is relatively small and efforts to introduce electric mobility have been limited, including the Nationally Appropriate Mitigation Actions (NAMA) for electric mobility. Recently, the Inter-American Development Bank (IDB) approved a US 20 million loan to stimulate private sector investment in sustainable electromobility solutions in Peru (Gestion, 2021b). **General transport sector investments are oriented towards road transport but there are also efforts to invest in standardising railways and the metro system in Lima** (AC&A; CENIT, 2020). These transportation measures are also included in the country's NDC.

Policy framework

Table 8 provides an overview of investor signals and targets, as well as policies and incentives for low-carbon investments in the transport sector for Argentina, Brazil and Peru.

Table 8: Policy framework assessment for the transport sector

Policy	Assesment			
Investor signals and targets				
Emissions reduction plan and target for the sector	 Not in place			
	 Short- to medium-term target or plan in place			
	 Medium and long-term target and plan in place			
Electric vehicle target (including fuel cell EVs)	 Not in place			
	 In place for one vehicle segment			
	 In place for all vehicle segments			
Plan to phase out sale of new ICE vehicles or move to sustainable zero-emission fuels only	 Not in place			
	 In place			

Policy	Assesment			
Policies and incentives to invest in low-carbon technologies				
Minimum energy/ emissions performance standards for LDV and HDV	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for LDVs or HDVs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for LDVs and HDVs			
LDVs - purchase subsidy and other incentives for EVs	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Other vehicles – support for EVs or zero-emission fuels HDVs, MDVs, buses, etc.	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Public transport support schemes and/or investment programmes	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place in some major cities	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place in all major cities			
Railway infrastructure investment programmes	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Policies and incentives to divest from fossil fuels				
Tax on fuel	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for some fuels	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place for all fuels			
Other disincentives to ICEs in cities	<input type="radio"/> Not in place	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place			

Investor signals and targets

All three countries have some sort of **transport sector plans for the mid-term**, but none for the long-term. Some plans are closely linked to NDCs (Argentina, Peru) which, while being serious commitments by these countries, are not consistent with the long-term temperature goal of the Paris Agreement, while others are standalone (Brazil). Some of these plans include indicative targets (Peru, Argentina) and sectoral measures. All in all, the **plans provide little investor**

guidance as they are not easily accessible, contain no binding elements and are minimally ambitious in their nature.

EV targets are currently only considered in Peru and limited to the government fleet. A lack of country-wide EV targets persists in all countries. However, an EV target would help to provide guidance to automobile makers and investors, highlighting the need to electrify the car

fleet and to invest in EV infrastructure. EV targets have become common practice in many countries to guide automakers in Europe, North America and Asia but have seen little uptake in Latin America, with only a few exceptions such as Colombia or Chile, that strives for 40% electric private transport by 2040 (Global Fleet, no date). In the past, the introduction of biofuel-based cars through Brazil's Proálcool program proved that such programs can be successful.

Colombia and Chile strive for 40% electric private transport by 2040.

Similarly, there are no **phase-out plans for fossil fuel vehicles** (or internal combustion engines (ICEs) vehicles), hence missing the opportunity to signal automobile makers and others towards a future green fleet. Only Brazil is considering a phase-out. However, with a time horizon of 2060, this is significantly later than other jurisdictions (e.g., California that stop ICE sales by 2035) and will probably not stir the necessary innovation and investment today.

Policies and incentives

None of the countries have implemented binding CO₂ emission standards or fuel economy standards. Some policies exist with the same aim of improving fuel economy, such as in Brazil, which provides an incentive scheme to help companies reduce vehicle emissions, however, these are far less effective in guiding investments, especially since they are largely voluntary. Emission and fuel economy standards provide important signals to automobile makers to improve their car fleets over the years. Given that most automakers serve global markets, setting clear emissions and fuel economy standards that progress over time provides important signals for investment, with implications that extend beyond the country of production.

All three countries are starting to acknowledge the important role of electrified transport, especially EVs in the energy transition and have implemented some types of mechanisms to support these. However, the lack of EV uptake in all these countries shows that these are not effective and, when compared to other countries, fall well short of those. Commonly used instruments are purchase incentives or tax credits that enable consumers

to buy EVs as they level the playing field by reducing up-front costs. Currently, the only financial incentive provided in the three countries are reduced import tariffs. However, given the existence of national car manufacturing in two of these countries (Argentina and Brazil), this will probably have a limited impact. Enabling market penetration with simultaneous support to develop charging infrastructure would bring down the costs of the technology in the market, over time.

Public transport has played a major role in all three countries for decades but equally suffers from underinvestment in all of them. Brazil has for years focused on enabling public investments through favourable loans, but has received criticism that this is not sufficient and needs to be complemented with incentivising of private investments (Leibziger, David; Lefevre, 2015).

Peru has identified various areas of underinvestment and has started to address these by putting in place a national policy for urban transport in 2019, but has yet to follow through with its implementation (Ministerio de Transportes y Comunicaciones Peru, 2019). Argentina has a national mitigation plan for the transport sector that includes various city-level investment schemes in the public transport sector.

Railways historically play a major role, especially in Brazil and Argentina, with Argentina having the sixth largest network globally and Brazil having the ninth largest network. In all countries, the railway network has seen significant neglect in investments, as road transport has pushed ahead during recent decades. All three countries have recently started to address this by attracting international investment, and Argentina as well as Peru have introduced frameworks that aim at improving the respective railway systems. However, the potential that remains is significantly larger, as the significantly higher shares of road transport in all countries suggest.

Argentina has the sixth largest and Brazil the ninth largest rail network in the world.

Fuel taxes, either fuel excise taxes or carbon taxes exist in all three countries, but their levels differ significantly. The impact that such a policy has on road

transport is significantly higher in Argentina than in Brazil, but still falls well behind the impact of taxes in other OECD countries (OECD, 2019b). In addition, **the impact that such taxes could have is often offset by other subsidies** that have the opposite effect of incentivising more consumption.

Summary and conclusion of analysis

Despite all existing challenges in the sector, such as high informality and informal employment, the transport sector has seen far too little political effort being made, to help incentivise investments towards its decarbonisation, given that it is one of the fastest growing three countries.

Individual success stories exist that can be built on, such as the historic role of public transport in all regions, the uptake of biofuels in Brazil or the railway infrastructure already exist in Brazil and Argentina.

Scattered initiatives already exist to ramp up investments in all these areas, but there is a need to significantly ramp up this effort across all countries.

Other areas, such as efficiency improvements in road transport have seen very little to no policy movement, including improvement in car and truck emissions standards or the development of alternative fuels, aside from biofuels, including EVs. Proven global good practice policy and target packages exist for many of these that could be replicated to incentivise investments in the three countries, and a number of other LA countries, notably Chile and Costa Rica, have put in place targets and strategies to do so.

Governments need to take key policy actions, such as introducing EV targets, expanding public transport, and accelerating a shift of freight transport from road to rail.





3.4 Buildings

Global sector overview

Energy-related CO₂ emissions from buildings have risen in recent years, after flattening between 2013 and 2016. Several factors have contributed to this rise in emissions, including growing energy demand for heating and cooling, with increasing air-conditioner ownership and extreme weather events. In 2019, direct and indirect emissions from electricity and commercial heat used in buildings rose to 10 GtCO₂, the highest level ever recorded in the sector; accounting for almost one third of global energy-related CO₂ emissions (IEA, 2020d).

The majority of these emissions are indirect emissions from electricity generated off-site to power buildings. **Buildings represent one of the largest energy-consuming sectors in the global economy, with over one-third of all final energy and half of global electricity consumed in the sector** (IEA, 2017). The remainder are direct emissions, primarily from on-site combustion of fossil fuels for heating, hot water, and cooking, and from leaks of compounds used in refrigeration and air conditioning (C2ES, 2018).

To reach the temperature goal of the Paris Agreement, all new buildings should be Zero Emission Buildings (ZEB). A building can be considered a ZEB if it either is, or can be, fully decarbonised when accompanied by decarbonisation of the power sector. While this benchmark should be implemented immediately by developed regions or nations such as the EU and USA, it should be reached by 2025, at the latest, by all other countries (Climate Action Tracker, 2018). In addition,

annual deep energy renovations¹⁰ across the global building stock needs to increase from currently 1 to 2% of existing stock per year, to more than 2.5 to 3.5 % per year in 2030 (IEA, 2017; Climate Action Tracker, 2018). To date, enormous emissions reduction potential remains untapped due to the continued use of fossil fuel-based assets, a lack of effective energy-efficiency policies and insufficient investment in sustainable buildings.

In this context, there is an urgent need for large and rapid investments in the building sector, to achieve the required building-related emission reductions and to prevent locking in carbon intensive technologies (Climate Bonds Initiative, 2016). It is worth highlighting, that approximately 75% of the total abatement potential in the buildings sector shows net economic benefits, with the remainder available at very low cost. The net economic benefits of the abatement potential in this sector overall is due to high energy savings over the full lifetime of investments (McKinsey & Company, 2009).

Approximately 75% of low-carbon investments in the sector show net economic benefits, due to high energy savings.

¹⁰ Cost analysis shows that deeper retrofits are more economically viable with a longer-term perspective (to 2050) compared to shallower performance retrofits. This analysis included possible energy reductions on the order of 80% to 85%. The initiative Renovate Europe for instance is calling for a 60% to 90% reduction in existing building energy consumption, with an average improvement of 80% (IEA, 2013).

In 2019, the total investments in the global buildings sector were worth an estimated USD 5.7 trillion. More than 60% of these investments were for building construction, while the rest were energy related (IEA, 2020d). Only about 3% of total spending in the global buildings sector was spent on energy efficiency measures in buildings, including the building envelope, heating, ventilation, and air conditioning (HVAC), appliances and lighting. Although non-residential buildings account for less than a quarter of global buildings sector floor area, almost half of the investments in energy efficiency measures were undertaken in this sub-sector, showing the considerable backlog in the residential sub-sector (IEA, 2019b).

Realising sustainable buildings requires annual capital flows to increase by an average of USD 27 billion over the next decade – a relatively small addition to the USD 5.7 trillion already invested each year in buildings, globally (IEA, 2019b, 2020d).

The USD 5.7 trillion already invested annually in buildings worldwide only needs to be increased by USD 27 billion to achieve sustainable buildings.

Overview in Latin America

In 2018, buildings accounted for 24% of total final energy consumption in Central and South America, and 21% of total process-related CO₂ emissions (8% direct and 13% indirect emissions) (GlobalABC/IEA/UNEP, 2020a). This roughly corresponds to the share of the sector in global final energy consumption and process-related CO₂ emissions.

The main drivers for building-related emissions in the region are urbanisation, with over 80% of the population living in cities, and a continuous expansion of the middle class, representing one-third of the population (UN DESA, 2019). The Latin American building stock is thus characterised by a number of very large established urban centres across the region, which have continued to grow and adapt to an influx of rural and

regional migration. Over the past two decades, the growth in floor space and wealth has continued to increase demand for better-quality public services, buildings with larger dwellings and more services (including heating, cooling and consumer appliances), and higher levels of comfort, but with only modest improvements in energy intensity (OECD, 2019a).

While a large share of the building stock that will exist by 2050 has already been built, floor area in Latin America and the Caribbean is still expected to grow by 65% by 2050, dominated by another almost 11 billion square metres in residential buildings by 2050 (IEA, 2017). Latin American cities in particular will continue to experience high growth, with an additional 150 million people expected to be living in urban areas by 2050. This means that the **high construction rates of 3 to 5% per annum will continue and probably increase**; elevating the need to ensure that new buildings are built to a high-performance standard (GlobalABC/IEA/UNEP, 2020a). **Currently, only 1% of total floor area in the region is covered by mandatory building codes.** Without expanding the coverage of mandatory building codes, 98% of the floor area to be built until 2050 would not be affected by mandatory buildings standards (compared to a world average of 71%). This is the highest share of all regions in the world (IEA, 2019b).

Total floor area in LAC is still expected to grow by 65% by 2050, with 98% of this floor area not covered by mandatory building codes.

Even if mandatory building standards were to be introduced on a wider scale, challenges for urban planners and policy makers of enforcement and implementation would remain (GlobalABC/IEA/UNEP, 2020a). On the one hand, Latin America's urbanisation has been accompanied by urban sprawl and fragmentation, with expansive areas of informal settlements in cities¹¹ (World Bank, 2018b). On the other, informal labour represents a significant proportion of the labour force in the Latin American region, especially

¹¹ Informal settlements as a percentage of urban population varies between low (11% to 13%, such as in Mexico and Colombia), medium (34% to 44%, such as in Peru and Bolivia), to high (74% in Haiti) percentages (GlobalABC/IEA/UNEP, 2020a).

in the building, services and construction sector. Up to 75% of the construction workers (especially for the construction of residential buildings) are either self-employed or salaried workers in small establishments (World Bank, 2017).

A highly informal and decentralised construction sector does not only pose challenges to the enforcement of policies but also makes it difficult to deliver the levels of investment necessary to rapidly increase the share of low-carbon buildings in the sector. **Addressing the enforcement challenge would be one of the main priorities along with the introduction of mandatory building standards** to ensure both a rapid increase in building renovation and the construction of green (i.e., zero emissions) buildings, which is needed to keep the sector in line with the Paris Agreement.

As in most regions, the growth of the Latin American green building market has been catalysed by green labelling schemes supported by a broad partnership of industry actors. Although national green building certification systems exist in Latin America, such as the Colombia Green Building Council and the Energy Efficiency Seal in Brazil, international green building labelling certification systems are the most widespread. In the absence of effective regulations to control resource use in buildings in most developing countries, these voluntary certification schemes are an important catalyst for the adoption of green buildings. The most successful international certification initiative promoting green buildings in Latin America is the Leadership in Energy and Environmental Design (LEED) certification system, administered by the World Green Building

Council (ELLA, no date). In 2020, there were more than 4,000 LEED projects and over 1,700 active LEED professionals in Latin America. While North America has by far the most LEED certified buildings, the number of such buildings in Latin America is similar to that in Europe, which is a higher number than those in the Middle East and North Africa, and only slightly lower than in East Asia (USGBC, 2020).

In 2020, there were more than 4,000 LEED projects and over 1,700 active LEED professionals in Latin America.

Low-carbon investments and developments in Argentina, Brazil, and Peru

In the buildings sector, the main low-carbon assets to invest in are green buildings, i.e., Zero Emissions Buildings. Depending on the building type or intended use, the providers of capital vary, but it is worth noting that, with the exception of public buildings, private capital is primarily required.

Table 9 provides a non-exhaustive overview of investment areas and sources of capital in the buildings sector.

Table 9: Investment areas and main sources of capital in the buildings sector – non-exhaustive list

Asset / activity	Capital provider / asset owner
Low emissions investment areas	
Green buildings – multi-family homes	Real estate investors, real estate developers, private households (very few)
Green buildings – Single family homes	Private households, real estate developers, real estate investors
Green buildings – Commercial	Real estate investors, real estate developers, companies (owners)
Green buildings – Industrial	Companies (owners), real estate investors, real estate developers

Asset / activity	Capital provider / asset owner
Green buildings – Public	State, municipalities, cities
Appliances – Heating and cooling systems	Real estate investors, real estate developers, private households,
Rooftop PV (and other decentralised RE)	Private households, energy service companies (ESCOs)
Appliances – household	Private households, landlords
Appliances – Commercial	Companies
High emissions investment areas	
Coal/oil/gas appliances	Private households, landlords
Standard or higher emissions buildings	See above for green buildings

The green building market in the three focus countries has evolved in recent years, although it is still in an infant stage of development. All three countries have a Green Building Council (GBC) that is actively pursuing the certification of buildings. However, the GBC Brazil, together with the GBC Colombia, is the only national council in Latin America participating in the World Green Building Councils' Advancing Net Zero project. The aim of this initiative is to accelerate the uptake of Zero Emissions Buildings to 100% by 2050, through the introduction of tools, resources, and programs such as certification schemes (WRI, 2019). The expansion of green building certificates can also be considered as an indication of low-carbon investments in the building sector.

In 2017, Brazil had 1425 published green building activities, including certifications and registrations and ranked fourth in terms of buildings that have been certified by the Leadership in Energy and Environmental Design (LEED) initiative worldwide (USBGC, no date; IFC, 2017b). Brazil can thus be considered a regional leader in terms of certified green buildings. Argentina and Peru had implemented 357 and 232 green building activities, respectively (USBGC, no date; IFC, 2017a, 2017c). The vast majority of green buildings are in the nation's capitals and larger cities. All three countries are also members of the Global Alliance for Buildings and Construction, which works towards zero-emission, efficient, and resilient buildings and the construction sector (GlobalABC/IEA/UNEP, 2020b). **However, the overall share of green buildings of all new buildings in 2019 was still very low, at around 2% in Argentina and Peru and 5% in Brazil** (IFC, 2017a, 2017b, 2017c).

In 2020, the construction sector as a whole in the region was also heavily impacted by the COVID-19 pandemic. According to GlobalData, Latin America is the world's worst-performing region in terms of construction output, reflecting the deepening economic damage caused by the COVID-19 pandemic (GlobalData, 2020). Among the largest countries in the region, Peru's construction output is expected to contract the most in 2020 at -24%, followed by Argentina at -23.5%. In Brazil, output is projected to fall by 4.8% in 2020, as the continuity of nearly all building activities, since the start of the pandemic has prevented a much worse outcome for the sector in the second quarter (GlobalData, 2020). Amid the COVID-19 crisis, the global market for green building materials estimated at US 238 billion in the year 2020, is projected to reach a revised size of US 425 billion by 2027, growing at a compound annual growth rate (CAGR) of 8.6% over the period 2020-2027 (Global Market Trajectory & Analytics, 2021).

However, **in Argentina, Brazil and Peru, investments in green buildings account for a relatively small share of total projected investments in the residential building sector in 2025, at 8%, 10% and 5% respectively**. This corresponds to a total projected investment in green residential buildings of USD 5 billion, USD 34 billion and USD 2.3 billion in 2025 in Argentina, Brazil and Peru, respectively. In the commercial building sector, the figures are similar in Argentina and Brazil, where 10% and 8% respectively of total projected investments in 2025 in this sector are expected to be in the green building market. In Peru, the share is slightly higher at 20%. Accordingly, the total investment in green commercial buildings in Argentina, Brazil and Peru in 2025 would be

USD 2 billion, USD 4 billion and USD 1 billion, respectively (IFC, 2017a, 2017b, 2017c).

The above-mentioned outlook in each of the three countries indicates that, due to remaining barriers, **most of the potential to invest in the sector remains untapped**. Some of the main challenges to investment in the sector should include longer payback periods and resistance to upfront investments, barriers related to split incentives between building owners and tenants, and limited visibility and awareness of the actual costs for heating, cooling or electricity. The fragmentation of the sector with millions of small emitters, many of whom are individuals, reinforces those challenges (McKinsey & Company, 2009). Another barrier to investments in the sector is access to finance. Access to finance is particularly challenging for low-income segments of the population and small and medium-sized enterprises (SMEs), given the high interest rate environment. In many Latin American countries, lending interest rates are between 8% and 20%, which is significantly higher than, for instance, in Asia. This creates a challenging environment for investments in general, and especially for medium- to

long-term investments, such as the ones in the buildings and construction sector (GlobalABC/IEA/UNEP, 2020a).

To overcome those challenges and thus increase the rate of building renovation and rate of construction of Zero Emissions Buildings, all jurisdictions must implement ambitious sustainable buildings policies that attract the necessary investment to drive the transformation to low-carbon construction and real-estate markets.

While there is a global common understanding and consensus around effective policy measures in the building sector, country-specific characteristics should be taken into account, when designing and prioritising country-specific policy measures.

As shown in Figure 10, Argentina's buildings emissions intensity per capita is well above that of countries like Peru and Brazil and even higher than the world average. This can be attributed to the relatively high heating requirement, due to its geographical location, especially in comparison to Peru and Brazil, combined with the problem of insufficiently insulated buildings.

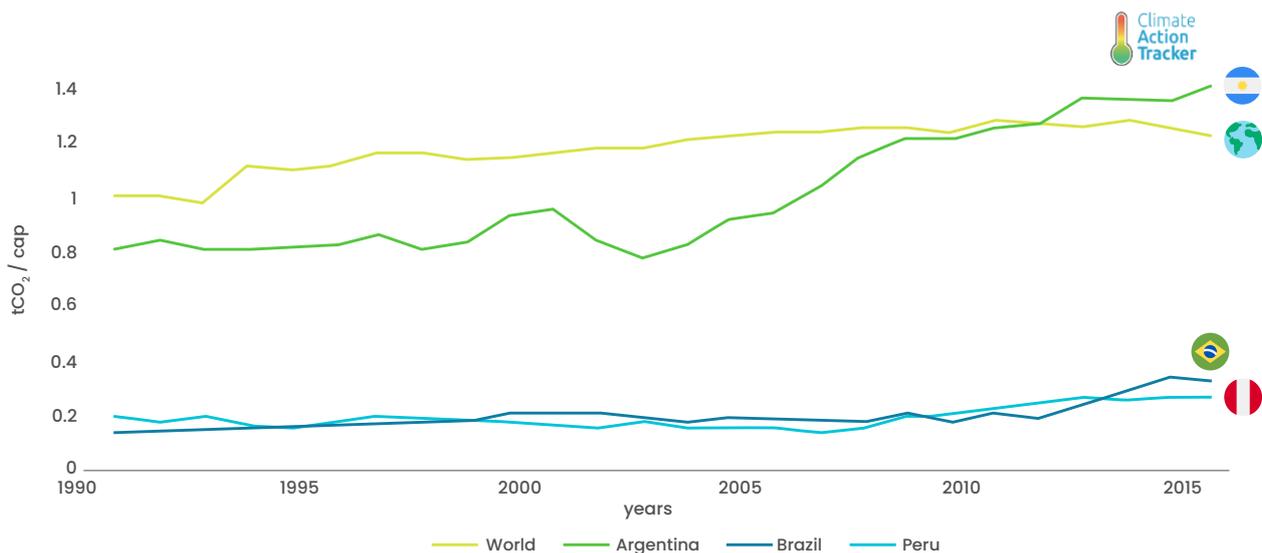


Figure 10: Buildings emissions intensity (per capita) in Argentina, Brazil, Peru and world average (Climate Action Tracker, 2020a)

Suitable measures in response to the above-described situation include the support of zero emissions heating alternatives to initiate a move away from gas-based heating or measures to reduce the upfront investment costs of thermal retrofits (e.g., lower interest rates and repaying the cost of efficiency measures with savings on heating costs) (CAT, 2019).

Policy framework

Most buildings last for decades – some for centuries – and building owners often only do one major energy renovation in their lifetime, if at all. This has significant implications for policy makers, as the very low turnover rate of the building sector is a critical constraint and risks locking in investments for decades to come.

Setting the right signals and targets in place as well as implementing policies to incentive low-carbon investments in the sector is thus crucial. The building sector policy landscape in Argentina, Brazil and Peru can be observed in Table 10.

Table 10: Policy framework assessment for the building sector

Policy	Assesment			
Investor signals and targets				
Emissions reduction plan and target for the sector	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Short-to medium-term target or plan in place <input checked="" type="radio"/> Medium and long-term target and plan in place	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Zero Emissions Buildings (ZEB) targets for new buildings	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place			
Renovation targets for public, residential and commercial buildings	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for one segment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for several segments			
Phase out plan for coal, oil or gas use in buildings	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for at least the most polluting fuel			
Policies and incentives to invest in low-carbon technologies				
Mandatory building codes (building envelope)	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for part of the sector	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for several segments			
Minimum energy performance standards (MEPS) for appliances (e.g. air conditioners and lighting)	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for at least 2 categories	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for 3 or more categories			

Policy	Assesment			
Financial support schemes for new low-carbon buildings/ energy efficiency renovations	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for new buildings or renovation	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place for new buildings and renovation			
Financial support for appliances, solar hot water and efficient cooking	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for one category	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for two or more categories			
Financial support schemes for renewable energy diffusion in buildings	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

Investor signals and targets

Long-term signals on the intention of government policy direction are important, given the long lifespan of buildings. They provide greater certainty, and importantly, they allow governments and private actors to plan for future actions and investment (IEA, 2019b). However, there are no signals or clearly formulated targets for the building sector, in any of the three countries.

Globally, very few NDCs include zero emissions performance in buildings or strategies for decarbonising buildings. The majority of Latin American countries also do not explicitly mention buildings in any form in their NDCs (GlobalABC/IEA/UNEP, 2020a). This is also the case in Argentina and Brazil, where an **emissions reduction plan or target** for the buildings sector in their NDCs is not specified. In Argentina, the National Infrastructure and Territory, and Climate Change Action Plan, however, provides information about mitigation measures in the building sector, covering the period up to 2030 (Government of Argentina, 2019c). While Peru’s NDC, does not include a sector specific target for the building sector, it provides a list with mitigation measures included under the energy sector, which relate to the application of the country’s Technical Code of Sustainable Construction.

The majority of Latin American countries do not explicitly mention buildings in any form in their NDCs.

None of the three focus countries has a **target for Zero Emissions Buildings for new buildings** or a **renovation target for public, residential and commercial buildings**. In addition, none of the countries has a **phase out plan for the use of coal, oil or gas in buildings**.

Policies and incentives

Governments can stimulate action through policy interventions that shape market rules to improve access to financing, de-risk clean energy investment and broaden the availability of market-based instruments that reduce barriers to transition and enhance the attractiveness of building sector investments. **An enabling policy framework for investment and finance is thus critical to mobilise and effectively channel finance to investments into the low-carbon building and construction sector.** While there are some developments in the area of building codes and minimum energy performance standards, targeted and holistic financial support mechanisms are largely absent in the three countries.

Despite the great demand for new residential buildings, progress on building energy codes globally is slow. Current policies and investments in building energy efficiency globally, are not on track to trigger the transformation that is needed. Nearly two-thirds of countries, globally still do not have any **building performance standards** in place and a similar share of energy-consuming equipment in buildings globally is not covered by **mandatory energy efficiency policies** (IEA, 2017).

None of the three countries has a building code in place that is mandatory for both the residential and commercial sector. In the case of Argentina and Brazil, there are mandatory codes in place that target parts of the sector or specific cities, e.g., covering social housing (Resolution 59/2019) and residential homes (Norma de Desempenho de Edificacoes Habitacionais), respectively (GlobalABC/IEA/UNEP, 2020a). In Peru, the Ministry of Housing, Construction and Sanitation offers guidance on building, taking into account climate conditions and there is the Technical Code of Sustainable Construction (Código Técnico de Construcción Sostenible), a voluntary code promoting sustainable construction in new buildings (Government of Peru, 2021b).

Codes and standards for energy efficiency refurbishment, which would trigger the requirement to use more energy-efficient products and designs, are mostly ignored across the region. In Latin America, only Chile has a building code that covers the retrofit of existing buildings (GlobalABC/IEA/UNEP, 2020a). There are various certification schemes for both existing buildings, such as LEED for O&M, and for new buildings, such as the net-zero energy buildings certificate issued by the Green Building Council Brazil, which, however, are mainly acquired by private-sector buildings (GlobalABC/IEA/UNEP, 2020a).

Most countries in Latin America, have **minimum energy performance standards** (MEPS), (including Argentina and Brazil) and energy labels in place (including the three focus countries). Common issues with these standards are that they are not ambitious enough, are outdated or are not adequately enforced (GlobalABC/IEA/UNEP, 2020a). **For MEPS to be an effective tool, they should be developed in collaboration across the region to enable cross-border applicability.** So far, standards are set at national level, and the lack of regional harmonisation of MEPS and labelling programmes limits the ability for markets to scale, posing a challenge for manufacturers, importers and retailers (GlobalABC/IEA/UNEP, 2020a).

Financial support schemes in the building sector are important to incentivise investments. Argentina and Brazil offer some **financial support for renewable energy diffusion in buildings** through net-metering, coupled, in the case of Brazil, with tax benefits for owners of solar power generators of up to 1 MW in size (PV Magazine, 2019).

While there is no specific financial support scheme for renewable energy diffusion in buildings in Peru, **financial support mechanisms exist for new low-carbon buildings and energy efficiency renovation** (MiVivienda, no date). While the latter is not available in Brazil, there are soft credits in place in Argentina for the acquisition of efficient materials, both for renovations and new buildings (CAT, 2019). This incentive, however, only targets the social housing segment and is not available for other building types.

Neither Brazil nor Peru have national **financial support schemes targeting appliances, solar thermal or clean cooking options** in place. There are, however, some examples of sub-national policies for instance for the City of Sao Paulo and Rio de Janeiro mandating solar thermal systems for new and refurbished public buildings (IRENA, 2013). In Argentina, last year, the Government announced a new credit line from Banco Nación for the purchase of household appliances at preferential conditions, seeking to improve the energy efficiency of a range of appliance categories (Government of Argentina, 2020b).

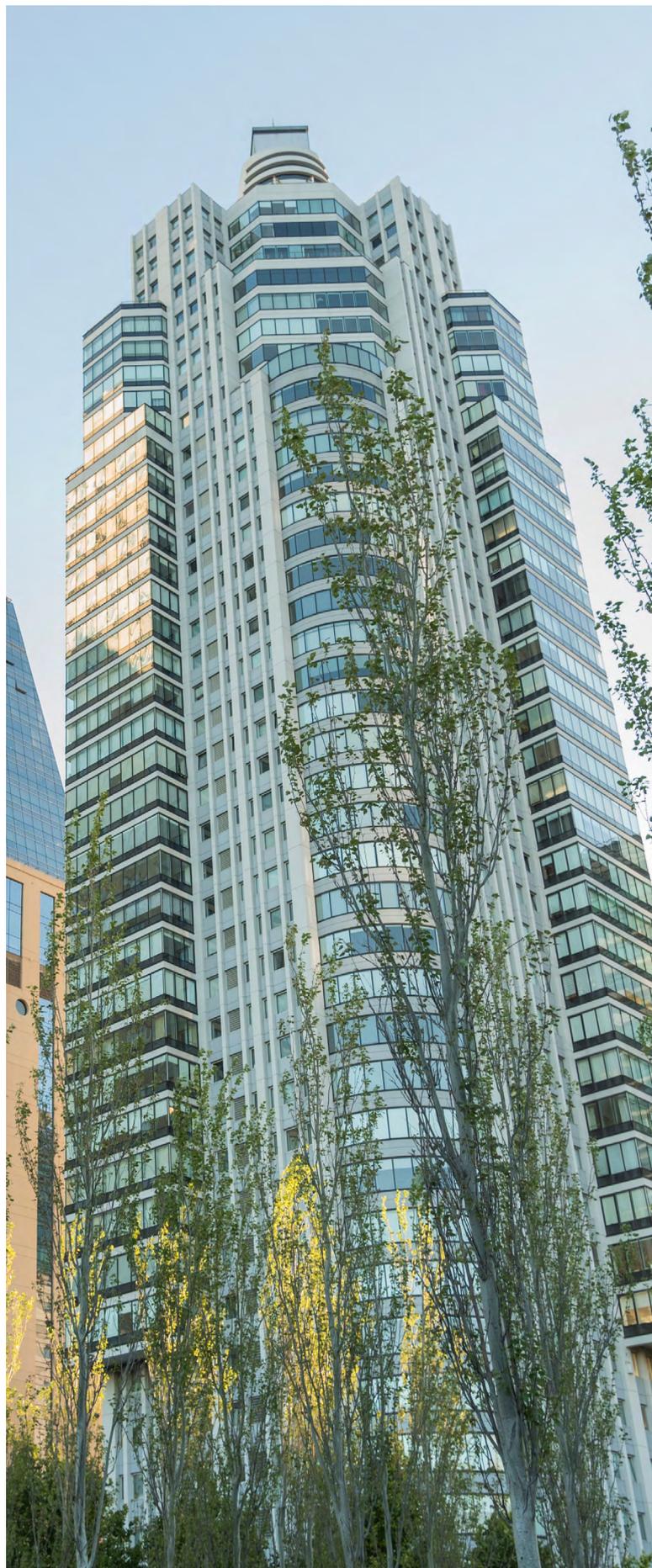
Summary and conclusion of analysis

To tackle climate change it is imperative to implement decisive action in the building sector, which is responsible for one quarter of energy-related CO₂ emissions in Latin America.

Technologically, commercially and economically viable solutions exist but stronger policies and partnerships to scale them up more rapidly are needed. Measures need to address both the existing building stock as well as new buildings. Nonetheless, none of the three countries have defined adequate signals or targets for Zero Emissions Buildings or renovations. There are individual approaches to implement policies (e.g., codes or MEPS) or incentives (e.g., financial support schemes) that are either not ambitious enough, are limited in scope or outreach, (e.g., voluntary vs mandatory) or lack adequate enforcement.

To bring the sector on a Paris compatible track and avoid stranded assets, it is essential that governments act quickly by expanding and strengthening building codes and performance standards and offer incentives that support technological and financial innovation, and the adoption of more integrated planning policies and low-carbon materials. In addition, increasing awareness about the (non) economic benefits of increasing energy efficiency measures in the sector can also be considered an important task for governments.

Governments need to introduce climate-friendly building standards to ensure more sustainable growth in the building sector.





3.5 Industry

Global sector overview

Emissions in the industry sector at the global level are distributed over a set of sub-sectors, and include energy and non-energy related emissions, such as process emissions. Direct industrial emissions, for example through on-site fuel combustion, roughly accounted for 25% of global emissions in 2018, and have been on a slightly downward trajectory since 2014; mainly driven by non-energy intensive industries (IEA, 2020e). Furthermore, the industry sector is also responsible for indirect energy-related emissions when sourcing energy from the electricity and heating grid.

The industrial sector is the largest energy consumer and its energy demand continues to rise, accounting for 37% of total global final energy use in 2018, largely due to process heating, steam generation, and to a lesser extent electricity use (IEA, 2020e). Manufacturing of construction materials, such as steel and concrete, are particularly energy and emissions intensive (IPCC, 2018, p. 138). The combustion of fossil fuels is a major source of anthropogenic emissions and with a lack of decarbonisation solutions, demand sectors need to phase them out (see Box 1: The oil and gas sectors).

The COVID-19 pandemic and governments' health restrictions have impacted some industry sectors more than others. However, the overall demand for industrial goods declined and restrictions led to the slowing or shutting-down of operations. As a result, global emissions from the industry sector declined by almost 6% in 2020, but a considerable rebound effect can already be observed in 2021 (IEA, 2021c). The International Energy Agency (IEA) projects 2021 emissions to reach the same level as in 2019 (IEA, 2021c).

The IPCC special report on 1.5°C shows that industrial emissions need to be reduced by 80% by 2050, relative

to 2010 levels (IPCC, 2018a). Residual emissions from certain industrial processes, such as chemical processes, remain and need to be compensated for, to reach net-zero emissions globally (IPCC, 2018a). Models with a better sectoral resolution suggest that steeper emissions reductions can be achieved using carbon capture and storage or utilisation (CCS/U) or breakthrough technologies and production processes such as novel cements (Rogelj et al., 2018; Climate Action Tracker, 2020f).

The IPCC special report on 1.5°C shows that industrial emissions need to be reduced by 80% by 2050, relative to 2010 levels.

Mitigation options in the industry sector are spread over a broad set of often complex technologies, and there is still a lack of technological solutions for some industrial processes; making it one of the sectors that is the hardest to decarbonise. At the same time, the industry sector plays an enabling role in the transition to a net-zero emissions economy, by manufacturing components required for a decarbonised economy, such as electric vehicles, heat pumps or smart grid components.

Therefore, three guiding considerations help to scope required investments in the industry sector: 1) demand levels, the type of products manufactured and their energy intensity, 2) the energy and emissions intensity of manufacturing processes, and 3) the energy and

emission intensity of materials, such as the choice between raw and recycled materials.

Reducing the energy and emissions intensity of manufacturing processes can be achieved through energy efficiency measures, the electrification of production processes (to date electricity is the only energy carrier that can be fully sourced from low carbon energy), and by deploying innovative processes and/or applying CCS/U and zero emission fuels such as hydrogen.

According to an analysis by the Climate Action Tracker, manufacturing processes will generally need to be fully electrified, by relying on low carbon, and eventually zero emission electricity, with an overlap with decarbonisation efforts in the power sector (Climate Action Tracker, 2020f). To that end, the electrification rate can guide policies and investment decisions (Table 11).

Table 11: Low carbon manufacturing benchmarks (Climate Action Tracker, 2020f)

Paris Agreement Compatible Sectoral Benchmarks	2030	2040	2050
Global minimum electrification rate of all manufacturing processes (in %)	35	45–55	50–55
Brazilian minimum electrification rate of all manufacturing processes (in %)	30–35	40–50	50–60

At the same time, some manufacturing processes are very energy intensive, for which the electrification of processes will not be sufficient. For example, new installations in emissions-intensive sectors need to be low-carbon as of 2020 already and need to maximise material efficiency to reduce direct emissions. As a result, no new conventional carbon-intensive installations should be financed after 2020, such as blast furnaces without CCS/U processes (Climate Action Tracker, 2020f).

New installations in emissions-intensive sectors need to be low-carbon as of 2020 already and need to maximise material efficiency.

Investment data on the technology options needed to reach such emissions reduction levels is hard to come by, given the diversity of technological solutions needed. The IEA suggests that investments in energy efficiency totalled USD 40 billion in 2018 in the sector, however without a reference of the total

investment volume needed in a scenario aligned to the temperature goal of the Paris Agreement, these figures are difficult to interpret (IEA, 2021c).

Overview in Latin America

Latin America made up 6% of global industrial emissions in 2010 (IPCC, 2014), and industry represented 24% of the region's GDP in 2018 (World Bank, 2019b). Emissions have been increasing at a relatively low pace in recent years, at around 2% yearly between 2000 and 2018 (ClimateWatch, 2020).

There are two main sources of emissions in the industry sector: energy use and industrial processes such as chemical processes. In the absence of emissions data, energy use can be an indication of emissions sources across the sector. As is the case at the global level, energy use in the industry sector among Latin American countries is spread across a broad set of industrial sub-sectors. The distribution of energy use across industry sub-sectors provides a good idea of the complexity of the task, to reduce emissions (and energy use) in the sector (Figure 11).

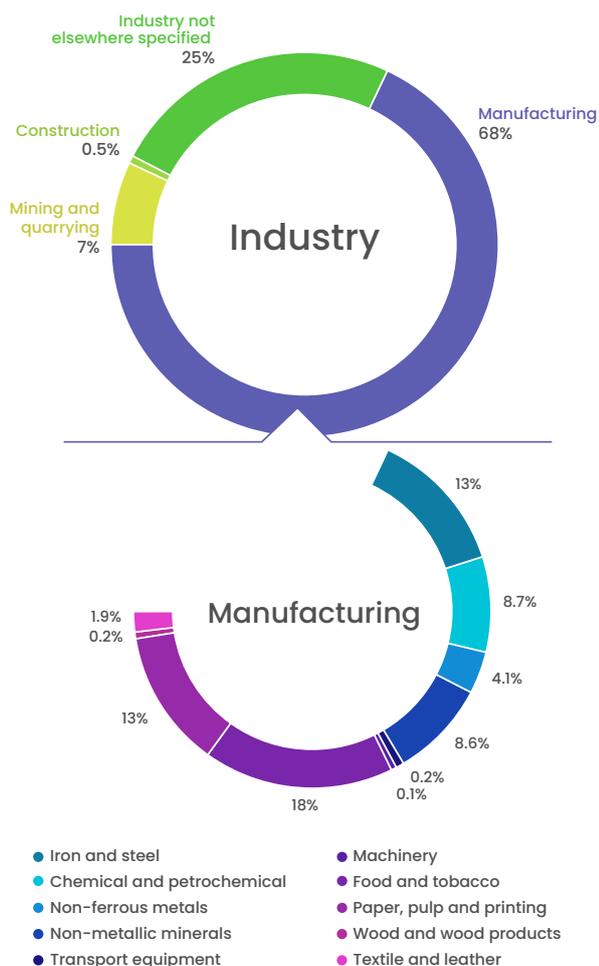


Figure 11: Energy use by industrial sub-sector in Latin America in 2018¹² (IEA, 2021f)

In Latin America, the largest industry sub-sector in terms of energy use is the ‘food and tobacco’ sector, and in particular the food processing sector, accounting for nearly a fifth of energy use (IEA, 2021f). The ‘iron and steel’ and ‘paper, pulp and printing’ sub-sectors are the next largest energy consumers in the region, with around 13% of the region’s energy use each. These three sub-sectors alone diverge in the type of mitigation measures to be deployed. Remaining sectors each account for less than 10% of energy use and all require a different set of mitigation measures.

Like other regions, the LAC region has experienced a decline in economic activity as a result of the COVID-19 pandemic. This has significantly impacted the industry sector. **While reduced economic activity leads to reduced emissions from industrial processes, it also means a potential lack of the investments needed to decarbonise the sector.**

12 The graph combines IEA regions non-OECD Americas (including Colombia) and Chile (OECD) to form Latin America

The effect of COVID-19 restrictions differs amongst LAC countries. For example, it is expected that Peru’s stringent lockdown will have halted construction works and decreased demand for cement by more than 10% (Fitch Ratings, 2020). At the same time Brazil’s demand for cement may have slightly risen in 2020, as the government did not enforce similarly stringent COVID-19 restrictions (Fitch Ratings, 2020). Governments’ recovery packages will have a significant impact on the shape of that recovery, for example when measures are focused at infrastructure investments.

Box 1: The oil and gas sectors

The oil and natural gas industry is different from others, in the sense that the majority of its emissions does not come from operational activities but rather from the combustion of the fossil fuels in end-use sectors (power, transport, buildings and other industry), either domestically or abroad, when they are exported. As such, much of the mitigation potential lies in these end-use sectors. The oil and gas sectors however have an important role to shift their business and investment plans towards more sustainable areas to contribute to the objectives of the Paris Agreement, and avoid stranded assets.

With CO2 emissions needing to decline to net zero by 2050, there will be a marginal role for the oil and gas sectors in the medium- to long-term. The developments across many Latin American countries go against this objective. At the current rate of production, it is estimated that oil reserves could last for well over 100 years in Central and South America, the highest among any region of the world. Much of this can be attributed to reserves in Venezuela, which has the world’s largest proven oil reserves (BP, 2020). Among the countries we analysed, Brazil ranks 15th, Argentina 33rd, and Peru 48th in terms of global oil reserves (CIA, 2018b). Argentina, Brazil, and Peru each also have substantial natural gas reserves (Energy Information Administration, 2021). Argentina is estimated to have one of the world’s largest shale gas reserves at the Vaca Muerta fields. To date, only a few countries have placed bans on further fossil fuel exploration or production. In the region, Costa Rica recently extended its oil exploration and exploitation ban to 2050 and Belize has ended offshore oil exploration (The Guardian, 2018; Government of Costa Rica, 2019).

Low-carbon investments and developments in Argentina, Brazil and Peru

Generally, it can be said that asset owners of production facilities are the investors in the industry sector, for example in the agribusiness, the production of heavy metals or the manufacture of motor vehicles. Table 12 provides a non-exhaustive list of investment areas in the industry sector, and related investors (including examples for steel and cement manufacturing as 'hard-to-abate' manufacturing sub-sectors). Given the large number of sub-sectors in the industry sector, the focus is primarily on the production of iron and steel,

Investments in the industry sector in the LAC region have not reduced energy intensity levels.

the second largest energy consumer of the sector in Latin America. This sub-sector is the most emission and energy-intensive sub-sector. It is one of the 'hardest to abate' sub-sectors and it requires immediate action to ensure a full transition by mid-century. Some of the main investment areas and their typical capital providers or asset owners are shown in Table 12.

Table 12: Investment areas and main sources of capital in the industry sector (including examples for steel and cement manufacturing as 'hard to abate' manufacturing sub-sectors) – non-exhaustive list

Asset / activity	Capital provider / asset owner
Low emissions investment areas	
For manufacturing processes that are not hard to abate	
Electrification of production processes	Production facility owner
Reduction of electricity emission intensity	Production facility owner / Energy utilities
For manufacturing processes that are hard to abate (Iron, steel and cement examples)	
RD&D	Governments, manufacturers
Recycling of steel	Iron and steel manufacturers
Hydrogen based steel production	Iron and steel manufacturers
Waste heat recovery systems	Iron and steel manufacturers
Carbon capture and sequestration or utilisation	Iron and steel manufacturers
High emissions investment areas	
New blast furnaces to basic oxygen furnace route (BF-BOF) plants	Iron and steel manufacturers

To date, investments in the industry sector in the LAC region have not reduced energy intensity levels (Santiago, Fuinhas and Marques, 2020). For instance, the emission intensity per output of cement in Brazil has increased since 2005; whereas Brazil's emissions intensity of direct energy use is low, compared to other countries; largely due to the use of biomass as a feedstock (IEA, 2021f). There is still a significant need to reduce the emissions intensity further, to reach the Paris Agreement compatible levels at a maximum of 100 kg CO₂/ton of cement by 2050 (Figure 12). Brazil's National Syndicate of the Cement Industry (SNIC) suggests an emissions intensity of 480 kg CO₂/ton of cement by 2030, in line with the Paris Agreement Compatible Sectoral Benchmarks put forward by the Climate Action Tracker. However, it proposes much higher emission intensities in the long-term, to keep global warming to 2°C (380 kg CO₂/ton by 2050).

Despite these differences, both studies suggest that **reducing current emissions intensity levels cannot be handled by relying on fuel switch only, such as bioenergy, but will require transformational investments and ambitious sectoral policies** to reduce direct process emissions and indirect emissions from thermal energy (SNIC, 2019; Climate Action Tracker, 2020f). Investments into the electrification of end-use industry sectors could help decarbonise the sector significantly.

More than half of global energy demand in industry should be electrified by 2050 to achieve full decarbonisation. Historical trends in Latin America, such as in Brazil, however suggest that investments in the electrification of the sector are not happening there yet (Climate Action Tracker, 2020f).

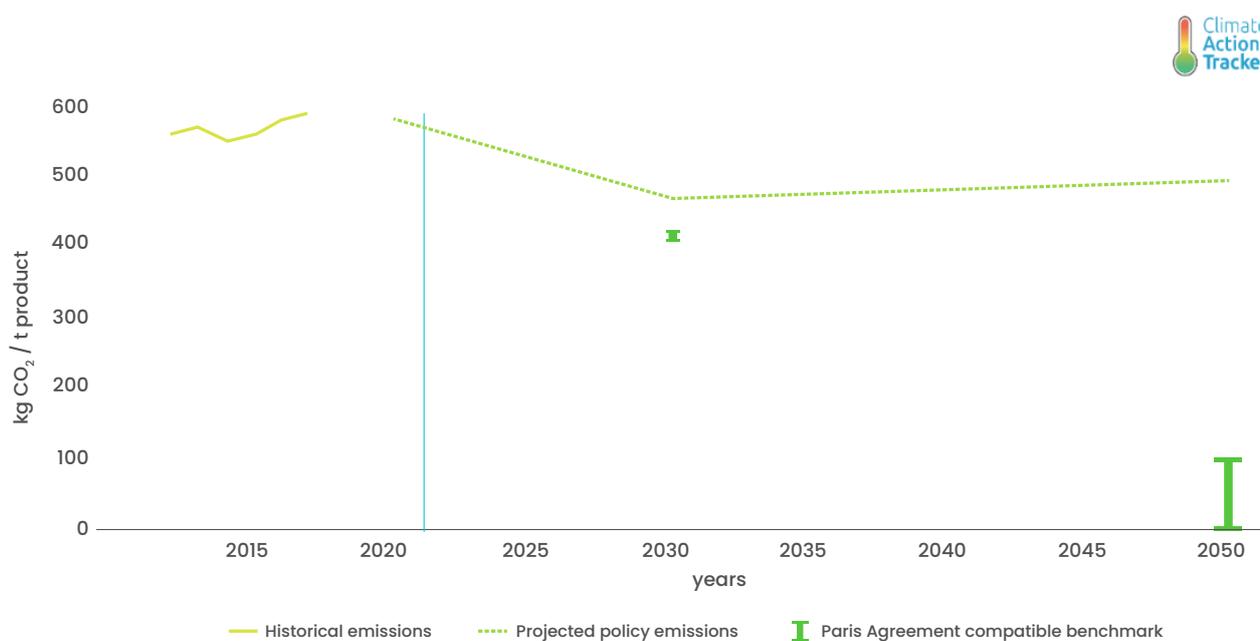


Figure 12: Emission intensity in cement in Brazil – historical data, projections and Paris compatible benchmarks (Climate Action Tracker, 2020f).

Policy framework

The industry sector is a major source of direct emissions and is the largest energy consumer along the transport sector (IEA, 2021b). Mitigation measures in the industry sector are crucial not only to reduce energy demand and therefore relieve pressure from the energy sector, but also to enable sectoral transitions in other sectors.

There is however little evidence that this is happening on the scale and speed needed in Latin America. Setting the right signals and targets as well as implementing policies to incentivise low-carbon investments in the sector are therefore crucial. The industry sector policy landscape in Argentina, Brazil and Peru is shown in Table 13.

Table 13: Policy framework assessment for the industry sector.

Policy	Assesment			
Investor signals and targets				
Emissions reduction plan and target for the sector	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Short-to medium-term target or plan in place	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> Medium and long-term target and plan in place			
Plan to end fossil fuel exploration	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place			
Support schemes for renewables	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
RD&D policies in place for 'hard to abate' sub-sectors (steel, cement)	<input checked="" type="radio"/> Not in place			
	<input type="radio"/> In place for one sub-sector or technology	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place for several sub-sectors			
Policies and incentives to invest in low-carbon technologies				
Strategy for material efficiency (steel, cement, aluminium, etc.)	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Minimum energy performance and equipment standards	<input type="radio"/> Not in place	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place			
Financial incentives in place for energy efficiency measures in industrial production	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for one sub-sector	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for several sub-sectors			
Financial incentives or other support for CCS/U and low-carbon hydrogen	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for one technology	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place for both technologies			

Investor signals and targets

Medium- to long-term plans to decarbonise the industry sector, including an emissions target, provide important signals to investors (especially targets) and set out a pathway towards achieving these. Of the three countries analysed, none has communicated a clear emissions target to guide investors.

None of the three countries has communicated a medium- to long-term plan or emissions reduction target to decarbonise the industry sector.

In the absence of such targets, plans ideally provide visions in line with the long-term goals of the Paris Agreement, to avoid developments with a lock-in of high-carbon technologies and activities. A dedicated sectoral plan exists in Argentina for the period until 2030, and Peru has individual measures in the sector, integrated into an economy-wide mitigation plan, also reflected in the NDC. In Brazil, only sub-sectors, such as the mining sector have plans. These plans lack the transformational vision needed when working towards a net-zero economy, as such measures only target incremental changes.

In a Paris-compatible world, fossil fuel extraction needs to be completely phased out, or accompanied with clear plans on how to mitigate the resulting emissions, for instance through the use of CCS/U solutions. However, Argentina, Brazil and Peru have plans in place to expand the extraction of fossil fuels in the short to near term (Castillo et al., 2020). For example, Argentina's "Plan Gas" aims for an increase in private investments of USD 5 billion in gas production in the coming years (Ministry of Economy of Argentina, 2020). Similarly, Brazil's PROMAR¹³ and REATE 2020¹⁴ plans, aim to coordinate action amongst the energy and finance industry, to competitively exploit Brazil's offshore and onshore oil and gas reserves, enhance financial support from the government and support the national industry around the exploration and production of offshore oil and natural gas (Castillo et al., 2020; EPE,

2021b). Furthermore, Brazil's Ministry of Mines and Energy pursues actions to promote a favourable environment to attract foreign investments in the oil and gas sectors, as part of the Mining and Development Plan (PMD) 2020-2023 (Government of Brazil, 2021a).

These plans require significant investments and play an important part of countries' economic growth and energy security strategies. Ultimately, the aim often includes the exporting of fossil fuels. Whilst investments into the expansion of fossil fuels provide near to medium term benefits such as revenue generation and jobs, such investments also lead to long-term implications for the industry and the energy sector that essentially will need to transition towards net zero emissions.

CO₂ emissions from already developed fossil fuel reserves (oil, gas and coal mines and fields that are currently under construction or in operation) are likely to exhaust the 2°C carbon budget and push the 1.5°C temperature goal out of reach (SEI et al., 2020). According to the "Net Zero Scenario" of the IEA, no new oil or natural gas fields are being developed beyond existing fields and those already approved for development (IEA, 2021f). Given the significant renewable energy resources that exist in the LAC region that could also in the future be used to export hydrogen (power to gas), and the lack of long-term transition strategies, the plans to extend fossil fuel exploration sends wrong long-term signals to investors.

Replacing fossil fuel feedstock with renewable alternatives and sourcing renewable electricity for industrial processes are key elements to decarbonising the industry sector. Today, biomass already plays an important role in the industry in Brazil, where renewable energy sources account for more than 40% of the direct energy use in the sector. In Argentina and Peru this is significantly less with only 8% in each country (IEA, 2021f). This is partly due to the fact that **Brazil has a support scheme that provides direct funding for renewables in the private sector. Argentina has a net-metering scheme in place to promote the use of renewable energy.** It also has put in place a law (Resolution 281-E/2017) that enables bilateral agreements between energy producers and large-scale consumers with a power demand greater than 300 kW. The law aims to develop a market for renewable energy through the MATER program that prioritises the dispatch of renewable energy (MINEM, 2017). Peru has no such incentives in place.

¹³ Revitalization and Incentive Programme for the Production of Maritime Fields

¹⁴ Revitalization of the Activity of Exploration and Production of Oil and Natural Gas in Land Areas

Technological solutions to reduce emissions in many industry sub-sectors are not readily available and **significant efforts into R&D and demonstration projects are still needed** to develop these (Climate Action Tracker, 2017). Technologies that need to be developed include novel cement production and hydrogen-based steel (Climate Action Tracker, 2020f). **None of the three focus countries have programmes in place to develop these technologies.** This reflects the lack of long-term vision towards net-zero emissions and a consequent lack of investments needed in the early stages of technology development.

While some of these required transformational technologies might be developed and first deployed in developed countries, they also need to be adjusted to the local context and/or different technologies might be more suitable in some countries than in others. Hence, at a minimum, investments into adapting technologies to the local context are necessary.

As a result of governments' lack of action, initiatives to reduce emissions in the sector, develop new technologies and drive investments for low-carbon solutions are currently largely driven by the private sector. Internationally operating companies such as LafargeHolcim or CEMEX have made commitments to reduce emissions (Cemex, 2020; Edie, 2020). However, these commitments are voluntary in nature, and current investments in transformational technologies are insufficient.

Efforts to reduce emissions in the industry sector and drive investments for low-carbon solutions are largely driven by the private sector.

Policies and incentives

Material efficiency, or the reduction in material use for the same end product, **is an integral part of reducing emissions in the industry sector.** A driving factor to significantly reduce emissions is the substitution of raw materials by recycled materials such as in the steel or aluminium sector. For instance Brazil had a 25% share of electric arc furnaces, an electricity-based method relying on the use of recycled steel, in 2013

and 22% in 2018 (World Steel Association, 2015, 2020). **Argentina's National Industry and Climate Change Action Plan entails several mitigation actions specifically targeted at resource efficiency** (Ministry of Production and Labor, 2018). Brazil and Peru do not have a government-level effort in place to foster material efficiency.

Brazil had some plans, but they are not supported by a clear strategy and/ or policies to support them. Hence, current successes are driven by market forces but could further be strengthened with effective policies such as the use of Best Available Techniques reference documents (BREFs) in the EU, to foster the use of best available techniques in the industry sector.

Minimum energy performance standards (MEPS) for products, especially for cross-cutting technologies such as machinery equipment, are essential to reduce the energy use in the sector. They set mandatory standards for energy efficiency that the industry has to comply with and that ideally become more stringent over time. Even though many industrial products are traded globally, unregulated markets include many inefficient products, suggesting that without the existence of such standards, companies tend to sell more energy intensive products in markets with weak or no MEPS (IEA, 2020b). The number of technologies in use in industry is large and MEPS should hence focus on the most relevant ones, high-emitting technologies or cross-cutting technologies used throughout industry sub-sectors. **Such cross-cutting standards are in place for motors in Brazil** (IEA, 2021d).

Financial incentives can guide investors towards investments into **energy efficiency** and given the broad spectrum of technologies in the sector, these incentives can be equally diverse. While energy efficiency measures are often economically viable over the lifetime of their application, significant barriers exist. Financial barriers such as long payback periods and non-financial barriers, such as complex processes in which embedding energy efficient technologies is difficult to implement hinder the roll-out of energy efficiency measures. Financial incentives can help overcome these barriers by making the product more attractive or by enabling the investor to accept a longer payback period. Programmes with a focus on supporting the uptake of energy efficient technologies in SMEs are implemented, both in Brazil and Argentina. However, these programmes are often minor in scale and need to be scaled up to have the impact needed.

Policies to support the uptake of energy efficient technologies in SMEs are implemented in Brazil and Argentina.

Carbon capture and sequestration or utilisation (CCS/U) and low-carbon hydrogen fuel are inevitable solutions as some industrial processes cannot easily be electrified (as discussed before). However, these solutions are not yet commercially available and require **financial incentives or other forms of public support**. There is a case for CCS/U to compensate for residual emissions from certain industrial processes, such as chemical processes, and for low-carbon hydrogen fuel, where electricity is not compatible, such as in certain high temperature processes. These are solutions that have very high (perceived) risks and more importantly, do not bring a return on investment or are significantly worse than alternate high carbon investments. CCS/U is an end of pipe technology and hence a technology that always leads to additional costs.

Brazil has programmes that support CCS/U, but these do not go beyond funding individual CCS/U projects for enhanced oil recovery. Argentina and Peru do not have such incentives in place, thus significantly hindering the uptake of such technologies. However, **Argentina's President has recently announced the development of a hydrogen plan for the country** (Government of Argentina, 2021b). A **State in North-eastern Brazil plans to host large hydrogen production plants from wind and solar energy; in cooperation with private companies**. However, no national policy exists to support green hydrogen investments (Wilson Center, 2021). Currently, private entrepreneurs wanting to venture into these areas and technical solutions entirely bear all costs and risks, which is unlikely to continue.

Summary and conclusion of analysis

To tackle climate change, it is imperative to implement decisive action into the industry sector, which is the largest energy consumer along the transport sector, responsible for roughly a quarter of global emissions,

and because the sector enables the transition of other sectors. While technological solutions differ for the many industry sub-sectors, electrification and energy intensity reduction are key mitigation measures.

The current pandemic has slowed investments in the industry sector. However, a rebound effect is expected in the LAC region. It is important that current and future investments in the industrial sector enable the transition towards a net-zero economy. The public sector has an important role to play, for example through recovery packages.

Policy measures in the industry sectors of the three focus countries are few and scattered. Argentina has a National Industry and Climate Change Action Plan to reduce emissions from industrial processes and accrue material efficiency. Brazil and Peru have no integrated plan to tackle emissions in the industry sector. Existing measures often only lead to very incremental changes, and measures that incentivise transformational change in the sector are practically non-existent. Furthermore, Argentina, Brazil and Peru have plans to invest in the extraction of oil or natural gas, which is misaligned with the temperature goal of the Paris Agreement.

Public sector interventions, such as through policy incentives, the setting of clear emissions reduction targets or through public procurement guidelines are essential to redirect investments towards the decarbonisation of the sector. Moreover, the public sector must support the development and deployment of some technical solutions in hard-to-abate industry sub-sectors that are essential yet bear high risks or require more research and development efforts.

Policy measures in the industry sector are sparse and scattered; investments made in low-carbon solutions, largely driven by the private sector, have only led to incremental changes.



3.6 AFOLU

Global sector overview

The agriculture, forestry and other land use (AFOLU) sector is responsible for 15 to 23% of emissions worldwide, depending on estimates, that is roughly equally split between agriculture on the one hand and forestry and other land use on the other (IPCC, 2019; WRI, 2021). The sector is currently not on a Paris-compatible emissions pathway, and to redress this situation, existing emissions sources will need to significantly decrease while simultaneously increasing emission sinks (IPCC, 2019; Kachi et al., 2021). In all 1.5°C-compatible pathways **CO₂ emissions from the AFOLU sector must be reduced to net zero by 2030 and become a major net sink before 2050** to compensate for residual emissions in other sectors (IPCC, 2018; Roe et al., 2019). In the short-term, net deforestation needs to be halted by 2025 (Kuramochi et al., 2018).

Afforestation, reforestation, and forest conservation are some of the most common measures to protect and increase carbon sinks. Beyond forests, ecosystems such as peatlands and coastal wetlands are also major carbon sinks, which need to be protected with adequate policies. A reduced conversion of coastal wetlands could reduce emissions by 0.11–2.25 GtCO₂e annually up to 2050, and a decrease in peatland conversion and burning could reduce emissions 0.45–1.22 GtCO₂e annually by 2050 (IPCC, 2019). To put this into context, total emissions from forestry and other land use were around 5.8 GtCO₂ between 2007 and 2016 (IPCC, 2019).

Population growth will impact activity and emissions in the agriculture sector, with the global population rising to around 10 billion in 2050. At the same time, the impacts of climate change are putting increasing

pressure on food security. To guarantee food security while lowering agricultural emissions (which indirectly also supports food security), more food needs to be produced without encroaching on additional high-carbon land and accelerating deforestation. While this poses a challenge, there are measures with untapped potential which can reduce the need for land conversion, such as reduced food waste, changing diets, and increases in productivity (IPCC, 2019).

In the agriculture sector, some of the measures with the highest mitigation potential globally include increased food productivity, agroforestry and increased soil carbon sequestration (IPCC, 2019; Kachi et al., 2021). Other significant mitigation measures include an improved management of cropland, livestock, and grazing land. A major share of agricultural emissions comes from meat and dairy production, particularly enteric fermentation in cows. Cattle and dairy cows produce around as much GHG emissions through enteric fermentation as the United States (Ahmed et al., 2020) and meat supply per capita has more than doubled globally since the 1960s (IPCC, 2019). Reducing emissions from fertiliser use is also an important mitigation measure in the sector.

Between 2010–2016, **food waste and loss alone contributed 8 to 10% of all GHG emissions**, and around 25 to 30% of all food is lost or wasted (IPCC, 2019). In Paris-compatible pathways and in line with the Sustainable Development Goals (SDGs), food waste would need to be decreased by 25% by 2030 and by 50% by 2050 compared to 2017 levels (Kachi et al., 2021; UN, 2021). By 2050, lower-emitting diets could further reduce emissions 0.7–8 GtCO₂e yearly (IPCC, 2019).

Overview in Latin America

The agriculture and forestry sectors have an important role in Latin American economies and have a much higher contribution to emissions in the region compared to world average levels. Whereas globally emissions from AFOLU represent between 15 to 23% of total emissions, in the LAC region this figure rises to around 46%.

Forestry and other land use: The LAC region is home to around a third of the world's forests, half of tropical forests and one fourth of mangroves (IDB, 2020a). Latin America is also the continent with the largest peatlands and coastal wetlands (Gumbricht et al., 2017). The conservation of these high-carbon landscapes is important for climate mitigation and biodiversity. At the same time, they are an important source of livelihoods; policies to avoid deforestation or the conversion of these lands are important, but they often need to be paired with incentives and economic benefits, to be successful (IDB, 2020a). This has been achieved for example in Costa Rica, where there is now a strong link between economic development through the tourism industry and forest conservation (IDB, 2020a). The main drivers of tropical deforestation in South America are beef and soy production.

Latin America is home to around a third of the world's forests, half of tropical forests and one fourth of mangroves. It also has the world's largest peatlands and coastal wetlands.

Agriculture: With 8.5% of the global population, the LAC region accounts for 13% of agricultural goods and fish produced worldwide and 25% of their exports (OECD-FAO, 2020). The sector is an important economic contributor and employs a significant share of the workforce. In 2019, the contribution from agriculture, forestry and fishing to national GDP was 6.1% in Argentina, 4.4% in Brazil, 7% in Peru (World Bank, 2021i). As of 2016, over 15% of all employment in Latin America and the Caribbean (excluding high-income countries) was in the agriculture sector (World Bank, 2020d). This makes it an important

sector for investment and government policy. Out of the countries analysed in this report, Argentina had the lowest share of jobs in agriculture at just 0.6%. In Brazil and Peru, employment in the sector comprised 10% and 28%, respectively (World Bank, 2021i).

The LAC region accounts for 13% of agricultural goods and fish produced worldwide and 25% of their exports.

Population in the LAC region is expected to increase from 650 million to around 760 million in 2050 (UN, 2019), as a result of which agricultural production and investments will likely increase, with increased land use pressures. At the same time, climate impacts will have an increasing impact on the AFOLU sector as a whole, with implications in terms of investment risks and livelihoods.

Low-emissions investments and developments in Argentina, Brazil, and Peru

Looking at investments in the AFOLU sector and policies to support increased, low-emissions investment is difficult, as the activities are segmented into various categories and data is often limited, including illegal logging for example. Investments in other sectors, such as mining and transport, can also have indirect impacts, particularly on forestry.

Some of the main investment categories in the sector are land, machinery and equipment, storage facilities and livestock. In the agriculture sector, farmers and agribusiness are responsible for most of the investments in the sector, as shown under Table 14. Investments in the agricultural sector are often perceived as risky, notably due to the uncertainties linked to production (FAO, 2018). These risks are, and will be further exacerbated, due to the impacts of climate change.

Table 14: Investment areas and main sources of capital in the AFOLU sector – non-exhaustive list

Asset / activity	Capital provider / asset owner
Low emissions investment areas	
Afforestation and reforestation	Governments, local forest rights holders, lessees, concessionaires, forest projects/management company
Agroforestry	Non-timber forest product businesses, farmers, traders
Sustainable forest management	Forest owners, forest managers, concessionaires, lessees, traders
Recovery of degraded pastures	Farmers, SMEs, landowners, lessees
Sustainable land management	Farmers, cooperatives, land-use planners
Biopesticides and biofertilisers	Farming companies
Seeds and breeding technologies	Farming companies, farmers, cooperatives
Climate-smart machinery and irrigation	Agribusinesses, farmers, cooperatives
High emissions investment areas	
Deforestation	Farmers, agribusinesses, forest owners, traders, industrial actors
Nitrogen fertilisers	Fertiliser/chemical companies

In the absence of comparable investment data, we look at changes in forest land area and agriculture emissions intensity in Argentina, Brazil, and Peru. These indicators indirectly show that investments in deforestation have increased, and that the agriculture sector now produces somewhat fewer emissions per unit of value produced than in 1990—thanks to increases in efficiency or structural changes.

Forestry and other land use: Globally, the forested land area has decreased by around 3% since 1990 (IPCC, 2019; Climate Action Tracker, 2020d). However, in many Latin American countries the forested area has decreased at a much faster rate. In Argentina, Brazil, and Peru, forest land area decreased by 22%, 10% and 5%, respectively between 1990 and 2015 (Climate Action Tracker, 2020d). The picture is more alarming for tropical forest deforestation, which increased by 12% globally in 2020, compared to 2019 (Weisse and Goldman, 2021). This was particularly the case in Brazil, where primary forest loss in the Amazon increased by 15%. **Brazil remains by far the country with the largest tropical forest loss worldwide, with**

Peru being the fifth largest globally, and second in the LAC region.

The emissions intensity of the agriculture sector in Brazil and Argentina is more than double the world average.

Agriculture: The emissions intensity of the agriculture sector has decreased in Argentina, Brazil, and Peru in the past decades, particularly in Brazil but remains twice as high as the world average in Argentina and 2.5 times higher than the world average in Brazil (see Figure 13). In Peru it was a little lower than the world average, in the same year. The agriculture sector in Brazil and Argentina on the one hand, and in Peru on the other, is different in terms of structure and production. One difference that is also reflected in

different emissions intensities lies in meat production, which is highly emissions-intensive, particularly when it comes to ruminant livestock. Peru's meat production is around 2.5 times lower than in Brazil and Argentina (Climate Action Tracker, 2020d).

The agriculture sectors of Brazil and Argentina are heavily export focused, and they are respectively the first and second agricultural goods and food exporters in Latin America and the Caribbean—with exports worth USD 79 billion and 35 billion in 2017 (OECD-

FAO, 2019). Brazil is the largest exporter of various commodities such as soy, beef, poultry, sugar, etc. (CBI, 2020c). In both countries, large, export-oriented farms dominate agricultural production. Despite this, most farms are still family-run (75% in Argentina) (FAO, 2021). In Peru, the agriculture sector is somewhat different. Small farms dominate and are responsible for the vast majority of food consumed in the country. Peru is also an important exporter (sixth largest in the Latin America and the Caribbean), with exports worth USD 8.8 billion in 2017 (OECD-FAO, 2019).

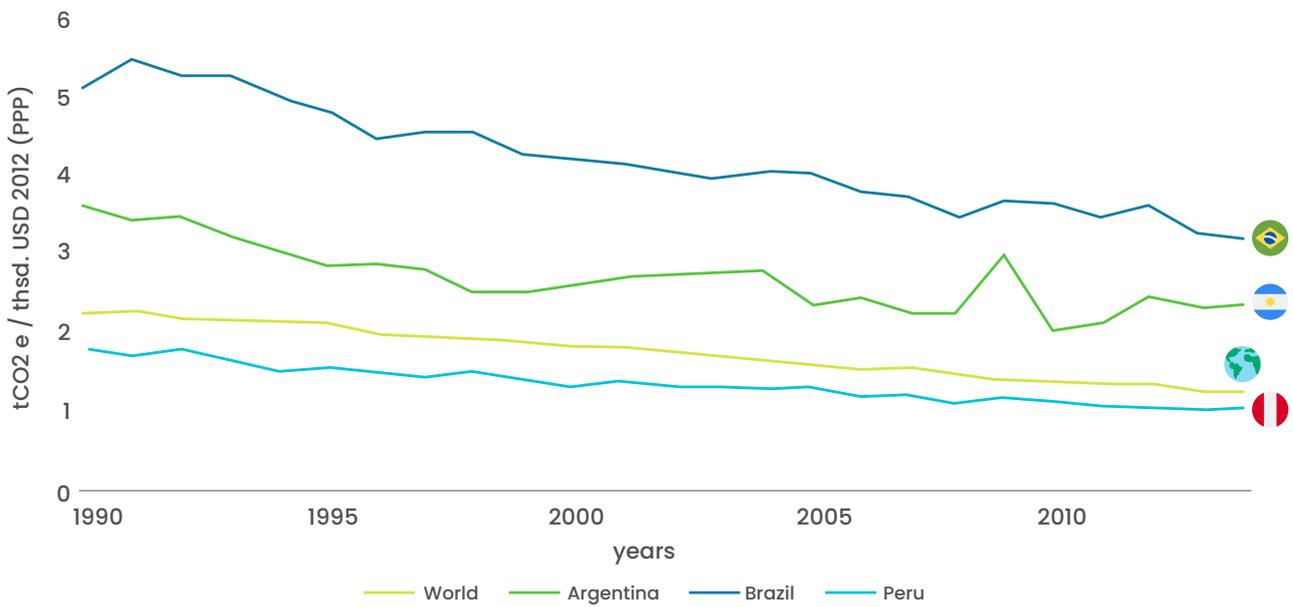


Figure 13: Agriculture emissions intensity in Argentina, Brazil, Peru, and the world in 1990–2014 (Climate Action Tracker, 2020d)

Policy framework

Clear policies and effective incentives in the land sector are needed to ensure that high-carbon activities cease, such as deforestation and the clearing of wetlands and peatlands, and that low-emitting activities and carbon sinks can be promoted. Table 15 provides an overview of some of the important mitigation policies and incentives in the AFOLU sector in Argentina, Brazil, and Peru.

Table 15: Policy framework assessment for the AFOLU sector

Policy	Assesment			
Investor signals and targets				
Clear timeline to achieve net-zero deforestation and stop tropical deforestation	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Medium- or long-term horizon in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> Short-term horizon in place			
Target for net-negative emissions in the sector	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> Net-negative objective in place			
Clear strategy and target in place to reduce emissions in the agriculture sector	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> Short- or medium-term target or plan in place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> Both medium and long-term target and plan in place			
Policies and incentives to invest in low-emissions technologies and activities				
Policies in place to support sustainable forest management, reforestation, and afforestation	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Policies preventing deforestation of high-carbon landscapes	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place but only partially implemented	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place and implemented			
Policies in place to restore and reduce conversion of peatlands and coastal wetlands	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> At least one policy is in place	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> Several policies are in place or policies covers both wetlands and peatlands			
Incentives to reduce GHG emissions from agricultural activities	<input type="radio"/> Not in place			
	<input checked="" type="radio"/> In place for one activity or sub-sector	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place or at least two activities or sub-sectors			

Policy	Assesment			
RD&D support to promote low-emissions agricultural practices and improve energy use in food systems	<input type="radio"/> Not in place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place			
Incentives or other policies to promote agricultural practices that increase soil carbon sequestration	<input type="radio"/> Not in place	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place			
Policies or incentives to reduce post-harvest food loss and waste	<input type="radio"/> Not in place	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
	<input checked="" type="radio"/> In place			
Strategies or policies to reduce consumption of emissions-intensive agricultural products (meat, dairy, etc.)	<input type="radio"/> Not in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input checked="" type="radio"/> In place			

Investor signals and targets

Forestry and other land use

None of the countries has an objective to achieve **net-zero deforestation and halt tropical deforestation**, nor is there a target to reach **net-negative emissions in the forestry and other land use sectors**. At the 2009 climate summit in Copenhagen, Peru formulated an objective to reduce forestry and other land use emissions to zero by 2021. This objective was later replaced with a target to reduce deforestation in the Peruvian Amazon by 30% by 2030. Argentina's Forest Law (Law, 26.331) prohibits deforestation in some primary forests, but there is no objective to achieve net-zero deforestation. The second NDC only refers to a 'substantial reduction' in the deforestation rate by 2030 (Government of Argentina, 2020a). Brazil had a commitment to reduce deforestation by 80% below 1996–2005 levels by 2020, but recent deforestation levels leave it far from achieving this (Climate Action Tracker, 2020b). None of the three countries have put forward net-negative emissions objectives for forestry and other land use, even though this is a critical step in all 1.5°C-compatible pathways. The net-zero emissions strategies under preparation in Argentina and Peru (as of June 2021) may include a target for forestry as a net sink, but this is yet to be confirmed

Agriculture

Argentina, Brazil and Peru all have a medium-term **plan to reduce emissions in the agriculture sector**, but none have a long-term outlook for the sector. Brazil's agriculture mitigation plan, the 'ABC Plan', has been in place for over a decade. In 2021, the government released an updated and extended 'ABC+ Plan' 2020–2030 (Government of Brazil, 2021b). Argentina's National Cabinet on Climate Change approved the first sectoral mitigation plan for agriculture in 2019. Peru's agriculture mitigation measures are linked to its latest NDC.

Policies and incentives

Forestry and other land use

Some mitigation policy options in the AFOLU sector have a faster impact than others—these include the conservation of high-carbon ecosystems such as wetlands, peatlands and forests (IPCC, 2019). Others, such as reforestation and the restoration of high-carbon landscapes, tend to take more time but are also associated with benefits linked to ecosystem services. Each of these measures require dedicated policy support from governments—and often also, dedicated public financing programmes or carbon pricing schemes.

When it comes to **support for afforestation and reforestation**, there are generally policies in place, but their implementation levels and effectiveness vary. Argentina, Brazil, and Peru each have various schemes to support afforestation and reforestation. They have also all put in place **policies to prevent deforestation in high-carbon landscapes**. None of these policies are however fully implemented, and illegal logging remains a significant issue. In Argentina, policies include ForestAr 2030 and the Forest Law (26.331), which aims to protect native forests. In 2020 however, nearly 115,000 hectares of native forests were lost in the north of the country, equivalent to around 21 MtCO_{2e} in emissions (Greenpeace, 2021). The rate of deforestation has however roughly halved under the Forest Law, from a yearly average of 370,000 hectares in 2002–2013 to less than 180,000 hectares per year in 2014–2018 (Government of Argentina, 2020a).

Illegal logging remains a significant issue, despite policies to prevent deforestation.

In Peru, Law 1220 has declared the efforts against illegal logging a matter of national interest. In March 2021, the government announced an investment of USD 50 million under the Forests Programme to reduce deforestation in the Amazon (Government of Peru, 2021c). The Amazon Fund, a key financial instrument to protect the Amazon forest in Brazil, was suspended in 2019 after the governments of Norway and Germany announced they would freeze donations, in protest against increased levels of deforestation under the current federal government (Boffey, 2019).

Currently, Argentina and Peru have a **policy to protect wetlands**. In 2020, the Argentinian government reactivated the Comprehensive Strategic Plan for the Conservation and Sustainable Use (PIECAS) after wildfires ravaged much of the wetlands area. Following renewed attention to the importance of wetlands, national legislation is planned to protect wetlands in a more systematic way (Infobae, 2020), which would be an important step in light of the fact that wetlands cover over a fifth of the territory in Argentina (Télam, 2021). The Peruvian government has also recently published a framework policy to deal with wetlands protection. None of the three countries have a comprehensive **policy to**

protect peatlands, even though each is home to major peatland areas.

Agriculture

Sustainable land management practices and technologies represent an upfront cost, but can become profitable after three to ten years (IPCC, 2019), and therefore require dedicated policy instruments to make them attractive to farmers and land managers. Argentina, Brazil, and Peru all have at least one **policy or incentive scheme to reduce emissions from agriculture**. In Peru, there are six mitigation measures linked to the NDC to reduce emissions from agriculture, which include improved livestock management, silvopastoral systems to reduce GHG emissions in the rainforest, replacing rice cultivation with lower-emitting and more economically attractive crops, improving rice cultivation to reduce emissions, and sustainable management of permanent crops in the Amazon.

In Brazil, the ABC Plan includes various measures to reduce emissions from agriculture, including the recovery of degraded pasture lands, the promotion of crop-livestock integration and agroforestry, biological nitrogen fixation to reduce fertiliser use, and better management of animal waste. Argentina has a national plan for integrating forestry and livestock (Government of Argentina, no date b); in 2016, livestock was the sub-sector with the highest emissions, representing 21.6% of all GHG emissions (Government of Argentina, 2020a). The main mitigation for the agriculture sub-sector, representing 5.8% of GHG emissions in 2016, is to increase the cultivated area with cereals (wheat and maize), and reduce areas with oilseeds (soy and sunflower).

Both Argentina and Brazil have invested in **R&D programmes to reduce emissions in their agricultural sectors**. The Brazilian development bank BNDES has put in place an agricultural innovation funding programme ("Plano Inova Agro") for Brazilian agribusinesses, which includes measures to improve efficiency (BNDES, no date). In addition, the Brazilian Agricultural Research Corporation (Embrapa) also conducts research on sustainable agricultural practices. Argentina has a programme for smart agriculture in place and the National Agricultural Technology Institute (INTA) has a mandate to conduct research on sustainable agriculture.

Soils are one of the main carbon sinks, but cropland soils have lost between 20 to 60% of their carbon content globally, compared to pre-cultivation levels (IPCC, 2019). To reverse this trend, **incentives to promote agricultural activities that increase soil carbon sequestration**

are needed. Soil carbon sequestration is one of the few measures for carbon dioxide removal that can be performed with low or sometimes even negative costs. In the agriculture sector, Brazil continues to implement the Low-Carbon Agriculture Plan (ABC Plan), which promotes low- or no-tillage practices. In Argentina, no-tillage practices are relatively widespread (Aapresid, 2018). The government has also put forward a plan for agricultural soils, which includes measures to monitor and increase soil carbon sequestration (INTA, no date).

Argentina and Brazil have policies in place to incentivise agricultural practices that increase soil carbon sequestration.

Argentina and Peru have put in place **policies to decrease food waste**. In 2020, Peru passed a decree to reduce food waste (Government of Peru, 2020b). Argentina also passed a national plan to reduce food waste and loss, which was passed as a law in 2019. None of the countries have put in place **strategies or policies to shift consumption of emissions-intensive products** (primarily meat and dairy). Most governments that have tackled this issue have done so through soft measures such as dietary guidelines, as has been done in China, the United States, and the United Kingdom (Froggatt and Wellesley, 2016). Meat consumption has significantly increased in Brazil over the past decades, and to a lesser extent in Argentina and Peru. In Brazil, meat consumption measured in kilocalories (kcal) per person per day doubled between 1990 and 2013, going from 220 to 450 (Climate Action Tracker, 2020d). In Argentina, it went up from 500 to 600 kcal per person per day during this same period. In Peru, where the overall meat consumption was below the world average of 240 kcal per person per day in 2013, consumption increased from just 70 to 100 kcal per person per day in 1990–2013.

Summary and conclusion of analysis

The AFOLU sector is particular in the sense that it is the sector most affected by the impacts of climate change, and one where investments are urgently needed in both mitigation and adaptation. It also has a different investment

profile and different mitigation policy needs, compared to most other sectors. This is particularly the case for forestry and other land use, where policy instruments are needed to ensure investments do not flow into emissions-intensive activities such as deforestation. Given the protection of high-carbon landscapes is a public good.

This is also an area where government action and resources in the form of policymaking, monitoring and enforcement, and financial incentives are often needed. While the divestment debate in the AFOLU sector is still at an earlier stage compared to fossil-fuel dominated sectors, the discussion around deforestation-free supply chains and finance is becoming increasingly prevalent, and one where investor and consumer pressure could help to gear investments in the right direction (WEF, 2017).

As a result of population increase and the important role Latin America plays in food production, investment in agriculture is likely to increase in the coming decades. There are some important areas for farmers and agribusinesses to invest in to reduce emissions, including sustainable intensification, practices that enhance carbon sinks such as agroforestry and soil carbon sequestration, reducing synthetic fertiliser use and moving away, where feasible, from emissions-intensive agricultural products (Stabile et al., 2020; Kachi et al., 2021).

With population increase and the important role Latin America plays in food production, investment in agriculture is likely to increase in the coming decades.



3.7 Waste

Global sector overview

In 2016, the waste sector was responsible for 3.2% of global GHG emissions, with landfills and wastewater accounting for 1.9% and 1.3%, respectively (Our World in Data, 2016). The sector's contribution to GHG emissions is mostly (97%) through methane emissions resulting from the anaerobic decomposition of waste in sanitary landfills (UN Environment, 2018b).

To be consistent with 1.5°C scenarios, by 2030 methane from the waste sector should be reduced by 65% (55-75%), compared to 2010 levels. Without additional controls, waste sector methane emissions are expected to increase to 78 Mt by 2030, compared to 57 Mt in 2010 (ccacoalition, 2020).

The climate benefits of waste practices result from avoided landfill emissions, reduced raw material extraction, and manufacturing, recovered materials and energy replacing virgin materials and fossil-fuel energy sources, carbon bound in the soil through compost application, and carbon storage, due to recalcitrant materials in landfills (UNEP, 2010a). Continuing and expanding positive actions will enable the solid waste sector to move from being a marginal contributor of GHG emissions to being a net saver of emissions (UN Environment, 2018b).

However, there is a **general global consensus that the climate benefits of waste avoidance and recycling far outweigh the benefits from any waste treatment technology**, even where energy is recovered during the process (UNEP, 2010b).

Overview in Latin America

The waste sector in Latin America and the Caribbean is responsible for 6% of total GHG emissions in the region, which is a higher share of total emissions than the world average (ECLAC, 2018). **In Brazil, emissions from the waste sector are even higher than emissions from the power sector** (Government of Brazil, 2020c). The region generates approximately 10% of all generated global waste (UN Environment, 2018b). The main drivers for the persistent increase of waste generation in the region are population growth, increasing trend towards urbanisation, economic growth, growing middle class and unsustainable consumption and production patterns (UN Environment, 2018b).

Although waste collection and management systems have progressively improved in recent decades, more than 40 million people in the region still lack access to a basic collection service, and about a third of all waste generated (145,000 tonnes per day) ends up in open dumps, causing serious impacts on health and the environment (UN Environment, 2018b).

More than 40 million people in the region lack access to basic waste collection, and about 1/3 of all waste generated ends up in open dumps.

Recycling rates in Latin America and the Caribbean are still low (between 1 to 20%), which means that **approximately 90% of the recovered municipal waste ends up in landfills** (UN Environment, 2018b). Organic waste represents, on average, 50% of municipal waste in the countries of the region. The lack of specific treatment options for organic waste generates GHG emissions and leachates, in addition to reducing the quality of recyclable products and making this process more difficult (UN Environment, 2018b). These figures are even more worrisome when considering the projected growth in the generation of waste in the region in the next decades. While in 2014, around 540,000 tons of municipal waste was generated in the region daily, this is expected to increase to 670,000 tons per day in 2050 (UN Environment, 2018b).

To date, only a few countries in the region have the formal infrastructure required to classify and recycle municipal solid waste. Recyclable materials' recovery is mostly performed by the informal sector, with an estimated 4 million informal recyclers in the region (IDB, 2015a). Although the informal waste sector makes a significant contribution to resource recovery and GHG emissions savings in cities in the Latin American region, those are typically ignored in official statistics (UNEP, 2010b). This is also one reason why most of the countries in the region have no official data on recycling rates (IDB, 2015b).

It is worth mentioning that municipalities throughout the region have shown interest in implementing waste-to-energy projects, and several countries have launched preliminary assessments and, in some cases, implemented first projects (IDB, 2015b). **Providing adequate investment in the waste sector is therefore essential if further negative impacts on the environment and climate is to be prevented and the benefits of recycling are to be reaped.**

Low-emissions investments and developments in Argentina, Brazil, and Peru

In the waste sector the main low-carbon assets to invest in are listed below in Table 16. Please note that the focus here lies on waste and not on wastewater. While both private and public capital providers play a role in the sector, waste management, including collection and disposal, is mostly undertaken by public actors, while private investors are predominantly involved in waste to energy projects.

Table 16: Investment areas and main sources of capital in the waste sector – non-exhaustive list.

Asset / activity	Capital provider / asset owner
Low emissions investment areas	
Integrated waste management (collection, treatment, disposal, after care of waste)	Municipality, companies
Waste prevention	Companies
Waste to heat technologies	Companies
Gas recovery systems for landfill sites	Municipalities, Companies
RD&D	Governments, companies
High emissions investment areas	
Unsustainable waste management	Municipality, companies

In **Argentina**, the collection and transport of waste are provided by both the state (through municipalities and the central government) and private service providers covering 45% and 54% of the population, respectively. In total, 99% of the population is covered by collection services. The state takes on the largest share of final waste disposal, as it covers 76% of total waste (45% by municipalities and 31% by the central government). Private service providers cover 24% of total waste disposal (UN Environment, 2018b).

The most common form of revenue collection is through property tax (68% of the population), followed by the direct waste bill (28%) and the electricity bill (4%). **The total cost of the management of solid waste is USD 125 per tonne.** With a total of 49,300 tons of municipal solid waste generated per day (around 1.15 kg/capita/day), half of which is generated in the region of Greater Buenos Aires, the total costs for solid waste management per day amount to around USD 6 million (USD 2.2 billion per year) (UN Environment, 2018b). **The Argentine Association for Solid Waste Research estimates that the volume of waste will increase dramatically in the future.** It is expected that the volume will almost double by 2030, compared to 2010 levels (GWP, 2018a).

According to the country's BUR, USD 150 million has been invested through an IDB loan between 2014 and 2019 in a comprehensive urban integrated waste management programme. Through a GEF grant, USD 2.8 million have been invested in sustainable business models for the production of biogas from organic urban solid waste between 2016 and 2020. It is unclear, however, whether the entire amount has been disbursed; as in the period 2017-2018 only 3% of the total sum has been spent (Government of Argentina, 2019a).

Landfill gas collection has only gained importance in Argentina in recent years and projects have not only been funded under the PROBiogas programme, but also under the RenovAr programme. By 2018, four landfill gas projects had been considered (out of around 150 renewable energy projects) (GWP, 2018b).

One landfill biogas capture project has been implemented in Buenos Aires Province (Complejo Ambiental), covering 14 million people and 40% of the country's municipal waste (ECLAC, 2019a). The project comprises 19 separation and utilization plants and reduces around 1 million tCO₂ / year while supplying 15 MWh.

In Argentina, 65% of municipal waste is disposed of in safe landfills and around 10% in so-called controlled

landfills, which ensures at least a minimum of appropriate waste storage. The remaining 25% are stored in open landfills and cause massive environmental problems. In addition to waste reduction and the separation of recyclables, the closure and rehabilitation of open landfills is one of the central goals of the National Strategy for Integrated Municipal Waste Management adopted in 2005 (covering the period 2005–2025) (GWP, 2018b). Only 6% of municipal solid waste is recycled in Argentina. The so-called cartoneros play a central and socially important role in the recycling process. The number of those who earn their living from this has increased enormously during the 2001 financial crisis. As part of the Zero Waste Act in Buenos Aires, adopted in 2005, many of these people were offered formal employment mainly through the establishment of cooperatives (GWP, 2018b).

In **Brazil**, waste collection and transportation is provided primarily by private service providers, subcontracted by the municipalities, and covering 68% of the population. The state, via municipalities, is responsible for 28% of waste collection and transportation. In total, 96% of the population is covered by collection services. The state takes on the largest share of final waste disposal, as it covers 70% of total waste (through municipalities). Private service providers cover 30% of total waste disposal (UN Environment, 2018b).

The most common form of revenue collection is through property tax (90% of the population), followed by drinking water and sewers (8%) and direct waste bill (0.3%). **The total cost of the management of solid waste is USD 104 per tonne.** With a total of 176,400 tons of municipal solid waste generated per day (around 0.86 kg/capita/day), the total costs for solid waste management per day amount to around USD 18 million or USD 6.6 billion per year (UN Environment, 2018b).

There are several biogas capture and burning facilities and more recently the first waste-to-energy plants have started to be planned and licensed, particularly in the state of São Paulo. In some cases the construction of these plants has received strong civil society opposition, due to waste privatisation conflicts and waste-picker access to waste; but construction has nevertheless been approved by public authorities (EJAtlas, 2020). Around 60% of municipal waste is disposed of in controlled landfills, which ensure at least a minimum of appropriate waste storage. The remaining 40% are stored in open landfills and cause massive environmental problems. Less than 2% of municipal solid waste is recycled (GWP, 2018b).

In **Peru**, the state is mainly responsible for the collection and transportation of waste (through municipalities), covering 55% of the population. Private service providers are responsible for 28% of waste collection and transportation. In total, 84% of the population is covered by collection services. The state also takes on the largest share of final waste disposal, as it covers 67% of total waste (through municipalities). Private service providers cover 33% of total waste disposal (UN Environment, 2018).

The most common form of revenue collection is through property tax (85% of the population), followed by the direct waste bill (15%) and drinking water and sewers (0.2%). **The total cost of the management of solid waste is USD 47 per tonne.** With a total of 20,541 tons of municipal solid waste generated per day (around 0.66 kg/capita/day), the total costs for solid waste management per day amounts to around USD 1 million, or USD 365 million per year (UN Environment, 2018b). Only around 45% of municipal waste is disposed of in controlled landfills, showing that appropriate waste storage is still not guaranteed for most of the waste generated. Most of the municipal solid waste (>50%) is stored in open landfills and causes massive environmental problems. Only 1 to 2% of municipal solid waste is recycled (GWP, 2018b).

Challenges the sector faces, across the region, that have led to investments being insufficient are linked to prevailing financially unsustainable management

schemes, uncertainty about direct and indirect costs of waste management, limited diversification of delivery models and difficulties in the service charging schemes (adapted from (ECLAC, 2019b)).

Due to decades of investment and development backlog in the areas of waste, energy and water management, there is now a great need for modernisation and expansion of numerous technologies and services. For the waste sector, landfill modernisation plant construction for the treatment of household waste and hazardous waste, as well as the need for waste management advice at subnational and national level should be mentioned as the main gaps in infrastructure and management skills (GWP, 2018b). It is imperative that governments implement a range of policies in the waste sector that address the above-mentioned challenges and enable countries to develop a modern circular economy that has a significant positive impact on the protection of soil, air, water and above all, human health.

Policy framework

Table 17 summarised the policy landscape in the waste sector for Argentina, Brazil and Peru, distinguishing between investor signals and targets, policies to invest in low-emissions technologies as well as policies to divest from emission intensive activities.

Table 17: Policy framework assessment for the waste sector

Policy	Assesment			
Investor signals and targets				
Strategy and target in place to reduce emissions in the sector	 Not in place			
	 Short- or medium-term target or plan in place			
	 Both medium and long-term target and plan in place			
Target for recycling municipal waste	 Not in place			
	 In place			
Integrated Waste Management Strategy	 Not in place			
	 In place			

Policy	Assesment			
Policies and incentives to invest in low-emissions technologies and activities				
Financial support schemes (grants, loans, tax exemptions) for waste treatment and conversion to energy investments	 Not in place			
	 In place for one category			
	 In place for several categories			
Policies and incentives to divest from emissions-intensive activities				
Environmental taxes (e.g., commodity tax, tax on waste disposal, packaging tax, tax on municipalities) or fees	 Not in place			
	 One tax or fee in place			
	 Several taxes or fees in place			

Investor signals and targets

The definition of sectoral targets and the formulation of concrete plans and strategies is an important element to show both private and public actors how a sector will develop in the medium- to long-term. Out of the three focus countries, only Peru has identified the waste sector as one of the priority sectors in its NDC and there is a clear national target for the management of solid waste, accompanied by an integrated solid waste management strategy. While the latter is also in place in Argentina and Brazil, these countries lack clear emission reduction and waste management targets.

All three countries have an integrated waste management strategy, although only Peru has identified the sector as a priority sector in its NDC.

One of the five sectors in which Peru plans to implement climate mitigation measures, according to its NDC, is the waste sector. It is specified that emissions should be reduced through solid waste disposal, in particular

through technologies for the final disposal of solid waste, material recovery and energy recovery, as well as through treatment of wastewater. While there is no sector-specific reduction target, there is a clear **emissions reduction plan** with an indicated total abatement potential (MINAM, 2018). The sector selection itself testifies to a high prioritisation of the waste sector in Peru. Brazil has no clear plan or target for reducing emissions in the waste sector. In the case of Argentina, its second NDC emphasises the need for improved waste management without specifying a target or presenting an emissions reduction plan (Government of Argentina, 2020a).

Peru is also the only country out of these three that introduced a national target for recycling municipal waste, aiming for 100% recycling of reusable waste by 2024 (MINAM, 2017b). However, it is worth mentioning that **targets and objectives on city or municipality level can be found in all three countries**. In Argentina, for instance, the City of Buenos Aires has a zero-waste legislation in place, prohibiting the final disposal of both recyclable and reusable materials by 2020 (City of Buenos Aires, 2006). All three countries have an **integrated waste management strategy** in place.

Policies and incentives

Proper management of waste remains one of the main sustainability challenges in the region. It is thus necessary that governments give adequate political priority to this issue, by designing and implementing sound public policies that promote investment in the sector.

Financial support schemes for waste treatment and conversion to energy investments are in place, to different extents, in all three countries. In Peru, for instance, the Solid Waste Law creates the National Solid Waste Investment Fund. The law further promotes regional and local public investments with private sector participation, by providing incentives such as tax exemptions (MINAM, 2017a). In addition, the Incentive Programme for the Improvement of Municipal Waste Management rewards municipalities that meet solid waste management goals. Funding obtained through this programme can only be used to further improve their waste management practices (MINAM, 2019).

In Argentina, financial support schemes for several waste categories exist, including a federal plan to invest in ending open-air dumps and several initiatives promoting energy generation from waste (such as PROBiomasa or through RenovAr) (Government of Argentina, no date c, no date a). Brazil also has support schemes in place through its National Zero Dump Programme, such as investment in urban waste management and the inclusion of energy recovery of solid waste in the Federal Government's Investment Partnership Program (Government of Brazil, 2020d).

In all three countries, the state charges a **fee for waste collection** and disposal, in most of the cases, through the country's property tax system. In fewer cases, those fees are collected via drinking water supply and sewers (Brazil) or via a direct waste bill (Argentina and Peru).

Summary and conclusion of analysis

The three countries have developed a set of normative instruments and invested in the improvement of solid waste management models. However, there are still weaknesses in the capacity of national and local governments to implement policies and regulatory frameworks, stimulate investments and promote further development in the sector (UN Environment, 2018).

Despite existing legal frameworks (e.g., "Cero Basura" Act in Buenos Aires) and implementation strategies (e.g., the National Strategy for the Comprehensive Management of Urban Solid Waste (ENGIRSU) in Argentina), no substantial progress has been made in practice to establish a functioning circular economy in any of the three countries (GWP, 2018b). All three countries still have low recycling rates. To achieve a higher recycling rate and improve the quality and capacity of the existing landfill infrastructure, government needs to increase its efforts and investments in that field.

There is also particular interest from both the private and the public sector for the further development of waste-to-energy facilities. Investing in waste-to-energy facilities can yield both environmental and financial benefits. Waste-to-energy electricity production is considered low-emissions technology when the waste used has been sorted and does not include plastics or metals. These facilities can mitigate GHG emissions by generating energy from landfill gas; reducing waste; and promoting reuse/recycling practices. They also create new revenue streams (or savings) for municipalities, as they sell off excess energy into the grid (IDB, 2019b).

Governments need to introduce policies and increase investments to achieve a higher recycling rate and improve the quality of existing landfill infrastructure.

An aerial photograph of a coastal city, likely Rio de Janeiro, Brazil. The image shows a dense urban area with numerous high-rise buildings and a mix of residential and commercial structures. In the foreground, there is a small, green island with a prominent lighthouse. The city is situated along a coastline with a sandy beach and waves breaking against the shore. The sky is clear and blue, suggesting a bright day.

4.

Climate finance readiness

Background

International climate finance to this date has flowed to recipient countries through a range of channels¹⁵ such as Multilateral Development Banks (MDBs), climate funds (for example the Green Climate Fund (GCF)) or multilateral and bilateral initiatives. Such public funds should also act as a lever to foster private sector investment in climate-relevant projects. However, international climate finance falls short of promises and needs: the commitment of developed countries to jointly mobilise USD 100 billion in climate finance by 2020 has not yet been achieved (Averchenkova et al., 2020). The funding gap to achieve the societal transition required to decarbonise economies

¹⁵ Other financing, for instance through Official Development Assistance (ODA), has flowed that is relevant to climate mitigation but has not always been counted as such, with an exception of those flows that have been covered under the Rio markers systems that have been set up by the OECD to monitor and statistically report on the development of finance flows targeting the themes of the Rio Conventions, inter alia climate change mitigation.

remains significant and continues to grow, as countries around the globe fail to act on climate change (UNEP, 2019). Current funding flows, both public and private, are far below the range of investment needed in a Paris-compatible scenario (Figure 14). In addition, large financial flows are still directed towards emission-intensive assets, and fossil fuel subsidies are still on the rise. In 2019, the G20 countries provided USD 130 billion in subsidies to coal, oil and gas; around 11% more than in 2018 (CPI, 2020).

Current funding flows, both public and private, are far below the range of investment needed in a Paris-compatible scenario.

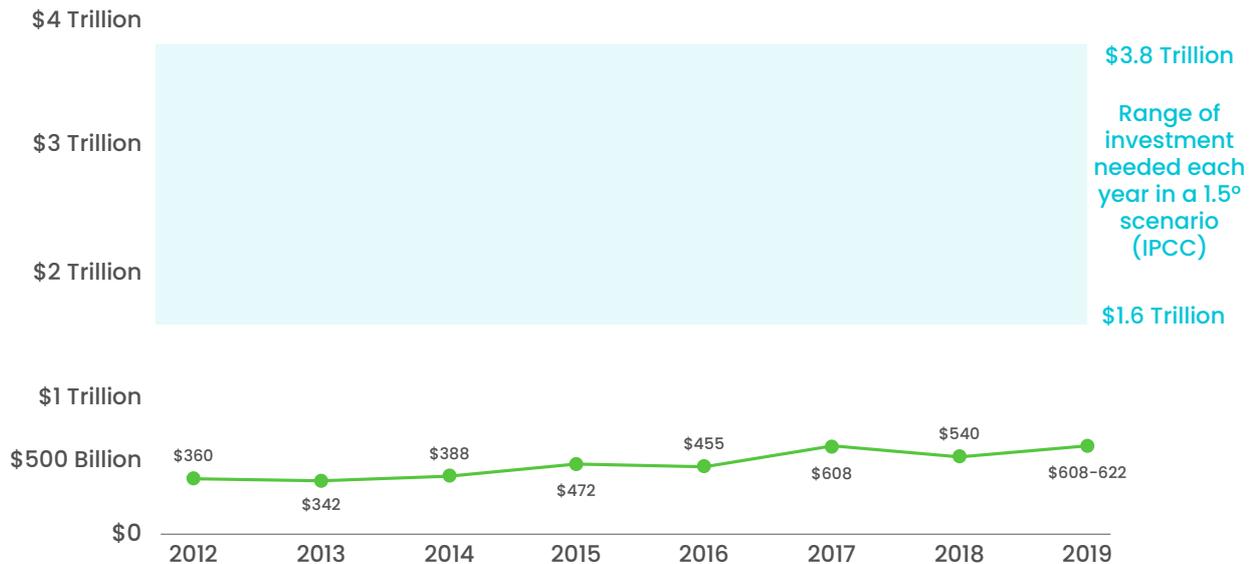


Figure 14: Total global climate finance flows 2012-2019 (green line) compared to annual investments needed in a 1.5°C scenario (blue area) (CPI, 2020)

In view of the tight timeframe to fully transition economies to net zero emissions by 2050 and the lack of progress in the implementation of climate targets, which are mostly not ambitious enough; **developing countries will have to achieve decarbonisation pathways similar to or at least not significantly slower than those of industrialised countries**, by the middle of the century, in order to keep global warming at well below 2°C/1.5°C.

Reflecting the United Nations Framework Convention on Climate Change's (UNFCCC) principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances, developing countries submit (as part of their NDCs) emission reduction targets that they consider such targets to be fair contributions, based on their own resources (realistic unilateral ambition in Figure 15). It is worth highlighting, however, that most of the NDCs, both from developed and developing countries are not consistent with holding warming below 2°C; let alone with the Paris Agreement's stronger 1.5°C limit, considering the respective country's fair share (Climate Action Tracker, 2021b). In addition to increasing unilateral ambition, the realisation of the long-term objectives of the Paris Agreement also requires that developed countries provide significant technical and financial support (through capacity building and the provision of climate finance) to developing countries, as part of a fair burden sharing in global climate protection based on the differences

in responsibility in causing climate change, as set out in the UNFCCC (Deutsche Klimafinanzierung, no date; UNFCCC, 2015b).

The realisation of the Paris Agreement requires developed countries to provide significant technical and financial support.

As indicated above, **developed countries, however, have not complied with their commitments to lead climate action and to make available adequate amounts of international public finance** (Averchenkova et al., 2020). International technical and financial support would allow developing countries to achieve their highest possible ambition (Figure 15). Many developing countries chose to present an unconditional climate mitigation target, representing their realistic unilateral ambition, as well as a conditional climate mitigation target, on condition that they would receive adequate levels of technical and financial support for the endeavour.

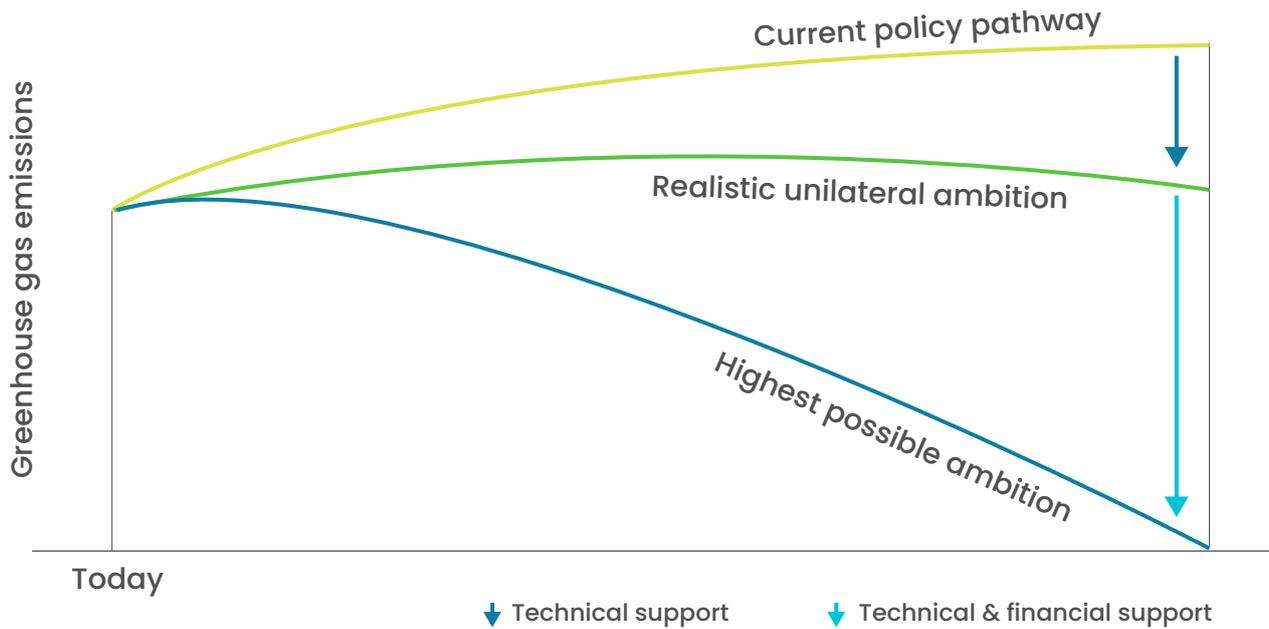


Figure 15: Filling the gap in developing countries – the need for technical and financial support from developed countries (Roeser et al., 2019)

Given that international climate finance¹⁶ should play a major role in achieving the highest possible ambition for developing countries, assuming that developed countries deliver on their promises, it is essential that the conditions to catalyse climate finance flows are in place in potential recipient countries. Adequate and comprehensive national climate finance governance structures and planning processes in recipient countries are crucial to provide both international and national, as well as public and private finance providers with certainty and predictability regarding the priorities and actions of the national government (Naidoo et al., 2014).

It is essential that conditions to catalyse climate finance flows are in place in the potential recipient countries.

Methodology

To assess a country's readiness to catalyse climate finance, this section explores both the governance around climate finance, as well as the status of planning and accessing the climate finance needed to implement a country's planned climate mitigation and adaptation measures and achieve its climate objectives (most often communicated in NDCs).

As in previous sections, the assessment of countries' climate finance readiness is based on a set of indicators that were defined, based on a literature review. Such indicators largely overlap in the existing literature, showing that there is a certain level of agreement as to what 'climate finance readiness' consists of (Nakhooda et al., 2012; UNDP, 2012). It is worth noting though that developing a framework of critical elements for the successful and rapid low-carbon transition is challenging, as there is no empirical evidence from which to draw on, as no country has (yet) successfully transitioned its economy (Climate Action Tracker, 2020e). In this assessment, the indicators are categorised into three elements:

¹⁶ Climate finance refers to local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change. (UNFCCC) While the term may evoke climate funds, such as the GEF and GCF, it also encompasses domestic government investments, ODA, commercial investments and green project development costs (UNFCCC, 2018).

- **Climate finance governance:** The indicators relate to institutional arrangements around climate finance, effective monitoring of climate finance, alignment of climate finance with national priorities, and mainstreaming of climate finance into ministries and private sector investments.
- **Climate finance planning:** The indicators relate to countries' planning processes to catalyse and disburse climate finance, informing investors how the country intends to use the received funds. These considerations include clearly defined climate adaptation and mitigation actions, most of which are embodied in country NDCs, corresponding implementation plans at the sector level, and certainty about financing needs.
- **Access to climate finance:** Indicators relate to countries' existing climate finance channels, to provide a better understanding of countries' track records in catalysing climate finance.

Institutional set-ups and planning processes can be relatively complex and nuanced and there is 'no one size fits all' solution. The assessment of each country's governance structure and planning processes is thus provided in qualitative terms and highlights existing strengths and areas of improvements to better catalyse climate finance. The approach ensures that the analysis is relative, taking a country's socioeconomic and geopolitical characteristics into account, responsive to its particular priorities and challenges, and reasonable, in terms of considering the country's key needs and issues.

Institutional set-ups and planning processes can be relatively complex and nuanced and there is 'no one size fits all' solution.

The following chapter first examines the main characteristics of current climate finance in the LAC region, including sources of climate finance, their magnitude as well as the end-use of funds (Section 4.1). This enables a discussion of their role in providing the

funding needed to implement climate mitigation action. The chapter then reviews, in the form of country case studies, governance and planning aspects of climate finance, as well as existing channels to access climate finance for Argentina, Brazil and Peru. These case studies aim to provide a better understanding of how each of these countries addresses climate finance through institutional and planning processes (Section 4.2 to 4.4).

Climate finance in the LAC region

Overview of global climate finance

According to a study by CPI, globally, public and private actors almost equally contribute to climate finance, with a share of 52% and 48%, respectively in 2018 (CPI, 2020). Climate finance is largely directed towards climate mitigation projects (over 90%). **National development banks are the most important source of public climate finance, contributing 45% of the total public climate finance.** Multilateral development banks (MDBs) (development banks created and funded by a group of countries) contribute almost 20%, and national governments, state-owned enterprises and state-owned financial intermediaries provide close to 30% of public climate finance. Climate funds account for only a small share of public climate finance (around 3%) (CPI, 2020).

Globally, public and private actors almost equally contribute to climate finance, mostly directed towards climate mitigation projects.

The most important sources for private climate finance are corporations, with close to 60% of total private climate finance, followed by households and commercial financial intermediaries (such as banks) with nearly 20% each. It is worth noting that the share and amount of private climate finance varies widely by sector. Also, there is generally less information and data on private climate finance flows, as opposed to public climate finance. Climate funds and institutional investors have only contributed a marginal share (CPI, 2020).

Climate finance in the LAC region

The **LAC region** has been a continuous recipient of climate action support and climate finance, partly due to its relative political and social stability. In 2018, the region catalysed close to USD 37 billion of climate finance, or almost 7% of global climate finance (estimated at USD 540 billion in the same year) (CPI, 2020). By comparison, this is in the same order of magnitude as the region's share of global GDP, which was around 7% in the same year (World Bank, no date). Only East Asia and the Pacific region receives more international climate finance; both in terms of the total and per capita climate finance mobilised, if developed countries are excluded (CPI, 2020; World Bank, 2021k).

The LAC region catalysed close to USD 37 billion of climate finance, equivalent to 7% of global climate finance.

Public climate finance volumes are higher than those of private climate finance, which differs from the global ratio (50-50). **Public climate finance reached over USD 22 billion, or around 60% of total climate finance, and private climate finance amounted close to USD 15 billion** (Figure 16). Climate finance mostly flows towards climate mitigation projects (at least 88%), which is a trend that is not particular to the LAC region. While the private sector almost exclusively funded mitigation projects (99%), public funds partly contributed to adaptation projects (at least 7% of public funds) (Figure 16). In this context, it is worth highlighting that the LAC region is particularly vulnerable to climate change and, as a result, finance for climate adaptation is critical, and corresponding measures are prominently displayed in LAC countries' NDCs (CAF, 2014).

Finance volumes by use of proceeds

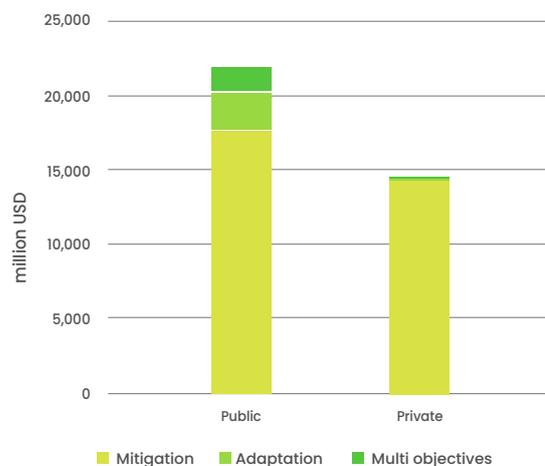


Figure 16: Climate finance volumes by use of proceeds in the LAC region in 2018 (CPI, 2020)

MDBs are the most important source of climate finance, accounting for close to 25% of total climate finance and over 40% of total public funds (Figure 17). Bilateral development banks (development banks created and funded by a single country) further contributed to 10% of total climate finance flows in 2018 (CPI, 2020). National public funds represented 25% of total climate finance in 2018, of which national development banks channelled close to 15% and other national entities, including state-owned enterprises and export credit agencies (typically offering trade finance to facilitate domestic companies' international exports), that contributed around 12% of total climate finance (Figure 17).

Commercial banks and corporations are the largest funders of private climate finance, together mobilising over 35% of total climate finance in 2018. Households and institutional investors (for example pension funds or insurance companies) accounted for less than 3% of climate finance.

The main financial instrument used to disburse climate finance in the LAC region are loans, including concessional and non-concessional loans, accounting for almost three quarters of climate finance flows (CPI, 2020). Public actors disbursed close to 30% of climate finance through project-level debt (at market level interest rates) and over 15% through concessional debt (below market level interest rates). Besides debt instruments, private actors also used equity finance instruments

to disburse around a third of private climate finance. Climate funds, both public and private, only contributed less than 4% of total climate finance in the region¹⁷.

Finance volumes by investor type

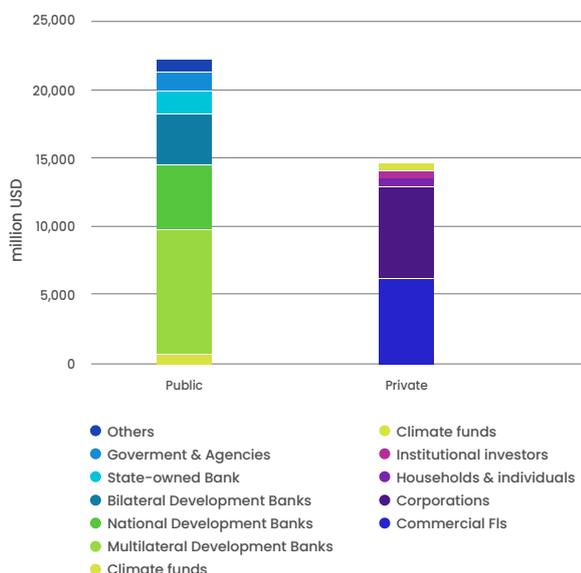


Figure 17: Climate finance volumes in the LAC region in 2018, by investor type (CPI, 2020)

Finance volumes by finance instrument

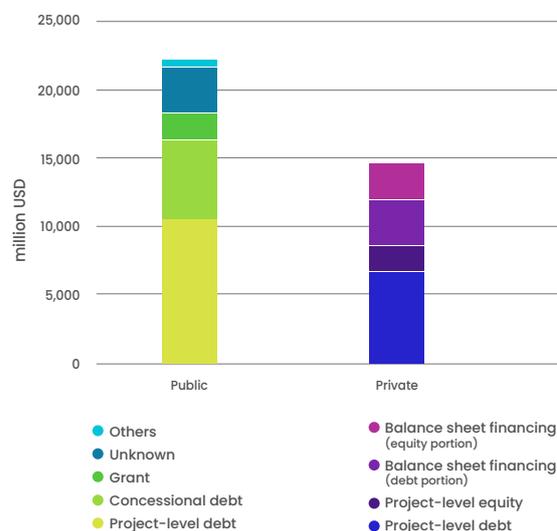


Figure 18: Climate finance volumes in the LAC region in 2018, by finance instruments (CPI, 2020)

¹⁷ Three quarters of the total climate related finance from multilateral climate funds for the region comes from the four funds: the Clean Technology Fund (CTF), the Amazon fund, the Green Climate Fund (GCF) and the Global Environmental Facility (GEF) (Climate Funds Update).

The NDC Partnership, of which 22 LAC countries are members, report that the region is “consistently asking for support to mobilise climate finance, particularly by involving private sector investors, in anticipation of the growing financial burden of climate change” (NDC Partnership, 2021). Furthermore, the Climate Bond Initiative reported that in the LAC region, governments and industry groups are increasingly aware of the urgent need to invest in green infrastructure and promote sustainable development (CBI, 2019).

In recent years, governments in the LAC region have been introducing institutional structures, especially with regard to catalysing climate finance; for instance through the creation of climate change directorates in cooperation with finance ministries (CBI, 2019). LAC countries continue to request

support to catalyse international climate funds and to mobilise the private sector, with a focus on the development of climate finance strategies, financial roadmaps, and the integration of climate finance considerations into government processes (NDC Partnership, 2021).

Governments in the LAC region have been introducing institutional structures, especially with regard to catalysing climate finance.



4.1 Argentina

Climate finance readiness

Summary

Argentina is currently undergoing extensive planning processes to ameliorate the coordination, monitoring and provisioning of climate finance. Relevant ministries and secretariats are engaged in the drafting of more detailed mitigation measures, including the definition of implementation plans and investment needs.

The country has in the past accessed international climate finance from a variety of climate finance sources supporting the implementation of individual projects. A more strategic approach could unlock larger volumes of climate finance, provided they are available, including from the private sector.

Climate finance governance

Argentina's climate change law and the inception of new institutions, including the creation of the National Climate Change Cabinet (GNCC, in Spanish) contribute to the establishment of a comprehensive governance framework to coordinate, monitor and foster climate finance. These developments are likely to contribute to further aligning climate finance with development priorities; likewise, improving the mainstreaming of climate considerations in the budget planning of line ministries and access to climate finance. However, additional efforts are needed to operationalise newly formed institutions and build associated capacities, knowledge and awareness amongst relevant actors, for which financial and technical support is needed.

With the passing of the climate change law and the establishment of a coordinating entity, Argentina has created favourable conditions to mobilise climate finance. The extent to which the institutions will be effective in coordinating climate finance in practice will depend on their continuity over a longer period. However, the anchoring of such institutions into a law should provide longer-term certainty.

In Argentina, the National Climate Change Cabinet has coordinated climate action since 2016. It is a high-level inter-ministerial coordination committee in charge of interjurisdictional and cross-sectoral coordination. It comprises representatives from line ministries and provincial government, and engages with academia, civil society and the private sector. Argentina also passed a climate change law which was approved by the National Congress in 2019 (Government of Argentina, 2019a). The law aimed to, among other things, further institutionalise the work carried out by the National Climate Change Cabinet.

Furthermore, the Ministry of Economy leads the Sustainable Finance Technical Roundtable (Mesa



The establishment of **adequate institutional arrangements** can be considered an important element for countries seeking to develop comprehensive approaches to climate finance in general and NDC financing in particular.

técnica de finanzas sostenibles) to exchange information, promote relevant discussions, coordinate and evaluate public policy actions, strategies and activities that aim to develop and strengthen sustainable finance in Argentina. It comprises ministerial development and key public finance stakeholders such as the Secretariat of Strategic Affairs and the Ministry of Environment and Sustainable Development, as well as the Central Bank.

The Sustainable Finance Technical Roundtable shall develop a National Sustainable Finance Strategy and "promote public and private investments that contribute to the achievement of economic and social objectives in the framework of the SDG's, including climate change mitigation and adaptation measures"(Government of Argentina, no date e).



Accurate monitoring of climate finance flows will allow a country to take more informed decisions about planning, prioritisation, and allocation of resources for climate change, and to measure and evaluate progress.

Argentina monitors financial expenditures on climate change activities from international public sources but lacks a mechanism to monitor domestic finance flows and those from international non-governmental actors destined to promote climate relevant activities.

Climate finance received from international public donors is reported in Argentina's Biennial Update Reports (BUR) in terms of financial resources, technology transfer, capacity building and technical assistance (Government of Argentina, 2019a).

Within the framework of the National Climate Change Cabinet, the government has established the International Financing Unit (Unidad de Financiamiento Internacional, UFI). It evaluates, prioritises and monitors projects funded by climate investment funds and multilateral and bilateral donor organisations (Government of Argentina, 2020a, 2021c).

Furthermore, the National Budget Office of the Ministry of Economy and Public Finance is working on the identification and labelling of activities and programmes related to adaptation and mitigation in the national budget (Government of Argentina, 2020a).



The alignment of climate finance planning with development and sector priorities, typically anchored in national, sub-national development or sector plans, is more likely to spur the society-wide transformational change required to address climate change.

Alignment of sectoral plans with medium- and long-term climate targets cannot finally be assessed as the government is currently updating these sectoral development plans. Newly formed institutions could potentially contribute to increasing the alignment of climate finance and (sectoral) development priorities in the future.

Argentina's sectoral plans include mitigation measures and corresponding cost assessments in the technical documents supporting the sectoral plans. However, these plans, which were released by the previous administration, are currently being revised and updated. The Government of Argentina has further established new institutions and defined new roles to existing ones, that carry the mandate to align climate finance with the country's development priorities:

The National Climate Change Cabinet recently launched the Sustainable Finance Working Group. Its purpose is to create the enabling framework to align financial flows with the promotion of the 2030 Agenda and climate action in Argentina, as well as to strengthen the country's position in relation to the regulation of Article 6 of the Paris Agreement.

The government also formed the Council of Economic and Social Affairs in February 2021. It is a high-level interdisciplinary body that draws on participatory processes to establish 'informed debate and the search for consensus on strategic priorities' (Government of Argentina, 2021a). The council working under the President puts a strong emphasis on aligning climate finance with sustainable development and a just transition (Government of Argentina, 2021a).



Mainstreaming of climate considerations into national budgeting processes is critical to creating an enabling environment for climate action and mobilisation of climate finance.

The degree to which climate finance and NDC implementation priorities are reflected in Argentina's national budgets is limited to NDC measures that were already planned for in sectoral plans.

Argentina's NDC is composed of aggregated measures proposed by line ministries to form an economy-wide climate mitigation target. It can thus be assumed that measures put forward by line ministries are covered to a certain degree in the public budget. International climate finance is usually disbursed by the Ministry of Finance to the line ministries; in accordance with multi- and bilateral finance agreements.



Private sector engagement to finance and implement climate action is key to address the climate challenge as public funding alone will not suffice.

Argentina has established public-private dialogue platforms and has also already unfolded some initiatives to engage the private sector, notably in the energy sector. However, the degree to which public entities engage with the private sector to foster climate action and related investments is still relatively low.

The establishment of the Climate Change Cabinet in 2016 has formalised engagement with the private sector and civil society, among others; with the purpose of developing climate action plans and feasibility assessments of mitigation measures (Government of Argentina, 2019a). The climate change law also mandates the formation of a permanent advisory council, with participation from the private sector, to assist and advise the development of public policies (Government of Argentina, 2019b). Notably, private sector investments have been spurred through renewable energy auction rounds under the RenovAr programme, the last of which occurred in 2018; and through public-private partnerships (PPPs), for instance to build Bus-Rapid-Transit (BRT) lines in Buenos Aires (BNamericas, no date; Government of Argentina, no date

d). Currently, private sector engagement is often limited to occasional participation in relevant roundtables and has hardly materialised in endorsed sector roadmaps or PPPs.

Climate finance planning

Argentina's latest NDC and BUR submissions provide generic guidance on how the country plans to meet its climate target. Relevant ministries and secretariats are currently engaged in the drafting of more detailed mitigation measures, including the definition of implementation plans and investment needs. Argentina has not yet communicated information about the level, type and purpose of climate finance; however, the development of a climate finance strategy is soon to be released and should provide more clarity once launched.



The NDC needs to be underpinned by clearly defined mitigation measures and potentially sub-targets at the sector level, aligned with medium- and long-term decarbonisation goals, on which basis budget implications and additional financial support needs can be defined.

Argentina's second NDC, which is to a large extent based on the aggregation of sector level activities, provides limited guidance on how the country plans to reach its climate target. However, revised sectoral plans, Argentina's forthcoming National Plan for Climate Change Adaptation and Mitigation, long-term low GHG emissions development strategy (LTS) and fourth BUR may provide more details on specific sectoral mitigation and corresponding finance needs. Ultimately, mitigation measures need to be aligned with medium- and long-term (decarbonisation) goals to avoid lock-ins and stranded assets.

Argentina's second NDC submitted in 2020 is more elaborate on many fronts than its first NDC and its GHG emission reduction target is more ambitious than its previous NDC. The country's second NDC entails a chapter on implementation, featuring a (non-binding and non-exhaustive) list of 21 priority climate mitigation measures (Government of Argentina, 2020a). The country's NDC was developed bottom up, with each sector listing mitigation measures (mostly linked to already planned projects) which were then added up to define the national target.

While this provides some guidance on how Argentina plans to reduce emissions, more detail is needed when it comes to specifying the mitigation potential per sector, to assess alignment with the economy-wide target, as well as with medium- to long-term decarbonisation goals. The sectoral plans that are currently being revised and the National Plan for Climate Change Adaptation and Mitigation that is meant to be completed this year will provide more details (Government of Argentina, 2021e).



Financial analysis and planning capacity are crucial to increase certainty about cost estimates for NDC mitigation measures and building a corresponding project pipeline.

Argentina's NDC and third BUR provide some guidance on planned mitigation actions but lack clear implementation plans and quantified finance needs. However, the government is currently developing sectoral climate mitigation plans which will provide the foundation for the development of sectoral implementation plans and the definition of investment needs.

The country's second NDC entails a three-scale estimation (high, moderate and minor) of concessional finance needs, along with capacity building and technology transfer needs (Government of Argentina, 2020a). Furthermore, Argentina's Third Biannual Update Report (BUR) includes an overview of the current and future actions needed to meet its climate target, that highlights the respective main barriers as well as the current status of implementation (Government of Argentina, 2019a).

The National Climate Change Cabinet coordinates the development of a revised National Plan for Climate Change Adaptation and Mitigation (Government of Argentina, 2019b). The Plan is expected to encompass mitigation measures for each sector, as well as implementation plans and investment needs.

Access to climate finance

Argentina has a long history of accessing international climate finance from a variety of climate finance sources. These include international climate funds, multi- and bi-lateral agreements and the Clean Development Mechanism, supporting climate action at project level. The country would benefit from a more strategic approach to access the larger volumes of climate finance needed to support the country's transition to a low carbon economy.

Argentina currently is setting up three **national funds** dedicated to climate action. The National Fund for the Enrichment and Conservation of Native Forests (FNECBN) invests in sustainable forestry. The Fund for the Development of Renewable Energy (FODER) and the Fund for Distributed Renewable Energy Generation (FODIS) provide guarantees, direct debt, equity financing, and other financial instruments to enable low-cost financing of renewable energy projects (Government of Argentina, 2019a).

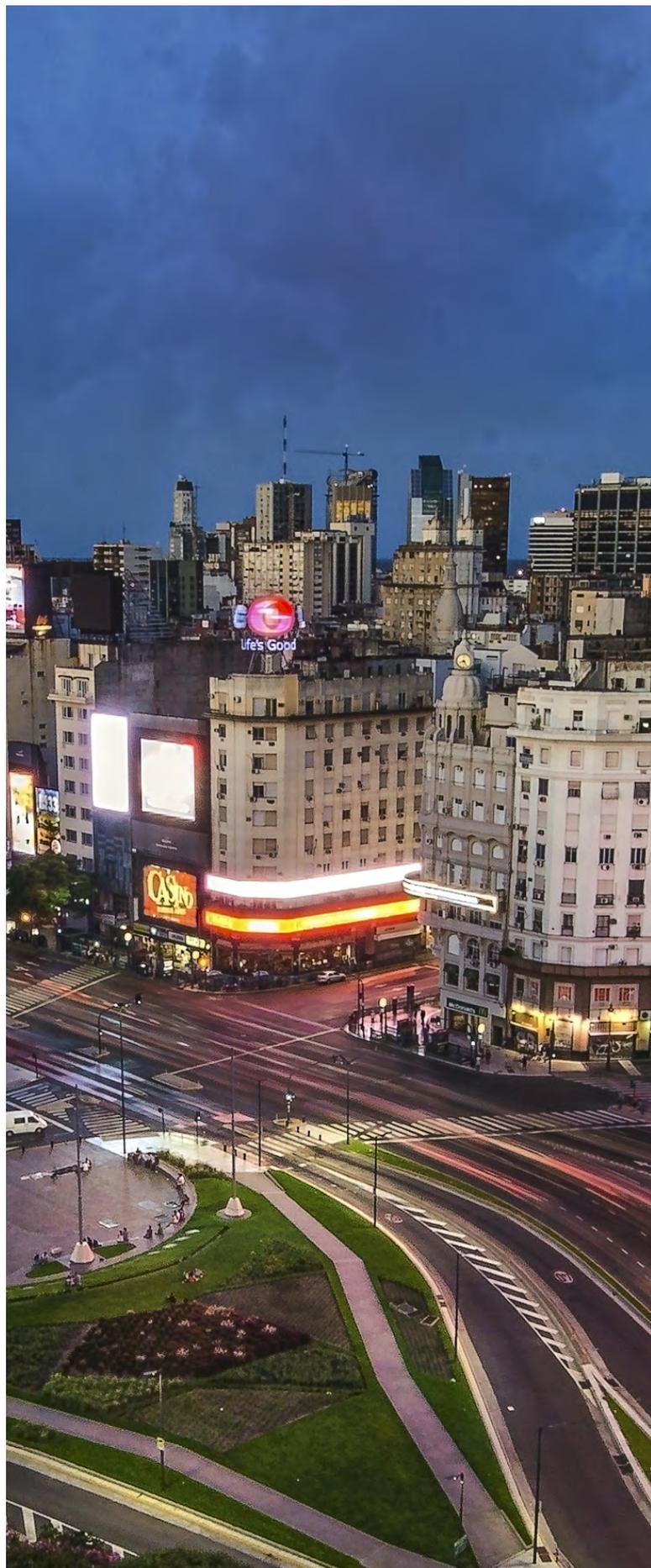
Argentina has implemented a large number of projects (co-)funded by **international climate funds** active in the LAC region, amounting to close to USD 340 million (GEF, no date; Green Climate Fund, 2021a). Notably, it is by far the largest recipient country among the three focus countries, for funding by the Global Environmental Facility (GEF), of which the Ministry of Environment and Sustainable Development (MADS) is the operational focal point (Government of Argentina, 2019a).

The Undersecretariat of International Financial Relations for Development, under the Secretariat of Strategic Affairs of the Presidency of the Nation, in liaison with the GNCC, will develop a Country Programme, entailing a pipeline of projects to seek funds from the Green Climate Fund and other climate funds. The Country Programme also aims to integrate the consideration of projects related to climate change in the annual programming of multilateral and bilateral development banks (Government of Argentina, 2020a).

Argentina is further engaged in many **bilateral and multilateral support initiatives**, among others; with the World Bank, the United Nations Development Programme (UNDP), the Food and Agriculture Organisation (FAO), the Development Bank of Latin America (CAF) or the Inter-American Development Bank

(IDB) (Government of Argentina, 2019a). Argentina also received funding for over 40 projects under the **Clean Development Mechanism** (Blanco et al., 2016).

Argentina's **national development bank**, the Banco Nación Argentina (BNA) acts as a public bank to support the country's development priorities and as a commercial bank for personal and corporate finance (BNA, 2019a). BNA which includes green criteria in its loan portfolio, actively engages in partnerships to promote sustainability and tracks emissions related to the bank internal activities (BNA, 2020). The extent to which BNA leverages investments for low-carbon development is however unclear, as the bank does not report on climate finance. A group of 18 banks, including BNA, have signed a Sustainable Finance Protocol in Argentina, with the aim of facilitating and encouraging financial institutions in the country; to implement best practices and international policies that promote the integration of economic, social, and environmental factors (BNA, 2019b). Through the agreement, the banks have committed to shift finance flows towards low-carbon funding, taking into account the commitments of the Paris Agreement.





4.2 Brazil

Climate finance readiness

Summary

Brazil put in place a governance structure around climate action and more specifically climate finance as early as 2007. However, there is clear evidence that the government has weakened these structures in recent years. Climate change considerations are not adequately aligned with sector plans, and consequently the necessary funding is not included in national or sector budgets. Climate change spending has generally been cut sharply in recent years. Because Brazil has not defined mitigation measures at the sector level, there is little certainty about the estimated costs of implementing them. Among other things, that poses a challenge for private sector participation in climate finance. The lack of climate action endorsement by the government has weakened climate finance channels; most notably the Amazon Fund, which is currently inactive. Nevertheless, Brazil has catalysed climate finance through numerous channels in the past and continues to do so.

Climate finance governance

Brazil introduced a climate change law as early as 2007, however there is limited evidence of climate finance coordination and monitoring. There is also limited evidence that climate finance is integrated into sectoral climate change plans or the national budget. Spending on climate mitigation has generally been cut sharply in recent years. In the absence of governmental guidelines, private sector stakeholders have shown voluntary climate action such as through the Brazil Green Finance Initiative (BGF).

Brazil has a committee of key stakeholders that is mandated to coordinating the country's climate action. Despite the adoption of various decrees in recent years that were intended to strengthen its mandate, especially concerning the coordination of investments and financing, there is limited evidence that these have improved the coordination of climate finance in general.

The Government of Brazil established the Inter-ministerial Committee on Climate Change (CIM) as early as 2007 (Government of Brazil, 2007). The CIM was originally led by the Office of the President of the Republic and comprised seventeen public agencies (Government of Brazil, 2007). In 2018, the government reduced the size of the Committee to eight ministries and appointed the President's chief of staff as the new coordinator (Government of Brazil, 2019c).

The mandate of the Committee on Climate Change is to coordinate climate change-related activities, including their financing. In 2017, the government further mandated the Committee to specifically support the



The establishment of adequate institutional arrangements can be considered an important element for countries seeking to develop comprehensive approaches to climate finance in general and NDC financing in particular.

implementation of Brazil's NDC (Government of Brazil, 2017). In 2019, the new government further stipulated that CIM should "establish guidelines and elaborate proposals for economic and financial mechanisms", to enable the implementation of the strategies and policies related to climate change (Government of Brazil, 2019c, 2019b).

There has, however, been little progress in implementing those guidelines and existing coordination processes between line ministries, the national development bank (BNDES); and other climate finance relevant stakeholders seem to have greatly decreased in recent years (Government of Brazil, 2019b). The lack of coordination is reflected in the fact that CIM organised only two meetings in 2020 and 2021, one to exchange on the 4th National Communication to the UNFCCC and the other to approve the new NDC (Government of Brazil, 2021c).



Accurate monitoring of climate finance flows will allow a country to take more informed decisions about planning, prioritisation, and allocation of resources for climate change, and to measure and evaluate progress.

Brazil reports on received climate funds from international sources in its BURs but has no mechanism in place to transparently monitor domestic climate finance and climate finance from international non-governmental funders.

Brazil monitors and reports on the climate finance the country has received in its Biennial Update Reports (BUR) to the UNFCCC. Brazil's third and fourth BURs lists funds from bilateral initiatives run through or partially coordinated by a public agency, as well as financial flows from multilateral initiatives and climate finance mobilised through the Clean Development Mechanism (CDM) (Government of Brazil, 2019b, 2020c).

The tracking of disbursements of Brazil's ABC Programme, the main credit line to finance low-carbon agriculture in the country, is reported on the government's website (Government of Brazil, no date). Beyond this, there is limited evidence suggesting that Brazil has a formal and holistic monitoring mechanism for climate finance in place.



The alignment of climate finance planning with development and sector priorities, typically anchored in national, sub-national development or sector plans, is more likely to spur the society-wide transformational change required to address climate change.

There is some evidence that climate action is reflected in Brazil's sectoral development plans. While some sectoral plans include climate considerations few plans cover the implications of their financing.

The integration of climate considerations in general and their financing in particular, in sectoral plans varies across economic sectors. Brazil's energy production and electricity sector plan (Ten-Year Energy Expansion Plan – PDE) foresees a continued reliance on renewable energy sources (80% of total capacity installed¹⁸) (Ministry of Energy and Mines, 2019, 2020). However, it also plans significant investments in the oil and gas industry, although these are mainly aimed for export, as the country's energy sector already sources almost half of its energy demand from renewable energy sources (EPE, 2019). The plan reflects proposed mitigation measures put forward in Brazil's First NDC, and Brazil is on track to meet the sectoral NDC goals by 2025 and 2030 (Government of Brazil, 2015; EPE, 2020, 2021a).

Several other line ministries have published sectoral plans to address climate change, covering the transport, industry, agriculture, mining and health sectors (Government of Brazil, 2019b). While these plans specifically address climate change, they do not integrate climate finance considerations, with the exception of the newly released agriculture plan (ABC Plan) (Government of Brazil, 2021b). It is noteworthy to highlight that several line ministries have partnered with the Climate Bonds Initiative to catalyse climate finance in the implementation of their sectoral plans (CBI / Brazil's Sub-Committee of Agriculture, 2020; Ministry of Infrastructure, 2021).

¹⁸ Brazil largely but not solely relies on hydropower to meet this renewable energy share target. However, hydropower is at risk from droughts, which will accrue through climate change. In 2015 and 2021, severe droughts affected hydropower plants, so that Brazil had to meet the energy gap through thermal power plants, increasing both emissions and energy prices (El País, 2015; G1 Economia, 2021).



Mainstreaming of climate considerations into national budgeting processes is critical to creating an enabling environment for climate action and mobilisation of climate finance.

Climate finance and NDC implementation priorities are not well reflected in Brazil's national budgets and have generally been cut in recent years.

There is no evidence that funding for climate activities is reflected in the national budget, except for those activities that were already planned for by line ministries and are therefore included in their budgets. Expenditure for climate change has generally been cut sharply in recent years. For example, funding has been cut for activities under Brazil's national climate change plan, which is led by the environment ministry and which is aimed at meeting Brazil's international commitment under the 2015 Paris Agreement (Reuters, 2020).



Private sector engagement to finance and implement climate action is key to address the climate challenge as public funding alone will not suffice.

The degree to which public entities engage with the private sector to foster climate finance is relatively low. However, there are some initiatives on the sector level to mobilise private sector investments contributing to climate mitigation and the recently signed Memorandum of Understanding with the Climate Bonds Initiative indicated larger engagement of the private sector in the future.

There is limited evidence that the government systematically engages the private sector to mobilise investments needed to implement mitigation measures. However, there are a few positive examples such as the adoption of decree 10.387/2020 that provides incentives for financing infrastructure projects with environmental and social benefits, such as non-motorised and low-carbon public transport systems or renewable energy infrastructure (Government of Brazil, 2020b). In the energy sector, the government auctions energy infrastructure projects, mainly allocated to solar and wind power plants, based on a competitive auction (Renewables Now, 2021). Further, the National Zero Dump Programme

(Programa Nacional Lixão Zero) of 2019 included various support schemes for urban waste management and the inclusion of energy recovery from solid waste in the Federal Government's Investment Partnership Program (Government of Brazil, 2019d).

Stakeholders of Brazil's finance and industry sector (representing 40% of the country's GDP) launched the Brazil Green Finance Initiative (BGFI), in cooperation with the Brazilian Business Council for Sustainable Development (CEBDS) and the Climate Bonds Initiative (CBI). The initiative aims to "develop and promote policy and market mechanisms to catalyse a robust pipeline of opportunities for green investments in Brazil" (CBI, 2020a). There are signs that the government is pursuing stronger private sector engagement, such as through the Investment Partnership Program (PPI), to expand infrastructure through privatisation and partnership contracts with the private sector (Vendramini, Yamahaki and Breviglieri, 2020; Estadão, 2021).

Furthermore, the federal government has signed several Memoranda of Understanding (MoU) with the Climate Bonds Initiative (CBI) to certify green public infrastructure projects and develop sustainable finance strategies to essentially catalyse climate finance from the private sector (Government of Brazil, 2019a; CBI, 2020b, 2021).

The Central Bank of Brazil is also pursuing several workstreams to encourage sustainable investments and the consideration of environmental issues, in investors' decision-making processes (Central Bank of Brazil, 2020).

Climate finance planning

The government has not presented clearly defined NDC mitigation measures at the sector level and accordingly, there is limited information on how individual mitigation measures will be financed.



The NDC needs to be underpinned by clearly defined mitigation measures and potentially sub- targets at the sector level, aligned with medium- and long-term decarbonisation goals, on which basis budget implications and additional financial support needs can be defined.

Brazil's updated NDC provides only limited information on how it plans to achieve its climate target, as for instance, it does not define mitigation measures per sector.

Brazil's second NDC proposes an economy-wide emissions reduction target, but no sectoral emission reduction targets (Government of Brazil, 2020a). Indicative mitigation measures to support the target are mentioned in its annex (Government of Brazil, 2020a). These mitigation actions focus on the agriculture and land-use sector, for which climate action has decreased in recent years, leading to a substantial increase in the country's deforestation rate (Silva Junior et al., 2021).

Alignment of current federal government policies with the national-wide target; let alone medium- to long-term decarbonisation goals is thus questionable. However, Brazil's first NDC proposed explicit mitigation measures for the energy sector, indicates that the country is on track for reaching its targets (Government of Brazil, 2015).



Financial analysis and planning capacity are crucial to increase certainty about cost estimates for NDC mitigation measures and building a corresponding project pipeline.

In the absence of concrete NDC sectoral mitigation measures, the country has not put forward an overarching (national) plan of how it intends to finance climate mitigation action.

Brazil's updated NDC includes a description of an institutional framework for the elaboration and implementation of policies and measures, but national or sectoral implementation plans are not addressed (Government of Brazil, 2020a). Brazil's updated NDC does project annual investment needs in the order of USD 10 billion for the conservation of its ecosystems; but

this figure is not linked to specific mitigation measures (Government of Brazil, 2020a). In the absence of NDC sectoral mitigation measures, the country has not put forward an overarching (national) investment plan linked to the NDC target. However, on a sector level, the country has identified financing options for mitigation measures. For example, the Brazilian National Confederation of Industry (CNI), with the cooperation of the Brazilian government, published the report "Climate Finance: A guide to optimise climate finance access by the industry actors" in 2020. The report intends to guide the industrial sector on operational, economic and sustainability aspects, in terms of access to sources of climate finance that are applicable to industry actors (CNI, 2020).

Access to climate finance

Brazil has a significant track record of channelling climate finance from international climate funds, bilateral or multilateral support initiatives, the clean development mechanism (CDM) as well as from voluntary carbon credit schemes. Notably, the country channels climate finance through its National Climate Fund and the Amazon Fund. Brazil's development bank, BNDES, leverages significant investments for low-carbon development through green credit lines as well as green bonds. However, in recent years climate finance channels have decreased.

Brazil's **national development bank**, BNDES, is a key factor in channelling domestic and international climate finance. It manages the country's **National Climate Fund** (Fundo Clima), established in 2009 through the National Policy on Climate Change¹⁹ (Government of Brazil, 2009). The Fund supports climate change mitigation and adaptation projects or studies (Law 12.114/2009). BNDES also manages Brazil's Amazon Fund, a fund that has been specifically dedicated to combating deforestation since 2008 (BNDES, 2020b, 2020a). Deforestation is of particular relevance for Brazil as its territory covers 60% of the Amazon rainforest. Of the three countries assessed, Brazil is the principal recipient of climate finance when considering the main **climate funds** active in the region

¹⁹ The National Policy on Climate Change is not taken into consideration under the climate governance and climate planning categories, as its timeframe was 2010 – 2020 and is therefore outdated. The Policy is still in place, which is relevant to the National Climate Fund (Government of Brazil, 2009).

(CTF, Amazon Fund, GCF and GEF). Half of the finance received through these funds was obtained through the Amazon Fund (Green Climate Fund, 2021b).

While both the National Climate Fund and the Amazon Fund channelled significant climate finance volumes in the past, their activity was halted in 2019 (BNDES, 2020a; Climate Laws, 2020). The National Climate Fund has slowly resumed its activities in 2020. However, the Amazon Fund is still largely inactive and has only disbursed funds for past projects, as Norway and Germany the largest contributors to the fund, have halted their support since 2019, due to concerns over forest management as well as a change in the fund's governance structure (Bloomberg Green, 2020; BNDES, 2020b).

BNDES further **leverages investments for low-carbon development** through green credit lines amounting to several USD billions (BNamericas, 2020b). Furthermore, the bank released its first green bond on international capital markets in 2015 and has issued several bonds since, for renewable energy and energy efficiency projects. The bank also manages the Finame Renewable Energy line, a permanent credit line to support investments in renewable energy, that was launched in 2018. In 2020, BNDES provided funding in the order of USD 1.3 billion to "projects relating to the green economy", suggesting a climate finance rate close to 40% of the bank's total disbursements (BNDES, 2020b). Despite its activities to foster climate finance, BNDES has no specific climate finance target in place, nor has it committed to aligning finance flows with the Paris Agreement.

Brazil's Caixa Econômica Federal (CEF) is another government led financial institution, operating under the Ministry of Finance. Complementary to BNDES, its focus lies in housing, basic sanitation, and public services at the sub-national level. As an accredited agency to the GCF it could also catalyse climate finance but has not yet done so (GCF, 2021). It has however received funding from the World Bank to catalyse finance flows from the private sector towards projects for public lighting in Brazilian municipalities and industrial energy efficiency (World Bank, 2018a). Brazil receives finance for climate action through a number of **bilateral and multilateral initiatives**.

While Brazil received around US 3.2 billion from bilateral and multilateral initiatives in 2016 and 2017, this figure decreased to less than US 2 billion in the following two years (Government of Brazil, 2020c). Most of these resources came from multilateral donors (almost 95% in

2018/2019) such as the International Finance Corporation (IFC) or the Inter-American Development Bank (IDB) (Government of Brazil, 2019b). Brazil has also been one of the largest recipients of climate finance through the **Clean Development Mechanism (CDM)** (UNFCCC, 2018).



4.3 Peru

Climate finance readiness

Summary

Peru has taken important steps towards establishing comprehensive governance and planning structures to coordinate and foster climate finance. However, the structures have not been in place long enough to assess whether the expected results will materialise. NDC mitigation measures have been defined on sector level. However, the cost assessment and indication of funding sources for individual measures exercises have not yet been finalised. Notably, Peru is currently developing a national climate finance strategy, which promises to bring clarity on how the country intends to reach its climate targets, the associated costs and returns, and how it plans to catalyse and monitor climate finance. Peru has been proactive in catalysing significant climate finance volumes from a range of climate finance channels.

Climate finance governance

The Peruvian government has taken some important steps in the field of climate finance governance, particularly with regard to legislation and institutionalisation. However, the structures have not been in place long enough to assess whether the expected results will materialise; for example with regard to aligning and mainstreaming climate finance considerations into sector plans and budgets or increasing private sector engagement.

Peru has taken important first steps in terms of legislation and institutionalisation to coordinate climate action and its financing. However, the effectiveness of these measures can only be finally assessed once they have been fully implemented.

In Peru, the General Directorate of Climate Change and Desertification, working under the umbrella of the Ministry of the Environment, is the main coordination body for climate-related activities, including climate finance (MINAM, 2021b). The National Climate Change Strategy, due to be updated this year, and the Framework Law on Climate Change (LMCC), in force since 2019, are the two key high-level instruments that aim to guide climate action, support the implementation of Peru's NDC, and ensure the incorporation of climate change into national development planning.



The establishment of adequate institutional arrangements can be considered an important element for countries seeking to develop comprehensive approaches to climate finance in general and NDC financing in particular.

Among others, these instruments establish inter-ministerial coordination processes, also related to climate finance, and require MINAM and the Ministry of Economy and Finance (MEF) to establish guidelines for the use of international climate finance, to ensure strategic and complementary use of these resources, in accordance with the NDC (El Peruano, 2019).

In addition, the country created the High-level Commission for Climate Change in July 2020 (Comisión de Alto Nivel de Cambio Climático - CANCC) (El Peruano, 2020). The Committee comprises 17 entities, including the President's office, all of which are relevant line ministries and other relevant public bodies such as the association of municipalities. The Committee has had at least three sessions since its creation but has otherwise not yet played a major role in efforts to coordinate climate finance.



Accurate monitoring of climate finance flows will allow a country to take more informed decisions about planning, prioritisation, and allocation of resources for climate change, and to measure and evaluate progress.

There are monitoring approaches in place for the various resource types, some of which are still in the pilot stage and others which are already being implemented. However, there is no centralised methodology to monitor all resource types, such as international and national, as well as private and public climate related investments.

A first pilot project is underway in Peru to include the monitoring of financial expenditure on climate change activities (both for adaptation and mitigation activities) into the existing Integrated Financial Administration System, which monitors all public budget expenditures (Government of Peru, 2020a). Furthermore, Peru's Ministry of Environment (MINAM) is mandated by the climate change law to establish necessary mechanisms around climate finance, including a Measurement, Reporting and Verification (MRV) system for private sector investments and international funds (El Peruano, 2019). Tracking private sector investments is currently at the pilot level and further work is needed, including defining a common taxonomy with respect to climate finance. International public resources are partially tracked by the Peruvian Agency for International Cooperation (APCI) (Government of Peru, 2021a).



The alignment of climate finance planning with development and sector priorities, typically anchored in national, sub-national development or sector plans, is more likely to spur the society-wide transformational change required to address climate change.

While there is legislation in place prescribing that the sector plans should be aligned with the country's NDC, implementation is still pending, and as such, climate finance or the financing of NDC measures is not yet fully taken into account in sectoral and subnational planning.

The Framework Law on Climate Change mandates line ministries to include climate change measures in sectoral planning. For the implementation of these guidelines, the law grants periods of up to four years (e.g., for strategic sectoral planning) (El Peruano, 2019). As of 2021, there are limited indications that the line ministries are planning a realignment of sector activities, in line with the country's NDC.

However, nineteen Peruvian subnational governments have developed Regional Climate Change Strategies, to incorporate climate change considerations in their regional development plans that are defined on a sectoral level (MINAM, 2015). In addition, subnational governments have incepted offices for the Promotion of Sustainable Private Investment (MDA, 2018).



Mainstreaming of climate considerations into national budgeting processes is critical to creating an enabling environment for climate action and mobilisation of climate finance.

Although the framework climate change law stipulates that climate change actions must be integrated into sectoral budgets, in practice, this is only partially the case and applies to NDC measures that were already planned for. There is otherwise limited reflection of NDC mitigation measures or more general climate change considerations in sectoral budgets, similarly to sectoral plans.

The framework climate change law mandates MINAM and the Ministry of Economy and Finance (MEF) to coordinate the integration of climate change activities into the national budget and mandates the inclusion of climate change adaptation and mitigation in local (provincial and municipal) governments' budgetary plans (El Peruano, 2019). So far, NDC mitigation measures are a combination of existing projects (for example projects with international agencies such as NAMAs), usually reflected in sectoral budgets, and additional climate actions, which are not (yet) reflected in sectoral budgets (Government of Peru, 2020a).



Private sector engagement to finance and implement climate action is key to address the climate challenge as public funding alone will not suffice.

There is currently little evidence that the private sector is systematically involved in financing climate action. However, the government has launched several initiatives that give hope that this will change in the future.

There are several initiatives by the Peruvian government to involve the private sector in climate change related actions. Dialoguemos is an ongoing initiative to engage with the private sector and civil society in the development of the NDC and the regulations contained in the climate change law (MINAM, no date). In early 2017, the government of Peru also initiated the High Level Multi-Sectorial Working Group for the implementation of the NDC (GTM-NDC). It comprised 13 Ministries and the Centre for National Planning (CEPLAN). The GTM-NDC interacted with sub-national governments (GORE), civil society, and the private sector, to develop a road map for mitigation and adaptation action and to analyse the potential for NDC implementation. The Group finalised its work by the end of December 2018 (Government of Peru, 2018).

Furthermore, the government established a public-private working group comprised of representatives from private sector associations (Grupo Impulsor de Asociaciones Empresariales) to drive NDC implementation, to initiate Cleaner Production Agreements with the private sector, and to launch a carbon footprint tool. The Cleaner Production Agreements initiative was set up in 2018. MINAM has undertaken several such agreements with large companies to reduce solid waste (MINAM, 2020). The

Ministry of Production has launched a similar initiative to collaborate with companies and increase energy and resource efficiency in production processes (Ministry of Production, 2021). The carbon footprint tool (Huella Carbono Perú), launched in 2020, has been a more successful initiative. It aims to incentive a domestic carbon market and to promote best practices in energy efficiency, circular economy, and value creation. Close to 300 companies reported their carbon footprint by 2021 (MINAM, 2021a).

Peru's Ministry of Economy and Finance (MEF) runs the program "Work for Taxes" that aims to stimulate private sector investment towards public investment projects that subnational governments and national government entities prioritise. This public-private partnership aims to reduce the existing infrastructure gap in the country by encouraging private companies to advance the payment of their income tax to finance public investment projects. Nonetheless, there is still little evidence of private sector engagement to finance and implement adaptation and mitigation measures defined in the country's NDC.

A potential cause of this apparent inactivity may be the difficulty to translate NDC measures into bankable projects that can be implemented by the private sector. In response, the government released the National Competitiveness and Productivity Plan in 2019.

According to that plan, a "Strategy for Financing of Climate Change Measures" shall be released by July 2021, and a monitoring platform for NDC compliance shall be implemented (Government of Peru, 2019). The strategy aims to boost the financial viability of the NDC and unlock required funds to implement NDC measures, specifically by involving the private sector through public-private initiatives.

Furthermore, MINAM, together with representatives of the financial sector (namely associations of financial intermediaries) signed the voluntary agreement "Green Protocol" in September 2020. The agreement seeks, among other things, to increase financing of climate-friendly projects in financial institutions' portfolios and to create a collaborative space between the public and the private sectors, to promote the incorporation of sustainability criteria in projects and investments financed by the Peruvian financial system (Government of Peru, 2020c). As of today, the engagement process has started by focusing on capacity building and raising awareness, inter alia, on the topic of climate finance.

Climate finance planning

With clearly defined measures for individual sectors, Peru has laid an important foundation for successful climate finance planning. In addition, the Peruvian government is working on a national strategy for climate finance (ENFC). Until the strategy comes into force, however, considerable uncertainties will remain, regarding the financing of individual mitigation measures.



The NDC needs to be underpinned by clearly defined mitigation measures and potentially sub- targets at the sector level, aligned with medium- and long-term decarbonisation goals, on which basis budget implications and additional financial support needs can be defined.

Mitigation measures in Peru's NDC are clearly defined on sector level. However, alignment of individual measures with decarbonisation goals cannot be assessed yet.

Peru's NDC is translated into sectoral adaptation and mitigation measures including estimates on emissions reductions' potential for individual measures. While the measures may be in line with the national 2030 climate target, it is not yet possible to evaluate whether those are aligned with medium- to long-term decarbonisation goals (Government of Peru, 2018; MINAM, 2018). Since Peru is the country with the second largest cover of Amazon forest and approximately half of Peru's emissions can be attributed to the LULUCF sector, it is worth highlighting the country's National Forest and Climate Change Strategy, approved in July 2016. Although qualitative, it forms an important milestone in Peru's response to climate change, as it provides a comprehensive response to the deforestation of Peru's forests (Government of Peru, 2016).



Financial analysis and planning capacity are crucial to increase certainty about cost estimates for NDC mitigation measures and building a corresponding project pipeline.

While the NDC and its technical study includes high-level information with regard to funding sources for individual mitigation measures, there is considerable room for improvement related to the implementation plans of proposed mitigation actions, as well as their cost estimates. So far, only a few investment plans or project portfolios exist for some mitigation measures. However, this may become more concrete and consolidated once the planned National Climate Finance Strategy (ENFC) is published.

Currently, there is no overall investment plan or portfolio of projects related to the NDC. Several plans contain information on climate finance planning. The country's NDC and the technical study for Peru's NDC 2021-2030 and the GTM-NDC Final report provide guidance on the country's strategic intent to make use of national and international public finance to implement its NDC, and provide an initial economic analysis for (part of the) climate change measures (Government of Peru, 2018, 2020a).

The planned National Climate Finance Strategy (ENFC), which is currently being developed by the Climate Change Directorate, should further communicate clear linkages between finance and climate action. The country's work plans (so-called tentative programs) include indicative information related to NDC mitigation measures, as well as an analysis on funding sources to finance those measures, and the next steps to implement them (Government of Peru, 2020a). However, the estimation of their costs is incomplete and is currently being complemented (Government of Peru, 2020a).

Access to climate finance

Peru catalyses significant climate finance volumes through a range of channels, including multi- and bilateral agreements, international climate funds, the CDM as well as alternative funding sources such as a voluntary carbon credit agreement.

Peru has several **national funds** but none of them is specifically dedicated to climate action. However, Peru's **national development bank**, COFIDE, has several green credit lines as part of its portfolio to, for instance, finance climate-friendly infrastructure projects or renewable energy projects. COFIDE has also run green and sustainable bonds in the past.

COFIDE has, however, no specific climate target and does not report on the share of green investments in its portfolio, although COFIDE commissioned a study in 2019 to determine the level of impact the development bank generates towards the social, environmental and economic spaces in Peru (COFIDE, 2020b). COFIDE is in the process of application to become a National Accredited Entity to the GCF.

Peru has several **bilateral and multi-lateral initiatives** in place, supported by a diverse set of institutions. Peru receives financial and technical assistance from a range of international institutions, including the Global Climate Change Alliance (GCCA), the German Federal Ministry of International Cooperation (BMZ), the Swiss Development Cooperation (SDC), and the Japan International Cooperation Agency (JICA) (Government of Peru, 2020a).

Compared to Brazil and Argentina, Peru receives lower absolute climate finance volumes from international **climate funds** (GEF, GCF and the CTF). However, climate finance from such climate funds adjusted to the population size is highest in Peru (Green Climate Fund, 2021c). Peru also receives funds from the Climate Investment Funds (CIF), in line with its national "Reducing emissions from deforestation and forest degradation" (REDD+) strategy (Government of Peru, 2020a).

Other finance channels also exist in Peru, although less prominent. For example, of all the CDM projects in Latin America, 6% were implemented in Peru (UNEP DTU, no date). In 2020, Peru further signed a carbon credit agreement with Switzerland to finance emission reduction projects that should contribute to sustainable development in Peru, while the emissions cuts will count towards the Swiss NDC (Climate Change News, 2020). Although controversial for Peru's mitigation efforts, such an agreement reflects the country's ability to engage in international initiatives.





5.

Conclusion

To strengthen the global response to the threat of climate change and to limit global temperature increase to below 1.5°C above pre-industrial levels, as agreed under the Paris Agreement; global CO₂ and other GHG emissions must reach net zero by 2050 and 2070, respectively.

The rapid, far-reaching and unprecedented changes in all aspects of society needed to achieve this goal, require a major increase in low-carbon investments across all sectors of the economy. For the energy transition alone, investments would need to be scaled up to around USD 4.4 trillion yearly between 2021–2050, compared to USD 3.4 trillion of planned annual investments in the same period; and investment would need to be redirected from fossil fuels towards energy transition technologies (IRENA, 2021b). This includes, among others, investments in renewable energy systems, electricity grids, storage capacity, energy efficiency in transport, buildings, and industry.

To close the finance gap, it is essential to ensure that all finance flows, including public and private, as well

as domestic and international investments, are made consistent with a pathway towards low GHG emissions and climate-resilient development, one of the Paris Agreement's central goals. In addition to unlocking and mobilising investments, it is also important to reallocate and shift investments from climate-damaging assets and activities to climate-friendly alternatives. With the global economy severely affected by the COVID-19 pandemic, sustainable economic recovery²⁰ packages are needed to steer investments in the right direction and prevent the lock-in of high-emissions infrastructure. At the same time, a focus on broader social and economic implications is paramount to achieve global and national sustainable development objectives.

In addition to macroeconomic, financial, and political

²⁰ According to a definition by the OECD (2020), sustainable recovery policies should trigger investment and behavioural changes that will reduce the likelihood of future shocks and increase society's resilience to them when they do occur; and include as key dimensions the alignment with long-term emission reduction goals, factoring in resilience to climate impacts, slowing biodiversity loss and increasing the circularity of supply chains.

conditions that have an impact on the investment environment (and therefore indirectly also on low-carbon investments), it is essential that adequate policies are implemented, and incentives created across all sectors, to promote investments in low-carbon technologies and disincentivise investments in high-emissions assets. The latter is of particular relevance, as only a few mitigation technologies have reached full market maturity and most still face barriers. While individual technologies and policy instruments that support the low-carbon transition exist in many sectors, they have hardly been combined into ambitious policy packages.

Sectoral policy framework for low-carbon investments

As the analysis of economy-wide policies and policy packages in six major sectors presented in this report has shown, the rather piecemeal policy response described above is also prevalent in Latin America and in the three focus countries Argentina, Brazil and Peru. The analysis reveals that at least initial policy measures to transition to a low-emissions society exist in each of the six sectors, and across all the three countries analysed. However, there are still areas in each of the six sectors where no or very little climate policy has been developed or implemented, which is also reflected in insufficient low-carbon investments in the respective areas.



Power

Latin America has one of the world's lowest emissions intensities in the electricity sector—in a context of rising demand and need for export revenues, the challenge will be to ensure that new investments support further decarbonisation, as power-related emissions need to decrease to zero before other, harder to abate sectors.

Low-emissions investments in the power sector have focused primarily on hydropower and bioenergy (the latter particularly so in Brazil), although more recently, other technologies, such as wind and solar, have gained momentum. The rapid growth in wind and solar investments in recent years are the result of government-initiated auctions, particularly in Brazil and Argentina, and to a lesser extent in Peru. Auctions alone are however not sufficient to guarantee a stable framework for renewable

energy investments. They need to be paired with credible and transparent sector planning, both in the short- and the long-term, including through setting renewable energy targets.

As the share of intermittent renewable power generation sources increases, having already reached around 10% in Brazil and Argentina, it becomes increasingly important to invest in flexibility options, storage capacity, and grid upgrades. Whereas subsidies are gradually being phased out for some renewable energies, new technologies, such as batteries, will require additional R&D and dedicated incentives for larger uptake. The high renewable energy availability and other enabling resources, including lithium for battery production for example, also creates opportunities for an integrated energy transition in the power, transport, buildings and parts of the industry sector.



Transport

Despite good preconditions to reduce emissions, transport continues to be the sector with the highest fossil energy consumption in the region, which indicates that initial approaches and technology uptake (e.g., e-vehicles) are not yet sufficient and significant public and private investments are needed.

Transport: Despite the good preconditions to reduce emissions from the transport sector, it is still the sector with the highest fossil energy consumption in the region, which indicates that initial approaches that exist (e.g., related to e-vehicles) are not yet sufficient, with few exceptions such as the biofuel use in Brazil.

The region has good conditions to reduce emissions from the transport sector, given the high renewable energy share over final energy consumption and the existing large railway networks (at least in Argentina and Brazil). However, the transport sector is still one of the fastest-growing sectors in terms of emissions in the region. Investments in low-carbon alternatives have mainly focused on strengthening public transportation options, such as Bus Rapid Transit, Mass Rapid Transit or railways, as well as in increasing the share of biofuels, particularly in Brazil. Other areas, such as efficiency improvements in road transport have seen insufficient policy development. For instance, with respect to car

and truck emissions standards, none of the three focus countries has implemented binding CO₂ emission or fuel economy standards.

While all three countries are beginning to recognise the important role of electrified transport, especially EVs, and have implemented some mechanisms to support these, the lack of EV uptake in all countries shows that these are not yet sufficient or effective. The use of biofuels in Brazil, however, is an example of how clear government policy that is gradually phased in can spur low carbon investments. Around three quarter of the cars in Brazil are bi-fuel cars and can use ethanol as well as gasoline. Low carbon financing gaps remain, especially in the investment of low carbon road transport vehicles (such as EVs) but also in safe and modern public transport options as well as the railway system, to avoid further passenger shifts to individualised transport.



Buildings

Investment in green buildings has so far been limited and is mostly driven by voluntary labelling schemes; to avoid stranded assets and to ensure that the large amounts of capital that will flow into the fast-growing construction sector in the future are invested in sustainable (zero emission) buildings, governments need to introduce and enforce ambitious and mandatory building standards.

Rapid urbanisation and a growing middle-class lead to a constantly high demand for new buildings in the region. The realisation of sustainable (zero emission) buildings would thus not require large additional capital flows, besides those that will take place anyway. In addition, the majority of low-carbon investments in the sector show net economic benefits, mostly due to high energy savings over the full lifetime of investments. Despite these opportunities, the green building market in the three countries is still in an infant stage of development. To avoid the risk of stranded assets and reap the economic benefits of mitigation solutions, governments need to step up their efforts; for example, by introducing ambitious and mandatory building codes and standards. Without expanding the currently extremely low coverage of mandatory building codes, 98% of the floor area to be built in Latin America until 2050 would not be affected by mandatory buildings standards.

Existing policies in the three countries, such as building codes or minimum energy efficiency standards or financial incentives, are either not ambitious enough (for example, with respect to binding targets for Zero Emissions Buildings), have limited scope or outreach (none of the three countries has a building code that is binding for both the residential and commercial sectors), or lack adequate enforcement. Introducing these policies would also help to ensure that the financial incentives that have already been created in the three countries in the sector take effect.



Industry

As a result of limited policies and incentives to reduce emissions in the industry sector and to foster the development and deployment of new technologies, current investments, which have largely been driven by the private sector, have only led to incremental changes and have not reduced energy intensity levels. Significant innovation potential remains.

Mitigation options in the industry sector are spread over a broad set of sub-sectors and often complex technologies, and there is still a lack of feasible technological solutions for some industrial processes; thus making it one of the sectors that is the hardest to decarbonise. As the sector will need to manufacture products and components supporting the transition to net zero emissions, investment opportunities in the sector are manifold. Investments into the electrification of end-use industry sectors especially could help decarbonise the sector significantly; such as electric vehicles, heat pumps or smart grid components.

Supply chains in the sector and some of the required commodities have a global nature and may require interventions and investments that go beyond national boundaries. Against this backdrop, policy measures in the industry sectors of the three focus countries are scarce and scattered. Argentina has a National Action Plan for Industry and Climate Change with an emissions reduction target and proposed mitigation measures, including material efficiency. Brazil and Peru have no integrated plan to tackle emissions in the industry sector.

As a result, investors have minimal guidance and incentives to invest in measures that lead to

transformational change, and existing measures often only lead to incremental change. For instance, private entrepreneurs wanting to venture into required transformational measures, such as novel cement, carbon capture and sequestration or utilisation (CCS/U) or green hydrogen, bear all costs and risks, which is unlikely to happen. In addition, Argentina, Brazil and Peru have plans in place to expand the extraction of fossil fuels in the short to near term; thus, promoting investments in high-emissions assets that may result in stranded assets.



AFOLU

The agriculture, forestry, and other land use (AFOLU) sectors need to become a net emissions sink globally after 2030, under Paris-compatible pathways; so governments and the private sector have an important joint role to ensure that investments in the sector do not lead to increased deforestation and destruction of other high-carbon landscapes.

The AFOLU sector plays an important role in Latin American economies and represents nearly half of total emissions in the region. Livestock is a major driver both of direct emissions, as well as deforestation in many countries of the region, contributing to agriculture emissions intensities well above world average in Argentina and Brazil. Argentina, Brazil, and Peru all have policies to reduce emissions from livestock and other agricultural products, and these will need to be further supported, going forward. Argentina, Brazil, and Peru have all passed legislation or policies to prevent deforestation of primary forests, but need to invest additional resources to implement them, as illegal logging remains an important issue. There are also still only very few policies to protect other high-carbon landscapes, such as wetlands and peatlands.

National policy action remains crucial, but it is also important to note that deforestation in the LAC region is often linked to international supply chains. The region produces 13% of the world's food and is responsible for one fourth of global food exports. Some international initiatives around deforestation-free supply chains have already been launched and can provide additional momentum to slow down deforestation. The AFOLU sector is also particularly important, in the sense that it is the sector most affected by the impacts of climate change, and one where investments are urgently needed

in both mitigation and adaptation. Climate change will also have an increasingly destabilising impact on crop yields, thereby further increasing the risk profile of agricultural investments, with consequences on the livelihoods of millions of farmers. Adapting to these risks will be an important challenge to tackle for governments in the LAC region, but also the international community—including in the form of financial support from developed countries.



Waste

Existing policies and incentives have led to investments and positive developments in certain areas of the sector (e.g., waste collection), but other areas such as recycling of waste or prevention of open dumping are not yet sufficiently developed and need increased attention.

The waste sector's share of total emissions is higher in Latin America compared to the world average. To date, only a few countries in the region have the formal infrastructure required to sort and recycle municipal solid waste, and the recovery of recyclable materials is mostly performed by the informal sector. Recycling rates in the region are therefore still low, with the majority of recovered municipal waste ending up in landfills. In addition, around 40 million people in the region still do not have access to basic collection services, and about one third of all waste generated ends up in open dumps. Due to decades of investment and development backlog in the areas of waste, energy and water management, there is a great need for modernisation and expansion for numerous technologies and services. In particular investments are required for landfill modernisations, plant construction for the treatment of household waste and hazardous waste, as well as for improving waste management advice at subnational and national level.

The challenges the sector faces, across the region, that have led to investments being insufficient are linked to prevailing financially unsustainable management schemes, uncertainty about direct and indirect costs of waste management, limited diversification of delivery models and difficulties in the service charging schemes. Existing legal frameworks and implementation strategies in the three countries have led to investments and positive developments in certain areas of the sector, such as the collection

of waste; as can be seen from the relatively high proportion of the population that is covered by these services (Peru 84%, Brazil 98% and Argentina 99%). The fact that areas such as the recycling of waste or the avoidance of open dumps are not yet sufficiently developed suggests that existing policy approaches are either not ambitious enough or do not cover these areas adequately, or that there are enforcement issues.

Climate finance readiness

An important element for financing the transition to a low-carbon society is that, on the one hand, sufficient international climate finance must be made available, particularly by developed countries and, on the other, governments in recipient countries must create favourable conditions and absorption capacity to catalyse domestic and private finance for the implementation of climate adaptation and mitigation action.

To date, developed countries have not complied with their commitments to lead climate action and to make available adequate amounts of international public finance.

While international climate finance can still be considered insufficient, there are steps that recipient countries can implement to create conditions for acquiring and channelling existing funds as well as those that will be made available in the future and for tapping (substantial) private domestic and international capital. There are several elements that determine a country's readiness to catalyse climate finance, including the country's corresponding governance structure and planning.

The analysis of the three focus countries has shown that there are first signs of climate finance being institutionalised and that processes on climate finance governance and planning are being initiated. However, evidence that this has led to efficient planning or allocation of resources is still limited for various reasons. The reasons vary from country to country and may be related to the fact that measures have only recently been initiated.

There has been restructuring due to a change of government, or because established processes are not actively implemented, due to a lack of prioritisation by an incumbent government. To increase the efficiency of resource planning and allocation, it is important that governments clearly define the role of international financing and domestic resources. It is also critical that governments reform their national budgeting processes

and taxation systems to better incorporate climate related considerations and provide the needed regulatory framework for sustainable corporate or financial practices.

Key messages

In the near future, it will be important for national climate plans, including updated NDCs, to be underpinned by clearly defined mitigation measures and sector-level targets that are aligned with medium- and long-term decarbonisation goals. This will help to define financial support needs and budget implications (important to attract international financial flows), and it will provide both public and private finance providers with clear investment signals and predictability.

Sector-specific plans need to be embedded and aligned with an economy wide, long-term vision to reach the objectives of the Paris Agreement, including as part of the long-term strategies communicated to the UNFCCC. This will help to ensure that short-term policies and investments are in line with long-term objectives, thereby decreasing the risk of stranded assets and enabling a smoother transition. An economy-wide perspective can also help to highlight synergies and linkages between sectors; for example, the coupling of energy supply and increased electrification of end-use sectors, and practices such as agroforestry.

Often limited domestic budgets and public support measures need to be aligned with climate goals to send clear signals to investors and incentivise decarbonisation rather than counteract ongoing climate efforts. The allocation of public funding to high carbon activities is a missed opportunity. Governments should ensure that domestic budget and investments, for example to lift countries out of economic recession are spent in a way that aligns with sustainable development and climate change goals. Out of the three focus countries, only Peru has earmarked a small proportion of its recovery spending for climate-friendly measures, while the recovery measures in Argentina and Brazil have been rather high-carbon weighted.

Clearly communicated commitments by governments to phase-out high carbon technologies and harmful policies, including, fossil fuel subsidies, give planning certainty to investors and can act as a stimulus for innovation and new business models. None of the focus countries has made a clear commitment, for example, to phase out fossil fuels, end deforestation or declare a moratorium on conventional engines. Fossil fuel subsidies, although declining in recent years,

continue to be part of the policy mix in Argentina and Brazil and counteract positive developments towards decarbonisation in key sectors. Developments in other countries suggest that clear and robust phase out goals and targets do not hinder but stimulate economic activity and innovation.

The public and private sectors need to work hand in hand. Governments play a key role to create a stable enabling environment to steer and foster private sector investment as well as protect investments from future risks. The private sector is critical as technology, service providers, investors and sources of income and employment. Improving sectoral policy packages and strengthening the capacity to implement them, promotes innovation and development to untap the vast number of investment opportunities in low-emission areas; and simultaneously avoid investments into less efficient, more expensive and polluting technologies or industries. In many areas, international market dynamics have already led to increasing sustainability and emissions standards, and as the sectoral transformations required to meet the Paris Agreement become more evident, such dynamics should then become increasingly common. It is in the interest of all involved to help shape the transformation and work together to promote solutions to a net zero future.



References

- Aapresid (2018) Evolution of no-tillage practices in Argentina - 2016-2017 campaign [Evolución de Siembra Directa en Argentina - Campaña 2016-2017], Argentinian Association of No-Tillage Producers (Aapresid). Available at: <https://www.aapresid.org.ar/wp-content/uploads/2018/03/Estimación-de-superficien-en-SD.pdf> (Accessed: 2 July 2021).
- AC&A; CENIT (2020) Análisis de inversiones en el sector transporte terrestre interurbano latinoamericano a 2040 - Peru. Available at: https://scioteca.caf.com/bitstream/handle/123456789/1575/Peru_Analisis_de_Inversiones_en_el_Sector_de_Transporte_Interurbano_Terrestre_Latinoamericano_al_2040.pdf?sequence=1&isAllowed=y.
- Ahmed, J. et al. (2020) 'Agriculture and climate change'. McKinsey & Company. Available at: https://www.mckinsey.com/~media/McKinsey/Industries/Agriculture/Our_Insights/Reducing_agriculture_emissions_through_improved_farming_practices/Agriculture-and-climate-change.pdf.
- Allianz Climate Solutions, NewClimate Institute and Germanwatch (2018) 'Allianz Climate and Energy Monitor', (November), p. 25.
- Andina (2020) GLP y Diésel son retirados del Fondo de Estabilización de Precios de Combustibles. Available at: <https://andina.pe/agencia/noticia-glp-y-diesel-son-retirados-del-fondo-estabilizacion-precios-combustibles-793944.aspx>.
- Andina (2021) Peru: Credit to private sector up 9.3% in April 2021. Available at: <https://andina.pe/Ingles/noticia-peru-credit-to-private-sector-up-93-in-april-2021-847397.aspx>.
- APEC (2015) Peer review on fossil fuel subsidy reforms in Peru. Available at: https://www.ewg.apec.org/documents/Peru__peer_review_of_fossil_fuel_subsidy_reforms_Nov102014_FINAL.pdf.
- Averchenkova, A. et al. (2020) Delivering on the \$100 Billion Climate Finance Commitment and Transforming Climate Finance. Available at: https://www.un.org/sites/un2.un.org/files/100_billion_climate_finance_report.pdf.
- BCRP (2020) Regional Dynamics of Income Inequality in Peru. Available at: <https://www.bcrp.gob.pe/docs/Publicaciones/Documentos-de-Trabajo/2020/documento-de-trabajo-004-2020.pdf>.
- Blanco, G. et al. (2016) 'Outcomes of the Clean Development Mechanism in Argentina', American Journal of Climate Change, 05(04), pp. 431-447. doi: 10.4236/ajcc.2016.54032.
- Bloomberg Green (2020) After Snubbing Amazon Donations, Brazil Hopes They'll Resume. Available at: <https://www.bloomberg.com/news/articles/2020-07-09/after-snubbing-donations-for-amazon-brazil-hopes-they-ll-resume> (Accessed: 8 June 2021).
- BloombergNEF (2020) Climatescope Emerging Markets Outlook 2020. Available at: <https://global-climatescope.org/> (Accessed: 25 June 2021).
- BNA (2019a) Annual Report and Consolidated Balance Sheet 2018. Available at: <https://www.bna.com.ar/Downloads/MemoriaBalanceGeneralConsolidado2018.pdf> (Accessed: 7 June 2021).
- BNA (2019b) Sustainable Finance Protocol For The Banking Industry In Argentina [Protocolo De Finanzas Sostenibles De La Industria Bancaria En Argentina]. Available at: <https://www.bna.com.ar/Downloads/ProtocoloDeFinanzasSostenibles.pdf> (Accessed: 7 June 2021).
- BNA (2020) Sustainability Report 2019. Available at: <https://www.bna.com.ar/Downloads/ReporteDeSustentabilidadBNA2019.pdf> (Accessed: 7 June 2021).
- Bnamericas (2021) 'Spotlight: Brazil's US\$11bn pipeline of railway investments'. Available at: <https://www.bnamericas.com/en/news/spotlight-brazils-us11bn-pipeline-of-railway-investments>.
- BNamericas (2019) Banks launch sustainable finance protocol in Argentina. Available at: <https://www.bnamericas.com/en/news/banks-launch-sustainable-finance-protocol-in-argentina> (Accessed: 9 June 2021).

- BNamericas (2020a) Brazil looks to attract US\$56bn in infrastructure investments. Available at: <https://www.bnamericas.com/en/news/brazil-looks-to-attract-us56bn-in-infrastructure-investments> (Accessed: 8 June 2021).
- BNamericas (2020b) Brazil to see US\$40bn in power investments by 2023. Available at: <https://www.bnamericas.com/en/analysis/brazil-to-see-us40bn-in-power-investments-by-2023> (Accessed: 8 June 2021).
- BNamericas (2020c) How capital markets are transforming Brazil's financial sector. Available at: <https://www.bnamericas.com/en/analysis/how-capital-markets-are-transforming-brazils-financial-sector> (Accessed: 8 June 2021).
- BNamericas (2021) Argentina begins to cancel renewable energy projects, BNamericas. Available at: <https://www.bnamericas.com/en/features/argentina-begins-to-cancel-renewable-energy-projects> (Accessed: 16 March 2021).
- BNamericas (no date) Argentina creates BRT unit. Available at: <https://www.bnamericas.com/en/news/argentina-creates-brt-unit> (Accessed: 7 June 2021).
- BNDES (2020a) Amazon Fund - Activity Report 2019. Available at: http://www.amazonfund.gov.br/export/sites/default/en/.galleries/documentos/rafa/RAFA_2019_en.pdf (Accessed: 8 June 2021).
- BNDES (2020b) Management Report BNDES - Fiscal Year of 2020. Available at: https://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_en/Galerias/Download/MR_BNDES_System__1H20_-_English.pdf (Accessed: 8 June 2021).
- BNDES (no date) Plano Inova Agro, National Development Bank of Brazil (BNDES). Available at: <https://www.bndes.gov.br/wps/portal/site/home/financiamento/plano-inova-empresa/plano-inova-agro> (Accessed: 2 July 2021).
- Boffey, D. (2019) Norway halts Amazon fund donation in dispute with Brazil, The Guardian. Available at: <https://www.theguardian.com/world/2019/aug/16/norway-halts-amazon-fund-donation-dispute-brazil-deforestation-jair-bolsonaro> (Accessed: 2 July 2021).
- bp (2020) Oil | Energy economics. Available at: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/oil.html#oil-reserves> (Accessed: 7 June 2021).
- C2ES (2018) Decarbonising US Buildings. Available at: <https://www.c2es.org/document/decarbonizing-u-s-buildings/>.
- CAF (2014) Vulnerability Index to climate change in the Latin American and Caribbean Region. Development Bank of Latin America (CAF). Available at: <https://scioteca.caf.com/bitstream/handle/123456789/509/caf-vulnerability-index-climate-change.pdf> (Accessed: 2 July 2021).
- CAMMESA (2021) Annual Statistics 2005-2020, Annual Report 2020. Available at: <https://cammesaweb.cammesa.com/2021/06/09/informe-anual/> (Accessed: 28 June 2021).
- Castillo, T. et al. (2020) Energy Outlook of Latin America and the Caribbean. Quito. Available at: <http://www.olade.org/en/institutional-publications-of-olade/>.
- CAT (2019) Scaling Up Climate Action: Argentina, CAT Scaling Up Climate Action series. Available at: https://climateactiontracker.org/documents/540/CAT_2019-09-05_ScalingUp_ARGENTINA_FullReport_ENG.pdf.
- CBI (2019) Latin America & Caribbean Green finance state of the market 2019. Climate Bonds Initiative (CBI). Available at: <https://www.climatebonds.net/resources/reports/latin-america-caribbean-green-finance-state-market-2019> (Accessed: 11 March 2021).
- CBI (2020a) Brazil Green Finance Initiative. Available at: <https://www.climatebonds.net/market/country/brazil/green-finance-initiative> (Accessed: 8 June 2021).
- CBI (2020b) Climate Bonds & Banco Central do Brasil sign agreement to develop sustainable finance agenda: New partnership to share technical knowledge on climate & financial sector. Available at: <https://www.climatebonds.net/2020/09/climate-bonds-banco-central-do-brasil-sign-agreement-develop-sustainable-finance-agenda-new> (Accessed: 9 June 2021).

- CBI (2020c) Unlocking Brazil's Green Investment Potential for Agriculture, Climate Bonds Initiative. Available at: https://www.climatebonds.net/files/reports/brazil_agri_roadmap_english.pdf (Accessed: 30 June 2021).
- CBI (2021) Brazilian Central Bank opens Public Consultation on sustainability criteria applicable to rural credit. Available at: <https://www.climatebonds.net/2021/03/brazilian-central-bank-opens-public-consultation-sustainability-criteria-applicable-rural> (Accessed: 9 June 2021).
- CBI / Brazil's Sub-Committee of Agriculture (2020) Investment Plan for Sustainable Agriculture [Plano De Investimento Para Agricultura Sustentável]. Available at: <https://www.gov.br/agricultura/pt-br/assuntos/politica-agricola/financas-verdes/textos-tecnicos-e-apresentacoes/lanodeInvestimentoparaAgriculturaSustentavelCBIconultor.pdf> (Accessed: 16 June 2021).
- ccacoalition (2020) Opportunities for 1.5C Consistent Methane Mitigation: Waste Sector. Available at: <https://www.ccacoalition.org/en/resources/opportunities-15c-consistent-methane-mitigation-waste-sector>.
- Cemex (2020) 'INNOVATING for a better world - Integrated report 2019'.
- Central Bank of Argentina (2021) Standardised tables of statistical series. Available at: http://www.bcra.gov.ar/PublicacionesEstadisticas/Cuadros_estandarizados_series_estadisticas.asp (Accessed: 9 June 2021).
- Central Bank of Brazil (2020) Sustainability. Available at: <https://www.bcb.gov.br/en/financialstability/sustainability> (Accessed: 16 June 2021).
- Central Bank of Brazil (2021) BCB Public Consultation No. 85/2021 - Regulation on risk management and social, environmental and climate responsibility. Available at: <https://www.bcb.gov.br/en/pressdetail/2391/nota> (Accessed: 9 June 2021).
- CIA (2018a) Country Comparisons - Railways. Available at: <https://www.cia.gov/the-world-factbook/field/railways/country-comparison>.
- CIA (2018b) Crude oil – proved reserves - The World Factbook. Available at: <https://www.cia.gov/the-world-factbook/field/crude-oil-proved-reserves/country-comparison> (Accessed: 7 June 2021).
- CIER (no date) Osinergmin: hay oportunidad de inversión en energías renovables en Perú, Comisión de Integración Energética Regional. Available at: <https://www.cier.org/es-uy/Paginas/Osinergmin-hay-oportunidad-de-inversion-en-energias-renovables-en-Peru.aspx> (Accessed: 17 March 2021).
- City of Buenos Aires (2006) Basura cero. Available at: https://www.buenosaires.gob.ar/areas/med_ambiente/basura_cero/.
- City of Buenos Aires (2019) 8 corredores nuevos de Metrobus. Available at: <https://www.buenosaires.gob.ar/compromisos/8-corredores-nuevos-de-metrobus>.
- Climate Action Tracker (2017) Blog: Decarbonising the global steel and cement sectors requires more than zero carbon fuels: analysis | Climate Action Tracker. Available at: <https://climateactiontracker.org/publications/blog-decarbonising-global-steel-and-cement-sectors-requires-more-zero-carbon-fuels-now/> (Accessed: 7 June 2021).
- Climate Action Tracker (2018) Climate Action Benchmarks: Identifying Paris-consistent pathways for countries and sectors. Available at: Not published.
- Climate Action Tracker (2019) 'Transformation Points: Achieving the Speed and Scale Required for Full Decarbonisation', CAT Decarbonisation Series, (April), pp. 1–21. Available at: <https://databank.worldbank.org/data/home.aspx>.
- Climate Action Tracker (2020a) Argentina (update of 30 December 2020). Available at: <https://climateactiontracker.org/countries/argentina/> (Accessed: 6 May 2021).
- Climate Action Tracker (2020b) Brazil (update of 22 September 2020). Available at: <https://climateactiontracker.org/countries/brazil/> (Accessed: 18 May 2021).
- Climate Action Tracker (2020c) Brazil (update of 9 December 2020). Available at: <https://climateactiontracker.org/climate-target-update-tracker/brazil/> (Accessed: 18 May 2021).

- Climate Action Tracker (2020d) Climate Action Tracker - Data portal. Available at: <https://climateactiontracker.org/data-portal/> (Accessed: 1 October 2020).
- Climate Action Tracker (2020e) Climate Governance series Methodology. Available at: <https://climateactiontracker.org/publications/climate-governance-methodology/> (Accessed: 7 June 2021).
- Climate Action Tracker (2020f) Paris Agreement Compatible Sectoral Benchmarks: Elaborating the decarbonisation roadmap. Climate Action Tracker (Climate Analytics, NewClimate Institute). Available at: https://climateactiontracker.org/documents/753/CAT_2020-07-10_ParisAgreementBenchmarks_FullReport.pdf.
- Climate Action Tracker (2020g) 'Paris Agreement Compatible Sectoral Benchmarks'. Climate Action Tracker. Available at: https://climateactiontracker.org/documents/753/CAT_2020-07-10_ParisAgreementBenchmarks_FullReport.pdf.
- Climate Action Tracker (2021a) CAT Climate Target Update Tracker. Climate Action Tracker (Climate Analytics, NewClimate Institute). Available at: <https://climateactiontracker.org/climate-target-update-tracker/> (Accessed: 6 May 2021).
- Climate Action Tracker (2021b) Climate summit momentum: Paris commitments improved warming estimate to 2.4°C. Climate Action Tracker (CAT). Available at: https://climateactiontracker.org/documents/853/CAT_2021-05-04_Briefing_Global-Update_Climate-Summit-Momentum.pdf (accessed on 06 May 2021).
- Climate Action Tracker (2021c) Countries. Climate Action Tracker (Climate Analytics, NewClimate Institute). Available at: <https://climateactiontracker.org/countries> (Accessed: 2 March 2021).
- Climate Bonds Initiative (2016) 'Aligning Buildings with a Climate Compatible 2050: Climate Bonds Initiative Aligning Buildings with the Paris Climate Agreement: Insights and Developments from the Green Bond Market', p. 15. Available at: https://www.climatebonds.net/files/files/SEIM_CBI_Report_V2.pdf.
- Climate Change News (2020) Peru and Switzerland sign 'world first' carbon offset deal under Paris Agreement. Available at: <https://www.climatechangenews.com/2020/10/21/peru-switzerland-sign-world-first-carbon-offset-deal-paris-agreement/> (Accessed: 8 June 2021).
- Climate Laws (2020) PSB et al. v. Brazil (on Climate fund). Available at: https://climate-laws.org/geographies/brazil/litigation_cases/psb-et-al-v-brazil-on-climate-fund (Accessed: 8 June 2021).
- Climate Transparency (2020) Climate Transparency Report: Comparing G20 Climate Action and Responses to the COVID-19 Crisis. Berlin, Germany: Climate Transparency. Available at: <http://www.climate-transparency.org>.
- ClimateWatch (2020) Historical GHG Emissions. Available at: https://www.climatewatchdata.org/ghg-emissions?end_year=2016®ions=G77%2CWORLD&start_year=1990 (Accessed: 11 November 2020).
- CMS (2021) Renewable energy law and regulation - Peru. Available at: <https://cms.law/en/int/expert-guides/cms-expert-guide-to-renewable-energy/peru>.
- CNI (2020) Climate Finance Guide to Optimizing Access by Industry [Financiamento Para O Clima Guia Para Otimização De Acesso Pela Indústria]. Brasília. Available at: https://static.portaldaindustria.com.br/media/filer_public/d9/3b/d93b47a4-f055-4062-a28a-269801ce5e6c/financiamento_para_clima.pdf (Accessed: 8 June 2021).
- COFIDE (2019) COFIDE emite el Primer Bono Sostenible del Perú hasta por 100 millones de soles. Available at: https://www.cofide.com.pe/COFIDE/files/Bono_sostenible_COFIDE_-_Oct19.pdf.
- COFIDE (2020a) COFIDE y KfW firman acuerdo por 250 millones de euros. Available at: https://www.cofide.com.pe/COFIDE/noticia_detalle.php?id=20.
- COFIDE (2020b) Sustainability Report 2019 [Reporte de sostenibilidad 2019]. Available at: <https://www.cofide.com.pe/COFIDE/uploads/medios/Reporte-de-sostenibilidad-2019.pdf> (Accessed: 8 June 2021).

- CPI (2020) Updated View on the Global Landscape of Climate Finance 2019. Available at: <https://www.climatepolicyinitiative.org/publication/updated-view-on-the-global-landscape-of-climate-finance-2019/> (Accessed: 5 May 2021).
- Deutsche Klimafinanzierung (no date) 'Channels of German climate finance'. Available at: <https://www.germanclimatefinance.de/overview-climate-finance/channels-german-climate-finance/>.
- ECLAC (2018) Economics of climate change in Latin America and the Caribbean. Available at: https://repositorio.cepal.org/bitstream/handle/11362/43889/1/S1800475_en.pdf.
- ECLAC (2019a) 'Taller Regional: Instrumentos para la implementación efectiva y coherente de la dimensión ambiental de la agenda de desarrollo'. Available at: https://www.cepal.org/sites/default/files/presentations/gestion_de_residuos_-_jordi_pon.pdf.
- ECLAC (2019b) 'Taller Regional: Instrumentos para la implementación efectiva y coherente de la dimensión ambiental de la agenda de desarrollo'.
- Economia (2021) Social inequality renews historic record in the 1st quarter, study points out [Desigualdade social renova recorde histórico no 1o trimestre, aponta estudo]. Available at: <https://g1.globo.com/economia/noticia/2021/06/14/desigualdade-social-renova-recorde-historico-no-1o-trimestre-aponta-estudo.ghtml> (Accessed: 16 June 2021).
- Edie (2020) World's largest cement manufacturer commits to science-based targets and net-zero pathway. Available at: <https://www.edie.net/news/6/World-s-largest-cement-manufacturer-commits-to-science-based-targets-and-net-zero-pathway/> (Accessed: 7 June 2021).
- EJAtlas (2020) Incinerator of urban solid waste in Barueri, São Paulo, Brazil. Available at: <https://www.ejatlaser.org/conflict/incinerator-of-urban-solid-waste-in-barueri-sao-paulo-brazil>.
- ELLA (no date) Green Building in Latin America. Available at: https://assets.publishing.service.gov.uk/media/57a08a07e5274a31e00003aa/131106_ENV_TheGreEco_BRIEF1.pdf.
- Energy Information Administration (2021) Natural Gas. Available at: <https://www.eia.gov/international/data/world/natural-gas/dry-natural-gas-reserves> (Accessed: 7 June 2021).
- EPE (2019) PDE 2027 – The Ten-Year Energy Expansion Plan 2027. Available at: <https://www.epe.gov.br/en/press-room/news/pde-2027-the-ten-year-energy-expansion-plan-2027> (Accessed: 8 June 2021).
- EPE (2020) Brazilian Energy Balance 2020. Rio de Janeiro. Available at: <https://www.epe.gov.br/sites/en/publicacoes-dados-abertos/publicacoes/Paginas/Brazilian-Energy-Balance-2020.aspx> (Accessed: 29 June 2021).
- EPE (2021a) Brazilian Energy Balance 2021 [Balanço Energético Nacional 2021]. Rio de Janeiro. Available at: <https://www.epe.gov.br/pt/publicacoes-dados-abertos/publicacoes/balanco-energetico-nacional-2021> (Accessed: 29 June 2021).
- EPE (2021b) MME launches maritime field revitalization program on March 11 [MME lança programa de revitalização de campos marítimos no dia 11 de março]. Available at: <https://www.epe.gov.br/pt/imprensa/noticias/mme-lanca-programa-de-revitalizacao-de-campos-maritimos-no-dia-11-de-marco> (Accessed: 30 June 2021).
- Estadao (2021) BNDES wants to structure more concession and PPP projects in 2021 [BNDES quer estruturar mais projetos de concessão e PPPs em 2021]. Available at: <https://economia.estadao.com.br/noticias/geral,bndes-quer-estruturar-mais-projetos-de-concessao-e-ppps-em-2021,70003643794> (Accessed: 9 June 2021).
- Europe Autonews (2021) Norway's EV sales rise to record 54% market share. Available at: <https://europe.autonews.com/automakers/norways-ev-sales-rise-record-54-market-share>.
- European Parliament (2017) Fossil fuel subsidies. Available at: [https://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595372/IPOL_IDA\(2017\)595372_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2017/595372/IPOL_IDA(2017)595372_EN.pdf).
- Eurostat (2021) 'Passenger mobility statistics'. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Passenger_mobility_statistics.

- EY (2017) Desafíos en materia de sostenibilidad corporativa en Perú. Available at: <https://bit.ly/materiadesostenibilidad>
- EY (2020a) Guide to investing in infrastructure projects in Peru 2020/2021. Available at: https://www.investinperu.pe/RepositorioAPS/0/0/JER/GUIA_INVERSION/2020/EY-Peru-Guide-Investing-Infrastructure-Projects.pdf.
- EY (2020b) Renewable Energy Country Attractiveness Index. Available at: https://www.ey.com/en_uk/recai (Accessed: 26 June 2021).
- EY (2021a) Guía de Negocios e Inversión en el Perú 2021. Available at: https://www.ey.com/es_pe/entrepreneurship/guia-de-negocios-e-inversion-peru.
- EY (2021b) RECAI May 2021, Renewable Energy Country Attractiveness Index. Available at: https://www.ey.com/en_gl/recai (Accessed: 30 June 2021).
- FAO (2018) Agricultural investment funds for development - Descriptive analysis and lessons learned from fund management, performance and private-public collaboration. Available at: www.fao.org/publications (Accessed: 29 June 2021).
- FAO (2021) Argentina | World Agriculture Watch, Food and Agriculture Organization. Available at: <http://www.fao.org/world-agriculture-watch/our-program/arg/en/> (Accessed: 2 July 2021).
- Febraban (2021) Green Taxonomy [Taxonomia Verde]. Available at: <https://portal.febraban.org.br/paginas/1103/pt-br/> (Accessed: 16 June 2021).
- Fitch Ratings (2020) Fitch Ratings 2021 Outlook: Latin American Cement. Available at: <https://www.fitchratings.com/research/corporate-finance/fitch-ratings-2021-outlook-latin-american-cement-03-12-2020> (Accessed: 7 June 2021).
- FitchRatings (2020) Fitch Affirms Brazil at 'BB-'; Outlook Negative. Available at: <https://www.fitchratings.com/research/sovereigns/fitch-affirms-brazil-at-bb-outlook-negative-18-11-2020> (Accessed: 8 June 2021).
- Froggatt, A. and Wellesley, L. (2016) China Shows Way with New Diet Guidelines on Meat, Chatham House.
- FS-UNEP Centre and BNEF (2020) Global Trends in Renewable Energy Investment 2020. Available at: <https://www.fs-unep-centre.org/global-trends-in-renewable-energy-investment-2020/>.
- G1 Economia (2021) 'Water crisis: government may activate more thermoelectric plants without a contract [Crisis hídrica: governo poderá acionar mais usinas termelétricas sem contrato]'. Available at: <https://g1.globo.com/economia/noticia/2021/06/07/crise-hidrica-governo-liberacao-mais-usinas-termeletricas-sem-contrato.ghtml> (Accessed: 16 June 2021).
- GCF (2021) Caixa Economica Federal (CEF). Available at: <https://www.greenclimate.fund/ae/caixa> (Accessed: 9 June 2021).
- GEF (no date) Argentina | Global Environment Facility. Available at: <https://www.thegef.org/country/argentina#block-wb-country-star5-alloc> (Accessed: 18 March 2021).
- Gestion (2021a) Diésel se incluye en Fondo de Estabilización de Precios de los Combustibles por 90 días. Available at: <https://gestion.pe/economia/diesel-se-incluye-en-fondo-de-estabilizacion-de-precios-de-los-combustibles-por-90-dias-nndc-noticia/?ref=gesr>.
- Gestion (2021b) Perú recibirá crédito de US\$ 20 millones del BID para impulsar electromovilidad. Available at: <https://gestion.pe/economia/bid-aprueba-credito-de-us-20-millones-para-impulsar-electromovilidad-en-peru-nndc-noticia/>.
- GI Hub (2018) Tren Norpatagonico. Available at: <https://pipeline.github.org/Project/ProjectDetails/473>.
- Global Fleet (no date) Governments gear up for EV transition in Latin America. Available at: <https://bit.ly/EVtransitioninLatinAmerica>
- Global Market Trajectory & Analytics (2021) Green Building Materials. Available at: <https://bit.ly/GreenBuildingMaterials2021>
- GlobalABC/IEA/UNEP (2020a) Regional Roadmap for Buildings and Construction in Latin America 2020-2050. Available at: <https://bit.ly/RegionaRoadmap>

GlobalABC/IEA/UNEP (2020b) Regional Roadmap for Buildings and Construction in Latin America 2020-2050.

GlobalData (2020) Construction activity in Latin America to contract more than any other region in 2020. Available at: <https://www.globaldata.com/construction-activity-latin-america-contract-region-2020-says-globaldata/>.

Government of Argentina (2018) En 2019 se invertirán más de 180.000 millones de pesos en transporte. Available at: <https://bit.ly/inversiontransporteArgentina>

Government of Argentina (2019a) Argentina's Third Biennial update report (BUR) to the UNFCCC [Tercer Informe Bienal De Actualización De La República Argentina A La Convención Marco De Las Naciones Unidas Sobre El Cambio Climático]. Available at: <https://unfccc.int/documents/201965> (Accessed: 17 March 2021).

Government of Argentina (2019b) Law Of Minimum Budgets For Adaptation And Mitigation To Global Climate Change - Law 27520 [Ley De Presupuestos Mínimos De Adaptación Y Mitigación Al Cambio Climático Global - Ley 27520]. Available at: <https://www.boletinoficial.gob.ar/detalleAviso/primera/224006/20191220> (Accessed: 22 March 2021).

Government of Argentina (2019c) Plan de acción nacional de infraestructura y territorio, y cambio climático. Available at: <http://servicios.infoleg.gob.ar/infolegInternet/anexos/330000-334999/332234/res447-7.pdf>.

Government of Argentina (2020a) Argentina's Second Nationally Determined Contribution [Segunda Contribución Determinada a Nivel Nacional de la República Argentina]. Ministry of Environment and Sustainable Development (MADS). Available at: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/ArgentinaSecond/Argentina_Segunda_Contribucion_Nacional.pdf (Accessed: 11 May 2021).

Government of Argentina (2020b) Línea de crédito para comprar electrodomésticos y otra para inversión productiva. Available at: <https://bit.ly/creditoelectrodomesticos>

Government of Argentina (2020c) Meoni junto al presidente Fernández anunció préstamos chinos para transporte ferroviario: 'Estamos haciendo un país federal con una inversión federal'. Available at: <https://www.argentina.gob.ar/noticias/meoni-junto-al-presidente-fernandez-anuncio-prestamos-chinos-para-transporte-ferroviario>.

Government of Argentina (2020d) Segundo Informe Voluntario Nacional Argentina 2020. Available at: https://www.argentina.gob.ar/sites/default/files/ivn_2020_07_03_0.pdf.

Government of Argentina (2021a) Council of Economic and Social Affairs [Consejo Económico y Social]. Available at: <https://www.argentina.gob.ar/consejo> (Accessed: 22 March 2021).

Government of Argentina (2021b) Forum 'Towards a National Hydrogen Strategy 2030' for the development of an inclusive and sustainable energy matrix [Foro "Hacia una Estrategia Nacional Hidrógeno 2030" para el desarrollo de una matriz energética inclusiva y sustentable]. Available at: <https://www.argentina.gob.ar/noticias/foro-hacia-una-estrategia-nacional-hidrogeno-2030-para-el-desarrollo-de-una-matriz> (Accessed: 30 June 2021).

Government of Argentina (2021c) International Financing Unit [Unidad de Financiamiento Internacional, UFI]. Available at: <https://www.mendoza.gov.ar/ufi/> (Accessed: 1 June 2021).

Government of Argentina (2021d) La CNV aprobó nuevo régimen para productos de inversión sostenible un nuevo hito en la agenda estratégica. Available at: <https://www.argentina.gob.ar/noticias/la-cnv-aprobo-nuevo-regimen-para-productos-de-inversion-sostenible-un-nuevo-hito-en-la>.

Government of Argentina (2021e) The Ministry of Environment held the first Provincial Articulation Table of the National Climate Change Cabinet [Ambiente realizó la primera Mesa de Articulación Provincial del Gabinete Nacional de Cambio Climático]. Available at: <https://www.argentina.gob.ar/noticias/ambiente-realizo-la-primera-mesa-de-articulacion-provincial-del-gabinete-nacional-de-cambio> (Accessed: 2 July 2021).

Government of Argentina (no date a) Basurales a cielo abierto: situación socioambiental y propuestas de solución integral. Available at: <https://www.argentina.gob.ar/ambiente/contenidos/basurales>.

Government of Argentina (no date b) National Management Plan for Forestry integrated with Livestock [Plan Nacional de Manejo de Bosques con Ganadería Integrada]. Available at: <https://www.argentina.gob.ar/ambiente/bosques/ganaderia-integrada> (Accessed: 2 July 2021).

Government of Argentina (no date c) Programa Biogás. Available at: <https://www.argentina.gob.ar/ambiente/control/biogas>.

Government of Argentina (no date d) RenovAr. Available at: <https://www.argentina.gob.ar/economia/energia/energia-electrica/renovables/renovar> (Accessed: 7 June 2021).

Government of Argentina (no date e) Sustainable Finance Technical Roundtable [Mesa Técnica de Finanzas Sostenibles]. Available at: <https://bit.ly/FinanzasSosteniblesArg> (Accessed: 1 June 2021).

Government of Brazil (2007) Decree no 6263 establishing the Inter-ministerial Committee on Climate Change. Secretariat General. Available at: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/decreto/d6263.htm (Accessed: 8 June 2021).

Government of Brazil (2009) Law 12.187/2009, establishing the National Policy on Climate Change (NPCC), regulated by Decree 7.390/2010. Brasilia. Available at: <https://bit.ly/NPCCBrazil> (Accessed: 8 June 2021).

Government of Brazil (2015) Brazil's First Nationally Determined Contribution (NDC). Available at: [https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Brazil First/BRAZIL iNDC english FINAL.pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Brazil%20First/BRAZIL%20iNDC%20english%20FINAL.pdf).

Government of Brazil (2017) Decree N° 9.773 of June 5th 2017 [DECRETO No 9.073, DE 5 DE JUNHO DE 2017]. Brasilia: Secretariat General. Available at: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2017/decreto/d9073.htm (Accessed: 8 June 2021).

Government of Brazil (2018) RESOLUTION No. 4.661, OF MAY 25, 2018 [RESOLUÇÃO No 4.661, DE 25 DE MAIO DE 2018]. Brasilia: Ministry of Finance / Central Bank of Brazil. Available at: <https://bit.ly/Resolución4661> (Accessed: 16 June 2021).

Government of Brazil (2019a) Brazil's infrastructure projects will access global green financing market [Projetos de infraestrutura do Brasil vão acessar mercado verde mundial de financiamentos]. Available at: <https://www.gov.br/pt-br/noticias/transito-e-transportes/2019/10/projetos-de-infraestrutura-do-brasil-va-acessar-mercado-verde-mundial-de-financiamentos> (Accessed: 9 June 2021).

Government of Brazil (2019b) 'Brazil's Third Biennial Update Report To The United Nations Framework Convention On Climate Change'. Available at: <https://unfccc.int/documents/193513>.

Government of Brazil (2019c) Decree 10.145/2019 [DECRETO 10.145/2019]. Brasilia. Available at: http://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Decreto/D10145.htm (Accessed: 29 March 2021).

Government of Brazil (2019d) Decree N° 10.117, of November 19th 2019 [Decreto No 10.117, De 19 De Novembro De 2019]. Brasilia. Available at: <https://www.in.gov.br/en/web/dou/-/decreto-n-10.117-de-19-de-novembro-de-2019-228634453> (Accessed: 8 June 2021).

Government of Brazil (2020a) Brazil's Updated Nationally Determined Contribution (NDC). Available at: [https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Brazil First/Brazil First NDC \(Updated submission\).pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Brazil%20First/Brazil%20First%20NDC%20(Updated%20submission).pdf) (Accessed: 29 March 2021).

Government of Brazil (2020b) Decree No 10.387, of June 5th 2020 [Decreto No 10.387, De 5 De Junho De 2020]. Brasilia. Available at: <https://www.in.gov.br/en/web/dou/-/decreto-n-10.387-de-5-de-junho-de-2020-260391759> (Accessed: 8 June 2021).

Government of Brazil (2020c) Fourth Biennial Update Report Of Brazil To The United Nations Framework Convention On Climate Change. Available at: <https://unfccc.int/documents/267661> (Accessed: 20 April 2021).

Government of Brazil (2020d) Meio Ambiente: Melhoria na gestão de resíduos sólidos no Brasil. Available at: <https://www.gov.br/pt-br/noticias/financas-impuestos-e-gestao-publica/500-dias/noticias-500-dias/meio-ambiente-melhoria-na-gestao-de-residuos-solidos-no-brasil>.

Government of Brazil (2021a) [Government seeks expansion of mining with international partners] Governo busca expansão da mineração com parceiros internacionais. Available at: <https://www.gov.br/mme/pt-br/assuntos/noticias/governo-busca-expansao-da-mineracao-com-parceiros-internacionais> (Accessed: 30 June 2021).

Government of Brazil (2021b) ABC+ Plan for Adaptation and Low Carbon Emission in Agriculture - Strategic vision for a new cycle. Available at: <https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/arquivo-publicacoes-plano-abc/abc-english.pdf> (Accessed: 16 June 2021).

Government of Brazil (2021c) CIM minutes [Atas do CIM]. Available at: <https://www.gov.br/casacivil/pt-br/assuntos/comite-interministerial-sobre-mudanca-do-clima/atas-do-cim> (Accessed: 16 June 2021).

Government of Brazil (no date) Plan ABC in numbers [Plano ABC em Números], 2020. Available at: <https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/plano-abc-em-numeros> (Accessed: 16 June 2021).

Government of Costa Rica (2019) President Alvarado extend oil moratorium until 2050 [Presidente Alvarado extiende moratoria petrolera hasta el año 2050]. Available at: <https://www.presidencia.go.cr/comunicados/2019/02/presidente-alvarado-extiende-moratoria-petrolera-hasta-el-ano-2050/> (Accessed: 7 June 2021).

Government of Peru (2016) National Strategy on Forests and Climate Change [Estrategia Nacional Sobre Bosques y Cambio Climático]. Available at: <https://www.minam.gob.pe/wp-content/uploads/2016/07/ESTRATEGIA-NACIONAL-SOBRE-BOSQUES-Y-CAMBIO-CLIMATICO-DECRETO-SUPREMO-007-2016-MINAM11.pdf> (Accessed: 8 June 2021).

Government of Peru (2018) Multisectoral Working Group of a temporary nature in charge of generating technical information to guide the implementation of Nationally Determined Contributions (GTM-NDC) - Final report [Grupo de Trabajo Multisectorial de naturaleza temporal encargado d. Available at: https://www.minam.gob.pe/cambioclimatico/wp-content/uploads/sites/127/2019/01/190107_Informe-final-GTM-NDC_v17dic18.pdf (Accessed: 8 June 2021).

Government of Peru (2019) National Competitiveness and Productivity Plan 2019-2030 [Plan Nacional De Competitividad Y Productividad 2019-2030]. Available at: https://www.mef.gob.pe/concdecompetitividad/Plan_Nacional_de_Competitividad_y_Productividad_PNCP.pdf (Accessed: 8 June 2021).

Government of Peru (2020a) Contributions Determined At The National Level Of Peru Technical Study [Contribuciones Determinadas A Nivel Nacional Del Perú Estudio Técnico]. Available at: http://sigrid.cenepred.gob.pe/sigridv3/storage/biblioteca/10353_contribuciones-determinadas-a-nivel-nacional-del-peru.pdf (Accessed: 7 June 2021).

Government of Peru (2020b) Decreto Supremo que aprueba el Reglamento de la Ley No 30988, Ley que promueve la reducción y prevención de pérdidas y desperdicios de alimentos, El Peruano. Executive power. Available at: <http://extwprlegs1.fao.org/docs/pdf/per194774.pdf> (Accessed: 13 April 2021).

Government of Peru (2020c) MINAM and financial entities sign the 'Green Protocol' in order to promote sustainable projects in the country [MINAM y entidades financieras suscriben el "Protocolo Verde" a fin de promover proyectos sostenibles en el país]. Available at: <https://www.gob.pe/institucion/minam/noticias/307538-minam-y-entidades-financieras-suscriben-el-protocolo-verde-a-fin-de-promover-proyectos-sostenibles-en-el-pais> (Accessed: 8 June 2021).

Government of Peru (2021a) Peruvian Agency for International Cooperation (APCI) [Agencia Peruana de Cooperación Internacional - APCI]. Available at: <https://www.gob.pe/apci> (Accessed: 7 June 2021).

- Government of Peru (2021b) Proyecto de Decreto Supremo que Aprueba el Código Técnico de Construcción Sostenible (CTCS). Available at: <https://bit.ly/CTCSPeru>
- Government of Peru (2021c) US\$ 50 million to be invested to reduce deforestation in eleven areas of the Peruvian Amazon [Invertirán US\$ 50 000 000 de dólares para reducir la deforestación en once regiones de la Amazonía peruana], Ministry of Environment. Available at: <http://www.bosques.gob.pe/notasdeprensa> (Accessed: 2 July 2021).
- Green Climate Fund (2021a) Argentina. Available at: <https://www.greenclimate.fund/countries/argentina> (Accessed: 28 April 2021).
- Green Climate Fund (2021b) Brazil. Available at: <https://www.greenclimate.fund/countries/brazil> (Accessed: 8 June 2021).
- Green Climate Fund (2021c) Peru. Available at: <https://www.greenclimate.fund/countries/peru> (Accessed: 8 June 2021).
- Greenpeace (2021) Deforestation in the North of Argentina - Annual Report 2020 [Deforestación en el norte de Argentina - Informe Anual 2020]. Available at: <https://www.greenpeace.org/argentina/campanas/bosques/> (Accessed: 2 July 2021).
- Gumbrecht, T. et al. (2017) 'An expert system model for mapping tropical wetlands and peatlands reveals South America as the largest contributor', *Wiley Global Change Biology*. doi: 10.1111/gcb.13689.
- Gupta, S. et al. (2007) Policies, Instruments and Co-operative Arrangements, *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Edited by B. Metz et al. Cambridge, UK, and New York, NY, USA: Cambridge University Press. Available at: <https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter13-2.pdf>.
- GWP (2018a) Länderprofil zur Kreislauf und Wasserwirtschaft in Argentinien. Available at: <https://bit.ly/pdfArgentinien>
- GWP (2018b) Länderprofil zur Kreislauf und Wasserwirtschaft in Argentinien.
- Hagemann, M. et al. (2017) *Faster and Cleaner 2. Kick-starting global decarbonization: It only takes a few actors to get the ball rolling*. San Francisco, Cologne, Berlin, London. Available at: http://climateactiontracker.org/assets/publications/publications/CAT_2017-04-20_Faster-Cleaner-2_Policy-Summary.pdf.
- Hagemann, M. et al. (2020) A roadmap for the power supply sector in Argentina: Implications of ambitious climate action for policy and investment. Available at: https://ambitiontoaction.net/wp-content/uploads/2020/02/AmbitionToAction_Argentina-Synthesis-Report.pdf.
- Hammad, S. (2020) Brazil: Investment In Times Of Fiscal Adjustment. Available at: <https://economic-research.bnpparibas.com/Views/DisplayPublication.aspx?type=document&IdPdf=39273> (Accessed: 8 June 2021).
- ICAP (2020) Emissions trading worldwide - Status report 2020. Available at: https://icapcarbonaction.com/en/?option=com_attach&task=download&id=677.
- IDB (2015a) 'Solid Waste Management in Latin America and the Caribbean'. Available at: <https://publications.iadb.org/publications/english/document/Solid-Waste-Management-in-Latin-America-and-the-Caribbean.pdf>.
- IDB (2015b) 'Solid Waste Management in Latin America and the Caribbean'.
- IDB (2019a) *Climate Risk and Financial Systems of Latin America: Regulatory, Supervisory and Industry Practices in the Region and Beyond* | Publications. Available at: <https://bit.ly/ClimateRiskFinancialSystems> (Accessed: 9 June 2021).
- IDB (2019b) *Green Infrastructure Investment Opportunities Brazil 2019*. Available at: <https://publications.iadb.org/en/green-infrastructure-investment-opportunities-brazil-2019>.
- IDB (2020a) *Latin American and Caribbean Forests in the 2020s: Trends, Challenges, and Opportunities*. Available at: <https://bit.ly/TrendChallengeOpportunity> (Accessed: 6 April 2021).

- IDB (2020b) The Inequality Crisis: Latin America and the Caribbean at the Crossroads. Available at: <https://publications.iadb.org/en/the-inequality-crisis-latin-america-and-the-caribbean-at-the-crossroads> (Accessed: 10 June 2021).
- IDB and DDPLAC (2019) Getting to Net-Zero Emissions: Lessons from Latin America and the Caribbean. Available at: https://publications.iadb.org/publications/english/document/Getting_to_Net-Zero_Emissions_Lessons_from_Latin_America_and_the_Caribbean.pdf (Accessed: 2 March 2021).
- IEA (2017) Energy Technology Perspectives 2017. Catalysing Energy Technology Transformations. Paris, France: International Energy Agency. Available at: <http://www.iea.org/etp2017/>.
- IEA (2019a) Global Energy & CO₂ Status Report: The latest trends in energy and emissions in 2018. Available at: <https://www.iea.org/reports/global-energy-co2-status-report-2019/emissions> (Accessed: 28 June 2021).
- IEA (2019b) Perspectives for the Clean Energy Transition - The critical role of buildings.
- IEA (2020a) '2020 Emission Factors'. International Energy Agency. Available at: <https://www.iea.org/data-and-statistics/data-products>.
- IEA (2020b) Appliances and Equipment . Available at: <https://www.iea.org/reports/appliances-and-equipment> (Accessed: 30 June 2021).
- IEA (2020c) Investment in the power sector by region, 2019-2020. Available at: <https://www.iea.org/data-and-statistics/charts/investment-in-the-power-sector-by-region-2019-2020> (Accessed: 17 March 2021).
- IEA (2020d) Tracking Buildings. Available at: <https://www.iea.org/reports/tracking-buildings-2020>.
- IEA (2020e) Tracking Industry 2020. Paris. Available at: <https://www.iea.org/reports/tracking-industry-2020>.
- IEA (2020f) 'World Energy Balances (2020 edition)'. Paris, France: International Energy Agency. Available at: <https://www.iea.org/reports/world-energy-balances-overview>.
- IEA (2021a) Central & South America – Countries & Regions - IEA. Available at: <https://www.iea.org/regions/central-south-america> (Accessed: 17 March 2021).
- IEA (2021b) Energy consumption. Available at: [https://www.iea.org/data-and-statistics/data-browser?country=WORLD&fuel=Energy consumption&indicator=TFCShareBySector](https://www.iea.org/data-and-statistics/data-browser?country=WORLD&fuel=Energy%20consumption&indicator=TFCShareBySector) (Accessed: 30 June 2021).
- IEA (2021c) Global Energy Review: CO₂ Emissions in 2020. Paris: International Energy Agency, Paris, France. Available at: <https://www.iea.org/reports/global-energy-review-2021/co2-emissions>.
- IEA (2021d) MEPS on Motors . Available at: <https://www.iea.org/policies/8037-meps-on-motors?country=Brazil&q=brazil> (Accessed: 30 June 2021).
- IEA (2021e) Net Zero by 2050: A Roadmap for the Global Energy Sector. Paris, France: International Energy Agency. Available at: <https://www.iea.org/reports/net-zero-by-2050>.
- IEA et al. (2021) The energy progress report SDG7: The energy progress report 2021. Washington D.C. Available at: https://trackingsdg7.esmap.org/data/files/download-documents/2021_tracking_sdg7_report.pdf.
- IEA (2021f) 'World Energy Balances'. Paris, France: International Energy Agency (IEA).
- IEA (2021g) World Energy Investment 2021. Available at: <https://www.iea.org/reports/world-energy-investment-2021> (Accessed: 10 June 2021).
- IEA (2015) 'Low-emissions urban mobility'. Available at: <https://energiaeambiente.org.br/nossos-objetivos/mobilidade-urbana>.
- IFC (2017a) Green Buildings Market Intelligence Argentina Country Profile. Available at: <https://edgebuildings.com/wp-content/uploads/2017/09/Argentina-Green-Building-Market-Intelligence.pdf>.
- IFC (2017b) Green Buildings Market Intelligence Brazil Country Profile. Available at: <https://edgebuildings.com/wp-content/uploads/2017/09/Brazil-Green-Building-Market-Intelligence.pdf>.

- IFC (2017c) Green Buildings Market Intelligence Peru Country Profile. Available at: <https://edgebuildings.com/wp-content/uploads/2017/09/Peru-Green-Building-Market-Intelligence.pdf>.
- IMF (2019) Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates. Washington, D.C., United States. Available at: <https://www.imf.org/en/Publications/WP/Issues/2019/05/02/Global-Fossil-Fuel-Subsidies-Remain-Large-An-Update-Based-on-Country-Level-Estimates-46509>.
- IMF (2021) Policy Responses to COVID-19. Available at: <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#B> (Accessed: 8 June 2021).
- inesc (2020) 'Incentives and subsidies for fossil fuels in Brazil'. Available at: https://www.inesc.org.br/wp-content/uploads/2020/11/EstudosFosseisEN_Errata.pdf.
- Infobae (2020) Wetlands law: What is it about and what do farmers and environmentalists think? [Ley de Humedales: ¿De qué se trata y qué piensan el campo y los ambientalistas?]. Available at: <https://www.infobae.com/campo/2020/09/27/ley-de-humedales-de-que-se-trata-y-que-piensan-el-campo-y-los-ambientalistas/> (Accessed: 2 July 2021).
- Infralatom (2019) 'Economic infrastructure investment data'. Available at: <https://s3.amazonaws.com/infralatom1/web/resources/home.html>.
- INTA (no date) Programa Nacional de los Suelos, Instituto Nacional de Tecnología Agropecuaria. Instituto Nacional de Tecnología Agropecuaria. Available at: <https://inta.gob.ar/pnsuelos> (Accessed: 13 September 2019).
- IPCC (2014) Working Group 3 Chapter 10: Industry. IPCC. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter10.pdf.
- IPCC (2018) Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change. Intergovernmental Panel on Climate Change.
- IPCC (2019) Climate Change and Land: An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems - Summary for Policymakers. Geneva, Switzerland. doi: 10.4337/9781784710644.
- IPE (no date) 'Fondo de estabilización de los precios de los combustibles'. Available at: <https://www.ipe.org.pe/portal/fondo-de-estabilizacion-de-los-precios-de-los-combustibles/>.
- IRENA (2013) Local Government Regulation Ordinances and Laws to Promote Renewable Energy. Available at: <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2013/Jan/IRENA-cities-case-6-Sao-Paulo>.
- IRENA (2015) Renewable Energy in Latin America 2015: An Overview of Policies. Available at: http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Latin_America_Policies_2015.pdf [accessed on 30 November 2016].
- IRENA (2021a) Renewable capacity statistics 2021. IRENA. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Apr/IRENA_RE_Capacity_Statistics_2021.pdf.
- IRENA (2021b) World Energy Transitions Outlook - 1.5°C Pathway. Available at: www.irena.org (Accessed: 15 April 2021).
- Kachi, A. et al. (2021) Paris Alignment in agriculture, land use, and the broader food system: A working paper on development finance investment criteria. Available at: Forthcoming.
- Kuramochi, T. et al. (2018) 'Ten key short-term sectoral benchmarks to limit warming to 1.5°C', *Climate Policy*, 18(3), pp. 287–305. doi: 10.1080/14693062.2017.1397495.
- Laif (2020) Latin American Green Bond Fund (LAGREEN). Available at: <https://www.eulaif.eu/en/projects/latin-american-green-bond-fund-lagreen>.
- Leibziger, David; Lefevre, B. (2015) 'Private Investment in Public Transport: Success Stories from Brazilian Cities'.

Macrotrends (2021) Peru Poverty Rate 1997-2021. Available at: <https://www.macrotrends.net/countries/PER/peru/poverty-rate>.

McKinsey & Company (2009) Pathways to a Low-Carbon Economy: Version 2 of the Global Greenhouse Gas Abatement Cost Curve. McKinsey & Company. Available at: <https://bit.ly/Lowcarboneyconomy> (Accessed: 25 January 2016).

MDA (2018) Regional public alliances with the private sector The case of the Office for the Promotion of Sustainable Private Investment of San Martín [Alianzas públicas regionales con el sector privado El caso de la Oficina de Promoción de Inversión Privada Sostenib. Available at: <https://mda.org.pe/media/2018/11/OPIPSVNOV18.pdf>.

MEF (2015) 'Resolución SMV No 033-2015-SMV/01'. Available at: <http://www.smv.gob.pe/sil/RGG021199800000007.pdf>.

MINAM (2009) Resolución Ministerial No.469-2009-MEM/DM. Available at: <http://www.minem.gob.pe/minem/archivos/PlanReferencialdelUsoEficiente> de la Energía 2009-2018(2).pdf.

MINAM (2010) Propuesta de política energética de Estado Peru 2010-2040.

MINAM (2015) Regional Climate Change Strategies [Estrategias Regionales de Cambio Climático]. Available at: <https://www.minam.gob.pe/wp-content/uploads/2015/09/ENCC-FINAL-250915-web.pdf> (Accessed: 7 June 2021).

MINAM (2017a) 'Decreto Legislativo N° 1278 - Decreto Legislativo que aprueba la Ley de Gestión Integral de Residuos Sólidos.' Available at: <https://www.minam.gob.pe/disposiciones/decreto-legislativo-n-1278/>.

MINAM (2017b) 'Plan Nacional de Gestión Integral de Residuos Sólidos 2016-2024'. Available at: <https://sinia.minam.gob.pe/documentos/plan-nacional-gestion-integral-residuos-solidos-2016-2024>.

MINAM (2018) Annex: List of Climate Change Mitigation Measures of the Peruvian State [Anexo: Lista De Medidas De Mitigación Al Cambio climático Del Estado Peruano]. Available at: <https://www.minam.gob.pe/cambioclimatico/wp-content/uploads/sites/127/2019/01/10.-Mitigación.pdf> (Accessed: 8 June 2021).

MINAM (2019) 'Programa de Incentivos para la mejora de la Gestión Municipal'. Available at: <https://www.minam.gob.pe/gestion-de-residuos-solidos/programa-de-incentivos-municipales/>.

MINAM (2020) Clean Production Agreements between Minam and private companies promote the circular economy [Acuerdos de Producción Limpia entre el Minam y empresas privadas promueven la economía circular]. Available at: <https://bit.ly/ProducciónLimpia> (Accessed: 29 June 2021).

MINAM (2021a) Carbon footprint in Peru [Huella de carbono Perú]. Available at: <https://huellacarbonoperu.minam.gob.pe/huellaperu/#/listadoInscritos/99> (Accessed: 29 June 2021).

MINAM (2021b) General Directorate of Climate Change and Desertification [Dirección General de Cambio Climático y Desertificación]. Available at: <https://www.minam.gob.pe/cambioclimatico/> (Accessed: 8 June 2021).

MINAM (no date) Let's Talk About Climate Change [Dialoguemos Sobre Cambio Climático]. Available at: <https://www.minam.gob.pe/cambioclimatico/dialoguemos/> (Accessed: 8 June 2021).

MINEM (2014) 'Plan Energético Nacional 2014- 2025'. Available at: http://www.minem.gob.pe/_detalle.php?id.

MINEM (2017) Resolution 281-E/2017 [Resolución 281-E/2017]. Buenos Aires. Available at: <https://portalweb.cammesa.com/Documentos/compartidos/Noticias/Res.MINEM.N.281-E-2017.pdf> (Accessed: 8 July 2021).

Ministerio de Transportes y Comunicaciones Peru (2019) Política de Subsidios del Transporte Urbano de pasajeros 2019 Title. Lima, Peru. Available at: <https://www.gob.pe/institucion/mtc/informes-publicaciones/366443-politica-de-subsidios-del-transporte-urbano-de-pasajeros-2019>.

Ministry of Economic Affairs (2021) Newsletter Debentures And other financial instruments under the terms of Law # 12,431 dated June 24, 2011 Real Estate Receivables Certificates-CRI's and Investment Funds. Available at: <https://bit.ly/NewsletterDebentures> (Accessed: 16 June 2021).

- Ministry of Economy of Argentina (2020) Promotion plan for Argentinean natural gas production. Available at: https://www.argentina.gob.ar/sites/default/files/nuevo_esquema_plan_gas_seleccion_b.pdf (Accessed: 16 March 2021).
- Ministry of Energy and Mines (2019) Ten-Year Energy Expansion Plan 2029 – PDE 2029 [Plano Decenal de Expansão de Energia 2029 - PDE 2029]. Available at: <https://bit.ly/Tenyearsenergy>
- Ministry of Energy and Mines (2020) Ten-Year Energy Expansion Plan 2030 – PDE 2030 [Plano Decenal de Expansão de Energia 2030 - PDE 2030]. Available at: <https://www.epe.gov.br/pt/publicacoes-dados-abertos/publicacoes/plano-decenal-de-expansao-de-energia-2030> (Accessed: 16 June 2021).
- Ministry of Infrastructure (2021) MInfra and CBI define next steps in the railway environmental certification process [MInfra e CBI definem próximas etapas do processo de certificação ambiental de ferrovias]. Available at: <https://www.gov.br/infraestrutura/pt-br/minfra-e-cbi-definem-proximas-etapas-do-processo-de-certificacao-ambiental-de-ferrovias> (Accessed: 16 June 2021).
- Ministry of Mines and Energy of Brazil (2020) PNE 2050 - National Energy Plan. Available at: [https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-227/topico-563/Relatorio Final do PNE 2050.pdf](https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-227/topico-563/Relatorio%20Final%20do%20PNE%202050.pdf) (Accessed: 12 March 2021).
- Ministry of Production (2021) Agreements for cleaner production [Acuerdos de Producción más Limpia]. Available at: <https://www.gob.pe/institucion/produce/campanas/4615-acuerdos-de-produccion-mas-limpia> (Accessed: 29 June 2021).
- Ministry of Production and Labor (2018) 'National Action Plan for Industry and Climate Change [Plan de Acción Nacional de Industria y Cambio Climático]'. Ministry of Production and Labor [Ministerio de Producción y Trabajo].
- MiVivienda (no date) Fondo MiVivienda. Available at: <https://www.mivivienda.com.pe/portalweb/usuario-busca-viviendas/buscador-home.aspx?op=ncmv>.
- La Nación (2021) Tarifas: el eterno talón de Aquiles de la economía argentina. Available at: <https://www.lanacion.com.ar/economia/tarifas-el-eterno-talon-de-aquiles-de-la-economia-argentina-nid16052021/>.
- Naidoo, C. et al. (2014) Strategic national approaches to climate finance - Report on scoping work in Peru, Chile and Colombia on national climate finance pathways and strategies. London. Available at: https://www.e3g.org/docs/E3G_Strategic_national_approaches_to_climate_finance_FINAL.pdf (Accessed: 24 April 2018).
- Nakhoda, S. et al. (2012) Climate Finance: Readiness and Strengthening Institutions.
- NDC Partnership (2021) Finance In Latin American and Caribbean NDCs. Available at: https://ndcpartnership.org/sites/default/files/Insight_Brief-Finance_in_LAC_NDCs_October-2020.pdf (Accessed: 7 June 2021).
- NewClimate Institute (2019) Climate Policy Database. Cologne, Germany: NewClimate Institute. Available at: <http://www.climatepolicydatabase.org> (Accessed: 11 April 2019).
- O'Callaghan, B. and Murdock, E. (2021) Are We Building Back Better? Evidence from 2020 and Pathways for Inclusive Green Recovery Spending. Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/35281/AWBBB.pdf>.
- OECD-FAO (2019) OECD-FAO Agricultural Outlook 2019-2028. Available at: https://www.oecd-ilibrary.org/docserver/agr_outlook-2019-en.pdf?expires=1617294696&id=id&accname=guest&checksum=273B70C9F7B16A7800BDEADCBDCF6455.
- OECD-FAO (2020) OECD-FAO Agricultural Outlook 2020-2029. Available at: <http://www.fao.org/publications/oecd-fao-agricultural-outlook/2020-2029/en/>.
- OECD (2019a) Fossil fuel support data and Country Notes. Available at: <https://www.oecd.org/fossil-fuels/data/>.
- OECD (2019b) Taxing Energy Use 2019. doi: <https://doi.org/https://doi.org/10.1787/058ca239-en>.

- OECD (2020) Building Back Better: A Sustainable, Resilient Recovery after Covid-19. Available at: https://read.oecd-ilibrary.org/view/?ref=133_133639-s08q2ridhf&title=Building-back-better-_A-sustainable-resilient-recovery-after-Covid-19 (Accessed: 13 November 2020).
- OICA (2018) Vehicles in use _ International Organization of Motor Vehicle Manufacturers. Available at: <http://www.oica.net/category/vehicles-in-use/> (Accessed: 28 September 2018).
- Osinergim (no date) Ley que crea el Fondo de la Compensación Social Eléctrica. Available at: [http://www2.osinerg.gob.pe/MarcoLegal/pdf/LEY No 27510.pdf](http://www2.osinerg.gob.pe/MarcoLegal/pdf/LEY%2027510.pdf).
- Osinergmin (no date) Renewable Energies - Tenders [Energías Renovables - Subastas]. Available at: <https://www.osinergmin.gob.pe/empresas/energias-renovables/subastas/> (Accessed: 30 June 2021).
- Our World in Data (2016) 'Emissions by sector'. Available at: <https://ourworldindata.org/emissions-by-sector#waste-3-2>.
- Oxford Business Group (2019) Peru targets investment in renewable energy. Available at: <https://oxfordbusinessgroup.com/analysis/looking-sun-work-under-way-attract-capital-renewable-energy> (Accessed: 23 March 2021).
- El País (2015) Drought and record consumption put pressure on the system and maintain the risk of blackout [Seca e consumo recorde pressionam sistema e mantêm risco de apagão]. Available at: https://brasil.elpais.com/brasil/2015/01/21/economia/1421876730_312375.html (Accessed: 29 June 2021).
- El Peruano (2019) Supreme Decree that approves the Regulation of Law No. 30754, Framework Law on Climate Change - No. 013-2019-MINAM [Decreto Supremo que aprueba el Reglamento de la Ley N° 30754, Ley Marco sobre Cambio Climático - N° 013-2019-MINAM]. Available at: <https://busquedas.elperuano.pe/normaslegales/decreto-supremo-que-aprueba-el-reglamento-de-la-ley-n-30754-decreto-supremo-n-013-2019-minam-1842032-2/> (Accessed: 7 June 2021).
- El Peruano (2020) Supreme Decree that creates the permanent Multisectoral Commission called 'High Level Commission on Climate Change (CANCC)' - No. 006-2020-MINAM [Decreto Supremo que crea la Comisión Multisectorial de carácter permanente denominada "Comisión de Alto Nivel. Available at: <https://bit.ly/Decretosupremo> (Accessed: 7 June 2021).
- Portal Movilidad (2021) Alberto Fernández confirmó incentivos a la fabricación de vehículos eléctricos en el país. Available at: <https://bit.ly/vehiculoseléctricos>.
- PV Magazine (2019) Distributed solar tops 500 MW in Brazil. Available at: <https://www.pv-magazine.com/2019/01/10/distributed-solar-tops-500-mw-in-brazil/>.
- Rapid Transition Alliance (2018) The Rise of Brazil's Sugarcane Cars. Available at: <https://www.rapidtransition.org/stories/the-rise-of-brazils-sugarcane-cars/>.
- REN21 (2020) Renewables 2020 Global Status Report, REN21 Secretariat. Paris. Available at: <http://www.ren21.net/resources/publications/>.
- Renewables Now (2021) Brazil sets price caps for June 25 auctions. Available at: <https://renewablesnow.com/news/brazil-sets-price-caps-for-june-25-auctions-741610/> (Accessed: 9 June 2021).
- Reuters (2019) Brazil private sector does more heavy lifting, but economy still struggling. Available at: <https://www.reuters.com/article/brazil-economy-private-sector-idUSL8N27S044> (Accessed: 8 June 2021).
- Reuters (2020) Brazil slashes budget to fight climate change as deforestation spikes. Available at: <https://www.reuters.com/article/us-brazil-deforestation-climate-change-a-idUSKBN2392LC> (Accessed: 8 June 2021).
- Reuters (2021a) Brazil's Bolsonaro, under U.S. pressure, vows climate neutrality by 2050. Available at: <https://www.reuters.com/business/environment/bolsonaro-says-brazil-will-reach-climate-neutrality-by-2050-2021-04-22/>.

- Reuters (2021b) Millions in Brazil thrown back into poverty as pandemic aid dries up. Available at: <https://www.reuters.com/article/us-brazil-economy-poverty-idUSKBN2Bl2OE> (Accessed: 8 June 2021).
- Reuters (2021c) Peru presidential race tightens as candidates battle for poor, undecided voters. Available at: <https://bit.ly/presidentialracetightens>.
- Reuters (2021d) UPDATE 1-Brazil govt debt ends 2020 at record high 89.3% of GDP. Available at: <https://www.reuters.com/article/brazil-economy-deficit-idUSL1N2K418F> (Accessed: 8 June 2021).
- Roe, S. et al. (2019) 'Contribution of the land sector to a 1.5 C world', *Nature Climate Change*, 9(11), pp. 817–828. doi: <https://doi.org/10.1038/s41558-019-0591-9>.
- Roeser, F. et al. (2019) NDC Update Report - Long-term, society-wide visions for immediate action. Berlin, Germany. Available at: <https://newclimate.org/2019/12/03/ndc-update-report-december-2019-long-term-society-wide-visions-for-immediate-action/>.
- Rogelj, J. et al. (2018) 'Mitigation Pathways Compatible With 1.5°C in the Context of Sustainable Development', in *Global warming of 1.5°C. An IPCC Special Report [...]*. IPCC, p. 82pp. Available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf.
- Saget, C., Vogt-Schilb, A. and Luu, T. (2020) Jobs in a net-zero emissions future in Latin America and the Caribbean. Available at: https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/documents/publication/wcms_752069.pdf (Accessed: 3 March 2021).
- Santander (2021) Peru: Foreign Investment. Available at: <https://bit.ly/Foreigninvestment>
- Santiago, R., Fuinhas, J. A. and Marques, A. C. (2020) 'An analysis of the energy intensity of Latin American and Caribbean countries: Empirical evidence on the role of public and private capital stock', *Energy*, 211, p. 118925. doi: 10.1016/j.energy.2020.118925.
- SEI et al. (2020) 'The Production Gap Report'.
- Silva Junior, C. H. L. et al. (2021) 'The Brazilian Amazon deforestation rate in 2020 is the greatest of the decade', *Nature Ecology and Evolution*, 5(2), pp. 144–145. doi: 10.1038/s41559-020-01368-x.
- SNIC (2019) Cement Technology Roadmap - Carbon Emissions Reduction Potential in the Brazilian Cement Industry by 2050. Rio de Janeiro. Available at: <http://snic.org.br/relatorio-roadmap.php> (Accessed: 30 June 2021).
- Stabile, M. C. C. et al. (2020) 'Solving Brazil's land use puzzle: Increasing production and slowing Amazon deforestation', *Land Use Policy*, 91. doi: 10.1016/j.landusepol.2019.104362.
- Statista (2014) 'Modes of transport used by EU citizens 2014 Published by Statista Research Department, Dec 31, 2014 This statistic shows the percentage of passengers using various modes of transport in the EU, based on a survey carried out in September 2014. 78 percent o'. Available at: <https://www.statista.com/statistics/429068/modes-of-transport-used-by-eu-citizens/>.
- Télam (2021) Protecting wetlands is protecting human health [Aseguran que proteger a los humedales es cuidar la salud humana].
- The Guardian (2018) Belize bans oil activity to protect its barrier reef. Available at: <https://www.theguardian.com/travel/2018/jan/14/belize-bans-oil-activity-to-protect-reef-diving-tourism-belize-barrier-reef> (Accessed: 7 June 2021).
- Transparency International (2020) Corruption Perceptions Index 2019. Available at: <https://www.transparency.org/en/cpi> (Accessed: 12 November 2020).
- UN (2019) World Population Prospects 2019. Available at: <https://population.un.org/wpp/> (Accessed: 29 June 2021).
- UN (2021) Goal 12 | Ensure sustainable consumption and production patterns. Available at: <https://sdgs.un.org/goals/goal12> (Accessed: 29 June 2021).
- UN DESA (2019) World Population Prospects 2019. United Nations Department of Economics and Social Affairs Population Division. Available at: <https://population.un.org/wpp/Download/Standard/Population/> (Accessed: 13 August 2019).

- UN Environment (2018a) Electric Mobility: Developments in Latin America and the Caribbean and opportunities for regional collaboration. Available at: <https://movelatam.org/wp-content/uploads/2019/06/MOVE-Regional-Report-2018-EN.pdf>.
- UN Environment (2018b) Waste Management Outlook for Latin America and the Caribbean. Available at: <https://wedocs.unep.org/handle/20.500.11822/26448>.
- UN Environment (2019) Latin America and the Caribbean could save US\$ 621 billion by 2050 through the decarbonization of energy, transport sectors. Available at: <https://www.unep.org/news-and-stories/press-release/latin-america-and-caribbean-could-save-us-621-billion-2050-through>.
- UNCTAD (2020) World Investment Report 2020. Available at: https://unctad.org/system/files/official-document/wir2020_en.pdf (Accessed: 19 April 2021).
- UNDP (2012) Readiness for Climate Finance. Available at: [http://www.undp.org/content/dam/undp/library/Environment and Energy/Climate Strategies/Readiness for Climate Finance_12April2012.pdf](http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Climate%20Strategies/Readiness%20for%20Climate%20Finance_12April2012.pdf).
- UNEP (2010a) Waste and climate change - Global trends and strategy framework. Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&ClimateChange.pdf?sequence=3>.
- UNEP (2010b) Waste and climate change - Global trends and strategy framework.
- UNEP (2018) Capitalizing sustainable finance in Argentina: A stocktake and review of sustainable finance opportunities for Argentina. Available at: <https://wedocs.unep.org/bitstream/handle/20.500.11822/34489/CSF.pdf?sequence=1&isAllowed=y> (Accessed: 9 June 2021).
- UNEP (2019) Emissions Gap Report 2019. Nairobi, Kenya: United Nations Environment Programme. doi: 10.18356/ff6d1a84-en.
- UNEP (2020) Zero Carbon - Latin America and the Caribbean: The opportunity, cost and benefits of the coupled decarbonization of the power and transport sectors in Latin America and the Caribbean. Available at: <https://www.unep.org/resources/report/zero-carbon-latin-america-and-caribbean> (Accessed: 9 June 2021).
- UNEP DTU (no date) CDM projects by host region. Available at: <https://www.cdmpipeline.org/cdm-projects-region.htm#4> (Accessed: 8 June 2021).
- UNFCCC (2015a) 'Decision 1/CP.21: Adoption of the Paris Agreement (FCCC/CP/2015/10/Add.1)' Available at: <https://unfccc.int/documents/9097>.
- UNFCCC (2015b) Paris Agreement - Decision 1/CP.21 - Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015 Addendum Part two: Action taken by the Conference of the Parties at its twenty-first session. Bonn, Germany: United Nations Framework Convention on Climate Change. Available at: <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>.
- UNFCCC (2018) Achievements Of The Clean Development Mechanism - Harnessing Incentive For Climate Action. Available at: https://unfccc.int/sites/default/files/resource/UNFCCC_CDM_report_2018.pdf (Accessed: 8 June 2021).
- UOL (2021) 'Investment is the smallest in 53 years, and Brazil is at risk of everything getting worse [Investimento é o menor em 53 anos, e Brasil corre risco de tudo piorar]'. Available at: <https://economia.uol.com.br/noticias/redacao/2021/02/28/menor-investimento-em-meio-seculo-coloca-brasil-em-encruzilhada.htm> (Accessed: 16 June 2021).
- USAGov(2020) 2020 Investment Climate Statements: Peru, US Department of State. Available at: <https://www.state.gov/reports/2020-investment-climate-statements/peru/>.
- USBGC (no date) Projects. Available at: <https://www.usgbc.org/projects>.
- USGBC (2020) Meet the 2020 Leadership Award recipients in Latin America. Available at: <https://www.usgbc.org/articles/meet-2020-leadership-award-recipients-latin-america>.

- Vendramini, A., Yamahaki, C. and Breviglieri, G. V. (2020) Barriers to attracting direct and capital market investments for railway infrastructure in Brazil. Available at: https://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.794593.de/cs-ndc_tracking_brazil_jul_2020.pdf (Accessed: 9 June 2021).
- WEF (2015) How are energy subsidies calculated? Available at: <https://www.weforum.org/agenda/2015/05/how-are-energy-subsidies-calculated/>.
- WEF (2017) The Role of the Financial Sector in Deforestation-free Supply Chains.
- WEF (2021) Chart: Which countries have the most electric cars? Available at: <https://www.weforum.org/agenda/2021/02/electric-vehicles-europe-percentage-sales/>.
- Weisse, M. and Goldman, E. (2021) Primary Rainforest Destruction Increased 12% from 2019 to 2020, WRI Global Forest Review. Available at: <https://research.wri.org/gfr/forest-pulse> (Accessed: 29 June 2021).
- Whitley, S. et al. (2018) Making finance consistent with climate goals - Insights for operationalising. Available at: <https://wriorg.s3.amazonaws.com/s3fs-public/making-finance-consistent-climate-goals.pdf>.
- Wilson Center (2021) Northeastern Brazil to Build World's Biggest Green Hydrogen Plant . Available at: <https://www.wilsoncenter.org/blog-post/northeastern-brazil-build-worlds-biggest-green-hydrogen-plant> (Accessed: 30 June 2021).
- World Bank (2017) 'The Cities of the Future in Latin America: Fewer Cars, Fewer Youth'. Available at: <https://www.worldbank.org/en/news/feature/2017/10/05/ciudades-del-futuro-en-america-latina>.
- World Bank (2018a) New financial instrument to make Brazilian cities more energy efficient. Available at: <https://bit.ly/Newfinancialinstrument> (Accessed: 29 June 2021).
- World Bank (2018b) 'Population living in slums (% of urban population)'. Available at: <https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?view=map>.
- World Bank (2019a) The Global Financial Development Database. Available at: <https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database>.
- World Bank (2019b) World Development Indicators. World Bank. Available at: <https://databank.worldbank.org/source/world-development-indicators> (Accessed: 10 December 2019).
- World Bank (2020a) GDP growth (annual %) - Latin America & Caribbean. Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=ZJ>.
- World Bank (2020b) GDP per capita (current US\$) - Peru. Available at: <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=PE>.
- World Bank (2020c) Gini index (World Bank estimate) - Brazil. Available at: https://data.worldbank.org/indicator/SI.POV.GINI?locations=BR&most_recent_value_desc=false (Accessed: 8 June 2021).
- World Bank (2020d) Worldwide Governance Indicators, Worldwide Governance Indicators. Available at: <http://info.worldbank.org/governance/wgi/> (Accessed: 11 December 2020).
- World Bank (2021a) Argentina Overview. Available at: <https://www.worldbank.org/en/country/argentina/overview> (Accessed: 21 April 2021).
- World Bank (2021b) Argentina Overview.
- World Bank (2021c) Carbon Pricing Dashboard. Available at: <https://carbonpricingdashboard.worldbank.org/>.
- World Bank (2021d) Country overview Peru. Available at: <https://www.worldbank.org/en/country/peru/overview>.
- World Bank (2021e) Ease of Doing Business in Brazil. Available at: <https://www.doingbusiness.org/en/data/exploreconomies/brazil#> (Accessed: 8 June 2021).
- World Bank (2021f) 'Gross domestic product 2019'. Available at: https://databank.worldbank.org/data/download/GDP_PPP.pdf.

- World Bank (2021g) Inflation, consumer prices (annual %) - Brazil. Available at: <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=BR> (Accessed: 8 June 2021).
- World Bank (2021h) State and Trends of Carbon Pricing 2021. Available at: <https://openknowledge.worldbank.org/handle/10986/35620>.
- World Bank (2021i) World Bank Open Data. Available at: <https://data.worldbank.org/> (Accessed: 22 March 2021).
- World Bank (2021j) World Development Indicators. GDP(Current US\$). World Bank. Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD> (Accessed: 5 June 2021).
- World Bank (2021k) World Development Indicators. Population, total. World Bank. Available at: <https://data.worldbank.org/indicator/SP.POP.TOTL> (Accessed: 10 May 2021).
- World Bank (no date) GDP (current US\$) - Latin America & Caribbean. Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?contextual=aggregate&locations=ZJ> (Accessed: 7 June 2021).
- World Steel Association (2015) Steel Statistical Yearbooks 2015. Brussels. Available at: <https://www.worldsteel.org/steel-by-topic/statistics/steel-statistical-yearbook.html> (Accessed: 8 June 2021).
- World Steel Association (2020) Steel Statistical Yearbooks 2020. Available at: <https://www.worldsteel.org/steel-by-topic/statistics/steel-statistical-yearbook.html> (Accessed: 8 June 2021).
- WRI (2019) Accelerating Building Decarbonization: Eight Attainable Policy Pathways to Net Zero Carbon Buildings For All. Available at: <https://www.wri.org/publication/accelerating-building-decarbonization>.
- WRI (2021) Climate Watch Historical GHG Emissions (1990-2018). Available at: https://www.climatewatchdata.org/ghg-emissions?end_year=2018&start_year=1990 (Accessed: 7 May 2021).
- Yamahaki, C. et al. (2020) 'Structural and specific barriers to the development of a green bond market in Brazil', *Journal of Sustainable Finance and Investment*. doi: 10.1080/20430795.2020.1769985.
- Yañez-Pagans, P. et al. (2019) 'Urban transport systems in Latin America and the Caribbean: lessons and challenges', *Latin American Economic Review*, 28(1), p. 15. doi: 10.1186/s40503-019-0079-z.
- Yépez-García, R. A. et al. (2018) The Energy Path of Latin America and the Caribbean. Available at: https://publications.iadb.org/publications/english/document/The_Energy_Path_of_Latin_America_and_the_Caribbean.pdf (Accessed: 1 March 2021).

