BRAZIL



CLII

CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION TOWARDS NET ZERO

2021

NOT ON TRACK FOR A 1.5°C WORLD

Brazil's unconditional NDC target would increase emissions by 54% above 2005 levels, or approximately 1,307 MtCO₂e by 2030. To keep below the 1.5°C temperature limit, Brazil's 2030 emissions would need to be around 608 MtCO₂e (or 28% below 2005 levels), leaving an ambition gap of 699 MtCO2e. All figures exclude land use emissions.

Gütschow et al., 2021; Climate Analytics, 2021





PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS BELOW G20 AVERAGE

GHG emissions (incl. land use) per capita (tCO₂e/capita)² in 2018



Brazil's per capita emissions are 0.92 times the G20 average. Total per capita emissions have decreased by roughly 8.5% between 2013 and 2018.

Climate Action Tracker, 2021; Gütschow et al., 2021; United Nations, 2019

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



Rapidly reducing deforestation towards zero is one of the most important opportunities for Brazil to enhance its climate action, as forestry is the country's largest source of emissions.



Agricultural emissions are Brazil's second largest emissions source and closely linked to deforestation. Reducing agricultural emissions presents a key opportunity for strengthening mitigation efforts.



Brazil should shift its energy infrastructure investments to **accelerate the uptake of renewables and decarbonise transport**.

RECENT DEVELOPMENTS



During the 2021 Leaders' Summit on Climate, Brazilian President Jair Bolsonaro advanced Brazil's target to reach climate neutrality by 10 years, to 2050.



The President reaffirmed Brazil's first NDC pledge to end illegal deforestation by 2030 – but only after the updated NDC was announced, so that pledge was excluded from the NDC update.



Brazil drastically reduced the 2021 budget for its Environment Ministry by over 30%, compared to 2020.

Government of Brazil, 2016a; BBC, 2021; World Resources Institute, 2021

CORONAVIRUS RESPONSE AND RECOVERY

As of July 2021, Brazil has suffered the world's second highest death toll from COVID-19, only behind the USA. The pandemic has not only caused the death of thousands of Brazilians, but also contributed to higher levels of deforestation in the Amazon rainforest as government oversight and resources were diverted to fighting the pandemic. Renewable energy auctions planned for spring 2020 were delayed, leaving space for continued fossil fuel company investment. While Brazil's economy show signs of returning to pre-pandemic levels in 2021, and the government attempts to implement recovery measures, Brazil need to make sure it avoids fossil fuels. A "green" economic recovery will require renewed investments and financial resources dedicated to avoiding a fossil fuel lock-in, and controlling deforestation.

BBC, 2020; Climate Action Tracker, 2020a; Eflein, 2021; Mcgeever, 2021

CONTENTS

We unpack Brazil's progress and highlight key opportunities to enhance climate action across:



SOCIO-ECONOMIC CONTEXT

Human Development Index (HDI)



Data for 2019. UNDP. 2020

The HDI reflects life expectancy, level of education, and per capita income. Brazil ranks high.

Population and urbanisation projections

Medium

(in millions)



LEGEND

Very low

l ow

Trends show developments over the past five years

arrows indicate assessment from a climate protection

Decarbonisation Ratings³ assess a country's performance compared to other G20 countries. A high score reflects a relatively

High Very high

Frontrunner

Policy Ratings⁴ evaluate a selection of policies that are essential

pre-conditions for the longer-term transformation required to

Hiah

good effort from a climate protection perspective but is

Medium

for which data are available. The colour-coded

perspective: Orange is bad, green is good.

not necessarily 1.5°C compatible.

Low

meet the 1.5°C limit.

Brazil's population is projected to increase by 8% by 2050, and become more urbanised. The projected increase in both overall population and urbanisation will put greater pressure on already vulnerable forests in the country. It will also contribute to increased energy use and transport, particularly if the country's GDP per capita continues on its upward trend.

United Nations, 2019; United Nations, 2018

Gross Domestic Product (GDP) per capita

(PPP constant 2015 international \$) in 2019



Death rate attributable to air pollution

Ambient air pollution attributable death rate per 1,000 population per year, age standardised in 2019



Over 60,000 people die in Brazil every year as a result of outdoor air pollution due to stroke, heart disease, lung cancer and chronic respiratory diseases. Compared to total population, this is still one of the lower levels in the G20.

Institute for Health Metrics and Evaluation, 2020

This source differs from the source used in last year's profiles and, therefore, the data are not comparable

A JUST TRANSITION

Brazil already has a large share of its energy supply sourced from renewables. However, the government still continues to support fossil fuel companies through subsidies and new projects, with continued allowance of coal and natural gas for energy, and weak policies on reducing internal combustion vehicles. Increased deforestation for agriculture during the COVID-19 pandemic has also boosted emissions and worsened the adaptive capacity of Brazil's rural and indigenous areas. Investing in low-carbon infrastructure, such as zero emission freight transport and electrified public transport, as well as sustainable agricultural practices, has the potential to boost Brazil's economy while also reducing emissions by up to 33%, creating a just economic and



environmental transition through decarbonisation.

Climate Action Tracker 2020: Pinheiro et al. 2020

ADAPTATION ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



Increase the ability to adapt to the adverse effects of climate change and foster climate resilience and low-GHG development.



Brazil is mainly at risk from hydro-meteorological extreme weather events, such as flooding and droughts, although forest fires have also been on the rise since 2020.



Brazil has already seen an average temperature increase of 2.5°C in coastal regions between 1901 and 2012, due to climate change.



Annual average losses (US\$ millions PPP)

Rising sea temperature, changes in ocean salinity and increased frequency, intensity and duration of El Niño Southern Oscillation events are all projected to have effects on Brazil's continental climate.

High

Low

Losses

ADAPTATION NEEDS

Climate Risk Index

Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather-related fatalities



Exposure to future impacts at 1.5°C, 2°C and 3°C

Impact ranking scale:					
Ve	ry low Low	Medium High Very high	1.5°C	2°C	3°C
WATED		% of area with increase in water scarcity			
WATER		% of time in drought conditions			
		Heatwave frequency			
		Days above 35°C			
		Reduction in crop duration			
AGRICULTURE	Wheat	Hot spell frequency			
		Reduction in rainfall			
	Soybean	Reduction in crop duration			
		Hot spell frequency			
		Reduction in rainfall			

Water, Heat and Health: own research; Agriculture: Arnell et al., 2019

Note: These indicators are national scale results, weighted by area and based on global data sets. They are designed to allow comparison between regions and countries and, therefore, entail simplifications. They do not reflect local impacts within the country. Please see technical note for further information.

CORONAVIRUS RESPONSE AND RECOVERY

While Brazil's economic and social responses to the COVID-19 pandemic have not directly affected its adaptation objectives, lack of enforcement of environmental policies during the pandemic have led to increased exploitation, particularly of Brazil's forests, in the form of illegal deforestation. Reducing deforestation is a key strategy listed in Brazil's sectoral adaptation strategies for both biodiversity protection and disaster risk reduction. However, in 2020 alone, deforestation in Brazil increased by 22% compared to 2019.

Global Forest Watch, 2020 Government of Brazil, 2016b; Federative Republic of Brazil, 2020

Adaptation Readiness

0.0

2000

2005

The figure shows 2000-2018 observed data from the Notre Dame Global Adaptation Initiative (ND-GAIN) Index overlaid with projected Shared Socioeconomic Pathways (SSPs) from 2020 to 2060.

1.0 Observed Brazil Observed G20 (0 = less ready, 1 = more ready) 0.8 SSP1 projection **Adaptation Readiness** 0.6 -- SSP2 projection --- SSP3 projection 0.4 0.2

2020

2025

2030

2040

2050

Notre Dame Global Adaptation Initiative (ND-Gain) Readiness Index



2010

2015

2018

The readiness component of the Index created by the ND-GAIN encompasses social (social inequality, information and communications technology infrastructure, education and innovation), economic, and governance indicators to assess a country's readiness

to deploy private and public investments in aid of adaptation. The index ranges from 0 (low readiness) to 1 (high readiness).

2060

The overlaid SSPs are qualitative and quantitative representations of a range of projections of future governance and, therefore, of possible adaptation readiness. The three scenarios shown here in dotted lines are described as a sustainable development-compatible scenario (SSP1), a middle-of-the-road (SSP2), and a 'Regional Rivalry' (SSP3) scenario.

Based on Andrijevic et al., 2020; ND-Gain Index, 2021

ADAPTATION POLICIES

National Adaptation Strategies

		Fields of action (sectors)													
Document name	Publication year	Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	Water	Monitoring & evaluation process
National Plan on Climate Change	2016														Assigned to the Executive Group on Climate Change.

Nationally Determined Contribution (NDC): Adaptation

TARGETS

Adaptation Plan.

No quantitative targets have been set by Brazil in its NDC nor in its National

ACTIONS

- Develop an agricultural risk and vulnerability monitoring system
- Preparation of Ecosystem-based Adaptation (EbA) in areas at risk of extreme events
- Expand scope of National Drinking Water Surveillance Programme
- Diagnose vulnerability to climate change of indigenous populations and lands

MITIGATION REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE **REDUCING EMISSIONS TO LIMIT**

PARIS AGREEMENT

Hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit to 1.5°C, recognising that this would significantly reduce the risks and impacts of climate change.

EMISSIONS OVERVIEW



Brazil's GHG emissions, excluding LULUCF, have increased by 79% (1990-2018), and the government's climate target to reduce emissions by 43% (below 2005 levels) by 2030, and to reach climate neutrality is not in line with a 1.5°C pathway.



In 2030, global CO, emissions need to be 45% below 2010 levels and reach net zero by 2050. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

Rogelj et al., 2018

GHG emissions across sectors and CAT 1.5°C 'fair-share' range (MtCO₂e/year)⁵



Brazil's emissions (excl. land use) increased by 79% between 1990 and 2018, to 1,080 MtCO2e. When considered by category, sustained increases were seen in energy-related emissions in all sectors, but with particularly noticeable increases in the transport and power sectors. While emissions growth has plateaued in recent years, it is projected to resume with the ongoing economic recovery from the COVID-19 pandemic. To be 1.5°C compatible, Brazil would need to strengthen its unconditional target and policies to be in line with its 'fair-share' contribution.

Gütschow et al., 2021; Climate Action Tracker, 2020a, 2021

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall energy-related GHG emissions are CO₂ emissions from fuel combustion, such as in the transport sector. Emissions in the power and transport sectors rose sharply for a few years, peaking in 2015, and declining thereafter. The transport sector contributes 47% of emissions, followed by the industrial and power sectors, at 27% and 9%, respectively.

ENERGY OVERVIEW



Brazil's energy system is already made up of 46% renewable energy, mainly from hydropower and biomass. However, it also still relies on fossil fuels for roughly 50% of its energy supply, with 35% from oil and 10% from natural gas.



The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050 and to substantially lower levels without carbon capture and storage (CCS).

Rogelj et al., 2018

Energy mix



This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, and cooking, but also for transport fuels. Fossil fuels (oil, coal, and, gas) make up 50% of the Brazil's energy mix, which is well below the G20 average of 81% in 2020, while renewables constitute 46% of the energy mix, far greater than the G20 average of 10%.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Solar, wind, geothermal, and biomass development





Solar, wind and biomass account for 33% of Brazil's energy supply – the G20 average is only 7%. In the last five years (2015-2020), the share of these renewable sources in total energy supply has increased by approximately 18%, less than the G20 average of just under 32%. Bioenergy (for electricity and heat) makes up the largest share.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.

Decarbonisation rating: renewable energy share of TPES compared to other G20 countries



TPES from solar, wind, geothermal and biomass (PJ)

Carbon intensity of the energy sector

Tonnes of CO₂ per unit of TPES (tCO₂/TJ)



Carbon intensity is a measure of how much CO_2 is emitted per unit of energy supply. The carbon intensity of Brazil's energy sector has decreased by 13% over the last five years, representing a sharper downward trend than the G20 average of a 4% decrease in the same five-year period. The carbon intensity of Brazil's energy supply was approximately 32 tCO₂ /TJ in 2020, compared to the G20 average of 57 tCO₂ /TJ.

Decarbonisation rating: carbon intensity of the energy sector compared to other G20 countries



Enerdata, 2021

Energy supply per capita



The level of energy supply per capita is closely related to economic development, climatic conditions and the price of energy. Energy supply per capita in Brazil is, at 56.38 GJ/capita in 2020, well below the G20 average, but has been decreasing at a slower pace – 5.68 % between 2015 and 2020 – in contrast to the decreasing G20 average of 0.12% over the same period.

Enerdata, 2021; United Nations, 2019

Energy intensity of the economy



This indicator quantifies how much energy is used for each unit of GDP. This is closely related to the level of industrialisation, efficiency achievements, climatic conditions or geography. Brazil's energy intensity is lower than the G20 average, but it has been decreasing at a lower rate, 1.25% (2014-2019), as compared to the G20 downward trend of 10.56% in the same period.

Enerdata, 2021; World Bank, 2021

POWER SECTOR

Emissions from energy used to make electricity and heat



Only 9% of Brazil's CO_2 emissions are from electricity and heating as it produces 82% of its electricity from renewable energy sources, most of which is hydropower (64%). In 2020 Brazil produced 3% of its electricity from coal and 9% from natural gas.



Share of energy-related CO_2 emissions from electricity and heat production in 2020.



Worldwide, coal use for power generation needs to peak by **2020**, and between 2030 and

2040, all the regions of the world need to phase out coal-fired

power generation. By 2040, the share of renewable energy in electricity generation has to be increased to at least 75%, and the share of unabated coal reduced to zero.

Rogelj et al., 2018; Climate Action Tracker, 2020b

Electricity generation mix

Gross power generation (TWh)



Brazil generated 14% of its electricity from fossil fuels in 2020. The share of renewable energy in Brazil's power sector has been increasing steadily, accounting for approximately 84% of the power mix in 2020. The majority (64%) of its renewable power generation is from hydropower.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Share of renewables in power generation

(incl. large hydro) in 2020





G20 average

Decarbonisation rating: share of renewables compared to other G20 countries



Enerdata, 2021

Emissions intensity of the power sector

(gCO₂/kWh) in 2020



Decarbonisation rating: emissions intensity compared to other G20 countries



For each kilowatt hour of electricity, 61.7 g of CO₂ are emitted in Brazil. The emissions intensity of the power sector has been dropping steadily in Brazil due to a decreasing share of oil and increasing shares of biomass and wind power in power production.

MCTIC, 2021

POLICY ASSESSMENT

Renewable energy in the power sector



In Brazil's first NDC submitted in 2015, the government set a target of achieving 23% renewable power production from non-hydropower renewable sources to further diversify a power sector already supplied by 84% renewable power, mainly from hydropower. This target was not updated in its new NDC, submitted in 2020.

Brazil's 10 Year Energy Expansion Plan (PDE 2029) presents a mixed outlook. While it projects that the share of fossil fuels in the power sector will remain steady by 2030, it also envisages an installed capacity of 8.4 GW of solar and 24.4 GW of wind by 2029.

Climate Action Tracker, 2020; Government of Brazil, 2016, 2020; Ministerio de Minas Energia do Brasil, 2019; Government of Brazil, 2021

Coal phase-out in the power sector



Brazil had set no target or policy for reducing coal use in the power sector. The government's 10 Year Energy Expansion Plan (PDE) through 2030 shows few plans to move from fossil fuels in favour of renewables. However, Banco Nacional de Desenvolvimento Econômico e Social (BNDES), the National Development Bank of Brazil, the main financier of coal projects, no longer provides finance for either coal- or oil-fired power plants. In July 2021, the first energy auctions since the pandemic saw only renewable energy sources being contracted, but in June 2021, Brazil changed regulations to allow greater use of thermal coal plants to cope with water scarcity and drought affecting its hydropower supply.

Granda, 2016; Climate Action Tracker, 2020; Ministerio de Minas Energia do Brasil, 2019; Molina 2021

😫 CORONAVIRUS RESPONSE AND RECOVERY

Brazil's very weak response to the COVID-19 pandemic has indirectly and negatively affected its mitigation efforts. A continuation of renewable energy auctions started in 2019 and planned for the spring of 2020 were cancelled due to the pandemic, and a lack of government oversight for environmental policies has led to a sharp increase in illegal deforestation and resulting forest fires.

TRANSPORT SECTOR

Emissions from energy used to transport goods and people



Emissions from transport are still on the rise. 92% of passenger transport is by road, and 59% of freight transport travelled by road in 2017. Both sectors are **still dominated by fossil fuels**, and electric vehicles (EVs) make up only 0.12% of car sales. In order to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.

Share of transport in energy-

related CO₂ emissions



The share of low-carbon fuels in the transport fuel mix globally must increase to between 40% and 60% by 2040 and 70% to 95% by 2050.

Rogelj et al., 2018; Climate Action Tracker, 2020b



47% Direct emissions

0.03%

Indirect emissions

Transport energy mix

Final energy consumption of transport by source (PJ/year)





Biofuels make up 26% of the energy mix in transport.

Enerdata, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

Transport emissions per capita

excl. aviation (tCO₂/capita) in 2020



Reductions in transport emissions per capita in 2020, and concomitant changes in the 5-year trends and decarbonisation ratings, reflect widespread economic slowdowns and transport restrictions imposed in response to the COVID-19 pandemic. For a discussion of broader trends in the G20 and the rebound of transport emissions in 2021, please see the Highlights Report at www.climate-transparency.org

Aviation emissions per capita⁶

(tCO₂/capita) in 2018



Enerdata, 2021; International Energy Agency, 2020; United Nations, 2019

per 1,000 inhabitants in 2019 in the Brazil*

VEHICLES

Market share of electric vehicles in new car sales (%)

The share of EVs in new car sales in 2020 was 0.12%.

IEA, 2021



Hiah

Verv hiah

Enerdata, 2021

Passenger transport

Motorisation rate

(modal split in % of passenger-km) in 2018*



Freight transport

(modal split in % of tonne-km) in 2017*



Freight transport by air, pipelines and waterways are excluded due to lack of data.

Enerdata, 2021

Goes et al., 2020

*Owing to the variety of sources and data years available, these data are not comparable across G20 countries.

POLICY ASSESSMENT

Phase out fossil fuel cars



Brazil updated its emissions performance standards for light-duty vehicles (LDVs) in 2018 through the Rota 2030 policy, which requires LDVs to reduce their fuel consumption by at least 11% below 2017 levels by 2022. The government has also initiated the RenovaBio program, which mandates the mixing of biofuels in fossil fuels for vehicles. However, the government has given no indication of a policy to phase out fossil fuel cars. The market share of EVs continues to be low and is only projected to reach 11% market share in Brazil by 2050.

Climate Action Tracker, 2020; Fl Group, n.d.; IEA, 2020; New Climate Institute, 2020

Phase out fossil fuel heavy-duty vehicles

Medium

The Rota 2030 emissions performance standards issued by Brazil in 2018 also apply to heavy-duty vehicles (HDVs) and freight transport, with mandatory reduction in fuel consumption of 8.6% compared to 2017 for trucks and vehicles up to 12 passengers. The government does not indicate any potential policy to phase out fossil fuel HDVs.

Climate Action Tracker, 2020; Fl Group, n.d.; New Climate Institute, 2020

Modal shift in (ground) transport



Brazil has set out goals to improve its public transport infrastructure in its 2012 National Urban Mobility Policy, which requires cities with more than 20,000 inhabitants to develop an Urban Mobility Plan to boost options such as mass and non-motorised transport. Few of the over 3,000 Brazilian cities that fall under this requirement have developed their Urban Mobility Plans. The Plan for Logistics and Transportation (PLNT) aims to increase the share of freight transport on rail and waterways, aiming to increase rail freight from 25% to 32% and waterway freight from 13% to 32% by 2025.

Real and Filho, 2009; Silva and Teles, 2020

BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings



Direct emissions and indirect emissions from the building sector in Brazil account for 4.81% and 4.18% of total energy-related CO_2 emissions respectively. Per capita emissions from the building sector is close to one-eighth of the G20 average.



Share of buildings in energy-related CO₂ emissions. Building emissions occur directly (burning fuels for heating, cooking, etc) and indirectly (grid-electricity for air conditioning, appliances, etc.)



By 2040, global emissions from buildings need to be reduced by 90% from 2015 levels, and be 95-100% below 2015 levels by 2050, mostly

energy demand, and electrification in conjunction with

complete decarbonisation of the power sector.

Rogelj et al., 2018; Climate Action Tracker, 2020b

Building emissions per capita

(incl. indirect emissions) (tCO₂/capita) in 2020



Building emissions per capita in Brazil were approximately one-eighth of the G20 average in 2020. This reflects the low energy use per square metre in Brazil, primarily due to its tropical climate and low need for heating. Brazil has managed to decrease building emissions per capita by 24.2% (2015-2020) almost nine times faster than the average decrease for G20 countries of 3% in that period.

Enerdata, 2021; United Nations, 2020

POLICY ASSESSMENT

Near zero energy new buildings



Development and enforcement of building codes falls under the responsibility of local governments in Brazil, and these are voluntary in nature. So far, there is no national level policy advocating for near zero energy new buildings.

De Souza E Silva and Cavalcante De Oliveira, 2019; New Climate Institute, 2020

Renovation of existing buildings



Brazil has not implemented any comprehensive national policy for the renovation of existing buildings to improve energy use or sustainability standards.

INDUSTRY SECTOR

Emissions from energy use in industry

Direct emissions and indirect emissions from industry in Brazil make up 26.5% and 3.3% of energy-related CO_2 emissions respectively. Brazil has included the industrial sector in its National Energy Efficiency Plan and in its National Electricity Conservation Programme, although no concrete energy efficiency targets for the sector are set yet.



Industrial emissions need to be reduced by 65-90% from 2010 levels by 2050.

Rogelj et al., 2018



Share of industry in energy-related CO₂ emissions.

Industry emissions intensity⁷

(tCO2e/USD2015 GVA) in 2017



5-year trend (2012-2017) +0.37% Brazil -16.45% G20 average

Industry emissions intensity:

Decarbonisation rating: industry emissions intensity compared to other G20 countries



Enerdata, 2021; World Bank, 2021

Carbon intensity of steel production⁸

(kgCO₂/tonne product) in 2016



Steel production and steelmaking are significant GHG emissions sources, and challenging to decarbonise.

World Steel Association, 2018; Brazil Steel Institute, 2018

POLICY ASSESSMENT

Energy efficiency



Brazil has no effective policies to increase the energy efficiency of the industry sector, nor any effective policies to reduce emissions and to decarbonise the sector.

Brazil has not updated its energy efficiency policies since its first National Energy Efficiency Plan in 2011, which outlined broad strategies but few concrete targets for improving the country's energy efficiency. In 2021, the IEA reports that only 7.3% of final energy use and only 8% of industry emissions in Brazil are covered by mandatory energy efficiency policies. *IEA. 2021: Ministério de Minas Energia do Brasil. 2011*

LAND USE SECTOR

Emissions from changes in the use of the land



To stay within the 1.5°C limit, Brazil needs to make the land use and forest sector (LULUCF) a net sink of emissions, e.g., by halting the expansion of illegal and unregulated deforestation and improving the efficiency of farming practices. Increased deforestation of the Amazon for the production of global commodities has resulted in the LULUCF sector being the largest source of emissions in Brazil. Preserving the Amazon is important to serve as a natural sink and to improve adaptive capacity in the face of climatic variability.



Global deforestation needs to be halted and changed to net CO_2 removals by around 2030.

Rogelj et al., 2018

Annual forest expansion, deforestation and net change

Forest area change in 1,000 ha/year



Between 2015-2020, Brazil lost 1,453 kha of forest area per year. The main cause of deforestation in this period was due to land use change for the production of global commodities, such as soy and cattle for beef.

Global Forest Resources Assessment, 2020

Note: There is a change of source and methodology for measuring this indicator from last year's profiles, which means the two years may not be directly comparable.

POLICY ASSESSMENT

Target for net zero deforestation



Brazil had set ambitious targets to reduce deforestation in its National Plan on Climate Change in 2008, aiming to reduce deforestation by 80% by 2020 relative to the reference period 1996-2005. However, despite a historic low deforestation rate in 2012, deforestation has been gradually increasing since, but spiked rapidly again during the COVID-19 pandemic.

The Bolsonaro administration has removed many environmental protections for forests, and the COVID-19 pandemic has made enforcement of remaining policies difficult.

AGRICULTURE SECTOR

Emissions from agriculture



Brazil's agricultural emissions are mainly from livestock enteric fermentation (mainly cattle) and livestock manure. A 1.5°C 'fair-share' compatible pathway requires behavioural and dietary shifts within Brazil, as well as an economic shift within the agricultural sector away from beef production for export in order to reduce the largest sources of agricultural emissions.

COMPATIBILITY

Methane emissions (mainly enteric

fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (mainly from fertilisers and manure) to need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels). *Rogelj et al., 2018*

Emissions from agriculture (excluding energy)



In Brazil, the largest sources of GHG emissions in the agriculture sector are enteric fermentation from livestock (59%) and manure (29%). Dietary changes and efficient use of fertilisers as well as reductions in food waste could help reduce emissions from this sector.

FAO STAT, 2021 Due to rounding, some graphs may sum to slightly above or below 100%

MITIGATION: TARGETS AND AMBITION



The combined mitigation effect of Nationally Determined Contributions (NDCs) assessed by April 2021 is **not sufficient and will lead to a warming of 2.4°C by the end of the century.** This highlights the urgent need for all countries to submit more ambitious targets by COP26, as they agreed to do in 2015, and to **urgently strengthen their climate action to align to the Paris Agreement's temperature goal.**

Climate Action Tracker, 2021a

AMBITION: 2030 TARGETS

Nationally Determined Contribution (NDC): Mitigation

TARGETS

Reduce emissions by 37% by 2025 and by 43% by 2030, compared to 2005 levels

ACTIONS

Not mentioned

Brazil transformed its first NDC's indicative 2030 target into its official target in the updated NDC released in 2020. Given that the baseline emissions estimate increased, this was actually a weakened mitigation commitment, which could see emissions rising while Brazil still meets its target.

Climate Action Tracker (CAT) evaluation of targets and actions

BRAZIL'S OVERALL RATING



This CAT evaluation is a **new, overall rating**, that combines the several, separately rated elements, of policies and actions, domestic and internationally supported targets, 'fair-share' target, and the country's contribution to climate finance. The "Highly insufficient" rating here indicates that overall, Brazil's climate policies and commitments are not consistent with the Paris Agreement's 1.5°C temperature limit.

If fully implemented, Brazil's current policies would result in emissions reductions beyond its targets, but still only in line with 3°C warming. Brazil is also not meeting its 'fair-share' contribution to climate change. Brazil's targets – to reduce emissions by 43% from 2005 levels by 2030, respectively – are unchanged on paper, but an increase in the base year used as a reference means that Brazil can continue to increase its emissions and still meet its targets. To improve its rating, Brazil could at the very least bring its 2030 targets in line with its current policies, and set a conditional target in line with a 1.5°C modelled domestic pathway. For the full assessment of the country's target and actions, and the explication of the methodology see www.climateactiontracker.org

Climate Action Tracker, 2021 Assessment based on CAT''s policy analysis from 22 September 2020 and Brazil's updated NDC submission from December 2020.

TRANSPARENCY: FACILITATING AMBITION

Countries are expected to communicate their NDCs in a clear and transparent manner in order to ensure accountability and comparability. The NDC Transparency Check has been developed in response to Paris Agreement decision 1/CP.21 and the Annex to decision 4/CMA.1, which sets out the "information to facilitate clarity, transparency and understanding" as crucial elements of NDCs.

NDC Transparency Check recommendations

Brazil's NDC was submitted to the UNFCCC on 08 December 2020. To ensure clarity, transparency, and understanding, it is recommended that Brazil provides additional detailed information in its next NDC or NDC update, including:

- Integrating the assumptions and methodological approaches for accounting for anthropogenic GHG emissions and removals.
- Information on the implementation plans to account for its NDC.
- Including references to relevant analyses which demonstrate the NDC mitigation target is aligned to the Paris Agreement long-term goals.
- Detailing when emissions peak will be reached.

AMBITION: LONG-TERM STRATEGIES

The Paris Agreement invites countries to communicate mid-century, long-term, and low-GHG emissions development strategies by 2020. Long-term strategies are an essential component of the transition toward net zero emissions and climate-resilient economies.

Status	Not yet submitted to the UNFCCC		
Interim steps	None yet published		
Sectoral targets	No		
Net zero target	Yes, but indicative		
Net zero year	Announced an "indicative" target to reach "carbon neutrality" by 2050		

FINANCE | MAKING FINANCE FLOWS CONSISTENT WITH CLIMATE GOALS



Make finance flows consistent with a pathway towards low-GHG emissions and climate-resilient development.



In 2019 Brazil spent USD 7.98 bn on fossil fuel subsidies, with 74% going to oil and 24% to natural gas. Although some corporations in Brazil participate in voluntary emissions trading systems (ETS), Brazil does not yet have an explicit nationwide carbon tax or ETS for CO₂. The implementation of a carbon tax or ETS is currently under consideration by the government.



Investment in green energy and infrastructure needs to outweigh fossil fuel investments by 2025.

Rogelj et al., 2018

FISCAL POLICY LEVERS

Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in the price.

Fossil fuel subsidies

(USD billions)



Fossil fuel subsidies by fuel type

USD in 2019



Over the past decade (2010-2019), Brazil's fossil fuel subsidies have consistently decreased after peaking in 2012, and reached their minimum value of USD 8.4bn in 2019. Over this period, most of the subsidies were directed to support the production and consumption of petroleum.

Comparable data is not available yet for 2020. However, according to the Energy Policy Tracker data, during 2020 Brazil pledged at least USD 582m to fossil fuel energy as part of its energy-related funding commitments and COVID-19 economic response. This funding commitment corresponds to the loans made available through the Emergency Support Measures for Civilian Aviation (FNAC) to airport concessionaires and airlines affected by the pandemic.

Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2020 Due to rounding, some graphs may sum to slightly above or below 100%

CORONAVIRUS RESPONSE AND RECOVERY

In March 2020, the Brazilian government announced an economic stimulus package of USD 150bn to cope with the impacts of

COVID-19, including support schemes for small businesses, families, the self-employed and other vulnerable populations. Despite this economic aid, the government recently announced a 30% cut in the 2021 federal budget for the Environment Ministry compared to the previous year. In July 2020, a group of 17 former Brazilian finance ministers released a letter pleading with the Bolsonaro administration to make better use of post-pandemic recovery funds to transition to a low-carbon economy, particularly by reinstating protections for the Amazon rainforest against ongoing deforestation.

BBC, 2021; Gonzales, 2020; KPMG, 2020; Tombini et al., 2020

Carbon pricing and revenue

(USD millions)

To date, Brazil has no explicit carbon pricing scheme, but the government is considering implementing a national carbon tax or ETS. To this end, voluntary ETS simulations have been operating since 2018. However, the level of pricing for permits or taxation has yet to be determined, alongside the proposed start date and sectors to be covered.

I4CE, 2021; OECD, 2020; Karpavicius, 2020

PUBLIC FINANCE

Governments steer investments through their public finance institutions, including via development banks both at home and overseas, and green investment banks. Developed G20 countries also have an obligation to provide finance to developing countries, and public sources are a key aspect of these obligations under the UNFCCC.

Public finance for fossil fuels

USD, per annum (2018-19 average)



Between 2018 and 2019, Brazil provided an average of USD 108m per year in public finance for the coal sector, and USD 1.1bn per year for the oil and gas sector, totalling around USD 1.28bn per year in public finance directed to fossil fuels. Brazil does not have an Export Credit Agency but provides export credits through the Brazilian Development Bank (BNDES); this is the public finance institution predominantly financing fossil fuels in the country. Coal-fired power plants are also being financed through other channels.

Oil Change International, 2020

Due to rounding, some graphs may sum to slightly above or below 100%

Provision of international public support

Brazil is not listed in Annex II of the UNFCCC and is, therefore, not formally obliged to provide climate finance. Despite this, Brazil continues to provide international public finance for mitigation via the Global Environment Facility (GEF) Trust Fund. While Brazil may channel international public finance towards climate change via multilateral and other development banks, it has not been included in this report

FINANCIAL POLICY AND REGULATION

Financial policy and regulation

Through policy and regulation, governments can overcome challenges to mobilising green finance, including real and perceived risks, insufficient returns on investment, capacity and information gaps.



Brazil has shown some encouraging progress in recent year to green its financial system. In September 2020, Banco Central do Brasil (BCB), the Central Bank of Brazil, released a "Sustainability" agenda to embed climate issues on a higher level in the bank's policies

and decisions. The agenda will support policymaking and strategic decision-making on bank stress tests, lending criteria and currency reserve management, thus targeting the wider financial system.

Following the release of the "Sustainability" agenda, the BCB opened public consultations in April 2021 to set rules and regulations on climate risk management and the disclosure of social, environmental and climate-related risks by financial institutions. The regulations are set to be implemented in two phases. The first phase will focus on the qualitative aspects of the social, environmental and climate risks disclosures, and the second phase will establish mandatory disclosure of quantitative targets and metrics.

BCB Sustainability Agenda, 2020; Green Finance Platform, 2021; Central Bank of Brazil, 2021

Nationally Determined Contribution (NDC): Finance

Conditionality	Not applicable
Investment needs	Not specified
Actions	Not mentioned
International market mechanisms	No contribution from international credits for the achievement of the target

ENDNOTES

Where referenced, "Enerdata, 2021" refers to data provided in July 2021. For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: www.climatetransparency.org/g20-climate-performance/ g20report2021

- The '1.5°C compatible pathway' is derived from global cost-effective pathways assessed by the IPCC's SR15, selected based on sustainability criteria, and defined by the 5th-50th percentiles of the distributions of such pathways achieving the long-term temperature goal of the Paris Agreement, Negative emissions from the land sector and novel negative emissions technologies are not included in the assessed models, which consider one primary negative emission technology (BECCS). In addition to domestic 1.5°C compatible emissions pathways. the 'fair-share' emissions reduction range would almost always require a developed country to provide enough support through climate finance, or other means of implementation, to bring the total emissions reduction contribution of that country down to the required 'fair-share' level.
- 2 'Land use' emissions is used here to refer to land use, land use change and forestry (LULUCF). The Climate Action Tracker (CAT) derives historical LULUCF emissions from the UNFCCC Common Reporting Format (CRF) reporting tables data converted to the categories from the IPCC 1996 guidelines, in particular separating Agriculture from LULUCF, which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).
- 3 The Decarbonisation Ratings assess the current year and average of the most recent five years (where available) to take account of the different starting points of different G20 countries.
- 4 The selection of policies rated and the assessment of 1.5°C compatibility are primarily informed by the Paris Agreement and the IPCC's 2018 SR15. The table below displays the criteria used to assess a country's policy performance.
- 5 The 1.5°C 'fair-share' ranges for 2030 are drawn from the CAT, which compiles a wide range of perspectives on what is considered fair, including considerations such as responsibility, capability, and equality. Countries with 1.5°C 'fair-share' ranges reaching below zero, are expected to achieve such strong reductions by

domestic emissions reductions, supplemented by contributions to global emissions reduction efforts via, for example, international finance. On a global scale, negative emissions technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions. In order to maintain comparability across all countries, this report harmonises all data with PRIMAP, 2021 dataset to 2018. However, note that Common Reporting Format (CRF) data is available for countries which have recently updated GHG inventories. Where countries submitted updated NDC targets before August 2021, these have been analysed and included.

- 6 This indicator adds up emissions from domestic aviation and international aviation bunkers in the respective country. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
- 7 This indicator includes only direct energyrelated emissions and process emissions (Scope 1) but not indirect emissions from electricity.
- 8 This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).

On endnote 4.	Low	Medium	High	Frontrunner		
Renewable energy in power sector	No policies to increase the share of renewables	Some policies	Policies and longer-term strategy/ target to significantly increase the share of renewables	Short-term policies + long-term strategy for 100% renewables in the power sector by 2050 in place		
Coal phase-out in power sector	No targets and policies in place for reducing coal	Some policies	Policies + coal phase-out decided	Policies + coal phase-out date before 2030 (OECD and EU28) or 2040 (rest of the world)		
Phase out fossil fuel cars	No policies for reducing emissions from light-duty vehicles	Some policies (e.g. energy/emissions performance standards or bonus/ malus support)	Policies + national target to phase out fossil fuel light-duty vehicles	Policies + ban on new fossil fuel- based light-duty vehicles by 2035 worldwide		
Phase out fossil fuel heavy-duty vehicles	No policies	Some policies (e.g. energy/emissions performance standards or support)	Policies + strategy to reduce absolute emissions from freight transport	Policies + innovation strategy to phase out emissions from freight transport by 2050		
Modal shift in (ground) transport	No policies	Some policies (e.g. support programmes to shift to rail or non- motorised transport)	Policies + longer-term strategy	Policies + longer-term strategy consistent with 1.5°C pathway		
Near zero energy new buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + national strategy for near zero energy new buildings	Policies + national strategy for all new buildings to be near zero energy by 2020 (OECD countries) or 2025 (non- OECD countries)		
Energy efficiency in industry	No policies	Mandatory energy efficiency policies cover more than 26-50% of industrial energy use	Mandatory energy efficiency policies cover 51–100% of industrial energy use	Policies + strategy to reduce industrial emissions by 75-90% from 2010 levels by 2050		
Retrofitting existing buildings	No policies	Some policies (e.g. building codes, standards or fiscal/financial incentives for low-emissions options)	Policies + retrofitting strategy	Policies + strategy to achieve deep renovation rates of 5% annually (OECD) or 3% (non-OECD) by 2020		
Net zero deforestation	No policies or incentives to reduce deforestation in place	Some policies (e.g. incentives to reduce deforestation or support schemes for afforestation/ reforestation in place)	Policies + national target for reaching net zero deforestation	Policies + national target for reaching zero deforestation by 2020s or for increasing forest coverage		

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