

SOUTH AFRICA



CLIMATE TRANSPARENCY REPORT: COMPARING G20 CLIMATE ACTION TOWARDS NET ZERO

2021

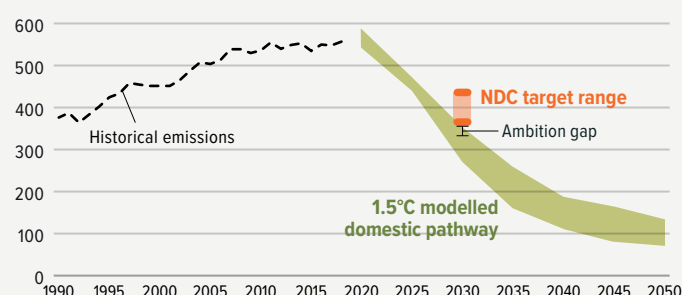
NOT ON TRACK FOR A 1.5°C WORLD

1.5°C

South Africa's updated NDC target would decrease emissions 3-19% below 1990 levels, or to approximately 366-436 MtCO₂e. To keep below the 1.5°C temperature limit, analysis by the 1.5°C National Pathways Explorer shows that South Africa's 2030 emissions would need to be around 334 MtCO₂e (or 6% below 1990 levels), leaving little (32 MtCO₂e) to no ambition gap should South Africa keep its emissions to the bottom end of its NDC range. All figures exclude land use emissions.

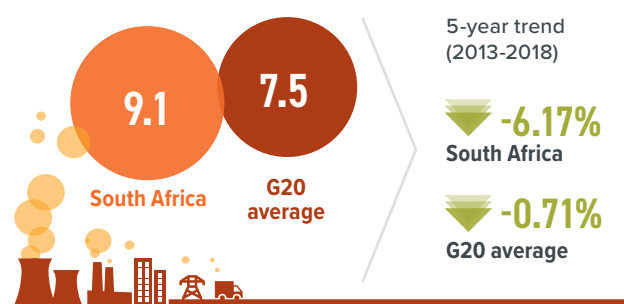
Gütschow et al., 2021; Climate Analytics, 2021

1.5°C compatible emissions pathway (MtCO₂e/year)¹



PER CAPITA GREENHOUSE GAS (GHG) EMISSIONS ABOVE G20 AVERAGE

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



South Africa's per capita emissions, including land use, are 1.22 times the G20 average. Total per capita emissions have decreased by 6% between 2013-2018.

Climate Action Tracker, 2021; Gütschow et al., 2021; United Nations, 2020

KEY OPPORTUNITIES FOR ENHANCING CLIMATE AMBITION



Finalise passage of the Climate Change Bill, which would establish the framework for setting carbon budgets, sectoral emissions targets and a national emissions reduction trajectory.



Direct and indirect emissions from industry make up nearly 40% of energy-related CO₂ emissions. **South Africa should implement and enforce policies to improve energy efficiency and emissions intensity in the industry sector.**



Avoid procurement of costly, emissions-intensive capacity in the power sector, such as the procurement of new coal under the Integrated Resource Plan 2019 (IRP2019), and instead focus on expanding renewable energy.

Department of Energy, 2019; Climate Action Tracker, 2020d; Department of Environment, Forestry and Fisheries, 2021

RECENT DEVELOPMENTS



While the Economic Reconstruction and Recovery Plan aims to pursue "green economy interventions", like energy efficiency retrofits, it also **includes support for expansion of gas infrastructure**.



The government launched the next round of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and raised the licensing exemption threshold for embedded generation projects from 1 MW to 100 MW, which will support wind and solar capacity.



The 2020 Medium Term Budget included a ZAR 10.5bn (USD 641m) bailout for South African Airways, with **no climate-related conditionalities**.

Department of Mineral Resources and Energy, 2021; Republic of South Africa, 2020a, 2020b; Bellini, 2021



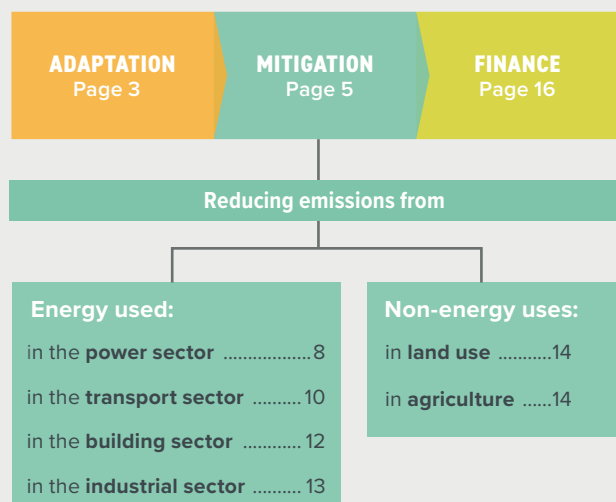
CORONAVIRUS RESPONSE AND RECOVERY

South Africa responded to COVID-19 with an early lockdown and a significant stimulus package of almost 10% of its GDP, but the implementation of stimulus measures has lagged. Early action prevented an exponential initial outbreak, but subsequent waves have caused further illness and death. The pandemic has also exacerbated existing inequalities and increasing unemployment, including discouraged workers, from 39.7% in early 2020 to 44.4% in Q2 2021.

Futshane, 2021; IMF, 2021; Institute for Economic Justice, 2021; Statistics South Africa, 2021

CONTENTS

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

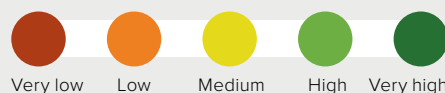


LEGEND

Trends show developments over the past five years for which data are available. The colour-coded arrows indicate assessment from a climate protection perspective: Orange is bad, green is good.



Decarbonisation Ratings³ assess a country's performance compared to other G20 countries. A high score reflects a relatively good effort from a climate protection perspective but is not necessarily 1.5°C compatible.

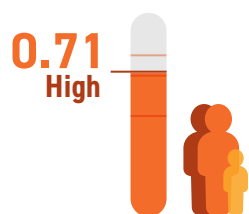


Policy Ratings⁴ evaluate a selection of policies that are essential pre-conditions for the longer-term transformation required to meet the 1.5°C limit.



SOCIO-ECONOMIC CONTEXT

Human Development Index (HDI)

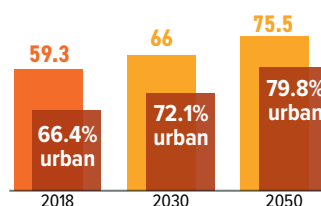


The HDI reflects life expectancy, level of education, and per capita income. South Africa ranks high.

Data for 2019. UNDP, 2020

Population and urbanisation projections

(in millions)

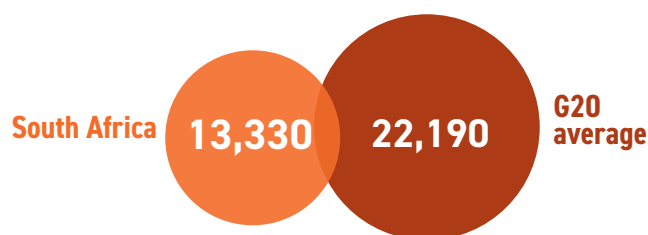


South Africa's population is projected to increase by 27% by 2050, and become more urbanised. Impacts of climate change are already placing significant stress on urban water services in South African cities and threatening biodiversity.

United Nations, 2018, 2019; Cullis et al., 2019; Gannon et al., 2018

Gross Domestic Product (GDP) per capita

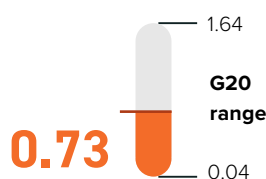
(PPP constant 2015 international \$) in 2019



World Bank, 2021; United Nations, 2019

Death rate attributable to air pollution

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



Over 29,800 people die in South Africa 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 higher 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

South Africa's economy is the most coal-dependent in the G20. The coal mining sector employs over 90,000 workers, concentrated in regions with high unemployment levels, making the transition more challenging. Government has explicitly recognised a just transition as a priority in national policy and in its updated NDC. In 2019, the National Planning Commission initiated a social dialogue process to identify pathways for a just transition, which has been formalised into the newly-launched Presidential Climate Commission (PCC), tasked to oversee and coordinate socially inclusive pathways to net zero. A national framework and sectoral strategies related to a just transition are being developed; Mpumalanga Province is undertaking social partner dialogues and exploring green economic diversification through Provincial structures; Eskom, the national power utility, is pursuing a just energy transition strategy through plant repurposing and new finance models; and local community groups are developing an Open Agenda on Just Transition.



Minerals Council South Africa, 2021; Presidential Climate Commission, 2021; DFFE, 2021a; Creamer, 2020; Life After Coal, 2020; Smith, 2021

ADAPTATION

ADDRESSING AND REDUCING VULNERABILITY TO CLIMATE CHANGE



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



Climate change poses a severe threat to water quality and availability in South Africa, with both extreme floods and droughts resulting in reduced crop production, livestock deaths and water scarcity.



South Africa has experienced warming at more than **twice the global rate of temperature increase**, particularly impacting the west and northeast.



Without policy intervention, the impacts of climate change are **expected to exacerbate poverty and inequality** as lower income communities will be disproportionately impacted due to their higher vulnerability and lower resilience.

ADAPTATION NEEDS

Climate Risk Index

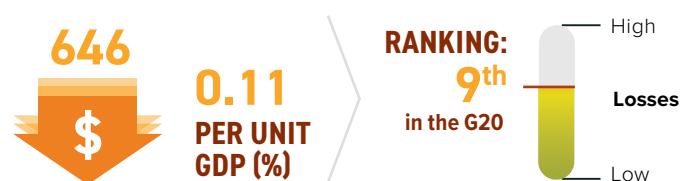
Impacts of extreme weather events in terms of fatalities and economic losses that occurred. All numbers are averages (1999-2018).

Annual weather-related fatalities



Based on Germanwatch, 2019

Annual average losses (US\$ millions PPP)



Based on Germanwatch, 2019

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

Impact ranking scale: Very low Low Medium High Very high

			1.5°C	2°C	3°C
WATER	% of area with increase in water scarcity				
	% of time in drought conditions				
HEAT AND HEALTH	Heatwave frequency				
	Days above 35°C				
AGRICULTURE	Maize	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

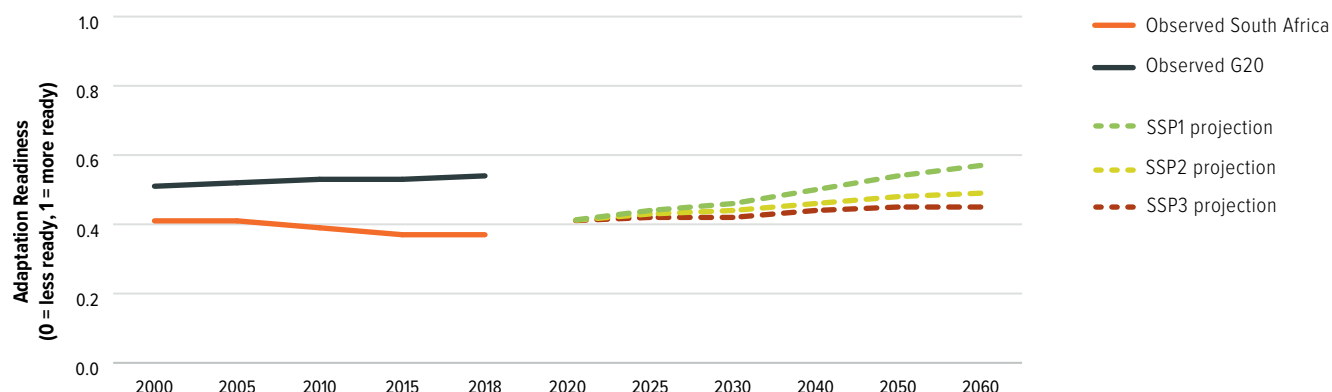
South Africa's COVID-19 stimulus plan, the Economic Reconstruction and Recovery Plan (ERRP), includes prioritising green economy interventions to improve energy, food and water security. Efforts to support vulnerable populations during the pandemic are critical to improving resilience to the impacts of climate change. Around 10% of the USD 26bn stimulus package in April 2020 was allocated to social assistance. However, the ERRP and April stimulus were missed opportunities to incorporate gender considerations into COVID-19 recovery and address systemic challenges that leave women vulnerable to climate change.

Bhorat and Köhler, 2020; Ramaphosa, 2020; Trade and Industrial Policy Strategies, 2021

Adaptation Readiness

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.

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



South Africa's observed adaptation readiness between 2000 and 2018 is well below the G20 average and declining. Socio-economic developments in line with SSP1 would produce improvements in readiness to bring it in line with the 2018 G20 average around 2040. Other measures, as represented by SSP2 and SSP3, would continue to undermine its readiness to adapt in the long term.

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).

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

Document name	Publication year	Fields of action (sectors)												Monitoring & evaluation process
		Agriculture	Biodiversity	Coastal areas and fishing	Education and research	Energy and industry	Finance and insurance	Forestry	Health	Infrastructure	Tourism	Transport	Urbanism	
National Climate Change Adaptation Strategy	2018	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	Annual reporting and update of strategy every 5 years

Nationally Determined Contribution (NDC): Adaptation

TARGETS

Goals listed in proposed NDC:

- Enhance adaptation governance and legal frameworks
- Develop understanding of climate impacts
- Implement NCCAS adaptation interventions
- Mobilise funding through multilateral mechanisms
- Quantify adaptation efforts

ACTIONS

"Efforts" to achieve the above goals listed

MITIGATION

REDUCING EMISSIONS TO LIMIT GLOBAL TEMPERATURE INCREASE



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



South Africa's GHG emissions, excluding LULUCF, have increased by 47.7% (1990-2018) to 557 MtCO₂e. The lower end of the updated NDC target's range of 366-436 MtCO₂e (excl. LULUCF) is close to being a 1.5°C 'fair-share' contribution. South Africa has stated its intention to move towards "net zero carbon emissions" by 2050 as part of its long-term strategy.

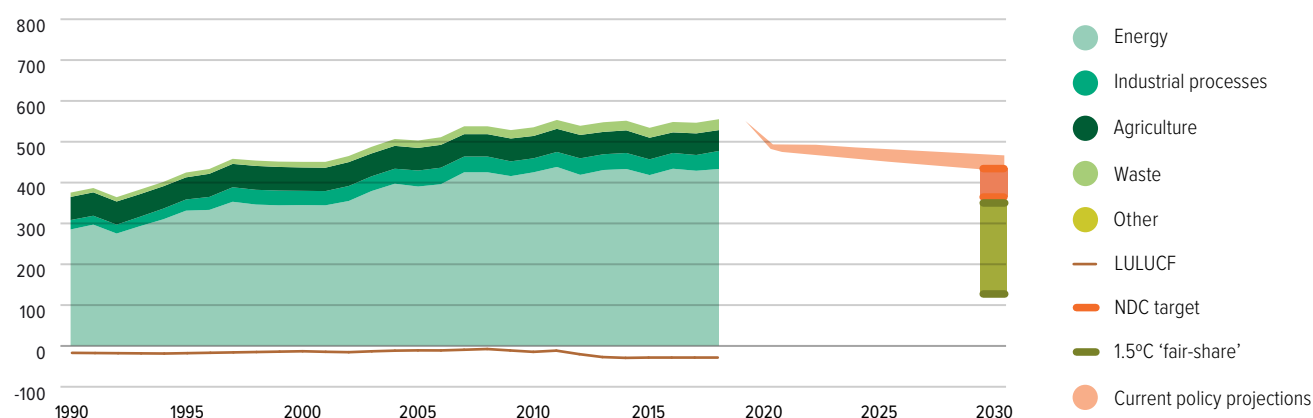


In 2030, global CO₂ emissions need to be 45% below 2010 levels and reach net zero by 2050. Global energy-related CO₂ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

Rogelj et al., 2018

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

Total GHG emissions across sectors (MtCO₂e/year)



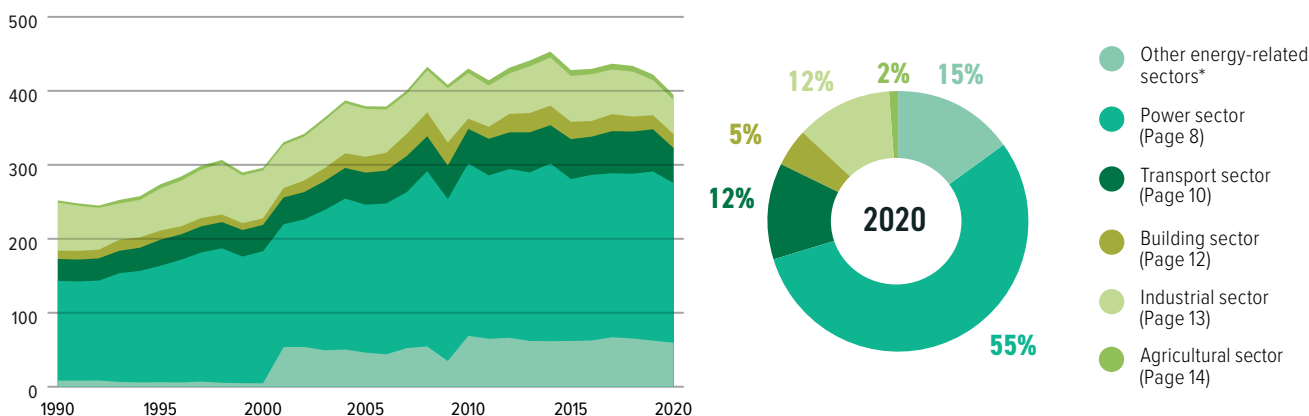
South Africa's emissions (excl. land use) increased by 48% between 1990 and 2018 to 557 MtCO₂e. Although stabilising somewhat in recent years, emissions in all categories – except for agriculture – have increased in that timeframe. Only the lower bound of the updated NDC target's range of 366-436 MtCO₂e (excl. LULUCF) is close to being a 1.5°C 'fair-share' contribution to the Paris Agreement's goals. To be 1.5°C 'fair-share' compatible, South Africa would need to ensure it achieved reductions in line with the bottom of its 2030 NDC range.

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

Note: Value excl. land use is calculated assuming a 10 year historical average for land use emissions based on South Africa's national inventory data from 2005-2015

Energy-related CO₂ emissions by sector

Annual CO₂ emissions from fuel combustion (MtCO₂/year)



The largest driver of overall GHG emissions are CO₂ emissions from fuel combustion. In South Africa, combustion emissions have been decreasing since 2017 and decreased across all end use sectors in 2020. The power sector is, at 55%, the largest contributor, followed by the energy sector (for its own use) and transport at 15% and 12%, respectively.

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

Note: Energy industry own use covers fuels used by the energy producing industries. It includes energy consumed by energy industries for the extraction process, heating, pumping, traction, lighting purposes and distribution. In South Africa, synthetic fuels production from coal is not included in this category.

ENERGY OVERVIEW



Fossil fuels still make up around 90% of South Africa's energy mix (including power, heat, transport fuels, etc) – among the G20's highest. Energy from solar PV and wind has been on the rise since 2014, but renewables still make up a tiny share of the overall mix. Carbon intensity of energy has remained nearly constant in recent years, with a slight dip in 2020 likely due to COVID-19.

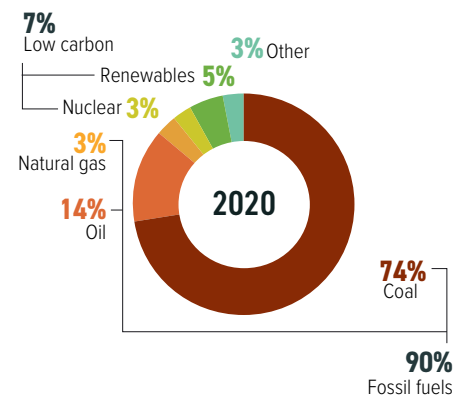
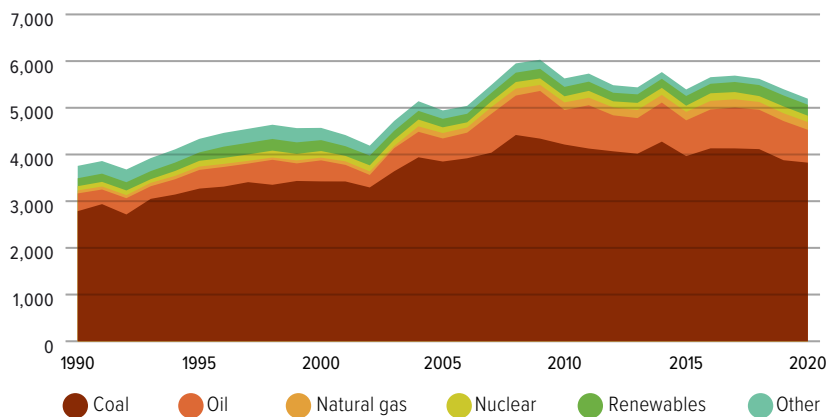


The share of fossil fuels globally needs to fall to 67% of global total primary energy by 2030 and to 33% by 2050, and to substantially lower levels without carbon capture and storage. (CCS)

Rogelj et al., 2018

Energy mix

Total primary energy supply (TPES) (PJ)

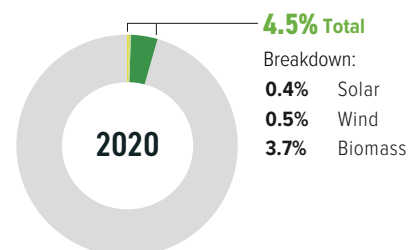
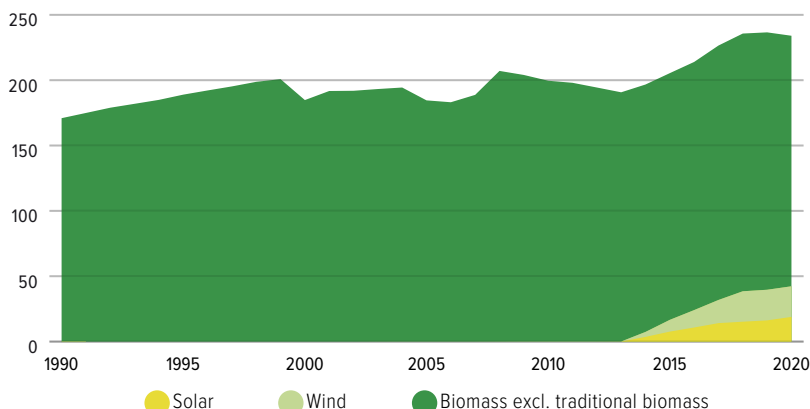


This graph shows the fuel mix for all energy supply, including energy used not only for electricity generation, heating, and cooking, but also for transport fuels. Fossil fuels (oil, coal, and gas) made up 90% of the South African energy mix in 2020, which is higher than the G20 average (81%). The vast majority (74%) of this is from coal, more than double the G20 average of 31%. While the share of renewable energy in the energy mix increased, it accounts for only a small share of South Africa's energy supply (4.5%). Despite growing generation from solar and wind, bioenergy provides the majority of South Africa's renewable energy.

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

Solar, wind, geothermal, and biomass development

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

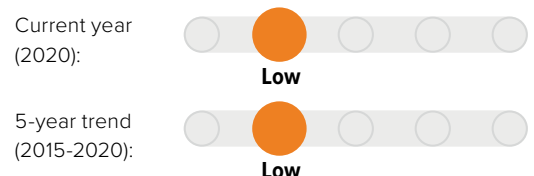


Solar, wind, geothermal and biomass account for 4.5% of South Africa's energy supply – the G20 average is 7%. Compared to the G20 average, renewable uptake has been slow. The share in total energy supply has increased by around 21% in the last five years in South Africa (2015-2020). Bioenergy (for electricity and heat) makes up the largest share, though recent growth is largely from increasing solar and wind energy.

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

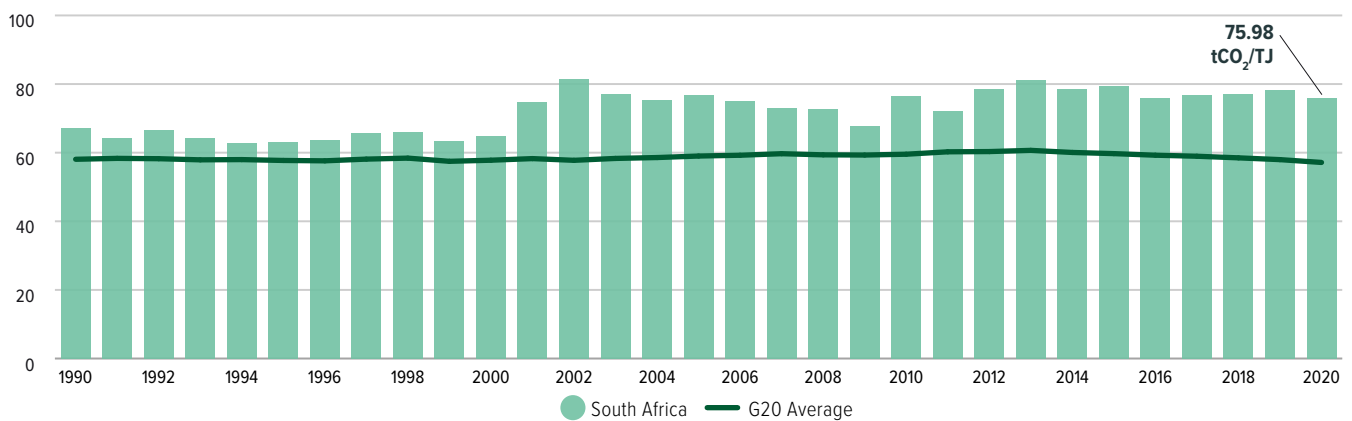
Note: Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.

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



Carbon intensity of the energy sector

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

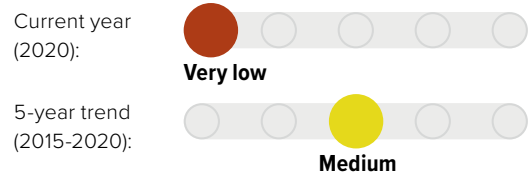


Carbon intensity is a measure of how much CO₂ is emitted per unit of energy supply.

In South Africa, carbon intensity dipped slightly to 76 tCO₂/TJ in 2020, after remaining relatively constant around 79 tCO₂/TJ over the previous eight years, likely due to the impacts of COVID-19. Still, South Africa has the highest carbon intensity in the G20. This high level reflects the continuously high share of fossil fuels in the energy mix.

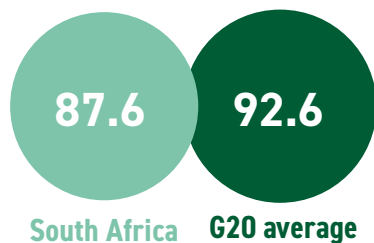
Enerdata, 2021

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

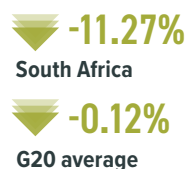


Energy supply per capita

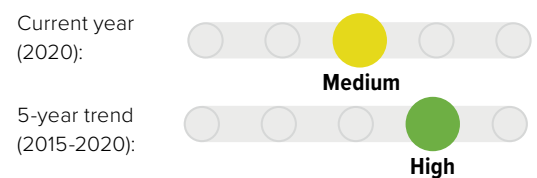
TPES per capita (GJ/capita) in 2020



TPES per capita (GJ/capita): 5-year trend (2015-2020)



Decarbonisation rating: energy supply per capita compared to other G20 countries

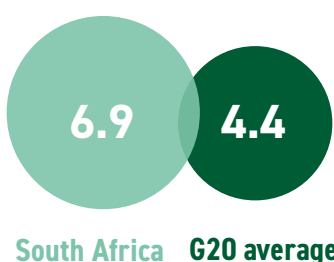


The level of energy use per capita is closely related to economic development, climatic conditions and the price of energy. Energy use per capita in South Africa is, at 87.6 GJ/capita in 2020, below the G20 average, and has been decreasing much faster at 11.3% between 2015 and 2020, in contrast to the slowly decreasing G20 average of 0.12% over the same period.

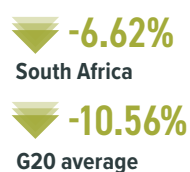
Enerdata, 2021; United Nations, 2019

Energy intensity of the economy

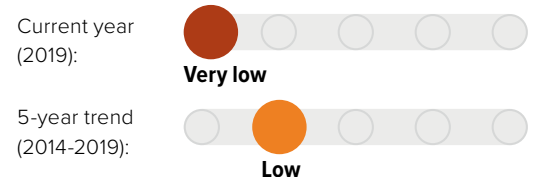
(TJ/million US\$2015 GDP) in 2019



Energy intensity of the economy: 5-year trend (2014-2019)



Decarbonisation rating: energy intensity compared to other G20 countries



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. South Africa's energy intensity is higher than the G20 average and has been decreasing at a lower speed of 6.6% (2014-2019) as compared to the G20's average rate of decrease of 10%.

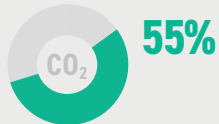
Enerdata, 2021; World Bank, 2021

POWER SECTOR

Emissions from energy used to make electricity and heat



South Africa produced **87% of its electricity from coal in 2020**. Remaining power generation came from nuclear (5%) and renewables (8%), mostly wind, hydro (including pumped hydro) and solar. In September 2020, the government announced plans to procure 6,800 MW of wind and solar and 4,500 MW of coal and gas capacity.



Share of energy-related CO₂ emissions from electricity and heat production in 2020.

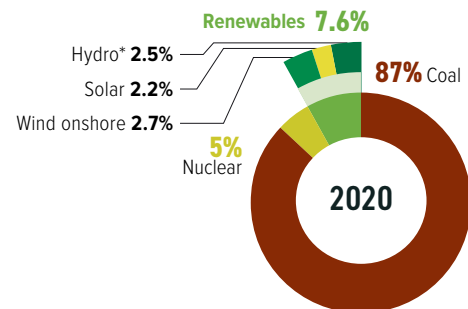
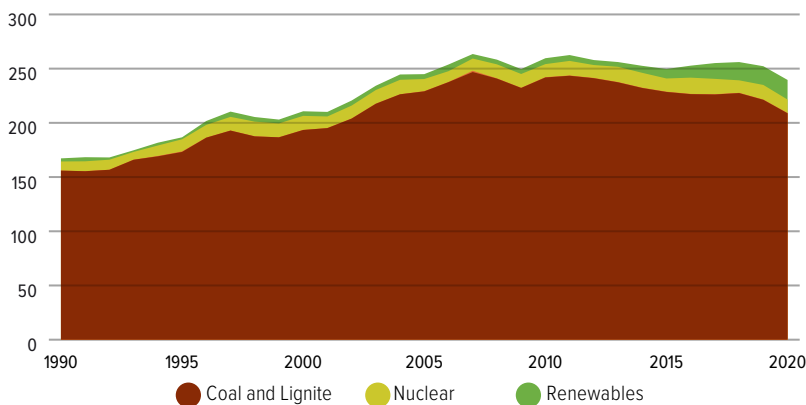


Worldwide, coal use for power generation needs to peak by **2020**, and between 2030 and 2040, all the regions of the world need to phase out coal-fired power generation. By 2040, the share of renewable energy in electricity generation has to be increased to at least 75%, and the share of unabated coal reduced to zero.

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

Electricity generation mix

Gross power generation (TWh)



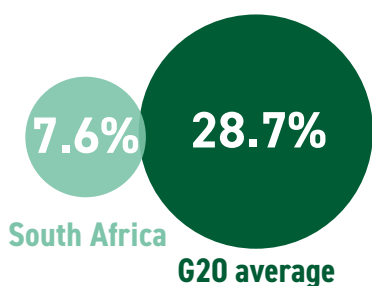
South Africa generated 87% of its electricity from coal in 2020. This is the highest share of coal in power generation of the entire G20. The share of renewable energy in South Africa's power sector has been increasing, accounting for approximately 8% of the power mix in 2020. While this share is very low compared to the G20 average, renewable generation has ramped up significantly in the last five years, albeit from a low baseline.

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

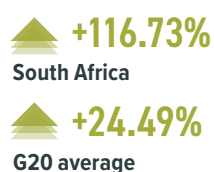
*Note: Pumped hydropower used for storage makes up the majority of hydro reflected in this figure. It is important to note that the majority of pumped hydropower in South Africa is charged by coalfired power plants, usually at night, and during times of low demand.

Share of renewables in power generation

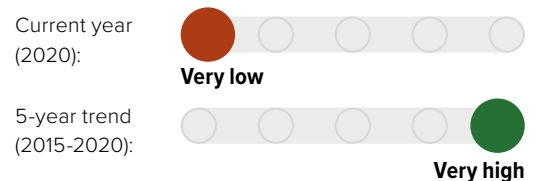
(incl. large hydro) in 2020



Share of renewables in power generation:
5-year trend (2015-2020)



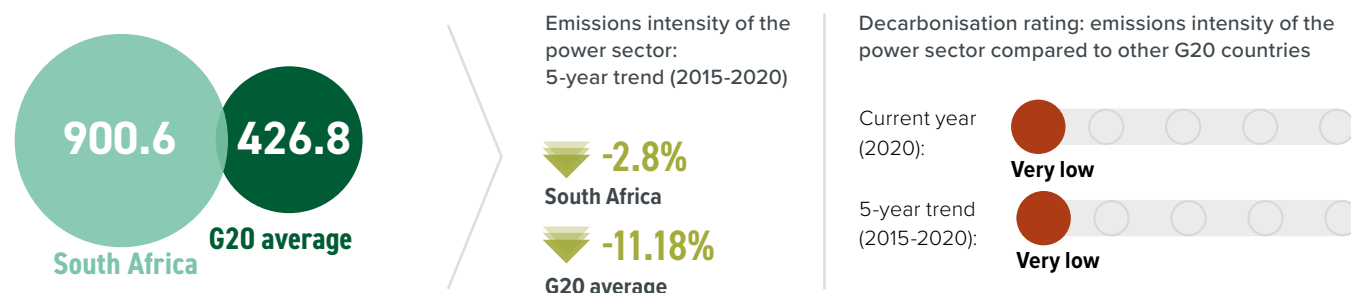
Decarbonisation rating: share of renewables compared to other G20 countries



Enerdata, 2021

Emissions intensity of the power sector

(gCO₂/kWh) in 2020



For each kilowatt hour of electricity, 900.6 g of CO₂ are emitted in South Africa. Emissions intensity has been decreasing slightly with the addition of new renewable generation over the last five years, but remains significantly higher than any other G20 country.

Enerdata, 2021

POLICY ASSESSMENT

Renewable energy in the power sector



South Africa's IRP2019 proposes an expansion of renewable energy capacity from a current total of about 6,600 MW (excluding large hydro) to a total of 26,700 MW (plus a projected 6,000 MW in distributed PV) in 2030. No 2050 renewables target has been adopted so far. In March 2021, the next round of renewable energy procurement under the REIPPPP was announced for 1,600 MW of onshore wind and 1,000 MW of solar PV capacity. The license threshold for embedded generation projects was also increased from 1 MW to 100 MW, which is expected to attract more investment for wind and solar projects.

Department of Energy, 2019; Department of Mineral Resources and Energy, 2021; Bellini, 2021

Coal phase-out in the power sector



South Africa's IRP2019 outlines the decommissioning of 12 GW of older coal plants by 2030; however, the plan also includes 1.5 GW of new coal capacity by 2030. This is in addition to another nearly 6 GW of already-committed coal capacity, and another 3.5 GW of off-grid coal capacity.

The majority of South Africa's current coal fleet would then be retired in the 2030s and 2040s, with several plants remaining operational in 2050.

Department of Energy, 2019; Yaowen, 2021

CORONAVIRUS RESPONSE AND RECOVERY

South Africa's COVID-19 response, the ERRP, includes provisions for "green economy interventions", such as energy efficiency retrofitting of existing buildings. At the same time, however, the ERRP includes targets to expand mining and natural gas infrastructure.

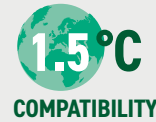
Ramaphosa, 2020; Vivid Economics and Finance for Biodiversity Initiative, 2021

TRANSPORT SECTOR

Emissions from energy used to transport goods and people



Emissions from transport are still on the rise. In 2020 78% of passenger transport was by road, and EVs made up only 0.06% of car sales. 85% of freight was transported by road in 2014. Both sectors are still dominated by fossil fuels. In order to stay within a 1.5°C limit, passenger and freight transport need to be decarbonised.



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



0.76%

Indirect emissions

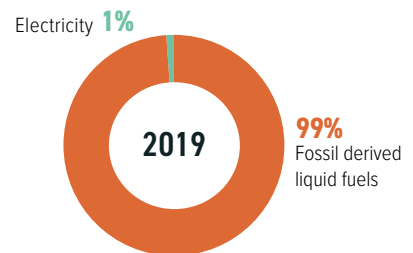
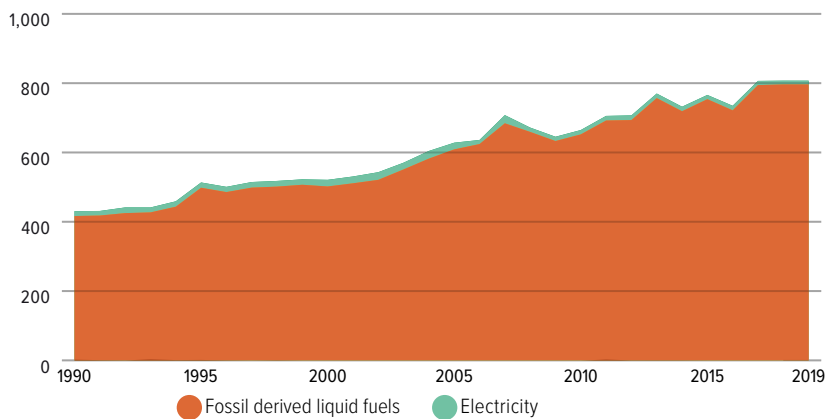
12.02%

Direct emissions

Share of transport in energy-related CO₂ emissions

Transport energy mix

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

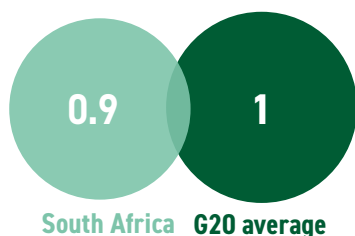


Electricity and biofuels make up only 1.35% of the energy mix in transport and, in 2020, South Africa adopted a new regulatory framework for biofuels. Coal and gas are also sources of liquid fuels for transport.

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



Transport emissions:
5-year trend (2015-2020)

-11.4%

South Africa

-4.3%

G20 average

Decarbonisation rating: transport emissions
compared to other G20 countries

Current year
(2020):



High

5-year trend
(2015-2020):



High

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

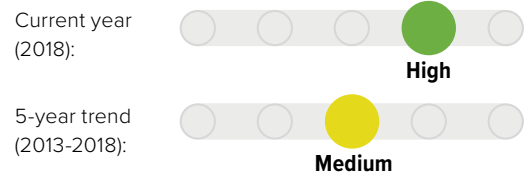
Enerdata, 2021; United Nations, 2020

Aviation emissions per capita⁶

(tCO₂/capita) in 2018



Decarbonisation rating: aviation emissions compared to other G20 countries



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

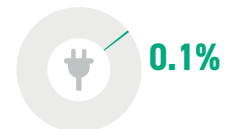
Motorisation rate



Enerdata, 2021

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

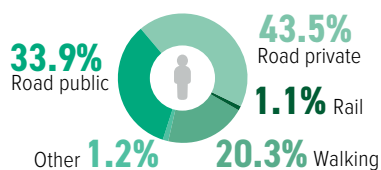
The share of EVs in new car sales in 2020 was 0.1%.



IEA, 2021

Modal split passenger transport

(% of passenger-trips): road, rail and air for work related travel in 2020*



Statistics South Africa, 2020

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

Freight transport

(modal split in % of tonne-km) in 2014*



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

Havenga, J. H. et al., 2016

POLICY ASSESSMENT

Phase out fossil fuel cars



South Africa has no plan to phase out fossil fuel vehicles, and no energy or emissions standards for vehicles, apart from an emissions-related tax on vehicle purchases and a carbon tax. The 2018 Green Transport Strategy proposed a range of measures to promote shifting to low-emission vehicles and introduce vehicle emissions standards; however, at time of writing (August 2021) these strategies have had little to no implementation. In 2021, the government published a policy discussion paper on options to expand the new energy vehicle market in South Africa.

Ahjum et al., 2021; Department of Trade, Industry and Competition, 2021; Department of Transport, 2018.

Phase out fossil fuel heavy-duty vehicles



South Africa has not adopted a target to phase out emissions from freight transport, nor are there energy or carbon emissions standards for heavy-duty vehicles. However, it has passed the Biofuels Regulatory Framework, which aims to increase the penetration of biofuels in the national fuel pool. The Framework, however, has been criticised for not providing adequate protections for food security and biodiversity, among other shortcomings.

Department of Mineral Resources and Energy, 2019; WWF, 2020

Modal shift in (ground) transport



South Africa's Green Transport Strategy (2018-2050) sets a target of a 5% reduction of transport emissions by 2050, shifting 30% of freight transport from road to rail, and 20% of passenger transport from private cars to public transport and eco-mobility transport within seven years of implementation. Support schemes have been proposed to promote public transport usage, but none are in place at present. There are also no detailed programmes for implementing the strategy. The 2020 ERRP includes some measures for passenger rail as well as for roads and mentions a "road to rail" strategy for freight.

Department of Transport, 2018; Ramaphosa, 2020

BUILDING SECTOR

Emissions from energy used to build, heat and cool buildings



Direct emissions and indirect emissions from the building sector in South Africa account for 4.57% and 21.68% of total energy-related CO₂ emissions, respectively. Per capita emissions from the building sector are slightly higher than the G20 average. **South Africa's policies are not sufficient for a 1.5°C pathway.**



4.57%
Direct emissions
21.68%
Indirect emissions

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.)



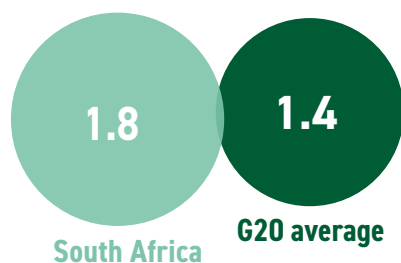
**1.5°C
COMPATIBILITY**

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 through increased efficiency, reduced energy demand, and electrification in conjunction with complete decarbonisation of the power sector.

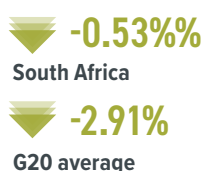
Rogelj et al., 2018; Climate Action Tracker, 2020b

Building emissions per capita

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



Building emissions:
5-year trend (2015-2020)



Decarbonisation rating: building emissions compared to other G20 countries

Current year (2020):



5-year trend (2015-2020):



Building-related emissions per capita are slightly higher than the G20 average as of 2020. This reflects the high fossil fuel share of the electricity mix. South Africa has managed to decrease the level by 0.5% (2015-2020), which is slower than the average G20 rate of decrease of just under 3%.

Enerdata, 2021; United Nations, 2020

POLICY ASSESSMENT

Near zero energy new buildings



South Africa's National Development Plan sets a goal for zero emissions buildings by 2030. The draft National Energy Efficiency Strategy foresees a 54% improvement in average energy performance of new commercial buildings by 2030, compared to the 2015 baseline. There are ambitious mandatory energy building codes for new residential and non-residential buildings. However, to be successfully implemented, these also require government to put enforcement measures in place to ensure compliance.

Department of Energy, 2016; National Planning Commission, 2012

Renovation of existing buildings



There are no mandatory building retrofit policies but, in 2020, the government adopted regulations requiring the submission and display of energy performance certificates in buildings of particular classes. Certificates would need to be renewed every five years. The draft National Energy Efficiency Strategy foresees a 20% improvement in energy performance of the residential building stock.

Department of Energy, 2016; Department of Mineral Resources and Energy, 2020

INDUSTRY SECTOR

Emissions from energy use in industry



Direct emissions and indirect emissions from industry in South Africa make up 11.7% and 26.3% energy-related CO₂ emissions, respectively. South Africa lacks the enforcement of policies to increase the energy efficiency of the industry sector and has no effective policies to reduce emissions or decarbonise the sector.



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

Rogelj et al., 2018



26.28%

Direct emissions

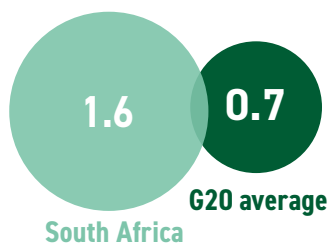
11.72%

Indirect emissions

Share of industry in energy-related CO₂ emissions.

Industry emissions intensity⁷

(tCO₂e/USD2015 GVA) in 2017



Industry emissions intensity:
5-year trend (2012-2017)

-13.06%

South Africa

-16.45%

G20 average

Decarbonisation rating: industry emissions intensity compared to other G20 countries

Current year
(2017):



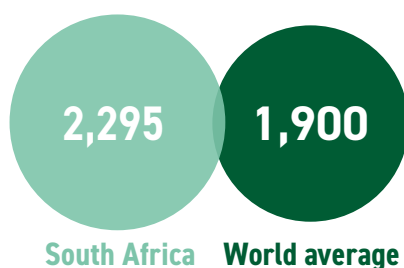
5-year trend
(2012-2017):



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; Climate Action Tracker, 2020c

POLICY ASSESSMENT

Energy efficiency



The draft Energy Efficiency Strategy envisages reducing the energy consumption of manufacturing by 16% by 2030 below 2015 levels. The Industrial Energy Efficiency Programme (2011-2021) promotes adoption of energy management measures and has achieved energy savings of 6.5 TWh since 2011. The 12L tax incentive promulgated in 2013 provides an allowance for businesses to implement energy-efficiency savings. The incentive was increased from a tax deduction of 45c/KWh saved on energy consumption to 95c/KWh.

Department of Energy, 2016; IEE Project, 2020; SANEDI. [n.d.]

LAND USE SECTOR

Emissions from changes in the use of the land



South Africa's land sector is currently a net carbon sink, despite decreasing forest cover, partly due to the growing importance of the timber industry. To stay within the 1.5°C limit, South Africa will **need to further enhance its current land sector sink by increasing afforestation and promoting soil carbon enhancement** on grasslands and on savanna.



Global deforestation needs to be halted and changed to net CO₂ removals by around 2030.

Rogelj et al., 2018

Annual forest expansion, deforestation and net change

Forest area change in 1,000 ha/year

No data available for South Africa

POLICY ASSESSMENT

Target for net zero deforestation



South Africa's land sector is currently a carbon sink. There is significant scope to enhance the sink, which could play an important role in a future net zero emissions target.

AGRICULTURE SECTOR

Emissions from agriculture



South Africa's agricultural emissions are mainly from the digestive processes of livestock (mainly cattle) and livestock manure. **A 1.5°C 'fair-share' compatible pathway requires behavioural and dietary shifts and less fertiliser use.**

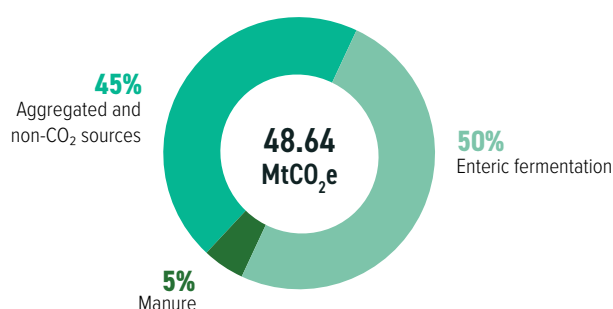


Methane emissions (mainly enteric fermentation) need to decline by 10% by 2030 and by 35% by 2050 (from 2010 levels). Nitrous oxide emissions (N₂O) (mainly from fertilisers and manure) need to be reduced by 10% by 2030 and by 20% by 2050 (from 2010 levels).

Rogelj et al., 2018

Emissions from agriculture (excluding energy)

Emissions from the agriculture sector in 2017



In South Africa, the largest sources of GHG emissions in the agriculture sector are enteric fermentation (49%), and aggregated and non-CO₂ sources (45%) – of which 76% is from direct N₂O from soil management, and only 2% from biomass burning. When including land use and Harvested Wood Products, South Africa's net emissions in this sector are 17,998 GgCO₂e.

Dietary changes and more efficient soil management could help reduce emissions from this sector.

DFFE, 2021b

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

MITIGATION: TARGETS AND AMBITION

WARMING OF

2.4°C

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

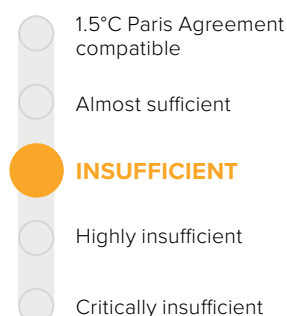
The Updated NDC, submitted to the UNFCCC on 27 September 2021, includes a 2030 GHG emission target range of 350-420 MtCO₂e, incl. LULUCF (as submitted) or 366-436 MtCO₂e, excl. LULUCF.

ACTIONS

Implementing the 2019 Integrated Resource Plan, Green Transport Strategy, enhanced energy efficiency programmes, and carbon tax.

Climate Action Tracker (CAT) evaluation of targets and actions

SOUTH AFRICA'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 "Insufficient" rating indicates that South Africa's climate policies and commitments need substantial improvements to be consistent with the Paris Agreement's 1.5°C temperature limit.

South Africa's 2030 emissions reduction target is rated as "Insufficient" when compared to modelled domestic pathways, and "Highly insufficient" when compared with its 'fair-share' contribution to climate action. South Africa's targets and policies are not stringent enough to limit warming to 1.5°C. If fully implemented, South Africa's current policies would result in emissions reductions only in line with 3°C warming. 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

This assessment includes the CAT's policy analysis from 22 September 2020 translated into our new rating methodology, but without new analysis of South Africa's climate policies since then. The assessment does, however, consider the Presidential Climate Commission's recommended targets, published in June 2021.

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

South Africa's NDC was submitted to the UNFCCC on 11 January 2016, and the draft NDC Update circulated publicly from March 2021. Comparing the draft NDC update text with the first NDC, there is still room for improvement to increase comparability, transparency, and understanding in South Africa's successive NDCs or updates, including:

- Information on how the land sector and removals will be accounted for.
- Provide relevant details on domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples in a gender-responsive manner.

For more visit www.climate-transparency.org/ndc-transparency-check

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	Submitted to UNFCCC in 2020
Interim steps	No
Sectoral targets	The proposed legislation (the Climate Change Bill) establishes a process to set "Sectoral Emissions Targets"
Net zero target	Yes
Net zero year	Net zero emissions 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, South Africa spent USD 4.324bn on fossil fuel subsidies. This had been decreasing since 2012 before picking back up again in 2017 and increasing dramatically in 2019. South Africa introduced a carbon tax in 2019 covering 80% of domestic emissions.



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

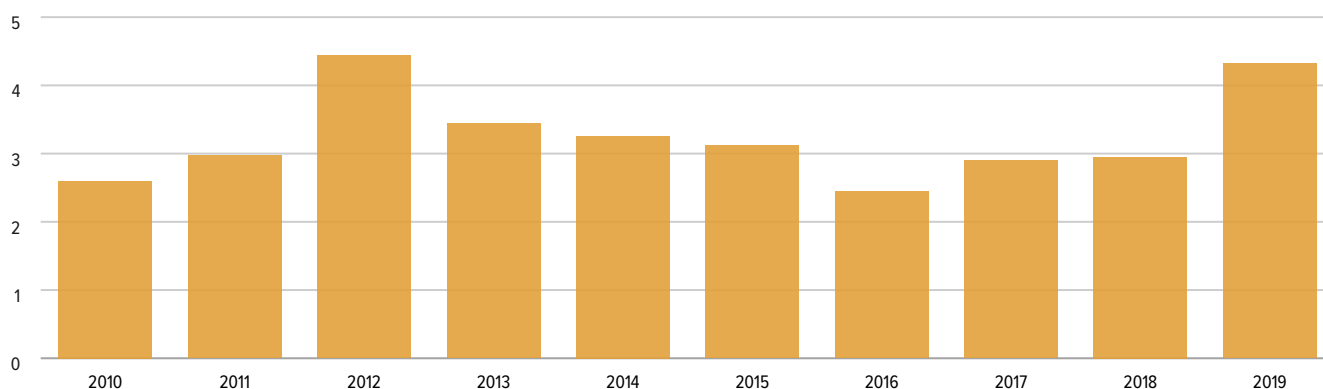
Rogelj et al., 2018

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)



OECD-IEA Fossil Fuel Support database, 2020

Fossil fuel subsidies by fuel type

USD in 2019

Over the past decade (2010-2019), South Africa's fossil fuel subsidies have fluctuated considerably, reaching a value of USD 4.3bn in 2019. Over this period, most of the subsidies were directed to support the production and consumption of petroleum and coal.

Comparable data is not available yet for 2020. However, according to the Energy Policy Tracker data, during 2020 South Africa pledged at least USD 637m to fossil fuel energy as part of its energy-related funding commitments and COVID-19 economic response. This amount corresponds to the bailout of the national carrier South African Airways; the bailout had no green strings attached.

Energy Policy Tracker, 2021; OECD-IEA Fossil Fuel Support database, 2021

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



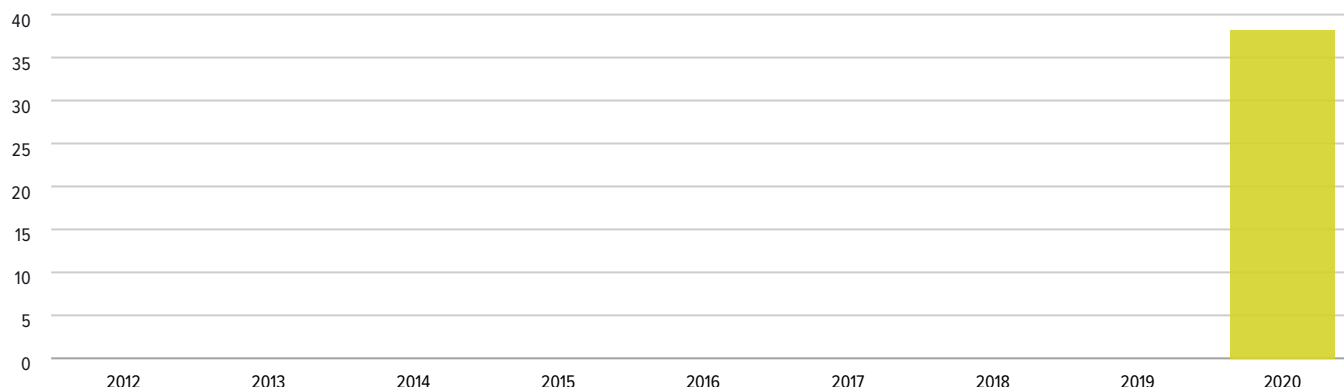
CORONAVIRUS RESPONSE AND RECOVERY

South Africa's 2020 Medium Term Budget included a ZAR 10.5bn (USD 641m) bailout for South African Airways, unconditional on any climate measures, as well as another USD 300m to an unspecified energy producer. In April 2020, COVID-19 stimulus included a three-month deferral for filing and first payment of the carbon tax.

Republic of South Africa, 2020a; South African Revenue Service, 2021; Vivid Economics and Finance for Biodiversity Initiative, 2021

Carbon pricing and revenue

(USD millions)



In June 2019, South Africa became the first African country to launch a carbon tax. The scheme covers the sources of approximately 80% of domestic emissions, including all types of fossil fuels across industry, power, buildings and transport sectors. Emissions are charged at around USD 9/tCO₂e, but allowances and exemptions reduce the effective tax rate by between 60% and 95%. The carbon tax rate will increase until 2022 by the amount of consumer price inflation plus two percent annually; after 2022, only inflationary adjustments are envisioned. The tax generated USD 38m in revenue in 2020.

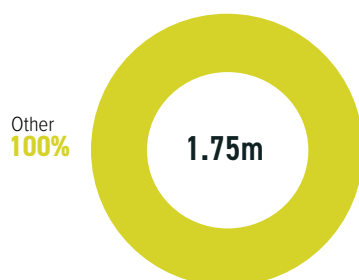
IACE, 2021; OECD, 2020

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, there was limited evidence of the public finance provided for fossil fuels in South Africa (of around USD 1.75m for fossil fuel transmission). However, for the period of 2016-2018, an average of USD 151m per year in public finance was provided for the coal sector. The country has no recorded public finance for oil and gas for the period 2016-2018.

Oil Change International, 2020

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

Provision of international public support

South Africa is not listed in Annex II of the UNFCCC and it is, therefore, not formally obliged to provide climate finance. Despite this, it continues to provide international public finance via the Global Environment Facility (GEF) Trust Fund. While South Africa 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.



South Africa has recently started taking steps to green its financial system. The National Treasury published the technical paper Financing a Sustainable Economy in May 2020. One of the key recommendations of the paper was to develop a national green

finance taxonomy for South Africa in June 2021, and the National Treasury has released the Draft National Green Finance Taxonomy for public consultation. The Taxonomy Working group falls under South

Africa's Sustainable Finance Initiative, launched in January 2017 by financial sector regulatory agencies and industry associations.

In June 2020, the Johannesburg Stock Exchange launched the Sustainability Segment with the aim of providing a platform for companies to raise debt for green, social and sustainable initiatives. The segment makes it accessible and easier for companies to list and trade sustainability-related instruments to raise funds for activities directed at sustainable development. The bond proceeds will be directed towards sustainable development activities.

JSE, 2020; National Treasury, 2020; SA Sustainable Finance initiative, 2021

Nationally Determined Contribution (NDC): Finance

Conditionality	Not specified
Investment needs	Mitigation investment needs will primarily be in the electricity sector, requiring USD 60-64bn over the next decade, as specified in IRP 2019 Achieve "a floor of USD 8 billion per year by 2030", to be equally distributed between adaptation and mitigation
Actions	Not mentioned
International market mechanisms	No contribution from international credits for the achievement of the target, but may sell credits elsewhere





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.climate-transparency.org/g20-climate-performance/g20report2021

1 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 energy-related 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

BIBLIOGRAPHY

Ahjum, F., F. Hartley and B. Merven. (2021). *The Green Transport Strategy of South Africa: GHG Mitigation Potential of Road Transport Interventions and Their Economy-Wide Impact*. <https://climatecompatiblegrowth.com/wp-content/uploads/2021/07/4B-COP26-Policy-Brief.pdf>

Andrijevic, M. et al. (2020). “Governance in Socioeconomic Pathways and Its Role for Future Adaptive Capacity”, *Nature Sustainability*. <https://doi.org/10.1038/s41893-019-0405-0>

Arnell, N. W. et al. (2019). “Global and Regional Impacts of Climate Change at Different Levels of Global Temperature Increase”, *Climatic Change*. <https://doi.org/10.1007/s10584-019-02464-z>

Bellini, E. (2021). *Sixty-Three PV Projects to Compete in South Africa’s 2.6 GW Renewables Tender*. <https://www.pv-magazine.com/2021/08/23/sixty-three-pv-projects-to-compete-in-south-africas-2-6-gw-renewables-tender>

Bhorat, H., and Köhler, T. (2020). Lockdown Economics in South Africa: Social Assistance and the Ramaphosa Stimulus Package. <https://www.brookings.edu/blog/africa-in-focus/2020/11/20/lockdown-economics-in-south-africa-social-assistance-and-the-ramaphosa-stimulus-package/>

Business Tech. (2021). WHO Sends COVID-19 warning to South Africa after Riots. <https://businesstech.co.za>

Climate Action Tracker (CAT). (2020a). *Climate Action Tracker Country Assessments*. Climate Analytics, NewClimate Institute. <https://climateactiontracker.org/countries/>

— — — (2020b). *Paris Agreement Compatible Sectoral Benchmarks Study*. https://climateactiontracker.org/documents/753/CAT_2020-07-10_ParisAgreementBenchmarks_FullReport.pdf

— — — (2020c). *CAT Decarbonisation Data Portal*. <https://climateactiontracker.org/data-portal/>

Climate Action Tracker. (2020d). *Climate Governance: Assessment of the Government’s Ability and Readiness to Transform South Africa into a Zero Emissions Society*. https://climateactiontracker.org/documents/837/2020_12_CAT_Governance_Report_South_Africa.pdf

— — — (2021). *CAT Climate Target Update Tracker*. <https://climateactiontracker.org/climate-target-update-tracker/>

— — — (2021a). *Climate Summit Momentum: Paris Commitments Improved Warming Estimate to 2.4°C*. https://climateactiontracker.org/documents/853/CAT_2021-05-04_Briefing_Global-Update_Climate-Summit-Momentum.pdf

Climate Analytics (2021). *1.5°C National Pathways Explorer*. <http://1p5ndc-pathways.climateanalytics.org/>

Cullis, J. D. S. et al. (2019). “Urbanisation, Climate Change and its Impact on Water Quality and Economic Risks in a Water Scarce and Rapidly Urbanising Catchment: Case Study of the Berg River Catchment”, *H₂O Open*. <https://doi.org/10.2166/H2OJ.2019.027>

Department of Energy. (2016). *Draft Post-2015 National Energy Efficiency Strategy for Public Comment*. https://www.gov.za/sites/default/files/gcis_document/201612/40515gen948.pdf

Department of Energy. (2019). *Integrated Resource Plan (IRP2019)*. https://www.gov.za/sites/default/files/gcis_document/201910/42778gon1359.pdf

Department of Environmental Affairs. (2019). *South Africa’s 3rd Biennial Update Report to the United Nations Framework Convention on Climate Change*. [https://unfccc.int/sites/default/files/resource/Final 3rd BUR of South Africa 100.pdf](https://unfccc.int/sites/default/files/resource/Final%203rd%20BUR%20of%20South%20Africa%20100.pdf)

Department of Forestry, Fisheries and the Environment (DFFE). (2021a). *Proposed updated Nationally Determined Contribution*. <https://www.environment.gov.za/sites/default/files/reports>

— — — (2021b). *National GHG Inventory Report South Africa, 2017*. <https://www.environment.gov.za/sites/default/files/docs/nir-2017-report.pdf>

Department of Mineral Resources and Energy. (2019). *South African Biofuels Regulatory Framework*. <https://www.gov.za>

— (2020). *Request for Information: Nuclear New Build Power Programme*. <http://www.energy.gov.za>

Department of Mineral Resources and Energy. (2021). *Key Messages from the Renewable Energy Independent Power Producer Procurement Programme Bid Window 5 (REIPPPP Bid Window 5) Bidders' Conference, held on 26 May 2021*. <https://www.dmr.gov.za>

Department of Trade, Industry and Competition. (2021). *First Input Towards the Development of the Auto Green Paper on the Advancement of New Energy Vehicles in South Africa*. http://www.thedtic.gov.za/wp-content/uploads/EV_Green_Paper.pdf

Department of Transport. (2018). *Green Transport Strategy for South Africa (2018-2050)*. https://www.transport.gov.za/documents/11623/89294/Green_Transport_Strategy_2018_2050_onlineversion.pdf

Energy Policy Tracker. (2021). *G20 Countries*. <https://www.energypolicytracker.org>

Enerdata. (2021). *Global Energy and CO₂ Data*. <https://www.enerdata.net/research/energy-market-data-co2-emissions-database.html>

Futshane, V. (2021). *COVID-19 in South Africa: The Intersections of Race and Inequality*. Oxfam International. https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2021/05/Futshane_paper.pdf

Gannon, K. E., Curran, P., and Conway, D. (2018). *As Southern Africa Faces New Urban Drought Challenges, Who is Heading the Wake-up Call?* Grantham Research Institute on Climate Change and the Environment. <https://www.lse.ac.uk>

Germanwatch. (2019). *Global Climate Risk Index 2020. Who Suffers Most from Extreme Weather Events?* <http://www.germanwatch.org>

Gütschow, J. et al. (2021). *The PRIMAP-hist National Historical Emissions Time Series (1850-2018)*, V.2.2. Zenodo open access repository. <https://doi.org/10.5281/zenodo.4479172>

Havenga, J. H. et al. 2016. "A Logistics Barometer for South Africa: Towards Sustainable Freight Mobility", *Transport and Supply Chain Management*, <http://hdl.handle.net/10019.1/100649>

IEE Project. (2020). *SA Industrial Energy Efficiency Project: Fact Sheet, October 2020*. <https://www.unido.org/sites/default/files/2020-10/IEE%20fact%20sheet%20.pdf>

IMF. (2021). *Policy Response to Covid-19*. <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>

Institute for Climate Economics (IACE). (2021). *Global Carbon Accounts 2021*. <https://www.iace.org/download/global-carbon-account-in-2021/>

Institute for Economic Justice (IEJ). (2021). *Vulnerabilities and Policy Priorities for South Africa's COVID-19 Third Wave*. <https://www.iej.org.za/vulnerabilities-and-policy-priorities-for-south-africas-covid-19-third-wave/>

Institute for Health Metrics and Evaluation (IHME). (2020). *Global Burden of Disease Study 2020*. <http://ghdx.healthdata.org/gbd-results-tool>

International Energy Agency (IEA). (2021). *Global Electric Vehicle Outlook 2021*. <https://www.iea.org/reports/global-ev-outlook-2021>

Johannesburg Stock Exchange. (2020). *JSE Announces New Sustainability Segment*. <https://www.jse.co.za/>

Minerals Council South Africa. (2021). *Facts and Figures 2020*. <https://www.mineralscouncil.org.za>

National Planning Commission. (2012). *National Development Plan*. <https://www.gov.za>

National Treasury. (2020). *Financing a Sustainable Economy. Technical Paper (Draft)*. <http://www.treasury.gov.za/publications>

Notre Dame Global Adaptation Initiative (ND-GAIN). (2021). *ND-GAIN Country Index*. University of Notre Dame. <https://gain.nd.edu/our-work/country-index/>

Organisation for Economic Co-operation and Development (OECD). (2020). *Effective Carbon Rates 2020: Pricing Carbon Emissions Through Taxes and Emissions Trading*. <https://doi.org/10.1787/9789264305304-en> and country profile supplement; <https://www.oecd.org/tax/tax-policy/effective-carbon-rates-all.pdf>

OECD-IEA. (2020). *OECD Analysis of Budgetary Support and Tax Expenditures. Fossil Fuel Support Database*. <http://www.oecd.org/fossil-fuels/data/>

Oil Change International. (2020). *Shift the Subsidies Database*. <http://priceofoil.org/shift-the-subsidies>

Presidential Climate Commission. (2021). *Recommendations on South Africa's draft updated Nationally Determined Contribution (NDC)*. <https://a9322a19-efe3-4459-9a6c-ab806fededa3.filesusr.com>

Ramaphosa, C. (2020). *South Africa's Economic Reconstruction and Recovery Plan*. South African Government. <https://www.gov.za/speeches>

Republic of South Africa. (2020a). *Minister Tito Mboweni: 2020 Medium-Term Budget Policy Statement*. <https://www.gov.za/speeches>

---. (2020b). *The South African Economic Reconstruction and Recovery Plan*. https://www.gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf

---. (2021). *Proposed Updated Nationally Determined Contribution: South Africa's First Nationally Determined Contribution under the Paris Agreement*. https://www.environment.gov.za/sites/default/files/reports/draftnationallydeterminedcontributions_2021updated.pdf

Rogelj, J. et al. (2018). "Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development", in Masson-Delmotte, V. et al. (eds) *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C*. IPCC. <https://www.ipcc.ch/>

SANEDI. (n.d.). *12L Tax Incentives*. <https://www.sanedi.org.za/12L.html>

South African Revenue Service. (2021). *Carbon Tax*. <https://www.sars.gov.za/customs-and-excite/excite/environmental-levy-products/carbon-tax/>

South Africa Sustainable Finance Initiative. (2021). *The Call for Stakeholder Inputs on a Draft National Green Finance Taxonomy*. <https://sustainablefinanceinitiative.org.za/taxonomy/>

Statistics South Africa. (2020). *National Household Travel Survey (NHTS) 2020* <http://www.statssa.gov.za/publications/P0320/P03202020.pdf>

Statistics South Africa. (2021). *Work and Labour Force*. http://www.statssa.gov.za/?page_id=737&id=1

Trade and Industrial Policy Strategies (TIPS). (2021). *Just Transition in South Africa: The Case for a Gender Just Approach*. <https://www.tips.org.za>

United Nations. (2018). *World Urbanisation Prospects*. UN Department of Economic and Social Affairs, Population Division. <https://population.un.org/wup>

---. (2019). *World Population Prospects, 2019 Highlights*. UN Department of Economic and Social Affairs, Population Division. <https://population.un.org/wpp>

United Nations Development Programme (UNDP). (2020). *Human Development Index Database*. <http://hdr.undp.org/en/data#>

Vivid Economics and Finance for Biodiversity Initiative. (2021). *Greenness of Stimulus Index: An assessment of COVID-19 Stimulus by G20 Countries and Other Major Economies in Relation to Climate Action and Biodiversity Goals*.

World Bank. (2016). *Urbanisation, Climate Change Threaten eThekweni Municipality's Long-Term Sustainability*. <https://www.worldbank.org/en/country/southafrica/publication>

---. (2019). *Population, total*. Washington, DC: USA. <https://data.worldbank.org/indicator/SP.POP.TOTL>

---. (2020). *GDP, PPP (current international \$)*. Washington, DC: USA. <https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD>

World Wildlife Fund (WWF). (2020). *New Biofuels Regulatory Framework Falls Short*. https://www.wwf.org.za/our_news

World Steel Association. (2018). *Steel's Contribution to a Low-Carbon Future and Climate-Resilient Societies*. <https://www.worldsteel.org>



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