Climate Transparency

**BROWN TO GREEN:** **2019**

**THE G20 TRANSITION TOWARDS A NET-ZERO EMISSIONS ECONOMY**

# SOUTH AFRICA

## South Africa's greenhouse gas (GHG) emissions are – per capita – above the G20 average.

Total GHG emissions (excl. land use) have increased by 39% since 1990, but emissions in recent years have been almost constant owing largely to low economic growth and declining electricity intensity.

**Greenhouse gas (GHG) emissions (incl. land use) per capita[1]**
($tCO_2e$/capita)

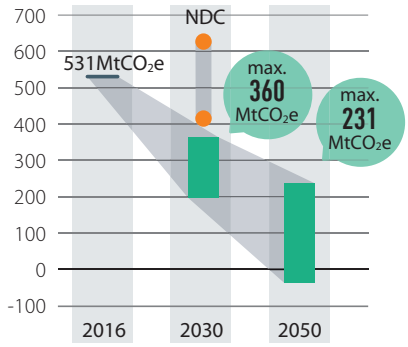

*Data for 2016*
*Source: CAT 2019; PRIMAP 2018; World Bank 2019*

**Trend** (2011-2016) -11% -1%

## South Africa is not on track for a 1.5°C world

South Africa needs to reduce its emissions to below 360 $MtCO_2e$ by 2030 and to below 231 $MtCO_2e$ by 2050 to be within its fair-share range compatible with global 1.5°C IPCC scenarios. South Africa's NDC would only limit its emissions to between 415 and 631 $MtCO_2e$ in 2025 and 2030 (adjusted to exclude land use). All figures are drawn from the Climate Action Tracker and exclude land use.

**1.5°C compatible pathway[2]**
($MtCO_2e$/year)




*Source: CAT 2019*

## Recent developments[3]

In June 2019, South Africa introduced a carbon tax. The effective tax rate is still low (US$0.4 to US$3.2/$tCO_2$) but will be reviewed for the second phase.

No new renewable energy capacity has been procured since 2015, despite the country facing acute power shortages at the moment.

The 2019 Integrated Resource Plan for the country's electricity sector includes 1500 MW of new coal plants, to come online from 2023 onwards, in addition to the current plants being built.

## Key opportunities for enhancing climate ambition[3]

South Africa's reliance for coal is high (70% of the energy mix)and expected to increase with current plans

→ **Halt new coal plants, cancel construction of units 5 and 6 at Kusile, and accelerate decommissioning of plants too costly to retrofit to meet air quality standards.** #1

Emissions from the transport sector account for 13% of the country's total energy-related $CO_2$ emissions, mainly from road transport

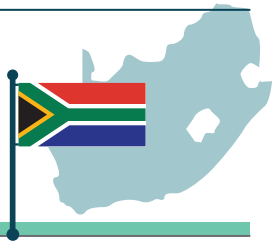
→ **Prioritise construction of mass electrified public transit in urban centres by 2030.** #2

Buildings account for 22% of South Africa's energy-related $CO_2$ emissions (direct and indirect)

→ **Establish better mandatory building codes for new residential, and commercial buildings and shift to more efficient appliances.** #3

This country profile is part of the **Brown to Green 2019** report. The full report and other G20 country profiles can be downloaded at: *http://www.climate-transparency.org/g20-climate-performance/g20report2019*

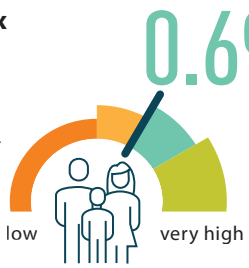
# SOUTH AFRICA – SOCIO-ECONOMIC CONTEXT



### Human Development Index

The Human Development Index reflects life expectancy, level of education, and per capita income. South Africa ranks as one of the lowest among the G20 countries.

*Data for 2017 | Source: UNDP 2018*




### Gross Domestic Product (GDP) per capita

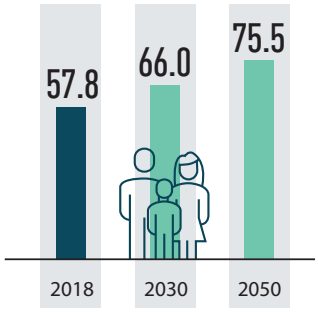
(PPP US$ const. 2018, international)


*Data for 2018 | Source: World Bank 2019*

### Population projections

(millions)

South Africa's population is expected to grow by around a quarter by 2050.



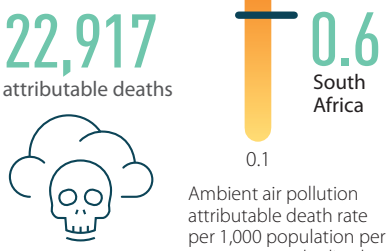

*Source: World Bank 2019*

### Death through ambient air pollution

(total ambient air pollution attributable deaths)

Almost 23,000 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 the total population, this number is in the middle range of the G20 countries.

*Data for 2016*
*Source: World Health Organization 2018*




# JUST TRANSITION[3]

South Africa's energy sector is the most coal-dependent of the G20 countries. South Africa also has high levels of poverty and unemployment, and ensuring a just transition has therefore been explicitly recognised as a priority in national policy and in the country's NDC. The coal mining sector employs over 80,000 workers and is concentrated in regions with higher than average unemployment levels, making the transition more challenging.

A social dialogue process to reach pathways for a just transition has been started by South Africa's National Planning Commission. A series of multi-stakeholder dialogues has resulted in the identification of key priorities, including analysis of the employment vulnerabilities of affected workers, and the identification of pilot 'hotspots' for intervention (such as closing mines and power plants). However, beyond identifying vulnerabilities, explicit transition policies for workers and communities in specific places and times are yet to be developed.

South Africa now needs to develop worker transition pathways, and build local economic resilience in coal-dependent regions. Opportunities in renewable energy, manufacturing and agriculture could pave the way for cleaner air and water, and for improved food security in coal areas, at the same time as addressing structural unemployment in the South African economy.

## Legend for all country profiles

### Trends

The trends show developments over the past five years for which data are available.

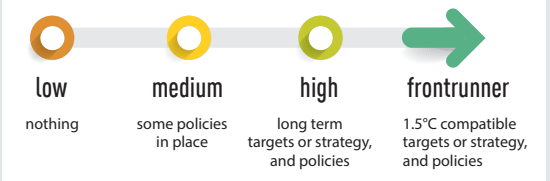
The thumbs indicate assessment from a climate protection perspective.

### Decarbonisation Ratings[4]

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


### Policy Ratings[5]

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




For more information see the Annex and Technical Note

# MITIGATION BIG PICTURE

# SOUTH AFRICA

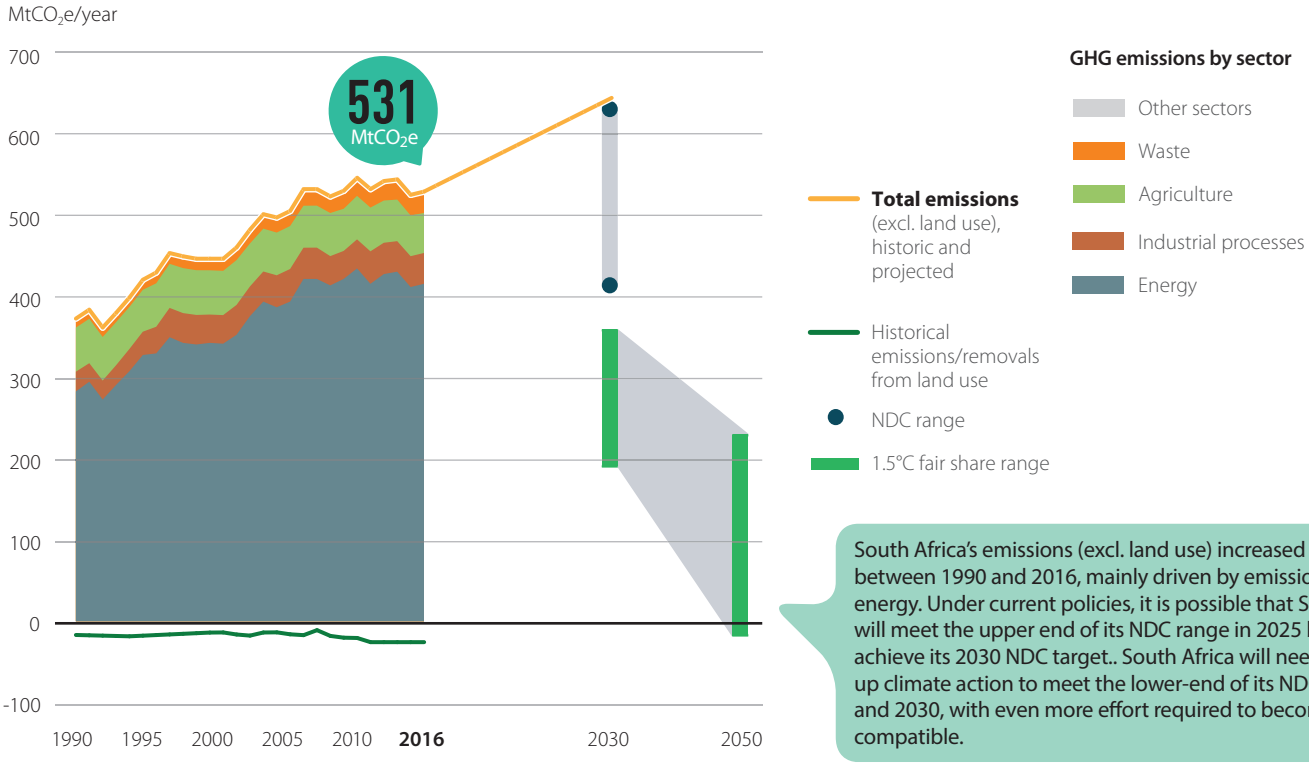
**South Africa's GHG emissions (excl. land use) increased by 41% (1990-2016) and its current 2030 target is not in line with a 1.5°C pathway.**

In 2030, global GHG emissions need to be 45% below 2010 levels and reach net zero by 2070.

1.5°C[6]

*Source: IPCC SR1.5 2018*

## Total GHG emissions across sectors[2]




South Africa's emissions (excl. land use) increased by 41% between 1990 and 2016, mainly driven by emissions from energy. Under current policies, it is possible that South Africa will meet the upper end of its NDC range in 2025 but not achieve its 2030 NDC target.. South Africa will need to scale up climate action to meet the lower-end of its NDC in 2025 and 2030, with even more effort required to become 1.5°C compatible.

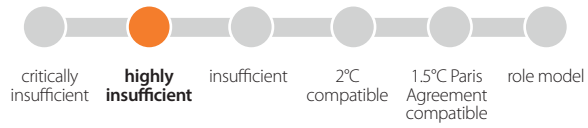
*Source: PRIMAP 2018; CAT 2019*

## Nationally-determined contribution (NDC): Mitigation

| | |
|---|---|
| **Targets** | Emissions by 2025 and 2030 will be in a range between 398 and 614 Mt $CO_2$e (incl. land use), as defined in national policy<br>According to CAT, this equals 415 and 631 Mt$CO_2$e if adjusted to exclude land use. |
| **Actions** | Actions specified for information purposes |

*Source: UNFCCC, NDC of respective country*

## Climate action tracker (CAT) evaluation of NDC[2]




*Source: CAT 2019*

## Long-term strategy (LTS) to be submitted to the UNFCCC by 2020

| | |
|---|---|
| **Status** | In preparation, expected by end 2019. A draft of South Africa's Low-Emission Development Strategy 2050 for submission to the UNFCCC was published in December 2018. A revised draft was circulated for comment in 2019 |
| **2050 target** | Emissions range specified as per policy for 2050 (212-428 Mt $CO_2$e), to be revised in terms of the Climate Change Bill |
| **Interim steps** | Yet to be determined |
| **Sectoral targets** | The proposed legislation (the Climate Change Bill) establishes a process to set 'Sectoral Emissions Targets' |

*Source: UNFCCC, LTS of respective country*

# MITIGATION ENERGY

# SOUTH AFRICA

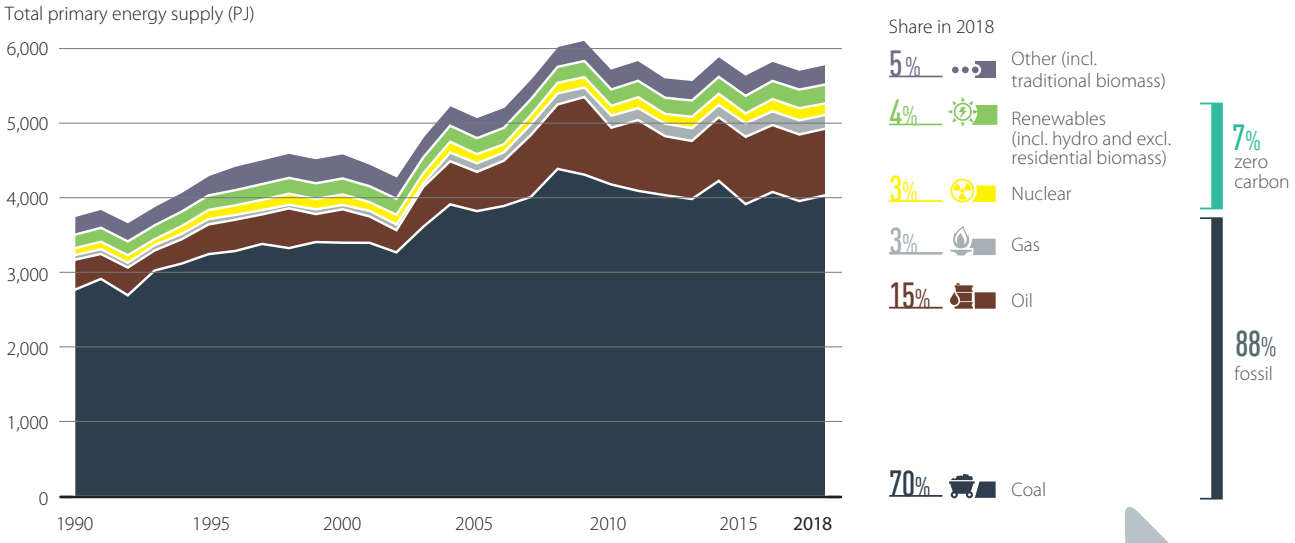
**Fossil fuels still make up around 88% of South Africa's energy mix (including power, heat, transport fuels, etc) – this is among the highest in the G20. Energy supply from renewables has barely increased over the last two decades.**

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.

**1.5°C**[6]

*Source: IPCC SR1.5 2018*

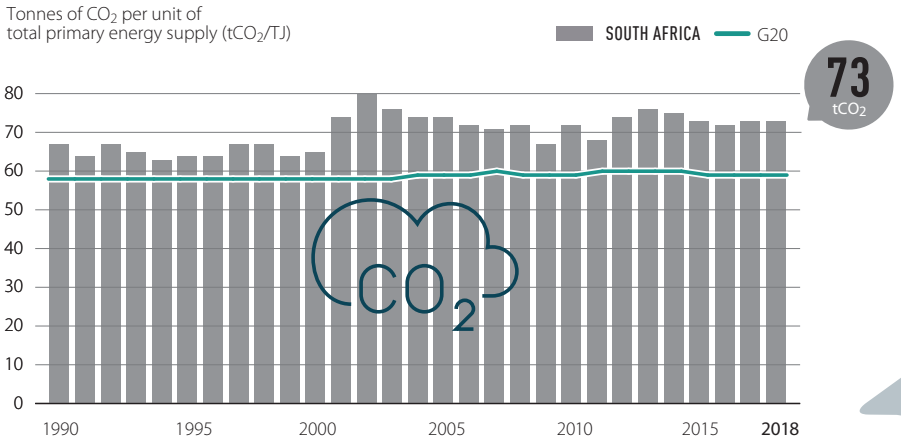
## Energy mix[7]




*Source: Enerdata 2019*

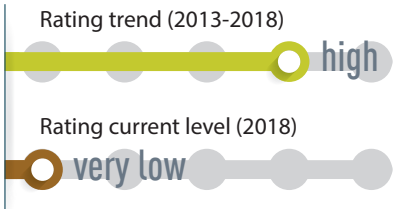
This graph shows the fuel mix for all energy supply, including energy used for electricity generation, heating, cooking, and transport fuels. Fossil fuels (oil, coal and gas) make up 88% of South Africa's energy mix, which is above the G20 average.

## Carbon intensity of the energy sector




*Source: Enerdata 2019*

### Rating of carbon intensity compared to other G20 countries[4]




*Source: own evaluation*

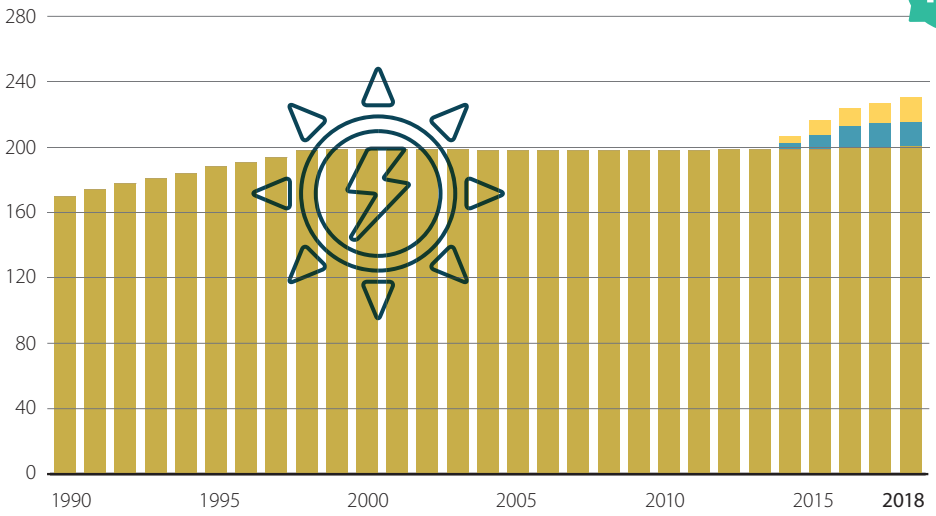
Carbon intensity shows how much $CO_2$ is emitted per unit of energy supply. In South Africa, carbon intensity is, at 73 $tCO_2$, above the G20 average, reflecting the continuing high share of fossil fuels in the energy mix. However, carbon intensity has dropped slightly (-4%, 2013-2018).

# MITIGATION ENERGY

# SOUTH AFRICA

## Solar, wind, geothermal and biomass development[8]

Total primary energy supply (TPES) from solar, wind, geothermal and biomass (PJ)




*Source: Enerdata 2019*

**Share of TPES in 2018**

0.25% Solar

0.25% Wind

0.00% Geothermal

3.46% Biomass, excl. traditional biomass

Solar, wind and modern biomass account for almost 4% of South Africa's energy supply – the G20 average is 6%. Their share in total energy supply has increased by around 14% in the last five years (G20 average: +29%). Bioenergy (for electricity, transport and heat) makes up by far the largest share.

## Rating of share in TPES compared to other G20 countries[4]

Rating trend (2013-2018): medium

Rating current level (2018): low

*Source: own evaluation*

## Energy supply per capita

Total primary energy supply per capita (GJ/capita)

101 South Africa

98 G20 average

The level of energy supply per capita is closely related to economic development, climatic conditions and the price of energy. At 101 GJ/capita, energy supply per capita in South Africa is slightly above the G20 average, but is declining (-5%, 2013-2018) in contrast to the increasing G20 average (+1%).

**Trend** (2013-2018) -5% +1%

*Data for 2018 | Source: Enerdata 2019; World Bank 2019*

## Rating of energy supply per capita compared to other G20 countries[4]

Rating trend (2013-2018): medium

Rating current level (2018): medium

*Source: own evaluation*

# MITIGATION ENERGY

# SOUTH AFRICA

**South Africa's economy is one of the most energy intensive in the G20. $CO_2$ emissions from energy have remained almost stable over the last two decades.**

Global energy and process-related $CO_2$ emissions must be cut by 40% below 2010 levels by 2030 and reach net zero by 2060.

1.5°C[6]

*Source: IPCC SR1.5 2018*

## Energy intensity of the economy

(TJ/PPP US$2015 million)

| South Africa | G20 average |
|---|---|
| 8.31 | 4.86 |

**Trend** (2013-2018): -4% | -12%

*Data for 2018 | Source: Enerdata 2019; World Bank 2019*

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 one of the highest in the G20 and has declined less (-4%, 2013-2018) than the G20 average.

### Rating of energy intensity compared to other G20 countries[4]

Rating trend (2013-2018): medium

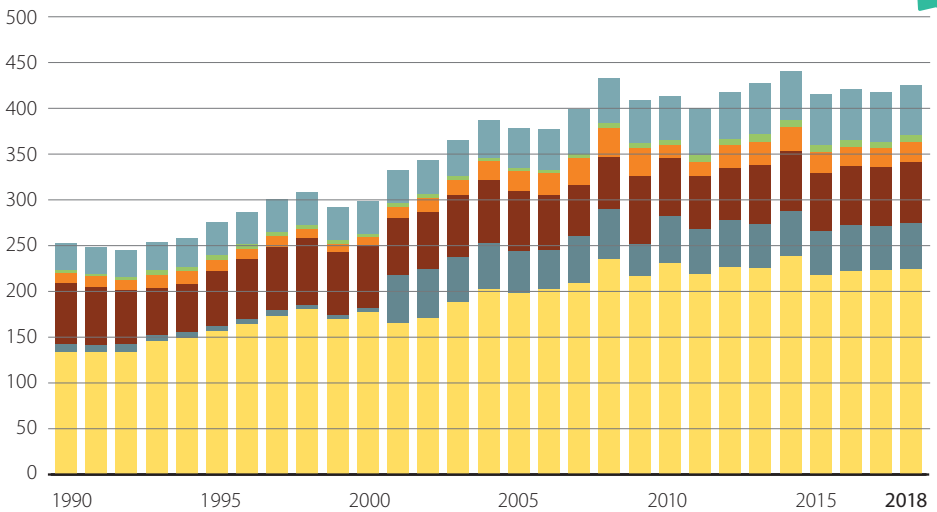
Rating current level (2018): very low

*Source: own evaluation*

## Energy-related $CO_2$ emissions[9]

$CO_2$ emissions from fuel combustion ($MtCO_2$/year)

428 $MtCO_2$




*Source: Enerdata 2019*

**Share of TPES in 2018**

**Share of total energy-related $CO_2$ emissions in 2018**

- 13% Transport
- 2% Agriculture
- 5% Buildings
- 16% Industries (incl. autoproducers)
- 12% Other energy sector
- 53% Electricity and heat

The largest driver of overall GHG emissions are $CO_2$ emissions from fuel combustion. In South Africa, they have remained almost stable over the last decade, with only minor ups and downs. At 53%, the electricity and heat sector is by far the largest single contributor of energy-related $CO_2$ emissions.

# MITIGATION POWER SECTOR

# SOUTH AFRICA

**! The power sector is responsible for 53% of South Africa's energy-related $CO_2$ emissions. South Africa has the highest share of coal power in the G20, and has no plans to effectively phase out coal power. Private sector investment in renewable energy has, however, established a sizable footprint, contributing 5% of total generation.**

**Share in energy-related $CO_2$ emissions**


*Data for 2018 | Source: Enerdata 2019*

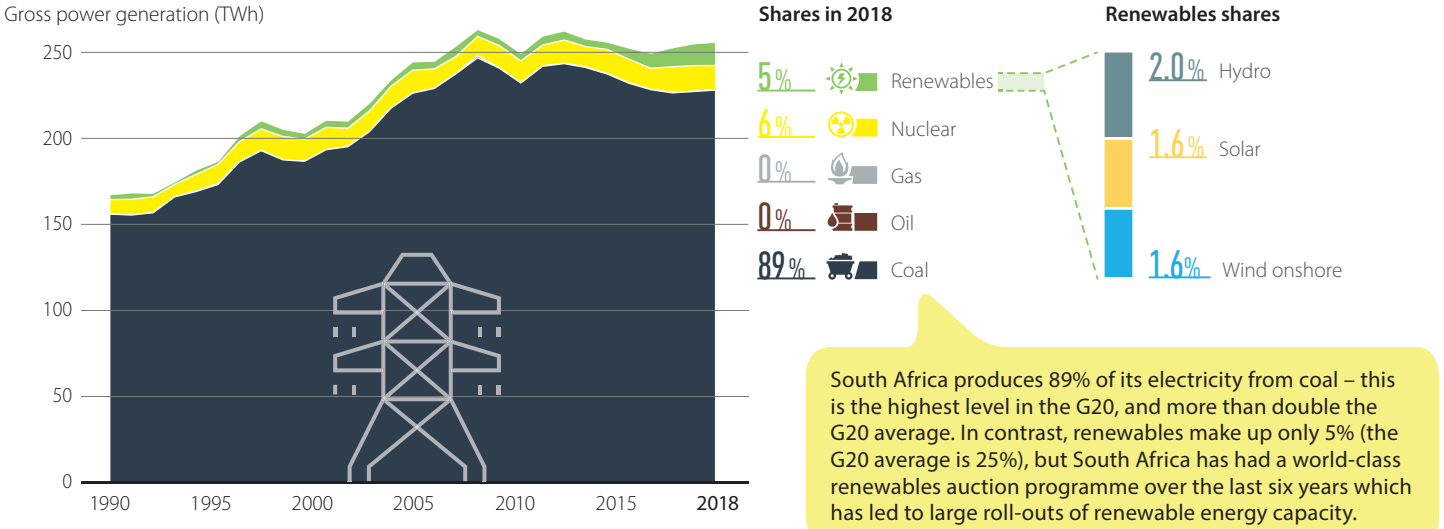
Coal must be phased out in the EU/OECD no later than 2030, in the rest of the world no later than 2040. Electricity generation needs to be decarbonised before 2050, with renewable energy the most promising option.[5]

1.5°C[6]

*Source: IPCC SR1.5 2018; Climate Analytics 2016; Climate Analytics 2019*

## STATUS OF DECARBONISATION

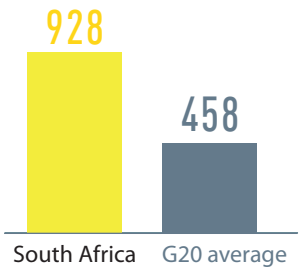
### Power mix




*Source: Enerdata 2019*

South Africa produces 89% of its electricity from coal – this is the highest level in the G20, and more than double the G20 average. In contrast, renewables make up only 5% (the G20 average is 25%), but South Africa has had a world-class renewables auction programme over the last six years which has led to large roll-outs of renewable energy capacity.

**Emissions intensity of the power sector**
($gCO_2/kWh$)



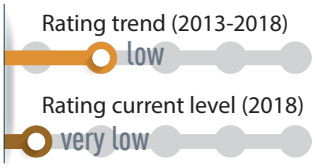

*Data for 2018 | Source: Enerdata 2019*

**Trend** (2013-2018)

-3% South Africa

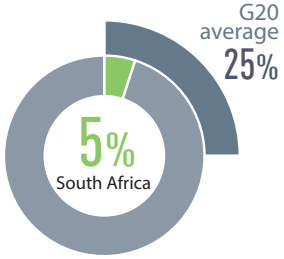
-11% G20 average

**Rating of emissions intensity compared to other G20 countries[4]**




*Source: own evaluation*

**Share of renewables in power generation**
(incl. large hydro)




*Data for 2018 | Source: Enerdata 2019*

**Trend** (2013-2018)

+196% South Africa

+20% G20 average

**Rating of share of renewables compared to other G20 countries[4]**


*Source: own evaluation*

For each kilowatt hour of electricity, 928 $gCO_2$ are emitted in South Africa. This is double the G20 average and reflects the high share of coal in the power sector. Emission intensity has dropped only marginally (-3%, 2013-2018).

*Source: own evaluation*

# MITIGATION POWER SECTOR

# SOUTH AFRICA

## POLICIES[5]

### Renewable energy in the power sector


South Africa's 2019 Integrated Resource Plan proposes an expansion of renewable energy capacity from a current total of 3800 MW (excluding large hydro) to a total of 26700 MW (plus a projected 6000 MW in distributed PV) in 2030. However, no new RE has been procured since 2015, and no 2050 renewables target has been adopted so far.

*Source: own evaluation*

### Coal phase-out in the power sector

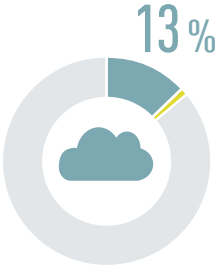

South Africa does not have a coal phase-out policy or plan. The 2019 Integrated Resource Plan includes investment in 1500 MW of new coal plants before 2030. South Africa's current coal fleet would then mainly retire in the 2030s and 2040s, with several plants remaining operational in 2050.

*Source: own evaluation*

# MITIGATION TRANSPORT SECTOR

**People in South Africa travel mostly by minibus taxi, by bus or on foot, with limited private vehicle ownership. Emissions in the sector are primarily from road transport (more than 90%), from fossil fuels. The government has recently finalised its Green Transport Strategy, which seeks to cut the share of national emissions from transport by 5% by 2050.**

### Share in energy-related $CO_2$ emissions




*Data for 2018 | Source: Enerdata 2019*

The proportion of low-carbon fuels in the transport fuel mix must increase to about 60% by 2050.

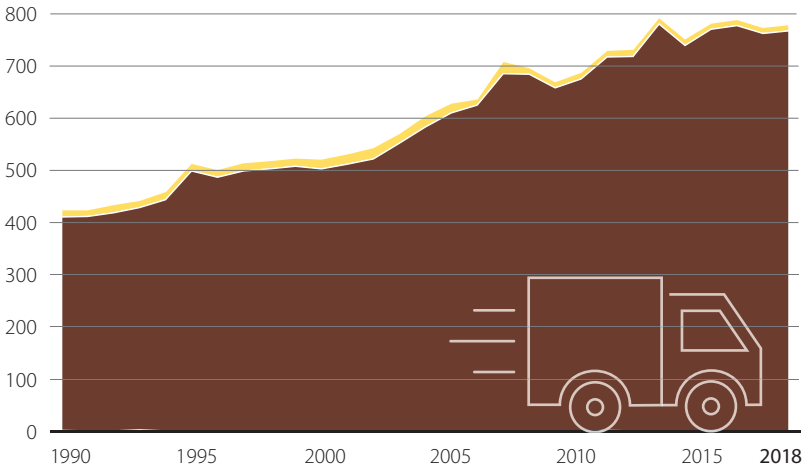
1.5°C[6]

*Source: IPCC SR1.5 2018*

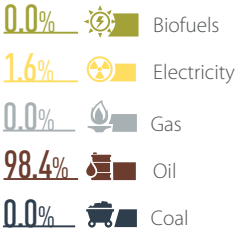
## STATUS OF DECARBONISATION

### Transport energy mix

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




**Share in 2018**




Electricity and biofuels make up only 2% of the energy mix in transport.

*Source: Enerdata 2019*

# MITIGATION TRANSPORT SECTOR

# SOUTH AFRICA

## STATUS OF DECARBONISATION (continued)

### Transport emissions per capita[10]

($tCO_2$/capita, excl. aviation emissions)

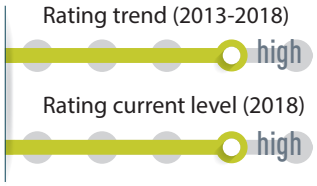

*Data for 2018*
*Source: Enerdata 2019; World Bank 2019*

**Trend** (2013-2018)

-7% South Africa

+5% G20 average

**Rating of transport emissions compared to other G20 countries[4]**




*Source: own evaluation*

### Aviation emissions per capita[11]

($tCO_2$/capita)

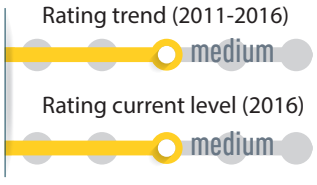

*Data for 2016*
*Source: Enerdata 2019; IEA 2018*

**Trend** (2011-2016)

+1% South Africa

+10% G20 average

**Rating of aviation emissions compared to other G20 countries[4]**




*Source: own evaluation*

### Motorisation rate

(vehicles per 1,000 inhabitants)


*Data for 2015*
*Source: Statistics South Africa 2019*

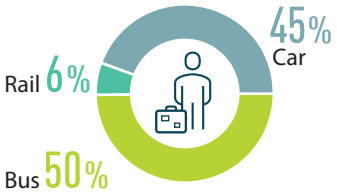
### Market share of electric vehicles in new car sales

(%)


*Data for 2018 | Source: IEA 2019*

### Passenger transport

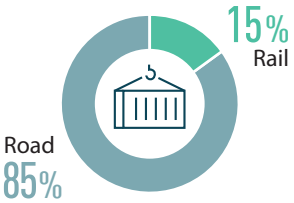
(modal split in % of passenger km)




*Data for 2014/2006 | Source: Agora 2018*

### Freight transport

(modal split in % of tonne-km)




*Data for 2014*
*Source: Stellenbosch University 2016*

## POLICIES[5]

### Phase out fossil fuel cars


South Africa has no plan to phase out fossil fuel vehicles, and as yet no energy or emissions standards for vehicles, apart from an emissions-related tax on vehicle purchase and the carbon tax. The 2018 Green Transport Strategy proposes a range of measures to promote shifting to low-emission vehicles and introduce vehicle emissions standards.

*Source: own evaluation*

### 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 emission standards for heavy-duty vehicles. However, it aims to shift freight from road to rail.

*Source: own evaluation*

### Modal shift in (ground) transport


South Africa's Green Transport Strategy (2018-2050) aims for a 5% reduction of transport emissions by 2050; shifting 30% of freight transport from road to rail; 20% of passenger transport from private cars to public and eco-mobility transport by 2022. There are support schemes for promoting public transport. Support schemes for promoting public transport exist.

⚠ Detailed programmes for implementing the strategy are currently lacking.

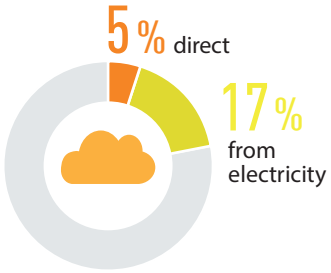
*Source: own evaluation*

# MITIGATION BUILDINGS SECTOR

# SOUTH AFRICA

**South Africa's building emissions – including heating, cooking and electricity use – make up less than a quarter of total $CO_2$ emissions. Energy use per $m^2$ is in the middle range of the G20 but concrete measures for reducing energy use in buildings are lacking.**

**Share in energy-related $CO_2$ emissions**




*Data for 2018 | Source: Enerdata 2019*

Global emissions from buildings need to be halved by 2030, and be about 80% below 2010 levels by 2050, achieved mostly through increased efficiency, reduced energy demand and electrification in conjunction with complete decarbonisation of the power sector.

1.5°C[6]

*Source: IEA ETP B2DS scenario assessed in IPCC SR1.5 2018*

## STATUS OF DECARBONISATION

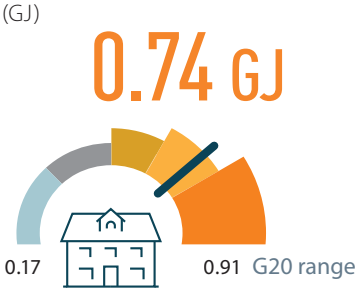
**Building emissions per capita**
(incl. indirect emissions)
($tCO_2$/capita)


-14.7% +1%

**Trend** (2013-2018)

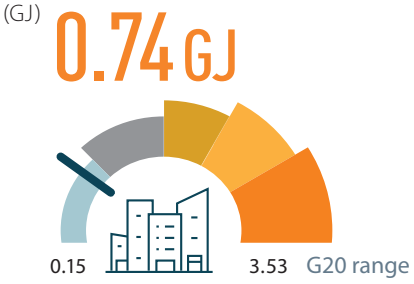
*Data for 2018 | Source: Enerdata 2019; World Bank 2019*

**Residential buildings: energy use per $m^2$**
(GJ)



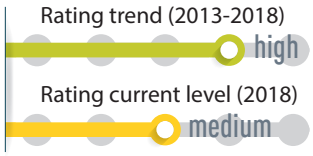

*Data: year different per country | Source: ACEEE 2018*

**Commercial and public buildings: energy use per $m^2$**
(GJ)




*Data: year different per country | Source: ACEEE 2018*

**Rating of building emissions compared to other G20 countries[4]**




*Source: own evaluation*

Building-related emissions per capita are slightly above the G20 average. But in contrast to the G20 average, South Africa has reduced that level by 15% (2013-2018).

Building emissions are largely driven by how much energy is used in heating, cooling, lighting, household appliances, etc. In South Africa, energy use per $m^2$ is in the middle range of the G20 countries.

## POLICIES[5]

### Near-zero energy new buildings


South Africa' 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.

The building codes will need to be policed for effective implementation.

*Source: own evaluation*

### Energy retrofitting existing buildings


There are no mandatory building retrofit policies but the government has introduced a 5-year project to retrofit 1,450 buildings. The draft National Energy Efficiency Strategy foresees a 20% improvement in energy performance of the residential building stock.

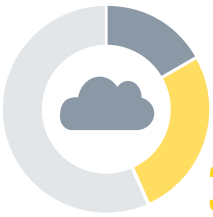
*Source: own evaluation*

# MITIGATION INDUSTRY SECTOR

# SOUTH AFRICA

**Industry-related emissions make up more than a third of energy-related $CO_2$ emissions in South Africa. South Africa has reduce emissions from this sector only slightly in recent years.**

**Share in energy-related $CO_2$ emissions** (not including process emissions)



16 % direct

30 % from electricity

*Data for 2018 | Source: Enerdata 2019*

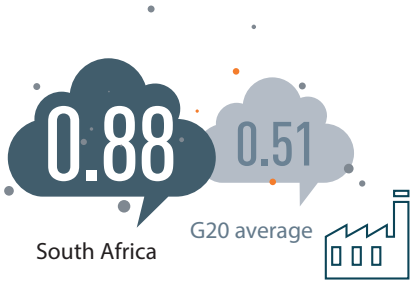
Global industrial $CO_2$ emissions need to be reduced by 65–90% from 2010 levels by 2050.

1.5°C[6]

*Source: IPCC SR1.5 2018*

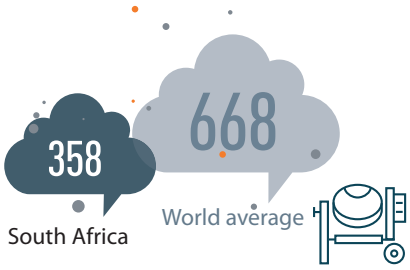
## STATUS OF DECARBONISATION

**Industry emissions intensity**[12]
($tCO_2e$/US$2015 GVA)



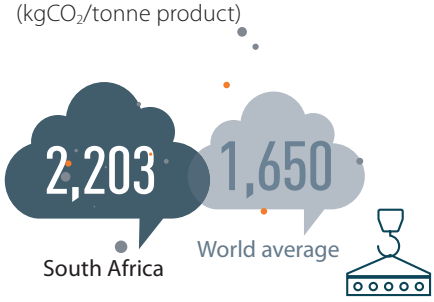

*Data for 2016 | Source: Enerdata 2019; PRIMAP 2018; World Bank 2019*

**Carbon intensity of cement production**[13]
($kgCO_2$/tonne product)




*Data for 2015 | Source: CAT 2019*

**Carbon intensity of steel production**[13]
($kgCO_2$/tonne product)




*Data for 2015 | Source: CAT 2019*

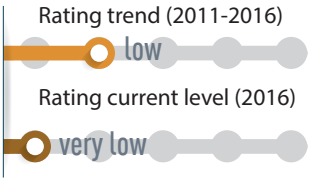
+5.5% -10.2%

**Trend** (2011-2016)

When comparing industrial emissions with the gross value added (GVA) from the industry sector, South Africa's industry is very emission intensive.

Steel production and steelmaking are significant GHG emission sources. Emission intensity for steel production in South Africa is well above world average.

**Rating of emissions intensity compared to other G20 countries**[4]




*Source: own evaluation*

## POLICIES[5]

**Energy efficiency**


*Source: own evaluation*

According to the International Energy Agency, mandatory energy efficiency policies cover 0-10% of industrial total energy use (as of 2017). The draft Energy Efficiency Strategy envisages reducing the energy consumption of manufacturing by 16% by 2030 compared to 2015.

The Industrial Energy Efficiency Programme (2016-2020) aims at direct energy savings of 1,000 GWh through energy management measures. The programme has been highly successful in reducing energy consumption in the past.

Higher electricity prices push industrial consumers towards cheaper forms of energy, mainly coal.

# MITIGATION LAND USE

# SOUTH AFRICA

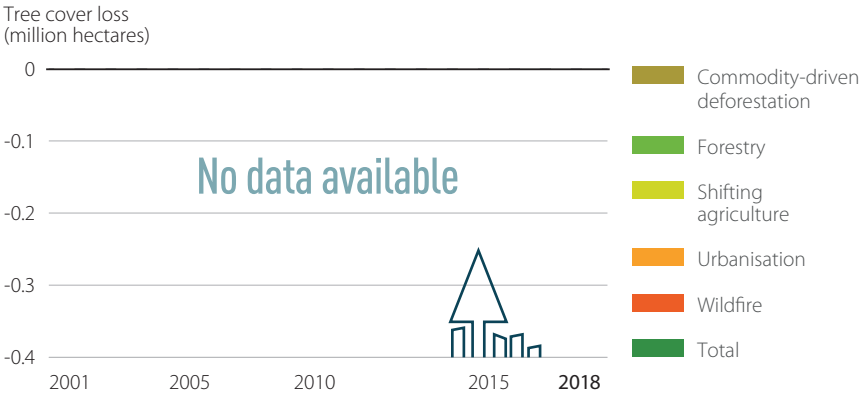
**In order to stay within the 1.5°C limit, South Africa will need to enhance its current land sector sink even further by reversing further deforestation and promoting soil carbon enhancement on grasslands and on savanna.**

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

1.5°C[6]

*Source: IPCC SR1.5 2018*

### Gross tree cover loss by dominant driver[14]




*Source: Global Forest Watch 2019*
*Note: 2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account*

## POLICIES[5]

### (Net) zero deforestation


South Africa's land sector is currently a net carbon sink, and this will have to be enhanced to enable the country to meet a more ambitious 1.5°C compatible emissions pathway. Policies and measures to achieve this are currently not in place, but are being developed.

*Source: own evaluation*

From 2001 to 2018, South Africa lost 1.34Mha of tree cover, equivalent to a **22% decrease since 2000**. This does not take tree-cover gain into account.

# MITIGATION AGRICULTURE

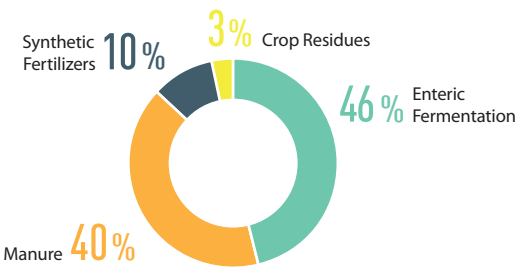
**South Africa's agricultural emissions are mainly from digestive processes in animals, livestock manure, and the use of synthetic fertilizers.**

Global 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 fertilzers and manure) need to be reduced by 10% by 2030 and by 20% by 2050.

1.5°C[6]

*Source: IPCC SR1.5 2018*

### GHG emissions from agriculture (not including energy)




*Data for 2016 | Source: FAOSTAT 2019*

In South Africa, the largest sources of GHG emissions in the agricultural sector are digestive processes in animals (enteric fermentation), livestock manure, and – to a lesser extent – the use of synthetic fertilizers. A shift to best practice environmental land-use management (eg organic farming, reduced tillage, use of biodigesters), more efficient use of fertilizers, and dietary changes could help reduce emissions.

# ADAPTATION

# SOUTH AFRICA

- **South Africa is vulnerable to climate change and adaptation actions are needed.**
- **On average, 47 fatalities and losses amounting to US$611 million occur yearly due to extreme weather events.**
- **With global warming, society and its supporting sectors are increasingly exposed to extreme weather events, such as droughts and reductions in crop duration.**
- **With a 3°C warming, South Africa would experience around 50 days per year when temperatures reach higher than 35°C.**

## ADAPTATION POLICIES

| Nationally-determined contribution: Adaptation | |
|---|---|
| **Targets** | Six targets specified: develop national adaptation plan; mainstream adaptation into development; build institutional capacity; develop early warning systems; develop vulnerability assessment and needs framework; communicate investments |
| **Actions** | Actions specified (sectors not mentioned) |

*Source: UNFCCC, NDC of respective country*

### National adaptation strategies

| Document name | Publication year | Fields of action (sectors) | | | | | | | | | | | | | M&E process (reporting frequency) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Agriculture | Biodiversity | Coastal areas & fishing | Education & research | Energy & industry | Finance & insurance | Forestry | Health | Infrastructure | Tourism | Transport | Urbanism | Water | |
| National Climate Change Adaptation Strategy | 2018 | x | x | x | x | x | x | x | x | x | x | x | | x | Annual reporting and update of the strategy every 5 years |

*Source: own research*

# SOUTH AFRICA

## ADAPTATION NEEDS

### Climate Risk Index for 1998-2017

Impacts of extreme weather events in terms of fatalities and economic losses that occured

**Global Climate Risk Index 2019** | All numbers are averages (1998-2017)

| Weather-related fatalities | Per 100,000 inhabitants | | Annual average losses (PPP US$ mn) | Per unit GDP (%) | |
|---|---|---|---|---|---|
| 47 | 0.1 | 100 rank out of 181 countries | 611 | 0.1 | 95 rank out of 181 countries |

*Source: Germanwatch 2018*

South Africa has already been struck by extreme weather events such as heat waves, dry spells, fires, heavy rainfalls and droughts. As highlighted by the numbers from the Climate Risk Index, such extreme weather events result in fatalities and economic losses. Climate change is expected to worsen the intensity, frequency and impacts of such events.

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

| | | | 1.5°C | 2°C | 3°C |
|---|---|---|---|---|---|
| **Water** | | % of area with increase in water scarcity | | | |
| | | % of time in drought conditions | | | |
| **Heat & Health** | | Heatwave frequency | | | |
| | | Days above 35°C | | | |
| **Agriculture** | Maize | Reduction in crop duration | | | |
| | | Hot spell frequency | | | |
| | | Reduction in rainfall | | | |

*Source: own research*

*Source: Based on Arnell et al 2019*

Overall, with rising temperatures, all sectors are adversely affected. In the water sector, water scarcity and time spent in drought conditions drastically increase. Heat wave frequency increases significantly, together with a high number of days when temperatures reach higher than 35°C.

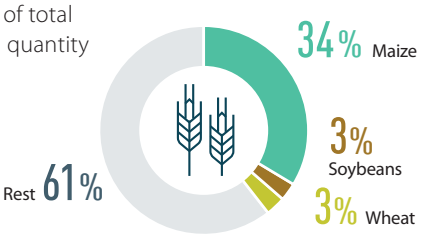
**Impact ranking scale**

- Very low
- Low
- Medium
- High
- Very high

Blank cells signify that there is no data available

### National crop production

(share in % of total production quantity in tonnes)




*Data for 2017 | Source: FAOSTAT 2019*

Maize has the largest share of crop production out of the four crops analysed (maize, rice, soybeans, wheat). Maize is affected by a decrease in hot spell frequency, a slight decrease in rainfall and a drastic reduction in crop duration.

# FINANCE

# SOUTH AFRICA

**South Africa's fossil fuel subsidies totalled US$2.3 billion in 2017, mostly on petroleum and coal. The country was the first African nation to introduce a carbon tax, doing so in 2019.**

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

1.5°C[6]

*Source: IPCC SR1.5 2018*

## Nationally-determined contribution: Finance

| | |
|---|---|
| **Conditionality** | Not specified |
| **Investment needs** | Not mentioned |
| **Actions** | National actions to align financial flows mentioned (fiscal levers) |
| **International market mechanisms** | Not mentioned |

*Source: UNFCCC, NDC of respective country*

### Financial policy and regulation supporting a brown to green transition

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.

| Category | Instruments | Objective | Under discussion/ implementation | Not identified |
|---|---|---|---|---|
| **Green Financial Principles** | N/A | This indicates political will and awareness of climate change impacts, showing where there is a general discussion about the need for aligning prudential and climate change objectives in the national financial architecture. | **x** | |

| | | | Mandatory | Voluntary | Under discussion | Not identified |
|---|---|---|---|---|---|---|
| **Enhanced supervisory review, risk disclosure and market discipline** | Climate risk disclosure requirements | Disclose the climate-related risks to which financial institutions are exposed | | **x** | | |
| | Climate-related risk assessment and climate stress-test | Evaluate the resilience of the financial sector to climate shocks | | | | **x** |
| **Enhanced capital and liquidity requirements** | Liquidity instruments | Mitigate and prevent market illiquidity and maturity mismatch | | | | **x** |
| | Lending limits | Limit the concentration of carbon-intensive exposures | | | | **x** |
| | | Incentivise low carbon-intensive exposures | | | | **x** |
| | Differentiated Reserve Requirements | Limit misaligned incentives and canalise credit to green sectors | | | | **x** |

*Source: own research*

The Banking Association South Africa introduced voluntary 'Principles for Managing Environmental and Social Risk' in 2014. In 2017, the financial regulatory body of South Africa, the South African Financial Services Board, welcomed and called for the implementation of Taskforce on Climate-related Financial Disclosure (TCFD) recommendations. In the same year, South Africa's National Treasury convened financial sector regulatory agencies and industry associations to develop a sustainable finance roadmap, engaging private sector actors in TCFD relevant forums.

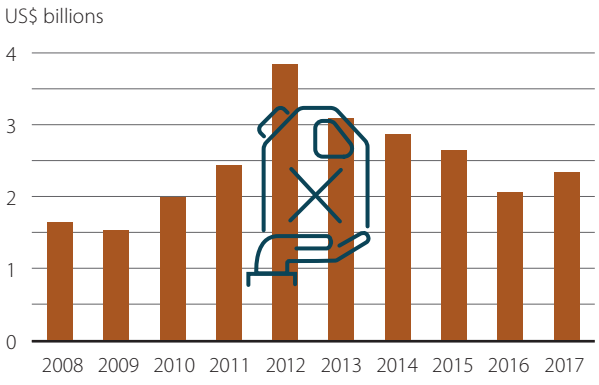
# FINANCE

# SOUTH AFRICA

## Fiscal policy levers

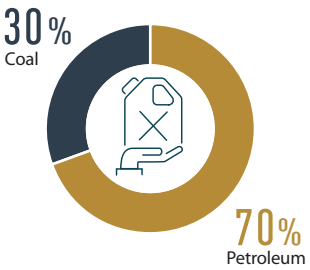
**Fiscal policy levers raise public revenues and direct public resources. Critically, they can shift investment decisions and consumer behaviour towards low-carbon, climate-resilient activities by reflecting externalities in prices.**

### Fossil fuel subsidies




*Source: OECD-IEA 2019*

### Subsidies by fuel type

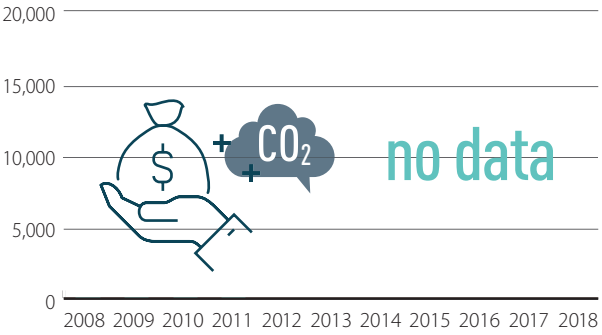



*Data for 2017 | Source: OECD-IEA 2019*

In 2017, South Africa's fossil fuel subsidies totalled US$2.3bn (compared to US$1.6bn in 2008, and the last decade peak of US$3.8bn in 2012). All of the subsidies quantified were for consumption of fossil fuels, and US$1.6 of the subsidies benefited petroleum. The largest subsidy is the value added tax exemption for gasoline, diesel and kerosene through broad objectives to support businesses (US$1.2bn), followed by the free basic electricity allowance (US$0.7bn). Free basic electricity will decarbonise as the electricity system does, and has massive social welfare benefits for the country.

### Carbon revenues

Carbon revenues (US$ millions)
from explicit carbon pricing schemes

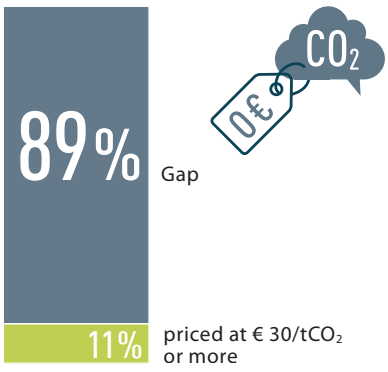



*Source: I4CE 2019*

South Africa became the first African nation to launch a carbon tax, in June 2019. The scheme covers 80% of domestic emissions, including all types of fossil fuels, and emissions are charged at US$8/tCO$_2$ although discounts currently bring the effective rate down to US$0.4 to US$3.2/tCO$_2$ Estimates for revenues from the scheme are not yet available, given its recent implementation.

### Carbon pricing gap[15]

% of energy-related CO$_2$ emissions




*Data for 2015 | Source: OECD 2018*

Only 11% of South Africa's CO$_2$ emissions are priced at EUR30 or higher (the low-end benchmark), creating a carbon pricing gap of 89%. This gap is much higher than the G20 average of 71%. The price covers not only explicit carbon taxes but also specific taxes on energy use and the price of tradable emission permits.

# FINANCE

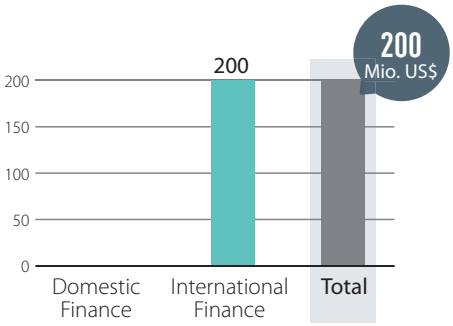
# SOUTH AFRICA

## 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 coal[16]

(million US$)




In 2017, South Africa's Export Credit Insurance Corporation provided US$400 million guarantee for a coal transportation project in Mozambique.

Domestic Finance

International Finance

*Data year: 2016-2017 average*
*Source: Oil Change International 2019*

### Commitments to restrict public finance to coal and coal-fired power[17]

| MDB level | National development agencies and banks | Domestic export credit agencies | Export credit restriction in OECD | Comment |
|---|---|---|---|---|
| – | – | – | | No commitments identified |

X yes – no not applicable

*Source: own research*

## Provision of international public support[18]

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 has provided international public finance to the Global Environment Facility (GEF) Trust Fund focal area climate change mitigation. 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.

**Obligation to provide climate finance under UNFCCC**

YES NO

United Nations Framework Convention on Climate Change

**Bilateral climate finance contributions**

| Annual average contribution (mn US$, 2015-2016) | Theme of support | | | |
|---|---|---|---|---|
| | Mitigation | Adaptation | Cross-cutting | Other |
| 0 | 0% | 0% | 0% | 0% |

*Source: Country reporting to UNFCCC*

**Multilateral climate finance contributions**

*See Technical Note for multilateral climate funds included and method to attribute amounts to countries*

| Annual average contribution (mn US$, 2015-2016) | Theme of support | | |
|---|---|---|---|
| | Adaptation | Mitigation | Cross-cutting |
| 0 | 0% | 0% | 0% |

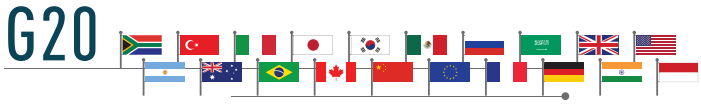
*Source: Country reporting to UNFCCC*

**Core/General Contributions**

| Annual average contribution (mn US$, 2015-2016) |
|---|
| 0 |

*Source: Country reporting to UNFCCC*

# ENDNOTES




1) '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 Land use, land-use change and forestry (LULUCF), which under the new IPCC 2006 Guidelines is integrated into Agriculture, Forestry, and Other Land Use (AFOLU).

2) The 1.5°C fair share ranges for 2030 and 2050 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, particularly between 2030 and 2050, 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 emission technologies are expected to play a role from the 2030s onwards, compensating for remaining positive emissions.

   The CAT's evaluation of NDCs shows the resulting temperature outcomes if all other governments were to put forward emissions reduction commitments with the same relative ambition level.

   The 2030 projections of GHG emissions are from the CAT's June 2019 update and are based on implemented policies, expected economic growth or trends in activity and energy consumption.

   The CAT methodology does not consider GHG emissions from LULUCF due to the large degree of uncertainty inherent in this type of data, and alsoto ensure consistency and comparability across countries.

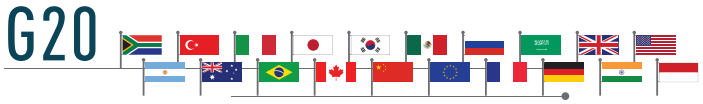
3) See the Brown to Green 2019 Technical Note for the sources used for this assessment.

4) The Decarbonisation Ratings assess the relative performance across the G20. A high scoring reflects a relatively good efforts from a climate protection perspective but is not necessarily 1.5°C compatible. The ratings assess both the 'current level' and 'recent developments' to take account of the different starting points of different G20 countries. The 'recent developments' ratings compare developments over the last five available years (often 2013 to 2018).

5) The selection of policies rated and the assessment of 1.5°C compatibility are informed by the Paris Agreement, the Special Report on 1.5°C of the International Panel on Climate Change (2018), and the Climate Action Tracker (2016): 'The ten most important short-term steps to limit warming to 1.5°C'. The table below displays the criteria used to assess a country's policy performance. See the Brown to Green Report 2019 Technical Note for the sources used for this assessment.

| On endnote 5) | low | medium | high | frontrunner |
|---|---|---|---|---|
| **Renewable energy in power sector** | No policy 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 target or policy 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 policy 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-based light-duty vehicles by 2035 worldwide |
| **Phase out fossil fuel heavy-duty vehicles** | No policy | 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) |
| **Retrofitting exis-ting 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 |
| **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 |
| **(Net) zero deforestation** | No policy or incentive 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 |

# ENDNOTES (continued)




6) The 1.5°C benchmarks are based on the Special Report on 1.5°C of the International Panel on Climate Change (2018). See the Brown to Green 2019 Technical Note for the specific sources used for this assessment.
7) Total primary energy supply data displayed in this Country Profile does not include non-energy use values. Solid fuel biomass in residential use has negative environmental and social impacts and is shown in the category 'other'.
8) Large hydropower and solid fuel biomass in residential use are not reflected due to their negative environmental and social impacts.
9) The category 'electricity and heat' covers $CO_2$ emissions from power generation and from waste heat generated in the power sector. The category 'other energy use' covers energy-related $CO_2$ emissions from extracting and processing fossil fuels (e.g. drying lignite).
10) This indicator shows transport emissions per capita, not including aviation emissions.
11) This indicator adds up emissions from domestic aviation and emissions from international aviation bunkers in the respective country. Emissions by aircrafts in the higher atmosphere lead to a contribution to climate change greater than emissions from burning fossil fuels. In this Country Profile, however, only a radiative forcing factor of 1 is assumed.
12) This indicator includes only direct energy-related emissions and process emissions (Scope 1) but not indirect emissions from electricity.
13) This indicator includes emissions from electricity (Scope 2) as well as direct energy-related emissions and process emissions (Scope 1).
14) This indicator covers only gross tree-cover loss and does not take tree-cover gain into account. It is thus not possible to deduce from this indicator the climate impact of the forest sector. The definition of 'forest' used for this indicator is also not identical with the definition used for the indicator on page 3.
15) 'Effective carbon rates' are the total price that applies to $CO_2$ emissions, and are made up of carbon taxes, specific taxes on energy use and the price of tradable emission permits. The carbon pricing gap is based on 2015 energy taxes and is therefore likely to be an underestimate, as taxation has tended to increase in countries over time.
16) The database used to estimate public finance for coal is a bottom-up database, based on information that is accessible through various online sources, and is therefore incomplete. For more information, see to the Brown to Green 2019 Technical Note.
17) See the Brown to Green 2019 Technical Note for the sources used for this assessment.
18) Climate finance contributions are sourced from Biennial Party reporting to the UNFCCC. Refer to the Brown to Green Report 2019 Technical Note for more detail.

For more detail on the sources and methodologies behind the calculation of the indicators displayed, please download the Technical Note at: http://www.climate-transparency.org/g20-climate-performance/g20report2019

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