



Climate Finance Landscape in South Africa

In-country delivery partners



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The climate finance landscape in South Africa

The Climate Finance Accelerator (CFA) is a four-year technical assistance programme funded by the UK Department for Business, Energy & Industrial Strategy (BEIS). The programme is supporting eight middle-income countries, which includes South Africa, which the CFA is supporting to develop a sustainable pipeline of bankable, low-carbon projects and identifying suitable financing options for those projects. The programme will also embed a permanent CFA process in South Africa that can continue to identify financing for low-carbon projects in order to support efforts to achieve the country's Nationally Determined Contribution (NDC) and to raise its overall climate ambition.

This document aims to:

- map data and information that are of relevance to the CFA in South Africa, including considering gender equality and social inclusion (GESI) issues;
- facilitate the analysis and comparability of the data;
- identify gaps, including in the supply chain, which will form the basis for the design of the CFA in South Africa;
- address these gaps, considering the country's context, such as its NDC and other policy objectives;
- make recommendations on how these gaps might be filled; and
- map available climate finance across the project development phases in South Africa, including project origination, project development, primary project finance and refinancing of projects.

The gaps will be identified by mapping country indicators and the climate finance ecosystem, such as the availability of finance for projects, technical assistance and capacity-building grants, concessional finance and related issues.

The GESI considerations have been addressed through consultations with gender and social inclusion experts and using the CFA's GESI Action Plan and a review of the CFA programme more broadly. In regard to the landscape mapping and country context, the project team has conducted primary research in regard to unpacking the gender impact and social inclusion aspects of South Africa's climate finance landscape.

Lists of abbreviations

AFOLU	Agriculture, forestry and other land use
BEIS	UK Department for Business, Energy & Industrial Strategy
BNEF	Bloomberg New Energy Finance
BRICS	Brazil, Russia, India, China, South Africa
BW	Bidding window
CFA	Climate Finance Accelerator
CGE	Commission for Gender Equality
CH₄	Methane
CO₂	Carbon dioxide
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and Environment
EV	Electric vehicle
FOLU	Forestry and other land use
FOSAD	Forum of South African Directors-General
GDP	Gross domestic product
GESI	Gender equality and social inclusion
GHG	Greenhouse gas
GNI	Gross national income
GW	Gigawatt
IEA	International Energy Agency
IPAP	Industrial Policy Action Plan
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial process and product use
IRP	Integrated Resource Plan
l/c/d	Litres/capita/day
Mt CO₂e	Metric tonnes of carbon dioxide equivalent
MW	Megawatt
MWp	Megawatt peak
N₂O	Nitrous oxide
NDC	Nationally Determined Contribution
ND-GAIN	Notre Dame Global Adaptation Initiative
NDP	National Development Plan Vison 2030

OECD	Organisation for Economic Co-operation and Development
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
SANS	South African National Standards
SDGs	Sustainable Development Goals
StatsSA	Statistics South Africa
UNFCCC	United Nations Framework Convention on Climate Change
ZAR	South African Rand

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1 Country profile

This section provides a country profile for South Africa. This includes the country's population, economy, energy dynamics and climate variability impacts, as well as an overview of the country's progress, and the challenges faced, in addressing climate change.

1.1 Demographics and economy

South Africa is located at the southern tip of Africa, stretching latitudinally from 22°S to 35°S and longitudinally from 17°E to 33°E. It is bordered to the west by the Atlantic Ocean and to the south and east by the Indian Ocean. The country's total land area is 1,213,090 km² and its neighbouring countries are Namibia, Botswana, Zimbabwe, Mozambique, eSwatini and Lesotho. South Africa experiences both subtropical and temperate climates; its land area is dominated by shrublands and grasslands.

Figure 1 Map of South Africa



In 2020, the mid-year population was approximately 59.62 million, while by May 2021 South Africa had a population of 59.96 million people, equivalent to 0.76% of the total world population.¹ South Africa is a diverse country and encompasses a wide variety of cultures, languages and religions.

¹ The Worldometer (2021) 'Elaboration of the latest United Nations data', <https://www.worldometers.info/world-population/south-africa-population/>

The country has an emerging economy and is the world's largest exporter of platinum. Mining, finance, trade, manufacturing and government services are the main drivers of economic growth.

Key indicators for the country are provided in **Error! Reference source not found.** below.

Table 1 Key indicators for South Africa

Key South African indicators	Year	Source
Demographics and economy		
Population	60.14 million (2021) ²	Statistics South Africa
Population growth rate	1.4% (period 2019–2020) ³	Statistics South Africa
Unemployment rate	<p>Overall unemployment 34.4% in the second quarter of 2021 ⁴</p> <p>Unemployment rate by population group (second quarter of 2021):⁵</p> <ul style="list-style-type: none"> • 38.2% Black African • 28.5 Coloured • 8.1% White • 19.5% Indians/Asian, <p>Unemployment by gender (second quarter of 2021):⁶</p> <ul style="list-style-type: none"> • Female unemployment, 36.8% • Male unemployment, 32.4% <p>The unemployment rate was 30.8% in September 2020, 23.3% in December 2019 and 26.7% in 2018⁷</p>	Statistics South Africa
Urban population	66.7% (approximately 39 million people in 2020) ⁸	The Worldometer
Rural population	32.64% ⁹	World Bank

² Statistics South Africa, 2021. Statistical Release P0302 Mid-year population estimates 2021, <http://www.statssa.gov.za/publications/P0302/P03022021.pdf>

³ Statistics South Africa, 2021. Statistical Release P0302 Mid-year population estimates 2021, <http://www.statssa.gov.za/publications/P0302/P03022021.pdf>

⁴ Statistics South Africa, 2021. Statistical Release P0211 Quarterly Labour Force Survey Quarter 2: 2021, <http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2021.pdf>

⁵ Statistics South Africa, 2021. Statistical Release P0211 Quarterly Labour Force Survey Quarter 2: 2021, <http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2021.pdf>

⁶ Statistics South Africa, 2021. Statistical Release P0211 Quarterly Labour Force Survey Quarter 2: 2021, <http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2021.pdf>

⁷ Statistics South Africa, 2021. Statistical Release P0211 Quarterly Labour Force Survey Quarter 1: 2021, http://www.statssa.gov.za/publications/P0211/Presentation%20QLFS%20Q1_2021.pdf

⁸ The Worldometer. 2021. South Africa Population (LIVE) <https://www.worldometers.info/world-population/south-africa-population/>

⁹ World Bank. 2021. Rural population (% of total population) - South Africa <https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=ZA>

Gini coefficient	0.65 in 2015 ¹⁰	Statistics South Africa
Economic inequality	Distribution of real annual mean: ¹¹ <ul style="list-style-type: none"> Male, South African Rand (ZAR) 38 180 /annum Female, ZAR 18 406 /annum Distribution of expenditure shares by gender of household head: 74% male and 26% female ¹²	Statistics South Africa
Human Development Index	0.709 in 2019 ¹³	United Nations Development Programme
Gender Equality Index	South Africa ranked 18th out of 156 countries assessed for gender equality ¹⁴	World Economic Forum
Life expectancy at birth (2021)	Overall life expectancy at birth for 2021 is estimated at 62%; 59.3 years for males and 64.6 years for females ¹⁵	Statistics South Africa
Infant mortality rate	24.1 per 1,000 live births ¹⁶	
People living with HIV	8.2 million ¹⁷	
Inflation rate	Annual consumer price inflation was 5,0% in October 2021 ¹⁸	Statistics South Africa
Economic growth forecast	South Africa's economy grew by an annualised 4.6% in the first quarter of 2021 ¹⁹	Statistics South Africa
Debt/GDP	External debt in South Africa increased to US\$ 170,836 million in the fourth	South African Reserve Bank

¹⁰ Statistics South Africa, 2019. Inequality Trends in South Africa: A multidimensional diagnostic of inequality. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

¹¹ Statistics South Africa, 2019. Inequality Trends in South Africa: A multidimensional diagnostic of inequality. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

¹² Statistics South Africa, 2019. Inequality Trends in South Africa: A multidimensional diagnostic of inequality. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

¹³ UNDP, 2020. Human Development Report 2020: The next frontier Human development and the Anthropocene. <http://hdr.undp.org/sites/default/files/hdr2020.pdf>

¹⁴ World Economic Forum, 2021. Global Gender Gap Report 2021 Insight Report March 2021. https://www3.weforum.org/docs/WEF_GGGR_2021.pdf

¹⁵ Statistics South Africa, 2021. Statistical Release P0302 Mid-Year Population Estimates 2021. <http://www.statssa.gov.za/publications/P0302/P03022021.pdf>

¹⁶ Statistics South Africa, 2021. Statistical Release P0302 Mid-Year Population Estimates 2021. <http://www.statssa.gov.za/publications/P0302/P03022021.pdf>

¹⁷ Statistics South Africa, 2021. Statistical Release P0302 Mid-Year Population Estimates 2021. <http://www.statssa.gov.za/publications/P0302/P03022021.pdf>

¹⁸ Statistics South Africa, 2021. Statistical release P0141 Consumer Price Index October 2021, <http://www.statssa.gov.za/publications/P0141/P0141October2021.pdf>

¹⁹ Statistics South Africa, 2021. GDP rises in the first quarter of 2021, <http://www.statssa.gov.za/?p=14423>

	<p>quarter of 2020, from US\$ 157,021 million in the third quarter of 2020²⁰</p> <p>Foreign currency-denominated external debt decreased from US\$87.1 billion at the end of December 2020 to US\$82.6 billion at the end of March 2021²¹</p>	
Key industries and economic sectors	<p>Finance is the largest industry in South Africa, followed by personal services. The percentage contribution to total value added in Q2: 2021 (current prices):²²</p> <ul style="list-style-type: none"> • Finance, 23% • Personal services, 17% • Trade, 14% • Manufacturing, 13% • Mining, 9% • Government, 8% • Transport, 7% • Electricity, gas, and water, 3% • Agriculture, 3% • Construction, 2% 	Statistics South Africa
GDP	The revised estimate of GDP in 2020 is ZAR5,521 billion ²³	Statistics South Africa
GDP per capita	ZAR 79,913 per person ²⁴	Statistics South Africa
Gross national income (GNI) per capita, purchasing power parity (current international US\$)	US\$12,640 ²⁵	World Bank
Exchange rate with GBP over last five years	1 GBP = 19.3931 ZAR on 15 June 2021 ²⁶	South African Reserve Bank

²⁰ South African Reserve Bank, 2021. Quarterly Bulletin June 2021, <https://www.resbank.co.za/content/dam/sarb/publications/quarterly-bulletins/quarterly-bulletin-publications/2021/back-up-folder-june-/01Full%20Quarterly%20Bulletin%20June%202021.pdf>

²¹South African Reserve Bank, 2021. Quarterly Bulletin September 2021 <https://www.resbank.co.za/content/dam/sarb/publications/quarterly-bulletins/quarterly-bulletin-publications/2021/back-up-september/01Full%20Quarterly%20Bulletin.pdf>

²² Statistics South Africa, 2021. Statistical Release P0441 - Gross Domestic Product (GDP), 2nd Quarter 2021, <http://www.statssa.gov.za/publications/P0441/P04412ndQuarter2021.pdf>

²³ Statistics South Africa, 2021. Statistical Release P0441 - Gross Domestic Product (GDP), 2nd Quarter 2021, <http://www.statssa.gov.za/publications/P0441/P04412ndQuarter2021.pdf>

²⁴ Statistics South Africa, 2021. Improving national accounts and GDP: The results of South Africa's rebasing and benchmarking exercise, 2021, <http://www.statssa.gov.za/publications/Report%2004-04-04/GDP%20benchmark%20media%20presentation.pdf>

²⁵ World Bank. 2021. GNI per capita, PPP (current international \$), <https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD>

²⁶ South African Reserve Bank. 2021. Selected Historical Rates Rand per British Pound, <https://www.resbank.co.za/en/home/what-we-do/statistics/key-statistics/selected-historical-rates>

	Rand per British pound = 21.6871 in June 2016	
Lending to the private sector	<ul style="list-style-type: none"> Loans to private sector in South Africa increased to ZAR 3,958,370 million in April 2021, from ZAR 3,935,120 million in March 2021²⁷ Domestic credit to private sector (% of GDP) = 129% in 2019 (World Bank)²⁸ Domestic credit to private sector reached US\$ 280 billion in November 2020, an increase of 3.5% from December 2019, when it was 139% of GDP 	South African Reserve Bank World Bank
Primary energy supply	5,559,679 terajoule (2019) ²⁹	IEA
Proportion of households with access to electricity from the mains electricity supply by gender of household head	Male 84.4% and female 87.2% ³⁰	Statistics South Africa
Energy power consumption	4,365.92 kWh per capita ³¹	World Bank
Proportion of households with access to water by sex of the household head (2002–2017)	Male 77.0% and female 70.3% ³²	Statistics South Africa
Formal/informal economy split	Informal economy – 2.7 million people (18%); formal economy – 10.2 million people (68.3%) in 2021 ³³	Statistics South Africa

²⁷ South African Reserve Bank, 2021. Quarterly Bulletin September 2021 <https://www.resbank.co.za/content/dam/sarb/publications/quarterly-bulletins/quarterly-bulletin-publications/2021/back-up-september/01Full%20Quarterly%20Bulletin.pdf>

²⁸ World Bank, 2019. Domestic credit to private sector (% of GDP) - South Africa <https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS?locations=ZA>

²⁹ IEA, 2021. World Energy Statistics and Balances, South Africa Key energy statistics, 2019, <https://www.iea.org/countries/south-africa>

³⁰ Statistics South Africa, 2019. Inequality Trends in South Africa: A multidimensional diagnostic of inequality. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

³¹ World Bank, 2021. Electric power consumption (kWh per capita) - South Africa <https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC?locations=ZA>

³² Statistics South Africa, 2019. Inequality Trends in South Africa: A multidimensional diagnostic of inequality. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

³³ Statistics South Africa, 2021. Statistical Release P0211 Quarterly Labour Force Survey Quarter 2: 2021, <http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2021.pdf>

Policy and regulatory framework		
Political structure	The national, provincial, and local levels of government all have legislative and executive authority in their own spheres, and are defined in the Constitution as distinctive, interdependent, and interrelated ³⁴	Government Communication and Information System
Economic policies and strategies	National Development Plan (NDP) 2030 was adopted as the cornerstone and blueprint for a future economic and socioeconomic development strategy for the country) ³⁵	The South African Government
Legal system and administration	The Republic of South Africa is a constitutional state, with a supreme Constitution and a Bill of Rights. All laws must be consistent with the Constitution. South Africa has a mixed legal system – a hybrid of Roman-Dutch civilian law, English common law, customary law, and religious personal law ³⁶	Government Communication and Information System
Laws, policies, national targets etc that relate to GESI	National Gender Policy Framework ³⁷ , Department of Women Strategic Plan 2015–2020 ³⁸ and the standing Commission for Gender Equality (CGE) ACT 39 OF 1996. The CGE was established in terms of Section 187 of the Constitution of the Republic of South Africa in order to promote respect for gender equality and the protection, development, and attainment of gender equality ³⁹	Commission for Gender Equality
Ease of doing business	South Africa is ranked 84 among 190 economies on ease of doing business, with a score of 67 ⁴⁰	World Bank

³⁴ Government Communication and Information System, 2021. Official Guide to South Africa 2019/20, <https://www.gcis.gov.za/content/resource-centre/sa-info/official-guide-south-africa-201920>

³⁵ South African Government. 2011. National Development Plan 2030 Our Future-make it work. https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf

³⁶ Government Communication and Information System, 2021. Official Guide to South Africa 2019/20, <https://www.gcis.gov.za/content/resource-centre/sa-info/official-guide-south-africa-201920>

³⁷ The Office on the Status of Women, 2000. South Africa's National Policy Framework for Women's Empowerment and Gender Equality, https://www.gov.za/sites/default/files/gcis_document/201409/gender0.pdf

³⁸ Department of Women, 2014. Department Of Women Strategic Plan 2015-2020 <http://www.women.gov.za/images/Department-of-Women---Strategic-Plan.pdf>

³⁹ Commission for Gender Equality, 2021. Welcome to the Commission for Gender Equality. <https://cge.org.za/>

⁴⁰ World Bank, 2019. Doing Business 2019: Economy Profile South Africa <https://www.doingbusiness.org/content/dam/doingBusiness/country/s/south-africa/ZAF.pdf>

Corruption Perceptions Index, 2020	South Africa scored 44/100 and was ranked 69 th out of 180 countries ⁴¹	Transparency International
Global Competitiveness	South Africa was ranked 60 th out of 141 countries and scored 62.4/100 in the Global Competitiveness Index 4.0 2019 Rankings ⁴² In terms of performance on economic transformation readiness, by aggregated 2020 score (0–100 scale), South Africa scored 50.4 ⁴³	World Economic Forum
Climate change profile, strategies and institutions		
Total commercial agriculture area	Commercial agriculture accounts for 46.4 million ha, representing 38% of the total land area of South Africa ⁴⁴	Statistics South Africa
Grazing land	36.5 million ha ⁴³	
Arable land	7.6 million ha ⁴³	
Cattle population	South Africa has a total of 13.9 million cattle ⁴⁵	Statistics South Africa
Forest area	There 0.5 million hectares of naturally growing indigenous tree species or 0.4% of South Africa's land cover Commercial timber plantations cover 1.2 million hectares or 1% of South Africa's land cover ⁴⁶	Forestry South Africa
Waste management	55.6 million tonnes of general waste generated in 2017, of which 65.2% was disposed to landfill and 34.5% was recycled or recovered ⁴⁷	Department of Environmental Affairs
South Africa's first NDC submitted 2016	South Africa submitted its first NDC covering the period 2030 in accordance with decision 1/CP.19 and 1/CP.20 on 1	The South African Government

⁴¹ Transparency International, 2021. Corruption Perceptions Index 2020. <https://www.transparency.org/en/cpi/2020/index/zaf#>

⁴² Klaus Schwab, World Economic Forum, 2019. The Global Competitiveness Report 2019, https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

⁴³ Klaus Schwab and Saadia Zahidi, World Economic Forum, 2020. The Global Competitiveness Report Special Edition 2020 How Countries are Performing on the Road, https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2020.pdf

⁴⁴ Statistics South Africa, 2020. Census of commercial agriculture, 2017. Financial and production statistics, Report No. 11-02-01 (2017), <http://www.statssa.gov.za/publications/Report-11-02-01/Report-11-02-012017.pdf>

⁴⁵ Statistics South Africa, Community Survey 2016. Agricultural households, Report No. 03-01-05. <https://www.statssa.gov.za/publications/03-01-05/03-01-052016.pdf>

⁴⁶ Forestry South Africa, 2018. Forestry Explained. A Fascinating Insight into Forestry in South Africa <https://www.forestrysouthafrica.co.za/wp-content/uploads/2018/11/171293-FSA-Infographic-booklet-Final-low-res.pdf>

⁴⁷ Department of Environmental Affairs, 2018. South Africa State of Waste, https://soer.environment.gov.za/soer/UploadLibrary/Images/UploadDocuments/141119143510_state%20of%20Waste%20Report_2018.pdf

	<p>November 2016, outlining the country's pledge to transition to a lower-carbon economy. The NDC covers adaptation and mitigation, as well as finance and investment requirements, and is based on the principle of equity⁴⁸</p>	
<p>South Africa's updated first NDC submitted 2021</p>	<p>South Africa's updated NDC submitted to the UNFCCC in September 2021, covers mitigation and adaptation goals, support requirements under the Convention and Paris Agreement and equitable access to sustainable development.⁴⁹</p> <p>South Africa's updated NDC reflects deeply on the impacts of climate change, already experienced by the country and the dire outlook in the face of rising global emissions. Southern Africa is identified as a global climate change hotspot.⁵⁰ The national average temperature has increased at a rate of more than twice that of global temperature increases since 1990, which is already resulting in more frequent droughts and extreme weather events.</p> <p>South Africa's annual GHG emissions will be in a range from 398-510 Mt CO₂-eq. for the period 2021-2025 and 350-420 Mt CO₂-eq. for the period 2025 – 2030. The updated mitigation NDC proposes a significant reduction in the GHG emissions target ranges up to 2030. The upper end of the target range in 2025 has been reduced by 17%, and the upper end of the target range in 2030 has been reduced by 32%, and the lower range by 12%.</p> <p>The mitigation component of the NDC prioritises the decarbonisation of the</p>	

⁴⁸ South African Government, 2021. South Africa's Intended Nationally Determined Contribution (INDC), <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf>

⁴⁹ Government of South Africa, 2021. South Africa First Nationally Determined Contribution Under the Paris Agreement Updated September 2021, <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/South%20Africa%20First/South%20Africa%20updated%20first%20NDC%20September%202021.pdf>

⁵⁰ Hoegh-Guldberg O, Jacob D, Taylor M, Bindi M, Brown S, Camilloni I, et al. Impacts of 1.5°C global warming on natural and human systems. In: Masson- Delmotte V, Zhai P, Pörtner H-O, Roberts D, Skea J, Shukla PR, et al., editors. Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. IPCC; 2018. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

	<p>electricity sector during the 2020s, with a deeper decarbonisation anticipated in 2030s, coupled with a transition in the transport sector towards low emission vehicles. Hard to mitigate sectors will be focus of transition effect during the 2040s and beyond.</p> <p>South Africa's Just Transition challenges are highlighted in the NDC, particularly arising from transitioning the electricity sector, seeking early investment in and preparing for mitigation in harder-to-mitigate sectors, and addressing the economic and social consequences resulting from this transition in coal-producing regions.</p>	
National Climate Change Bill	<p>The Government has approved the submission of the National Climate Change Bill to Parliament. The Bill seeks to provide a legal instrument towards the implementation of the National Climate Change Response Policy allowing for the alignment of policies that will influence the country's climate change response. The Bill has already gone through an extensive public consultation process⁵¹</p>	
Greenhouse gas (GHG) contribution as % of global total and sectoral split	<p>The National GHG inventory covers, Energy; Industrial Process and Product Use (IPPU); Agriculture, Forestry and Other Land Use (AFOLU); and Waste.</p> <p>South Africa's GHG emissions (excl. FOLU) were 448 874 Gg CO₂e in 2000 and these increased by 63 787 Gg CO₂e (or 14.2%) by 2017. Emissions (incl. FOLU) were estimated at 482 016 Gg CO₂e in 2017 and showed an increase of 10.4% since 2000.</p> <p>The Energy sector is the largest contributor (80.1% in 2017) to emissions (excl. FOLU) and is responsible for 96.6% of the increase over the 17-year period. The AFOLU sector is an overall</p>	Department of Forestry, Fisheries and Environment

⁵¹ South African Government, 2021. Statement on virtual Cabinet Meeting of 14 September 2021. <https://www.gov.za/speeches/statement-virtual-cabinet-meeting-14-september-2021-20-sep-2021-0000>

	<p>source, however this source has been reducing due to the increasing Land sink.</p> <p>Carbon dioxide is the largest contributor to South Africa's emissions, increased slightly from 83.2% in 2000 to 84.5% in 2017. This is followed by CH₄ and N₂O.⁵²</p>	
GHG/head	<p>The carbon intensity of the population (i.e., total net emissions per capita) increased between 2000 and 2007 to a peak of 10.8 tCO₂e per capita, after which it declined to 8.5 tCO₂e per capita in 2017⁵³</p>	Department of Forestry, Fisheries and Environment
ND-GAIN Country Index	<p>Notre Dame Global Adaptation Initiative (ND-GAIN) Country Index rank – 92. Score: 47.6. Vulnerability: 0.413.⁵⁴</p> <p>Readiness: 0.366. The low vulnerability score and low readiness score of South Africa places it in the lower-left quadrant of the ND-GAIN Matrix. The ND-GAIN Country Index captures a country's vulnerability to climate change and other global challenges, and its readiness to improve resilience. Relative to other countries, South Africa's current vulnerabilities are manageable but improvements in readiness will help it better adapt to future challenges. South Africa is the 80th least vulnerable country and the 81st least ready country</p>	University of Notre Dame
Other climate policy status (e.g. climate change law)	<p>Over the past two decades, South Africa has adopted a range of national and sectoral policies, plans and strategies, as detailed in Figure 11 of the landscape mapping report. This includes the National Climate Change Response Strategy and National Energy Act</p>	The South African Government
Institutions responsible (e.g. role of subnational actors etc.)	<p>The National Climate Change Response Policy details the key institutions and</p>	

⁵² Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

⁵³ Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

⁵⁴ University of Notre Dame. 2018. ND-GAIN Country Index. <https://gain.nd.edu/our-work/country-index/rankings/>

	<p>stakeholders involved in South Africa's climate transition.⁵⁵</p> <p>The national government, provincial entities, municipalities, civil society organisations, private sector and research community in South Africa are actively working on their contributions to the shift to a low-carbon and climate-resilient society in the country.</p>	
Energy transition investment data	<p>In 2020, global investment in the low-carbon energy transition totalled US\$ 501.3 billion, up from US\$ 458.6 billion in 2019 and just US\$ 235.4 billion in 2010.⁵⁶</p> <p>This figure includes investment in projects such as renewable power, energy storage, electric vehicle (EV) charging infrastructure, hydrogen production and carbon capture and storage projects – as well as end-user purchases of low-carbon energy devices, such as small-scale solar systems, heat pumps and zero-emissions vehicles.</p>	Bloomberg New Energy Finance

⁵⁵ Government of South Africa, 2011. National Climate Change Response White Paper, https://www.dffe.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf

⁵⁶ Bloomberg NEF. 2021. Energy Transition Investment trends, <https://about.bnef.com/energy-transition-investment/#toc-download>

1.2 GESI

There are many dimensions to inequality in South Africa. The most recent survey, the 'Inequality Trends in South Africa' report released by Statistics South Africa, documents six forms of inequality that are prevalent in South Africa:⁵⁷

- economic inequality (per capita income and per capita expenditure);
- asset and wealth inequality (household asset ownership);
- labour market inequality (access to employment, participation, income);
- inequality in the social domain (access to education, healthcare, and basic services, such as water, sanitation, refuse removal and electricity);
- gender inequality; and
- unequal social mobility (movement of an individual/household between social strata or social classes).

Inequality in South Africa disproportionately affects women. Gender intersects with a range of factors, such as race and ethnicity, age, and disability, all of which contribute to and shape an individual identity. These factors are interrelated and are experienced as interconnected by individuals on a daily basis. The impact of gender inequality overlaps with and amplifies many other disadvantages, reproducing poverty and inequality.

South Africa's Gini coefficient, which is a measure of inequality, is 0.66, which is among the highest in the world. Women are the group that is most vulnerable to poverty and constitute the majority of South Africans living in poverty. More than half (55%) of the country's population live in poverty, with more than 10% living in extreme poverty – the majority of whom are Black African women. The Gini coefficient for individuals living in female-headed households declined to 0.61 in 2011 and has remained at 0.61. Since 2009, the Gini coefficient based on per capita expenditure has been the highest for Black Africans compared to the other three population groups. Income from the labour market accounted for the largest proportion of income inequality in this period. Women's share of household income and expenditure is significantly lower than that of men and the socioeconomic status of households headed by women is considered to be lower than that of households headed by men.⁵⁸ Individuals living in male-headed households have annual mean and median expenditures higher than those living in female-headed households (which account for approximately four of every 10 households). Further, children are far more likely to live with their mother than their father, resulting in the majority of South Africans receiving both physical and financial care from women. From a race perspective, the White population group had the highest annual mean and median expenditure compared to other population groups between 2006 and 2015, while Black Africans had the lowest.⁵⁹

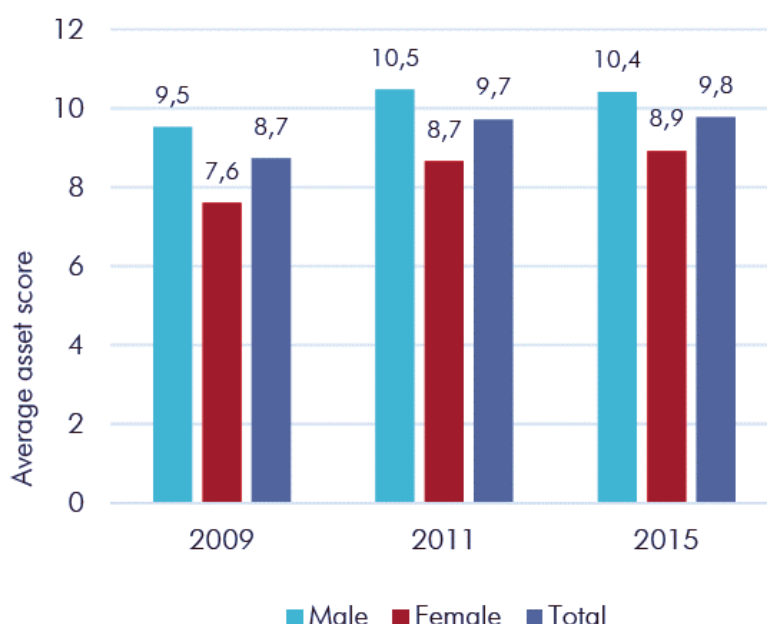
The average Gini scores for assets reflect inequality between groups in terms of availability of resources that a specific group have compared to another group. As shown in Figure 2, the asset scores for individuals living in male-headed households remained higher than those living in female-headed households in the period 2009–2015. This suggests that the economic well-being of individuals in male-headed households is better than that of individuals in female-headed households.

⁵⁷ Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

⁵⁸ Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

⁵⁹ Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

Figure 2 Average asset scores by sex of household head (2009, 2011 and 2015)⁶⁰



Wealth inequality in South Africa is considerably higher than income inequality, with the wealth Gini coefficient being estimated at 0.94 in 2014/15.⁶¹ Furthermore, while the top 10% of the population has a 56% to 58% share of income, they have approximately 95% of all wealth.⁶²

South Africa has significant racial and spatial disparities, given the country's history of racial and spatial segregation. For example, youth unemployment is over 50%, while the overall unemployment figure is just over 30%. There is considerable spatial inequality, which is manifested in a rural versus urban divide and also within urban areas. All of this has been exacerbated by the impacts of the COVID-19 pandemic on the South African people and economy.

The South African labour market is heavily racialised and gender-biased. Female workers earn approximately 30% less, on average, than male workers, across all educational levels. Males are more likely to be employed and have relatively better paying jobs compared to females. Women are more likely than men to be doing unpaid work. The proportion of men in employment is higher than that of women. The unemployment rate among men is lower than that among women. Once they are in employment, appointments to decision-making positions and jobs in certain sectors, or with certain characteristics, remain elusive for women. Women, and especially Black and other ethnicity women, continue to be under-represented in high-skilled and management positions.⁶³ The earnings distribution starkly reveals the heavily racialised inequality in the South African labour market. In

⁶⁰ Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

⁶¹ Orthofer, A., 2016. Wealth inequality in South Africa: Evidence from survey and tax data. Research project on employment, income distribution & inclusive growth, 15. <https://thedocs.worldbank.org/en/doc/731511476914370714-0050022016/original/WealthinequalityinSouthAfrica.pdf>

⁶² Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

⁶³ Statistics South Africa, 2019. Quarterly Labour Force Survey of the 2nd quarter of 2021. <http://www.statssa.gov.za/publications/P0211/P02112ndQuarter2021.pdf>

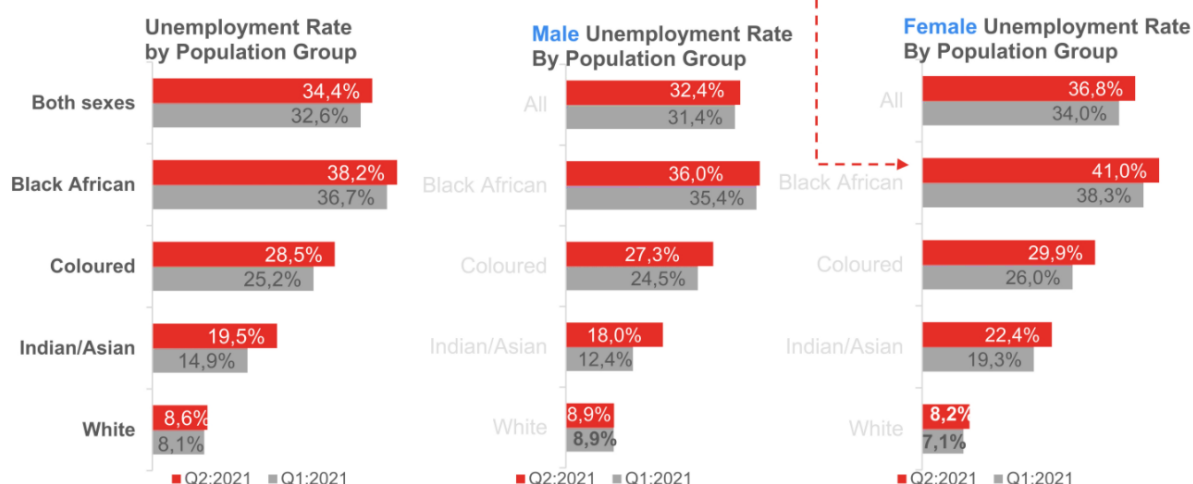
addition to having the worst employment outcomes, Black Africans, and Black African women in particular, also earn the lowest wages when they are employed.

Figure 3 shows South Africa's labour market profile by race and gender.

Figure 3 South Africa labour market profile by race and gender⁶⁴

Black African women are the most vulnerable with an **unemployment rate of 41,0%** in Q2:2021. This is 4,2 percentage points higher than the national average.

OFFICIAL unemployment rate by population group and sex



The impact of apartheid policies has left a legacy of unequal development across the South African landscape, which is manifested in regional inequalities in terms of access to education, healthcare, and basic services (such as water, sanitation, refuse removal and electricity). From a social domain perspective, female-headed households were still more deprived in 2017 relative to male-headed households with regard to access to piped water, improved sanitation, refuse removal and the internet. Males also had consistently higher literacy rates compared to females, at 95.6% and 94.1%, respectively, in 2017.⁶⁵

Efforts to address GESI need to integrate intersectional approaches so as to be able to understand and to respond to the ways in which different factors – such as race and ethnicity, age, and disability – intersect to shape an individual identity.

1.3 South Africa's GDP and debt

In South Africa, GDP is measured by the production method (the official GDP figure) and the expenditure method.⁶⁶ The first measures the total value added of all goods and services produced, while the second measures GDP via total spending that has taken place in the economy. GDP growth in South Africa has persistently been worse than expectations in recent years: economic activity has underperformed relative to the South African Reserve Bank's expectations (and those of most

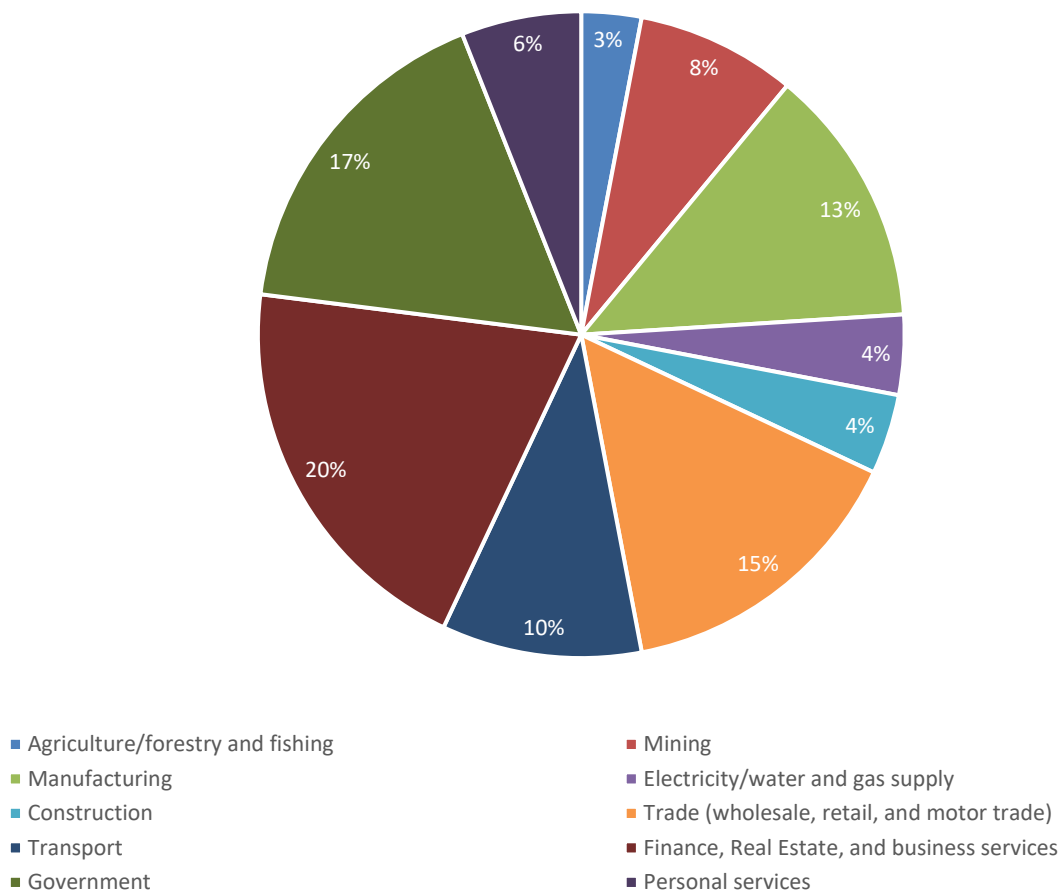
⁶⁴ Statistics South Africa, 2019. 'Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

⁶⁵ Statistics South Africa, 2019. Inequality Trends in South Africa: A multidimensional diagnostic of inequality'. Report No. 03-10-19. <https://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

⁶⁶ Statistics South Africa, 2019, 2021 'Measuring South Africa's Economic Growth', https://www.statssa.gov.za/economic_growth/15%20Measuring%20GDP.pdf

analysts), resulting in continuous downward revisions to the growth outlook. The key sectors that keep South Africa's economic engine running are manufacturing, wholesale and retail trade, financial services, transport, mining, agriculture, and tourism.

Figure 4: Contribution by sector to South Africa's GDP (2017–2020 estimates)



1.3.1 The impact of COVID-19 on South Africa's GDP and debt

Approximately 86,967 COVID-related deaths (24 September 2021) have been reported by the National Department of Health and the impact of the COVID-19 pandemic continues to have profound economic and social consequences.⁶⁷ After the major outbreak of the pandemic in 2020, unemployment rates rapidly increased in most developing and advanced economies, with poverty rates also increasing. These same trends are clear in South Africa. South Africa's unemployment rate rose to 32.6% in the first quarter of 2021, from 27.2% in the first quarter of 2019. This was the highest jobless rate since comparable data collection began in 2008.

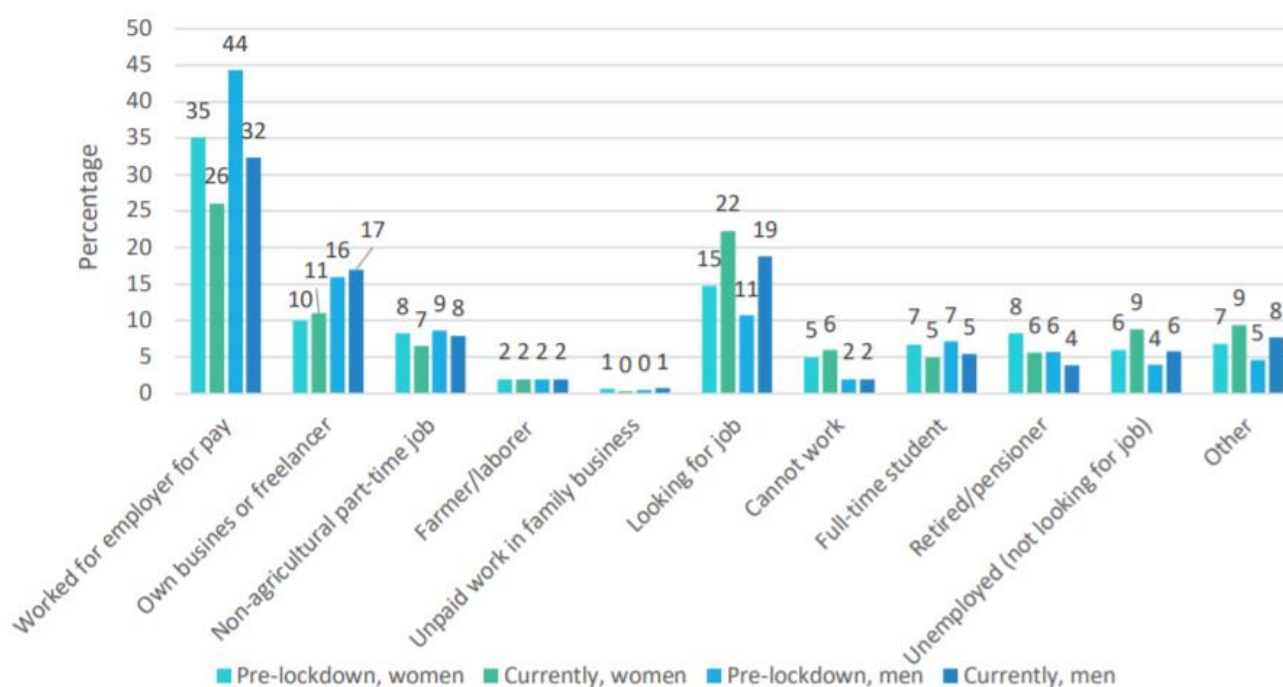
The findings from the National Income Dynamics Study – Coronavirus Rapid Mobile Survey (NIDS-CRAM), one of the largest non-medical research projects on COVID-19 in South Africa to date, indicate that women have been most severely affected by the pandemic in the general economy, the workplace and the home. Women accounted for two-thirds of the net job losses early on during the

⁶⁷ Department of Health. 2021. COVID-19 Statistics in South Africa (Friday 24 September) <https://sacoronavirus.co.za/2021/09/24/update-on-covid-19-friday-24-september/>

pandemic. Among those who retained employment, women also saw larger declines in hours worked. Women also took on a larger share of the extra childcare work following school closures⁶⁸.

The pandemic has brought to the fore the intersecting inequalities of race and gender in South Africa, exacerbating existing poverty, inequality, and lack of access to economic opportunities and services, particularly for Black South Africans in rural, peri-urban and informal settlements (Figure 5).

Figure 5 Pre-COVID-19 lockdown and current economic activities, by gender⁶⁹



The pandemic and subsequent lockdown restrictions caused significant disruptions to the South African economy. Real GDP was ZAR 782 billion in the first quarter of 2020 (January–March), compared to a quarterly average of ZAR 1,260 billion in 2019. Economic output subsequently dropped to ZAR 652 billion in the second quarter of 2020 (April–June), when lockdown restrictions were at their most stringent.⁷⁰ The South African economy grew by 1.1% in the first quarter of 2021, which translated into an annualised growth rate of 4.6%. This follows a revised 1.4% (annualised: 5.8%) rise in the real GDP in the fourth quarter of 2020. Eight of the 10 sectors included in Figure 4 recorded positive gains in the first quarter of 2021, with finance, mining and trade making the most significant contributions.

South Africa's external debt increased to US\$ 1.70 billion in the fourth quarter of 2020, from US\$ 1.57 billion in the third quarter of 2020.⁷¹ South Africa's external debt as a percentage of GNI for BRICS countries is shown in Figure 6 below.

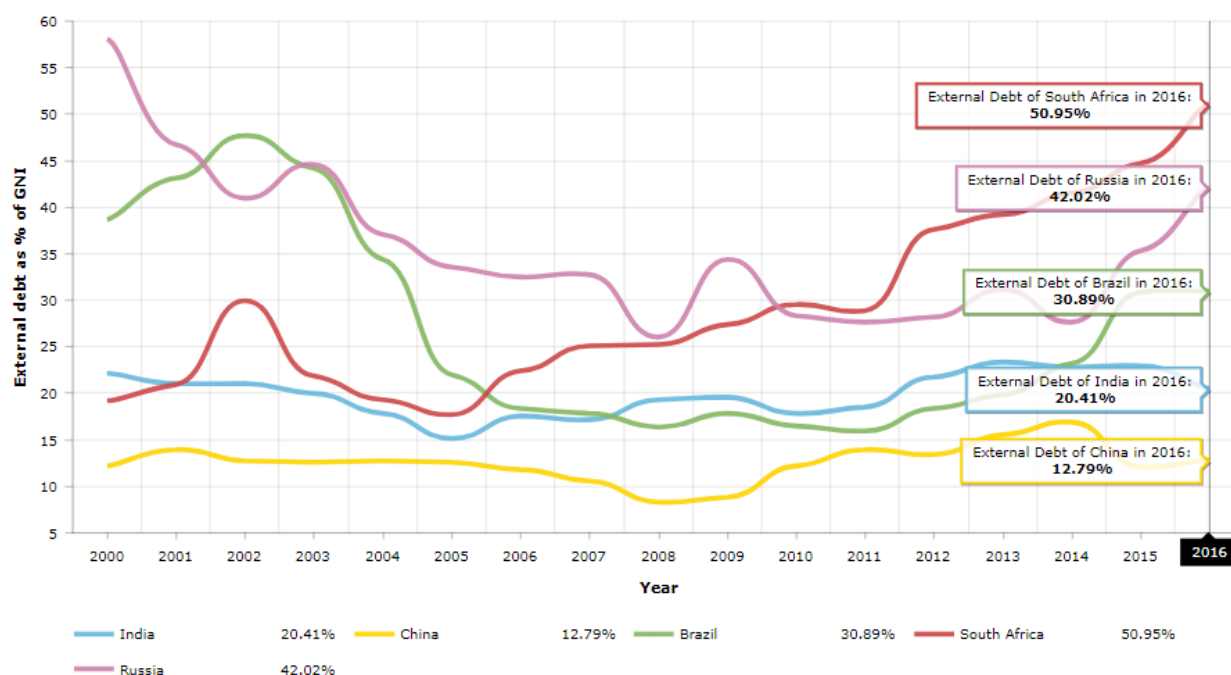
⁶⁸ Casale, D. and Posel, D. 2021. Gender inequality and the COVID-19 crisis: Evidence from a large national survey during South Africa's lockdown. Research in Social Stratification and Mobility 71 (2021). <https://www.sciencedirect.com/science/article/pii/S0276562420301050?via%3Dihub>

⁶⁹ Casale, D. and Posel, D. 2021. Gender inequality and the COVID-19 crisis: Evidence from a large national survey during South Africa's lockdown. Research in Social Stratification and Mobility 71 (2021). <https://www.sciencedirect.com/science/article/pii/S0276562420301050?via%3Dihub>

⁷⁰ Statistics South Africa, 2021. 'GDP rises in the first quarter of 2021', <http://www.statssa.gov.za/?p=14423>

⁷¹ Trading Economics (2020) 'South Africa Total Gross External Debt', <https://tradingeconomics.com/south-africa/external-debt>

Figure 6 External debt as % of GNI for BRICS countries⁷²



Loans to the private sector in South Africa increased to ZAR 3,958,370 million in April 2021, from ZAR 3,935,120 million in March of 2021.⁷³ According to World Bank data, domestic credit in the private sector (as % of GDP) was 129% in 2019.⁷⁴

1.3.2 Balancing climate change mitigation and poverty

South Africa remains one of the most unequal economies in the world, with a Gini coefficient of 0.63 in 2021.⁷⁵ The country grapples with inequality and an uneven distribution of wealth, persistent and high unemployment rates, and a large group of people who are dependent on subsistence agriculture for food security. Climate change is exacerbating poverty and food insecurity for many South Africans residing in rural communities and those classified as the urban poor, who reside in informal human settlements.

The increase in the number of floods and droughts recorded across the country suggests the future narrative of climate change impacts – deepening conditions of poverty and food insecurity for many South Africans living in rural and urban poor communities. Not only will the impacts of climate change disproportionately affect the poor, they will also affect South Africa's ability to meet its development and economic growth goals, including job creation and poverty reduction.⁷⁶ It is in the country's interest to invest in the transition to a low-carbon society, which will reduce the risks and impacts of climate change, alleviate poverty, and improve livelihoods and well-being.

⁷² Trading Economics (2020) 'South Africa Total Gross External Debt', <https://tradingeconomics.com/south-africa/external-debt>

⁷³ Trading Economics (2021) 'South Africa Loans to Private Sector', <https://tradingeconomics.com/south-africa/loans-to-private-sector>

⁷⁴ World Bank (2019) 'Domestic credit to private sector (% of GDP) – South Africa', <https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS?locations=ZA>

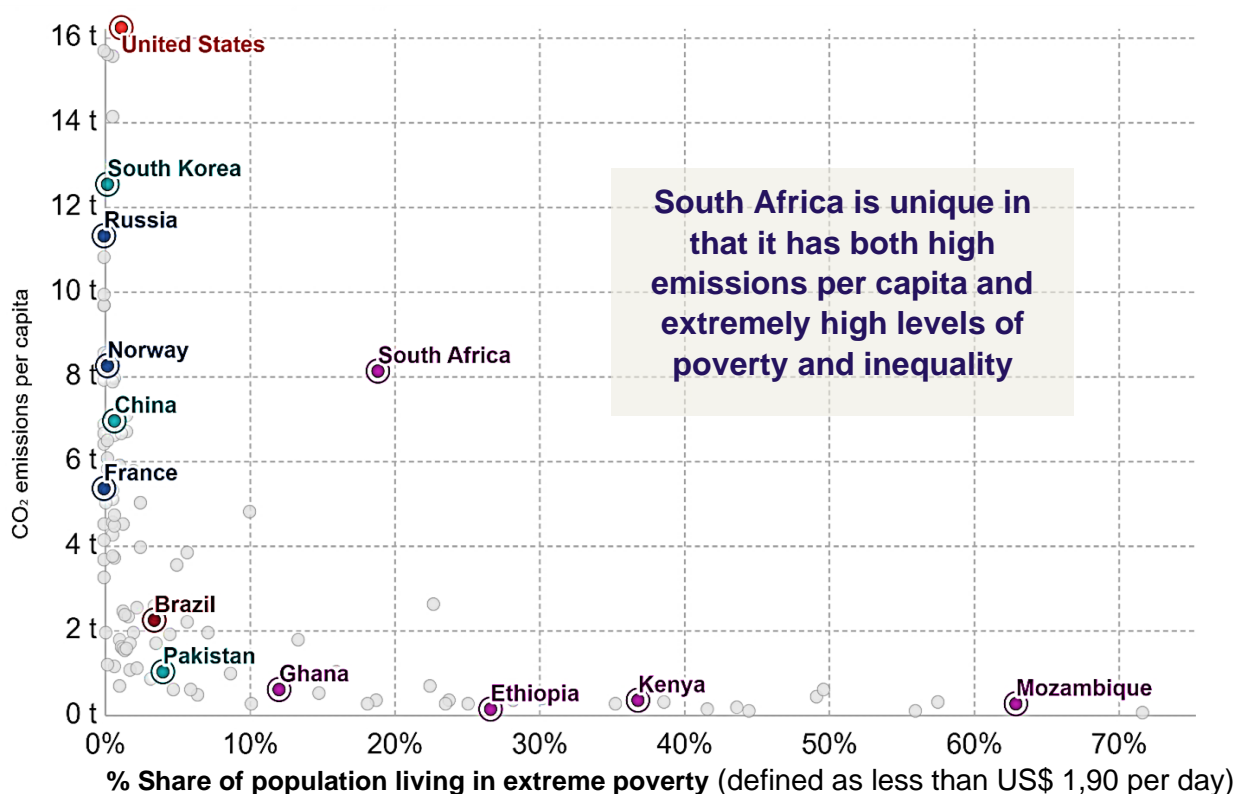
⁷⁵ <https://worldpopulationreview.com/country-rankings/gini-coefficient-by-country>

⁷⁶ DEA (2018) 'South Africa's 3rd Annual Climate Change Report', DEA, Pretoria. <https://www.dffe.gov.za/sites/default/files/reports/SouthAfricas-3rd-climate-change-report2017.pdf>

The ND-GAIN Country Index captures a country's vulnerability to climate change and other global challenges, and its readiness to improve its resilience. South Africa's GAIN scores in 2018 were as follows: ND-GAIN Country Index rank: 95 out of 182 countries; score: 47.6; vulnerability: 0.413; and readiness: 0.366. The low vulnerability score and low readiness score indicate that the country's current vulnerabilities are manageable. Still, improvements in readiness will help South Africa better adapt to future challenges.⁷⁷

A big question for South Africa is where the country sits on the spectrum of developed and developing economies. The answer is that it has elements of both. As shown in Figure 7, South Africa is unique in that it has both high emissions per capita and extremely high levels of poverty.

Figure 7 Percentage of population living in extreme poverty (defined as less than US \$1,90 per day)⁷⁸



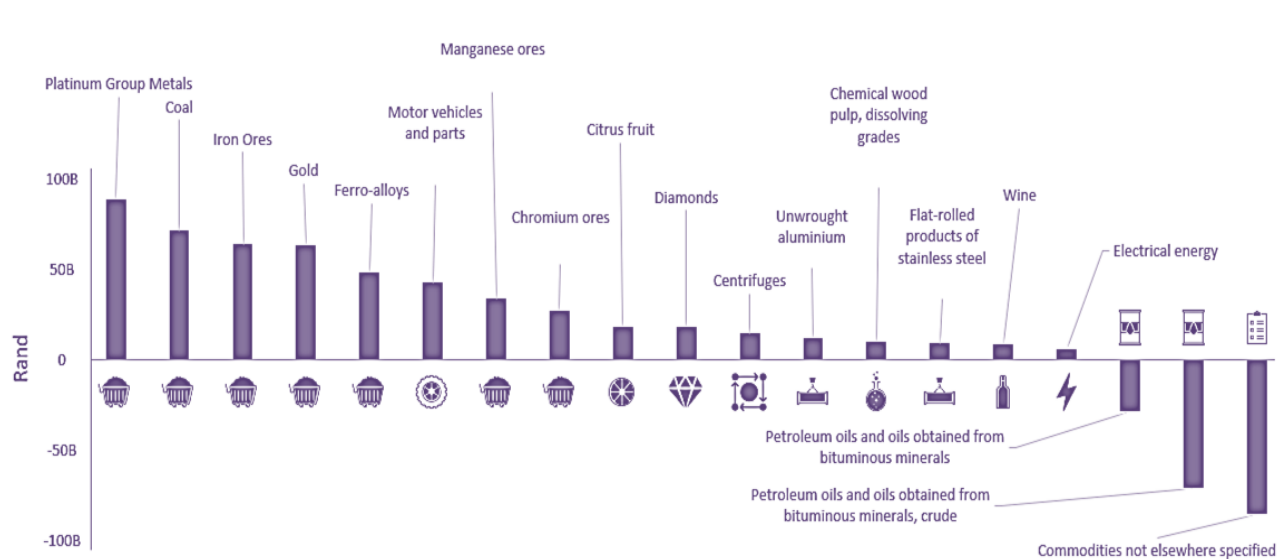
Key to this discussion is historical emissions and the remaining share of the carbon budget to which South Africa is entitled. While it is entitled to a greater carbon budget, South Africa's long-term vision is of a low-carbon and climate-resilient economy and society, with much-reduced poverty and inequality.

When considering its balance of payments, South Africa's trade vulnerability is particularly acute. As shown in Figure 8 below, the commodities that are the country's biggest export earners are all extremely vulnerable to changes in global demand, thereby threatening South Africa's ability to service its national debt and to import liquid fuels in the medium term, as well as to address food security. Managing the transition to a low carbon economy for these sectors could lead to significant opportunities.

⁷⁷ University of Notre Dame (2018) *ND-GAIN Country Index*, <https://gain.nd.edu/our-work/country-index/rankings/>

⁷⁸ Our World in Data, from Global Carbon Project, World Bank, Gapminder, United Nations.

Figure 8 Largest export-earning commodities for South Africa⁷⁹



One-third of platinum group metals demand comes from catalysts for the internal combustion engine. We anticipate that the last internal combustion engine will be manufactured before 2035. This will impact demand from both vehicle and vehicle part manufacturers for platinum group metals. However, an opportunity is embedded in the role of platinum group metals in fuel cells and hydrogen applications. Furthermore, the automotive sector could be transitioned to manufacturing EVs.

Coal is unlikely to have any significant role in the global economy post-2050, and will likely phase out around 2040. South Africa must find alternatives to this significant export commodity, possibly through hydrogen and carbon-neutral liquid fuels.

The success of gold, iron ore and ferroalloys is dependent on finding zero-carbon production technology options, with low-energy input prices that allow carbon-neutral versions of these commodities to capture global market share.

Given that, according to the Department of Trade, Industry and Competition, South Africa is the second most vulnerable country as regards trade-weighted distance, and given that tourism makes up as much as 10% of GDP, carbon-neutral shipping and aviation are critical global technologies for ensuring the country's economic competitiveness.

South Africa has critical choices to make about how to turn commodity risk into opportunity. There is also strong evidence of non-green infrastructure investments becoming stranded assets over time.

1.4 Political and legal framework

The Republic of South Africa is a constitutional state with a supreme Constitution and a Bill of Rights. All laws must be consistent with the Constitution. South Africa has a mixed legal system: a hybrid of Roman-Dutch civilian law, English common law, customary law, and religious personal law.

The South African government is divided into three parts: the executive (the Cabinet), the legislature (Parliament) and an independent judiciary (the courts).

⁷⁹ NBI and Boston Consulting Group analysis of Department of Trade, Industry and Competition data.

South Africa is a constitutional democracy with a three-tier system of government. The national, provincial and local levels of government all have legislative and executive authority in their spheres and are defined in the Constitution as distinctive, interdependent and interrelated. Operating at both national and provincial levels are advisory bodies drawn from South Africa's traditional leaders. The Constitution prescribes that the country be run in accordance with a cooperative governance system.

Governance in South Africa involves government clusters, which are groupings of government departments with cross-cutting programmes. These clusters foster an integrated approach to governance to improve government planning, decision-making and service delivery. Their main objective is to ensure proper coordination of all government programmes at national and provincial levels and their main functions are to ensure the alignment of government-wide priorities, to facilitate and monitor the implementation of priority programmes, and to provide a consultative platform on cross-cutting priorities and matters being taken to Cabinet.

The clusters of the Forum of South African Directors-General (FOSAD) mirror the ministerial clusters, to which they provide technical support. FOSAD is chaired by the Director-General within the Presidency.

Governance in South Africa involves ministers entering into delivery agreements with the President and giving progress reports on their departments' set targets.

The seven outcomes identified by the government as priorities in the Medium-Term Strategic Framework 2019-2024 include:⁸⁰

- Priority 1: A Capable, Ethical and Developmental State
- Priority 2: Economic Transformation and Job Creation
- Priority 3: Education, Skills and Health
- Priority 4: Consolidating the Social Wage through Reliable and Quality Basic Services
- Priority 5: Spatial Integration, Human Settlements and Local Government
- Priority 6: Social Cohesion and Safe Communities
- Priority 7: A better Africa and World

Cross Cutting Focus

- Women, Youth & People with Disabilities

In terms of GESI, South Africa's definition of, and goals for achieving, gender equality are guided by a vision of human rights that incorporates the acceptance of equal and inalienable rights of all women and men. South Africa's National Policy Framework for Women's Empowerment and Gender Equality establishes guidelines for South Africans as a national group to take action to remedy the historical legacy by defining new terms of reference for interacting with each other in both the private and public spheres and by proposing and recommending an institutional framework that facilitates equal access to goods and services for both women and men.

Black Economic Empowerment is an integration programme launched by the South African government to reconcile South Africans and redress the inequalities of Apartheid.

It encourages businesses to integrate Black people in the workspace, upskill, mentor and support Black businesses, and give back to mainly poor communities that remain poor due to land dispossession. The Broad-Based Black Economic Empowerment Act 53 of 2003 provides the legislative framework for Broad-Based Black Economic Empowerment in South Africa. Beyond these

⁸⁰ Department of Planning, Monitoring and Evaluation, 2020 Revised Medium-Term Strategic Framework 2019-2024, https://www.dpme.gov.za/keyfocusareas/outcomesSite/MTSF_2019_2024/2019-2024%20MTSF%20Comprehensive%20Document.pdf

two relevant legislative examples, South African workers and employers enjoy many rights, thanks to the Basic Conditions of Employment Act.

1.5 Ease of doing business in South Africa

South Africa is ranked 84 among 190 economies in the World Bank ease of doing business index, with a score of 67, according to the 2020 World Bank annual ratings (Table 2). South Africa's rank fell to 84 in 2019, from 82 in 2018.

Table 2 Ranking and score for ease of doing business in South Africa⁸¹

Topics	2020 rank	2020 score	2019 score	Change in score (% points)
Overall	84	67.0	66.7	↑ 0.3
Starting a business	139	81.2	81.2	-
Getting electricity	114	68.8	68.8	-
Registering property	108	59.5	59.3	↑ 0.2
Getting credit	80	60.0	60.0	-
Protecting minority investors	13	80.0	80.0	-
Paying taxes	54	81.2	81.1	↑ 0.1
Trading across borders	145	59.6	59.6	-
Enforcing contracts	102	56.9	54.1	↑ 2.8
Resolving insolvency	68	54.6	54.5	↑ 0.1

The 2008–2009 financial crisis led policymakers across the world to introduce new regulations/policies. Due to these changes, financial systems were strengthened worldwide. By pushing banks to deleverage, increase capitalisation and reduce non-performing loans, banks emerged from the financial crisis stronger and were overall sounder in 2019 than they had been in the previous 12 years. The situation of South Africa's banking system relative to selected countries is shown in Table 3 below (column A). During this timeframe, banks worldwide eased credit conditions, supported by an accommodative monetary policy, granting better capital access to both large firms and small and medium-sized enterprises (SMEs) (Table 3, column B).

Table 3 Banking system indicators for selected countries ⁸²

Column A: Stability indicators					B: Access indicators	
	Non-performing loans, (level 2018)	Non-performing loans, (difference 2012 to 2018)	The soundness of banks (index, 2019 score relative to 2008)	Change in bank capital to asset ratio, (difference 2008 to 2019)	Loans strictness (difference Q4 2008 to Q4 2018)	Financing of SMEs, % change (index, 2019 score relative to 2015)
China	1.8%	0.88%	114.4	9.31	-	123.6
Germany	1.2%	-1.62%	91.3	2.04	-36.46	106.7

⁸¹ World Bank (2021) 'Ease of doing business report', <https://www.doingbusiness.org/en/data/exploreeconomies/south-africa>

⁸² World Economic Forum (2020) 'Global Competitiveness Report Special Edition', <https://www.weforum.org/reports/the-global-competitiveness-report-2020>

India	9.5%	6.09%	77.8	8.11	-	99.4
Indonesia	2.3%	0.52%	95.7	6.43	-	108.1
Korea, Rep.	0.3%	-0.24%	100.7	1.66	-	116.3
Mexico	2.1%	-0.39%	98.4	1.40	-	102.0
South Africa	3.7%	-0.31%	96.0	8.51	-	85.8
UK	1.1%	-2.51%	97.3	2.40	-	114.6
USA	0.9%	-2.40%	102.9	11.78	-77.60	104.9

1.6 Climate change priorities, strategy and institutions

Note: The non-performing loans indicator is the ratio of the value of non-performing loans divided by the total value of the loan portfolio of all banks operating in a country. The soundness of banks indicator corresponds to responses to the question 'In your country, how do you assess the soundness of banks?' [1 = extremely low – banks may require recapitalisation; 7 = extremely high – banks are generally healthy, with sound balance sheets]. The bank capital to asset ratio is obtained by dividing banks' assets by total capital. The loans strictness indicator is the percentage of bank managers reporting having tightened standards for loans. The financing of SME indicator corresponds to responses to the question 'In your country, to what extent can small- and medium-sized enterprises (SMEs) access finance they need for their business operations through the financial sector?' [1 = not at all; 7 = to a great extent]

South Africa has an energy- and carbon-intensive economy that is vulnerable to climate change and underprepared for a low-carbon transition. The energy sector contributes around 80% of total GHG emissions – 50% from electricity generation and liquid fuel production alone. The energy carbon intensity of the population (i.e. energy sector emissions per capita) increased significantly (by 12.1%) between 2001 and 2007, stabilised until 2009, and then showed a decline (by 16.5%) between 2009 and 2017 (Figure 9).

The country's carbon intensity is 599 t of CO₂ per million dollars of GDP, more than double the global average of 286 t of CO₂ per million dollars of GDP (Figure 10). Carbon intensity in South Africa increased by 1.4% in 2018 and 2019, while real GDP growth was a modest 0.2%.

While South Africa's renewable energy generation is set to increase, the adequacy of the pace of decarbonisation is widely questioned. As stated earlier, South Africa is also one of the world's most unequal societies, and its structural unemployment and high levels of poverty are major concerns for a low-carbon transition.

Figure 9 Trends in energy intensity indicators for South Africa between 2000 and 2017

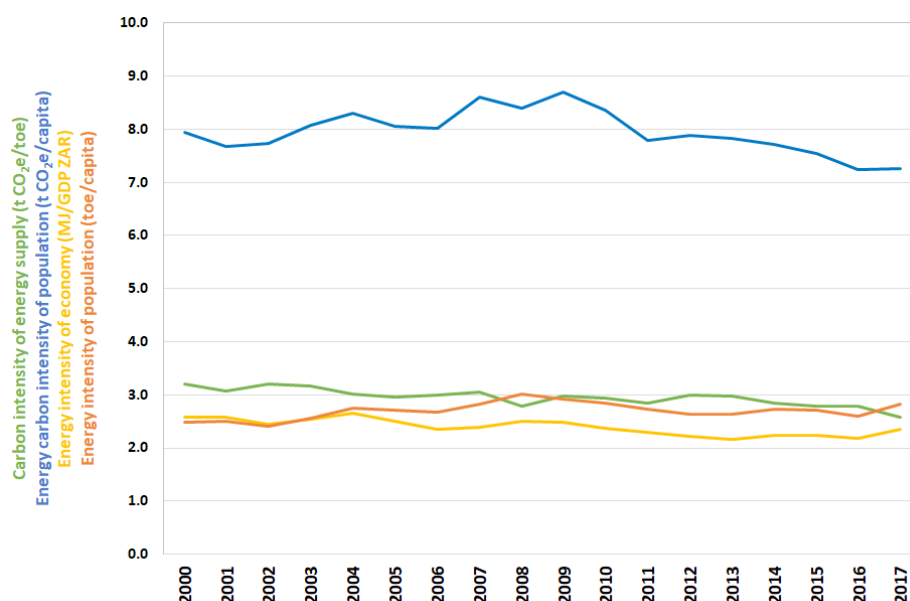
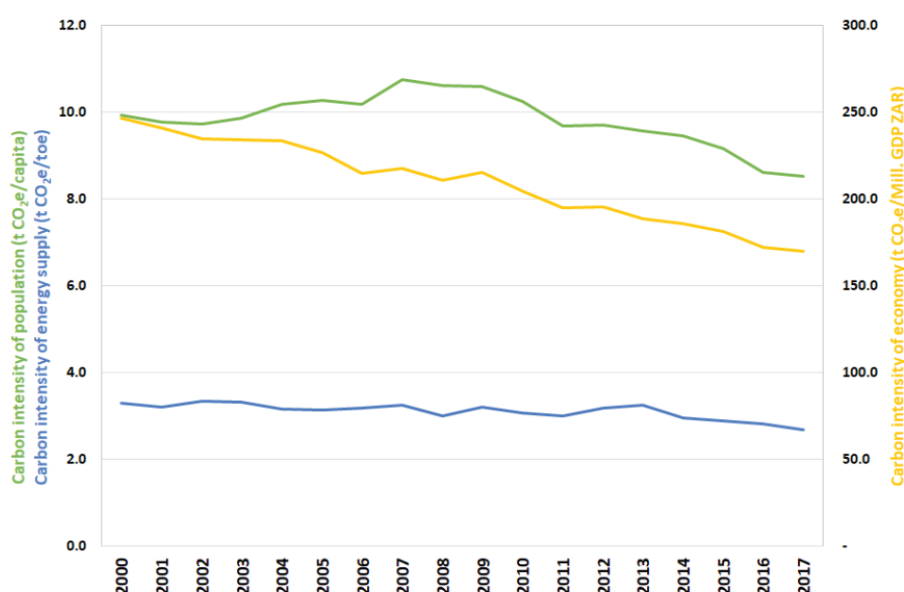


Figure 10 Trends in carbon intensity indicators for South Africa between 2000 and 2017⁸³



The United Nations 2030 Agenda for Sustainable Development highlights the importance of inclusive and sustainable economic growth and employment, and decent work for all (Sustainable Development Goal 8).

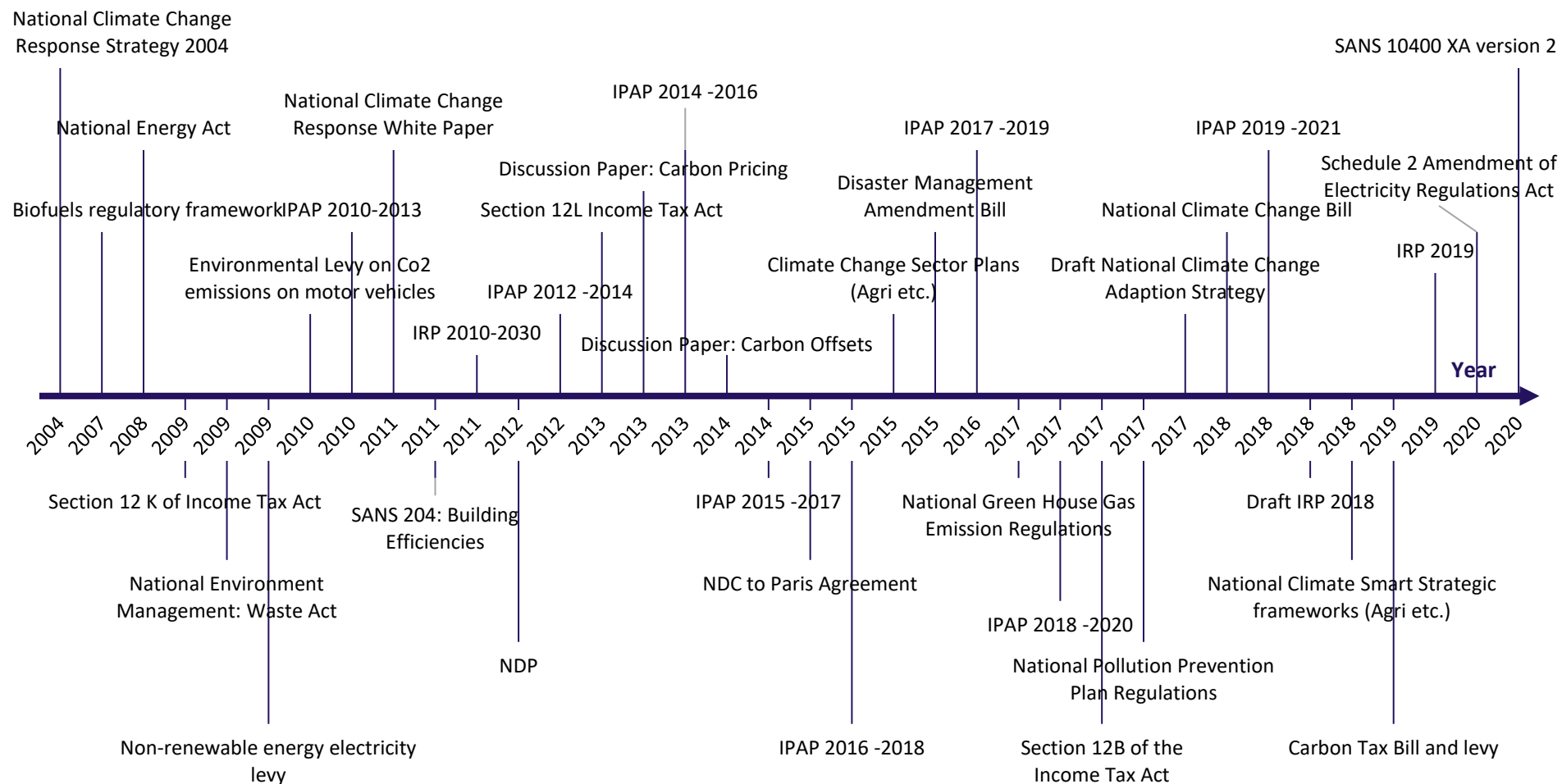
Furthermore, sustainable development is considered an important tool for achieving the goals of the Paris Agreement globally and for achieving the NDC that South Africa has committed to, so as to reach the goal of limiting warming to 1.5°C above pre-industrial levels by 2100.

The national government, provincial entities, municipalities, civil society organisations, the private sector and the research community in South Africa are actively contributing to the shift to a low-carbon and climate-resilient society. Over the past two decades, South Africa has adopted a range of national

⁸³ Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

and sectoral policies, plans and strategies to this end, as detailed in **Error! Reference source not found.** below.

Figure 11 Timeline of national climate-related policy development in South Africa



These national and sectoral policies, plans and strategies are aimed at decarbonising the South African economy while meeting the broad developmental objectives recently outlined in the 2019 State of the Nation Address:⁸⁴

- economic transformation and job creation;
- improved education, skills and health;
- consolidating the social wage through reliable and quality basic services;
- spatial integration, human settlements and local government;
- social cohesion and safe communities;
- a capable, ethical and developmental state; and
- a better Africa and world.

Addressing the threat of climate change requires restructuring energy- and resource-intensive sectors, sharp increases in energy efficiency, shifts in production and consumption, and adaptation of all sectors. With about 80% of South Africa's GHG emissions coming from a fossil fuel-dependent energy sector, and high vulnerability to climate change risk, South Africa needs strong and durable social agreements between government, labour, business and civil society. It needs to plan for workforce reskilling and job absorption, social protection and livelihood creation, and it needs to incentivise new green sectors, diversify coal-dependent regional economies, and develop labour and social plans as and when ageing coal-fired power plants are decommissioned.

The deployment of renewable energy has risen rapidly in South Africa, with the cost of renewables (notably solar and wind) falling significantly. In line with the national commitment to transition to a low-carbon economy, the 2010 Integrated Resource Plan (IRP) included plans for 17,800 megawatt (MW) new renewables capacity to be installed by 2030. South Africa's investment in renewable energy in 2018 was the highest in five years, according to Bloomberg New Energy Finance. Investment sat at US\$ 2.6 billion in the third quarter of 2018. This is a huge increase compared to the same period in 2017, partly due to a US\$ 1.4 billion wind project and partly due to financial close finally being reached with the preferred bidders for Bidding Window 4 (BW4) and BW4.5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) in 2018. BW4 had been tendered in 2014, with preferred bidders appointed in 2015.⁸⁵

In 2020, global investment in the low-carbon energy transition totalled US\$ 501.3 billion, up from US\$ 458.6 billion in 2019. This figure includes investment in projects such as renewable power, energy storage, EV charging infrastructure, hydrogen production and carbon capture and storage projects, and end-user purchases of low-carbon energy devices, such as small-scale solar systems, heat pumps and zero-emissions vehicles.⁸⁶

As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), South Africa remains committed to stabilising GHG concentrations in the atmosphere and halting global warming.⁸⁷

The Department of Forestry, Fisheries and Environment (DFFE), formerly known as the Department of Environmental Affairs (DEA), plays a central coordinating and policymaking role as the designated authority for environmental conservation and protection in South Africa.

⁸⁴ South African Government (no date) 'Key issues', <https://www.gov.za/issues/key-issues>

⁸⁵ Carbon Brief (2018) 'The Carbon Brief Profile: South Africa', <https://www.carbonbrief.org/the-carbon-brief-profile-south-africa>

⁸⁶ Bloomberg New Energy Finance (2021) 'Energy Transition Investment trends', <https://about.bnef.com/energy-transition-investment/#toc-download>

⁸⁷ South Africa's 4th biennial update report to the United Nations Framework Convention on Climate Change: https://www.environment.gov.za/sites/default/files/reports/biennialupdate/report04tounfccc_zeroorderdraft.pdf

The work of the DFFE is underpinned by the Constitution of the Republic of South Africa (Act No. 108 of 1996), the NDP (National Planning Commission, 2011), the National Environmental Management Act (Act No. 39 of 2004), the National Climate Change Response Policy (DEA, 2011) and other relevant legislation and policies applicable to the government's efforts to address environmental management, including climate change.

The DFFE coordinates the work on preparing the Biennial Update Reports to the UNFCCC, under the Chief Directorate: International Climate Change Relations and Negotiations. The Project Steering Committee, established by the Director-General of the DFFE, continues to support contributing authors in providing technical inputs and oversight on compiling these reports. This includes reviewing and commenting on the reports' content to ensure it reflects the national circumstances correctly.

1.6.1 National GHG emissions inventory

The national GHG inventory for South Africa (shown in summary in Table 4) is presented from 2000 to 2017. The inventory covers all four sectors: energy; IPPU; AFOLU; and waste. South Africa's GHG emissions (excluding FOLU) were 448,874 Gg CO₂e in 2000 and increased by 63,787 Gg CO₂e (or 14.2%) by 2017. Emissions (including FOLU) were estimated at 482,016 Gg CO₂e in 2017, an increase of 10.4% since 2000.⁸⁸

As shown in Table 4, the energy sector is the largest contributor (80.1% in 2017) to emissions (excluding FOLU) and is responsible for 96.6% of the increase over the 17-year period. The AFOLU sector is a key source of emissions but has been declining due to the increasing land sink.

Table 4 Summary of South Africa's GHG emissions between 2000 and 2017 by sector⁹

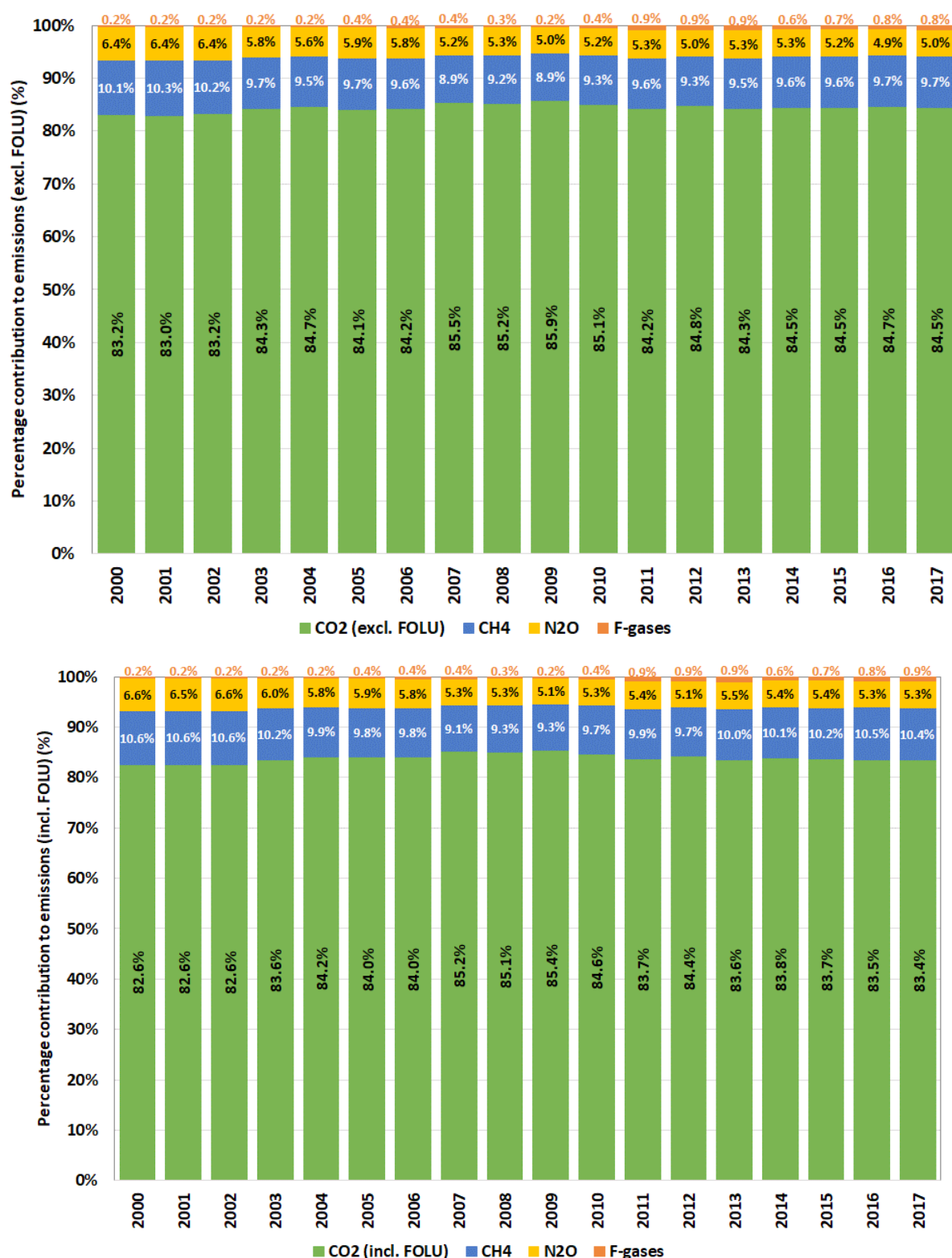
GHG source or sink sector	Emissions (Gg CO ₂ e)		Difference (Gg CO ₂ e)	Change (%) relative to 2000
	2000	2017		
Total (incl. FOLU)	436 733.5	482 016.3	45 283	10%
Total (excl. FOLU)	448 874.2	512 660.6	63 786	14%
Energy	349 099.7	410 685.3	61 586	18%
IPPU	32 987.3	32 084.6	-903	-2.7%
AFOLU (excl. FOLU)	53 229.4	48 641.8	-4 588	-8.6
AFOLU (incl. FOLU)	41 088.7	17 997.5	-23 091	-56 %
Waste	13 557.8	21 249.0	7 691	57%

Carbon dioxide is the largest contributor to South Africa's emissions, increasing slightly from 83.2% in 2000 to 84.5% in 2017. This is followed by methane (CH₄) and nitrous oxide (N₂O). The CH₄ contribution to total emissions (excluding FOLU) decreased from 10.1% to 9.7% over this period, and the N₂O contribution to emissions (excluding FOLU) declined from 6.5% in 2000 to 5.0% in 2017.

The F-gas contribution to total emissions (excluding FOLU) has increased from 0.2% to 0.8% over the 17-year period; however, this is due mostly to the incorporation of new sources over the assessment period.

⁸⁸ Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

Figure 12 Percentage contributions from each of the gases to South Africa's emissions – excluding FOLU (top) and including FOLU (bottom) – between 2000 and 2017⁸⁹

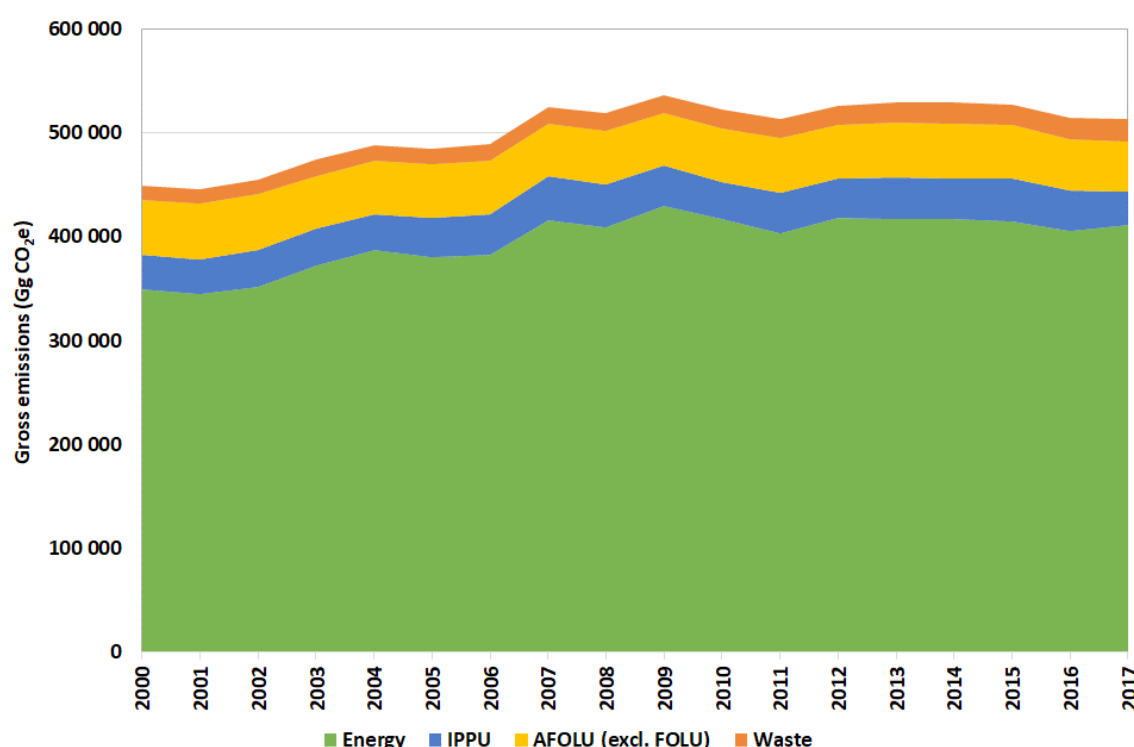


⁸⁹ Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

Energy emissions have increased over time (Figure 13) due to increased demand for liquid fuels in the road transportation, manufacturing, construction, civil aviation, residential and commercial sectors, but are now stabilising. There has been a slowly increasing trend in emissions from the IPPU sector, except for the reduction in emissions during the recession.

The main drivers in the IPPU sector are the metal industries, particularly iron and steel production and ferroalloy production. Emissions from agriculture (equivalent to AFOLU excluding FOLU) are stable but have declined slightly due to a slight reduction in the livestock population, particularly cattle. The land sector (FOLU) sink has increased in recent years due to increasing forest land area (particularly thickets and woodlands/open bush) and a decline in wood losses. Waste emissions have increased due to the growing population.⁹⁰

Figure 13 Trend in South Africa's GHG emissions between 2000 and 2017 by sector⁹¹



1.6.2 Mitigation actions and their effects

South Africa's mitigation system is based on three pillars: the GHG inventory, analysis of the mitigation potential, and sectoral emissions targets. Several policies and measures, both cross-sectoral (Carbon Budgets, the GHG Reporting Regulation, the Carbon Tax Act and the Carbon Offset Regulation) and sectoral, assist South Africa in achieving its emissions reduction targets.

In the energy sector, 11 measures have been identified, with the main policy drivers being the IRP, National Energy Efficiency Strategy, and (for transport) the Green Transport Strategy. In the IPPU sector, the Carbon Budgets and Pollution Prevention Plans for process emissions support the identified measures. In the AFOLU sector, five measures (afforestation, forest rehabilitation, thicket restoration, grassland rehabilitation and conservation agriculture) are implemented, supported

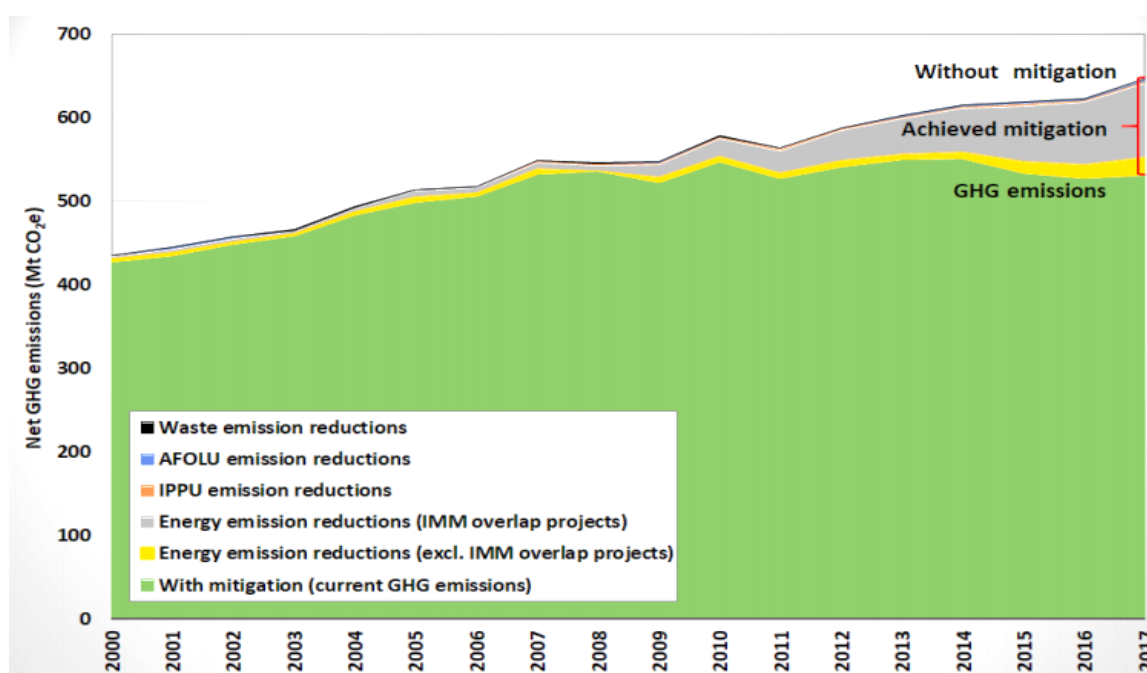
⁹⁰ South Africa's 4th biennial update report to the United Nations Framework Convention on Climate Change: https://www.environment.gov.za/sites/default/files/reports/biennialupdate/biennialupdate04tounfccc_zeroorderdraft.pdf

⁹¹ Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

through the Draft Climate Change Sector Plan for Agriculture, Forestry and Fisheries, the Draft Conservation Agriculture Policy, and the DFFE Strategic Plan. The policies in the AFOLU sector are not strictly designed for mitigation purposes, being aimed more at improving biodiversity and sustainability. The National Waste Management Strategy is the main driver for mitigation in the waste sector.

The annual GHG emissions reductions were estimated at 16.8 Mt CO₂e, 18.5 Mt CO₂e and 24.3 Mt CO₂e in 2015, 2016 and 2017, respectively (Figure 14). The energy sector reductions accounted for 79.1% of the total emissions reductions in 2017, while the IPPU sector contributed 10.3%. The AFOLU and waste sectors contributed 8.2% and 2.2%, respectively. Any action that involved projects which are also included under the International Market Mechanisms were excluded from these totals and reported separately. These projects are all in the energy sector, and would add 49.5 Mt CO₂ in 2015 and 64.6 Mt CO₂ in 2017. These projects, across all sectors, contributed 24.0 Mt CO₂ in 2015 and 25.7 Mt CO₂ in 2017, with the energy sector contributing 77.8% to the total in 2017.⁹²

Figure 14 South Africa's emissions reductions between 2000 and 2017⁹³



South Africa is committed to addressing climate change based on science and on applying the principles of the equity and sustainable development.⁹⁴

South Africa submitted its first [NDC](#) on 1 November 2016, outlining the country's pledge to transition to a lower-carbon economy. The NDC covers adaptation and mitigation, as well as finance and investment requirements, and is based on the principle of equity. It has been developed recognising that the Paris Agreement is binding, fair, effective and incorporates 'no backsliding' and a 'progressive approach' to enhance climate change mitigation and adaptation implementation within the context of sustainable development that considers a just transition.

⁹² South Africa's 4th biennial update report to the United Nations Framework Convention on Climate Change: https://www.environment.gov.za/sites/default/files/reports/biennialupdate/report04tounfccc_zeroorderdraft.pdf

⁹³ *Ibid.*

⁹⁴ DFFE website: <https://www.environment.gov.za>

In 2020, South Africa submitted its [Long-term low greenhouse gas emission development strategies](#) (LT-LEDS) to the UNFCCC, and it closely mirrored the existing sectoral climate response policies and strategies in existence at that time.

Three key climate policy documents provide the foundation on which South Africa's LT-LEDS has been developed:

- **NDP Vision 2030** (discussed in more detail below): With the overarching objective of eliminating poverty and reducing inequality by 2030, the NDP outlines a set of goals and actions to meet the country's environmental sustainability and resilience needs, and has a chapter entitled 'Environmental Sustainability: An equitable transition to a low-carbon economy'.
- **The National Climate Change Response Policy**: This represents the government's comprehensive policy framework for responding to climate change, including provisions for adaptation and mitigation.
- **The Climate Change Bill** (forthcoming) will form the legislative foundation for the climate change adaptation and mitigation response. With respect to mitigation, the Bill provides for future review and determination of the national GHG emissions trajectory; determination of sectoral emissions targets for emitting sectors and subsectors; and the allocation of Carbon Budgets. It also makes provision for the development of plans to phase down or phase out the use of synthetic greenhouse gases, in line with the Kigali Amendments to the Montreal Protocol.

South Africa pro-actively submitted to the UNFCCC an NDC that expresses a level of flexibility that may be reviewed and adjusted over time based on science (balanced within the context of sustainable development). To show South Africa's ambition and commitment towards contributing to achieving the global goal outlined in article 2(a) of the Paris Agreement, South Africa decided to adjust its first NDC in light of the 2018 special report on global warming of 1.5°C (SR1.5) by the Intergovernmental Panel on Climate Change (IPCC), which highlighted that we have already reached a global mean surface temperature of 1°C above pre-industrial levels, and that if emissions remain at the current rate, we will reach and overshoot 1.5°C in 2030–2052.

The DFFE, in partnership with national and provincial environmental partners, updates the adaptation, mitigation, finance, and investment requirement components of the NDC. In March 2021, South Africa launched its updated draft of the NDC for public consultation. The updated mitigation NDC proposes a significant reduction in the GHG emissions target ranges up to 2030. The 2025 target range allows time to fully implement the national mitigation system, including elements in the Climate Change Bill. It will also allow space for the implementation of IRP 2019 and other key policies and measures, as well as the national recovery from COVID-19. The 2030 target range (398–440 Mt CO₂ e q) is consistent with South Africa's fair share of carbon emissions and improves on the previous NDC target. The upper range of the proposed 2030 target range represents a 28% reduction in GHG emissions beyond the 2015 NDC targets.⁹⁵

1.6.2.1 National priorities and circumstances

South Africa's NDP⁹⁶ recognises that faster, broad-based growth is needed to transform the economy, create jobs, and reduce poverty and inequality by 2030. South Africa's economy and energy system

⁹⁵ The South African Government (2021) 'South Africa's updated draft Nationally Determined Contribution (NDC) launched'. https://www.environment.gov.za/mediarelease/creecy_indc2021draftlaunch_climatechangecop26

⁹⁶ Government of South Africa. National Development Plan 2030. Our future – make it work https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf

is one of the most coal-dependent globally: a just transition strategy will be needed to shift to low-carbon technologies to maximise benefits and minimise adverse impacts on communities, workers and the economy.

The environment chapter of South Africa's NDP closely mirrors the National Climate Change Response Policy, setting out the long-term plan for decarbonisation of the South African economy:

- **The 2020s** will focus primarily on the **electricity sector**.
- **In the 2030s**, a deeper transition will occur in the **electricity sector**, and there will be a transition in the **transport sector** towards low emissions vehicles.⁹⁷
- **The 2040s** and beyond will see the decarbonisation of **hard-to-mitigate sectors, such as cement, iron and steel**.

The National Climate Change Adaptation Strategy of the Republic of South Africa⁹⁸ also details the national adaptation priorities: biodiversity and ecosystems; water; health; energy; settlements (coastal, urban, rural); disaster risk reduction; transport infrastructure; mining; fisheries; forestry; and agriculture.

1.6.3 The challenge and necessity of a just transition and social inclusivity

One of the greatest challenges of any developing country is to strike a balance between increasing consumption to improve quality of life while ensuring an equitable transition towards a low-carbon economy (such an economy being inevitable).

South Africa has faced many socioeconomic challenges and social ills.⁹⁹ According to the Statistics South Africa report 'Inequality Trends in South Africa: A Multidimensional Diagnostic of Inequality', emphasis is by the national government is placed on improving the lives of citizens by targeting poverty, inequality and unemployment by the national government and key policies. Access to healthcare is a great concern in South Africa; a large percentage of the population depends on the public health system to provide for its healthcare needs. Despite continuing efforts by the government to address gender inequality, women have not advanced as rapidly as men in terms of socioeconomic empowerment and gender equality: males have been consistently better off than females when looking at indicators such as literacy, earnings, expenditure shares and access to most basic services.

Over the next 20–30 years, there will be a fundamental reorganisation of the South African economy. If this reorganisation can be done in a 'just' way, it will be possible to address many existing social ills through increased investment, new jobs and new skills. This is particularly the case when it comes to investing in long-term infrastructure projects that will have lasting economic, environmental and socioeconomic impacts. The recognition of the need for an equitable transition that is aligned with wider social impact has been a priority in South Africa's sustainable development pathway for several years. However, now more than ever, deep partnerships and collaborations are required to build resilience in society through inclusivity. Building trust, partnerships and a shared future vision are key elements in designing and building South Africa's climate change transition pathway.

⁹⁷ The electrification of light/medium transport and hydrogen for aviation and shipping.

⁹⁸ Department of Forestry, Fisheries and Environment, 2021. National Climate Change Adaptation Strategy 2019, https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf

⁹⁹ StatsSA (2019) 'Inequality Trends in South Africa: A Multidimensional Diagnostic of Inequality', <http://www.statssa.gov.za/publications/Report-03-10-19/Report-03-10-192017.pdf>

1.6.4 The role of sustainable finance and green finance

South Africa's National Climate Change Response Policy explicitly calls for the inclusion of the financial services sector in shaping South Africa's climate and green finance architecture, alongside project developers and policymakers. In March 2019, South Africa's 3rd Biennial Update Report to the United Nations Framework Convention on Climate Change (Biennial Update Report 3) highlighted that catalysing the financing and investments required to proceed towards a low-carbon and climate-resilient economy remains an important challenge for the country. Both the policy and the report prioritise the development of resource and investment strategies, capacities, mechanisms and instruments that support and enable climate change responses. They also clearly recognise the importance of a combined effort across private, public and blended finance in achieving national climate change response actions and identify the opportunity for the financial sector to mainstream climate change in risk and investment decisions.

2 Demand-side analysis

The following section provides a breakdown of the South African climate finance demand, detailing the dominant sectors in the South African green economy and providing a breakdown of the barriers to, and enablers of, climate finance.

Box A: Distributed generation

The market size for this opportunity is reported to be ~500 MW, announced by the recent IRP 2019, with unlimited provisions between 2019–2022, with an investment potential of ZAR 48 billion. This opportunity spans other technologies (biomass, landfill gas and co-generation) that are under-represented in the broader IRP 2019 provisions.

2.1 Sectoral analysis

The National Climate Change Response White Paper, the NDP and the Industrial Policy Action Plans emphasise the necessity of the development and growth of the green economy to realise an equitable transition to a low-carbon economy. These documents provide a useful harmonised vision, highlighting that the green economy is not a separate economy but rather presents a call to action to green the current economy and to transition it so that it becomes resilient and globally competitive.

This definition is intrinsic to much of South Africa's policy environment, given that South Africa's approach has deliberately been to mainstream sustainable and climate-resilient development, rather than develop standalone policy. The ambitious NDP vision for 2030 forecasts that a reduced dependency on high-carbon energy sources and natural resources will characterise the country's trajectory towards a green economy, while carefully balancing the developmental imperatives of employment creation and reducing poverty and inequality.

Five growing sectors are currently leading this mainstreaming of climate-resilient development in South Africa: clean energy, low-carbon transport, smart water (supply and demand), circular economy, and smart agriculture. These sectors represent a sizeable and significant economic and development opportunity for local and international investors. The following sections provide some insights into these investment opportunities that are currently being unlocked in different market segments. GreenCape's sector experts have gathered this information and full reports are available on GreenCape's [website](#).

2.1.1 Renewable energy

Most climate finance investments in South Africa relate to investment in clean energy and energy efficiency. The South African Climate Finance Landscape 2020 has shown that clean energy generation, accounting for 95% of mitigation finance, accounted for the largest portion of mitigation flows captured, while an additional 3% went to energy efficiency and demand-side management.¹⁰⁰

The South African renewable energy sector can be broadly separated into two main sectors: utility-scale renewable energy (including distributed energy) and energy services.

¹⁰⁰ Cassim, A.; Radmore, J.; Dinham, N.; McCallum, S.; Falconer, A. and Meattle, C. 2021. South African Climate Finance Landscape 2020, <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/01/South-African-Climate-Finance-Landscape-January-2021.pdf>

2.1.1.1 Utility-scale renewable energy

South Africa has a single electricity utility model, managed by Eskom. Eskom is a state-owned entity that manages the electricity generation and transmission, and a portion of the distribution, in the country. Eskom currently has a total installed generation capacity of 48 GW. This capacity is currently dominated by coal power stations (over 80%).

Since establishing the Independent Power Producers Office in 2010, over 6.4 GW of renewable energy projects have been procured through the REIPPPP.

Just over 4 GW is already connected to the national electricity grid, with the balance expected to be connected by 2020/21. The cost of renewable energy projects continues to decrease, with the latest projects producing a levelised cost of energy of less than ZAR 0.61/kWh.

These developments suggest significant growth opportunities in the utility-scale renewable energy market over the next 10 years (2020–2030). Based on the ZAR/MW overnight capital cost per technology, the approximate South African market value per technology based on the 2019 IRP¹⁰¹ allocations is ZAR 99 billion for solar photovoltaic (PV), ZAR 271 billion for wind, and ZAR 48 billion for distributed generation of less than 10 MW. Indications are that prices as low as ZAR 0.46/kWh and ZAR 0.56/kWh for solar and wind, respectively, can be expected by 2030.

Over the next 10 years, the national government will procure additional electricity capacity in accordance with the IRP 2019. The capacity determined is 11.3 GW of generation and 513 MW of energy storage, including 6,800 MW of renewable energy generation.

A proposal for a new generation capacity of 2,000 MW under the **Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP)** was issued in August 2020, with the closing date extended to December 2020.¹⁰² In March 2021, the Department of Mineral Resources and Energy announced the eight preferred bidders, totalling 1,845 MW, and a further three eligible bids, totalling 150 MW (these three bids are subject to value for money propositions in line with the provisions in the request for proposals). The solutions provided by these preferred bidders include a combination of a range of technologies: solar PV, wind, liquefied gas, and battery storage. These eight projects will inject a total private sector investment of ZAR 45 billion into the country's economy.

On 19 March 2021, the Department of Mineral Resources and Energy released a request for proposals for a new bid window under REIPPPP (BW5). The request for proposals calls for proposals from independent power producers to develop new generation capacity of 2,600 MW, including 1,600 MW from onshore wind and 1,000 MW from solar PV. BW6, under REIPPPP, is expected in August 2021 and BW7 is expected in January 2022. These will have similar capacities to BW5.

Continued investment opportunities for climate finance will largely rely on (1) the commencement of the REIPPPP against the IRP 2019 allocations; (2) local content requirements; (3) a Presidential announcement in favour of a 100 MW licence exemption that will stimulate significant investment in large-scale embedded generation, including renewable energy, at mines/major industrial user sites;¹⁰³ and (4) the finalisation of the Eskom unbundling process and legal establishment of the transmission entity.

¹⁰¹ The IRP is a national government document that aims to provide a clear indication of South Africa's electricity demand and how this demand will be supplied and at what cost.

¹⁰² IPP Risk Mitigation website: <https://www.ipp-rm.co.za/>

¹⁰³ The Department of Mineral Resources and Energy has gazetted Schedule 2 of the Electricity Regulation Act, which will enable private entities to generate up to 100 MW of 'distributed' or self-generated electricity without a licence.

Diversifying the renewable energy off-take opportunities

The Department of Mineral Resources and Energy has gazetted Schedule 2 of the Electricity Regulation Act, which will enable private entities to generate up to 100 MW of 'distributed' or self-generated electricity without a licence.

In 2021 the Department of Mineral Resources and Energy amended the Electricity Regulations Act on New Generations Capacity, which enables municipalities in good financial standing to procure new generation capacity (from IPPs) and to develop their power generation projects. This has created a new market for utility-scale renewable energy outside of REIPPPP.¹⁰⁴

2.1.1.2 Electrifying thermal loads and transport

The South African energy mix remains dominated by coal and liquid fuel imports. The electricity sector accounts for 51.6% of South Africa's direct GHG emissions, while transport (8.2%), liquid fuel refineries (9.6%) and industry (12.2%) account for a combined 30%. Given the rapidly decreasing costs of variable renewable energy generators, such as wind and solar PV, the decarbonisation of the power sector is accelerating. However, reducing emissions from other energy end-use sectors, such as transportation (see Section 2.1.2) and heat demand, is more challenging.

Given the limited arable land for biomass, along with water stress and food competition, an alternative approach to decarbonising these sectors involves the electrification of loads, whereby additional electrical demand can be provided by renewable energy. This coupling of transportation (either directly through EVs or indirectly through hydrogen) and heat demand for renewable electricity not only increases the decarbonisation potential but also adds flexibility to the grid to absorb higher penetrations of renewable energy while also increasing the potential market size.

2.1.1.3 Green hydrogen

While there has been some discussion of hydrogen for in-country consumption, most of the discussion revolves around green hydrogen for export to foreign markets (mainly Germany and Japan). South Africa's renewable resource is such that green hydrogen and related products, such as ammonia, green steel, methanol and aviation fuel, may be produced at a lower cost than in most other countries. Given the German and Japanese demand, this creates an export market. The size of the electrical demand supporting hydrogen production for local and export demand has been estimated by IHS Markit at 5.2 terawatt-hour (TWh) and 58 TWh per year in 2030 and 2050, respectively. By contrast, Enertrag has calculated that if South Africa could supply 10% of global demand for green ammonia (for fertiliser and shipping fuel) and sustainable aviation fuel, together with 5% of global green steel demand, the electrical demand to provide the hydrogen in 2050 would come to 1 350 TWh/year, requiring an installed capacity of 300 GW each of solar PV and wind, dwarfing the size of the current grid.

It is essential to move quickly to avoid South Africa being overtaken by competitor nations such as Morocco, Argentina, Chile or Australia. This requires a national consensus about the benefits and the urgency of developing renewable hydrogen for export.

¹⁰⁴ It is not yet clear how this market will impact the technology allocation that will be procured through REIPPPP but it will likely decrease the size of future REIPPPP bid windows.

2.1.1.4 Energy services

In South Africa, the term energy services is used to describe three interrelated energy market segments in the South African energy space: (1) *small-scale embedded generation*,¹⁰⁵ (2) energy storage; and (3) energy efficiency. These market segments are increasingly bolstered by offerings in the energy finance sector, which in and of themselves also present opportunities to financial investors.

There are five main factors driving growth in the energy services market: South Africa's above-inflation electricity price rises; national energy insecurity; decreasing technology costs; supportive policies, regulations, and tariffs; and **well-adapted finance options. These have all played an important role in driving the growth of the energy services market.**

The national embedded generation market for the installation, operation and maintenance of rooftop solar PV has been identified as an important part of the country's immediate efforts towards energy security. It shows remarkable resilience, with full development pipelines holding the expected growth trajectory through to 2020 close to the saturation point of 500 MWp (Megawatt peak) annual installed capacity.¹⁰⁶ The market is expected to reach a **total capacity of 7.5 GW by 2035, with a market value of ZAR 75 billion. The installation of an additional 500 MWp in one year offers the potential to create around 1,250 jobs.** This is significant, considering the national expanded¹⁰⁷ unemployment level reaching 42.0% in 2020.¹⁰⁸ This market could generate as much as 23 GWh per annum, saving more than 23,690 tonnes of carbon emissions.

In 2020 the South Africa energy storage market saw a surge in the commercial and agricultural sectors. The flexibility of application use-cases and the increasing relevance of load-shedding-related risk will lead to an increasingly prevalent role of the storage segment in energy service provision. The market is expected to rise to ~ ZAR 31 billion, **with 6.5 GWh installed capacity, by 2030. This represents an exciting opportunity for climate finance investments in South Africa.**

Table 5 provides an overview of the sectoral analysis for renewable energy in South Africa.

Table 5 Sectoral analysis – renewable energy

Sectoral analysis elements	Description
Mitigation impact assessment	<ul style="list-style-type: none">• The Eskom grid emissions factor is debatable. The highest possible emissions factor (1.03 kg CO₂e/kWh) was used for this report.• Renewable energy, energy storage (linked to renewables) and energy efficiency represent core mitigation markets in South Africa.• Large-scale renewable projects currently generate 11,882 GWh over a 12-month delivery period.
Enabling environment analysis	<ul style="list-style-type: none">• Policies and regulatory frameworks provide regulatory certainty to the market and guide the development of the renewable energy sector in South Africa. South Africa has a mature renewable energy market, with a strong policy.• The NDC submitted in 2016 defined the target range for 2025 and 2030, in which emissions will be between 398 and 614 Mt CO₂ e. In the enhanced NDC submitted for consultation in 2021, the 2030 target range is proposed

¹⁰⁵ Generation of less than 1 MW embedded within the electricity distribution grid.

¹⁰⁶ GreenCape Energy Services Market Intelligence Report.

¹⁰⁷ This includes people who were available for work but not looking for a job.

¹⁰⁸ Hodes, L. 2020 (Thursday 12 November 2020). Investec Labour update: The unemployment rate climbed to 30.8% in the third quarter of 2020 <https://www.investec.com/content/dam/south-africa/content-hub/annabel-bishop/economic-updates/documents/Unemployment-Q3-2020.pdf>

	<p>to be 398–440 Mt CO₂ e. The upper range of the proposed 2030 target range represents a 28% reduction in GHG emissions from the 2015 NDC targets.</p> <ul style="list-style-type: none"> Decarbonisation of energy supply will largely be driven through the Integrated Energy Plan, the IRP and biofuels opportunities driven by the Mandatory Blending Regulations and the South African Biofuels Regulatory Framework 2019.
Commercial maturity assessment	<ul style="list-style-type: none"> The renewable energy sector is a mature market that can access private sector capital. Energy storage, electrifying thermal loads and transport, and renewable energy generation for the production of green hydrogen are expanding markets that could benefit from the CFA programme.
Recommendation	<p>Renewable energy is key to South Africa's climate change mitigation and is a recommended focus area for CFA:</p> <ul style="list-style-type: none"> Distributed generation <ul style="list-style-type: none"> private and public sector off-take – rooftop up to 1 MW solar PV private and public sector off-take – ground-mounted 1–100 MW solar PV electrifying thermal loads and transport Energy storage (small- and utility-scale) Renewable energy generation for the production of green hydrogen or related products (green steel, green ammonia)

The energy efficiency segment was the hardest hit by the economic shutdown during the COVID-19 lockdown. Unlike the embedded generation segment, decreased demand and access to stockpiled equipment led to a market contraction, with many companies being forced to constrict their workforce. Significant untapped potential still lies in this market for investors and businesses as it is an important low-hanging fruit going forward in regard to optimising energy costs. **The estimated market for continued climate finance-related investment by 2035 is ZAR 21 billion.**

2.1.2 Low-carbon transport

Globally, the momentum for electric mobility has increased exponentially, as evidenced by the increase in the number of sales from 2013 to 2020. This global shift has been primarily driven by national emissions reduction commitments stemming from the Paris Agreement on climate change, growing urban air pollution concerns, and continued crude oil price volatility. At the heart of this transition is EV.

In 2019 a year-on-year decrease in EV sales figures was seen for the first time after China halved its subsidies for new energy vehicles, including EVs. Many countries worldwide have now shifted their policies towards accelerating EV uptake — including as part of their COVID-19 recovery strategies — which is likely to drive up the global demand for EVs. South Africa does not yet have policies, subsidies or incentives to accelerate the development of the EV market. It has therefore not yet joined the ranks of those countries experiencing a steep rise in EV uptake and the development of the ecosystem and value chain around EVs. However, this is likely to change as lithium-ion battery prices continue to fall. Decreasing battery prices drive EV prices down. It is expected that once the price of EVs becomes competitive in South Africa, the same rise in uptake in the consumer market will be experienced. The EV market holds additional transition-level importance for South Africa as a large portion of South Africa's manufacturing-linked GDP contribution comes from manufacturing internal combustion engine vehicles.

South Africa already has a strong market for the assembly of internal combustion engine vehicles. The automotive sector is a key player in the country's economic landscape, contributing 6.4% of GDP and 27.6% of manufacturing output. Total revenue from this sector was more than ZAR 500 billion (US\$ 35.6 billion) in 2019, with the industry employing up to 900,000 people directly and indirectly — including downstream in wholesale, retail trade and maintenance. If South Africa does not want to lose this key sector, support is needed to ensure that the sector can transition to manufacturing EVs.

here are substantial environmental, economic and social opportunities for South Africa in transitioning to a low-carbon trajectory, supported by a green energy transition. For South Africa, a thriving EV market supported by local manufacturing promises economic growth and job creation. It will also counteract the inevitable decline in demand for internal combustion engine vehicles globally. T

The transport sector has been identified as a key contributor to global GHG emissions because it relies on fossil fuels. Of global GHG emissions, 15% can be attributed to the transport sector. Transport is the fastest-growing source of GHG emissions in South Africa, accounting for 91.2% of the increases over the past decade.

According to the Department of Transport, fossil fuels (at 92%) are the largest source of primary energy in South Africa (Department of Transport, 2018). This is the highest in the G20, and South Africa's emissions intensity is almost double the average of the G20 countries. To achieve the country's current environmental and climate commitments and targets, South Africa must reduce emissions by 32% in the next 10 years. Reductions from electricity generation and supply alone are not enough to achieve this.

The climate targets set for the automotive sector by 2030 cannot be met without EVs being incorporated into the transport system. Internal combustion engine improvements alone are insufficient to achieve these targets. Additionally, EVs are only as green as the energy source that is used to charge them (and the mining process linked to the batteries). Powering EVs using electricity from coal sources is counterproductive; renewable energy sources like wind and solar are ideal and are in line with a global clean energy transition.

Table 6 provides an overview of the sectoral analysis for low-carbon transport in South Africa.

Table 6 Sectoral analysis – low-carbon transport

Sectoral analysis elements	Description
Mitigation impact assessment	<ul style="list-style-type: none"> Emissions from the transport sector account for 10.8% of the country's total GHG emissions, with road transport responsible for 91.2% of these. Should these trends continue in the absence of any policies and measures, the transport sector is projected to emit a total of 136 Mt CO₂ e by the year 2050.¹⁰⁹
Enabling environment analysis	<ul style="list-style-type: none"> South Africa focus: shifting passengers from private transport to public transport and freight from road to rail; switching to cleaner fuels and adopting new technologies, such as alternative energy vehicles, while making cities and towns friendlier places for cyclists and pedestrians. South Africa does not yet have policies, subsidies or incentives to accelerate the development of the EV market.

¹⁰⁹ Green Transport Strategy for South Africa: (2018-2050), https://www.transport.gov.za/documents/11623/89294/Green_Transport_Strategy_2018_2050_onlineversion.pdf/71e19f1d-259e-4c55-9b27-30db418f105a

	<ul style="list-style-type: none"> • South Africa's updated NDC, submitted to the UNFCCC in September 2021, references the Green Transport Strategy (GTS) developed by the Department of Transport. The GTS commits the South African transport sector to a 5% reduction of emission in the transport sector by 2050. It is widely accepted that this will not be sufficient to reach South Africa's targets. The updated NDC commits South Africa to a range of green transport measures including electric and hybrid vehicles, mode shifting and the enhanced provision of safe and affordable public transport. • The government has committed to investing 10% of GDP within three key areas – transport, energy and water – up to 2030.
Commercial maturity assessment	<ul style="list-style-type: none"> • Low-carbon transport represents a nascent market in South Africa. • A focus on government-led blended finance may be needed to support the establishment of this industry. • Bilateral/multilateral development finance institutions are the largest investors in the low-carbon transport sector to date.
Recommendation	<ul style="list-style-type: none"> • Low-carbon transport is key to South Africa's climate change mitigation and is a recommended focus area for the CFA. <p>Recommended focus breakdown:</p> <ul style="list-style-type: none"> • Modal shift (passenger and freight): Improved transport modes/system integration – electric, hydrogen, gas, hybrid and non-motorised. • Infrastructure (passenger and freight): Dedicated supporting infrastructure (charring, fuel etc.) – smart logistics and efficient transport systems.

2.1.3 Water conservation, supply and demand

The South African water sector's response to climate change has largely been from an adaptation perspective, due to an added pressure on resources, but the water sector also contributes to climate change. The process of getting water from source to use and treating it so that it is drinkable, and so that the final effluent is safe to release into the environment, uses a lot of electricity.

Box B: Sector-specific mitigation measures impacting water use

In most cases, sector-specific mitigation measures (i.e. in energy, smart agriculture or transport) can have various effects on water: for example, a biogas crop can reduce fossil fuel use but will increase the demand on water resources. Water impact is an important additional lens through which to view mitigation-based projects.

The relationship between climate change mitigation measures and water is a reciprocal one. Mitigation measures can influence water resources and their management; it is important to realise this when developing and evaluating mitigation options. On the other hand, water management policies and measures can influence GHG emissions, and thus the respective sectoral mitigation measures. However, interventions in the water system might be counterproductive when evaluated in terms of climate change mitigation.

According to World Wildlife Fund South Africa, South Africa is the 30th driest country in the world. In 2019, the water crisis was the second-highest risk to doing business in South Africa, behind

unemployment (which was at a rate of 30% before the COVID-19 pandemic).¹¹⁰ South Africa is a water-scarce country characterised by an uneven rainfall distribution and extreme climate and evaporation rates that often exceed precipitation. The country has a reliable yield (i.e. supply from current infrastructure) of around 15 billion kl/year (at 98% assurance of supply – or 2% annual probability of supply failure), of which the majority is from surface water (68%), and returns flow that supports surface water (13%).

Despite South Africa being a water-scarce country, the national average consumption is around 233 litres/capita/day (l/c/d). Consumption in the Western Cape is around 201 l/c/d. These figures are much higher than the international benchmark of 173 l/c/d. Forecasts indicate that water demand will exceed supply by 10% by 2030. Low water tariffs drive this inefficient use of water, exacerbated by inadequate cost recovery, leakages, inappropriate infrastructure choices (e.g., waterborne sanitation in a water-scarce country) and increased demand in the municipal, industrial, and agricultural sectors.

The growth in demand by the municipal sector is expected to be the greatest among different sectors, partly driven by urbanisation but also by increased industrial production, commercial activity, and population growth. A model of the future water balance for South Africa indicates that if the planned additional water supply is added and realistic water efficiency is achieved, the gap between supply and demand by 2030 can be narrowed substantially. The additional water supply sources are mainly groundwater, desalinated seawater in coastal areas, and wastewater reuse.

Agriculture is the largest water use sector (61%). Transportation of water from source to crop is a significant carbon emitter. About 18% of the world's croplands now receive supplementary water through irrigation. Expanding this area (where water reserves allow), or using more effective irrigation measures, can enhance carbon storage in soils through enhanced yields and residue returns. However, some of these gains may be offset by carbon dioxide from the electricity used to deliver the water. Solar-powered irrigation systems (SPIS) are becoming a viable option for both large- and small-scale farmers. The key factor that determines the economic viability of SPIS is how solar energy compares with other forms of energy. Most of the literature conducted on SPIS shows that these systems are economically viable when compared to diesel pumps.

The second-largest water user in South Africa is local municipalities (27%), which includes residential, commercial and industrial water users supplied by municipalities. The relative proportion of municipal and agricultural use differs between provinces and municipalities, depending on the local economy's human settlement patterns. Revenue from the sale of water and the provision of sanitation services in South Africa in 2019/20 totalled ZAR 51.6 billion and ZAR 20.6 billion, respectively. Of municipal sales, about 58% typically comes from domestic residential use and 40% from commercial and industrial use.

Water's carbon emissions cost varies greatly depending on water quality, topography and distance from source to consumer.

Some high-level examples for South Africa are given below:

1. Impoundment (dam): 0.059 kg CO₂/kl of water abstracted.
2. Wastewater treatment: 0.112 kg CO₂/kl of wastewater (primary treatment).
3. Treatment of raw water: 0.219 kg CO₂/kl of water treated.
4. Distribution and collection:
 - a. 0.139 kg CO₂/kl of potable water distributed.

110

http://reports.weforum.org/global-risks-2019/survey-results/global-risks-of-highest-concern-for-doing-business-2019/?doing_wp_cron=1584605900.8945949077606201171875#country/ZAF

b. 0.150 kg CO₂/kl of wastewater collected.

The pursuit of water security, resilience and sustainability has become a key driver for investment in the sector due to the country's recurrent severe drought conditions and expected longer-term water constraints. The National Water and Sanitation Master Plan (2019) estimates that South Africa could have a 10% gap between supply and demand by 2030, even if the planned additional water supply projects are implemented.

It is estimated that there is an infrastructure funding gap of ZAR 12 billion per annum. South Africa has higher water consumption and losses (~233 l/c/d and ~41% non-revenue water) than the world's average, and is highly dependent on waterborne sanitation (~65% of households), with 20% of households (~2.8 million households) lacking access to sanitation. This represents an exciting opportunity for climate finance investment to impact mitigation and adaptation targets by unlocking innovative technologies to tackle non-revenue water¹¹¹ and non-sewer sanitation systems. Furthermore, the quest for sustainability and the imminent ban on placing organic waste in landfill presents an investment opportunity in wastewater sludge beneficiation technologies. The Western Cape Organics Landfill Ban will come into effect in 2022, requiring a 50% reduction in the roughly three million tonnes of annual organic waste dumped in the province's landfills.¹¹² These investment opportunities are supported by the National Water and Sanitation Master Plan, the NDP and the Sustainable Development Goals.

Table 7 provides an overview of the sectoral analysis for water conservation and supply.

Table 7 Sectoral analysis – water conservation and supply

Sectoral analysis elements	Description
Mitigation impact assessment	Water extraction, distribution and treatment offer various options to reduce carbon emissions. Investments that aim to improve the energy efficiency of water provision and treatment, change the methods used in water provision and treatment, or reduce overall water use can have a mitigation impact.
Enabling environment analysis	The National Water and Sanitation Master Plan (2019) prioritises water loss monitoring and reduction, alternative water source development, access to sanitation for all, and policy changes towards private sector financing for municipal infrastructure.
Commercial maturity assessment	While the municipal sector represents the largest water opportunities for investors, a few barriers are specific to this market. These barriers are the inability to access funding, capacity constraints, procurement processes (specifically linked to national government procurement), insufficient revenue collection, and a lack of locally demonstrated technologies.
Recommendation	The relationship between climate change mitigation measures and water is a reciprocal one. Mitigation measures can influence water resources and their management; it is important to realise this when developing and evaluating mitigation options. On the other hand, water management policies and measures can influence GHG emissions, and thus the respective sectoral

¹¹¹ Non-revenue water is water that is pumped and then lost or unaccounted for.

<https://blogs.worldbank.org/water/what-non-revenue-water-how-can-we-reduce-it-better-water-service>

¹¹² van Diemen, E., 2021 15 September. Waste not, want not: Western Cape to ban organic waste from landfills, starting with 50% reduction in 2022. Daily Maverick. <https://www.dailymaverick.co.za/article/2021-09-15-waste-not-want-not-western-cape-to-ban-organic-waste-from-landfills-starting-with-50-reduction-in-2022/>

	<p>mitigation measures. However, interventions in the water system might be counterproductive when evaluated in terms of climate change mitigation.</p> <p>There are cases in water sourcing, treatment and efficiency where mitigation impacts are evident and have sustainable development co-benefits. These are described below:</p> <p>Source alternatives:</p> <ul style="list-style-type: none"> • desalination (solar-based) <p>Energy efficiency in wastewater treatment:</p> <ul style="list-style-type: none"> • energy efficiency and solar for wastewater treatment • algal ponds • biogas/bio digesters
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2.1.4 Circular economy/waste management

2.1.4.1 Circular economy

In its broadest sense, circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. It replaces the end-of-life concept with restoration and shifts towards the use of renewable energy.

In South Africa, the focus has been on renewable energy and the recycling of waste. Evidence of progressive thinking on ‘designing out waste’¹¹³ in industry is not apparent. For example, the use of standardised steel beams and construction methods allows steel to be recovered and reused, obviating the need for emissions-intensive smelting of iron ore for new steel. At present in South Africa, steel is recovered as scrap and melted in an energy-intensive process.

The concept of designing out waste will become even more important in the future, in light of the huge amounts of critical minerals required for the future net-zero-emissions economy, as evidenced in data from the International Energy Agency (IEA) net-zero by 2050 scenario.

2.1.4.2 Waste management

As detailed above, momentum has been building in the South African waste sector towards a waste economy that is increasingly characterised by circularity, with much focus on the outer rungs of waste beneficiation. This focus on landfill diversion, and specifically beneficiation, has accelerated over the last couple of years and has been evident throughout the value chain, from the government to business, and from industry to the public. Private sector investments have grown in number and scale; public sector material recovery investments are included in municipal budgets and have broken ground; positive regulatory reforms continue to be considered, drafted, and promulgated; and the scope of industry organisations has expanded into the realm of extended producer responsibility.

Furthermore, growing global and local public concern over plastic in the environment has put immense pressure on brand owners, retailers and the general plastics sector to align with local and global initiatives to divert waste from landfills and the environment. As a result, the South African waste economy continues to experience growth, and there is growing interest in the uptake of alternative waste treatment solutions and associated value chains. This has resulted in a continued and increasing diversion of waste from landfills. This is likely to accelerate in the medium term.

At the start of 2021, the South African waste management landscape was waiting for numerous regulatory changes to be implemented and key documents to be published. Once this regulatory

¹¹³ Building in the concept of circularity, reduced waste from design, and design of the ability to reuse, within a circular economy.

certainty is provided, it should ultimately unlock opportunities in the plastic, organics, electronic, construction, and demolition waste sectors (among others).

According to the then DFFE, the waste economy contributed around ZAR 24.3 billion to South African GDP in 2016/17, providing 36,000 formal jobs and supporting around 80 000 informal jobs/livelihoods. A further ZAR 11.5 billion per year could be unlocked by 2023 by diverting up to 20 million tonnes of waste. The anticipated spin-offs could include 45,000 additional formal jobs and 82,000 indirect jobs, and the creation of 4,300 SMMEs.

Table 8 provides an overview of the sectoral analysis for circular economy/waste management in South Africa.

Table 8 Sectoral analysis – circular economy/waste management

Sectoral elements	analysis	Description
Mitigation assessment	impact	<ul style="list-style-type: none"> The waste management sector makes a relatively minor contribution to GHG emissions. Every waste management practice generates GHG, both directly (i.e. emissions from the process itself) and indirectly (i.e. through energy consumption). The actual magnitude of these emissions is difficult to determine because of insufficient data on worldwide waste generation, composition and management, and inaccuracies in emissions models. The climate benefits of waste practices result from avoided landfill emissions, reduced raw materials extraction and manufacturing, and reduced energy production (reduced fossil fuel energy sources).
Enabling environment analysis	environment	<ul style="list-style-type: none"> At the start of 2021, the South African waste management landscape was waiting for numerous regulatory changes to be implemented and key documents to be published. Once this regulatory certainty is provided, it should ultimately unlock opportunities (among others) in the plastic, organics, electronic, construction, and demolition waste sectors.
Commercial assessment	maturity	<ul style="list-style-type: none"> The circular economy market is a nascent and developing sector in South Africa, with no commercial finance being channelled into this sector at present.
Recommendation		<ul style="list-style-type: none"> Circular economy/waste management interventions that focus on reducing waste going into landfill, energy generation from waste (i.e. landfill gas, biogas, biomass etc.) and the shift towards sustainable transport (i.e. waste management logistics) will meet the requirements of the CFA programme.

2.1.5 Smart agriculture, food production, fisheries, and forestry

Only around 11% of land in South Africa is considered arable, of which 3% is truly fertile soil; a mere 1% has the right climate and soil combination for rain-fed crops. Primary agriculture contributes a relatively small share of total GDP (2.6% in 2018, or ZAR 135 billion) but is significant in providing employment and earning foreign exchange. However, the sector is estimated to contribute about 12% (or approximately ZAR 625 billion) of the national GDP when considering the whole agricultural value chain.

The South African agricultural economy has seen decent growth over the past decade, albeit with some difficult periods. The declines registered in the agricultural GDP and net farm income between

2015 and 2016 were mainly attributed to the drought in the summer rainfall region. The most recent decline in 2018 was also due to drought conditions experienced in the Western Cape, resulting in income losses.

Animal disease outbreaks have also led to below-average growth in the sector at times. For instance, in June 2017, Highly Pathogenic Avian Influenza started spreading in the South African chicken industry, which ultimately led to the compulsory culling of 70% of all layer birds in the Western Cape.

Renewable energy and conservation agriculture solutions continue to offer opportunities for investors and businesses in the agriculture sector. Emerging opportunities with significant growth potential include technologies for undercover, precision, and urban agriculture. The main market drivers for these opportunities are climate adaptation and water risk mitigation. However, interventions that explore renewable energy and conservation agriculture may meet the CFA requirements.

Table 9: Sectoral analysis – smart agriculture, food production, fisheries, and forestry

Sectoral elements	analysis Description
Mitigation impact assessment	<ul style="list-style-type: none"> Outside of energy, agriculture is the second-highest emitting sector and contributes 7% of total GHG, of which 42% is due to enteric fermentation, 33% to manure left on pasture, and 25% to other agriculture subsectors.¹¹⁴ Climate-smart agriculture is an integrated approach to managing landscapes – cropland, livestock, forests and fisheries – addressing the interlinked challenges of food security and climate change. Climate-smart agriculture aims to simultaneously achieve three outcomes – increased productivity, enhanced resilience, and reduced emissions – through pursuing lower emissions for each calorie or kilo of food produced, avoiding deforestation from agriculture, and identifying ways to absorb carbon out of the atmosphere.
Enabling environment analysis	<ul style="list-style-type: none"> The Department of Agriculture, Land Reform and Rural Development (DALRRD) and the DFFE are the national entities responsible for overseeing and supporting the development of the agricultural sector in South Africa. The support provided by both DALRRD and the DFFE is guided by the vision of a sustainable agricultural sector that addresses agricultural policy distortions of the past with reformative policies that create an enabling agricultural sector for the future.
Commercial maturity assessment	<ul style="list-style-type: none"> As with any new technology or approach penetrating an existing and mature market, many challenges lie ahead. This is a relatively nascent market that is primed for significant development.
Recommendation	<ul style="list-style-type: none"> Implementing climate-smart agriculture is a very context- and location-specific process. There is no single set of practices that applies to all situations. International market pressure for low carbon, environmentally friendly products, and international regulations on synthetic chemicals are key drivers for implementing climate smart agricultural solutions. These trends, as well as rising input costs of conventional inputs, contribute to emerging investment opportunities in:

¹¹⁴ USAID, GHG Emissions Fact Sheet South Africa, t.ly/ctLp

	<ul style="list-style-type: none"> • remote sensing technologies for precision agriculture applications (driven specifically to improve water efficiency and climate adaptation); • urban agriculture, with hydroponic production specifically still emerging; • undercover farming, which includes low-tech infrastructure, such as shade netting and higher-tech-controlled environment agriculture systems; • remote sensing applications for precision agriculture – there are emerging opportunities for companies offering bespoke services in aerial-data analytics for farmers; and • urban agriculture – specifically, hydroponic production is still emerging; a conservative estimate for the market of rooftop hydroponic production is ZAR 2.59 million to ZAR 3.94 million, based on current installations by the largest market player.
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2.2 Barriers and enablers

Critical barriers to access to, and mobilisation of, climate finance persist, but South Africa has also made extensive progress in creating enablers for the transformation of its economy. The CFA methodology analyses these barriers and enablers across six headings:

1. policy, regulatory, institutional;
2. financial and economic;
3. technology and market;
4. information and capacity;
5. GESI/social; and
6. cultural and behavioural.

This grouping is done to provide structure and order to the analysis: it is not intended to be deterministic as there are several linkages among individual barriers and across categories. Additionally, the number of barriers in each category should not be seen as a definite indicator of the relevance or importance of barriers, as a single barrier may have a disproportionately high or low impact.

Key findings from the CFA landscape mapping and other research carried out during the CFA South Africa project under each heading are summarised in the tables below, with barriers and enablers rated high (H), medium (M) or low (L).

Table 10 Financial and economic barriers

Barrier	Rating
The venture capital industry in South Africa is very small and nascent. This results in very limited funds available to invest in early-stage projects/companies	H
Limited availability of financing for early-stage projects and high-risk projects, and for moving projects from early development stages to commercialisation	H
Limited project identification and project development support available for projects	H
Barriers to funding for mid-sized projects (either too small or too large ticket size)	H
Commercial banks and private equity companies are typically not willing to assume technology and development risks (i.e. new industries/adaptation/mitigation projects)	H

Funders often do not make a distinction between low-carbon projects and projects in other sectors or non-low-carbon projects and therefore neither see the opportunities nor prioritise investment in low-carbon sectors.	H
Limited focus on non-energy-related low-carbon projects, i.e. most climate finance still flows into the energy sector	H
High transaction costs for commercial finance of low-carbon projects results in reduced finance flow	H
Emerging climate sectors require an upfront grant or concessional funding to reach bankability and offset perceived risks: <ul style="list-style-type: none"> design and structure of concessional credit lines are limited in climate finance landscape grant-based funding remains limited due to unfavourable global economic conditions 	H
A lack of understanding of options and an enabling environment limits retail investment in climate sectors	M
An absence of well-defined interfaces, linkages and cooperation between funders and receiving entities (to ensure that funding meets South Africa's requirements and priorities).	H

Table 11 Financial and economic enablers

Enabler	Rating
High disbursement rate of climate finance – according to the South African Climate Finance Landscape 2020 report published in January 2021, South Africa has a 97% rate of disbursing committed climate finance (the global average is 60%)	H

Table 12 GESI/social enablers

Barrier	Rating
There is a lack of coordination and unified voice between the active civil society organisations (CSO) and groups working to drive GESI and environmental development in South Africa. <ul style="list-style-type: none"> A few larger organisations often crowd out a diversity of opinions across the CSOs working on GESI and environmental issues. For example, the larger coal worker groups get more attention than CSOs supporting renewable energy communities South African CSOs are a divided group of organisations with no coordination. They are all working towards their individual goals instead of presenting a unified vision for change 	H
The impact potential of CSOs in South Africa is limited by poor governance and the resulting inability to influence policy. <ul style="list-style-type: none"> Parliamentary committees do not hold national departments to account. These limits impact the ground There is a lack of political will to listen to inputs from civil society organisations There is a disconnect between policy and GESI requirements 	M
Communication and knowledge sharing <ul style="list-style-type: none"> Insufficient and biased information shared with communities, e.g., often when communities interact with the extractive industries, information on the positives are shared with communities but not the negatives. 	M

<ul style="list-style-type: none"> • Lack of skills/information available for CSOs to build strong arguments for change (i.e. renewables vs coal debate). Local CSOs are not well enough equipped to actively participate in technical debates • Information asymmetry and information gatekeepers 	
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Table 13 GESI/social enablers

Enabler	Rating
<p>CSOs active in the South African landscape are keen to participate and drive change (despite the barriers listed above) also in climate change and finance areas despite the barriers listed above.</p> <p>Some examples of focus areas of different civil organisations are as follows:</p> <ul style="list-style-type: none"> • environmental management • urban development • public affairs and transition • mobility • GESI • just transition • youth employment • trade and industrial policy • carbon trading • resilience • democracy and civil participation, youth leadership • skills development • legal/governance issues • energy access • business in society 	M

Table 14 Information and capacity barriers

Barrier	Rating
Climate finance facility selection criteria – even where there are dedicated financing facilities for low-carbon projects, the criteria for accessing them may not always be clear	M
Capacity building (finance partners) – capacity and knowledge constraints in public and private finance (i.e. understanding the financial needs in new environmental sectors)	H
Capacity building (project partners) – project development skills shortages within project developers (i.e. many projects are developed by engineers with limited business acumen)	H
Capacity building (finance partners) – project sourcing and evaluation skills shortages within the financial sector	H
Lack of agreed-upon definitions – an established definition for climate finance and clearly defined sectors and subsectors would enable tracking, and an established definition would enable aggregating climate finance flows for climate finance and clearly defined sectors and subsectors	M
Expertise on tagging climate finance – providers of finance are not aware of how to tag their climate financial flows, making it difficult to identify, track and quantify the quantum of climate finance in the market.	M

Climate tracking – a high degree of sophistication of tracking systems is required at the country level; there are a multitude of stakeholders and funding channels, currencies, aggregation, co-financing, additionality etc.	M
Donor coordination – currently, there is no centralised donor coordination on climate finance and funded projects and programmes	M
Missing links – private flows, on-the-ground impact, additionality and attribution, existing financing gaps and ring-fence funding in an efficient and effective pattern	M

Table 15 Policy, regulatory and institutional barriers

Barrier	Rating
Misalignment of policy and climate finance – misalignment between green economy vision, industrial policy, and structure of the financial system and the flows of finance into key climate sectors	H
Sub-optimal coordination between commercial banks and development finance institutions	M
Climate finance is not tied to climate goals – limited knowledge around tagging and volumes of climate finance mean we do not know how large the climate finance gap is	H
The challenge and necessity of a just transition and social inclusivity – one of the greatest challenges of any developing country is to strike a balance between increasing consumption to improve quality of life while ensuring an equitable transition towards a low-carbon economy	H
Investor certainty – lengthy development and approval of policies due to high levels of bureaucracy	M
Investor certainty – limited clarity and decisiveness from the government on key decisions (e.g. IRP 2019 and REIPPPP round 5) create uncertainty for investors	H

Table 16 Policy, regulatory and institutional enablers

Enabler	Rating
<ul style="list-style-type: none"> Strong green economy policy – the National Climate Change Response White Paper, the NDP and the Industrial Policy Action Plans emphasise the necessity of the development and growth of the green economy to realise an equitable transition to a low-carbon economy 	M
<ul style="list-style-type: none"> Paris Agreement NDC – there is great demand for low-carbon projects for South Africa to achieve its NDC. The NDC submitted in 2015 defined the target range for 2025 and 2030, in which emissions must be in the range between 398 and 614 Mt CO₂ e In the enhanced NDC submitted for consultation, the 2030 target range is proposed to be 398– 440 Mt CO₂ e. South Africa published a draft update of its new NDC in March 2021: the proposed new 2030 target range represents a 28% reduction in GHG emissions from the 2015 NDC targets Additionally, the updated draft targets envisage that emissions will now decline between 2025 and 2030. Previously, emissions were planned to plateau until 2035 before declining from 2036 	M
<ul style="list-style-type: none"> South Africa's updated NDC submitted to the UNFCCC in September 2021, prioritises the decarbonisation of the electricity sector during the 2020s, with a deeper decarbonisation anticipated in 2030s. 	M

- | | |
|--|--|
| <ul style="list-style-type: none"> • Planning for the decarbonisation of the electricity sector advanced with the gazetting of an updated Integrated Resource Plan in 2019 (IRP 2019) for 2010–2030, considering climate change mitigation amongst multiple objectives, and allocating large shares of the future energy mix to renewable energy technologies. • The IRP is an electricity infrastructure development plan prepared using least-cost modelling (with adjustments for economic benefits such as employment). • The IRP2019 aims to decommission over 35 GW (of 42 GW currently operating) of Eskom’s ageing coal-fired power capacity by 2050 (5.4 GW of Eskom’s coal power generation capacity will be decommissioned by 2022, and 10.5GW by 2030). | |
|--|--|

Table 17 Technology and market

Barrier	Rating
Diversification needed – need to build a wider base of projects/interventions across key mitigation sectors (not just a few large projects in renewable energy for mitigation, for example)	M

3 Supply-side analysis

A database has been developed to capture information on the climate finance landscape in South Africa. This includes information on national market players (e.g. commercial banks, microfinance banks, private equity/debt, venture capital/angel investors etc.), as well as international climate finance streams (e.g. climate funds, development finance institutions, multilateral institutions, bilateral development partners and domestic sources of finance).

3.1 Climate finance typology

The scoping exercise for this report included reviews of existing mappings and typologies, which were interrogated for their relevance to the South African environment.¹¹⁵ A series of iterations of a suitable typology were created and refined based on one-on-one interviews with key market experts.

Figure 15 provides the resulting typology

¹¹⁵ The reviews of existing mappings and typologies undertaken included the following reports and publications:

Cassim, A.; Radmore, J.; Dinham, N.; McCallum, S.; Falconer, A. and Meattle, C. 2021. South African Climate Finance Landscape 2020, <https://www.climatepolicyinitiative.org/wp-content/uploads/2021/01/South-African-Climate-Finance-Landscape-January-2021.pdf>

Novikova, A.; Klinge, A.; Juergens, I.; Emmrich, J.; Hainaut, H and Cochran, I. 2019. Tracking investment into energy transition in Germany and France: a comparison of methodologies and selected results. https://www.i4ce.org/wp-core/wp-content/uploads/2019/11/IKEM_I4CE_OFATE_Tracking_investment_into_energy_transition_in_Germany_and_France.pdf

Novikova, A., Stelmakh, K. and Emmrich, J., 2018. Climate finance landscape of the German building sector. Forschungsbericht IKEM: Bericht, Kopernikus ENavi, AP, 4. https://www.ikem.de/wp-content/uploads/2018/08/IKEM_2018_Climate-Finance-Landscape_Buildings-Sector.pdf

Hainaut, H.; Ledez, M.; Cochran, I. .2019. Landscape of Climate Finance in France Edition 2019. https://www.i4ce.org/wp-core/wp-content/uploads/2020/08/I4CE3113-Panorama2019_VA1.pdf

Sissou, G.; Turia, R.; Scriven, J.; Cowling, P.; Hugel, B.; Guay, B.; Maniatis, D.; Isoev, M.; Katapa, P. and Moko, S. .2018. Landscape of Climate-Relevant Land-Use Finance in Papua New Guinea - A review of financial flows related to land-use mitigation and adaptation. <https://landusefinance.org/land-use-finance-mapping-papua-new-guinea/>

Oliver, P., Clark, A., Meattle, C. and Buchner, B., 2018. Global climate finance: An updated view 2018. <https://www.climatepolicyinitiative.org/wp-content/uploads/2020/12/Updated-View-on-the-2019-Global-Landscape-of-Climate-Finance-1.pdf>

Falconer, A.; Dontenville, A.; Parker, C.; Daubrey, M. and Gnaore, L. 2017. The Landscape of REDD+ Aligned Finance in Côte d'Ivoire. <https://www.climatepolicyinitiative.org/wp-content/uploads/2017/01/The-Landscape-of-REDD-Aligned-Finance-in-Cote-d'Ivoire.pdf>

Indonesian Ministry of Finance & CPI. 2014. The Landscape of Public Climate Finance in Indonesia. <https://climatepolicyinitiative.org/wp-content/uploads/2014/07/The-Landscape-of-Public-Finance-in-Indonesia.pdf>

Juergens, I.; Amecke, H.; Boyd, R.; Buchner, B.; Novikova, A.; Rosenberg, A.; Stelmakh, K. and Vasa, A. 2012. The Landscape of Climate Finance in Germany, <https://climatepolicyinitiative.org/wp-content/uploads/2012/11/Landscape-of-Climate-Finance-in-Germany-Full-Report.pdf>

Figure 15 Climate finance typology for South Africa

Organisation type <ul style="list-style-type: none"> •Commercial bank •Microfinance bank •Private equity/debt •Venture capital •Development finance institution •Climate fund •Asset owner •Asset manager •Bilateral development partners/international government •Private philanthropy •NGO •Facility •Government department/ agency •Angel investor •Intermediary
Financial products <ul style="list-style-type: none"> •Debt (commercial, unlisted) •Debt (concessional, unlisted) •Debt (listed) •Venture capital •Equity (listed) •Equity (unlisted) •Mezzanine finance •Structured finance •Guarantee/risk mitigation instrument •Grant •Government budget
Support types <ul style="list-style-type: none"> •Pre-feasibility/feasibility support (financial/commercial) •Pre-feasibility/feasibility support (technical/engineering) •Pre-feasibility/feasibility support (environmental/social) •Operational/advanced stage support •Capacity building •Financial intermediation
Sector <ul style="list-style-type: none"> •Sector-agnostic •Transport •Energy •Energy efficiency •Waste •AFOLU •Water •Multiple sectors
Climate finance supply chain alignment <ul style="list-style-type: none"> •Project identification •Project development •Primary project finance •Refinancing

3.2 Climate finance mapping

The CFA climate finance mapping looks at stakeholder mapping and detailed project-level data to build a rich picture of the South African climate finance landscape. The insights gathered inform the design of the CFA in South Africa beyond the initial scoping phase of the project and contribute to embedded a CFA process in the South Africa over the long-term.

This analysis collected data from two primary sources – datasets and direct surveys – complemented by desktop research, including government budgets, reports and funding lists. Datasets were retrieved from Bloomberg New Energy Finance and the Organisation for Economic Co-operation and Development (OECD) database.

A total of 257 financing solutions were mapped across 134 unique public and private sector stakeholders. Although not all tracked investments provided information on the total value or ticket size of their investments, ZAR 35.8 billion was tracked across 200 financing solutions.

3.2.1 Climate finance supply chain gap analysis

Using the climate finance supply chain concept as its base (project initiation, project development, primary project funding and secondary markets and refinancing), the table below indicates the available resources. It identifies gaps in the current operation of the chain in terms of the various kinds of finance that need to be present at each stage of the chain for it to function effectively.

Green shading indicates that a particular type of finance is relevant to the respective stage and is available to at least some degree, while red indicates major gaps in what is required. Yellow indicates there is still significant room to increase levels of finance/support from current levels, or that the pipeline is not available (for example, for institutional investors). Where a cell shading is grey, the type of finance is neither available nor considered relevant, either to the stage in the supply chain or to the type of institution represented in the cell.

The purpose of Table 18 is to indicate quickly where the CFA and others may wish to focus their analysis of what new or additional resources may be impactful.¹¹⁶

¹¹⁶ Please note that this is a global table, so there may be discussion around the margins of what belongs where. The table is intended to give a picture of the ecosystem and help to identify key gaps.

Table 18: Potential CFA South Africa focus areas ¹¹⁷

Available		Partially available		
Significant gap		Not available		
SOURCE	PROJECT INITIATION	PROJECT DEVELOPMENT	PRIMARY PROJECT FUNDING	SECONDARY MARKETS AND REFINANCING
Commercial Banks				
Institutional investors				
Private equity				
Corporate funders				
Asset managers				
Venture capital				
Impact funds				
Angel investors				
Microfinance and credit unions				
Government budget				
Climate funds				
Bilateral development partners				
Multilateral development partners				
NGOs and philanthropic organisations				

¹¹⁷ It is important to note that in all cases availability is conditional on well-structured projects that meet funder due diligence requirements. In most cases “not relevant” simply means that one would not look to funders in that category to participate in a refinancing.

INSTRUMENTS	PROJECT INITIATION	PROJECT DEVELOPMENT	PRIMARY PROJECT FUNDING	SECONDARY MARKETS AND REFINANCING
Company balance sheets				
Corporate bank loans				
Project finance				
Structured finance				
Bonds				
Green/blue/social/sustainable bonds				
De-risking products				
Concessional finance				
Grants				
Government budget spend				
Microfinance				

It is important to note that availability of climate finance is conditional on the existence of well-structured projects that meet funder due diligence requirements in all cases. This is why refinancing has been listed as not relevant in some cases, as there is not yet a large enough pool of climate mitigation projects that require refinancing.

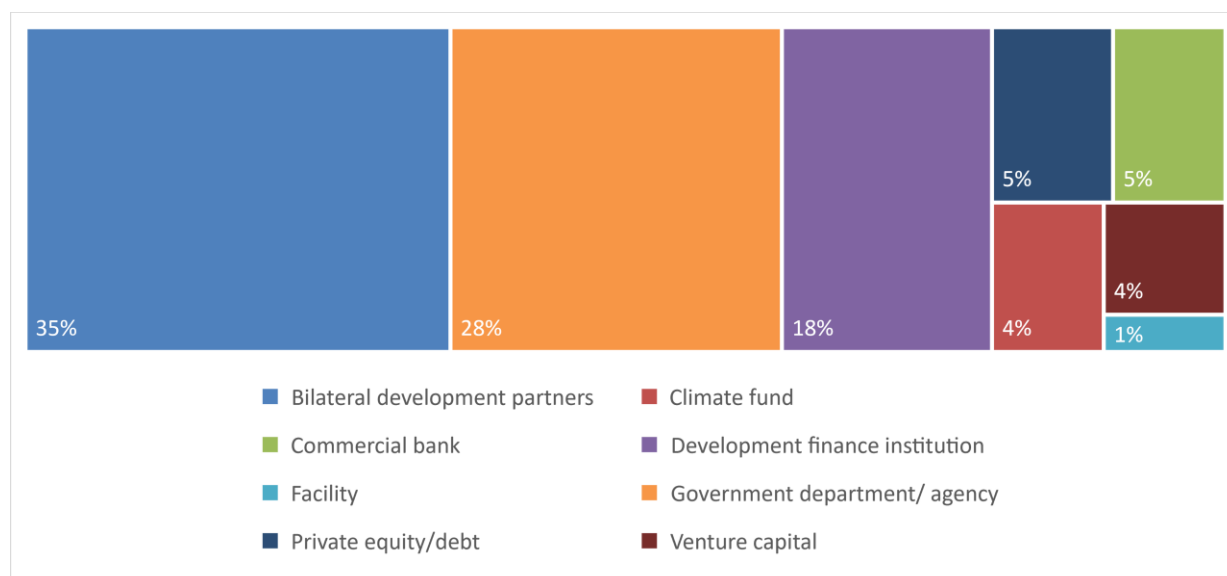
The landscape mapping analysed 257 financing solutions in the climate finance landscape. 85% of the tracked solutions offered primary finance products, 13% offered project development support, while only 2% offered project identification funding. Less than 1% of the mapped financing solutions offered to refinance.

3.2.2 Climate finance by organisational type

The CFA landscape mapping tracked 134 unique public and private sector stakeholders linked to the climate financing solutions. The original climate finance sources can be separated into 15 broad categories. Each of these sources has its own goals and ultimate objectives for its climate finance.

In this analysis, bilateral development partners, local and international development finance institutions, and government departments/agencies made up 80% of the tracked stakeholders. The remaining 20% were climate funds, commercial banks, private equity/debt, and venture capital (see the barrier relating to venture capital).

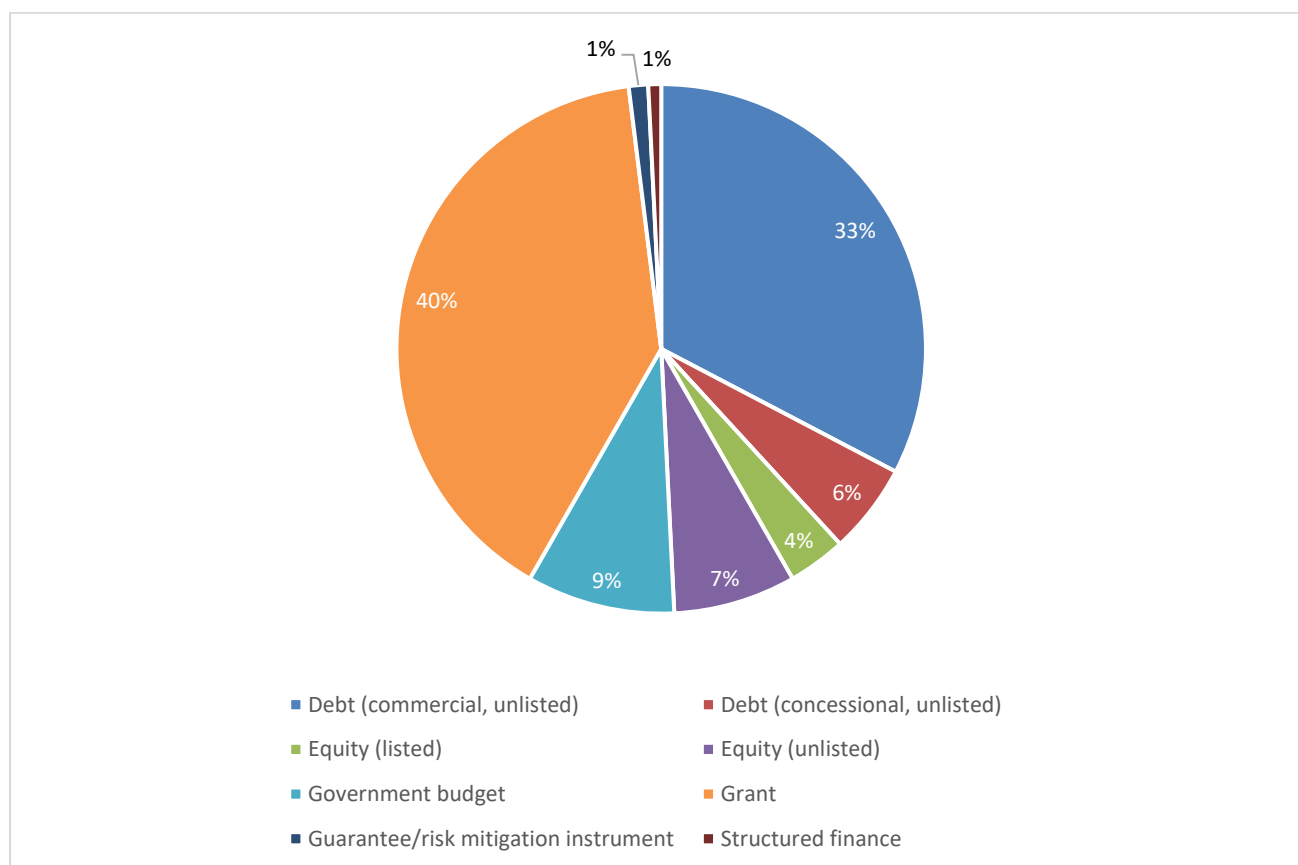
Figure 15 Climate finance by organisational type



3.2.3 Climate finance by financial products

The CFA landscape mapping categorises transactions by the financial products used to structure the provision of finance by one actor to another, or for specific climate projects. The landscape considered eight different financial products: debt (commercial (listed and unlisted and concessional)), equity (listed and unlisted), venture capital, mezzanine finance, structured finance, guarantee/risk mitigation instrument, grants, and government budget.

Figure 16 Number of investors offering different financial products (not total value)



Debt and equity made up 50% of the tracked finance products. 40% of the tracked stakeholders offered grants. It is important to note that the value of the grants available was relatively small. Government budget spends covered 9% of the tracked products. Guarantee/risk mitigation instruments and structured finance covered 1%–2% of tracked products.¹¹⁸

Regarding total value, of the ZAR 35.8 billion, debt and equity products made up 76%, grants 19%, and government budget spending 5%. This gives a strong indication as to the magnitude of available grants. Although there may be several grants available, the ticket size may not be relevant for the need. There is also a mismatch between the granting ‘agenda’ and the needs of the recipients.

3.2.4 Climate finance by support types

Using the climate finance supply chain concept (Section 3.2) as its base, the ‘support type’ analysis maps available resources. It identifies gaps in the current operation of the chain in terms of the various kinds of finance that need to be present at each support stage for it to function effectively. The stages of support tracked are as follows:

- pre-feasibility/feasibility support (financial/commercial);
- pre-feasibility/feasibility support (technical/engineering);
- pre-feasibility/feasibility support (environmental/social);
- operational/advanced stage support;
- capacity building; and
- financial intermediation.

¹¹⁸ These exclude government guarantees that may have been provided to unlock debt for REIPPP projects, for example.

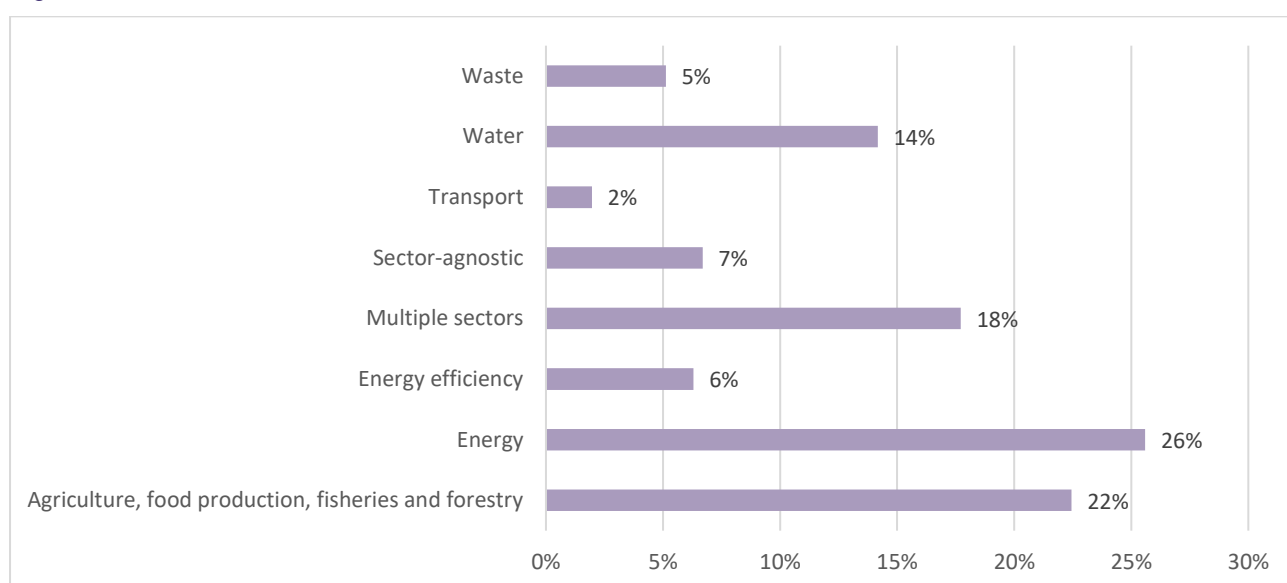
Corroborating what was seen in the climate finance supply chain gap analysis, most (around 85%) of the tracked interventions or support offerings focused on operational/advanced stage support. It was pleasing to see that 10% of the tracked support structures offered a degree of pre-feasibility/feasibility support. This remains a significant need in the market, with pipeline development and due diligence costs being significant barriers to long-term investments.

3.2.5 Climate finance landscape by sector

The sections below summarise the climate finance landscape by sector, highlighting the key finance providers by type or institution and the financial instruments that dominate that sector.

As expected, clean energy was the focus of the 257 tracked financial offerings (Figure 17), accounting for more than 33% of all investments tracked when including energy efficiency and demand-side management. In terms of the total value, energy and energy efficiency accounted for almost 50% of the total value tracked (around ZAR 16 billion).

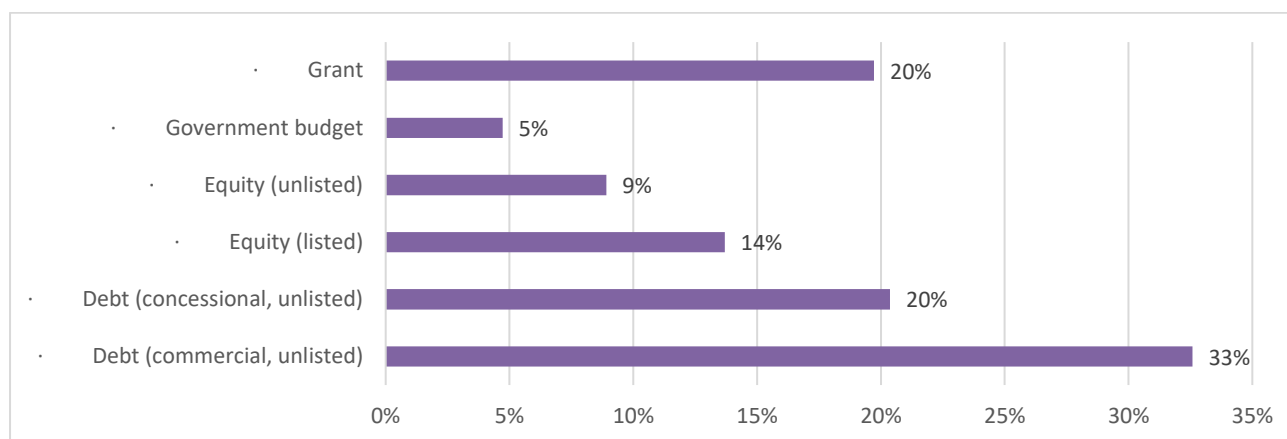
Figure 17 Breakdown of the sector focus of the 257 climate finance solutions



3.2.5.1 Renewable energy (small- and large-scale)

From what this mapping was able to track, renewable energy investments were dominated by the private sector (corporate investors and commercial banks) and by development finance institutions. More than 76% of these investments were made through debt and equity investments (Figure 18).

Figure 18 Financial products invested in energy



The fact that private sector investment is allocated exclusively to clean energy and energy efficiency and demand-side management demonstrates that South African investors do not consider other climate sectors economically viable, or they lack the knowledge and tools to identify climate investments opportunities correctly.

Sectors such as water conservation, smart agriculture and the circular economy are still heavily reliant on public and philanthropic capital.

3.2.5.2 Low-carbon transport

Investments in low-carbon transport were dominated by climate facilities and government departments/agencies. These were all made using grant instruments. As set out in South Africa's NDP, the government has committed to investing 10% of GDP within three key areas – transport, energy and water – until 2030.

This is also a pleasing pointer towards the growth of potential blended finance facilities. Blended finance is the strategic use of development finance (i.e. public or philanthropic finance) to mobilise additional finance (i.e. private finance) towards sustainable development in developing countries. Blended finance, with higher leverage ratios of concessional to market-rate finance, supports an increased risk appetite, allowing investments into new and innovative sectors like low-carbon transport.

3.2.5.3 Circular economy/waste management

Over the last decade, the momentum in the waste sector has been building towards a waste economy that is increasingly characterised by circularity, with much focus on the outer rungs of waste beneficiation. This focus on landfill diversion, and specifically beneficiation, has accelerated over the last couple of years. The sector is still heavily reliant on the support of bilateral development partners and local government departments/agencies. Grants and government budget spending were the two dominant financial products, with less than 1% financed through commercial debt. This structure speaks to the commercial maturity of the sector.

3.2.5.4 Water conservation and demand

There are certain sectors where private sector investments are unlikely. This is typically where an investment is seen as an unprofitable public good, as with water infrastructure, flood protection, social safety nets, and disaster management. The public sector is the main source of investment for such goods and services. Bilateral development partners and government departments/agencies accounted for 83% of the total investments in water conservation and demand. 83% of this total investment was made using grant products, and 13% using concessional debt.

3.2.5.5 Smart agriculture, food production, fisheries, and forestry

While sectors such as water conservation and the circular economy are still heavily reliant on public and philanthropic capital, sectors such as agriculture and food production have an established business case, with private climate funds and development finance institutions accounting for 94% of the total value invested through commercial debt and unlisted equity.

4 Conclusion and recommendations for CFA approach

The sections below summarise the main conclusions and recommendations from the research presented in this report. They provide actionable opportunities for stakeholders interested in improving climate finance flows and build a pipeline of bankable low carbon projects in South Africa.

4.1 Ecosystem recommendations and conclusion

There remains a **market failure** in South Africa's climate finance landscape in that there is a mismatch in finance designed for climate finance markets and the availability of a sufficiently large bankable pipeline of climate mitigation projects. The South African ecosystem is perfectly primed for an intervention that supports South Africa's efforts to implement its NDC, by bringing together stakeholders that can develop and finance climate projects at scale.

Box 3 provides climate action policy insights for South Africa, informed by extensive stakeholder engagement on collaborative climate action.

Box 1 Key policy insights for enabling low-carbon climate action

1. Conversations on policy, finance and project innovation are more effective when considering a specific intervention rather than broader macro-economic policy.
2. The way stakeholders work with each other on a specific intervention is not always effective. Carefully structured and facilitated processes are needed.
3. The financial services sector needs to be incorporated into discussions about current and future policies as soon as possible.
4. Project developers and policy makers have low levels of financial literacy in relation to the role of finance in development. To improve this, education is needed for all non-finance stakeholders on the role of finance. Policy developers should consider the role of finance when designing policy.
5. The discussion of specific policy interventions between relevant stakeholders, need to acknowledge the context of the interventions within the broader economy and policy landscape.
6. There are opportunities to improve public perceptions related to policy consistency in South Africa. Education around the misperceptions of policy consistency would help to overcome certain existing barriers to collaboration.
7. To drive uptake and acceptance of certain interventions, policy developers should consider their policy innovation interactions with consumer behaviour, business models and financial provision and innovation.
8. Of the various national policies considered, the NDP Vision 2030 is by far the most comprehensive of the guiding policy documents. The NDP has been translated into the Government's Medium Term Strategic Framework (MTSF) 2019-2024 which is also informed by the electoral mandate of the Sixth Administration of government. The MTSF lays out the package of interventions and programmes that will achieve outcomes to ensure success in achieving Vision 2030. Stakeholders should consider their development plans and interventions in the context of this vision (in parallel with the Sustainable Development Goals).

Box 3 continued: Key policy insights for enabling low-carbon climate action

9. The flagship programmes, as identified in the National Climate Change Response Policy of South Africa, provide a significant potential starting point for large-scale climate action but,` need to be multi-stakeholder implementation programmes and not government programmes. This starting point can be supplemented by the priority investment areas identified by the CFA.
10. In the project development cycle, progress along a development curve is stepped and progressive. The development cycle is marked by long periods of stagnation that represent barriers that need to be addressed to produce short periods of enormous activity.
11. Pilot studies that demonstrate the benefits of potential solutions can support increased progress for an identified intervention area. The pilot studies and their benefits can be subsequently used to demonstrate best practice that can be replicated nationally.
12. The actions with the greatest impact, taken in pursuit of unlocking green economy projects and/or financial innovation, are focused on creating a unified understanding of the problem and/or providing price certainty.
13. Convening a series of well structured, expertly facilitated, multi-stakeholder workshops on priority interventions in the economy will be invaluable guides for policy makers and help to trigger periods of activity.
14. To support improved capacity building about the role of finance in South Africa's development, all relevant stakeholders should be engaged. As a result, the conversations need to be well facilitated and structured using "conversation frameworks".
15. There are specific gaps in the structure of the financial services sector in South Africa which need to be acknowledged in policy setting. This acknowledgement will support understanding the impact of the gaps on projects and to use policy to fill the gaps.
16. Developing economies carry the dual burden of low GDP per Capita and poor access to financial services. While access to financial services is a significant barrier to development, financial service barriers are firmly rooted in barriers related to governance, national level planning and available institutions. South Africa are fortunate to have a robust and well-regulated financial services sector that provide a significant range of services.
17. Development in South Africa is inhibited by structural barriers in the financial services sector. Policy development and public spending therefore needs to consider limited levels of private equity and venture capital, especially in relation to the green economy. Policy should attempt to stimulate private capital in these areas, attracting greater levels of finance that are available to state entities.
18. Use available international finance and budgeted government revenue for stimulating the financial services sector, scaling investment in the green economy.
19. Consideration of project level barriers in the context of the investment areas identified in this project, is a necessary final step in understanding the climate finance challenge. For policy and financial innovation to be most effective, it should address specific barriers. The CFA project team piloted a rapid solution development process that represents an excellent approach to increasing progress.
20. A sophisticated stimulation of the green economy in South Africa would act to bolster credit ratings and have a positive impact on bond rates, which would ease pressure on the fiscus.

Source: NBI Green Economy Finance Project Research Report – Project Overview: The power of collective action in green economy planning

There is a need to restructure energy- and resource-intensive sectors. South Africa's power sector is facing challenges along multiple dimensions. Due to its reliance on a largely aged coal fleet, the sector is unreliable, expensive, accounts for a significant share of the country's emissions, and negatively impacts the environment (which particularly impacts water availability, air quality, and health). Despite South Africa's abundant and complementary wind and solar energy resources, less than 6% of electricity is currently generated via renewables. Due to the significant reliance on coal for power generation, South Africa's electricity system has a grid emission factor of ~1.0 tCO₂e/MWh, which is among the most carbon intense in the world. This makes the power sector a key contributor to the country's overall emissions.¹¹⁹

By 2050, renewables-dominated power generation is the most cost-competitive system for South Africa.¹²⁰ By leveraging its world class renewable energy sources, South Africa can fully decarbonise its power sector, while unlocking the opportunity to stimulate economic growth and job creation. By deploying renewable energy, with a combination of gas and batteries for flexibility, the energy system is able to reduce emissions and supply electricity at least-cost. Integrated policy and planning – from energy, fiscal, environmental, and industrial perspectives, coupled with close collaboration and coordination of stakeholders, is crucial to achieving the energy transition.

Error! Reference source not found. provides a summary of the key findings on a future decarbonised power sector in South Africa based on a recent NBI study focussing on the decarbonisation of South Africa's power sector as part of the Just Transition and Climate Pathways Study for South Africa.

¹¹⁹ NBI, 2021. Just Transition and Climate Pathways Study for South Africa: Decarbonising South Africa's Power System. Available from <https://www.nbi.org.za/decarbonising-south-africas-power-system-report-launch/>

¹²⁰ NBI, 2021. Just Transition and Climate Pathways Study for South Africa: Decarbonising South Africa's Power System. Available from <https://www.nbi.org.za/decarbonising-south-africas-power-system-report-launch/>

Box 2 Decarbonising power in South Africa: 10 key findings of the sector analysis

1. By leveraging its world class renewable energy sources, South Africa can fully decarbonise its power sector, while unlocking the opportunity to stimulate economic growth and job creation.
2. South Africa's complementary wind and solar resources are among the best renewable energy resources in the world, available on vast amounts of unused land.
3. By 2050, a renewables-dominated power system is the most cost-competitive system for South Africa.
4. Transitioning South Africa's power system to net-zero would require the deployment of ~150GW wind and solar capacity by 2050. This is almost four times the total capacity of South Africa's coal power plants today and would require an investment of ~ZAR 3 trillion within the next 30 years. To enable this transition will require significant expansion and upgrade to the transmission and distribution infrastructure.
5. To reach net-zero by 2050, South Africa would need to speed up deployment of renewable energy capacity; at least 4GW of renewables will need to be installed every year – roughly ten times the current pace of new-build.
6. Natural gas as a transition fuel will be critical in this journey. Initially natural gas will be needed as an enabler to the integration of wind and solar into the power system at scale, and will then be gradually replaced by other technologies to reach net-zero emissions.
7. The transformation of South Africa's power system can result in net-positive job creation, but requires successfully localising elements of the renewable energy value chain and effectively re-skill of the existing energy workforce.
8. South Africa's world class renewable energy resources also enables a highly competitive production cost of H2 below 1.60 \$/kg by 2030, putting South Africa as potentially one of the largest global exporters of green hydrogen and green fuels.
9. To help fund the energy transition, and ensure competitive cost of capital, access to international green finance will be required.
10. The energy transition will also require cross-sector collaboration and a conducive policy environment will be critical.

Source: NBI, 2021. Just transition and climate pathways study for South Africa: Decarbonising South Africa's power system

South Africa has adopted a range of national and sectoral policies, plans and strategies.

South Africa's driving frameworks provide a call to action aimed at greening the current economy to remain resilient and globally competitive. The National Climate Change Response White Paper (NCCRWP), the NDP and the Industrial Policy Action Plans emphasise the necessity of the development and growth of the green economy to realise an equitable transition to a low carbon economy.

The challenge of a Just and Socially Inclusive Transition.

One of the greatest challenges of any developing country is to find the balance between increasing consumption to improve quality of life, while ensuring an equitable transition towards a low carbon economy. Essentially, the transition towards a low carbon economy is inevitable. Over the next 20-30

years, there will be a fundamental reorganisation of the South African economy (RES4Africa, 2020). If this reorganisation can be done in a “just” way, an opportunity arises to address many of the existing social challenges through increased investment, new jobs, and new skills. This is particularly true when investing in long-term infrastructure projects that will have lasting economic, environmental, and socio-economic impacts. The need for an equitable transition which is aligned with wider social impact has been a priority in South Africa’s sustainable development pathway for several years.

There are many dimensions to inequality in South Africa. Developing countries are often challenged by high unemployment and, as a result, labour market management is directed at job creation (rather than transformation) and skills development, reducing capacity to focus on green job creation. Informal sectors of the economy tend to account for a significant proportion of developing country labour markets, but they are largely absent from just transition dialogues.

A just transition for South Africa is a shift towards an environmentally sustainable economy and society for all. This transition must take place in a way that is just, leaves no-one behind and that sets the country onto a new, more equitable and sustainable development path; one which builds new local industries and value chains. Such a transition needs to be well-managed and contribute to the goals of decent work, social inclusion, and the eradication of poverty for all South Africans. Thus, there is a clear impetus towards the creation of inclusive and sustainable economic growth, employment, and decent work for all (SDG8) and achieving the goals of the Paris agreement.

However, now more than ever, deep partnerships and collaborations are required to build resilience in society through inclusivity. Building trust, partnerships and a shared vision of the future are key elements in designing and building South Africa’s climate change transition pathway.

South Africa is clearly committed to the Global Agenda for Sustainable Development.

There is clear impetus towards the creation of inclusive and sustainable economic growth, employment, and decent work for all (SDG8) and achieving the goals of the Paris agreement.

The next ten years represent a critical decade for the planet. We must take rapid action if we are to meet the goals of the Paris Agreement and limit global warming to 1.5 degrees. The NDCs are country pledges which are at the heart of the Paris Agreement and embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.

South Africa’s National Climate Change Response Policy (NCCRP) explicitly calls for the inclusion of the financial services sector in shaping South Africa’s climate and green finance architecture alongside project developers and policymakers.

4.2 Demand-side recommendations and conclusions

Five growing sectors are currently leading this mainstreaming of climate-resilient development in South Africa. These are clean energy, low carbon transport, smart water (supply and demand), circular economy and smart agriculture. These sectors represent a sizable and significant economic and development opportunity for local and international investors. Table 19 details the recommendations for the CFA in South Africa.

Table 19 Recommendations for the CFA in South Africa

Sector	Recommendation
Renewable energy	Policies and regulatory frameworks provide regulatory certainty to the market and guide the development of the renewable energy sector in South Africa. South Africa has a mature renewable energy market with a strong policy. The renewable energy sector is a mature market that can access private-sector capital. Renewable energy is key to South African climate change mitigation and is a recommended focus area for CFA as there will be a significant pipeline of bankable projects seeking finance opportunities.
Low carbon transport	Low carbon transport represents a nascent market in South Africa. A focus on government-led blended finance may be needed to support the establishment of this industry. Low carbon transport is key to South African climate change mitigation and is a recommended focus area for CFA. Work will be needed to develop a pipeline of projects as many will be in early feasibility or prefeasibility stages. There will also a limited number of investors who have made investments in this sector.
Smart water (supply and demand)	<p>Water extraction, distribution and treatment offer various options to reduce carbon emissions. Investments that aim to improve the energy efficiency of water provision and treatment, change the methods used in water provision and treatment or reduce overall water use can have a mitigation impact.</p> <p>The relationship between climate change mitigation measures and water is a reciprocal one. Mitigation measures can influence water resources and their management, and it is important to realise this when developing and evaluating mitigation options.</p> <p>On the other hand, water management policies and measures can influence GHG emissions and, thus, the respective sectoral mitigation measures. However, interventions in the water system might be counter-productive when evaluated in terms of climate change mitigation.</p> <p>Water conservation and supply are not key to South African climate change mitigation and are not a CFA's recommended focus area. However, there are cases in water sourcing, treatment, and efficiency where mitigation impacts can be seen, especially because of adaptation and sustainable development co-benefits.</p>
Circular economy (waste management)	Circular economy/waste management interventions that focus on reducing waste to landfills, energy generation from waste (i.e., landfill gas, biogas, biomass etc.) and the shift towards sustainable transport (i.e., waste management logistics) will meet the requirements of the CFA program.
Smart agriculture	Outside of energy, agriculture is the second-highest emitting sector and contributed an average of 9.9% to the total emissions (excl. FOLU) between 2000 and 2017. Livestock contributed 54.0% to the total AFOLU (excl. FOLU). In 2017 CH ₄ emissions contributed the most (52.8%) to the AFOLU (excl. FOLU) emissions, with N ₂ O contributing 44.6%. Enteric fermentation contributed 95.8% of the CH ₄ emissions. Direct N ₂ O emissions from managed soils was the largest contributor (78.6%) to the N ₂ O emission in this sector. ¹²¹

¹²¹ Department of Forestry, Fisheries and Environment, 2021. National GHG Inventory Report South Africa 2017, <https://www.dffe.gov.za/sites/default/files/docs/nir-2017-report.pdf>

	<p>Implementing climate-smart agriculture is a very context- and location-specific process. There is no single set of practices that applies to all situations. International market pressure for low carbon, environmentally friendly products, and international regulations on synthetic chemicals.</p> <p>As with any new technology or approach penetrating an existing and mature market, many challenges are to come. This is a relatively nascent market that is primed for significant development.</p>
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Project development skills shortages within project developers (i.e. many projects developed by engineers with limited business acumen). Support is needed to improve the bankability of the projects in the green economy pipeline.

Diversification is needed in South African investments if the country is to meet its NDCs. There is need to build a wider base of projects/interventions (not just a few large projects, or most projects in RE for mitigation, for example.)

Increased clarity and consistency around regulation is needed, particularly for smaller climate sectors and subsectors. Regulation and legislation in South Africa need to focus on creating a more enabling environment for climate finance. Discussions with experts in climate finance revealed that there are gaps in certain sector policies, and legislation needs to be adapted to support the shift and diversify the portfolio of climate projects. More incentives should be created for climate finance spending, both by the private sector and households. The National Treasury's technical paper on Sustainable Finance (2020), highlights that regulators and practitioners should collaborate to provide technical guidance, standards, and norms to assist in identifying, monitoring and mitigating environmental (and social) risks.

4.3 Supply-side recommendations and conclusions

South Africa's National Climate Change Response Policy (NCCRP) explicitly calls for the inclusion of the financial services sector in shaping South Africa's climate and green finance architecture alongside project developers and policymakers. In March 2019, *South Africa's 3rd Biennial Update Report to The United Nations Framework Convention on Climate Change* (BUR3) highlighted that catalysing the financing and investments required to proceed towards the low carbon and climate-resilient economy remains an important challenge for the country. Both documents prioritise the development of resource and investment strategies, capacities, mechanisms, or instruments that support and enable implementation of climate change responses. They also clearly recognise the importance of a combined effort across private, public and blended finance in achieving national climate change response actions and identifies the opportunity for the financial sector to mainstream climate change in risk and investment decisions.

Corroborating what was seen in the climate finance supply chain gap analysis, most (~85%) of the tracked interventions or support offerings focused on operational/advanced stage support. It was pleasing to see that 10% of the tracked support structures offered a degree of pre-feasibility/ feasibility support. This remains a significant need in the market, with pipeline development and due diligence costs being significant barriers to long-term investments.

There are gaps across the entire supply chain (see Section 3), especially in project identification, project development and refinance¹²².

¹²² The gap in refinancing is mainly because of a lack of "green" projects and markets that demand this type of finance

- The landscape mapping analysed 257 financing solutions in the climate finance landscape. 85% of the tracked solutions offered primary finance products. 13% offered project development support, while only 2% offered project identification funding. Less than 1% of the 257 mapped financing solutions offered to refinance.
- venture capital industry in South Africa is very small and nascent. This results in very limited funds available to invest 'at-risk in early-stage projects/companies
- Limited availability of financing for early early-stage projects., high-risk projects and for moving projects from early development stages to commercialisation

In this analysis, bilateral development partners, local and international development finance institutions and government departments/agencies made up 80% of the tracked stakeholders. The remaining 20% was provided by climate funds, commercial banks, private equity/debt, and venture capital (see barrier regarding venture capital).

Debt and equity made up 50% of the tracked finance products. Forty percent of the tracked stakeholders offered grants. It is important to note that the value of the grants available was relatively small. Government budget spends covered 9% of the tracked products. Guarantee/risk mitigation instruments and structured finance covered 1%-2% of tracked products.

The majority of climate finance investors are focused on mitigation projects. There is a greater need to attract adaptation finance to South Africa. As expected, clean energy was the focus of the 257 tracked financial offerings (Figure 8). It accounted for more than 33% of all investments tracked when including energy efficiency and demand-side management. In terms of the total value, energy and energy efficiency accounted for almost 50% of the total value tracked (+ZAR16 billion).

Very few South African financial institutions currently consider environmental, social, and governance (ESG) criteria and even fewer consider emission reductions, environmental impacts, or alignment with the appropriate SDGs as part of their credit approval process and corporate targets.

Embedding climate mitigation into the credit and investment processes of financial institutions to unlock finance at scale. The market failure in climate finance for institutional investors (i.e. pension funds) is the un-reflected externalities that are absorbed by the environment. Once these externalities cross a threshold, the risk is increased (drought, flood, etc.). If South Africa is going to successfully transition, institutional investors should have a mandate that includes long run country stability and sustainability.

To mainstream investment in emission-reducing infrastructure at scale, and reach South Africa's climate goals, the investment community needs to incorporate environmental impact criteria into their investment policies, procedures and targets. Work is needed to address the capacity gaps that exist within financial institutions.



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