



South Africa

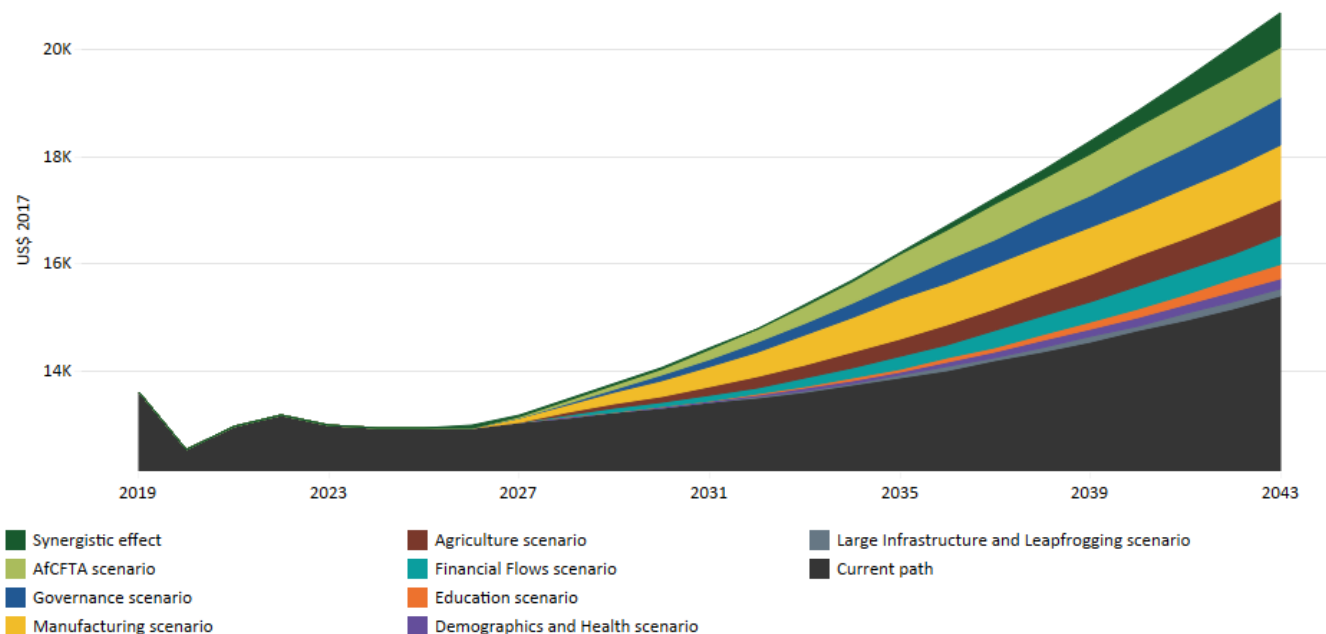
South Africa: Scenario Comparisons

Jakkie Cilliers and Alize le Roux

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Chart 29: GDP per capita in the Current Path and scenarios, 2019-2043



Source: IFs 8.26 initialising from IMF data

Chart 29 presents GDP per capita in the Current Path and Combined scenario plus the synergistic effect in the eight sectoral scenarios. The purchasing power parity data is from 2019 to 2043.

The Combined scenario combines all eight sectoral scenarios: Governance, Demographics and Health, Education, Large Infrastructure and Leapfrogging, Agriculture, Manufacturing and Leapfrogging, AfCFTA, and Financial Flows. The integrated nature of our modelling means that these sectoral scenarios produce a synergistic or additional effect that further improves outcomes.

In the Combined scenario, GDP per capita would be 34% above the Current Path in 2043, equivalent to an additional US\$5 290 per person.

Amongst the eight sectoral scenarios the full implementation of the Manufacturing scenario has the most positive effect on GDP per capita by 2043 (an increase of US\$1 000 per person or 6.5% above the Current Path), followed by the full implementation of the AfCFTA (an increase of US\$950 or 6.2% above the Current Path) and Agriculture (an increase of US\$690 or 4.5% above the Current Path). Because South Africa has a relatively well-developed infrastructure, the Large Infrastructure and Leapfrogging scenario has the least impact, followed by Demographics and Health scenario. Better health outcomes and education take a longer time to manifest but their impact on improved contributions to human capital are long-lasting.

After an initial period of euphoria following the historic transition from apartheid in the 1990s, South Africa has been buffeted by numerous exogenous and self-inflicted shocks that have reduced growth to the extent that GDP per capita has stagnated or steadily declined since 2013, with a brief recovery in 2018. On the Current Path, South Africa will recover to its 2013 level in 2036, implying 23 lost years. Following the May 2024 national elections and the establishment of a

Government of National Unity (GNU), hope exists for positive change. In the Combined scenario, South Africa will recover to its 2013 GDP per capita level in 2030, six years earlier than on the Current Path with strong and positive growth thereafter.

In his inauguration address following the establishment of the GNU, President Cyril Ramaphosa described it as the beginning of a new era. The GNU comprises 10 political parties, seven of which hold cabinet positions in a national administration previously dominated by the ANC. The challenge is translating the associated changes into inclusive economic growth and the political acumen to have this balancing act together.

Change to South Africa's mediocre Current Path prospects will inevitably require deliberate choices, determined implementation, leadership and some pain, but the impact of the combined efforts on incomes, extreme poverty and growth can be transformative.

The two scenarios with the most impact, Manufacturing and the full implementation of the AfCFTA are mutually supportive. The latter would boost South Africa's manufacturing trade with the region and its role as a logistics and services hub. To date, instead of an export-orientated growth model, South Africa's trade and industrial policy means that effective protection rates remain high in some sectors. The ANC government adopted a cautious approach to trade agreements in spite of the potential to benefit its manufacturing sector. Instead of upstream support to enable manufacturing the focus was on localisation to produce for the protected domestic market instead of incentivising companies to explore new export opportunities. The effect was to raise barriers for new entrants and lowering competition for incumbent firms.

To address its previous bias against growing its manufacturing sector through exports, the department of trade, industry and competition (DTIC) and international relations and co-operation (DIRCO) [announced](#), in November 2024, that they intend to review and strengthen South Africa trade relations with its larger trading partners to unlock more rapid export growth. South Africa urgently needs to address the high costs of investment and trading across borders; review the impact of existing industrial, localisation and sector-specific policies on export behaviour; implement a comprehensive and well-targeted export promotion and export finance framework; and update its trade policy approach to negotiations across the continent and internationally.

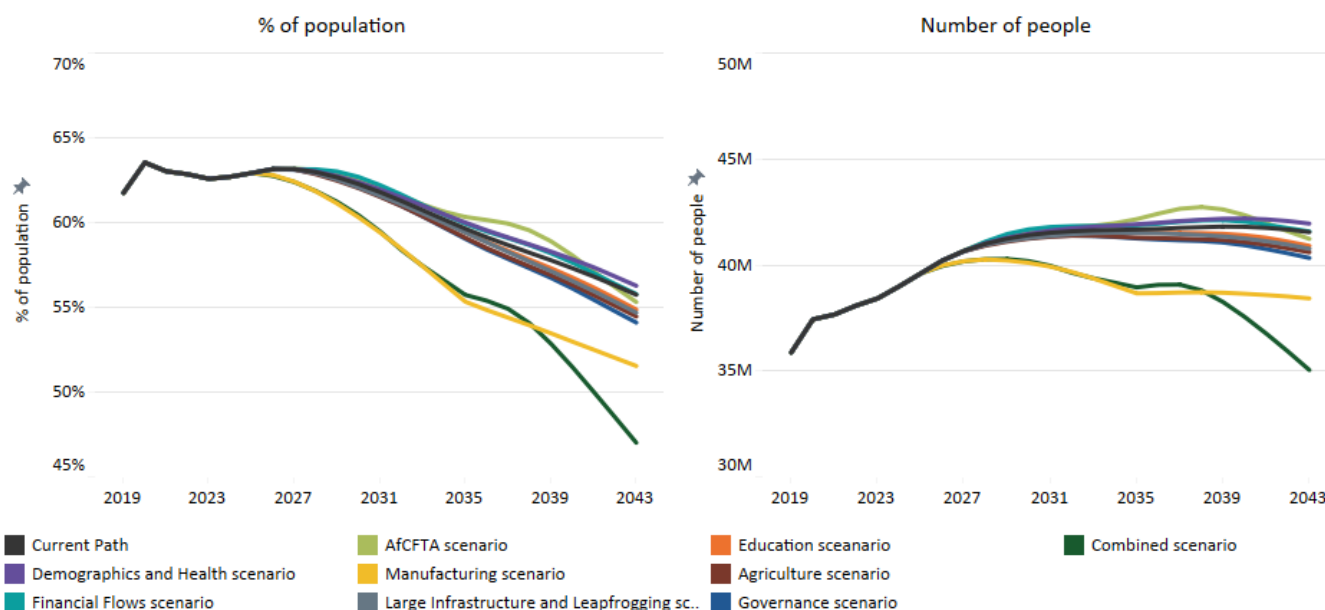
The National Treasury has estimated that about 35% of the growth slowdown from 2007 to 2021 can be attributed to the underperformance of network industries such as electricity and rail, with their productivity shocks having significantly impacted the rest of the economy. The government, therefore, prioritised network industries such as electricity, rail and telecommunications for specific focus during phase one of Operation Vulindlela, a joint initiative between the Presidency and National Treasury that was launched in 2020 to accelerate the implementation of structural and economic reforms to drive growth and job creation.

By the close of 2024, Operation Vulindlela had achieved particular success in the energy sector (through the National Energy Crisis Committee or NECOM) and logistics (through the National Logistics Crisis Committee or NLCC). The result is an end to load-shedding and near energy security whilst freight volumes, port operations, border post-processing times, and improvements in operations of the passenger rail system gain momentum. There is much more scope to have South Africa's most significant ports — ranked among the world's worst performers — run privately and to move more goods by rail rather than trucks. There is now a concerted effort to prioritise investment in infrastructure to grow regional and international trade.

The second phase of Operation Vulindlela will also focus on private sector growth, which requires business confidence to facilitate an investment climate.

Improvements in transport infrastructure and the emphasis on facilitating investment and business climate will lay the foundations for a more significant impact of free trade on economic growth. Our analysis confirms the potential that a focus on manufacturing and the AfCFTA could have on South Africa's economic development in expanding into the region due to its proximity and rapid population growth. The improvement of port and transport infrastructure, removal of tariffs imposed on South African exports into the rest of Africa, and improved trade facilitation present South Africa with growth opportunities in manufacturing, agriculture, and services.

Chart 30: Poverty in the Current Path and scenarios, 2019-2043



Source: IFs 8.26 initialising from UNPD population prospects estimate, WDI and PovcalNet data

Chart 30 presents poverty in the Current Path and in each scenario, from 2019 to 2043. The data is for the number of people and as a percentage of the population. The user can select the number of poor people or the percentage of the population.

Because South Africa has extraordinarily high levels of inequality, a relatively small informal sector and large numbers of people that are not economically active, the various scenarios have a limited impact on poverty compared to most of its peers. Using the World Bank upper-middle-income monetary poverty line (US\$6.85 per person), 38.4 million people (or 62.6% of the population) lived in poverty in 2023. The Current Path would see that number increase to 41.6 million people although the portion of poor people will decline to 55.7% in 2043. In the Combined scenario the number of poor people will decline to 35 million people or 47% of the population. Even in the Combined scenario the extent to which growth translates into poverty reduction is therefore very limited. In fact, in two scenarios, Financial Flows and Demographics and Health, poverty in 2043 is marginally higher than on the Current Path since South Africa's high level of inequality weakens the elasticity of poverty to economic growth. An initial unequal distribution of physical, human and financial resources makes it much more difficult for the poor to participate in and gain from economic growth. FDI inflows in the Financial Flows scenario benefits higher skilled and better educated persons and, although it accelerates growth, does not reduce poverty.

Next to the Manufacturing scenario, better governance has the most impact on poverty reduction amongst the eight sectoral scenario, followed by Agriculture. Poverty reduction in the Manufacturing scenario follows the inclusion of

additional social transfers (grants) in the scenario.

Social grants from the government already support around a third of South Africans (26 to 28 million people) and play an important role in alleviating extreme poverty and also has a positive impact on reducing inequality. The grants are means-tested, unconditional on employment status, and well-targeted. They serve as a crucial lifeline for many South Africans, providing financial support to vulnerable groups such as the elderly, children and people with disabilities. The World Bank estimates that transfers are equivalent to about 60% of household expenditure for the poorest 20% of the population, significantly above the 7% estimated for the entire population. They are administered by the South African Social Security Agency (SASSA) and consist of several types such as:

- Older Person's Grant: For individuals aged 60 and above.
- Child Support Grant: For children whose primary caregivers are unable to provide for them.
- Care Dependency Grant: For people of any age who require full-time care due to a disability or illness.
- Disability Grant: For individuals with a severe and permanent disability.
- Foster Child Grant: For caregivers looking after children who cannot be cared for by their parents.
- Grant-in-Aid: For people living on a social grant who require additional support.
- War Veteran's Grant: For veterans who served in the South African Defence Force and various liberation armies.

Because it generally improves government efficiencies, the Governance scenario has the second largest impact on reducing poverty (next to the Manufacturing scenario) amongst the eight sectoral scenarios, reducing poverty to 54.1% (40.3 million) followed by the Agriculture and Large Infrastructure/Leapfrogging scenarios. These are still very high poverty rates and point to the need to maintain and further extend social grants as well as consideration of mass employment schemes in addition to the interventions reflected in the various sectoral scenarios. To this end various **lobby groups** have pushed for the introduction of a universal basic income (UBI) grant that would provide each citizen with a monthly cash payment set at or close to the upper-bound poverty line of (R1 634 in 2024) which would increase annually based on inflation.

Chart 31: GDP (MER) in the Current Path and Combined scenario, 2019-2043

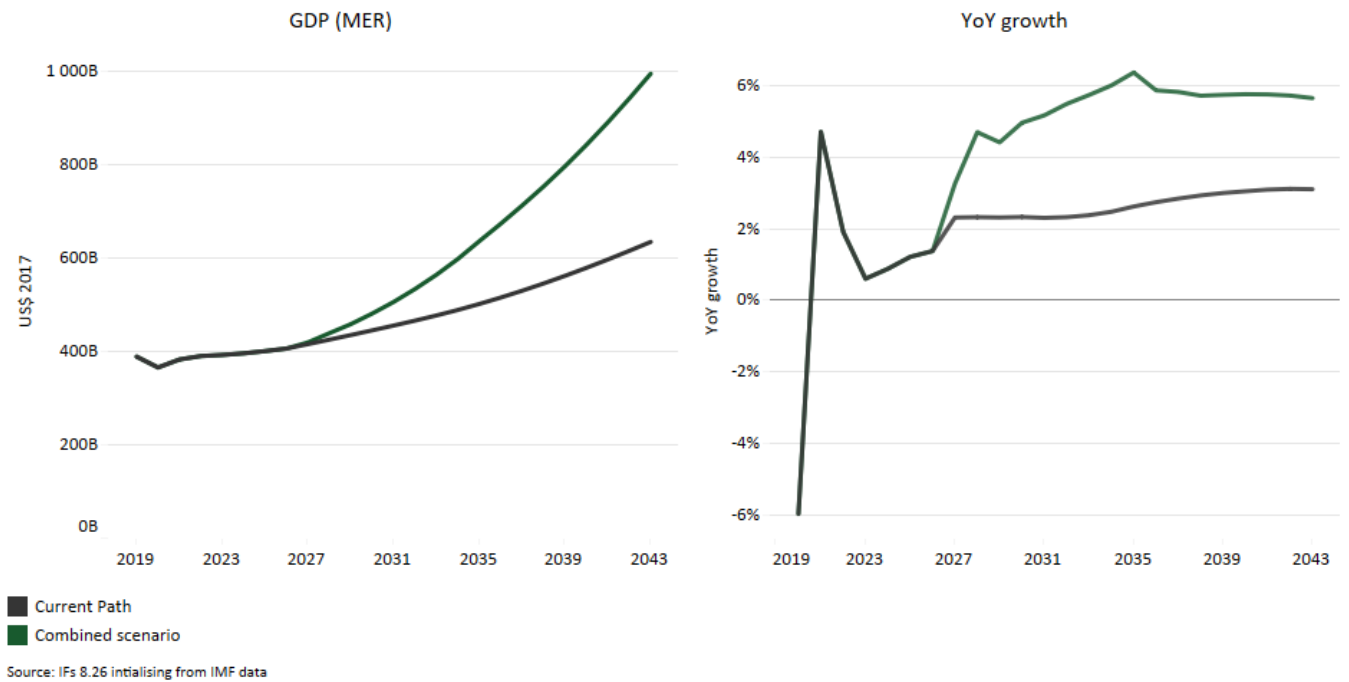


Chart 31 presents GDP in the Current Path and the Combined scenario, from 2019 to 2043. The data is in US\$ 2017 and at market exchange rates.

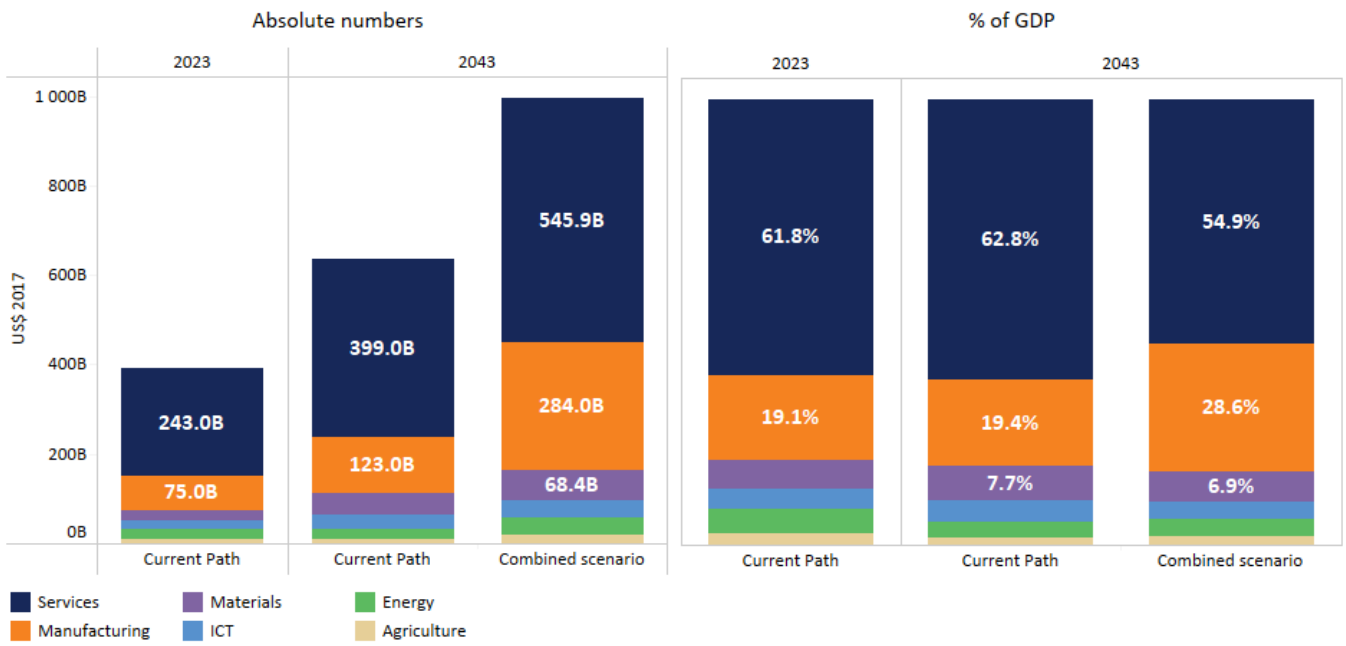
After more than a decade of slow and sometimes negative growth, South Africa's GDP stood at US\$392.1 billion in 2023. On the Current Path it will increase to US\$634.1 in 2043 (63% larger than in 2019). In the Combined scenario it would get to US\$994 billion, 57% above the Current Path for 2043 and 153% above its size in 2019.

Instead of growing at 2.4% from 2024 to 2043, economic growth would come to almost double that in the Combined scenario, at 4.8%. These rates are a far cry from the 5.4% growth target to 2030 that was set out in the 2012 National Development Plan, but would transform South Africa - although not resolve its massive poverty, inequality or unemployment, all of which are generational challenges. The Current Path growth rate from 2024 to 2030 (the horizon of the National Development Plan) is 1.8%. It is 3% in the Combined scenario, accelerating thereafter.

Classic growth theory posits that economic growth comes from the contributions from labour, capital and technology/multifactor productivity. In our modelling, the contribution of multifactor productivity consists of four components, knowledge, physical, social and human capital. Among these components, poor human capital stands out as South Africa's greatest challenge to sustained, rapid growth, followed by social capital - the latter largely a function of its high crime and intentional injury rates. The country has a small comparative advantage in both knowledge capital, which is a net contributor to growth, and in its physical capital. The positive contribution from knowledge capital is underpinned by South Africa's relatively high levels of integration into the global economy compared to most other African economies, and the positive impact of knowledge diffusion through the larger number of trade and multinational corporations active in the country compared to other African countries. The positive impact of physical capital flows from South Africa's relatively high levels of infrastructure and basic service provision such as water and sanitation.

The Combined scenario has a large positive impact on the contribution from social capital to the extent that it contributes positively to growth, but does not fully eliminate the drag from poor human capital which is a generational challenge.

Chart 32: Value added by sector in the Current Path and Combined scenario, 2023 and 2043



Source: IFs 8.26 initialising from IMF World Economic Outlook data

Chart 32 presents the value added by sector in the Current Path and in the Combined scenario, for 2023 and 2043. The data is in US\$ 2017 and as a percentage of GDP.

Our modelling provides forecasts in six sectors, agriculture, energy, materials (including mining), manufactures, services and ICTech. In 2023, the services sector contributed 62% to GDP, followed by manufactures at 19%, materials at 6.4%, energy at 5.6%, ICTech at 4.6% and agriculture at 2.4%. The Combined scenario will result in an economy that is significantly larger in 2043 (see Chart 31) largely due to the growth in the GDP contribution of manufactures above the Current Path (also from agriculture, but more modestly), while the services sector contracts compared to the Current Path, as does energy, ICTech and energy, though more modestly. In absolute terms all sectors are larger in the Combined scenario compared to the Current Path in 2043 with the largest absolute increase in the manufacturing sector which, by 2043 is 28.6% instead of 19.4% of GDP implying that the manufacturing sector will contribute an additional US\$161.2 billion to the economy compared to the Current Path.

Chart 33: Informal sector in the Current Path and Combined scenario, 2019-2043



Source: IFs 8.26 initialising from Elgin and Oztunali (2008), and Schneider and Enste (2012) data

Chart 33 presents the size of the informal sector as per cent of the total economy in the Current Path and in the Combined scenario, from 2019 to 2043.

South Africa has a relatively small informal sector compared to other countries at similar levels of development. In 2023, the informal sector in South Africa contributed 13% to GDP (US\$50 billion), some three percentage points below the average for upper-middle-income countries (UMICs) in Africa and comparable to Malaysia, Serbia, Brazil and Costa Rica, all of whom have higher GDP per capita than South Africa and lower levels of inequality. In the Current Path the informal sector will decline to 11.7% (US\$74.4 billion) by 2043.

Because of the effect of interventions on government effectiveness, reduced corruption and better regulations, the Governance scenario reduces the informal sector most rapidly amongst the eight sectoral scenarios. In the Combined scenario the informal sector will constitute 7.1% of GDP, equivalent to US\$74.4 billion.

South Africa needs to commit to growing its informal sector even as it expands employment in the formal economy. Growth in the informal sector requires the easing and simplification of regulations and permits to allow informal businesses to operate legally, improved access to finance such as microfinance and credit facilities, infrastructure development to provide electricity, water and transportation in areas with large informal sector activity, and the provision of vocational and entrepreneurial skills to empower persons active in the sector.

In addition, efforts must be made to foster market integration by promoting linkages with formal enterprises, providing market information, and supporting networking opportunities. Enhanced business support services tailored to the informal sector would also be required such as business incubators and the provision of digital tools and technologies to improve efficiencies and productivity. Because of its spatial inequality, the focus would probably have to be in townships and rural areas whilst at the same time launching efforts to improve living conditions and infrastructure in informal settlements to create a conducive business opportunity.

Chart 34: Life expectancy in the Current Path and Combined scenario, 2023 and 2043

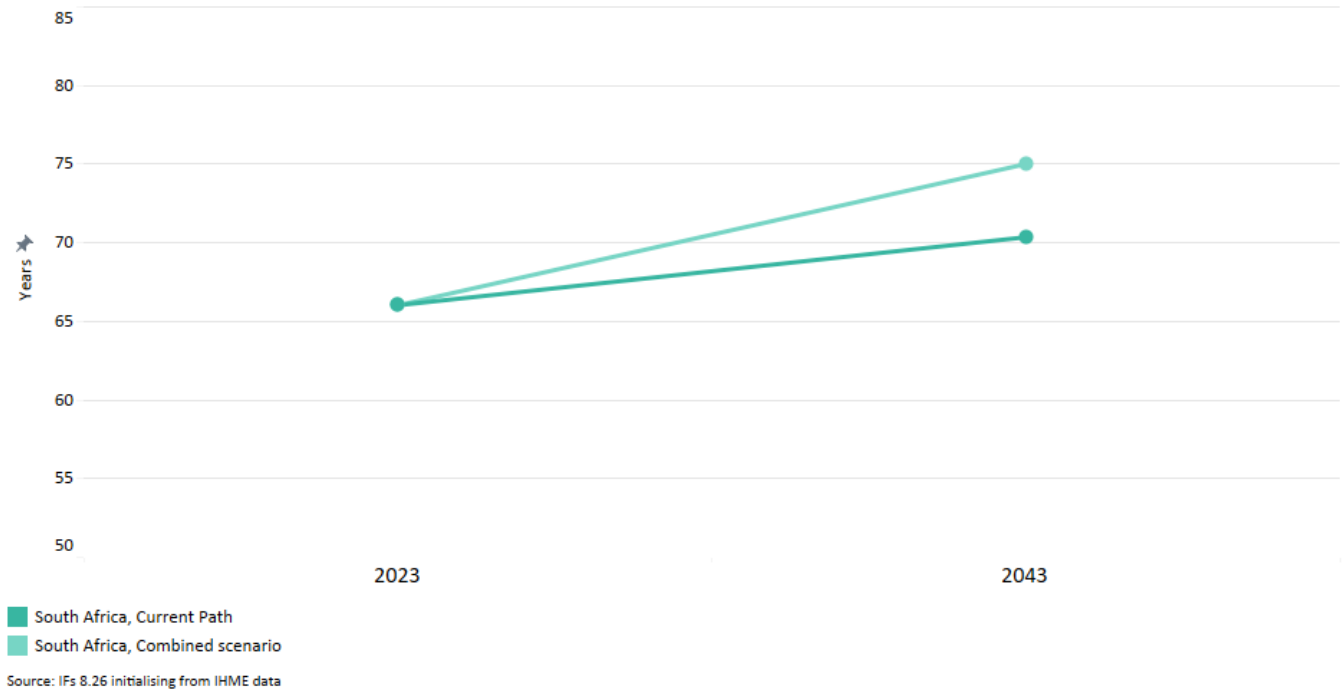


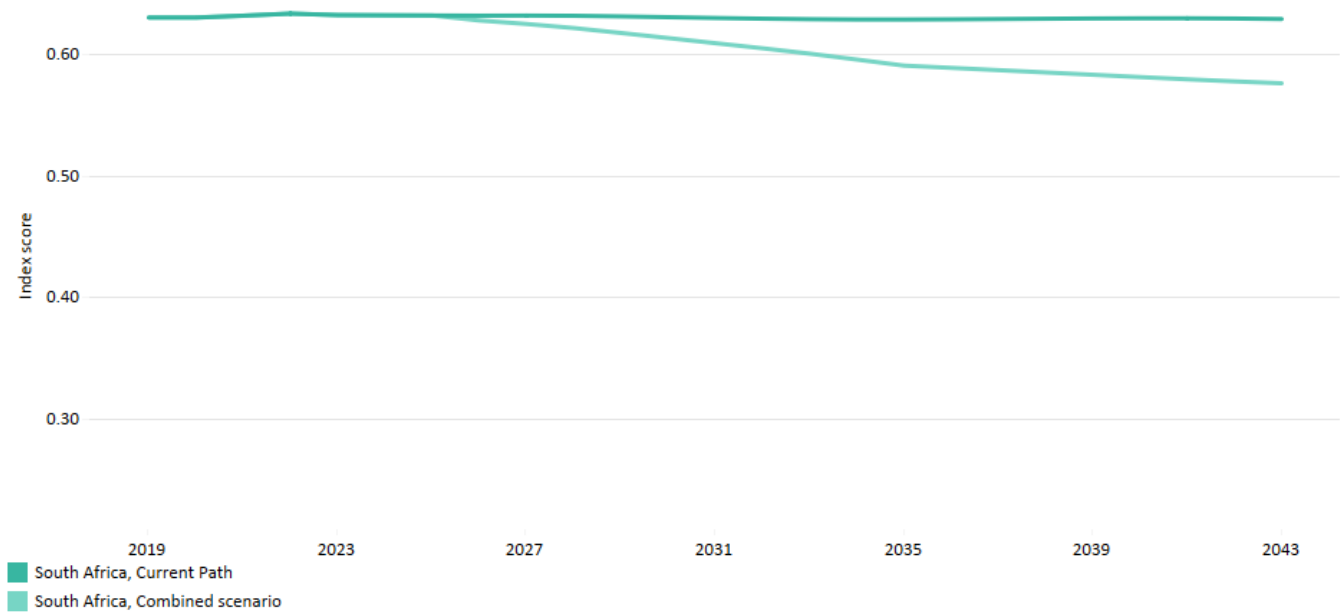
Chart 34 compares life expectancy in the Current Path with the Combined scenario for 2023 and 2043.

Life expectancy at birth is one of the best aggregate measures of health and well-being, and a powerful tool in helping to explain the huge drag that poor human capital in South Africa has on economic growth.

At the height of the HIV/AIDS scourge in 2005, life expectancy in South Africa was a mere 52 years, compared to an average of 73 years for upper-middle-income countries (UMICs) globally. South Africa's life expectancy has subsequently recovered to its previous trajectory, but in 2023 it was still 11 years below that of UMICs globally (66 years vs 77 years) in large part due to an unusually high burden of communicable diseases, in particular HIV/AIDS and tuberculosis. South Africa's life expectancy was also 1.4 years lower than the average for Africa. The Current Path is that the gap between South Africa and the average for UMICs globally will remain relatively constant to 2043. In the Combined scenario, life expectancy in South Africa improves significantly by 4.2 years above the Current Path by 2043, to 74.4 years, still five years below the average for UMICs. Female life expectancy, 6.2 years above that of males in 2023, is, by 2043, almost 6.9 years above that of males in the Current Path, but the difference is lower at 6.1 years in the Combined scenario.

Signing the Presidential Health Compact in July 2019, President Ramaphosa publicly acknowledged the crisis in South Africa's health system. The biggest obstacles to achieving improved health outcomes are a poorly functioning public healthcare system, over-servicing and inflated costs in the private healthcare system, and public debt. Better management and more competition are vital, but given poor efficiencies and high debt levels, South Africa will struggle to implement universal health coverage as envisioned in its 2017 White Paper. See the Demographics and Health scenario for context.

Chart 35: Domestic Gini in the Current Path and Combined scenario, 2019-2043



Source: IFs 8.26 initialising from WDI data

Chart 35 compares the Gini coefficient in the Current Path with the Combined scenario, from 2019 to 2043.

South Africa's status as the most unequal country globally is well-known. On the Current Path, only the Central African Republic, a war-torn, low-income country with significantly lower development indicators will relegate South Africa to second spot in 2043. In the Combined scenario, South Africa's Gini coefficient will be almost 9% lower in 2043 than the Current Path.

The most effective counter to South Africa's extraordinary high levels of inequality is undoubtedly employment in the formal sector. Even being active in the informal sector would be better than being unemployed and not economically active.

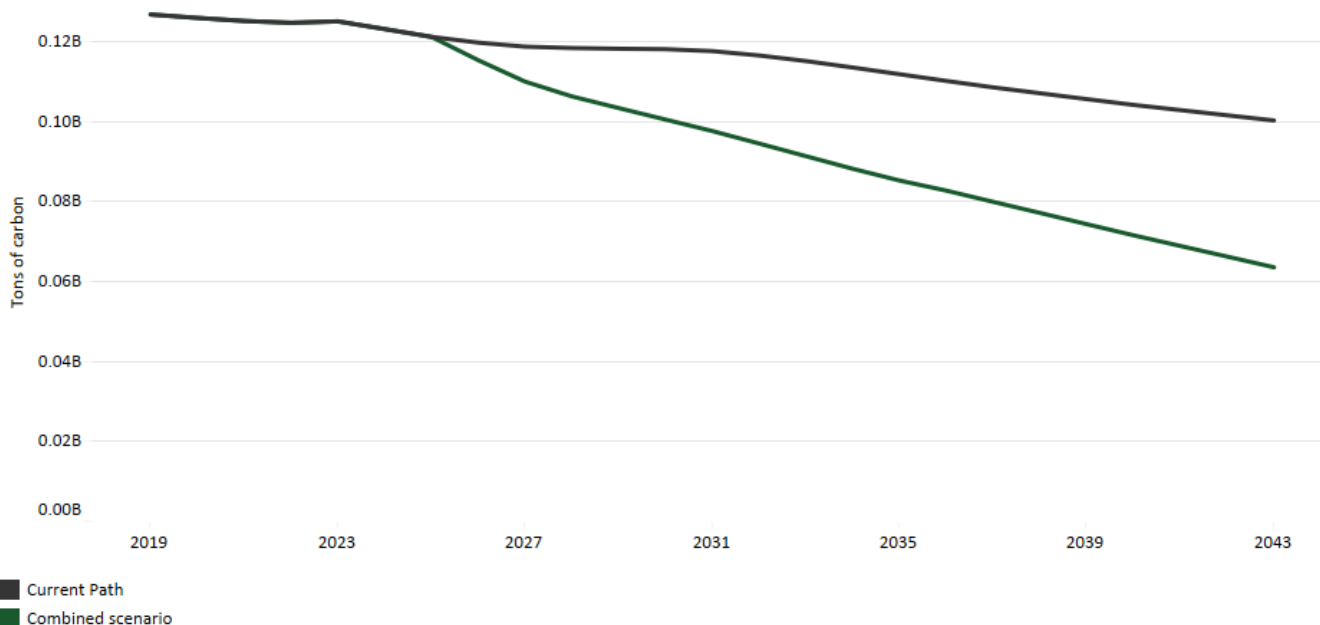
Compared to the Current Path, the Combined scenario would see the largest employment growth in the manufacturing sector, followed by services, materials, the agriculture sector and energy. Employment in the information, communications sector will decline marginally. Whereas, in 2023, 18.95 million South Africans were employed in the six sectors modelled, that number would increase to 31.2 million in the Combined scenario by 2043, more than 3 million above the Current Path. Labour force participation rates therefore improve to 64.7% in the Combined scenario compared to 56.8% in the Current Path. Here it is important to point out that much of the associated increase comes from the modelling approach applied in the Manufacturing scenario where we increased labour participation rates for men and women, reflecting policies that advance low-end manufacturing. The size of South Africa's labour force, persons who either are employed or actively seeking employment, increases significantly in the Combined scenario. In 2023 it was 24.9 million people out of a total population of 61.4 million people. In the Current Path the size of the labour force in 2043 will be 32.4 million. In the Combined scenario it will be 37.9 million. South Africa's 2043 population will number 74.4 million in the Combined scenario and about a million less in the Current Path.

Important as these improvements in the Combined scenario are, they are insufficient for a country with South Africa's high levels of unemployment, poverty and inequality. Government, the private sector and civil society would clearly have to

come together around a range of employment schemes to maintain stability sufficient to allow for growth to resolve the unemployment and inequality challenge in the long term.

Chart 36: Carbon emissions in the Current Path and Combined scenario, 2019-2043

Million tons of carbon (note, not CO₂ equivalent)



Source: IFs 8.26 initialising from Carbon Dioxide Information Analysis Center data

Chart 36 compares carbon emissions in the Current Path with the Combined scenario from 2019 to 2043.

South Africa's 2021 updated Nationally Determined Contribution (NDC) articulates a detailed climate action plan. It commits to significantly reducing greenhouse gas emissions to between 350 and 420 MtCO₂e by 2030. This commitment aligns with the Paris Agreement's rigorous targets to maintain global temperature increases well below two degrees Celsius, with aspirations to limit warming to 1.5 degrees Celsius.

Central to this strategy are several pivotal policy documents and frameworks. The first [Adaptation Communication](#) outlines strategies across essential sectors to effectively manage and mitigate climate impacts. Furthermore, the [Climate Change Act](#), signed into law in July 2024, establishes a comprehensive legal framework supporting mitigation and adaptation efforts. This legislation ensures that climate actions are scientifically grounded and seamlessly integrated into national policies.

The NDC envisions a strategic transformation in energy production, as delineated in the [2019 Integrated Resource Plan \(IRP\)](#). This plan advocates for a diversified energy mix, expanding gas and nuclear power capabilities, and significantly increasing renewable energy sources. The [2023 update to the IRP](#) extends these initiatives, focusing on reducing coal dependency and bolstering investments in cleaner, sustainable energy options. This shift is crucial for achieving a balanced energy mix that supports environmental sustainability and energy security.

This transition is part of a broader "Just Energy Transition," designed to meet stringent climate goals while promoting economic and social sustainability. Emphasising a mix of various energy production types is vital for maintaining energy security alongside environmental sustainability. However, realising the NDC's ambitious targets will require an escalated commitment to renewable energy, alongside enhanced international support and technological innovation.

South Africa's 2019 National Climate Change Adaptation Strategy (NCCAS) aims to serve as an overarching legislative framework for adapting to and mitigating the effects of climate change. It is supported by the implementation of the low-emissions development and growth strategy for South Africa. South Africa has already imposed a carbon tax on emissions that gradually becomes more punitive.

Several African countries, from Zimbabwe to Ghana, have started to regulate the production and trade of carbon credits, which can be sold to companies or countries to compensate for their emissions of climate-warming gases to garner more income for the governments. Even though South Africa has the potential to produce the credits from its renewable-energy activities and the restoration of carbon-absorbing ecosystems, it is the world's 14th-biggest producer of greenhouse gases (it produced 1.3% of global emissions in 2023). The bulk of those emissions are due to the reliance on coal to produce electricity and petrochemicals from plants operated by companies, particularly Eskom and Sasol.

In his *State of the Nation Address in February 2024*, President Ramaphosa announced the establishment of the Climate Change Response Fund (CCRF) to bring together all spheres of government and the private sector and leverage collaborative efforts to build resilience and respond to climate change. However, the inaugural 'South African State of Climate Action Report' publication in June 2024 found that South Africa's commitments to tackling climate change and facilitating a just transition are hindered by incoherent policies, weak governance structures, and inconsistent government and other stakeholders' actions. The report was published at a time when Eskom, South Africa's state-owned energy utility, has been permitted to delay the decommissioning of the Hendrina, Camden and Grootvlei power stations to 2030, with potential implications for whether South Africa will still be able to meet its Nationally Determined Contribution target of reducing greenhouse-gas emissions to between 420 million and 350 million tons by 2030. The country has set the goal to reach net zero emissions by 2050 in its *Low-Emission Development Strategy* submitted in 2020.

The commitment to decommission the three plants helped South Africa to secure initial pledges of US\$8.5 billion financing for its Just Energy Transition Investment Plan (JET) at COP26 in 2021 from an International Partners Group made up of France, Germany, the UK, the US and EU. The pledges have since increased significantly, with the Government intending to leverage that to US\$98 billion to drive the required investments in the electricity grid, green hydrogen, electric vehicles, economic diversification and skills development.

The just-energy conversion is proving difficult. A first effort, funded by the World Bank at US\$497 million, to convert the 1 000MW Komati coal-fired power station in the Mpumalanga province into a renewable energy generation site powered by 150MW of solar, 70MW of wind, and 150MW of battery storage was disastrous. Poor planning meant the plant increased unemployment and poverty, creating massive resentment in the surrounding area.

Coal will, however, remain the dominant source of energy production and is also essential from an employment perspective. In 2024, coal directly employed between 75 000 and 100 000 workers, constituting about 0.5% of total employment and nearly 20% of mining employment. In 2023, 95% of South Africa's energy production came from coal, declining to 66% in 2043 on the Current Path. In the Combined scenario, South Africa will still produce 21% of its energy from coal despite completing two phases of its nuclear build and aggressively ramping up renewables and gas production. As a result, various studies are underway towards more efficient and cleaner coal technologies, including a Carbon Capture Utilisation and Storage (CCUS) pilot study.

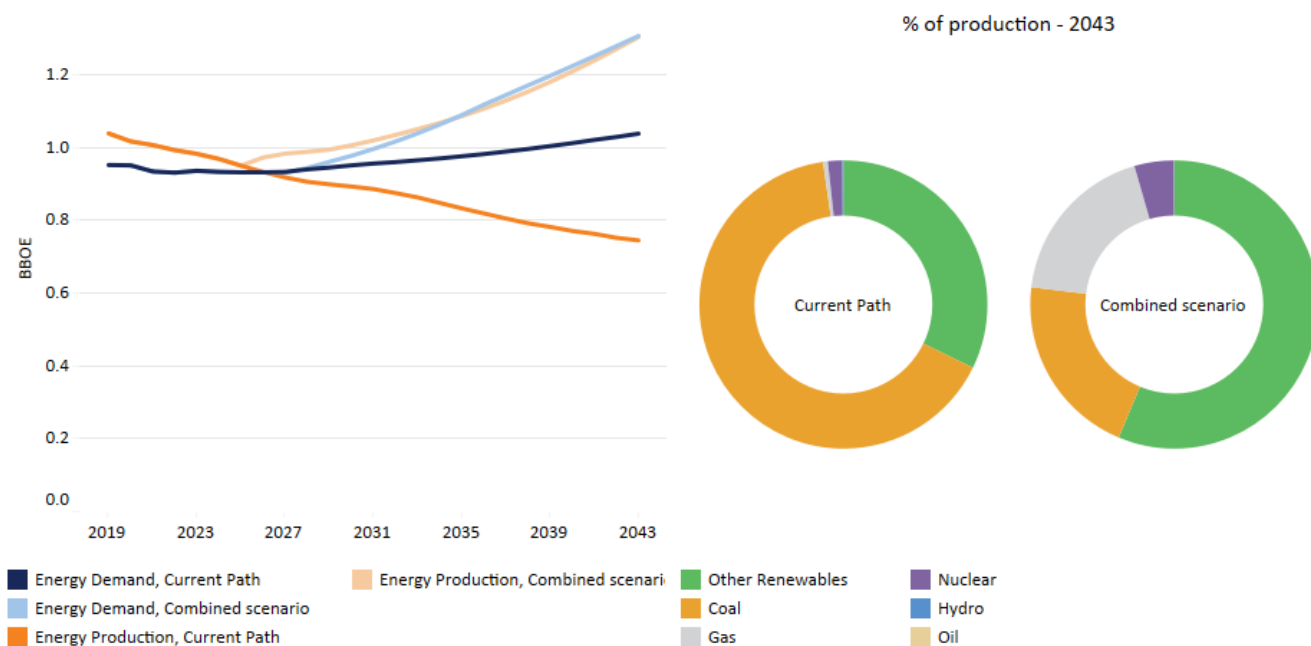
The 2024 *Climate Change Act* sets out a national climate change response, including mitigation and adaptation actions. The Act enables the alignment of policies to ensure South Africa's transition to a low-carbon and climate-resilient economy. It sets carbon reduction targets on a sectoral basis, guiding industries and large emitters towards net zero, with the timing aligned with the carbon tax and carbon trading regimes. All industries that emit greenhouse gases, including coal mining, must submit annual progress reports to the minister of forestry, fisheries and the environment. The act makes it an offence if a business fails to submit a mitigation plan and criminalises the failure to provide the minister with information

or to comply with emission reduction measures. It also established the Presidential Climate Commission as a statutory body. It gave powers and responsibilities to all layers of government to manage emissions targets on a sectoral and sub-sectoral basis. It sets up an adaptation resilience fund and requires the state to undertake adaptation financing and resilience.

In 2023, South Africa released 125 million tons of carbon (or 458 million tons of CO₂) from fossil fuels, which will decline to 100 million tons in 2043 (366 million tons of CO₂) as the country transitions away from coal as the primary source of electricity generation. South Africa's carbon emissions will increase most in the AfCFTA and Governance scenarios, each emitting an additional 5 million tons of carbon (18 million tons of CO₂) by 2043 compared to the Current Path. Still, the slight increase in the various sectoral scenarios will be offset by the steady replacement of coal by gas, other renewables and nuclear (reflected in the Infrastructure/Leapfrogging scenario), which reduces carbon emissions such that the emissions in the Current Path in 2043 will be similar to the Combined scenario even though the economy will be 52% larger.

The remarkable impact of more renewables, nuclear and gas that are part of the Large Infrastructure and Leapfrogging scenario means that South Africa will be the third largest emitter of carbon in Africa in both scenarios, having been overtaken by Nigeria and Egypt. In 2043, South Africa will be the 19th largest carbon emitter globally in both the Current Path and Combined scenario. It is currently at number 14.

Chart 37: Energy demand and production by type in the Current Path and Combined scenario, 2019-2043



Source: IFs 8.26 initialising from World Energy Outlook data

Chart 37 compares energy demand and production in the Current Path with the Combined scenario from 2019 to 2043.

Energy production in our modelling is done in six types, namely oil, gas, coal, hydro, nuclear and other renewables. The data for coal in IFs includes open-cycle gas turbines and pumped storage produced by Eskom. The data is converted into billion or million barrels of oil equivalent (BBOE or MBOE) to allow for comparisons between different energy sources.

South Africa has the only functioning commercial nuclear energy production plant in Africa (at Koeberg in the Western Cape) and apartheid South Africa developed a sophisticated oil from coal industry whilst still under sanctions, today hosted by a private company, Sasol.

On the Current Path, South Africa's energy imports exceed exports by value as from 2027, meaning that the country is becoming increasingly energy insecure and the gap is set to increase over time. South Africa has traditionally exported about a quarter of its total coal production but energy export earnings will fall below energy import costs as from 2028. Already South Africa's 2023 energy imports (mostly refined petroleum) amounted to US\$9 billion, set to increase to US\$21.4 billion on the Current Path by 2043. Ongoing reliance on coal for the production of electricity and for exports run counter to South Africa's commitments in terms of global carbon reductions such as those under the Paris agreement. The large reliance on coal for domestic energy production also makes South Africa vulnerable to efforts by others, such as the European Union's Carbon Border Adjustment Mechanism (CBAM) that will tax goods entering the EU using (cheap) fossil fuels that may compete with its more expensive but less carbon intensive domestic production.

Poor planning and implementation inertia has led to ongoing electricity shortages in South Africa that have lasted more than a decade before easing in 2024. In recent years the government started to publish and regularly update an Integrated Resource Plan (IRP) to ensure security of electricity supply and balance it with demand whilst considering the environment and cost. Coming from very high levels of carbon emissions (due to its current reliance on coal for most of its electricity generation) means that South Africa has significant potential to reduce emissions as it envisions large changes to its energy mix but it also has to increase energy production to account for the increase in energy demand.

In 2023, coal contributed 95% of South Africa's energy production, followed by 2% each from nuclear and other renewables and 0.7% from gas. The contribution from hydro is negligible. As a result of its large dependence on coal, South Africa is the largest emitter of carbon in Africa and the 14th largest globally (see Chart 36). The government has had to balance the ongoing electricity shortages (and the associated need to keep more coal-fired power stations in service) with its commitments to reduce carbon emissions as set out in its updated Nationally Determined Contribution (NDC) discussed earlier. To that end it returned the Camden coal-fired station to service and delayed the closer of two others.

Gas is important for South Africa particularly as Sasol, which imports natural gas from its declining Pande and Temane fields in Mozambique but will stop supplying local companies with gas starting June 2026 as reserves deplete. South Africa has auctioned exploration blocks for shale gas, with a focus on the Orange Basin and the Karoo region but legal challenges and environmental concerns have constrained exploration, such as halting Shell's exploration for gas in 2024. Later that year Shell announced that it would shift its attention to the lucrative Orange River basin on the west coast while it, Total and others were exiting the gas discoveries off the South coast of Mossel Bay that had yielded two major discoveries, Brulpadda and Luiperd.

The energy production forecast is part of the Infrastructure and Leapfrogging scenario (and included in the Combined scenario).

Contrary to the Current Path forecast that would see South Africa rapidly becomes energy insecure, energy production keeps pace with demand in in the Combined scenario.

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Dr Jakkie Cilliers is the ISS's founder and former executive director. He currently serves as chair of the ISS Board of Trustees and head of the African Futures and Innovation (AFI) programme at the Pretoria office of the Institute. His 2017 best-seller *Fate of the Nation* addresses South Africa's futures from political, economic and social perspectives. His three most recent books, *Africa First! Igniting a Growth Revolution* (March 2020), *The Future of Africa: Challenges and Opportunities* (April 2021), and *Africa Tomorrow: Pathways to Prosperity* (June 2022) take a rigorous look at the continent as a whole.

Ms Alize le Roux joined the AFI in May 2021 as a senior researcher. Before joining the ISS, she worked as a principal geo-informatics researcher at the CSIR, supporting various local and national policy- and decision-makers with long-term planning support. Alize has 14 years of experience in spatial data analysis, disaster risk reduction and urban and regional modelling. She has a master's degree in geographical sciences from the University of Utrecht, specialising in multi-hazard risk assessments and spatial decision support systems.

About African Futures & Innovation

Scenarios and forecasting can help Africa identify and respond to opportunities and threats. The work of the African Futures & Innovation (AFI) program at the Institute for Security Studies aims to understand and address a widening gap between indices of wellbeing in Africa and elsewhere in the world. The AFI helps stakeholders understand likely future developments. Research findings and their policy implications are widely disseminated, often in collaboration with in-country partners. Forecasting tools inspire debate and provide insights into possible trajectories that inform planning, prioritisation and effective resource allocation. Africa's future depends on today's choices and actions by governments and their non-governmental and international partners. The AFI provides empirical data that informs short- and medium-term decisions with long-term implications. The AFI enhances Africa's capacity to prepare for and respond to future challenges. The program is headed by Dr Jakkie Cilliers.