



AFRICA REGION

# SOUTH AFRICA

EXECUTIVE SUMMARY

Building a resilient, sustainable,  
and inclusive economy

# COUNTRY CLIMATE AND DEVELOPMENT REPORT

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World Bank Group

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# Overview

**South Africa's ambition is to build a more inclusive, resilient, and sustainable economy. This ambition depends on the extent to which the country is able to shift from its heavy dependence on coal to low-carbon activities (mitigation) and to address the growing risks presented by climate change (adapt and build resilience). This low-carbon path and adaptation must be people-centered, creating jobs and protecting the poorest in the most unequal society in the world (just transition).**

South Africa has taken considerable strides forward since it became a democracy some 30 years ago, with increased access to housing, municipal services (such as electricity and water), education, and health services. However, those gains have been challenged over the past decade: gross domestic product (GDP) per capita has contracted by 5.6 percent while poverty and inequality have reverted to their pre-2010 levels. This is largely due to the continued legacy of apartheid; delayed implementation of structural reforms in strategic sectors; insufficient investments, particularly in energy; widespread corruption, crime, and insecurity; and external shocks (including the COVID-19 pandemic and the Russian invasion of Ukraine).

The government has placed the climate agenda at the center of its development strategy and, accordingly, has started to adjust its legal and institutional frameworks. This Country Climate and Development Report (CCDR) argues that it is in the country's interest to pursue a low emission growth model with the adoption of new technologies in power, transport, and industries. By expanding in renewable energy, the country will not only reduce its carbon emissions but also address its protracted energy crisis. Today, Eskom, the national public energy utility, has an unreliable and aging coal power fleet with high operating, maintenance, and renovation costs, which has resulted in increasing levels of loadshedding. Renewables are the cheapest and most immediate solution to increase electricity supply and to reduce the strain on existing generation capacity (allowing for the development of required maintenance works). They will contribute to reduce load shedding—which reached 1,950 hours (or almost 1/3 of total time) in the first 9 months of 2022. Over the long run, as the penetration of renewables increases, additional investment in the grid, storage, and flexible low carbon generation technologies (like natural gas and battery storage) will be needed to ensure system stability.<sup>1</sup> Reducing carbon emissions will also help the country maintain its competitiveness as major trading partners, institutional investors, multinationals, and international consumers are turning away from carbon-intensive products and investments. Lower greenhouse gas (GHG) emissions will also reduce local air, water, and soil pollution, which affects the health of both people and the ecosystem, labor productivity, and water and food security.

The climate agenda is also important because South Africa is vulnerable to climate change. Its agriculture, cities, infrastructure, and people are particularly affected by rising temperatures and variable rainfall, resulting in recurring droughts, floods, and heatwaves. These are especially disruptive in coastal cities, poor agricultural provinces, and the underdeveloped peri-urban areas of the main metropolitan centers. The impact of climate change is exacerbated by income inequality: poor people are both more exposed to climate risks and less able to cope with them.

Against this backdrop, this CCDR suggests that South Africa can deliver an effective response to climate change risks without undermining its socioeconomic goals by embracing three interconnected transitions: a low-carbon transition, a resilient transition, and a just transition. These are discussed in further detail below.

Achieving the transitions will require a combination of structural reforms (such as increased competition in strategic sectors, including those dominated by state-owned enterprises), a more flexible labor market, and improvements in fiscal and financial policies which will require a stronger effort to address the existing political economy challenges. Furthermore, the CCDR estimates that the financing requirements associated with the transitions could amount to 4.4 percent of GDP per year—or R8.5 trillion (about \$500 billion in net present value) between 2022 and 2050. Given the government's limited fiscal space and the global public good's dimension of the climate change, both the domestic private sector and external financing, including in the form of grants and concessional loans, will have an important role to play in these transitions.

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<sup>1</sup> Low-carbon generation options that are dispatchable or allow for long-term storage that are considered in the CCDR include battery storage, pumped storage hydropower, gas turbines (running on natural gas), fossil fuels with carbon capture and sequestration, nuclear, geothermal, and biomass energy.

# Developing a Low-Carbon, Climate-Resilient, and Inclusive Economy

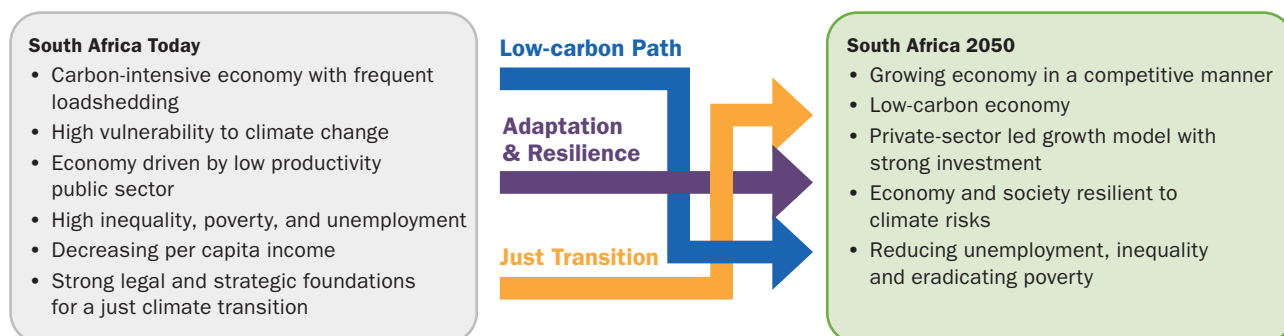
In October 2020, South Africa adopted an ambitious set of objectives in its Economic Reconstruction and Recovery Plan, including achieving accelerated and inclusive growth and creating productive jobs. Facing a decade of slow GDP growth, rising public debt, and an unemployment rate of over 30 percent (and over 60 percent for youth), the government recognized the need to shift its economic model toward better infrastructure investments and delivery, a revitalized and diversified mining and manufacturing sector, and a supportive policy environment for accelerated, inclusive, and transformative growth. These objectives are fully aligned with the Government’s long-term National Development Plan, Vision 2030.

As part of its new development strategy, the government has clearly defined its climate ambitions, which include working toward net-zero emissions and building a resilient economy, while ensuring a just transition for all. In the last two years, the government has revamped its planning and institutional frameworks with the creation of the Presidential Climate Commission, the approval of the Just Transition Framework, and the submission of the Climate Change Bill to Parliament. In parallel, the private sector has started to reduce its carbon footprint, with record investments in renewable energy in the past few years.

Despite this progress, South Africa could do more to address its development and climate challenges, as set out in the CCDR’s three proposed interconnected transitions (Figure 1):

- **Mitigating climate change—the low-carbon transition:** South Africa is one of the most carbon- and energy-intensive economies in the world, at 5.6 times higher than the OECD average, 1.7 times higher than China, and 3.2 times higher than the global average in 2019. Moving away from coal toward renewable energy would be in the national best interest. It will help the country address its current energy crisis most urgently and cost-competitively, while lowering GHG emissions and delivering substantial local health, environmental and economic competitiveness co-benefits.
- **Adapting to climate change—the resilient transition:** Climate change negatively affects South Africa’s infrastructure, productivity, human capital, and scarce water resources. The country is vulnerable to rising temperatures and variable precipitation that result in droughts, floods, and heatwaves. This vulnerability undermines the country’s ability to achieve its long-term development goals. Extreme weather events are expected to become more frequent and put billions of dollars in public and private assets at risk. Agriculture is directly exposed, but the manufacturing and service sectors are also vulnerable through the expected impacts on cities—where over 66 percent of people and 80 percent of economic activities are concentrated.
- **Protecting poor and vulnerable people—the just transition:** To reconcile development and climate goals while addressing inequality, South Africa needs to pay special attention to its most vulnerable people. The country already starts from a disproportionately low base with unequal access to productive assets (such as land, water, finance, education, and skills) and racial and spatial exclusion. Unfair low-carbon and resilient transitions would exacerbate existing economic, social, and political tensions and make it harder to reach the consensus needed to adopt and urgently implement the necessary reforms. The government will need to pay special attention to the distributional impacts of the shift toward a low-carbon economy on the people through labor and other markets and provide targeted assistance to poor communities most affected by climate hazards.

Figure 1: Aligning South Africa’s development paradigm with climate change



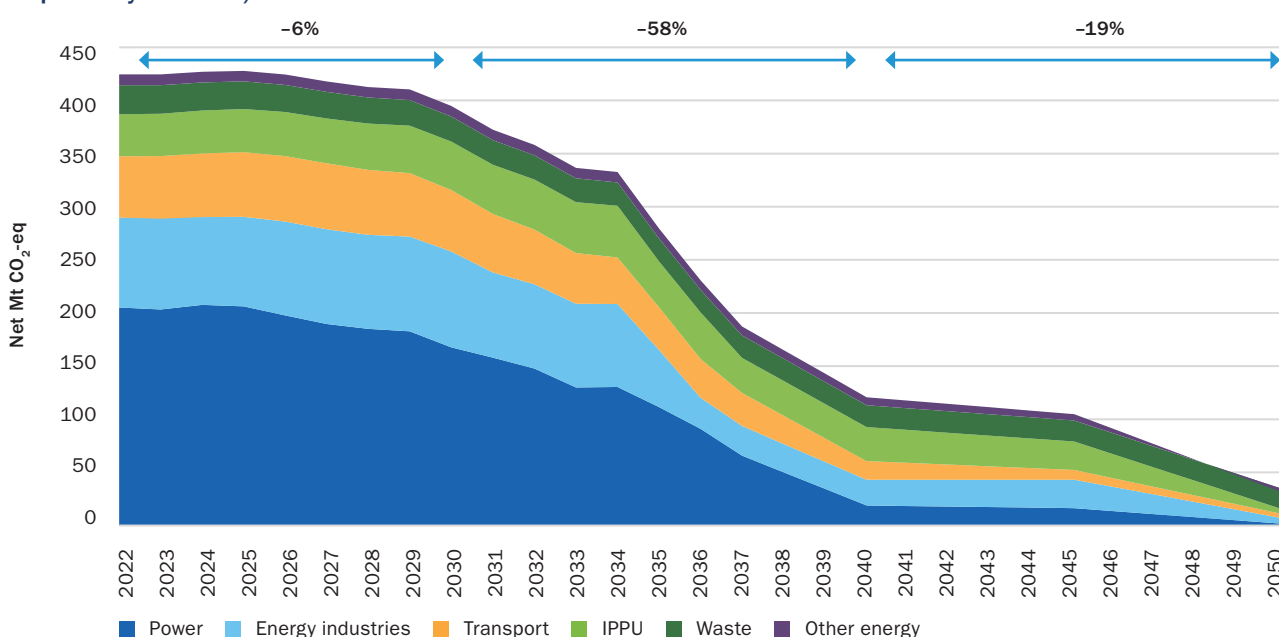
Source: The World Bank. Adapted from the National Development Plan: Vision 2030, and the Economic Recovery and Reconstruction Plan 2020.

# The Low-carbon Path

The low-carbon transition will facilitate energy security and help South Africa achieve net-zero carbon emissions by 2050.

South Africa accounts for 1.2 percent of global GHG emissions. The country will need to invest substantially to lower emissions in the main emitting sectors and reach net zero by 2050 (Figure 2). The power sector (which accounted for 45 percent of GHG emissions in 2017, according to the latest official data available) will need to transform radically by moving away from coal toward renewables and to grow to meet increased demand from electrification of energy use (e.g., in transport or industries). Solar and wind are projected to provide about 85 percent of the country’s power supply by 2050 (Figure 3). This shift should start immediately to address the ailing generation capacity, accompanied by enhanced regional energy market. Using natural gas, battery and pumped hydro storage in later years will provide system stability.

**Figure 2: Net GHG emissions (CO<sub>2</sub>-eq) by sectors to achieve net zero by 2050 (including percentage reductions required by decades)**



Source: South Africa TIMES Model (SATIM).

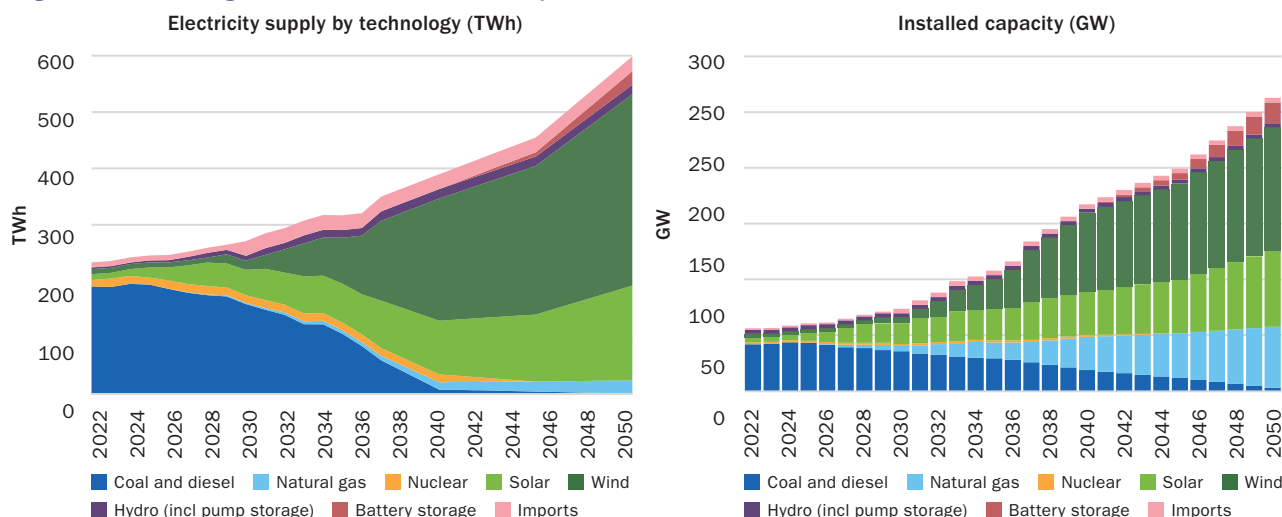
Note: IPPU = industrial processes and product use. Excludes Agriculture, Forestry and Other Land Uses (AFOLU)

Solving the power crisis also requires a transformation in the overall energy sector value chain, including addressing the poor operational and financial performance of both Eskom and municipalities,<sup>2</sup> creating a competitive wholesale power market that incentivizes private sector participation, and developing the mechanisms to ensure there is sufficient investments in the grid (transmission and distribution) and local human capital available to drive implementation. In transport (the second highest emitting sector), a shift toward electric vehicles is expected from the early 2030s, which will be aligned with the increase in the supply of more reliable and cleaner electricity. The CCDR also emphasizes that businesses and consumers will need to change their behavior, especially in polluting industries, waste management, and agriculture.

Heading toward a net-zero economy will put South Africa on a positive growth trajectory (Figure 4). In a scenario where the country achieves net zero, the economy could expand by an average of about 2.3 percent of GDP per year between 2022 and 2050, which would be more than twice the rate achieved over the past decade. This positive impact on growth is mainly explained by the resolution of the energy crisis, productivity gains and an increase in employment that will generate higher income for the labor force. An even higher growth rate would be possible in South Africa, and closer to the government’s own ambitions for the country, but it would require further and broader policy reforms.

<sup>2</sup> Municipal power distribution service has been affected by a combination of financial (e.g., affordability, inadequate tariff structures, etc.), technical and operational (commercial losses, transformer failures, etc.) barriers, as well as legislative and regulatory restrictions (e.g., municipal power and authority, licensing issues, etc.). More recently, increasing loadshedding has forced the replacement of deteriorated distribution assets on emergency basis at under cost recovery tariff.

**Figure 3: Technological transformation in the power sector, 2022–2050**

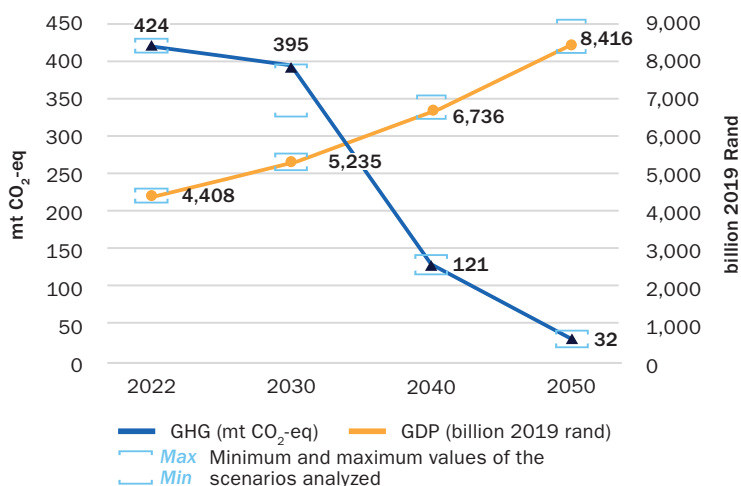


Source: South Africa General Economy (SAGE) model and South Africa TIMES Model (SATIM).

The impact of the low-carbon transition on economic growth can be further enhanced with proactive measures, including:

- **Improving energy efficiency to reduce energy demand.** Energy efficiency can be implemented in the short term and will contribute to increase GDP by about 2 percent in 2030. This can be accompanied by smart urban planning and digital tools that will help further reduce business and household energy consumption in cities. Efficiency gains are often relatively inexpensive compared to creating new infrastructure because they require mainly behavioral changes (driven by price incentives) and/or smaller investments.
- **Mobilizing more external resources (both public and private)** will reduce the pressure on domestic savings and crowding out of resources for other equally productive investments, leading to higher economic growth.
- **Expanding carbon pricing mechanisms** will encourage businesses and households to change their behaviors and so reduce the need for investments in new technologies. It will also provide additional revenue to the government that can be used to finance the transition and protect the most vulnerable groups.
- **Promoting green hydrogen (H2) exports** could add another 6 percent to GDP by 2050. However, the technology is still in its infancy, and promoting the production of green H2 will require even more investments in renewable energy.

**Figure 4: The net-zero emissions transition will accelerate GDP growth**



Source: SAGE and SATIM models.

Note: Data from net-zero reference scenario (excl. AFOLU)

The low-carbon transition will benefit the South African economy in the long term. It will also deeply transform its GDP structure. Several industries (renewables, green H2, and non-coal mining, for example) will expand, while high-emitting sectors, including the chemicals, coal, and crude oil sectors, will wane over time. This transformation will require close attention from the government to ensure it is also just for the affected workers and communities.

Compared with historical levels, the low-carbon transition will require incremental investments in the order of R940 billion in net present value (\$55 billion or 1.6 percent of GDP per year) between 2022 and 2030. Furthermore, reaching a net-zero target will require total incremental investments of

R4.2 trillion (\$245 billion or 2.1 percent of GDP per year) in net present value between 2022 and 2050. These incremental investments are explained by the magnitude of the shift required to move from an economy highly dependent on coal to renewable energy sources. About 61 percent of these investments are for the power sector (wind, solar, batteries, and gas), 20 percent for the transport sector, and 19 percent for others (including green H2).

## **Building Resilience to Climate Change**

**South Africa urgently needs to manage water stress and strengthen the resilience of its cities and poor agricultural areas to floods, droughts, and heatwaves.**

Over the past few years, South Africans have increasingly been exposed to climate-related disasters. The country has been warming at twice the global average rate and, in 2021, declared its third national state of disaster for drought in the last four years. Agriculture and tourism are vulnerable to changes in temperatures and rainfall, while private and public assets are at risk in major urban centers. Climate risks disproportionately affect poor people who live in more exposed areas, have limited access to public services, and lack the resources to adapt to more extreme climate events.

Looking ahead, the impact of climate disasters is expected to be more pronounced in certain areas and sectors in South Africa. Extreme weather events and broader water scarcity have already caused significant damage and their intensity is expected to worsen. Fortunately, South Africa is relatively less exposed to the two most potentially devastating climate risks worldwide—tropical storms and higher sea levels (at least until 2050).

The CCDR emphasizes that most adaptation measures will be needed in the water and agriculture sectors, as well as in cities—home to the majority of the country's people and the site of most of its economic activity. Road transport is relatively resilient but some provincial and rural areas will require attention. Priority should be given to investments that have synergies with other transitions. For example, investments in irrigation, agronomic practices, sustainable land management, and ecosystem restoration would not only increase resilience but also lower agricultural GHG emissions. They would also be people-centered, promoting productivity (improving income and resilience) and creating more climate co-benefits (improving water availability and quality, flood protection, and carbon sink). Similarly, land-use planning, and compact urban development policies are important to encourage settlements away from flood-prone areas and optimize resilient infrastructure to benefit the poor. Retrofitting existing assets and infrastructure as well as new investments will need to be combined with strengthening early warning systems (including through the use of new digital technologies) and post-disaster assistance.

The resilient transition will require incremental investments estimated at R866 billion (\$51 billion or 1.4 percent of GDP per year) in net present value between 2022 and 2030. Total incremental investments between 2022 and 2050 are estimated at around R2.4 trillion (\$143 billion or 1.3 percent of GDP per year) in net present value. To reduce the costs of adaptation measures, the government could incentivize private investments in green and climate-smart projects by using pricing instruments (such as subsidies) together with stronger regulations and enforcement (for land-use and construction norms, for example). It could also develop innovative partnerships to de-risk those investments. This would go hand in hand with improvements in public spending.

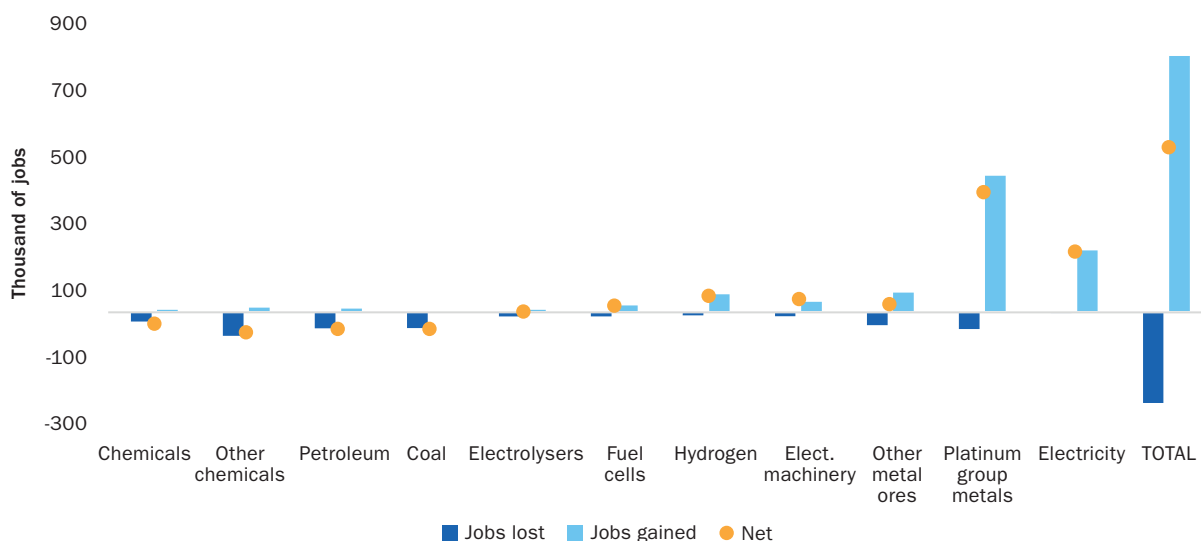
## **Supporting a Just Transition**

**People should be at the center of climate change actions by creating opportunities for workers and small local businesses and by providing assistance to the most vulnerable.**

By adopting the Just Transition Framework in August 2022, the government has committed to a people-centered approach, balancing the need for climate action with ongoing initiatives to address social and economic inequality, including by putting productive assets and skills in the hands of poor and vulnerable people.

Specific actions are needed to mitigate the potential negative effects of the low-carbon transition on poor people. These could include targeted subsidies to compensate for higher electricity tariffs. More importantly, the government will need to support the 300,000 workers who would lose their jobs in high-emitting sectors

**Figure 5: Employment changes in 11 key sectors affected by decarbonization, 2022–2050**



Source: World Bank Staff SAGE and microsim models.

(coal, fuel, and heavy industries) between 2022 and 2050 (Figure 5). Assuming a job multiplier of “two”, in line with recent estimates for South Africa, this means that twice the number of jobs (600,000) will be lost during the transition. The government could leverage and strengthen social assistance, labor market intermediation, and reskilling and upskilling programs. More support is also needed for micro-, small, and medium enterprises and for self-employed businesses (in both the formal and informal sectors). A holistic approach is required immediately in Mpumalanga, the province most affected by the closure of coal mines and coal-fired power plants.

For each job eliminated, an estimated 2-3 jobs could be created (Figure 5). The challenge is that these new jobs will be gradually created over time in non-coal mining activities, renewables, and green manufacturing and services, while the job losses will mainly occur in the mid-2030s. Furthermore, most new jobs are unlikely to emerge in the same geographic areas. The government will have to address these two challenges—timing and location—by ensuring the availability of workers with the right skills and encouraging them to move across sectors and regions. This will require the development of partnerships with the private sector in the short term, and the identification of support to income-generating opportunities, the revamping of the education system (especially technical and vocational education and training), and the removal of persistent rigidities in the labor market in the longer term. This should help promote the government’s broad-based economic empowerment agenda.

Poor people will also be disproportionately affected by extreme climate events, such as floods, droughts, and heatwaves, particularly in agricultural areas and in informal urban settlements. Without taking action, it is estimated that about 1 million South Africans will be driven into poverty by 2030 because the highest poverty rates are reported in the most climate-vulnerable regions. The poorest households in cities will also be the worst affected by climate risks, as demonstrated by the recent flooding in Durban. Protecting poor people from climate shocks will require targeted investments and financial assistance, including in the provinces of the Northern Cape and North West (water stress) and in Limpopo (heat stress). In the longer term, the resilience of the poorest households could be supported by introducing aquaculture, high-value crops, and agro-processing in rural areas, while the development of sustainable land management and ecosystem restoration could bring climate co-benefits to poor people in urban settlements.

To support appropriate social and labor programs and provide infrastructure for resilience and adaptation of the poorest communities, the just transition will require incremental financing in the order of R574 billion (\$34 billion or 1 percent of GDP per year) in net present value over the period 2022 to 2030. Total incremental investments between 2022 and 2050 are estimated at about R1.9 trillion (\$114 billion or 1 percent of GDP per year) in net present value over the period 2022 to 2050. This will cover the costs associated with new social and labor programs and the investments required to upgrade early warning systems and informal settlements.



# The Way Forward—Top Priorities

This CCDR presents a set of **five priority policy packages** that require special attention from the government and its social partners if South Africa is to achieve its climate and development goals. These packages include the most urgent measures to be implemented in the short-term and those that will require more time (between one and three years) to identify the policies, responsibilities, and budgets required.

## **Priority package 1: Accelerate the clean energy transition to end loadshedding and reduce emissions.**

- *Short-term:* Immediate steps to address the power crisis and the low-carbon transition include: (i) complementing public efforts to develop renewable energy by streamlining the approval process of private investments in renewables that suffer from delays due to complex and redundant procedures; (ii) completing the unbundling of Eskom transmission and developing an action plan with concrete milestones to improve the availability of Eskom's generation fleet that could trigger financial support from National Treasury; (iii) engaging with municipalities to help them procure electricity from renewable energy-independent power producers, define programs to enhance their operational and commercial efficiency, and address infrastructure vandalism; and (iv) accelerating the implementation of energy efficiency programs to scale up the energy service company (ESCO) market.
- *One to three years:* The following structural reforms should be considered: (i) develop a competitive power market to reduce the risk from Eskom's role as single purchaser; (ii) develop a mechanism for transparent and non-discriminatory access to the transmission grid; (iii) review the tariff-setting methodology and structure to ensure tariffs are designed to reflect the efficient cost of service provision, including net billing provisions for rooftop solar photovoltaic (PV) power; and (iv) increase investment in the grid (transmission, distribution, storage), including through mechanisms to attract private sector participation.

## **Priority package 2: Manage the shift away from a coal-dependent economy by renewing the social compact.**

- *Short-term:* Develop a comprehensive regional/provincial roadmap for Mpumalanga, where the decommissioning of coal-fired plants started in October 2022 with the closure and repurposing of Komati.<sup>3</sup> This roadmap should include active support to those affected by the transition (such as provision of temporary income support, labor intermediation and job-seeker services, severance, and reskilling programs), as well as a clear approach to creating new opportunities in low-carbon sectors, such as renewables, agriculture, and tourism. It should be underpinned by information and civil participation in public debates, with the aim of providing broad-based economic empowerment opportunities. The successful implementation of the roadmap, with early positive results, will demonstrate that the planned climate transition will be people-centered and offers new opportunities to all. This is critical to rally broader support for the transition in a difficult political economy situation.
- *One to three years:* Implement the above identified roadmap by capitalizing on the projected demand for new low-carbon activities, including in renewables. The authorities (in coordination with the private sector) should identify, quantify, and disaggregate the types of occupations required for the green transition (and for other demand), including the details of the skills and competencies required for each occupation. This information will have to be regularly updated and disseminated to training providers, businesses, and job-seekers. Concurrently, reforms should be considered to improve the quality of the general education and training system so that workers will have the foundational and technical basis to learn new skills and adapt to economic disruptions. More generally, the government will need to align its industrial, fiscal, and labor policies with the objective to promote further economic diversification toward climate-smart value chains (including by empowering micro-, small, and medium enterprises in both the formal and the informal economy).

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<sup>3</sup> Supported by the World Bank under the Eskom Just Energy Transition project. The project includes measures to support workers and the communities and the repurposing of the plant with solar PV, wind, and battery storage.

**Priority package 3: Prioritize and coordinate investments and policies to build resilience against water scarcity and extreme weather events in the most vulnerable areas.**

- *Short-term:* Strengthen the existing early warning system with the further use of digital information and tools for better communication as well as improved coordination among different agencies. To better protect vulnerable people against natural hazards, the recent extension of the social relief of distress grant to climate catastrophes should be made operational as soon as possible. To address their vulnerability to water stress, municipalities and metros should develop a comprehensive and integrated water resources management plan that will be immediately actionable when disaster hits. This should include policy, regulatory, technical, and financial measures to deal with emergencies.
- *One to three years:* The focus should be on building resilient cities through effective land-use planning and developing/upgrading buildings and infrastructure. This should include the adoption of investment plans that will prioritize areas and identify financing mechanisms (including public-private partnerships (PPPs)). Further attention should be paid to water management in rural areas exposed to drought by developing modern irrigation schemes and strengthening policies and regulations for water use to support climate-smart agricultural activities. Water management in urban areas is equally critical and should include demand-side management measures (such as reducing non-revenue water) and a comprehensive water security plan with climate considerations at city level (starting with key urban areas) to better prepare for disasters. The government should incentivize climate-related investments by implementing crosscutting reforms in public investment management and procurement. Among others, amendments to the Public Financial Management Act (1999) should be considered to operationalize climate budget tagging and to align policies with the low-carbon agenda. Another important step will be to support the use of insurance and risk-hedging instruments to reduce the cost of damages from climate-related events for businesses, farmers, and households.

**Priority package 4: Become the regional catalyst for climate innovation and financing.**

- *Short-term:* The government should send strong signals to the market that it will support the shift toward a green and clean economy. This can include clear commitments on the enabling environment for inclusion of renewables in the energy mix, the use of pricing instruments to incentivize businesses to shift toward new technologies, including broadening the existing carbon tax to high-emitting sectors, extending carbon trading in agriculture and other land uses, and redirecting current subsidies toward green technologies in a fiscally neutral way. The development of blended financial instruments, including PPPs, could make innovative projects less risky, while supporting start-ups and small- and medium-sized enterprises. It will also be important to facilitate technology and skills transfers from large corporations and potential international investors to local businesses and workers. Easing working permit approvals for qualified foreign workers could also bring short-term benefits.
- *One to three years:* Innovation will require competition and skilled human capital, which will need to be supported by appropriate policies. This could include the review of existing industrial and local content policies and the development of synergies with neighboring countries through the development of value chains (especially for climate-smart minerals beneficiation and manufacturing of renewable energy products), underpinned by trade facilitation and selected high return regional investments (such as ports and corridors, energy infrastructure). The promotion of joint research and innovation centers and skills development programs would provide the economies of scale required for effective innovation.

**Priority package 5: Utilize local ambitions on climate to mobilize external resources.**

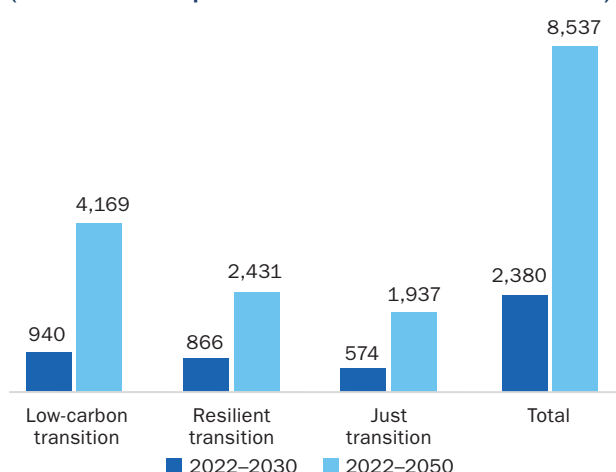
- *Short-term:* The government should act quickly to approve and share a comprehensive investment program, including financing plans for shifting the economy to a low-carbon growth path over the next three to five years. This will allow the country to capitalize on recent positive developments, including the landmark commitment from the United States, United Kingdom, France, Germany, and the European Union in 2021 to provide \$8.5 billion over three to five years to help bring local carbon emissions within the limits of the Paris Agreement by 2030. Expediting the ongoing amendments of the PPP framework regulations for faster approval of small and green projects will send a strong signal to the market and encourage potential investors.

- **One to three years:** Mobilizing external resources for climate-related projects will require deeper reforms. A review of the existing fiscal incentives system should be carried out so that incentives can be redirected toward clean and green sectors. Encouraging private (both domestic and foreign) investments in strategic sectors will reduce the dominant role of several state-owned enterprises, which often act as barriers to innovation. Further emphasis should be given to the development of linkages between foreign direct investment and local industries through technology transfers, suppliers' contracts, and training programs. To attract institutional investors, the government could play a more active role on the green bonds market to help benchmark the cost of issuances by South African corporations. The application of the recently approved green taxonomy (and alignment with ongoing work under the just transition financing framework) will provide clarity to banks and investors on the list of projects qualified to be financed by green or sustainable loans and bonds.

Successful implementation of these priority packages will require additional analysis on some elements such as a better understanding of the changes in the labor market, the impact of climate change on human capital, and mechanisms to promote broad-based economic empowerment as part of the transition. To efficiently implement these five priority packages, the government will need to address several challenges that have undermined the pace of reforms in South Africa over the years. Many of these problems are rooted in the weakness of the institutional framework for the climate change agenda. These weaknesses may be improved by:

- **Streamlining the governance of state-owned enterprises.** This includes completing Eskom's unbundling and creating an independent transmission system operator; improving the operational and financial performance of state-owned enterprises (Eskom and Transnet in particular); and ensuring tariff mechanisms for regulated activities are based on the cost of efficient service provision and support regulatory independence.
- **Urgently implementing the Climate Change Bill** to support the much-needed harmonization of national, sectoral, and subnational climate strategies and the finalization of climate-relevant sectoral plans in energy, transport, urban development, and agriculture.
- **Establishing a solid institutional anchor.** The roles and responsibilities within the climate agenda have not been fully mapped out, leading to confusion and fragmentation, including at the technical level. As noted, a first step would be implementing a regional development plan for Mpumalanga.
- **Increasing public participation in the climate change decision-making and implementation process** to create broad support for climate-related reform.

**Figure 6: Projected financing requirements**  
(R billion in net present value at a 6% discount rate)



Source: World Bank Staff SAGE and microsim models

transition will need financing of an estimated R1.9 trillion (\$114 billion) for new social and labor programs and investments in informal settlements.<sup>4</sup>

## Financing The Transitions

To fund this ambitious plan, domestic finance must be mobilized, but external support is also required.

The total incremental financing requirements for the low-carbon, resilient, and just transitions by 2030 could reach an estimated R2.4 trillion (\$140 billion). While between 2022 and 2050, the total incremental financing requirements could reach R8.5 trillion (\$500 billion or 4.4 percent of GDP per year) (Figure 6). The low-carbon transition is likely to account for about half of this amount through substantial investments in the power, industrial, and transport sectors for the 2022–2050 period; the resilient transition will require about R2.4 trillion (\$143 billion), mainly for investment in water, agriculture, roads, and cities; and the just transition will need financing of an estimated R1.9 trillion (\$114 billion) for new social and labor programs and investments in informal settlements.<sup>4</sup>

<sup>4</sup> All the figures are in net present value terms at a discount rate of 6 percent. These estimates should be interpreted with caution, given uncertainties about the future evolution of technologies and other parameters, including the magnitude of climate projections, business and household behaviors, and government policies.

Meeting the funding gap associated with these transitions will require a reallocation of domestic private savings toward climate-related projects, an increase in public savings and improvements in public spending efficiency, and external financial support. The contribution of each of these sources of financing will depend on the nature of the interventions as, for example, the social transfers to affected people requested by the just transition should be financed by the public sector since they will compensate losses like in the case of the decommissioning of coal plants. In contrast, public resources should only help leverage or de-risk private financing for the projected investments in renewables that should be mostly financed by local and foreign private investors. Mapping the list of interventions will be important as it will help determine the right balance between private and public financing and external resources and the magnitude of the effort necessary to mobilize them. Priorities in this regard include:

- **Encouraging domestic private investment to shoulder the three transitions.** This will require (i) using pricing instruments (through taxation and subsidization) to shift capital toward climate-related projects; (ii) greening the financial sector (including taxonomy and disclosure); and (iii) developing market-based instruments and de-risking tools (such as insurance products) to better share the burden of risk between the public and private sector. To further mobilize private savings, the government could also prepare a list of bankable green infrastructure transactions (including through PPPs).
- **Increasing public financing for the just transition and for the collective investments required by the low-carbon and resilient transitions.** This can be achieved by a combination of repurposing of existing spendings and broadening the application of the carbon tax, which could help collect about 1.4 percent of GDP per year over the next decade. A fraction of the additional revenues would be needed to manage the negative distributional impacts associated with higher energy prices during the low-carbon transition and to protect the poorest and most vulnerable. The government can also realize efficiency gains in its spending and encourage further allocations toward climate-related investments by adjusting the procurement rules and the transfers to provinces and state-owned enterprises. By contrast, the high levels of debt will constrain the government's borrowing capacity in future.
- **Garnering more resources from multilateral and bilateral development partners** and tap into foreign direct investment inflows and capital from institutional investors including through the issuance of climate-themed bonds on international markets. External resources are needed not only for affordability—the country does not have enough domestic savings—but also to share responsibility as climate risks are a global challenge. Many interventions that are efficient and essential to reduce GHG emissions or to build climate resilience would not meet private sector investment criteria. These interventions would require concessional resources or grants from the international community. This is particularly the case when they contribute to mitigating climate change as a global public good, a global challenge to which lower-income countries have contributed much less than richer countries and have more limited resources to dedicate to.







