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SOUTH AFRICA (ACT) INVESTMENT PLAN



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PROPOSED DECISION

(To be added)

Government of the Republic of South Africa

ACCELERATING COAL TRANSITION (ACT)
INVESTMENT PLAN FOR SOUTH AFRICA

OCTOBER 11, 2022

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Abbreviations and Acronyms

AAGR	Average Annual Growth Rate
ACT	Accelerating Coal Transition
AfDB	African Development Bank
BEIS	Business, Energy, and Industrial Strategy
BESS	Battery Energy Storage Systems
CBAM	Carbon Border Adjustment Mechanism
CDD	Community-Driven Development
CER	Centre for Environmental Rights
CEU	Clean Energy Unit
CFPP	Coal-Fired Power Plant
CIF	Climate Investment Funds
CIF AU	Climate Investment Funds Administrative Unit
COSATU	Congress of South African Trade Unions
COUE	Cost of Unserved Energy
COVID-19	Coronavirus Disease 2019
CSIR	Centre for Scientific and Industrial Research
CSO	Civil Society Organization
CTA	Carbon Tax Act
CTF	Clean Technology Fund
DFFE	Department of Forestry, Fisheries, and Environment
DFI	Development Financial Institution
DMR	Department of Mineral Resources
DMRE	Department of Mineral Resources and Energy
DOE	Department of Energy
DPE	Department of Public Enterprises
DSCR	Debt Service Coverage Ratio
EAF	Energy Availability Factor
EBITDA	Earnings before Interest, Tax, Depreciation, and Amortization
ED	Enterprise Development
EE	Energy Efficiency
EEDSM	Energy Efficiency and Demand-Side Management
EEPBP	Energy Efficiency in Public Buildings and Infrastructure Program
EJETP	Eskom Just Energy Transition Project
EPP	Electricity Pricing Policy
ERA	Electricity Regulation Act
ESCO	Energy Services Company
ESG	Environmental, Social, and Corporate Governance
ESI	Energy Supply Industry
ESMAP	Energy Sector Management Assistance Program
ESRG	Energy System Research Group
EU	European Union

FBE	Free Basic Electricity
FCDO	Foreign, Commonwealth, and Development Office
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GGI	Gender Gap Index
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation (<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i>)
GoRSA	Government of the Republic of South Africa
HR	Human Resources
ICF	International Climate Finance
IEA	International Energy Agency
IFC	International Finance Corporation
ILO	International Labour Organization
IMF	International Monetary Fund
IOS	Interruption of Supply
IP	Investment Plan
IPCC	Intergovernmental Panel on Climate Change
IPG	International Partners Group
IPP	Independent Power Producer
IRP	Integrated Resource Plan
JET	Just Energy Transition
JETO	JET Office
JETP	Just Energy Transition Partnership
KfW	<i>Kreditanstalt für Wiederaufbau</i>
LULUCF	Land Use, Land-Use Change, and Forestry
M&E	Monitoring and Evaluation
MDB	Multilateral Development Bank
MES	Minimum Emission Standards
MEU	Municipal Electric Utility
MSMEs	Micro, Small, and Medium Enterprises
NALEDI	National Labour and Economic Development Institute
NDC	Nationally Determined Contribution
NEA	National Energy Act
NERA	National Energy Regulator Act
NERSA	National Energy Regulator of South Africa
NDP	National Development Plan
NGO	Nongovernmental Organization
NPC	National Planning Commission
NT	National Treasury
NTCSA	National Transmission Company of South Africa SOC Limited
NUM	National Union of Mineworkers
NUMSA	National Union of Metalworkers of South Africa

O&M	Operation and Maintenance
OCGT	Open Cycle Gas Turbine
PACT	Partnering for Accelerated Climate Transitions
PCC	Presidential Climate Commission
PCFTT	Presidential Climate Finance Task Team
PCG	Partial Credit Guarantee
PGM	Platinum Group of Metals
PM	Particulate Matter
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PV	Photovoltaic
REIPPP	Renewable Energy Independent Power Producers Program
REI4P	Renewable Energy Independent Power Producer Procurement Program
RFP	Request for Proposal
RMI4P	Risk Mitigation Independent Power Producer Procurement Program
SADC	Southern African Development Community
SAESA	South African Energy Storage Association
SANEDI	South African National Energy Development Institute
SAPP	Southern African Power Pool
SAPVIA	South African Photovoltaic Industry Association
SARETEC	South African Renewable Energy Technology Centre
SAWEA	South African Wind Energy Association
SEA	Sexual Exploitation and Abuse
SED	Socioeconomic Development
SESA	Strategic Environmental and Social Assessment
SH	Sexual Harassment
SOE	State-Owned Enterprises
STEM	Science, Technology, Engineering, and Mathematics
STPPP	Short-Term Power Procurement Programme
TA	Technical Assistance
TIPS	Trade and Industrial Policy Strategies
TOU	Time-of-Use
TVET	Technical and Vocational Education and Training
UCT	University of Cape Town
UNFCCC	United Nations Framework Convention on Climate Change
UOS	Use of System
USAID	United States Agency for International Development
VPP	Virtual Power Plant
VRE	Variable Renewable Energy
WEF	World Economic Forum

Executive Summary

1. The Accelerating Coal Transition (ACT) Program was established by the Climate Investment Funds (CIF) in March 2021, to accelerate the transition away from coal while ensuring a holistic, integrated, socially inclusive, and gender-equal approach through its three pillars: governance, people and communities, and infrastructure. South Africa was selected as an ACT pilot country in October 2021 and invited to develop an Investment Plan (IP) in collaboration with relevant CIF partner multilateral development banks (MDBs): the World Bank, the International Finance Corporation (IFC), and the African Development Bank (AfDB). This IP, prepared by the Government of the Republic of South Africa (GoRSA), is a business plan proposing areas for ACT-financed investments and technical assistance (TA) and exploring the possibility of securing complementary co-financing from bilateral, multilateral, and private sources.

2. Given the country's climate vulnerability and greenhouse gas (GHG)-intensive economy, coal transition in South Africa is essential for combating climate change. Since 1990, the national average temperature has increased at a rate that is more than twice the rate of global temperature increases, resulting in an increase in the frequency of droughts and extreme weather events.¹ Despite this, the nation has relied for decades on domestic, low-cost coal, which generates nearly 90 percent of the nation's electricity. The coal power fleet in South Africa is the largest contributor to the country's GHG emissions, placing the country among the 20 highest in the world. This heavy reliance on coal has a direct impact on South Africa's economic and trade competitiveness, exacerbating its financial position, in the context of the coal transition process under way globally.

3. To combat climate change, South Africa is committed to transitioning away from coal. The Presidency mandated the Presidential Climate Change Commission (or Presidential Climate Commission, PCC) to develop a Just Transition Framework. Eskom, the national power utility, intends to decommission 6,000 MW of coal-fired power generation capacity by 2025. However, the country faces the following challenges:

- (a) This transition needs to occur despite an existing electricity supply shortfall of 4–6 GW resulting in recurrent load shedding, which has taken a toll on the South African economy. The power shortage is caused by a lack of effective generation capacity during the peak load hours and the forgone consumption of wind power because of nighttime curtailments.
- (b) Even though the status quo is not providing relief for the existing unemployment conundrum and coal transition is anticipated to bring economic benefits in the long-term, the impact of the transition on the affected subnational sectors and communities must be carefully addressed. The impacts of transition will be the most acute in the coal belt, especially the Mpumalanga Province and more specifically four municipalities. Focusing on supporting workers, local communities, and provincial/local government authorities affected the most by the transition; reducing coal dependency by diversifying the economic base; and enhancing the voice and agency of local communities, especially women, youth, workers, and other vulnerable groups, will be key to ensuring a 'just' transition.

¹ Engelbrecht, Francois, et al. 2015. "Projections of Rapidly Rising Surface Temperatures over Africa under Low Mitigation." *Environ. Res. Lett.* 10 (08): 5004; Wolski, Piotr. 2019. "Twice the Global Rate." Climate System Analysis Group Blog by University of Cape Town, September 25, 2019. <https://www.csag.uct.ac.za/2019/09/25/twice-the-global-rate/>.

- (c) Eskom’s unstable financial condition and the fiscal constraints affecting the GoRSA threaten the execution of its coal transition strategy.

4. To overcome these challenges, this ACT IP for South Africa sets its objective as catalyzing the country’s transition away from coal in a socially inclusive manner while ensuring energy security. The plan proposes a financing package of US\$2.6 billion, including US\$500 million from the CIF, to achieve its transformative objective through the following proposed Projects:

- a) **Project 1. Retiring and Replacing Coal-based Power Generation Capacity:** Three Eskom coal-fired power plants (CFPPs) at Camden, Hendrina, and Grootvlei will be decommissioned and repurposed in alignment with Eskom’s Just Energy Transition Plan. The track record of replacing the retired thermal capacity with dispatchable renewable energy power, while considering the economic, social, and environmental challenges of transition, will be established in Mpumalanga and other coal-dependent regions. The repurposing and the capacity replacement involves installing of renewable energy generation capacity and energy storage by the public and private sectors.
- b) **Project 2: Mpumalanga Community Development Project:** The project will support Community-Driven Development (CDD) in the coal-dependent Mpumalanga Province to address the broader economic and social impacts of coal transition in an inclusive and sustainable manner while also strengthening the capacity of provincial and local governments to effectively transition to a green economy.
- c) **Project 3: Energy Efficiency, Distributed Generation, and Community Generation Programs:** The ACT Program will support the development of an Energy Efficiency in Public Buildings and Infrastructure Program (EEPBIP) and distributed generation and community generation programs for social and economic development with an initial focus on the Mpumalanga Province.

5. Table ES.1 provides a summary of an indicative funding plan, whereas

6. Table ES.2 provides an expected IP outcomes framework. More information on the financing plan and monitoring and evaluation (M&E) framework is to be found in Section 4 Financing Plan and Instruments and Section 7 Monitoring and Evaluation Framework, respectively.

Table ES.1. Indicative ACT Financing Plan for South Africa (US\$, millions)

IP Components	ACT	MDB			Country Counterparts	Private Sector	Others	Total
		IBRD	IFC	AfDB				
Project 1: Retiring and Replacing Coal-based Power Generation Capacity								
Component A: Decommissioning	10	100		40				150
Component B: Repurposing and capacity replacement	230	375	70	165	300	860		2,000
Component C: Socioeconomic impact mitigation	110	90						200
Project 2: Mpumalanga Community Development Project								
Community-Driven Development	100	5		5		15	30	155
Project 3: Energy Efficiency, Distributed Generation, and Community Generation Programs								
Energy Efficiency and distributed generation	50	5		45				100
IP total	500	570	70	255	300	875	30	2,605

Table ES.2. Summary of South Africa's ACT Integrated Results Framework

ACT Program Results Statement ^a	Indicators	Baseline	Targets
CIF-Level Impacts			
Accelerated transformational change toward net-zero emissions and inclusive, climate-resilient development pathways	GHG emissions reduced or avoided (tCO ₂ eq)	0	<ul style="list-style-type: none"> Project 1: Approximately 71 million tons from decommissioning of CFPPs over the lifetime Project 3: 153,700 tons per year
	Number of beneficiaries of ACT investments (disaggregated by gender, age, employment status, race/ethnicity, disability, and other vulnerability status)	0	250,000 ^b (40%, female)
	Volume of co-finance leveraged (US\$)	0	2,650,000,000
South Africa Investment Plan-Level Impacts			
Accelerated transition away from coal-powered to clean energy while ensuring a holistic, integrated, socially inclusive, and gender-equal just transition	Share of renewable energy generation in South Africa's power system (%)	7% ^c	TBD
	Share of women participating in decision-making forums/platforms related to just transition	0	40%
	Share of women (in all diversity) who reported satisfaction on mitigation measures and positive impact in their life	n.a.	70%
South Africa Investment Plan-Level Outcomes			
Sources of income created for affected employees and communities through job retention or job creation	Number and percentage of employees of retired coal plants that have access to sustained income (#, %) (gender-disaggregated)	0	70%
	Number of women (in all diversity) who benefit effectively from mitigation measures	0	TBD
	Number of direct beneficiaries and the amount of income-generating schemes and economic regeneration activities linked to the green economy (#, US\$) (gender-disaggregated)	0	TBD
Affected communities equipped with relevant skills for jobs of the future	Number of people trained in the renewable energy sector, medium- and high-skilled green jobs, STEM-education and relevant vocational training through ACT (gender-disaggregated)	0	5,000 people trained (50% female)

ACT Program Results Statement^a	Indicators	Baseline	Targets
	Number of new jobs created in clean energy sector (beneficiaries of new jobs disaggregated by gender, age, and other relevant vulnerable factors, with breakdown on long term versus short term, formal versus informal, administrative versus technical and managerial)	0	TBD
Transition to cleaner energy sources	Capacity of existing coal power generation capacities accelerated for retirement (MW)	0	2,400 MW (Camden: 1,600 MW Grootvlei: 560MW Hendrina: 2,000MW)
	Installed capacity of renewable energy for repowering (MW)	0	900 MW
	Energy rating (MWh) and power rating (MW) of installed energy storage system to support the use of clean energy as a CFPP repurposing and capacity replacement solution	0	450 MW 1,800 MWh
Other infrastructure	Annual energy savings (GWh/year)	0	145 GWh/year
ACT Program-Level Co-Benefits			
Social, Economic, and Environmental Development Co-Benefits	Air pollutants emission reduced (ton)	0	TBD

1. The results statement and the set of results indicators are guided by the ACT Program Integrated Results Framework approved by the CIF Clean Technology Fund (CTF) Trust Fund Committee.
 2. Estimates based on the total population of the four municipalities in Mpumalanga province with the highest concentration of coal mines and power plants. In addition to beneficiaries of direct jobs created, people trained, etc., these figures also include beneficiaries of community and other infrastructure development schemes supported under Project 2.
 3. Source: Enerdata, February 2022. Country Energy Report - South Africa.
- Note:* STEM = Science, technology, engineering, and mathematics.

1 Country Context

1.1 South Africa's Macroeconomic and Social Overview

Table 1. South Africa's Social, Economic, and Environmental Indicators

Social Indicators	
Population (2021, millions)	60
Lower national poverty line (2020, percent of population)	59.8
Economic Indicators	
Nominal GDP (2020, US\$, billions)	335
GDP per capita (2020, in US\$)	5,637
GDP growth outlook for 2022 (%)	2.1
Unemployment (2020, percent of labor force, annual average)	29.2
Female unemployment (%)	36.4

Source: National Treasury (NT) (2022 Budget Review), International Monetary Fund (IMF) (January 21, 2022. IMF Country Report No. 22/37).

Note: GDP = Gross domestic product.

1. South Africa is Sub-Saharan Africa's largest and most advanced economy but with stagnated growth rates. Since the end of apartheid, there have been two distinct periods of economic development with the transition point coinciding with the global financial crisis of 2008. Until 2008, the economy grew robustly, benefiting from the commodity super cycle and greater openness to the world, which led to high growth in trade and foreign direct investment. High growth and macro stabilization gains led South Africa to reach sovereign investment grade rating in 2000. However, the less favorable global environment in the context of the Global Financial Crisis from 2008 combined with adverse domestic political, institutional, and economic factors led South Africa to lose most of the drivers of growth leveraged since 1994. The country thus experienced a decade of low growth, while inequality and poverty remained persistently high.

2. It is anticipated that the country's economy will become more vulnerable regarding trade competitiveness in the near future due to its high carbon footprint. The European Union (EU) is one of South Africa's most important export markets, accounting for 19 percent of its total exports in 2019. EU climate regulations, such as the Carbon Border Adjustment Mechanism (CBAM), will have a significant impact on the country's trade with EU countries.² The scope of the current CBAM proposal does not include indirect emissions, providing some relief.³ If indirect emissions are included in the future, South African exporters will face additional risks given the nation's reliance on coal for electricity and liquid fuels. The same risk will emerge with other trade partners because of the global trend toward decarbonization.

3. Recently, the country was hard-hit by the coronavirus disease 2019 (COVID-19) pandemic but showed relatively rapid recovery from a deep output contraction. It has had the highest number of infections on the continent and the government's quick response, starting with a month-long lockdown implemented at the end of March 2020, bought the government time to prepare for the unfolding health crisis by developing relief measures for vulnerable people and businesses. However, this came at a high

² TIPS (Trade and Industrial Policy Strategies). 2021. "European Green Deal: The Carbon Border Adjustment Mechanism and Implications for South African and European Union Trade." Policy Brief: 6/2021.

³ Brill, T. R., M. Bodelier, and E. De Bie. 2021. "EU Pro-posed Carbon Border Adjustment Mechanism." *The National Law Review*, July 21, 2021. <https://bit.ly/33hfo7>.

economic cost with gross domestic product (GDP) having contracted by 7.0 percent in 2020. Following the large output contraction in 2020, growth recovered faster than anticipated in 2021, despite frequent power outages, as lockdowns were phased out and terms of trade further improved.⁴ The mining sector was supported by high commodity prices and businesses (manufacturing and some services) benefitted from a relatively strong rebound in consumption.

4. The toll on employment remains severe and persistent, despite the rebound in economic activity. In net terms, there were still 1.4 million fewer jobs in 2021 than in 2020. The unemployment rate has continued to increase, though there was a 0.8 percentage point decrease from the fourth quarter of 2021, reaching 34.5 percent during the first quarter of 2022. Among women, the rate of unemployment was 3.4 percentage points higher than among their male counterparts in the first quarter of 2022, highlighting that the South African labor market is more favorable to men than it is to women. Further, even with the relatively strong social assistance system, poverty has increased, reversing years of progress. The poverty rate is estimated to have reached 59.8 percent in 2020 based on the upper-middle-income country poverty line (US\$5.5 per day in 2011 purchasing price parity) compared to 57.7 percent in 2019. Women are more likely than men to live below the poverty line with black women being the poorest.⁵ In terms of gender, according to the World Economic Forum's 2021 Global Gender Gap Index (GGI), South Africa ranks 18th globally and 2nd within the Southern African Development Community (SADC) region.⁶ It has made notable progress in improving the number of women in Parliament, achieving gender parity in participation at the primary and secondary school levels, and closing the gender gap in rates of adult literacy. However, the largest and most persistent gaps remain in the areas of economic empowerment.⁷

5. Despite narrow gender gaps in education, there is a large gender gap in labor force participation rates in South Africa, with the female-to-male labor force participation rate just 78.8 percent as of 2019—the fourth lowest in the SADC as of 2019.⁸ Besides the difference in rate between men and women, women's absolute level of participation is also low—according to International Labour Organization (ILO) estimates—and as of 2019, just 49.6 percent of women are economically active compared to 65.3 percent in Botswana, 60.4 percent in Lesotho, and 55.8 percent in Namibia. These lower rates of female labor force participation in South Africa have persisted over the last decade.⁹ Women continue to get paid 25 to 35 percent less than men even if they have the same amount of schooling and similar work experience.¹⁰ Occupational segregation contributes in part to the gender pay gap—women tend to be overrepresented in low paying sectors (for example, private households) and underrepresented in most of the higher paying sectors.¹¹ Nonetheless, the Global Gender Gap report of the World Economic Forum (WEF) ranked South Africa first (along with 40 other countries) in terms of the proportion of professional and technical workers who are female, predominantly nurses and teachers.¹² However, there is predominance of men in what is

⁴ The national accounts were revised using upgraded statistical measurements. The nominal GDP level rose by about 10 percent on average relative to the previous series. However, the path of real GDP growth changed little.

⁵ World Bank. 2022. *South Africa Gender Assessment*. Washington, DC: World Bank.

⁶ WEF. 2021. *Global Gender Gap Report 2021*. http://www3.weforum.org/docs/WEF_GGGR_2021.pdf.

⁷ Ibid.

⁸ World Bank. 2021. *World Development Indicators*. As of May 25, 2021. <https://databank.worldbank.org/source/world-development-indicators>.

⁹ Statistics South Africa. 2020. *Quarterly Labor Force Survey, Quarter 4: 2019*. Pretoria: SSA; Statistics South Africa. 2021. *Quarterly Labour Force survey, Quarter 4: 2020*; <http://www.statssa.gov.za/publications/P0211/P02114thQuarter2020.pdf>. http://www.statssa.gov.za/?page_id=1854&PPN=P0211&SCH=7622.

¹⁰ Mosomi, J. 2019. "Distributional Changes in the Gender Wage Gap in Post-Apartheid South African Labour Market." SA-Towards Inclusive Economic Development Working Paper 31.

<https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp-2019-17.pdf>

¹¹ World Bank. 2022. *South Africa Gender Assessment*. Washington, DC: World Bank.

¹² WEF. 2021. *Global Gender Gap Report 2021*. http://www3.weforum.org/docs/WEF_GGGR_2021.pdf.

termed as ‘frontier skills’ or those that are relevant to the changing global economy.¹³ For example, in the context of this Accelerating Coal Transition (ACT) Investment Plan (IP), women are underrepresented in utilities’ jobs (electricity, gas, and water supply)—among all the employed women, only 0.4 percent have a position in these types of jobs. One of the primary reasons for this is the low representation of women in the science, technology, engineering, and mathematics (STEM) field as they represent only 42.76 percent of all STEM students.

6. Moreover, women are less likely to own a business, and this gender gap has grown over the past decade. For instance, the estimate of the International Finance Corporation (IFC) suggests that as of 2017, 62 percent of micro, small, and medium enterprises (MSMEs) were owned by men and 38 percent by women.¹⁴ Women continue to face barriers to entrepreneurship including a lack of financial literacy, basic skills, and limited access to finance.¹⁵ Besides women, another group that requires targeted measures in facilitating labor market participation is persons with disabilities. In South Africa, the national disability prevalence rate is 7.5 per cent; however, persons with disabilities make up 1 per cent of the workforce.¹⁶

7. Women’s representation in government overall is good compared to many other SADC countries, although challenges remain in terms of substantive representation at all levels. As country experts posit, descriptive representation at the national and local levels of government does not always translate into legislative influence or substantive power in decision-making. South Africa is ranked high at number 12 in the world in terms of women’s representation in Parliament, although at the local government level women’s representation remains low.¹⁷ Finally, challenges associated with gender-based violence (GBV) remain significant and the rates of female homicide are almost five times higher than the global average.¹⁸ Accordingly, the direct costs of GBV in South Africa is estimated to be about ZAR 28.4 billion to ZAR 48.2 billion (approximately US\$2.3 to US\$4 billion) per year.¹⁹

1.2 National and International Climate Strategies and Plans

8. Sub-Saharan Africa accounts for only 4 percent of global greenhouse gas (GHG) emissions, but the continent, including South Africa, is extremely vulnerable to the impacts of climate change.²⁰ Shifting weather patterns that cause droughts and flooding threaten food production, infrastructure, and rural livelihoods tied to the agriculture, fisheries, and forestry sectors. Hence, climate change poses serious threats to sustainable development. Climate variability will disproportionately affect the poor. South Africa is already a water-stressed country and future drought trends are a major cause for concern, especially for

¹³ WEF. 2020. *Global Gender Gap Index 2020*. http://www3.weforum.org/docs/WEF_GGGR_2020.pdf.

¹⁴ IFC. 2018. *The Unseen Sector: A Report on the MSME Opportunity in South Africa*. Washington, DC: World Bank. https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/financial+institutions/resources/msme-opportunity-south-africa.

¹⁵ World Bank. 2022. *South Africa Gender Assessment*. Washington, DC: World Bank.

¹⁶ <https://www.mdpi.com/2673-7272/2/2/23/htm>

¹⁷ IPU (Inter-Parliamentary Union). 2019. *Women in National Parliaments*. Situation as of February 1, 2019. <http://archive.ipu.org/wmn-e/classif.htm>.

¹⁸ World Bank. 2022. *South Africa Gender Assessment*. Washington, DC: World Bank.

¹⁹ KPMG. 2014. *Too Costly to Ignore—Violence against Women in South Africa*. <https://assets.kpmg/content/dam/kpmg/za/pdf/2017/01/za-Too-costly-to-ignore.pdf>.

²⁰ Sub-Saharan Africa also faces high climate change impact risks due to the double global warming rate it will experience, as outlined in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) of the United Nations Framework Convention on Climate Change (UNFCCC) in April 2022. <https://www.ipcc.ch/assessment-report/ar6/>.

the smallholder farmers and poor households in townships and informal settlements. As a result of this socioeconomic vulnerability, the country has recognized that it urgently needs to integrate efforts to reduce GHG emissions and provide strategies for adaptation. Climate action can reduce risks and help deliver developmental objectives such as eradicating poverty and boosting sustainable growth.

1.2.1 South Africa's International Climate Change Commitments

9. Through its initial submission of the country's first Nationally Determined Contribution (NDC-2016) under the Paris Agreement, South Africa had committed to manage the country's GHG emissions to peak by 2025, to plateau for the decade between 2026 and 2035, and to decline from 2036 onward.²¹ The country submitted its Low-Emissions Development Strategy 205022 to the UNFCCC, communicating its goal to reach to net-zero carbon emissions by 2050. Ahead of COP-26 in Glasgow, South Africa submitted an updated NDC (NDC-2021) to the UNFCCC in September 2021, which strengthened the country's absolute GHG commitment from 398–614 MtCO₂eq indicated for 2021–2030 to an updated commitment of 398–510 by 2025 and a range of 350–420 MtCO₂e (including land use, land-use change, and forestry [LULUCF]) by 2030.²³ South Africa's NDC emphasizes the need for financial support by the international community, as specified in the Paris Agreement.

1.2.2 South Africa's Response to Climate Change

10. South Africa is a leader in the transition to a low-carbon and socially inclusive future. The government's recent announcements and documents related to the infrastructure development strategy, economic reconstruction, and post-COVID-19 recovery place importance on the significance of green, resilient, and just recovery.²⁴ The country has adopted a National Development Plan (NDP), which includes a lower-carbon chapter incorporating a Just Energy Transition (JET) strategy to ensure that its transition to a low-carbon economy is based on the priorities of social inclusion, gender equality, poverty alleviation, and job creation.

11. South Africa's Integrated Resource Plan 2019 (IRP-19), which was developed by the Department of Mineral Resources and Energy (DMRE), sets out a pathway for the country's optimal electricity capacity expansion plan up to 2030. IRP-19 calls for reducing the share of fossil fuel in the country's primary energy mix by decommissioning 12 GW of old and inefficient coal-fired power plants (CFPPs), scaling up renewable energy by an ambitious 18 GW and 2 GW of energy storage in the time frame until 2030, including.²⁵ The IRP-19 will be updated in 2023 as the Eskom unbundling process is implemented. In addition, the Government of the Republic of South Africa (GoRSA) also plans to use other tools, including sector emission and energy efficiency targets, firm-level carbon budgets, and scaling-up of carbon capture and storage, as key levers for carbon emission reduction.

12. The carbon intensity of South Africa's GDP is very high. It is estimated that the country's footprint per unit of GDP is the double of China and 70 per cent higher than India.

²¹ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf>.

²² <https://unfccc.int/sites/default/files/resource/South%20Africa%27s%20Low%20Emission%20Development%20Strategy.pdf>.

²³ <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/South%20Africa%20First/South%20Africa%20Updated%20first%20NDC%20September%202021.pdf>.

²⁴ <https://www.bloomberg.com/news/articles/2022-07-25/south-africa-to-open-floodgates-for-private-power-generation>
https://ec.europa.eu/commission/presscorner/detail/en/IP_21_5768.

<https://www.mining.com/web/eskom-considers-7-2-billion-in-wind-and-solar-investment-by-2030/>.

²⁵ DMRE, Integrated Resource Plan 2019. <http://www.energy.gov.za/IRP/2019/IRP-2019.pdf>.

13. In September 2020, President Cyril Ramaphosa and the Cabinet established the Presidential Climate Commission (PCC), an independent, statutory, multi-stakeholder body to oversee and facilitate a just and equitable transition toward a low-emission and climate-resilient economy. South Africa has adopted a national climate change response policy that also includes several adaptation plans, mainstreamed across sectors and different government tiers, with a strong institutional framework for coordination, monitoring, and reporting. An Inter-Ministerial Committee and Presidential Climate Finance Task Team (PCFTT) have been established to undertake the preparation of an IP for a Broader Just Transition Project under the Just Energy Transition Partnership (JETP). The Climate Investment Funds (CIF) ACT IP is dovetailing with the JETP IP to avoid parallel processes. The CIF ACT IP will feed essential inputs into the broader JETP IP. A climate change bill has been adopted by South Africa's Cabinet and tabled to the country's Parliament, where, once agreed, it will give legal credence to many of the sectoral policies and guidelines adopted.

14. Overall, the strong national commitments to climate change and concrete plans regarding coal phasedown provide a sound foundation for the implementation of the ACT IP.

1.3 Power Sector Overview

15. To achieve its climate change objectives, actions in the energy sector would be key, given its significant contribution to emissions. In particular, actions within the power sector would be critical as decarbonization solutions available today are most feasible in the supply of electricity than in other parts of the energy sector. Accordingly, decarbonization of the power sector is a priority for the country and also the focus of this IP. At the same time, the broader JET IP that is being prepared by the Government will focus on the other parts of the energy sector as well.

1.3.1 Institutional and Regulatory Framework

16. In South Africa, the electricity sector is principally governed by the provisions of the National Energy Regulator Act, 2004 (NERA), the Electricity Regulation Act, 2006 (ERA), and the National Energy Act, 2008 (NEA). The sector comes under the purview of the DMRE, which is headed by the Minister for Mineral Resources and Energy (Minister).

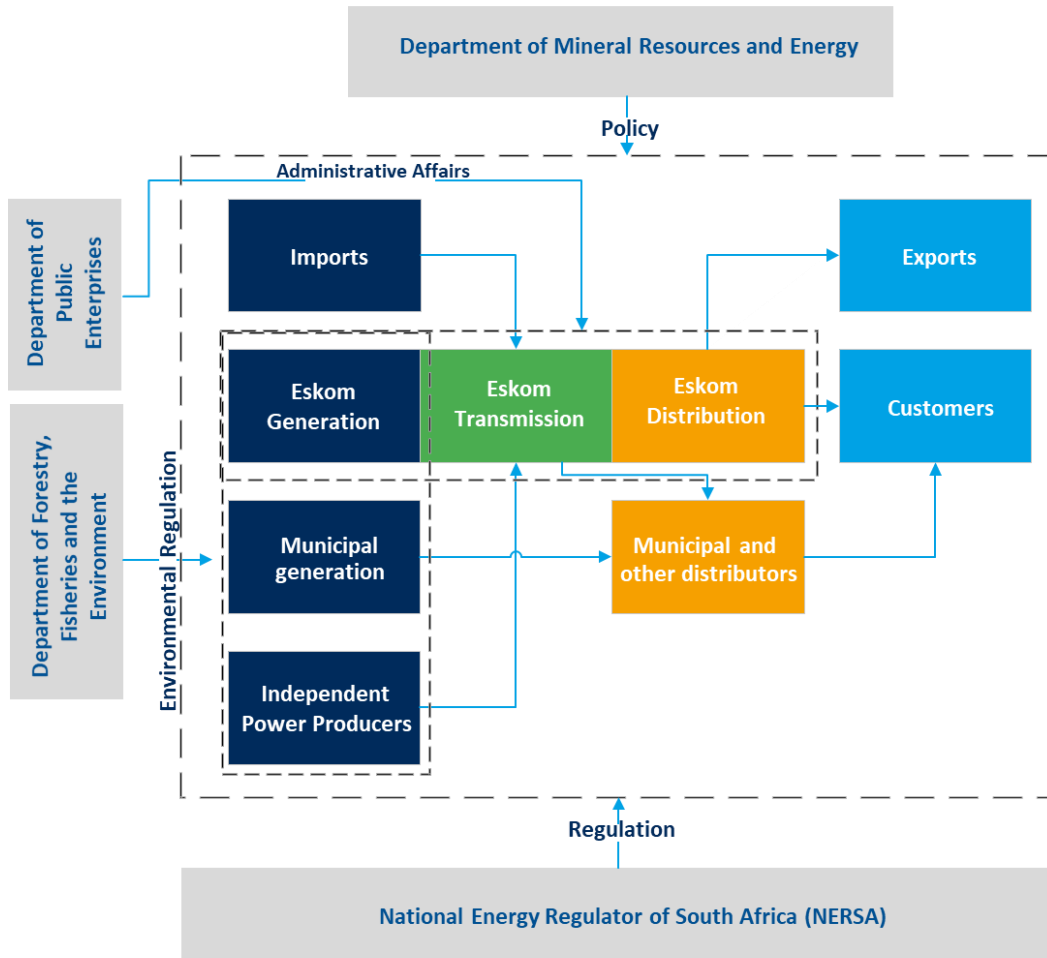
17. The South African electricity sector is dominated by Eskom, the state-owned vertically integrated utility. In addition to generating 85 percent of the domestic production, Eskom is also responsible for international trade of power and government-mandated power purchase from private generators. The utility also owns more than 30,000 km of transmission lines, along with multiple substations and related assets. As the sole transmission licensee and system operator in South Africa, Eskom fulfills multiple duties such as providing transmission network service and ensuring the short-term reliability of the country's power and compliance with the Grid Code. Although municipalities are responsible for the distribution of electricity within their boundaries, Eskom acts as the sole or joint final distributor in over 90 municipalities. Wherever Eskom is not the sole final distributor, the utility supplies power to the licensed distributor at a bulk supply tariff. Thus, Eskom supplies power directly to 40 percent of the country's end users.²⁶

18. Eskom's dominance in the sector has prompted the need for regulatory oversight, which is fulfilled by the National Energy Regulator of South Africa (NERSA). Although the electricity sector comes under the direct purview of the DMRE, other ministries, including the Department of Forestry, Fisheries, and

²⁶ Black and Veatch. 2022. *Technical and Financial Approaches to Repurpose Coal Assets: Case of India, Indonesia, and South Africa*, work in progress.

Environment (DFFE) and Department of Public Enterprises (DPE), also have the power to effect changes in the sector. Incidentally, the DMRE also oversees the policy environment for the coal value chain. Independent Power Producers (IPPs), municipalities, and consumers are also important stakeholders in the electricity sector. Laws, regulations, and other policy instruments such as the IRP are drafted by the concerned ministry and feedback from the public is solicited on the same. Based on the comments received, the final version is drafted and, after fulfilling statutory requirements, if any, comes into effect. Figure 1 summarizes the market participants and authorities in the electricity sector.

Figure 1. Overview of the Electricity Sector in South Africa

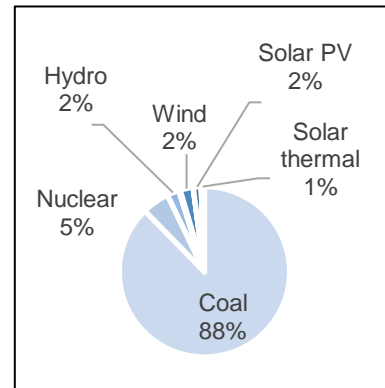


Source: Black and Veatch. 2022. *Technical and Financial Approaches to Repurpose Coal Assets: Case of India, Indonesia and South Africa*, work in progress.

1.3.2 Capacity Mix and Electricity Generation Mix

19. Out of the 52 GW of installed power generation capacity, coal-fired power generation represents the largest source at 74 percent of installed capacity, followed by renewables (15 percent), oil (7 percent), and nuclear (3 percent). In 2020, the power sector produced 239 TWh of electricity, of which 88 percent (210 TWh) was from coal, 5 percent (12 TWh) from nuclear, and 7 percent (17 TWh) from renewables (4 percent from wind and solar). Given its high share of GHG emissions, decarbonizing the power sector is key to South Africa’s ability to meet its commitments under the Paris Agreement.

Figure 2. Electricity Generation by Source in 2020



Source: International Energy Agency (IEA).

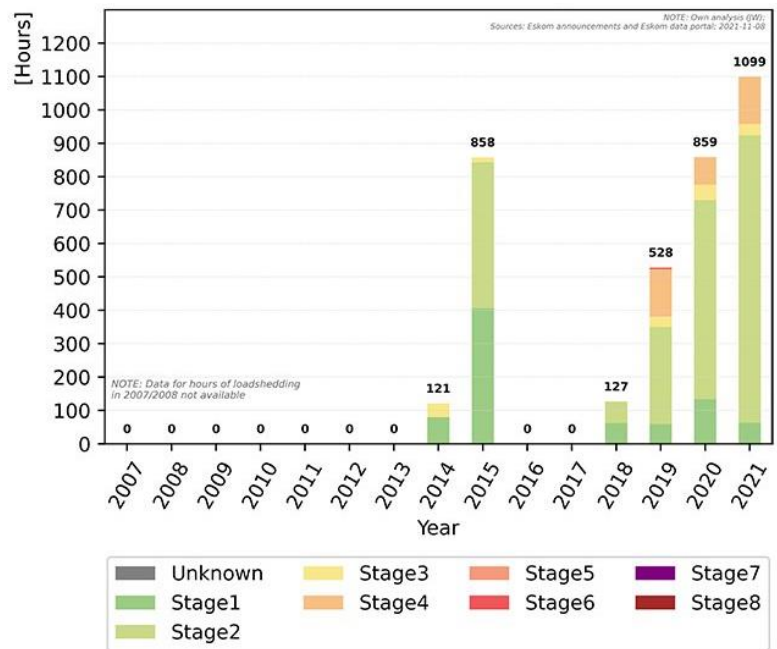
1.3.3 Major Challenges in the Electricity Sector

20. There are four key challenges the power sector in South Africa is currently facing: (a) recurrent load shedding, (b) unsustainable Eskom debt not only affecting its operations but also its capacity to maneuver the coal transition, (c) implementation of JET, and (d) electricity access.

21. Power shortage and load shedding.

Since 2008, South Africa has been facing chronic power shortages with frequent load shedding due to insufficient peak power generation capacity (seasonal and daily) and sudden losses of capacity due to the poor state of coal plants. In 2020, load shedding accounted for about 1 percent of the power demand (1,798 GWh) despite a reduced load (-5.7 percent relative to 2019) due to COVID-related lockdown. From January to July 2022, Eskom implemented 84 days of power cuts, including so-called stage 6 load shedding, which removed 6,000 MW from the grid, already exceeding last year’s total number of hours in load shedding. It is estimated that the current on-grid power supply gap is between 4 and 6 GW and will not be filled before 2024. The unreliable electricity supply is weighing on output and business

Figure 3. Hours of Load Shedding



Source: Creamer Media’s Engineering News.

confidence. According to the central bank, South Africa's economy contracted 1.1 percent in the second quarter, partly due to more extensive blackouts.²⁷

22. There are several government and Eskom programs to increase generation capacity and narrow the electricity supply and demand gap. These include the following:

- (a) **Since 2019, Eskom has embarked on a generation performance improvement plan** to fix latent defects in new plants and optimize use of open cycle gas turbines (OCGTs) and pumped hydropower. Eskom is implementing a comprehensive maintenance program for performance improvement that will help reduce load shedding and improve the security of power supply. According to Eskom, the overall energy availability factor (EAF) is expected to rise from 65 percent to a projected 85 percent once the maintenance program for the older CFPPs has been completed and the new mega CFPP projects (Medupi and Kusile) come online.
- (b) **Eskom's Short-Term Power Procurement Programme (STPPP)**. Request for Proposal (RFP) to purchase all available capacity from industrial consumers (128 MW to be contracted).
- (c) **Risk Mitigation Independent Power Producer Procurement Program (RMI4P)**. To respond to the urgent capacity shortfall, in July 2020, the DMRE launched the procurement of 2,000 MW of emergency generation to be commissioned within 24 months after contract signature. Among the eight bidders awarded in March 2021, the cheapest offer was using solar photovoltaic (PV) and battery storage technologies, which were more competitively priced than bids for thermal plants. Among those, Scatec's three Kenhardt projects with total solar capacity of 540 MW, battery storage capacity of 225 MW/1,140 MW, and 150 MW of dispatchable power reached financial close and started construction in July 2022.²⁸
- (d) **Renewable Energy Independent Power Producer Procurement Program (REI4P)**. On October 29, 2021, the DMRE announced 25 successful bidders under the REI4P Bid Window 5. The DMRE announced Bid Window 6 in April 2022, with bids submitted on October 3 2022 for 3.2 GW wind and 1 GW solar PV. An additional 1.6 GW from renewables (Bid Window 7) and 513 MW of battery storage is expected to be issued subsequently.
- (e) **Nuclear power**. The Department of Energy (DOE) has also confirmed South Africa's intention to proceed with a nuclear energy expansion program, and Eskom intends to extend the life of the existing nuclear power plant until 2045.

23. On July 25, 2022, President Ramaphosa announced five additional actions to address the ongoing electricity crisis. First, Eskom will improve the performance of its existing fleet of power stations by increasing the budget allocation for critical maintenance and recruiting skilled personnel. Second, the procurement of new generation capacity from renewable, gas and battery storage will be accelerated. Third, the GoRSA will increase private investments in generation capacity by removing the licensing threshold for embedded generation completely. Fourth, the government intends to enable businesses and households to invest in rooftop solar. Lastly, the electricity sector will be fundamentally transformed for future sustainability by restructuring Eskom and establishing competitive electricity market. Sub-section

²⁷ Bloomberg. 2022. "South Africa to Suspend Power Cuts for First Time in Five Weeks." (<https://www.bloomberg.com/news/articles/2022-07-22/south-africa-to-suspend-power-cuts-for-first-time-in-five-weeks#xj4y7vzkg>)

²⁸ Scatec, 2022. <https://scatec.com/2022/07/19/scatec-is-starting-construction-of-solar-and-battery-project-in-south-africa-after-reaching-financial-close/>.

1.3.4 'Power Sector Reforms to Overcome the Challenges' provides more information on the third and fifth actions.

24. **Eskom's unsustainable debt and precarious financial health.** Tariffs below cost-reflective levels and cost increases above inflation contributed to the degradation of profitability of Eskom (for example, earnings before interest, tax, depreciation, and amortization [EBITDA] margins have been below 20 percent since 2019 and reached 16 percent in 2021). Low profitability and an unsustainable debt burden, stemming from overreliance on debt to fund ambitious capital expansion plans in the past, have taken a toll on solvency indicators. Debt service coverage ratios (DSCRs) have been exceptionally low, falling below 0.5 since 2019 and dropping to 0.3 in 2021. Debt arrears from municipalities have also been an increasing concern, affecting liquidity and even cash-based solvency indicators such as the cash interest coverage ratio. This indicator dipped to an alarming value of 0.85 in 2021. There was a slight improvement in indebtedness indicators from 2020 to 2021, largely due to government equity being channeled into debt servicing and the strengthening of the South African rand. However, indebtedness remains high for the current levels of operating profit. Standard & Poor's global ratings downgraded Eskom's credit rating to CCC+, reflecting a high probability of default.

25. **JET.** The goal of JET is to support the decarbonization of the mining and energy sectors in a socially acceptable manner while contributing to the nation's economic growth. As the policy owner for the mining and energy sectors, the DMRE is mandated to plan, oversee, and implement the future energy mix and JET for South Africa. In the power sector, IRP-2019 is an important policy instrument that defines the energy transition path until 2030, mandating the decommissioning of approximately 12 GW of CFFPs by 2030 and the expansion of 18 GW of private sector-led renewables over the same time frame. The Eskom coal plant retirement plan is in complete accordance with IRP-2019 except for the Tutuka Power Station, which will be shut down earlier than planned in IRP-2019. The DMRE's JET framework to provide the structure for monitoring and managing the socioeconomic effects of the energy transition has been approved by the Minister after stakeholder consultations held in December 2021 and will move toward approval by the Cabinet.

26. One of the greatest challenges for the power sector in JET planning and implementation is to find the appropriate balance between energy security, existing labor market challenges, and meeting the country's climate change mitigation commitment. These priorities need to be optimized by focusing on the supply of reliable and affordable electricity to stimulate economic development; meeting the country's climate change targets and NDC commitments; mitigating socioeconomic impacts, particularly on vulnerable groups; and reducing the coal dependency of local economies in Mpumalanga and other coal-dependent provinces.

27. **Universal energy access.** Since the beginning of the decade, the GoRSA has developed a range of policies on universal access that allowed the country to fast-track the provision of electricity access.²⁹ Since then, the country has made substantial progress toward achieving universal access to electricity, and the percentage of the population with access to electricity was estimated at 84.39 percent in 2020. However, pockets of unelectrified areas are found not only in rural isolated areas but also in new informal settlements near large metro areas. Further, the free basic electricity (FBE) of 50 MWh per household per month is deemed to be inadequate for most household usage, including cooking and washing which are generally considered women's responsibilities. As big metros continue to attract migrants from inside and outside the country, universal access remains a government priority. Accordingly, alternate forms of

²⁹ National Planning Commission. 2012. *National Development Plan 2030: Our Future - Make it Work*. ISBN: 978-0-621-41180-5.

energy access are being explored—the containerized micro-grids that Eskom is planning to roll out in the unelectrified areas of the country is an example.

1.3.4 Power Sector Reforms to Overcome the Challenges

28. New investment in electricity infrastructure had been stymied for many years by regulatory constraints, and slow reforms over time have only gradually allowed limited participation for the private sector. The vertical integration of Eskom’s operations across the entire electricity sector had, historically, resulted in a notable lack of transparency and accountability. The generation sector faces severe inefficiencies due to lack of competition and low operational performance due to an undermaintained, aging coal fleet. The transmission sector faces an aging infrastructure and large investment requirements. The distribution business faces economic and technical problems due to highly fragmented retail markets, aging infrastructure, underfinanced municipalities, and regulatory uncertainties.

29. **Unbundling of Eskom.** Eskom’s vertical integration across the entire electricity sector has resulted in a number of inefficiencies. The generation sector lacks competition, and the operational performance is poor. Significant investments in transmission infrastructure are backlogged. There are economic and technical problems in the distribution sector due to a highly fragmented retail market, aging infrastructure, and regulatory and governance uncertainties.

30. In October 2019, the Cabinet approved the Roadmap for Eskom in a Reformed Electricity Supply Industry, which outlines the plan to split Eskom into three state-owned entities for generation, transmission, and distribution. Eskom has established the National Transmission Company of South Africa SOC Limited (NTCSA), a wholly owned subsidiary, and is on track to separate its generation and distribution businesses by the end of 2022. Soon, the GoRSA will appoint boards for the transmission and generation entities.³⁰

31. **The exemption from a generation license.** Subject to specified exemptions set out in Schedule 2 of the ERA, no person may operate any generation, transmission, or distribution facility in South Africa without a license issued by NERSA. On June 10, 2021, President Ramaphosa announced the government’s approval of an increase in the threshold for generation license exemptions for generation projects from 1MW to 100MW. Further on July 25, 2022, it was announced that the government will altogether lift the 100 MW license exemption cap on distributed generation plants being developed by miners and heavy industry. The first reform, which was announced in June 2021, had already stimulated 80 confirmed private sector projects with a combined capacity of over 6,000 MW.

32. **From Eskom single-buyer model to a wheeling market.** In the past, under the REI4P and RMI4Ps, IPPs had been limited by their ability to generate and sell power only to a single buyer, Eskom. The only exceptions were small-scale embedded generators, which needed to apply for a license to generate up to 1 MW to a captive customer other than Eskom. Municipalities had also been limited in their ability to procure electricity from private producers. The reform will break Eskom’s monopoly as the single buyer in the market and allow IPPs to sell power directly to buyers.

33. With South Africa’s wheeling market in its infancy, large-scale industrial power consumers are currently best positioned to benefit from wheeling agreements—from mining operators, data centers, property portfolios, and industrial operations to automotive manufacturers. Key advantages of this energy

³⁰ Address to the nation on energy crisis by President Cyril Ramaphosa, July 25, 2022. <https://www.gov.za/speeches/president-cyril-ramaphosa-address-nation-energy-crisis-25-jul-2022-0000>.

model include up to 50 percent cheaper tariffs than traditional grid prices for direct Eskom clients, a reduction in carbon tax and carbon emissions through the use of clean energy such as wind and solar PV, higher penetration due to a time-of-use (TOU) credits system, and no capital requirements.

34. In addition, as part of its JET program, Eskom is supporting the country's decarbonization efforts while at the same time strengthening the electricity grid in the Northern and Eastern Cape provinces, as a key enabler for the roll-out of new renewable capacity in these areas. The energy wheeling frameworks and tariffs are unlocking the potential for significant private sector investment in renewable energy generation by removing some of the geographical location-based limitations and addressing the customers' commitments toward renewable energy consumption by 2030. Wheeling is already used successfully in a few local projects, and wheeling frameworks are already in place for various municipalities across the country.

35. According to the ERA and NERSA's Transmission Grid Code and Distribution Network Code, all customers, including transmission- and distribution-connected generators and loads, are provided nondiscriminatory access to the grid to allow for energy to be delivered or exported. However, third-party wheeling of energy is currently subject to the buyer being connected to a medium voltage or high voltage network and being on a TOU tariff.

36. **Tariff and pricing reform.** In February 2022, the DMRE published the draft Electricity Pricing Policy (EPP)³¹ for public comment. This proposal seeks to provide general pricing principles as well as the wholesale and transmission pricing structure while balancing affordable electricity tariffs for low-income consumers along with a cost-reflective tariff for others.³²

1.4 Mpumalanga Province and Transition Process

1.4.1 Socioeconomic Profile

37. Mpumalanga Province, situated toward the east of South Africa, is the second smallest province in the country but contains almost half of its high potential arable land. The province shares international borders with Eswatini to the southeast and Mozambique to the east. In 2020, the population of Mpumalanga was approximately 4.7 million (approximately 7.8 percent of South Africa's total population) with a labor force participation rate of 53.4 percent. The provincial population predominantly comprises individuals between ages 15 and 64—approximately 65 percent of the provincial population in 2020. Over the years, the province has experienced increasing migration from countries such as Mozambique and Eswatini linked to the high demand for unskilled labor in the mining and agriculture sector.³³ Between 2010 and 2020, the province's working-age population increased at an average annual rate of 1.8 percent, which is slightly higher than the 1.5 percent growth rate recorded nationally over the same period. Almost half (45.7 percent) of households in Mpumalanga province are female headed, which is associated with increased vulnerability to poverty.³⁴

38. Since most of the provincial population is of working age, there exists significant human resources for future economic growth and sustainability, provided there is the availability of economic opportunities

³¹ <https://d1jbg4la8qhw2x.cloudfront.net/wp-content/uploads/2022/02/EPP.pdf>.

³² <https://www.esi-africa.com/industry-sectors/finance-and-policy/far-reaching-amendments-available-for-public-comment/>.

³³ Provincial profile: Mpumalanga / Statistics South Africa 2018.

³⁴ <https://www.statista.com/statistics/1114301/distribution-of-female-headed-households-in-south-africa-by-province/>

to absorb the labor supply. However, this human resource potential is yet to be harnessed. Mpumalanga has low educational attainment, that is, 11 percent of the population hold a post-matriculation qualification. During the first quarter of 2021, the unemployment rate in Mpumalanga stood at 33.5 percent against the national unemployment rate of 32.6 percent during the same period.³⁵ Likewise, the youth unemployment in Mpumalanga in the fourth quarter of 2020 was 47.6 percent against the national rate of 45.3 percent.³⁶ Mirroring the trends in the coal sector globally, the female labor force participation rate is quite low—at present, Eskom employs 31 percent females and coal mines employ 21 percent females in Mpumalanga. Notably however, these female employees have higher educational attainment than their male counterparts (for example, 67 percent of females compared to 49 percent of males at Eskom hold a post-matric qualification), as a result of which females hold higher positions despite being underrepresented in absolute terms.³⁷ Most of the formal sector workers in the coal mining sector are Black South Africans (82 percent), male (83 percent) with above average levels of education (70 percent have completed at least secondary education), and unionized (60 percent). These workers support an average of three dependents each. The loss of male breadwinner's job due to the transition process could mean that women, and sometimes children might be pushed into income generation activities.

39. In 2020, the Mpumalanga provincial economy was valued at approximately US\$21 billion and contributed 7.2 percent to the national economy during that year.³⁸ The primary contributors to the economy of the province are mining (24 percent) and manufacturing (22 percent).³⁹ The potential for expanding the economic base, reducing coal dependency, and diversifying the economy is significant. For instance, the key economic nodes in the province (that is, eMalahleni, Steve Tswete, Mbombela, Secunda, and Ermelo) are connected by a vast network of roads; the province is also close to key markets in Gauteng and has links with Mozambique via the Maputo corridor and to the deep-water port of Richards Bay in KwaZulu-Natal. These features of Mpumalanga's location and close access to key markets create an advantageous environment for economic diversification, growth, and development.

1.4.2 Coal Activity in Mpumalanga and Potential Impacts on Socioeconomic Profile of Communities

40. Mpumalanga is rich in coal reserves and approximately 80 percent of South Africa's coal is sourced from the province while 93 percent of South Africa's coal miners, that is, 90,000 people, are based in the province. Coal activity is however geographically concentrated; most of the coal reserves are concentrated in the west and southwest of the province and four municipalities (eMalahleni, Steve Tshwete, Msukaligwa, and Govan Mbeki). These areas account for the majority (68 percent) of all coal mining employment, contributing to 70 percent of South Africa's total value added in coal in 2019.

41. In total, the coal industry provides direct and indirect employment to approximately 250,000 people most of whom, as mentioned above, are in Mpumalanga Province. Beyond the direct jobs provided by the coal sector, coal mines and related industries also have positive spillover effects in terms of employment generation in Mpumalanga's non-mining sectors, especially in the transport (around 15,000 jobs) and service sectors.

³⁵ <https://www.statssa.gov.za/publications/P0211/P02111stQuarter2021.pdf>.

³⁶ Quantec EasyData 2021.

³⁷ https://www.cobenefits.info/wp-content/uploads/2022/01/COBENEFITS-Study_From-coal-to-renewables-in-Mpumalanga.pdf.

³⁸ Mpumalanga was the fifth largest contributor to the national economy. Quantec EasyData 2021.

³⁹ Quantec EasyData 2021.

42. According to current estimates, the decommissioning process is estimated to result in net job losses in the province by 2030. Specifically, in the IRP-2019 scenario (10.7 GW decommissioned), 74,000 operation and maintenance (O&M) jobs (22,000 direct, 23,000 indirect, and 29,000 induced) would be lost at coal-fired power stations, compared to 124,000 O&M jobs lost (36,000 direct, 39,000 indirect, and 49,000 induced) when 17.8 GW is decommissioned. Not all job losses in Mpumalanga's fossil fuel sector can be compensated by clean energy jobs.⁴⁰ Further, the current jobs in the coal sector are overwhelmingly formal and permanent (95.3 percent), paying wages above those earned by similar workers in other industries, thus indicating that the impacts on those directly affected are likely to be magnified by the transition.

43. The population in Mpumalanga, particularly communities living in concentrated coal areas, are also dependent on the coal sector for basic services, including electricity, water, and health services, rather than their municipalities. This has led to the Mpumalanga provincial and municipal local economy being reliant on the coal sector. For example, coal accounts for almost half of local revenues in eMalahleni and approximately one-third in Steve Tswete and Msukalingwa. On its part, as towns have grown primarily due to in-migration triggered by job opportunities in the coal value chain, local governments have found it difficult to keep pace with providing basic needs for the growing population, especially those living in informal settlements, where many residents remain without access to electricity, water, and sanitation or the means to pay for them.

44. In addition to the above, there are often invisible social impacts that result from increasing economic strains on households, among others, triggered by the phaseout of the coal sector. Traditionally marginalized and excluded groups often experience these more acutely. Frustrations that men may feel because of not being able to meet expectations associated with traditional gender norms around manhood (such as providing for a family) may result in high rates of crime and GBV. Women who are economically dependent on their partners are more likely to experience domestic violence. In addition to the psychological impacts and trauma that this may cause, the situation could also increase the spread of sexually transmitted infections such as HIV/AIDS among communities.

45. Studies conducted to better understand what works in Just Transition in coal-dependent communities, including in the Mpumalanga Province, have found that insufficient community and civil society involvement and engagement would leave JET at significant risk of lacking support, legitimacy, and ultimately effectiveness.⁴¹ Yet, progress in South Africa toward meaningful engagement with civil society and community stakeholders remains to be fully achieved. In particular, there is a need to develop mechanisms to close the feedback loop for these consultations and to provide local communities and civil society groups with mechanisms to hold government representatives accountable.

1.4.3 A Community-Centered Approach and Mpumalanga's Policy Frameworks Relating to Energy Transition

46. The Mpumalanga Vision 2030 aims to shift Mpumalanga's reliance on coal toward developing a green and sustainable economy while also prioritizing employment and economic growth, education,

⁴⁰ https://www.cobenefits.info/wp-content/uploads/2022/01/COBENEFITS-Study_From-coal-to-renewables-in-Mpumalanga.pdf.

⁴¹ https://www.researchgate.net/publication/355900607_UNDERSTANDING_JUST_TRANSITIONS_IN_COAL-DEPENDENT_COMMUNITIES_Case_Studies_from_Mpumalanga_South_Africa_and_Jharkhand_India; https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/supporting_just_transitions_in_south_africa.pdf.

health, and social protection for all. The vision document sets out the need for a community-centered approach as an essential condition toward building supportive, safe, and cohesive communities to achieve the overall outcomes of the vision. The need for meaningful and long-term engagement with communities is also emphasized in the Mpumalanga Department of Economic Development and Tourism Strategic Development Plan 2020–2025 and in the PCC’s Framework for A Just Transition in South Africa, 2022.

47. Achieving these goals will require deliberate, comprehensive, and effective planning; otherwise, there is a risk of the phaseout of coal leading to substantial socioeconomic losses.⁴² Provincial and municipal level plans are also needed to ensure that the transition process meets the principles of a Just Transition, which include social inclusion, decent work for all, and poverty reduction. This will require development and implementation of a people-centered and a comprehensive strategy for economic growth that harnesses the potential in other sectors such as tourism and agriculture following the coal phaseout.

48. The transition from coal also provides for an opportunity to ensure gender-inclusive development in Mpumalanga, especially given the persistent gender gaps in the coal sector. This will require comprehensive efforts for training, recruitment and retention of women in clean energy and green economy jobs, and targeted support for female entrepreneurship. Further, to ensure the ‘justness’ of the transition process, the strategy needs to focus on sustained bottom-up approaches to participatory planning and decision-making around the transition activities, from investments in social and economic infrastructure (including those relating to the green economy) to ensuring that all members of the target communities are provided with the information, facilitation, and capacity building to provide direct feedback in real time on progress of project activities as well as fully participate in the benefits that the transition may bring.⁴³

49. There has been considerable preparatory work around what a green economy will look like in Mpumalanga including recognition of the importance of community engagement. However, less attention has been paid to specifically what community structures, systems, capacity, and social support services will be required and how communities can be engaged as partners and not simply beneficiaries of the transition process. Differentiated approaches are also required to ensure that groups traditionally under-represented - women, youth, migrant workers, persons with disabilities etc are involved in and benefit from the transition process. This will in turn be essential to ensuring communities participate in and are empowered to influence decision-making on equal footing with government and private sector counterparts in planning and decision processes to equitably benefit from the transition outcomes.

⁴² https://www.cobenefits.info/wp-content/uploads/2022/01/COBENEFITS-Study_From-coal-to-renewables-in-Mpumalanga.pdf.

⁴³ *Socio-Economic Impact Study for the Shutdown and Repurposing of Komati Power Station to Create a Basis for Sustainable Livelihood*. Draft Integrated Report by Urban-Econ Development Economists June 2022.

2 Accelerating Coal Transition (ACT) Context

2.1 State of Coal Mining and Coal-Dependent Energy Systems and Assets

2.1.1 Mining Sector in the Country's Economy

50. South Africa is rich in mineral resources, ranging from coal, diamonds, gold, iron, nickel, silver, and platinum to uranium. The mining sector plays a key role in the economy. According to the latest data from the Minerals Council,⁴⁴ the South African mining sector contributed a 7.5 percent share to total GDP in real terms and more than 4 percent comes from the coal value chain. The direct contribution of mining to fixed investment was ZAR 95.7 billion in 2020 (US\$5.58 billion (at ZAR 17.15 = US\$1 as of July 1, 2022)). As a whole, mining contributes more than 20 percent to the economies of the provinces of Limpopo, Mpumalanga, Northwest, and the Northern Cape. While employment opportunities are the largest contributor to the provincial economies, the revenue from mining activities and employment also enables better infrastructure in these areas.

51. South Africa is currently the world's fifth largest producer of coal with 248 million tons in 2020 (which accounts for 94 percent of Africa's coal production) and is a major producer and exporter of coal and mining products with exports accounting for ZAR 45 billion (US\$2.62 billion) in 2020. South Africa's coal production peaked at 263 million tons in 2014 compared to 258.9 million tons in 2019 before seeing a decline in 2020 due to COVID-19. Coal provides 74 percent of South Africa's primary energy needs, and the country is also a large user and importer of natural gas, mainly for industry. Coal is also a source of natural gas production, through coal bed methane, and synthetic oil fuels.

52. The coal value chain has been central to South Africa's development for over a century, especially for energy, petrochemicals, and metals refineries. Coal is the main fuel for electricity generation, powering 87 percent of the country's total generation. Coal is the main input in basic chemicals and is a key input to the coal-to-liquid process (28 percent of fuel supply) as well as to metallurgical industries. Coal is also important for general uses including domestic heating and cooking. Recent trends in coal demand from key sectors include the following:

- (a) **Power generation.** There are 12 CFPPs located in Mpumalanga Province, two in Limpopo Province, one in the Free State (privately owned by Sasol), and three (including one privately owned plant—Kelvin Power Station) in Gauteng Province. The other privately owned power plant is located in Richards Bay, KwaZulu-Natal Province, and is a combined gas, biomass, and coal power plant. Over the past several years, Eskom's sales of electricity (in GWh) have declined steadily, partly as a result of external factors such as relatively slow national economic growth over the past five years, due to the closure of energy-intensive smelters and because many industrial customers responded to higher electricity tariffs by becoming more energy efficient.⁴⁵
- (b) **Petrochemical industries.** Sasol is the largest coal-to-chemical producer in the country. Similar to Eskom, Sasol has seen a decline in chemical production in recent years due to sluggish economic growth in South Africa and as a result of supply chain disruptions following the COVID-19 pandemic. As a result, Sasol plans to shift from coal to gas (imported from

⁴⁴ <https://www.mineralscouncil.org.za/sa-mining/slps/slps-by-sector>.

⁴⁵ <https://www.eskom.co.za/wp-content/uploads/2021/08/2021IntegratedReport.pdf>.

Mozambique) as part of its strategy to reduce its emissions intensity. This shift is likely to reduce its demand for coal over time.

53. Historically, coal exports accounted for 30 percent of coal production by volume but about 50 percent by value.⁴⁶ Australian thermal coal futures that were trading at about US\$80 per ton at the start of 2021 rocketed to a record high of US\$440 a week after the conflict in Ukraine began and were trading at US\$326 per ton in May 2022. Mining companies in South Africa have resorted to trucking coal to ports to meet a surge in European demand since the war in Ukraine started, bypassing the deteriorating rail infrastructure they blame for billions of dollars in lost revenue.

54. South Africa's coal industry provides both direct and indirect employment for as many as 250,000 people (ranging from power generation, liquid fuels manufacture, and so on). It is concentrated in Mpumalanga and Limpopo Provinces that have higher-than-average unemployment levels, making the transition more challenging from a socioeconomic perspective. Formal employment in the coal mining sector is about 94,000, which is 20 percent of employment in the overall mining sector in South Africa.

55. As part of the coal phasedown, it would be necessary to address all aspects of the coal supply chain including the closure of mines. The GoRSA places highest priority on the decarbonization of the power sector due to its significance in addressing climate change and therefore has requested the multilateral development banks (MDBs) to focus this IP on addressing decarbonization of the power sector.

2.1.2 Gradual Decline of the Coal Value Chain

56. Coal suppliers are increasingly aware of the concentrated risks in South Africa, such as limited transport and other essential infrastructure such as health facilities, data centers, waste and wastewater, and emergency services. As a result, some coal suppliers, particularly larger international firms, have been diversifying their sales of coal in anticipation of the upcoming transition in the South African power sector. Larger mining companies, including Anglo American, Exxaro, and Glencore, among others, are better placed to diversify their operations and implement formal programs to support their employees to reskill as needed. Groups such as Billiton Energy Coal South Africa (BHP) and Rio Tinto have made recent announcements regarding their intention to diversify⁴⁷ in other ways, for example, by investing in the platinum group of metals (PGM) used in green hydrogen production and other climate-smart mining and metals production important for a climate-friendly future, as well as by investing in renewable energy generation. BHP and Glencore signed a nickel supply agreement and cobalt supply agreement, respectively, with Tesla. Both metals are used to manufacture rechargeable batteries. Meanwhile, Rio Tinto is partnering with customers such as Apple to produce carbon-free aluminum.⁴⁸ These announcements come in the wake of a significant boom in global commodity prices combined with a sharp increase in investor interest in Environmental, Social, and Corporate Governance (ESG).

57. Notwithstanding the current coal export boom as a result of the Russia-Ukraine conflict, the main climate-change-related impacts on the coal value chain derive from a decline in demand at home and abroad, as countries seek to reduce their GHG emissions especially from electricity generation and other

⁴⁶ Burton, J., et al. 2018. *Coal Transition in South Africa - Understanding the Implications of a 2°C-Compatible Coal Phase-out for South Africa*. IDDRI & Climate Strategies.

⁴⁷ <https://www.whitecase.com/publications/insight/mining-metals-2022-esg-and-energy-transition-sectors-biggest-opportunity>.

⁴⁸ <https://renewafrica.biz/news/south-africa-news/motsepes-arm-commit-to-a-renewable-energy-future/>.

uses.⁴⁹ The impacts as a result of the GHG policy are, however, “difficult to distinguish in some cases from the effects of the slowdown in the South African and global economy.”⁵⁰ Moreover, it is not possible to attribute the future anticipated closure of specific coal mines to the accelerated decommissioning of specific coal plants. More analysis and research are needed to pinpoint specific mines that are likely to be at risk of closure in the future.

58. Despite the current lack of specificity about which coal mines are most at risk of closure, in general, it is expected that 18 GW of coal power plants and associated mines will be shut down by 2035. The resulting decline in overall employment will provide an opportunity to support better planning to enable a more just transition. This is especially important given the historical track record of derelict and ownerless mines (mainly pre-1991), as well as of more recently ‘abandoned mines’ that have been placed on interminable care and maintenance and are not formally recognized as closed by the DMRE. These ownerless, derelict, and abandoned mines have left behind a legacy of destroyed livelihoods with degraded land, acid mine drainage, and air and water pollution and are not only a danger to community health but also constrain investments in agriculture, tourism, and other economic revitalization efforts.

59. Coal mining communities are expected to require support in planning and preparing how to respond to the various JET challenges over the next five to ten years. These challenges range from financing new technology and reducing the carbon footprint of their operations to reskilling of workers to engage in alternative economic activities. They also need to be prepared for proper mine closure, including preparing land, water, and related assets for repurposing, while addressing the needs of employees and community stakeholders.

2.2 Coal Transition in the Power Sector

2.2.1 Decarbonizing the Electricity Sector as a Key to Meeting NDC Commitments

60. The power sector is the largest GHG emitter in South Africa (48 percent), followed by transport (10 percent) and agriculture (9 percent). Electricity generation in South Africa alone represents approximately 40 percent of Sub-Saharan Africa’s power sector GHG emissions. The country’s biggest power sector emission in the region is also partly attributed to electricity exports as well. The country is interconnected with its neighboring countries through the Southern African Power Pool (SAPP): Botswana, the Democratic Republic of Congo, Namibia, Eswatini, Lesotho, Zimbabwe, Zambia, and Mozambique. The country is a net exporter—between 2 and 7 TWh per year over 2010–2019 (4.4 TWh in 2020).⁵¹

61. South Africa has identified decarbonization of its electricity sector as a central climate action priority, consistent with the country’s coal transition roadmap and the emerging JET initiative. The decommissioning and repurposing of uneconomic CFPPs and replacing the retired coal-based generation capacity, along with enabling significant new investments in renewable energy within the time frame until 2030–2031 that are consistent with the country’s IRP-19, are key elements of South Africa’s ambitious international climate change commitments contained in its updated NDC commitment. ACT support will be crucial in ensuring that the decommissioning of the coal power generation capacities happens as planned in the IRP-19 by preventing life extension of the CFPPs for addressing the severe power shortage.

⁴⁹ TIPS. 2019. *National Employment Vulnerability Assessment: Analysis of Potential Climate Change Related Impacts and Vulnerable Groups*.

⁵⁰ Ibid.

⁵¹ Enerdata, February 2022. *Country Energy Report - South Africa*.

2.2.2 Status of Coal Power Generation

62. Coal-fired power generation represents the highest share in Eskom's generation mix from 15 CFPPs with a combined capacity of 44 GW. Eight of these plants are in and around Emalaheni in Mpumalanga Province within a 35-mile radius of each other. The newest power plants, each with an estimated lifespan of 50 years, have a capacity of 4,800 MW, namely Medupi, where the first unit was commissioned in 2015 and Kusile, which is expected to be commissioned in 2025. Table 2 lists Eskom's coal-fired power generators. The difference between installed and nominal capacity reflects the auxiliary power consumption and reduced capacity caused by the age of the plant.

Table 2. Eskom's Coal-Fired Power Generators

Name of Station	Years Commissioned, First to Last Unit	Total Installed Capacity (MW)	Total Nominal Capacity (MW)
Arnot	September 1971 to August 1975	2,220	2,100
Camden ^a	March 2005 to June 2008	1,561	1,481
Duvha ^b	August 1980 to February 1984	3,000	2,875
Grootvlei ^a	April 2008 to March 2011	1,180	570
Hendrina ^c	May 1970 to December 1976	1,760	1,135
Kendal ^d	October 1988 to December 1992	4,116	3,840
Komati ^a	March 2009 to October 2013	990	114
Kriel	May 1976 to March 1979	3,000	2,850
Kusile ^d	August 2017 to Mar 2021 (Under construction)	2,397	2,160
Lethabo	December 1985 to December 1990	3,708	3,558
Majuba ^d	April 1996 to April 2001	4,110	3,843
Matimba ^d	December 1987 to October 1991	3,990	3,690
Matla	September 1979 to July 1983	3,600	3,450
Medupi ^d	August 2015 to November 2019 (Under construction)	3,970	3,597
Tutuka	June 1985 to June 1990	3,654	3,510
Total		43,256	38,773

Source: Eskom, March 31, 2021. Integrated Report.

Note: a. Former mothballed power stations that have been returned to service. The original commissioning dates were as follows:

- (i) Camden was originally commissioned between August 1967 and September 1969.
- (ii) Grootvlei was originally commissioned between June 1969 and November 1977.
- (iii) Komati was originally commissioned between November 1961 and March 1966.

b. Due to technical and/or financial constraints, some units at these stations have been derated.

c. The Duvha Unit 3 recovery project has been cancelled and the unit removed from the installed base.

d. Certain units are under extended inoperability and their capacity has been removed from the nominal base.

e. Dry-cooled unit specifications based on design back-pressure and ambient air temperature.

63. Eskom's coal plant fleet has an average age of 41 years and about 25 percent of the current generation capacity is coming to the end of its life in the next 10 years, according to the IRP-19. This old and cost-inefficient coal fleet has been poorly maintained over the last decade, causing a structural generation shortage that led to power shortages from 2007. In addition, the two newer power plants,

Medupi and Kusile (at 4,800 MW capacity each), have faced cost and time overruns and design defects. Medupi also had performance and safety issues.

64. Operating these old CFPPs longer or harder will exacerbate the already precarious Eskom's financial position given the inefficiency of the fleet and the noncompliance to environmental standards. The generation division's maintenance cost increased by 26 percent from ZAR 9.9 billion in 2020 to ZAR 12 billion in 2021. Eskom can also be affected by the Carbon Tax Act (CTA) (2019), which is to levy a carbon tax on GHG emissions. While Eskom is not expected to have a carbon tax liability until January 2023 due to the rebates allowed in the CTA, the liability is expected to be more than ZAR 11 billion per year after that.⁵² Eskom set up a 50-year CFPP decommissioning schedule, where approximately 10 percent of the coal generation capacity will be decommissioned by 2030 and more than 60 percent will be retired by 2045.

2.3 National Policies Enabling Coal Transition

65. Coal phasedown efforts in South Africa are also enabled by the Climate Change Act and efforts in the area of air quality management.

2.3.1 Climate Change Act⁵³

66. Following a lengthy, multiyear stakeholder process, on February 18, 2022, the government (DFFE) introduced a bill (BN 2022) with proposed language for a Climate Change Act to Parliament. The act seeks to provide for a coordinated and integrated response by the economy and society to climate change and its impacts, including setting a strategic direction and process for adaptation and disaster management and creating a framework for the operation of the Commission on Climate Change.

2.3.2 Air Quality Management

67. Climate change mitigation and air quality management are mostly addressed separately in South African legal acts and policies.⁵⁴ In the years following South Africa's emergence from apartheid in 1994, several new laws, including the National Environmental Management Act of 1998, were put into the books to protect all its citizens.⁵⁵ Subsequently, the Air Quality Act of 2004 was signed by the President in 2005 and introduced minimum emission standards (MES) for coal and liquid fuel generators.⁵⁶ The MES regulations provide time frames for compliance to power plant air quality emission limits and provide for a one-off suspension of meeting these standards for newer plants and for older plants being decommissioned by March 31, 2030, and that the National Air Quality Officer may grant an alternate emission limit or emission load if certain conditions are met.

68. In June 2019, two environmental organizations, GroundWork and Vukani Environmental Justice Movement in Action, supported by a coalition of other organizations and represented by their lawyers at

⁵² Eskom, March 31, 2021. Integrated Report.

⁵³ https://www.parliament.gov.za/storage/app/media/Bills/2022/B9_2022_Climate_Change_Bill/B9_2022_Climate_Change_Bill.pdf.

⁵⁴ A policy review of synergies and trade-offs in South African climate change mitigation and air pollution control strategies can be found at <https://www.sciencedirect.com/science/article/pii/S1462901115301180#>.

⁵⁵ https://www.gov.za/sites/default/files/gcis_document/201409/a107-98.pdf.

⁵⁶ https://www.dffe.gov.za/sites/default/files/legislations/nema_amendment_act39.pdf.

the Center for Environmental Rights, filed a landmark lawsuit against the GoRSA for failing to crack down against power plants operated by Eskom and refineries owned by Sasol.

69. Pursuant to the MES guidelines, Eskom sought postponements for meeting some of the air quality compliance timelines for 17 of its power stations (Majuba, Kendal, Lethabo, Tutuka, Duvha, Matla, Kriel, Arnot, Hendrina, Camden, Komati, Kusile, Grootvlei, Matimba, Medupi, Acacia, and Port Rex).⁵⁷ In its exemption application to the DFFE, Eskom stated that while it intended to improve ambient air quality for the health of affected communities, it faced significant challenges to meet the particulate matter (PM), nitrogen oxides (NOx), and sulfur dioxide (SO₂) emission standards. Eskom estimated that the cost of full compliance with the MES is over ZAR 300 billion (US\$21.8 billion) for end-of-pipe control technologies, which would add at least 10 percent to the existing electricity tariff without any additional generation capacity to the grid. Eskom added that installing emission reduction technology would increase its water demand by an additional 20 percent in a country already facing water stress and reduce power available to the grid.

70. As an alternative to expensive retrofits on its aging coal plant fleet, Eskom argued that its planned emission reduction plan included investment in technology retrofits to reduce emissions, the progressive closure of older stations, and the move to a cleaner energy mix. It stated that its forward-looking plan had a broader sustainable development perspective that would seek synergies between the important objectives of air quality, water conservation, waste reduction, and climate action rather than simply investing money in retrofitting expensive end-of-pipe technology to reduce stack/point source emissions at aging coal-fired plants with a limited remaining lifetime. Specifically, Eskom's plan would result in a reduction of emissions, including PM, SO₂, and NOx by 58 percent, 46 percent, and 66 percent, respectively, by 2035 and carbon dioxide (CO₂) emissions by 50 percent by 2035. Moreover, Eskom stated that its planned initiatives would result in a substantial reduction of emissions going forward in line with its JET strategy and the government's policy objectives in terms of GHG reduction.

2.4 Key Stakeholders

2.4.1 Planning & Coordination Level

71. **The National Planning Commission (NPC).** South Africa's NPC is the highest national government structure charged with meeting South Africa's international commitments to reduce CO₂ emissions. The Commission is under the Office of the Presidency and its main objective is to rally the nation around a common set of objectives and priorities to drive development over the longer term. Led by the NPC, South Africa's NDC was updated and ratified by the Cabinet in 2021.

72. **The PCC** is a multi-stakeholder coordination body that was established with an advisory mandate by the NPC for the Just Transition Framework. It is chaired by the President of South Africa to help realize the government's international climate change commitments by advising on the country's climate change response and pathways to a low-carbon climate-resilient economy and society by 2050. The PCC has been conducting consultations with a wide variety of stakeholders across the country and emphasizes the 'just' in Just Transition to include economic revitalization, job creation, and community engagement in coal areas affected by the transition and protect the most vulnerable to climate change, particularly women,

⁵⁷ Eskom's oldest coal-fired power stations Camden, Hendrina, Arnot, Komati, Grootvlei, and Kriel are scheduled to shut down by 2030 with Komati being the first to shut down its last unit in September 2022 and Hendrina before 2025. The two peaking stations, Acacia and Port Rex, reach their 50-year life in July 2026.

the youth, and the marginalized. These consultations have influenced the design and scope of activities envisaged in this IP.

2.4.2 National Government Departments

73. **The NT** seeks to protect the economy and unlock economic opportunities that will enhance the country's ability to adapt to the rapidly changing climate and realize socioeconomic benefits from the transition to a lower carbon, greener economy. The NT has provided guarantees backstopping Eskom as offtaker of power purchase agreements (PPAs) with private sector project developers for the first five bidding windows of the REI4P and for the 2021 RMI4P process.

74. **The DMRE** is the consolidated line ministry responsible for policy, regulation, and the promotion of development of the mining and energy sectors, which was created in 2018 through the merger of the former DOE and the Department of Mineral Resources (DMR). It is charged with planning for the provision of sustainable and affordable energy, including IRP-19 and defining relevant policies to foster JET in a manner that promotes economic growth and development, social equity, and environmental sustainability. Since 2004, NERSA is the regulatory body for electricity, petroleum products, and natural gas. NERSA is an independent entity by law but is largely dependent on the DMRE in practice, as all new regulations are drafted and approved by the DMRE. NERSA has made consistent efforts to move toward cost-reflective tariffs in the power sector. Tariffs of consumers directly supplied by Eskom increased by 15.06 percent starting in April 2021, after the regulatory process conducted by NERSA and court proceedings involving the High Court. Although the tariff is not yet fully cost-reflective, this increase decisively contributes to forecasted improvements in profitability and solvency indicators in FY2022. Moreover, tariff increases ranging from 15 percent to 10 percent are anticipated as a crucial element of the forecasts until FY2026. However, the decline in power supply combined with tariff increases has been met with opposition and protests by many South Africans.

75. The DMRE, which has expressed concerns about the price and security of electricity supply and the competitiveness of the mining sector, including the just transition of affected workers and communities, recently gazetted several important sector reforms that should spur much-needed investment for renewable energy investment by the private sector selling directly to buyers.⁵⁸ This builds upon the record of accomplishment of the former DOE's IPP Office, which completed five previous bid windows of the REI4P auction where it selected preferred bidders for private investment in renewable energy and issued an RFP in April 2022 inviting proposals for Bid Window 6 to be evaluated starting in August 2022.

76. **The DFFE** is the government department responsible for environmental protection, including mitigation of climate change impacts as well as negotiating and meeting international climate change commitments in alignment with the country's development objectives. The DFFE sets national standards for air quality and provides leadership in environmental management, conservation, and protection. It has been actively engaged in Just Transition in several key value chains, including coal, PGMs, metals,

⁵⁸ http://www.energy.gov.za/files/media_frame.html.

petroleum-based transport, and tourism through its leadership on developing the National Employment Vulnerability Assessment and Sector Jobs Resilience Plans.⁵⁹

77. The **DPE** is Eskom's shareholder and is responsible for its oversight. It approves Eskom's strategic directions and investment decisions, appoints Eskom's senior management, and serves as Eskom's liaison with the national budget (NT) and policy (DMRE). The DPE is the government department responsible for managing the transition of state-owned entities (such as Eskom and Transnet), including the development and implementation of alternative economic activities to economically sustain communities dependent on power stations and associated mines.

2.4.3 Provincial & Local Government Stakeholders

78. **The local governments of coal-dependent province.** The Mpumalanga provincial government has recognized that transition from coal is inevitable over time and has been proactive in exploring opportunities to stimulate investment in digital and green economy-led growth to smooth the transition by creating new jobs for local community members. Municipal governments, especially where coal activities are concentrated, are not only reliant on the mines and power plants for their revenues but some of the municipal services, including electricity, water, and health services, are also provided by the mines, Eskom or Sasol. As towns have grown due to urbanization and in-migration, local governments have not been able to meet the demands of their growing population, especially of those living in informal settlements.

79. Mpumalanga's Premier has announced plans to invest ZAR 10 billion (US\$730 million) to fight unemployment, which could help smooth this inevitable economic transition. These include a host of potential initiatives, including, for example, the opportunities presented by repurposing land on coal plants and mines that will ultimately be decommissioned. In collaboration with GreenCape, the region has prioritized a cluster development model by creating the Mpumalanga Green Cluster Agency, to build a modern green economy by bringing together government, business, and academia to unlock new investment opportunities. Further, national policies and frameworks such as the 'National Policy Framework for Public Participation, 2007,' can be used more actively by the provincial and local governments to engage with the communities and ensure that they are able to benefit from the transition process.

80. **Municipal electric utilities (MEUs)** represent 60 percent of the power distributed to end users. MEUs are administered by the municipalities and follow the national electricity regulations. Surpluses from distributing and marking up electricity procured from Eskom, which was a major source of the MEUs' revenues for many years, are now in decline. Real increases in bulk electricity tariffs from Eskom and municipal tariffs set by NERSA have severely compressed municipal distributors' gross margins in recent years, which declined from a combined 75 percent to 33 percent between 2007 and 2019. Nearly half of the municipalities in the country are in financial distress and many MEUs suffer challenges related to service delivery failures, poor management, financial mismanagement, billing crises, and power outages due to aging and failing infrastructure, compounded by Eskom load shedding.

⁵⁹ The National Climate Change Response White Paper requires the development of Sector Jobs Resilience Plans (SJRPs). These plans aim to protect vulnerable groups that may lose their jobs or livelihoods as a result of climate change impacts, related either to physical effects or to the transition to alternatives. This report is the main report: National Employment Vulnerability Assessment - Analysis of Potential Climate-Change Related Impacts and Vulnerable Groups. <https://www.tips.org.za/research-archive/sustainable-growth/green-economy-2/item/3988-sector-jobs-resilience-plan-national-employment-vulnerability-assessment-analysis-of-potential-climate-change-related-impacts-and-vulnerable-groups>.

2.4.4 Organized Labor

81. The Congress of South African Trade Unions (COSATU) is concerned about the impact of unreliable and insufficient power generation on the economy and recognizes the need for urgent rollout of new, renewable, and alternative energy in line with climate change challenges. The National Labour and Economic Development Institute (NALEDI), the research arm of labor has collaborated with the TIPS research institution in support of JET-related themes and a representative of each has participated in the ACT IP consultations, where they have communicated the importance of employment creation and economic opportunity through the coal transition.

82. The National Union of Mineworkers (NUM) and the National Union of Metalworkers of South Africa (NUMSA) are active in the South African mining sector. Both unions have concerns about job losses and new job creation, and NUMSA has expressed its hope that the transition away from coal-based power to renewable energy and a green economy will create new opportunities for workers who will benefit from skills development for green jobs. They also support initiatives to promote local ownership, local content, and community benefits. Truck drivers and transport unions are a powerful voice in the country and have an interest in maintaining the coal value chain, including transportation of coal to local plants and to the Richard Bay terminal for export.

2.4.5 Civil Society Organizations & Academia

83. TIPS and Project 90 by 2030 are among the civil society organizations (CSOs) that have produced substantive research and analysis on technical and socioeconomic issues related to JET, which has informed national and regional discussions and dialogue. The ACT team has also engaged with other organizations during the IP development process, including the Centre for Environmental Rights (CER) and NALEDI, among others. South Africa also has a well-developed university-based academic research community, including the Energy System Research Group (ESRG) of the University of Cape Town (UCT), the University of the Witwatersrand, and the Centre for Scientific and Industrial Research (CSIR) for applied R&D for scale-up and commercialization of new green economy technologies. Additionally, nongovernmental organizations (NGOs), mining action groups (for example, Mining Affected Communities United in Action), women's organizations (for example, Women of Change, African Women in Energy and Power, Women in Oil and Energy Sector South Africa and Progressive Association of Women), local economic development forums, traditional leaders, youth groups (for example, National Youth Development Agency), environmental groups (for example, Earthlife Africa), and so on are also key stakeholders actively involved in South Africa's Just Transition agenda.

2.4.6 Private Sector and Industry Associations

84. The private sector actors in South Africa, including local developers and the financial sector, are credited with contributing to the success of the REI4P, which serves as a model for subsequent competitive power procurements in the country and in the continent. South Africa has a robust financial sector with experienced commercial banks that have proven their capacity to finance the REI4P investments, albeit with loans to projects with Eskom PPA payment guarantees backed by the NT. As of December 2021, 6,323 MW of electricity has been contracted from 92 renewable energy IPPs in Bid Windows 1–4 and 5,661 MW of electricity generation capacity from 85 IPP projects has been connected to the national grid,⁶⁰

⁶⁰ Independent Power Producer Office. 2021. *Independent Power Producers Procurement Programme (IPPPP): An Overview*.

representing 9 percent of the total installed capacity.⁶¹ Additional 2.6 GW of capacity is to be added by 25 IPPs through Bid Window 5, which was launched in October 2021.

85. Many of the successful IPP bidder consortia comprised smaller South African companies that had partnered with large international firms on power generation, equipment manufacturing, and energy services, overcoming initial skepticism from local businesses regarding the number of large international firms participating in the early auction rounds. The investment inflows and local content requirements attracted other segments of the value chain, including for the local manufacturing of solar panels and wind towers, balance of plant infrastructure including wind tower foundations, assembly and recycling of electrical equipment, and wind and solar consulting services. Due to the discontinuous nature of the REI4P process, some of these local businesses that supported the value chain have since ceased operations.

86. The South African National Energy Development Institute (SANEDI), the South African Wind Energy Association (SAWEA), the South African Photovoltaic Industry Association (SAPVIA), and the newly formed South African Energy Storage Association (SAESA) are important private sector partners.

2.4.7 Mining Council

87. The South African Minerals Council and its members are planning to pursue important investments in renewable power to secure energy supply for their operations. The council's members have indicated that they are planning to invest in about 2 GW of renewable energy at or adjacent to their sites. This 'captive' or 'embedded' power could be supplied directly by IPPs and will assist the members' mining operations and the national grid while contributing toward the decarbonization of the South African economy over time.

2.5 Role of Private Sector, Innovation, and Leverage of Resources

88. The recent enactment of the license exemption for generation of up to 100 MW combined with the worsening loadshedding have triggered significant activity in the market with a number of large mining companies and industrials (Anglo American, Tronox, Sasol, and so on) looking to procure their own renewable energy projects under long-term offtake agreements. Commercial banks have increasingly become comfortable with bilateral PPAs, particularly for creditworthy offtakers, and are providing competitive financing terms similar to what is seen under the REI4P.

89. The private sector is also exploring the possibility of merchant power plants with no long-term PPA, albeit this is still at its nascency; an optimal financing structure for such IPPs is yet to be determined. Further to this, the wheeling framework is yet to be fleshed out.

90. In terms of innovation, there is considerable scope for taking the best proven ideas from abroad into consideration, for example, on feed-in tariff design, virtual power plants (VPPs), and community-owned/cooperative generation plants.

2.6 Barriers to Just Transition Away from Coal

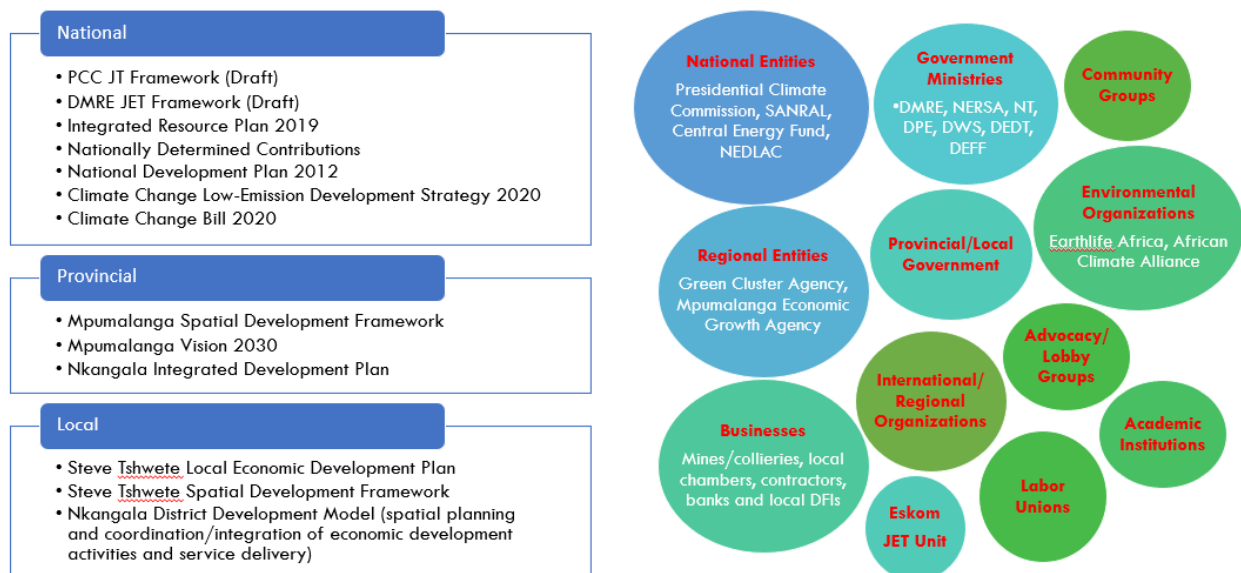
91. Just Transition is one of the biggest challenges South Africa is facing in its efforts to secure the future and livelihoods of workers and communities in the transition to a low-carbon economy. Just

⁶¹ The total net generation capacity is estimated to be 62,155.7 MW as of 2021 (Source: Fitch Solutions. 2022. *South Africa Power Report: Includes 10-Year Forecasts to 2031*).

Transition has been outlined in various national plans and roadmaps, such as the NDP (2030) and the Fourth Industrial Revolution (2019), but is yet to be fully translated into an actionable implementation strategy. The existing policy and institutional framework on Just Transition remain fragmented with different stakeholders and policies developed at the national, provincial, and local levels. Figure 4 provides a broad overview of the current stakeholder landscape and policies/ strategies developed at the national and provincial levels that relate to Just Transition.

92. To coordinate a nationwide Just Transition, in 2020, the Presidency mandated the Presidential Climate Change Commission (or Presidential Climate Commission, PCC) to develop a Just Transition Framework for South Africa, setting out the actions that the government and its social partners will need to take to achieve a just transition and the outcomes to be realized in the short, medium, and long terms. The Just Transition Framework was endorsed by the Cabinet in August 2022.

Figure 4. Policy and Institutional Landscape Supporting Just Transition



Note: JT = Just transition, DWS – Department of Water and Sanitation, NEDLAC – National Economic and Labour Council

93. Eskom’s financial health remains precarious even as its management introduces and implements measures intended to improve its position. Low profitability and an unsustainable debt burden have taken a toll on solvency indicators. As noted, DSCRs have fallen below 0.5 since 2019 and dropped to 0.3 in 2021. Debt arrears from municipalities are a liquidity concern affecting the cash interest coverage ratio, which dipped to 0.85 in 2021. In the context of Eskom’s financial situation and a deterioration in South Africa’s macroeconomic indicators and sovereign credit rating, the NT Department remains cautious about extending additional guarantees to the energy sector.

94. While retiring and repurposing aging and inefficient coal plants and replacing the coal-based generation capacity clearly has long-term benefits, certain critical barriers that are common to most plants must be addressed in the short term. These barriers include costs and associated financing risks, the size of liabilities attached to plants, the complexity in identification of plants to be retired or repurposed, direct and indirect impacts on workers and communities dependent on the coal value chain, perceived or real

supply security risks, and other system flexibility considerations.⁶² The cost of retiring coal power plants, especially before the end of their lifetimes (including the costs of decommissioning and environmental cleanup and the loss of electricity production and revenues) and the investment needed to repurpose the plant to an income-generating asset (for example, a renewable energy generation asset) may, in some cases be too high to justify using purely commercial financing terms. An economic analysis of retiring and repurposing, and replacing coal-based generation capacity, on the other hand, considers the full range of costs from decommissioning costs and loss of revenue from the plant and social costs and compares these with the benefits of closure that may include, among others, revenue from the repurposed site and avoided emissions costs.⁶³ Regulators can reduce closure costs by revising the tariffs for early recovery of the repurposing and capacity replacement investments made and compress the period of recovery, which would result in the tariffs increasing for existing customers. The impact of unaffordable higher tariffs as a result of accelerated transition from coal generation will need to be addressed by concessional climate financing in the early years of implementation.

95. Most concerningly, without adequate replacement capacity, electricity supply will be affected nationally, particularly given the current condition of the coal power plants in South Africa, where recurrent load shedding is common even with the existing coal plant fleet. Coal plants are mostly old and cost-inefficient and have been poorly maintained over the last decade and caused a structural generation shortage. In 2020, load shedding accounted for about 1 percent of the power demand (1,798 GWh) despite a reduced load (-5.7 percent relative to 2019) due to COVID-related lockdown. It is estimated that the current on-grid power supply gap is between 4 and 6 GW and will not be filled before 2024. Therefore, the ongoing power shortfall in South Africa makes it politically and economically unattractive to shut down any generation, including coal plants, which supply power to the grid.

96. Building significant new affordable replacement generation capacity quickly and at scale is imperative to accelerate the decommissioning of coal plants. The South African commercial banking sector has developed a wealth of experience in financing onshore wind and solar through the previous rounds of the REI4P as well as dispatchable energy investments through hybrid projects in the RMI4P. However, financing battery storage and other commercially newer and more complex technologies remains expensive and raises new risks. PPAs for the previous fifth round of the REI4P have been delayed, in part because of the rise in costs of renewable energy equipment since the close of the bidding process caused by increased global demand in the wake of the Ukraine crisis and supply chain disruptions.

97. In addition, the current inflationary and high interest financial context is not favorable for financing affordable new generation investments, especially at the scale required. As mentioned above, questions also remain about the continued appetite of the NT to provide guarantees backing PPAs with Eskom, especially with IPPs increasingly expected to shift to direct power contracting with commercial and industrial customers. The range of challenges to the timing and affordability of new renewable energy generation capacity creates a potential roadblock to accelerating coal decommissioning in the context of existing power shortages in South Africa and raises the issue of how the country can use concessional financing to unlock these necessary investments in a timely and affordable manner.

⁶² A detailed discussion on the topic is available in Chattopadhyay, D., et al. 2021. "Accelerating the Coal transition." *The Electricity Journal* 34 (2): 106906. <https://www.sciencedirect.com/science/article/pii/S1040619020301986>.

⁶³ There is, however, a strong economic case for retiring and repurposing coal plants as discussed in ESMAP (Energy Sector Management Assistance Program). 2021. *Coal Plant Repurposing for Ageing Coal Fleets in Developing Countries*. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/36238>.

98. From a regulatory perspective, while recent reforms introduced by NERSA are intended to support captive generation and/or independent direct generation—which could help improve the attractiveness of renewable energy generation projects—there are still important regulatory gaps to be addressed. Under these reforms, a generator facility of up to 100 MW, including IPPs, would be able to sell electricity through a direct connection to a customer for their own use or to multiple end use customers to whom the electricity is wheeled over a transmission or distribution grid without the need for a generation license from NERSA. The wheeling framework and charges that Eskom will apply will need to be clearly accessible and should be capable of being implemented without the need for lengthy one-on-one negotiations with Eskom. These technical and regulatory uncertainties that have not been addressed in the current regulations reduce the attractiveness of new renewable energy projects providing replacement generation capacity. NERSA has been drafting a national framework for the use of system (UOS) charges, and there is no clarity yet on how wheeling and system charges will be applied. If wheeling is required, then the generation facility needs to meet the Grid Code requirements and have a connection agreement with the relevant grid provider(s) to be ‘registered’ by NERSA, which has yet to release a current and simple registration procedure. This remains an additional barrier to much-needed investment in generation capacity.

99. From a social perspective, the impact of accelerating coal transition on the upstream and downstream industries and activities linked to the coal value chain as well as the coal-dependent communities need to be carefully considered in the context of South Africa’s persistent and strong income inequalities, high unemployment rates, and post-COVID economic recovery. The establishment of coal assets has generally been observed with the mushrooming of satellite towns and cities around the power plants and mines. Local economies, particularly in and around Mpumalanga, have developed and continue to be closely interwoven with the full-scale coal operations. The economies of most of the coal-based areas are based on the revenues accruing from the mining fees, royalty, and local taxes apart from the additional boost to local enterprise and employment. The closure of coal-based operations in these areas would have a cascading effect on the upstream and downstream economic activities. Measures to reduce coal dependency and provide alternate economic opportunities for the local populace and small enterprises are critical, especially to avert the risk of the coal-dependent communities and towns turning into ‘ghost towns’. This makes a strong case for the use of concessional and grant funding to catalyze social and economic development in Mpumalanga.

100. The ongoing war in Ukraine has provided a temporary advantage to the South African coal industry as coal imports from South Africa to Europe have grown sharply. However, Europe has also made strong commitments to phase out the use of coal over time, so this temporary reprieve needs to be placed in the medium-term context where coal demand will decline in Europe and globally.

3 Program Description

3.1 Overview of Proposed Interventions

101. The discussion in the previous sections indicates that, although there are barriers to coal transition, (a) the plan should prioritize the electricity sector for the earliest impact in scale on GHG emission; (b) coal fleets that are cost-inefficient and noncompliant to environmental standards need to be decommissioned while not exacerbating the country's power shortage; (c) the proposed interventions must include measures to mitigate the impact of CFPP retirement on the plant workers and ways to diversify the economy of the coal region given the country's high unemployment rate and economic disparity; and (d) the impact mitigation and economic diversification activities should prioritize the Mpumalanga Province, where most of the nation's coal reserves are focused and the three CFPPs to be decommissioned are located. New generation installations can be considered in Mpumalanga and other coal regions. The IP design process considered these criteria in putting together the first transformative program for coal transition in South Africa.

102. Based on these factors, the ACT IP for South Africa comprises the following three Projects that will build the momentum for coal transition:

- (a) Project 1. Retiring and Replacing Coal-based Power Generation Capacity: Supporting the implementation of South Africa's CFPP decommissioning plan for three power stations at Camden, Hendrina, and Grootvlei and repurposing the plant sites. In addition, establishing track record of financing the replacement for the retired thermal generation capacity by installing renewable energy and energy storage capacity on a PPP a direct project finance basis while considering the economic, social, and environmental challenges of transition, as informed by the Strategic Environmental and Social Assessment (SESA)
- (b) Project 2: Mpumalanga Community Development Project: Supporting community-driven development (CDD) in the coal-dependent Mpumalanga Province to support the transition process and invest in future green economy in relevant sectors, including on afforestation, smart agriculture, renewables value chain, manufacturing, digital infrastructure
- (c) Project 3: Energy Efficiency, Distributed Generation, and Community Generation Programs: Supporting the development of an Energy Efficiency in Public Buildings and Infrastructure Program (EEPPIP) for economic diversification of coal-dependent regions, with an initial focus on Mpumalanga Province.

103. The IP aims to strengthen the inclusion of women and their roles as employees, particularly in technical and leadership roles and in entrepreneurship while supporting those affected by the transition. The IP's gender and social inclusion approach will be adapted to each project's specific design while addressing the specific barriers that women and other vulnerable groups experience in the energy sector and the transition process. Issues related to closing gender gaps in terms of access to electricity, economic participation, voice, and agency as well as opportunities to promote gender equality and inclusion will be effectively identified and embedded throughout each project's cycle. Where relevant, participatory approaches will be adopted to ensure that the activities in the IP attend to the needs and priorities of women and other vulnerable groups. The IPs will include gender-specific indicators, disaggregated by sex and relevant vulnerable factors and analysis of quality, to monitor progress in terms of closing the gender

gaps in relation to women’s labor force participation, access to economic opportunities, and increases in voice and agency.

3.1.1 Project 1: Retiring and Replacing Coal-Based Power Generation Capacity

104. The project will use concessional finance including grant resources to accelerate the decarbonization of South Africa’s electricity sector by financing the implementation of three major components:

- (a) Component A: Decommissioning. Accelerating the dates of decommissioning of up to three Eskom-owned CFPPs, Camden, Grootvlei, and Hendrina
- (b) Component B: Repurposing and capacity replacement. Positioning dispatchable renewable energy as replacement capacity to enable accelerated decommissioning of thermal generation. This will include both repurposing the decommissioned CFPP sites and replacing the retired power generation capacity by mobilizing public and private investments in new renewable energy and auxiliary service infrastructure in Mpumalanga and other coal-dependent regions. This will also include exploring various financial mechanisms to stimulate private sector investments into strengthening dispatchable renewable energy capacity; and
- (c) Component C: Socioeconomic impact mitigation. Providing transition support to coal plant employees as well as training opportunities for suppliers, contract workers, and local communities, to be reabsorbed in new economic activities, including those created by repurposing and capacity replacement activities. Project activities will include specific measures to ensure that interventions to support job retention/transition support to workers, job creation especially in the clean energy sector, and skills development target women and other vulnerable groups. Further, these activities will also be informed by the targeted beneficiaries’ priorities and needs as identified through in-depth community engagement.

105. The decarbonization of the electricity sector and the concomitant retirement of CFPPs is anticipated to present both positive environmental and social impacts as well as risks. Understanding these challenges, risks, and opportunities will support up-front planning to make the transition just for workers and communities in coal-dependent areas. Accordingly, a SESA will be prepared under this project to support strategic planning for implementation of Eskom’s JET Strategy while effectively managing the environmental and social aspects of the transition process.

106. More details on Project 1 are available in Annex 5.

3.1.2 Project 2: Mpumalanga Community Development Project

107. The retirement of coal plants is expected to have a significant impact on employment and income in Mpumalanga Province where 76 percent of South Africa’s total coal-related employment is concentrated.⁶⁴ As described above, many of the communities living in concentrated coal areas are dependent on the mines, Eskom, or Sasol for their jobs and livelihoods as well as essential public services,

⁶⁴ In general, energy transition processes are known to have significant social impacts. Beckfield, Jason W., D. A. Evrard, Robert J. Sampson, and Mary C. Waters. “Social Impacts of Energy Transition.” <https://ceepr.mit.edu/wp-content/uploads/2021/09/The-Roosevelt-Project-WP-2.pdf>.

including electricity, water, and health services. Communities in these areas have social and generational ties that are closely linked to the coal sector, which have persisted over time. Coal transition will also negatively affect the revenue of the local governments and their capacity to fund public services. This makes it imperative for the province and municipalities to plan for the coming transition, invest in future green economy jobs, and train the human capital needed for such jobs. The decommissioning process is also expected to weaken social cohesion unless a concerted bottom-up process to engage communities in the JET process is prioritized.

108. The project objective is to support the provincial and local governments and communities in Mpumalanga Province during the coal transition and prepare for a green economy. The proposed project will entail three components: (a) community mobilization and capacity building to enable local communities to take part in the decision-making process over local investments in social and economic infrastructure and income-generating activities; (b) strengthening governance mechanisms and institutional capacity to support the governance mechanisms and capacity development of provincial, municipal, and local government authorities in Mpumalanga Province to support the transition process in a sustainable and inclusive manner; and (c) investments in community infrastructure schemes and income-generating opportunities in the green sector, including among others, through initiatives focused on afforestation, smart agriculture, renewables value chain, manufacturing, and digital infrastructure.

109. The identification, design, and implementation of these activities will be based on community needs identification and assessment and regional and local government priorities and will be carried out in consultation with local and provincial governments, community organizations and local representatives, civil society groups, academia, and economic development agencies in the Mpumalanga region. Adopting the principles of CDD has been found to be successful both in the context of South Africa and in terms of the just transition processes elsewhere around the world.⁶⁵ Such an approach also aligns with the recommendations of climate change thought leaders on the utility of such a process in enabling South Africa to lead a just coal to clean transition, and eventually model for the world.⁶⁶ It is expected that the project will provide a useful experience to test different approaches to scale additional JET interventions, including private sector investment, while also ensuring the legitimacy and ‘justness’ of the transition process.

110. More details on Project 2 are available in Annex 5.

3.1.3 Project 3: Energy Efficiency, Distributed Generation, and Community Generation Programs

111. At a national level, the potential contribution of energy efficiency projects to South Africa’s transition to a low-carbon economy is recognized in the NDP, the draft National Energy Efficiency Strategy, and in the Climate Change Policy White Paper through its flagship projects. The Energy Efficiency and Energy Demand-Side Management (EEDSM) flagship aims to support the development and implementation of an aggressive program of energy efficiency in industry, the residential sector, and the government building sector.

112. The proposed project aims to develop a Mpumalanga-focused program of the EEPBIP, to specifically drive the development and implementation of energy efficiency projects in the province. The

⁶⁵ <https://www.3ieimpact.org/evidence-hub/publications/working-papers/community-driven-development-does-it-build-social-cohesion>.

⁶⁶ Gompertz, D. 2022. Coal in 2022: South Africa’s Just Energy Transition Partnership. E3G.

project will not only reduce the use of grid-based electricity and associated GHG emissions but will also contribute to social and economic development in the province. The expected outcomes are as detailed in the following paragraphs.

113. **Job creation in the energy services sector as a result of an increased pipeline of projects in Mpumalanga.** With an increased long-term demand for services provided by energy services companies (ESCOs), they would be encouraged to set up a presence, with associated permanent jobs, in Mpumalanga. In addition, the public sector pipeline of this initiative will develop and provide a baseload of work that can leverage further private sector opportunities. The province has a number of energy-intensive sectors (for example, mining, paper and pulp, and sugar milling) that are a potential source of such opportunities, in addition to a broad base of MSME activities. This diversification of the sources of projects would support the sustainability of these companies supporting long-term and localized employment benefits.

114. **The development of an energy services sector** would also create opportunities for new skills development for workers in Mpumalanga.

115. **Retention of existing jobs is and will be important in Mpumalanga and this initiative should assist in supporting the resilience of existing companies.** This is through the development of an active energy services sector in the province, which will be looking for opportunities to support companies in reducing their exposure to energy-related costs. The SMME sector is particularly vulnerable to increasing energy prices in South Africa, whether it is liquid fuels or electricity related. Any reductions in these costs will assist companies in retaining staff and lessen the impact on their growth strategies. In addition, reducing energy use further opens opportunities to address the energy security challenge South African businesses face, whether it be by storage and/or own generation. This reduced energy use reduces the scale, and therefore the costs, associated with such interventions.

116. In terms of speed, this initiative is currently up and running. It builds on an initiative that is already approved, in implementation, and supported by the DMRE, a key stakeholder in South Africa's Just Transition landscape.

117. Project concept briefs with more detail are available in Annex 5.

3.2 Enabling Technologies and Innovative Models

118. There are examples, most notably in the United Kingdom and Europe, where coal plants have been shut down well ahead of the end of their economic life. Old coal plants are also being shut down in other parts of the world at a faster pace than ever. There are several alternative business models, or combinations of models, that countries could consider depending on their national context and the set of coal plants that they target. These include repurposing, auctions, policy-based closures, PPA swaps, and others. The limited experience with the implementation of coal transition programs has been mixed. For example, the United Kingdom has seen success with its coal transition program, without necessarily adopting a specific business model at the national level. Australia's experience with the buyout model, however, was ultimately unsuccessful. Therefore, several factors need to be considered in choosing a suitable business model. In the context of the current structure of the power sector in South Africa and the urgent need to bring additional supplies, repurposing CFPPs and replacing coal-based generation capacities with public-private partnership (PPP) structures is considered a suitable option by the government under this IP.

119. Repurposing CFPPs can be an attractive economic option in South African plants. Repurposing benefits can potentially outweigh the decommissioning costs of older coal plants by a factor of five, addressing one of the key barriers to coal retirement.⁶⁷ Given that technical decommissioning costs of coal plants in developed countries can be as high as US\$100–US\$200 per kW,⁶⁸ coal plant repurposing can generate an alternative cash inflow that can absorb some of the decommissioning costs. This can be achieved by allowing some or all the existing components of the plant to continue to be in use. The World Bank presents a comprehensive economic analysis framework to weigh the costs and benefits of coal plant repurposing. Using the example of a hypothetical coal plant in India, the paper shows that the benefits of the avoided cost of carbon associated with early retirement and flexibility can far exceed the investments needed for repurposing.

120. One of the key benefits of repurposing is the reuse of the site of the coal plant, which already has transmission interconnection, and replacement of some of the electricity or ancillary services being removed from the power system. In addition, repurposing could potentially provide employment opportunities for coal plant workers and allow energy systems to develop cheaper and cleaner energy sources. There are several ways a coal plant can be repowered from its original use, and the costs and benefits of the repowering exercise differ based on the option selected. Identifying coal plants that would be suitable targets for retirement and repurposing requires (a) a least-cost planning modeling and analysis to ascertain new capacity within the energy system that would meet future energy demand and (b) a cost-benefit analysis that compares the business-as-usual scenario with the repurposing scenario.⁶⁹

121. Battery storage technologies are essential to speed up the replacement of fossil fuels with renewable energy. Battery storage systems will play an increasingly pivotal role between green energy supplies and responding to electricity demands. Battery storage, or battery energy storage systems (BESS), are devices that enable energy from renewables, such as solar and wind, to be stored and then released when customers need power the most. Locating smaller, utility-scale battery storage closer to population centers can reduce reliance on long transmission lines. It can also decrease energy loss across transmission lines and means that if one facility goes down others are still able to operate. This strategy of developing decentralized generation has already been used in more developed economies.

3.3 Investment Preparation Activities

122. Some of the investment preparation activities have been ongoing, led by the private sector or through upstream donor assistance. The World Bank, with assistance from ESMAP, has provided support to Eskom for undertaking technical and socioeconomic and environmental assessments related to the Komati, Camden, Grootvlei, and Hendrina power plants.

123. The IP also benefitted from the preparation activities related to the Komati project, which included technical assessments, broad-based consultations with various stakeholders, and socioeconomic impact assessment of the shutdown and repurposing of the Komati Power Station for the power plant and the community. The Komati experience, in many ways, is a pilot for the ACT IP.

⁶⁷ Raimi, D. 2017. *Decommissioning US Power Plants*. Resources for the Future.

<https://media.rff.org/documents/RFF20Rpt20Decommissioning20Power20Plants.pdf>.

⁶⁸ The World Bank estimates for such costs in South Africa and India, albeit for a limited number of plants as part of pre-feasibility studies, are well below US\$100 per kW.

⁶⁹ Huang, Z., et al. 2021. "ACT on RE+FLEX: Accelerating Coal Transition through Repurposing Coal Plants into Renewable and Flexibility Centers." *IEEE Access* 9: 84811–84827. <https://ieeexplore.ieee.org/document/9448134>.

124. Policy briefs on JET and social assessments carried out by the CSOs, such as TIPS, Green Cape on the Green Economy Cluster, Impact Catalyst, CSIR, COBENEFITS in Mpumalanga Province, have been complementary and helpful in charting the course of investment in the province.

4 Financing Plan and Instruments

125. Table 3 presents a plan for financing the projects described in Section 3. It shows the proposed fund allocation from ACT and estimates of the amounts anticipated from MDBs, counterparts, private sector, and other development partners. As a part of the US\$8.5 billion JETP, US\$500 million of ACT funding is expected to directly catalyze 5.3 times as much investment, mostly from private sector and public sector participations in PPPs for repurposing the decommissioned Eskom's coal power plants and replacing coal-based power generation capacities with renewable power generation.

126. Table 4 specifies the ACT financial instruments for each activity.

127. The breakdown of the US\$500 million ACT funding envelope by ACT Program pillar will be US\$5 million (1% of the total ACT financing) for *Governance*, US\$270 million (54% of the total ACT financing) for *People*, and US\$230 million (46% of the total ACT financing) for *Infrastructure*.

Table 3. Summary of Financing Plan for South Africa by Funding Source (US\$, millions)

IP Components	ACT				MDB			Country Counterparts	Private Sector	Others	Total
	Total	World Bank	IFC	AfDB	World Bank	IFC	AfDB				
Project 1: Retiring and Replacing Coal-based Power Generation Capacity											
Component A: Decommissioning	10	5		5	100		40				150
Component B: Repurposing and capacity replacement	230	70	68	92	375	70	165	300	860		2,000
Component C: Socioeconomic impact mitigation	110	110			90						200
Project 2: Mpumalanga Community Development Project											
Community-Driven Development	100	95		5	5		5		15	30	155
Project 3: Energy Efficiency, Distributed Generation and Community Generation Programs											
EE and distributed generation	50	5		45	5		45				100
IP total	500	285	68	147	575	70	255	300	875	30	2,605

Table 4. An Indicative ACT Funding Allocation by Financial Instrument (US\$, millions)

IP Components	ACT IP Total		World Bank		IFC		AfDB	
	Loan	Grant	Loan	Grant	Loan	Grant	Loan	Grant
Project 1: Retiring and Replacing Coal-based Power Generation Capacity								
Component A: Decommissioning	10		5				5	
Component B: Repurposing and capacity replacement	225	5	70		63 ⁷⁰	5	92	
Component C: Socioeconomic impact mitigation	95	15	95	15				
Project 2: Mpumalanga Community Development Project								
Community-Driven Development	75	25	75	20				5
Project 3: Energy Efficiency, Distributed Generation and Community Generation Programs								
EE and distributed generation	45	5	5				40	5
Total	450	50	250	35	63	5	137	10

Note: GU = Guarantee

⁷⁰ Or guarantee

128. The costs, financing instruments, and funding sources of each project in the IP are based on the best estimate possible at the time of the IP development. The US\$350 million ACT funding is allocated to the Project 1 to cover the costs of decommissioning of the three identified CFPPs and activities related to supporting replacement renewable energy capacity (US\$2.3 billion of co-financing is expected to follow). The cost estimates are informed by an assessment of the estimated costs of renewable energy and energy storage technologies and a comprehensive set of studies commissioned by the World Bank for the decommissioning and repurposing of Komati, Camden, Grootvlei, and Hendria CFPPs with earliest dates of planned shutdown and based on a conservative assumption on the inflation. The studies have been jointly supervised by Eskom and the World Bank and have been implemented since June 2021.

129. The ACT financing instrument for Project 1 will be a mix of the US\$20 million ACT grant and US\$330 million ACT concessional loan or guarantee⁷¹ channeled through the World Bank, IFC and AfDB. Component B (Repurposing and capacity replacement) will contain several projects, exploring various financing modalities, including a PPP structure, private sector project finance structures, financial guarantee to cover the guarantee requirements from IPPs to secure PPAs and possibly other modalities, altogether mobilizing US\$860 million of private sector investments. Notwithstanding its current limits in PPP business models, Eskom plans to conduct a study funded by ESMAP on the use of private sector financing or PPP financing for the delivery of repurposing for the retired CPPs with the World Bank's support. A private sector guarantee scheme might explore a possibility to lessen the budgetary pressure on Eskom, by directly supporting IPPs with various offtakers, including traders, to provide the much-needed liquidity in the private electricity generation and private energy trading market.

130. Project 2, Mpumalanga Community Development Project, will be funded by a US\$75 million ACT concessional loan and US\$25 million ACT grant and further co-financed by bilateral development partners and philanthropies and moderate amounts of IBRD and AfDB loans and private sector investments. Given the requirement for a higher concessionality for this project, funding from other development partners and philanthropic communities will be actively sought during the investment project development stage. Additionally, funding from other sources such as the "Women Led Coal Transitions" (WOLCOT) Grant Mechanism under ACT could also be sought to support direct and sustained engagement throughout project cycle with local women groups and organizations advocating for gender equality and social inclusion.

131. The ACT financing will help overcome first-mover costs, build confidence among local stakeholders and communities, and accelerate the participation of private developers and commercial lenders along the process. The concessional terms of ACT financing are particularly crucial given Eskom's precarious financial health and current inflationary and high interest financial context. The ACT grants and risk financing will also provide the necessary flexibility to support social and economic transition of Mpumalanga where many people live on the margins already.

132. For Project 1, the affordability of energy is also an important consideration in the political economy of accelerating decarbonization. Although the cost of coal power generation is increasing, there may still be a price differential in terms of the cost of generation and the resulting tariff, depending on the availability of solar and wind resources in target regions. To attract new investment, the IP will allocate support to buy down the cost of new dispatchable generation capacity from renewable energy and battery

⁷¹ For public sector, the CIF lending rate for South Africa is 75 percent of IDA-only regular service charge for 20-year-maturity loans and 90 percent for 30-year-maturity loans. The resulting pricing of the CIF loans are 98 basis point and 117 basis point, respectively, effective on or after July 1, 2022. https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/joint_ctf_scf_cif_financial_terms_and_conditions_policy.pdf.

storage in Mpumalanga or other regions, as appropriate, to make the generated power cost-competitive. The ACT project design will explore ways to minimize the need to introduce a fiscal implication for renewable energy deployment in the long term, including exploring IPP guarantee schemes to lessen the Eskom Budgetary burden

5 Additional Development Activities

5.1 Activities Funded by Other Development Partners

133. There are three major initiatives by the international donor community to support South Africa's energy transition:(a) the Eskom Just Energy Transition Project (EJETP, the Komati project), (b) the CIF ACT IP, and (c) the JETP. Though these initiatives are at different stages of development, they are all interrelated creating synergies. In August 2021, the government expressed interest in the US\$1.5 billion concessional financing initial allocation provided by G-7 countries through the CIF. From the CIF ACT deliberations on October 13, 2021, South Africa was ranked first among all 13 countries that expressed interest. It was determined that South Africa would receive an allocation between US\$250 and US\$500 million, upon submission of the country's coal transition IP. These funds would need to be blended with multilateral bank funding (that is, the World Bank, IFC and AfDB) to implement projects and programs. The World Bank continues to lead development of the IP with the GoRSA, closely coordinating with IFC and AfDB.

134. The JETP was established by the GoRSA with contributions from France, Germany, the United Kingdom, the United States, and the EU (forming the International Partners Group[IPG]). The partnership offered to mobilize US\$8.5 billion (R 131 billion) over the next three to five years to support South Africa's Just Transition plans. A task team was subsequently appointed by the South African President to work with the IPG on a comprehensive JETP IP, aiming to channel the committed resource into an integrated investment program. The government has indicated that partnership support should initially focus on three key areas (power sector transition, green hydrogen development, and electric vehicles industrialization and uses), with an emphasis on the socioeconomic aspects of the program. An Inter-Ministerial Committee, chaired by President Ramaphosa, is coordinating work on the country's Just Transition plan and financial offers made to South Africa in the context of the partnership. The ACT IP and JETP IP are being prepared in coordination, facilitated by the government.

135. The working draft of the JETP IP has been designed to enable a set of development outcomes that tackle poverty, inequality, and unemployment, through the following: (a) develop new green industrialization opportunities; (b) protect vulnerable communities in the most affected geographies and sectors; (c) increase employment, skills, and livelihoods; (d) locate investments within the broader country planning processes; (e) identify early and catalytic investments, indicative costs, and timescales for energy transition; (f) identify financing to support workers and communities; (g) identify the potential for private sector investments and partnerships; and (h) confirm the needed enabling policy and regulatory framework.

136. Donor financing from Norway, the United States, and the United Kingdom will also be coordinated with the local private sector. Norfund, the Norwegian development finance institution, and the United Kingdom's CDC Group have partnered to invest over US\$37 million (ZAR 600 million) in the South African private sector renewable energy company H1 Capital. The funding is expected to enable H1 Capital to fund a pipeline of over 2.4 GW of new wind and solar projects, generating approximately 6,400 GWh per year. The Power Africa initiative of the United States Agency for International Development (USAID) will also

support Eskom with technical assistance (TA) funding for procurement of IPPs through the USAID Southern African Energy Program.

137. One of the components under the EJERP includes creating opportunities for workers and communities to enhance the opportunities from the positive impacts of the coal transition while minimizing the social and economic risks and impacts associated with decommissioning and repurposing of coal power plants. A private sector organization will be competitively selected to establish and manage the activities under the component, which will include (a) transition support to Komati workers; (b) community development and economic diversification that will involve piloting/scaling-up of innovative initiatives in the energy sector (for example, commercial agrivoltaics plant, containerized microgrid assembly, and manufacturing facility), investments in local development activities, and strengthening of the livelihoods of affected communities through support to SMMEs, seed grants, incubation services, business development support, reskilling/upskilling community members in alternative development opportunities following the transition from coal, and community support programs (for example, early childhood development centers, mobile health clinics, and so on); and (c) stakeholder engagement and community empowerment. Training activities will involve partnerships with NGOs and institutes such as the South African Renewable Energy Technology Centre (SARETEC), industry associations such as the SAPVIA or SAWEA, and technical and vocational education and training (TVET) colleges in the Mpumalanga region while the other activities will be carried out in partnership and collaboration with the private sector and provincial and local governments.

5.2 Complementary Work by Other Development Partners

138. A number of major donors, including Denmark, France, Germany, and the United Kingdom, are active in supporting South Africa's JET.

139. The Danish Ministry of Finance is supporting a program with the DOE that is being implemented by the Ministry of Climate, Energy, and Utilities on the provision of Danish TA for the South African energy transition. The Danish-South African cooperation focuses on wind energy mapping and energy efficiency. Support is focused on three main areas: (a) TA to the DOE for scaling up renewables and energy efficiency; (b) mapping of South African wind resources in Eastern Cape, KwaZulu-Natal, and Free State Provinces; and (c) TA to Eskom focused on grid integration of renewables.⁷²

140. The AfDB provides over US\$83 million in grants and US\$66 million in loans to the Just Energy Transition Project activities in South Africa. The loans funds are focused on developing JET IPs for Eskom for identified coal plants totaling 75 MW. The AfDB grants are focused on policy reforms for coal transition, green hydrogen market development, and renewable energy capacity additions.

141. Technical advisory and socioeconomic support grants totaling over US\$70 million have been provided by the German Agency for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit*, GIZ) for a variety of coal transition activities in South Africa. Eskom and the DMRE are recipients of TA grants focused on power sector reform and energy management systems as part of the JETP in South Africa. The Department of Higher Education and Training will receive a US\$11.5 million grant to support reskilling and retraining of coal mine sector workers in preparation of coal transition. There is also an ongoing GIZ grant focused on developing a hydrogen market as part of the planned coal

⁷² <https://sydafrika.um.dk/en/relations/climate-and-energy-cooperation>

repurposing activities, led by the Department of Trade, Industry and Competition (DTIC). *Kreditanstalt für Wiederaufbau* (KfW) has also committed US\$220 million in loans to the Industrial Development Corporation of South Africa (IDC) for green hydrogen development. Over US\$735 million in KfW loans to Eskom has been approved for TA studies needed for coal transition planning and grid integration of renewables, in addition to the already committed US\$330 budget support loan to the NT focused on energy sector reform for Just Transition as part of KfW's COVID Support Program in South Africa. KfW is also supporting at the municipal level through a planned US\$165 million loan the City of Cape Town focused on scaling up renewables, a US\$110 million loan to the City of Johannesburg to improve energy efficiency and reduce GHGs in the waste sector, and a US\$220 million loan to Transnet for electric locomotives manufacturing in the City of Durban. The eThekweni Metropolitan Municipality also received a US\$110 loan from KfW focused on climate-smart urban transport.

142. The United Kingdom's Partnering for Accelerated Climate Transitions (PACT) is a flagship program governed and funded by the Foreign, Commonwealth, and Development Office (FCDO) and the Department for Business, Energy, and Industrial Strategy (BEIS) under the United Kingdom's International Climate Finance (ICF) portfolio. The global program, which runs for five years to March 2026, supports action in South Africa on just transition pathways and a low-carbon economic recovery through climate action that contributes to job creation and poverty alleviation. Priority areas of focus for the UK PACT in South Africa are aligned with key national priorities in JET, renewable energy, energy efficiency, sustainable transport, and sustainable finance. The UK PACT projects can contribute to addressing industry-wide constraints and common metropolitan challenges and bringing city-, provincial-, and national-level public and private partners together to address climate priorities.

6 Implementation Potential with Risk Assessment

143. In 2020, South Africa's economy contracted by 6.4 percent following the effects of the COVID-19 pandemic, with broad-based effects across sectors. The toll on jobs was severe and has been persistent over the last two years, despite the rebound in activity in 2021. In the context of improving terms of trade, current account surpluses, and robust mining activity, the South African rand and stock market indexes have rebounded significantly from their pandemic-induced lows, while market interest rates have reverted to pre-pandemic levels. However, risk sentiment remains sensitive to the extent that the more transmissible delta variant has hurt the pace of the global recovery and there are signs of persistent upward pressure on global inflation with rising concerns about net portfolio outflows as a result of the United States Federal Reserve raising rates and indicating further increases in 2022.

144. Many national government departments have stakes in JET as do a large number of other stakeholders. While this is excellent, the flip side is that decisions need to be made in an efficient manner for timely implementation. This makes it important to identify no more than a handful of implementation partners to manage the implementation process, while remaining accountable for results. This risk is mitigated by working largely with Eskom for public sector implementation, a provincial economic development agency such as the Mpumalanga Green Cluster Agency for most of the community-based development activities, and the private sector to expand investments in renewable energy generation.

145. Institutionally, the power sector in South Africa is currently under structural reform. The unbundling of Eskom and the transfer of Eskom Transmission Division to a wholly owned subsidiary is aimed to be finalized in 2022, but risks remain that the transition may not be completed on time. Eskom's financial situation also remains precarious. Without dealing with legacy debt, Eskom will remain unable to pay its debt obligations without sovereign support. Financial risks for Eskom include low profitability mainly driven by tariffs below cost-reflective levels, poor solvency and liquidity indicators including a DSCR of 0.3 in 2021, and high level of indebtedness. The continued ability of the NT to backstop Eskom's PPAs with IPPs is also a risk to financing new replacement renewable energy capacity. Without new replacement capacity coming into place quickly, Eskom's planned schedule for retirement of coal plants is at risk.

146. In terms of renewable energy generation development potential, land is abundant, and South Africa has a relatively thriving private sector and liquid domestic capital market compared to the rest of the region, which could quickly scale up renewables if there is improvement in the enabling environment. Yet, recent changes in the political landscape in South Africa render new generation investments riskier. Political and financial risk factors, including rising costs of borrowing, also reduce the likelihood of construction of new generation investments (including new fossil fuel plants) when planned retirements of existing plants come into effect in the short run.

147. Coal transition will undoubtedly require the provincial economy and communities to find new sources of sustainable livelihoods and income. This makes the success of the ACT Program, tied closely to the ability of existing employees and contractors, to be absorbed into alternative opportunities and for new opportunities to be created for the community at large, especially by targeting women, unemployed youth, retired coal workers, people with disabilities, and other vulnerable groups.

148. Each coal plant retirement may also have risk impacts on the mines that deliver coal to the plants. All affected mines are owned by private sector companies that have coal supply contracts with Eskom. The duration of some of those coal contracts will go beyond the retirement schedule of specific plants. While

these coal contracts are plant specific, Eskom has confirmed that it has a coal supply shortage and will be able to honor all its supply contracts and redirect those contractual volumes to other plants in its coal fleet.

149. With respect to specific coal plant decommissioning activities, the most severe environmental risks and impacts anticipated in South Africa include (a) generation of large quantities of both inert and hazardous wastes, including exposure and release of hazardous substances such as asbestos, mineral fibers, and mercury during the demolition activities; (b) soil and ground water pollution, including potential legacy contamination concerns associated with contaminated soils and water resources, the full extent of which is currently not known; (c) excessive noise, dust, and vibration emissions; and (d) community and occupational health and safety risks, especially through increase in road traffic, fall from heights, exposure to potentially hazardous substances, and exposure to and spread of COVID-19 and other communicable diseases. Most activities are expected to be short in duration, predictable, and manageable and therefore of moderate to substantial environmental risk depending on the final repurposing and capacity replacement technology that will be selected for specific project sites under investigation. The main anticipated environmental impacts associated with each of the technologies include, among others, (a) generation of hazardous waste when reaching its end of life (solar PV and battery storage), (b) bird and bat collision and impact on migratory routes (wind), (c) noise and vibrations and flickering (wind turbines), (d) accidental fires and explosions (battery storage), and (e) visual impacts due to potential glare reflection from solar PV panels.

150. Anticipated social risks for project activities are related to the adverse impacts of energy transition, such as (a) direct impacts on employment and livelihood systems of those dependent on the coal value chain (for example, women engaged in providing ancillary services); (b) displacement and out-migration of workers and communities; (c) impact on social identities of coal-dependent communities and heightened vulnerabilities of excluded groups, including women, historically disadvantaged groups, migrant workers, and youth; (d) exclusion of women, local communities, and disadvantaged groups from decision-making, including those that are directly affected from the closure of the power station; (e) decrease in land value and business growth/opportunities and increase in informal settlements; and (f) risks associated with temporary labor influx and labor and working conditions. These risks are particularly likely as a result of decommissioning of plants, especially if no alternate economic activities and jobs are created.

151. Decommissioning, repurposing, and capacity replacement activities are also expected to engage direct and contracted workers as well as primary supply workers. Accordingly, risks associated with temporary labor influx, labor and working conditions, occupational health, and safety, as well as GBV/sexual exploitation and abuse (SEA)/sexual harassment (SH), are present. Accordingly, a GBV/SEA/SH plan to prevent and mitigate the risks and also respond to those that arise, will be required. Job loss by main breadwinners due to the transition process could also result in increase in vulnerable employment by women or even child labor. Further, in relation to forced labor risks for solar PV panels, as some repurposing and capacity replacement projects might involve procurement of solar PV and batteries, before the commencement of the procurement process, Eskom will undertake a market analysis to identify the possible sellers of solar panels to the project. Bidding documents will emphasize forced labor risks in solar panels and components and will require that sellers of solar panels to the project not engage or employ any forced labor among their workforce.

152. The existing information around coal plant sites in South Africa does not indicate the presence of indigenous peoples/Sub-Saharan African Historically Underserved Traditional Local Communities that would meet the criteria under the World Bank's Environmental and Social Standards on Indigenous

Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities (ESS7), but this will also be determined through detailed Environmental and Social Impact Assessments of each site. Open and transparent engagement with project stakeholders will be done on an ongoing basis to improve environmental and social outcomes, enhance project acceptance, and ensure successful project design and implementation. Project activities will also ensure that the stakeholder engagement process considers the current COVID-19 pandemic conditions in the country by outlining specific measures that will be taken to safeguard exposure and spread of COVID-19 in line with both the national and World Bank guidance on citizen engagement and stakeholder consultation during COVID-19.

7 Monitoring and Evaluation Framework

153. The integrated monitoring and evaluation framework (IRF) for the South Africa ACT IP is established by the government and national implementing entities, in cooperation with the MDBs, for tracking and reporting on progress in achieving the ACT objectives and outcomes, mirroring the results chain of the IP activities as presented in Figure 5. The IRF is built on the CIF's *Accelerating Coal Transition Investment Program Integrated Results Framework*. If ACT addresses funding gaps related to the successful implementation of the IP activities, then national governments, Eskom, and private sector stakeholders will act to accelerate the retirement of existing coal power plants and their replacement with new sources of renewable energy while ensuring a holistic, integrated, socially inclusive, and gender-equal just transition away from coal. The M&E framework will be coordinated by the DFFE, the national ACT focal point.

154. Table 5 presents the proposed IRF for South Africa's ACT IP. The main results areas are decarbonization of power sector, mitigation of negative impact on the coal power plant employees, and economic diversification of the Mpumalanga region with an emphasis on gender equality. The respective indicators are placed at multiple levels on the results chain. Some of the results targets will be set up at the project development stages.

155. The South Africa IP is therefore also structured to outline the program's results chain – from program-level activities, outputs, outcomes, and impacts (based on the anticipated investment pipeline and the related activities to be funded within the program, the overall program design, and the theory of changes) and incorporates elements related to (i) evaluation and learning, (ii) transformational change, (iii) gender and social inclusion, (iv) just transition, (v) SDGs, and (vi) development impacts/co-benefits in addition to the fundamental program results and corresponding indicators.

Figure 5. South Africa's ACT Results Chain

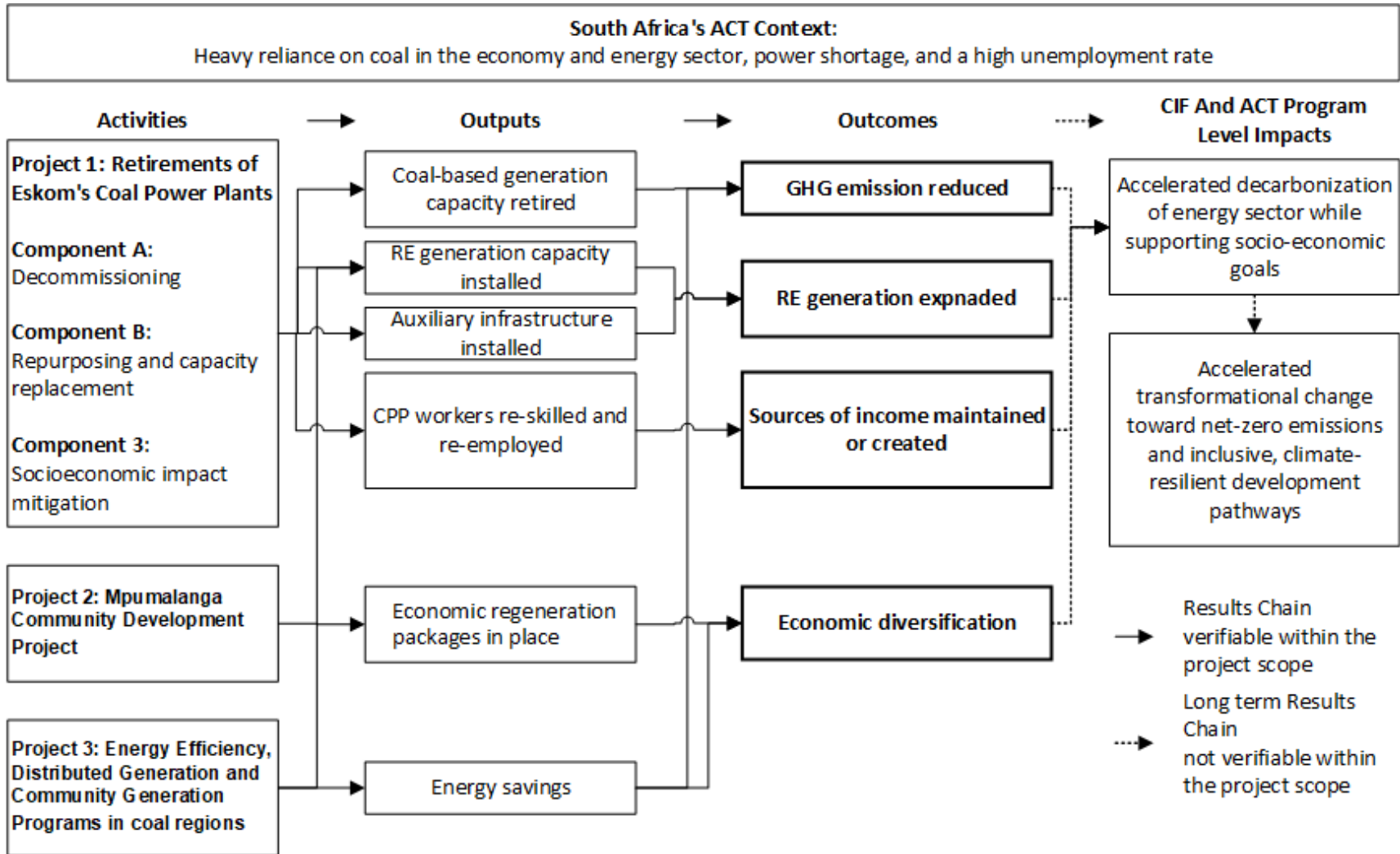


Table 5. South Africa’s ACT Integrated Results Framework

ACT Program Results Statement ^a	Indicators	Baseline	Targets
CIF-Level Impacts			
Accelerated transformational change toward net-zero emissions and inclusive, climate-resilient development pathways	GHG emissions reduced or avoided (tCO ₂ eq)	0	<ul style="list-style-type: none"> Project 1: Approximately 71 million tons from decommissioning of CFPPs over the lifetime Project 3: 153,700 tons per year
	Number of beneficiaries of ACT investments (disaggregated by gender, age, employment status, race/ethnicity, disability, and other vulnerability status)	0	250,000 ^b (40%, female)
	Volume of co-finance leveraged (US\$)	0	2,650,000,000
South Africa Investment Plan-Level Impacts			
Accelerated transition away from coal-powered to clean energy while ensuring a holistic, integrated, socially inclusive, and gender-equal just transition	Share of renewable energy generation in South Africa’s power system (%)	7% ^c	TBD
	Share of women participating in decision-making forums/platforms related to just transition	0	40%
	Share of women (in all diversity) who reported satisfaction on mitigation measures and positive impact in their life	n.a.	70%
South Africa Investment Plan-Level Outcomes			
Sources of income created for affected employees and communities through job retention or job creation	Number and percentage of employees of retired coal plants that have access to sustained income (#, %) (gender-disaggregated)	0	70%
	Number of women (in all diversity) who benefit effectively from mitigation measures	0	TBD
	Number of direct beneficiaries and the amount of income-generating schemes and economic regeneration activities linked to the green economy (#) (gender-disaggregated)	0	TBD
Affected communities equipped with relevant skills for jobs of the future	Number of people trained in the renewable energy sector, medium- and high-skilled green jobs, STEM-education and relevant vocational training through ACT (gender-disaggregated)	0	5,000 people trained (50% female)

ACT Program Results Statement^a	Indicators	Baseline	Targets
	Number of new jobs created in clean energy sector (beneficiaries of new jobs disaggregated by gender, age, and other relevant vulnerable factors, with breakdown on long term versus short term, formal versus informal, administrative versus technical and managerial)	0	TBD
Transition to cleaner energy sources	Capacity of existing coal power generation capacities accelerated for retirement (MW)	0	2,400 MW (Camden: 1,600 MW Grootvlei: 560MW Hendrina: 2,000MW)
	Installed capacity of renewable energy for repowering (MW)	0	900 MW
	Energy rating (MWh) and power rating (MW) of installed energy storage system to support the use of clean energy as a CFPP repurposing and capacity replacement solution	0	450 MW 1,800 MWh
Other infrastructure	Annual energy savings (GWh/year)	0	145 GWh/year
ACT Program-Level Co-Benefits			
Social, Economic, and Environmental Development Co-Benefits	Air pollutants emission reduced (ton)	0	TBD

1. The results statement and the set of results indicators are guided by the ACT Program Integrated Results Framework approved by the CIF Clean Technology Fund (CTF) Trust Fund Committee.
 2. Estimates based on the total population of the four municipalities in Mpumalanga province with the highest concentration of coal mines and power plants. In addition to beneficiaries of direct jobs created, people trained, etc., these figures also include beneficiaries of community and other infrastructure development schemes supported under Project 2.
 3. Source: Enerdata, February 2022. Country Energy Report - South Africa.
- Note:* STEM = Science, technology, engineering, and mathematics.

156. The methodologies for estimating expected GHG emission reductions from Project 1 and Project 3 will be developed at each project development stage in alignment with the applicable international standards. For Project 1, GHG emission reductions attributable to the accelerated decommissioning of the three CFPPs will be estimated by simulating the entire power system, as guided by the CIF ACT Integrated Results Framework, using factual and counterfactual scenarios. The expected GHG emission reductions will be estimated by comparing the emissions under both scenarios. The factual scenario is under which the CFPPs will be decommissioned as scheduled by Eskom. This scenario's emissions result from a combination of available marginal generation technologies that are likely to replace the power generation outputs that would have been produced by the project CFPPs. The emissions of the counterfactual scenario result from the extended operation of the CFPPs in question. The most likely life extension options and durations will be carefully assessed through discussions with Eskom.

157. Transformational change⁷³ will be tracked in accordance with the CIF monitoring, evaluation, and learning approach using the ACT Integrated Results Framework as a guiding tool. Monitoring data from various levels on the results chain will feed into the evidence base for transformational signals⁷⁴ to measure the transformational impact of ACT interventions. Stand-alone evaluation and learning activities may be carried out against the five dimensions of transformation change, relevance, systemic change, scale, speed, and adaptive sustainability, driven by the CIF AU or initiated by the country or the participating MDBs.

158. South Africa's ACT IRF will be implemented in collaboration between various stakeholders. The national focal point or implementing entities have a crucial role in adapting the Integrated Results Framework to their own context and needs, collecting the results data, and remaining accountable. The MDBs are primary agents of results management at the investment project level. They are responsible for ensuring the incorporation of all core indicators and at least one co-benefit indicator into the project-level Results Frameworks, establishing their targets, and reporting updates of achieved values to the CIF during the annual reporting period. Within the CIF Administrative Unit, the monitoring and reporting team is primarily responsible for the design, implementation, and oversight of the CIF's monitoring approach, including the annual reporting process for each CIF program, results data management, and analysis. The CIF's Evaluation and Learning team conducts periodic thematic analysis, evaluation and learning activities with a focus on transformational change, development impacts, and just transition. The CIF's gender team is an available resource for technical support on integrating gender equality and social inclusion issues into future ACT projects. It is responsible for monitoring progress on the CIF's Gender Action Plans and co-managing gender-related evaluations.

⁷³ Transformational change is defined as “fundamental change in systems relevant to climate action with large-scale positive impacts that shift and accelerate the trajectory of progress towards climate neutral, inclusive, resilient, and sustainable development pathways.” (Transformational Change Concepts, May 2021, https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/tclp_workshop_updated_tc_concepts_may2021.pdf).

⁷⁴ Transformational signals—which can be advanced or emerging—offer an alternative conceptual framework for recognizing and capturing transformational change through the programmatic lifecycle. https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/tclp_workshop_signalsenergy_framework_may2021.pdf.

Annex 1. Responsiveness to ACT Investment Criteria

ACT Criteria	South Africa IP Relevance
1. Potential for Transformational Change	
Relevance	Transformational change of this IP is expected for coal transition from the decommissioning and repurposing of three coal power plants at Camden, Hendrina, and Grootvlei and replacing coal-based generation capacities, including installations of renewable energy and energy storage capacity, while considering the economic, social, and environmental challenges of transition.
Systemic Change	The IP will bring about systemic benefits in terms of reduced coal transport costs and environmental costs and avoided electricity transmission losses with distributed solar generation. Businesses and community services to benefit from improved reliability of electricity and reduced pollution as a result of coal decommissioning. In terms of specific electricity sector benefits, the IP will promote an open electricity market and more investment in the electricity value chain as renewable energy generation installations increase.
Speed	Given the commitment from key public sector stakeholders in South Africa, the initiatives planned in this IP can be up and running within six months to begin implementation. The IP is building on the government and Eskom plans that have already been approved, in implementation and supported by the DMRE, a key stakeholder in South Africa's Just Transition landscape. The activities planned for immediate implementation include undertaking energy audits, identifying and developing business plans for potential energy efficiency projects, developing standardized procurement and energy performance contracting procedures, and associated capacity-building activities in the public and private (including financial) sectors.
Scale	The share of renewable energy generation in South Africa's power system is expected to increase from the current baseline of 6% to over 10% of the country's power grid. The capacity of existing coal power generation assets accelerated for retirement is expected to be over 2 GW, while the expected installed capacity of renewable energy from repurposing and capacity replacement is expected to be over 900 MW.
Adaptive Sustainability	South Africa has adopted a national climate change response policy that also includes several adaptation plans, mainstreamed across sectors and different government tiers, with strong institutional framework for coordination, monitoring, and reporting. The renewable energy installations and reduced pollution expected from this IP will enhance adaptation and resilience, making it easier for physical or natural systems to cope with climate change. There has also been a commitment from South Africa's NT to protect the economy and unlock economic opportunities that will enhance the country's ability to adapt to the rapidly changing climate and realize socioeconomic benefits from the transition to a lower carbon, greener economy. Activities planned in this IP will be included in the NT's initiative with government oversight.
2. Potential for GHG Emissions Reduction/Avoidance	
Increased rate of renewable energy deployment	New alternatives of clean and reliable energy sources will reduce GHG emissions from the avoided and reduced use of coal power. Appropriate regulatory reforms and demonstrations of private sector investment could potentially facilitate development of more renewable energy capacity installations with a significant reduction impact on CO ₂ emissions from coal-based power generation (provided this capacity is shutdown).
Reduction/avoidance of GHG emissions	An estimated GHG impact of 153,700 tons of CO ₂ equivalent per year will be avoided from the implementation of the projects.
Contribution to technology development	The manufacturing of renewable power technologies involves a highly skilled workforce and a modernizing of the local industry base. Job creation and skills development are

ACT Criteria	South Africa IP Relevance
	anticipated for the construction/installation and O&M of renewable technologies and smart grids.
Enhanced integration of climate-related risks	Clean energy and transport investments will enhance adaptation and resilience, making it easier for physical or natural systems to cope with climate change
Prevention of increased import dependency on fossil fuels	The anticipated reduction of electricity imports will promote a higher level of energy independence. Shifting from the traditional carbon-intensive baseload electricity sources, which require fuel source imports and/or costly transportation (such as coal and oil), to renewables such as wind, solar, geothermal, and hydro energy (intermittent and distributed) would increase diversification.

3. Financial Effectiveness

Value for money	Eskom is not able to fund financially and economically attractive investments without external financing. The daily operations depend on central government subsidies and most of the financing must come from external sources. The energy policy reform is moving toward liberalization but the transition process is longer than expected by the government. Financial support is intended to promote the involvement of the private sector in the energy sector, specifically for renewable energy development.
Mobilization potential	The renewable energy installation demonstration projects and planned regulatory reforms will help remove barriers in the energy sector where a number of private sector initiatives remain to be implemented but are affected negatively by the perceived regulatory risks in South Africa.
Implementation potential	The ACT support will address funding gaps related to the successful implementation of the IP activities, which the DMRE, Eskom, and private sector stakeholders will implement, including the accelerated retirement of existing coal power plants and their replacement with new sources of renewable energy, while ensuring a holistic, integrated, socially inclusive, and gender-equal just transition away from coal. It is important to identify a limited number of implementation partners to manage the implementation process while remaining accountable for results. This risk is mitigated by working largely with Eskom for public sector implementation, with a provincial economic development agency such as the Mpumalanga Green Cluster Agency for most of the community-based development activities, and with the private sector to expand investment in renewable energy generation. The M&E framework will be coordinated by the DFFE, the national ACT focal point, to maximize the speed, efficiency, and quality of implementation potential.

4. Just Transition

Government stakeholders involved in consultations for this IP have committed to ensuring that South Africa's Just Transition includes economic revitalization, job creation, and community engagement in coal areas affected by the transition and to protect the most vulnerable to climate change, particularly women, the youth, and the marginalized. These consultations have influenced the design and scope of activities envisaged in this IP. Resources will be committed to developing a comprehensive just transition plan for the province and participating municipalities that focus on green growth strategies, alternate economic opportunities, and poverty reduction and social protection-related policies and programs. Specifically, the Eastern South African province Mpumalanga (which is home to almost all coal mines and coal-fired plants in the country) has high unemployment relative to South Africa's average unemployment rate, and stimulating socioeconomic development (SED) is critical to ensure a just transition for the communities in the province. The ACT support will be implemented with coordinated activities covering CFPP retirement, renewable energy generation in coal-dependent regions, and SED in Mpumalanga.

5. Gender Equality and Social Inclusion

Gender equality/social inclusion considerations are integrated in the coal transition policies and strategies:

- Women and vulnerable groups' influence increased through improved leadership and decision-making capacities
- Negative gender-specific impacts of transition mitigated

ACT Criteria	South Africa IP Relevance
	<ul style="list-style-type: none"> - Gender equality and inclusion in retention/redeployment and social/economic regeneration programs - Share of enterprises led by women and other excluded groups in CFPP repurposing and capacity replacement supply chains increased - Share of socially responsible enterprises in CFPP repurposing and capacity replacement supply chains increased.

Women will equally benefit from better energy security and reliability of supply, especially during daytime hours. It will reduce their time from collecting wood and other biomass for fuel use.

Each project in the IP also offers possible opportunities for targeted job creation for women (for example, requirements that the plant operators provide earmarked jobs for women). This will encourage private sector participation and create new economic activities and jobs related to these renewable energy technologies.

6. Development Impact Potential	
Economic, social, and environmental impacts	The planned renewable energy development has minimal negative environmental impact, whereas its contribution to reduction of GHGs and urban pollution in major cities is significant. The installations will provide training and capacity building, demonstration of technologies, and employment opportunities extending to the most adversely affected economic regions of the country as a result of coal transition.
Markets of system impacts	The regulatory reforms and private sector investments related to the renewable energy installation projects are intended to promote the involvement of the private sector in renewable energy development, including remote areas and economically adversely affected areas as a result of coal transition.

Annex 2. Assessment of Country Absorptive Capacity

1. The determinants for absorptive capacity can be classified into the following main groups: demand for the proposed development activities and investments, stability during the course of absorption, and complementary factors essential to the implementation process.⁷⁵ The country's capacity is assessed against determinants relevant to the South African context to be enough to absorb the requested US\$ 500 million ACT funding for transition. In light of the current electricity sector crisis and the substantial proportion of coal-fired power in the generation mix, the absorptive capacity in the power system is also briefly discussed against the suggested determinant groups.

Table A.1. Determinants of Absorptive Capacity

Determinant Groups	Factors Relevant to ACT Implementation	Factors Relevant to Power System
Demand	<ul style="list-style-type: none"> • Demand for ACT resources 	<ul style="list-style-type: none"> • Demand for electricity • Underperforming coal fleets and unserved energy
Stability	<ul style="list-style-type: none"> • Stability of economic indicators 	<ul style="list-style-type: none"> • Performance of reserves
Complementary factors	<ul style="list-style-type: none"> • Efficiency of public investments • Governmental strategy and policy environment • Renewable energy investment potential • Access to commercial financing • Competitiveness of renewable energy cost 	<ul style="list-style-type: none"> • Adequacy of transmission capacity

A.2.1. Factors Relevant to ACT implementation

A.2.1.1. Demand for ACT Resources

2. The demand for capital is a major driver of the absorption of investment in the country. The investment needs and costs to deliver an ambitious energy transition in South Africa is estimated to be at least US\$250 billion over the next three decades.⁷⁶ Initial effects of Russia's invasion of Ukraine include the possibility of higher commodity prices and inflation,⁷⁷ which may lead to a rise in capital demand in the near future. The requested US\$500 million in ACT financing represents only 0.2 percent of the total demand for energy transition, leaving room for additional funding. Moreover, not only can the ACT investment be adequately absorbed, but it is essential for leveraging additional investments that will comprise the US\$250 billion energy transition costs.

A.2.1.2. Stability of the Economic Indicators

3. There are numerous economic stability indicators, but the proposed IP uses only two: the ratio of public investments to GDP and the IMF's framework for evaluating the public debt's sustainability.

⁷⁵ Berger, F. 1982. "The Concept of Absorptive Capacity: Origins, Content, and Practical Relevance." *Intereconomics* 17 (3): 133–137. ISSN 0020-5346, Verlag Weltarchiv, Hamburg. <https://doi.org/10.1007/BF02927883>.

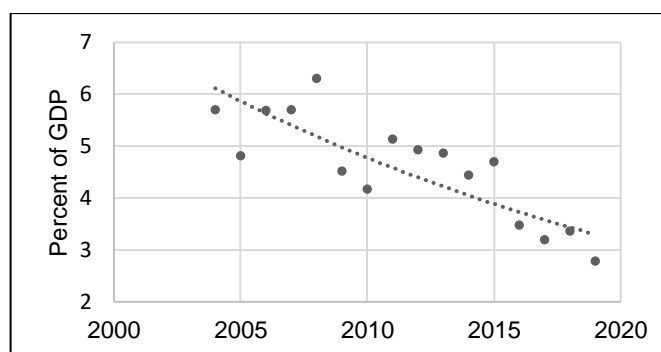
⁷⁶ Blended Finance Taskforce and Centre for Sustainability Transitions. 2022. *Making Climate Capital Work: Unlocking \$8.5bn for South Africa's Just Energy Transition*.

⁷⁷ The Economist Intelligence Unit, August 4, 2022. *EIU Viewpoint One-click Report: South Africa*.

Adequacy of the Scale of ACT investments Compared to GDP

4. According to the IMF, the proportion of public investments to GDP is one of the most important factors influencing the absorption capacity of public investments in developing countries. It has been empirically demonstrated that when public investment exceeds 10 percent of GDP, the productivity of public investment projects decreases. In 2019, the public investment-to-GDP ratio in South Africa reached 2.77 percent,⁷⁸ continuing a steady downward trend. It is currently well below the 10 percent threshold, and assuming the trend does not abruptly reverse, the requested US\$500 million ACT investment at the scale of 0.15 percent of the 2020 GDP can be absorbed in the country without compromising investment efficiency.

Figure A.1. Trend of Public Investments in South Africa



Data source: IMF, World Economic Outlook Database (April 2022); Investment and Capital Stock Dataset (ICSD) (last updated on June 15, 2022)

5. Further, the economic growth outlook points to some recovery in the near term which will create more room to absorb investments, although the medium-term performance is likely to be lackluster. Growth is estimated at 4.6 percent in 2021 and projected at 1.9 percent in 2022 led by private consumption—real output would rebound to its 2019 level by 2022. In the medium term, growth is projected to ease to 1.4 percent, capped by structural constraints to investment, prevailing policy uncertainty, and elevated public debt, which will hinder job creation.

6. However, there are main risks to the above-stated baseline scenario relating to the pace of adjustment and reform and evolving global liquidity conditions. Domestically, additional COVID-19 outbreaks amid slow vaccination uptake and slower-than-expected progress in or reversals of policies and reforms would weigh on growth. Externally, growth could be hurt by weak economic performance in trading partners. On the upside, faster reform implementation would boost growth as shown in the ‘upside scenario’ in Table A.2. Also, terms of trade could remain favorable for a longer period, continue to support exports, and prolong a faster pace of output growth.

Table A.2. Economic Output Growth Projection

		2020	2021	2022	2023	2024	2025
			Estimated	Projected.			
Baseline Scenario	Real output growth (%)	-6.4	4.6	1.9	1.4	1.4	1.4
	Per capita real output growth (%)	-7.8	3.7	0.3	-0.1	-0.1	-0.1
Downside Scenario	Real output growth (%)	-6.4	4.6	0.9	-1.5	-0.9	-0.5
	Per capita real output growth (%)	-7.8	3.7	-0.6	-3.0	-2.4	-2.0
Upside Scenario	Real output growth (%)	-6.4	4.6	2.3	2.8	3.1	3.6
	Per capita real output growth (%)	-7.8	3.7	0.8	1.3	1.6	2.0

⁷⁸ Author’s calculation using IMF data: World Economic Outlook Database (April 2022) and Investment and Capital Stock Dataset (ICSD) (last updated on June 15, 2022).

7. Provided that public investment projects are more likely to be successful when undertaken during periods of higher economic growth,⁷⁹ it is imperative that the country achieves the upside scenario through the adoption of well-sequenced structural reforms in conjunction with fiscal consolidation. *Operation Vulindlela* was introduced as a coordination mechanism to facilitate reform implementation. While the bulk of the agenda remains outstanding, some steps relevant to the energy sector have been taken (for example, easing regulations in the energy sector).

Public Debt Sustainability

8. The IMF assessed that the government's debt outlook remains challenging despite the fast rebound in output from the 2020 contraction.⁸⁰ The COVID-19 pandemic significantly increased debt and debt service, exacerbating the already unfavorable dynamics arising from persistent weak growth, high fiscal deficits, and a growing materialization of contingent liabilities from state-owned enterprises (SOEs). Debt is projected at 88 percent of GDP by 2026 and is not expected to stabilize during the projection period, while gross fiscal financing needs would average 17 percent of GDP in 2021–2026. Risks to the debt outlook include the uncertain nature of the recovery, possible global financial tightening, additional spending pressures, and large SOE liabilities. While the currency and maturity composition of debt mitigate these risks, debt sustainability critically hinges on timely and credible policies to tackle the economy's fiscal and structural weaknesses.

9. As a monopolistic and vertically integrated electricity sector player in the country, Eskom is one of the key partners to implement the proposed ACT IP activities. However, Eskom's debt is unsustainable and bill collection is inadequate, despite various efforts for improvements. The ZAR 33 billion in cash flow from Eskom operations is insufficient to cover annual debt obligations (ZAR 69 billion). Eskom's guaranteed debt is ZAR 450 billion (representing 17 percent of total RSA⁸¹ debt and 55 percent of contingent liability from GoSA guarantees), with ZAR 80 billion maturing within the next three years. The Sovereign will continue to provide Eskom with the necessary liquidity to meet shortfalls in its debt service obligations and Eskom is to be unbundled to improve its financial position; however, a credible strategy to address Eskom's debt situation must be developed and implemented to demonstrate Eskom's financial viability without ongoing NT support.

10. Nevertheless, the ACT support including the CIF loans is crucial for the decarbonization for the economic growth and improved health and livelihoods in the country, and the country is willing to borrow. The coal transition will help improve debt sustainability in the long term by mitigating the adverse impact of power outages on economic activities caused by the aging coal-fired generating plants. According to the CSIR, the disruptions affecting the economy were estimated at ZAR 60–120 billion in 2019. The CIF concessional financing instruments are the best available option for the needed energy transition for its affordable lending rate and long maturities, thereby minimizing the additional burden on the already severe debt distress of the country. Without the CIF financing, the country would become even more indebted and or fall into a slump in pursuing its motivation for decarbonization.

⁷⁹ Presbitero, A. 2016. "Too Much and Too Fast?: Public Investment Scaling-up and Absorptive Capacity." *Journal of Development Economics* 120: 17–31.

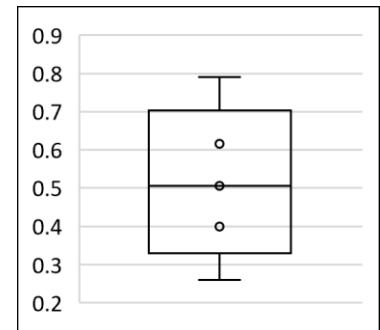
⁸⁰ IMF. 2022. *IMF Country Report No. 22/37*.

⁸¹ RSA = Republic of South Africa.

A.2.1.3. The efficiency of Public Investments in the Country

11. The IMF computed public investment efficiency scores using data envelopment analysis with public investment as a share of GDP and GDP per capita as inputs and the quality of infrastructure from WEF's Global Competitiveness ranking as an output.⁸² South Africa scored 0.64, which belongs to the top quartile among 62 developing countries where road infrastructure projects have been financed by the World Bank. South Africa's score of 0.64 places it in the first top quartile. A score of 0.64 for output efficiency indicates that the inefficient producer achieves 64 percent of the infrastructure quality score attained by the most efficient producers with the same inputs. This high score indicates that the nation is in a position to reap the benefits of ACT investments. Figure A.2 depicts a box plot of the scores of 62 developing nations grouped into four quartiles.

Figure A.2. Summary Statistics of Public Investment Efficiency Scores of 62 Developing Countries



12. In particular, the Country has a successful track record of CIF investments. the CIF, through its implementing partners operating in South Africa, namely, the World Bank, IFC, and AfDB, provided over USD 450 million in concessional financing to renewable energy projects for over a decade. This includes the Sear wind farm, pioneering Xina, KaXu and Khi concentrated solar power (CSP) plants, with KaXu being the first ever built in a developing country which put South Africa at the forefront of modern solar technology. More recently, this also includes the Eskom Battery Energy Storage System (BESS) project which would act as a proof of concept on the delivery of the first battery energy storage project in South Africa.

A.2.1.4. Governmental Strategy and Policy Environment

13. South Africa lacks a strategic and coherent policy on JET, which causes political tension and polarization of the energy debate and impedes the power sector reform agenda and public and private energy sector investments. Although a unified long-term coal transition strategy is yet to be developed, the President's dedication to the energy transition is strong. In his address to the nation on the energy crisis on July 25, 2022, President Cyril Ramaphosa announced that climate funding through the JETP will be used for repurposing CFPPs and replacing coal-based generation capacity.⁸³ The ACT support, as part of the broader JETP, will kick-start the coal transition in the country by focusing primarily on the electricity sector and mitigating the immediate social impacts to address the country's energy crisis in a sustainable and socially just manner in coordination with Eskom, while the long-term strategy is being developed.

A.2.1.5. South Africa Renewable Energy Investment Potential

14. Private sector participation in solar PV and wind generation investments has been robust, involving both the energy and banking sectors. The country's financial services industry is highly developed and dominated by private banks. The banking industry has ample capital and a solid balance sheet. Through the Renewable Energy Independent Power Producers Program (REIPPP), the private sector has added 6 GW of installed capacity, representing approximately 8 percent of the nation's generation capacity. The REIPPP bid windows are typically oversubscribed, as numerous producers and financiers in the

⁸² IMF 2020. Ibid.

⁸³ Address to the nation on energy crisis by President Cyril Ramaphosa, July 25, 2022. <https://www.gov.za/speeches/president-cyril-ramaphosa-address-nation-energy-crisis-25-jul-2022-0000>.

renewable energy sector are already mobilized. Given their track record, they are in an excellent position to fund renewable energy as repurposing and capacity replacement solutions.

15. Although potential PPP arrangements for CFPP repurposing and coal capacity replacement under the ACT Program have not yet been identified in detail, two conditions would be necessary to attract private sector interest: (a) if renewable energy capacity is procured through REIPPP, which requires consultations and approvals by NERSA, concurrence by the NT for their contingent liabilities, and DPE for Eskom to enter into PPAs, these essential steps of the approval process must be better coordinated and accelerated and (b) the electricity market has to be further liberalized. While measures to improve Eskom's financial position, including unbundling and fiscal resource injection, are being taken, the market structure has to move away from the Eskom single-buyer model. A diversified pool of credible offtakers will attract private investments in renewable energy generation capacity, without unsustainable long-term Eskom PPA backstopped by fiscal resources. This change is considered feasible considering that the recent Eskom land lease program was oversubscribed by three times with 18 successful bidders for 1.8 GW capacity without Eskom PPA and NT guarantee.

A.2.1.6. Cost Competitiveness of Renewable Energy

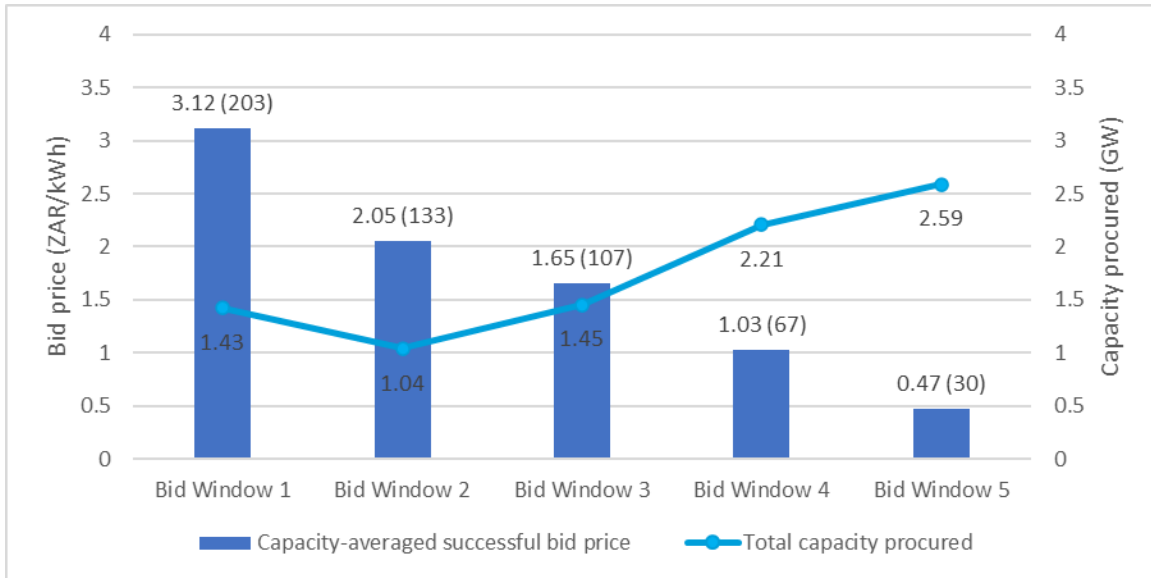
16. The current renewable tariffs are sufficiently competitive to disincentivize coal power projects, making CFPP repurposing and capacity replacement feasible. It is noted that per Bid Window 5 of REI4P, the solar tariff ranges between US\$23.47 per MWh and US\$30.35 per MWh and wind tariff ranges between US\$21.56 per MWh and US\$38.69 per MWh. It is comparable with Eskom's operational cost of generation from its coal fleet at US\$27.29 per MWh. Observations indicate that the levelized cost of electricity (LCOE) of newly constructed renewables is comparable to the marginal cost of coal generation. Given the capital cost of a coal power plant and the declining costs of renewables, the latter is anticipated to become cheaper. Figure A.3 depicts the significant price reductions over time in the REI4P's competitive bidding process.

1. It is worth noting, however, that REIPPPP rounds 5 and 6 have not yet reached financial closure yet and there is uncertainty whether bidders will be able to deliver their projects in a timely manner considering the current context of steep cost increases for generation equipment, materials, and capital.

Figure A.3. Capacity-Averaged Successful Bid Prices⁸⁴

⁸⁴ Black and Veatch. 2022. *Technical and Financial Approaches to Repurpose Coal Assets: Case of India, Indonesia and South Africa*, work in progress.

Prices in 2021 South African rand. The figure excludes Bid Window 3.5 as the capacity procured was only 200 MW. Values in parentheses indicate equivalent in US\$ per MWh; exchange rate used: ZAR 1 = US\$0.065.



2. The addition of energy storage to renewables causes the cost to exceed that of coal generation, but the trend is downward. Table A.3 shows annual estimates for levelized cost of energy from coal and renewable energy + storage from the Electric Power Research Institute (EPRI) (for 2017) and Lazard.

Table A.3. Levelized Cost of Electricity for Coal and Renewable Energy + Storage in South Africa

Year	Estimation Entity	Coal (US\$/MWh)	Renewable Energy + Storage (US\$/MWh)
2017	EPRI	97.53	452.56
2018	Lazard	101.50	124.00
2019	Lazard	109.00	120.50
2020	Lazard	112.00	110.50
2021	Lazard	108.50	121.50 ⁸⁵

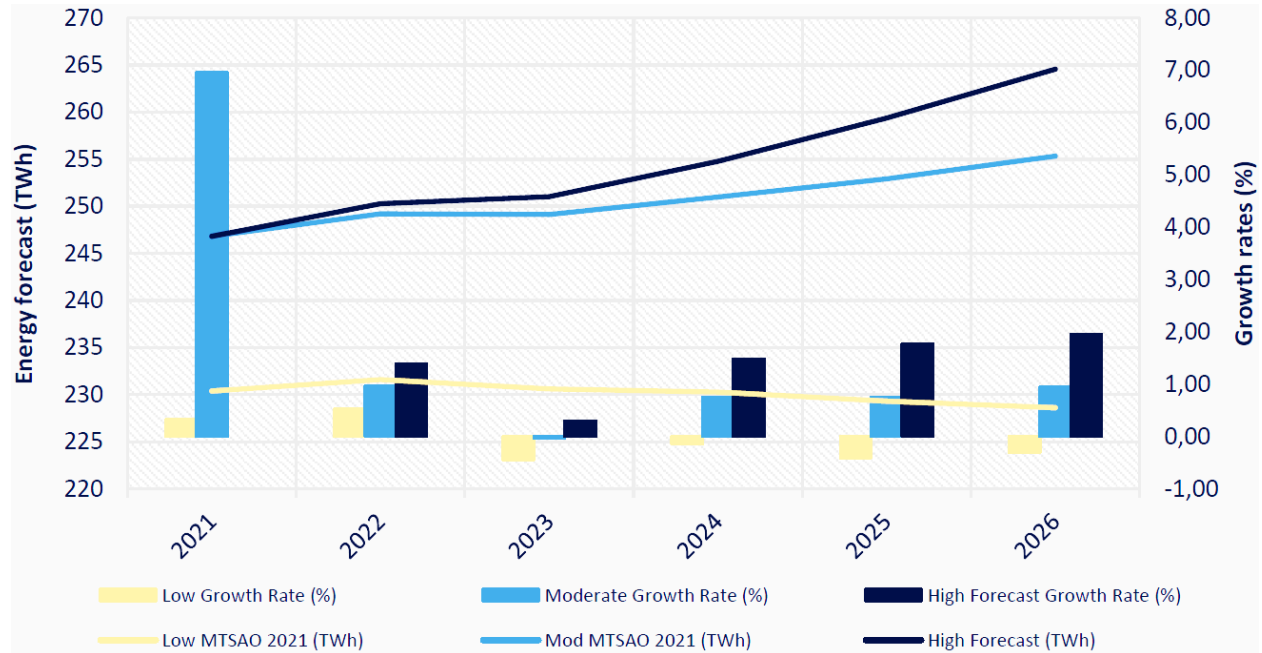
Source: EPRI and Lazard.

⁸⁵ The LCOE estimate by Lazard for 2021 can be benchmarked against the only winning bid in the RMIPPPP that offered solar PV + BESS at an LCOE of ZAR 1,885 per MWh (approximately US\$130 per MWh).

A.2.2. Factors Relevant to Power System

A.2.2.1. Demand for Electricity

Figure A.4. Possible Energy Demand Forecasts⁸⁶



3. The forecast for electricity demand in the medium term indicates a moderate but steady expansion. Eskom developed three demand forecasts for consideration in the Medium-term System Adequacy Outlook 2022–2026, as depicted in Figure A.4.⁸⁷ The demand forecasts in dark and light blue curves were derived within Eskom Transmission, based on GDP projections as inputs. The light blue line, termed ‘moderate demand’, has an average annual growth rate (AAGR) of 0.7 percent from 2022 to 2026. The dark blue line, with an AAGR of 1.4 percent, anticipates much stronger recovery following the COVID-19 pandemic from 2023. The bottom line (yellow) is derived from Eskom’s sales projections from customers as an input and this demand is similar to the 2020 actual demand of 229 TWh reported by Statistics SA (Stats SA 2020) and is considered too low for resource planning.

A.2.2.2. Underperforming Coal Fleets and Unserved Energy

4. Due to the poor performance of the existing coal fleet, coal transition is required immediately to meet both current and medium-term demand despite the fact that demand growth is anticipated to be moderate. Considering the average age of the old coal fleet, which is 41 years, and the associated reliability issues, it is and will continue to be difficult to consistently meet the baseload capacity. The older stations are susceptible to failures due to a prolonged lack of maintenance. Eskom continues to implement its Reliability Maintenance Recovery Programme on the coal-fired generation fleet in an effort to reduce unscheduled maintenance, but the effects have not yet been observed in all units. In addition to the technical performance of the generating stations, there are other risks that could lead to capacity loss, such as noncompliance with MES and late issuance of operating licenses. Some Eskom coal stations are in

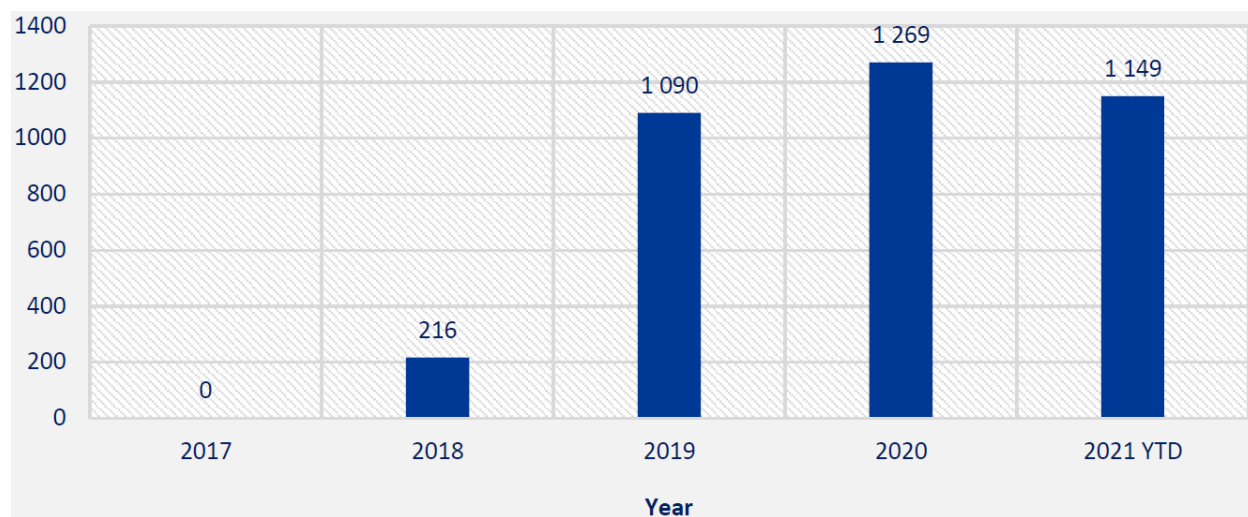
⁸⁶ Eskom. 2021. *Medium-term System Adequacy Outlook 2022–2026*.

⁸⁷ Eskom. 2021. *Medium-term System Adequacy Outlook 2022–2026*.

violation of the Air Quality Act and may be forced to close. This event will have a significant impact on the power grid, and there are no credible resources available to replace this capacity.

5. To maintain a stable power system, the system operator implements load shedding and/or demand reduction in the event of a supply shortage. The amount of energy not supplied historically due to emergency load reduction is 1.15 TWh, as shown in Figure A.5. Even though 2020 was a year with an unusually low load, load reduction did not decrease significantly compared to 2019, indicating an inadequate system. The values include load shedding and load curtailment but exclude interruption of supply (IOS). IOS refers to all contracted and mandatory demand reductions to maintain system frequency and security of supply within acceptable bands.

Figure A.5. System Operator-Instructed Load Shedding for 2017–2021 YTD (GWh)⁸⁸



6. In March 2022, NERSA estimated Eskom’s total economic cost of unserved energy (COUE) for 2020 to have been over ZAR 100 per kWh.⁸⁹

A.2.2.3. Performance of Reserves

7. The Eskom system operator (SO: Ancillary Services 2019) stipulates the type (instantaneous and regulating reserves) and capacity (in megawatts) required to restore system frequency to acceptable levels, depending on the drop in the level of frequency. Frequency incidents are correlated to the performance of reserve deployment. Given the identified risk of reserve shortages due to underperformance of Eskom stations contracted to provide reserves, monitoring this index is critical in alerting the system operator to an increasing trend in frequency incidents.

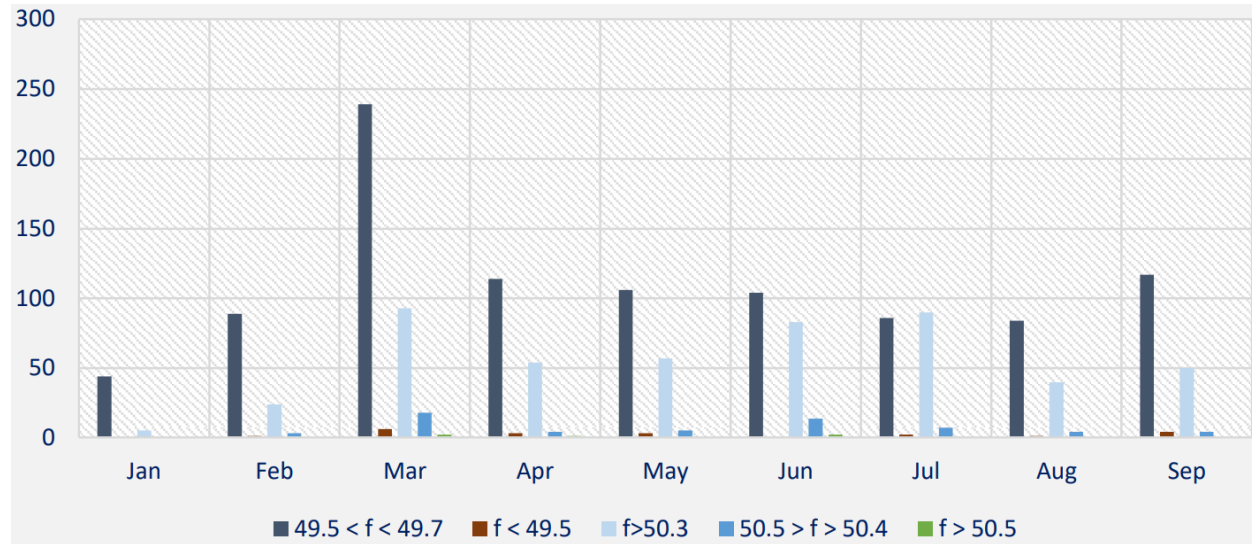
8. Although fewer generation trips led to frequency decay in 2020, the 49.5 < f < 49.7 Hz band experienced 983 incidents, an increase compared to 848 in 2019 and 379 in 2020. The system also experienced a spike in over-frequency in the 50.3 Hz band. The actual incidents for January to September 2021 are shown in Figure A.6. There were no incidences of frequency dropping below 49.2 Hz; such an incident would automatically activate underfrequency load shedding. While the number of incidents

⁸⁸ Eskom. 2021. *Medium-term System Adequacy Outlook 2022–2026*.

⁸⁹ https://www.nersa.org.za/wp-content/uploads/2022/05/Decision-and-RfD_Eskom-COUE-Methodology-Review-and-2020.pdf.

indicates the system’s lack of ability to react to varying outputs from generators, the proposed CFPP repurposing and coal capacity replacement concept aim to minimize the adverse impact of variable renewables on the system stability by combining with energy storages.

Figure A.6. Actual Frequency Incidents 2021 YTD⁹⁰



A.2.2.4. Adequacy of the Transmission Capacity

9. The transmission capacity for power evacuation from the renewable power generation to be built under the ACT Program to the load centers needs to be assessed for each generation capacity development activity, given the lack of transmission capacity, to effectively handle new renewable power at the entire country level, particularly in Northern and Eastern Cape. The periodic Generation Connection Capacity Assessment by Eskom shows that the interprovince transmission capacity for power evacuation from Northwest and Northern Province with maximum renewable generation potential is minimal. However, it shows that significant transmission capacity is available between Mpumalanga, where the target CFPPs to be decommissioned are located, and Gauteng, the biggest load center.

⁹⁰ Eskom. 2021. *Medium-term System Adequacy Outlook 2022–2026*.

Annex 3. Summary of Stakeholder Consultations

1. Stakeholder consultations were held in May 2022 with government agencies, Eskom, development partners, private sector, civil society, and academia. The complete list of participants is included in the tables at the end of this annex. During stakeholder consultations, concerns were primarily raised by CSOs regarding the potential impacts of decommissioning CPPs on the related coal value chain, including coal mines. These impacts are being studied at the plant level as well as the provincial level by various stakeholders. Given the depth and breadth of engagement required in this area, some of the well-defined elements could be captured in the ACT IP and studies could be funded for future activities. Various stakeholders shared their views that significant support needs to be provided to the 'People' pillar of the ACT IP to the extent possible. MDBs advised that incorporating the 'People' element into the investment projects would strengthen the overall quality of the IP and is in line with the ACT design document. MDBs also acknowledged that support for CPP workers and communities under the proposed Komati project could be replicated for the retirement of other CPPs, if proven successful.

2. MDBs and Eskom also discussed off-grid access as a potential additional area for private participation. Off-grid could be eligible for ACT funding if (a) the ultimate beneficiaries are the people and communities that are affected by coal phaseout and (b) it entails job creation, reskilling, and economic revitalization. Containerized microgrids could be a possible option in that regard. Eskom stated that it intends to maximize local content and innovations in the containerized microgrid space.

3. In terms of replacement generation capacity for retired coal plants, there was concurrence on the role of gas in energy transition across the wider stakeholder groups, including Eskom and private sector actors, but it was also confirmed to all stakeholders that repowering involving dispatchable thermal generation using natural gas is not eligible for the ACT support. Consultations with private sector stakeholders also focused on factors that affect private sector investment mobilization:

- (a) While the license exemption for the generators under 100 MW is a step in the positive direction, the regulatory requirement remains onerous. NERSA registration necessitates virtually the same level of preparation as for a license (although NERSA showed recent signs of process acceleration).
- (b) Transmission capacity is constrained, which was also emphasized during the private sector meeting.
- (c) The land use policy requires reapplication for approval of the changed use of land (for example, in case of converting a mine land into a renewable site, which became irrelevant as the IP is scoped within the electricity sector).

4. It was also concluded that since many of the private sector activities and the community development activities are focused on the Mpumalanga Province, these could be potentially integrated under a Mpumalanga economic development program to supported affected communities.

5. Below is a list of all organizations from each sector that participated in stakeholder consultations.

Public Sector Stakeholders
DFFE
National Treasury
DMRE

Public Sector Stakeholders

Eskom
Presidency of South Africa

Development Partners/Donors

French Development Agency (AFD)
Development Bank of South Africa (DBSA)
European Investment Bank (EIB)
New Development Bank (NDB)
US State Department
UK High Commission
Denmark Embassy
British International Investment
KfW
Development Finance Corporation
Cao Jingtao
Megan Taylor
EU
Power Africa
Res4Africa Foundation
Transfer Africa Foundation

Civil Society and Academia

Centre for Scientific and Industrial Research
National Labour and Economic Development Institute (NALEDI)
Just Share
Centre for Environmental Rights
Trade and Industrial Policy Strategies (TIPS)
GreenCape
University of Pretoria
Groundwork
Stellenbosch University
Mpumalanga Green Cluster Agency
CIF Observer

Private Sector

Industrial Development Corporation
SAESA
Sanlam
Marubeni
Vestas
South African independent Power Producers Association
British International Investment
Bushveld Energy
Mainstream Renewable Power
Sasol
Nedbank Capital

Private Sector

National Business Initiative

Standard Bank

MDBs

AfDB

IFC

World Bank

CIF Administrative Unit

Annex 4. Development Co-Benefits

Results	Development Co-Benefits	Description
Accelerated transformational change toward net-zero emissions and inclusive, climate-resilient development pathways	Reduced GHG emissions	The accelerated decommissioning of the three CFPPs will result in approximately 71 million tons of CO ₂ over the project lifetime.
	Diversification and energy security	This IP will facilitate a reduced dependence on fossil fuels and will promote higher level of energy independence. Shifting from the traditional carbon-intensive baseload electricity sources which require fuel source imports and/or costly transportation (such as coal and oil) to renewables such as wind, solar, geothermal, and hydro energy (intermittent and distributed) would increase diversification and also reduce the need for electricity imports. Diversified energy mix reduces vulnerability due to climate impacts, minimizes the volatility of primary energy costs, and encourages technological competition between energy platforms, ensuring that progressive innovation takes place and that costs are minimized.
	Health benefits	Moving toward green and clean fuel will help reduce the health-related impacts leading to acute respiratory infections, tuberculosis, chronic respiratory diseases, lung cancer, cardiovascular disease, asthma, low birth weights, diseases of the eye, and adverse pregnancy outcomes due to inhalation of toxic emissions released from coal-based power plants. This will eventually help in saving costs on the health front. In the residential sector, increased electrification through cleaner resources reduces the use of coal for cooking and heating in homes, which will also contribute to overall improvements in health, resulting in long-term cost savings in health care.
Accelerated transition away from coal powered to clean energy while ensuring a holistic, integrated, socially inclusive, and gender-equal just transition	Household benefits for women	Renewable technologies replacing coal power will generate electricity during high-demand daytime periods and will similarly enhance supply adequacy and reliability during the hours of the day in which the value of lost load and losses are typically the highest. Women will equally benefit from better security and reliability of supply, especially during daytime hours. It will reduce their time in collecting wood and other biomass for fuel use. Accordingly, efforts will be made to increase accessibility to electricity for vulnerable groups, including women-headed households and households with persons with disabilities
	Transport sector environmental benefits	Coal transportation by water, rail, and roads is responsible for pollution, congestion, high fuel consumption, road accidents, and so on. Not having to transport coal by ship could have a positive impact with lesser marine pollution. No transportation of coal will also lead to decongestion of road and rail infrastructure, which are already stressed in developing countries. Hence, decommissioning has the potential to reduce consumption of transportation fuel, which will lead to minimal vehicular emissions.
Sources of income created for affected	Alternative livelihoods for locals affected by coal transition	This IP will ensure additional benefits for communities in the vicinity of projects participating in the REI4P. Renewable energy projects are primarily located in rural communities, frequently categorized as 'marginalized communities'. The REI4P has created

Results	Development Co-Benefits	Description
employees through job retention or job creation		a legal framework to incentivize IPPs to channel benefits to communities near renewable energy project sites through a range of means, including local employment quotas and community ownership in renewable energy projects, as well as contributing a proportion of their revenue toward development spending, known as socioeconomic development (SED) and enterprise development (ED) spend.
	Increase in employment	The implementation of this IP will support job creation and skills development related to the construction/installation and O&M of renewable technologies and smart grids. Jobs in renewable power generation are concentrated in the services, construction, and manufacturing sectors. However, employment opportunities are created in almost all sectors, including the mining sector, which will result in net increase in employment despite the expected job losses in coal mining. The IP will also include targeted measures to facilitate training, recruitment, retention and career progression of groups traditionally underrepresented in the labor market, i.e., women, youth, persons with disabilities, among others.
	Green job creation	Renewable power sources also contribute to local economic growth and, according to some, provide better jobs. The manufacturing of renewable power technologies involves a highly skilled workforce and a modernizing of the local industry base. The use of renewable energy makes local businesses less dependent on imports from other regions, frees up capital for investments outside the energy sector, and serves as an important financial hedge against future energy price spikes.
Affected communities equipped with relevant skills for jobs of the future	Workforce upskilling	As more skilled workers are required in the renewable energy technology sector compared to coal, the shift brings the challenge of building the technical capacities through established training institutes and education. Upskilling education of the workforce in the deployment of these technologies will be prioritized. Each project in the IP also offers possible opportunities for targeted job creation for women (for example, requirements that the plant operators provide earmarked jobs for women, youth, people with disabilities). This will encourage private sector participation and create new economic activities and jobs related to these renewable energy technologies.
	Skill building training	The number of jobs estimated to be created in 2018–2030 (IRP and CSIR models) will range between 580,000 and 1.2 million depending on the expansions of the renewable energy options to produce electricity. ⁹¹ This requires significant funding support to reskill the unemployed coal employees by the South African Government. The funding support of US\$2 billion over three to five years will focus on training and educating the coal and thermal power plant workers to get suitable employment in alternative technologies (solar, wind, synchronous condensers, and battery + solar PV) in addition to other manufacturing sectors such as electric vehicles.

⁹¹ IASS and CSIR. 2019. *Future Skills and Job Creation with Renewable Energy in South Africa*. IASS and CSIR, Pretoria.

Results	Development Co-Benefits	Description
Transition to cleaner energy sources	Reduction in pollution	Transitioning toward the use of nonfossil fuels can help improve the environmental conditions and subsequently reduce the pollution load. Reducing CO ₂ emissions from electric power generation will simultaneously reduce the emissions of SO ₂ , NO _x , and particulate matter such as PM 2.5. Reduced coal power production will also result in significant reductions in water pollution and overall water consumption.
	Prevention from disasters and climate change vulnerabilities	Transitioning toward clean energy will minimize the eventual, severe impacts of climate change and provide improvements in resilience and adaptive capacity to natural disasters. The primary climatic benefits of clean energy stem from the fact that immediate efforts can stop the buildup of GHGs in the atmosphere. Clean energy and transport investments will enhance adaptation and resilience, making it easier for physical or natural systems to cope with climate change.

Annex 5. Project Concept Briefs

A.5.1. Project 1: Retiring and Replacing Coal-based Power Generation Capacity

A.5.1.1. Background

1. Environmental and technical concerns require the retirement of South African CFPPs. The country's electricity sector relies heavily on a fleet of CFPPs representing 87 percent of the country's installed generation capacity of 52 GW that contribute 48 percent of South Africa's total CO₂ emissions. At the same time, the electricity users face frequent outages due to the low reserve margin and decreasing electricity availability factor of the incumbent aging CFPPs. Eskom's aging coal fleet of 15 power plants have an average age of 41 years, with some plants that are prime targets for accelerated decommissioning. Decommissioning of these target plants is expected to pave the way for the country to decarbonize its electricity sector and make progress toward meeting its NDC commitment.

2. As part of the effort to accelerate the retiring of CFPPs, there will be a need to quickly scale up the investment in power generation to close the resulting generation capacity gap. The REI4P was embarked upon in 2010, which has, over the last five bid windows yielded government procurement of primarily solar (PV and CSP) and wind generation, as well as some biomass, small hydro and landfill gas electricity generation from IPPs. However, current REI4P rounds 5 and 6 have not yet closed and there is uncertainty whether bidders will be able to deliver their projects in a timely manner considering the current context of steep cost increases for generation equipment and materials. There are nevertheless a number of shovel-ready, smaller-scale IPP projects which can be developed and brought onto the grid by 2023.

3. With this, various approaches need to be considered to ensure that the power sector, including both public and private sectors, can respond efficiently and effectively to fill the needed renewable power generation. Given the intermittent nature of renewable energy, it will also be increasingly important to ensure that there is dispatchable power that could be called upon, as needed. Aside from thermal power options, there are different energy storage technologies that have been deployed on a limited basis in South Africa and could be scaled up or new proven technologies could be introduced. For example, locating, utility-scale battery storage closer to population centers can reduce reliance on long transmission lines and also decrease transmission energy loss. At the time, pumped hydro storage can play a defining role in the energy transition by providing balancing and system services to the grid that can alleviate grid constraints and limitations to RE deployment resulted from decommissioning of CFPPs and thereby enable the ramping up variable RE power.

4. While the addition of new power generation capacity and energy storage require private sector investment along with public sector, some of the recent changes may require a risk mitigation mechanism for private sector participation. There are uncertainties in the national guarantees for Eskom to enter into PPAs. Also, the regulation has been changed to allow PPAs to be entered directly between private sector entities, as well as other entities such as municipalities. There may be growing uncertainty and apprehension to enter into PPAs, unless a risk mitigation mechanism such as a guarantee could be incorporated.

A.5.1.2. Project Objective

5. The objective of this project is threefold: (a) demonstrating the ways to ramp up the process of decommissioning Eskom's CFPPs by public sector that can be further scaled up even after ACT intervention;

(b) enabling the acceleration of CFPP decommissioning by positioning dispatchable renewable energy as replacement capacity through a series of public and private projects; and (c) creating opportunities for the retired CFPP workers and the affected communities; to meet South Africa's energy security, climate change, and poverty reduction targets.

A.5.1.3. Proposed Approach

6. The project will comprise three components to achieve its threefold objectives.

7. Component A involves decommissioning of the power stations. Decommissioning entails the entire process of permanently shutting down the coal power generation capacity and disconnecting it from the system, demolition and blasting activities, and site rehabilitation.

8. Based on the retirement schedule of Eskom-owned CPPs, three plants have been identified to be shut down under the ACT support. CPPs with the earliest retirement dates are Camden, Hendrina, and Grootvlei. Camden Power Station was first commissioned in 1967 with a total installed capacity of 1,600 MW consisting of eight units. Between 1988 and 1990, all of Camden's units were decommissioned. However, due to increasing demand, Eskom initiated a return-to-service program of its mothballed coal plants and Camden was the first one to be recommissioned between 2005 and 2008. It is now being considered as one of the priority plants to be decommissioned and repurposed before 2030.

9. Grootvlei Power Station is situated approximately 18 km southwest of Balfour in Mpumalanga. It has a total installed capacity of 1,200 MW comprising six units, each of which has a nominal capacity of 200 MW. One of the older plants in Eskom's fleet, it was commissioned in 1969 and temporarily ceased operations between 1988 and 1990. However, due to growing demand in the 2000s, Grootvlei has been brought back to service since 2008 and has been operational with a current available capacity of 560 MW, which accounted for 1 percent of Eskom's overall capacity in 2021.

10. Hendrina Power Station is located at 40 km south of Middelburg in Mpumalanga. The first unit was commissioned in 1970 and the last in 1977. It was then refurbished in the mid-1990s. At the time it was built, it was the largest station to be designed by Eskom. It has a total capacity of 2,000 MW with 10 units of 200 MW. Together with Camden and Grootvlei, Hendrina Power Plant is considered to be decommissioned and repurposed before the end of 2025.

11. Component B focuses on repurposing the CFPPs and establishing track record of replacing the retired coal-based generation capacities. The repurposing and capacity replacement solutions include solar PV, wind, energy storage (with different technologies), and synchronous condensers⁹² as optimal technologies. The component will involve a broad range of investors and developers, including both public and private sectors, to add renewable generation capacities to the immediate CFPP sites, surrounding areas, and broader coal regions. Among various financing model and risk mitigation arrangements to be explored, a study on possible PPP structure to repurpose the three Eskom CFPP sites are planned to be carried out by Eskom.

12. The repurposing and capacity replacement will occur in parallel with decommissioning under a 'two-phased approach' to ensure the nation's energy security in light of current power shortages. The initial repurposing and capacity replacement phase will focus on areas where there is no (or limited) infrastructure installed and where new technologies could be developed and procured as soon as the final

⁹² General Electric, *Synchronous Condenser Technology Overview*. White Paper prepared for the World Bank, 2021.

technical design is agreed upon and while decommissioning is ongoing at the plant site and ash dams. Once the main plant and associated facilities are demolished and the ash dams are rehabilitated, Phase 2 of repurposing will include the additional installation of renewable energy capacity and auxiliary infrastructure to the immediate CFPP sites. Phase 2 repurposing can only be implemented once the decommissioning is completed, the sites are cleaned up, and the repurposing design is consistent with the environmental remediation and closure plans.

13. As a critical part of ramping up the dispatchable renewable energy replacement capacity, various modalities of supporting energy storage projects will be explored. While there are some initial experiences in South Africa for utility-scale battery storage energy systems, including a large Eskom project funded by the World Bank utilizing resources from the Clean Technology Fund, the novelty of this segment will require support and potentially concessional funding to facilitate the entry of private sector players and investment. Similarly, existing Pumped Hydro Storage (PHS) facilities in South Africa are limited to a few projects sized according to the previously dominant coal power generation profiles. Developing new private-sector driven PHS, tailored to complement renewable energy generation base will likely require concessional funds and will serve as a demonstration for other/future “Grid Strengthening and Expansion” opportunities.

14. In terms of business model and financing for repurposing and capacity replacement, ways to promote private sector participation are being identified. Depending on private sector appetite and interest, different interventions for each private sector subproject are to be provided. One possible way of intervention is a guarantee mechanism. Due to Eskom’s weak balance sheet, all PPAs entered into by Eskom (that is, the DMRE Procurement Programs) include a national government guarantee, although a weakening fiscal position and an alarming level of government’s contingent liabilities suggest that this is unsustainable over time. This provides an opportunity not only for IPPs with Eskom offtake but also for traders to provide the much-needed liquidity in the private electricity generation and private energy trading market.

15. The underwriting of the REIPPP by sovereign guarantees has led to more competitive bid prices and has provided a strong impetus to the local renewable energy industry. One of the unintended consequences of the REIPPP is that the highly competitive process resulted in many bankable and well-structured projects being conceptualized, of which only a share would be commercialized as winning bidders. This has resulted in many excellent projects being stranded. The stranded projects now have the opportunity to be developed to supply power to the commercial and industrial sector due to two significant energy supply industry (ESI) developments. The first is the permission for private suppliers to wheel power through the national grid from a generation source to any consumer. The second development is the removal of generation license requirements for IPPs with private sector PPAs.

16. As a result of these developments, the previously REIPPP stranded but shovel-ready capacity provides a significant opportunity for energy trading to connect these IPPs to creditworthy offtakers across the country. It must be noted that many private renewable electricity generation projects have to date taken place ‘behind the meter’ (that is, embedded generation) as this was, until recently, the most practical approach to self-generation since it does not involve UOS agreements and wheeling by Eskom or municipalities and is not subject to economic regulation.

17. As different private entities move into the role of aggregators or energy traders, there may be a need to consider a financial guarantee to cover the guarantee requirements from IPPs to secure PPAs for installed renewable energy capacity. This could help unlock hundreds of megawatts of power into the ESI.

18. Component C aims to create opportunities for workers and communities affected by decommissioning and repurposing of the decommissioned coal power plants while minimizing the adverse social and economic risks and impacts. Specific activities under this component will include reskilling/upskilling of workers and community members in the renewable energy sector, investments in MSMEs to strengthen livelihoods and jobs opportunities to reduce coal dependency and generate alternate employment opportunities,⁹³ and mechanisms for enhancing stakeholder engagement and enabling communities to participate in transition planning and decision-making.

19. Investments in activities under Component C will seek to strengthen women's roles as employees, particularly for those in technical roles who aim to pursue a permanent job, and entrepreneurs while supporting those affected by the transition. Targeted activities will be identified to address key gender gaps, including (a) actions to promote female employment (for example, training for human resources [HR], management, and women who seek jobs and capacity-building activities); (b) support to women-owned and youth-led enterprises (for example, financial literacy and business development services); (c) implementation of preventive measures to mitigate associated incidents or risks (for example, GBV and workplace incidents such as SEA/SH) in the project implementation areas; and (d) facilitating of women's participation and voice during consultations, local-level planning, decision-making, and leadership roles. Each project will include gender-specific indicators to monitor progress in terms of closing the gender gaps in relation to women's labor force participation, access to economic opportunities, and increases in voice and agency.

20. Notably, some of the activities under Component C fall beyond Eskom's mandate. Accordingly, it is envisaged that the implementation of Component C activities will significantly be aided by the progress made under the EJERP in Komati and also aligned with the activities carried out under Project 2. In particular, the trainings and skills development will be accessible through the Komati Training Facility while the partnerships and coordination mechanisms developed with the provincial/municipal authorities, relevant government departments, private sector, and CSOs will support the implementation of broader local and community development activities that fall outside Eskom's expertise and responsibilities.

21. Understanding these challenges, risks, and opportunities associated with the decommissioning, repurposing, and capacity replacement processes, upfront planning to make the transition just for workers and communities in coal-dependent areas, and implementing strategies to mitigate the social and economic impacts, will be key to ensuring the success of the JET agenda. To assess the overall impact of the Eskom JET (that is, coal plant retirement as set out in IRP-2019), an SESA will be prepared under this project. The SESA will use an analytical and broad-based participatory approach to identify the impacts of the larger process of closing multiple coal-fired power stations, especially the effects on workers and communities, supply chains, and the coal sector generally. The SESA will provide a tool to support strategic planning for implementation of Eskom's JET Strategy while effectively managing the environmental and social aspects of the transition process.

A.5.1.4. Implementation Readiness

22. The decommissioning and repurposing of the immediate three CFPP sites and outer land will be implemented by Eskom and will build upon Eskom's experience of implementing the CTF-financed projects, including Renewables Energy Support Project, and EJERP implementation arrangements to be tried for the Komati plant. The implementation of the project will be coordinated directly by the Office of the Eskom

⁹³ One of the plans to create alternative employment opportunities is a climate-smart, labor-intensive agricultural development pilot at Grootvlei Power Station site. A pre-feasibility study will be conducted by Eskom and the Netherlands Embassy.

CEO overall, among the implementation of components and project monitoring and reporting requirements. Within the Office of the CEO, there are two distinct functions: the JET Office (JETO) and the Clean Energy Unit (CEU). The JETO drives strategy, advocacy, and JET stakeholder management, including with relationships with funders, and will provide oversight for the overall Eskom JET program, with the CEU responsible for implementation.

23. For broader coal-based generation capacity replacement activities, particularly by the private sector, IFC (together with other relevant development financial institutions [DFIs]) closely follows the developments in the market, driven by the regulatory and policy regime set by the Government of South Africa. With the continued developments across the country, particularly with anticipated push in CFPP retirement in the Mpumalanga region and acceleration of renewable energy penetration across the country, it is expected that the subprojects will start gaining traction in late 2023 and will advance to the Board approval stage in 12–18 months from that.

A.5.1.5. Rationale for CTF ACT Financing

24. ACT financing, along with co-financing by MDBs and other development partners and the philanthropic community, will support South Africa to catalyze and build momentum on the implementation of its program to accelerate transition from coal. The identified three coal power stations will be among the first projects to be decommissioned as part of South Africa's plan to retire 12 GW of coal power plants by 2030. The CTF ACT financing will help overcome first-mover costs, build confidence among local stakeholders and communities, and accelerate the participation of private developers and commercial lenders along the process. These will, in turn, build on investor confidence and ensure long-term financing of future coal plant closures and repurposing and capacity replacement, including support by other development partners and the philanthropic community to help accelerate South Africa's transition from coal.

25. With the expected transition away from large quantities of baseload power from coal, South Africa will need to double down on closing the gap between energy supply and demand. This will unavoidably include the need to attract large investments to transform the economy to a new green future; most of this investment volume will have to come from the private sector. No sizeable or sustainable coal transition process can be designed without rapid growth of investment in the replacement firm power generation infrastructure. While, owing to multiple successful rounds of the REI4P, the renewable energy generation market in South Africa is substantially commercial, the sector requires further strengthening to reduce the reliance on national government guarantee and, more significantly, the sector requires definitive and careful support to stimulate the growth of the firm load renewable energy power generation. This creates a case for the ACT support to private sector activities to demonstrate areas for further investment and together catalyze new economic opportunities. Once the precedents are set, established models and approaches can be scaled up.

26. In case of BESS for CFPP repurposing, the project can build on some initial experiences in South Africa for utility-scale BESS, including a large Eskom project funded by the World Bank using resources from the CTF. However, the novelty of this segment will require support and potentially concessional funding to facilitate the entry of private sector players and investment. Due to the generation technology changes and the historical grid design (baseload) in the Mpumalanga Province, it could be beneficial to include storage solutions in the province as well as in other provinces (provided the needed wheeling arrangements are worked out) to complement the expected newly deployed renewable energy generation.

27. The ACT builds upon the World Bank's US\$366 million EJETP and will leverage the US\$8.5 billion

JETP announced at COP-26.

A.5.1.6. Indicative Financing

28. The indicative costs for project components are listed in table A.4

Table A.4. Indicative Financing Plan for Project 1 Retiring and Replacing Coal-based Power Generation Capacity (US\$, millions)

	Total	Camden (January 2023— November 2025)	Hendrina (Mach 2023— December 2025)	Grootvlei (March 2026— September 2027)
Component A: Decommissioning	150	49	49	52
Shutdown, demolition, rehabilitation	150	49	49	52
Component B: Repurposing and capacity replacement	2,000	711	780	509
Phase 1	1,556	505	689	362
PV	MW	453	185	100
	Cost	477	195	105
Energy storage	MW	450	150	150
	Cost	878	311	256
Wind	MW	120	—	120 ^a
	Cost	186	—	186
Synchronous Condensers	#	1	—	1
	Cost	16	—	16
Phase 2	444	205	91	147
PV	MW	205	75	50
	Cost	235	85	60
Wind	MW	122	72	50
	Cost	208	120	88
Component C: Socioeconomic impact mitigation	200	68	68	63
Transition for Eskom workers	38	15	15	9
Economic diversification	149	50	50	50
Stakeholder engagement	13	4	4	4
Project Total	2,350	828	898	624

Note: a. For the Hendrina Power Station, wind power generation could be part of Phase 1 repurposing because enough data are available from a wind study carried out by Enertrag, despite the general time requirement for minimum 12 months for site-specific measurements at minimum 80 percent of expected hub height.

A.5.1.7. Results Indicators

29. The decarbonization of the electricity sector and the concomitant retirement of CFPPs is anticipated to present positive environmental impacts. Closure of power stations will result in immediate reductions in air emissions that will improve ambient air quality. Potential emission reduction from

decommissioning is expected to reach approximately 71 million tons of CO₂.⁹⁴ Likewise, while the impact of the plant closures on the jobs of those directly employed by the power plants and those whose livelihoods are dependent on the coal value chain will be significant, activities under Component C are expected to mitigate these risks while creating alternate livelihood opportunities, especially in the renewable energy sector, and reducing coal dependency.

30. The final list of indicators will be available during the project preparation stage. Anticipated outcomes of the project include the following:

- (a) Decommissioned coal-based power generation capacity (MW)
- (b) Net GHG emissions (metric tons/year)
- (c) Generation capacity of energy constructed or rehabilitated (megawatt) - Solar, wind, energy storage
- (d) Eskom workers retrained/redeployed/compensated (percentage, female, male)
- (e) Number of suppliers, contractors, and enterprises supported (percentage, female-led)
- (f) Financing mobilized, including from MDBs and other parties (broken down by government and other sources).

A.5.1.8. Timeline

31. The project timeline for CFPP decommissioning and CFPP site repurposing will be in line with Eskom’s CPP retirement schedule, as shown in Table A.5.

Table A.5. Retirement Schedule of the Three Eskom Coal Power Generation Units

CPP	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
len	July 2023	January 2023	January 2024	April 2025	November 2025	August 2024	November 2024	July 2025	n.a.	n.a.
Hendrina	—	February 2025	—	March 2025	December 2025	September 2025	March 2024	—	—	March 2023
Grootvlei	August 2026	March 2026	September 2027	—	—	—	n.a.	n.a.	n.a.	n.a.

32. It is expected that the private sector coal-based generation capacity replacement projects (likely as a private sector program) will be submitted for the Trust Fund Committee review in late 2023 and IFC Board approval of the individual subprojects will follow in 12–18 months after that.

A.5.2. Project 2: Mpumalanga Community Development Project

A.5.2.1. Background

33. Accelerating coal transition and the retirement of coal plants is expected to significantly affect employment and livelihoods in Mpumalanga Province, particularly in the Highveld region. Nearly 76 percent of South Africa’s total coal-related employment is concentrated in just four municipalities in

⁹⁴ This is only a preliminary estimation of the expected GHG emission reduction with excessively simplified assumptions. A detailed analysis on the expected GHG emissions reduction from decommissioning of the CFPPs involving a power system-level analysis will be conducted at the project development stage through consultations with Eskom.

Mpumalanga: eMalahleni, Steve Tshwete, Msukaligwa (formerly Ermelo), and Govan Mbeki, which have highly undiversified economies that rely heavily on the coal economy and where coal mining accounts for 26 percent, 17 percent, 14 percent, and 11 percent of total employment, respectively.

34. Many of the communities living in concentrated coal areas are not only dependent on the mines, Eskom or Sasol, for their jobs but some are also provided basic services including electricity, water, and health services by these entities rather than by their municipalities. As towns have grown due to immigration, local governments have not been able to keep pace with providing basic needs for the growing population, especially those living in informal settlements where many residents remain without access to electricity, water, and sanitation or the means to pay for them. Projected backlogs for 2021 stood at close to 40,000 households without access to water, 70,000 without access to electricity, and 67,000 households without sanitation. Reduction in local revenues of local governments due to the closure of the coal mines and power plants will further limit their capacity to fund public services. The shift away from coal activities will present complex social challenges as it will particularly affect the traditionally marginalized and excluded groups, increasing the likelihood of social tensions both within households and communities.

35. This makes it imperative for the province and municipalities to plan for both mitigating the negative impacts of the planned transition as well as investing in future green economy jobs and the human capital needed for such jobs and opportunities by strengthening participatory planning and collective action by communities and local governments. This is a key principle of just transitions recognized in the provincial and national government's just transition policy and planning documents.⁹⁵ Accordingly, the transformation should include opportunities for communities, local businesses, labor unions, local governments, provincial authorities, and other relevant stakeholders to participate in and invest in the new opportunities in the wake of the transition in green sectors, including agriculture and forestry.

36. The principles of CDD are found to have been successfully leveraged both in the context of South Africa and in just transition processes elsewhere around the world.⁹⁶ A community-driven process also aligns with recommendations of climate change thought leaders on the utility of such a process enabling South Africa to lead a just coal to clean transition that South Africa can model for the world.⁹⁷ Prior assessments on understanding the challenges to the transition process in Mpumalanga as well as the South Africa Renewable Independent Power Producer Programme (REIPPP) identify the need for improving bottom-up stakeholder engagement to ensure inclusive outcomes and buy-in.⁹⁸ Examples of industrial transition processes from other countries show that unless an increased focus on the role of communities is placed in the transition process, it can have critical impacts on the social and economic fabric of communities, starting a vicious spiral where a declining tax revenue means less funding for basic services, more employers and workers moving away, and fewer and fewer jobs. Reversing this cycle and

⁹⁵ For example, see The Mpumalanga Vision 2030, Mpumalanga Department of Economic Development and Tourism Strategic Development Plan 2020–2025 and the PCC's Framework for A Just Transition in South Africa Report 2022.

⁹⁶ <https://www.3ieimpact.org/evidence-hub/publications/working-papers/community-driven-development-does-it-build-social-cohesion>.

⁹⁷ Gompertz, D. 2022. *Coal in 2022: South Africa's Just Energy Transition Partnership*. E3G. <https://www.e3g.org/news/coal-in-2022-south-africa-s-just-energy-transition-partnership/>.

⁹⁸ <https://justtransitioninitiative.org/understanding-just-transitions-in-coal-dependent-communities/>; WWF (World Wide Fund for Nature). 2015. *A Review of the Local Community Development Requirements in South Africa's Renewable Energy Procurement Programme, 2015 Technical Report ZA*.

http://awsassets.wwf.org.za/downloads/local_community_development_report_20150618.pdf.

revitalizing communities take sustained efforts.⁹⁹ There are several examples of using a sustained community-driven approach to ensure a critical outcome of a just transition process, that is, social acceptance and stakeholder empowerment. Case studies include the coal decommissioning processes in the United States,¹⁰⁰ Denmark’s wind sector, and Port Augusta in Australia (closure of two coal-fired power stations)¹⁰¹ among others, which provide lessons and evidence of the need for a community-driven process to ensure effective bottom-up social dialogue to ensure good retraining and deployment of employees and creation of new jobs in renewable energy including ensuring benefits to surrounding communities indirectly affected by transition processes.¹⁰²

A.5.2.2. Project Objective

37. The project objective is to support local communities and the provincial and local governments in Mpumalanga Province during coal transition and prepare for a new green economy for the future. This will be achieved by increasing the quality of, and access to, energy, social, and economic infrastructure services; strengthening local governance mechanisms for creating an enabling environment to facilitate investments in sustainable, green, and resilient growth; and empowering local communities to become more resilient to the impacts of the transition through the creation of new jobs and livelihoods opportunities.

A.5.2.3. Proposed Approach

38. The IP envisages two levels at which community benefits are generated for this project:(a) Mpumalanga’s Green Cluster model and (b) community-level development initiative.

39. **Mpumalanga’s Green Cluster model.** The Mpumalanga provincial government has recognized that transition from coal is inevitable over time and has been proactive in exploring opportunities to stimulate investments in alternative and green economy-led growth to facilitate the transition process. This opportunity, championed by the Mpumalanga Department of Environment and Economic Development, seeks to smoothen the inevitable economic transition and includes a host of potential initiatives, including, for example, the opportunities presented by repurposing land on coal plants and mines that will ultimately be decommissioned. In collaboration with GreenCape, and supported by the UK’s PACT, the region has prioritized a cluster development model by creating the Mpumalanga Green Cluster Agency, to build a modern green economy in partnership with the government, business, and academia to unlock new investment opportunities across various sectors.

40. Registered as a not-for-profit organization, the Mpumalanga Green Cluster Agency was established with the vision of working at both the micro and macro levels to support green-tech MSMEs build their businesses, enabling bigger businesses to improve their environmental footprint, and assisting the provincial government to create an enabling environment to facilitate more investments to create shared value for sustainable and resilient economy that creates decent and sustainable green jobs.

⁹⁹ <https://www.oecd.org/env/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>.

¹⁰⁰ Tarekegne, B. W., K. Kazimierczuk, and R. S. O’Neil. 2021. *Coal-Dependent Communities in Transition: Identifying Best Practices to Ensure Equitable Outcomes*. https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-31909.pdf.

¹⁰¹ <https://www.oecd.org/env/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>.

¹⁰² https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-31909.pdf; <https://www.oecd.org/env/cc/g20-climate/collapsecontents/Just-Transition-Centre-report-just-transition.pdf>; Tarekegne, B., K. Kazimierczuk, and R. O’Neil. 2022. “Communities in Energy Transition: Exploring Best Practices and Decision Support Tools to Provide Equitable Outcomes.” *Discover Sustainability* 3 (12). <https://doi.org/10.1007/s43621-022-00080-z>; https://energy.ec.europa.eu/system/files/2021-05/good_practice_examples_of_regional_and_sub-regional_strategies_in_coal_regions_in_transition_0.pdf.

41. **CDD.** The focus of this proposed initiative is to support the just transition agenda in South Africa by sustainably enhancing the access of local communities to improved social and economic infrastructure services and strengthening the capacity of provincial and local governments to effectively transition to a green economy. The rationale for adopting a CDD approach to achieve these objectives is to ensure that (a) local communities, including youth, women, and marginalized groups, are actively engaged in selecting transition-focused initiatives; (b) investments in social and economic infrastructure (including those relating to the green economy) attend to the needs and priorities of local communities in an inclusive manner; (c) all members of the target communities are provided with the information, facilitation, and capacity building necessary to make decisions that are needs-based and inclusive of women, vulnerable, and poor households, while also influencing project implementation; and (d) local communities and marginalized groups such as women, youth, people with disabilities, are playing an active role in oversight and monitoring of project implementation .

42. The initiative could include both public and private sector elements and will include the following components:

43. **Component A: Community Mobilization and Capacity Building.** Enabling local communities alongside local government mechanisms to take part in decision-making processes over local investments in social and economic infrastructure and income-generating activities will be key to ensuring that people are at the center of the decision-making processes.¹⁰³ Proportionate representation of local communities in decision and implementation processes, with active participation of women and youth, would also be critical to ensuring equitable outcomes of a just transition process. Further, more information dissemination, education, and awareness on the effects of climate change and energy transition are also needed to foster meaningful engagement. The community mobilization and capacity-building activities will involve adopting approaches to first bring together communities, including women and unemployed youth, by addressing barriers that limit participation, providing the necessary information in a simplified form and supporting them in assessing the information, opportunities, and options that are presented to them.

44. Accordingly, the project will support (a) establishment of community development councils or revitalization of existing community organizations, with representation of women and other marginalized groups, to facilitate community participation and oversight in the development process relating to coal transition; (b) community mobilization and capacity-building activities to enable local communities, including women and other vulnerable groups, to take part in the decision-making process over local investments in social and economic infrastructure in an informed and cohesive manner (for example, TA and capacity development support to strengthen the ability of community development councils/community organizations, including women and other vulnerable groups, to identify, plan, and implement community subprojects); (c) establishment of community governance, social accountability, and conflict resolution systems with proportionate representation of women and other marginalized groups; and (d) registration of these community councils/or community organizations with the provincial government to provide them with the status to serve as a partner of the provincial government.

45. **Component B: Strengthening Governance Mechanisms and Institutional Capacity.** The objective of this component is to support the governance mechanisms and capacity development of provincial,

¹⁰³ World Bank. 2009. Community Driven Development and Accountable Local Governance : Some Lessons from the Philippines. Washington, DC. OECD/UN ECA/AfDB (2022), Africa's Urbanisation Dynamics 2022: The Economic Power of Africa's Cities, West African Studies, OECD Publishing, Paris

municipal, and local government authorities in Mpumalanga Province. Given the scale of the transition and the wide-ranging impacts on communities, strong and increased levels of coordination among social partners with clear roles and responsibilities and accountability framework is required to avoid fragmentation and social tensions and maximize opportunities from the transitions process.

46. Under this subcomponent, resources will be committed to developing a comprehensive just transition plan for the province and participating municipalities that focus on green growth strategies, alternate economic opportunities, poverty reduction, and social protection-related policies and programs, in a gender and socially inclusive manner. This subcomponent will also support focused analytical studies, reviews of current practices, international experience sharing, and stakeholder dialogue and dissemination, with an emphasis on meaningful engagement with the community councils/organizations, including women and other vulnerable groups, discussed under Component A. It is expected that these activities will pave the way for the establishment of participatory planning processes, management information, and M&E systems (including impact evaluation); partnerships development; and transparent and effective feedback mechanisms to support the transition process. Further, it will also seek to advance social accountability mechanisms, including community-based monitoring, community scorecards, and social audits, to ensure community oversight, transparency, and accountability of investments. Support from different funding sources such as the WOLCOT Grant Mechanism would allow targeted engagement with women and other social excluded groups, to ensure that have the capacity and the means to engage in project governance and implementation.

47. **Component C: Investments in Community Infrastructure Schemes and Income-Generating Opportunities in the Green Sector.** This component will include investment grants to support local development schemes, entrepreneurial initiatives, and activities that respond to community priorities identified through participatory processes followed under Components A and B. The identification, design, and implementation of these activities will be based on community needs and provincial and local government's priorities and will be carried out in consultation with local and provincial governments, community organizations and representatives (including women, youth and other vulnerable groups), civil society, academia, and economic development agencies in the Mpumalanga region. It is expected that the project will provide useful experience to test different approaches to scale additional JET interventions, including private sector investment while also establishing process legitimacy for the sustainable retirement of CFPPs and how to ensure equitable outcomes in the transition process.

48. Activities financed could include those that will increase local communities, including women and other vulnerable groups' access to basic social services, enhance the economic infrastructure, support income generation through existing MSMEs and start-ups, promote social cohesion, and strengthen local governance and capacity in relation to the transition process. All subprojects will be reviewed by the provincial/municipality governments to ensure that the schemes financed are consistent with local development plans and promote gender equality and social inclusion and sustainability, particularly as they relate to the impacts of the transition process and will be documented in public records. The investments could also include private sector infrastructure investments focused on promoting clean energy generation and supply chains, with examples including expanding energy efficiency, rooftop and community solar, and solar irrigation. The selection of the investments will also seek to finance local community projects that prioritize the needs of women, youth, and other vulnerable groups and empower them in the implementation of the projects (for example, initiatives that facilitate energy access for female-headed households, including development of energy services, afforestation, and smart agriculture initiatives).

A.5.2.4. Implementation Readiness

49. With increasing recognition that the success of South Africa's transition process is closely tied to Mpumalanga's capacity to mitigate the adverse impacts and benefit from coal transition, the interest in supporting the provincial and local governments has burgeoned recently. The ability to optimize this varied support requires having in place a strategic framework for regional development, relevant capacity at the provincial and local government levels, institutional mechanisms for coordination, basic infrastructure and facilities needed for private sector growth, entrepreneurial capacity and skills to use opportunities of green growth, and an informed citizenry able to participate in decision-making and contribute to the development process. This comprehensive support provided through this project will help create an enabling environment for the successful closure of power plants and coal mines as well as green growth. Critical factors indicating implementation readiness include the following:

- (a) National and provincial commitments, including frameworks, policies, and strategies to put people at the center of the transition process
- (b) Institutional mechanisms within Mpumalanga Province such as the Green Cluster Agency; the proposed two-level governance structure for stakeholder engagement, the Mpumalanga Just Transition and Climate Change Forum, a multi-stakeholder coordinating forum; and a Technical Working Group/Technical Coordinating Committee ancillary to and in support of the forum
- (c) Memorandum of understanding signed between Eskom and Mpumalanga Province to partner on the JET Strategy and the closure of Eskom's first CFPP in Komati (financed by the World Bank) currently under preparation
- (d) Request from the provincial government to the World Bank for support in implementing its Just Transition Strategy, including capacity development of provincial and local government institutions; improving access to energy, social, and economic infrastructure services; and enhancing stakeholder engagement, in coordination with the PCC
- (e) Successful cases of CDD activities in South Africa, especially from KwaZulu-Natal and the Western Cape,¹⁰⁴ which can be replicated in the context of Mpumalanga as well.

A.5.2.5. Rationale for CTF ACT financing

50. With high rates of unemployment, large number of people living on the margins, and an economy that is highly dependent on the coal value chain for income and livelihoods, the Just Transition agenda in Mpumalanga, and by extension, South Africa, requires multi-sectoral interventions that hinge on inclusive and participatory planning and decision-making. Managing and easing the social and economic transition will also need to attract investment to transform the regional economy to a new green future. This creates a case for support to both the public and private sectors to create an enabling environment for investment and together catalyze new economic opportunities. Grants and risk financing will provide the flexibility to support programs through Eskom (at and around their former coal plants), for the Green Cluster Agency through their public and private programs and for the CDD-led community programs. It will also create a model for such partnerships for future transition and offer lessons that can be incorporated over time into

¹⁰⁴ Sustainable Community Development in South Africa. <https://www.globalnature.org/en/community-development-south-africa/>; <https://www.saferspaces.org.za/organisation/entry/arise-community-development-projects/>; <https://www.saferspaces.org.za/organisation/entry/arise-community-development-projects/>; <https://www.3ieimpact.org/evidence-hub/publications/working-papers/community-driven-development-does-it-build-social-cohesion/>; <https://www.e3g.org/news/coal-in-2022-south-africa-s-just-energy-transition-partnership/>.

this and other related JET programs.

A.5.2.6. Results Indicators

51. Anticipated outcomes of the project include the following:
- (a) Improved capacity of provincial and municipal governments to implement relevant just transition strategies
 - (b) Improved access of local communities to municipal services (for example, water, electricity, and so on)
 - (c) Effective community infrastructure schemes and income-generating activities in the green sector, especially with the participation of women, youth, and other vulnerable groups
 - (d) Share of women in decision-making forums/platforms related to just transition
 - (e) Enhanced collaboration/partnerships between local communities, private sector, civil society, and provincial/local governments on the transition process.

A.5.2.7. Timeline

52. The timeline for the project will be finalized once approval is obtained for the proposed IP program.

A.5.3. Project 3: Energy Efficiency, Distributed Generation, and Community Generation Programs

A.5.3.1. Background

53. At a national level, the potential contribution of energy efficiency projects to South Africa's transition to a low-carbon economy is recognized in the NDP, the draft National Energy Efficiency Strategy, and the Climate Change Policy White Paper through its flagship projects. The EEDSM flagship aims to support the development and implementation of an aggressive program of energy efficiency energy efficiency in industry, the residential sector, and the government building sector.

54. Fostering distributed generation, defined as smaller renewable energy systems connected to the grid at the distribution level (in the case of electricity), has many benefits. When comparing larger grid-tied solar PV plants with rooftop solar, it is found that job creation of the latter is significantly higher. South Africa's grid is constrained in many places, limiting the short-to-medium prospects of large-scale variable renewable energy (VRE) plants. Distributed generation when supported by feed-in tariffs or the like allows utilities to leverage private capital for additional incremental generation capacity. Eskom is working on its own distributed generation business case and some municipalities are doing the same.

55. However, not all people, businesses, and entities (public and private) have access to land and/or rooftops suitable for distributed generation. Moreover, the minimum cost ('entry ticket') for distributed generation systems runs into tens of thousands of rands. Thus, based on international experience, fractional ownership of distributed generation plants, with the fractions potentially being tradeable, offer a way for poorer segments to engage in and experience ownership of renewable energy generation assets. Furthermore, with wheeling clearly being part of South Africa's path toward much higher use of renewable energy, fractional ownership will not be restricted to specific locations. On the other hand, fractional ownership of renewable energy generation assets can be offered—at market or reduced prices—to

affected members of the public as an enabling policy to reduce opposition to projects and fractional ownership can also be employed as a national 'Just' policy giving every citizen a stake in the country's generation fleet.

56. Energy efficiency, distributed generation, and community generation programs will be initiated in the province of Mpumalanga with the possibility of scaling to more provinces.

57. There have been many successes regarding energy efficiency in the country, including Section 12L, of the South African tax code providing an income tax allowance for energy efficiency investments and the DMRE EEDSM program. However, it is recognized that there is still an enormous potential for further energy efficiency improvements in the South Africa economy. Tariff increases are often a key driver underpinning the development of energy efficiency projects; however, despite significant increases over the past decade, few projects are implemented. There are several reasons for this including, but not limited to, limited understanding of energy efficiency projects in the financial sector; lack of expertise in both the private and public sectors on how to identify, commission, and implement such projects; and the inability of providers of energy efficiency services, and private sector companies, to access finance for these types of projects. Cumulatively, these barriers result in the lack of a pipeline for the development of energy efficiency projects through identification, design, development, financing, and successful implementation.

58. The EEPBIP funded by the Nationally Appropriate Mitigation Actions (NAMA) facility and presently being implemented by the DMRE, with GIZ support, offers one potential solution to this problem.

59. Its focus is on energy efficiency in public sector buildings and infrastructure (for example, municipal wastewater treatment plants and streetlighting). It aims to develop a pipeline of bankable projects, mobilizing private sector providers of energy services (including ESCOs) to finance and deliver such projects in partnership with public sector entities.

A.5.3.2. Proposed Approach

60. The project comprises the following three components:

- (a) Component A: Energy efficiency
- (b) Component B: Distributed generation
- (c) Component C: Community generation.

61. The proposed approach toward Component A is to develop a Mpumalanga-focused program to drive the development and implementation of energy efficiency projects in the province. The support includes, but is not limited to,

- (a) Undertaking energy audits;
- (b) Identifying and developing business plans for potential energy efficiency projects;
- (c) Support Eskom and distribution companies to design on-bill-financing mechanisms targeting both public and private sectors
- (d) Developing standardized procurement and energy performance contracting procedures; and
- (e) Associated capacity-building activities in the public and private (including financial) sectors.

62. A supporting financial component involves the creation of a Partial Credit Guarantee (PCG) to mitigate risks (for example, non-payment or payment delays) of private sector companies contracting with public sector institutions for such projects. The objective of the PCG (to be implemented by the Industrial Development Corporation) is to increase the appetite of financial institutions to get involved in such projects, by addressing project related risks. In terms of the financial component, as an additional element for this proposal, it is also proposed that funding be made available to seed an energy efficiency credit line for Mpumalanga-based projects to further support pipeline development. This is to be located at a South Africa-based financial institution, which would be identified in the project preparation phase. As mentioned previously, the fact that this proposed initiative is leveraging on an existing program infers a high state of implementation readiness.

63. This initiative is relevant in terms of the ACT Program, not only in terms of the reductions in the use of grid-based electricity and their associated GHG emissions but also in terms of the social and economic development aspects. Implementing a pipeline at scale will lead to several positive socioeconomic impacts that will contribute toward mitigating the negative impacts associated with the transition from coal. These include the following:

- (a) **Job creation in the energy services sector because of an increased pipeline of projects in Mpumalanga.** With an increased long-term demand for services provided by ESCOs, they would be encouraged to set up a presence, with associated permanent jobs, in Mpumalanga Province. In addition, the public sector pipeline of this initiative will develop and provide a baseload of work that can leverage further private sector opportunities. The province has a number of energy-intensive sectors (for example, mining, paper and pulp, and sugar milling) that are a potential source of such opportunities, in addition to a broad base of MSME activities. This diversification of the sources of projects would support the sustainability of these companies supporting long-term and localized employment benefits.
- (b) **The development of an energy services sector** would also create opportunities for new skills development for workers in Mpumalanga.
- (c) **Retention of existing jobs is and will be important in Mpumalanga and this initiative should assist in supporting the resilience of existing companies.** This is through the development of an active energy services sector in Mpumalanga, which will be looking for opportunities to support companies in reducing their exposure to energy-related costs. The SMME sector is particularly vulnerable to increasing energy prices in South Africa, be it liquid fuels or electricity related. Any reductions in these costs will assist companies to retain staff and lessen the impact on their growth strategies. In addition, reducing energy use further opens opportunities to address the energy security challenge South Africa businesses face, whether it be by storage and/or own generation. This reduced energy use reduces the scale, and therefore the costs, associated with such interventions.
- (d) **The proposed initiative is aligned with the strategic aims of the ACT and in addition will support systemic change and adaptive sustainability.** This is a result of building a system that will enable a long-term pipeline of energy efficiency projects to be developed, as it is linked to the public sector which, as a permanent element of Mpumalanga's economy, will support the sustainability objective of the project. The Project Management Unit envisaged will also enable the initiative to be responsive to any changes in the context it operates in and ensure that issues such as social inclusion and gender are reflected effectively and comprehensively in the initiative's operational approaches and any projects developed through its work.

64. Component B structures will be created to support and foster private and public investments in the distributed generation system, initially in the province of Mpumalanga, with the explicit ambition that the component will help in the transition away from fossil fuels and help address the supply crisis in the country. In terms of technology, the program will be neutral with the provision that rooftop solar PV will have a dominant role at least at the beginning. Small-scale roof-top type projects have significant direct job creating potential compared to utility scale projects and potential indirect effects on SMEs.

65. Component C will adopt the following approach. South Africa already has at least one entity that offers fractional ownership of rooftop solar PV installations but with a model that entails PPAs and monetary returns to fractional owners. While this model is with merits, the Community Generation Programme initially centered in the province of Mpumalanga will also seek to foster citizen-focused models in which kilowatt hours produced are credited to fractional owners' electricity bills. Furthermore, the model can be expanded to include communal or trust-owned systems that, for instance, ensure common goods such as streetlights operating in an area. A key strength of a community generation approach is that it lends itself easily to hybrid ownership structures. It also lends itself to cash-starved entities developing large rooftops or land unsuitable for habitation or productive uses (for example, retired rubbish dumps and areas along railway lines) by using a communal ownership model in return for a share in kilowatts produced.

A.5.3.3. Implementation Readiness

66. Currently, the ACT participating MDBs, including AfDB and the World Bank, are discussing the implementation modalities with the country counterpart and international development partners.

67. The EEPBIP is a program in implementation that is available to address some of the main challenges of energy efficiency project development. It does this through two components—technical and financial. The technical component uses an Energy Efficiency Support and Project Management Unit to plan, manage, and implement projects in the public sector.

68. In addition, there are existing initiatives in place that will allow energy efficiency activities to scale up quickly and specifically identify potential project developers. These initiatives include

- (a) SANEDI's program to implement Energy Performance Certificates in buildings;
- (b) SANEDI's ongoing work supporting ESCO development in the country; and
- (c) Mpumalanga Province's initiative to develop a Mpumalanga Green Economy Cluster in the province to support Just Transition-related activities.

69. Distributed generation is a proven approach in terms of technical viability backed by rapid developments in inverter technology, which means that such systems can be grid forming (support grid stability). Eskom and municipalities have staff who can, with support, apply models developed in other markets to the circumstances in South Africa. On-bill-financing modalities for energy efficiency interventions can be expanded to also encompass distributed generation and storage with particular relevance for SMEs.

70. While there are significant overseas experiences in community generation and South African expertise is emerging, Component C will initially require dedicated support both in terms of financing and TA.

A.5.3.4. Rationale for CTF ACT financing

71. The ACT's focus on regions and communities that are being affected by the transition away from coal is the underlying rationale for financing this component. It will be focused on South Africa's coal regions, starting with Mpumalanga Province, which is the region that will experience the most significant socioeconomic impacts because of the move away from coal. To support this project effectively, a mix of TA for project development and the mobilization of financing to support the implementation of developed projects will be required. This fits the support mechanisms being offered by the ACT. In addition, the focus will not only be on reducing GHG emissions but also on looking at the creation of economic opportunities for the communities and workers in Mpumalanga and other coal regions and elsewhere affected by the transition.

A.5.3.5. Indicative Financing

72. An indicative financing plan is shown in Table A.6.

Table A.6. Energy Efficiency, Distributed Generation, and Community Generation Programs (US\$, millions)

Project Component	ACT Funding Allocation	MDB Funding Allocation
Component A: Energy efficiency	40	10
Component B: Distributed generation	5	20
Component C: Community generation	5	20
Total	50	50

73. Components B and C are expected to have a high degree of leveraging of private capital in the form of utilization of private savings and ability to borrow from the financial sector. For the province of Mpumalanga, it is estimated that ACT funding of US\$5 million for each in combination with MDB financing of US\$20 million for each component will have a significant catalytic effect.

A.5.3.6. Results Indicators

74. The scale and associated impact of the intervention under Component A is expected to be significant, although it would need to be confirmed in the project preparation phase. In terms of verified energy savings, a rough estimate from the EEPBIP's work nationally provides a conservative figure of 145 GWh of, possible, electricity savings per year in Mpumalanga Province only. In terms of GHG impact, this is equivalent to an emission reduction of 153,700 tons of CO₂ equivalent per year. The following results indicators are proposed for the project results log frame:

- (a) Verified energy savings in kWh or GJ (the energy savings will not only be in electricity)
- (b) GHG emission reductions associated with the verified energy savings (in tons of CO₂ equivalent)
- (c) Indicators to measure the economic opportunities created and any associated social beneficial impacts.

75. Components B and C will facilitate a high degree of citizen involvement in solving the country's energy crisis, make use of private investments for the transition away from fossil fuels, and expand local opportunities for skilled job's creation. By its very nature, the community generation approach involves engagement at local levels both potentially uplifting poorer areas and individuals and creating buy-in to the notion of transitioning from fossil fuels. Smaller localized projects would, i.e. the distributed

generation projects described above, generate jobs and develop skills in local areas, which could be an area directly affected by the closure of coal mines and/or coal-fired power stations. The proposed results indicators include

- (a) Verified energy production in kWh;
- (b) GHG emission reductions associated with the verified energy production (in tons of CO2 equivalent assuming substitution of coal); and
- (c) Indicators to measure the economic opportunities created and any associated social beneficial impacts.

A.5.3.1. Timeline

76. The detailed timeline for the 3 components will be developed once approval is obtained for the proposed IP program, but tentatively it is expected that energy efficiency activities can start early after approval, that distributed generation activities will require assistance with generating detailed concepts and that community generation projects will take the most preparatory work to facilitate South African models.



The Climate Investment Funds

The Climate Investment Funds (CIF) were established in 2008 to mobilize resources and trigger investments for low carbon, climate resilient development in select middle and low income countries. To date, 14 contributor countries have pledged funds to CIF that have been channeled for mitigation and adaptation interventions at an unprecedented scale in 72 recipient countries. The CIF is the largest active climate finance mechanism in the world.

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