In collaboration with:

Policy Brief: Just Greening of the South African Economy in a post-COVID Era

Findings from the Research Report prepared for GIZ in cooperation with SDSN

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Overview

This policy brief summarises the key findings presented on the research conducted on the just energy transition of the South African economy under funding from the GIZ. It includes comments and ideas for future research that were gathered during the stakeholder engagements that was held as part of the project which provide relevant and applicable feedback to the modelling exercise, the interpretation of the modelling results, and provided feedback on the estate of the just energy transition in South Africa while focusing on the Leaving No One Behind (LNOB) principle.

The study aimed to provide insights into how the continuous energy transition will influence the socioeconomic conditions of the South African population and how policies can be proactive. The study covers all provinces in South Africa regarding geographical differences with a special focus on Mpumalanga which is the province where most coal power plants are located and is therefore expected to be affected the most by the just energy transition. Sectorial differences were examined in the study, considering that economic sectors will enter the energy transition and will also be affected by national policies and international agreements that will guide their transition. This study systematically evaluated a green energy transition whilst considering the LNOB principle. This was done to ensure that policies that will have the most significant long-term economic impact for all, including the most vulnerable population groups of the South African society, are evaluated while addressing the transition towards cleaner energy sources and ensuring sustainable access to energy for all on a post-COVID era.

The key results from the study highlighted that 1) as expected, the shift away from coal-fired generation has a meaningful impact on reducing CO2 emissions; and 2) at a national level at least, there is the possibility of a double dividend when greening the SA economy, and perhaps even a triple dividend if a just transition in Mpumalanga can be achieved.

INTRODUCTION

The COVID-19 pandemic led to a global economic crisis of extensive magnitudes, which affected economies, societies and health systems across the globe (IEA, 2022a). During the lockdown periods, economic activity globally was reduced, consumers and suppliers substantially altered their profiles and trends, which is demonstrated by the short-run halting of Greenhouse Gas (GHG) emissions and energy usage reduction.

Internationally, the energy sector did not escape the consequences and impact of the COVID-19 pandemic and the restrictive lockdown measures that followed (Abu-Rayash & Dincer, 2020; Chakraborty & Maity, 2020). The energy sector was severely affected by repeated lockdowns in 2020, with slowed transport, trade, and economic activity across the globe. It has been reported that energy use declined by over 4% globally (IEA, 2022a). However, as waves of the pandemic continued to roll across the world in 2020 and 2021, different stimulus packages and vaccine rollouts allowed most economic activity to return, with global energy demand reportedly rebounding by over 4.5% in 2021, taking it above pre-pandemic levels (IEA, 2022a).

The effects of the COVID-19 pandemic have brought to the forefront the worldwide debate on how green the economic recovery can and should be and whether the pandemic has accelerated the existing energy transition whilst ensuring a just transition for vulnerable groups such as unskilled workers and women. For South Africa, one of the significant challenges remains to substitute fossil fuel consumption, which represents over 90 percent of the country's energy sources, especially in vital economic sectors such as mining, iron, and steel (EIA, 2022b). The sectors' dependence on energy and capital makes them adapt more slowly to change, and these sectors are also recognised as key employers in the country (Inglesi-Lotz, 2015). Another challenge facing middle- and low-income countries, particularly, is that universal access to energy during transition conditions is imperative to achieve the countries' developmental goals (see United Nations Sustainable Development Goal SDG 7). Such a combination, which includes transitioning to cleaner fuels to mitigate climate change while ensuring that vulnerable populations will mostly be positively affected (or at least not negatively affected), is referred to as the just energy transition (ILO, 2015; Montmasson-Clair, 2021).

In the energy transition process, with the targeted and expected outcome being the reduction of GHG emissions and the input seen as the investment in changes in technologies, the indirect impacts are demonstrated as losses or gains in economic welfare or job opportunities. Economic sectors react in various ways, offer different acceleration options, or contribute to the energy transition. Evaluating the short and long-run impacts of the just energy transition among different economic sectors is essential for policymakers to prioritise those with the highest net result (minimising both financial and socioeconomic losses) and consider the principle of *Leaving No One Behind* (LNOB).

The principle LNOB is based on moving away from assessing progress on averages and means but ensuring that all population groups progress. It thus becomes imperative for society, particularly researchers, civil society, and policymakers, to compare and contrast the disaggregate progress of all population groups in all aspects. People who are left behind in development are often economically, socially, spatially, and politically excluded – for example, due to ethnicity, race, gender, educational attainment, age, disability or a combination of these, leading to multiple discriminations.

In the South African case, given that the coal-base electricity generation is mostly located on one province, Mpumalanga, the effects of the just energy transition need to be considered under the LNOB principle and should be evaluated at a regional level.

Expanding on the views from the research done by van Heerden et al. (2016), South African energy policymakers face a triple challenge: (1) to generate adequate energy for the growing demands of the population; (2) to develop and use clean energies to reduce greenhouse gas (GHG) emissions; and (3) to minimise the socioeconomic losses from the changes (job, income and trade losses for example).

Therefore, policies must be appropriately directed and concerted to effectively balance the triple challenge elements. Furthermore, the challenge is multifaceted and exhibits at least two layers of depth: geographic and sectorial differentials. Using a regional computable general equilibrium (CGE) model, which is an economy-wide modelling tool that allows us to consider the regional, sectoral and socioeconomic aspects of

the LNOB agenda taking into account the post-COVID era, this study provided insights into how the continuous energy transition will influence the socioeconomic conditions of the South African population and how policies can be proactive. The study covers all provinces in South Africa regarding geographical differences. Sectorial differences are examined, considering that economic sectors will enter the energy transition and will also be affected by national policies and international agreements that will guide their transition. This study systematically evaluated a green energy transition whilst considering the LNOB principle ensuring that policies that will have the most significant long-term economic impact for all, including the most vulnerable population groups of the South African society, are evaluated while addressing the transition towards cleaner energy sources and ensuring sustainable access to energy for all on a post-COVID era.

BACKGROUND

South Africa's climate related policies are extensive and include mechanisms for decarbonising the economy and facilitating new climate-resilient and transition-compatible economic opportunities. The country's energy sector dependence on coal makes the coal industry fundamental to the country's decarbonisation plans. The national government has committed to a scheduled retirement of coal-fired power generation to transform this sector, which will have implications for the whole coal value chain, including mining and related businesses (ΠPS, 2022).

South Africa has focused its efforts on the transition to the energy sector with the ultimate purpose of mitigating climate change consequences. The transformation of the South African energy sector is not a recent phenomenon but an ongoing dynamic situation.

South Africa's updated Integrated Resource Plan (IRP), published before the COVID-19 pandemic in 2019, confirms that the country's planned energy-mix trajectory will move to a more significant share of renewables by 2030 and beyond. A quick cross-country comparison found that many other countries have initiated similar programmes to meet their environmental obligations under the Paris Agreement and SDGs framework.

BOX 1: OVERVIEW OF THE SOUTH AFRICAN GREEN TRANSITION

Gradual move away from coal-fired generation to cleaner sources of electricity in a just way

- The so-called 'green transition' has been underway in some form or another for decades and the health and environmental threats of pollution and climate change are now established science
- South Africa is the 14th largest emitter of GHG, Mpumalanga is one of the world's most air-polluted regions
- Combination of SDGs and NDCs dictate the transition away from coal-fired generation, confirmed by the current IRP's proposed generation-mix path
- However, considerable policy uncertainty remains (real or perceived) further complicated by South Africa's continued lack of reliable electricity supply and fiscal constraints, amongst other issues
- All of South Africa's base load stations (coal and nuclear) present current or potential problems due to aging, poor maintenance, design issues, etc. as highlighted by the current state of affairs
- The *Just Transition* and *Leave No One Behind* principles, informed by ILO guidelines, are foundational aspects of the ongoing transition and planning process, and emphasised in the IRP

Eskom (2022) explains how the transition is viewed in the South African context (refer to Figure 1):

Figure 1 Just Energy Transition Concept

JUST	ENERGY	TRANSITION
Doing better for people and the planet	*Continued Electricity provision*	*Transformational change of business models*
Detailed studies of socio-economic impact of plant shutdown on employees and communities	Repowering ageing coal fleet	Repurposing ageing coal fleet
Stimulate local manufacture and job creation, competiveness	Increasing share of renewable energy	Future of the Generation business vis-à-vis increasing role of IPPs
Emission reductions – air quality and carbon emissions	Increasing share of gas	Separate coal and green business
Managing rehabilitation liabilities	Storage options	A different Eskom from what we now know – Transmission, Distribution, Generation redefinition
Customer needs driven	Grid strengthening	Enable private sector financing, partnerships
	Smart grids	New revenue streams to contribute to JET
	Electricity access through micro grid options	

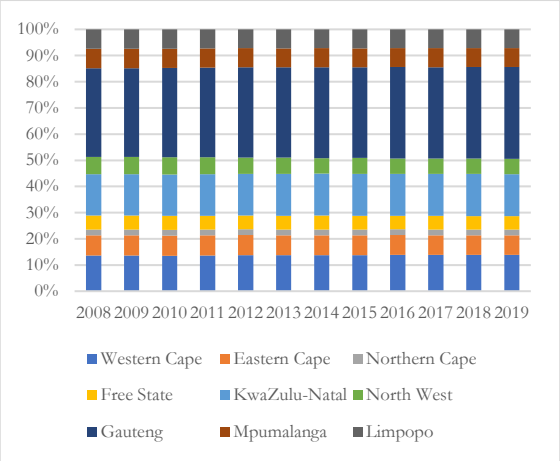
Source: Adapted from Eskom (2022)

The prolonged slump in South African economic activity, which was heightened by the COVID-19 pandemic, combined with regulatory bottlenecks, public sector funding constraints and reluctance in private sector investment during and in the aftermath of the state capture era has curtailed momentum with progress in the adoption of renewables, and developments are behind schedule. The COVID-19 pandemic and associated devastation over the fragile South African economy provided the impetus for the President's Economic Reconstruction and Recovery Plan (ERRP), which was announced in late 2020. In the spirit of 'do not let a crisis go to waste', one of the key stimulus areas is the rapid expansion of electricity generation capacity through a diverse energy mix. This focus area has also been labelled an attempt at kickstarting a 'green economic recovery' aimed at achieving the elusive double dividend of (1) boosting economic growth coupled with associated benefits such as job creation and the reduction of inequality and (2) reducing harmful emissions leading to environmental benefits.

It is imperative to consider social justice and the potential effects on jobs and local economies when drafting policies to guide the timing of the shift to a low-carbon economy (DoE, 2019). South Africa's high unemployment levels magnify the risks of job losses resulting from transitioning coal out of the supply mix. The choice of technology and the scale and speed of adoption of renewable energies will have consequences that vary across economic sectors and geographical regions. Mpumalanga is the province in South Africa where most coal power plants are located, a shift away from coal will significantly affect the Mpumalanga economy, which represents around 8 per cent of the South African economy (Figure 2), and employment levels in the mining sector in South Africa (Figure 3).

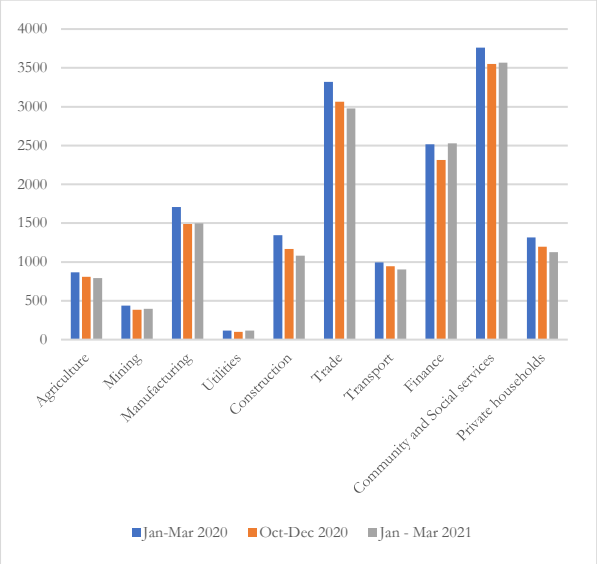
The energy transition's effects are not one-dimensional among South Africa's provinces due to the distribution of coal mines and coal-fired power plants (as shown in Figure 4 which highlights how the majority of South Africa's power plants are located in one province - Mpumalanga) (Bohlmann et al., 2019). The impact of switching to an energy supply mix with a lower share of coal generation is dependent on other economic and policy circumstances, mainly how the global coal market responds and, as a result, how much coal South Africa exports. Under conditions in which surplus coal resulting from lower domestic demand cannot be readily exported, the economies of coal-producing regions in South Africa, such as the Mpumalanga province, are the most severely affected. The subsequent migration of semi-skilled labour from that province to others within the country require appropriate and timeous planning by energy policymakers and urban planners (refer to Figure 5 which shows that semi-skilled labour forms a big proportion of the South African labour force).

Figure 2: Provincial GDP constant 2010 prices



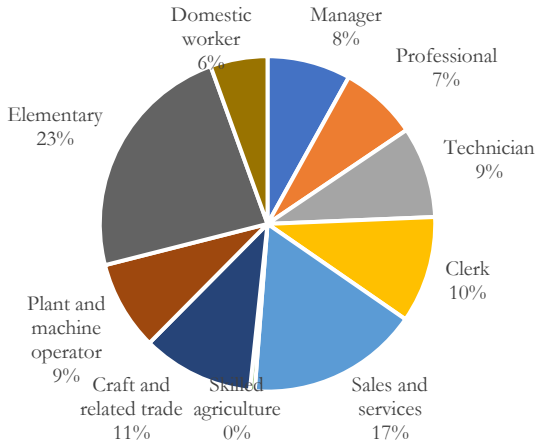
Source: StatsSA(2022a)

Figure 3: Employment by industry (in thousands)



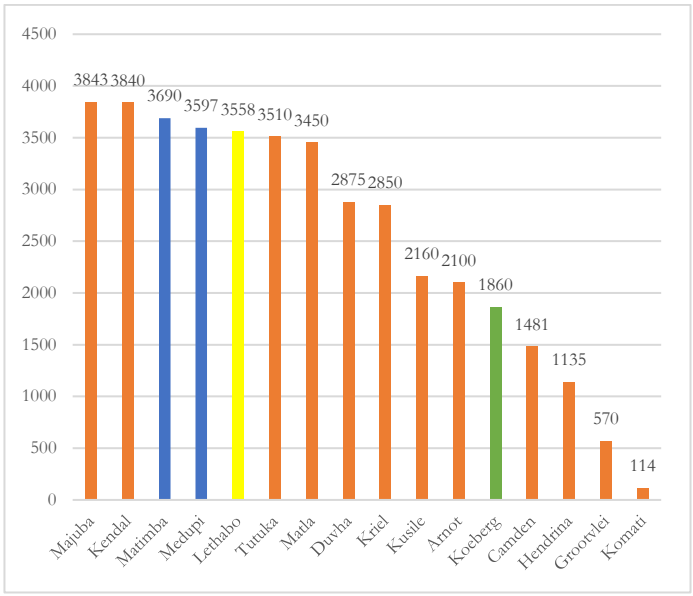
Source: StatsSA (2022b)

Figure 4: Employment by profession – Apr – Jun 2022



Source: StatsSA (2022b)

Figure 5: Eskom baseload 2021



Source: Eskom Integrated Report 2021

Note: Orange: Mpumalanga, Blue: Limpopo, Yellow: Free State, Green: Western Cape

BOX 2: STYLISED FACTS OF THE SOUTH AFRICAN ECONOMY

Macro and industry level numbers that matter

- GDP of the South African economy was R5.6tn in 2019 (roughly the same as 2022 in real terms)
- Domestic industry coal supply was R135bn at basic prices, R150bn at market prices
- Refined petroleum (R24bn), electricity generation (R44bn), and exports (R67bn) were the main users of coal in value terms contributing to over 90% of total demand
- The coal mining industry (SIC21) employed just over 90,000 workers in total
- The electricity and gas industry (SIC41) employed just over 100,000 workers in total
- There were 25.777mn workers in the expanded labour force in 2019, of which 16.350mn were employed and 9.427mn unemployed or discouraged
- The national expanded unemployment rate was 36.5% in 2019, but is currently (QLFS 2022Q2) estimated to be 44.1%, with Mpumalanga at an alarming 48.1%
- The vast majority of coal mining (75%+) and electricity generation activity is concentrated in Mpumalanga, with significant indirect linkages to surrounding areas and other economic activities
- The majority of employment and wages earned (75%+) in the coal mining sector is low-paid/low-skilled workers, and alongside low-paid/low-skilled workers in the electricity generation sector, are highly vulnerable to the phasing out of coal and changing electricity generation-mix landscape
- Low baseline growth, and by implication, employment growth is currently projected over the medium term, making it very hard to absorb any adjustment costs of a policy shock

RESEARCH EXERCISE AND RESULTS

Our modelling approach

- We use the regional-dynamic version of UPGEM to estimate the effects of various scenarios linked to the green transition
- CGE models are ideally suited and have been widely used for this type of analysis
- The simulations we ran are intended as benchmark scenarios, and are not specifically calibrated in terms of the magnitudes and timespan of the shocks
- Given the general uncertainty surrounding the transition, we believe this is a useful way to gauge which regions, industries and workers are most exposed to possible events
- Where relevant, we have tried to run the simulations under multiple sets of assumptions
- Results are, unless stated otherwise, percentage change deviations from the BAU baseline

Benchmark scenarios

- **S1A** models a 2% point **increase in financing costs** over two years (decrease in amount of investment at any given rate of return) for the **coal industry**, and **S1B** models the same for the **refined petroleum industry**
- **S2** models a spillover effect related to the current crisis through a **1% increase in economy-wide financing costs** over two years
- **S3** models a gradual **decline/embargo on coal exports** (70% reduction over 5 years)
- **S4** models the **electricity generation-mix change away from coal** to non-coal inputs, with national coal exports kept to its baseline path
- These simulations cover a broad spectrum of scenarios and shocks related to the 'green transition' and global move to cleaner energy sources, financing and ESG considerations by industrie

RESULTS

Impact of generation-mix change on emissions

- As expected, our research shows that the shift away from coal-fired generation has a meaningful impact on reducing CO2 emissions
- Various assumptions influence the size of the drop in emissions, and may be further supported if other policies such as carbon taxes or future ESG pressures are taken into account
- At a national level at least, this confirms the possibility of a double dividend when greening the SA economy, and perhaps even a triple dividend if a just transition in Mpumalanga can be achieved

DISCUSSION AND POLICY CONSIDERATIONS FOR SOUTH AFRICA

Our story in a nutshell

- Our results show that, firstly, the transition away from fossil fuels is inevitable, and second, the concern for managing a just transition in Mpumalanga is valid
- Nationally there is very little concern, but this is a regional story, and the Mpumalanga economy is a clear loser in the greening transition, although opportunities will still present itself at an industry level
- Low-paid/Low-skilled workers in coal mining regions, mainly Mpumalanga, are perhaps more at risk than what the results suggest – poor labour mobility and ability of other Mpumalanga industries to pick up the slack in terms of output and exports may hamper their employment prospects
- Massive investment is therefore needed in Mpumalanga industry and its workers to achieve a just transition
- However, this is by design in our modelling exercise, the use of fossil fuels must be constrained for environmental and health reasons and stakeholders have known this for a long time

BOX 3: SOME REAL WORLD ISSUES TO CONSIDER WHEN MODELLING THE JUST ENERGY TRANSITION

- Labour mobility and skills transition will pose various challenges
- Ability of other Mpumalanga industries to pick up the slack in terms of production and exports
- New generation types and locations
- Fiscal space to support the just transition, how high should this spending priority rank?
- Differences in short vs long run outcomes (adjustment path) can be crucial
- Spatial and infrastructure planning
- Continued fuel switching by consumers to off-grid renewable solutions
- Practical or logistical constraints not considered/known by the model
- Review of key parameters in the model and sensitivity analysis

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