

BEYOND COAL

OPPORTUNITIES TO DIVERSIFY THE ECONOMIES OF
EMALAHLENI AND STEVE TSHWETE
LOCAL MUNICIPALITIES



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Beyond coal: opportunities to diversify the economies of Emalahleni and Steve Tshwete local municipalities

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This report is a collaboration between two initiatives. Trade & Industrial Policy Strategies (TIPS), with the National Labour and Economic Development Institute (NALEDI), in collaboration with Peta Wolpe, and supported by groundWork, worked together on fostering a just transition in South Africa's coalfields, with a focus on eMalahleni and Steve Tshwete. This was funded by the United Kingdom Partnering for Accelerated Climate Transitions (UK PACT). The Just Urban Transitions project is led by Adapt and funded by Agora Energiewende, focusing on subnational development and implementation of South Africa's just transition.

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Cover image:

Komati Power Station, Joëlle Chesselet, Director, [Voices from under a dark cloud](#)



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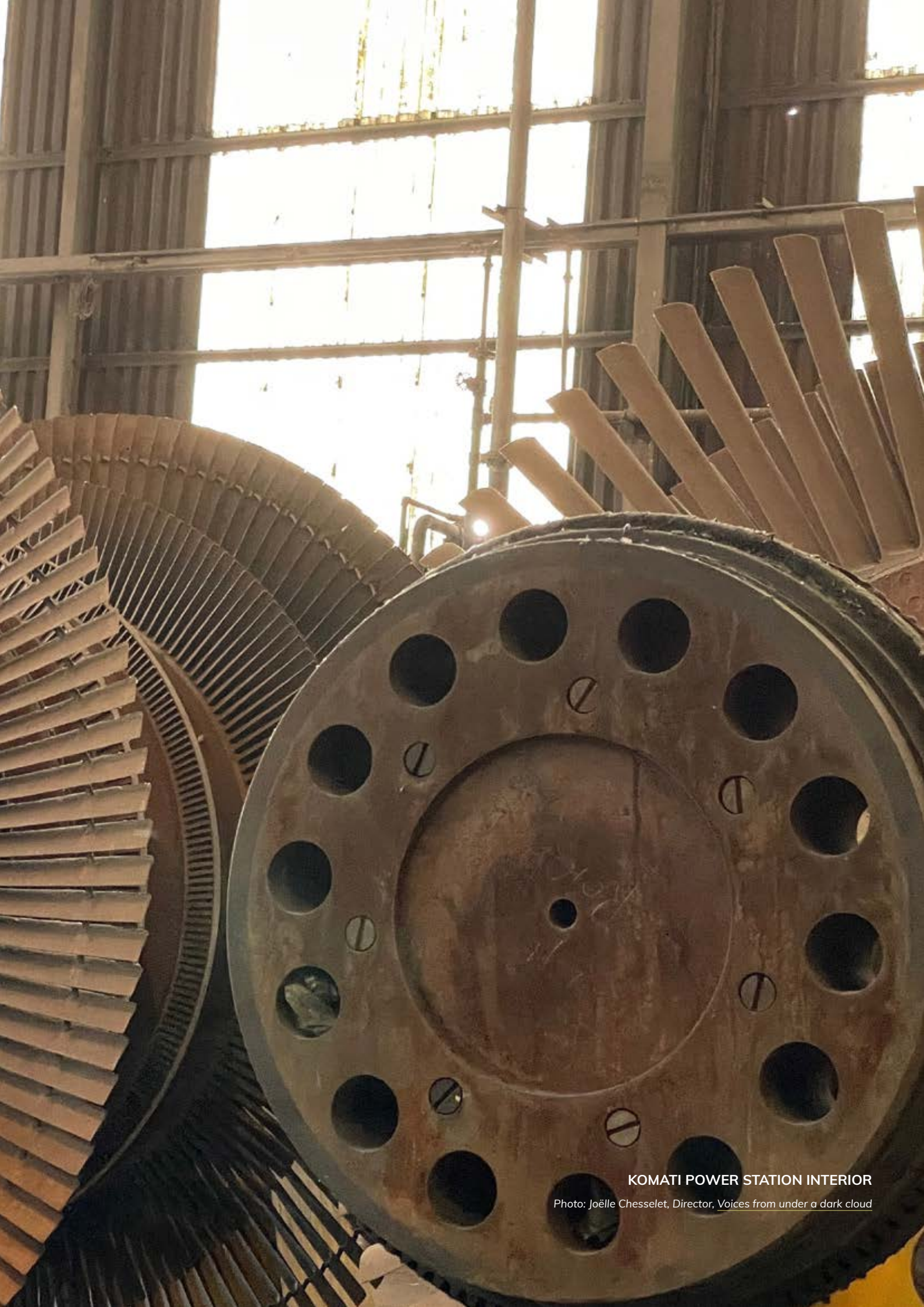


ABBREVIATIONS

CCPs	Coal Combustion Products
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
GVA	Gross Value Added
ha	Hectares
ICMM	International Council on Mining and Metals
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
km	Kilometres
m	Metre
MI	Megalitres
Mt	Megatonne
MW	Megawatt
MWCB	Mine Water Coordinating Body
NO _x	Nitrogen oxides
PV	Photovoltaic
R&D	Research and Development
REDZ	Renewable Energy Development Zone
SACAA	South African Coal Ash Association
SAF	Sustainable Aviation Fuel
SETA	Sector Education and Training Authority
SO ₂	Sulphur dioxide
TVET	Technical and Vocational Education and Training
UK	United Kingdom

MPUMALANGA LANDSCAPE

Photo: Joëlle Chesselet, Director, [Voices from under a dark cloud](#)



KOMATI POWER STATION INTERIOR

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INTRODUCTION

Climate science is unequivocal. A rapid and deep decarbonisation of the economy and society is necessary to avoid catastrophic climate changes and associated impacts. Economics is also unambiguous. New technologies have arisen, displacing increasingly expensive and obsolete ones in every sector. Accordingly, public policy has provided the direction of travel, with goals of net-zero carbon emissions.¹

Such dynamics are particularly acute in the coal value chain, which still accounted for 36% of global electricity supply in 2019. An increasing number of countries have committed to phasing out coal. Similarly, financial institutions have increasingly pledged to stop funding coal-related investments.

South Africa is in the midst of such forces. The country depends heavily on coal for its energy supply and is also a key coal producer and exporter. About 86% of electricity came from coal in 2019, and so did about 20% of liquid fuels. Coal is also a key input into other industries, such as iron and steelmaking. Overall, the coal value chain, from mining, to transport, to use, directly employed about 150 000 people in 2019. And many more people indirectly rely on the value chain for their livelihood, both in the formal and informal sectors. At the same time, South Africa is in a precarious socio-economic situation, with high levels of poverty, unemployment and inequality. In addition, environmental damage and impacts, such as land, water and air pollution, are rampant in many areas of the country, with disastrous social consequences for the population.

South Africa has committed to a significant phasing down of its fleet of coal-fired power stations and associated coal mines (DoE, 2019). As the country embarks on a shift away from coal, the need for a just transition is acute. Most people and communities have low levels of resilience to shocks. People employed in the coal value chain face job losses. Those who depend on them, as well as those who indirectly service the industry or the people employed in it see their livelihood disappearing. At the community level, the concentration of coal-related activities in a few locations, primarily Emalahleni and Steve Tshwete in Mpumalanga, makes the risk of ghost towns real.

Within this context, a core component of a just transition in South Africa is the economic diversification and rejuvenation of the coalfields.² This is critical to at least compensate for upcoming losses of employment and livelihood, and ideally generate even more economic activity than exists at present. It is also an opportunity to pivot the economy of coal-dependent municipalities towards more sustainable and diversified activities. Importantly though, every local context is different – a starting point often overlooked by national level analysis and policymaking. Even in Mpumalanga's coalfields, the operation of mines, power plants and heavy industries has affected specific towns differently – and so will their phasing out or restructuring. Economic structures, social and political fabrics, and environmental health vary between locations. Transition trajectories will also differ.

This report unpacks the historical trajectory of coal-dependent economies in Mpumalanga and charts possible futures by analysing potential economic opportunities. To explain the status quo, Chapter 1 discusses the past and present economic structure of coal-based municipalities in South Africa, while Chapter 2 unpacks existing assets and liabilities. Chapter 3 looks forward by diving into possible economic activities that could provide the basis for diversification and rejuvenation. Chapter 4 concludes with policy implications.

1 An increasing number of countries and firms have committed to net-zero emissions pathways, often by 2050 or earlier. Net-zero carbon emissions refers to when carbon emissions from a country or company are in balance with emissions reductions. At net zero, carbon dioxide emissions are still generated, but an equal amount of carbon dioxide is removed from the atmosphere as is released into it, resulting in a zero increase in net emissions.

2 Importantly, this is only one of multiple components required to achieve a just transition. See Montmasson-Clair (2021) for the various elements of a just transition.

MAFUBE MINE WATER IRRIGATION PROJECT,
MAFUBE COLLIERY, NKANGALA

Photo: Joëlle Chesselet, Director, [Voices from under a dark cloud](#)



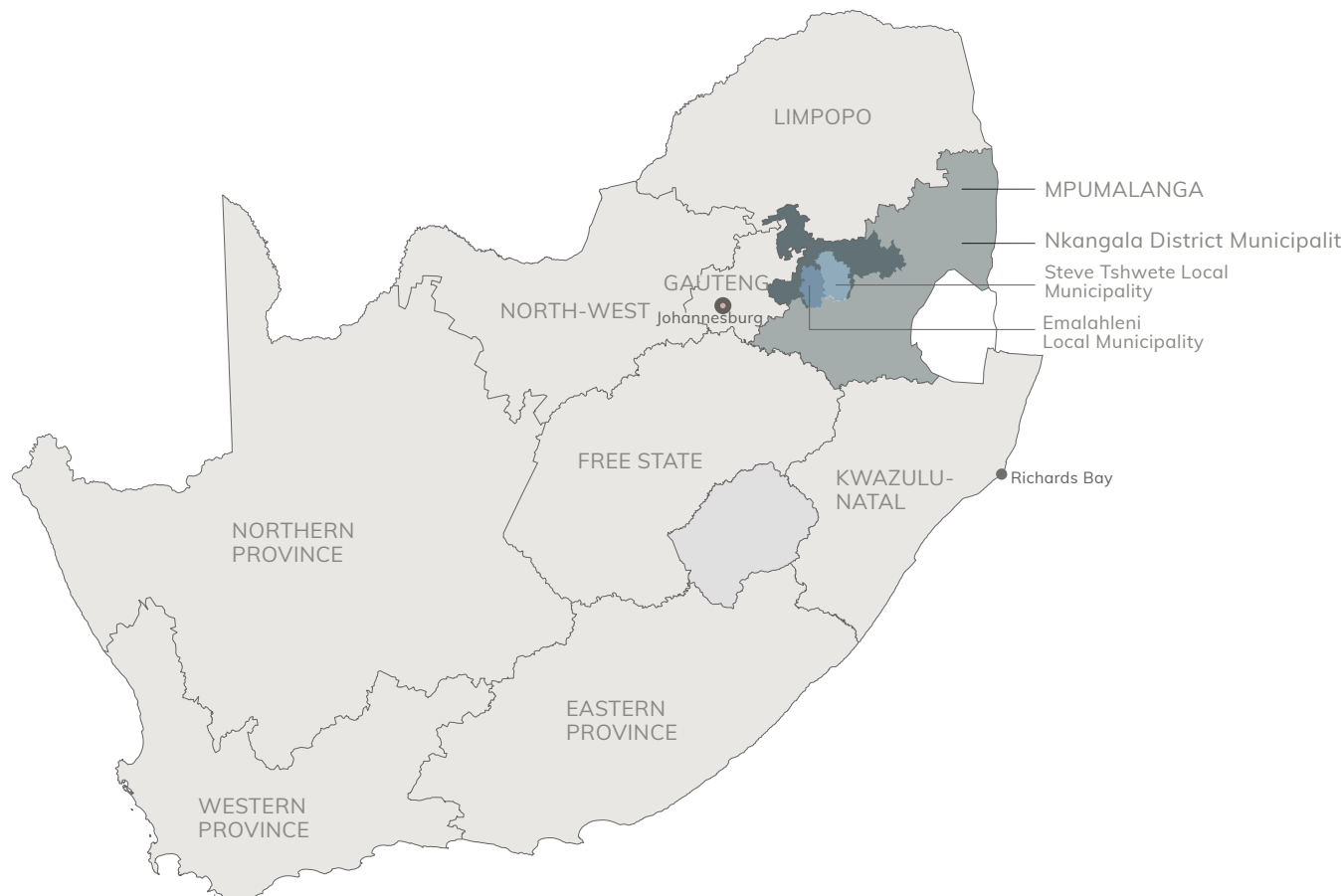
CHAPTER 1

PAST AND PRESENT ECONOMIC STRUCTURE OF THE COAL-BASED MUNICIPALITIES

Mpumalanga Province was formed from part of the old apartheid era Transvaal Province and the former homelands of KaNgwane, Gazankulu and Lebowa (SAHO, n.d.). It has a population of 4.5 million people. There are three district municipalities in the province: Nkangala, Gert Sibande and Ehlanzeni district with 17 local municipalities within them.

Steve Tshwete and Emalahleni Local Municipalities are in the Nkangala district and between them have most of the country's coal mines, power stations and other coal-related industries. Both towns have developed around these industries. In 2019, the estimated population of Steve Tshwete was around 317 000 people. Between 2007 and 2016, the population grew by 4.4% a year (Steve Tshwete Local Municipality, 2021). By 2050, it is expected to reach 509 000 people.

Steve Tshwete has two urban areas, Middelburg and Mhluzi, which are the commercial, government and administrative centres. There are many small villages and towns, some built around mines and power stations as well as farmworker villages. The Emalahleni Local Municipality consists of the towns of eMalahleni, Kwa-Guqa, Ga-Nala and Ogies. In 2016, about 455 000 people lived in the municipal area (Emalahleni Municipality, 2021).



ECONOMY

The province is home to two key energy production domains of the South African energy system – Sasol’s petrochemical production in Secunda in Gert Sibande and Eskom’s power stations surrounding Emalahleni and Steve Tshwete. In the 1970s, the Secunda complex was developed by Sasol and located near to the coal mines to supply the coal-to-liquids process which produces liquid fuels and products such as plastics, rubber and explosives. Eskom’s power stations were also commissioned in Mpumalanga due to their proximity to coal resources used as feedstock, and the economic hub of Gauteng. The thermal coal export market is serviced through Transnet Freight Rail, linking Mpumalanga’s coal fields to the Richard’s Bay Coal Terminal in KwaZulu-Natal. Small businesses that cater to the value chain are also supported by coal activities in Mpumalanga. This is linked directly by coal truckers and engineering firms that supply services for the value chain, and indirectly through accommodation and retail services, which are supported by major firms and employees of the value chain.

Based on the gross value added (GVA) data for the province, Mpumalanga is dominated by mining (20%), manufacturing (26%), finance, real estate and business services (11%), and wholesale and retail trade (11%), which collectively accounted for 67% of GVA over the period 2015 to 2020. Sixty-three percent of Mpumalanga’s total GVA is accounted for chiefly by Emalahleni (21%), Govan Mbeki (17%), Mbombela (14%) and Steve Tshwete (11%). Coal mining accounts for about 55% of mining activities in Mpumalanga in GVA terms, followed by the mining of metals (33%), gold (7%) and other minerals (5%). Manufacturing in Mpumalanga is dominated by chemicals (47%), metals (22%), and food processing (13%).

Figure 1 and Figure 2 indicate the share of GVA and employment that mining accounts for in the major municipalities in Mpumalanga, respectively. The share of mining in GVA in Emalahleni (40%), Govan Mbeki (18%), and Steve Tshwete (31%) are substantially higher than the shares for the province (20%) and the country (7%). These dynamics are mirrored when looking at employment shares. The share of mining employment in Emalahleni (27%), Govan Mbeki (16%), and Steve Tshwete (18%) significantly exceed the mining employment shares of the province (9%) and the country (3%).

EMPLOYMENT

Mpumalanga has traditionally been a source of in-migration from other provinces, with workers employed as miners in the coalfields, at power stations and petrochemical plants. Since the 2011 Statistics South Africa census, Mpumalanga has seen consistent net in-migration from other provinces. About 23%³ of in-migration into Mpumalanga has been from outside of the country with the remaining 77% from other provinces (StatsSA, 2019). The main provincial areas of migration into Mpumalanga have been Gauteng (27%), Limpopo (17%), KwaZulu-Natal (13%) and Eastern Cape (6%). Combined, these provinces have represented 65% of total in-migration into Mpumalanga over the 2011-2020 period. Tracking the sources of in-migration is important in just transition policy as a decline in economic activity in Mpumalanga would likely result in out-migration back towards origin centres or towards other urban centres within the country. The extent of in-migration has also created a higher competition for employment, with many local community members unable to obtain jobs, notably due to respiratory problems (generated from living in a coal mining area).

3 Average from 2011, 2016 and 2020 census data over the period 2011-2020.

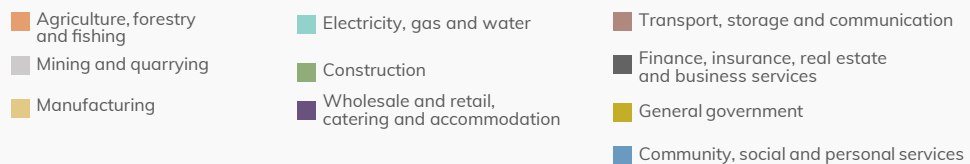
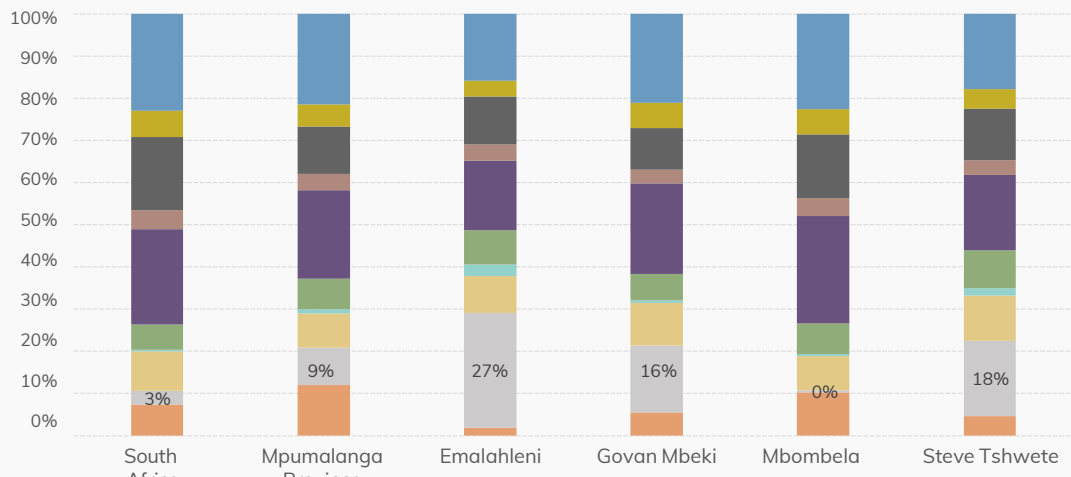
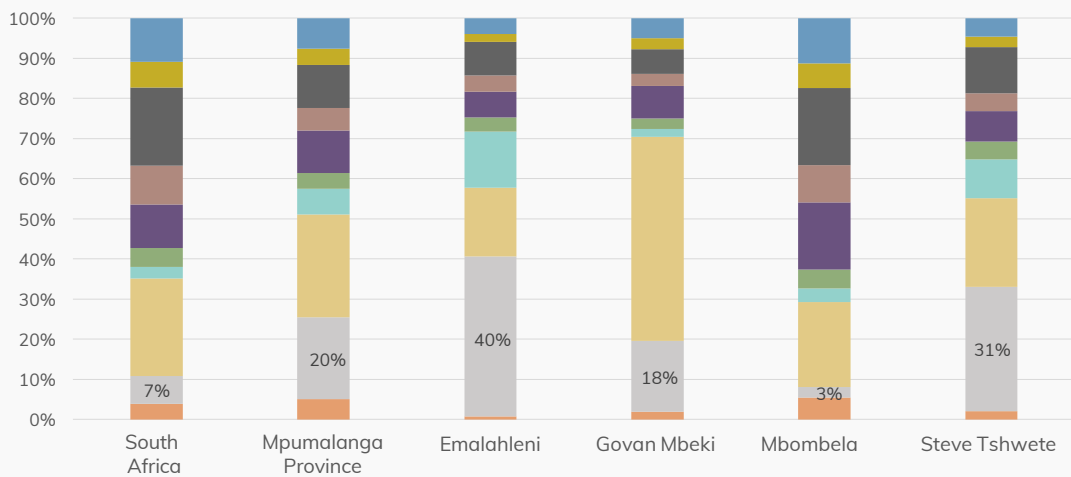


FIGURE 1 (Top) GVA shares of mining in major municipalities in Mpumalanga compared to the provincial and national shares (percentages)

FIGURE 2 (Bottom) Employment shares of mining in major municipalities in Mpumalanga compared to the provincial and national shares (percentages)

Source: Authors, based on data from Quantec, series on Employment and compensation by skill level, sector, industry and 2011 local municipal/ward-based metro region level, downloaded from <https://www.easydata.co.za> in November 2021. Note: Percentage values are based on GVA values, averaged for each level of aggregation over the period 2015-2020.



EMISSIONS

Substantial power generation and petrochemical activities have thrust Mpumalanga into global prominence as a region with high levels of greenhouse gas emission and environmental pollution. This is exacerbated by the emission control performance of the coal-fired boilers being dramatically worse than in other countries.

Sasol's Secunda plant generates more greenhouse gas emissions than entire countries, such as Norway and Portugal (Williams, 2020) and Eskom's coal-fired power plants are permitted to emit more than 20 times as much SO₂ and 15 times as much NO_x as Chinese and European coal-fired plants (Myllyvirta, 2019).

Substantial emissions affect the health and air quality of regions where coal consumption is high. This is particularly acute in Emalahleni and Steve Tshwete where citizens have to deal with respiratory problems such as asthma, even among children (Williams, 2020). The distribution of particulate matter can also lead to cardiovascular disease and cancer. Expert reports have called for the dramatic reduction, in particular of SO₂, NO_x and particulate matter, which in 2019 vastly exceeded the World Health Organization guidelines for daily or hourly averages for all pollutants (Gray, 2019).

MAFUBE COLLIERY, NKANGALA

Photo: Joëlle Chesselet, Director, [Voices from under a dark cloud](#)





MPUMALANGA LANDSCAPE

Photo: Joëlle Chesselet, Director, *Voices from under a dark cloud*

CHAPTER 2

ASSETS AND LIABILITIES

Mpumalanga's coalfields, given their historical development and current characteristics, face unique circumstances. On the one hand, they have a set of acute liabilities, originating from decades of mining, electricity generation and heavy industrial activities, a general lack of resources (particularly in the face of continual population growth), and the progressive weakening of civic structures. On the other hand, the region's unique positioning and role in the South African economy brings an array of assets, from infrastructure, to skills, to geography.

ASSETS

While the legacy of mining and heavy industry has a complicated impact on the demographic, infrastructural and land use patterns in the two municipal areas, both Emalahleni and Steve Tshwete have several assets on which to build new economic futures. There are features within the current configurations that provide opportunities for economic activities, investments and strategies for short-, medium- and long-term development. Assets across the two municipal areas are differentiated but are also connected through their relevance within South Africa's geography, as well as national and provincial spatial development planning and prioritisation. To capitalise on these assets, institutional capacity and strong governance is crucial. Steve Tshwete has historically performed well (Steve Tshwete Local Municipality, Letsema, and GIZ, 2020). Emalahleni has had challenges with overspending and financial controls (AGSA, 2019).

Both municipalities are close to Gauteng, and are connected to one another by road and rail, forming the Midleni Corridor (passing through Middleburg). This connectivity provides access to markets, for example, for manufacturing and agricultural products (CoGTA and Nkangala District Municipality, 2020). Emalahleni and Steve Tshwete are also part of the Maputo Development Corridor. This opens further export markets through Mozambique. An additional export route exists via Middleburg (Steve Tshwete) along the Richards Bay Corridor (N11) (Mpumalanga Provincial Government, 2019). While road transport infrastructure is in need of maintenance, it gives rise to a potentially strategic positioning for the Emalahleni-Steve Tshwete region, for synergistic trade and for tourism development.

Legacy infrastructure across Emalahleni and Steve Tshwete, in general, has been identified as advantageous for regional economic development. Infrastructure investment planned for the Nkangala District exceeds R10 billion (2019/20 FY),⁴ of which R467 million is private investment underway (CoGTA and Nkangala District Municipality, 2020). Energy generation and transmission infrastructure, in particular, could be leveraged to maintain key regional relevance within the country's electricity system. The fact that Eskom has begun a process to divisionalise its generation, transmission and distribution could make space for more opportunities in this space. As South Africa continues to invest in renewable energy generation, existing transmission grid capacity will be essential to accommodate additional plants. This is particularly relevant for Emalahleni, which has been identified as a Renewable Energy Development Zone (REDZ) (DEA, 2020). Both towns rely heavily on the coal-to-power value chain and face significant risks as coal-fired power plants are decommissioned. However, as they are mothballed, the power stations themselves have physical infrastructure which Eskom is already working on repurposing. For example, the Komati Power Station is being installed with agri-voltaics and a microgrid assembly plant. On the other end of the value chain, mining land rehabilitation presents its own opportunities.

4 The timeline for investment is unclear.

Land, particularly arable land, is another regional asset. Combined with a favourable climate, the land availability can support the development of multiple activities, from renewable energy to agriculture, to tourism. Although lagging far behind mining in its current contribution to GVA, agriculture particularly has been identified as a significant potential growth area for the Nkangala District. Steve Tshwete, for instance, has identified opportunities for cattle farming, poultry and crop farming, notably for emerging farmers (See Agriculture section, Chapter 3). However, the opportunity to leverage this asset depends on the effective management of land rights and restitution processes (Steve Tshwete Local Municipality, 2019a; Steve Tshwete Local Municipality, Letsema, and GIZ, 2020). The sector is also exposed to significant water stress and trade-offs with mining activities, as well as climate risk. If these risks can be managed, agriculture could be a driver of employment, particularly for workers with relatively lower formal skill levels. Agro-processing could similarly increase, although this is also constrained by water risk and land degradation from mining activities in the Emalahleni-Steve Tshwete region.

Human capital in Steve Tshwete and Emalahleni is relatively dynamic with growing, young populations.⁵ The province's population (more than 4.5 million residents) is young (more than 92% are below 60, the highest percentage in the country) and displays a net positive migration pattern, indicative of its dynamism. Mining and manufacturing activities have developed a skills base that could be further enhanced to support new and sustainable economic opportunities. The Nkangala Technical and Vocational Education and Training (TVET) College is the largest tertiary educational institution in the Mpumalanga Province. It draws most of its learners from urban areas in Steve Tshwete and eMalahleni (CoGTA and Nkangala District Municipality, 2020).

Reskilling programmes can also build on the existing skills base, driven by mining companies' social and labour plan commitments, or programmes led by stakeholders such as the Minerals Council, the International Council on Mining and Metals (ICMM) and Eskom.

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5 The Nkangala District has a population of 1.5 million (2019 figures), with 501 000 or 33.5% between the age of 25 and 48 (CoGTA and Nkangala District Municipality 2020).

LIABILITIES

While more than 100 years of mining and industrial activities have enabled development of the region, providing a livelihood to many people, it has left its mark on Mpumalanga's economy, population and environment. As discussed in Chapter 1, most towns in the coalfields have historically evolved around mines and power stations, and have relied exclusively on one economic activity, raising the risk of these former bustling centres becoming ghost towns.

Eskom has undertaken a socio-economic impact study on the closure and repurposing of its power stations. The study was commissioned in recognition of the negative impacts of closure on the economy and the communities surrounding the power stations. In Komati, the 1 900 households (2011 data) were mostly employed in the mining, utility and agriculture sectors. Some mines and most of the power units have closed, with clear negative impacts on the community. In Pullens Hope (Hendrina), there has been an increase in unemployment and standards of living have declined with reduced investment in the town (Eskom, 2021).

Pullens Hope: Demise of a mono-economy

Pullens Hope is a good example of a mono-economy town embedded in South Africa's Minerals-Energy Complex. Built around the Hendrina Power Station, which is in the process of closing down, it was once a thriving town. As the plant closes down, so are all the connected economic activities. This impacts the mines as well as direct suppliers into the plants and associated mines. But it also trickles down to the overall community, negatively affecting businesses in the formal and informal economy which service the workers and their families. Virtually every business and household in the vicinity of the plant (and beyond) feels the impact of the plant closure.



Photo: [Hendrina Power Station. Hein Waschefort, Wikimedia Commons](https://commons.wikimedia.org/wiki/File:Hendrina_Power_Station.jpg)
(<https://creativecommons.org/licenses/by-sa/3.0/deed.en>)

Services and infrastructure

In the face of population growth, in-migration and limited resources, the provision of basic services has been increasingly challenging. As towns have grown, local governments have not been able to keep pace with an escalating population and particularly the increase in informal settlements. Many residents remain without electricity, water and/or sanitation and those who have access often cannot afford to pay for it. Health clinics are not always accessible and, according to residents, often not adequate or lack treatments.

Transport to these centres is also not reliable in some cases. Steve Tshwete's 2020/2021 Integrated Development Plan (IDP) recognises that backlogs in service delivery are a priority, particularly due to aging infrastructure. In 2016, while 90% of households in the municipality had access to electricity, many had poor quality of access, and backyard dwellers and informal settlements remained without a formal connection (StatsSA, 2016). In Emalahleni, the 2020/2021 IDP talks to the urgent need to address challenges in service delivery. Projected backlogs for 2021 stood at close to 40 000 households not having access to water, 70 000 requiring access to electricity, and 67 000 households without sanitation.

Housing

The state of housing is problematic. This is worsened by the direct impact of mining activities on housing. Some of the problems include cracks due to mining techniques, land subsiding, sinkholes, fires and toxic waste (Hallowes and Munnik, 2017; University of the Free State, 2014). Mining companies have historically provided some housing, particularly single-sex housing compounds, as well as contributing to the construction of schools, clinics and other public services. This changed after 1994 when mining companies were able to let go of their liabilities, as government and trade unions were in favour of taking over some of their responsibilities. This "normalisation" of mining towns did not provide the benefits hoped for, with mining companies spending less on housing, fringe benefits, recreation facilities and health services, and municipalities not being able to keep up with the pace of services required.

Living conditions have deteriorated, as highlighted by the growth in informal settlements (Cloete and Marais, 2020). In 2016, 14.4% of households in Steve Tshwete were living in informal settlements.

Coal-fired power plants have also contributed to infrastructure development and service delivery, through water treatment, water supply and waste management for instance. It remains unclear how municipalities will be in a position to take over and further expand such services as the coal value chain is phased out. Both Steve Tshwete and Emalahleni have not been able to meet their strategy and IDP framework goals (Steve Tshwete Local Municipality 2021; Emalahleni Municipality 2021). With the loss of economic activity, local revenues are moreover set to decline, stressing once more the need to diversify the region.



Beyond coal

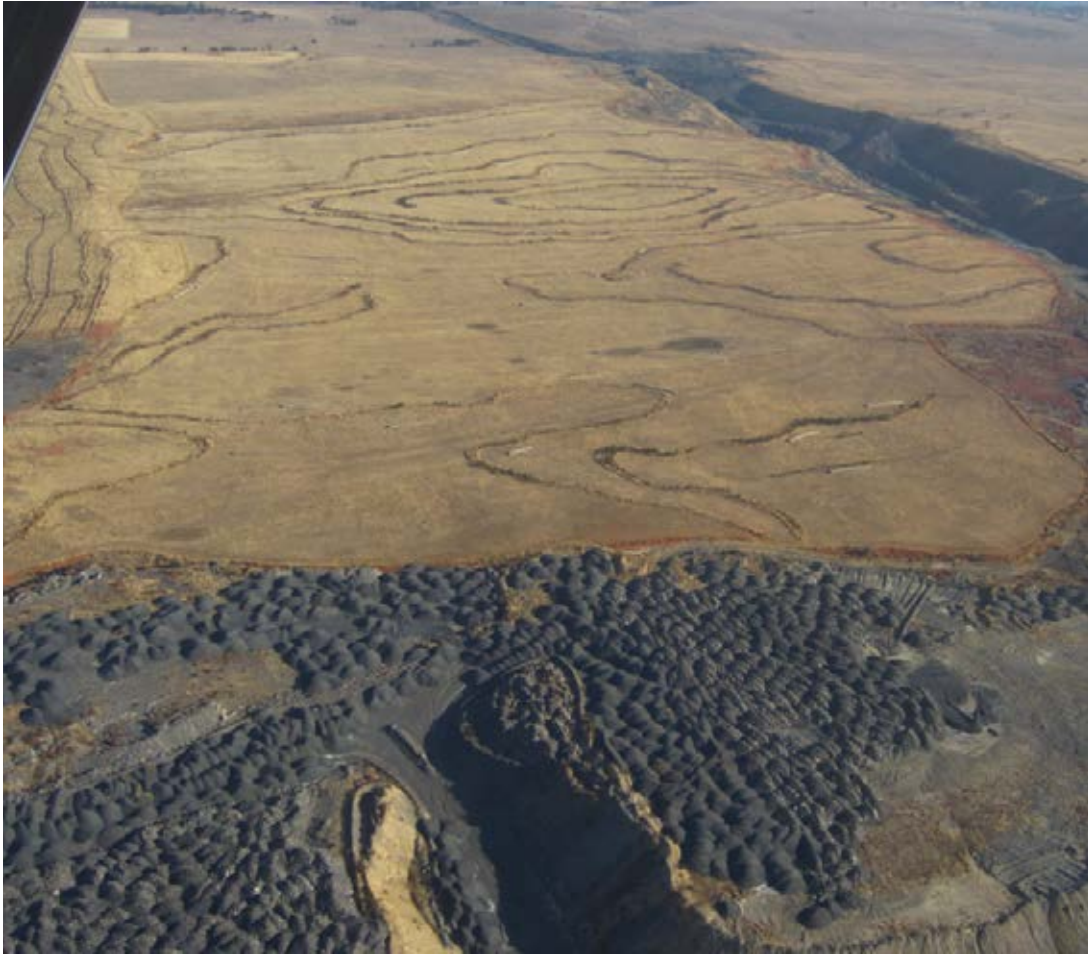
In addition, a strong “coal mining” identity exists in the region, making it harder for many local residents to conceive a future beyond coal. Despite knowing the negative impacts associated with coal mining (at the individual and community levels), many workers and jobseekers in the area continue to see the industry as their best employment prospect. Poverty is endemic and the promise of a green economy does not guarantee a door out of their current situations. Jobs provided by the coal industry are relatively well remunerated and provide noteworthy benefits, particularly for the level of skills required (Patel et al, 2020). Coal employment has enabled many people and their families to achieve a decent standard of living. This is a challenge when thinking about the future of the province. New jobs that are expected to replace current coal-based employment are likely to be rejected by the community if they do not provide the same levels of remuneration and benefits as the coal industry.

Environmental impact

Decades of mining, power and industrial pollution have had devastating consequences. Given the rapid growth and encroachment of mines in urban Mpumalanga, particularly in Steve Tshwete and Emalahleni, the phase-out of coal-based activities will not change the status quo in and of itself. Indeed, simply moving away from coal mining and industry will not solve the accumulation of decades of environmental and ecosystem neglect and damage, including air, water and land pollution.


At least 60% of the province’s land is mined or under prospecting applications (Simpson et al, 2019). Often, mining rights have been granted without due regard for water resources, air quality and food security, and there is little enforcement of environmental regulations. Government has not upheld some of the legal and regulatory frameworks in place dealing with air and water pollution, fly ash and waste deposits. Mines have also opened illegally, affecting trust that government can manage the transition smoothly and in the interests of the local communities. In addition, the environment is generally not rehabilitated, leaving acid mine drainage, degraded land and polluted air and water to impact communities for decades. And attempts made to rehabilitate the land have been often unsatisfactory. In many cases, communities have had to stop growing their own vegetables and raising cattle as the land is too damaged and water not suitable for small-scale agriculture and drinking, compromising food security. More broadly, a strong tension exists around land competition, which also affects food security given large-scale agriculture and coal mining.

Historically, the focus has been on economic development, namely mining and associated industries at a cost to social, developmental, ecological and environmental sustainability and justice. Changing that paradigm will take time. Transforming into a low-carbon economy would demand changes at an individual, government and industry level. While there is a general consensus on the need for a just transition, conflicting and divergent views remain. There is much fragmentation and little honest discussion that deals head on with the opposing positions. Until this is addressed, the transformation will be problematic.



**Piles of overburden alongside
scarred and sterile “rehabilitated” land**

*Photo: Centre for Environmental Rights (CER) from a series of photographs
taken over the Mpumalanga Highveld by CER attorneys in June 2014 and May
2015*



ROBBERS PASS, MPUMALANGA

Photo: [South African Tourism, Wikimedia Commons](#)

CHAPTER 3

OPPORTUNITIES

Looking ahead, diversifying the economy of South Africa's coal-reliant municipalities demands that all possibilities are considered. Economic history presents relevant lessons on how to approach economic diversification, pointing to the importance of building diversification strategies in line with local contexts and capabilities and the need to proactively drive inclusivity to contribute to a just transition through economic rejuvenation. Aligning vested interests towards a common purpose is a cornerstone of change. Taking into consideration the existing economic structure of Mpumalanga, and internalising present assets and liabilities, a number of rejuvenation avenues emerge. This chapter reviews a (non-exhaustive) list of economic opportunities which could be developed to diversify the economy of South Africa's coalfields, unpacking their potential, strengths and shortcomings.⁶

6 Beyond this (non-exhaustive) list of diversification opportunities, the much-needed provision of services, from energy, water, sanitation and waste management to (public) transport, health, education and security, supports livelihoods and enhances the living conditions of local communities. While these are not considered as economic diversification opportunities, depending on how infrastructure and services are delivered, direct local employment could also be created.





ENERGY

Mpumalanga can partially retain its reputation as the energy hub of the country through the development of sustainable and low-carbon energy. Renewable energy generation and beneficiation through green hydrogen represents an opportunity that aligns with the substitution of coal use. This relates to the repurposing of coal-based generation plants and supplementing petrochemical production with green hydrogen. As highlighted, this conforms, and responds to, the envisioned solar and wind capacity additions in the 2019 Integrated Resource Plan (IRP), which totals in excess of 20 000 MW (DMRE, 2019). Emalahleni has been approved as a REDZ for wind and solar photovoltaic (PV) projects (CSIR, 2019). This is a positive step in diversifying the local economy and a further rollout of REDZs in other vulnerable municipalities, such as Steve Tshwete, could be explored.

Eskom has begun looking at the decommissioning of the existing coal fleet and repurposing the power stations. Renewable energy generation and green hydrogen production are being investigated as energy options for deployment at the power stations. In January 2022, the utility announced the intent to invite bids from private renewable energy developers for projects on its land in Mpumalanga (Creamer, 2022).

Eskom is currently at the research and development (R&D) stage for hydrogen and anticipating finalising its hydrogen strategy by March 2022. Eskom views green hydrogen as a promising, however, early technology, which is still associated with substantial capital and operational expenditure costs, and requiring some period (from 2030 onwards) to be cost feasible. Currently, hydrogen is imported or produced at some of the coal-based power stations and is used for cooling purposes.

Sasol is also investigating opportunities around renewable energy and green hydrogen. Sasol produces about 2.7 million tonnes per annum of grey hydrogen (based on coal and gas) at both its Secunda and Sasolburg plants. The bulk of the production is reserved for captive (internal) use⁷ within Sasol's existing production routes to produce chemicals such as ammonia and methanol. Sasol is considering how green hydrogen production can be phased into its production sites in Secunda.

Based on consultations with Sasol, green hydrogen can be easily incorporated in low volumes through gradual supplementation. Investments would involve changing the energy input to renewable energy-based electricity and retrofit the existing electrolysers, which are currently used to produce chlorine. In April 2021, a collaboration between Sasol, Linde, Enertrag, and Navitas Holdings was announced to bid for the production of sustainable aviation fuel (SAF) through the German Federal Government's H₂Global auction platform. This involves the production of green hydrogen at the Secunda plant to produce SAF for export to Germany (Sasol, 2021).

Beyond these developments, other opportunities exist to transition workers in the coal value chain to other economic activities. Coal truckers are vulnerable to declines in coal activities, particularly businesses which are small and black-owned. About 4 000 workers are employed as drivers in coal logistics in Mpumalanga. Given the wide biomass feedstock base and similarities between the hauling practices of coal and biomass, coal truckers could, in the future, switch to transporting sustainable biomass for new green industries. Chireshe and Bole-Rentel (2022) highlight that transporting lignocellulosic biomass for the production of SAF, such as cleared invasive alien plants or garden waste, could create almost 3 000 jobs for drivers of side tipper trucks (used currently for coal transportation), meaning that almost 75% of the current coal jobs could be directly transitioned to biomass transport.

⁷ Only a small fraction, about 1% of production, is sold externally for use in downstream industries.



Intertwined with mining rehabilitation is the development of biomass production on mining land, which in turn can be used as the basis for producing electricity, heat, biofuels or biomaterials. In cases where food crops are not viable (because land is contaminated or less fertile), then biomass production for other purposes, such as biofuels, biochemical and biomaterials, could be investigated.

Municipalities in the coal fields should moreover support the development of the renewable energy supply chains. This can include developing skills in the maintenance and repair of renewable generation infrastructure, the manufacturing of renewable energy generation components and allied services, and the use of TVET colleges to train technicians and artisans in green hydrogen technology. Further, the rollout of rooftop solar systems to local households and businesses can also assist local communities in transitioning towards low-carbon energy production.



WITBANK DAM AND DUVHA POWER STATION, EMALAHLENI

Photo: [Nick Roux, Wikimedia Commons](#)



MANUFACTURING

Historically, along with power generation and coal mining, a number of manufacturing activities developed in Mpumalanga's coalfields. As raised in Chapter 1, manufacturing in the area has been dominated by energy-intensive value chains, namely the metals value chain (Columbus Stainless, Samancor, Macsteel, Thos Begbie, Ferroglobe/Silicon Smelters, Neven Matthews, Bushveld Minerals), industrial coke furnaces (African Fine Carbon, CharTech, Rand Carbide) and chemicals production and associated products (Gradco South Africa). The food and beverage industry (agro-processing) also has a noteworthy footprint in the region (Blinkwater Meule, Witbank Abattoir). Other industries, such as wood and paper (Sappi, Mpact), non-metallic mineral production, machinery and equipment and transport equipment, have a marginal presence as well.

Overall, as highlighted in Figure 3, manufacturing accounted for 21% of Mpumalanga's economy in 2020 (from a peak of 28% in 2010) and 8% of employment. In Nkangala, manufacturing represented 19% of the district's local output in 2020. At the municipal level, manufacturing was relatively more significant in Steve Tshwete (21% of output and 10% of employment in 2020) than in Emalahleni (17% of output and 8% of employment).

Building on existing strengths, a variety of manufacturing opportunities could be explored in the region. The metals sector, and particularly the iron and steel value chain, is a natural first port of call. As the industry transitions to a low-carbon business model, the region has the potential to be a player in the production of green iron and steel products, powered by green hydrogen (as unpacked in the section on energy in this chapter). More broadly, the long-term growth in steel demand regionally and globally (including for rail, construction and renewable energy) provides the impetus to further develop the sector.

Mineral processing and beneficiation is another industry that could be expanded. The presence of significant vanadium reserves in the surrounding areas and the existing Vanchem plant at Emalahleni's Ferrobank Industrial Park,⁸ which produces a range of vanadium-based products, provides an interesting foundation for expansion, notably to tap into the prospected demand for vanadium-based batteries. Leveraging South Africa's leading manganese endowment, the only plant outside of China producing

electrolytic manganese metal (that is also the world's largest producer of 99.9% manganese) is located in Mbombela. The Manganese Metal Company beneficiates manganese for a variety of applications, including lithium-ion battery production (Montmasson-Clair, Moshikaro and Monaisa, 2020).

Opportunities in the energy sector could materialise on the back of a large rollout of renewable energy and battery technologies. Many parts of the renewable energy value chain, which is set to grow in the province (see section on energy in this chapter), could be developed. The South African Renewable Energy Master Plan process has identified a number of parts and components which could be localised in South Africa, such as the balance of system (cables and ancillaries), towers and internals and mounting structures but also turbine hubs, inverters, solar modules, trackers and blade post-moulding (GreenCape, 2021). For instance, Eskom has announced plans to repurpose the Komati Power Station's workshops, in Steve Tshwete, to manufacture microgrid (so-called containerised) solutions (Creamer, 2021). They have a demonstration container on site and have plans to expand this project. Beyond beneficiation, opportunities abound in the lithium-ion battery value chain, with the potential to manufacture many parts and components as well as assembly battery packs (Montmasson-Clair, Moshikaro and Monaisa, 2020).

Depending on the transition pathways followed in the province, other manufacturing opportunities could be worthwhile in the region. A strong growth in agricultural activities (see section on agriculture in this chapter) would, for example, support the production of machinery and equipment as well as

⁸ See <https://www.bushveldminerals.com> for more information on Bushveld Minerals.



the chemicals (fertilisers) industry. A sustainable fuel and green chemicals industry could also be built on the back of biomass availability and green hydrogen, leveraging the existing chemicals complex in Secunda in Govan Mbeki Municipality (Gert Sibande district) (see Chireshe and Bole-Rentel, 2022).

The Mpumalanga’s coalfields are strategically located in the Maputo Development Corridor and the axis of economic integration between Gauteng, Limpopo, Swaziland and Mozambique. They are also positioned close to two (of the three) envisaged hubs for the country’s Hydrogen Valley, i.e. Johannesburg and Mogalakwena in Limpopo. In addition to the assets discussed in Chapter 2, the Highveld Industrial Park, located on the outskirts of Emalahleni (on the erstwhile Evraz Highveld Steel and Vanadium facility), also provides an interesting location for investment in manufacturing, particularly heavy industrial activities. The park has direct access to Eskom’s grid, piped natural gas, oxygen, nitrogen and argon, road and rail facilities. Environmental services and fully equipped metallurgical and chemical laboratories, as well as a Sector Education and

Training Authority (SETA)-accredited training centre are available on site.⁹

However, a key interrogation remains on the competitiveness of manufacturing activities in the existing coalfields. The paradigm which led to the development of manufacturing in Mpumalanga, discussed in Chapter 1, is no longer valid and a renewed business case ought to be established. Many industrial activities, while technically possible and (marginally) viable financially, would not be economically competitive (against other countries but also other parts of the country) without a degree of support (for instance, see Semelane et al, 2021 on the manufacturing of solar PV panels in Steve Tshwete). The existence of strong industrial parks, and ideally a Special Economic Zone (which could match the Emalahleni REDZ), would assist to develop manufacturing in the region. Further support, through industrial policy, sector-specific policy (such as energy or agriculture) as well as the successful operation of an economic cluster (of which the Mpumalanga Green Cluster Agency is an example) linking government, business, academia and local communities appear paramount for development.

9 See <http://www.highveldindustrialpark.co.za> for more information about the industrial park.

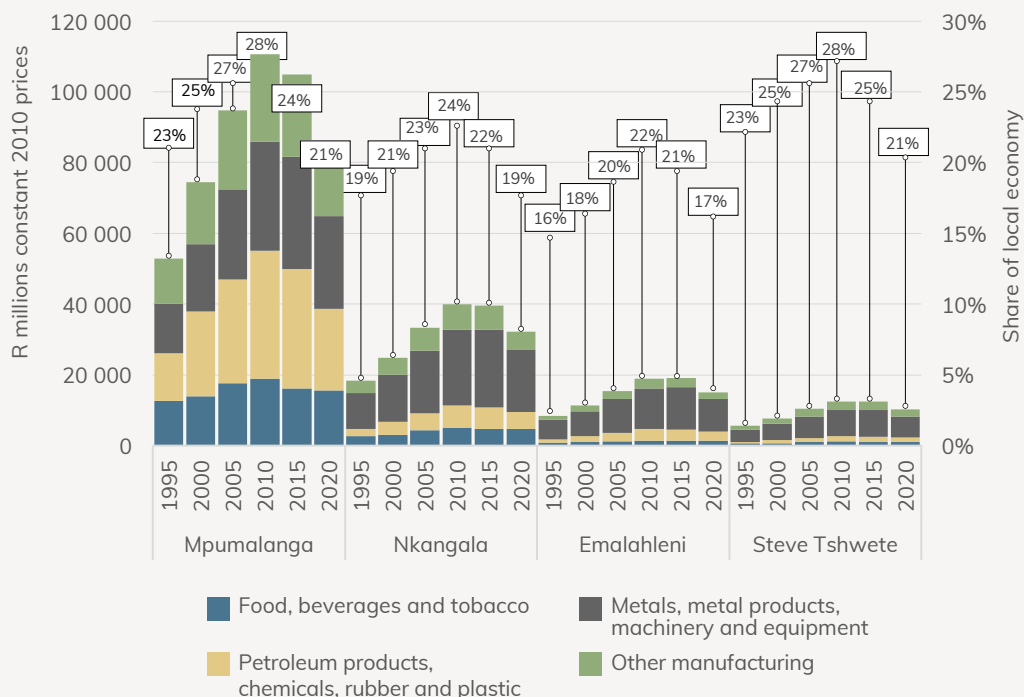


FIGURE 3: Manufacturing in Mpumalanga’s coalfields

Source: Authors, based on data from Quantec, series on Regional Output and GVA at basic prices by industry and 2011 local municipal/ward-based metro region level, downloaded from <https://www.easydata.co.za> in November 2021.



COAL ASH

Besides the transformation of existing economic sectors, some liabilities could be turned into short-term assets. The use of coal ash, a by-product of coal combustion, is one such interesting opportunity. While coal ash beneficiation is linked to the historical and ongoing coal use, and therefore not viable over the long term, it provides crucial opportunities for the transition.

Eskom's power stations and Sasol's Secunda plant use coal as an input. When combusted, the process produces coal combustion products (CCPs), which include fly ash, bottom ash, boiler slag and flue gas desulphurisation gypsum. This ash, deemed hazardous waste, is stored in close proximity to the facilities in ash heaps. There has been a surge in interest recently in the ash value chain with major producers, such as Eskom and Sasol, showing interest in selling the ash that is produced at their processing facilities. The beneficiation of fly ash presents an opportunity for Mpumalanga given the diversity of end-products that can be produced from it. Ash can be used to manufacture a diverse array of goods and can be incorporated into processes to serve many needs. These include the production of cement and bricks, mine backfilling, mine drainage treatment, soil amelioration, and land reclamation. Rare earth metals can also be extracted from coal ash.

Eskom is by far the primary producer of coal ash in the country. About 30% of residual ash is left over after a unit of coal is burned in Eskom's power stations¹⁰ and about 90% of the CCPs produced at Eskom's power stations are fly ash (Eskom, 2018). The utility faces rising costs and legislative challenges with the storage of coal ash at its power stations and is interested in selling a greater share of ash to limit its own costs (Reynolds-Clausen and Singh, 2017). Eskom's storage facilities are approaching their maximum capacity at power stations and building additional storage involves substantial capital expenditure. Strict environmental regulations surrounding ash storage and landfilling further increase the costs of such storage expansions. Only about 7% of

Eskom's ash is sold (from six power stations) and Eskom has embarked on reviving its Ash Utilisation Project to limit costs of expanding storage. On average, about 19%¹¹ of ash produced at a power station can be sold (Reynolds-Clausen and Singh, 2017). Eskom's main off-taker for ash is the construction industry which uses ash in the production of cement and bricks.

The South African Coal Ash Association (SACAA) also supports the development of ash opportunities. Large ash producers such as Eskom, Sasol and Sappi are members of this association. There is also academic research at institutions such as the University of Pretoria supporting the development of the ash value chain. The university is notably involved in research on the use of fly ash in construction and agricultural applications.

Utilising coal ash is, however, not without problems. Since ash is considered hazardous waste, its use must be accompanied by a Waste Management Licence which is issued by the Department of Forestry, Fisheries and the Environment (DFFE). While necessary for environmental protection, the difficulty in obtaining such a licence is one of the key factors hindering the development of the value chain. For small businesses interested in entering the ash recycling or management value chain, accessing a Waste Management Licence is costly and time-consuming. It costs about R200 000 to get a licence and the process is typically accompanied by a two-year processing period (Reynolds-Clausen and Singh, 2017). Eskom has engaged with DFFE about the possible exemption from the legislation for ash purchasers. Exemptions, which also take about two years to be processed, have been granted to some large

10 Based on a total of 120 Mt of coal burned in 2014/15 and 34.4 Mt of ash produced from that combustion (Reynolds-Clausen and Singh, 2017). By comparison, Sasol liberates about 200 000 tons of ash for beneficiation per year (SACAA, 2019).

11 The fraction of ash that can be sold varies by power station. Furthermore, there is a limit on the fraction of ash produced that can be sold, as some ash is used to treat effluent water that emanates from the power stations.

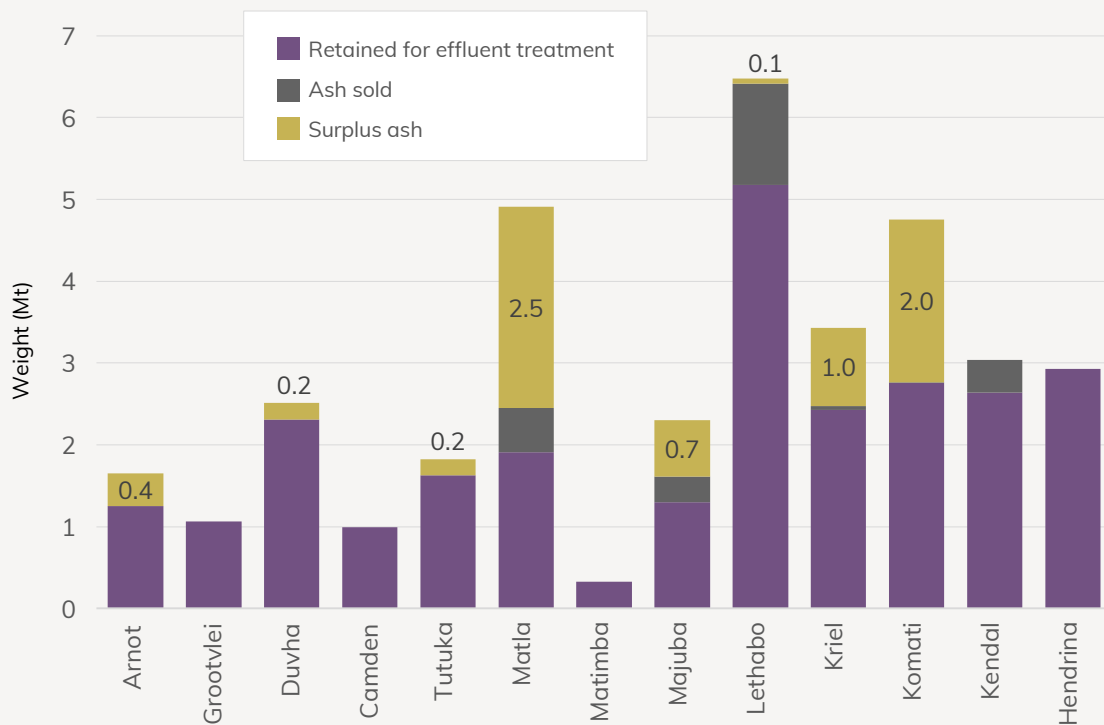


FIGURE 4. Eskom's surplus ash by power station per year

Source: Authors, based on Reynolds-Clausen and Singh, 2017.

consumers of ash for mine drainage treatment, backfilling, soil amelioration and land reclamation, road construction, brickmaking, and cement production.

Another barrier for small businesses wanting to enter the space is the cost of capital associated with installing liners beneath ash-handling facilities, based on the hazardous nature of ash (Reynolds-Clausen and Singh, 2017).

Transport costs between ash producers and consumers are another important constraint to take into account, and it is generally recommended that ash processing plants be close to ash suppliers. This would mean that ash processors would benefit from being closely located to Eskom's power stations and Sasol's Secunda facility. Based on a study commissioned by Sasol, ash could be competitively sold within a 200 km radius. The

inferior state of provincial and municipal road infrastructure compounds this problem.

Furthermore, since fly ash contains toxic elements, like heavy metals, adequate treatment of the fly ash is required before use. This is particularly crucial for use in soil amelioration, which is the use of coal ash to improve the health of previously mined land. Part of the mine rehabilitation process involves filling up voids left in the ground, for example in surface mining. The upper-most portion of the soil, referred to as top soil, is removed at the beginning of excavation and is generally the medium in which agricultural produce grows. When mines are refilled after closure, the top soil can be regenerated through the use of fertiliser. Coal ash can be added to improve the fertiliser value of the soil, as fly ash has a high content of essential plant nutrients (chiefly phosphorus) (Mupambwa, Dube and Mkeni, 2015).



MINE REHABILITATION

Mining land, through rehabilitation, is another liability which could be turned into an opportunity. There were 64 registered coal mines in Emalahleni and Steve Tshwete in 2021, 34 in the former and 30 in the latter. Unsustainable management of mines and their impacts over their entire lifespans and post-closure is one of the most serious impediments to a just transition in Mpumalanga. The water, land and air pollution arising from mining activities in the Nkangala District are well-documented (Mhlongo, et al, 2018). This pollution has impacts on individual and community health and safety, ground and surface water availability, biodiversity, and air and soil quality. It also affects livelihoods, limiting the potential for agricultural and other economic activities (Laisani and Jegede, 2019). Managing mining impacts includes implementing rehabilitation activities to restore mining land to a state approximating its pre-mining condition and productive potential. To this end, South Africa's environmental legislation and mining rights require mining land rehabilitation plans with financial provision made until a "closure certificate" is issued (Minerals Council South Africa, 2020).

Successful rehabilitation requires effective governance mechanisms to monitor the appropriateness of activities and apportioning of costs and liabilities arising over time. However, the full cost of ameliorating the ecological damage caused by mining far outstrips historical requirements of mining companies. This presents a significant barrier to closure and raises serious questions as to who should fund the shortfall. The financial question is more serious in the case of smaller mining companies, which make up the majority of mine owners in the Steve Tshwete municipal area (Steve Tshwete Local Municipality, Letsema and GIZ, 2020). This is a serious challenge for governance, with government reluctant to sanction rehabilitation activities and transfer liabilities¹² away from mining companies where the scope and timescale for impacts is uncertain. This complex multi-level, multi-sector governance challenge has led to high levels of inertia between public and private actors. As of December 2021, not a single mine closure certificate had been issued for a coal mine by the Department of Mineral Resources and Energy (DMRE).

For Mpumalanga, and the Nkangala District, in addition to managing the impacts of operational mines, the result of this inaction is that the region is marked with non-operational mines (predominantly coal mines) that are "derelict and ownerless" (abandoned with untraceable owners), abandoned with traceable owners, or under "care

and maintenance", without a clear plan to achieve rehabilitation and closure. Whether abandoned or under maintenance, unproductive mines continue to generate ecological risks, most notably acid mine drainage, and subsidence,¹³ with serious socio-economic consequences. Failure to rehabilitate land carries an opportunity cost, preventing local authorities from including mining land in economic development plans, rezoning the land for agriculture and tourism, and facilitating the sale thereof. What is required is a governance solution, and urgent implementation. At the end of 2021, the DMRE was finalising updated guidance for mine closure, with input from the DFFE, the private sector (mining companies and industry bodies) and civil society.

Beyond this, there is a need for all parties to get behind the successful closure of a mine to test assumptions about cost, appropriate finance mechanisms, as well as the job creation potential of interventions.

The private sector, in partnership with government, researchers, local governments and affected communities, has piloted activities that support sustainable mine rehabilitation and closure. These activities include water treatment, water use and bioremediation, with links to existing and future agricultural and tourism development. Water risks have drawn particular investment, due to mining activities placing strain on the Olifants

¹² This is not entirely straightforward as previous landowners can be held liable for environmental degradation after ceding ownership to another legal entity.

¹³ Driven by a lack of employment, there is also illegal mining in abandoned shafts, which is unsafe because of the risk of collapse of unmaintained tunnels.



River Catchment, particularly affecting Emalahleni. In 2004, Anglo American Coal (now Thungela) and BHP Billiton Energy Coal South Africa formed a joint venture to form the eMalahleni Water Reclamation Plant (Thungela Resources, 2021). Operating since 2007, the plant has the capacity to treat and supply 50 megalitres (ML) of acid mine drainage-affected water.¹⁴ Water treatment is energy-intensive and therefore also costly. Actors, such as GreenCape, have investigated more cost-effective decentralised onsite water treatment options.

The Mine Water Coordinating Body (MWCB)¹⁵ facilitates multistakeholder (private and public) planning on water issues. Through this platform, a number of rehabilitation and livelihood pilot projects have been implemented in the region. One example is a project that uses mine water for crop irrigation for emerging farmers.¹⁶

Other researchers have investigated the potential of bioremediation, using specific crops to restore soil quality and generate incomes for local residents.¹⁷

However, key questions still remain. First, it is unclear whether and how these pilot projects will add up to a full rehabilitation and closure ending in certification by the DMRE. It is unclear how complete land rehabilitation will be, and how this curtails agricultural development, for example. Third, even attempts to ensure labour-intensive rehabilitation may fall far short of the required employment in the region, and below existing labour quality. The ability of these investments to play a catalytic role in longer-term economic development remains entirely unclear, given that there are no concrete cases on which to start basing forecasting and planning.

14 Despite this facility, water contamination and undersupply remain an issue that has also led to legal action being brought against the municipal government, as water provision falls under its mandate. The situation has led to research and pilots being advanced by various stakeholders, including the DFFE.

15 MWCB was established in 2016 by the Department of Water and Sanitation, the (then) Department of Mineral Resources and Energy, Anglo American, Exxaro, Glencore, South32, Sasol, and Eskom. The ICMM has an overlapping membership with the MWCB.

16 The DFFE is formally opposed to this application of mine water because of impacts on soil salinity.

17 Various organisations, such as the ICMM, the MWCB and the Mpumalanga Green Cluster Agency, have attempted to track initiatives in this space.

VIEW OF THE MPUMALANGA LOWVELD FROM GOD'S WINDOW,

Photo: Carolina Ödman, [Wikimedia Commons](#)





AGRICULTURE

Mpumalanga is an agricultural powerhouse, accounting for 46% of South Africa's high-potential arable land. About 2.5 million hectares are used by commercial agriculture, representing 32% of the province's land area. It produces large volumes of maize and sugarcane as well as important quantities of soybeans, citrus and many other crops (see Figure 5). Mpumalanga drives 67% of South Africa's banana production, 57% of macadamia nuts, 44% of soya beans and 23% of maize. The province is also the fourth largest seller of cattle in the country and hosts a massive poultry industry. In addition, Mpumalanga is home to the largest area under forestry plantations (41% of national total in 2017). Overall, the province is a large net exporter of agricultural products, with a net surplus of R5.3 billion in 2020.

As a result, Lekwa in Gert Sibande, and Steve Tshwete in Nkangala, were the two largest income-generating municipalities in the country in 2017 from an agricultural standpoint. And, at the district level, Gert Sibande ranked second nationally (only after the Cape Winelands) in agricultural income (StatsSA, 2020a).

Although in decline since a peak in 2000, agricultural and silvicultural activities employ a sizeable number of people in Mpumalanga. In 2020, in excess of 130 000 people were directly employed in the sector, accounting for 12% of the provincial employment. Most of this employment is, however, located outside the coalfields, where competition for resources is less pronounced. In Emalahleni and Steve Tshwete respectively, the sector represented only 2% and 5% of municipal employment in 2020. Interestingly, where coal mining is present but less dominant, such as in Msukaligwa, the agricultural value chains can drive employment further – they accounted for 17% of employment in the municipality in 2020.

The potential for expanding agricultural operations in the province is high, thanks to favourable land and climatic conditions. The Bureau for Food and Agricultural Policy's forecast for the 2020–2029 period predicts an increase in the area under cultivation for multiple South African crops cultivated in the province (such as macadamia

nuts, avocados, maize and soybeans) pushed by rising demand in many cases, and overall yield gains (BFAP, 2020). Although the area under plantation is forecast to keep declining, a continued increase in productivity, along with the implementation of sustainability practices, would provide opportunities for economic development.

Besides reducing imports of some products by increasing domestic production, a growing export potential also exists. The African Continental Free Trade Area agreement, which intends to remove tariffs for most goods trade on the continent, and the revised protocol for the export of lemons between South Africa and China (signed in June 2021), which relaxed the regulatory requirements for cold treatment, present opportunities for increased exports out of Mpumalanga, notably citrus products such as lemons and oranges as well as maize, livestock products and nuts (Morokong, et al., 2021; Slater 2021).

Key opportunities also lie in developing waste beneficiation, using organic residues for energy (electricity and fuel), animal feed, biochemicals, fertilisers and biomaterials. The sugarcane, livestock and forestry industries are particularly suited for such developments in the short term. For instance, the Ngodwana Power Station, a 25-MW biomass-fired thermal power plant is under development in the Ehlanzeni District. It is located adjacent to the Sappi Ngodwana paper mill and will use biowaste from the adjacent wood and paper operation to boil water and produce steam.¹⁸

The rollout of smart agricultural practices is another avenue for economic diversification. A varied set of investment opportunities exists in present and new agricultural value chains, from improved soil health (regenerative agriculture, soil remediation), rangeland management (alternative protein feed, sustainable livestock production, feed storage), soilless farming (input supplies, niche farming, energy efficiency) and resource use efficiency, through protected farming (greenhouses and shade nets), smart farming (information and communications technology, and remote sensing applications), water reuse for irrigation, and energy efficiency (MGCA, 2021).

¹⁸ See <https://www.sappi.com> for further information.

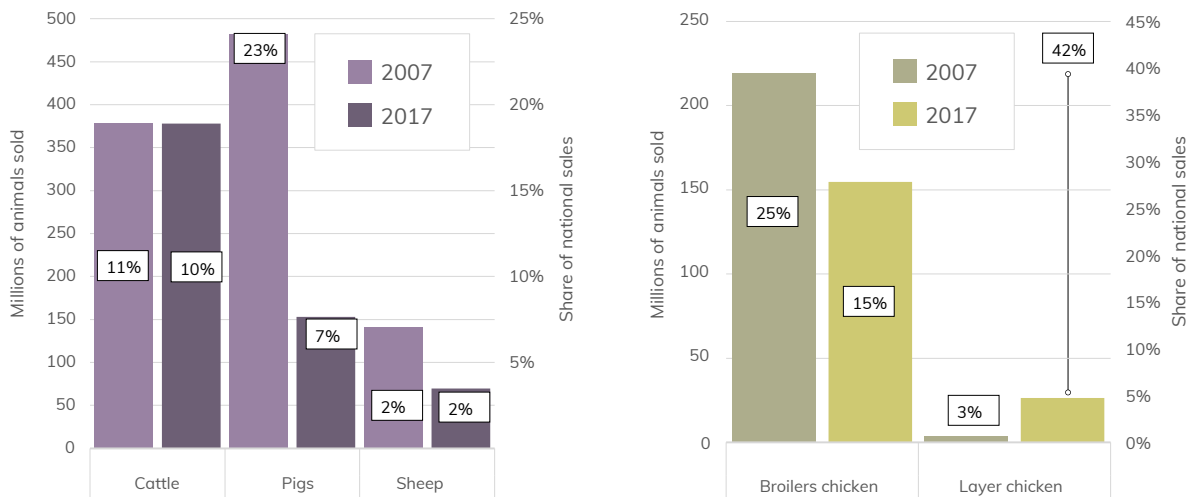
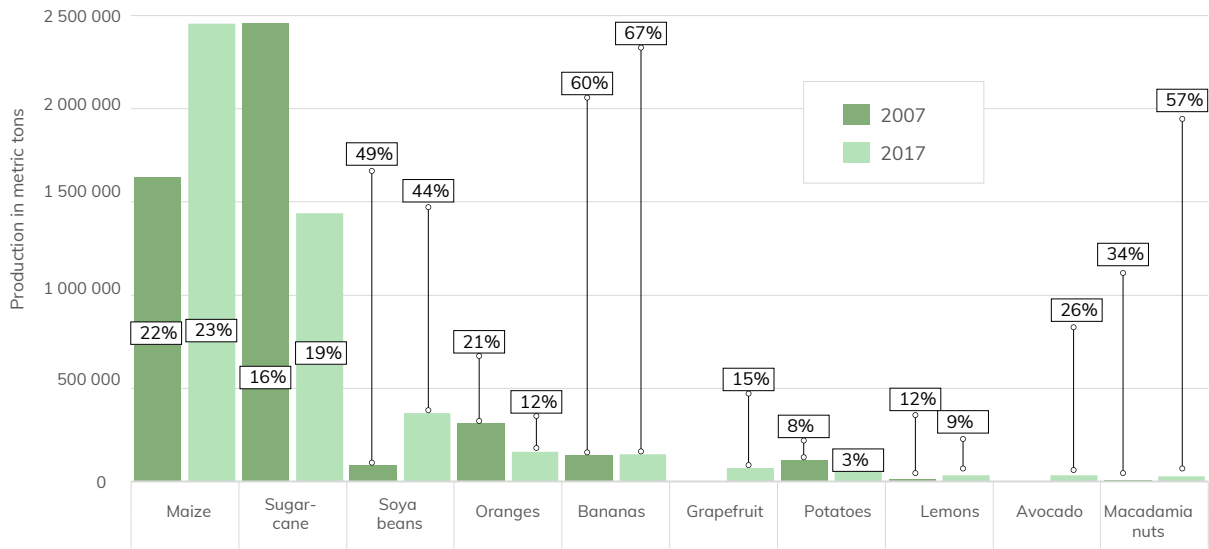


FIGURE 5: Main crop and livestock production in Mpumalanga

Source: Authors, based on data from Statistics South Africa, Census of commercial agriculture, 2017 Financial and production statistics, downloaded in November 2021.

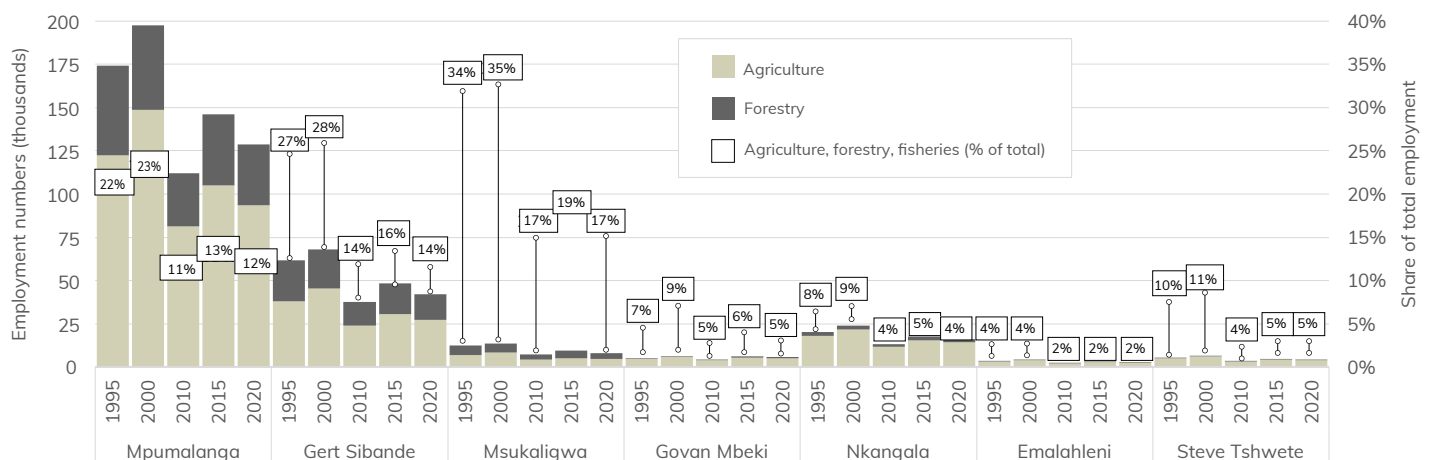


FIGURE 6: Agricultural employment in Mpumalanga's coalfields

Source: Authors, based on data from Quantec, series on Employment and Compensation by industry and 2011 local municipal/ward-based metro region level, downloaded from <https://www.easydata.co.za> in November 2021.



Deepening the role of agriculture in Mpumalanga is not without challenges, however:

Land-use competition

First, land-use competition, particularly with mining operations, is a significant hindering factor, with 93 632 ha (14%) of the province's high potential arable land already mined, and 40% subject to prospecting activities (Chigumira, 2021). While the Preservation and Development of Agricultural Land Bill, proposed in 2020, aims to address this problem, it is foreseen to persist in the near future.

Degraded land

Second, agricultural land in the province is severely degraded as a result of poor soil management and mining activities, leading to negative feedback loops with increased use and damage from fertilisers and chemicals (MGCA, 2021). This is notably a consequence of the lack of enforcement of environmental regulations, leading to mining rights often being granted without due consideration to “cumulative impacts on water resources, biodiversity, air quality, and food security, nor to the health or well-being of affected communities” (CER, 2016).

Employment conditions

Third, employment conditions in the agricultural sector do not match those in the rest of the economy, let alone mining. In 2018, the median monthly earning in agriculture stood at R2 816, compared to R3 500 for the country as a whole, R10 000 in utilities and R8 500 in mining (StatsSA, 2020b). Furthermore, agricultural workers tend to enjoy much lower degrees of social protection (such as formal contracts, leave, pension fund) than those in mining, power and manufacturing value chains (Makgetla et al, 2020).

A lack of skills

Fourth, many emerging and prospective farmers with access to arable land do not have the skills, guidance and capital needed to grow a viable farming business. The recruitment of additional extension officers, to assist with farming and managerial skills, as well as financial support would be required to foster agricultural entrepreneurship.

In sum, provided the land is preserved and/or properly rehabilitated, developing agricultural value chains, including high value-added horticultural products, crops for industrial uses, or food crops could be a massive source of (additional) employment in Mpumalanga. To be part of a just transition in the province would, however, necessitate schemes to promote decent employment, notably through small-scale commercial agriculture.



TOURISM

Mpumalanga is one of South Africa's main tourist destinations, primarily thanks to its wealth of biodiversity. The province's fauna and flora, from wetland, grassland and forest ecosystems to rare, threatened and endemic animal species, provide unique tourist attractions, drawing visitors from around the world. Some of the main tourist attractions include rivers and lakes, parks, animals and birds, with the Kruger National Park, in the eastern part of the province, as the main landmark. The Blyde River Canyon, the Echo Caves, God's Window and the Sabi Sands Game Reserve are some of the other leading nature-based tourism destinations in the province.

Tourism is an important economic activity in the province, supporting the livelihood of many people, particularly in poor, rural areas. The sector, which is a large contributor to GVA in the province, has seen a decline over the past few years, especially due to the COVID-19 pandemic, but has been identified by the province as a significant key driver for economic diversification given the potential as a fast-growing sector (Theunissen, 2018).

The direct economic benefits of tourism are multiple and range from employment creation to economic activity, such as procurement of goods and services by the hospitality industry, to foreign exchange earnings. Tourists source food and drinks from shops and contribute to the local travel industry. Indirect impacts will depend on where those goods and services are sourced, such as locally grown food.

Tourism also offers opportunities to preserve both the environment and the rich biodiversity of the region (Spenceley, Schägner, and Engels, 2021). This is essential not only for the health of citizens in the province but the country as a whole. Taking care of the ecosystems is of prime importance for much of what is discussed in this report and needs to be undertaken not only by considering infrastructure but the cross sectoral impacts.

Yet, to date, most tourism activities take place outside of Mpumalanga's coalfields. This is not surprising considering the high competition for land and resources with the coal value chain and the environmental degradation generated by decades of mining and heavy industrial activities.

Developing tourism in Mpumalanga's coal region would require addressing environmental liabilities.

Both municipalities are significantly affected by mining and mining associated industries, with a negative impact on their attractiveness from a tourism standpoint. More broadly, Mpumalanga's natural capital, which needs to be preserved and maintained to sustain tourism activities, has been eroded over time in part due to climate change and in part due to large-scale agriculture, land use, growing urbanisation, and mining and industry (Pegasys Strategy and Development, 2017).

Many of the provincial ecosystems are already degraded. Close to 9% of the land area is classed as endangered and the province has already experienced significant losses in biodiversity over the years. For instance, the province is home to 4 300 plant species of which 146 (in 2014) were threatened and 334 posed a high conservation concern. Moreover, air and water pollution due to mining and minerals industries have severely impacted on the environment, with drastic impacts on animal and human health and wellbeing (Lotter et al, 2014). It is critical that care is taken to ensure that the land and structures that might be used for rehabilitation are made safe from further mining, cracks and leaks of hazardous materials.

Mpumalanga's natural capital, which needs to be preserved and maintained to sustain tourism activities, has been eroded over time in part due to climate change and in part due to large-scale agriculture, land use, growing urbanisation, and mining and industry.



COAL-BASED TOURISM ASSETS

Besides existing nature-based assets, an opportunity exists to turn coal-based liabilities into tourism assets in and around Steve Tshwete and Emalahleni. The rehabilitation and repurposing of closed power stations and mines in both municipalities could offer new tourist prospects. This would entail restoring the land into sustainable and usable spaces while taking into consideration not only affected communities but biodiversity loss (Beuermann, 2021). For instance, the Komati power station came on line in 1961 and has one of the country's tallest chimneys. It could become a just transition hub or museum showcasing the history of coal mining and coal-fired power generation in the country.

EXAMPLES FROM OTHER COUNTRIES

Looking at examples in other countries, interesting initiatives highlight the possibility of turning abandoned mines and power stations into parks, nature reserves or museums:

The horizontal Eiffel Tower of Lusatia, Germany: In 1995, a 350m long and 80m high conveyor steel bridge became an adventure area and museum that attracts many tourists (70 000 in its first year of operation) as part of German industrial heritage.¹⁹

Lake Kepwari, Australia: After 30 years of open-cut coal mining, the site in Collie, in Western Australia, has been converted to a water sports landmark. Opened in 2020, Lake Kepwari is anticipated to attract up to 22 000 overnight stays and 37 000 day trip visitors per annum. The lake and river Collie are also important for the indigenous Nyungar people in providing food and water.²⁰

The Hoge Kempen National Park in Genk, Belgium: Following the closure of seven coal mines and 60 000 job losses, the area was converted into national parks by non-government organisations and communities. It boasts about 150 000 visitors annually.

The Lusatian Lake District in Germany: 30 years ago, the district was a major coal mining area with numerous pits affecting 26 000 inhabitants. Today, it is one of Europe's largest artificial lake complexes with 20 lakes, restored forests, a cycling network, water sports, fishing, restaurants and hotels all attracting large numbers of tourists.²¹

The Eden Project, in the United Kingdom (UK): Through an ecotourism project, an abandoned clay quarry in the UK was transformed into a successful adventure park and garden. It comprises an indoor rainforest, outdoor gardens and concert facilities. The Eden Project has brought 2 billion pounds into the regional economy and hosted more than 20 million visitors over the past two decades.²²

19 See <https://www.lausitzerseenland.de/en> for more information.

20 See <https://www.yancoal.com.au> for more information.

21 See <https://www.weforum.org> for more information

22 See <https://chinaattractionsexpo.org> and <https://travelbaseonline.com> for more information.



Some potential to develop more traditional tourist attractions also exist. Looking specifically at Steve Tshwete, it is strategically placed in terms of tourism destinations (Steve Tshwete Local Municipality 2019b). The 2020/2021 IDP targets heritage and culture as important elements of tourism. The Urban Middelburg Innercity Renewal Project is considering the establishment of an art gallery and centre, and a museum.²³

Overall, to be successful, the development of tourism in the region should be undertaken as a partnership between all stakeholders, with local communities at the core. This requires substantial financing, political will and careful strategic planning which should commence long before the closure of coal-based facilities takes place. The 1996 White Paper on the Development and Promotion of Tourism in South Africa called for communities to be involved in the development of and benefit from local tourism, as well as the respect of the environment, and natural and cultural diversity (DEAT, 1996). The potential exists to develop responsible tourism that focuses on local goods, services, ecosystems and people. Most of the success stories around the world and in South Africa have come out of partnerships between the public and private sectors, with the voices of communities at their core, from planning and finance to reskilling.

²³ Emalahleni has more limited opportunities for tourism development, particularly given the prevalence of coal mining, the poor state of road infrastructure, and electricity and water shortages (Emalahleni Municipality, 2021).

ROBBERS PASS, MPUMALANGA

Photo: [South African Tourism, Wikimedia Commons](#)





CHAPTER 4

LOOKING AHEAD

Opportunities to diversify the economies of Emalahleni and Steve Tshwete, and Mpumalanga more broadly, abound. Most, if not all, avenues will have to be explored to set the province's coalfields on a new, more sustainable development trajectory. Yet, the path forward is not without challenges. The phase-out of coal-based activities will not in and of itself lead to the growth of other economic activities. Proactive, coordinated action at multiple government levels is required to do so.

NATIONAL

At the national level, a wide set of tools should be harnessed to drive the diversification of the regional economy. Industrial policy is central in this respect to drive and support the emergence of new economic opportunities. Industrial policy can both drive investment directly as well as support investment by the private sector. A new, coherent industrial strategy must be defined for the region, building on the opportunities explored in this report. A comprehensive audit of the region's strengths and weaknesses should be conducted. This would include the state of infrastructure, skills, ecosystems, civic structures and public services. Instruments, such as Special Economic Zones, support programmes (for R&D, entrepreneurship, greenfield and brownfield investment, small business development), direct investment, infrastructure development and trade policy, could then be used in support of this new vision.

Labour market policies are also important to support the transition of workers to new opportunities and foster green and decent work. It combines both active labour market policies, such as income support programmes, reskilling and small business support, with passive labour market policies that impact labour market conditions (such as minimum wage). In the context of the coalfields, particular attention should be paid to the structure of a social protection support package for affected workers, so that they are in a position to find new livelihoods or exit the labour market (retirement).

WILHELMINA CHERRY FARM, FICKSBURG SMART GRID CENTRE
OF EXCELLENCE SOLAR MICROGRID DEMONSTRATION PROJECT

Photo: [Joëlle Chesselet, Director, Voices from under a dark cloud](#)

In addition, an extension of social protection is paramount to support communities beyond workers. Social protection aims to provide a safety net for all, primarily²⁴ through non-contributory support such as social grants, universal basic income, public employment programmes, and service provision (e.g. energy and water). Many people in the coalfields already face a dire social context. This is set to be exacerbated, in some aspects, by the disruption created by the transition process. In this context, improved and wider coverage of social protection measures is necessary to ensure the economic diversification process is as inclusive as possible. This could include the piloting of a universal basic income, retirement packages or a job guarantee scheme in the coal value chain or the country's coalfields.

Importantly, the policy response should be tailored to the local context. Often this is missing from national policies and frameworks, including in the just transition space. Even within the coalfields, situations differ between municipalities and communities. Emalahleni and Steve Tshwete, while similar in many respects, face different realities when initiating their diversification. Steve Tshwete is more diversified than Emalahleni. Emalahleni has a much higher population density (about 150 people / km²) than Steve Tshwete (about 58 people / km²), which hosts less people on a larger area. This has key implications for service delivery, infrastructure development as well as the development of new economic activities. Steve Tshwete is also in a stronger financial position than its counterpart. Similarly, social dialogue is more established in Steve Tshwete than in Emalahleni, which has an impact on the effectiveness of bottom-up and grassroots processes.

National government also has a key role to play in providing clarity on the institutional arrangements and the multi-level governance of the just transition processes. It can also support the coordination and alignment of various stakeholders, within government and between government and stakeholders. Strengthening alignment of climate, energy and industrial policies (among others), both between government departments as well as between spheres of government is key to the concept of cooperative governance which resides in the Constitution. Many of the issues raised in this report do not sit neatly within one department or one sphere of government but are cross-cutting. For this reason, strong leadership, governance and accountability are essential. This is also crucial to ensure the adequate monitoring of implementation (Makgetla, 2021). Furthermore, a clear just transition finance strategy and an associated roadmap are necessary to enable the successful transformation of the coalfields (Lowitt, 2021).

PROVINCIAL

Provincial government operates as a balance between national and local government assisting local government to implement national policies. While the Mpumalanga province has enormous challenges in managing the coal phase-out from a just transition perspective, it has made enormous headway in driving the just transition agenda and is the first province, through its Department of Agriculture, Rural Development, Land and Environmental Affairs, to develop a just transition strategy. The strategy sets out pathways to institutionalise and mainstream just transition planning into the different departments within the province and at the district and local levels. It highlights a number of key areas, namely social dialogue, economic diversification, worker transition, social protection and service delivery. Importantly, it attempts to align and coordinate all efforts within the province

24 Contributory schemes, such as unemployment insurance, also play a role. These overlap with labour market policies.

including the local level of government. Further, it calls for economic diversification that will improve livelihoods and safeguard ecosystems, food security, human wellbeing and address some of the effects of years of coal mining and coal-related industries.

At the provincial level, further alignment with other spheres of government as well as other stakeholders operating in the region is critical to foster a just transition. In this respect, provincial agencies have a key role to play in catalysing investment and unlocking the potential of the province. For instance, the newly-established Mpumalanga Green Cluster Agency uses the triple helix cluster model with representation from government, industry, and academia as part of its design setup. It works at the interface between stakeholders to identify and remove barriers to an economically viable green economy, catalysing uptake to enable the region and its citizens to prosper. Further alignment can also be achieved through inclusive, integrated provincial policymaking. Provincial policy can play a crucial role in fostering education and awareness for all stakeholders so that information and communication are clear and transparent. It also has the opportunity to support local-level policy with a particular focus on providing service delivery and engaging communities and workers in the transition process.

LOCAL

Complementarily, as elaborated in Hermanus et al. (2022), there are five main avenues for municipalities to steer their just transition. First, municipalities play a pivotal role in planning at the local level, through IDPs, Growth and Development Strategies, spatial planning and land use management, and environmental planning. Furthermore, the One District; One Plan; One Budget; One Approach allows for the development of regional solutions at the district level for areas such as energy infrastructure or waste management. Second, as per the Constitution, municipalities have key regulatory powers at the local level. This includes regulations on environmental externalities (air quality, water) as well as environmental and other planning permissions, including land zoning. Third, local governments have dedicated budgetary and fiscal models. While the transition to renewable energy notably raises certain challenges for municipal finances, it also opens the door for new business models and revenues streams, with the opportunities to improve the sustainability of local government finances. Here, local government can foster the development of alternative business models involving publicly- and community-owned assets. Municipalities also have the opportunity to attract additional finance, through green or social bonds for instance. Fourth, with municipal finance comes municipal expenditure. Municipalities can have material impacts on the transition through their procurement spending, infrastructure investment and provision of social support (such as the free basic electricity and free basic alternative energy policies). The local economic development mandate is a cornerstone of the just transition for local government. Last but not least, local government has a crucial facilitation role. Municipal governments can foster local forums and ensure the functioning of ward committees. They can also support and take part in regional clusters.

In sum, while not without challenges, the path ahead is filled with possibilities. Opportunities for diversification abound. Policy tools are available. The resilience and sustainability of the province lies in exploring as many viable options as possible, especially given their interconnection. And delaying the exploration of diverse opportunities will only make the inevitable shift away from coal more arduous. It is time to get to work.

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