SOCIO-ECONOMIC IMPACT STUDY FOR THE SHUTDOWN AND REPURPOSING OF **KOMATI POWER STATION**

DOCUMENT INFORMATION

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EXECUTIVE SUMMARY

Introduction and purpose

Urban-Econ Development Economists, supported by Savannah Environmental, was appointed by Eskom Holdings ("Eskom") to undertake a socio-economic impact study for the shutdown of three coal-fired power stations (i.e. Komati, Hendrina, and Grootvlei). Communities surrounding each of the power stations have strong interlinkages with their continued operation as they provide employment opportunities, basic services and play a crucial role in local economic activity. However, as all three power stations are approaching their end-of-life dates and will be shut down as part of Eskom's "Strategy 2035" and the attainment of South Africa's nationally determined contribution (NDC).

It is within the above context that Eskom commissioned a socio-economic impact assessment to quantify, where possible, the socio-economic impacts associated with the shutdown of each power station with the aim of transitioning and sustainably diversifying the host area. Apart from the determination of possible socio-economic impacts, the study also aims to identify new opportunities to manage and mitigate the societal and economic impact arising from the shutdown of these power stations. As such, the objectives of the study are:

- Identify and assess potential socio-economic impacts associated with the full closure of the power stations;
- Determine and evaluate downside and upside socioeconomic risks associated with the full closure of the power stations;
- Identify clear and tangible opportunities to minimise the socio-economic impact of the full shutdown, collaborating with other stakeholders and leveraging government, industry, and sector-specific programmes and interventions;
- Develop a concrete plan of action to implement the identified opportunities and to support the district government, local municipalities, and other stakeholders; and
- Set out concise roles and responsibilities for each role player involved in the implementation.

This report presents the outcomes of the socio-economic impact assessment for **Komati Power Station (KPS)** in addition to the proposed impact mitigation strategy and implementation plan to mitigate the anticipated impacts arising from its shutdown.

Summary of potential impacts

As noted above, communities surrounding KPS rely on its continued operation for the provision of basic services, employment opportunities, and economic activity. Therefore, the shutdown of the power station is expected to result in a broad spectrum of impacts ranging from a possible deterioration of infrastructure and a potential slowdown in economic activity to an increase in social ills or losses in community cohesion.

To guide the identification of potential impacts, a Community Capitals Framework (CCF) and Theory of Change (ToC) principle were applied to develop a causal chain of events and impacts that would be triggered by the shutdown. This allowed for the identification of the root causes of impacts that would need to be prioritised for mitigation. The outcome of this approach is presented in Figure ES.1, which showcases the impact of the KPS shutdown without the implementation of mitigation measures.

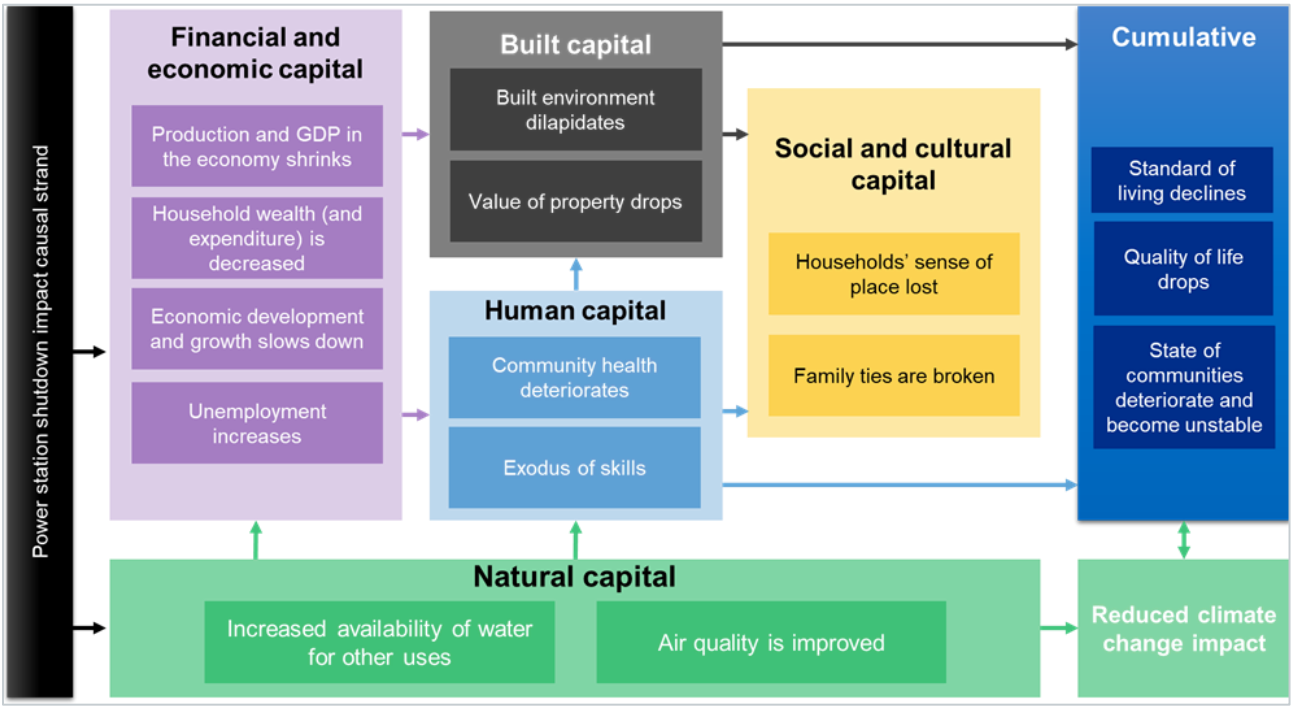


Figure ES.1: Impact assessment at the community capital level

The analysis revealed that a reduction in capital and operating expenditure resulting from the shutdown of KPS results primarily in financial and economic impacts. These include, for example, declines in household wealth and expenditure, a slowdown in economic development and growth, and an increase in unemployment. These impacts, in turn, result in a deterioration of community health and a potential exodus of skills. Furthermore, due to migration of individuals from the area or the deterioration of local economic conditions, infrastructure in the area may become dilapidated, resulting in a decline in property values. The migration of individuals from the area may exert further negative effects on family ties while households may lose their sense of place given their attachment to KPS. Cumulatively, living standards, quality of life, and the state of communities are expected to deteriorate. However, despite these adverse impacts, potential benefits such as the increased availability of water and improved ambient air quality may ensue from KPS's shutdown.

Apart from the above analysis, the study further attempts to quantify the impact of the KPS shutdown on the local, provincial, and national economies by evaluating the impacts on employment, gross domestic product (GDP), production/output, and household income. To inform the modelling exercise, data such as expenditure, procurement, labour, income earned by KPS employees, and tax payments by KPS were considered. Once again, it should be emphasised that these figures represent the magnitude of impacts should no mitigation measures be considered. A summary of assumptions and outcomes of the modelling exercise is presented in Figure ES.2.

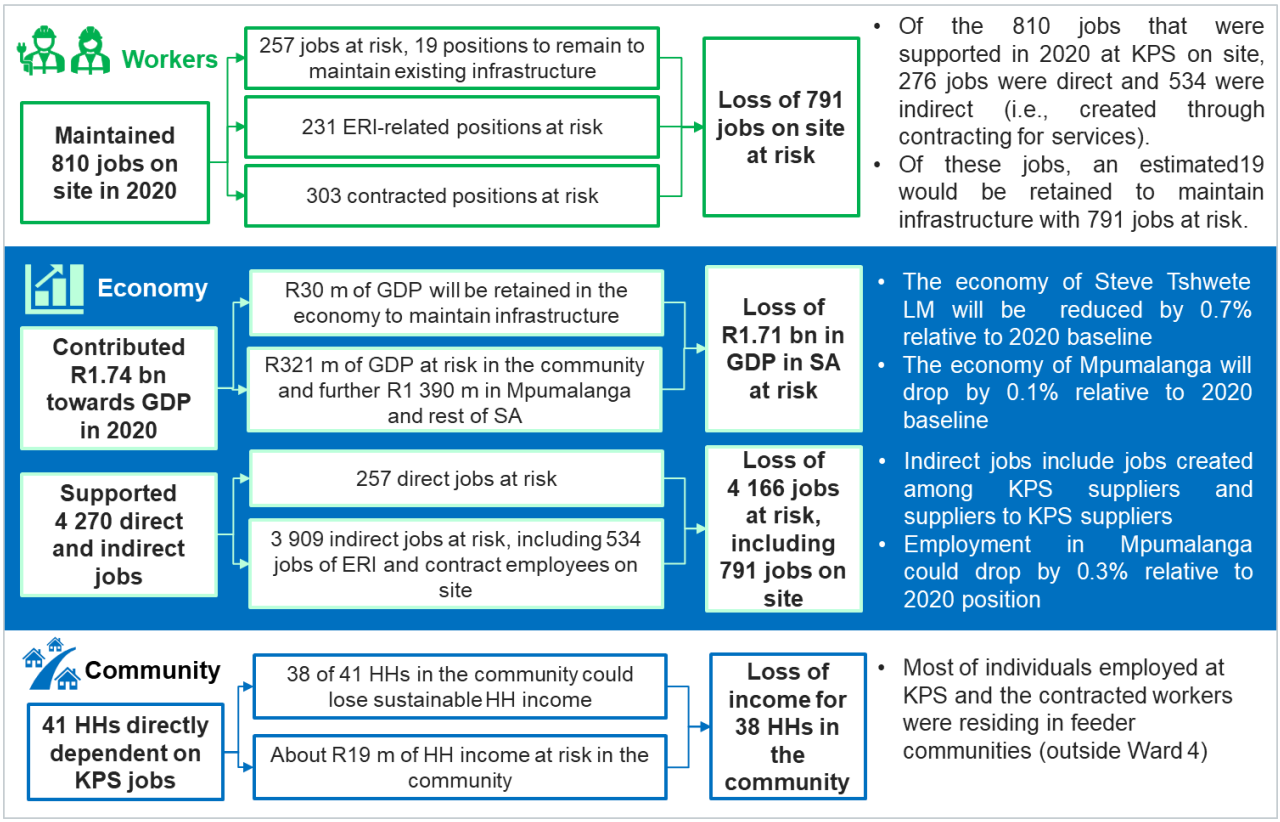


Figure ES.2: Summary of assumptions and impacts

As showcased above, the impact of the KPS shutdown without mitigation is expected to be significant. Nearly 800 employment opportunities previously supported by the operations of KPS is at risk. In addition, around R1.71 billion (in 2020 prices) in national GDP is expected to be lost, with the economies of Steve Tshwete Local Municipality (LM) and Mpumalanga declining by 0.7% and 0.1%, respectively, relative to the 2020 baseline. Furthermore, a 0.3% decline in provincial employment relative to 2020 may ensue.

The quantification of expected socio-economic impacts provides crucial insights into the magnitude of economic impacts. Importantly, these figures also provide a benchmark for the development of mitigation measures included in the implementation plan for KPS.

KPS implementation plan and summary of impacts

To mitigate the expected impacts stemming from the KPS shutdown, a comprehensive implementation plan was developed by taking into consideration the expected impacts on the various community capitals. In addition, the implementation plan was based on the mitigation strategy philosophy for KPS, which includes the following:

- alignment with the Just Energy Transition (JET) vision and principles for South Africa;
- integration of Eskom's JET strategy;

- consideration of lessons learned from case study analyses of coal-fired power station repurposing in other countries;
- alignment with government priorities and strategic objectives;
- partnerships and a collaborative approach; and
- consideration of other initiatives and interventions planned by private and public sectors.

Following the principles outlined in the mitigation strategy philosophy and taking into consideration mitigation measure concepts identified during the socio-economic impact assessment, the mitigation framework for KPS implies the development of human capital, the stabilisation and enhancement of financial and economic capital, and the strengthening of built and social capitals – all of which is envisaged to be communicated externally and internally. As such, the mitigation framework for KPS comprises five pillars that are aimed at addressing one or two community capitals, a combination of which allows for a holistic and integrated approach to addressing the potential negative impacts that could ensue from the shutdown of KPS. The mitigation framework for KPS is provided in Figure ES.3 and aims to promote a holistic approach to impact mitigation.

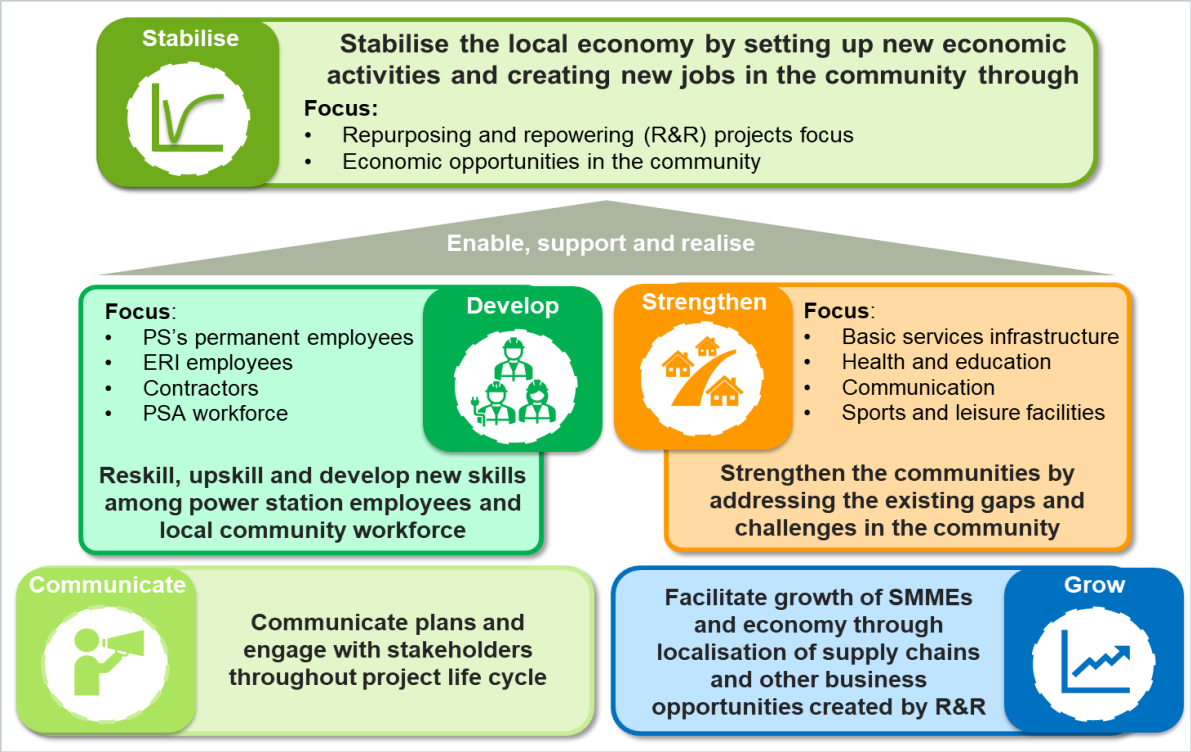


Figure ES.3: Mitigation strategy framework for KPS

The "**Stabilise**" pillar includes commercial projects that aim to stabilise the economic base of the local community, the distress of which has been identified to be the root cause of most of the socio-economic negative effects described in the impact assessment. The interventions included in this pillar are aimed at creating new direct, sustainable employment opportunities that would offset the direct employment losses caused by the closure of the power station. For the employment opportunities created by the Stabilise and

other pillars to be localised, the "**Develop**" pillar focuses on upskilling and reskilling the employees of the power station. This pillar also focuses on developing skills in the community that will be required during both construction and operational activities of the newly introduced projects. Parallel to this, the "**Strengthen**" pillar aims to focus on strengthening the local community by addressing existing infrastructure gaps and challenges. To realise opportunities brought about by the introduction of new commercial projects in the area, the "**Grow**" pillar includes realising local business opportunities as well as interventions that could become viable with the deployment of similar economic interventions at other power stations in the province. Lastly, the "**Communicate**" pillar entails the communication of the strategy to all groups of stakeholders (both internal and external) to acquire their buy-in.

The following diagram illustrates the specific interventions that are proposed to mitigate the impacts of the KPS shutdown.

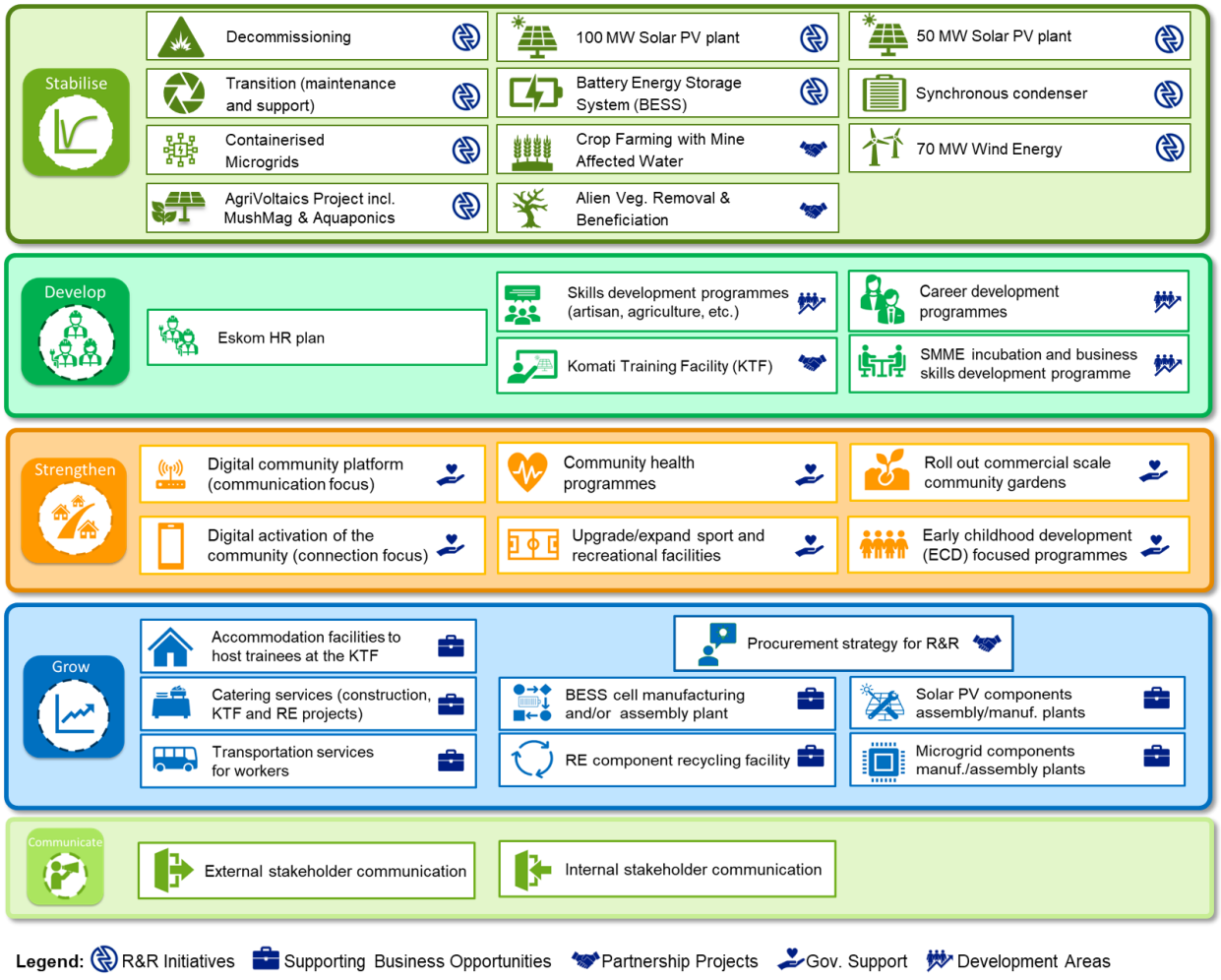


Figure ES.4: Proposed mitigation strategy for KPS unpacked

The implementation of the various projects proposed to mitigate the impact of the KPS shutdown is dependent on the provision of support by various stakeholders and entities, which stems from the nature of the JET. Although Eskom is considered a key champion for the mitigation strategy, various government departments are also considered crucial in providing support as part of their respective mandates. In several instances, both Eskom and government entities are considered the champions for specific interventions. In the case of others, either Eskom or government is the champion with support from the other. Essentially, the overall success of the proposed mitigation strategy is dependent on successful collaboration between Eskom and the various partners.

As illustrated in Figure ES.5, the successful implementation of the mitigation strategy outlined in Figure ES.4 may hold significant social and economic benefits for local communities. In total, over R7 billion will be invested in the local economy to support its transition. Once operational, these projects may contribute around R870 million to GDP on an annual basis. In terms of employment creation, around 8 700 temporary employment opportunities may be supported during the construction period, while 2 150 sustainable jobs may be created once all the projects are operational.

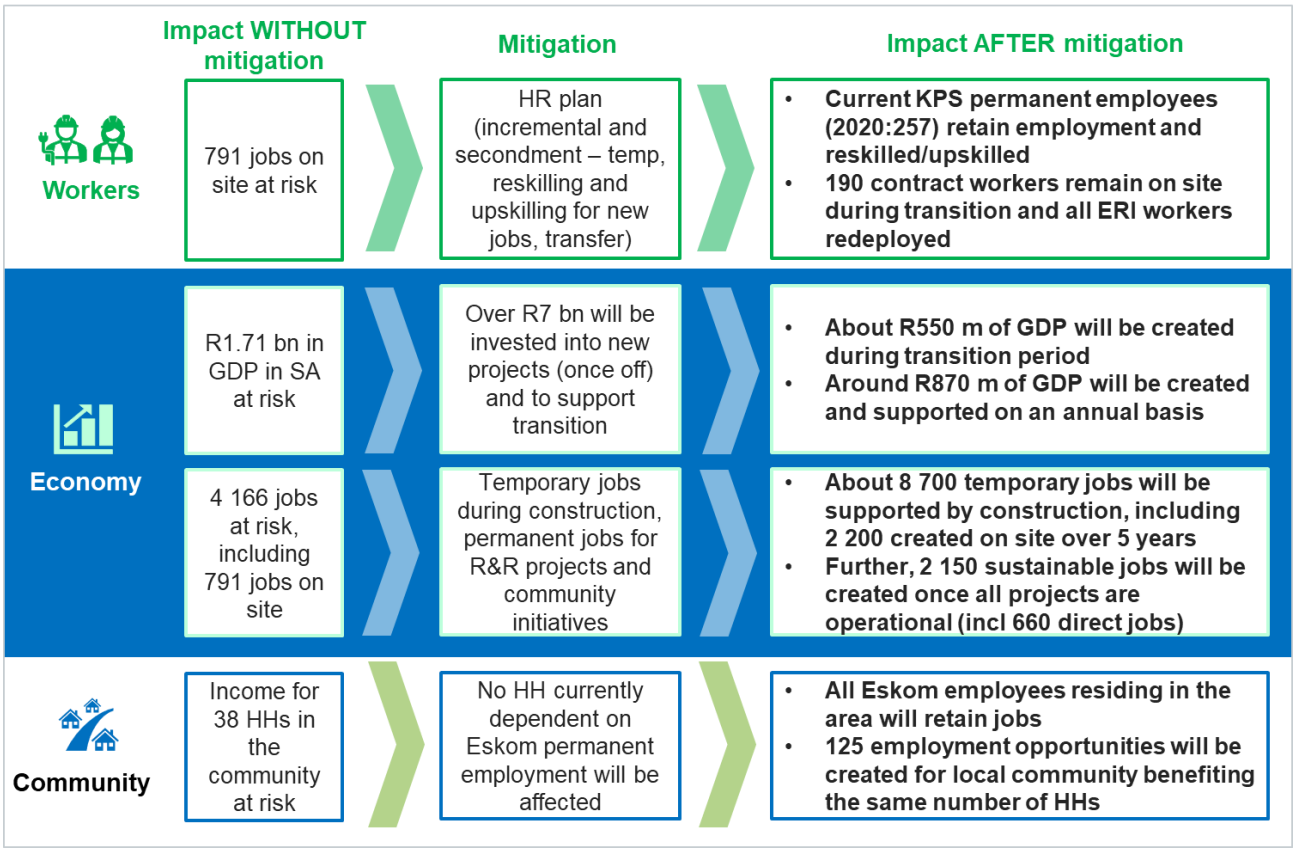


Figure ES.5: Impact of mitigation measures

Apart from the stimulation of economic activity and the creation of employment opportunities, the measures contained in the mitigation strategy aim to sustainably diversify the local economy through the inclusion of projects aligned with the JET while uplifting communities and improving overall living standards. Crucially, the shutdown of KPS and the successful implementation of the identified mitigation measures present a key opportunity to showcase the sustainable and just transition of the South African energy sector and economy away from its reliance on coal.

LIST OF ACRONYMS AND ABBREVIATIONS

4IR	Fourth Industrial Revolution
AC	Alternating Current
AI	Artificial Intelligence
AIDS	Acquired Immunodeficiency Syndrome
B4D	Business for Development
BAPEPSA	Biomass Action Plan for Electricity Production in South Africa
BESS	Battery Energy Storage System
BRM	Black Royalty Minerals
BUSA	Business Unity South Africa
CAPEX	Capital Expenditure
CBD	Central Business District
CBF	Central Bargaining Forum
CBO	Community-based Organisation
CCF	Community Capitals Framework
CCGT	Combined Cycle Gas Turbine
CER	Centre for Environmental Rights
CO_2	Carbon Dioxide
COC	Chamber of Commerce
CoGTA	Department of Cooperative Governance and Traditional Affairs
COP	Conference of the Parties
COVID-19	Coronavirus Disease 2019
CPUT	Cape Peninsula University of Technology
CSI	Corporate Social Investment
CSIR	Council for Scientific and Industrial Research
CSR	Corporate Social Responsibility
DALRRD	Department of Agriculture, Land Reform and Rural Development
DARDLEA	Mpumalanga Provincial Department of Agriculture, Rural Development, Land and Environmental Affairs
DBSA	Development Bank of Southern Africa
DC	Direct Current
DDM	District Development Model
DE	Digital Entrepreneur
DEDT	Department of Economic Development and Tourism Mpumalanga
DFFE	Department of Forestry, Fisheries and the Environment
DFI	Development Finance Institution
DHET	Department of Higher Education and Training

DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DOH	Department of Health
DPE	Department of Public Enterprises
DPWI	Department of Public Works and Infrastructure
DSI	Department of Science and Innovation
DWS	Department of Water and Sanitation
EAP	Economically Active Population
ECD	Early Childhood Development
EIA	Environmental Impact Assessment
E-JETP	Eskom Just Energy Transition Project
EPWP	Expanded Public Works Programme
ERI	Eskom Rotek Industries
ESI	Electricity Supply Industry
Eskom	Eskom Holdings SOC Limited
FTE	Full-time Equivalent
FY	Financial Year
GDP	Gross Domestic Product
GGF	Generation National Group Forum
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
GNI	Gross National Income
GOS	Gross Operating Surplus
GPS	Grootvlei Power Station
GVA	Gross Value Added
GW	Gigawatt
GWh	Gigawatt Hour
ha	Hectare
HDI	Human Development Index
HH	Household
HI	Horizontal Irradiance
HIV	Human Immunodeficiency Virus
HPS	Hendrina Power Station
HR	Human Resources
HRD	Human Resource Development
IC	Impact Catalyst
ICT	Information and Communication Technology

IDC	Industrial Development Corporation
IDP	Integrated Development Plan
IPAP	Industrial Policy Action Plan
IRP2019	Integrated Resource Plan 2019
IZOI	Immediate Zone of Influence
JET	Just Energy Transition
Km	Kilometre
KPS	Komati Power Station
Kt	Kilotonne
KTF	Komati Training Facility
kW	Kilowatt
kWh	Kilowatt Hour
kWp	Kilowatt Peak
ℓ	Litre
LED	Local Economic Development
LM	Local Municipality
LNG	Liquified Natural Gas
LRA	Labour Relations Act
m	Metre
M&E	Monitoring and Evaluation
m/s	Metres per second
m^2	Square Metre
MAP	Mining Academy Programme
MBUCF	Middelburg Business and Unemployment Community Forum
MCCI	Middelburg Chamber of Commerce and Industry
MEGA	Mpumalanga Economic Growth Agency
Mℓ	Megalitre
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPG	Mpumalanga Provincial Government
Mt	Megatonne
MTSF	Medium Term Strategic Framework
MVar	Megavolt-Ampere Reactive
MW	Megawatt
MWCB	Mine Water Coordinating Body
MWh	Megawatt Hour
NAFCOC	National African Federated Chamber of Commerce and Industry

NDC	Nationally Determined Contribution
NDP	National Development Plan
NEA	Not Economically Active
NERSA	National Energy Regulator of South Africa
NEVA	National Employment Vulnerability Assessment
NGO	Non-governmental Organisation
NO_2	Nitrogen Dioxide
NOX	Nitrogen Oxide
NPC	National Planning Commission
NPO	Non-profit Organisation
NT	National Treasury
NUF	National Urban Fellows
OPEX	Operational Expenditure
p.a.	Per Annum
PBO	Public Benefit Organisation
PCC	Presidential Climate Commission
PM	Particulate Matter
PRET SA	Practical Radical Economic Transformation South Africa
PS	Power Station
PSA	Primary Study Area
PV	Photovoltaic
R&D	Research and Development
R&R	Repurposing and Repowering
RD&I	Research, Development and Innovation
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RES	Renewable Energy Sources
SA	South Africa
SAERRP	South African Economic Reconstruction and Recovery Plan
SAM	Social Accounting Matrix
SANCO	South African National Civic Organisation
SAPS	South African Police Service
SAPVIA	South African Photovoltaic Industry Association
SAQA	South African Qualifications Authority
SARETEC	South African Renewable Energy Technology Centre
SAWEA	South African Wind Energy Association
SDLS	Supplier Development and Localisation Strategy

SEZ	Special Economic Zone
SJRP	Sector Jobs Resilience Plan
SMME	Small, Medium or Micro Enterprise
SNA	System of National Account
SO_2	Sulphur Dioxide
SOX	Sulphur Oxide
SPLUMA	Spatial Planning and Land Use Management Act
SSA	Secondary Study Area
Stats SA	Statistics South Africa
STD	Sexually Transmitted Disease
t	Tonne
TB	Tuberculosis
TBC	To Be Confirmed
TBD	To Be Determined
the **dtic**	Department of Trade, Industry and Competition
TIA	Technology Innovation Agency
ToC	Theory of Change
ToR	Terms of Reference
TSA	Tertiary Study Area
TVET	Technical and Vocational Education and Training
TW	Terawatt
UK	United Kingdom
US	United States of America
VAT	Value-added Tax
VSP	Voluntary Severance Package
WfW	Working for Water

ESKOM DEPARTMENTS AND TEAMS

CCSD	Climate Change and Sustainable Development Department
CSI	Corporate Social Investment
GCDPS	Group Capital Division Project Stability
Gx	Generation Division
HR	Human Resources
PED	Primary Energy Department
PSGM	Power Station General Managers
R&SEM	Risk and Sustainability: Environmental Management
SE	Stakeholder Engagement

APPLICABLE TERMS AND DEFINITIONS

Affected employee

An employee whose current position at Komati Power Station has been declared redundant (closed) or that the same is regarded as surplus. This situation may exist because:

- job content has changed to such an extent that the employee could not reasonably be expected to adapt;
- work currently being done is simply no longer necessary; and/or
- work performed is not required to be performed in its present locality.

(Eskom, 2019)

Decommissioning

According to the EIA regulations of 2014, it means to "take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned". It also involves dismantling all equipment, demolishing buildings and structures and cleaning up the entire site (including wet and dry disposal areas and coal yards) – all as per standards.

(Eskom, 2019)

Employee

Section 213 of the Labour Relations Act (LRA) – Anyone, other than an independent contractor, who works for another person or for the State and who receives, or is entitled to receive, any remuneration and or any other person who assists in conducting the business of an employer.
This definition omits only service providers who are external and/or truly autonomous.
Section 200A of the LRA states that, unless the contrary is proven and regardless of the form of the contract, a person is presumed to be an employee if any one of the following circumstances exist:

- the manner in which the person works, or his/her hours of work is/are subject to the direction or control of another person;
- the person forms part of the organisation;
- the person has worked for the other person for an average of at least 40 hours per month for the last three months;
- the person is economically dependent on the other person for whom he or she works or renders services;
- the person is provided with tools of trade by the other person; or
- the person only provides services to one person.

(Eskom, 2019)

Fixed-term employment contract

A contract in writing which stipulates the period of the employment contract and termination date and does not raise future expectations of continued or further employment (Eskom, 2019).

Mothballing

The deactivation and preservation of equipment or a production facility for possible future use or sale (long-term storage).

Procurement

A process that creates, manages and fulfils contracts relating to the provision of goods, services and engineering, and construction works or disposals or any combination thereof.

Repurposing	Refers to adapting an item or capability (in this case a power station) for a purpose other than that for which it was created. In this context, repurposing refers to the adaptation of a coal-fired power station so that it can serve as a renewable energy plant, a process that may require the dismantling of existing infrastructure and the installation of a modern technology mix at the power plant. Services or buildings at the repurposed facility that may still be required may be retained for re-use. (VPC, 2021)
Reserve storage	Reserve storage is the formal term for when a power station unit is shut down and put into temporary storage under preservation while keeping the unit in readiness to return to operation within 12 months, if required (short-term storage). Reserve storage is a technical term that is often used interchangeably with “shutdown”.
Shutdown	Shutdown implies the same as reserve storage but is often used in stakeholder engagement processes for ease of understanding. Shutdown, therefore, refers to a situation where power station units are available for operation but not electrically connected to the transmission system for capacity or economic reasons. Furthermore, the term describes a situation in which the units can be returned to service within a period not greater than 12 months. (Eskom, 2019)

1 INTRODUCTION

1.1 Study background

Eskom operates 15 coal-fired power stations. Among these are Duvha, Arnot, Kriel, Matla, Tutuka, Camden, Hendrina, Grootvlei and Komati, which are approaching the end of their lifespans and will be shut down. This study focuses on the Hendrina, Grootvlei and Komati power stations.

Surrounding communities have strong linkages with these power stations as the facilities offer employment, provide basic services and account for most of the economic activity in the areas. Thus, the shutting down of power stations may have adverse effects, including job losses, a limiting of economic opportunities, the possible departure of people (with a resultant stranding of assets), deterioration in the provision of basic services, and reduction in investment and expenditure. Such effects are likely to impact the sustainability of local communities.

The shutting down of these power stations therefore necessitates an assessment of the socio-economic implications of the closures on both internal and external stakeholders[1] and the development of an impact mitigation strategy. Social planning is associated with the formulation of plans for future action concerning social institutions and resources to meet the needs of society; it is occasionally complementary to economic planning (Madge, 2020). The shutting down of these power stations necessitates the development of an impact mitigation strategy that carefully and extensively considers the socio-economic factors of the communities and which can be used to inform the "detailed planning, decision making, the timing and execution of the planned shutdown".

This document presents the socio-economic assessment study for the shutdown and repurposing of the **Komati Power Station (KPS)**.

1.2 Study scope

The study is aimed at developing a socio-economic impact assessment to identify impacts, risks and opportunities of the KPS shutdown. It also seeks to develop an impact mitigation strategy to manage and mitigate the societal impact of the shutdown.

The objective of the study is to describe and, where possible, quantify the socio-economic impacts that will ensue as a result of the shutdown of the power stations, and undertake a risk assessment. Considering the focus of this study, a plan for mitigating these impacts is to be developed. While Eskom is a key player in the geographical area of operation, collaboration with other stakeholders will allow for the minimisation of the expected impacts. This, in turn, requires a concrete plan of action that sets out, among others, the roles and responsibilities of all stakeholders.

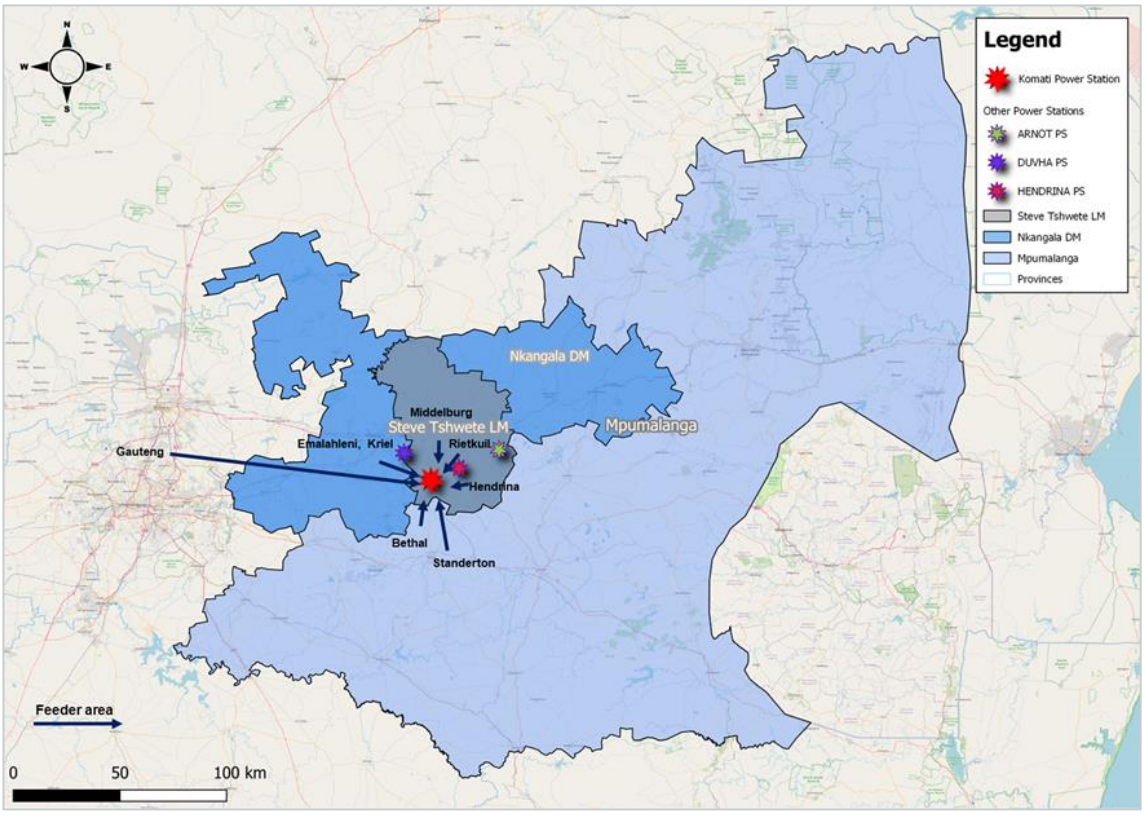
[1] The term "internal stakeholders" refers to all stakeholders affiliated with Eskom and the operations of KPS; "external stakeholders" refers to individuals or organisations that do not form part of Eskom. The latter includes various levels of government, organised business, civil society organisations, private sector entities, and communities, among others.

The scope of work for this study, as stated in the Terms of Reference (TOR), consists of:

- Conducting a socio-economic impact assessment at local and regional level for the shutdown of the power station – in this case, KPS
- Conducting site-specific socio-economic risk assessments, consolidating these with the risks from other pillars, and identifying social and economic opportunities for the impacted communities and municipalities
- Developing an integrated impact mitigation strategy, which includes a socio-economic management and implementation plan with an appropriate exit strategy for Eskom, that leverages government, industry, and sector-specific programmes, platforms, and interventions – and identifies prospective partnerships, funding, and collaboration
- Compiling the final impact mitigation strategy accompanied by a monitoring and evaluation plan

1.3 Study boundary and delineation of areas

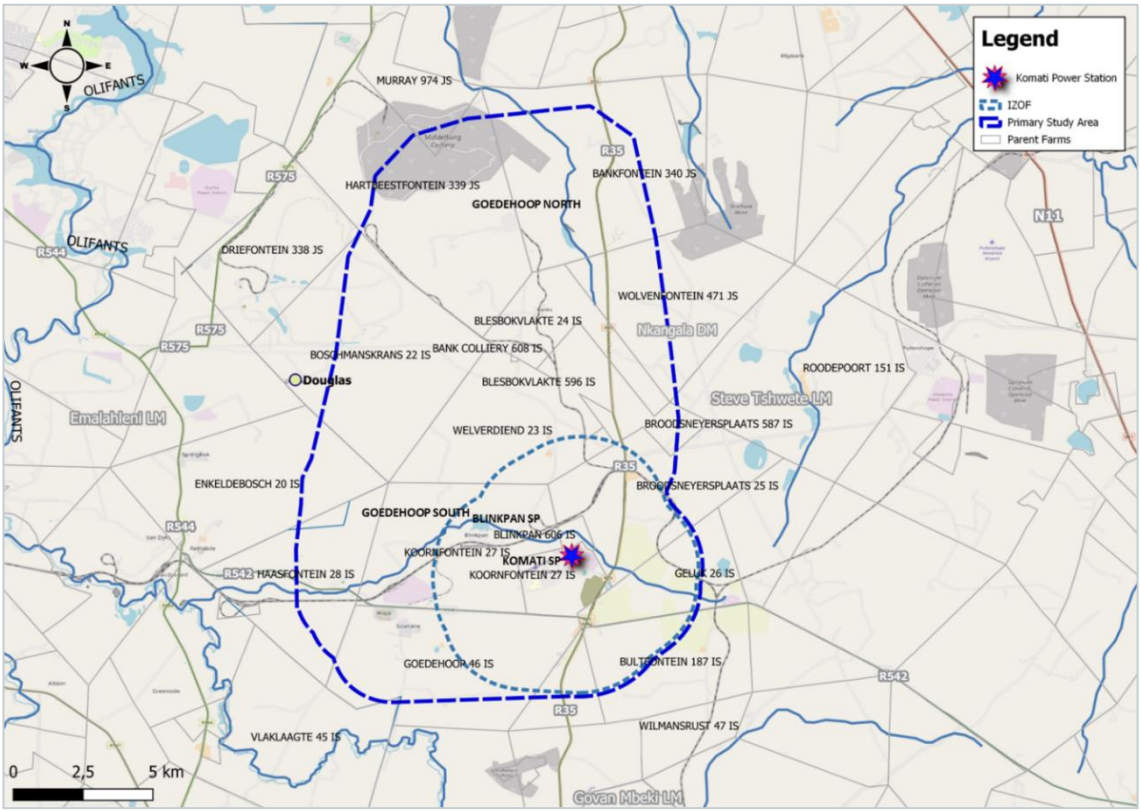
KPS is located in Ward 4 of the Steve Tshwete Local Municipality (LM), about 37 kilometres (km) from Middelburg. The area falls under the Nkangala District Municipality (DM) in the Mpumalanga province, as illustrated in Map 1.1 below.



Map 1.1: Location of KPS

For the purposes of this study the following study areas will be considered:

- The **immediate zone of influence (IZOI)**, defined in consultation with the power station's management team, comprises the communities and farms in the immediate vicinity of the power station i.e. within a 5 km radius of the power station (refer to Map 1.2). The IZOI for KPS comprises the Komati/Koornfontein Village, Blinkpan, Brey Farm, Big House informal settlement, and 26 farms (collectively known as the "farm belt"). Also located within the IZOI is the Koornfontein mine, which is used to supply coal to KPS via a conveyor belt. The area has access to railway lines that pass through Goedehoop South and Blinkpan, stretching in various directions including towards Hendrina Power Station (HPS).
- The **primary study area**[2] **(PSA)**, comprises labour-sending areas and communities that Eskom and KPS recognise as being highly dependent on the operations of the power station (refer to Map 1.2). The PSA of KPS thus encompasses the IZOI of the power station. It also includes the settlements of Banks and Goedehoop North, which are associated with the collieries.



Map 1.2: The immediate zone of influence and primary study area of KPS

[2] A distinction needs to be drawn between the PSA and the feeder areas. The PSA is located in the immediate vicinity of KPS. Feeder areas typically form part of the secondary and tertiary study areas. Both the PSA and the feeder areas are utilised by KPS to source labour.

- The **secondary study area (SSA)** focuses on the LMs and DMs, that also host employees of the power stations but represent more diversified economies making them less dependent on the operations of the power stations that are to shut down. Secondary study areas encompass primary study areas and subsequently the zones of influence, and also represent the economies where potential socio-economic opportunities to mitigate the effects of the shutdown are investigated and identified.
- The **tertiary study area (TSA)** comprises Mpumalanga and South Africa.
- **Feeder areas** are communities and regions from which KPS sources labour, goods and services. Feeder areas encompass the primary study area and parts of secondary and tertiary study areas. Within the secondary study area, feeder areas include Hendrina, Rietkuil, Middelburg, Emalahleni, and Kriel, all of which are located in the Nkangala DM. Feeder communities within the tertiary study area include Bethal and Standerton, which are within the rest of Mpumalanga, and in Gauteng province.

1.4 Methodology

1.4.1 Community capitals framework

To assess the impact of the KPS shutdown on surrounding communities and identify areas of intervention, the community capitals framework (CCF) has been employed. The CCF is an approach that allows for the assessment of communities and community development from a systems perspective.

Figure 1.1: Community capitals framework

The CCF identifies seven types of resources (or capitals) that are present within a community. Each capital may be used to enhance other capitals to the benefit of the community. The capitals, as illustrated in Figure 1.1, are:

- **natural capital**, which includes elements of nature found within a community;
- **cultural capital**, which refers to societal values and perspectives of members of a community that may affect community change;
- **human capital**, which refers to the self-esteem, education, skill endowment, and health of a community;
- **social capital**, which includes societal relations and characteristics;
- **political capital**, which relates to the ability of communities to guide or influence policy frameworks and the implementation thereof;
- **financial capital**, which refers to the monetary resources of the community; and
- **built capital**, which includes the facilities and structures that contribute to the capacity of the community infrastructure.

The CCF allows for the comprehension of various elements, resources, and associations within the concerned community and the contribution of these factors to the overall functioning of the community. According to Emery and Flora (2006), the examination of community capitals allows for a better understanding of the interaction between different community capitals, external investments in different capitals, and community and economic development efforts. Given its all-encompassing nature, the CCF can be implemented as an evaluation methodology in various models for community assessment and support the planning and/or implementation of community interventions (Pitzer & Streeter, 2015).

The CCF approach was employed to determine the consequences of the shutdown of KPS for various community spheres. Since the concerned capitals are interlinked – an alteration to one affects the other – the shutdown of KPS is expected to influence various capitals both directly and through secondary channels. The CCF was thus deemed a sufficiently comprehensive approach for determining the effects of the shutdown of KPS on concerned communities and, subsequently, adequate mitigation strategies.

1.4.2 Data sources and data gathering methods

1.4.2.1 Secondary data

To inform the analysis, several secondary data sources were utilised. These may be grouped into the following:

- overarching national and provincial strategies, policies, and regulations;
- district and local government strategies and policies;
- sector-specific policies and strategies; and
- sector-resilience and transitional strategies such as the Just Energy Transition (JET).

1.4.2.2 Primary data

The development of the socio-economic baseline included consultations with various parties situated in the PSA of KPS. Table 1.1 provides an overview of the engagements that took place to inform the baseline analysis.

Table 1.1: Primary data sources

Group	Organisations

Civil society organisations (Non-governmental organisations (NGOs)/Community-based organisations (CBOs)/Non-profit organisations (NPOs))	• Ward committee members representing:
	  ○ Goedehoop (now known as Goedehoop South)
	  ○ Banks (now known as Goedehoop North)
	  ○ Blinkpan
	  ○ Komati/Koornfontein Village
	• Maphila Traditional Council
	• Community development workers
	• Home-based care and community [workers?]
	• Church forum
	• Business forum
	• B and K Structure Forum
	• Isizwe Sekonsi
	• Thubalethu Community Structure
	• Farm Belt Community Development Structure

Local businesses operating in the PSA	• Mechanic • Café/Butchery • Afsol Petroleum • Igwababa Supermarket • OK Foods • Food Zone • Lakama Guest House
PSA communities	Komati Village residents

Note: Primary data used to inform the baseline assessment was gathered during 2020.

In addition to the above-mentioned parties, several stakeholders were consulted to gather insights into possible projects and mitigation measures to offset the impact of the KPS shutdown. These are listed below.

Table 1.2: Stakeholder consultation for impact mitigation strategy

Group	Organisation
National government	Department of Trade, Industry and Competition (the **dtic**)
Local government	Nkangala DM
	Steve Tshwete DM
	Department of Economic Development and Tourism (DEDT), Mpumalanga

Group	Organisation
Platforms	Mine Water Coordinating Body (MWCB)
	The Impact Catalyst
Development finance institutions (DFIs)	Development Bank of Southern Africa (DBSA)
Organised business	Minerals Council South Africa
	Middelburg Chamber of Commerce and Industry (MCCI)
NGOs	GreenCape

Note: Private sector entities were also consulted to inform the mitigation strategy.

1.5 Report structure

Figure 1.2 provides an overview of the report structure.

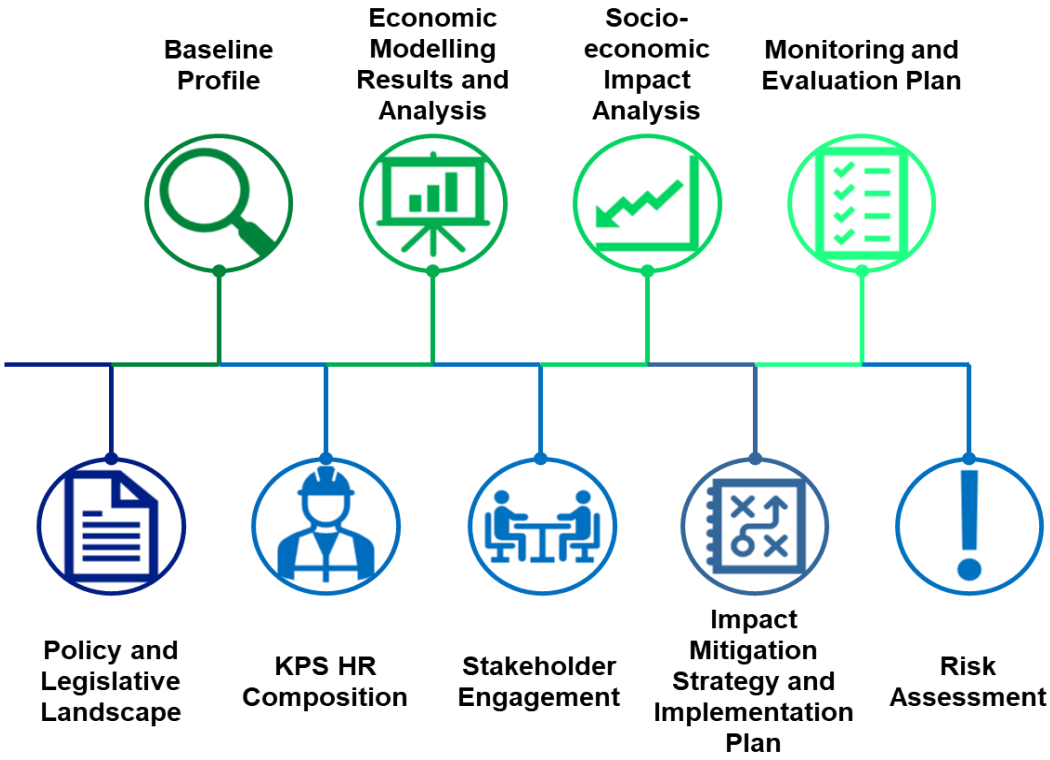


Figure 1.2: Report structure

The report includes the following:

- **Section 2 – Policy and Legislative Landscape:** The purpose of this section is to present the key findings of a review of various national, provincial, and local developmental policies and strategic

documents, focusing on the identification of the government priorities and developmental vision to present implications they have for the study.

- **Section 3 – Baseline Profile:** This section discusses the study area delineation and presents the socio-economic profiles of the various study areas, including Mpumalanga, Nkangala DM, Steve Tshwete LM, and the Komati PSA. Lastly, the section highlights KPS's contribution towards the PSA and the region. The profiles are compiled using secondary data and the primary data gathered through stakeholder engagements, facility surveys, business surveys and household surveys conducted during the fourth quarter of 2020. The profiles help determine the strengths and weaknesses of the socio-economic environments and assist in identifying the significance of the impacts that will ensue because of the power station's shutdown.
- **Section 4 – KPS HR Composition:** The section provides the human resources (HR) profile of KPS and outlines the approach to human resource management pre- and post-shutdown.
- **Section 5 – Economic Modelling Results and Analysis:** This section describes and quantifies the economic impacts that may ensue from the shutdown of KPS while assessing their possible effects on the local, regional, and national economies. The modelling results contained in this section inform the assessment of impacts presented in Section 7.
- **Section 6 – Stakeholder Engagement:** This section describes the stakeholders of the project and the engagement process conducted during the course of the study.
- **Section 7 – Socio-economic Impact Assessment:** The purpose of this section is to provide an assessment of the socio-economic impacts that the shutdown of KPS could have on its PSA, as well as at a regional and national level. Mitigation measures are also identified. These are provided as a concept or a principle, and will be expanded on in the socio-economic development plan. Lastly, the identified socio-economic impacts are linked to the socio-economic risks that will be faced at the local and regional level. The section concludes with an analysis of cumulative impacts. The rating of impacts discussed in this section are provided as annexures.
- **Section 8 – Impact Mitigation Strategy and Implementation Plan:** This section presents a treatment plan promoting the socio-economic recovery of the area and thus the long-term sustainability of the local economy and community. The section explains the mitigation philosophy behind the interventions proposed and identifies opportunities for partnership and collaboration; it also stipulates the roles, responsibilities, and funding mechanisms that would pertain as regards these partnerships and collaborations. The section outlines a detailed action plan for projects, indicating timelines and resources.
- **Section 9 – Monitoring and Evaluation Plan:** The purpose of this section is to provide a monitoring and evaluation (M&E) process measured against approved plans. The section presents a logframe linked to the theory of change (TOC) and interventions identified to ensure the success of the socio-economic management and implementation plan, while allowing for future motoring and reporting.
- **Section 10 – Risk Assessment:** This section presents the identification and assessment of external and internal risks associated with the mitigation of the socio-economic impacts identified earlier in the report and which could pose a threat to mitigating the impacts arising from the KPS shutdown.

2 POLICY AND LEGISLATIVE BACKGROUND

This section presents the findings of a comprehensive review of national, provincial, and local developmental policies and strategies. This exercise was undertaken to determine the strategic objectives and plans of respective government spheres. These objectives and plans will inform the situational analysis and formulation of the mitigation strategy.

2.1 National and provincial government policy implications

The following subsection explores the key legislative and regulatory instruments in South Africa and the implications thereof concerning the natural (N), cultural (C), human (H), financial (F), built (B), political (P), and social (S) capitals with respect to the study. Table 2.1 identifies the key legislation and the capitals that will be impacted by it in relation to the study.

Table 2.1: National and provincial government policy implications

Policy	N	C	H	F	B	P	S
National Development Plan (NDP) 2030							
Industrial Policy Action Plan (IPAP) 2018/19 – 2020/2021							
Medium-Term Strategic Framework (MTSF): 2019– 2024							
National Social Economy Draft Green Paper (2019)							
Socio-economic considerations for a Paris Agreement-compatible coal transition in South Africa							
National Employment Vulnerability Assessment (NEVA) and Sector Jobs Resilience Plans (SJRPs)							
National Skills Development Plan, 2030							
The Human Resource Development (HRD) Strategy Towards 2030							
Integrated Resource Plan 2019 (IRP2019)							
National Coal Strategy for South Africa (2018)							
National Climate Change Adaptation Strategy (2017/18)							
Draft Climate Smart Agriculture Strategic Framework (2018)							
Draft Conservation Agriculture Policy (2017)							
Draft Policy on the Preservation and Development of Agricultural Land (2016)							
National Water and Sanitation Master Plan (2018)							
Mpumalanga Economic Growth and Development Path (2011)							
Mpumalanga Spatial Development Framework (2018)							
State of the Province Address (Annual)							
Mpumalanga Tourism Strategy (2018)							
SMME and Second Economy Support Strategy (2009)							
Mpumalanga Vision 2030 (2013)							
Policy Statement on Localisation for Jobs and Industrial Growth, 2021							

2.1.1.1 Policy implications for natural capital

Several key themes were identified from the national and provincial policy review. These include the need for climate change mitigation and a reduction in carbon emissions, the protection of water resources, and promoting sustainable use of land and other natural resources.

Several key findings indicate that the proposed shutdown of coal power stations will contribute to improved air quality as it is driving a compatible coal transition in South Africa and addresses the need to alter the pattern of coal extraction. Any interventions that are proposed to support the shutdown process must contribute towards the reduction of carbon emissions going forward.

Access to energy and water as well as the **sustainable use of water** are key areas of concern in South Africa. The provision of technologies that promote efficient resource use and renewable energy projects is therefore recommended for communities affected by the shutdown to ensure access to and conservation of energy and water resources. Affected communities could also benefit from skills development opportunities related to understanding and implementing water and energy conservation measures.

Food security, access to land, poverty, a lack of employment opportunities, and the low resilience of rural communities remain a concern in South Africa, particularly in remote areas. Therefore, there exists a need to provide support for smallholder farmers in affected communities as this may contribute to job creation and improved food security. The low-carbon economy is becoming increasingly important. However, it is critical to ensure that agricultural development is not affected by the prioritisation of land and resources for renewable energy projects as this will negatively impact food security, small-scale agriculture, and the affected communities over the long term.

The review of national and provincial policies also highlights the importance of preserving and developing the **natural environment and land** in South Africa. The shutdown of the power stations should therefore be conducted in such a manner that the power stations and surrounding areas are rehabilitated. This will ensure that there are no long-term implications for the natural environment and communities.

2.1.1.2 Policy implications for social and cultural capital

Social capital focuses on the notion of equitable resource mobilisation and distribution and can be a tool for change at social, political, and economic levels (Bayat, 2005). According to Bayat (2005), trust is a key value that engenders and maintains social capital. This is important to note when considering the shutdown of the power stations and the future of the affected communities. Key stakeholders involved in the process must ensure clear communication channels and transparency to maintain trust and build or maintain social capital. All but one of the identified policies/regulatory documents are expected to have implications for social and/or cultural capital.

From a legislative perspective, several themes emerge that focus on the empowerment of youth, women, and vulnerable groups; increasing support and investment in communities; skills and capacity building; job creation; localisation of labour; and ensuring equitable access to resources such as land, water, and infrastructure.

The study recognises that the climate change mitigation policy infrastructure in South Africa does not address the impact on those affected by the transition away from coal (Burton, Marquard, & McCall, 2019). This means there are no clear interventions to address the job losses that will occur as a result of the closure of coal-fired

power stations, which automatically poses a major threat to the job security, livelihoods, and food security of the affected communities. It should also be noted that the negative effects that may arise due to job losses linked to the shutdown of coal power plants may outweigh the positive impacts (e.g. job creation) that are likely to occur as a result of future interventions (such as the introduction of renewable energy and other repurposing projects). As the current climate change mitigation policy infrastructure is not conducive to South Africa's transition from coal, there is a greater need for interventions geared towards a JET. As such, greater emphasis ought to be given to diversifying the economy and maximising both energy and non-energy-related repurposing efforts in and around the power station.

There are several policy implications for the study that should be noted when considering interventions for the affected communities. The affected communities should be encouraged to engage with new opportunities and options that empower the youth and women. In addition to promoting new opportunities, it is essential to maintain transparency around the potential impacts of the shutdown to encourage social cohesion and reduce the risk of social unrest. Increased support and investment targeted at affected communities will likely result in improved confidence and social stability.

To promote and support equitable access to resources, there should be a focus on skills training and development for job seekers in the affected communities to increase their chances of obtaining decent jobs and contributing meaningfully to societal development. Skills development initiatives and innovative, sustainable interventions that create more jobs should specifically target the youth. Mpumalanga is an important tourist destination; there is thus an opportunity to empower communities through skills development and capacity-building initiatives to create and market products for the tourism industry such as ornaments and culturally linked products.

It is also important to consider the cultural capital within the affected communities. Current and future projects should therefore not alter the cultural heritage and societal norms observed by the affected communities. This will ensure that their sense of place is not distorted.

2.1.1.3 Policy implications for human capital

Human capital is mainly linked to the education and workforce preparation that make people more productive and able to contribute to the economy. Such preparation is a key factor when looking at the socio-economic state of communities and individuals. All of the above-mentioned policies or regulatory documents are expected to affect human capital. Although South Africa's Nationally Determined Contribution (NDC) is not considered an official government policy or strategy, the update of this in 2021 will increase the need for human capital interventions given the acceleration of carbon emission reduction.

The shutdown of the power stations will inevitably result in job losses, which will have a negative impact on the human capital in the affected communities. However, an opportunity exists to skill unemployed persons for future projects. A challenge in this regard is whether there will be adequate resources for skills training initiatives. Based on the legislative review, several themes were noted, including skills development and training in new or alternative fields/sectors (agriculture, the green economy, etc.), creating incentive schemes to encourage the employment of youth and women, and ensuring that the affected communities are equipped to transition to new workplaces or opportunities outside of their current roles.

The noted implications link closely to those discussed under the social and cultural capital section, with the focus also being on capacity building, youth and women empowerment, improved access to resources, and ensuring the community's participation in the economy after the shutdown process has been completed.

The development of the social economy[3] is also noted as a key focus area in the legislative and policy environment, with a specific focus being placed on reducing barriers to entry and promoting the growth of entities within the social economy. This necessitates the development of sustainable value chains where demand is sustained without having a negative impact on the natural environment. Potential projects that focus on sustainable value chains include renewable energy and climate-smart agriculture as there remains a consistent demand for food, water, housing, and energy, among other things. The promotion of innovation around the social economy can result in efficiency. However, a key risk associated with this intervention is the possible inadequacy of funding and resources to empower remote (and affected) communities through **skills development** in line with the Fourth Industrial Revolution (4IR). Notwithstanding the importance of skills development, however, is uncertainty about whether future jobs resultant from the 4IR will offset the growing demand for jobs in the affected communities.

The human capital aspect is essential to keep in mind as South Africa's high unemployment rate is already placing social and economic systems under pressure. Interventions and support are thus needed to ensure that affected communities are accommodated and able to adapt to the changes in their economic situation. This will require the involvement of various stakeholders, including the affected communities, to ensure that all options are considered and a sustainable solution that meets the needs of the communities found.

2.1.1.4 Policy implications for financial and economic capital

Of the 22 policies/regulatory documents identified above, all are expected to have implications for the financial and economic capital. The policy review indicated key themes relevant to the study, including the impact of developments on small, medium, and micro enterprises (SMMEs) and the development of the renewable energy sector.

The closure of the power stations will impact businesses reliant on the operations of the power stations and across the coal value chain. Therefore, it is vital to consider how SMMEs and informal traders can be supported/sustained in the long term, placing great importance on localisation. This includes linking existing businesses to possible value-adding activities such as agro-processing (in addition to the primary production of agricultural commodities) and the waste economy. Furthermore, the update of South Africa's NDC increases the need for economic diversification due to more ambitious carbon emission reduction targets.

The development of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) to supply energy to the national grid through private power producers provides a stimulus for manufacturing activities. Notably, most of the major inputs (products) for renewable generation are designated for local procurement. Therefore, an expected increase in energy demand and electricity will probably result in an increased demand for renewable energy projects, which will contribute to the increased local manufacturing of capital goods. This implies that there is an opportunity for local manufacturing initiatives.

[3] The term "social economy" may be defined as an economic development model that seeks to create social cohesion, sustainability, social justice, and an equitable distribution of wealth (Ruano, Milán-García, Rumí, & Valenciano, 2021).

Additionally, this conforms to the notion that localisation is critical to creating jobs in new industries and the green economy (the **dtic**, 2021). South Africa's NDC further emphasises the importance of setting up measures that speak to workforce reskilling and job absorption to ensure a just transition when coal-fired power plants such as KPS are decommissioned.

Another opportunity is found in the growing contribution of renewable energy to the diversified electricity mix. The potential economic impacts as a result of the uptake of renewable energy include the establishment of new local and manufacturing industries, job creation, and localisation across the value chain (DMRE, 2019). Options include biomass from waste that can be used in cogeneration plants, delivering electricity at a price-competitive level with minimal transmission and distribution requirements (DMRE, 2019). The linkages between biomass and biofuel programmes could also provide strong linkages that create employment in both rural and urban areas, including the affected communities (DMRE, 2019).

Another opportunity exists in the agricultural sector, where it is possible to link primary agricultural activities to the revitalisation of the township economy through investing in and expanding agro-processing facilities. This will facilitate value-adding activities and job creation within the area. However, funding is required for skills development in value-adding activities, using innovative farming technologies and infrastructure.

Although opportunities to promote economic development have been identified, there is concern about whether there will be adequate support (financial, technical, and training) for assembling local manufacturing capabilities and ensuring that the affected communities can participate in the renewable energy sector.

2.1.1.5 Policy implications for built capital

Of the 22 policies/regulatory documents identified above, 14 are expected to have implications for the built capital. Built capital includes all buildings, sewerage treatment plants, manufacturing and processing plants, water and energy infrastructure, transportation infrastructure, communications and technology infrastructure, and other built assets. The legislative review identified key themes such as the provision and maintenance of basic infrastructure, access to basic services, and the need to provide the infrastructure that facilitates social and economic development.

The power stations currently form part of the affected built capital in the communities. It is important that the built capital of the communities is protected as much as possible in the course of the shutdown process. A key factor to note is that the process should not affect the supply of and access to basic services such as electricity and water provision, municipal waste removal, etc. or access to education and healthcare. Through the development of the renewable energy and agricultural sectors, the built capital in the communities could be maintained or further developed, thereby mitigating the impact of the power stations' closure. Proposed interventions (including those concerning infrastructure and housing) must not result in the degradation and reduced availability of land used in agricultural production as this could have a negative impact on the development of the agricultural sector and thus food security in the affected communities.

It is also important for the proposed interventions related to energy provision to focus on reducing negative emissions and keeping water usage to a minimum while ensuring that sufficient generation capacity is achieved.

2.2 Local government policy implications

This subsection explores the key legislative and regulatory instruments in the affected district and local municipalities and the implications of these instruments for the natural, cultural, human, financial, built, political, and social capitals at issue in this study. Table 2.2 identifies the key legislation and the capitals that will be impacted by it.

Table 2.2: Local government policy implications

Policy	N	C	H	F	B	P	S
Nkangala Integrated Development Plan 2019-2020							
Nkangala Rural Development Plan 2017							
Nkangala Agri-Park Final Master Business Plan 2016							
Steve Tshwete LM Integrated Development Plan 2019/2020							
Steve Tshwete LM LED Strategy 2016-2021							
Steve Tshwete LM Spatial Development Framework Draft Report							
By-law introduced under the Spatial Planning and Land Use Management Act (SPLUMA)							

2.2.1.1 Policy implications for natural capital

All of the regulatory documents listed above were found to impact natural capital. Several key themes emerged from the review of local policies, including the need for sustainable employment of regional resources, the dependence of the regions on commercial coal-related activities, and the mitigation of negative environmental impacts. Key findings indicate that the proposed shutdown of coal power stations supports climate change adaptation measures and the reduction in greenhouse gases (GHGs) as it is driving a compatible coal transition in South Africa and addresses the need to alter the pattern of coal extraction. In addition to affirming the environmental benefits of closing coal power stations, the regional framework calls for the implementation of sustainable mitigation solutions that contribute to job creation, innovation and sustained economic growth.

As the region relies substantially on coal mining and the distribution thereof to coal power stations, the shutdown of coal-fired power stations is expected to disturb the coal distribution line/value chains. This may pose several risks to the region's economic viability. Furthermore, the policy frameworks recognise the importance of the agriculture sector in potentially employing large numbers of relatively low skilled workers. Efforts to utilise indigenous resources to stimulate job creation should therefore take this sector into account.

The district is a predominantly rural area with a resource-based economy consisting of extensive farming, nature reserves, and mining areas. It will be important to consider harnessing these advantages and identifying other sectors that could help diversify the economy while creating sustainable economic development.

2.2.1.2 Policy implications for social and cultural capital

Of the seven policies/regulatory documents identified above, four are expected to have implications for the social and/or cultural capital. The reviewed policy frameworks identify a need to improve the institutional

environments of the region – this to address existing conditions and problems with the ultimate objective of enabling sustainable economic development.

To facilitate interventions that are required to cement the sustainability of the economy, it is essential to include special programmes to encourage youth participation in the economy. According to the Nkangala Integrated Development Plan (IDP), societal ills within the DM include elevated levels of poverty, illiteracy rates, high youth unemployment, and insufficient skills – all of which contribute to the delayed economic and social upliftment of the region. As such, the impact of the shutdown of coal power stations on the social and cultural nature of the region requires special consideration.

2.2.1.3 Policy implications for human capital

All but two of the reviewed policy documents are anticipated to have an impact on human capital. The legislative frameworks identified specifically recognise the importance of human capital for the continued economic development of the regional economy. In addition, the policy documents acknowledge the importance of skills development and employment creation to alleviate poverty and contribute to improved standards of living.

These human capital implications are narrowly associated with the social and cultural implications mentioned above. The policies also underscore the economic importance of agriculture given that it has the potential to provide employment for substantial numbers of relatively low skilled workers rendered jobless by the shutdown of the power stations. The agriculture sector has the capacity to absorb labour and ought to be targeted in the use of indigenous resources to create jobs. In addition, land reform to enable the participation of black farmers in the agricultural economy and the restructuring of the regional economy remains imperative.

The human capital aspect remains vital given the high levels of unemployment in South Africa and the region and the pressure thereof on socio-economic mechanisms. As a result, the identified interventions must ensure that affected communities are accommodated and able to adapt to the changes in their economic situation. This will require the involvement of various stakeholders, including the affected communities, to ensure all that options are considered and a sustainable solution that meets the needs of the communities found.

2.2.1.4 Policy implications for financial and economic capital

Of the seven policies/regulatory documents identified above, four are expected to have implications for economic capital. The closure of the power stations will impact businesses reliant on the operations of the power stations and across the coal value chain. Therefore, it is important to consider how SMMEs and informal traders can be supported and sustained in the long term. This includes linking existing businesses to value-adding activities such as agro-processing (in addition to the primary production of agricultural commodities) and the waste economy.

Several key themes were identified after evaluating the policy frameworks, including the expansion of economic infrastructure to stimulate local economic development, the development of public transport infrastructure to allow for improved access to economic activities, increased support for SMMEs to encourage employment creation and youth participation, and the continued implementation of green economy initiatives to expedite the regional economy's transition to a sustainable economy.

Furthermore, regional policy documents acknowledge the importance of establishing supporting alternatives once the coal power stations have been shut down to avoid the deterioration of the local economy. These alternatives include the expansion of the steel and metals sector. They also encompass the continued development of agriculture as this sector is a fundamental contributor to job creation given its ability to absorb large numbers of labourers. The availability of alternative economic sectors should be considered as the local economy undergoes a JET.

2.2.1.5 Policy implications for built capital

In facilitating the transition of the economy to sustainable alternatives, the rolling out of solar energy is crucial as is the extension of the electrification programme to parts of the DM that are still without power. This broadly supports efforts under the regional rural development plan to address the needs of inhabitants and reduce high levels of poverty in rural areas. Support measures for enhancing rural development include investment in infrastructure such as irrigation and electricity networks. Furthermore, the policy frameworks outline the importance of private sector participation and investment in the implementation of these initiatives.

In addition, the expansion of local infrastructure to areas outside of central business districts and industrial areas is vital to ensuring the equitable distribution of economic infrastructure across all spheres of society and in accelerating rural development. This broadly aligns with the initiatives established through the regional policy frameworks to ensure that service delivery is provided for all members of society to allow for improved standards of living.

2.2.1.6 Force field analysis

Figure 2.1 summarises the key factors that define the current socio-economic environment according to the policy and regulatory frameworks of the Nkangala DM and Steve Tshwete LM.

The factors are presented using Lewin's Force Field, which in this instance depicts external positive and negative forces that influence the socio-economic environment in the local and district municipalities. These forces are likely either to assist in driving the change required to mitigate negative impacts from the closure of the power station (in the case of positive forces) or to restrain necessary change (in the case of negative forces. The size of each force is measured on a scale of 1 to 5, with 1 referring to low influence and 5 a high influence.

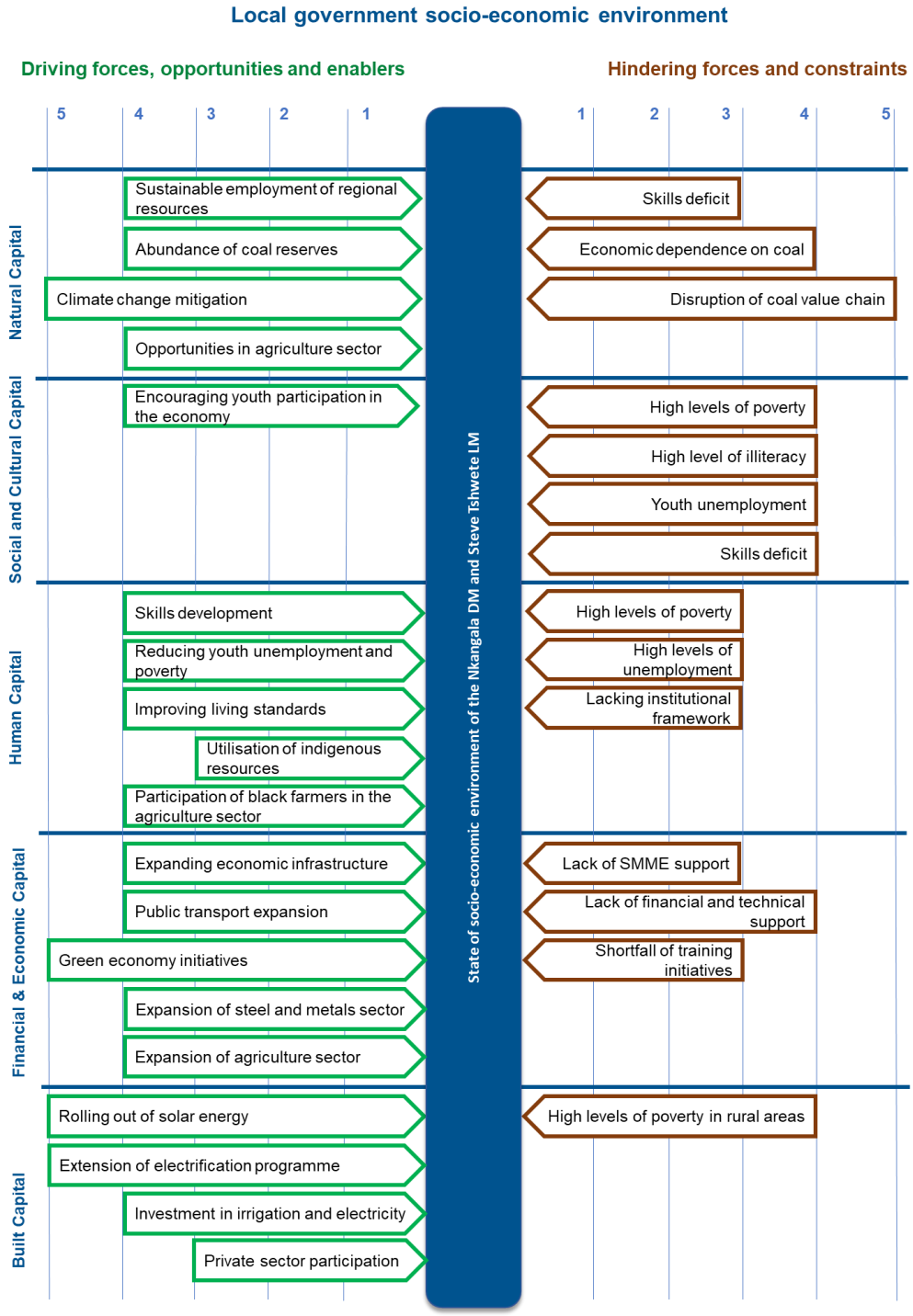


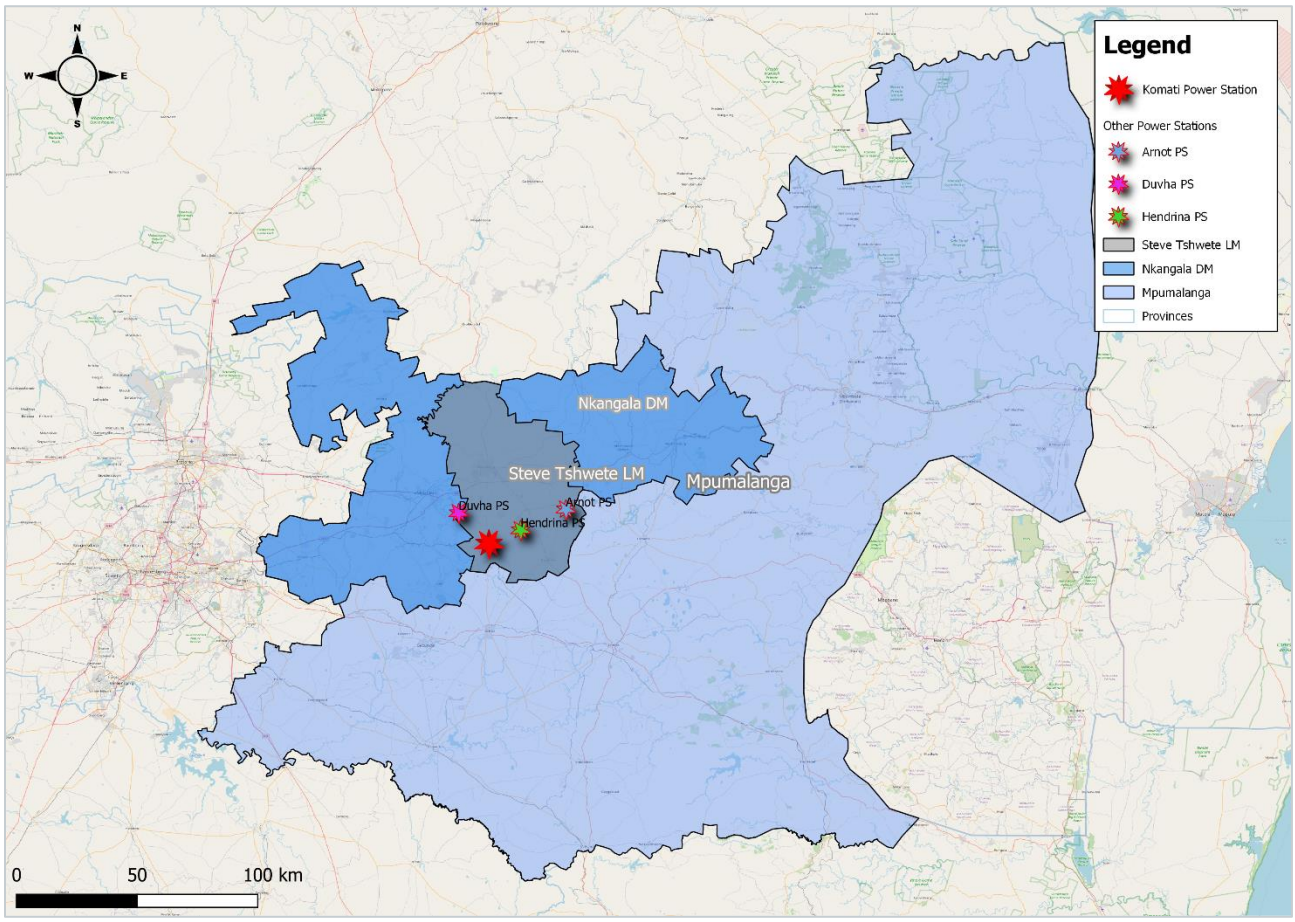
Figure 2.1: The state of the socio-economic environment in the Nkangala DM and the Steve Tshwete LM

3 BASELINE PROFILE

The following section presents a socio-economic profile of the Mpumalanga province, Nkangala DM, and Steve Tshwete LM, in which KPS is located.

3.1 Study area delineation

Map 3.1 shows the location of the Nkangala DM and Steve Tshwete LM as well as the position of KPS. Nkangala DM comprises six local municipalities, namely Emakhazeni LM, Steve Tshwete LM, Emalahleni LM, Victor Khanye LM, Thembisile Hani LM and Dr JS Moroka LM.



Map 3.1: Location of Nkangala DM and Steve Tshwete LM in Mpumalanga

The major economies of Nkangala DM are Steve Tshwete LM and Emalahleni LM. These economies predominantly rely on the steel industry and broader manufacturing sector. Consequently, the regional economy is highly susceptible to economic shocks (Nkangala DM, 2019). Therefore, the diversification of these economies is critical to ensuring their stability and growth.

The purpose of examining baseline characteristics as part of the broader scope of the study is to understand the spatial, demographic, and economic characteristics of the study area. As KPS is located in Steve Tshwete LM and Nkangala DM, understanding the characteristics of these regions enables a more informed and accurate representation of the possible impacts associated with the shutdown of KPS. Furthermore, establishing a baseline also enables a more appropriate identification and implementation of projects to counter the impacts arising from the KPS shutdown.

3.2 Mpumalanga province profile

3.2.1 Spatial composition

Map 3.2 indicates the network of transport corridors and economic nodes within Mpumalanga. Mpumalanga is situated in eastern South Africa and shares borders with the Limpopo, Gauteng, Free State and KwaZulu-Natal provinces. Furthermore, Mpumalanga shares international borders with Eswatini (formerly known as Swaziland) to the southeast and Mozambique to the east. The province constitutes approximately 6.5% of South Africa's total land area.

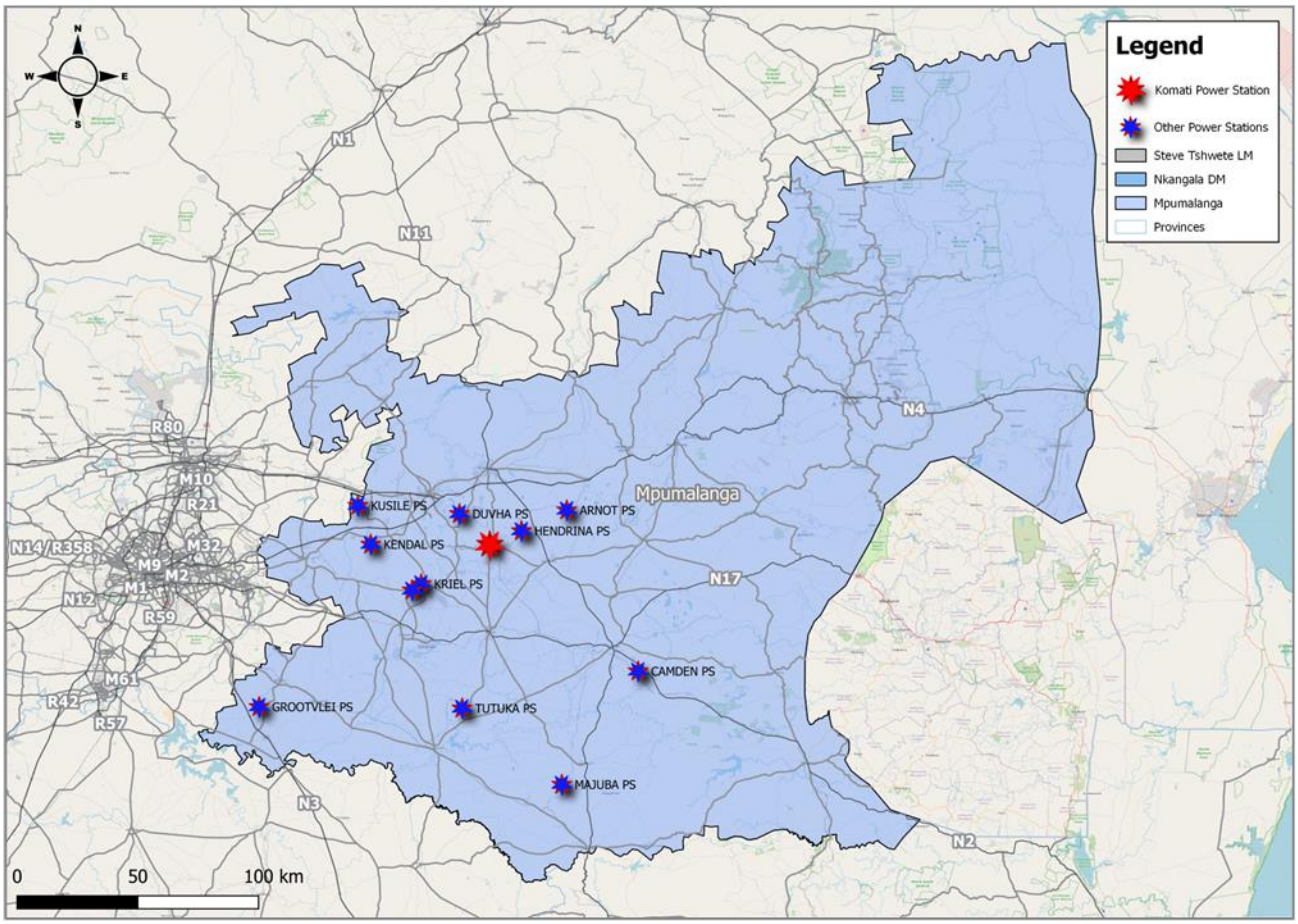
Mpumalanga is largely situated on the high plateau grasslands of the Middleveld with large areas of mountain peaks and ridges in the Lowveld, the latter contributing to the scenic beauty and tourism destinations in the province. Mpumalanga is linked to Gauteng and the Mozambican capital, Maputo, via the Maputo corridor (N4). This linkage creates significant potential for economic development and growth in the region.

As mentioned, the connection of key economic nodes in the province by a vast network of roads provides opportunities for economic growth and development. Other notable development corridors in Mpumalanga are the Pretoria-Maputo and Johannesburg-Durban lines. As such, there exist multiple corridors for development in the province. However, it should be noted that the road transportation network in Mpumalanga is often considered unmaintained, which may impede economic activity.

Across the province, there exist five primary nodes of economic activity:

- Witbank/Emalahleni;
- Middelburg;
- Mbombela/Nelspruit;
- Secunda; and
- Ermelo.

Given the above, significant potential exists for economic diversification in the province given its proximity to key markets in Gauteng, the linkage with Mozambique via the Maputo corridor, and the connection with the deep-water port of Richards Bay in KwaZulu-Natal.



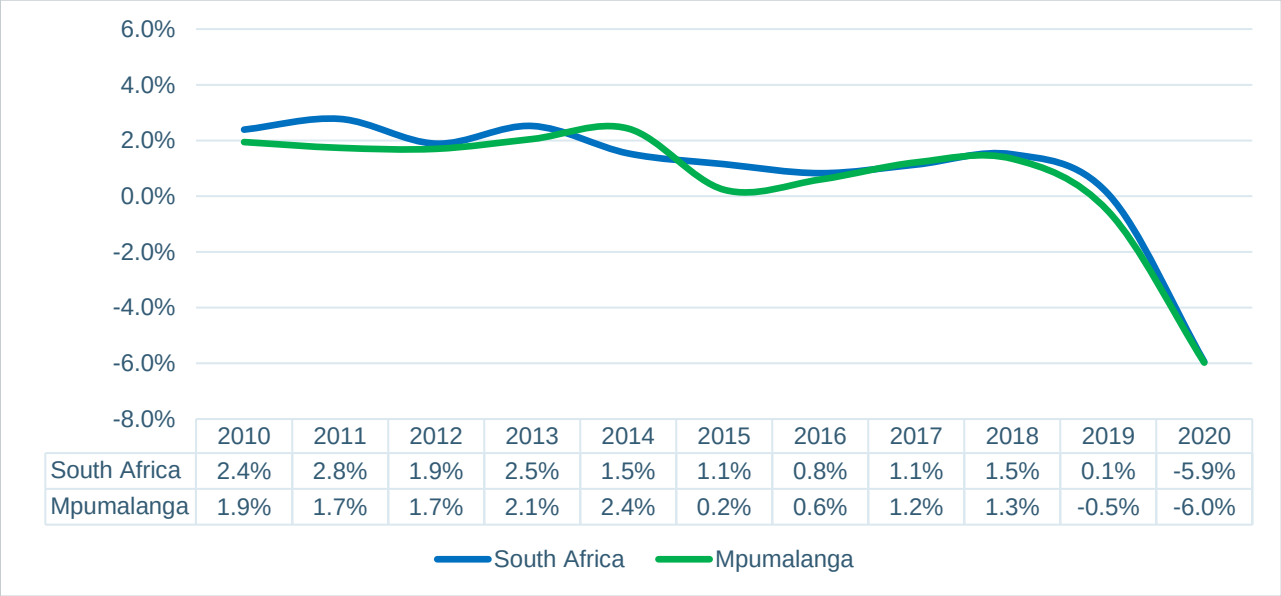
Map 3.2: Economic nodes and transportation routes in Mpumalanga

3.2.2 Economic profile

In 2020, the Mpumalanga provincial economy was valued at R360.9 billion (in current prices) and contributed 7.2% to the national economy (Quantec, 2022a). This made the province the fifth largest contributor to South Africa's national gross value added (GVA[4]) for 2020.

Figure 3.1 depicts the GVA growth rates (in constant 2015 prices) of South Africa and Mpumalanga from 2010 to 2020. Overall, growth in the province's economy broadly followed that of the national economy. Most notable is the steep contraction recorded in both the national and provincial economies in 2020 because of Coronavirus disease 2019 (COVID-19) and ensuing lockdown measures to contain the spread of the pandemic.

[4] GVA may be defined as the value added to purchased goods and services by producers. As such, it is considered as a measure of the total value of goods and services produced in an economy.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South Africa	2.4%	2.8%	1.9%	2.5%	1.5%	1.1%	0.8%	1.1%	1.5%	0.1%	-5.9%
Mpumalanga	1.9%	1.7%	1.7%	2.1%	2.4%	0.2%	0.6%	1.2%	1.3%	-0.5%	-6.0%

Figure 3.1: Year-on-year GVA growth rate, South Africa and Mpumalanga, 2010-2020 (based on Quantec, 2022a)

Figure 3.2 provides an overview of the contributions by each of the respective sectors to provincial GVA in 2020. The mining and quarrying sector is considered a key driver of economic activity in the province. In 2020, the sector contributed 24.8% of provincial GVA (Quantec, 2022a).

As mentioned in the preceding section, the contribution of mining and quarrying to provincial GVA relative to the sector's contribution to provincial employment is indicative of its capital intensive nature. As such, the shutdown of the coal power stations may have economic ramifications in terms of a possible decline in capital investments and may contribute negatively to the province's economic outlook.

The finance, insurance, real estate and business services sector was the second largest contributor to provincial GVA in 2020 (13.7%). It was followed by the wholesale and retail trade, catering and accommodation (13.1%) and community, social and personal services (12.7%) sectors.

At 12.3% of GVA, the manufacturing industry also contributed a sizeable portion to the provincial economy in 2020, which is indicative of a strong manufacturing and beneficiation base. Growing Mpumalanga's manufacturing sector will contribute to improve demand for resource-based commodities locally while increasing employment (DEDT, 2020). The construction sector accounted for the smallest segment of the provincial economy (2.4%) in 2020.

It should be noted that 2020 is considered an extraordinary year in terms of the distortions to economic performance that resulted from COVID-19. As such, the contributions of the respective economic sectors during the year were influenced by the varying effects of lockdown measures on the functioning of each and the increased importance of certain sectors (such as the general government sector).

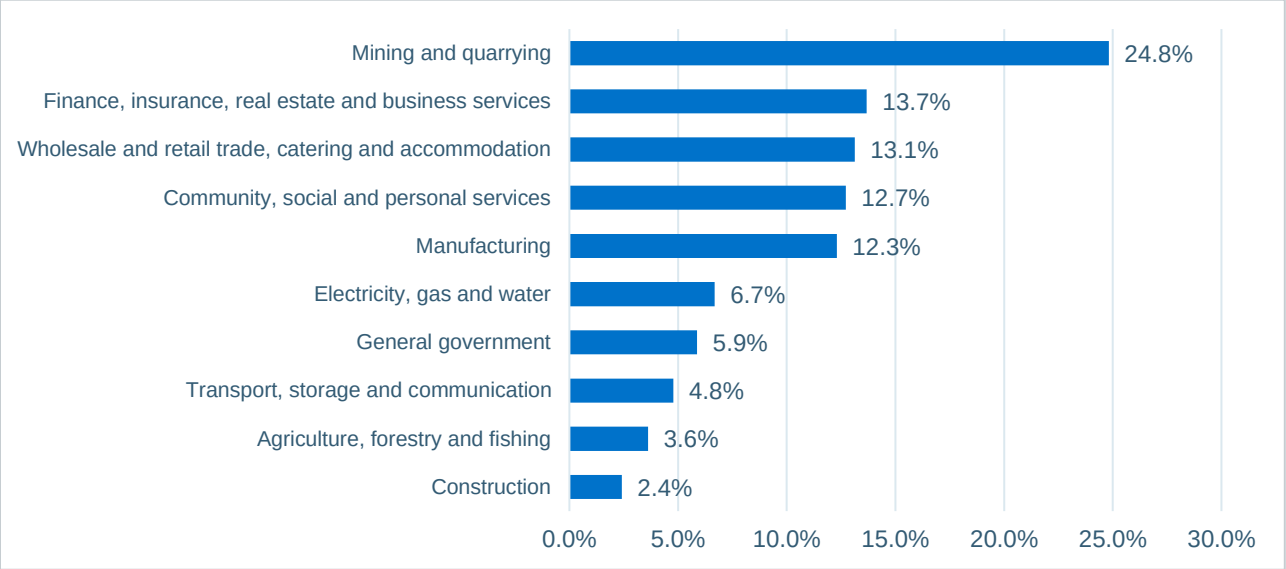


Figure 3.2: Economic contribution (GVA) per sector in Mpumalanga, 2020 (based on Quantec, 2022a)

3.2.3 Labour force profile

In 2020, Mpumalanga's working-age population totalled just over three million individuals, while the labour force participation rate stood at 53.4% (Quantec, 2021c; 2021a). From 2010 to 2020, the province's working-age population increased at an average annual rate of 1.8%, slightly higher than the 1.5% growth rate recorded nationally over the same period.

Mpumalanga's labour force absorption rate was recorded at 36.5% in 2020, which was lower than the national labour force absorption rate of 39.2% for the same year (Quantec, 2021a). In addition, the province recorded an unemployment rate of 31.7% in 2020, which was higher than the national unemployment rate of 29.2% during the same year (Quantec, 2021a). In quarter four of 2020, youth[5] unemployment in South Africa at 45.3% (Quantec, 2021a). During the same quarter, Mpumalanga recorded a youth unemployment rate of 47.6% (Quantec, 2021a), which was slightly higher than the national rate.

The province's labour force participation and absorption rates are indicative that the Mpumalanga's labour market may not be conducive to the creation of employment opportunities. However, the recent performance of the provincial and broader national labour markets and their ability to absorb new entrants should be considered against the backdrop of the COVID-19 pandemic.

Figure 3.3 shows the employment contributions of the various sectors in the province in 2020. In this year, the community, social and personal services sector accounted for the largest share of employment (21.5%) in Mpumalanga. This was followed by the wholesale and retail, catering and accommodation (20.9%) and agriculture, forestry and fishing (11.7%) sectors.

[5] Individuals aged between 15 and 34 years old.

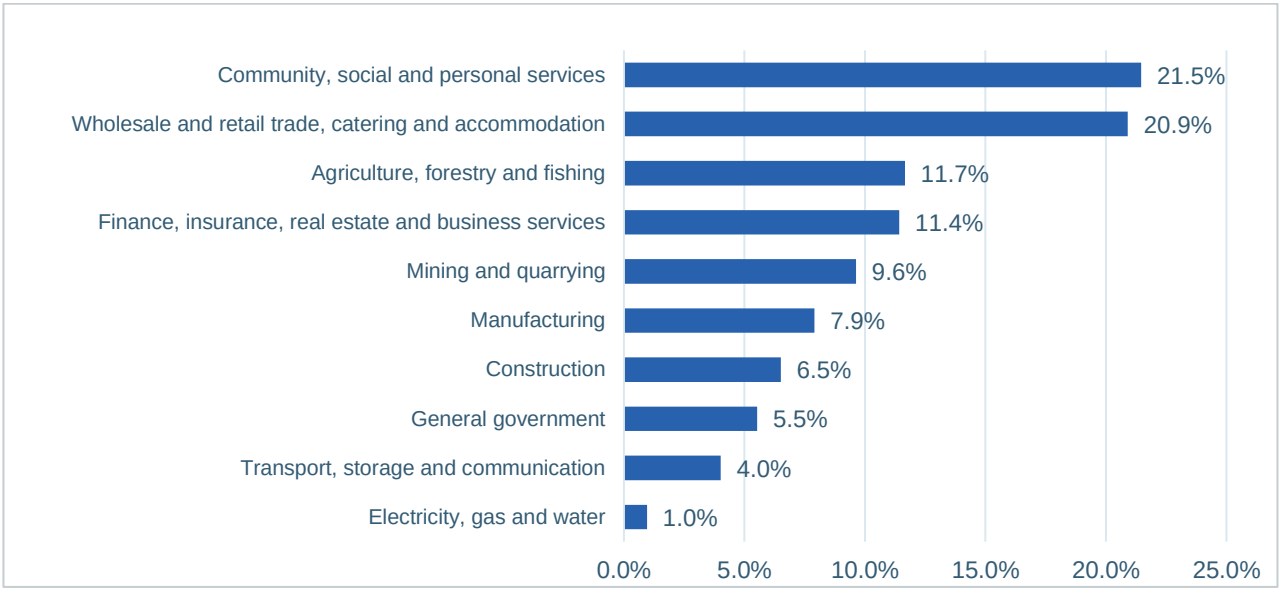


Figure 3.3: Employment contribution per sector in Mpumalanga, 2020 (based on Quantec, 2021a)

In 2020, the mining and quarrying sector was the fifth largest contributor to employment at 9.6%. Despite the size of the sector and its contribution to the provincial economy (and to some extent the national economy), the sector's employment contribution may be reflective of its capital intensity. During the same year, the electricity, gas and water sector was the smallest contributing sector to employment in the province at 1.0%.

As Mpumalanga is the main supplier of coal in the country, the mining sector is key in driving economic activity and creating employment opportunities. As indicated in Figure 3.4, South Africa's production of coal dropped significantly in 2015 and has stagnated since then. This was initially accompanied by a drop in employment opportunities in the industry.

The industry managed to increase employment to about 91 000 jobs by 2020 – the highest level in the past 20 years. However, this increase was not accompanied by a comparable rise in production and also took place during a decline in commodity prices. As a result, the productivity of the industry dropped from about 4.6 kt per job in 2022 to 2.7 kt per job in 2020, putting the industry under significant pressure. With coal mining companies such as Anglo American beginning to transition away from coal operations to support the global transition to renewable energy sources (Stoddard, 2021), the sustainability of the coal mining industry is in jeopardy.

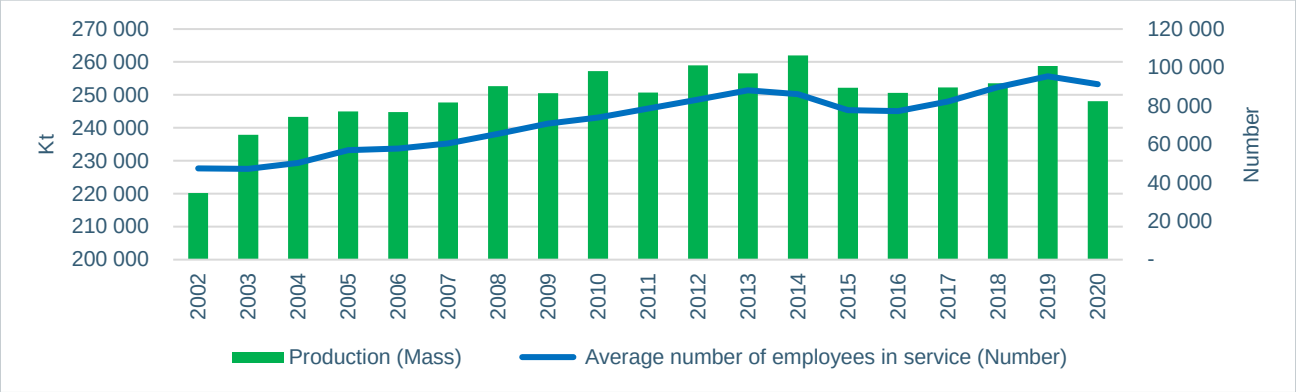


Figure 3.4: Coal production versus average employment in the sector (DMRE, 2022)

3.2.4 Demographic profile

Figure 3.5 depicts the demographic profile of Mpumalanga. In 2020, the population of Mpumalanga stood at approximately 4.7 million, which was about 7.8% of the national population during the same year (Quantec, 2021c). As such, Mpumalanga had the sixth highest population out of the nine provinces that make up South Africa.

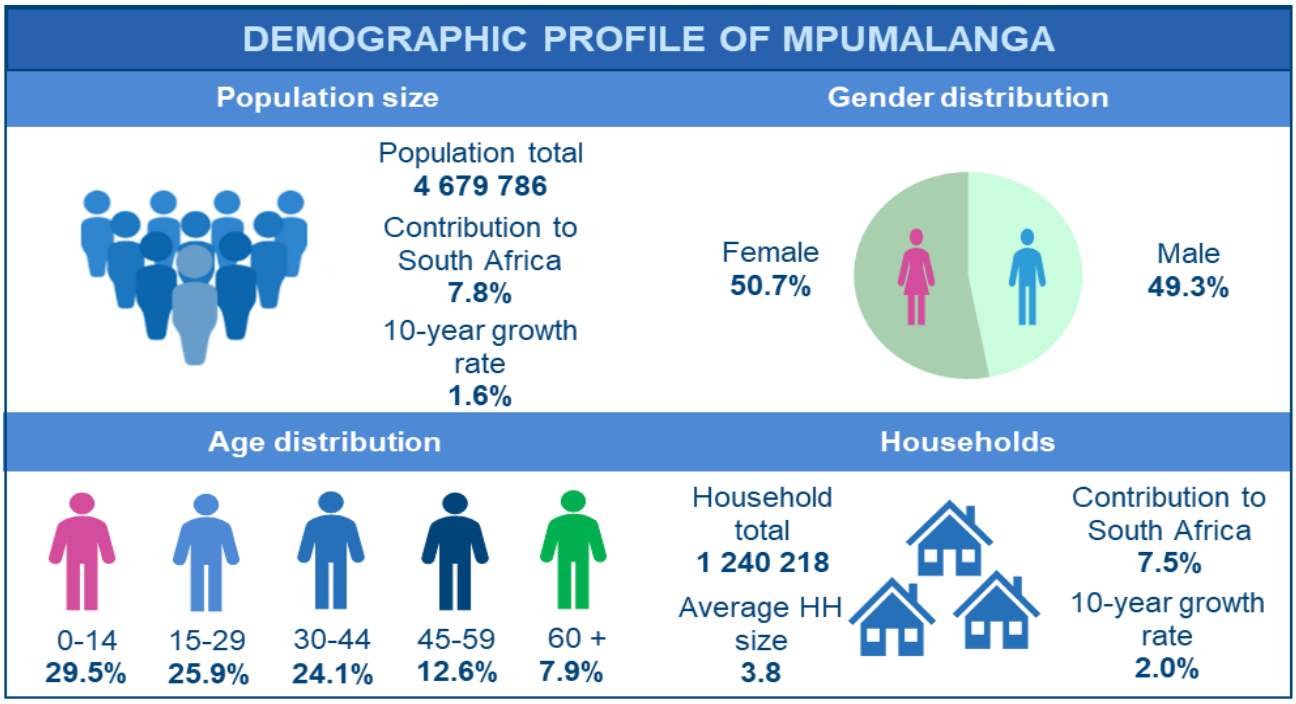


Figure 3.5: Demographic profile of Mpumalanga, 2020 (based on Quantec, 2021c)

From 2010 to 2020, the province's population grew at an average annual rate of 1.6%. This rate was marginally

higher than the national growth rate of 1.5% recorded over the same period. The increase in the province's population may, in some instances, be attributed to increased migration from countries such as Mozambique and Eswatini (formerly known as Swaziland). The high demand for low skilled labour in the mining and agriculture sectors of the province may also be a contributing factor to Mpumalanga's population growth. In 2020, semi-skilled and low-skilled workers employed in the coal mining and agriculture sectors accounted for 11.1% and 14.6%, respectively, of overall employment in the province.

The provincial population consists mainly of individuals aged 15 to 64, totalling just over 3.0 million (approximately 65%) of the provincial population in 2020. As most of the provincial population is of working age, there exist significant human resources for future economic growth and sustainability. However, the number of working-age individuals (thus the availability of labour) is dependent on the availability of economic opportunities to absorb labour supply. In Mpumalanga, labour is mainly the result of activities associated with the various power stations, including those that occur throughout the coal value chain. In 2020, a total of 8.9% of employed individuals in Mpumalanga worked in the coal mining and electricity and gas sectors (Quantec, 2021a).

In 2020, there were just over 1.2 million households in Mpumalanga, which constituted 7.5% of all households at a national level (Quantec, 2021c). Between 2010 and 2020, the number of households in Mpumalanga grew at an average annual rate of 2.0%, which was marginally higher than the national average growth rate of 1.9% recorded over the same period. Furthermore, the average household size in the province stood at an average of 3.8 individuals per household in 2020, marginally higher than the national average of 3.6 individuals recorded during the same year. It should be noted that the average number of individuals per household has remained at 3.8 since 2014 following a marginal decline from 3.9 in 2013.

3.2.5 Infrastructure profile

Figure 3.6 illustrates the share of households that have access to basic facilities. Access to bulk services is considered an appropriate indicator of a province's ability to meet economic development requirements.

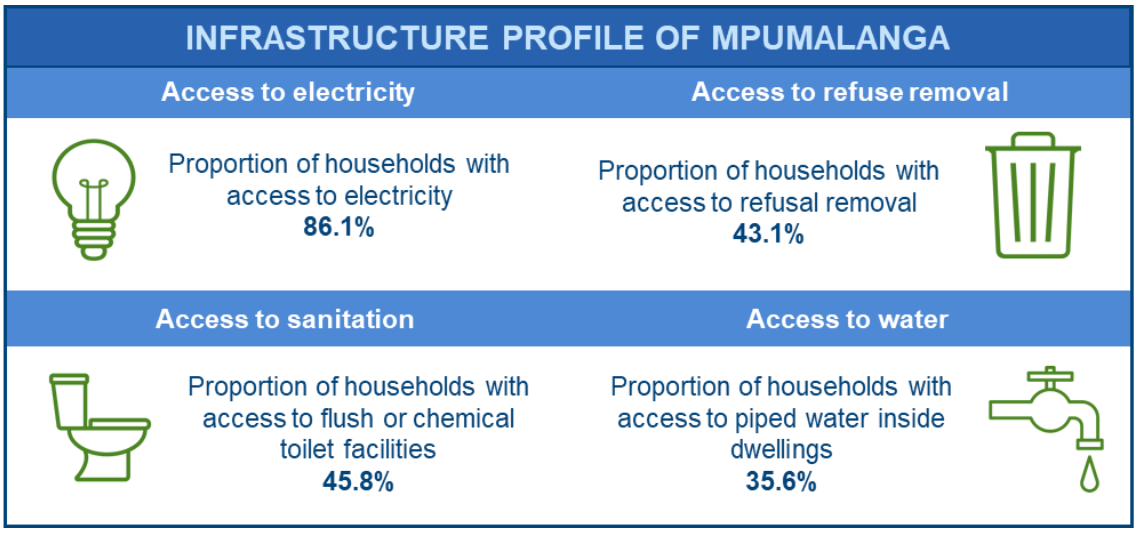


Figure 3.6: Infrastructure profile of Mpumalanga, 2020 (based on Quantec, 2021b)

In 2020, 86.1% of households in Mpumalanga had access to electricity for lighting, which was slightly higher than the national average of 84.8% during the same year (Quantec, 2021b). The provision of sanitation and refuse removal poses a greater challenge in Mpumalanga than it does in many other parts of South Africa. In 2020, the proportion of households in Mpumalanga with access to sanitation, as measured by the number of people with access to flush or chemical toilets, was 45.8%. This was lower in comparison to the 63.6% of South African households that had access to sanitation during the same year.

In terms of access to refuse removal by a local authority at least once a week, 43.1% of households in Mpumalanga received this service in 2020. This rate was significantly lower than the national average of 63.6% recorded during the same year. Furthermore, a total of 35.6% of households in the province had access to piped water inside their dwellings in 2020.

Given the above, it is evident that households in Mpumalanga have sufficient access to electricity, which is likely to contribute significantly to the province's development. However, the lack of access to sanitation, refuse removal, and water requires consideration for the future development of the province and its communities. Furthermore, as the province is responsible for the majority of South Africa's electricity generation, alternative methods of electricity generation will be required as the country reduces its reliance on fossil fuels.

3.2.6 Economic resources

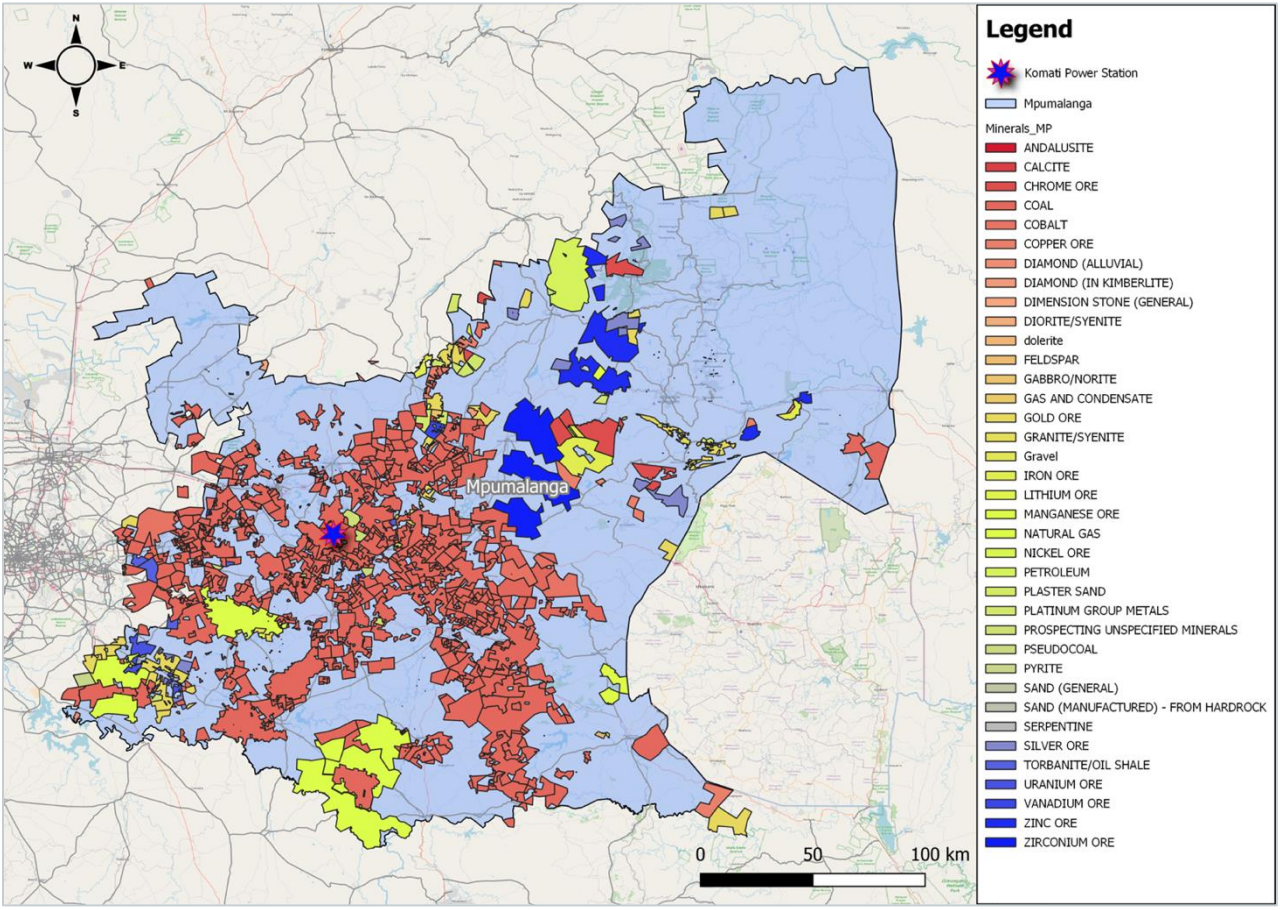
Map 3.3 illustrates the **mineral** resources in Mpumalanga. Mpumalanga is rich in coal reserves and home to South Africa's major coal-fired power stations. As indicated in Map 3.3, there are several coal reserves in the west and southwest of the province as well as scattered deposits of mineral ores, including platinum aggregate metals, cobalt, natural gas, iron and gold. It is important to note that 90.0% of South Africa's coal consumption is earmarked for electricity generation and use in the fuel industry.

Approximately 80.0% of coal used in South Africa is sourced from Mpumalanga, signifying the importance of the provincial coal industry to the national economy. Globally, mined coal is mostly used as a primary source of domestic energy with a small percentage of production being exported. On an annual basis, South Africa contributes around 3.3% of global coal production and 6.0% of global coal exports (Ratshomo & Nembahe, 2017). However, between 2011 and 2020, coal exports as a share of South Africa's foreign earnings declined from 7.0% to 4.6% (Makgetla & Patel, 2021). It should be noted that mineral prices, especially those of coal, have recently experienced a "commodity price-super-cycle"[6] because of COVID-19. This commodity price-super-cycle is likely to worsen due to the Russia-Ukraine conflict.

Given the above, the international and domestic shift from coal power generation is expected to have significant implications for the provincial economy if the JET is not managed appropriately. In 2021, South Africa updated its annual NDC[7] mitigation targets to range between 395 Mt and 510 Mt of CO_2-equivalent by 2025. The latest targets include a further reduction of 350 Mt to 420 Mt CO_2-equivalent by 2030 with the aim of reaching net zero CO_2 by 2050. The strengthening of South Africa's NDC targets signifies a more aggressive

[6] Commodity price super-cycles may be defined as prolonged periods during which commodity prices trade relatively high compared to their long-term average.
[7] NDC – nationally determined contributions – are targets set by countries for the reduction of GHG emissions. Countries that set NDCs are required to indicate the actions they will take to reach these targets (UN, 2022).

and hasty transition from a carbon-intensive economy, which will require an accelerated economic diversification in the province. The attainment of South Africa's NDC is most likely to be supported by the shutdown of coal-fired power stations such as KPS.



Map 3.3: Mineral resources in Mpumalanga

In terms of **agricultural** resources, Mpumalanga is considered one of the largest contributors to the national agriculture sector. Approximately 24.0% of the province's total land area is arable land, while 13.6% is natural grazing land (DEDT, 2020). However, should coal mining continue in the province, it is estimated that approximately 240 000 hectares (ha) of high-potential farmland may be lost (Creamer, 2021).

On an annual basis, the province accounts for 3.0% to 15.0% of South Africa's total vegetable farming output; however, vegetable processing remains at a relatively low level in the province (DEDT, 2020). While the province has a well-established commercial farming sector, its small-scale farming sector is constrained by a lack of technology and access to facilities.

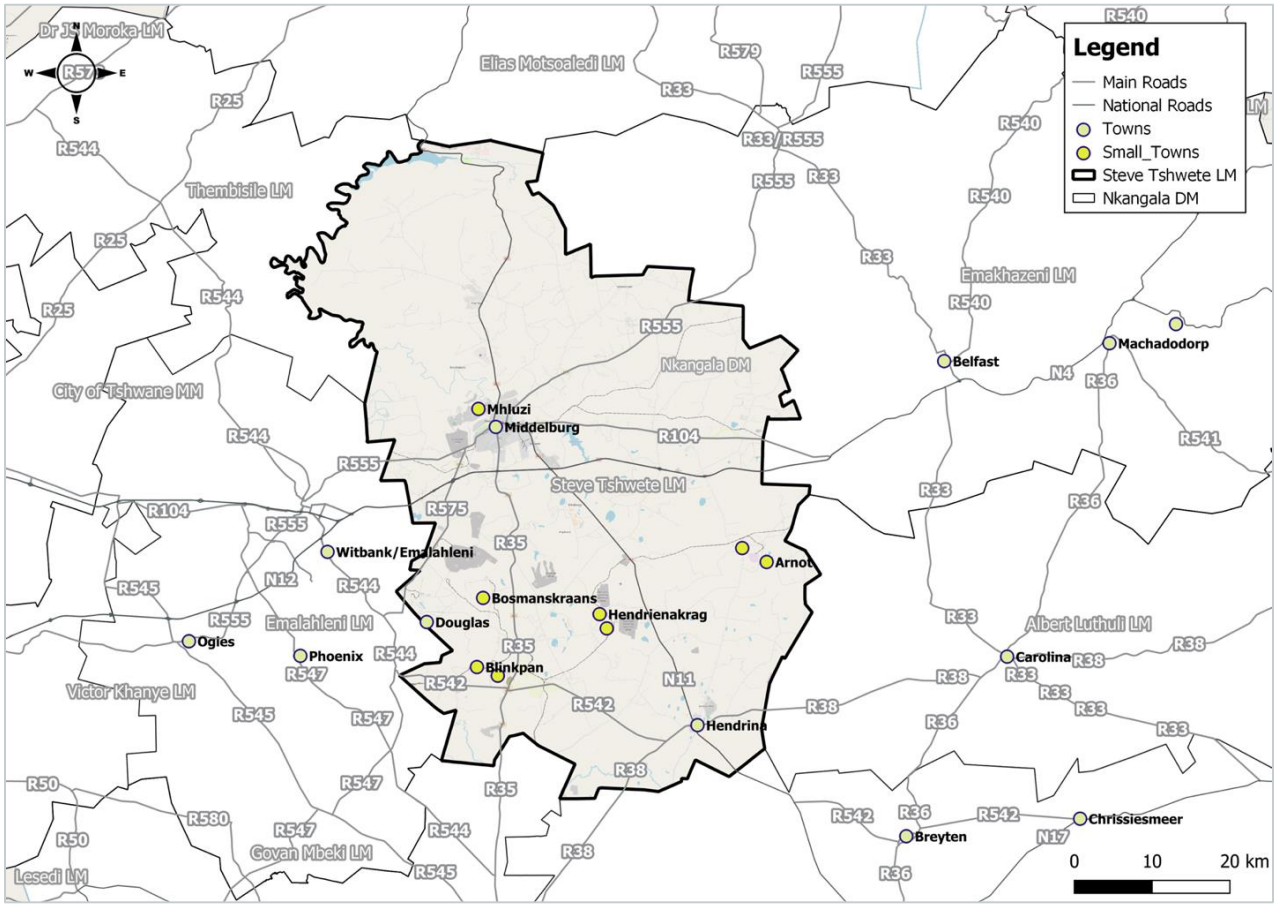
Historically, Mpumalanga has benefitted from its proximity to Gauteng and countries such as Eswatini and the Kingdom of Lesotho as tourist sources. Key natural attractions in the province include the Kruger National Park, Blyde River Canyon and the Drakensberg Escarpment, the Lowveld Botanical Gardens, the Sudwala

and Echo Caves, Chrissiesmeer, the Makhonjwa Mountains, and the Blyde Mariepskop Complex (DataWorld, 2019).

3.3 Nkangala DM and Steve Tshwete LM profiles

3.3.1 Spatial composition

Six LMs comprise the Nkangala DM, namely the Emakhazeni, Steve Tshwete, Emalahleni, Victor Khanye, Thembisile Hani and Dr JS Moroka LMs. The major economic hubs of Nkangala DM are the Steve Tshwete LM (Middelburg) and Emalahleni LM (Witbank). These economies are mainly dependent on the local steel industry and have a high reliance on the manufacturing sector, which makes the region vulnerable to economic cycles (Nkangala DM, 2019).



Map 3.4: Steve Tshwete LM local context map

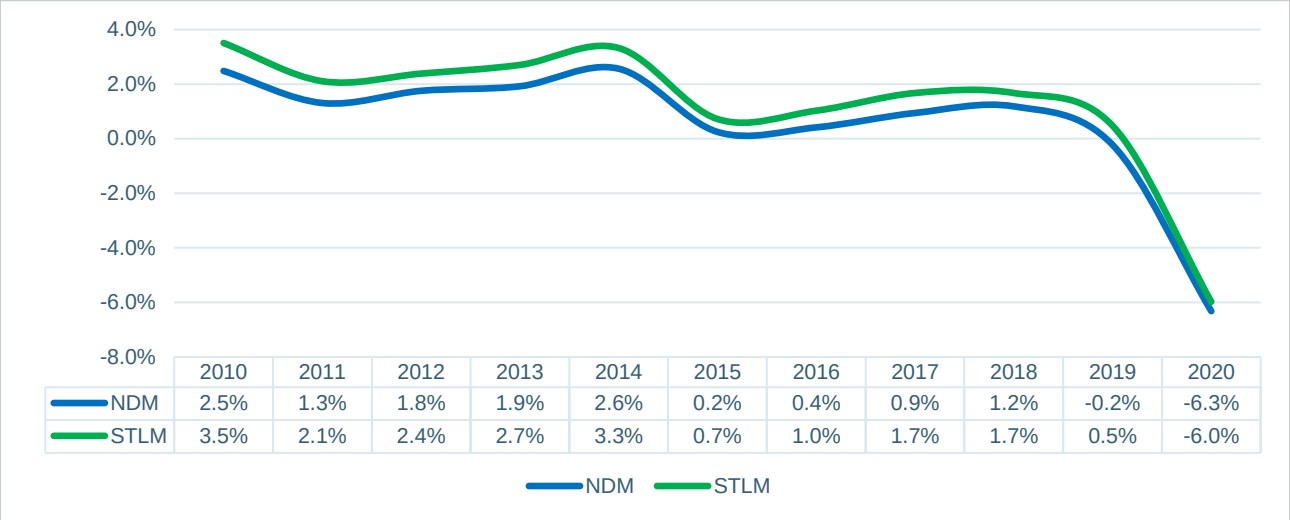
Coal mining within the district predominantly occurs in the southern regions and is linked to the power stations. As such, the region holds significant potential for continuous coal development. Furthermore, amongst other strengths, Nkangala DM has strong skills development, tourism and government services sectors. The

adjacent province of Gauteng has become a major source of tourism to the DM and also offers a number of export opportunities for the district. In addition, Nkangala DM's proximity to Gauteng allows for access to broader markets and a larger consumer base for its agricultural and manufacturing sectors. Moreover, land in the district is available at a low cost for the implementation of projects, including tourism and light and heavy industries (Nkangala DM, 2019).

3.3.2 Economic profile

In 2020, the Nkangala DM economy was valued at R147.1 billion (in current prices), having grown at an average annual rate of 0.3% between 2010 and 2020. During the same period, Steve Tshwete LM recorded a substantially higher average annual growth rate of 1.0%, which indicates the LM's importance as a key driver of economic growth in the district. Furthermore, Steve Tshwete LM was valued at R40.9 billion in 2020.

Figure 3.7 shows the performance of Nkangala DM and Steve Tshwete LM from 2010 to 2020. Growth in Steve Tshwete LM broadly followed that of Nkangala DM, with sizeable contractions recorded in both municipalities in 2020 due to COVID-19.



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
NDM	2.5%	1.3%	1.8%	1.9%	2.6%	0.2%	0.4%	0.9%	1.2%	-0.2%	-6.3%
STLM	3.5%	2.1%	2.4%	2.7%	3.3%	0.7%	1.0%	1.7%	1.7%	0.5%	-6.0%

Figure 3.7: Year-on-year GVA growth rate, Nkangala DM and Steve Tshwete LM, 2010-2020 (based on Quantec, 2022a)

Figure 3.8 indicates the contribution of the respective economic sectors to the overall GVA of both Nkangala DM and Steve Tshwete LM in 2020. The mining and quarrying sector was the largest contributor to the economies of Nkangala DM and Steve Tshwete LM at 34.6% and 34.9%, respectively. This was followed by finance, insurance, real estate and business services at 12.6% and at 14.8%.

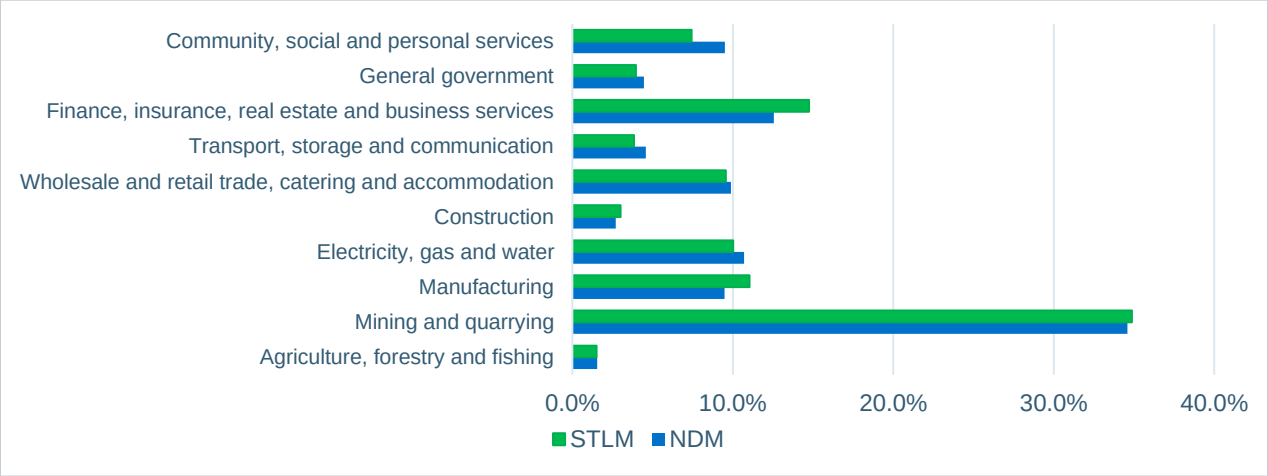


Figure 3.8: Economic profile of Nkangala DM and Steve Tshwete LM, 2020 (based on Quantec, 2022a)

The electricity, gas and water sector was the third largest contributor to the Nkangala DM economy (10.7%) and the fourth largest to the Steve Tshwete LM economy (10.0%). Other notable contributors to both economies included the manufacturing; wholesale and retail trade, catering and accommodation; and community, social and personal services sectors. However, GVA contributions by each of the respective sectors to the two economies may have been distorted by the COVID-19 pandemic. For example, the general government sector may have increased in size due to the health response or increased health-related expenditure to counter the spread of COVID-19.

The growth of the mining industry has been essential to the Nkangala DM's economy, with mineral resources constituting coal deposits such as refractory (flint) and small deposits of gold, tin, copper, lead, manganese, uranium, nickel, cobalt, and silver (Nkangala DM, 2019). The performance of the electricity sector can be attributed to the significant presence and performance of power stations in the district.

Although the agriculture sector is the lowest contributor to the Nkangala DM economy, it remains an essential economic activity with potential in Nkangala DM, especially for the development of rural areas. Commercial crop and livestock farming predominantly occur in Nkangala DM, with limited subsistence farming occurring in the district. Therefore, it is important that the agricultural sector is protected and promoted through the advancement of supplementary activities such as agro-processing (Nkangala DM, 2019).

Defining 'agro-processing'

Within the manufacturing sector, agro-processing usually refers to the activities related to the processing of raw materials and intermediate goods produced by the agriculture sector (CSIR, 2022). Essentially, agro-processing entails the undertaking of activities to transform raw agricultural produce into end products such as food, animal feed, etc. In addition, agro-processing may be separated into primary and secondary processing. Primary processing includes processes such as peeling, washing, chopping, butchery, and shelling, while secondary processing entails the conversion of primary processed products into more complex food items. Activities for secondary processing are mixing, drying, heating, cooling, cooking, and moulding, among others (Agribook.digital, 2022).

Steve Tshwete LM is one of the largest economies in Nkangala DM and is considered one of the commercial hubs of the province, hosting mining and metal (or steel) manufacturing industries (Steve Tshwete LM, 2019).

The mining and quarrying sector contributed 17.2% to employment in Nkangala DM in 2020 and 19.2% to employment in Steve Tshwete LM. However, the GVA contribution of the sector during the year outweighed its contribution to employment. This may be attributed to the capital intensity of the sector.

Conversely, the agriculture, forestry and fishing sector's employment contribution in both municipalities outweighed its GVA contributions, suggesting that the sector is labour-intensive. Other leading contributors to employment in both municipalities included the wholesale and retail trade, catering and accommodation sector; the community, social and personal services sector; and the finance, insurance, real estate and business services sector.

3.3.3 Labour force profile

Figure 3.9 summarises the labour force profiles of Nkangala DM and Steve Tshwete LM. The working-age population[8] of the Nkangala DM amounted to 1 100 881 individuals in 2020 and accounted for 68.4% of the DM's total population for that year. Of this total, 54.1% were classified as economically active.

The working-age population and economically active population (EAP) of Steve Tshwete LM were larger than those of Nkangala DM in 2020 at 71.9% and 62.1%, respectively. As such, Steve Tshwete LM (23.8%) recorded a substantially lower unemployment rate in 2020 compared to Nkangala DM (34.2%). However, employment and unemployment indicators should be considered against the changes in calculations by Statistics South Africa in 2020. As a result of the COVID-19 pandemic, a large proportion of individuals were moved from the employed and unemployed segments to the "not economically active" (NEA) segment as they were unable to search for employment due to the national lockdown.

Of the EAP in Nkangala DM, 48.9% were formally employed, 16.9% informally employed and the remainder unemployed in 2020. In Steve Tshwete LM 58.6% of the EAP were formally employed, 17.6% informally employed and the remaining 23.8% unemployed during the same year.

When evaluating the respective skills distributions, Steve Tshwete LM had higher percentages of skilled, semi-skilled, and low-skilled individuals than Nkangala DM: 12.2% of Steve Tshwete LM's EAP was considered skilled, higher than the 9.5% recorded in the Nkangala DM. A significant difference in terms of semi-skilled individuals was recorded in 2020 with 26.7% and 33.4% in Nkangala DM and Steve Tshwete LM, respectively. However, the distribution of low skilled was comparatively similar during the year.

[8] The working-age population refers to individuals aged 15 to 64 years of age (Stats SA, 2021).

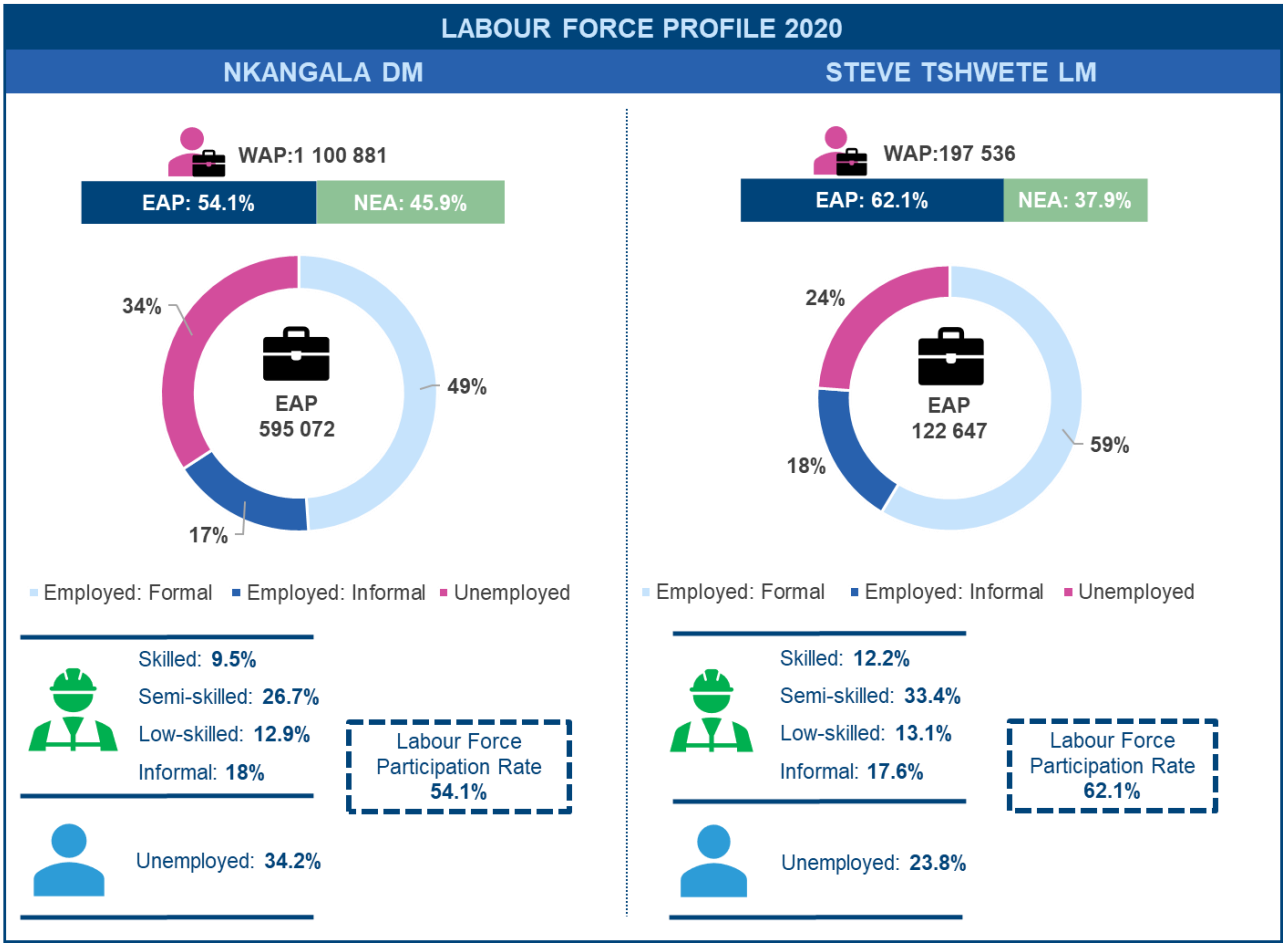


Figure 3.9: Labour force profile of Nkangala DM and Steve Tshwete LM, 2020 (based on Quantec, 2021a)

3.3.4 Demographic profiles

3.3.4.1 Population and household trends

Figure 3.10 illustrates the demographic profiles of Nkangala DM and Steve Tshwete LM in 2020.

In both Nkangala DM and Steve Tshwete LM, males make up the majority of the total population at 51.0% and 53.0%, respectively. Furthermore, in each of the municipalities, most of the population is aged between 15 and 64, amounting to 68.4% and 71.9% in Nkangala DM and Steve Tshwete LM, respectively. This implies that there exists an abundance of human capital in Nkangala DM and Steve Tshwete LM to be utilised for future economic development.

Steve Tshwete LM accounted for 17.1% of the Nkangala DM's total population in 2020, a share totalling 274 561 individuals. Between 2010 and 2020, Steve Tshwete LM recorded an average annual population growth rate of 2.6% and is therefore considered an important contributor to the DM's overall population growth

rate. In 2020, the total number of households in Steve Tshwete LM amounted to 77 701, which signifies a contribution of 17.8% to the total number of households in Nkangala DM. The average household size in Steve Tshwete LM was recorded at 3.5 individuals per household in 2020.

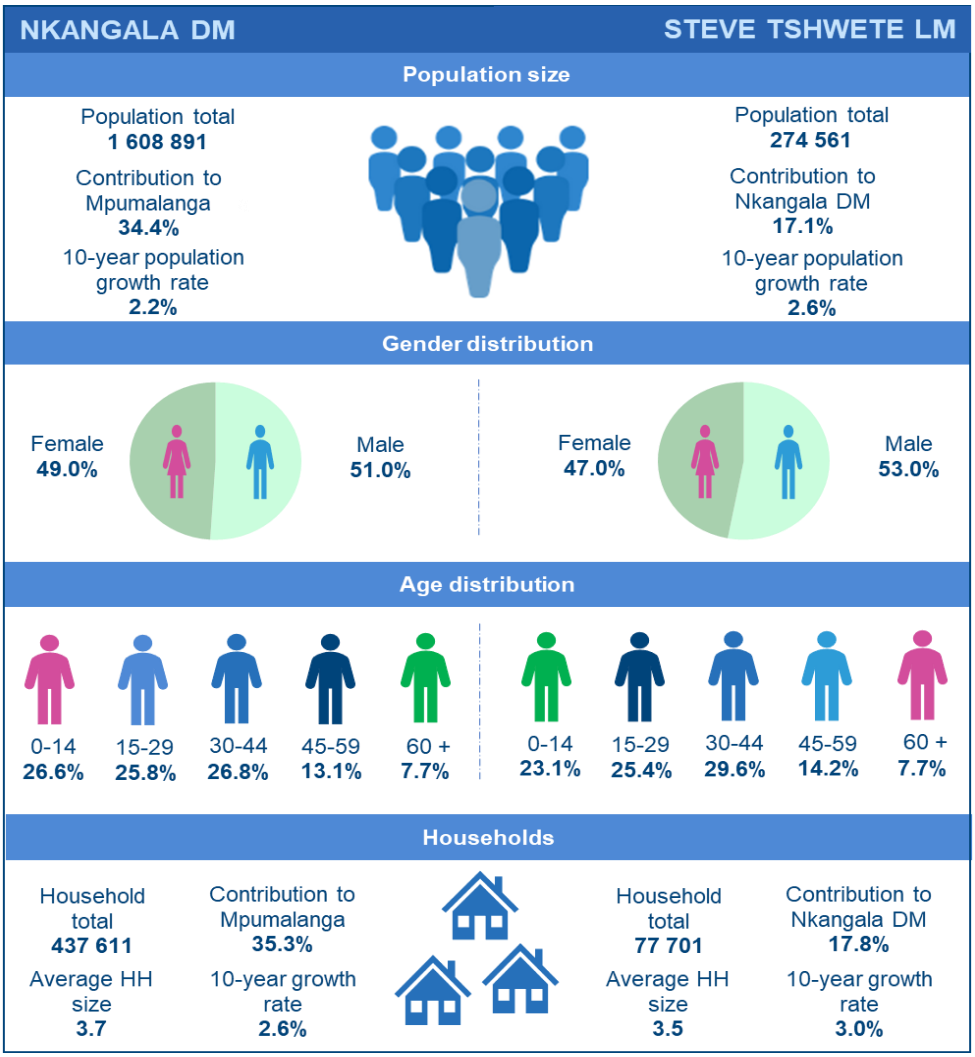


Figure 3.10: Demographics of Nkangala DM and Steve Tshwete LM 2020 (based on Quantec, 2021b)

3.3.4.2 Education levels

Figure 3.11 provides an overview of education levels in Nkangala DM and Steve Tshwete LM in 2020.

Of the Nkangala DM and Steve Tshwete LM adult populations (i.e. individuals over the age of 20), 10.6% and 7.2%, respectively, had no schooling. Steve Tshwete LM had a larger percentage of individuals with at least a Grade 12 qualification in 2020 than Nkangala DM, while Nkangala DM had a larger proportion of individuals

with some primary and secondary education. Given the education profiles of both Nkangala DM and Steve Tshwete LM, it can be concluded that the populations of both municipalities are relatively low skilled.

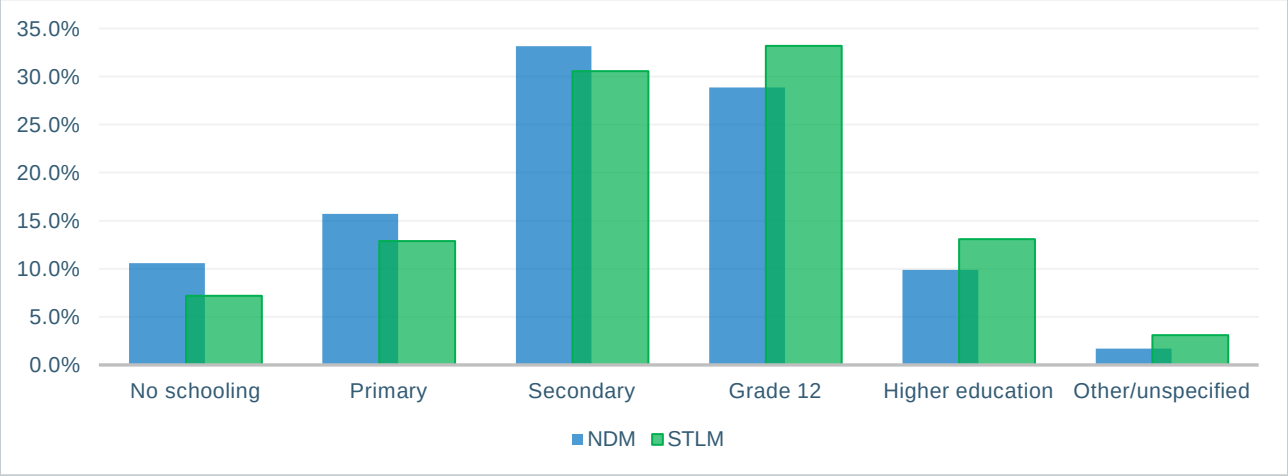


Figure 3.11: Education levels, Nkangala DM and Steve Tshwete LM, 2020 (based on Quantec, 2022b)

In terms of functional illiteracy (which is defined as an individual's inability to use reading, writing, and calculation skills as a contribution to their own or the community's development), Nkangala DM recorded a functional illiteracy rate of 22.1% of the adult population in 2020 and a functional literacy rate of 76.2%. The remaining 1.7% was unspecified.

In Steve Tshwete LM, 16.6% of the adult population was considered functionally illiterate in 2020 and 80.4% functionally literate. The remaining 3.0% was unspecified. However, an insufficient level of skills in Nkangala DM has been identified as a fundamental constraint on the exploitation of existing opportunities (Nkangala DM, 2020).

3.3.4.3 Standard of living

The Human Development Index (HDI) measures key dimensions of human development, namely life expectancy, access to education, and a decent standard of living as measured by gross national income (GNI) per capita. In 2020, the HDI stood at 0.70 and 0.74 in Nkangala DM and Steve Tshwete LM, respectively. This difference may be attributed to higher levels of average years of schooling, life expectancy at birth, and GNI per capita in Steve Tshwete LM.

The Gini coefficient is used to measure income distribution or inequality, with a value of zero reflecting perfect income equality and a value of one reflecting perfect income inequality. In 2019, the Gini coefficients of Nkangala DM and Steve Tshwete LM were measured at 0.70 and 0.73, respectively. During the same year, South Africa and Mpumalanga both recorded Gini coefficients of 0.68. As such, it is concluded that there exists a higher level of income inequality in Steve Tshwete LM than in Nkangala DM. Furthermore, income inequality in both the local and district municipalities exceeded that of Mpumalanga and the country overall.

On average, households in Nkangala DM earned an income of R208 219.50 per annum in 2020, which was higher than the average incomes of other DMs in Mpumalanga (R202 508.00 per annum in Gert Sibande DM

and R196 348.40 per annum in Ehlanzeni DM). Steve Tshwete LM recorded an average household income of R299 101.50 per annum during the same year.

3.3.5 Infrastructure profile

The sections below provide indicators for access to bulk services (i.e. water, electricity, sanitation, and refuse removal) that are similar to those used in the profile concerning evaluation of provincial infrastructure. The purpose thereof, as mentioned earlier, is to provide an indication of the ability of Nkangala DM and Steve Tshwete LM to meet economic development needs.

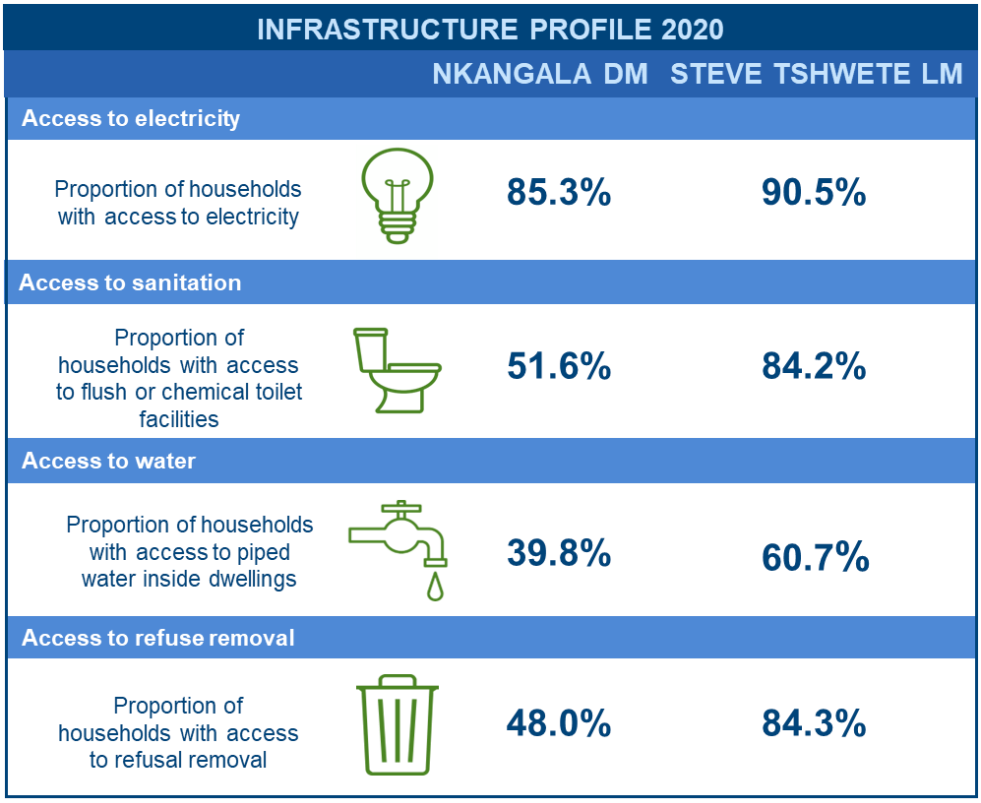


Figure 3.12: Infrastructure profiles of Nkangala DM and Steve Tshwete LM, 2020 (based on Quantec, 2021b)

3.3.5.1 Access to water

In 2020, 39.8% of households in Nkangala DM had access to piped water inside dwellings and 41.4% had access to water inside their yards. During the same year, 60.7% of households in Steve Tshwete LM had access to piped water inside their dwellings while 24.3% had access to piped water inside their yards.

Despite the relatively high accessibility of piped water within dwellings or yards in both Nkangala DM and Steve Tshwete LM, a sizeable proportion of households relied on sources of water within and beyond 200 metres

(m) of their dwellings. In 2020, 4.1% of households in Nkangala DM relied on water sources located more than 200 m from their dwellings. In Steve Tshwete LM, this figure stood at 5.0% in the same year. Furthermore, 7.1% of households in Nkangala DM and 1.4% in Steve Tshwete LM relied on a source of water within 200 m of their dwellings. Therefore, it can be concluded that a large proportion of households in both Nkangala DM and Steve Tshwete LM need to travel some distance to obtain water.

3.3.5.2 Access to electricity

Access to electricity by households in Nkangala DM and Steve Tshwete LM was higher than the national average recorded in 2020. During the year, 85.3% of households in Nkangala DM had access to electricity. In Steve Tshwete LM, 90.5% of households had access to electricity in 2020, which was more than the national, provincial, and district access to electricity by household.

Between 2010 and 2020, access to electricity by households in Nkangala DM and Steve Tshwete LM increased by an average annual rate of 3.0% and 3.8%, respectively. These rates were higher than the national and provincial annual increases of 2.7% and 2.9%, respectively, over the same period.

3.3.5.3 Access to refuse removal

Solid waste management, which includes refuse removal, is considered a basic service which LMs are mandated to deliver. In 2020, 48.0% of households in Nkangala DM had their refuse removed by local authorities at least once a week, while 1.3% of households had their waste removed by a local authority less often.

In Steve Tshwete LM, most households (84.3%) had their waste removed by the local authority at least once a week and 1.6% less often. When comparing refuse removed at least once per week in Steve Tshwete LM during 2020 to the national and provincial averages (63.6% and 43.1%, respectively), it is concluded that Steve Tshwete LM's refuse collection services performed significantly better.

3.3.5.4 Access to sanitation

In 2020, just over half (51.6%) of households in Nkangala DM had access to flush toilet facilities, while 43.1% of households utilised pit latrines. Unlike Nkangala DM, 84.2% of households in Steve Tshwete LM had access to flush toilet facilities in 2020 and only 9.3% made use of pit latrines. During the same year, Steve Tshwete LM performed significantly better than South Africa and Mpumalanga in terms of households' access to flush toilet facilities (63.6% and 45.8%, respectively) and the use of pit latrines (27.3% and 45.4%, respectively).

3.3.6 Economic resources

3.3.6.1 Land resources

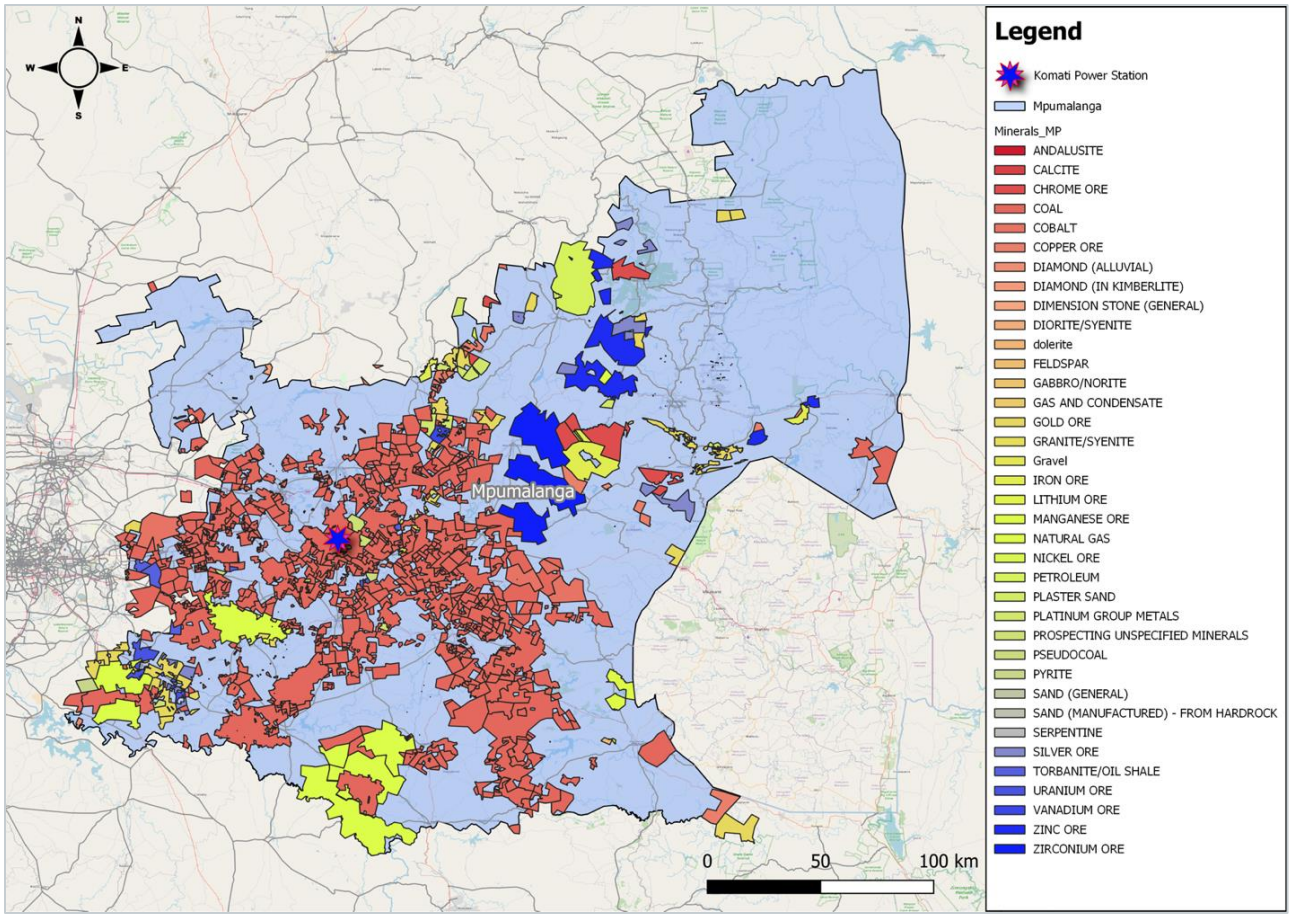
The Nkangala DM is a resource-based economy – that is, one where natural resources such as coal, water, land capacity, geographical features, climate, conservation areas, and ecosystems contribute significantly to the economy and its performance (Nkangala DM, 2019). However, resource-based economies are known to suffer from constrained economic growth performance due to a phenomenon known as the "resource curse",

which refers to the crowding-out of other industries due to the increased importance of a resource-based sector (the phenomenon is otherwise known as Dutch Disease).

Agricultural activities are practised and promoted across Nkangala DM, with extensive crop farming practised in the southern regions and cattle or game farming observed in the northern regions. Agriculture is a fundamental sector with the potential to contribute meaningfully to the economy. Furthermore, the agriculture sector is known for its ability to absorb low-skilled labour due to its labour-intensive nature. However, the mechanisation of farming activities at a large scale threatens the sector's ability to absorb labour as there is a reduced need. Nonetheless, the agriculture sector may be utilised to mitigate the impact of the shutting down of coal power stations and disruptions to the coal value chain.

3.3.6.2 Mineral resources

Mineral reserves in Nkangala DM include coal, refractory (flint), and smaller deposits of gold, tin, copper, lead, manganese, uranium, nickel, cobalt, and silver. Map 3.5 shows that the south of Nkangala (Middelburg and Emalahleni) is a coal-rich area.



Map 3.5: Minerals in Nkangala DM

Figure 3.13 provides an overview of the contributions to the Nkangala DM's coal mining GVA by the four contributing LMs in 2020. The two remaining LMs, namely Thembisile and Dr JS Moroka, did not contribute to the DM's coal mining GVA during the year.

In 2020, the Nkangala DM coal mining industry contributed 72.0% of the provincial coal mining GVA, with the Emalahleni LM (68.3%) and Steve Tshwete LM (27.2%) contributing the largest shares to the DM's coal mining sector during the year.

Of the 13 coal-fired power stations in Mpumalanga, eight are in Nkangala DM (Komati, Arnot, Hendrina, Kriel, Matla, Duvha, Kendal, and Kusile), hence the dominance of the mining sector and its sizeable contribution of the electricity sector. As such, the shutdown of KPS could have a negative impact on the region's coal mining sector because of reduced demand for coal. As mentioned earlier, the global shift from fossil fuels towards greener alternatives as a means of electricity generation may alter the viability of coal exports as an alternative contribution to the domestic economy.

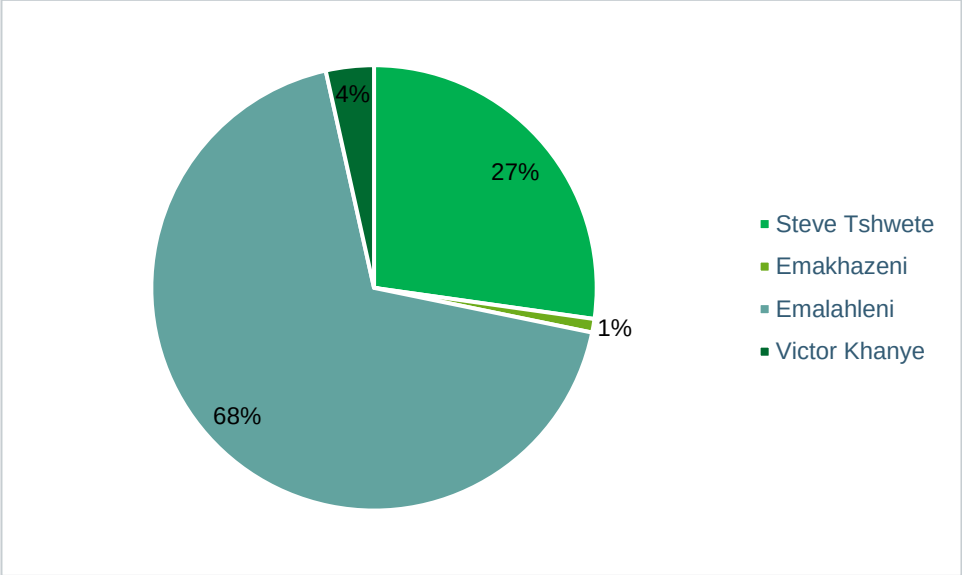


Figure 3.13: Percentage contribution to Nkangala DM coal mining sector per LM, 2020 (based on Quantec, 2022a)

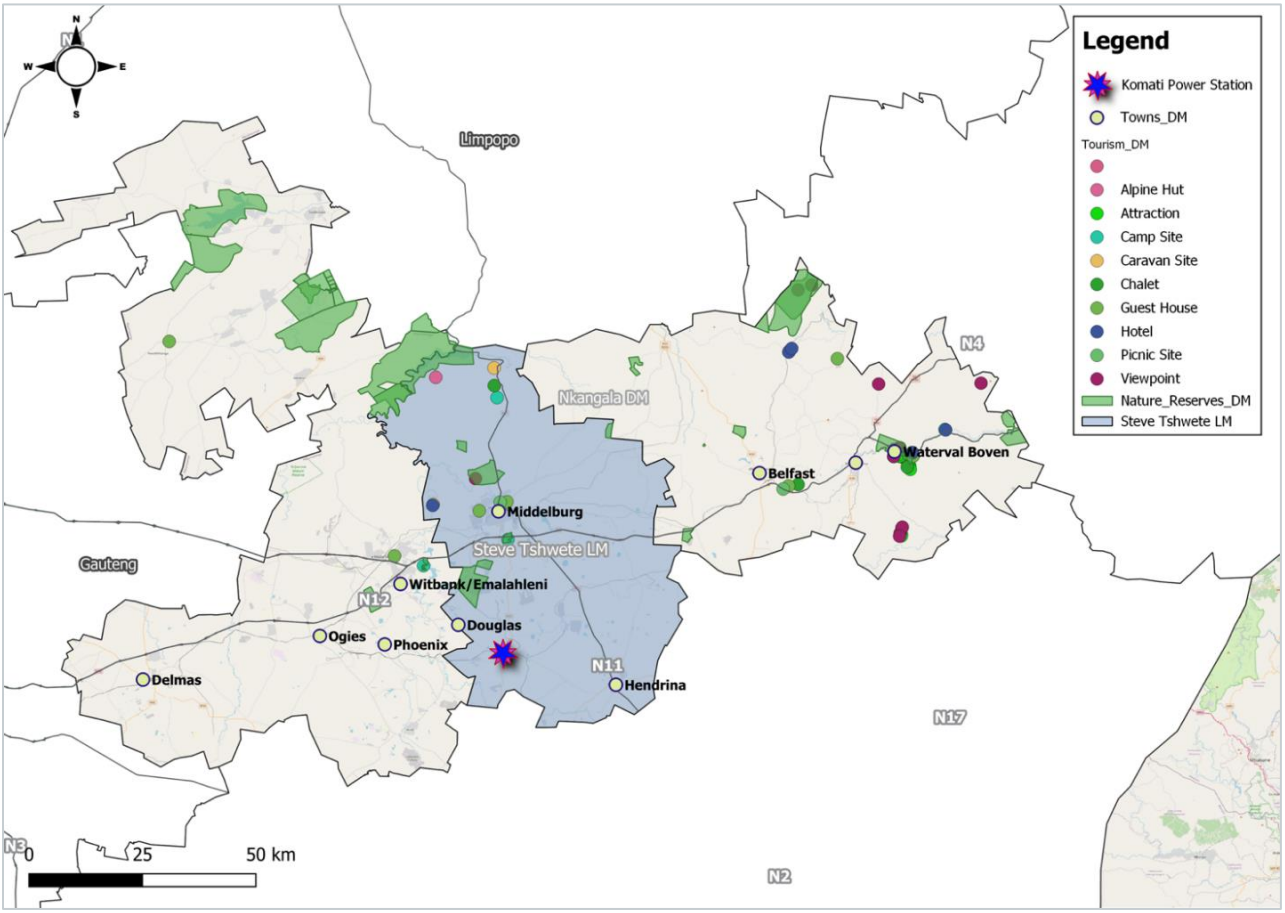
As mentioned, coal is a major resource in the southern part of Nkangala; this area includes Steve Tshwete LM, which is highly dependent on the coal mining industry for economic growth and local job creation. Mining in this area, in addition to its linkages with Eskom operations, is expected to continue to dominate the local economy.

As noted in the 2022 Mpumalanga State of the Province Address, the future importance of the coal mining industry was reaffirmed by the province's commitment to the rehabilitation of the coal haulage road network in the Gert Sibande and Nkangala DMs. These upgrades are intended to improve the transportation of coal to Eskom power stations (Mtsweni-Tsipane, 2022). However, over the long term, alternative plans need to be considered to mitigate the impacts on the employment and economy in the region of downscaling, the possible closure of mines, and the shutdown of power stations.

3.3.6.3 Tourism

Map 3.6 identifies various tourist attractions within Steve Tshwete LM and Nkangala DM. The tourism industry is considered a key driver of export diversification and may contribute to reducing trade balances deficits or compensate for weaker export revenues from other goods and services.

Steve Tshwete LM benefits from its strategic proximity to iconic tourist destinations such as the Kruger National Park as well as to Gauteng. It offers various accommodation facilities, resorts, and other tourism amenities, which allow the local industry the potential to grow (Steve Tshwete LM, 2019).



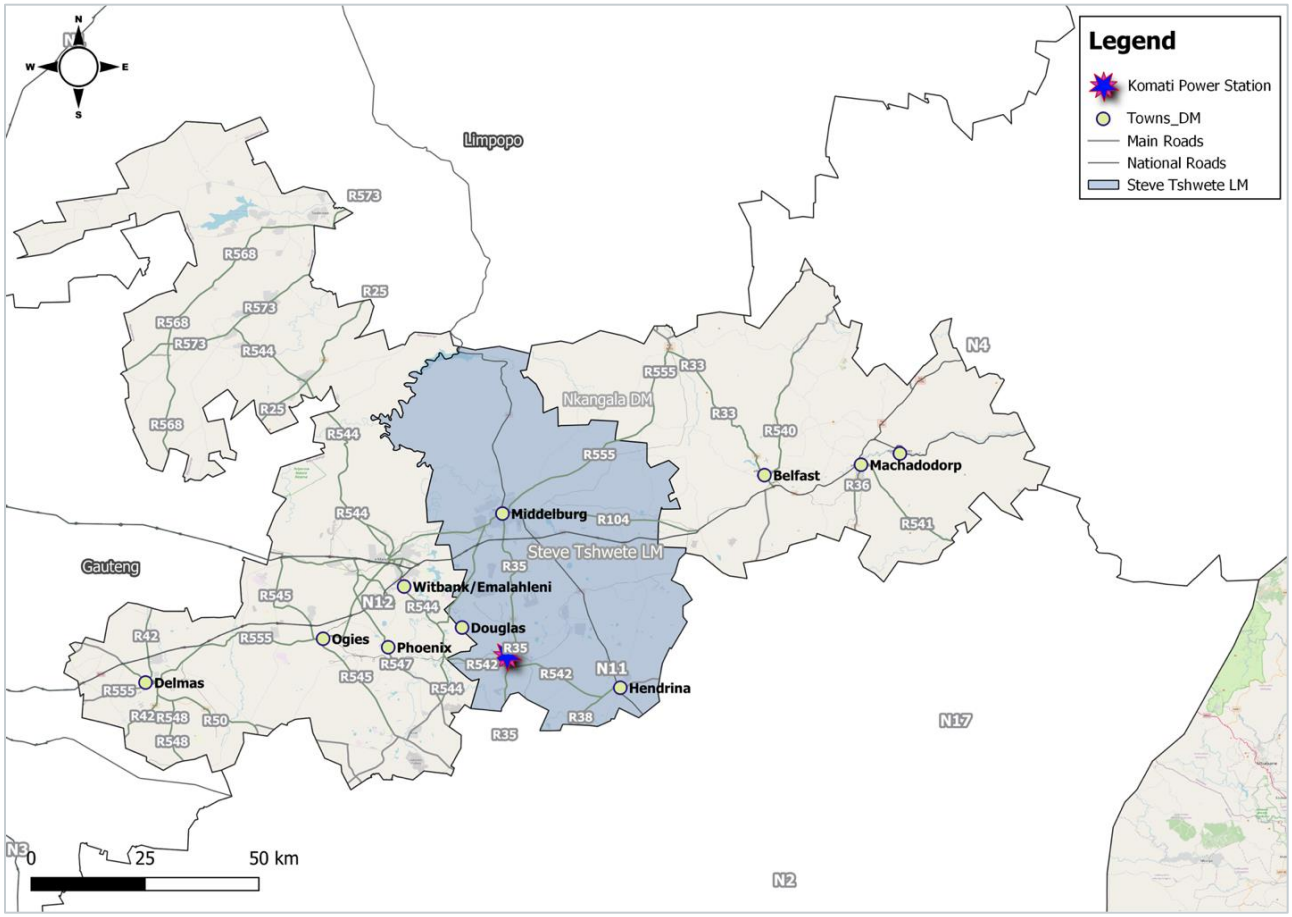
Map 3.6: Tourist attractions of Nkangala DM and Steve Tshwete LM

Although the tourism industry in Steve Tshwete LM may have substantial potential given the above, the industry's performance is impacted by aging infrastructure, a lack of investment in formal accommodation, and limited secondary tourism services (GIZ, 2019). Furthermore, the performance of Steve Tshwete LM's tourism industry (and that of the broader national tourism industry) was significantly impacted by COVID-19, which reduced international and domestic tourist activity substantially. Requirements for international travel (such as

COVID-19 vaccinations or negative COVID-19 test results) and recurring COVID-19 waves are likely to affect the short-term recovery of the sector.

3.3.6.4 Infrastructure

Map 3.7 shows that Nkangala DM and Steve Tshwete LM have access to key national roads such as the N12 and N4 routes, which form part of the Maputo Corridor. These provide the main east-west linkages connecting Mpumalanga to the industrial centres and other prominent nodes in Gauteng. The R555 also connects one of Nkangala's economic hubs, Emalahleni, to Middelburg, the economic node of Steve Tshwete LM. In addition, the R555 stretches across other parts of Mpumalanga.



Map 3.7: Road linkages in Nkangala and economic nodes of Steve Tshwete LM

Various economic opportunities could be pursued along these routes such as intensive agriculture, agro-processing, hospitality ventures, manufacturing, warehouses, wholesale trade, clean industries, and transport business.

3.3.7 Local government viability analysis

In the 2021/22 financial year (FY), the total operating revenue of Nkangala DM was approximately R509.7 million, which signified an increase of 18.7% compared to the preceding FY. The largest segment of the Nkangala DM's revenue originated from transfers recognised (R487.1 million), which increased by 21.0% compared to the 2020/21 adjusted budget. This indicates a substantial reliance by Nkangala DM on funding from the national government.

Investment revenue amounted to R20.6 million during the FY while other sources of revenue contributed R2.0 million. Both revenue categories recorded substantial annual decreases of 12.5% and 34.7%, respectively. Based on budgetary forecasts, Nkangala DM's total operating revenue is expected to increase to R534.4 million in the 2022/23 FY and to R572.5 million in the 2023/24 FY (Nkangala DM, 2021).

Total operating expenditure for the 2021/22 FY was budgeted at R594.9 million. The bulk of these funds was allocated to transfers and subsidies (R230.9 million) and employee-related costs (R191.8 million). Nkangala DM's total operating expenditure is expected to reach R602.7 million in the 2022/23 FY before declining to R596.9 million in the 2023/24 FY. Thus, Nkangala DM is expected to record budgetary deficits over the medium term (Nkangala DM, 2021).

In Steve Tshwete LM, total operating revenue for the 2021/22 FY amounted to approximately R2.2 billion of which trading services (i.e. water management, waste management, etc.) and municipal governance and administration accounted for the largest shares. Total operating revenue in Steve Tshwete LM is expected to increase to approximately R2.4 billion in the 2023/24 FY (Steve Tshwete LM, 2021).

Total operating expenditure for the 2021/22 FY was R2.2 billion and is expected to reach R2.4 billion in the 2023/24 FY. Trading services are the leading contributor to municipal expenditure (Steve Tshwete LM, 2021). Over the medium term, Steve Tshwete LM is not anticipated to record a budget deficit. However, despite the expectation of stable finances in Steve Tshwete LM over the medium term, challenges to the medium-term outlook include:

- increases in unemployment due to the COVID-19 pandemic;
- aging water, road, sanitation, and electricity infrastructure;
- steep increases in the price of bulk purchases from Eskom; and
- additional lending to supplement capital programmes (Steve Tshwete LM, 2021).

Although Steve Tshwete LM's financial standing is expected to remain stable in the medium term, a continued positive outlook is not certain. Furthermore, the mitigation of the KPS shutdown should not restrain municipal finances in the long term and may therefore necessitate alternative sources of finance.

3.4 Komati Power Station primary study area profile

The following subsection investigates the socio-economic capital of the Komati PSA.

3.4.1 Force-field analysis of the Komati Primary Study Area

Figure 3.14 depicts the driving forces and hindering factors identified in the Komati PSA. Further detail on each capital is provided in the following subsections.

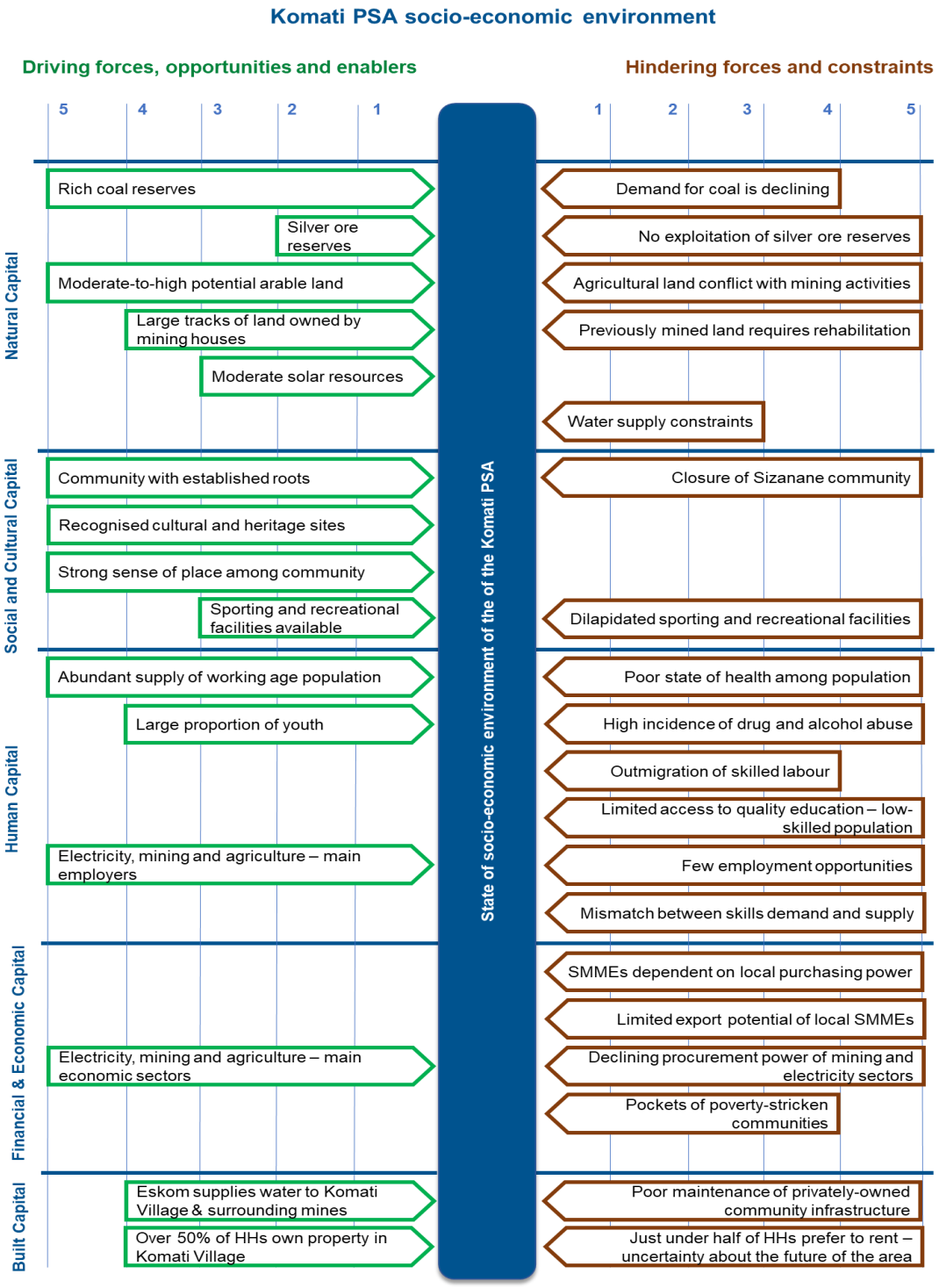


Figure 3.14: Komati PSA driving forces and hindering factors

In terms of natural capital, the Komati PSA is rich in coal and silver ore reserves. Recent declines in the demand for coal may, however, influence the economic contribution of the coal value chain not only to the Komati PSA but also the regional economy. The exploitation of the Komati PSA's silver ore reserves may therefore be a potential substitutionary economic activity.

Social and cultural capital driving forces include well-established cultural and heritage sites, deeply rooted communities within the PSA, and a balanced split between male and female populations. The abundance of working-age individuals and the large number of young people in the PSA contribute to the area's human capital profile. However, the poor state of health, alcohol and drug abuse, out-migration of skilled labour, and the sharp decline in employment opportunities are all constraining factors on the PSA's human capital.

The Komati PSA's financial and economic capital is largely based on the electricity, mining, and agriculture sectors. As a result, the termination of operations at KPS could have severe economic repercussions. Furthermore, the limited export potential of SMMEs and a decline in procurement power by the mining and electricity sectors could further undermine the PSA's economic viability.

In terms of built capital, the Komati PSA depends on KPS for the provision of water to the Komati Village. In addition, more than 50% of households own properties in the Komati Village and are therefore greatly invested in the Komati PSA.

3.4.2 Primary study area description

As indicated in section 1.3, the areas of particular importance for the study are feeder areas that supply labour, goods and services required for the operation of KPS. These areas encompass the PSA as well as certain parts of the secondary and tertiary study areas. Within Ward 4, the feeder areas include Komati/Koornfontein Village, Blinkpan, Goedehoop North and South, Koornfontein, and the Brey farm. Outside of Ward 4, feeder areas include Middelburg, Emalahleni, Bethal, Kriel, Hendrina, Rietkuil, Standerton and Gauteng.

In addition to the localities indicated above, there are surrounding/adjacent farms that form part of KPS PSA. These adjacent farms are known collectively as the farm belt. Within the PSA of KPS, the settlement of Goedehoop North is farthest away from the power station. The route to KPS from Goedehoop North via Bank Road is 18.2 km long. The alternative route is via the R35, along which the distance between the two points is 19.4 km.

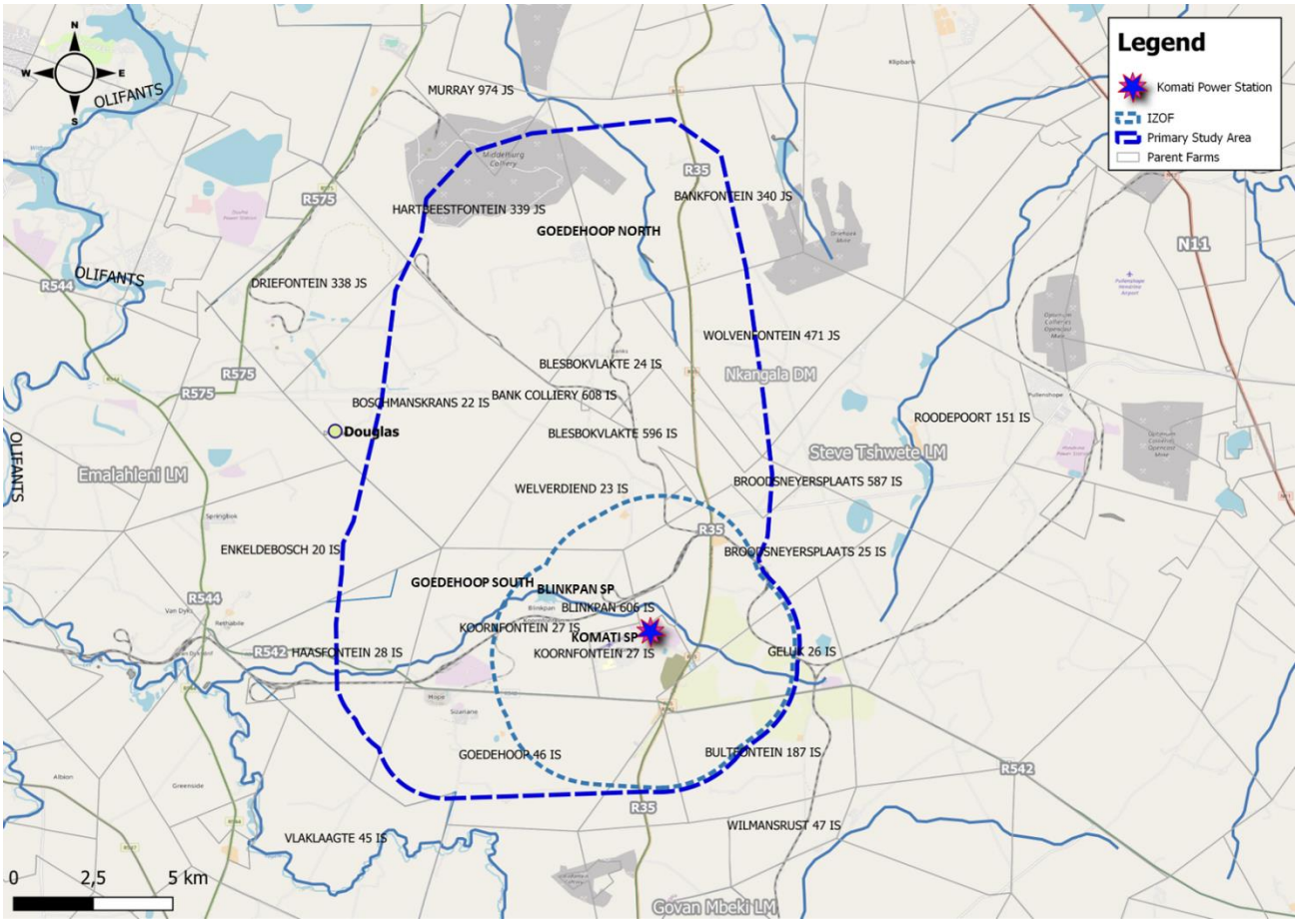
KPS is accessible via tarred roads from the major settlements (Komati Village, Blinkpan, Goedehoop South, and Goedehoop North). However, these roads are deteriorating and littered with potholes.

3.4.3 Locational analysis

The PSA, particularly the immediate zone of influence, is strategically located due to its accessibility from the major throughways. The R542, located to the south of the power station, bisects the IZOI from east to west. The R35 transverses the PSA from north to south on the eastern side of the power station. The R542 and R35 routes connect south of KPS within the IZOI.

Picture 3.1: R544 to KPS

The Komati PSA is surrounded by major towns which are accessible via national and regional highways. Some of the economic nodes surrounding the PSA are Emalahleni (previously Witbank), Middelburg, Nelspruit and Johannesburg.



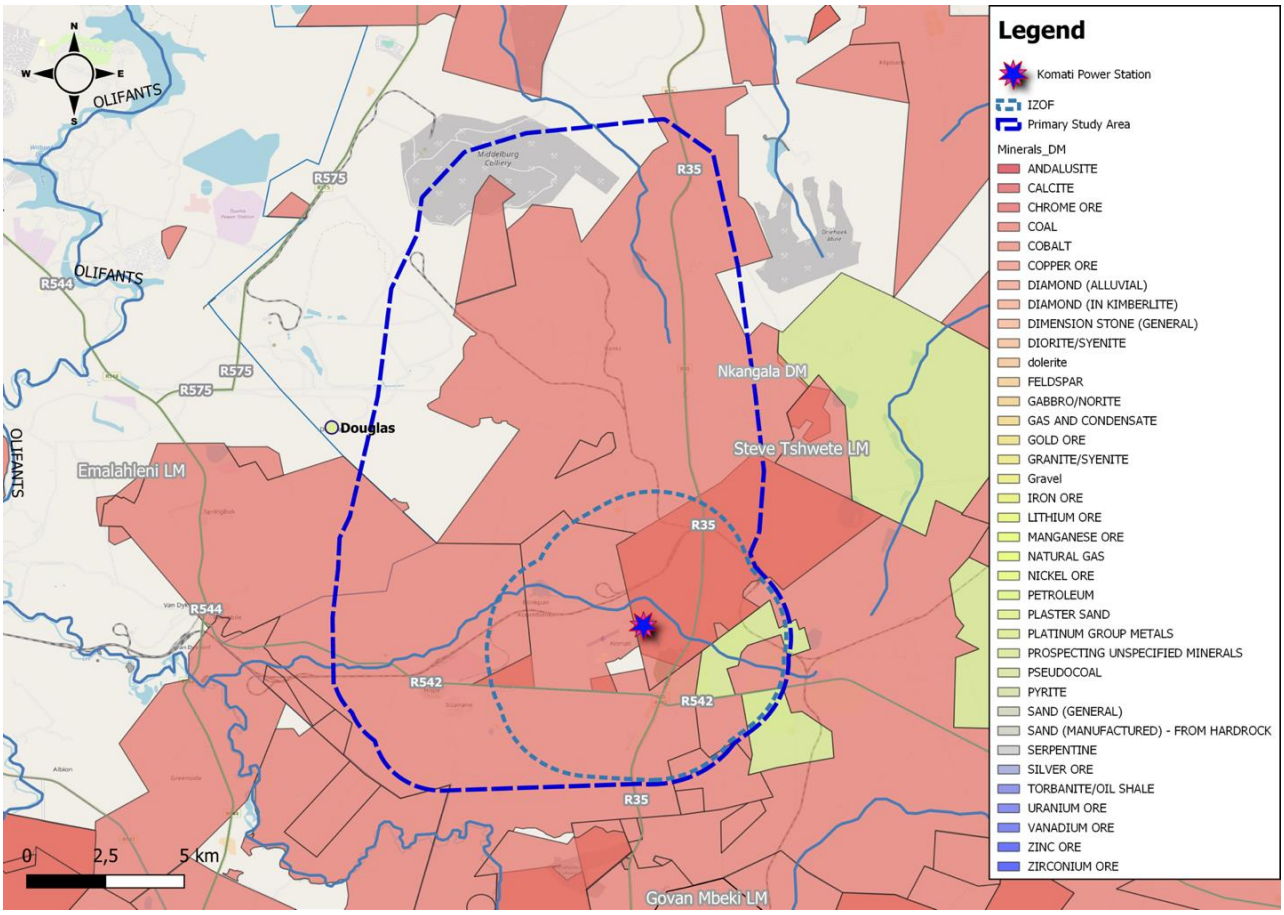
Map 3.8: Location of Komati PSA

3.4.4 Natural capital profile

This subsection will discuss the resource endowments that exist in the PSA of Komati.

3.4.4.1 Mineral resources profiling

Map 3.9 illustrates the mineral resources with which the Komati PSA is endowed with and shows that the larger portion of the area surrounding the PSA is rich in coal. Coal mines of note in the PSA include the Goedehoop Colliery and Koornfontein Mine.



Map 3.9: Minerals resources in Komati PSA

The Goedehoop Colliery is considered the heart of the Witbank coalfield, with the mining boundary covering a total of 28 000 ha (Anglo American, 2015). In June 2021, ownership of the mine was transferred to Thungela Resources Limited (Thungela) following the demerger of Anglo American's thermal coal operations in South Africa (Anglo American, 2021). It is understood that the mine formally began trading under Thungela in March 2022. Mining operations at Thungela have a lifespan of around three years as of 2022.

The Goedehoop Colliery, which is a combination of two existing collieries – namely Goedehoop North and Goedehoop South – predominantly exports coal through the Richards Bay coal terminal. However, no mining operations have occurred in the Goedehoop South area since December 2019 as it was considered a high-cost operation (Jeffrey, 2021; Cutifani, 2021). In addition to coal mining operations, the mine also houses a beneficiation plant: this enables single-stage washing of higher-grade coal to maintain its quality (Jeffrey, 2021). As such, the Goedehoop Colliery is expected to continue as an important contributor to the Komati PSA in terms of employment.

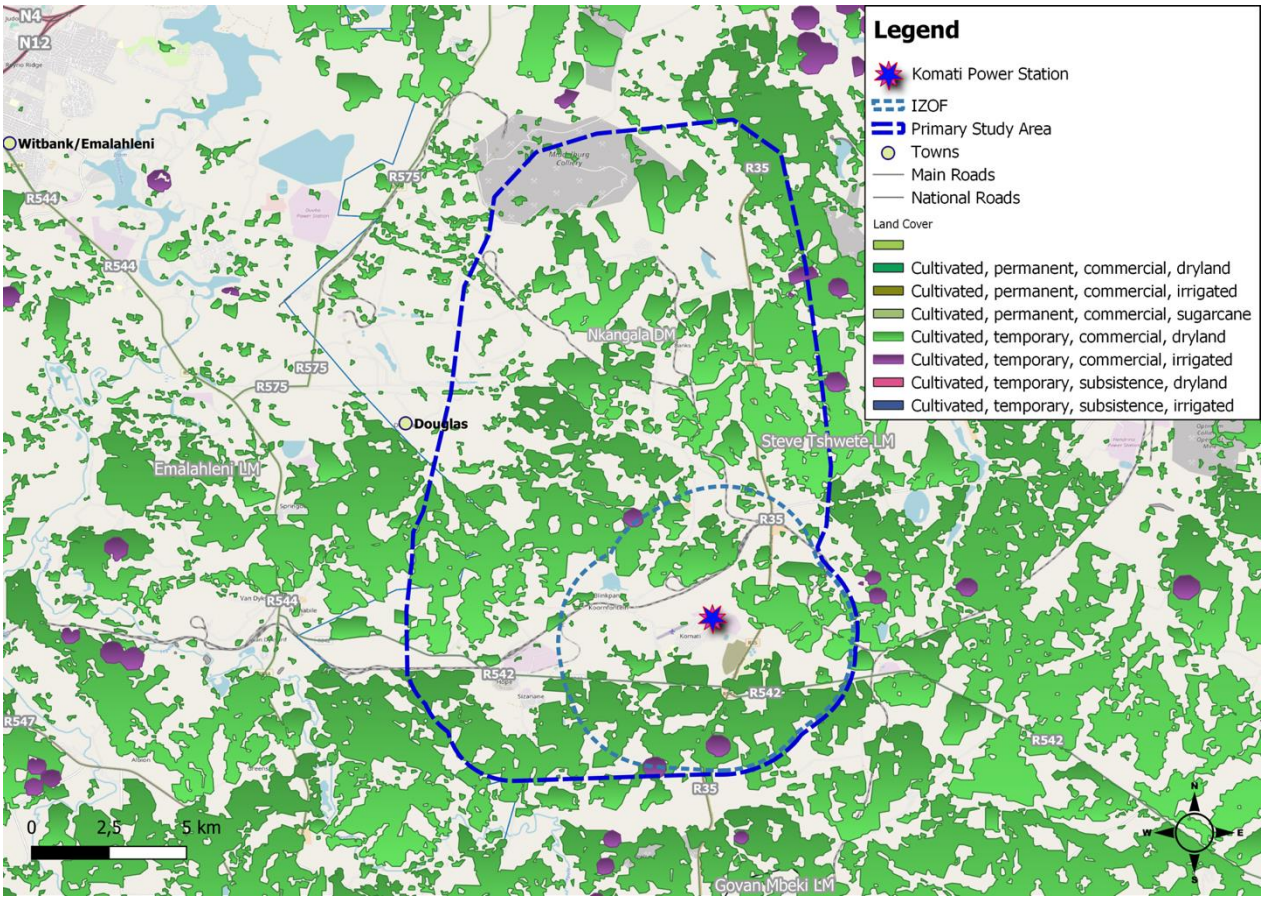
Picture 3.2: View of Goedehoop Mine from Komati Village

Coal mining operations at the at the Gloria section of the Koornfontein mine commenced in early 1991, with coal from the Blinkpan section being crushed, screened and washed before being transported to the KPS by rail. In February 2018, the Koornfontein mine entered into business rescue after the Bank of Baroda announced its withdrawal from South Africa (Khumalo, 2018). However, in October 2019, the mine was bought by Black Royalty Minerals (BRM) for R300 million after the initial successful bidder failed to raise the necessary funds. BRM secured approvals from both the Competition Commission and the Minister for the acquisition of the mine in August 2020. In October 2020, it was reported that operations at the Koornfontein mine would commence after contractual matters with Eskom were resolved (Creamer Media, 2020).

There are areas within the PSA where silver ore may be extracted. These include portions of land east and southeast of KPS that are located near the PSA and are adjacent to the R35 and R542.

3.4.4.2 Agricultural resources profiling

Map 3.10 depicts the richness of agricultural resources and land capability in the area surrounding KPS. Vast portions of land in the PSA have the potential for cultivation. Most of the agricultural activities undertaken in the area are done on a commercial scale, albeit on dryland. There are few portions, however, on which irrigated commercial farming is undertaken. Considering that the area has potential for agricultural production, there is also an opportunity to introduce or enhance agro-processing activities.



Map 3.10: Agricultural resources in Komati PSA

3.4.4.3 Tourism resources profiling

Little or no tourism activity could be identified in the area. Therefore, tourism-related opportunities may be considered for development of the area – but are likely to be limited.

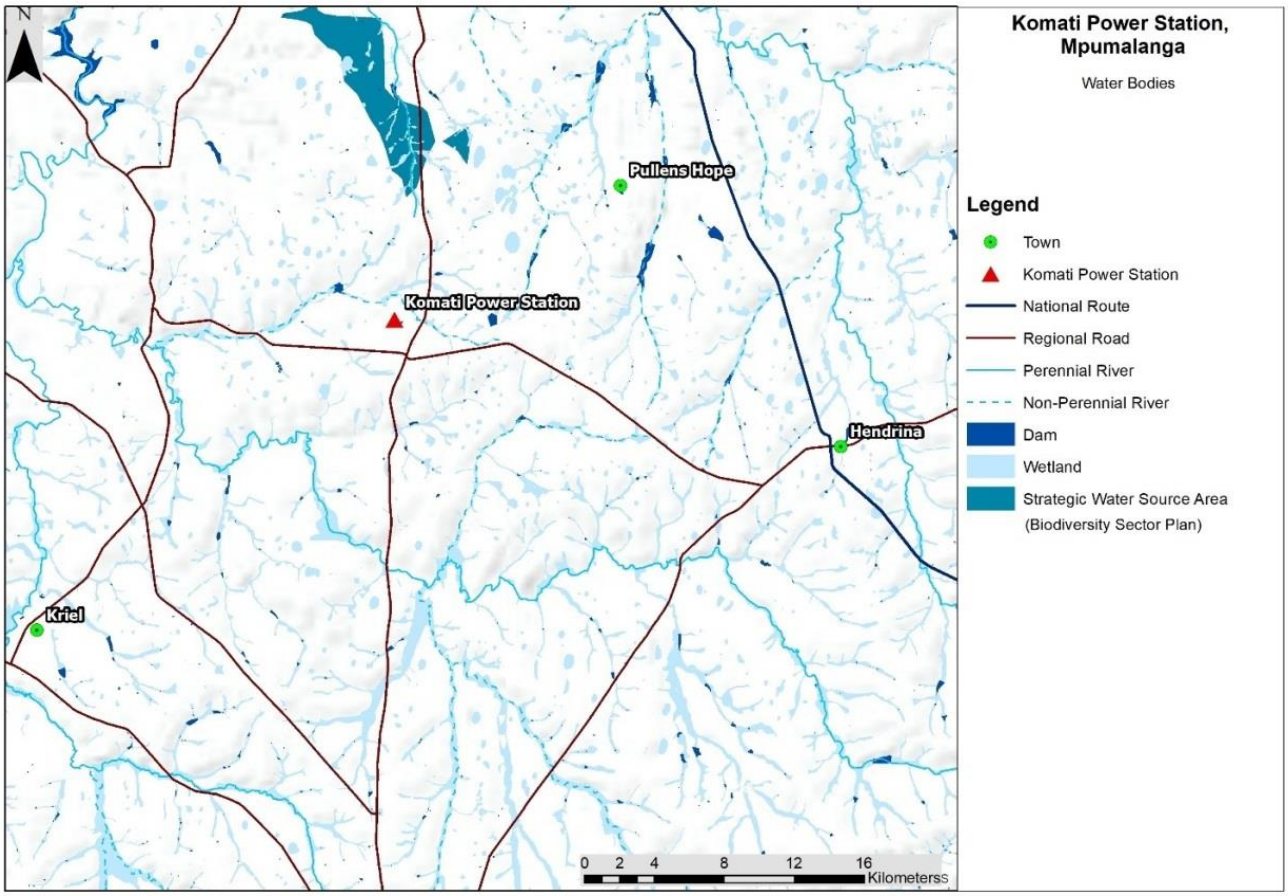
Picture 3.3: Lakama Guest House, Komati Village

3.4.4.4 Water resource profiling

KPS is located within the Olifants River Water Catchment. About 42% of the land area in the Olifants River Water Catchment is officially classified as endangered or vulnerable. Various water bodies are present within the area surrounding KPS, including perennial and non-perennial rivers, wetlands, dams, and a strategic water source area.

Raw water for KPS is obtained from the Nooitgedacht Dam (with a capacity of 78 477 m^3) on the Komati River. Water is pumped a distance of 64 km to reservoirs at Klipfontein from where it is pumped to the power station. The water is treated by KPS to potable water standards as well as demineralised for use in power production.

Development opportunities in the KPS area will be dependent on the availability of water from the Olifants River Catchment as well as from neighbouring catchments (i.e. Inkomati). The availability of the water resource will also present challenges in terms of development should it not be available.

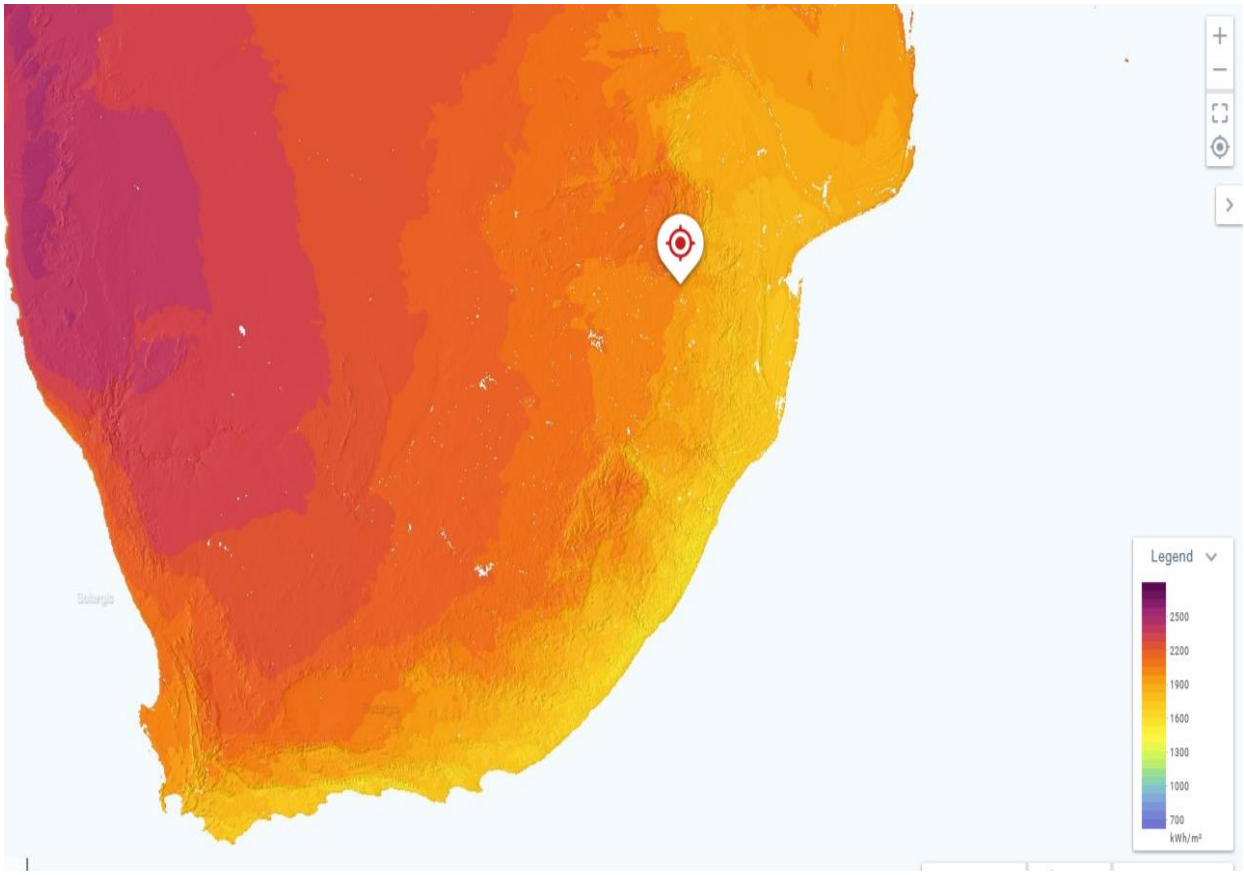


Map 3.11: Water bodies within the KPS PSA

3.4.4.5 Solar resources profiling

The horizontal irradiation (HI) value of the general area surrounding KPS is 1 981 kilowatt hours (kWh). This HI falls within the moderate ranges compared to areas in the Northern Cape, which are often said to have the best solar resources in the country.

HI is the total amount of shortwave radiation received from the sun by a surface horizontal to the ground and is of particular interest for photovoltaic installations. Given the potential of the solar resource in the area, the use of solar energy technology for development may be considered.



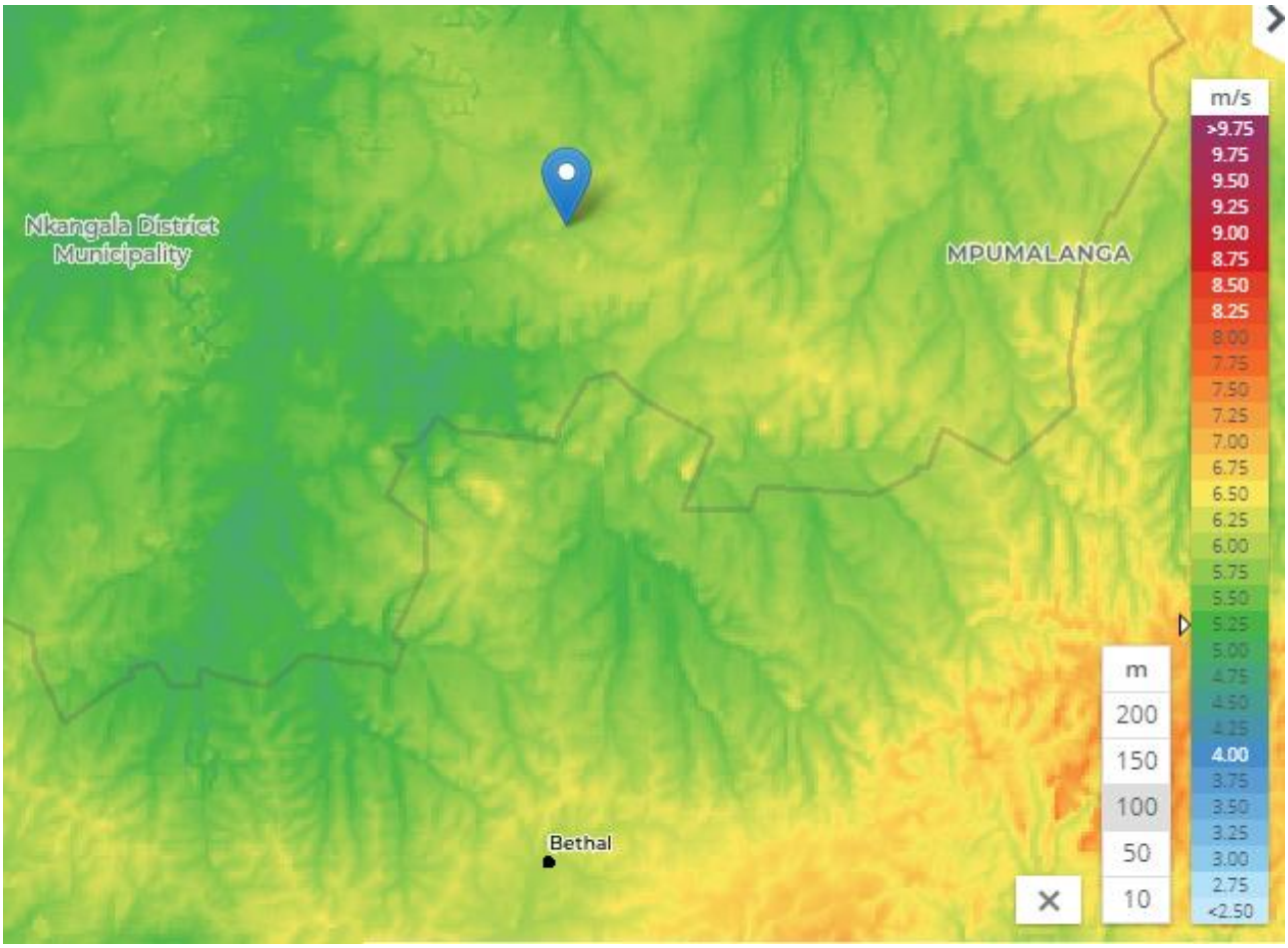
Map 3.12: HI values in the KPS PSA (Source: Global Solar Atlas (https://globalsolaratlas.info/map))

3.4.4.6 Wind resources profiling

Mean wind speed is a measure of the wind resource. Higher mean wind speeds normally indicate better wind resources. As indicated in Map 3.13, the wind resource of the area falls within the lower range of the scale at 5.25 metres per second (m/s), suggesting a limited potential to harness wind resources in the area of KPS. However, the presence of the wind resource will have to be confirmed through wind monitoring and wind data collection.

According to VPC (2021), wind resources in the Komati area are estimated at 6.5 m/s as an annual average at 100 m height.[9] The use of the wind resource for the development of a wind energy facility will have to be determined from a technical and feasibility perspective, including the availability of a feasible grid connection.

[9] Wind speeds below 6.0 m/s at a height of 100 m may render wind energy unviable. Wind speeds up to 7.0 m/s at a 100 m height are considered as the most promising given that they have the most viable output. However, large rotors would still be required to provide good production throughout the year and for all wind speeds. Wind speeds in excess of 7.0 m/s are only considered useful when they are sustained throughout the year (VPC, 2021).



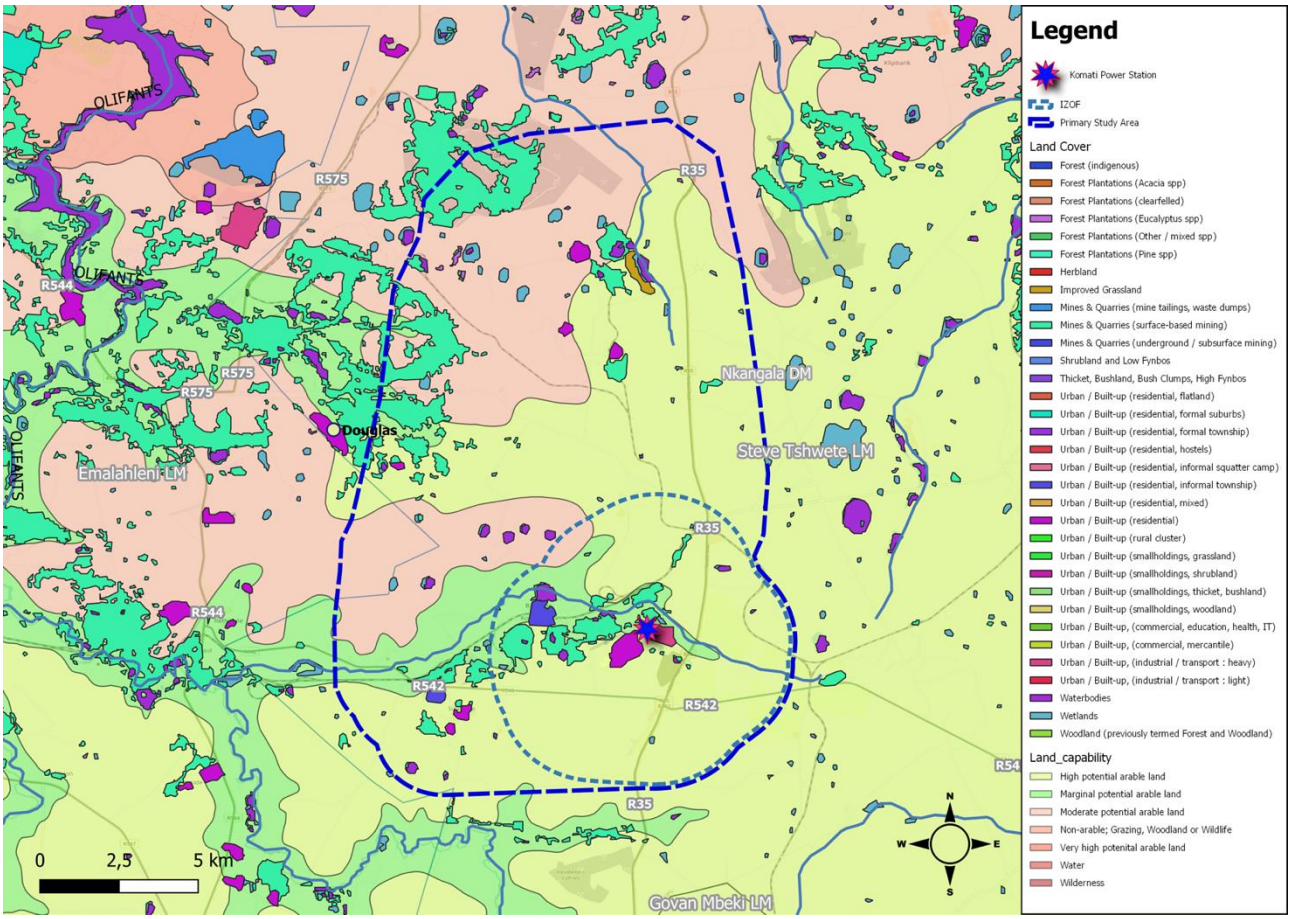
Map 3.13: Wind speeds in the KPS PSA (Source: https://globalwindatlas.info/map)

3.4.4.7 Land-use profile

North of the PSA (north and east of Goedehoop North) is an area with moderate-potential arable land. This is similar to the portion of land east of Goedehoop South. Although the belt that lies east of the power station has marginal-potential arable land, most of the PSA has high potential for cultivation.

Map 3.14 depicts land uses within the PSA, clearly indicating that mining and quarrying activities are dominant, particularly to the east of the power station and in the northeastern part of the PSA. Small pockets of urban land use are also observed in the PSA, comprising primarily residential and industrial uses.

An analysis of the land capability and land use considerations shows that mining and quarrying activities have transpired in areas that have at least moderate-potential land. Although mining activity has contributed to the economic output, it has also contributed to loss of income from agricultural activities that could have taken place.



Map 3.14: Land uses in Komati PSA

3.4.5 Social and cultural capitals profile

This section discusses the social and cultural capitals of the Komati PSA, describing first the demographic profiles of the key settlement areas, then the cultural and social profiles.

3.4.5.1 Demographic profile

Population and household numbers, including household size

Based on Census 2011[10] data, the Komati PSA had a population of just over 3 000 individuals a decade ago. Most of the persons within the PSA resided in Komati Village in 2011. The changes in the demographics of the main settlements within the PSA are examined further below.

[10] Census 2011 data was used due to the unavailability of more recent ward-level data when the baseline was developed.

Table 3.1 illustrates the demographic profiles of the main settlements. The variables of interest that are represented as per Census 2011 are the population, number of households and average household size.

Table 3.1: Demographic profile of Komati PSA (2011)

PSA settlement	Population	Households	Household size
Komati Village	1 207	640	2.5
Blinkpan	1 821	445	2.5
Total	**3 028**	**1 085**	

Source: Adapted from Statistics SA (2012)

The Blinkpan settlement has the largest population size of the aforementioned main settlements within the PSA. However, it has a smaller number of households than Komati Village. The Komati and Blinkpan settlements each have an average household size of 2.5 persons per household. Overall, 3 028 individuals resided in both settlements in 2011, which had a collective total of 1 085 households.

Racial grouping and spoken language

The majority of persons residing within the PSA are Black Africans, followed by White individuals. Engagements with community representatives revealed that the area also houses a small number of people of Indian and Asian descent. The majority of persons within the Komati PSA speak mostly isiNdebele and isiZulu. The third most common language in the area is Afrikaans, followed by English. In addition, some residents speak siSwati or isiXhosa.

Gender distribution

Table 3.2 depicts the gender distribution in the main settlements within the Komati PSA as reported in Census 2011.

Table 3.2: Gender profile of Komati PSA (2011)

PSA settlement		Male	Female	Male: Female Ratio
Komati Village		1 052	769	1.37:1
Blinkpan		729	478	1.52:1
Total	**%**	**58.8%**	**41.2%**	**1.43:1**
	Number	**1 781**	**1 247**	

Source: Adapted from Statistics SA (2012)

At the time of Census 2011, there were more males than females in the area, with an average male-to-female ratio of 1.43 to 1 (i.e. 143 males for every 100 females). Blinkpan had the highest male-to-female ratio despite its size. The above ratios, given the larger prevalence of males versus females, reflect the extent to which the settlements are largely linked to the mining operations and host workers who migrate to the area for purposes of finding employment in the mines.

Representatives of the local communities suggest that the distribution between males and females may have become more even since 2011 due to the closure of mining operations. Other community members suggest that there is an equal distribution between males and females in the PSA. Importantly, a significant shift in the area in terms of gender distribution is apparent and the 2011 status quo no longer stands.

Age distribution

The age profile of the Komati PSA is reflected in Table 3.3. Most individuals in the Komati PSA were of working age (15 to 34 years old) at the time of Census 2011. The group of persons who are no longer youths but not yet retired (35 to 64 years old) represent the second largest category of the population in the area.

Table 3.3: Age profile of Komati PSA (2011)

PSA settlement		Babies and toddlers (under 4 y.o.)	School going age	Youth (15-34 y.o.)	Adults (35-64 y.o)	Retirement age (>65 y.o.)	Total
Komati Village		5.8%	11.0%	39.2%	38.4%	5.6%	100%
Blinkpan		6.1%	11.0%	42.2%	39.6%	1.1%	100%
Total	**%**	**6.0%**	**11.0%**	**40.7%**	**39.0%**	**3.4%**	**100%**
	Number	**180**	**333**	**1 232**	**1 181**	**101**	**3 028**

Source: Adapted from Statistics SA (2012)

The above suggests that the working-age population remains the dominant group among the persons residing within the PSA, pointing to the availability of labour as a factor of production in the area.

Income levels

Based on the household survey, it was established that about 16.3% of households had a total monthly income of R7 501 to R12 500. The second-largest income group (13.8%) earned an income of R15 001 to R20 000; this was followed by households earning an income ranging from R12 501 to R15 000 (12.5%).

Of the households that were surveyed, 51.3% indicated that they relied on earned income only (salaries or wages). About 11.3% relied on both earned income and self-employment income, while 8.8% indicated that they relied on income from self-employment only. Other sources of income mentioned were grants (3.8%), spousal maintenance and grants (2.5%), and remittances from friends and family members living outside the area (1.3%), all comparatively smaller sources of income.

3.4.5.2 Cultural profile

Discussions with community representatives indicated that most household heads are aged 35 to 44. However, a few households are headed by persons aged 45 to 54, 55 to 64 and at least 65 years old. Although the gender split in the communities may appear to be balanced, males account for the largest proportion of household heads in the PSA. Nonetheless, stakeholder engagements revealed that there are several female- and child-headed households in the area.

Community representatives indicated that most of the community members have been residents of the PSA for over 25 years. Some families have been in the area for at least 16 years. This, coupled with the fact that a significant portion of the population appears to be in the youth age bracket, suggests that many of the young individuals residing in the area were born in the PSA and have remained there with their families for their entire lives.

Heritage sites in the PSA include KwaMophila, graveyards in the Geluk and Komati farm areas, the Koornfontein and De Beer farms, and the power station. It is a practice for some community members to communicate with their ancestors and the deceased at graveyards. Other traditional ceremonies and events

are also held in the community. Community representatives noted that most of the traditional events held are linked to the Ndebele heritage/culture. Certain representatives raised concerns about how other cultures are not embraced in the community.

3.4.5.3 Social capital

Most of the community representatives suggested that several communities in the PSA are deeply engaged with one another. The means of engagement in most cases include sporting activities. Main sporting activities hosted in the area include soccer/football, netball and volleyball.

Given the above, an opportunity exists in the communities for sports talent recruitment, particularly for the youth who wish to pursue a career in sports. The area has sporting infrastructure, as shown in Picture 3.4, which is privately-owned and therefore not maintained by the local municipality. The sporting infrastructure requires an upgrade.

Picture 3.4: A soccer field and basketball court in Komati Village

3.4.6 Human capital profile and supported facilities

The following subsections explore the human capital profiles in the PSA and the facilities that are currently accessible by communities.

3.4.6.1 Education

Levels of education

Table 3.4 illustrates the education profiles of the main settlements in the PSA as per Census 2011 data.

Table 3.4: Education profile of Komati PSA (2011)

PSA settlement		No schooling	Some schooling	Matric	Higher education	Other/ Unspecified	Total
Komati Village		2.4%	38.9%	36.0%	10.7%	12.1%	100%
Blinkpan		3.7%	45.3%	34.3%	6.9%	9.8%	100%
Total	**%**	**3.1%**	**42.1%**	**35.2%**	**8.8%**	**11.0%**	**100%**
	Number	**92**	**1 275**	**1 064**	**266**	**331**	**3 028**

Source: Adapted from Statistics SA (2012)

The education profile was based not on the entire populations of the settlements but rather on the proportion of the populations eligible to have accessed education in the past years.

Based on Census 2011 data, most of the persons within the PSA had some level of schooling, with those residents having at least some primary education with certain persons going on to secondary education – but not completing matric. The second largest group of the population had completed matric. While about 8.8% of the population had higher education, the smallest proportion (3.1%) of the population had no schooling.

Access to education facilities

There are two primary schools located close to the power station and one combined school in Goedehoop North, which is further north of the power station. The primary schools in the PSA are Blinkpan Primary School and Laerskool Koornfontein (see Picture 3.5 below). During the stakeholder engagements, it was established that the two schools have one group/class per level and one qualified teacher per level from Grade R until Grade 7.

Picture 3.5: Laerskool Koornfontein, Komati Village

In the past, the area also had a privately-owned Wonderland Preschool. The school has been closed for some time and, as depicted in Picture 3.6, its condition has deteriorated. The property is available to be used to facilitate human capital development but will require significant investment to make it suitable for operations.

Picture 3.6: Wonderland Preschool, Komati Village

Through engagements with community representatives, it was established that most of the communities also have early childhood development (ECD) centres. While some families utilise the ECDs in the area, others rely on relatives (particularly aged family members) and friends for daycare. Although confirming the total number of ECD centres in the areas was not possible, it was established that each community in the PSA has two to five ECD centres on average.

Community representatives shared concerns regarding the number and state of ECDs. It was expressed that more ECD centres should be established, particularly in communities that are on the outskirts of Komati Village. The lack of ECDs in the PSA is one of the main reasons why some families rely on relatives who are no longer economically active for daycare. It relieves the household of having to spend funds on transport needed to take children to ECDs. In addition, some of the households cannot afford the fees for daycare.

There are no Technical Vocational Education and Training (TVET) and community colleges located in the PSA. The absence of a TVET institution or community college could be a contributing factor towards fewer persons having achieved higher education in the area.

3.4.7 Employment and skills profile

3.4.7.1 Skills profile

Skills profile information was derived from the household survey that was conducted in Komati Village. Most of the women who participated in the survey indicated that they were both low skilled and unemployed and described themselves as housewives. Some of the skills that stood out from the household survey in the IZOI relate to occupations such as catering (i.e. cooking skills), electricians, and welders.

The second prominent skill set tier included cleaning, managerial, and supervisory skills (particularly in the mining, construction, and scaffolding operations); pipe fitting; and awareness of safety, health and environmental hazards. According to the survey, there is also a group of general workers who are presumably low-skilled. Other skills listed in the survey included security, administrative and cashier proficiencies.

3.4.7.2 Employment profile

Employment status

Employment is the key means by which people earn income to make a living. Table 3.5 outlines the working-age population, employed residents and unemployed persons as per Census 2011.

Table 3.5: Employment profile of Komati PSA (2011)

PSA settlement		Working-age	Employed	Unemployed	Unemployment rate
Komati village		1 515	884	92	6.1%
Blinkpan		1 000	544	96	9.6%
Total	**%**	**83.1%**	**47.2%**	**7.5%**	
	Number	**2 515**	**1 428**	**406**	

Source: Adapted from Statistics SA (2012)

Approximately 83.1% of the population in the PSA were of working age in 2011 (2 515 out of 3 028 persons), with the majority of working-age individuals residing in Komati Village. On average, the PSA had an unemployment rate of approximately 7.5% (as a percentage of the working-age population), with Blinkpan having the highest unemployment rate (9.6%) during the year. It is important to note that these figures exclude discouraged job seekers.

Sector of employment

Table 3.6 differentiates between persons working in the formal and informal sectors as per Census 2011. The population of people described below includes the employed but excludes private households and individuals who would not disclose their employment status.

Table 3.6: Employment sector of Komati PSA (2011) excluding private households and unspecified

PSA settlement		Formal	Informal	Formal to informal ratio	Total
Komati Village		682	76	8.97:1	758
Blinkpan		385	52	7.40:1	437
Total	**%**	**74.7%**	**9.0%**	**8.34:1**	**1 195**
	Number	**1 067**	**128**		

Source: Adapted from Statistics SA (2012)

In total, 1 195 persons were classified as employed in the formal or informal sector (excluding private households and unspecified) in 2011. Approximately 7 in 10 individuals who had jobs were employed in the formal sector, while the rest engaged in informal activities to earn income. This shows that in 2011 the communities within the PSA relied primarily on formal employment opportunities created in the area. However, this was before the closure of the Koornfontein mine, which has drastically worsened prospects for employment in the area. The resumption of activities at the Koornfontein mine will likely increase the number of available employment opportunities.

Place of employment

A follow-up discussion was done with community representatives regarding the employment dynamics in the PSA. It was established that the major employers in the area are Eskom (power generation), the mining sector, and farms. Other employers in the area include the retail and trade sector, personal services (such as salons and cleaning services), and the municipality. In addition, some individuals are employed by private households.

3.4.8 Financial and economic profile

The local economy of the PSA has been sustained through activities and linkages that have been established through the presence of the power station, mines and agricultural activities. Engagements with some of the businesses operating in the area (particularly in Komati Village) indicated that the buying power of households within the PSA sustains many businesses, although these enterprises also have customers beyond the immediate town/communities.

Picture 3.7: Businesses in Komati Village

There are a few exceptions where some businesses primarily rely on income from individuals residing outside the PSA. Examples include guesthouses that offer accommodation to persons visiting the area. Important to note is that Eskom employees, particularly from the neighbouring power stations, are the most important clients for some of the guesthouses in the area.

A common sentiment shared by the local businesses surveyed is that revenue and markets for businesses in the various sectors have either remained the same or declined in the last few years. Furthermore, the businesses anticipate that the situation will worsen in the near future.

Due to a perceived lack of opportunities in the area, businesses with access to finance are considering either relocating or opening new branches/operations in other (neighbouring) areas/regions. However, not all businesses, especially start-ups, can exercise this option. While certain businesses highlighted the need for skills training and recommended this as an opportunity to be explored, others indicated that their operations would be sustainable if the power station continued to operate.

As indicated earlier, businesses that contribute more towards the local economy in terms of employment generation and livelihoods operate in the mining and agricultural sectors. Community representatives indicated that construction activities as well as the transport and accommodation sectors also create jobs.

3.4.9 Built capital profile

3.4.9.1 Residential dwellings profile

Dwelling types

Based on Census 2011 data, nearly all of the dwellings in the Komati PSA were considered formal dwellings such brick/concrete houses and flats or apartments. In Komati Village and Blinkpan, formal dwellings constituted 92.2% and 95.3%, respectively, of all dwellings. No dwellings were classified as traditional in Blinkpan, while 0.8% was classified as such in Komati Village. Furthermore, informal housing made up 2.7% and 0.9% of all dwellings in Blinkpan and Komati Village, respectively, in 2011. Lastly, 2.0% and 6.1% of dwellings were classified as “other) in Blinkpan and Komati Village. These types of dwellings include, for example, caravans or tents.

Picture 3.8: Apartments in Komati Village

Ownership

Approximately 57.5% of households indicated that they owned the property in which members resided, while the remaining share of households (42.5%) rented the dwellings where they resided. The following reasons were cited for why some households opted to rent:

- Awareness of the high likelihood that the power station will shut down. Therefore, the households are prepared to relocate to other areas where they can sustain their livelihoods.
- Some of the households cannot afford to buy property.

3.4.9.2 Access to services profile

Access to basic services

Table 3.7 outlines the number of households with access to these services as per Census 2011.

Table 3.7: Access to basic services of Komati PSA (2011)

PSA settlement		Access to piped water	Access to electricity	Access to refuse removal	Access to sanitation
Komati Village		573	636	626	635
Blinkpan		**303**	**436**	**431**	**431**
Total	**%**	**80.7%**	**98.8%**	**97.4%**	**98.2%**
	Number	**876**	**1 072**	**1 057**	**1 066**

Source: Adapted from Statistics SA (2012)

Table 3.7 shows that nearly all the households in the PSA had access to electricity, refuse removal (having waste removed by a local authority at least once a week), and access to sanitation (a flush toilet connected to the sewerage system) in 2011. However, access to piped water by households in the PSA settlements was lower proportionally when compared to the other basic services provided.

Communities in the PSA are serviced by both local municipalities and Eskom. KPS produces drinking water, which is supplied in bulk to the main reservoirs in Komati Village. However, Steve Tshwete LM is responsible for the distribution network that provides water to households and businesses in Komati Village.

In terms of electricity provision, KPS supplies electricity to the municipal substation, and Steve Tshwete LM is responsible for domestic infrastructure and the supply of electricity to Komati Village. All the community representatives agreed that refuse removal and sanitation services were provided by the local municipality — for communities that had access to these services.

3.5 KPS contribution towards PSA and the region

The following subsection provides an overview of the direct contribution of the KPS to the Komati PSA in terms of employment, the procurement of goods and services, and the services provided by the KPS to communities within the Komati PSA.

3.5.1 Employment contribution of KPS

Table 3.8 indicates the employment contribution of KPS to the immediate PSA, the rest of Mpumalanga and South Africa overall with respect to permanent Eskom employees in 2020. From the Komati PSA, 41 individuals are employed by KPS, which is equivalent to 14.9% of KPS's total labour force. The vast majority of KPS's employment profile is composed of labourers residing elsewhere in Mpumalanga.

Table 3.8: Employment contribution of KPS in 2020 as provided by Eskom in 2021

Location	Number of individuals	Percentage of total
Komati PSA	41	14.9%
Rest of Mpumalanga	217	78.6%
Rest of South Africa	18	6.5%
Total	**276**	**100%**

Of the 276 permanent Eskom employees, 217 (78.6%) are from surrounding areas of Mpumalanga. The remaining 18 employees (6.5%) are from the rest of South Africa.

In addition to permanent Eskom employees, and based on data provided by Eskom in 2021, a further 534 people were working at KPS. Of these, 231 were employees of Eskom Rotek Industries (ERI) who were seconded to KPS for coal handling and other activities; the remaining 303 individuals were working on site through subcontracting arrangements. Therefore, a total of 810 individuals were working at KPS in 2020.

3.5.2 Procurement of goods and services by KPS

Figure 3.15 indicates the procurement locations of KPS in 2020. The procurement of goods and services by KPS amounts to approximately R1.6 billion per annum (excluding labour costs).

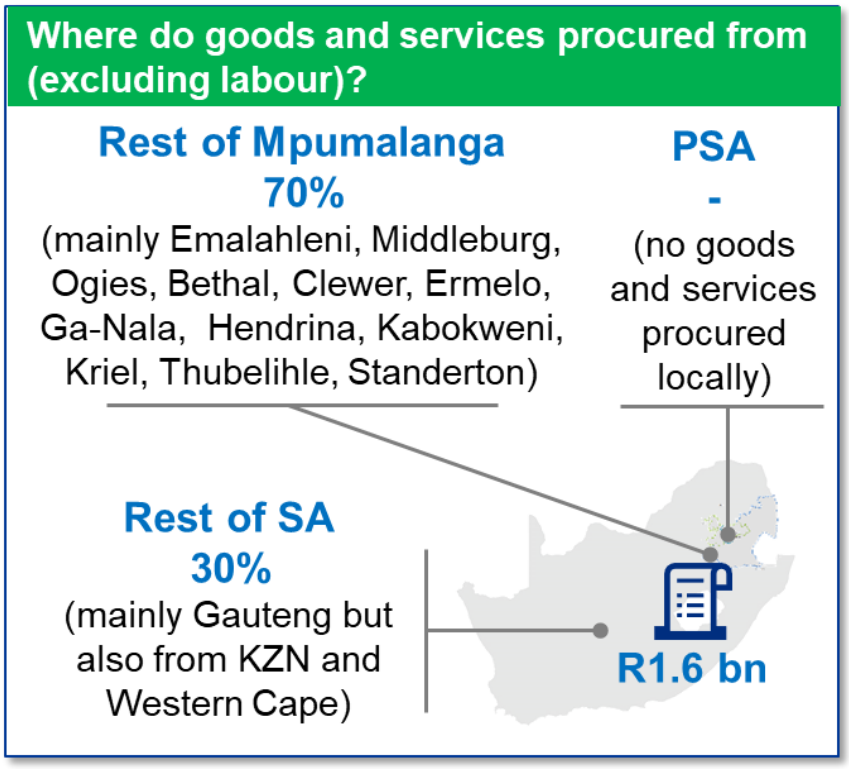


Figure 3.15: Procurement locations of KPS in 2020

Of this, 70% were sourced from Mpumalanga in 2020. The main procurement centres include eMalahleni, Middelburg, Ogies, Bethal, Clewer, Ermelo, Ga-Nala, Hendrina, Kabokweni, Kriel, Thubelihle and Standerton. The remaining 30% of goods and services are procured from the rest of South Africa, mainly from Gauteng, KwaZulu-Natal, and the Western Cape. No goods or services were procured from the Komati PSA in 2020.

3.5.3 Reliance on KPS for the provision of services

Through discussions held with the power station managers, it was established that KPS has a water purification facility and supplies water to some communities. This facility has a capacity of purification of 4.3 megalitres

per day (Mℓ/day) for potable water and 5.7 Mℓ/day for demineralised water. The following outlines the communities that receive water directly from the power station, with the quantities supplied:

- Komati Village – 45 Mℓ/month
- Lakama Group – 1.5 Mℓ/month
- Koornfontein mine – 8 Mℓ/month

Furthermore, KPS owns two properties located in Komati Village.

4 KPS HR COMPOSITION

According to Eskom's definition of the JET, the transition towards cleaner and greener energies involves the creation of employment opportunities for those displaced by the replacement of coal (Rambharos, 2020). Crucially, this necessitates an assessment of employees directly affected by the shutdown of coal-fired power stations to inform approaches to HR management. Therefore, the purpose of this subsection is to provide insights into the employment demographics of KPS to ultimately outline approaches to the management of employees required as part of the shutdown of KPS.

Employees in this regard include permanent employees at KPS, contractors, and those who form part of ERI. However, a distinction will be drawn between each employment category when management options are identified and discussed.

Note: Data presented in this section refers to 272 permanent employees at the power station rather than the 276 permanent employees referred to in the previous and next section. This discrepancy is due to the revised data supplied by Eskom in 2022, which took place after the modelling of the potential economic impacts had been completed.

4.1 KPS HR profile

4.1.1 Employee demographics

The evaluation of KPS employee demographics includes indicators such as bargaining power, age, gender and marital status. The determination and subsequent implementation of HR management options will rely substantially on the demographics of KPS employees and various social dynamics such as the varying number of dependents between males and females, ease of relocation variations between age groups, etc. The data used below reflects 2020 statistics in alignment with the impact modelling section and will be, in some instances, compared to 2021 data.

4.1.1.1 Size and split of KPS labour force

To allow for adequate planning and preparation for the shutdown of KPS, it is necessary to determine the number of employees that are employed on a permanent basis, as contractors or who fall under ERI (which also separates employees on a permanent employee or contractor basis). This will allow for an indication of the number of employees who may require redeployment, upskilling/reskilling, etc. It is important to note that Eskom has emphasised that no employee will be forcibly discharged as a result of the KPS shutdown.

As of 2020, KPS employed 272 permanent Eskom employees, 231 ERI employees (who can also be separated into permanent individuals and contractors), and 303 contractor employees, totalling a labour force of 806 employees. As of August 2021, the total number of permanent employees had decreased to 234, while the number of ERI employees had decreased to 210 and contractor employees to 292.

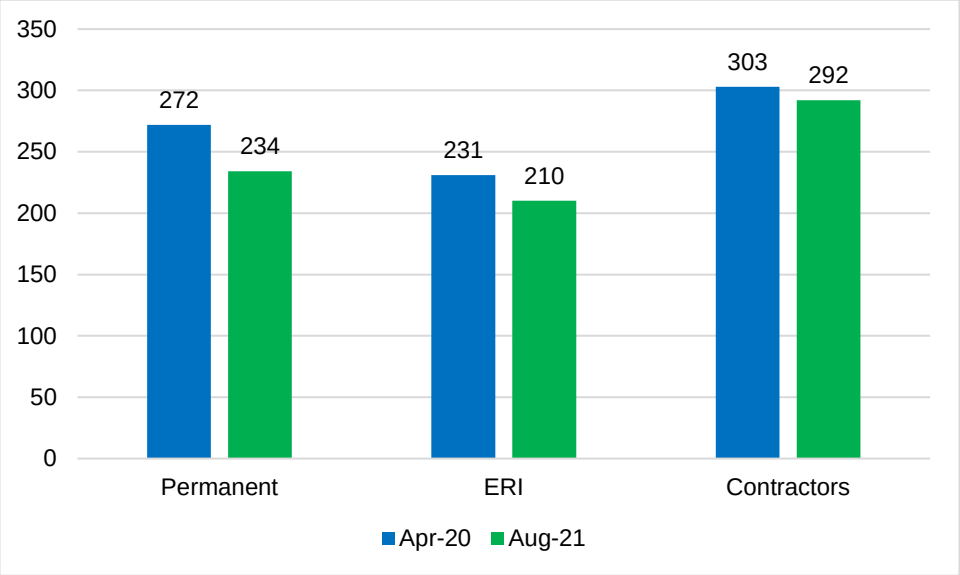


Figure 4.1: KPS staff distribution

Permanent Eskom employees are to be employed in repowering and repurposing (R&R) initiatives (e.g. as operators or technicians in green technology solutions) or may be redeployed to other generation stations. ERI employees may, for example, be redeployed to other operating power stations. As mentioned, the purpose of evaluating the classification of the workforce at the power station (i.e. Eskom permanent, ERI or contractors) is vital in determining the adequate implementation of approaches to minimise the impact on employee livelihoods in accordance with JET principles. Note that approaches to HR management are discussed in greater detail in another section.

4.1.1.2 Age and gender distribution by employment category

HR management approaches require an evaluation of the age and gender demographics of KPS employees. The rationale thereof is to take into consideration the varying impact of the KPS shutdown on, for example, males versus females or individuals of different ages. Younger individuals tend to be more mobile and would thus be easier to redeploy, while placing older individuals on early retirement may not yield significant savings. However, older individuals may be more skilled and useful in repowering options. Furthermore, whether an individual is male or female may correlate with the number of dependents or the ease with which the individual may be relocated. Ultimately, the purpose is again to inform and facilitate HR management options devised by Eskom according to the demographic segmentation of KPS employees.

Of the 272 individuals permanently employed at KPS in 2020, 159 were male (52%) and 113 (48%) female. Of the ERI staff, the majority of the employees were male (accounting for 167 individuals), while 64 (28%) were female.

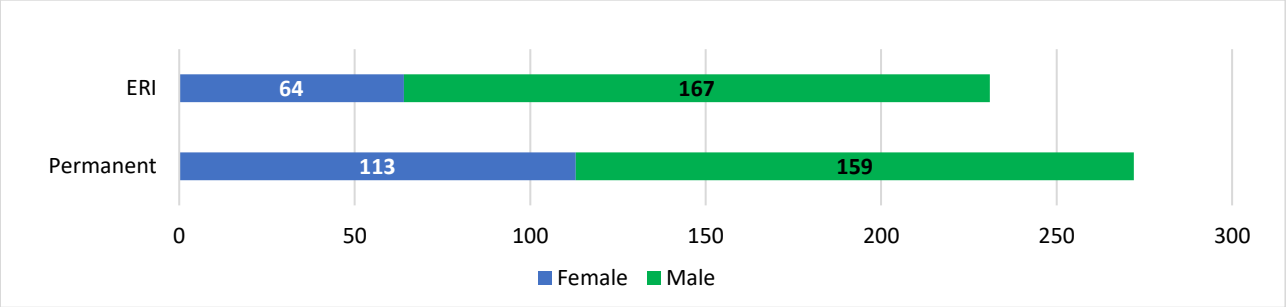


Figure 4.2: KPS employee gender distribution by employment category, 2020

As of August 2021, these numbers had decreased. For permanent employees, there was a decrease to 139 males (59%) and 95 females (accounting for 41% of the permanent labour force).

As indicated in Figure 4.3, the majority of the permanently employed staff (68%) were aged 35 to 54. The youth made up approximately 27% and 14 individuals (5.2%) were either close to retirement age or had already attained pension age. The largest proportion of KPS's permanent staff were individuals aged 30 to 45, which makes up the productive and experienced age group. This implies that this proportion of workers may be reutilised for renewable energy options considered for the KPS site or options related to plant preservation post-shutdown.

The majority of ERI employees (49%) were aged 35 to 54, with a minority group (7%) close to or within pension age (55 and above). However, the youth category among ERI workers (43%) constituted a larger share when compared to permanent employees (27%).

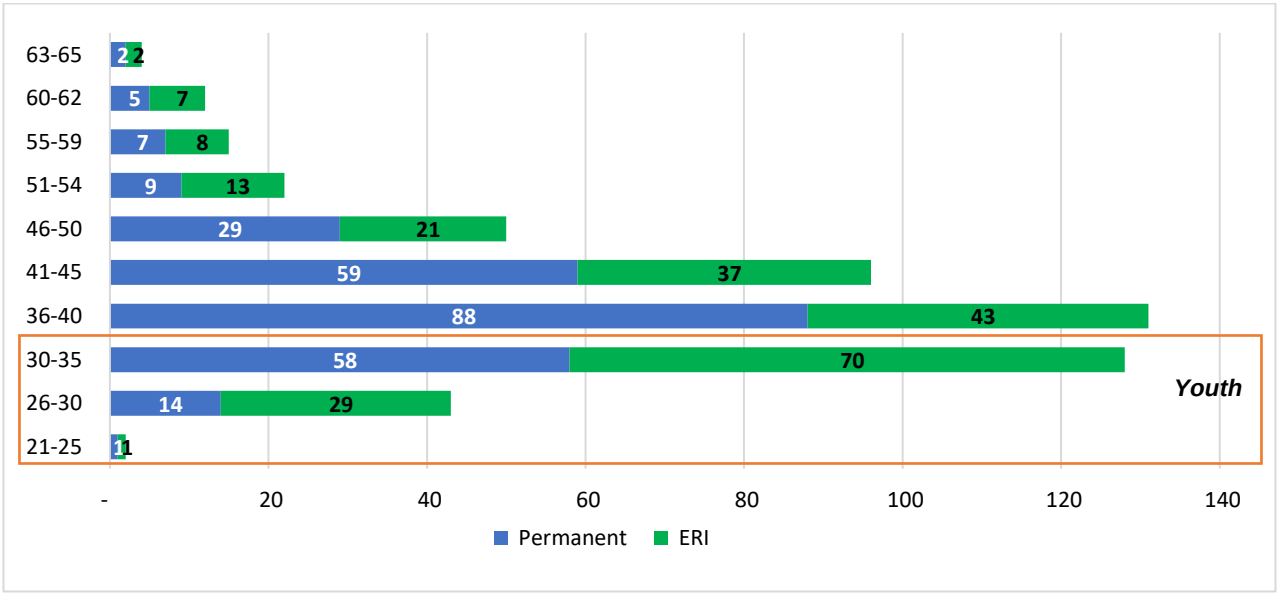


Figure 4.3: KPS employee age distribution by employment category, 2020 *(Note: 21-34: youth; 35-54: experienced; 55-59: close to pension age; above 60: pension age)*

Despite the decrease in employment numbers in 2021, the dynamics remained the same. That is, the largest group remains individuals aged 30 to 45, and the minority group consists of those either close to pension age or those who have already attained pension age. For permanent employees, the youth account for 21%, the experienced (35 to 54 years) account for 74% and the minority group 5%. For the ERI employees, the youth account for 32%, the experienced account for 60% and the minority group 8%.

As the majority of the KPS labour force is still well below the pension age, careful consideration must be given to redeploying the affected individuals to other positions or to providing the necessary training opportunities. Since younger individuals are more mobile and seeking to establish themselves in their careers, offering opportunities to these individuals to redeploy to other power stations should prove a strong incentive. Furthermore, as individuals who are either close to pension age or who have already reached pension age do not constitute a large segment of the KPS employee base, offering them early retirement to reduce employee numbers would not yield large savings.

4.1.2 Employee experience and skills

Years of service of KPS employees is indicative of levels of experience and, more importantly, skills. Therefore, years of service (and thus experience or skills) may be critical in allocating individuals towards redeployment or repowering alternatives. Essentially, individuals with extensive years of experience may be considered attractive alternatives for other vacancies in Eskom or may prove vital in repowering options given their respective skill sets. Furthermore, a skills audit may inform required skill interventions for employees to successfully implement the JET.

4.1.2.1 Function of employees by gender

The main job clusters among the permanent Eskom staff were inspectors (46 individuals), officers (39), and controllers (32), constituting approximately 60% of the permanent labour force. Similar trends applied to both genders, with most males working as inspectors (31 individuals), controllers (25), officers (17) and technicians (17). These employees accounted for 56% of the male staff.

A slight difference is identified for females who were mostly employed as officers (22), inspectors (15), operators (13) and technicians (10). These employees constituted just over 53% of the permanent female labour force. Figure 4.4 illustrates the distribution of the labour force across various clusters, while Figure 4.5 illustrates the gender distribution across the same clusters.

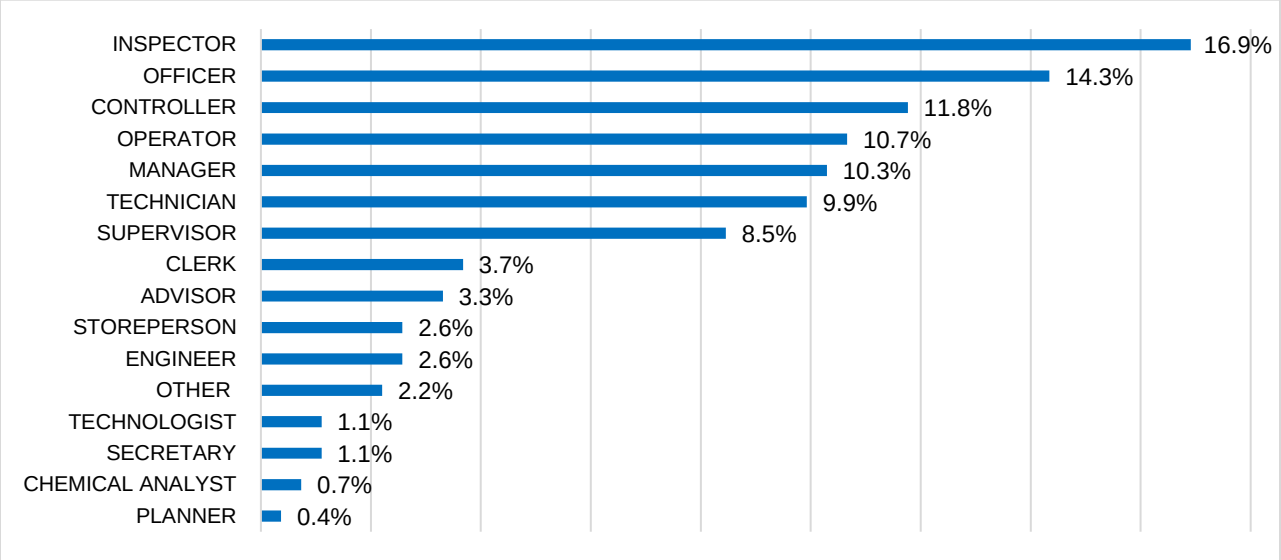


Figure 4.4: KPS permanent Eskom employees per job cluster, 2020

The 2021 data reflects similar trends where the same job clusters have remained the main employers. Nonetheless, there has been a decrease in the number of people employed in these clusters. Officers decreased by 11, controllers and supervisors decreased by six each and operators decreased by four. Other clusters reduced by at most three employees.

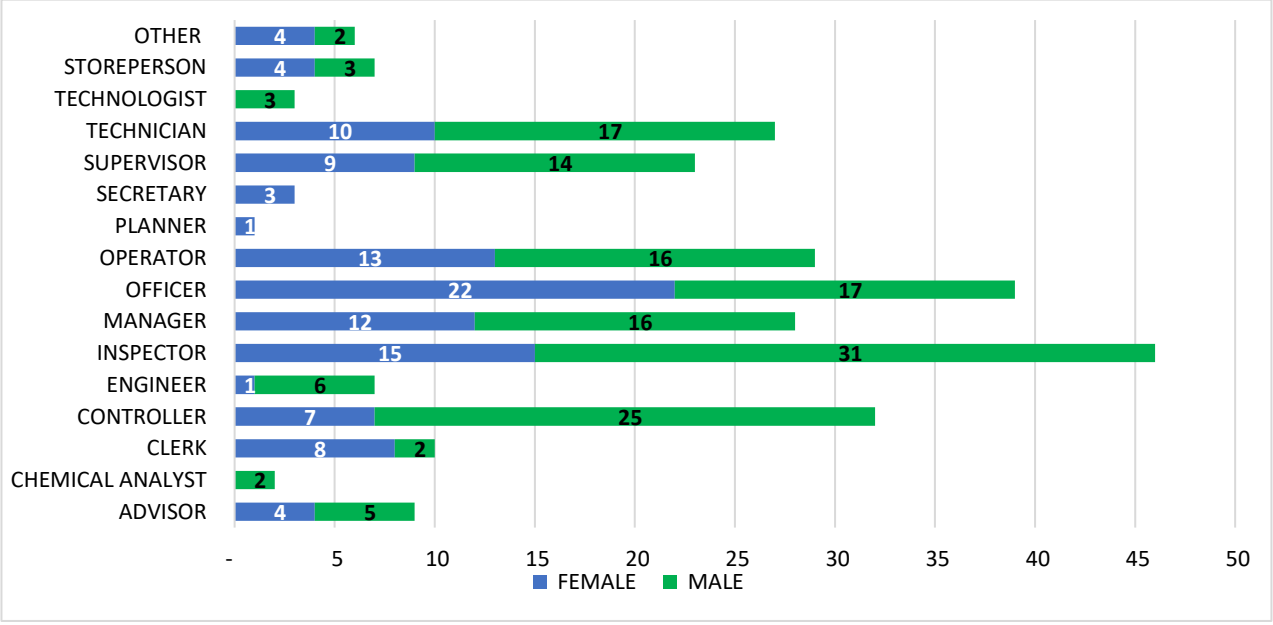


Figure 4.5: Job clusters of Eskom permanent employees by gender, 2020

Figure 4.6 demonstrates the distribution of the ERI labour force. Operators formed the largest job cluster, with 77 employees holding that position (of which 60 were males). Other clusters with significant numbers of employees included utilitymen (33), general workers (27) and artisans (23), encompassing almost 70% of the ERI labour force. As of 2021, significant changes included a decrease in operators (13), supervisors (4) and utilitymen (5), while artisans increased by two individuals.

Since the majority of the KPS Eskom permanent labour force is relatively isolated in three of the employment areas, the redeployment of affected labourers to other employment roles may require additional training and skills development. This also needs to be considered against the repowering options considered for the KPS site. Nonetheless, most of the clusters can be reused in clean energy technologies. This would include clusters for technicians, operators, controllers, supervisors and engineers.

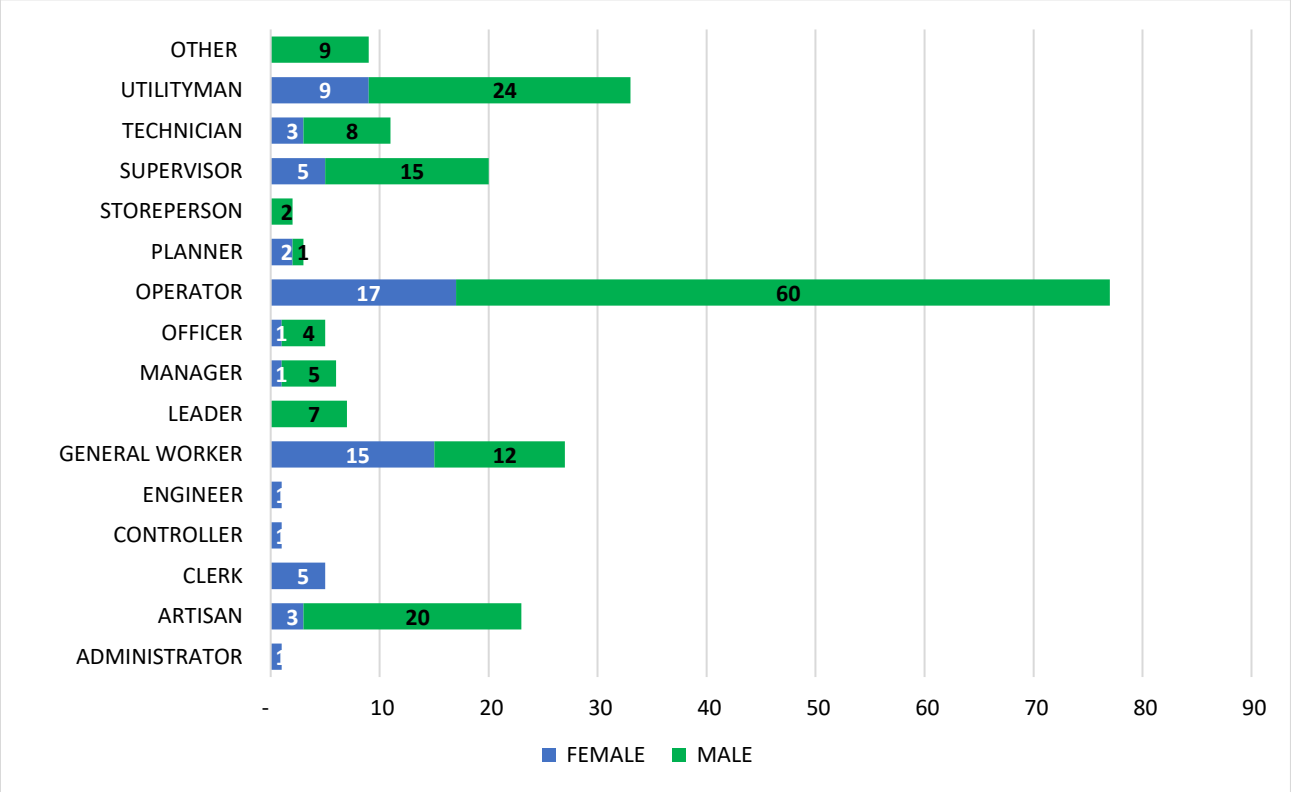


Figure 4.6: Job clusters of ERI employees by gender, 2020

4.1.2.2 Years of service and age

Figure 4.7 illustrates the average years of service and the average age in relation to job clusters of KPS permanent Eskom employees. The average for years of service of the KPS permanent labour force is around 11 years and the average age of the employees is around 40 years. The average ages of the permanent employees in job clusters with the most workers are 40 (for inspectors), 41 (for officers), 44 (for controllers) and 37 (for technicians).

These employees' average years of service is as follows: inspectors (9), officers (11), controllers (12) and technicians (9). The years of service are relatively lower than other occupations as shown in Figure 4.7. A correlation may be assumed considering that the positions with a high number of years of service are leadership roles such as manager and supervisor. These are held by employees that fall within the age group of those considered to be experienced. That is, individuals of advanced age are naturally expected to have more years of experience while younger employees tend to have fewer years of service or experience. The low years in service can be attributed to the fact that the power station generally has a younger workforce as highlighted previously.

The redeployment of individuals of a younger age may require additional training to prepare these individuals for other positions of employment. In contrast, individuals with more years of service may be more adaptable to changes in employment as their skills deficits may be lower to some extent, thus requiring minimal training, if any.

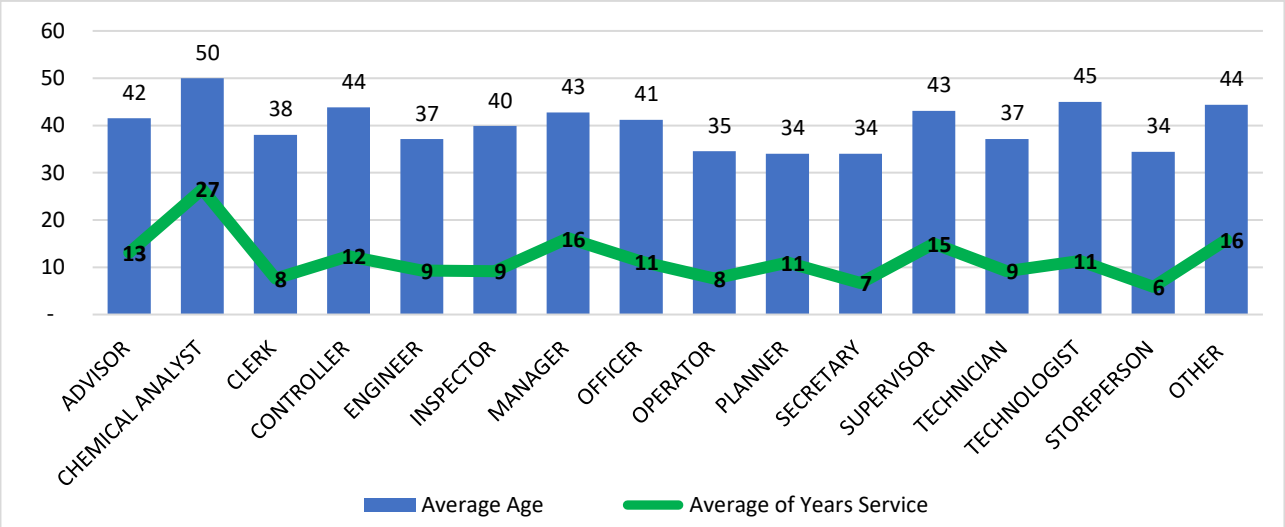


Figure 4.7: KPS permanent employee average years of service and average age by job clusters, 2020

The average for years of service of the KPS ERI labour force is around eight years, and the average age of the employees is around 39 years. In ERI job clusters with the most workers the average age of employees is as follows: operators (38), utilitymen (42), general workers (35) and artisans (40). These employees' average years of service is as follows: operators (4), utilitymen (7), general workers (2) and artisans (9).

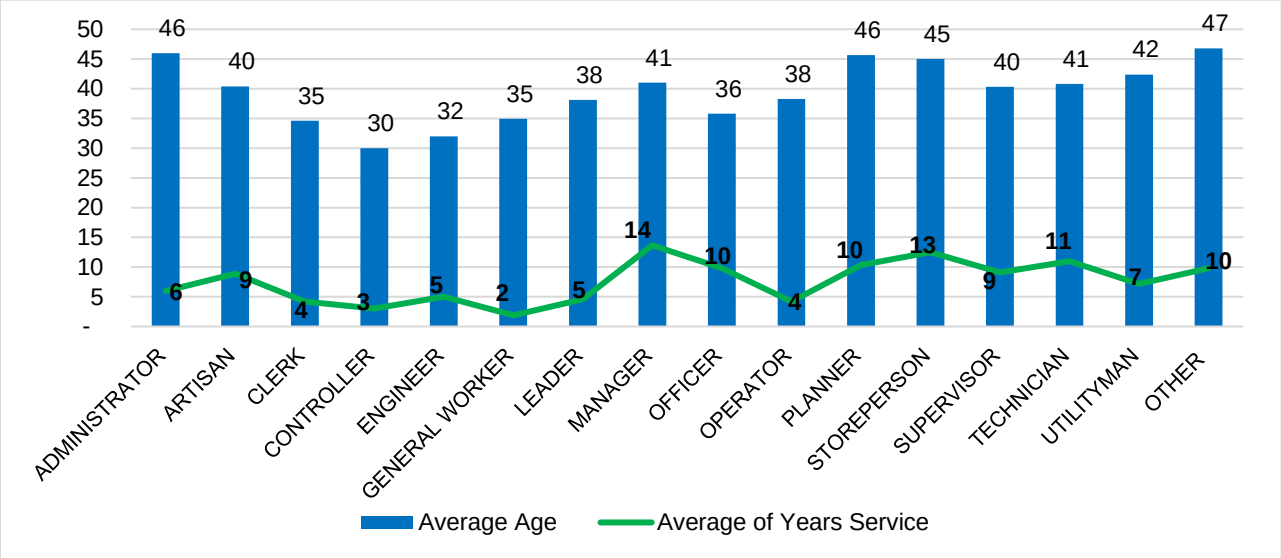


Figure 4.8: KPS ERI employee average years of service and average age by job clusters, 2020

Similar to permanent Eskom employees, the years of service for ERI employees are lower than other occupations as shown Figure 4.8. Positions such as utilityman and general workers require a limited set of skills and level of education, which could be the reason for the lower years of service of these employees and the high employment numbers in the clusters. Different mitigation options need to be considered to accommodate the varying demographics, and these need to take relevant skills into account regarding any staff redeployment.

4.1.2.3 Qualifications

The qualifications held by the KPS labour force provide an indication of the necessary skills interventions to be considered following the shutdown of KPS. Furthermore, the educational background of KPS employees also provides an indication of how and where employees may be absorbed into other Eskom operations. In terms of education, the KPS labour force comprises varying levels of education, with the majority of individuals being in possession of a tertiary education qualification related to engineering.

5 ECONOMIC MODELLING RESULTS AND ANALYSIS

The purpose of this section is to describe and quantify the potential economic impacts that could ensue from the shutdown of KPS and assess their significance in the context of the local, regional, and national economies. The section starts with the background to economic impacts and economic modelling, followed by an outline of the inputs in the economic modelling exercises. It then proceeds to describe the impacts on the local, regional and national economies, focusing on the impact on production and gross domestic product (GDP), employment, households, income and government revenue. The results of the impact modelling and analysis contained in this section inform the assessment of impacts presented Section 7.

5.1 Understanding economic impacts

This section provides background to the typology of economic impacts.

5.1.1 Economic impact analysis and social accounting matrices

Economic impact analysis is an analysis of the economic impacts of a particular intervention or change in an economic system; it can include both resources, monetary, social and environmental outcomes. This implies that the impacts (both positive and negative) on different economic agents are considered simultaneously across the different aspects mentioned above.

To quantify the impacts on different economic agents, an aggregate economic model is required. This model reflects the relationships between various economic agents based on the flow of resources (i.e. transactions) between these agents. It allows for a change in one area of the economy to be translated – through these relationships – into other areas of the economy, yielding the economic impact.

The aggregate economic models utilised in this study are based on the social accounting matrix (SAM) for South Africa as well as the SAM for Mpumalanga. A SAM is an aggregate representation of the flows of economic transactions that have taken place within an economy over a certain period, usually one year. The SAM is based on the System of National Accounts (SNA) for a particular economy and therefore reflects the structure of that economy for that time. The SAM essentially captures the circular flow of the economy where every transaction has both an income effect and a production effect – reflecting the movement of goods and services from producers to consumers and the value addition that occurs as a result of the productive process.

There are three defining features of a SAM (Round, 2003):

- the representation of the transactions in a matrix format (i.e. a table) where the rows and columns are equal;
- the comprehensive nature of the matrix in that it records all aspects of economic activity, including production, consumption, accumulation and distribution; and
- the flexibility of the matrix in terms of the disaggregation and emphasis on different aspects of the matrix as it relates to econometric modelling and analysis.

These three features make SAMs useful tools in the modelling and analysis of change in an economic system.

5.1.2 Measuring economic impacts

The SAM is not an econometric model that can be used to quantify the economic impacts or contributions of certain interventions in an economy. Rather, it is the database that reflects the record of transactions between the different agents, accounts and production factors in an economy. This database, in turn, can be used to develop an economic model.

Measuring economic impacts involves the quantification of the total effects of a particular change in the flow of resources between economic agents and – due to the circular flow of the economy – the indirect effects other economic agents experience as a result of the direct change. These changes are interpreted across a set of economic indicators that allow an interpretation and contextualisation of the direct and indirect effects to ascertain whether the change/intervention is positive or negative for the economy. These impacts can also be compared to existing policies, plans and strategies for the economy as a whole and for specific sectors to determine whether the intervention is supportive of policy and the aspirations of policymakers. The typical indicators include:

- **Intermediate production:** Intermediate production is defined as the process by which labour and assets are used to transform inputs of goods and services into outputs of other goods and services. The impact assessment will measure the change in production expected to result from the project.
- **GDP:** GDP refers to the market value of all final goods and services produced within a country in a given period. The assessment, therefore, measures the impact of the proposed project on the national economy.
- **Employment in job-years:** An employment opportunity is defined as one person being employed for one year. Seasonal work, therefore, is not counted as an individual employment opportunity but instead is combined to calculate the number of total jobs created in one year.
- **Income generated:** The income generated by the project refers to the salaries and wages earned by those employed directly for the project and the suppliers of goods and services.
- **Gross operating surplus (GOS):** This is the income generated by enterprises based on production and reflects gross profits for enterprises.
- **Taxes:** Taxes refer to the revenue generated for the government from the production and sale of goods and services in the economy.

As mentioned previously, the use of a SAM enables the quantification of direct, indirect and induced impacts associated with a change or intervention in an economy where the differences between these impacts can be explained as follows:

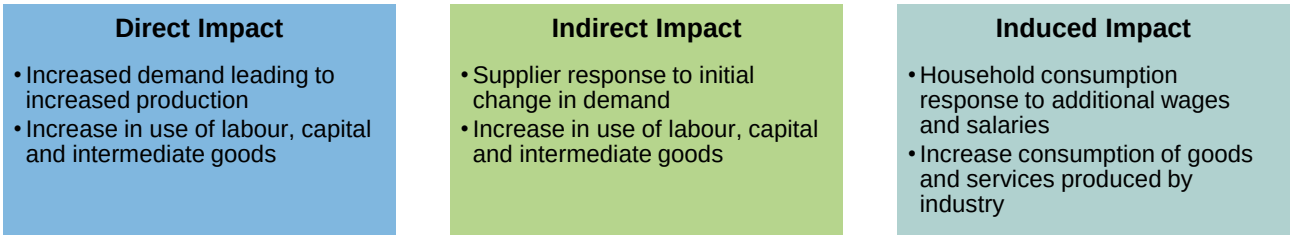


Figure 5.1: Direct, indirect, and induced impacts

An impact assessment typically involves the analysis of all three types of impacts. However, for the purposes of this study, only direct and indirect effects are investigated. This means that the impact assessment does not consider negative effects that may occur due to shifts in spending on food, clothing, shelter and other consumer goods and services due to a change in household income influenced by the project directly or indirectly.

5.1.3 Limitations

By utilising the SAM, it is possible to develop economic impact models that can quantify the multiplier effects in an economy. The SAM approach to modelling is, however, not free of limitations. As with most economic models, the SAM is based on an economic theory where various assumptions and limitations are present. Some of the most important limitations of SAM-based economic modelling include the following.

- **Persistence of the impacts:** It is difficult to determine the exact lifespan of impacts in terms of the extended multiplier effects that occur as a result of an intervention in the economy. Although the capital and operational investments do have a specified lifespan, the multiplier effects as a result of the capital or operational expenditure can continue after the capital and operational investment period is complete.
- **Displacement:** Modelling using social accounting matrices does not consider changes in the structure of the economy in terms of local factors and product markets. For instance, an intervention in the economy could lead to a dominant firm expanding its operations with the same amount of employment so that additional employment is not necessarily created. Interventions or changes in an economy can also permanently affect the structure of the economy, which would change the relationships between economic agents, affecting the multipliers.
- **Price elasticity:** A fundamental assumption of SAM-based modelling is that of price constancy or price stickiness in that only quantities change and not prices. For example, an increase in the demand for concrete can affect both the supply of concrete to meet the additional demand or lead to an increase in the price of concrete simultaneously. This can reduce the demand for concrete in other areas of the economy, leading to a neutral net effect.

5.2 Modelling inputs and assumptions

This section presents the power station operational data used as inputs for the economic modelling exercise. These inputs were obtained from KPS during the course of the study, which also provided SAP data that allowed for an accurate allocation of procurement spend by the facility in terms of economic sectors and spatial distribution. The modelling focuses on determining the economic effects of the closure of a power station as far as production, value-added, jobs and income are concerned. It excludes an investigation into the effect on electricity supply and prices resulting from the closure of an electricity generating facility as this is not part of the scope of the study.

5.2.1 Modelling periods and capacity data

The economic impact is modelled using information for three periods provided by Eskom during 2020/2021, namely:

- **pre-shutdown**, when KPS was at full operations; in the case of all power stations, this was 2017;

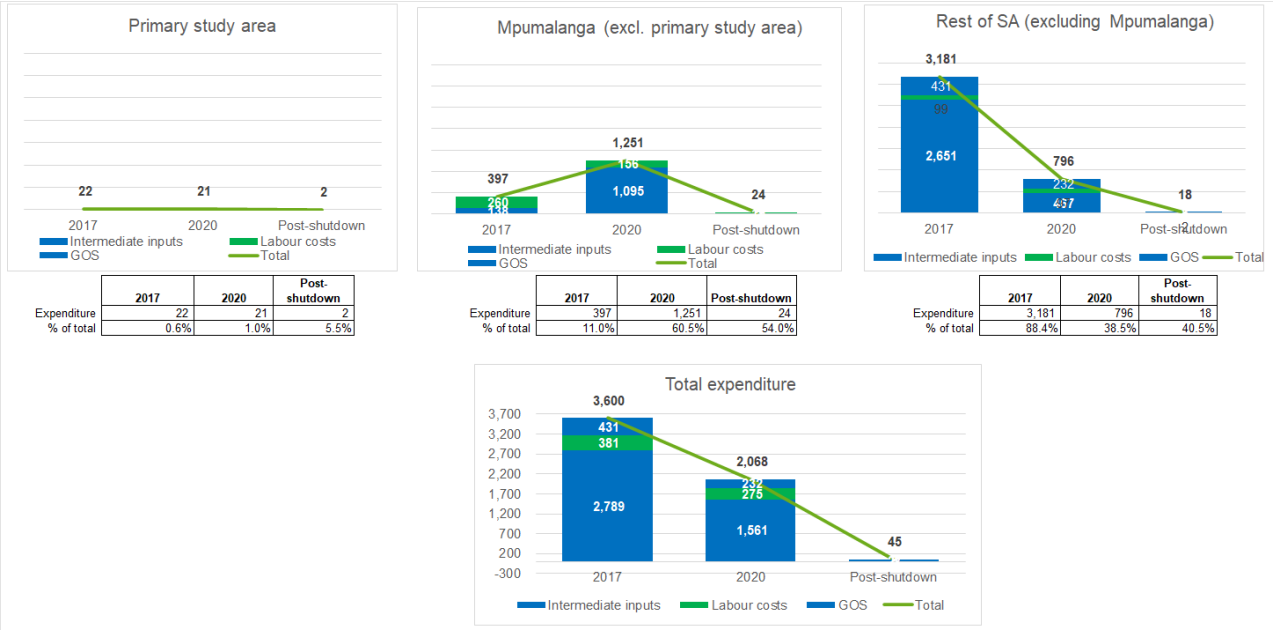
- The **current situation** (i.e. the beginning of 2020), when some of the units at the power station have already been shut down and the facilities have been de facto ramping down; and
- **post-shutdown**, when all units at the power station have been shut down and the facility has been put on reserved maintenance. For the purposes of this study, this was assumed to be 2022.

The following capacity and production data related to KPS were applicable during the analysed periods:

- **Pre-shutdown (2017):** KPS had nine operational units with a combined output of 4 123 gigawatt hours (GWh).
- **Ramping down (2020):** The number of operational units was reduced to four with a combined output reducing from 2 542 GWh to 1 581 GWh.
- **Post-shutdown (2022):** The remaining four units are shut down. It is, therefore, assumed that by the start of 2022, KPS will no longer be operational as a coal-fired power station.

5.2.2 Expenditure-related modelling inputs

Figure 5.2 summarises the total expenditure breakdown of KPS during the analysed periods. Data for 2017, 2020 and post-shutdown was provided by Eskom. Data for 2017 and 2020 figures reflects the actual expenditure by the KPS. Data for post-shutdown, which was assumed to be 2022, reflects projected expenditure when operations have ceased but some infrastructure (such as the water treatment facility) and the general security of the site need to be maintained.



	2017	2020	Post-shutdown
Expenditure	22	21	2
% of total	0.6%	1.0%	5.5%

	2017	2020	Post-shutdown
Expenditure	397	1,251	24
% of total	11.0%	60.5%	54.0%

	2017	2020	Post-shutdown
Expenditure	3,181	796	18
% of total	88.4%	38.5%	40.5%

Figure 5.2: KPS expenditure inputs during 2017, 2020 and a post-shutdown period, nominal prices (Eskom, 2021d)

As indicated in Figure 5.2, KPS operating and capital expenditure amounted to R3.6 billion in 2017, of which the majority was spent outside Mpumalanga on goods and services required to maintain operations. By 2020,

the share of expenditure within the province had increased, although the total spending by KPS had dropped from R3.6 billion to R2.1 billion. Based on the data provided, this drop was largely attributed to the source of coal procurement. During the post-shutdown, it is estimated that KPS will spend R45 million on maintenance per annum, the biggest portion of which will be spent outside the PSA but within Mpumalanga.

5.2.3 KPS procurement breakdown inputs

The following paragraphs detail the procurement breakdown of KPS during 2017, 2020 and 2022 (modelled as post-shutdown) within the PSA, the rest of Mpumalanga (excluding the PSA) and the rest of South Africa (excluding the entire Mpumalanga province). Procurement refers to the purchase of goods and services by the power station during a particular period and excludes labour costs.

5.2.3.1 Local area procurement

The procurement of goods and services from the PSA was divided into various economic sectors, as seen in Table 5.1. At full capacity in 2017, 100% of the procurement of KPS at a local level was for trade and accommodation. In 2020, none of the local businesses benefited from KPS. It is assumed to be the same for the post-shutdown period.

Table 5.1: KPS PSA procurement (excluding direct labour costs), R, nominal prices

Sector	2017		2020		Post-shutdown preliminary estimate	
	Rand value	% of total	Rand value	% of total	Rand value	% of total
Agriculture	-	0%	-	0%	-	0%
Mining	-	0%	-	0%	-	0%
Manufacturing	-	0%	-	0%	-	0%
Utilities	-	0%	-	0%	-	0%
Construction	-	0%	-	0%	-	0%
Trade	43 920	100%	-	0%	-	0%
Transport	-	0%	-	0%	-	0%
Fin. and bus. services	-	0%	-	0%	-	0%
Community services	-	0%	-	0%	-	0%
Government services		0%	-	0%	-	0%
TOTAL	43 920		-		-	

Source: Obtained from Eskom (2021d), reflecting actual (2017 and 2020) and preliminary estimates (post-shutdown)

5.2.3.2 Rest of province procurement

The procurement of goods and services from the rest of Mpumalanga was divided into the various economic sectors, as seen in Table 5.2. At full capacity in 2017, the majority of the procurement of KPS was for trade, while a quarter of procurement expenditure went to the financial and business services sector. It should be noted that based on the SAP data provided by KPS, primary energy inputs captured were to be procured from “the rest of South Africa” and were not registered as coal procurement in 2017. In 2020, it is estimated that the mining sector received 73% of the expenditure localised in the province, with trade remaining a major supplier of goods to KPS from within the province.

Table 5.2: KPS procurement from the rest of Mpumalanga, R, nominal prices

Sector	2017		2020		Post-shutdown preliminary estimate	
	Rand value	% of total	Rand value	% of total	Rand value	% of total
Agriculture	-	-	-	-	2 300 000	12%
Mining	-	-	799 103 382	73%	-	-
Manufacturing	9 819 616	7%	7 339 959	1%	-	-
Utilities	-	0%	-	0%	-	-
Construction	12 239 244	9%	49 454 826	5%	-	-
Trade	78 421 346	57%	212 765 157	19%	12 000 000	63%
Transport	2 590 825	2%	402 384	0%	1 500 001	8%
Fin. and bus. services	32 841 424	24%	19 213 139	2%	-	-
Community services	1 867 987	1%	6 378 039	1%	3 200 000	17%
Government services	-	-	-	-	-	-
TOTAL	**137 780 441**	**100%**	**1 094 656 886**	**100%**	**19 000 001**	**100%**

Source: Obtained from Eskom (2021d), reflecting actual (2017 and 2020) and projected figures (post-shutdown)

5.2.3.3 Rest of South Africa procurement

As seen in Table 5.3, at full capacity in 2017, the majority of the procurement of KPS outside Mpumalanga was for manufacturing, while almost a quarter of procurement expenditure went to the construction sector. In 2020, the trade sector received 65% of the expenditure outside Mpumalanga, with the financial and business sector expenditure receiving a higher proportion of the total spend. It is projected that the community services and financial and business services sectors will receive the most significant share from the KPS by 2022.

Table 5.3: KPS procurement from beyond Mpumalanga, R, nominal prices

Sector	2017		2020		Post-shutdown preliminary estimate	
	Rand value	% of total	Rand value	% of total	Rand value	% of total
Agriculture	5 439 834	-	-	-	-	-
Mining	1 451 644 684	55%	-	-	-	-
Manufacturing	367 233 148	14%	49 378 681	11%	-	-
Utilities	-	-	-	-	-	-
Construction	579 431 918	22%	2 856 621	1%	-	-
Trade	60 482 635	2%	302 906 969	65%	-	-
Transport	1 086 523	0%	810 355	0%	-	-
Fin. and bus. services	181 823 668	7%	49 912 601	11%	2 545 647	30%
Community services	513 579	0%	423 317	0%	4 632 000	55%
Government services	3 215 342	0.1%	60 280 865	13%	1 300 001	15%
Total	**2 650 871 334**	**100%**	**466 569 409**	**100%**	**8 477 649**	**100%**

Source: Obtained from Eskom (2021d), reflecting actual (2017 and 2020) and preliminary estimates (post-shutdown)

5.2.4 Labour-related inputs

Employment at KPS comprises three groups of workers, namely:

- permanent employees of KPS, who form part of KPS payroll;
- employees of ERI, who are employed by ERI and are deployed to different power stations within Eskom's fleet; and
- contracted workers, who are employed by various companies with which the power station has a contract for a particular period.

Note: For the purposes of this study, direct jobs are considered to be those of permanent employees of KPS. On-site jobs provided by ERI and other companies that are contracted by Eskom are considered indirect employment opportunities, although they are created at KPS. This is because the services of ERI and other companies are procured through normal supply chains by KPS. Therefore, the services of ERI and other companies form part of the total intermediate expenditure of the power station and are not direct expenses on labour. By modelling convention, such jobs are treated as indirect jobs, although as mentioned earlier, they are created on-site.

Table 5.4 provides modelling data inputs related to direct employment by KPS in terms of skill levels and residence.

As indicated by KPS, of the 276 people permanently employed at the power station in 2020, 41 resided in the PSA, 217 in other parts of the province and the rest (18) outside Mpumalanga. During post-shutdown, it is preliminarily estimated that 19 individuals will be employed by KPS (including staff to oversee the maintenance of the water purification facility), all of whom will be living in Mpumalanga and primarily outside the PSA.

Table 5.4: Eskom KPS permanent employees, place of residence and associated labour costs

	2017	2020	Post-shutdown preliminary estimate
Employment by skill level			
Highly skilled	136	83	0
Skilled	450	193	19
Semi-skilled	0	0	0
Total	586	276	19
Employment by residence			
PSA	64	41	3
Mpumalanga (excluding local)	433	217	16
Rest of South Africa (excluding Mpumalanga)	89	18	-
Total	586	276	19

Source: Obtained from Eskom (2021d), reflecting actual (2017 and 2020) and preliminary estimates (post-shutdown)

5.2.5 Household income and expenditure per area inputs

Given the salaries and wages earned by the employees of KPS, it is assumed that expenditure in the PSA will decrease from R21.1 million in 2020 to R2.4 million in 2022. Household spending in the rest of Mpumalanga is expected to decline from R156.5 million in 2020 to R5.1 million post-shutdown. Household expenditure in the rest of South Africa is anticipated to drop from R274.9 million in 2020 to R9.4 million post-shutdown.

Table 5.5: KPS permanent employee household expenditure by area, R'million in nominal prices

	2017	2020	Post-shutdown preliminary estimate
Local	21.8	21.1	2.4
Mpumalanga (excluding local)	259.6	156.5	5.1
Rest of South Africa (excluding Mpumalanga)	99.2	97.3	1.8
Total	380.6	274.9	9.4

Source: Obtained from Eskom (2021d), reflecting actual (2017 and 2020) and preliminary estimates (post-shutdown)

5.2.6 Tax-related modelling assumptions

During the analysed period, Table 5.6 provides tax payment-related assumptions for KPS. It should be noted that no details on the local rates and taxes paid by KPS were provided; however, these would have been captured as part of the expenditure listed in Table 5.2.

Table 5.6: KPS contribution to fiscus, R'million, nominal prices

	2017	2020	Post-shutdown preliminary estimate
National	430.7	232.3	7.8

Source: Obtained from Eskom (2021d), reflecting actual (2017 and 2020) and preliminary estimates (post-shutdown)

5.2.7 Assumptions regarding the closure of other power stations

When undertaking a cumulative impact assessment for the study, the project team relied on the data that was supplied in the first quarter of 2021. At that time, it was assumed that the Grootvlei Power Station (GPS) would be closed in 2024 and the Hendrina Power Station (HPS) in 2026. Since the completion of the modelling exercises for all three power stations, including the KPS, the dates for the closure of the former two power stations (i.e. HPS and GPS) have changed. The results of the modelling exercise, though, were kept as per the original information supplied by Eskom.

5.3 Analysis of economic impacts associated with the shutdown of KPS

This section presents the results of the economic modelling exercise for KPS, which informs the assessment of the significance of impacts (Section 7) and mitigation strategy (Section 8).

The figures in this section are all presented in nominal terms (i.e. current prices) and are interpreted in the context of the economic baselines for the respective years. When analysing the results of the impact modelling exercises, the analysis first presents the results for the direct impact that is to ensue from the shutdown of KPS, followed by the results of the indirect impact and total impact, including indirect and induced effects.

All impacts are presented in terms of the PSA, the rest of Mpumalanga and the rest of South Africa to ensure a more accurate prediction of the significance of the impacts in the next section of the report. The results are again presented for all three periods under analysis: pre-shutdown, current and post-shutdown. This provides an insight into the extent to which the negative impacts associated with the ramping down process have already been exerted on the respective socio-economic environments and the extent to which these impacts are likely to increase between the current and post-shutdown periods.

Employment impacts are calculated in terms of full-time equivalent (FTE) employment positions, which is the same as an FTE job or one man-year of work. This does not directly translate into a headcount of people employed or taking up new job opportunities. Generally, one FTE man-year is equal to one person working for 40 hours a week for about 50 weeks per year. However, it could vary depending on the industry.

Note: An FTE man-year means that if one person worked only 20 hours per week for 50 weeks in a year, the FTE equivalent would be 0.5. If two people worked for 20 hours per week for 50 weeks in a year, the combined workload would be estimated as one FTE man-year or one FTE job. In the short term, an increase in FTE employment positions could be absorbed by the existing workforce either through overtime or if these labour resources are underutilised in the industry.

5.3.1 Analysis of direct impacts

Figure 5.3 shows the direct contribution that KPS made to the economy before ramping down in 2017 and 2020.

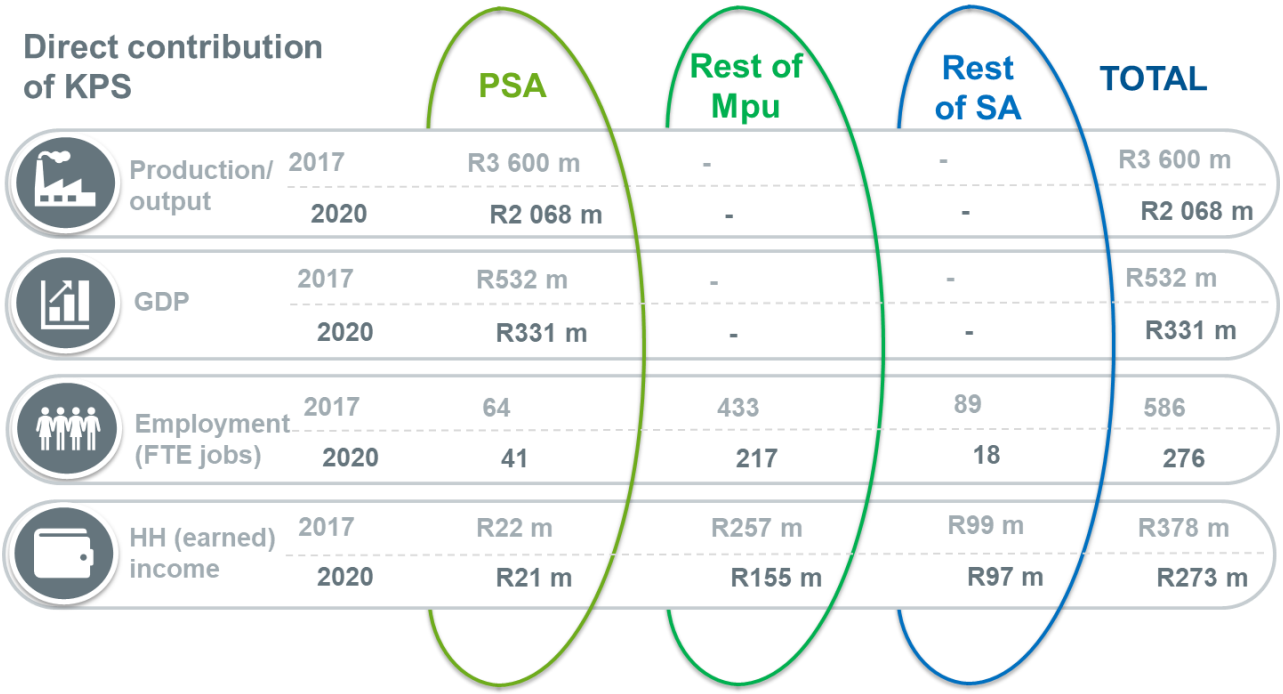


Figure 5.3: KPS direct economic contributions in 2017 and 2020 (nominal figures)

From the figure above, the contribution to economic production and, subsequently towards GDP of the local economy, has been declining as the units at the power station have been shut down between 2017 and 2020. This decline, in turn, has resulted in reduced demand for associated goods and services. In 2020, KPS contributed R331 million to the GDP of the local economy, which equated to 0.8% of Steve Tshwete LM's GDP. Considering the size of the electricity sector in Steve Tshwete LM, the operations of KPS accounted for 7.1% of the sectoral GDP in 2020 – a decline from the 13.5% observed in 2017.

As mentioned earlier, KPS employed 586 people in 2017. By 2020, direct employment at the power station had decreased to 276 people. While these jobs were created at KPS, employment is usually counted by the residence of the individuals. Given that most of the individuals employed at KPS were living outside the PSA, the distribution of employment, therefore, has been spread among various study areas. More specifically, by 2020, only 41 individuals working at KPS were living in the PSA. Of the 276 employees of KPS, 217 were living outside the PSA – primarily in the feeder communities – and 18 were living outside Mpumalanga (primarily in Gauteng).

Since the income earned by individuals is largely spent in the areas where they live, the distribution of income earned by direct employees of KPS follows the distribution of their residences. As such, the majority of income earned by direct employees of KPS would be spent in the feeder communities – outside the PSA but within the boundaries of Mpumalanga.

Once the power station is shut down, the direct contribution of the facility towards production, GDP, employment and household income will drop even further. Figure 5.4 illustrates the estimated direct economic losses that will ensue as a result of the KPS shutdown. All the figures are presented in 2020 constant prices.

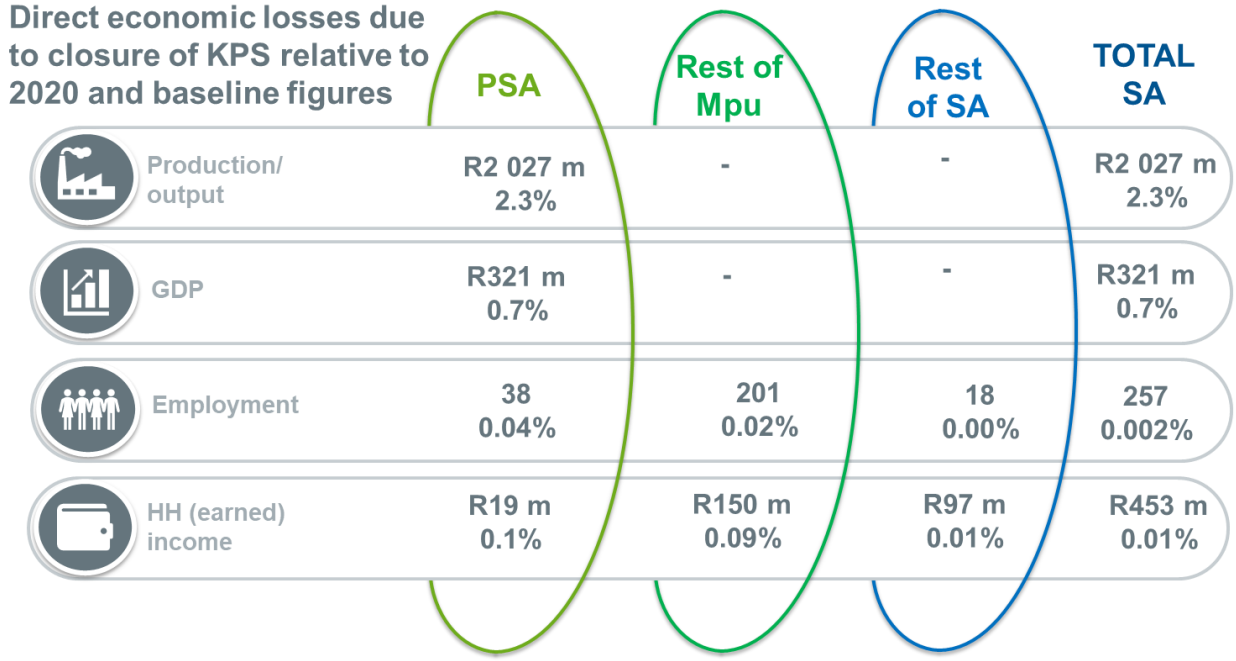


Figure 5.4: Direct economic losses due to KPS shutdown before mitigation (2020 prices)

As shown in Figure 5.4, the shutdown of KPS will lead to a direct loss of R2 027 million in production, which equates to R321 million of GDP at 2020 prices. Considering the size of the local economy in 2020, this loss represents an 0.8% decline in the size of the Steve Tshwete LM economy and a 6.9% decline in the local electricity sector. Regarding employment, a total of 257 jobs of 276 jobs will be no longer be supported by KPS in the absence of mitigation measures. The difference (i.e. 19 estimated jobs) are jobs that will be retained to maintain existing water infrastructure and to provide security services.

Of the 257 jobs that will no longer be supported by KPS once it is shut down, 37 will be lost by individuals working and living in the PSA in 2020. Most of the individuals whose jobs will become redundant, though, are living in the community feeder areas – outside the PSA. Of the 217 individuals who were employed at KPS in 2020 and living outside PSA but within the province, jobs for 201 individuals will no longer be available on site. Similarly, jobs for all 18 individuals who worked at KPS in 2020 and lived outside Mpumalanga will no longer be available at KPS.

The above impact reflects the worst-case scenario and does not include mitigation measures that Eskom will implement to reduce the negative effects on employees and the potentially affected communities. The measures to mitigate against these impacts are discussed in Section 7 and 8 of the report.

5.3.2 Analysis of indirect impacts, including impact on coal mining and coal transportation

Aside from the direct impacts, the operations of KPS generate significant contributions to economic production, GDP, jobs, and household income through the procurement of goods and services required for its operations. The magnitude of these indirect effects is reflected in Figure 5.5. It should be noted that the impact captured in the figure does not only reflect the contribution to Tier 1 suppliers but also the impact on the entire supply chain, including but not limited to Tier 2 and Tier 3 suppliers.

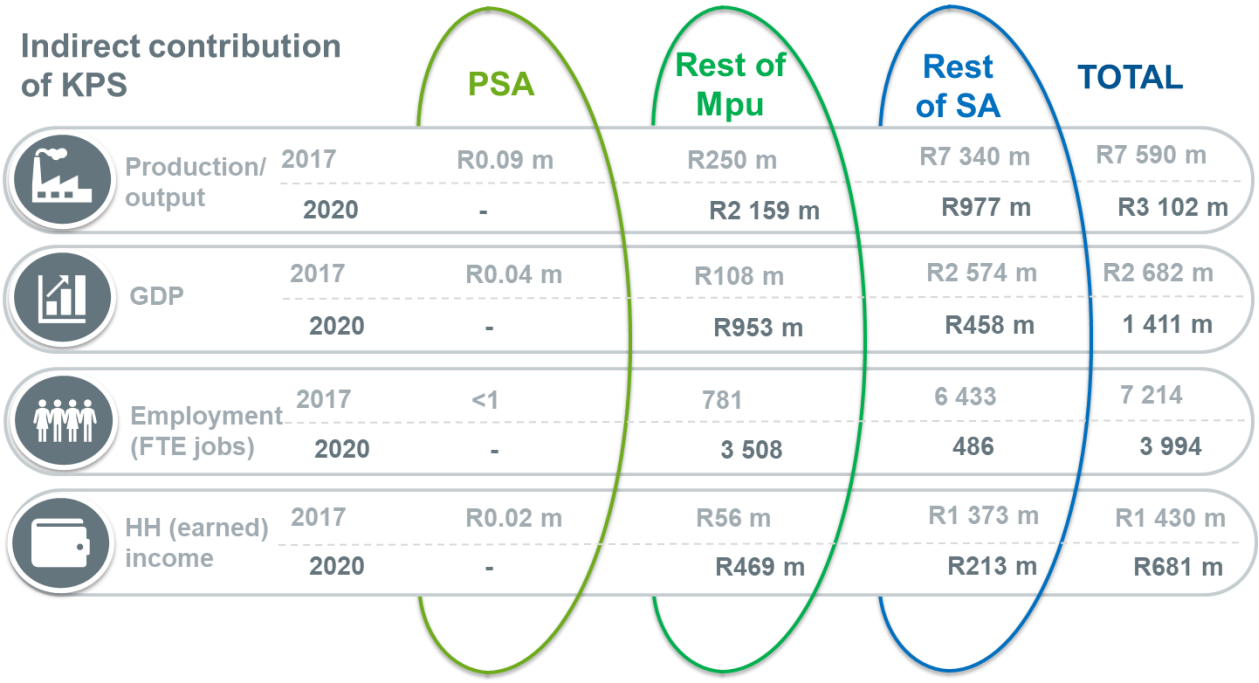


Figure 5.5: KPS indirect economic contributions in 2017 and 2020 (nominal figures)

As shown in Figure 5.5, the operations of KPS indirectly supported R7 590 million in economic production in 2017, which translated into R2 682 million of GDP and 7 214 FTE jobs. As a result of the downscaling of activities at KPS, the indirect contribution of the power station to the economy dropped to R3 102 million in

terms of output by 2020 (or R1 411 million in terms of GDP). The number of FTE jobs supported through the supply chain dropped to 3 944 in 2020.

Most of the indirect impact on economic production, GDP and jobs created for KPS operations has been concentrated outside the province, with sectors that benefit the most including trade activities and mining.

KPS does not have contracts with mines to supply coal. **Coal** to the power station is supplied under contracts with other power stations and is currently being diverted to KPS. In 2020, coal supplied to KPS came from six coal mines, namely Universal's North Block Complex, Dorstfontein Coal Mine, Impunzi Coal Mine, Greenside Colliery Road IMP, Mzimkhulu Mine and Vanggatfontein Coal Mine (VPC, 2021). Aside from Dorstfontein Coal Mine, supplies to KPS by the mines accounted for between 1% to 11% of contracted amounts in 2020 (VPC, 2021). Almost half (46%) of the contracted amount from Dorstfontein Coal Mine was supplied to KPS in 2020; however, this contract had ended in 2019 (VPC, 2021).

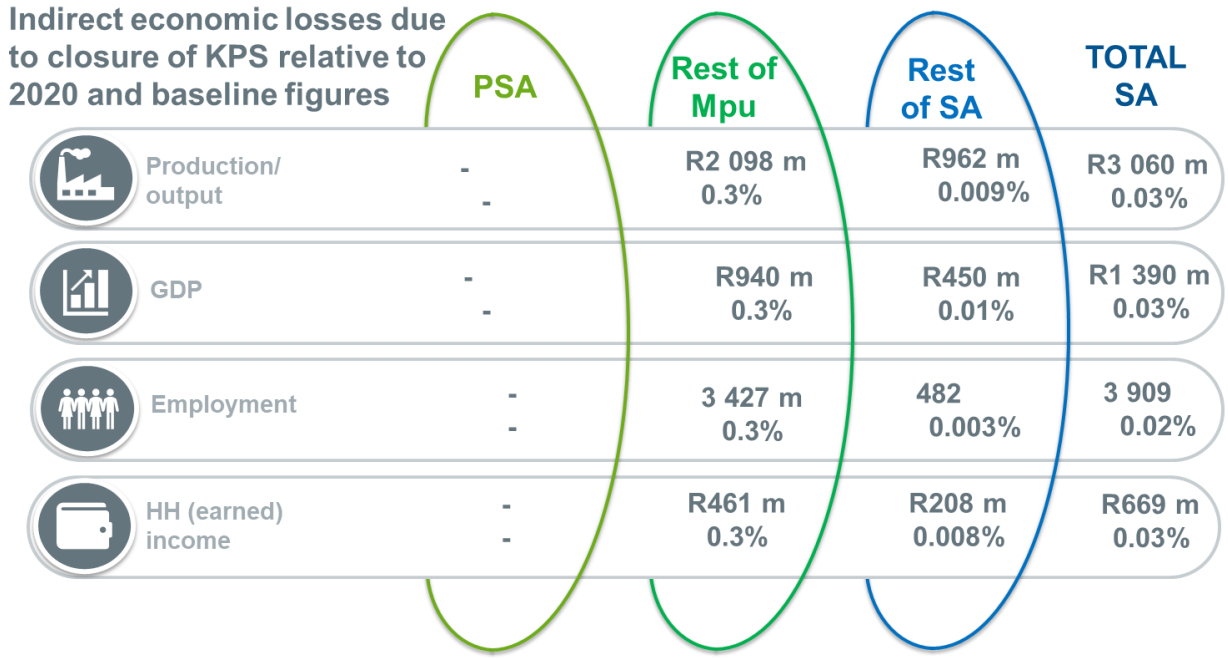


Figure 5.6: Indirect economic losses due to KPS shutdown before mitigation (2020 prices)

The supply of coal from the above-mentioned mines varies month to month and mine to mine. In 2020, 873 kilotonnes (kt) of coal was supplied to KPS (VPC, 2021), a quantity representing about 0.35% of all coal produced in South Africa that year and 0.7% of coal purchased by Eskom (Eskom , 2021; DMRE, 2022). This shows that the KPS demand for coal in 2020 was extremely small compared to that of the rest of the fleet of coal-fired power stations operated by Eskom. Considering that there were 91 231 people employed in the coal industry and that this industry produced 248.1 Mt of coal in 2020 (DMRE, 2019), the coal volume supplied to KPS equates to about 321 coal industry employees supported in that year.

Since coal supplied to KPS was transported by road, the demand for coal created by the power station is interlinked with the demand for **transport services**. Based on the information contained in the VPC (2021)

report, an average of 72.8 kt of coal was supplied to the power station on a monthly basis during the course of 2020. Assuming a truck can carry about 33 t of coal per trip, this translates into 2 205 truckloads of coal delivered to the power station on average per month. Assuming that one truck makes one trip a day, this further equates to 82 trucks being used to deliver coal to the power station on a monthly basis, supporting about 41 jobs in coal transportation.

With KPS operations ending, the demand for most of the goods and services required by the power station will drop, which will have a negative impact on the production of the businesses along its supply chain. This, in turn, will create negative effects further upstream of the immediate supply chain of the power station, leading to the indirect losses outlined in Figure 5.6.

It is estimated that a total of R3 060 million of output (2020 prices) will be lost to the national economy indirectly or as a result of reduced procurement along the supply chain. This translates into R1 390 million of losses in GDP and 3 909 FTE jobs. As illustrated in Figure 5.6, these losses will be concentrated in Mpumalanga.

5.3.3 Analysis of total (direct and indirect) impacts

Figure 5.7 presents a summary of the total contributions of KPS to production, GDP, employment, and income, including both direct and indirect effects. The figure indicates contributions made at the PSA level, in the rest of Mpumalanga and in the rest of South Africa. Together, these contributions amount to the total direct and indirect contribution of KPS to the national economy.

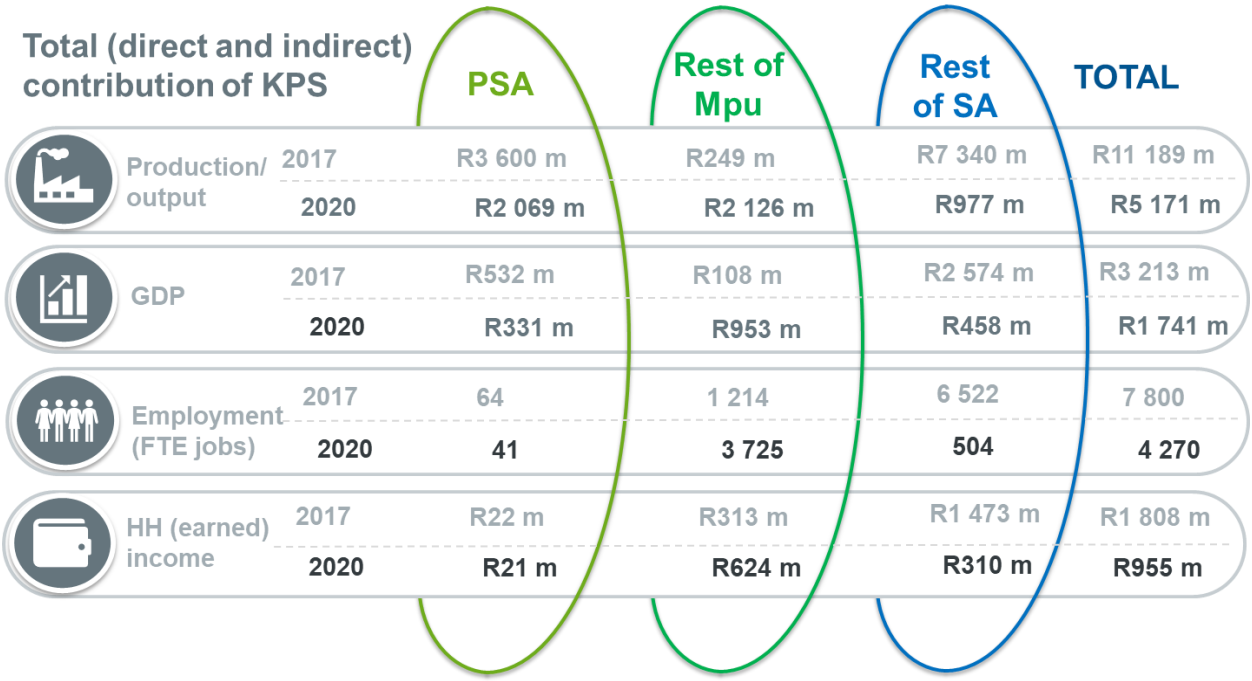


Figure 5.7: Total (direct and indirect) economic contribution of KPS during 2017 and 2020 (nominal prices)

As outlined earlier in the section, due to the shutdown of five out of nine units at KPS between 2017 and 2020, the capital and operating expenditure of the power station was reduced from R3.6 billion to R2.07 billion. This means that in the past few years, the businesses and economic sectors that benefited from KPS expenditure when it was operating at full capacity have already been negatively impacted. This is evident in the fact that the total contribution of KPS to the national economy has dropped from R11 189 million (or 0.2%) in 2017 to R5 171 million (or 0.1%) in 2020.

Responses from a supplier survey corroborate the above statement as businesses report having lost contracts that they had held for a decade, something that negatively impacted their workload. The increase in the contribution of KPS from 2017 to 2020 at the provincial level is explained by data provided by KPS, which states that the procurement of coal for KPS was done outside of Mpumalanga in 2017.

Regarding employment, Figure 5.7 shows that through direct and indirect effects, the power station maintained 7 800 FTE jobs in 2017, thus contributing 0.05% to national employment and 1.0% to employment in the electricity sector. By 2020, the reduced production of KPS resulted in the FTE jobs supported by the power station declining to 4 270, reducing the contribution towards national employment to 0.03%.

At the provincial level, KPS operations supported 1 278 FTE jobs in 2017 (sum of PSA and rest of Mpumalanga figures) but increased to 3 766 in 2020 due to the localisation of some of the procurement from areas outside the province to Mpumalanga. Thus, the power station's total contribution to provincial employment, through both direct and indirect effects, increased to 0.3% in 2020.

Through the support of direct and indirect employment opportunities, KPS contributed towards the generation of R1 808 million of household income in 2017, which equated to 0.07% of the income earned by households nationally in that year. By 2020, the decline in production that also led to the decline in procurement expenditure by KPS stimulated only R955 million of household earnings in the country; thus, reducing KPS's contribution towards earned income to 0.04%. Due to the change in the procurement of coal, the contribution of KPS to earned income at the provincial level increased from 0.2% in 2017 to 0.3% in 2020, reaching R645 million in nominal prices. Once KPS is shut down, most of the economic benefits described above will be lost. The extent of these losses, converted in 2020 constant prices, are reflected in Figure 5.8.

As indicated in Figure 5.8, the national economy will lose R5 087 million in output due to the shutdown of KPS, which reflects a 0.05% reduction in economic output generated in 2020. This translates into a loss of R1 710 million of GDP in the country, of which R1 261 million will be lost in Mpumalanga alone (the sum of the impact on the PSA and the rest of Mpumalanga is outlined in Figure 5.8). Given the size of the provincial economy in 2020, this loss will equate to 0.4% of the provincial GDP. Simultaneously, the PSA economy will decline by R3 210 million, which equates to 0.8% of Steve Tshwete LM's GDP in 2020.

Besides the utilities sector, which will account for a third of the reduced production, sectors such as mining and manufacturing, followed by business services and trade, will experience the greatest reduction in absolute values throughout the national economy. One respondent in the supplier survey suggested that the KPS shutdown may result in the business losing up to R20 million a year, although other respondents indicated that their companies will not be significantly impacted. This means that the extent of the impact at a business level will depend on the dependency of a particular business on the contracts signed with KPS.

It is important to note that the coal that KPS is currently procuring will continue to be procured by Eskom as these contracts are not linked to KPS operations. Coal for KPS is currently supplied through contracts that

have been signed with the mining houses to supply coal to other operations in the province, which have simply been diverted to KPS until its shutdown. The losses related to the coal supply will still ensue, although they will be experienced over the medium to long term and not immediately upon the shutdown of KPS. This is because, once the contracts expire, the demand for coal that KPS has been creating will not be replenished reducing the overall demand for coal.

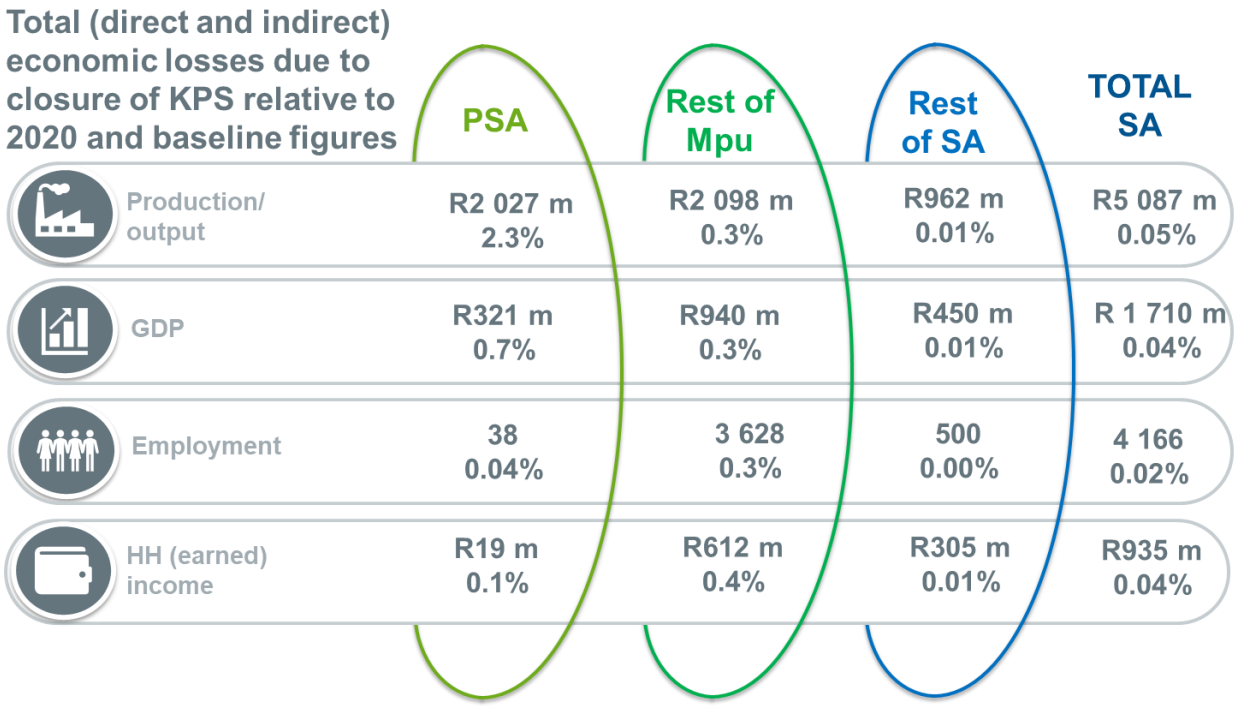


Figure 5.8: Total economic losses due to KPS shutdown before mitigation (2020 prices)

Regarding employment, after the shutdown of KPS, a total of 4 166 FTE jobs in the country will be lost, which represents 0.02% of the total 2020 employment in South Africa. Roughly 88% of these FTE jobs will be lost in Mpumalanga, which will reduce provincial employment by 0.3% relative to the 2020 level. At the level of the PSA, a total of 38 FTE jobs will be lost.

The loss of FTE jobs as a result of the KPS shutdown will have varying effects on businesses that form part of the power station's supply chain depending on the size of the business and its ability to pivot. One of the businesses suggested that 22 of its employees working at KPS will have to be either reallocated or retrenched if the power station is shut down, while another supplier noted that the company may expand to other power stations if KPS shuts down.

The shutdown of KPS will result in the loss of R935 million in household income, which will shrink the earned household income in the country by 0.04% relative to 2020 figures. At the provincial level, the total loss in household income will equate to R630 million (the sum of income earned in the PSA and the rest of Mpumalanga), which represents 0.5% of the earned income in Mpumalanga in 2020. Within the PSA, R19 million in household income will be lost, accounting for 0.1% of the earned income in Steve Tshwete LM.

5.4 Cumulative impact assessment

The previous sections provided an analysis of the economic losses that will ensue as a result of the shutdown of one power station – KPS. However, the study is investigating the shutdown of three power stations that will take place in the next five years, as per the original schedule provided in 2020 that has since been revised. To gain a better insight into the extent to which the shutdown of these power stations will affect the national and provincial economies, the cumulative impact of their shutdown needs to be considered.

At the local level, two of the three power stations are located in the same municipality— Steve Tshwete LM. Although the PSAs of HPS and KPS do not coincide, the proximity of their power stations will also create a cumulative impact on Steve Tshwete LM. Thus, the analysis of the combined negative economic effect on Steve Tshwete LM due to the shutdown of HPS and KPS can also bring valuable insight into the magnitude of the effects in the context of the local economy.

When calculating the cumulative impact of the shutdown of the three power stations, 2020 constant prices are used. The impact is calculated over time, starting in 2022 when KPS is shut down, assessing the situation in 2024 when GPS was initially expected to be shut down but the negative effects of KPS still remain; and lastly in 2026, when HPS was envisaged to be shut down and the other two power stations would have already been put on reserve maintenance. While since the completion of the impact modelling exercise the shutdown dates for HPS and GPS have been revised and moved outwards. However, the results of the cumulative impact assessment can still be used to gauge the extent of potential negative impacts on the economy as they are reflected in constant prices and indicate an impact in a particular year. In other words, the years 2022, 2024, and 2026 can be viewed as three separate scenarios where:

- scenario 1, represented by the year 2022, reflects a situation in which KPS is no longer operational but the other two power stations continue to generate electricity;
- scenario 2, represented by the year 2024, assumes the shutdown of KPS and GPS but continued operations of HPS; and
- scenario 3, represented by the year 2026, assumes the shutdown of all three power stations.

The cumulative impacts are calculated for a conservative scenario. From the socioeconomic perspective, this represents the worst-case scenario, as it implies that losses in the mining sector occur during the same year in which the power stations are completely shut down and mitigation measures have yet to be considered. It should be noted, though, that the continued expansion of the power generation fleet by Eskom and investigations into setting up new generation capacities provide for continued mitigation of some of the negative socio-economic impacts that are described in this section.

5.4.1 Impact on production

Figure 5.9 presents the cumulative contribution of the three power stations' production to the national and provincial economies and also the contribution of production in the PSAs of KPS and HPS to Steve Tshwete LM. In addition, the figure shows the potential reduction in production that will be experienced by the economies of the various study areas relative to production in 2020.

Figure 5.9 shows that in 2017 the three power stations contributed R55 649 million (in 2020 prices) to the national output; the contribution dropped to R33 032 million by 2020 as a result of the shutdown of some of

the units at the power stations. By 2026, when all three power stations will be shut down, the contribution of the facilities to business sales in the country will drop to R1 575 million (in 2020 prices). This means that from 2020 to 2026, the national production will be reduced by R30 457 million in 2020 prices, which equates to a decline in the national output of 0.3% relative to the 2020 figure.

Provincially, the operations of the three power stations contributed R25 651 million in 2017; this was reduced to R21 429 million by 2020 (in 2020 prices) after the shutdown of some of the units. In the next six years, the production in the province is expected to continue declining as each of the power stations shuts down, dropping to R833 million in 2020 prices by 2026. This equates to 2.7% of the Mpumalanga production in 2020.

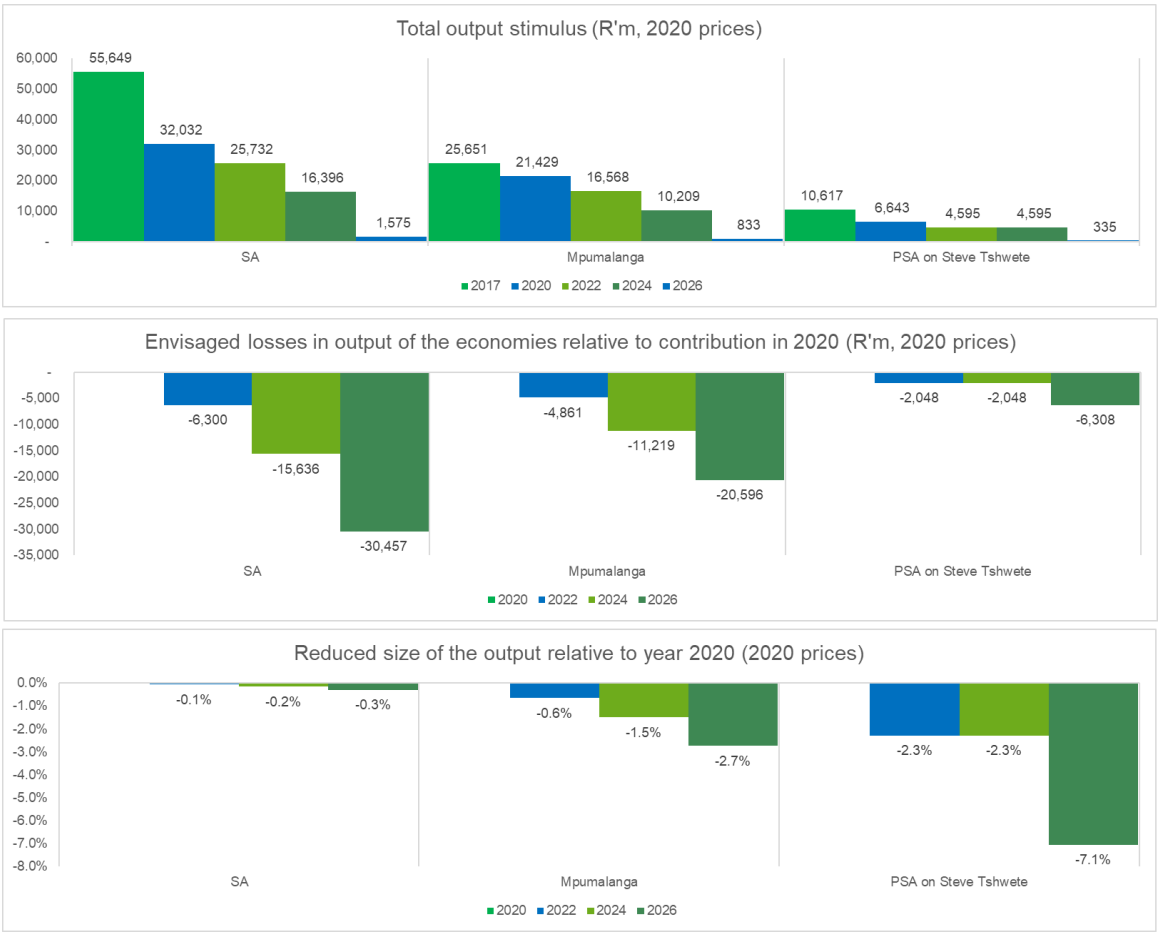


Figure 5.9: Cumulative contribution towards economic production between 2017 and 2026 and potential production losses relative to the year 2020 (in 2020 prices)

With regard to Steve Tshwete LM, the operating and capital expenditure that was localised in the PSAs of HPS and KPS contributed R10 617 million to production in the municipality in 2017 – an amount that declined to R6 643 million (in 2020 prices) by 2020. This means that in the past three years, the Steve Tshwete LM has experienced a decline in production of R3 975 million (or a third of what the two power stations supported in 2017).

Between 2020 and 2026, the first negative impact will be exerted by the shutdown of KPS in 2022, which will reduce production in the PSA of that power station by R2 048 million in 2020 prices. It will be another four years before the full effect of the HPS shutdown will be experienced, which will increase the cumulative negative impact on production to R6 308 million in 2020 prices. This decline in production of the two PSAs will reduce the local economy of Steve Tshwete LM by 7.1% relative to its output in 2020.

5.4.2 Impact on GDP

Figure 5.10 illustrates the contribution of the three power stations to the national and provincial GDP during the analysed periods and the extent to which the respective economies are envisaged to shrink as a result of station shutdowns.

As illustrated in Figure 5.10, in 2017 the three power stations' operations contributed R18 363 million in 2020 prices to South Africa's GDP; this amount dropped to R10 861 million (in 2020 prices) by 2020. Over the next six years, the combined contribution of the three power stations to the national economy is expected to reduce first by R2 220 million (in 2020 prices) in 2020 when KPS is shut down, then by R5 366 million in 2020 prices when the GDP losses ensuing from the KPS shutdown are augmented by those from the shutdown of GPS. Lastly, the contribution will fall by a cumulative R10 292 million of value-added in 2026 when the last of the three power stations – HPS – is shut down. By the time HPS is shut down, the national GDP will be reduced by 0.2% relative to its 2020 size.

The effects on the Mpumalanga GDP will be considerably more concentrated and significant given the relatively small size and the localisation of expenditure associated with the power stations' operations. As shown in Figure 5.10, from 2017 to 2020 the provincial economy experienced a relatively small loss in GDP of R269 million – or 3.9% of its contribution in 2017. However, as the units at the power stations continue to shut down and the facilities are put on reserve maintenance, the negative impact on the province will grow drastically; from a reduction of R1 569 million in 2020 prices between 2020 and 2022 to a cumulative drop of R6 355 million of valued-added by 2026. Were the provincial economy's GDP in 2026 to remain at the level of 2020, these reductions would equate to it contracting by 1.8%.

Concerning the PSAs of HPS and KPS, these areas have already experienced a notable decline in the value-added created locally. As a result of power stations ramping down from 2017 to 2020 dropped from R1 714 million to R950 million in 2020 prices. Most of that value-added is created on site and not in the local communities. Nonetheless, the shutdown of the two power stations will see a further decline in the GDP of the PSAs of R870 million in 2020 prices, which equates to 2.0% of the Steve Tshwete LM's GDP in 2020.

Figure 5.10: Cumulative contribution towards GDP between 2017 and 2026 and potential GDP losses relative to the year 2020 (in 2020 prices)

5.4.3 Impact on employment

The reduction in production and subsequent value-added generated in the economy linked to the operations of the three power stations will have a negative impact on the employment absorption capacity of the national, provincial and local economies, resulting in job shedding. Figure 5.11 shows that by the time all three power stations are shut down, 25 138 FTE jobs will be lost to the country. Of these, eight out of 10 FTE jobs lost will be FTE jobs located in Mpumalanga.

The reduction in employment opportunities will be gradual. By 2022, the national economy will lose 6 232 FTE jobs, a figure that will double by 2024 and then increase to over 25 000 by 2026. A similar trend will be observed at the provincial level, where the loss of FTE jobs in 2022 will lead to a reduction of 0.5% of the employed in

Mpumalanga in 2020. By 2024, the reduction will amount to 1% of the employed in 2020; and by 2026, 1.7% of the employed individuals in 2020.

Within the two PSAs, the combined employment losses will grow from 92 FTE jobs in 2022 to 316 FTE jobs in 2026. Relative to the size of the employed labour force in the Steve Tshwete LM in 2020, these will be small losses. The loss of employment opportunities, however, will affect a considerably larger number of people. Given the average household size in the Steve Tshwete LM, and assuming that one FTE job will affect only one household, over 1 100 people living in the PSAs of KPS and HPS will be impacted. Provincially, the reduction in FTE jobs will impact over 77 000 people or 1.7% of the Mpumalanga population in 2020.

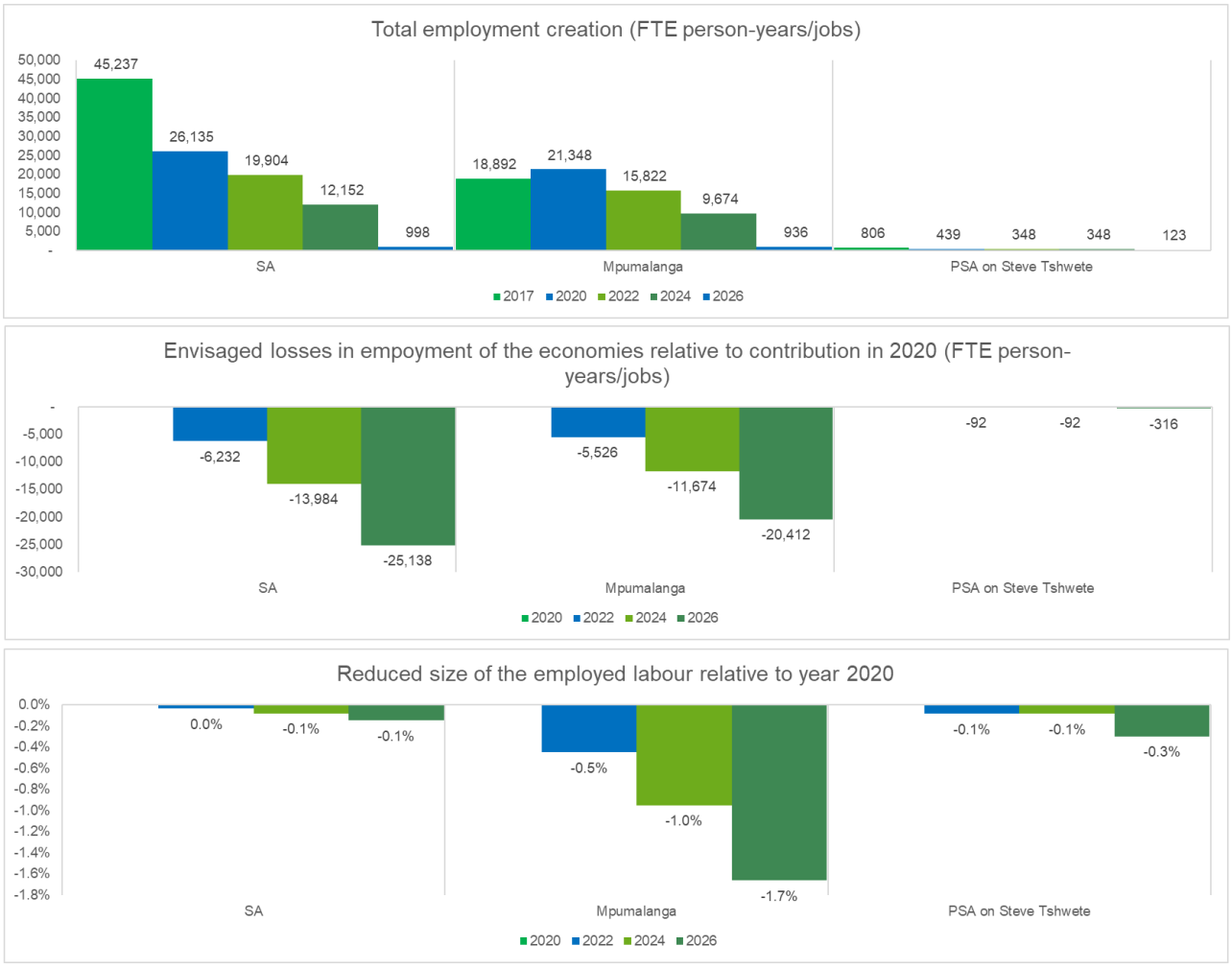


Figure 5.11: Cumulative contribution towards employment between 2017 and 2026 and potential job losses relative to the year 2020

5.4.4 Impact on household income

The loss of employment opportunities will translate into a loss of sustainable income, as shown in Figure 5.12.

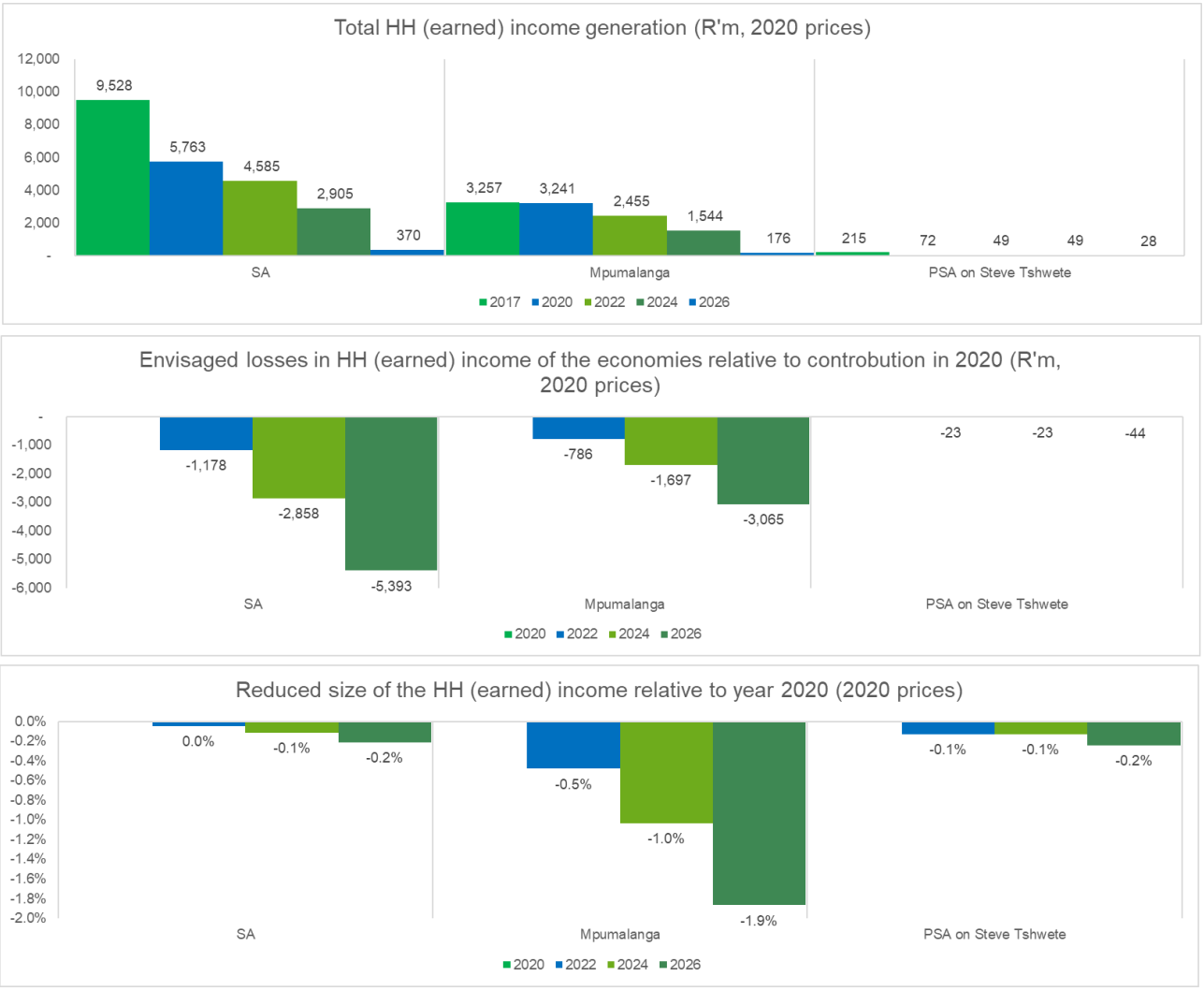


Figure 5.12: Cumulative contribution towards household income between 2017 and 2026 and potential earned income losses relative to the year 2020 (in 2020 prices)

As shown above, the three power stations contributed R9 528 million in 2020 prices to household income in the country in 2017. By 2020, this contribution had dropped to R5 763 million (in 2020 prices) and will be largely lost by 2026 when all three power stations are shut down consecutively. In the context of the total earned income derived by households in 2020, the loss of R5 393 million in salaries and wages will reduce the national earned household income by 0.2%. However, the extent of the impact at the provincial level will be more noticeable.

In 2017, the operations of the three power stations contributed about R3 257 million in 2020 prices to household earnings. Most of this income was retained in the province, despite the shutdown of some of the units at the power stations, as most of the employment opportunities were retained. By 2026, however, following the shutdown of KPS, then GPS and – finally – HPS, households in Mpumalanga will have lost

R3 065 million in earned income (2020 prices). This equates to a loss of 1.9% of household income earned in the province in 2020. As mentioned earlier, this will negatively affect over 77 000 people.

At the PSA level, the loss of 316 FTE jobs by 2026 will lead to a loss of R44 million in earned household income, translating into a loss of R11 616 in household earnings per month. As mentioned earlier, this development will probably affect more than 1 100 people living in the PSAs of HPS and KPS.

5.4.5 Loss of government revenue

Government revenue will also be negatively impacted by the shutdown of the three power stations. By 2026, R845 million (in 2020 prices) of revenue derived by government through rates and taxes will be lost.

6 STAKEHOLDER ENGAGEMENT

This section describes the stakeholders of the project and the engagement process that has been followed during the course of the study. It also highlights the concerns raised during the initial stage of stakeholder engagements that were considered during identification of potential impacts and formulation of the mitigation strategy and implementation plan. Feedback obtained during the stakeholder engagement following the release of the final integrated report will be captured and attached as annexure.

6.1 General approach to stakeholder engagement

Considering the focus of the study, a comprehensive and robust stakeholder engagement and communication process was identified to be an integral component of the project. As a result, stakeholder engagement was one of the five pillars of the study.

Stakeholder engagement during the study followed a four-step approach and subscribed to the principle of inclusivity and meaningful participation.

During the **first step**, to guide the stakeholder engagement process, a communication plan and engagement strategy was formulated. This included, among others, the identification and categorisation of both internal and external groups of stakeholders, as well as defining the objectives, means, and frequency of engagements during the course of the study. Since the study was also conducted during COVID-19, the stakeholder engagement strategy had to be adapted to consider various restrictions imposed by the government for, among others, travelling and group meetings. Lastly, the strategy assigned responsibilities for engagement with various internal and external stakeholders.

Preparation for engagements, which was the **second step** in the approach, included solving various logistical aspects, as well as preparing material for stakeholder engagements.

The **third step** of the approach, engagements with various stakeholders, took place over the entire duration of the project and is planned to continue until the end of the study when the final results need to be communicated and engaged with various stakeholder groups. In brief, local community representatives, government, businesses, NGOs, financial institutions and other interested and affected parties (I&APs) were engaged since the inception of the study. Their concerns and recommendations have been taken into consideration during the course of the project and informed the mitigation strategy and implementation plan developed.

The engagement process under this study will be concluded with the **fourth and final step** and will be delivered through the submission of the outcome report. This report, added as an annexure to the final report, will contain the feedback from various groups of stakeholders on the proposed mitigation strategy and implementation plan for the shutdown and repurposing of the power station and associated responses from Eskom and the consulting team.

Since engagement with stakeholders does not end with the completion of the study, a broader stakeholder engagement plan for the closure and repurposing of KPS has been developed and is already being executed. The plan looks over the entire life cycle of the facility going forward.

6.2 Stakeholder identification methodology and analysis

The identification and consultation of stakeholders are crucial in adequately and comprehensively determining the potential impacts that may arise from the shutdown of KPS. However, each stakeholder group possesses varying levels of interest in and influence over the shutdown of KPS and the subsequent mitigation measures. As such, each stakeholder group is expected to have different concerns. To this end, the Power-Interest Matrix developed by Mendelow (1991) was utilised to determine the power and interest of the respective stakeholder groups. Figure 6.1 provides an overview of the matrix as a methodological tool for stakeholder analysis.

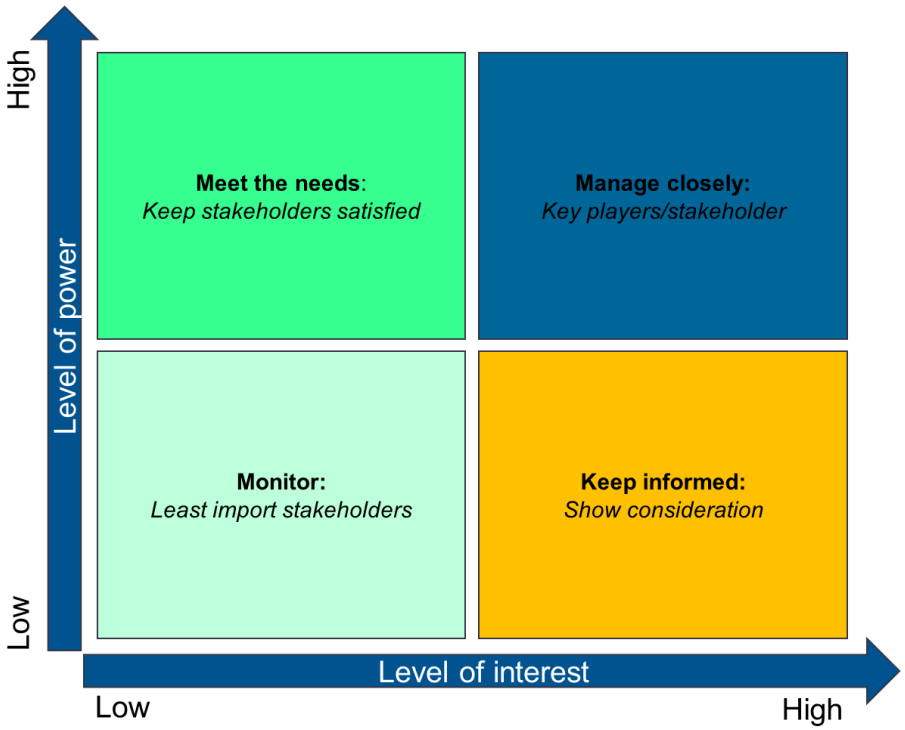


Figure 6.1: Mendelow's Power-Interest Matrix

Some stakeholders require close management as they have a high interest in and power over the shutdown of KPS, in addition to the proposed mitigation measures. Crucially, these stakeholders may need to be involved in the governance of the proposed mitigation measures and in decision-making. Stakeholders that need to be kept satisfied require their needs to be met as they have a high power over the shutdown and proposed mitigation measures while possessing a low interest. These stakeholders need to be kept satisfied through the incorporation of their views and inputs. Stakeholders that have a high interest in and low power over the shutdown of KPS and the mitigation measures are to be kept informed, while their inputs are to be encouraged. Lastly, stakeholders with a low interest in and power over the shutdown and mitigation measures need to be monitored and kept informed of any changes.

Apart from the above categories, stakeholders may further be categorised as either internal or external stakeholders. Internal stakeholders refer to groups or individuals that form part of Eskom or participate in

activities related to the operations of KPS. Conversely, external stakeholders are those that may be affected by the shutdown of KPS but do not form part of Eskom. Table 6.1 lists groups of external and internal stakeholders that have been identified to be involved in or have an interest in the shutdown of KPS, in addition to the potential mitigation measures.

Table 6.1: Groups of stakeholders

Group	Organisation
External	
National government	Department of Mineral Resources and Energy (DMRE)
	National Energy Regulator of South Africa (NERSA)
	National Treasury (NT)
	Department of Public Enterprises (DPE)
	Department of Water and Sanitation (DWS)
	Department of Industry, Trade and Competition (the **dtic**)
	Department of Science and Innovation (DSI)
	National Planning Commission (NPC)
	Department of Forestry, Fisheries and the Environment (DFFE)
Provincial government	Office of the Premier Mpumalanga
	Department of Economic Development and Tourism (DEDT)
	Mpumalanga Economic Growth Agency (MEGA)
	Department of Cooperative Governance and Traditional Affairs (CoGTA)
Local government	Nkangala District Municipality
	Steve Tshwete Local Municipality
Civil organisations NGOs / CBOs / NPOs	Middelburg Business and Unemployment Community Forum (MBUCF)
	Earth Life
	GroundWorks
	Centre for Environmental Rights (CER)
	South African National Civic Organisation (SANCO)
	National Urban Fellows (NUF)
	Practical Radical Economic Transformation South Africa (PRET SA)
	CMR Mpumalanga
Development Finance Institutions (DFIs)	Development Bank of Southern Africa (DBSA)
	Industrial Development Corporation (IDC)
	World Bank
Organised business	The National African Federated Chamber of Commerce and Industry (NAFCOC) Mpumalanga
	Business Unity South Africa (BUSA)
	Middelburg Chamber of Commerce and Industry
	KAMOSO Chamber of Business
	Minerals Council of South Africa
Organised labour	Trade Union Federations
Private sector	Companies involved in the supply of goods and services for the power station
	Local businesses operating in the PSA
PSA communities	Komati/Koornfontein Village, Blinkpan, Goedehoop North, Goedehoop South, surrounding farms
Internal	
Employees of KPS	Permanent and contracted employees
Power station	Management
	HR department

Group	Organisation
	Central Bargaining Forum (CBF)
Eskom HQ	Risk and Sustainability: Environmental Management
	Stakeholder Engagement
	JET office
	CCSD
	CSI
	Gx,
	PED
	R&D
	EXCO, Generation Board and Eskom Board

Following the identification of stakeholders, each group was allocated to the categories specified in Figure 6.1. The outcome of this exercise is depicted in Figure 6.2.

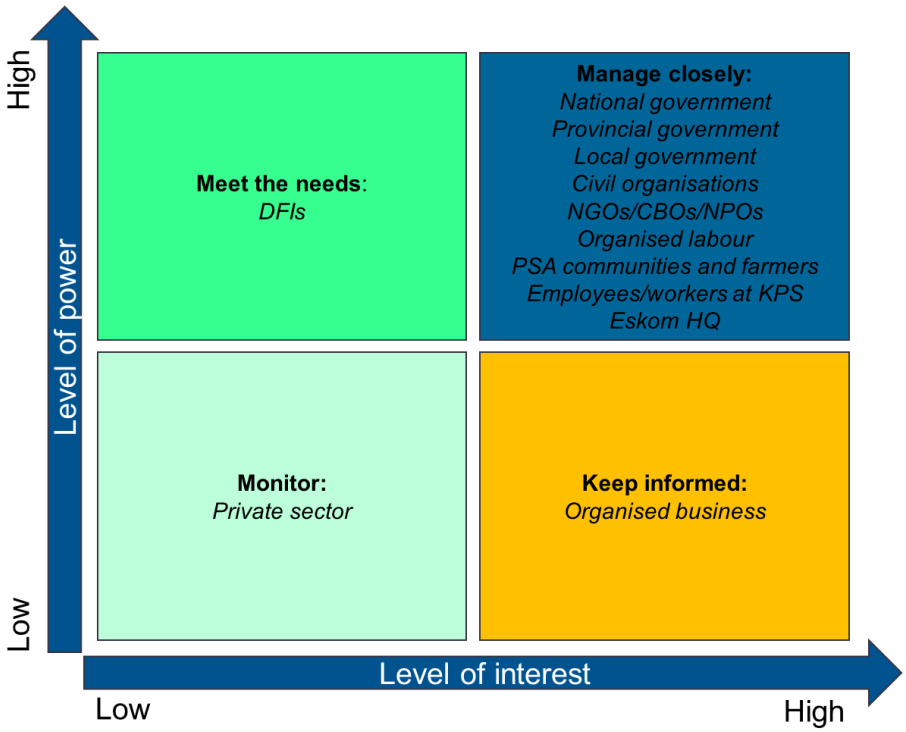


Figure 6.2: Power-Interest Matrix for stakeholder groups

The objectives pursued by the above groups of stakeholders in relation to the study and its outcomes are captured in the following table. The objectives of each stakeholder group provide the justification for its inclusion in the relevant categories of the matrix.

Table 6.2: Stakeholder groups' objectives in relation to the objective

Stakeholder	Objectives of the stakeholder	Level of analysis (H=High, M=Medium, L=Low)	
		Interest	Power
External			
National government	• Ensure shutdown and mitigations are compliant with the regulations and applicable legislation related to safety, environmental protection, public procurement, etc. • Implement national strategies and plans	**High**	**High**
Provincial government	• Attract investment into the area • Grow and develop the economy • Create jobs • Implement provincial strategies and plans	**High**	**High**
Local government	• Implement IDP and other strategic plans • Provide communities with access to services • Address poverty and inequality in the communities • Secure 'vote' of the community members in the upcoming elections • Attract investment into the area • Grow and develop the economy • Create jobs • Implement provision strategies and plans • Collect rates and taxes	**High**	**High**
Civil organisations NGOs/CBOs/NPOs	• Facilitate social development in communities • Interact with the government and identify community needs • Secure funding for their work in communities	**High**	**High**
Development Finance Institutions (DFIs)	• Provide funding in areas and for projects where the market is underfunded • Assist national, provincial and local governments in realising their strategic developmental priorities and objectives	**Low**	**High**
Organised labour	• Protect and advocate for the rights of workers • Advance the interests of the member in the workplace	**High**	**High**
Organised business	• Represent its members in various platforms and engagements • Lobby interests of the business members • Provide a platform for engagement and information sharing of business members	**High**	**Low**
Private sector (directly affected)	• Remain sustainable • Grow a business and profits	**Low**	**Low**
PSA communities	• Good quality of life: health, happiness and comfort • Good standard of living: employment, income, access to services, no poverty, no inequality	**High**	**High**
Internal			

Stakeholder	Objectives of the stakeholder	Level of analysis (H=High, M=Medium, L=Low)	
		Interest	Power
Employees of KPS	• Increase in income • Secure employment • Personal growth opportunities	**High**	**High**
Power station	• Continued operations without disruptions • Social licence to operate • Stability of the environment where the power station operates • High employee morale • Access to skilled labour		
Eskom HQ	• Reliable, predictable affordable electricity • Achieve and ensure business and financial sustainability • Socio-economic transformative link to Eskom contribution • Growing stakeholder confidence • Improve Eskom's image and reputation		

6.3 Study-focused stakeholder engagement process and outcomes

6.3.1 Overview of stakeholder engagements undertaken as part of the study

Stakeholder engagements were conducted in two phases during the course of the study.

During the **first phase**, the engagement was largely centred around the gathering of information/data from various parties of relevance in the region or who were considered as significantly related to the shutdown of KPS (refer to section 1.4.2 for more details). This information was mainly used to inform the situational analysis concerning KPS, inform the shutdown implications and identify possible mitigation measures. During this phase, the outcomes of the study were not communicated to the various stakeholders.

During the **second phase**, engagements followed the same approach as in the first phase. Crucially, this phase allowed for the opportunity to update the information gathered during the first phase, in addition to exploring possible areas of collaboration and partnerships.

The schedule of the engagements during the first and second phases is provided in As indicated, the stakeholder engagements undertaken as part of the study commenced in 2020 and continued into 2022. Given the extended period of time over which the engagements took place, several entities have undergone changes in leadership. As a result, the concerns and recommendations summarised in Table 6.3 are the views of the respective representatives engaged at that time (see Annexure 4). Worth noting is that as engagements progressed, concerns raised by representatives of various entities increased and the sense of urgency to address them and mitigate impacts became more apparent.

Table 6.3. As indicated, the stakeholder engagements undertaken as part of the study commenced in 2020 and continued into 2022. Given the extended period of time over which the engagements took place, several entities have undergone changes in leadership. As a result, the concerns and recommendations summarised in Table 6.3 are the views of the respective representatives engaged at that time (see Annexure 4). Worth

noting is that as engagements progressed, concerns raised by representatives of various entities increased and the sense of urgency to address them and mitigate impacts became more apparent.

Table 6.3: Previous engagements undertaken by Urban-Econ as part of the study

Stakeholder group	Entities represented	Concerns by stakeholders	Recommendations by stakeholders
National government	DBSA	• Concerned over the impact of power stations' shutdown on a provincial level	• No recommendations provided – may assist in funding for projects and support spatial development
	DFFE	• Concerns about the size and scale of the impacts that are to ensue from the shutdown of power stations	• Possibility of collaboration on alien vegetation as a mitigation measure
	the **dtic**	• No critical concerns were raised as the purpose of the engagement was to discuss potential for participation in mitigation measures	• No recommendations provided – areas of involvement by the **dtic** provided (e.g., digital hubs, Nkomazi SEZ and Inkandustria)
Provincial government	DEDT	• Concerned over the impact of the power stations' shutdown on provincial economic sustainability	• No recommendations provided
	Mpumalanga Provincial Government/DEDT	• Concerned over the impact on a provincial level - overview of provincial government initiatives provided	• No recommendations provided – overview of projects undertaken by the provincial government were provided
Local government	Nkangala DM	• No critical concerns were raised – noted the dependency of the DM on the coal value chain and potential employment impacts	• Continuous engagement between Eskom and Nkangala DM is crucial in obtaining updates on the progress of projects
	Steve Tshwete LM	• Concerned over the impact of the KPS shutdown on communities and the local economy	• No recommendations made – emphasised the importance of continuous engagement between Eskom and the LM
	Ward Committee Members/Councillors	• Highlighted that communities suffer from high levels of substance abuse and teenage pregnancies, while many households are child-headed • Concerned over the limited number of ECDs/educational facilities in the area	• Public-private partnerships are crucial in mitigating the impact of the KPS shutdown • Initiatives or projects deployed to mitigate the impact of the KPS shutdown should be owned by community members, where possible

Stakeholder group	Entities represented	Concerns by stakeholders	Recommendations by stakeholders
		• Emphasised the need for employment and economic opportunities for community members • Highlighted the need for access to water and electricity among farm dwellers • Concerned over the participation of community members in economic opportunities	• Community members are to be prioritised in the measures proposed to mitigate the KPS shutdown
Mining houses and organisations	Minerals Council South Africa (with representation from Exxaro, Glencore, AngloAmerican Coal, South32, Seriti)	• Concerned that PSA communities will migrate to areas in which mines are situated. • Concerned about the shutdown and cumulative impacts • Community needs • Loss of trust between local government and mining companies • Stakeholders operating in silos	• No recommendations provided – potential opportunities identified (including industrial hub, projects/programmes through SLPs and reclamation of mine dumps)
	Thungela Resources	• Concerned over the continued provision of water to mining operations	• No recommendations provided
Local CBOs, NGOs & PBOs	Farm Belt Community Economic Development Structure	• Substance abuse in the area • Lack of teachers and educational facilities in the area • Concerned about lack of skills among community members • Reliance on Eskom for employment creation • Continued provision of water and electricity following the shutdown of KPS	• The involvement of community members should be prioritised • KPS should remain operational and should not be shut down • Eskom should be responsible for reskilling/upskilling community members
	JOG Church		
	Thubalethu Community Structure		
	Traditional Council		
KPS suppliers	Various private entities	• Concerned over potential impacts on business operations and employment	• No recommendations provided
Organised business	MCCI	• Involvement of community members in opportunities • Levels of education among community members	• Reskilling/upskilling of local community members will need to be undertaken prior to the deployment of mitigation opportunities

Stakeholder group	Entities represented	Concerns by stakeholders	Recommendations by stakeholders
			• Career expos should be undertaken to inform local pupils and expose them to potential career opportunities • Community members should be regarded as prominent stakeholders in mitigation projects • Partnership opportunities identified (including project management related to the implementation of projects and planning between the Chamber and Eskom)
	MWCB	• Concerned about water and water issues following the shutdown of KPS	• Recommended that ICT barriers are to be addressed as a priority to improve access to markets • Projects undertaken by MWCB include areas such as tyre pyrolysis, plastic recycling and biodiesel, repurposing ash dams and waste rock dams, coal repurposing
NPOs	GreenCape	• No concerns raised	• No recommendations were provided – reference was made to the Alternative Service Delivery Unit project which may be used in the area
	The Impact Catalyst	• No key concerns raised	• No recommendations provided – highlighted different projects undertaken by The Impact Catalyst which may be considered as mitigation measures to be implemented through a partnership approach • Other opportunities: mine water reuse, use of waste/grey water for agricultural purposes
Local communities	Komati Village Koornfontein Village Blinkpan	• Increase in crime due to an increase in unemployment • Loss of employment and income for contract workers and sub-contractors	• Communities should own the majority of infrastructure in the community rather than private entities • Maintenance of facilities should be determined at the

Stakeholder group	Entities represented	Concerns by stakeholders	Recommendations by stakeholders
		• Lack of employment opportunities for community members • Residents moving away/community becoming a ghost town • Loss of income for local businesses, resulting in the closure of local businesses that community members rely on • Loss of electricity and water (water provided by Eskom) • Loss of rental income/demand for local guest houses • Decreases in property values • Uncertainty around the reasons for KPS's shutdown • Concerns about the rehabilitation of the area • Costs associated with relocation if employees are required to move to other stations • CSR projects coming to a halt • Ownership of community infrastructure • Concerned over the participation of community members in proposed interventions Continued provision of basic services, such as water	onset and the local municipality should take ownership of maintaining certain infrastructure • Requested that, if possible, community members should own land that becomes available following the decommissioning of KPS
Local farmers	Driefontein Farm	• Concerned over the continued provision of water by KPS to surrounding mines, which in turn provide water to some farms in the area • Increases in crime due to potential increases in unemployment or migration to the area • Uncertainty over which structures will be retained at the KPS site	• An increased number of police may be required to manage potential crime risks • Some of the infrastructure/structures at KPS that have been provisionally earmarked for demolition should be retained for other purposes (e.g., installation of security measures to monitor a wider area)
	Koornfontein Farm		
	Bultfontein Farm		
	Goedehoop Farm		

Stakeholder group	Entities represented	Concerns by stakeholders	Recommendations by stakeholders
Local small businesses	Businesses located in communities surrounding KPS	• Concerns were raised over the potential impact of the KPS shutdown on business operations and revenue as workers at the power station are considered a key client base • Emphasised the importance of KPS to sustain communities • Concerned about the continued provision of basic services, such as water • Emphasised potential increases in crime following the shutdown of KPS	• No recommendations provided

6.3.2 Eskom-facilitated stakeholder engagement process and outcomes

Apart from the above, Eskom has also undertaken extensive **engagements with several stakeholders on the repowering and repurposing of KPS**, and Eskom's JET. Table 6.4 provides a summary of the engagements undertaken by Eskom in this regard.

Table 6.4: Eskom-facilitated engagements

Date	Stakeholder entities	Type	Purpose of engagement/concerns
25 April 2022	• DMRE	External	Engagement between Eskom and DMRE at KPS specifically focusing on the JET and its overall contribution to decarbonisation.
5-6 May 2022	• Presidential Climate Commission (PCC)	External	Eskom participated in one of the PCC's stakeholder and community engagement sessions where JET opportunities were submitted.
10 May 2022	• Steve Tshwete LM	External	Concerned about potential increases in unemployment and declines in the tax base due to the shutdown of KPS and mine closures. Highlighted potential increase in the number of undocumented individuals and indigents in the area. Concerned about potential mushrooming of informal settlements. Identified that the shutdown of KPS may increase infrastructure and basic services needs
9-11 May 2022	• DFFE • DMRE • Steve Tshwete LM • the **dtic**	External	Eskom facilitated engagements between the World Bank and DFFE, DMRE and Steve Tshwete LM around the E-JETP. The engagements were centred around environmental management policy, energy policy, local government municipal management and the overall ecosystem to support E-JETP.

Date	Stakeholder entities	Type	Purpose of engagement/concerns
			Engagements with the **dtic** were specifically on the microgrids intervention and possible areas of collaboration with the Black Industrialists Programme (BIP).
20 May 2022	• British High Commission • COP26 Delegation visit to KPS	External	Eskom undertook various engagements with the British High Commission in preparation for the COP26 Delegation visit to KPS. The purpose of the COP26 engagement was to expose the COP26 delegation to the repowering and repurposing initiatives being implemented at KPS. As part of this, the COP26 President attended meetings with Executive Mayors, the Mpumalanga Provincial Government and other prominent stakeholders.
23 May 2022	• Chamber of Commerce and Industry • SANCO • DEDT • Nkangala DM Mayor • Gert Sibande DM Mayor • Emalahleni Mayor • Steve Tshwete LM Mayor	External	Eskom provided insight into its sustainable future through the JET and outlined how collaboration with Mpumalanga Province could facilitate sustainable economic growth and development. This was followed by the signing of a Memorandum of Agreement (MOA) between the Mpumalanga Provincial Government (MPG) and Eskom on the 24th of May 2022. The purpose of the MOA is to strengthen cooperation and provide a framework to enable the roll-out of initiatives determined through the Mpumalanga Economic Reconstruction and Recovery Plan (MERRP) and the Eskom Turnaround Plan. The MOA seeks to obtain the necessary technical, political and security support to strengthen and stabilise Eskom's operations in the province.
30 May 2022	• Ambassador of Spain	External	Eskom and the Spanish embassy conducted an introductory meeting to discuss Eskom's JET, repowering and repurposing. The Ambassador indicated Spain's interest in collaborating to ensure the sustainability and stability of South Africa.
5 and 14 July 2022	• Mpumalanga Provincial Government	External	Concerned over the impact of the transition on the livelihoods and future of affected communities. Raised concerns over the implications of the shutdown on the coal value chain, housing market and national electricity generation capacity and prices. The primary focus of the JET should be retained to all residents in the Province and not just the power stations. An integrated plan should be followed to address the shutdown of power stations in South Africa.
2 August 2022	• Nkangala DM	External	Concerns around the involvement of local businesses. Emphasised the importance of reskilling/upskilling and the development of SMMEs. The need for collaboration was further emphasised through constant communication between Eskom and the DM.

Date	Stakeholder entities	Type	Purpose of engagement/concerns
			Community ownership in the JET was emphasised, while local community members are to be capacitated and linked to opportunities through a consultative forum. Locals are to be hired for general work and artisans.

Eskom has undertaken engagements concerning the shutdown of KPS and repurposing as part of the JET and repowering/repurposing at national, provincial and local government levels. These engagements are strategic in nature on the JET, repowering/repurposing, funding and identification of potential partnerships. Apart from Eskom's engagements, the World Bank has also initiated engagements with various entities including the DPE, DMRE, National Treasury, DMs and LMs and research institutions as part of the funding request preparations for the World Bank missions to South Africa.

6.3.3 Key concerns and recommendations

The below figure provides an overview of the key concerns raised by the stakeholders consulted as part of the study. Crucially, these concerns were considered as part of the identification of initiatives included in the KPS mitigation strategy with the aim of ensuring that the concerns of stakeholders are accounted for in a holistic manner.

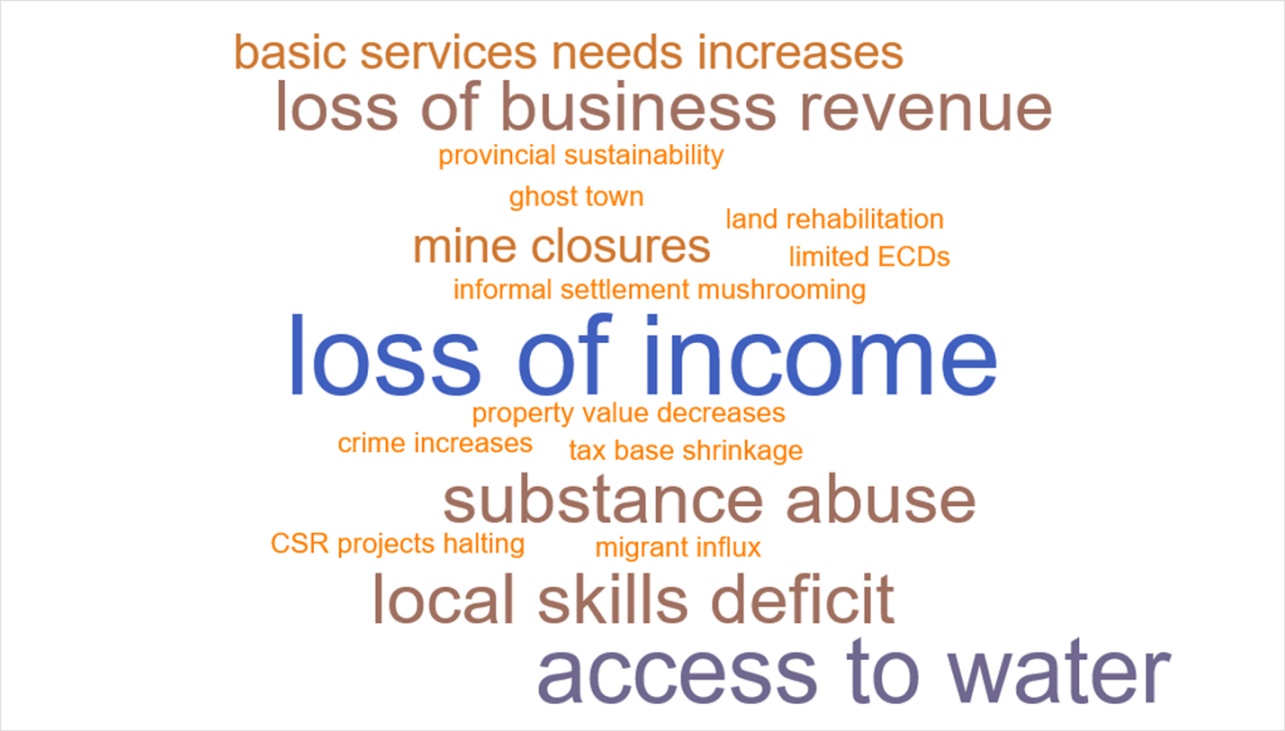


Figure 6.3: Summary of concerns raised by stakeholders

Among some of the greatest concerns raised by the respective stakeholders is the inclusion or participation of community members in the economic opportunities brought about by the proposed mitigation measures. This stems from the high levels of unemployment in the area, in addition to the need for reskilling/upskilling of community members. In addition, several concerns were raised pertaining to the potential impact of the KPS shutdown on the operations and viability of the businesses in the area, given that workers that participate in the operations of KPS are considered a vital client base and source of income for local businesses. Engagements also revealed that stakeholders are concerned about the continued provision of basic services in the area, specifically the continued provision of water.

Concerns on the sustainability of the Mpumalanga province were also raised as part of stakeholder engagements, which stem from both the impact of the shutdown of KPS and the impact on coal mining operations. In addition, the shutdown of KPS was anticipated to result in a potential migration of individuals to areas surrounding mining sites and the mushrooming of informal settlements, which increases the need for infrastructure and basic service delivery. Lastly, the shutdown of KPS is expected to contribute to the increase in social ills, such as teenage pregnancies and substance abuse, while potentially increasing crime in the area. In summation, many of the concerns raised by stakeholders ultimately stem from the shutdown of KPS, of which stakeholders have indicated uncertainty over the reasons for the shutdown.

Figure 6.4 illustrates the key recommendations made by the various stakeholders relevant to the study, thus, the shutdown of KPS and the proposed mitigation measures. Similar to the concerns raised by stakeholders, a key recommendation identified is the participation of community members in the proposed mitigation measures, in addition to ownership of initiatives by communities. Furthermore, the need for collaboration among various stakeholders and the need for public-private partnerships to drive the proposed mitigation measures. This is to be facilitated through continuous stakeholder engagements. As such, the prioritisation of community participation was emphasised in various engagements. In addition, collaboration among stakeholders has been identified as a key enabler for not only the proposed mitigation measures but also the broader JET. This may be facilitated through the Memorandum of Agreement (MoA) between Eskom and the Mpumalanga Provincial Government.

Stakeholder engagements revealed that the responsibility of the broader JET is to be shared between the various stakeholders, including Eskom and various levels of government and departments. Given the shared responsibility of the JET, stakeholders have also emphasised that the proposed measures to mitigate the shutdown of the KPS and other coal-fired power stations need to be aligned with the JET to ensure the sustainability of communities reliant on the operations of the power stations and the broader province. This, as recommended by stakeholders, is to be accompanied by reskilling/upskilling interventions to uplift communities. In summation, the shutdown of KPS and the implementation of measures to mitigate the potential impacts arising from its shutdown should be undertaken through an integrated approach.

Figure 6.4: Summary of recommendations made by stakeholders

Apart from the concerns and recommendations raised and made by the various stakeholders throughout the engagements, the following **lessons were learned**:

- Communication and consultation with stakeholders are critical to secure the buy-in of any possible plan that is created.
- Public participation needs to follow correct/suitable routes (i.e., consultation with some more prominent stakeholders may have to be undertaken before engaging with other stakeholders) and acknowledge the structure of each local community (i.e., recognising prominent community leaders and traditional authorities).
- Communication should start right from the beginning of the project to inform and raise awareness, and then proceed throughout the study.
- Eskom and its respective power stations have existing and established channels of communication with various stakeholders. These channels need to be utilised as far as possible.
- Surveying is fast-tracked if questionnaires are clear and available in languages that are commonly spoken in the area.
- Collaboration with local representatives or appointed community representatives is critical to facilitate participation.
- Venues are to be accessible for disabled individuals to allow inclusiveness and comprehensive participation.

- The hiring of local labour to conduct surveys assists in cost-saving, facilitates skills development and speeds up the completion of surveys.
- Disclosure of the project scope and purpose before consultations was found to facilitate constructive discussions.

7 SOCIO-ECONOMIC IMPACT ASSESSMENT

This section provides a socio-economic impact assessment regarding the possible effects of the KPS shutdown. The assessment seeks to determine the significance of these impacts and provide a basis for identifying possible mitigation measures. The latter could be implemented to reduce or possibly eliminate the negative effects of the shutdown and, where relevant, enhance the positive impacts. These mitigation concepts are expanded on in Section 8. It is important to note that the impacts presented in this section reflect the **no mitigation scenario**, i.e. if no measures are implemented to mitigate the potential employment and economic losses.

7.1 Impact assessment map and impact assessment approach

Through information gathered from primary and secondary data sources, several triggers and associated socio-economic impacts that may ensue from the shutdown were identified. Figure 7.1 illustrates the socio-economic impacts categorised in terms of the socio-economic capitals, thus providing an insight into how analysis of the impacts is structured throughout this section.

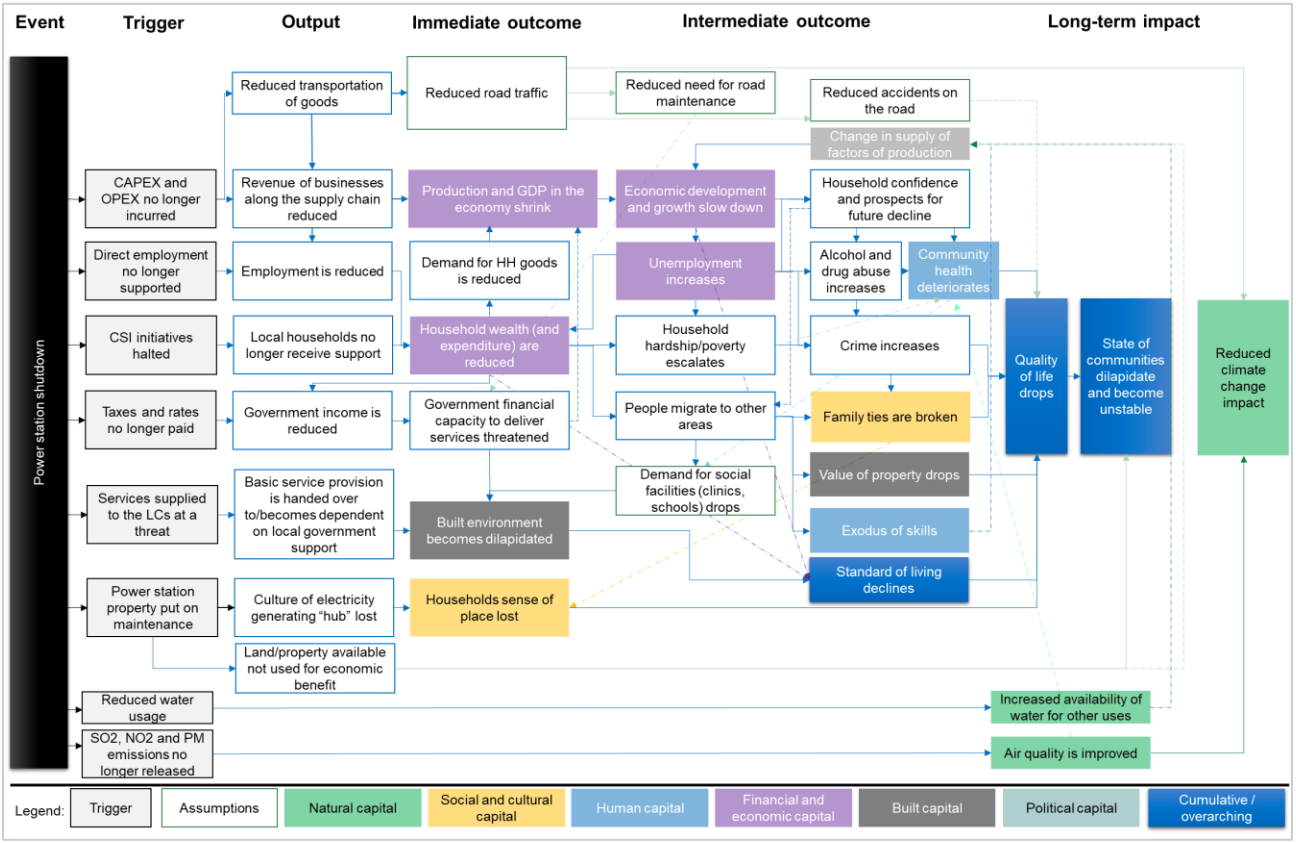


Figure 7.1: Socio-economic impacts map linked to socio-economic capitals

Figure 7.1 shows that the shutdown of the power station will create numerous triggers, including a reduction of capital and operating expenditure, loss of on-site employment opportunities, reduction in payment of rates and taxes to government, reduction in air emissions from the power station, and potential disruption of the services that the power station has been providing to local communities. The majority of these triggers will have numerous negative socio-economic implications and some positive impacts.

For example, the reduction in capital and operating expenditure will lead to a reduction in business revenue along the power station's backward linkages, including the transport of coal to a power station either by road or rail. The reduced procurement of goods and services from businesses will lead to reduced production and value-added generated in the economy, which will **slow down the growth** of the respective economies. Furthermore, the reduction in the revenue derived by businesses along the supply chain of the power station and retrenchments at the power station itself will translate into a **loss of employment** opportunities, leading in turn to a **reduction in household income**. The reduced household income will lead to a reduction in demand for household goods in the area, which will further reduce the demand for goods and services provided by local and non-local businesses. This is likely to exacerbate the situations in the respective economies and amplify their sluggish development. Slower development will ultimately become part of the cumulative negative effect exerted on households, adversely affecting **quality of life** and leading to the **dilapidation of communities**. Further analysis of the linkages is included in the examination of each impact provided below.

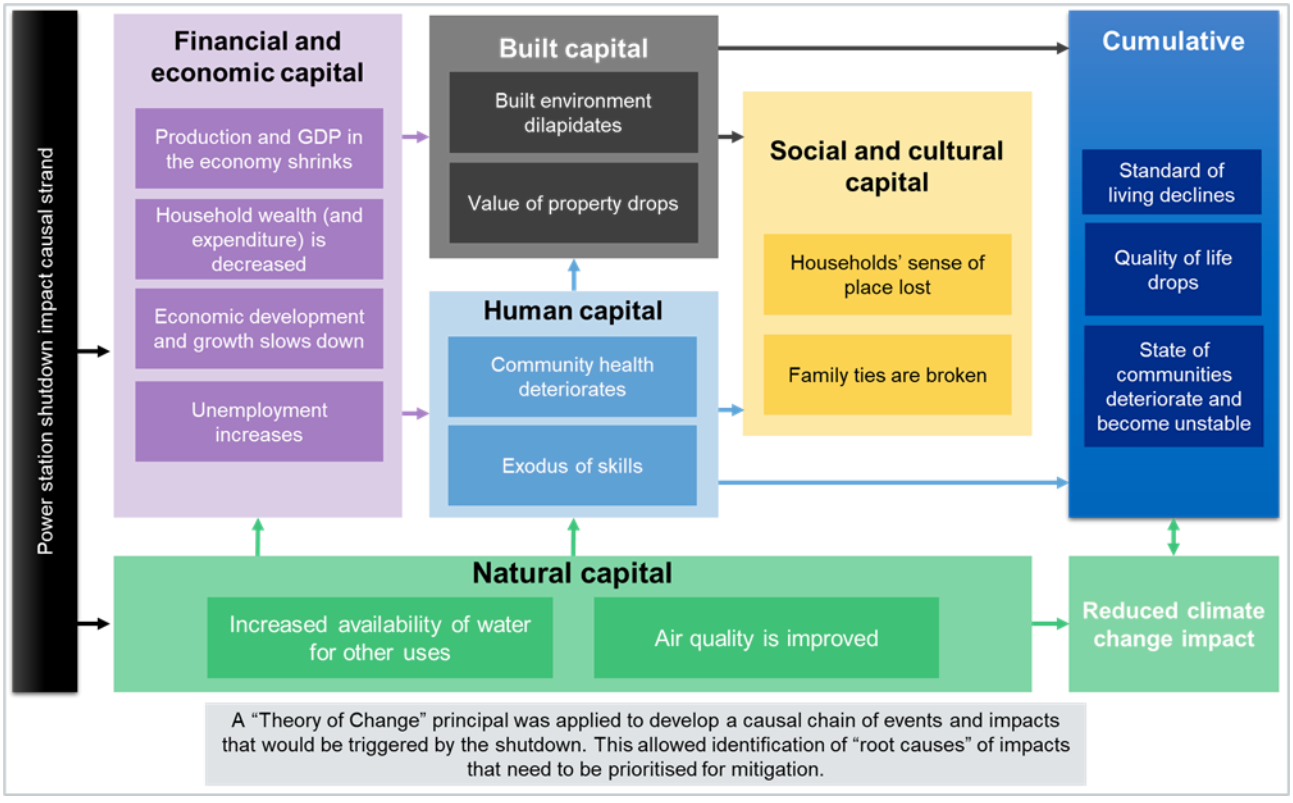


Figure 7.2: Impact assessment at the community capital level

For ease of analysis, Figure 7.1 can be further simplified as shown in Figure 7.2, which illustrates the interlinkages among impacts at the community capital level.

Figure 7.1 and Figure 7.2 illustrate the generic chain of events and their preconditions that are envisaged to occur if one of the power stations is shut down. However, the significance of each immediate and long-term impact will depend on the context – local and regional – in which such impacts take place. This is why the assessment of these impacts needs to be conducted considering the socio-economic baseline profile outlined in Section **Error! Reference source not found.**.

Determining the significance of impacts is done by following the methodology provided in Table 7.1. In line with the best practices for socio-economic impact assessment, impacts are evaluated in terms of extent, duration, magnitude and probability of occurrence. The combination of these factors facilitates the determination of the overall significance of an impact.

Following the assessment of impacts, concepts for mitigation measures to reduce the negative effects or to enhance the positive impacts are identified. At this stage, these mitigation measures are provided simply as a principle or as a concept. These principles and concepts will be refined and translated into tangible measures in the next section of the study, which focuses on the development plan.

Table 7.1: Impact evaluation methodology

Aspect	Ranges
Extent (E)	» Impact is concentrated in the immediate zone of influence – on site or immediately adjacent to the power station (5) » Impact is concentrated in the primary study area of the power station (4) » Impact is spread over the greater region and will be dispersed across the entirety of Mpumalanga (3) » Impact will be dispersed across the entire country (2) » Impact will affect the international community (1)
Duration (D)	» Very short duration, 0–2 years (1) » Short duration, 2–5 years (2) » Medium-term, 5–15 years (3) » Long-term, > 15 years (4) » Permanent (5)
Magnitude (M)	» Insignificant: no effect on socio-economic environment (0) » Minor: the effects on socio-economic conditions within the defined extent are barely perceptible and will not change the existing processes (2) » Low: the change in the socio-economic conditions in the context of the extent will be noticeable but slight, requiring only some adjustments by socio-economic agents (4) » Moderate: socio-economic conditions within the defined area (i.e., extent) will be noticeably modified and will require significant adjustments on the part of socio-economic agents to maintain stability; the socio-economic environment continues to function but in a modified way (6)

Aspect	Ranges
	» High: socio-economic conditions within the defined area (i.e., extent) will be altered to such an extent in the defined area that some of it will temporarily cease to exist; the continued viability of the existing socio-economic environment is severely impaired and social stability is threatened (8) » Very high: complete destruction of the socio-economic environment and a complete collapse of the socio-economic system within the defined area (10)
Probability (P)	» Highly improbable: probably will not happen (1) » Improbable: some possibility but low likelihood (2) » Probable: distinct possibility (3) » Highly probable: very likely (4) » Definite: impact will occur regardless of any preventative measures (5)
Significance (S)	Calculated using the following formula: S=(E+D+M)*P » < 25 points: Low (i.e. the impact does not influence the social stability of the area and does not have a direct influence on future development decisions) » 25-39: Low to medium (i.e. the impact could noticeably affect the social stability and may need to be mitigated) » 40-60 points: Medium (i.e. the impact would threaten the stability of the area and requires targeted mitigation) » > 60 points: High (i.e. the impact is severe and requires extensive mitigation)

Detailed impact tables for each considered impact that were compiled using the methodology described above are provided in Annexure 1. **Error! Not a valid bookmark self-reference.** provides a summary of the various impacts.

Table 7.2: Summary of socio-economic impacts – no mitigation scenario

Impact	Nature	Significance
Natural capital		
Availability of land where KPS is located, as a factor of production	Positive	**High**
Availability of water previously consumed by KPS for other productive uses	Positive	**High**
Improved air quality due to reduced emissions by KPS	Positive	**Medium**
Financial and economic capitals		
Jeopardised prosperity and growth of the KPS PSA economy	Negative	**Medium**
Slowdown of provincial growth and development due to the shutdown of KPS	Negative	**Medium**
Increase in unemployment in the PSA of KPS	Negative	**Medium**
Increase in unemployment in Mpumalanga due to shutdown of KPS	Negative	**Medium**
Declining household income and wealth in the PSA of KPS	Negative	**Medium**
Social capital		

Impact	Nature	Significance
Loss of social cohesion and family ties in the KPS PSA	Negative	Low to medium
Loss of sense of place due to KPS shutdown	Negative	Medium
Human capital		
Deterioration of health of KPS PSA communities	Negative	Medium
Exodus of skills from the KPS PSA	Negative	Medium
Built capital		
Loss of property value in the PSA of KPS	Negative	Low to medium
Dilapidation of built environment in KPS PSA	Negative	Low to medium

7.2 Impact on natural capital

The purpose of this subsection is to present the assessment of socio-economic impacts on natural capital associated with the shutdown of KPS. The analysis of impacts is done following the categorisation of impacts in terms of the socio-economic capitals.

7.2.1 Impact on availability of land as commercial property

Land is one of the four major factors of production along with labour, entrepreneurship and capital. Land is usually associated with natural capital but can also be viewed as a source of commercial real estate. As indicated in Figure 7.3, the shutdown of a power station will result in the land where the power station is located no longer having the same property value as was the case while KPS was operational, thereby influencing the supply of factors of production. If this opportunity is capitalised on, it may lead to economic development and growth in the area, which will ultimately influence the standard of living of local communities.

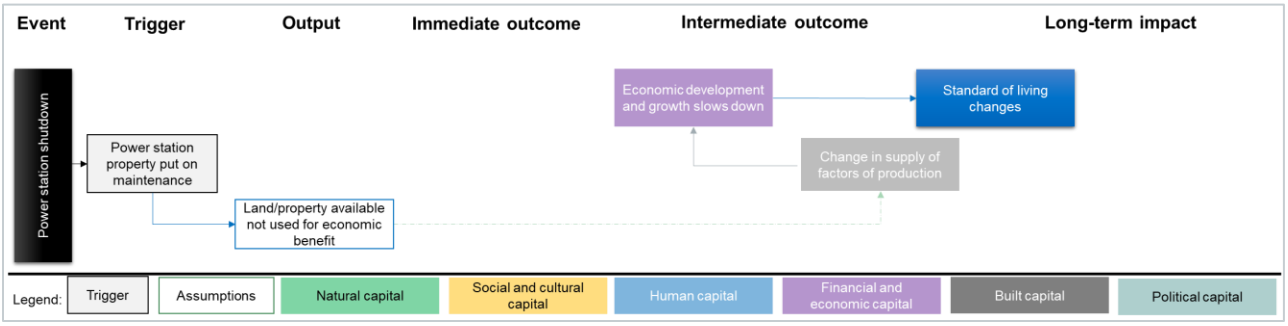


Figure 7.3: Impact on availability of land as commercial property causal chain

7.2.1.1 Impact assessment

The analysis of natural resources that was presented in Section 3 of the study showed that the KPS PSA is rich in coal reserves and various other mineral resources. Furthermore, it was determined that the PSA has

moderate- to high-potential arable land and that there are extensive commercial farming activities in the area. Due to the abundance of natural resources that enable the exploitation of land in the area, the conflict between agricultural and mining land uses in the KPS PSA is apparent. An analysis of the maps included in Section 3 illustrated that some of the mining and quarrying activities occur in areas that have marginal- to high-potential arable land, thereby limiting the potential income from and development of the agricultural sector (as well as of other economic activities in the area).

Whether used for the exploitation of mineral resources or agricultural potential, the introduction of new activities may lead to the sterilisation of these resource potentials, which may not be the most optimal use of land. The shutdown of the power station, however, will create an opportunity for alternative uses of land that has been previously used for electricity generation and therefore has already been sterilised for the exploitation of mineral resources or agricultural production. This impact will, therefore, be bound by the footprint of the power station and will be concentrated in the IZOI.

As KPS will be shut down permanently, land on the site of the power station will be made available. However, it should be noted that the land that is made available will be Eskom-owned land but may be available for alternative uses, i.e. repowering or repurposing while making use of some of the infrastructure and equipment that is to be retained.

Impact	Nature	Significance
Availability of land where KPS is located, as a factor of production	Positive	High

7.2.1.2 Mitigation measures concept

The land where the power station is currently located creates an opportunity for introducing innovative uses that align with both Eskom's future vision for JET and government objectives related to sustainable development. To mitigate the loss of productive uses of land, the site and its surrounding properties could be reused for other industrial activities, such as energy production or storage or repurposed for economic activities that are not linked to power generation. Failure to reuse the land will result in a lost opportunity to diversify the local economy and create new jobs that could improve the quality of life of the residents.

7.2.2 Impact on availability of water

Water is one of the primary inputs for the generation of electricity using coal. Water is converted into superheated steam which is used to rotate a turbine connected to a generator; this generator then converts mechanical energy into electrical energy. A significant volume of water is thus required to generate electricity using coal.

The shutdown of a power station implies that the water usage on site will be significantly reduced, even if the facility is placed under maintenance. This impacts factors of production and creates opportunities for alternative uses of water to be explored subject to availability and DWS authorisation and re-licensing. A combination of other factors such as entrepreneurship, capital, labour and financial resources can lead to the generation of added value where water is one of the primary inputs. This, in turn, can stimulate economic development and change residents' standard of living.

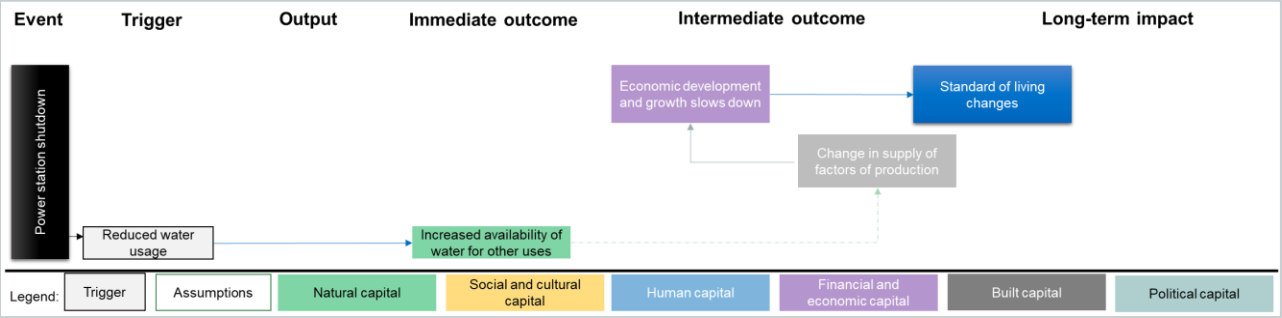


Figure 7.4: Impact on the supply of water as part of the land factor of production causal chain

7.2.2.1 Impact assessment

In 2018/2019, the average water consumption among Eskom's fleet of power stations stood at 1.41ℓ/kWh. Given that KPS generated 1 504 GWh of electricity in 2019/2020, the estimated consumption of water by the power station during that year equated to 2 120 Mℓ. With the shutdown of the power station, this water will no longer be consumed by the facility, freeing it for other productive uses or to help ensure water security in the catchment. Given that the Free Basic Water standard in South Africa has been set at 25ℓ/person/day, the water saved through the KPS shutdown would equate to free basic water for about 232 000 people for a full calendar year. The amount of water to be saved or diverted to other productive uses at the regional level is thus substantial.

Impact	Nature	Significance
Availability of water previously consumed by KPS for other productive uses	Positive	High

7.2.2.2 Mitigation measures concept

The reduced demand and subsequent consumption of water create opportunities for alternative exploitation of this natural resource to better the socio-economic environment in the area. This opportunity could be explored in combination with the arable land that is available in some parts of the PSA, which could assist in diversifying the local agricultural sector. As the current licence restricts water use for existing power production and supply of potable water, any changes to water use and amounts require authorisation. Securing a water licence from the relevant authorities, however, is linked to a possible risk that will need to be managed.

7.2.3 Impact on ambient air quality

Electricity generation using coal leads to emissions of CO_2, SO_X NO_X and particulates, which have an adverse effect on people and the environment. While GHG emissions contribute to climate change, the emissions of SO_X, NO_X, and particulates degrade the quality of air at local and regional levels, negatively impacting communities located downwind of the power stations. Poor air quality has adverse long-term implications for human health. It can lead to the development of bronchitis and asthma, which in turn leads to increased healthcare costs and reduced labour force productivity.

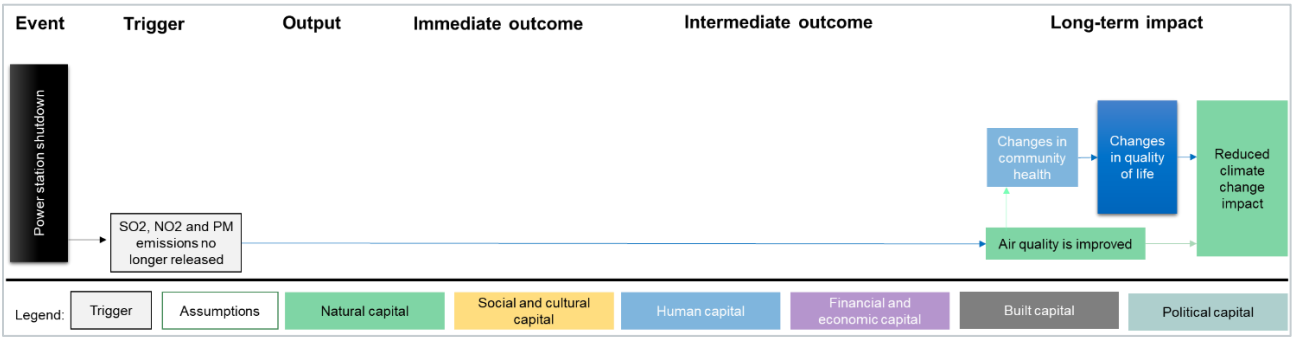


Figure 7.5: Impact on air quality causal chain

7.2.3.1 Impact assessment

During the engagements with community representatives, tuberculosis (TB) and chronic illnesses were identified as being among the major health issues with which the local population is confronted. TB is caused by a slow-growing bacteria (Mycobacterium tuberculosis). These illnesses were perceived to be linked to coal dust and air pollution from surrounding mines and the power station. The reality is that ambient/local air quality is impacted by a range of factors. While Eskom power stations and other industries do add to the total pollution load in the Highveld, local sources of pollution (dust from roads, ash dams and mines; household fuel use; biomass burning; etc.) also contribute to air quality problems in areas surrounding KPS. It is scientifically difficult to draw a direct relationship between power station emissions and local air quality problems, but the shutdown of stations will nonetheless reduce the total air pollution load in the Highveld.

According to the monthly emission reports produced by Eskom for KPS, the power station released about 305.7 t of particulate matter (PM), 9 901 t of sulphur dioxide (SO_2), and 8 930 t of nitrogen dioxide (NO_2) into the atmosphere during the 2019/2020 period. The shutdown of the power station will result in a complete halt of stack emissions; however, other emission sources such as roads and ash dumps/dams will need to be managed to avoid them becoming local problems. This will be an ongoing improvement in the medium to long term. The magnitude will be low- to medium-impact since a direct relationship cannot be drawn between stack emissions and ambient air quality, especially around an individual station and given that the station has been generating so little in the past few years.

Impact	Nature	Significance
Improved air quality due to reduced emissions by KPS	Positive	Medium

7.2.3.2 Mitigation measures concept

The shutdown of KPS and associated reduction in air pollutant load in the area where the power station is located may have a positive, long-term and definite impact on the health of individuals living in the area which in turn may improve productivity levels of the local labour force. The extent to which this materialises will be correlated to continuing levels of household fuel consumption and biomass burning. The impact is expected to be ongoing once the station is shut down. This will, however, require introducing new economic activities on site that will be associated with a significantly lower negative impact on the environment, specifically air

quality. The presence of agricultural activities that are already observed in the areas, which are generally associated with rural and relatively eco-friendly activities, also provides an opportunity to reverse perceptions that the area has poor air quality.

7.3 Impact on financial and economic capital

7.3.1 Impact on prosperity and growth of the economies of the PSA

Viable communities are those in which people believe they can reside for long periods and find sources of income. While a community's viability is dependent on various conditions, one of the most important factors that influence its status is its levels of development and prosperity as these create jobs and enable community members to earn a sustainable income.

The level of development and prosperity of a community is reliant to some extent on the continuity and productivity of monetary resources spent in the area. During the power station's operations, these investments largely took the form of capital and operating expenditure undertaken by KPS. Once the power station is shut down, this capital and operating expenditure will be drastically reduced, which will lead to a decline in revenue earned by businesses along the power station's supply chains. Due to the multiplier effect, this will lead to an immediate reduction in the production and GDP of the economy where KPS, businesses supplying to the power station, and its suppliers are located. As illustrated in Figure 7.6, this reduction will – in turn – lead to a slowdown of the economy.

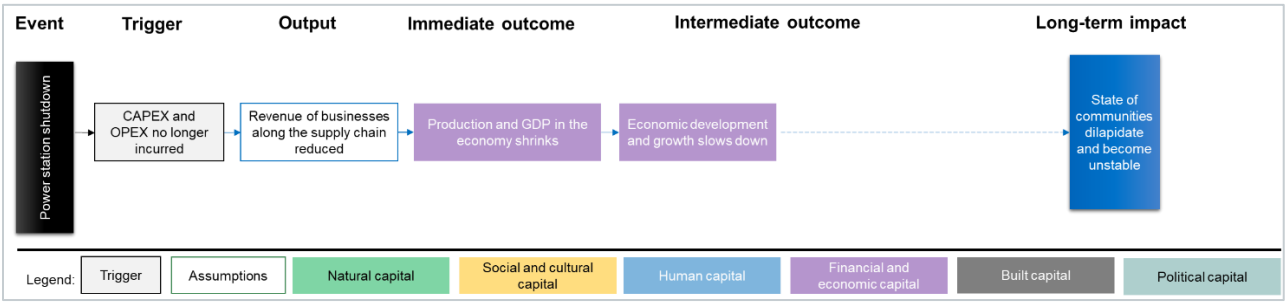


Figure 7.6: Impact on the development and growth of the community causal chain

7.3.1.1 Impact assessment

Businesses and communities [11] have been established and sustained through economic opportunities presented by the power station, mines and agricultural activities carried out within the area. The growth of the local economy, particularly that of the PSA, has been attributable to the buying power of local households, which are dependent on formal and informal economic activities. Notably, informal income-generating activities have a strong reliance on prospects created through the operation of the power station. Therefore, the

[11] The term "businesses and communities" refers here to entities located within the Komati PSA as well as those located outside of the PSA – but which provide goods and services to KPS.

shutdown of KPS will have a direct bearing on the sustainability of businesses in the communities within the KPS PSA.

The reliance of communities on the power station's operations (due to direct and indirect employment opportunities) means the shutdown of KPS will limit income-generation options and consequently result in less disposable income in the local economy. The shutdown of the power station will lead to a total loss of R19 million (in 2020 prices) of income per annum by households in the Komati PSA (refer to Figure 5.8). This loss is anticipated to reduce household consumption by approximately R9 million, affecting businesses that are heavily reliant on local purchasing power. The negative effects are likely to be experienced by local street vendors, retail facilities, transportation businesses and community services, including education facilities and personal services such as health and beauty. Coupled with the loss of the direct contribution by the power station towards production, this will reduce the GDP of the PSA economy by R321 million (in 2020 prices) (refer to Figure 5.8). As a result, the growth potential of the area will be reduced and viability of communities threatened.

Since the power station will be shut down permanently, the impact will be permanent. Furthermore, since the shutdown is definite, the likelihood of the impact occurring and its effect on the affected communities (given their dependency levels) is also definite. This, coupled with the magnitude of the impact in the context of the PSA economy, means that the overall significance of the impact is rated as medium.

Impact	Nature	Significance
Jeopardised prosperity and growth of the KPS PSA economy	Negative	Medium

7.3.1.2 Mitigation measures concept

As indicated above, the impact on the viability of the communities could be quite devastating and requires attention. Mitigating decline in the development of any economy can only be done by investing in the area. However, such investment needs to be holistic and – most importantly – efficient and effective. That is, it should ensure long-term sustainability and capitalise on local competitive advantages.

If the negative impacts on the prosperity and development of local communities are not adequately mitigated, there is a risk of social unrest – something for which the areas surrounding the power station under analysis are already known. Social unrest can lead to violent protests, which may prompt an escalation of crime in the area. All these risks will need to be closely monitored.

7.3.2 Impact on provincial economic growth and development

The effects of the reduced capital and operating expenditure of the power station will slow down the associated economies. This subsection focuses on an assessment of the impact at the regional level, i.e. that of the province.

7.3.2.1 Impact assessment

Mpumalanga has a strong mining sector and is a key contributor to approximately 80% of South Africa's coal and other minerals. Other key sectors in the province include the wholesale and retail trade, catering and

accommodation, and manufacturing sectors. As noted in Section 3, the economy of Mpumalanga depends significantly on the coal value chain.

With the shutdown of KPS, the provincial electricity sector's value-added will contract by 1.5%, while the LM's electricity sector will shrink by 6.9%. However, the negative effects on the electricity sector will account for only a fifth of the total losses in the economy: with multiplier effects increasing the negative impact, the Mpumalanga economy will ultimately lose a total of R1 209 million in GDP (2020 prices). This amount represents 0.34% of the size of the economy in 2020. Given that the highest economic growth rate of the province in the past decade was 2.4% in 2014, the anticipated decline in GDP represents a significant potential erosion of Mpumalanga's development.

Just under a third of the GDP that is likely to be lost in the provincial economy due to the shutdown of KPS will be lost in the mining sector. This impact will not be immediate and will take place after the coal supply contracts expire. It will be linked to the duration of the shutdown period or will last until the demand for coal is renewed. The above suggests that the duration of the impact is likely to be permanent and the impact itself noticeable. Lastly, the likelihood of the impact occurring is highly probable, thus making the overall significance medium.

Impact	Nature	Significance
Slowdown of the provincial growth and development due to the shutdown of KPS	Negative	Medium

7.3.2.2 Mitigation measures concept

The negative impacts of the shutdown of the power station will spread beyond the PSA and be distributed throughout the province, although a notable portion of the impact is to be concentrated in Nkangala DM (due to the procurement value chains of the power station). Two thirds of the impacts will take place as a result of production- and consumption-induced impacts.

Mitigation of these impacts will require considerably greater political power than Eskom alone holds, and partnerships with the local and provincial governments as well with as corporates in the province will be integral to ensuring that the negative effects on provincial development are addressed holistically. There is a risk of power play among the different spheres of government, particularly between local and provincial spheres, something that could significantly stall the implementation of projects. Bureaucratic processes linked to approvals may also impede the success of a plan. Nonetheless, the initiatives and interventions that will need to be considered as part of the mitigation plan will need to extend beyond what Eskom can champion and include projects that are owned and implemented by other stakeholders.

To ensure the success of such projects, the initiatives need to be financially viable and have adequate funding while also being accepted by local communities. This, in turn, suggests that the projects implemented throughout the province to mitigate the potential negative impacts of the power station's shutdown must form part of government plans or business expansion plans and must consider the local communities. Furthermore, given the potential losses in the provincial economy, such plans need to include landmark initiatives that revolve around one or two anchor projects and enable the development of the entire cluster of businesses around it.

7.3.3 Impact on employment in the PSA

Slow economic development and growth may lead to job shedding. This, in turn, will lead to an increase in unemployment, as outlined in Figure 7.7, either directly or through reduced demand for goods and services required by the power station and households. The worsening of the employment situation in an area has numerous negative effects, including reduced household wealth and negative perceptions among community members with respect to the future of the area and their ability to find a sustainable income and live meaningful lives.

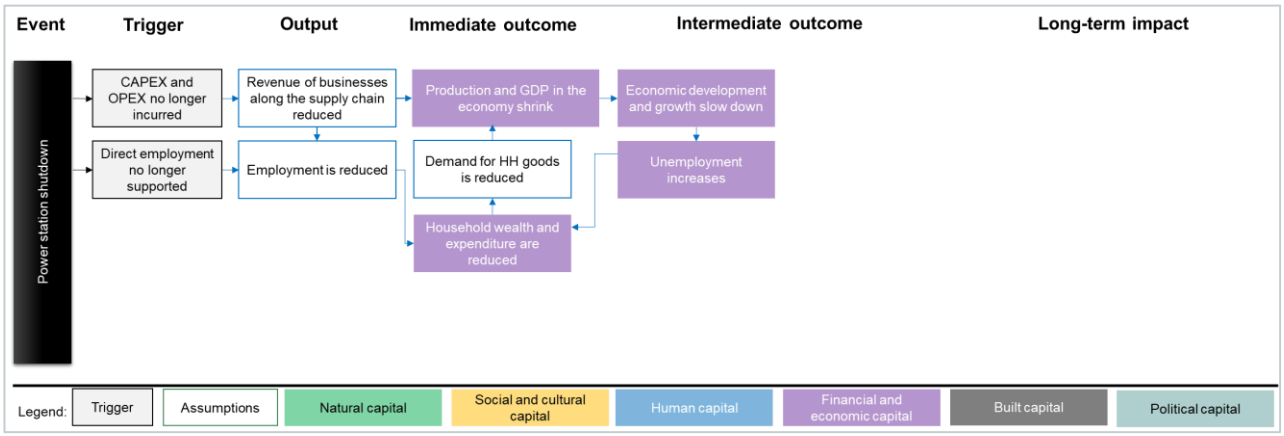


Figure 7.7: Impact on employment causal chain

Due to the linkages between production and employment impacts, the effects on employment can be analysed from a different spatial perspective. This part of the section focuses on an analysis of the impact on employment in the PSA of the power station while the following subsection examines the effects at the provincial level.

7.3.3.1 Impact assessment concept

As described in Section 3, most members of communities in the PSA are employed in the mines, on the farms, at Eskom and in retail and personal services. In 2011, the KPS PSA had fewer than 2 000 people employed, which is envisaged to be lower at the moment given the closure of Koornfontein mine since the Census 2011. As indicated in Table 3.8 and Table 5.4, only 41 individuals employed at KPS were residing in the PSA. The rest were living in the feeder communities and outside Mpumalanga.

The shutdown project will result in the loss of 38 direct and indirect FTE employment positions by people who reside in the PSA. Job losses at the power station will reduce overall household wealth and expenditure in the area, which will lead to lower demand for personal services and products offered by the retail and trade sector. Reduced employment may also cut demand for agricultural commodities. The potential job loss represents about 0.04% of employment in the PSA in 2011, making it a noticeable impact in the context of the local area.

While the impact is most likely to take place, the duration of this impact will be short term due to the nature of the shutdown. The magnitude of the impact's assumed duration and the probability of the impact affecting the communities are of medium significance.

Impact	Nature	Significance
Increase in unemployment in the PSA of KPS	Negative	Medium

7.3.3.2 Mitigation measures concept

To address the impact associated with the potential increase in unemployment, the mitigation measures proposed for the impacts associated with the threat to the prosperity and growth of the PSA need to be implemented. These mitigation measures will lead to the creation of new employment opportunities. However, to ensure that these jobs are filled by people from the local communities of the power station, the focus of measures to mitigate unemployment needs to be on reskilling and upskilling the local labour force, including the workforce of KPS. Importantly, skills development and training need to be done prior to the execution of projects planned for the area and not after the projects are developed. Therefore, a skills development plan that speaks to the mitigation measures planned for the PSA of the power station needs to be devised alongside the development plan.

The loss of employment opportunities linked to the operations of the power station creates a risk of cyclical unemployment. This is often associated with a recession when the demand for labour is reduced due to a decline in demand for goods and services. Since such unemployment in the area would not be the result of the organised business cycle but rather created due to the need to shut down old power stations, it may provide an opportunity for local businesses to attract highly skilled and skilled workers, who would then enter the labour market. This is particularly important considering the scarcity of skilled individuals available in the PSA.

Even if new projects are implemented in the area, there will still be a risk of structural unemployment, which is associated with a mismatch between the skills that are in demand and the skills that are available in an area. Structural unemployment can be resolved by predicting the future skills requirements in an area and directing the training and skills development of individuals from the same area toward meeting these requirements.

7.3.4 Impact on employment in the region

This section examines the impact on unemployment that will take place at the provincial level, i.e. beyond the PSA boundaries.

7.3.4.1 Impact assessment

In 2020, the Mpumalanga economy created 1 112 708 employment opportunities, which accounted for approximately 7.3% of the total employed persons in the country. Roughly one out of 11 people employed in the province worked in the coal value chain, with the majority being employed in the mining sector.

The modelling results showed that approximately 4 166 FTE jobs will be lost in South Africa as a result of the KPS shutdown, approximately 88.0% of these jobs in Mpumalanga (refer to Figure 5.8). This means that in the context of the 2020 employment situation, the provincial employed will be reduced by 0.3%. In the context of the average number of jobs that the economy has been creating in the past decade, the potential losses equate to about a quarter of these jobs.

The losses of jobs are highly probable, although their duration is envisaged to be permanent as KPS will be shut down indefinitely. A combination of the above factors produces an impact of medium significance.

Impact	Nature	Significance
Increase in unemployment in Mpumalanga due to shutdown of KPS	Negative	Medium

7.3.4.2 Mitigation measures concept

Having Eskom mitigate the negative impacts at the provincial level will be somewhat challenging – largely due to the extent of the cumulative effect. Nonetheless, the stimulation of the PSA economy, which has been suggested as a mitigation measure for the local-level impact, can also assist in addressing negative effects at the provincial level as any new activities in the PSA are likely to involve procurement of goods and services from different areas of the province and possibly the country. The ability to localise the employment opportunities that could be created because of newly introduced economic activities in the area and the opportunities created through interventions outside the PSA will be reliant on the diversity and capabilities of the provincial economy. Building these capabilities, however, is not within the mandate of Eskom. This means that partnerships and commitments by government, labour, and businesses will be integral to the successful realisation of mitigation measures focusing on the creation of employment throughout the province.

7.3.5 Impact on the wealth of households from the local communities

The shutdown of KPS will not only lead to reduced expenditure on operations and capital investment at the power station but will also be associated with a decline in employment available in the area. Since the power station will no longer be operating, the social corporate investment initiatives that Eskom has been implementing in the KPS PSA could also be reduced and in some instances halted (more information on these interventions is provided in Section 8). The loss of employment – either directly or indirectly – and the reduced support may lead to decreased purchasing power on the part of households in the PSA, thus negatively impacting the wealth of individuals. Depending on the status of the household, this may escalate poverty in the area, increase the hardships experienced by households and lead to the outmigration of people and their skills.

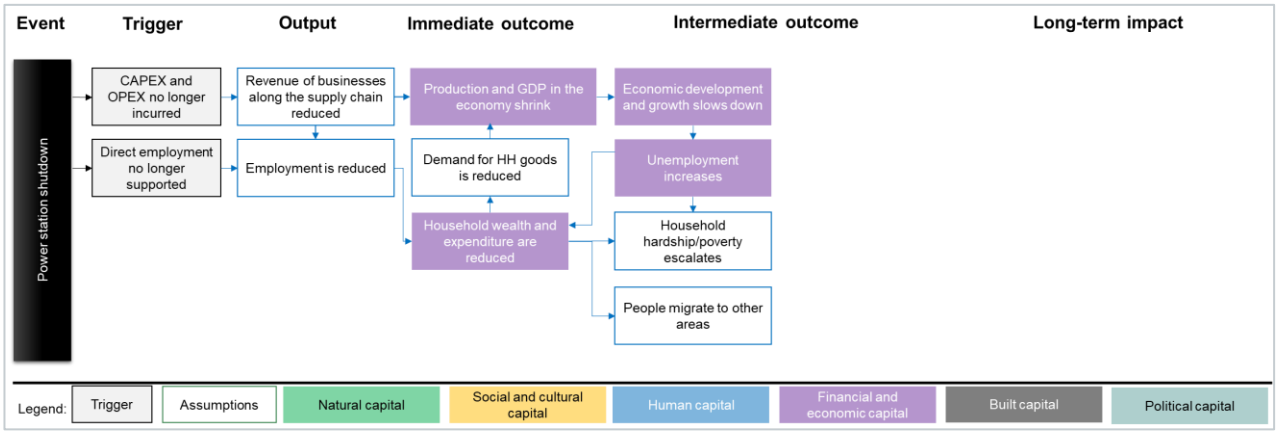


Figure 7.8: Impact on household wealth causal chain

7.3.5.1 Impact assessment

Engagements in the PSA of KPS revealed that communities in the area are confronted with poverty. The poverty level has worsened over the years due to a decrease in job creation in the area, the closure of mining operations, the growing population and increased size of households, and the rising number of dependants. Due to the poverty level, most of the households in the PSA focus on meeting their basic needs and are struggling to accumulate wealth.

The shutdown of KPS is likely to halt or lessen the value of CSI initiatives that have been undertaken by Eskom (along with reducing employment in the area by 38 FTE jobs, as indicated earlier). The decreased support from CSI initiatives and reduced employment opportunities will lead to the loss of R19 million in household income in the area. Given the population of the PSA in 2011 (about 3 028), the loss in income will impact about 1.3% of the area's population and is thus of moderate significance.

The impact on households' ability to spend, save and accumulate wealth is expected to be permanent. The impact will also be highly likely and have medium significance.

Impact	Nature	Significance
Declining household income and wealth in the PSA of KPS	Negative	Medium

7.3.5.2 Mitigation measures concept

Mitigating the potential negative effect on household wealth in the PSA of the power station can only be done by growing the economy and creating employment that will produce sustainable household income. This means that the mitigation measures for this impact are the same as those that have been proposed for the negative impact on the local and regional economies as well as those put forward regarding unemployment. Failure to mitigate these impacts may not only lead to unrest in the area and increase crime but could also threaten the social fabric of the PSA.

Loss of income is likely to lead to a reduced quality of life amongst residents. Quality of life is not merely about the conditions and comfort in which people live but also relates to people's state of health and happiness. Reduced income is likely to exacerbate poverty in the area, which could lead to an increase in malnutrition. Lack of employment in the PSA along with limited opportunities for occupying individuals, particularly the youth, may also lead to hazardous social habits and troublesome behaviour. Alcohol and drug abuse are often linked to the lack of employment among the youth, who, once under the influence, also tend to resort to criminal activities. All of the above pose a threat to the health of community members, which, in turn, threatens the long-term productivity of the labour pool.

7.4 Impact on human capital

Human capital encompasses people and their ability to earn income and be productive members of society. Human capital is built through learning, education, experiences, and leadership development. The strength of human capital can be manifested in the health status of the community, the level of skills in the community, leadership, and knowledge.

7.4.1 Impact on the health of communities

Health, from an individual perspective, relates to the emotional and physical well-being of a person, which allows him or her to satisfy their needs and realise their aspirations. Good health affects all facets of a person's life and influences his or her ability to become a productive member of society. Individuals, however, usually do not live in isolation from other people. Therefore, the state of the mental and physical well-being of the people who live in the same neighbourhood or the same area influences many facets of the community that affect its ability to develop and prosper.

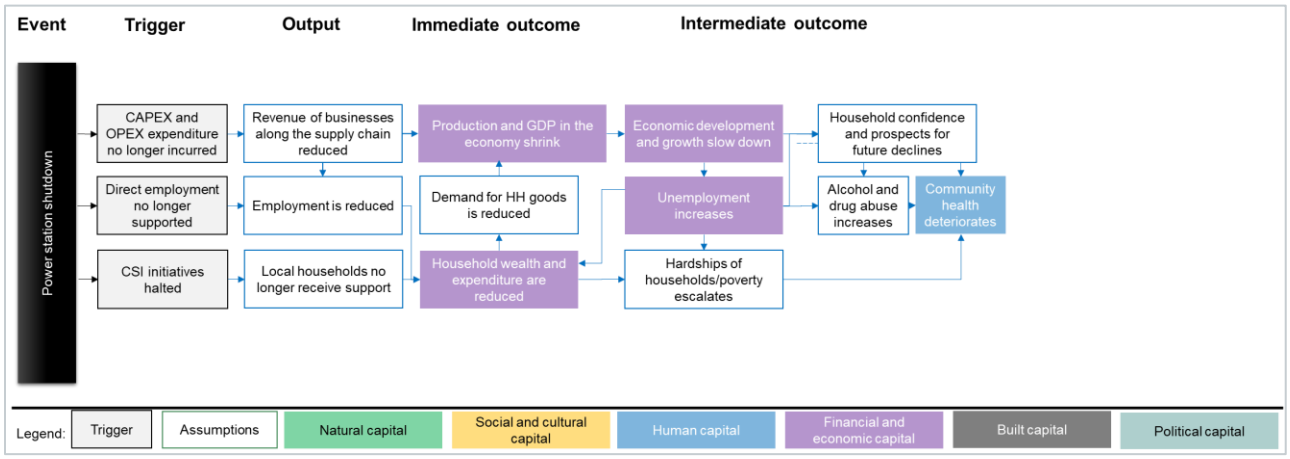


Figure 7.9: Impact on community health causal chain

The decline in business sales due to the shutdown of the power station, as outlined in Figure 7.9 and discussed earlier in this section, will impede economic development. Without mitigation, this will negatively influence the perceptions of community members regarding their future and result in an emotional deterioration that could affect the mental well-being of individuals. It could also translate into an increased incidence of alcohol and drug abuse, which, in turn, may harm physical well-being. The loss of household income and increased levels of poverty in the area may also result in a higher incidence of malnutrition, which would further worsen the physical well-being of people. All of these factors combined are likely to result in community health deterioration, which could significantly hamper the community's ability to maintain the strong human capital required for development and prosperity.

7.4.1.1 Impact assessment

An analysis of the social ills observed in the PSA of KPS indicated that abuse of alcohol and drugs is very common among the communities, particularly the youth. It was suggested that the incidence of alcoholism and drug abuse is driven by a lack of jobs, inadequate entertainment facilities, and overall frustration with the situations that people find themselves in as these do not allow the youth to experience meaningful lives. Overall, stakeholders engaged during the study voiced concern about the general health status of communities in the PSA. In addition to alcohol and drug abuse, TB, sexually transmitted diseases (STDs), human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), and dietary problems are prevalent in these communities.

The shutdown of the power station, which will negatively impact the socio-economic environment in the PSA, is expected to degrade the confidence that households have in the future of the area. Given the prevalence of alcohol and drug abuse, the decline in the perceived prospects by community members is most likely to continue fuelling the current rate of alcohol and drug abuse. Reduced income levels and poverty could worsen food insecurity in the PSA, aggravating dietary issues. In addition, they may trigger a higher incidence of prostitution, which is already considered a problem in the area, leading to the spread of STDs. Given that the shutdown of the power station is expected to affect about 1% of the PSA population, the magnitude of the impact is anticipated to be moderate.

Health problems have a lasting effect. Therefore, given the permanent shutdown of KPS, the duration of the impact is expected to be permanent. The likelihood of the impact taking place is highly probable. Thus, the combination of the above factors makes the significance of the impact in the KPS PSA likely to be medium.

Impact	Nature	Significance
Deterioration of health of KPS PSA communities	Negative	Medium

7.4.1.2 Mitigation measure

Similar to the impact on social cohesion, idleness and unemployment are some of the main reasons for individuals' engagement in alcohol and drug abuse and crime in the PSA. As discussed earlier, the shutdown of the power station risks aggravating this problem. Accordingly, the provision of employment and providing means for the community to occupy themselves outside the work environment remain key mitigation measures. This is accompanied by an opportunity to extend more effort towards addressing the persistent health issues in communities by providing the means and facilities for the local community members to engage in sporting activities, address the malnutrition problem and support individuals who engage in substance abuse.

7.4.2 Impact on quality of skills in the area

The decline in economic prospects of the area linked to the shutdown of the power station and the subsequent loss of employment and household income are likely to lead to an exodus of skilled people and their households from the area in search of alternative employment opportunities. Outmigration of skilled individuals will have a negative impact on the human capital of the PSA, which, together with the possible deterioration of the community's health, could significantly erode its strength.

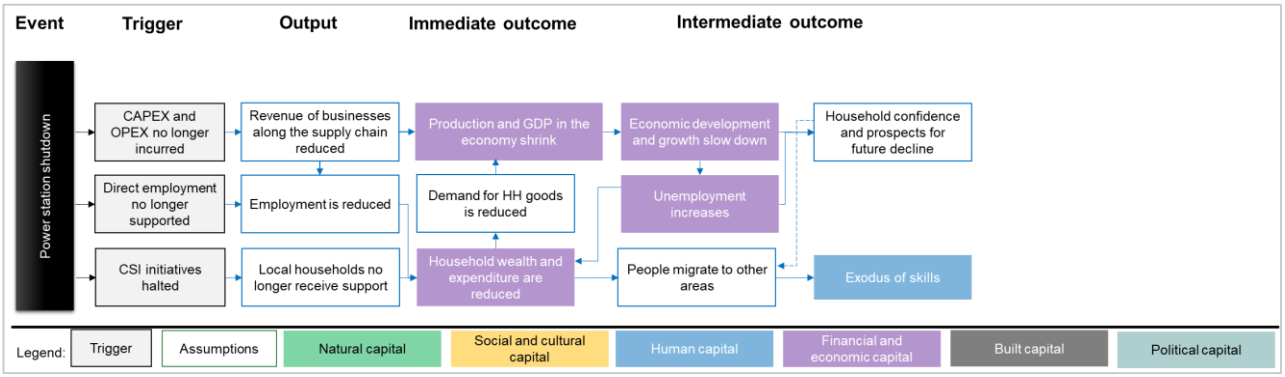


Figure 7.10: Impact on quality of skills in the PSA causal chain

7.4.2.1 Impact assessment

Household surveys showed that communities (particularly those located in the immediate zone of influence) have diverse skill sets. For instance, they include artisans such as pipefitters, electricians, and welders. Some of the skills that have benefited households that rely on self-employment opportunities include those for hairstyling and catering. In addition, there is a considerable number of persons who rely on their cleaning skills, while others are employed as general workers, cashiers, or security personnel.

The shutdown of the power station will result in the loss of 38 direct jobs in the PSA. Since employees of KPS are expected to take up work at other power stations, they are likely to relocate to other areas, resulting in an exodus of skilled workers from the PSA. The loss of FTE job opportunities through production-related impacts will largely affect the agricultural sector, business services, trade, manufacturing, and community and personal services. Some of the individuals who would be negatively impacted may also decide to move away from the area. Skilled individuals have greater employability and prospects to find employment in other areas; therefore, if individuals start moving away, it is likely that such individuals have certain marketable skills.

Given the number of people potentially affected by the decline in employment and considering that this number represents primarily skilled people despite being only 4% of those employed in 2011, the magnitude of the impact is considered to be moderate. The impact is expected to be permanent and has a high probability of occurrence. Considering the magnitude of the impact, its probability and its duration, the significance of the impact is expected to be medium. This is because the change in the skills structure as a factor of production will reduce the growth potential and economic development of the PSA economy.

Impact	Nature	Significance
Exodus of skills from the KPS PSA	Negative	Medium

7.4.2.2 Mitigation measures concept

The shutdown of the power station and subsequent loss of employment by skilled individuals can be viewed as an opportunity for other businesses to acquire skilled individuals. However, those employed by KPS are likely to relocate and not enter the local job market. Thus, only skilled individuals who lose employment through

the indirect and induced effects of the power station's shutdown may become available. However, those who possess marketable skills may also decide to relocate, increasing the risk of brain drain.

The best means of preventing an exodus of skills from the areas is to invest in the local economies, i.e. to implement mitigation measures proposed to address the impact on the prosperity of local communities. This will need to be accompanied by a solid skills development plan aimed at ensuring that the skills required for the economic activities introduced into the area are able to be sourced locally. This mitigation measure was already proposed for addressing the increase in unemployment in the area. To execute the skills development plan, a support infrastructure will be required in the form of career development centres and exhibitions as well as upgrades and expansions of local post-school education facilities to accommodate programmes that respond to future skills needs.

7.5 Impact on social capital

The purpose of this subsection is to present the assessment of impacts associated with social and cultural capitals. Social and cultural capitals are associated with the way community members associate themselves and communicate among themselves. They include the use of a common language, cultural identity, developed trust, and values and traditions that are upheld by community members. Cultural and social capitals define how community members think and act and determine a community's level of cohesion and connection.

7.5.1 Impact on community social cohesion, i.e. family ties

The negative impact on the economy and employment that is to ensue from the power station's shutdown will reduce the average level of income among households in the PSA and have devasting effects on the lives of community members if not mitigated.

As illustrated in Figure 7.11, the loss of unemployment and concomitant decrease in household wealth will increase the hardships faced by households and reduce their prospects for a sustainable future. These effects could motivate some households to relocate in search of alternative employment, a decision that is likely to be linked to perceptions of how successful members of the household will be in finding employment elsewhere and maintaining the standard of living they enjoy in the PSA.

As mentioned earlier, the decline in employment opportunities in the area is expected to intensify the incidence of alcohol and drug abuse in the area. The anticipated increase in crime that is often associated with drug and alcohol abuse could also motivate some of the locals to move away from the area. The out-migration of people from the PSA could negatively impact the social cohesion of communities due to broken family ties.

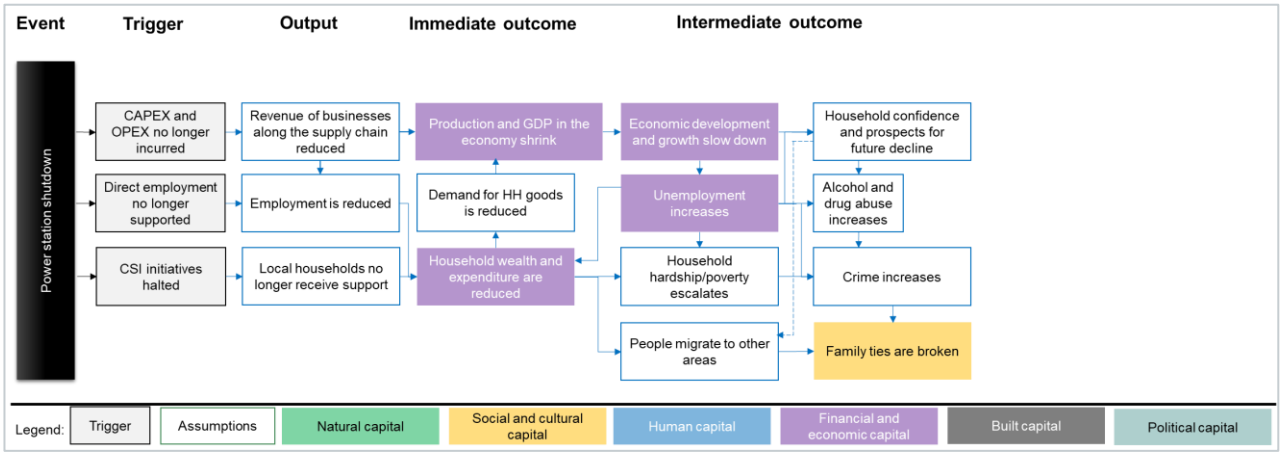


Figure 7.11: Impact on the social cohesion of communities' causal chain

7.5.1.1 Impact assessment

The analysis of the social and cultural capitals of communities in the KPS PSA indicated that most households have been situated in the area for at least a quarter of a decade, while some families have lived there for more than 16 years. Apart from the duration of stay in the area, several communities have close ties. Some of the events that have contributed to the strengthening of ties between communities are sporting events and tournaments.

Noteworthy are the strong ties between households in the same community. The relationships among some of community members have been strengthened by stokvels and closed groups (such as societies established to raise funding for a particular purpose) as well as support offered in times of bereavement.

Despite the presence of deep community ties and the maintenance of cultural and social practices, there are concerns regarding the safety of community members in the PSA. Although crime statistics could not be shared by the local police office, some of the criminal offences known to be prevalent in the area include common assault, driving under the influence of alcohol and drugs, and burglaries at residential and commercial premises, all of which undermine the sense of safety and security of the communities in the PSA. Poverty and frustration – both the result of high local unemployment – are typically cited as the causes of this criminality.

Considering the above, the shutdown of KPS is likely to aggravate social ills and crime in the area, which would make the local communities less attractive for families and could lead to out-migration. In light of the close relationships that exist among households and communities, the relocation of families is likely to cause significant losses in family ties and threaten the social cohesion of the communities. However, given that only 38 jobs will be lost and considering the total population of the PSA, the magnitude of the impact is expected to be noticeable but slight.

It is expected that this impact will not take place immediately upon shutdown but could build over a few years as households seek alternative options. However, once the households relocate, the impact is likely to be permanent. The likelihood of the impact occurring is distinct as the skills profile of the community members suggests that opportunities for individuals to find alternative employment may be limited; thus, the likelihood

of a household moving away is also lower. A combination of the factors discussed suggests that the significance of the impact will be low to medium.

Impact	Nature	Significance
Loss of social cohesion and family ties in the KPS PSA	Negative	Low to Medium

7.5.1.2 Mitigation measures concept

As indicated above, the shutdown of the power station carries a risk of loss of community and family ties, which is likely to reduce social cohesion and influence the quality of life of households. When mitigating the impacts, it is important to recognise the root causes of the problem. This is to ensure that the mitigation measures do not focus on addressing the symptoms, which may only be a temporary solution, but aim to inset the measures that ensure change over a prolonged period.

Idleness and unemployment are amongst the main reasons for the possible relocation of community members, which can lead to the loss of ties and reduced social cohesion. Thus, the mitigation measures to address the potential losses of family ties and to maintain social cohesion in the communities are the same as those proposed for the economic capital. They are also the same as mitigation measures that aim to deal with the potential decline in local growth and development and those intended to deal with the increase in unemployment.

7.5.2 Impact on the sense of place

The out-migration of people from the area, leading to a loss of community ties, will contribute to a change in the sense of place in the PSA. This impact will be further exacerbated by the power station's shutdown and the areas; subsequently, losing one of the landmark employers in the area and their reputation as an electricity-generating hub.

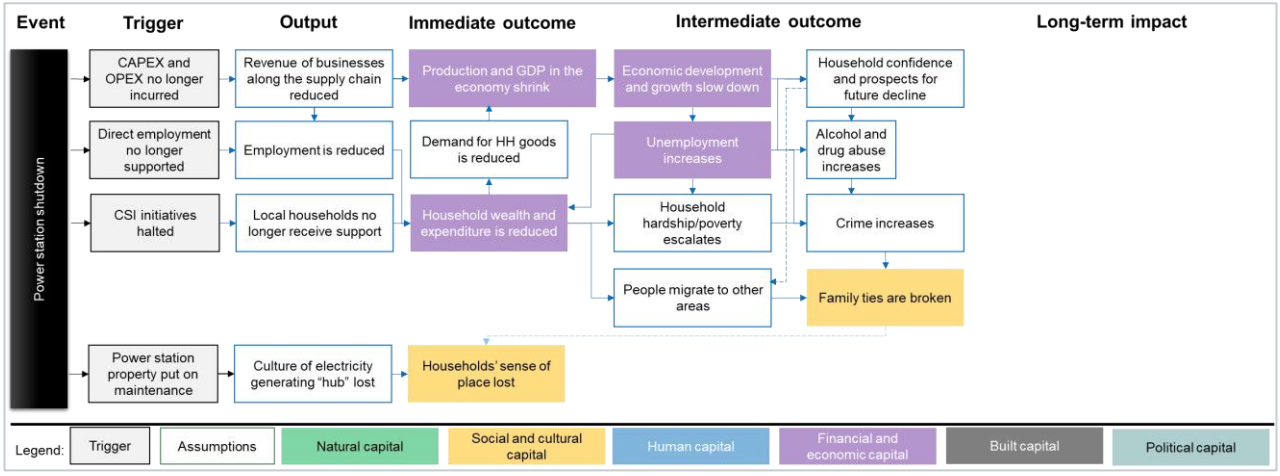


Figure 7.12: Loss of household sense of place due to shutdown causal chain

7.5.2.1 Impact assessment

KPS was commissioned in 1961 and was mothballed in the late 1980s due to surplus capacity in the grid, increasing maintenance costs, and the need to put newly built power stations such as Majuba in commercial service (Eskom, 2020a). In 2008, due to increasing demand for electricity in the country, one of the KPS units was returned to service. All nine units were operating by 2012.

Given this history, the power station is regarded as an important heritage site in the PSA. A sentiment shared during stakeholder engagements was that communities have a sense of pride in the power station supplying electricity to the national grid. A combination of the power station being viewed as a heritage site, shared traditions, and duration of stay in the community has nurtured a greater sense of place amongst community members. Such a sense of place is particularly prevalent in the IZOI, which encompasses Komati Village and Blinkpan. Therefore, it is anticipated that the communities located within the IZOI will be most affected. However, the shutdown of the power station started before 2020, at which point more than half of the units had been closed or put in reserve storage. This means that compared to 2020, the impact on the sense of place is expected to be moderate.

Since KPS will be shut down permanently, the impact on the sense of place among community members is expected to be permanent. However, the likelihood of the negative impact occurring is highly probable because the shutting down of the power station is inevitable. Therefore, the significance of the impact will be medium.

Impact	Nature	Significance
Loss of sense of place due to KPS shutdown	Negative	Medium

7.5.2.2 Mitigation measures concept

A significant sense of place creates a place attachment and is linked to a feeling of safety and security in individuals. Changes in the sense of place create uncertainty. Depending on individuals' past experiences in similar situations and the information passed on to them about the future, such changes can influence the perceptions and behaviours that the individuals adopt and their overall quality of life. While a change in the sense of place is usually associated with potential negative effects, it can also be viewed as an opportunity to rebrand and set out a new vision for the local area and its communities. In the instance of the analysed areas, this opportunity is associated with the potential to rebrand the areas from being associated with "dirty" industries to new associations with "green" and "future" technologies.

The specific mitigation measures that can be explored to address the change in the sense of place are linked to the introduction of new economic activities, which again aim to address the root causes of the problem rather than its symptoms.

7.6 Impact on built capital

Built capital is a community foundation that encompasses basic services, facilities, roads, technology, and other physical infrastructure that is used by other capitals to strengthen local development. Built capital does not provide a solution on its own. It must always be paired with other capitals such as social and human capital to ensure the provision of sustainable value to the community.

7.6.1 Impact on property values

Property, as in real estate, forms part of the built environment and influences the standard of living as well as the quality of life in a given area. Households invest in residential property to obtain security of tenure and to supplement their future income sources. Therefore, a decline in property values can have significant negative impacts on both the wealth and living standards of households, ultimately influencing their quality of life.

Property value is determined by the equilibrium between supply and demand. An increase in demand for property in certain income brackets in a market where supply is limited can significantly increase the value of property. Conversely, lacklustre demand in a property market that has an abundance of supply can lead to a significant devaluation of property.

The demand for residential property is directly linked to the size of the population, its growth rate, and households' affordability levels. If the population declines and the area loses households that can afford to rent or own property, the demand for existing properties is likely to decrease drastically. The situation can become catastrophic if the property market in the area was already in turmoil, as this can lead to a sharp decline in house prices or rental rates, eroding households' investments. Poor demand for properties may also lead to limited investment in refurbishments and upgrades, which means that properties could become dilapidated over time and lose most of their value.

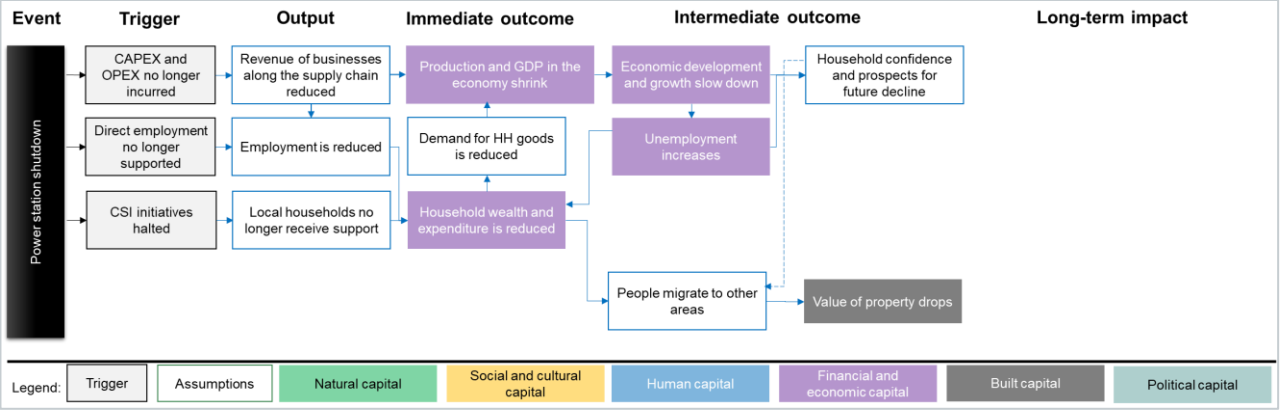


Figure 7.13: Impact on property value causal chain

7.6.1.1 Impact assessment

A household survey in the Komati Village revealed that 57% of households living in the area own the properties where they stay. The remaining households rent accommodation as they cannot afford to buy property but also because of uncertainty about the future of the area. Among the properties that are owned by Eskom in the area, only two are known to be vacant. The above illustrates that the Komati community is invested in the area. Although many households rent property, the demand for residential property in the IZOI of KPS remains high.

As mentioned earlier, there is a high likelihood that people who are employed at the power station will be relocated, while some of the households which would be negatively impacted through indirect and induced

effects of the shutdown could also choose to migrate to other areas. There is a possibility that the Koornfontein mine, which is located near the Komati Village, will soon reopen; this may offset the potential decline in demand for property that could lead to the out-migration of people. However, since the reopening has yet to be confirmed and given that impact assessments follow a conservative approach (i.e. they proceed according to the worst case scenario), it is best to assume that the effects on properties will be noticeable. This will particularly be the case for those properties that are currently being rented. Households that own properties in the area are also likely to experience difficulty selling the properties due to the advent of a buyer's market.

In 2011, there were at least 600 dwellings in Komati. A review of Google imagery suggests that the number of dwellings in the village has not changed significantly. It is also known that at least 38 households stand to be impacted by the shutdown of the power station, which is likely to be relocated. Not all the impacted households are located in Komati, and whether these individuals own or rent a property is unknown. However, the anticipated decrease in demand for property is likely to be spread throughout the PSA, which includes more than 1 000 residential dwellings. Given the above, the potential magnitude of the impact is expected to be low.

The likelihood of the impact taking place is probable. Furthermore, the impact would probably be permanent given the duration of the shutdown period. As a result, the significance of the impact is estimated to be low to medium.

Impact	Nature	Significance
Loss of property value in the PSA of KPS	Negative	Low to medium

7.6.1.2 Mitigation measures concept

The potential decline in property values will pose a risk to some households as well as corporates that have invested in properties in the PSA and rented them out to supplement their income streams. It will also create a risk of property devaluation as an investment. Where clusters of properties located in close proximity to one another are vacated and remain unused, there could be a risk of vandalism, illegal occupation, and the forming of criminal hubs. The presence of such clusters in a community may undermine the attractiveness of the entire area, further degrading property values in the PSA.

Mitigating the impact on property values can only be done by maintaining a vibrant economy in the area, one that attracts and retains individuals who can afford to rent or buy properties. The mitigation measures proposed for the development of local communities and those for reducing the chances of increased unemployment in the area should be sufficient also to mitigate the possible decline in property values caused by the shutdown.

7.6.2 Impact on social facilities and infrastructure

The establishment and maintenance of built capital in communities – bulk water supply, transmission lines, sewerage systems, schools, clinics, roads, libraries, and other social facilities – is primarily the responsibility of the different spheres of government. Local municipalities are usually tasked with the prominent role to provide and maintain these facilities and services. However, corporates may also contribute to the development of the social environment, especially where settlements are created to host employees and their families.

The provision of infrastructure and maintenance is done using the funds that local government receives from National Treasury as well as the funds that it earns from providing residents with various services. Any activities that compromise the ability of the national and local government to earn such revenue can have a negative effect on their ability to keep the existing infrastructure in good order. These activities may also undermine the capacity to provide new public facilities.

The potential causal chain in which the shutdown of the power station results in the dilapidation of social facilities and infrastructure is illustrated in Figure 7.14. The shutdown of KPS will lead to a loss of national government revenue in the form of value-added tax (VAT), corporate income tax, and personal income tax. This may, in turn, reduce allocations to local government. Simultaneously, the decline in household income and the potential out-migration of people from the areas affected by the shutdown will lead to a decline in revenue earned by the local government through the collection of rates and taxes.

In instances where Eskom power stations have participated in the provision of basic services, these services are likely to be handed over to the local government, something that could place additional financial and administrative burdens on local municipalities. Faced with a smaller revenue base and a greater burden, the local government may not be able to maintain the provision of services at current levels. It may also struggle to improve or even maintain infrastructure, which could lead to the dilapidation of built capital in the PSA.

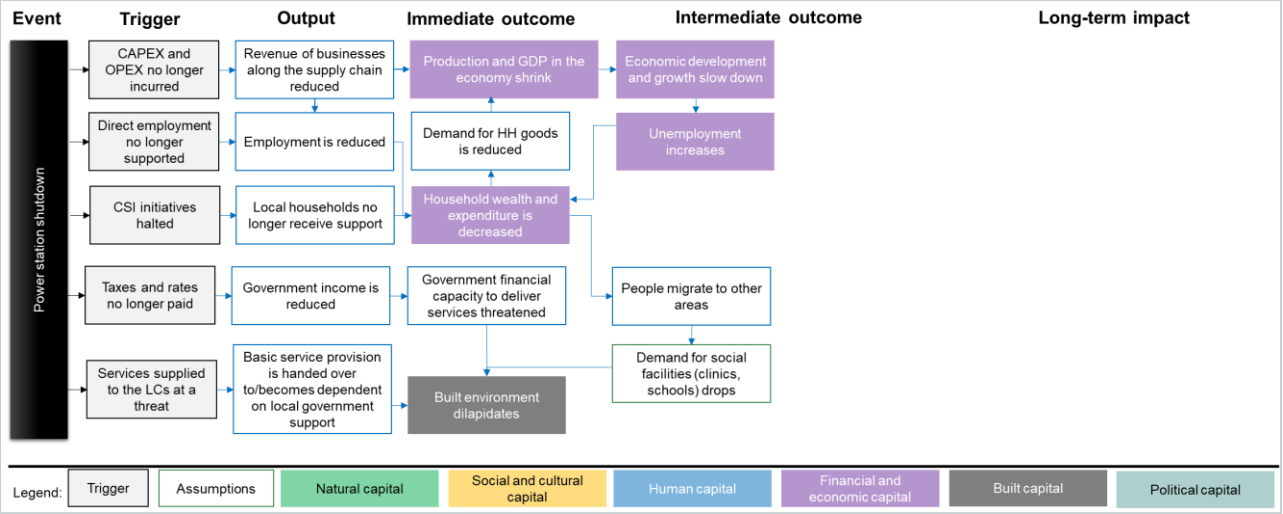


Figure 7.14: Impact on social facilities and other built environment causal chain

Furthermore, the out-migration of people may significantly reduce demand for certain social facilities, which could make their continued operation unviable. This is particularly the case for educational facilities, which may be faced with a lower enrolment of pupils. Declining enrolment may lead to a decision to close the educational facility altogether and result in the existing infrastructure being abandoned.

7.6.2.1 Impact assessment

The analysis undertaken in the baseline assessment showed that around seven in 10 households (on average) have access to refuse removal, electricity, and decent sanitation facilities. However, less than six out of 10 households have access to piped water inside their dwellings.

While most of the basic services in the PSA are supplied by the local municipality, potable water for Komati Village residents and surrounding businesses is supplied by KPS. It is understood that Eskom has a contractual obligation to continue supplying water to Komati Village and the Koornfontein mine after the power station is shut down.

The communities in the PSA have access to two primary schools, both situated within the IZOI, and one combined school situated north of the power station. The combined school is located outside of the IZOI. An analysis of the social facilities showed that one of the primary schools and a couple of ECDs are under-resourced. Previously, these education facilities benefited from support provided by mining houses. However, some of these companies have closed, halting the stream of financial support.

While some of the education facilities indicated prospects of being assisted by large companies operating in the area such as Eskom, the condition of these facilities is deteriorating. As a result, communities that can afford to do so contribute towards the sustainability of these facilities. This has been done through, for example, additional payments made by parents of pupils attending the schools in question.

The PSA is traversed by two regional roads, the R35 and the R542. All settlements in the PSA are accessible from the power station via tarred roads; however, the condition of these roads is deteriorating and there are potholes along the routes.

The above illustrates that the basic infrastructure in the PSA of KPS requires upgrades and improvements, suggesting that the municipality is already struggling to fund the maintenance of the infrastructure and to increase access to basic services in the area. The analysis of the financial performance of Nkangala DM and Steve Tshwete LM indicated that these governments have been running a deficit in the past few years. This suggests that both the district and the local government failed to generate sufficient revenue to cover their expenses and struggled to maintain existing infrastructure. Similarly, they appear to have difficulty in improving the quality and provision of basic services. Ageing and poorly maintained water, roads, and electricity infrastructure coupled with the decline of the revenue base are among the major challenges faced by the local municipality in the past few years.

The shutdown of the power station will probably create a further gap in government revenue. A bigger concern with respect to the built environment, however, lies with the possible need to restructure the supply of educational services due to the potential change in demand in some settlements as this could significantly inconvenience some households.

Alongside the negative effects, the shutdown of the power station will probably reduce heavy vehicle traffic on the local roads, which will reduce the rate at which roads are becoming dilapidated and the need for future road maintenance. However, the benefit of that can only be harnessed if the dilapidated state of road infrastructure is addressed.

Considering the above possible negative and positive impacts, the net effect on the built environment is expected to remain negative. In addition, it is envisaged to be noticeable yet slight. The likelihood of the impact

occurring is probable, informed by the need for support demonstrated by the facilities during the engagements, and the fact that the power station will shut down. Furthermore, the impact is anticipated to be permanent. The significance of the negative impact of the shutdown on the built environment in the KPS PSA is therefore estimated to be low to medium.

Impact	Nature	Significance
Dilapidation of built environment in KPS PSA	Negative	Low to medium

7.6.2.2 Mitigation measures concept

The shutdown of the power station will create risks of closure concerning some social facilities, particularly schools, following reduced demand and the worsening of service delivery due to diminished government revenue. The risks, if not mitigated, will result in the dilapidation of built infrastructure, which will subsequently reduce the living standards of the local population.

Mitigating this impact can only be done by growing an economic base through maintaining business activity and high levels of employment. This will secure future government revenue and good governance and, in turn, ensure the efficient and effective spending of that revenue. Following a root-cause approach to impact mitigation, the interventions proposed for addressing the potential decline in local and regional development and those concerning the increase in unemployment should be sufficient to mitigate the possible negative impact on the built environment.

8 IMPACT MITIGATION STRATEGY AND IMPLEMENTATION PLAN

This section contains a detailed impact mitigation strategy for KPS, which responds to the impacts identified and described earlier in the report. It begins with an introduction of the philosophy of the mitigation strategy formulation and proceeds to the presentation of the mitigation measures and mitigation plan.

8.1 Mitigation strategy philosophy

The purpose of this study is to identify impacts and risks associated with the shutdown of KPS along with opportunities for managing and mitigating these societal impacts. Earlier in the report, a community capitals framework was presented as the means to analyse the baseline situation and identify changes that are expected to ensue as a result of the power station's shutdown. The same framework was used to develop a mitigation concept map, the argument being that the management and mitigation of the societal impacts needs to be done in a holistic manner. This approach acknowledges a community as an ecosystem with closely interlinked and interdependent elements (or capitals).

In total, there are seven community capitals: financial/economic, social, human, political, cultural, built, and natural. Communities rarely have well-developed forms of every capital; however, research suggests that investment in key resources such as financial/economic, social and human capitals can positively influence the other capitals (Emery & Flora, 2006). The analysis of the impacts that may result from the power station's shutdown revealed that the root causes of most of the negative impacts lie with changes to the financial and economic capital of the community as these will create a downward spiral effect, particularly on human capital, built capital and social capital.

In developing the mitigation strategy for KPS, the focus is directed first to the identification of interventions and projects that can address the root causes of possible impacts. These projects are therefore linked to the financial and economic capital. However, given the importance of human and social capitals in enabling the successful realisation of financial and economic capital projects as well as in stimulating the development of other capitals, the focus then shifts to identifying projects and interventions that can strengthen and further develop human and social capitals. Lastly, the focus is directed towards strengthening and growing the built, natural, cultural and political capitals of the community – to initiate and sustain a process of change that can provide a basis for the communities to sustainably transition.

In the identification of interventions and projects to strengthen and develop the community capitals as part of the mitigation strategy for the shutdown of KPS, several principles and approaches have been adopted. These are detailed in the subsections below.

8.1.1 Alignment with the Just Energy Transition vision and principles for South Africa

Mpumalanga is the energy hub of South Africa and has been developed on the backbone of significant coal reserves. The exploitation of coal and establishment of coal value chains over the last half-century has been integral to the development of the South African economy. Continued use of coal for power generation, however, creates economic, social and environmental risks for the country (Burton, Marquard, & McCall, 2019).

As a signatory to the Paris Agreement, South Africa has committed to reducing its carbon emissions, which will require a fundamental change concerning the extraction and use of coal. Such a change may lead to significant losses in employment and could destabilise economies that are reliant on coal value chains, if not adequately managed.

The Paris Agreement (2015) recognises the implications of the transition to a zero-carbon world and calls for any change to take "*into account the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities*". In response to the above, government, business, organised labour and civil society have embarked on social dialogue revolving around a just transition. The term "Just Transition" in this context is understood to include "*social interventions needed to secure workers' jobs and livelihoods when economies are shifting to sustainable production, including avoiding climate change and protecting biodiversity among other challenges*" (NPC, 2019).

The draft Climate Vision for 2050 that was formulated following several social dialogues states the following:

Draft Climate Vision for 2050

By putting people, especially those living in poverty and the vulnerable, at the forefront, South Africa will have achieved a net-zero carbon economy by 2050. We have built the resilience of our economy and our people through affordable, decentralised, diversely owned renewable energy systems; conservation of our natural resources; equitable access to our water resources and sustainable, equitable and inclusive land use for all, especially for the most vulnerable. The high value we place on healthy ecosystems, land, water and air underpins our future and ensures a better life for all who live in South Africa.

(NPC, 2019)

A Just Transition implies consideration of the energy-water-land nexus, with JET being one of the three pathways that are interconnected and which promise to deliver the transition in a just way.

The end state for JET proposed in the Draft Climate for Vision 2050 (NPC, 2019) is for energy poverty to be eradicated by 2050 through the following:

- sufficient affordable renewable energy for all;
- a decentralised electricity supply industry (ESI) characterised by diversified ownership, including community-owned/socially owned renewable energy sources;
- the empowering of local and district authorities to secure energy equity and independence for their citizens and industries;
- transformation of the transport sector;
- a scaled-up renewable energy programme (including the related value chain) that facilitates employment creation and increases local manufacturing; and
- proactive transformation that involves all social partners, particularly communities.

8.1.2 Integration of Just Energy Transition strategy of Eskom

As the main supplier of electricity in South Africa, Eskom is committed to providing stable electricity in the most efficient manner to sustain and enable economic growth. Furthermore, Eskom has committed itself to supplying electricity in the most environmentally responsible manner (Eskom, 2021a). Given the strengthening of South

Africa's nationally determined contribution, Eskom will need to balance its commitments to the reduction of GHGs with ensuring a reliable electricity supply.

With the decommissioning of 10 coal-fired power stations scheduled to take place by 2040, as outlined in the Integrated Resource Plan 2019, Eskom has identified an opportunity for a transition towards cleaner and greener energy that will reduce the utility's carbon footprint while providing for the creation of new employment opportunities. Such a transition is envisaged to be achieved via repurposing and repowering projects on the sites of power stations that are to be shut down. These projects do not only aim to be associated with a low carbon footprint; they also seek to stimulate economic development and create employment opportunities for communities in the directly affected areas to achieve a sustainable social compact. In relation to this study, therefore, projects and initiatives that Eskom is currently pursuing with respect to repurposing and repowering have been included in the mitigation strategy.

The success of the JET is, crucially, not only dependent on the actions of Eskom. To manage and mitigate the impact of the JET, it is essential that initiatives driven by government and the private sector are utilised along with the initiatives driven by Eskom. This will ensure that communities and local economies are safeguarded and supported. Given the nature of the JET and need to reduce South Africa's carbon emissions in pursuit of its NDC targets, government may be considered an essential leading entity.

8.1.3 Lessons learned from case study analyses of coal-fired power station repurposing in other countries

With numerous coal-fired power stations shutting down across the globe, several redevelopment/repurposing concepts have been developed and implemented in countries that include the United States, the United Kingdom, Australia and South Africa. Power stations have been redeveloped into facilities such as waste-to-energy operations, charter schools, office and retail complexes, logistics parks, and museums, among others.

The case studies considered included completed redevelopments and in-progress/anticipated redevelopments. While the socio-economic and community profiles of the case studies differ significantly from those of the areas under consideration for this study, key lessons that could apply to the current study were identified. These relate to the following:

- **Time frames and financing:** Developing the sites of old coal plants often takes several years because of zoning rules, site clean-up (environmental remediation), the issue of working with old buildings to ensure safety and durability in their future use, requirements for historic preservation, and sourcing of funding. Funding issues have resulted in the slow progress of redevelopments and in some instances have led to the halting of projects. Most redevelopment projects were planned ahead of time to reduce costs. Funding is typically through partnerships and collaborations or a mixture of public and private funding obtained from a variety of sources, including government, donations, community development grants, local and national educational foundations, business groups, savings from power station owners, and other investments.
- **Reuse and design:** In most case studies, there was reuse and conversion of existing power station infrastructure with upgrades to some of the existing equipment to ensure continued operation/stability and safety in the long run. Some cases involved the preservation of original structures and architectural features with expansions to the buildings depending on the repurposing project. In certain

instances, the reuse of old infrastructure was more challenging, costlier and more time-consuming than expected. On another point, clean energy and green building practices were found to be common in the initiatives detailed by the case studies. Some of the site redevelopments were LEED-certified; that is, they explored opportunities that promote Leadership in Energy and Environmental Design[12] in buildings through maximising energy efficiency, water savings, and improved indoor environmental quality.

- **Strategic location:** When deciding on a redevelopment project, developers ought to ensure that the location of the power station is fit for the new purpose. For example, the Old Turbine Hall in Newtown (Johannesburg), which serves as a conference and business centre, is situated in the central business district, making it an easily accessible venue for various events. Another example is the proposed HRP Hudson Logistics Park, located in one of the principal warehouse/distribution centre regions of the United States (i.e. New Jersey).
- **Community involvement:** As with KPS, most ageing coal-fired power stations have been part of local history and development. Their fate affects the future of local communities, hence the need for community involvement in redevelopment plans. A lesson from the case studies is that collaboration with municipal agencies, the city and the public is essential in ensuring that redevelopments speak to community needs and resources.

8.1.4 Alignment with government priorities and strategic objectives

As previously noted, KPS is located in the Steve Tshwete LM, which forms part of Nkangala DM. Both local government spheres need to align their strategic objectives and priorities with provincial and national plans while also considering local opportunities and challenges. Such an alignment allows for coherent and streamlined government planning and implementation. It is therefore important that mitigation measures to manage or reduce the potential socio-economic impacts are devised to ensure alignment with government priorities and objectives in all three spheres. Such alignment will allow for tapping into government programmes and initiatives that can facilitate the implementation of interventions and projects. In addition, support and leadership on behalf of various government levels may be crucial in ensuring the successful implementation of the KPS implementation plan, in addition to the broader JET.

8.1.5 Partnership and collaborative approach

The analysis of potential impacts revealed that two aspects need to be considered in developing a mitigation strategy, namely the spatial distribution of impacts and existing socio-economic challenges in the communities that fall under the PSA of KPS.

Firstly, the socio-economic impact assessment revealed that the negative socio-economic effects will not be concentrated solely in these communities but will, rather, be felt throughout the region and also affect other parts of South Africa. This is due to the spatial distribution of indirect and induced effects. Communities and

[12] LEED-certification refers to a rating system devised by the United States Green Building Council to evaluate the environmental performance of a building and encourage market transformation towards sustainable design.

businesses that will be negatively impacted by the shutdown are not only located away from the power station but also outside the direct influence of the utility.

Secondly, as indicated earlier in the report, the local community capitals of the KPS PSA are already weakened as a result of challenges regarding service delivery, constrained and underdeveloped education and health infrastructure, the legacies of closed mines, and limited investment inflows. Although the communities in the PSA are accepted by KPS as "its communities", the power station does not have sole responsibility for strengthening and developing their capitals. Such responsibility is shared with the local, provincial and national government, the businesses that are operating in the area, organised labour, civil society, and community members themselves.

The spatial distribution of potential negative impacts and the fact that the responsibility for strengthening and developing the communities is shared between various stakeholders emphasise the importance of strong partnerships and continued collaborations among stakeholders in mitigating the socio-economic impacts of the shutdown. Proactive involvement of communities and a partnership approach are also emphasised by the JET movement.

8.1.6 Consideration of initiatives and interventions planned by the private and public sectors

It is important to recognise that the area where KPS is operating forms part of a greater economic ecosystem with many other public and private entities having an interest in and mandate for the development of the surrounding communities. Knowledge of such activities is necessary to make sure that any plans developed for Eskom do not overlap with similar initiatives planned by other entities. This will help ensure efficient use of resources. Furthermore, the implementation of the identified projects further underscores the importance of government support and its role in the broader JET.

The study identified 14 economic development projects planned for Nkangala DM contained in IDPs and other strategic documents. The table below provides information on these projects' CAPEX and contributions to employment.

Table 8.1: Regional projects to mitigate impacts on financial and economic capitals

Item	Project	Location	Champion	Estimated jobs	Estimated CAPEX
1	Establishment of Steve Tshwete Hotel and Convention Centre	Steve Tshwete LM	Steve Tshwete LM	20-50	R350 000 000
2	Establishment of Centre of Excellence for Steel and Metal Fabrication	Steve Tshwete LM	Steve Tshwete LM and GIZ	20-50	R102 207 619
3	Crop Farming with Mine-affected Water at Mafube Colliery	Steve Tshwete LM	DWS, Mafube Coal and MWCB	20-50	R9 200 000
4	Establishment of Fly Ash Beneficiation Plant	Steve Tshwete LM/ Emalahleni LM	Nkangala DM	20-50	R195 000 000

Item	Project	Location	Champion	Estimated jobs	Estimated CAPEX
5	Green Economy Hub Recycling Plant	Steve Tshwete LM/ Emalahleni LM	Nkangala DM	<20	R27 000 000
6	Mining and Metal Industrial Park	Emalahleni LM	DEDT	50-100	R100 000 000
7	Establishment of Glass Recycling Plant	Dr JS Moroka LM	Nkangala DM	50-100	R1 700 000 000
8	Dr JS Moroka Agri-Hub	Dr JS Moroka LM	DEDT	20-50	R5 000 000 – R10 000 000
9	Revitalisation of Siyabuswa Industrial Park	Dr JS Moroka LM	DEDT	20-50	R10 000 000 – R20 000 000
10	Establishment of Biodiesel Tech Incubator	Dr JS Moroka LM	Dr JS Moroka LM and MPG	<20	R27 000 000
11	Construction of High-altitude Sports Centre	Emakhazeni LM	Nkangala DM	50-100	R5 300 000 000
12	Mpumalanga Winter Wheat Pilot Programme at Wonderfontein Colliery	Emakhazeni LM (pilot site)	B4D, Impact Catalyst, MWCB, Glencore and ICMM	20-50	R820 000 (for pilot)
13	Resuscitation of the Sawmill Project	Emakhazeni LM	Nkangala DM	20-50	R27 000 000
14	Revitalisation of Thembisile Hani Industrial Park	Thembisile Hani LM	DEDT	20-50	R10 000 000 – R20 000 000

Should all the projects identified in Table 8.1 be implemented successfully, around R7.9 billion in investments may be attracted to the region and 9 000 temporary employment opportunities created during construction. Furthermore, these projects have the potential to create between 370 and 750 direct permanent employment opportunities in Nkangala DM during operations. Crucially, between R305 million and R510 million per annum in production may be contributed to the regional economy directly. However, it should be emphasised that the benefits of these projects depend on their successful implementation.

In addition to the above-mentioned economic interventions, there are also a number of human capital and infrastructural projects that are envisaged to be implemented by public and private entities operating in the same localities as KPS. These are listed in Table 8.2.

Table 8.2: Human and built capital projects identified in the area as of May 2022

Project/Intervention	Location	Champion/Owner
Human capital/Skills development projects		
EPWP Vuk'uphile Learnership Programme	Steve Tshwete LM	Department of Public Works and Infrastructure (DPWI)
Goedehoop Colliery Skills Development Plan	Goedehoop (Steve Tshwete LM)	Goedehoop Mine (Thungela)

Project/Intervention	Location	Champion/Owner
Mining Academic Programme	Ward 4 (Steve Tshwete LM)	Black Royalty Minerals (owner of Koornfontein Mine)
Mpumalanga Stainless Initiative	Mpumalanga	DEDT (supported by various stakeholders)
Built capital/Infrastructural projects		
Mobile clinic	Steve Tshwete LM	Goedehoop Mine (Thungela)
Municipal capacity project	Steve Tshwete LM	Goedehoop Mine (Thungela)
Water supply sustainability: 2 boreholes and tanks	Steve Tshwete LM	Goedehoop Mine (Thungela)
Construction of Thusong Centre	Blinkpan	Steve Tshwete LM

If the above human capital and infrastructural projects are successfully implemented, they could increase the skills base of the local workforce (specifically the Ward 4 skills base), expand opportunities for job creation and improve access to basic and community services.

As a way forward, it will be important for Eskom to continue participating in various regional platforms (see Figure 8.1) to keep track of the progress with these projects and seek new opportunities.

8.2 Mitigation framework for KPS

Following the principles outlined in section 8.1 and considering the mitigation measures proposed in Section 7, the mitigation framework for KPS implies the development of human capital, stabilisation and enhancement of financial and economic capital, and strengthening of built and social capitals. All of the above is envisaged to be communicated externally and internally (refer to Figure 8.1).

Figure 8.1: Community capitals and mitigation strategy pillars

As shown above, the mitigation framework for KPS comprises five pillars that are each aimed at addressing one or two community capitals. In combination, the pillars allow for a holistic and integrated approach to addressing the potential negative impacts that could ensue from the shutdown of KPS. In addition, the mitigation strategy for KPS involves a wide range of stakeholders, including various government departments and private sector entities. As such, the mitigation strategy for KPS can be seen as a collaborative effort driven not only by Eskom. Potential partnerships or champions apart from Eskom are identified with each of the proposed interventions. The focus of each pillar is outlined in Figure 8.2.

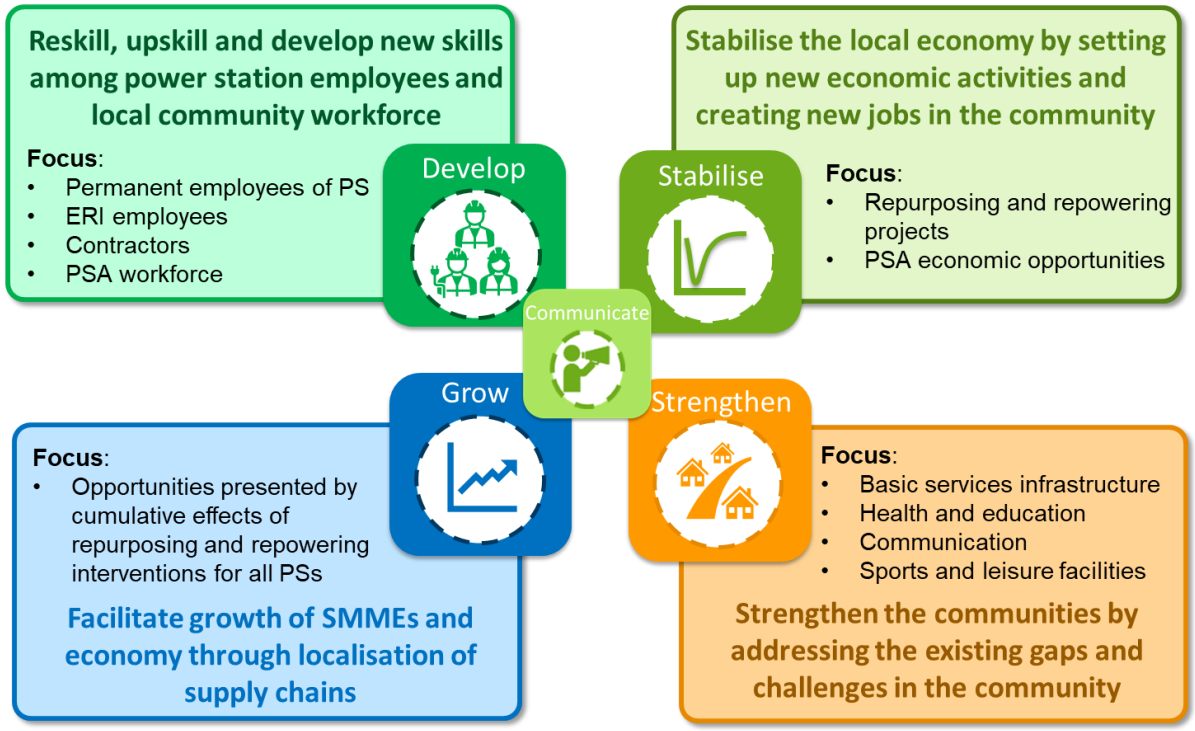


Figure 8.2: Mitigation strategy framework

The following diagram lists the interventions and projects that are included in each pillar of the KPS mitigation strategy and that are further elaborated on in the implementation plan contained in section 8.3.

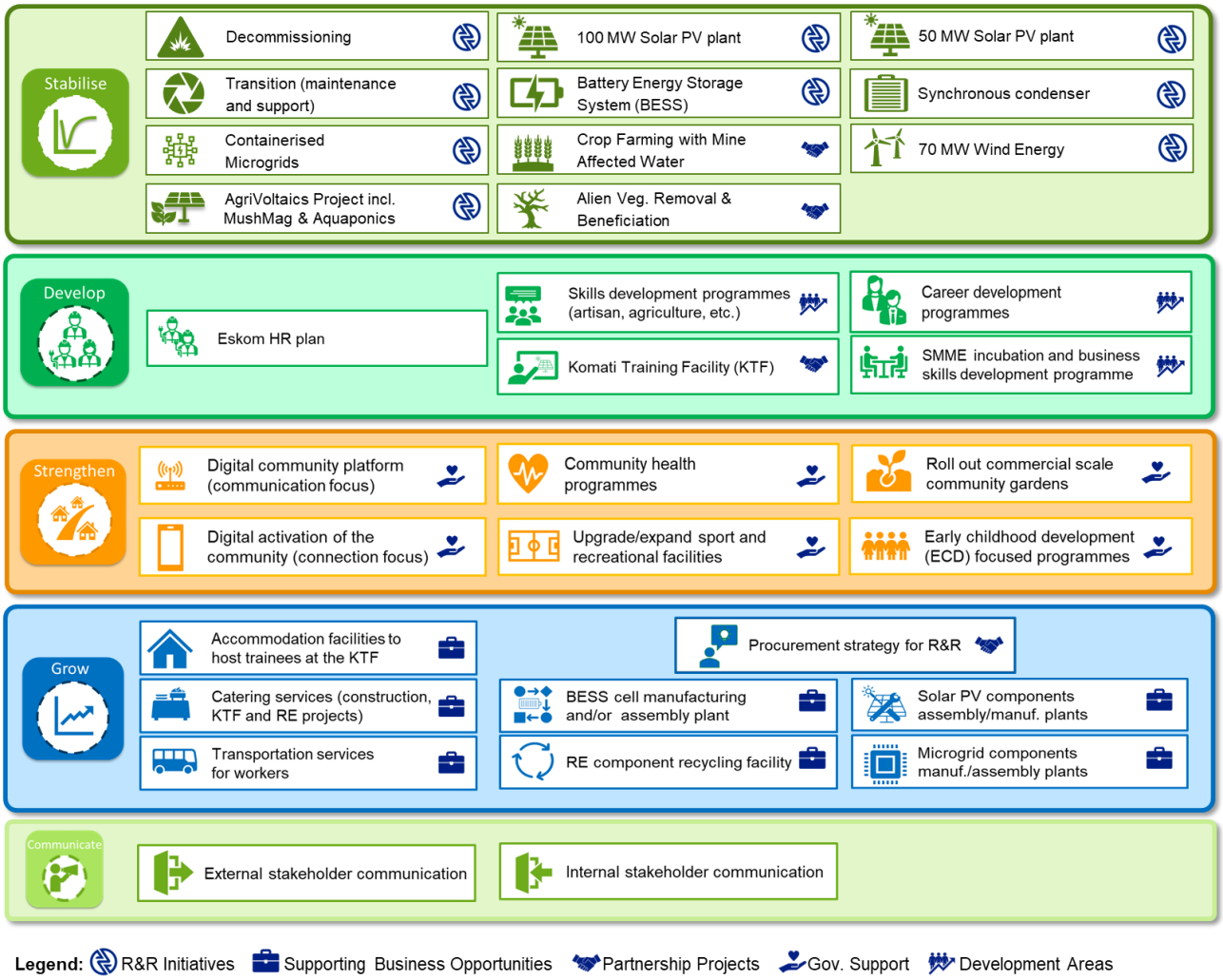


Figure 8.3: KPS mitigation strategy unpacked

"Stabilise" pillar

The "Stabilise" pillar includes commercial projects that aim to stabilise the economic base of the local community, given that economic distress has been identified as the root cause of most of the negative socio-economic effects described in the impact assessment section (refer to Section 7). Interventions included in this pillar are aimed at creating new direct, sustainable employment opportunities that would offset the direct employment losses caused by the closure of the power station. Indirectly, the interventions included in this pillar will create demand for goods and services across various supply chains and, as a result, create and support indirect employment opportunities.

As outlined in Table 8.3, upwards of R6.7 billion will be required to invest in the 11 interventions that form part of this pillar. The first two interventions, the transition and decommissioning of KPS, are expected to be

temporary. The other 10 interventions are long-term initiatives intended to create a new economic base for the local community. Having said this, every intervention will be associated with some form of construction or development stage, which will also create temporary employment opportunities.

Table 8.3: Investment required for and maximum estimated number of jobs to be created through "Stabilise" pillar interventions

Project	Investment (R'm)	Jobs – Construction			Jobs – Operation		
		Direct	Indirect	Total	Direct	Indirect	Total
Transition	TBC	330	310	640	-	-	-
Decommissioning of KPS	R473	539	940	1 478	-	-	-
Containerised microgrid assembly	TBC	TBC	TBC	-	200	1 316	1 516
Establishment of agrivoltaics plant	R15	72	10	82	26	8	34
Eskom Phase 1 Solar PV	R1 566	700	1 244	1 944	75	46	121
Battery Energy Storage Systems	R2 535	17	1 259	1 276	8	50	58
Eskom Phase 2 Solar PV	R783	216	622	838	38	23	61
Wind energy facility	R1 097	350	872	1 222	38	33	71
Synchronous condensers	R78	3	62	65	2	1	3
Alien vegetation removal and beneficiation	R3	3	6	9	100	2	102
Crop farming with mine-affected water	R35	8	14	22	50	9	59
TOTAL	**R6 585**	**2 238**	**5 339**	**7 577**	**537**	**1 489**	**2 026**

As indicated in the above table, the proposed 11 interventions will create just over 2 200 direct and 5 300 indirect jobs during the construction phases. However, it is important to note that these jobs are temporary in nature. Once all of the projects reach their operational stage, they will create and sustain up to 537 direct jobs and 1 489 indirect jobs. Thus, the total contribution of these interventions towards mitigating employment losses over the long term will equate to about 2 026 jobs. Considering the time frames for implementation of these projects, the sustainable employment opportunities are envisaged to be created within three to five years of the projects getting underway. Until then, the employees of the power station will be seconded, retained for the transition period or transferred to other facilities while being reskilled and upskilled to take up new opportunities.

The total number of new FTE jobs anticipated (2 026, as indicated above) is expected to be lower than the total number of direct and indirect jobs expected to be lost due to the closure of the power station: 4 166. Having said this, the number of direct jobs to be created in the community will be greater than the number of direct jobs that will be lost – up to 587 FTE jobs versus the 257 jobs referred to in section 5.3. Therefore, the net effect of the proposed mitigation projects on direct job creation in the area will be positive. The lower job creation that is expected to be derived along the supply chain (i.e. through indirect effects) is linked to the nature of the projects that will be introduced into the area: specifically, these projects have different supply chains to those supported by the power station. Mitigation projects proposed under the "Grow" pillar are aimed to address these further.

"Develop" pillar

In order for the employment opportunities created by the Stabilise and other pillars to be localised (i.e. taken up by the employees of the power station and community members), it will be important to ensure that the local labour force has the skills and expertise needed to be absorbed in the newly created employment opportunities. It is for this reason that the "Develop" pillar focuses on upskilling and reskilling the employees of the power station and developing skills in the community that will be required during both construction and operational activities of the newly introduced projects.

The development of skills required during the construction and operational stages of the projects is envisaged to be achieved through the establishment of the Komati Training Facility, which plans to offer a wide variety of training courses. Identified power station employees will be enrolled in the training facility to enable them to take up their new positions and roles once the new projects become operational. Until then, a "no job loss" policy will be followed where some employees of KPS will continue working at the power station during the transition and decommissioning period while others will be temporarily seconded to other power stations. All ERI employees will be transferred to other generation projects.

Targeted skills development programmes will be introduced in the area through the Komati Training Facility as well as in partnership with other training and education centres. Such skills development programmes will respond to the technical skills needs of the Stabilise interventions as well as the softer and business-related skills needs of projects under other pillars. A career development programme will be introduced for local community members and power station employees to nurture their talents and assist them in selecting the career that best speaks to their talents and interests.

Given the need for support services that will be created in the area during both the construction and operation stages of the new projects (which form part of the "Grow" pillar), the mitigation strategy also provides for the introduction of a small and medium enterprise incubation facility. This facility will aim to assist local community members in identifying opportunities created locally by the new projects and in starting or expanding business ventures to take up these opportunities.

"Strengthen" pillar

The community capitals framework introduced earlier in the report (refer to section 1.4.1) promotes a holistic approach to the development of communities, this to achieve sustainable improvements. Addressing the immediate negative effects of job losses and on economic development will, as mentioned earlier, address the root causes of most of the human resource, infrastructural and social capital negative impacts. The study also determined that the local community is already suffering from major social ills and experiencing major gaps with respect to social infrastructure. Therefore, to set the local community on a new path for development, it will be critical also to alleviate the existing problems that the community faces. This is the purpose of interventions included under the "Strengthen" pillar.

The key objective of the Strengthen pillar is to improve the community's health and access to information where:

- the former includes a range of interventions for improving the health of community members from birth to old age and encompasses projects that target nutritional health, physical health and emotional health. Such interventions will also provide holistic health education for community members; and

- the latter includes two interventions that are aimed at providing the entire community with access to a internet network and a communication platform, respectively; the platform is intended to be used by all local stakeholders.

"Grow" pillar

This pillar includes economic interventions aimed at taking advantage of opportunities that are generated by the KPS decommissioning and the introduction of new commercial projects in the area. The pillar also encompasses opportunities that could present themselves with the deployment of similar economic interventions at other power stations in the province.

The proposed interventions under the "Grow" pillar can be broken down into two groups, namely:

- KPS-linked opportunities: These projects are aimed at responding to the potential demand for goods and services created by the projects under the "Stabilise" pillar. They would include business opportunities for local SMMEs along the supply chains of the various interventions and other procurement initiatives.
- Broader JET-linked opportunities: These projects will respond to opportunities arising from the implementation of mitigation strategies for the shutdown of other coal-fired power stations in Mpumalanga (the closures are scheduled to take place as per Eskom's Strategy 2035). The projects are to include the establishment of a solar PV assembly plant, the manufacturing of components required in containerised microgrid assembly, the manufacturing of battery energy storage cells and assembly of batteries, and a facility for recycling renewable energy components.

"Communicate" pillar

The successful implementation of the proposed mitigation strategy will depend on whether the strategy receives buy-in from all groups of stakeholders. For this to occur, the strategy will need to be communicated to them and stakeholders will need to be engaged on its content. It is for this reason that the fifth pillar of the strategy focuses on communication. Given the above, the "Communicate" pillar is as essential to the success of the mitigation strategy as any of the other pillars. Communication for the strategy will be structured to reach two broad groups of stakeholders, namely internal stakeholders and external stakeholders. Interests and the ability to influence the success of the mitigation strategy will differ between these groups as well as between segments of each group. Therefore, the approach to engaging and maintaining a dialogue with these groups must consider such differences.

8.3 Implementation plan

Details of the projects included in the mitigation strategy for KPS are provided in this section. As outlined in Figure 8.4, implementation of the mitigation strategy is a long-term process with some of the interventions required to be implemented in the short term and others envisaged to be implemented at the later stages. While the implementation of some of the projects in the long term are dependent on certain technical and economic parameters, many of the short-term and medium-term projects are interlinked. For example, to optimise the benefits from R&R interventions that are proposed for the medium term, there is a need to prioritise the development of skills in the local community as well as to upskill and reskill power station

employees. This will ensure that the labour force can be timeously absorbed by the newly developed projects. Another example concerns strengthening the social capital of the community, which needs to be prefaced with interventions that focus on infrastructure or built capital.

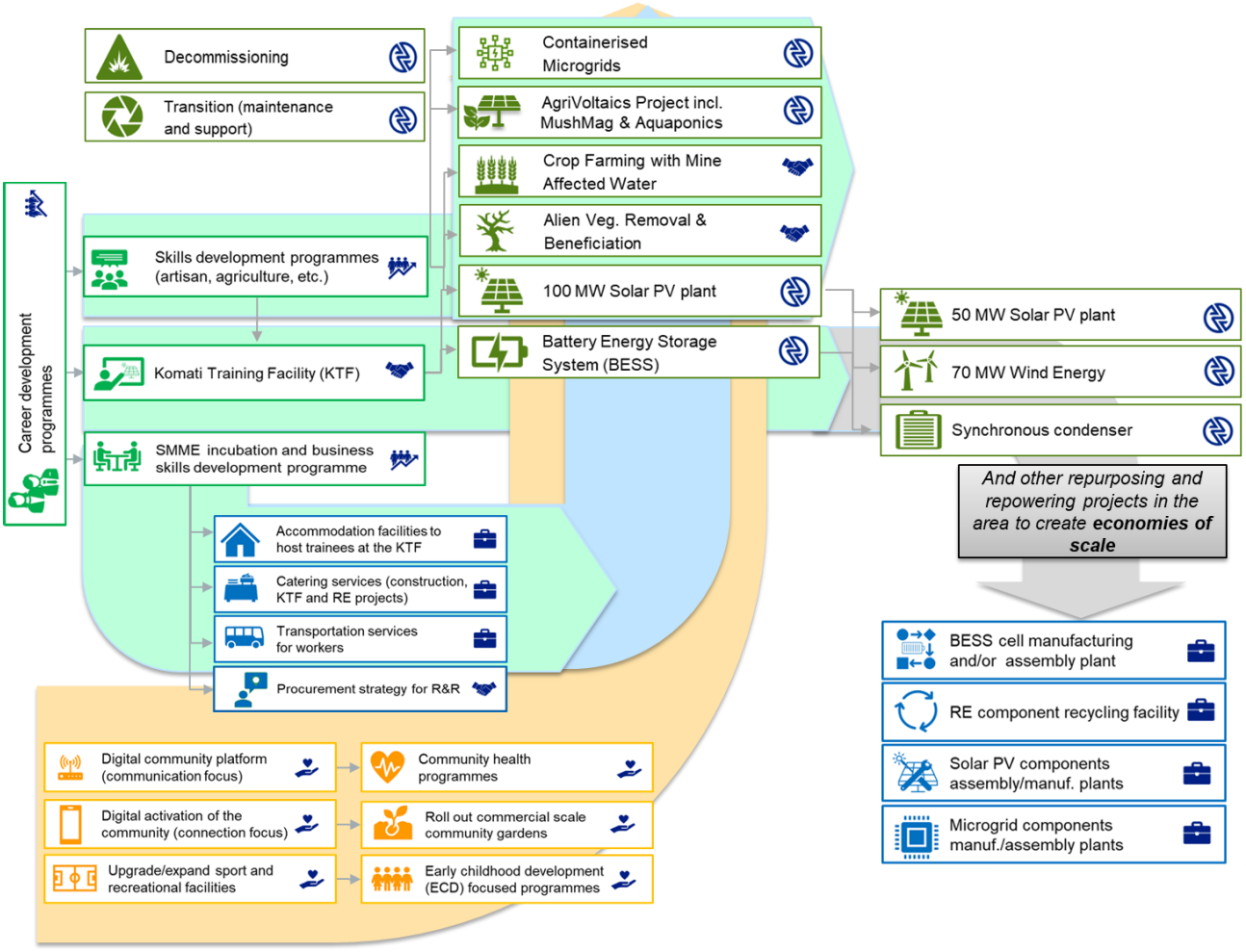


Figure 8.4: Mitigation strategy implementation plan for KPS

8.3.1 Pillar 1: Develop (reskill, upskill and develop new skills among power station employees and the local community)

This pillar focuses on developing the KPS and local community workforce through reskilling and upskilling initiatives. The pillar is divided into two sets of interventions. The first focuses on Eskom employees and includes a guide to the skills development plan for existing permanent employees of the power station. The second set targets human capital development interventions that focus on creating skills in the broader community. Figure 8.5 illustrates the interventions of the pillar.

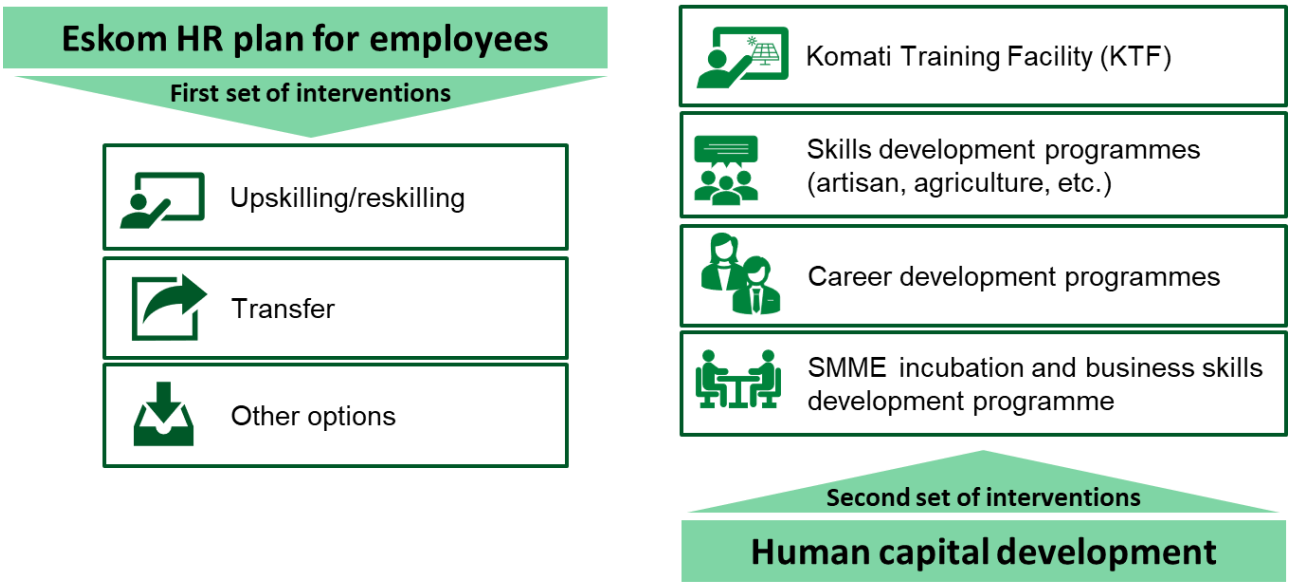


Figure 8.5: Pillar 1 interventions

Developing the human capital of the KPS workforce and PSA is vital given that human capital interventions are considered critical enablers of the economic projects envisaged to mitigate negative effects resulting from the shutdown of the power station. Various skills will be developed through these interventions. The following are some of the benefits that are to be expected should the interventions be successfully implemented:

- skills levels of the local workforce are enhanced;
- employability of the local workforce is improved;
- the creation of new SMMEs is facilitated;
- the youth are taken off the streets, which facilitates a reduction in drug and alcohol abuse; and
- livelihoods of households are supported.

8.3.1.1 Eskom HR plan

Rationale

According to the KPS employment profile, as of 2021 the power station has 234 permanent employees, 210 ERI employees, and 292 contractor employees who will be affected by the shutdown. As such, the shutdown of KPS necessitates an HR management plan. The HR plan, devised by Eskom, is essential for providing guidance on the management and provision of strategies for affected employees (bearing in mind the differentiation of employee categories (as per Section 4). Crucially (and in alignment with Eskom's JET), the HR management plan is aimed at assisting Eskom to pivot into a sustainable organisation while remaining cognisant of its employees and their livelihoods. New skills and expertise, retraining opportunities, and skills retention are crucial elements in ensuring that the shutdown of KPS is managed sustainably from a personnel perspective.

The HR plan ought to align with the implementation of the approved R&R strategy for the power station to:

- assist in the management and provision of strategies for dealing with permanent employees who would be affected by the R&R strategy;
- guide management in providing an appropriate response in cases of large impacts that would require engagement with permanent employees, organised labour, and other key stakeholders;
- ensure that affected employees are managed in a responsible and integrated manner; and
- facilitate a process where employees are assisted in sustaining themselves in line with the changes as a result of the approved strategy.

Description

Eskom has drafted an approach that highlights possible options for managing employees affected by the shutdown of the power station. Figure 8.6 illustrates the possible options to be considered, which include transfers, reskilling/upskilling, and incremental and other options. In the case of KPS, transfers, redeployment, and upskilling are the main options for KPS. Voluntary separation, on the other hand, is not expected to be an option for KPS. Work is ongoing in terms of the details of each of the options and their financial implications. A more detailed approach is still to be consulted with employees and trade unions, and will be undertaken in the short-term.

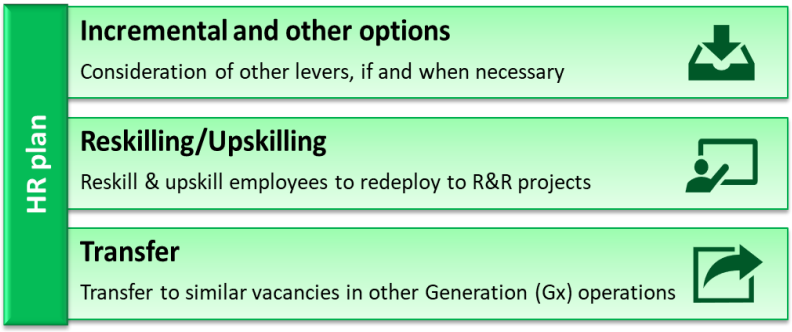


Figure 8.6: HR mitigation options for employees affected by the power station closure

In line with Figure 8.6, the following are key considerations in ensuring that all Eskom permanent employees are accommodated through various means:

- Eskom will be ensuring job security; there will be no job losses or retrenchments.
- All permanent employees will undergo change management interventions.
- Some employees will be reskilled/upskilled for R&R options.
- A mechanism for reskilling has been developed; however, the execution of skills development has not started.
- Skill sets such as those for technicians, engineers, and operators, among others, will be reused – allowing for shifts to different technologies.
- KPS has a fairly young population, which implies flexibility and a higher chance of mobility elsewhere.
- Eskom does not have a policy to forcibly let go of employees.
- ERI employees will be transferred to other sites/operations while alternatives are being considered through engagements with the suppliers of contract employees.

All employee adjustments will be made internally. In line with South Africa's JET strategy, Eskom is considering projects that promote clean energy solutions such as the repowering projects, including various technologies such as solar, wind, and battery energy storage systems (BESS).

Key metrics

The following are the assumptions for KPS repowering options:

- Some of the staff will be retained for five years for plant preservation (e.g. security, water services, and ash dams, among others).
- Around 113 employees will be redeployed to solar and 10 to BESS and synchronous condensers, 123 new jobs will be created in the transition to clean technologies. In addition, around 38 permanent direct employment opportunities will be created as part of the deployment of 70 MW wind.

Figure 8.7 summarises the estimated number of jobs that will be created as part of the repowering options at KPS. These assumptions are still under review and have yet to be finalised.

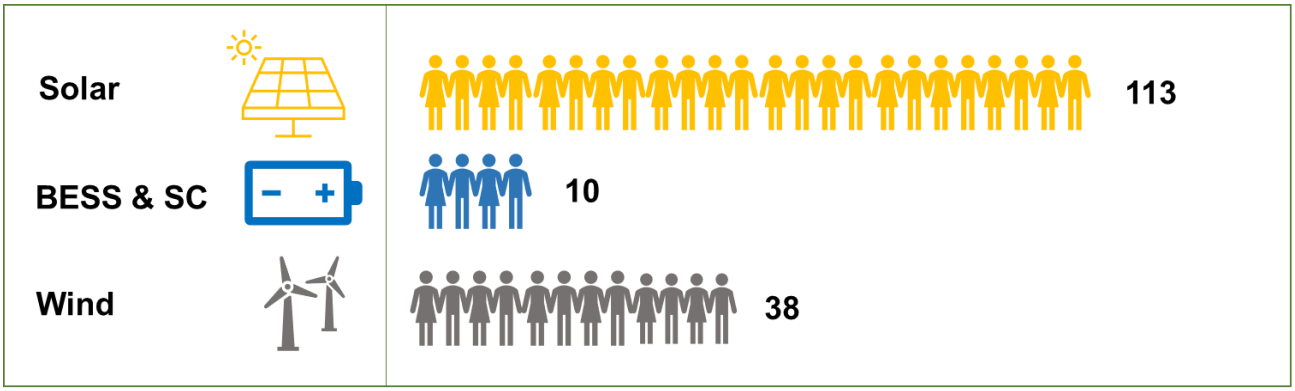


Figure 8.7: Workforce plan per technology for KPS

As mentioned above, certain employees will be retained for the reuse of their skills, with some of these technical staff being reskilled/upskilled to new positions. In addition to the permanent employment opportunities that will be created at the new facilities, several jobs will be retained at the power stations during the transition period. The number of employees and contractors that are to be temporarily retained post-shutdown has yet to be finalised; however, preliminary figures available as of May 2022 are provided in Table 8.4.

Table 8.4: Resource and contractor requirements during the transition period (i.e. not permanent)[13]

Resources required during the transition period	
Komati Management	8
Engineering Department	19
Operations Department	33
Finance Department	20
Human Resources Department	6
Risk and Assurance	54
Total	**140**
Contractor requirements during the transition period	

[13] These figures are based on the latest information received from Eskom and were not included in the original modelling exercise undertaken in Section 5.

Resources required during the transition period	
Engineering Department	47
Operations Department	64
Risk and Assurance Total	79
Total	**190**

According to the information above, a total of 161 permanent employment opportunities are to be created during the operational phases of the solar PV, wind energy, battery energy storage, and synchronous condensers to be deployed at KPS. Furthermore, a total of 330 employment opportunities are to be created for plant maintenance during the incremental period. Furthermore, Eskom is considering various other repurposing and repowering projects, which will create additional jobs as highlighted in the sections to follow.

Table 8.5: HR plan project metrics as of May 2022

Mitigation option	Value	Comment
Incremental and other options	330	140 permanent employees and 190 contractors to maintain existing infrastructure during the incremental period.
Number of employees to be upskilled	Up to 257	Considering the number of KPS Eskom permanent employees at the power station. The number of those who will need to be reskilled and/or upskilled with be determined by a detailed HR plan in line with the new projects' skill requirements.
Number of employee transfers	Up to 231	Permanent ERI employees involved at KPS may be transferred.
Total costs	Up to R69 million	The HR plan is to spend around R69 million to implement the above options. This cost includes the cost for VSPs (R36.9 million), redeployment/transfers (R15.1 million), and retraining (R16.8 million).

Current status, risks, and challenges identified

The periods required for upskilling/retaining can be considerable. This factor is of critical significance since the training and upskilling/reskilling ought to precede the changes suggested above as mitigations for the impact of the shutdown, which will take place in less than six months.

8.3.1.2 Komati Training Facility (KTF)

Rationale

South Africa's JET, in accordance with the global shift towards renewable energy while ensuring sustained economic growth, is considered the centrepiece of the shutdown process of South Africa's coal-fired power stations. As noted in Eskom's JET strategy, the JET is considered as the intersection between the following: (i) decreasing carbon emissions, (ii) stimulating economic development while protecting and increasing employment opportunities, and (iii) supplying reliable and clean electricity. Concerning the second area of focus listed and the need for renewable energies to replace coal-fired power stations, the JET crucially requires

the upskilling/reskilling of the South African labour force. This need is reiterated in the 2040 Long Term Strategy of the Steve Tshwete LM, which identifies the upskilling of communities in fields of renewable energy as a key intervention (GIZ, 2019).

As part of the R&R interventions for KPS, solar PV, wind energy, BESS, and synchronous condensers are to be deployed at the KPS site following its shutdown. Although permanent employees of Eskom and those who form part of ERI possess some skills related to electricity generation, these skills are not necessarily useful in the deployment of clean energy technologies (i.e. conventional coal-generated electricity versus renewable energy sources (RES). There thus exists a need both to reskill Eskom and ERI employees and upskill the broader labour force to facilitate the deployment of RES not only at KPS but also other power stations scheduled for shutdown. The basic rationale in this instance may otherwise be stated as follows: as RES are deployed following the shutdown of coal-fired power stations, there will be increased demand for workers with RES-related skills; this demand will necessitate training interventions.

There exists an argument for the establishment of such as centre such as KTF at the KPS site as most of Eskom's coal-fired power stations are located in Mpumalanga. In addition, as KPS is the first of Eskom's fleet of coal-fired power stations to be shut down, it may be useful to pilot the training facility at this particular power station. As such, KPS is to be considered a pilot site in this regard.

Description

The aim of KTF is to capacitate permanent Eskom employees with the necessary skills for RES deployment necessitated by the JET. However, the provision of training related to RES should not be restricted to Eskom workers. Where possible, it should also include qualifying members of the local community. The KTF is anticipated to expedite specialised and accredited training applicable to the entire renewable energy industry. This, in turn, is likely to support localisation through the preparation of a skills pipeline relevant to and required for the deployment of renewable energy.

In alignment with training institutes of a similar nature, KTF is likely to focus on helping to make locally developed technologies accessible to the renewable energy industry. However, the success of this project is dependent on partnerships with various industry associations such as the South African Wind Energy Association (SAWEA) and the South African Photovoltaic Industry Association (SAPVIA). KTF will be established in partnership with the South African Renewable Energy Technology Centre (SARETEC), which is based at the Cape Peninsula University of Technology (CPUT).

Initially, KTF will be established as a satellite SARETEC campus – this for a transitionary period of 24 months. During this period, Eskom aims to acquire the necessary skills and accreditation through the Eskom Academy of Learning. Should this approach prove successful, Eskom may consider the establishment of similar facilities at other coal-fired power station sites to be shut down.

It is anticipated that KTF will be equipped with state-of-the-art equipment, which may result in the acquisition of international accreditations. Eskom has proposed that existing buildings and warehouses at KPS be refurbished and repurposed to house KTF. Broadly, the KTF will require classroom, demonstration, and storage facilities.

Eskom has noted that minimum standards will be determined for learners to qualify for training programmes offered by KTF. Learners are to be selected from local communities as well as from Eskom's workforce. However, candidates will be required to have some level of experience as an artisan.

Partners

To achieve the set JET vision, Eskom has committed to partnering with key stakeholders such as trade unions, renewable energy associations, technology partners and/or clean energy sector-wide partners, surrounding communities, and local SMME entrepreneurs. This is to ensure that it meets the goals in an inclusive, collaborative manner while drawing on the skills of the partners.

Accordingly, Eskom is partnering with SARETEC for a period of 36 months starting in August 2022. SARETEC, the first national renewable energy technology centre in South Africa, was established through the National Skills Funds at the CPUT Bellville campus in Cape Town.

SARETEC will manage the project and oversee the refurbishment of the existing Eskom training centre, including the procurement for upgrades and renewable energy training equipment. It will also ensure that the KTF is developed in accordance with the relevant training qualification standards as well as CPUT procurement policies, internal processes, and governance structures.

Current status, risks, and challenges identified

SARETEC has been selected for the implementation of the KTF. The coursework and training material to be used at the KTF have yet to be agreed on and finalised.

As noted during community engagements that formed part of this study, community members are interested in participating in skills development initiatives. However, given the varying levels of education within communities, it is recommended that Eskom weigh the entry requirements against the levels of education within the community. This process will need to be cognisant of the community's perception of Eskom should they not be included in the initiative.

Action plan

Key action items for the establishment of the KTF are provided in the table below along with the institutions responsible for taking the actions and the relevant timeframes.

Table 8.6: KTF action plan

Action	Responsibility	Timeframe
Run course on introduction to renewables	Eskom	Short-term (1-3 years)
Identify training to commence SARTEC training during project setup	Eskom	
Confirm KTF locations/venues	Eskom and SARETEC	
Define KTF purpose and business motivators	Eskom and SARETEC	
Define KTF information and specific requirements	Eskom and SARETEC	

Action	Responsibility	Timeframe
Define necessary architecture and specify technology	Eskom and SARETEC	
Determine physical layout and initiate facility setup	Eskom and SARETEC	
Identify trainees, trainers, sponsors, stakeholders, and end users	Eskom	
Coordinate physical facility layout and setup	Eskom and SARETEC	
Develop training programmes and timelines, and assign trainees/trainers	Eskom and SARETEC	
Determine which programmes will run at the Eskom Academy of Learning and which at KPS	Eskom and SARETEC	
Define logistical arrangements	Eskom and SARETEC	
Align with line managers regarding employees that will be on training and concerning duration of training	Eskom	
Define KTF roles and responsibilities	Eskom and SARETEC	
Establish KTF management governance	Eskom and SARETEC	

A critical step in the establishment of the KTF involves the identification of suitable trainees. To identify candidates, Eskom will determine the minimum requirements for individuals to participate in the training programme. Individuals will be selected from Eskom's workforce and local communities by using a fair and transparent criterion. However, to participate in the training offerings of KTF, candidates are required to have experience as an artisan.

8.3.1.3 Career development and skills development programmes

Rationale

Career development involves the process of assisting individuals to choose careers that are the best fit for them. This typically includes assisting them to obtain the required education, training, and skills development and to find employment. It may also involve helping them to advance further along career paths, linking them to their ideal jobs, skill sets, and lifestyles (Mckay, 2020). Career development programmes will therefore be essential for providing guidance to those who have completed school and are considering post-school opportunities. In some instances, it involves supporting an individual through a career or job change, which may be the case for certain residents of the Komati PSA as the power station shuts down and new industries are established and/or grow.

The review of national policies highlighted the importance of skills development and training in new or alternative sectors such as agriculture, the waste economy, and the green economy, among others; promoting the employment of youth and women and ensuring that affected communities such as those in the PSA are

equipped to transition to new workplaces or roles. Nonetheless, as highlighted in the previous sections, new projects may pose a risk of a mismatch between the skills that are in demand and the skills that are available. Hence, identifying future skills requirements in the area and directing the training and skills development of individuals from the same area towards meeting these requirements is essential. For example, agrivoltaics is a project proposed for the area that creates a need for skills development in the aquaponics system.

Career and skills development programmes are a means of developing not just the communities but the individuals themselves, which necessitates investments in local human capital. Various factors in the Komati PSA necessitate career and skills development programmes. They include the following:

- Some of the social ills in the area are caused by unemployment and idleness, especially among the youth. A career development programme would help the youth identify areas into which they fit best and the paths they should pursue.
- Barring those employed at KPS, skill levels are relatively low in the region, with most community members having artisanal skills.
- The exodus of skilled persons from the PSA in search of alternative employment opportunities due to the power station closure will impact the quality of skills left within the area and the ability of the community to host new economic prospects.
- Additionally, the need to diversify the economy implies a need for matching skills.

Given the above, a career development centre is to be established in the Komati PSA to improve the employability of the local labour force. Crucially, the career development centre will provide community members with information on possible career opportunities and employment opportunities available in the area as well as career/skill assessments and career development paths.

Description

The career development centre will focus on the provision of services to community members to improve their employability. The centre will focus on linking community members with employment opportunities in the area while providing targeted services to improve the employability of local community members.

Given the above, the centre will need to be operated by individuals that have the necessary skills or qualifications related to human resources. To facilitate linking community members with employment opportunities in the area (including those brought about by the R&R of KPS), it is envisaged that the centre will undertake regular career expos or job fairs for community members. Essentially, the career development centre should provide community members with a personal development path to attain their desired employment roles.

Recommendations

A suitable location for the career development centre is Plot 167 and 168 in Komati Village. This property can also be used for other purposes such as ECD-focused programmes, community health programmes, and recreational activities. However, it should be noted that this property is currently privately-owned.

Figure 8.8: Location of the properties (*Additional images illustrating the various rooms of the property are attached as an annexure.*)

Partners

This initiative may be driven by the Mpumalanga Provincial Department of Higher Education and Training in partnership with Eskom. In addition, partnerships with other agents may be considered such as the Middelburg Chamber of Commerce and Industry.

Key metrics

Table 8.7 indicates the key metrics associated with the intervention.

Table 8.7: Career development key metrics

Indicator	Value	Comment
Renting of office space	R150 000	Per annum, assuming office space will be rented and not purchased.
OPEX requirements	R1.5 million – R2 million	Estimate; may require revision upon confirmation of exact services.

Indicator	Value	Comment
Direct jobs to be created during operations	3 - 5	May not be absorbed by community members as labour/professionals may be outsourced.
Targeted start of operations	2023	-

Current status, risks, and challenges identified

A needs assessment still needs to be conducted. Furthermore, partners need to engage with the supplier regarding the courses that will be presented. The final costs of the project have yet to be determined, with the identified costs being considered preliminary figures.

One of the main threats to implementation of the career development centre is the availability of resources such as funding and facilities. Upskilling and training are on a critical path since the power station will be shutting down soon and this should be an intervention that precedes the implementation of some of the projects.

Action plan

Key action items for the establishment of the career development centre are listed in the table below along with the institutions responsible for taking the actions and the relevant timeframes.

Table 8.8: Career development centre action plan

Action	Responsibility	Estimated duration
Conduct further research/needs assessment for the career development programmes	Eskom	Short-term (1-3 years)
Engage TVET colleges	Eskom	
Form partnerships	Eskom	
Develop and implement programmes for high-need job groups, then expand and update curricula to match the skills needs	Eskom and TVET in collaboration with SAQA	
Determine the location, infrastructure, and system requirements for the centre(s)	Project partners	
Refurbish/establish facilities to be used	Service provider	
Purchase necessary equipment	Project partners	
Hire staff	Project partners	
Operation	Project partners	Ongoing
Undertake monitoring and evaluation exercises	Project partners	Ongoing

Because KTF is already planned for the area, the career development centre should consider a wider range of sectors such as agriculture and other sectors linked to the skills demand of the area and future jobs.

8.3.1.4 SMME incubation and business skills development programme

Rationale

SMME incubation is considered an innovative mechanism for emerging and growing businesses, and business development is viewed as a key mechanism for realising sustainable economic growth and development, especially within transitioning and developing economies (Ntlamelle, 2015). As such, the SMME incubation and business skills development programme would be fundamental in creating an opportune and suitable environment for small businesses and could positively affect the Komati PSA.

The baseline profile showed that the shutdown of KPS may affect businesses that are dependent on its operations and across the coal value chain. Thus, providing support to SMMEs and informal traders is critical to ensuring sustainability. Providing support to SMMEs through the incubation and business skills development programme would promote employment creation and youth participation. This, in turn, would address some of the key issues regarding the closure of the KPS and the potential impacts of the shutdown for the PSA, including unemployment and slow economic growth. The provision of SMME support will contribute to sustainable businesses, which may support local economic growth and the creation of employment opportunities. Growth and higher employment will result in increased household income, increased local purchasing power, and eventually local economic stability.

Description

The SMME incubation and business skills development programme aims to provide “training and incubation programmes to capacitate and grow local businesses to be able to benefit from opportunities and create jobs” (Eskom, 2021b). While this intervention is to be linked to opportunities from JET and R&R projects, it will also consider creating opportunities for the waste economy and agro-processing. The programme will offer a platform for South African suppliers to develop into global suppliers and for emerging suppliers to develop specific technologies and services. Additionally, the programme may link existing businesses to value-adding commercial activities. The expected outcomes of the intervention, if it is successfully implemented, may include improved entrepreneurial skills and small business development. This will promote the creation of new jobs in the local area and, thus, the sustenance of the economy.

SMME incubation and business skills development programmes typically include services such as training, mentorship, and business coaching. In addition, the intervention may include services such as mentorships or business coaching; however, these will need to be tailored according to the needs of the business. Furthermore, the offerings of the SMME incubator will need to consider the entrepreneurial stage of the business to provide accurate and targeted support.

It is recommended that the incubator targets small informal businesses in the area that focus on activities aligned with the JET. These would include activities linked to the waste economy, agriculture sector, and tertiary sector (i.e. catering, accommodation, telecommunications, food services or local vendors, and hospitality, among others).

Partners

Although the intervention presents an opportunity for Eskom's involvement, partnerships with other entities will need to be considered (e.g. the MCCI or Steve Tshwete LM). Furthermore, partnerships with mining houses in the area may also be considered to further enhance the impact of the intervention.

Key metrics

The following table highlights the key metrics associated with the intervention.

Table 8.9: SMME incubation and business services key metrics

Indicator	Value	Comment
CAPEX	R1 million	For establishing the physical infrastructure to house the incubator (assuming that an existing building will be refurbished)
OPEX requirements	R4 million - R5 million	Estimate may require revision upon confirmation of exact services.
Direct jobs to be created during operations	6 - 8	May not be to the benefit of community members as labour/professionals may be outsourced.

Current status, risks, and challenges

As SMME incubation services can often be costly, a key difficulty in proceeding with this intervention is the securing of necessary funding. In addition, partnerships with key entities will be crucial in ensuring the success of the intervention.

Action plan

Table 8.10 illustrates the high-level action plan proposed for the establishment of an SMME incubator and business development programme.

Table 8.10: SMME incubation and business skills development programme action plan

Action	Responsibility	Estimated duration
Review incubation opportunity; specify the focus of target SMMEs	Eskom/service provider	Short-term (1-3 years)
Define incubator methodology, design, and selection criteria		
Reach out to partners and define the governance structure		
Identify location and revenue model, and determine/acquire necessary equipment		
Register and launch the incubator		
Undertake monitoring and evaluation exercises	Service provider	Ongoing

8.3.2 Pillar 2: Stabilise (stabilise the local economy by setting up new economic activities and creating new jobs in the community)

The second pillar of the mitigation strategy focuses on stabilising the local economy following the shutdown of KPS. This pillar encompasses the establishment of new economic activities and the creation of new employment opportunities within the local community. Based on the modelling exercises undertaken for this study, the shutdown of KPS is expected to result in a direct economic loss of R321 million in GDP of the PSA. Therefore, consideration needs to be given to interventions to stabilise the local economy following the shutdown of KPS.

Two sets of interventions define this pillar. The first set encompasses R&R projects, which will be led by Eskom and are to be implemented at the KPS site. The second set of interventions is either led by Eskom or is to be implemented in partnership with Eskom. These interventions focus more on the local community than the KPS site. Furthermore, projects in the second set may be grouped into three phases depending on their implementation timeframes. Interventions that form part of Pillar 2 are depicted in Figure 8.9, where the Eskom logo denotes projects that are Eskom led.

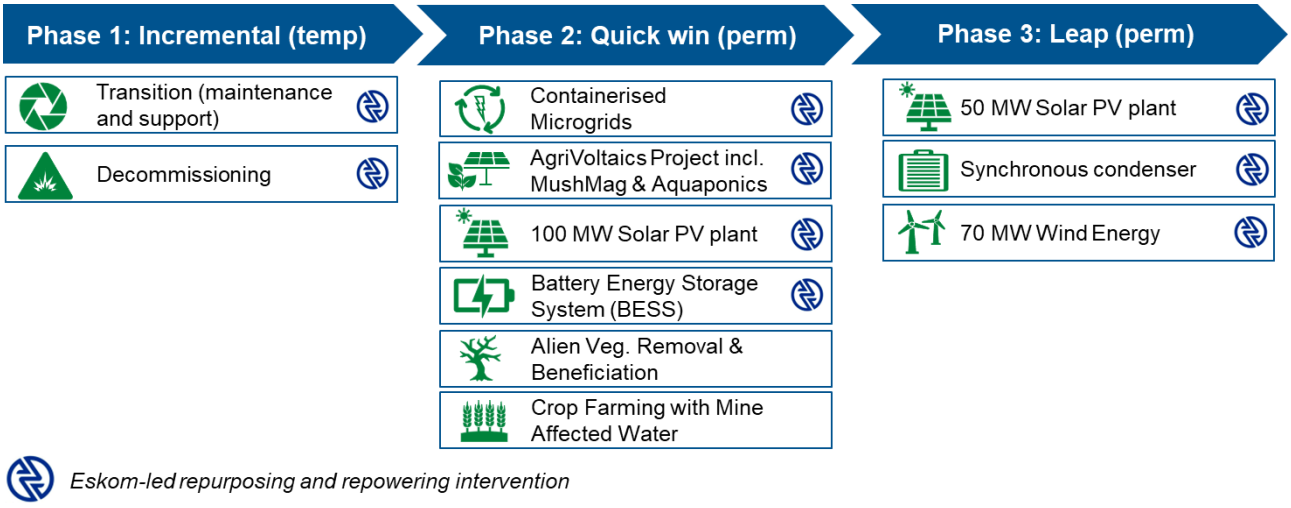


Figure 8.9: Pillar 2 interventions

Although these interventions require substantial investments, they are expected to result in significant opportunities for the local community should they be implemented successfully. With regard to the permanent employment opportunities that will ideally be established through these initiatives, a total of 537 sustainable employment opportunities stand to be created across Phases 2 and 3. In total, Pillar 2 is expected to contribute R674 million to the economy directly during operations and R1.4 billion indirectly. It should be noted that the employment opportunities and production contributions created during the construction phase, although temporary, will further contribute to the immediate stabilisation of the local economy following the shutdown of KPS. As such, it is anticipated that these interventions will offset the direct losses in the PSA area that are associated with the KPS shutdown.

In addition to the above, other benefits that have not been quantified are anticipated. The successful implementation of the identified interventions is likely to result in improved prospects and household confidence in the area. This may also be associated with the stabilisation of unemployment and the reduced exodus of individuals from the area. Furthermore, given the anticipated mitigation of migration from the area and a reduction in unemployment, property values are likely to be sustained. The shutdown of KPS is also expected to improve the quality of ambient air in the area and, subsequently, the overall health of individuals.

8.3.2.1 Transition - maintenance and support of existing infrastructure

Rationale and description

The shutdown of KPS will require the retention of some Eskom employees to provide maintenance and support services for activities that will continue following the shutdown (cleaning services and maintaining water services, among others). The required contractors may be grouped according to engineering services, operations, and security. Table 8.11 outlines the contractor requirements for KPS post-shutdown.

Table 8.11: Contractor requirements post-shutdown

Engineering department	Operations department	Risk and assurance (security)
• Civil maintenance • Water plant maintenance • Electrical maintenance • Lubrication • C&I	• Station cleaning • ERI • Ash dams • Coal stockyard	• Security personnel • Quality controllers, fire officers, and quality assurance • Fire and emergency services • Cleaning services • Horticulture • Hygiene services • Pest control • Waste removal

Key metrics

According to information received from Eskom, several employees will be required across various professions during the transition period. An overview of the human resources and contractor requirements across the various professions is provided in Table 8.12. In total, 330 employment opportunities are required for the transition of KPS following its shutdown. However, the anticipated employment opportunities are temporary and may thus not be considered as sustained employment creation. Based on the modelling exercises undertaken for the study, the transition period of KPS may result in a direct and indirect production contribution of R415 million and R335 million, respectively. A total of 310 indirect employment opportunities are expected to ensue.

Table 8.12: Required resources and contractor requirements during the KPS transition

Required human resources post-shutdown	
Komati Management	8
Engineering Department	19
Operations Department	33

Required human resources post-shutdown	
Finance Department	20
Human Resources Department	6
Risk and Assurance	54
Total	**140**
Contractor requirements post-shutdown	
Engineering Department	47
Operations Department	64
Risk and Assurance	79
Total	**190**

Partners

Eskom is considered the champion for this intervention. In addition, contracting services pertaining to engineering, operations, and risk and assurance will be required.

Action plan

It is understood that staff will be retained for around five years for plant preservation. As such, the transition period is expected to last five years.

8.3.2.2 Decommissioning of KPS

Rationale

According to EIA Regulations of 2014, decommissioning means to “take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned”. It also involves dismantling all equipment, demolishing all buildings and structures, and cleaning the entire site – including disposal areas (both wet and dry) and coal yards – all as per standards (Eskom, 2019).

Map 8.1: KPS development areas

Although there is a strong environmental argument for the decommissioning of KPS and coal-fired power stations in general, consideration needs to be given to the impact thereof on communities dependent on their operation. Studies to assess the economic viability of decommissioning KPS found that the total benefit arising thereof is valued at R12.9 billion (VPC, 2021).

Description

A significant proportion of KPS has been identified for decommissioning, thus for shutdown, demolition, and rehabilitation. The decommissioning concept also entails the emptying and cleaning of systems and equipment disconnection from electrical, hydraulic, and pneumatic auxiliary energy.

Map 8.1 indicates the development areas to be considered for the shutdown of KPS. Yellow areas are earmarked for decommissioning and repurposing while the red areas indicate the extent of the total development.

Table 8.13 provides an overview of decommissioning activities relevant to KPS. Apart from the listed activities, it is recommended that the site be subdivided into a total of nine lots (which is considered phase one of the decommissioning, demolition and rehabilitation process) (VPC, 2021). Phase two includes the decommissioning and rehabilitation of the ash dam complex, which is to be handled separately from the power plant project.

Table 8.13: Proposed KPS decommissioning activities[14]

Area
Main power station complex (phase one)
Decontaminate, dismantle, then salvage, demolish or dispose of waste at new on-site waste facility (Type C). Shape footprint and rehabilitate the area.
Linear infrastructure (roads, fences, pipes and conveyors). Remove that which will not be required for the next land use. Shape footprint and rehabilitate the area.
Sort and screen waste produced, crush concrete, dispose of the on-site facility (Class C), and hazardous waste to a hazardous disposal facility. Shape footprint and rehabilitate the area.
Coal stockyard: Dismantle and remove infrastructure and dispose of inert waste at the on-site facility. Shape footprint and rehabilitate the area.
Ash dam and related infrastructure (phase two)
Recovery dams (Lake Stoffil, Lake Fin), return water dams third recovery dam. Evaporate water, remove equipment, remove and dispose of HDPE liner, excavate and dispose of contaminated sediment to ADF, infill cavity, and revegetate.
Existing ash dam, shape upper surface and side slopes add 1m cover to prevent ingress of rainfall, establish vegetation, stormwater management.
Old asbestos facility. Shape upper surface, install cover (J&W Design), revegetate
Reservoirs: Will remain at KPS as it is the source of raw water supply to the water treatment plant which will remain in operation under Eskom.
Borrow pit for infilling requirements.

Source: VPC (2021)

It should be noted that the following buildings and structures are to be retained for repurposing:

- the main services building;
- the main stores complex and the Alstom and DB thermal workshops (among others);
- the HV yard and switching stations;
- the main office block, the engineering offices, and the medical centre;
- the turbine house (following the removal of core equipment and the demolition of the boiler house); and
- the water treatment plant.

[14] The decommissioning scope is considered by VPC(2021) to be an initial proposition. The final decommissioning scope has yet to be determined by a dedicated Owner's Engineer based on the requirements of Eskom.

All other plant structures will be removed to provide space for other facilities (VPC, 2021). As it entails the demolition of certain areas, the decommissioning of KPS will require the establishment of a waste disposal facility on site to manage inert and decontaminated building rubble (VPC, 2021). It should be noted that such an on-site waste disposal facility will require a waste management license in terms of the National Environmental Management: Waste Act (2008, as amended).

Partners

Eskom is considered the champion for the decommissioning of KPS. However, a multitude of partners may be considered depending on the decommissioning needs.

Key metrics

Key project metrics associated with the decommissioning of KPS are outlined in Table 8.14.

Table 8.14: Decommissioning metrics

Indicator	Value	Comment
Total cost of KPS demolition	R472 million	Cost indicated excludes the market value of recyclable materials. Value of materials put at R169.61 million (VPC, 2021).
Direct jobs	540	Temporary employment opportunities during demolition.

As indicated, it is expected that the total cost of demolishing KPS will amount to R472 million. This is expected to create a total of 540 jobs. However, as mentioned, these jobs are considered temporary.

Current status, risks, and challenges identified

As the decommissioning processes require various licenses and permits, the overall process may be delayed through the inability to obtain the necessary authorisations. As mentioned, the establishment of an on-site waste disposal facility is necessary as part of the KPS decommissioning; this, in turn, will require a waste management license. According to VPC (2021), the period for obtaining a license for a waste disposal facility has been set at 197 days (which includes 30 days for public participation and a minimum of 90 days for a possible appeal).

In addition to the above, the decommissioning of KPS will require an environmental authorisation license for which the basic assessment may take 197 days (including 30 days for public participation and 90 days for a possible appeal process) (VPC, 2021). In addition to the two licenses identified, other authorisations/licenses that will be required are related to water use, atmospheric emissions, the decommissioning of dams with a safety risk, biodiversity, and heritage conservation.

Other risks or challenges identified as part of the decommissioning of KPS include:

- noise pollution (short-term);
- damage to infrastructure required for repurposing activities;
- fatalities or injuries; and
- air and water pollution.

Action plan

Table 8.15 lists the action items to be completed to implement the project.

Table 8.15: Decommissioning action plan

Action	Responsibility	Estimated duration
Clearance of objects earmarked for demolition	Contractor	Short-term (1-3 years)
Removal, treatment, and elimination of existing hazardous substances	Contractor	
Rehabilitation and removal of pollutants from the demolished objects	Contractor	
Dismantling of technological equipment/facilities	Contractor	
Structural separation	Contractor	
Preparatory measures for blasting	Contractor	
Processing, recycling, or disposal of material acquired during demolition	Contractor	
Layered backfilling of excavation pits with compactable, approved material	Contractor	
Demolition of existing underground facilities	Contractor	
Setting up of surfaces as per the planned use	Contractor	
Implementation of traffic safety measures	Contractor	

Source: Adapted from VPC (2021)

8.3.2.3 Containerised microgrids assembly plant

Rationale

Access to reliable electricity is known to be an enabler of economic growth and development (Stern, Burke, & Bruns, 2017). In addition, access to electricity is considered a fundamental requirement for the development and upliftment of rural communities. Although households' access to electricity for lighting purposes in 2020 stood at 84.8% in South Africa and 86.1%[15] in Mpumalanga, a noteworthy proportion of households both nationally and provincially are still without electricity.

As many of the regions in South Africa without access to electricity are likely to be rural, the cost of grid extension should be considered. Studies done in this regard have found that it is often more economical to implement solutions such as standalone microgrids in rural areas located some distance from the main electricity grid than to extend the grid to these areas (Longe, Rao, Omowole, Oluwalami, & Oni, 2017). However, the feasibility of microgrids is dependent on the breakeven or electric distance limit between the area that requires electrification and the main grid.

[15] Source: Urban-Econ calculations based on Quantec (2021b).

Apart from the provision of access to electricity, the local manufacturing of microgrids (from component production to assembly) can stimulate the local economy and create employment opportunities. Furthermore, the upskilling of community members in renewable energy technologies contributes to the success of the JET.

Given the above, the deployment of standalone microgrids in rural areas may be regarded as essential in providing universal access to electricity. Furthermore, the deployment of such solutions may contribute to employment creation on a national scale and may also provide a more cost-effective solution for the provision of electricity. Crucially, the deployment of microgrids is likely to provide a more sustainable and reliable source of electricity than the energy sources typical of rural communities. In addition, the deployment of microgrids to rural areas may reduce carbon emissions as these communities largely rely on the burning of wood or paraffin for energy.

Description

Given the need to provide all communities with access to electricity, particularly marginalised communities, Eskom is considering the development and deployment of microgrids to fast-track universal access to sustainable and reliable electricity services. The development of containerised microgrids will not only provide communities with electricity but will simultaneously contribute to local economic development and the attainment of NDP 2030 objectives.

Due to the anticipated increase in demand for containerised microgrids as part of Eskom's drive to provide universal access to electricity, the proposed project at the KPS site entails the manufacturing of containerised microgrids. Various types of infrastructure at KPS will be reused to manufacture containerised microgrids. However, some renovations and refurbishments are required.

The core processes of the containerised microgrid assembly line are illustrated in Figure 8.10.

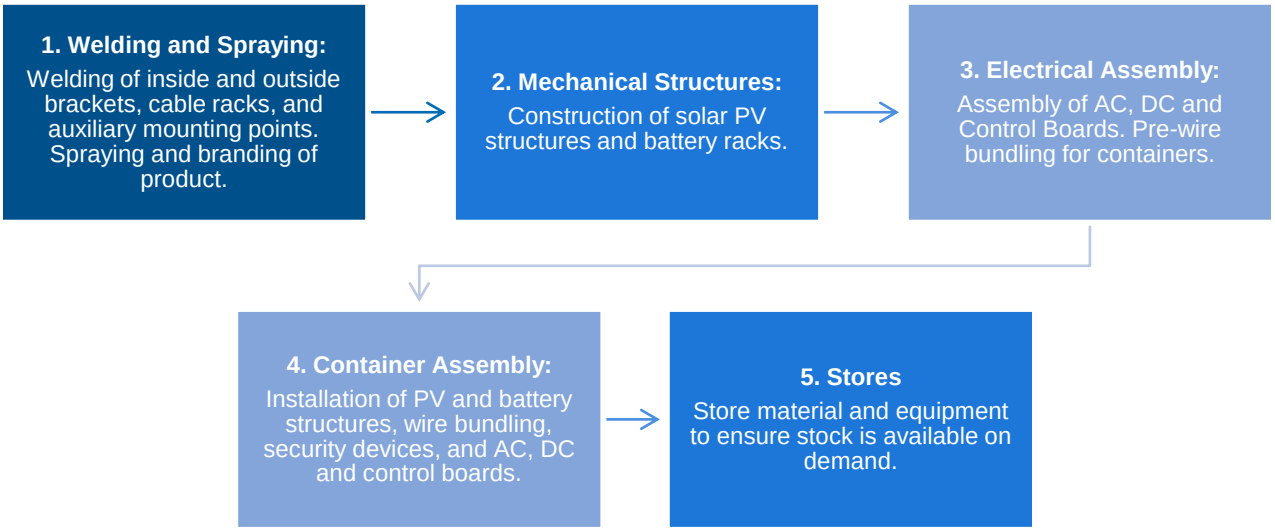


Figure 8.10: Containerised microgrid assembly line

The system consists of solar panels mounted on a repurposed shipping container, where the container houses an inverter and batteries for storing the electricity generated by the solar panels. The containerised microgrid

system is geared towards hosting a variety of renewable generation technologies, including solar PV, wind, and fuel cells, amongst others. The system manages supply and demand conditions in addition to engineering or monitoring capabilities. Furthermore, each system is linked to a control centre, which utilises artificial intelligence (AI) and machine learning to determine/forecast factors that may exert an impact on the plant.

Picture 8.1: A containerised microgrid at KPS

In terms of employment, the distribution of containerised microgrids to communities creates employment opportunities for residents such as scheduled maintenance, cleaning of solar panels, or vegetation management. In addition, there also exist opportunities for small businesses to form following the provision of electricity to a previously unelectrified area.

According to information obtained from Eskom, given the existing infrastructure at KPS, a total of 20 assembly lines may be deployed with the potential to create around 20 full-time employment opportunities per assembly line. With a single containerised microgrid system requiring around five working days to complete, it is estimated that around 50 containerised microgrids may be completed per year by a single team. As such, should all 20 assembly lines be considered, around 500 employment opportunities may be created at a target of 1 000 containerised microgrids per year. However, Eskom has set a target of 10 assembly lines.

Picture 8.2: Control and communication systems and lithium-ion battery banks inside the container

The manufacturing of containerised microgrids may play a key role in providing alternative and sustainable electricity sources to remote, off-grid areas. These systems are to be distributed by Eskom in its pursuit of providing universal access to electricity in South Africa. To this end, Eskom's Distribution department is considered the key offtaker for the containerised microgrids assembled at KPS. In addition, the deployment of containerised microgrids is considered a cost-effective solution when compared to the installation of transmission lines to connect remote communities to the grid. Crucially, consideration should be given to the skill sets of community members such as welders or electricians, as they may be deployed in this intervention.

Partners

Eskom is considered the champion for the manufacturing of containerised microgrids.

Key metrics

Table 8.16 provides an overview of the key project metrics associated with the development of containerised microgrids.

Table 8.16: Containerised microgrids project metrics

Indicator	Value	Comment
CAPEX	TBD	Costs have yet to be determined.
OPEX	TBD	Costs have yet to be determined.
Direct employment	200	20 employment opportunities per assembly line, with a target of 10 assembly lines (there is the potential for 20 assembly lines, which would increase the number of employment opportunities).
Production capacity	500 units per annum	-

Current status, risks, and challenges identified

The manufacturing of containerised microgrids will require strict adherence to technical specifications and standards for each system component. In addition, the system components will need to conform to Eskom's engineering specifications and national standards.

In addition to the above, it is understood that Eskom has submitted a funding proposal to the World Bank to review and develop country-specific business models, verify business cases and prepare to produce the first batch of microgrids for South Africa and the African continent. However, the status of the study is uncertain. According to the submission to the World Bank, the study will entail the following:

- a needs analysis for South Africa and the African continent;
- economic valuation (available country options, macroeconomic impacts, business metrics, etc.);
- project due diligence;
- value assessment;
- procurement and contracting strategy; and
- solution options analysis.

In terms of the microgrid deployment, Eskom has demonstrated the successful use of microgrids with the establishment of a solar-powered microgrid at Wilhelmina Farm in Ficksburg. Although not containerised, the plant produces 32 kW of electricity and is equipped with three sets of lithium-ion batteries that have a cumulative storage capacity of 90 KWh. Furthermore, the plant has successfully delivered electricity to 14 households with a total of 81 family members (Pombo-van Zyl, 2018). The deployment of microgrids is thus likely to leverage key lessons learnt from the Ficksburg microgrid plant.

Picture 8.3: Ficksburg microgrid

Action plan

Key action items for the development of containerised microgrids are provided in Table 8.17, which also stipulates the institutions responsible for the actions and relevant timeframes. It should be noted that the facility is currently operating at KPS and may thus only require expansion if the need arises and if feasible.

Table 8.17: Containerised microgrids action plan

Action	Responsibility	Timeframe
Expand operations if feasible	Eskom	Short-term (1-3 years)
Undertake monitoring and evaluation exercises	Eskom	Ongoing

8.3.2.4 Establishment of agrivoltaics plant

Rationale

The shutdown of KPS and the subsequent implementation of mitigation measures or projects is, as mentioned, considered the pilot operation for South Africa's broader JET. Furthermore, as indicated in the preceding

sections of this report, agriculture is considered a fundamental sector for the provision of sustainable livelihoods in the communities surrounding KPS.

Coal mining activities and coal-fired power stations are prominent drivers of economic activity and employment in Mpumalanga. However, the decision by Eskom to reduce the use of fossil fuels for energy generation, coupled with the limited lifespan of mines, threatens the sustainability of communities dependent on the continued operation of mines and coal-fired power stations.

Given the importance of the energy-food-water nexus, consideration should be given to synergies between the proposed establishment of solar PV and BESS at the KPS site (see Eskom Phase 1 and 2 RES. Furthermore, given the underlying principles of the JET, there exists a need to transition organisational operations towards cleaner energy production while ensuring that the socio-economic aspects of those directly impacted are adequately mitigated. This may allow for a reduction in the unintended consequences of the shutdown of coal-fired power stations.

Agrivoltaics is among the repurposing options available to KPS for addressing the energy-food-water nexus. Agrivoltaics may be defined as the combination of agriculture and photovoltaics as the process entails positioning solar panels directly above agricultural land or produce. In essence, solar energy is utilised twice, first to grow crops (the processes for which may range from the utilisation of aquaponics to raised bed farming) and secondly to generate electricity. Therefore, the establishment of commercial agrivoltaics activities at KPS may generate income for participants and will be accompanied by a diversification of skills and local economic activity.

Description

As noted above, agrivoltaics may be key in addressing the energy-food-water nexus. The establishment of an agrivoltaics plant at KPS combines the repowering brought by solar PV and BESS with agricultural activities underneath and alongside the PV array. Based on information received from Eskom, it is understood that Eskom has already established a pilot agrivoltaics project at KPS and has subsequently initiated the process of establishing a 500 kilowatt peak (kWp) commercial agrivoltaics plant. The plant will feed electricity into the grid and utilise energy for sustainable agricultural activities (such as aquaponics and raised bed farming).

Two processes or technologies are to be included as part of the agrivoltaics project. This first is the Gravel Barrel Aquaponics system, which combines fish farming and vegetation/crop farming. The vegetation or crops are to be grown in a locally designed gravel barrel and will provide yields throughout the year. Secondly, the MushMag Mushroom Dome system will produce exotic mushrooms for both the local and export markets. In addition, the system will allow community members with mobility and hearing disabilities to participate in the programmes (Eskom, 2021e).

It is anticipated that the project will be undertaken in two phases. The first phase includes the establishment of a 4 kW Gravel Barrel Aquaponics system along with 10 mushroom domes (each 1.5 m in diameter) for demonstration and training purposes. It should be noted that the associated training and skills development programmes will be preceded by the selection of participants according to a pre-established selection/eligibility criterion. Subsequently, farmers will be required to compete for a portion of the farming space within the aquaponics or mushroom farming systems (Eskom, 2021e).

During phase one, a total of 40 community members are to be trained in the use of the aquaponics system while 10 community members will be trained in mushroom farming. Furthermore, six individuals will obtain in-depth training in the maintenance of the aquaponics system. These individuals are to be employed to control, operate and maintain the larger system, which forms part of phase two. In addition, the Gravel Barrel Aquaponics system is expected to be a family-size system, i.e. 4kW.


Picture 8.4: Demonstration of the Gravel Barrel Aquaponics system and the MushMag Mushroom Dome system at KPS

Phase two entails the establishment of a commercial agrivoltaics plant, which will require the installation of a commercial-scale Gravel Barrel Aquaponics system for small-scale farming. However, this depends on Eskom completing the construction of a 500 kWp solar PV system (Eskom, 2021e).

In addition, phase two will include the installation of an additional 40 MushMag mushroom domes. Notably, the farming activities to be undertaken and the harvesting of crops will be linked with the Nkangala Agri-hub and local fresh produce markets. This may ensure a sustainable offtake of the produce and the generation of income for community members. Furthermore, once the fish reach maturity, they are to be systematically removed, replaced and sold to the local community. A portion of the income generated by local community members will be collected by Eskom to maintain the systems (Eskom, 2021e).

Apart from the above, produce from the systems may be sold to local restaurants or shops. Pillar 4 of the KPS mitigation strategy includes the provision of catering services to workers. Therefore, synergies between interventions need to be considered to further enhance their impacts.

It is understood that Eskom's role in the agrivoltaics project is to purchase the aquaponics and mushroom systems. Thereafter, Eskom will engage with the local community with the intent of transferring knowledge through specialised training programmes. Ultimately, the process aims to equip small-scale aquaponics and mushroom farmers in the local community with the necessary skills to ensure the sustainable continuation of the project.

The project is considered a key enabler for the development of skills within the local community and ensuring its sustainability following the shutdown of KPS. In addition, synergies exist between the agrivoltaics initiatives

and other interventions proposed for the KPS site. For example, the additional training envisaged for enabling community members to manufacture the MushMag domes and steel structures for the aquaponics systems will impart skills that may subsequently be utilised in the microgrid assembly initiative. Furthermore, the cooling properties associated with agricultural activities are expected to reduce the degradation of solar panels.

Partners

Eskom is envisaged to champion the initial implementation phase of the project and will be responsible for the acquisition of the aquaponics and mushroom systems. Following the transfer of skills via dedicated training programmes, ownership of the project may be transferred to the local community. During the operations phase, Eskom will be responsible for maintaining the system, which is to be funded by a portion of the income generated from produce sales. Other partners in the project include:

- the Technology Innovation Agency (TIA);
- the Eco-Agro Enterprise;
- the Aquaponics Association of South Africa;
- the University of Stellenbosch;
- AgriColleges;
- Nkangala Agri-hub; and
- local fresh produce markets.

Key metrics

Table 8.18 provides an overview of the capital, training, and support costs as well as other key metrics associated with the proposed agrivoltaics project at KPS.

Table 8.18: Agrivoltaics (incl. aquaponics) project metrics

Indicator	Value	Comment
CAPEX	R4 million	Includes costs of phase one (gravel barrel and MushMag mushroom domes) and phase two (commercial agrivoltaics facility).
Training and support costs	R200 000	Costs for phase one only (including training for the Gravel Barrel Aquaponics and MushMag Mushroom Dome systems).
Direct jobs	22-26 jobs	• 6 jobs for agrivoltaics • 16-20 jobs for aquaponics
Community members trained	~ 60 individuals	During phase one: • 40 community members are to be trained in the use of the aquaponics system; • 10 community members will be trained in mushroom farming; and • six individuals will obtain in-depth training in the aquaponics system and the maintenance thereof.

Source: Eskom (2021e)

In total, around R4.2 million in funding is required based on the project's funding proposal. As noted, phase one includes an agrivoltaics demonstration and training plant, which consists of a family-sized aquaponics unit,

initial seedlings, and fish along with 10 MushMag domes. Furthermore, during phase one, around 60 community members are to receive training (with 10 receiving training in use of the MushMag domes).

Current status, risks, and challenges identified

It is understood that repurposing work at KPS has already commenced as necessitated by the shutdown of the power station. According to information received from Eskom, a funding proposal for phase one of the project was submitted on 23 November 2021. Furthermore, it is understood that a demonstration of the Gravel Barrel Aquaponics and MushMag Mushroom Dome systems has already taken place at the KPS site. It is therefore assumed that funding for the first phase of the project has been obtained.

In terms of training material, it is understood that relevant training programmes, materials, or services for the aquaponics and MushMag systems have been formulated or secured. Technical training for the MushMag system was to have taken place between January and March of 2022.

Eskom still needs to secure funding for the second phase of the project, which is the establishment of the larger commercial agrivoltaics plant, and for training requirements that may form part of the second phase. According to information received from Eskom, as part of the funding proposal for phase one, financing for the commercial plant was requested by 31 March 2022.

In addition to the above, Eskom will need to ensure that an adequate amount of land is available for the establishment of the commercial plant in accordance with the repowering and repurposing options recommended for KPS. Furthermore, it is recommended that Eskom facilitate the process of securing an initial offtake agreement with the Nkangala Agri-hub, after which the agreement should be handed over to community members.

Action plan

Table 8.19 outlines the action plan items for the agrivoltaics project at KPS. In addition, the agents responsible for each action item are provided as well as the relevant timeframe.

Table 8.19: Agrivoltaics action plan

Action	Responsibility	Timeframe
Host community engagement sessions	Eskom	Short-term (1-3 years)
Identify and select community members based on eligibility criteria		
Provide training to selected individuals		
Secure funding for the establishment of commercial agrivoltaics plant		
Secure agreement with Nkangala Agri-hub		
Launch agri-incubator		
Construction of commercial agrivoltaics plant		
Commence operations		
Undertake monitoring and evaluation exercises		Ongoing

8.3.2.5 Eskom Phase 1 RES (solar PV and BESS)

Rationale

The shutdown of KPS, whether the power station is repurposed and repowered or not, will result in significant positive environmental impacts in the form of, for example, reduced emissions of CO_2 and other GHGs as well as lower water usage. However, according to studies done in this regard, there exists significant potential for RESs on the KPS site. As mentioned in Section 3, the horizontal irradiation value of the area surrounding KPS was measured at 1 981 kWh. The area may thus be considered as having moderate potential when compared to areas in the Northern Cape. Therefore, the use of solar energy on the KPS site may be considered.

As the KPS site is expected to be repurposed for alternative uses following its shutdown, there is a need to establish alternative energy generation mechanisms on the site to power repurposing initiatives. Crucially, alternative energy generation needs to be aligned with Eskom's JET principles, which outline both the reduction of GHG emissions and the safeguarding of livelihoods. The R&R of KPS thus needs to avoid contributing to GHG emissions while ensuring equitable employment opportunities.

Given the above, Eskom has been tasked with creating or identifying alternative employment opportunities for permanent employees of the utility and ERI workers who will be affected by the shutdown of coal-fired power stations – such as KPS. These employees, many equipped with skills related to energy generation, range from low-skilled workers (e.g. security guards and cleaners) to highly skilled individuals (e.g. engineers and technicians).

Three repowering options have been identified for the KPS site, namely solar PV, BESS and wind energy. These options have been selected because they generate electricity more cost-effectively than other technologies (such as combined cycle gas turbine power plants, which utilise the gasification of biomass or liquified natural gas. Besides being cost-effective, the RES options identified provide independence from the volatility of fuel costs and may provide long-term generation stability. Furthermore, the solar PV repowering option, in combination with BESS, is associated with an increased number of employment opportunities in absolute terms and on a per MW basis.

Although the establishment of RES does increase South Africa's electricity generation capacity, RES production will not deliver electricity directly to the national grid. The objective of the initiative is to provide electricity to the BESS for balancing purposes if the need arises (VPC, 2021). Only surplus electricity generated by RES on the KPS site will be delivered to the grid. The establishment of RES on the site provides employment opportunities for both low- and high-skilled employees of KPS with minimal retraining requirements. The retraining of KPS employees may be carried out by the establishment of the KTF, proposed as a mitigation measure/project for the KPS shutdown. Therefore, the deployment of RES under Phase 1 (and Phase 2) as part of the KPS repowering may contribute to mitigating the impact on human capital resulting from the KPS shutdown. This may be considered a key human capital intervention, one that would benefit not only the local area but also the renewable energy sector in South Africa overall.

Phase 1 of the repowering options considered for KPS, which includes solar PV and BESS, is outlined below.

Description

As mentioned in the preceding section, the establishment of RES at the KPS site is required for the provision of electricity to the site following the shutdown of KPS. Crucially, the electricity generated by RES will not feed directly into the grid; only surplus electricity will be earmarked for that purpose. In total, the potential of solar energy at the KPS site was determined to be 150 MW. The deployment of RES at the KPS site is to be done in two phases. During Phase 1, 100 MW of solar PV and 150 MW of battery storage are to be deployed at various locations at the power station. Although the solar PV potential for Phase 1 was determined to be 105 MW, it was recommended that 100 MW be installed with the remaining 5 MW to be added during Phase 2. In addition, a synchronous condenser able to deliver 50 megavolt-amperes reactive (MVAr) will be added during Phase 1 as a pilot (VPC, 2021).

Map 8.2 provides an overview of the locations suitable for solar arrays at the KPS site. The locations demarcated by red lines are to be used for solar energy, and the area demarcated in green is for battery storage.

Map 8.2: Areas identified for solar PV and BESS (VPC, 2021)

Map 8.2 outlines possible solar PV locations identified by Eskom; the utility estimates that a total of 90 MW can be generated by solar PV installed at these sites, which comprise vacant or rehabilitated land. The

locations include Eskom sites 1, 2, 3, and 4 as well as the pilot sites of PV 1 and 2. The sizes of these land portions are provided in Table 8.20.

Table 8.20: Solar PV areas under Phase 1

Description	Gross area (ha)	Net area (ha)
Eskom site 1	19	19
Eskom site 2	57	57
Eskom site 3	108	76
Eskom site 4	30	30
Eskom pilot PV 1	0.8	0.7
Eskom pilot PV 2	0.4	0.3
Total	**215.2**	**183**

Source: VPC (2021)

A key enabler of both Phase 1 and 2 of the RES options is the retention of switch yards, transformers, grid connections, and overhead electric cable lines at KPS. In addition to the installation of batteries, the existing grid connection at KPS will have to be altered in accordance with the deployed solar. This project, along with Phase 2, may be considered an intervention related to the economic, human, and built capitals.

Map 8.3: Solar PV sites identified by Eskom (VPC, 2021)

Partners

Eskom is the champion for both Phase 1 and 2 of the repurposing of KPS. Other partners to be considered for Phase 1 (and Phase 2) include:

- the Southern African Photovoltaic Industry Association;
- various original equipment manufacturers; and
- engineering, procurement and construction companies.

Key metrics

Table 8.21 outlines the key project metrics associated with Phase 1 of the repurposing of KPS. As mentioned, Phase 1 includes the installation of 100 MW of solar PV and a 150 MW BESS (with a capacity of 600 MWh), in addition to one 50 MVAr synchronous condenser.

Table 8.21: Eskom Phase 1 RES metrics

Indicator	Value	Comment
CAPEX requirements	R4.1 billion	R1.6 billion allocated to 100 MW solar PV, R2.5 billion for 150 MW battery, R20 million for first synchronous condenser. Costs may vary according to the prevailing exchange rate as original costs were quantified in US dollars.
OPEX requirements	R135 million	OPEX requirements for the entire solar PV plant are estimated at R32 million, for BESS R96 million and for the first synchronous condenser R6 million.
Direct jobs to be created during operations	56 – 85 jobs	50 – 75 jobs for solar PV, 6 – 10 jobs for BESS and all synchronous condensers. Note that employment opportunities created in Phase 2 for the installation of the other two synchronous condensers are included in Phase 1 based on data provided.

Source: VPC (2021)

In total, around R1.6 billion is required for the 100 MW solar PV installation and R2.5 billion for the 150 MW BESS. In addition, around R20 million is required for the installation of the synchronous condenser. Aside from the above CAPEX and OPEX requirements, it is estimated that between 50 and 75 FTE jobs are to be created as a result of the 100 MW of solar PV established in Phase 1. In addition, six to 10 jobs may be created through installation of the BESS and the three synchronous condensers. As mentioned, only operational employment opportunities are included as those related to construction are considered temporary.

Future projects to be considered include a 500 MW combined cycle gas plant with gas storage and a 100 MW biomass gasification plant. The capital investment requirements for these two projects were determined at R10.4 billion and R3.5 billion, respectively. However, the focus of Phase 1 and Phase 2 should be restricted to the projects outlined above.

Current status, risks, and challenges identified

As outlined in Table 8.21, Phase 1 is expected to require a capital investment of approximately R4.1 billion and an annual operational expenditure of 3% of capital expenditure per annum thereafter (VPC, 2021). Given

the magnitude of the required investment, careful consideration needs to be given to funding sources as Eskom's financial capabilities are limited. It is therefore proposed that Phase 1 is implemented through a REIPPPP process.

The land or spatial needs for solar energy are approximately 2 ha per MW. However, the KPS site does not have an extensive amount of land available for RES purposes as no private property outside of what is owned by Eskom is to be considered. Despite the shortage of land, Eskom announced that it would make land available in Mpumalanga for renewable power plants. This was scheduled to occur towards the end of 2021 (Arnoldi, 2022).

The land around KPS is mainly agricultural. As such, the installation of solar PV at the KPS site may disturb farming activity or negatively impact the availability of land for other purposes. Given these constraints, solar panels may be installed on the rooftops of the power station instead of on the ground.

The poor condition of road infrastructure is considered a key challenge to the deployment of RES at the Komati site. Solar PV components are fragile and require careful transportation. Therefore, the upgrading or refurbishment of road infrastructure is necessary for the deployment of RES at the Komati site to avoid losses of or damage to RES components. This is particularly the case for roads in the immediate vicinity of the power station. KPS is unlikely to be the only beneficiary of improved road conditions as these may also contribute to the economic capabilities of the local economy.

Although the deployment of RES at the KPS site is considered an environmentally conscious alternative, the establishment of solar infrastructure may contribute to habitat destruction. It would therefore be necessary to install these technologies outside of sensitive areas.

Action plan

Table 8.22 provides an overview of the key steps to be undertaken for the implementation of the first phase of the KPS repurposing.

Table 8.22: Eskom Phase 1 RES action plan

Action	Responsibility	Timeframe
Issue intention to procure Phase 1 through REIPPPP	Eskom	Short-term (1-3 years)
Identify the private entity to undertake the project on land owned by Eskom	Eskom	
Sign agreement regarding land leased and other infrastructure usages	Eskom and private entity	
Conduct feasibility study	Private entity and Eskom	
Conduct EIA	Private entity and Eskom	
Conduct localisation study (including development of local content and workforce development strategies)	Private entity and Eskom	
Secure funding from World Bank for Eskom's portion of work	Eskom	
Participate in bid window (depending on the timing)	Private entity	

Action	Responsibility	Timeframe
Reach financial closure	Private entity	
Construction, including site preparation	Private entity	
Operation	Private entity and Eskom	Ongoing
Undertake monitoring and evaluation exercises	Private entity and Eskom	Ongoing

8.3.2.6 Eskom Phase 2 RES (solar PV, wind, and synchronous condensers)

Rationale

Phase 2 of the repurposing project may be considered an extension of Phase 1 and will include solar PV, wind energy and synchronous condensers. The rationale for Phase 2 broadly follows that of Phase 1, which is the provision of electricity to the KPS site following the shutdown of the power station. Furthermore, as with Phase 1, Phase 2 is intended to provide employment opportunities for Eskom employees (permanent KPS employees and ERI workers) who will be affected by the closure. The extension of Phase 1 broadens the availability of employment opportunities for both low- and high-skilled workers.

Phase 1 will constitute pilot project, providing key insights for Phase 2. As such, Phases 1 and 2 may contribute to the mitigation of impacts on human capital emanating from the KPS shutdown. These impacts may further be lessened by the establishment of the KTF at KPS, which will allow for a steady supply of employees skilled in renewable energies. This may be considered a complementary factor for the broader renewable energy sector in South Africa.

Description

Phase 2 of the KPS repowering options includes the addition of 50 MW of solar PV. As mentioned previously, an additional 5 MW of solar PV was added to Phase 2, which resulted in the reduction of Phase 1 from 105 MW to 100 MW of solar PV. In addition, two 50 MVAr synchronous condensers will be installed[16]. In addition to the deployment of solar PV and synchronous condensers, up to 70 MW of wind energy will be deployed.

Map 8.4 indicates the areas included in Phase 2 in which solar PV will be deployed. The sizes of these land portions are indicated in Table 8.23.

Table 8.23: Solar PV areas under Phase 2

Description	Gross area (ha)	Net area (ha)
Phase 2 area 1	4	4
Phase 2 area 2	3.4	3.4
Phase 2 area 3	4.2	4.2

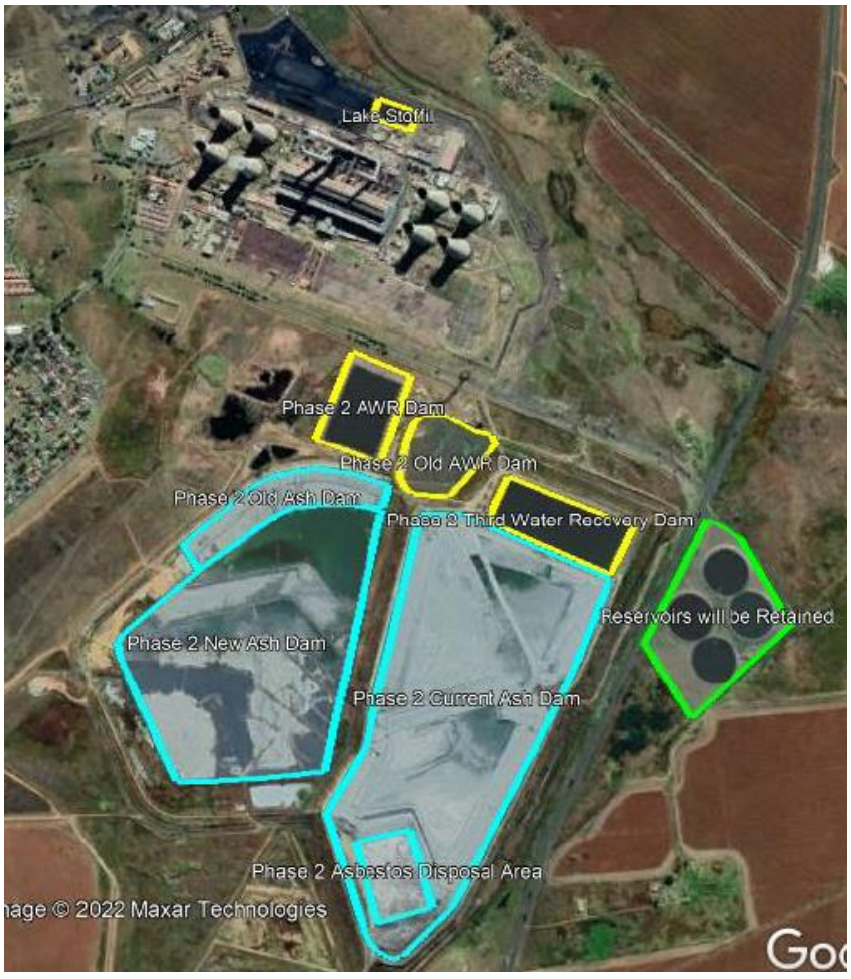
[16] As recommended by VPC (2021), generators in good condition (four 125 MW generators, which include units 5, 6, and 7 as well as the spare generator) may be converted to synchronous condensers.

Description	Gross area (ha)	Net area (ha)
Phase 2 area 4	41	41
Phase 2 area 5	37.5	37.5
Total	**90.1**	**90.1**

Source: Obtained from VPC (2021).

As part of Phase 2, existing generators of KPS that were refurbished or replaced during the return-to-service of the facility will be converted to synchronous condensers.

The length of time required for the completion of Phase 2 may be shortened as a result of site work undertaken for Phase 1. The grid connection may, for example, already be in place at the commencement of Phase 2. In addition, Phase 2 may benefit from lessons learned during Phase 1 as well as from the establishment of KTF at KPS. The possible locations for wind turbines are outlined in Map 8.2 (blue spots).



Map 8.4: Phase two solar PV areas (VPC, 2021)

Partners

As mentioned under Phase 1, Eskom is to be the champion for Phase 2 of the KPS repurposing. Partnerships for this project still need to be finalised. However, partners to be considered for Phase 2 (and Phase 1) include:

- the Southern African Photovoltaic Industry Association;
- the South African Wind Energy Association;
- various original equipment manufacturers; and
- engineering, procurement and construction companies.

Key metrics

Table 8.24 provides an overview of the key metrics related to Phase 2 of the repurposing of KPS.

Table 8.24: Eskom Phase 2 RES metrics

Indicator	Value	Comment
CAPEX requirements	R1.9 billion	R783 million for 50 MW solar PV, R1.1 billion for 70 MW wind energy, and R40 million for two additional synchronous condensers.
OPEX requirements	R63 million	OPEX assumed at 3% of CAPEX per year. R16 million for 50 MW solar PV, R34 million for 70 MW wind energy, R13 million for two synchronous condensers.
Direct jobs to be created during operations	46 – 76 jobs	25 – 38 jobs for 50 MW solar PV, 21 – 39 jobs for 70 MW wind energy. Jobs for synchronous condensers are included in Phase 1.

Source: VPC (2021)

In total, approximately R1.9 billion in CAPEX is required for Phase 2 of the repowering of KPS. With regard to employment opportunities, 25 to 38 FTE jobs are to be created through the addition of 50 MW of solar PV. In terms of the proposed 70 MW of wind energy to be deployed, it is anticipated that between 21 and 39 FTE employment opportunities will be created. As indicated in Table 8.24, only FTE employment opportunities as part of the operational phase of both Phases 1 and 2 are considered. This is mainly due to the temporary nature of construction jobs.

Current status, risks, and challenges identified

The implementation of Phase 2 of the repowering options identified for KPS depends on the completion of Phase 1 and the level of preparation for RES uptake achieved at the KPS site during this phase (e.g. the grid connection). As with Phase 1, the capital investment for Phase 2 is substantial and careful consideration will have to be given to how it can be shared between Eskom and its partners. The risks and challenges identified as part of Phase 1 largely hold true for Phase 2.

In addition, Phase 2 can only commence after the rehabilitation of the KPS site, thus after all decommissioning activities have been completed. Therefore, the initiation of Phase 2 may be delayed by a delay in decommissioning KPS.

Action plan

The key steps to be considered for the implementation of Phase 2 of the repurposing of the KPS site are provided in Table 8.25.

Table 8.25: Eskom Phase 2 RES action plan

Action	Responsibility	Timeframe
Issue intention to procure Phase 2 through REIPPPP	Eskom	Medium-term (3-5 years)
Identify the private entity to undertake the project on land owned by Eskom	Eskom	
Sign agreement regarding land leased and other infrastructure usages	Eskom and private entity	
Conduct a feasibility study	Private entity and Eskom	
Initiate amendment to EIA authorisation (to accommodate Phase 2)	Private entity and Eskom	
Conduct localisation study	Private entity and Eskom	
Secure funding from World Bank for Eskom's portion of work	Eskom	
Participate in bid window (depending on the timing)	Private entity	
Reach financial closure	Private entity	
Construction, including site preparation	Private entity	
Operation	Private entity and Eskom	Ongoing
Undertake monitoring and evaluation exercises	Private entity and Eskom	Ongoing

8.3.2.7 Alien vegetation removal and beneficiation

Rationale

Invasive alien vegetation refers to non-indigenous plant species. These plants, brought to South Africa intentionally or not, may reproduce rapidly – ultimately posing a threat to indigenous plants. Alien vegetation is also considered one of the biggest threats to South Africa's water security (Henderson, 2020). Other impacts or threats include:

- more pronounced wildfires as invasive plants may burn at a higher intensity than indigenous plants; and
- increased erosion, the siltation of rivers and dams, sedimentation and poor water quality, mudslides, and flooding.

Steve Tshwete LM is considered a critical biodiversity region and large segments of the municipality are classified as irreplaceable (ICLEI Africa, 2020). Key areas concerning biodiversity (i.e. areas of sensitivity) within Steve Tshwete LM are:

- the Loskop Dam Nature Reserve;
- the grasslands between Middelburg and the Loskop Dam Nature Reserve; and
- the ecological corridor between Middelburg and eMalahleni.

In addition to the impacts on biodiversity identified above, alien invasive plants also negatively impact food security and livelihoods. This impact is more pronounced in developing countries such as South Africa where subsistence farmers and smallholders are not equipped to eradicate or otherwise manage invasive species (IUCN, 2021). Importantly, alien vegetation compromises the resilience of natural habitats, increasing their susceptibility to climate change. The removal of alien vegetation is thus necessary for the protection of ecosystems, the safeguarding of water reserves to facilitate water provision, the sustainability of agricultural activities, and the protection of livelihoods.

The removal of alien vegetation has been recognised as a key enabler of employment creation. South Africa, through its Expanded Public Works Programme, has contributed significantly to the removal of alien vegetation while improving the livelihoods of programme participants. In addition, the Working for Water (WfW) programme, which focuses on managing the impact of invasive alien species, has made significant contributions to the livelihoods of vulnerable groups, particularly women and unemployed youth (ILO, 2012).

In addition to delivering environmental and social benefits, alien vegetation removal initiatives may facilitate biomass-based energy generation. A case study in the Eastern Cape found the establishment of a biomass energy plant that utilises alien vegetation to be financially feasible on condition that it operates in partnership with WfW (Mugido, et al., 2014). As such, synergies between the establishment of a biomass energy plant and similar alien vegetation removal projects in the Steve Tshwete LM may be considered.

An article published in May of 2022 put the number of individuals employed in South Africa as coal truck drivers at approximately 4 000 (Chireshe, 2022). All of these workers are likely to be affected by the closure of coal mines as the South African economy decarbonises. Given the similarities between coal hauling operations and those for biomass, coal truck drivers could be employed in biomass beneficiation operations. The transition would be especially easy for the drivers of side tipper trucks, which are used for transporting both coal and biomass. Studies in this regard have indicated that nearly 75% of current coal transport jobs may be transitioned to biomass transport that involves the use of side tipper trucks (Chireshe & Bole-Rentel, 2022).

In conclusion, such an intervention would contribute to employment creation, an improvement in livelihoods, food and water security, agricultural sustainability, and energy generation. The benefits of an alien vegetation removal initiative would thus address the human, economic, and natural capitals.

Description

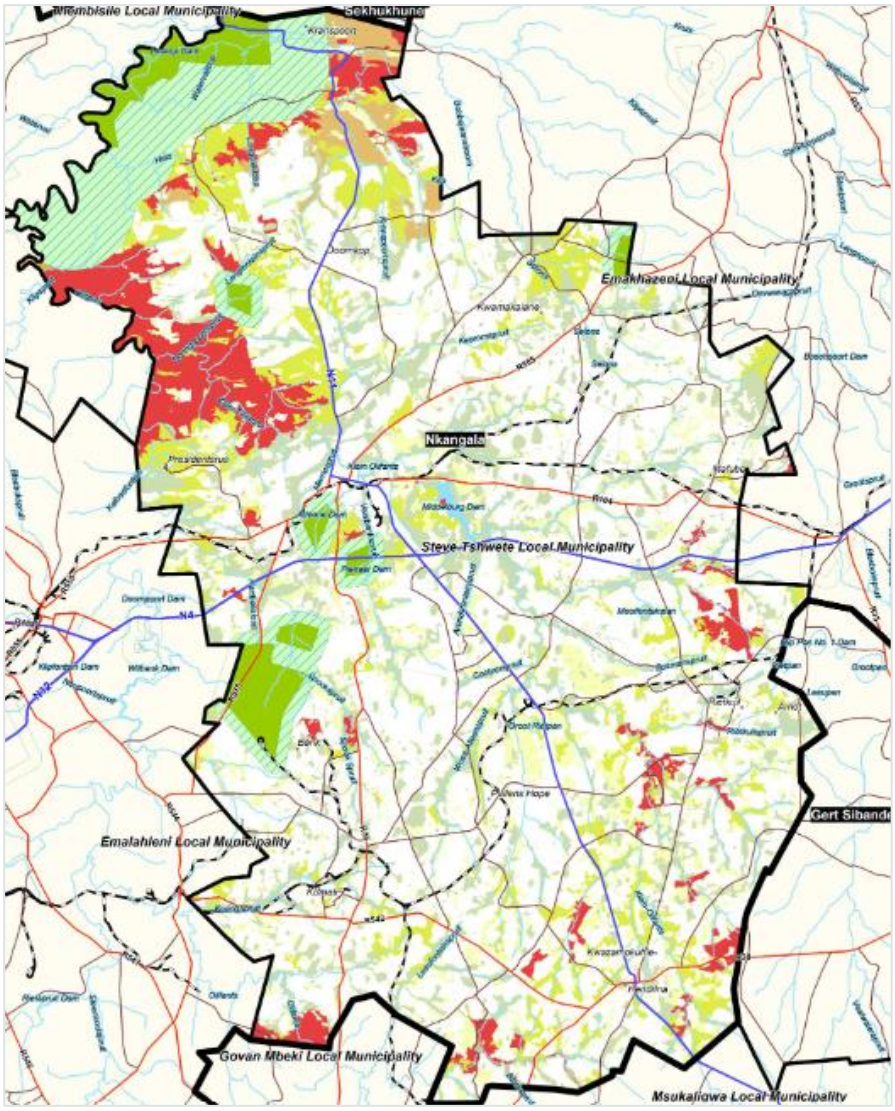
The alien vegetation removal and beneficiation initiative focuses on the removal of alien vegetation with the aim of improving water security. The project is to be initiated in eMalahleni and is to be implemented in regions such as Kromdraai, Greenside, Leeuwpan, Matla, and Inyanda. Although the initiation areas are not located in Steve Tshwete LM, it should be noted that the project is intended to address the problem of invasive species throughout the province. Crucially, the project focuses on addressing the value chain in its entirety, from the removal of alien vegetation to the beneficiation of biomass (which includes biodiesel and green hydrogen).

Map 8.5 showcases the terrestrial biodiversity plan of Steve Tshwete LM. The purpose of the map is to identify possible areas of consideration should the initiative be expanded into Steve Tshwete LM.

Critical biodiversity areas are indicated in red. These areas are considered 80% to 100% irreplaceable; it is thus essential that biodiversity conservation targets for such areas are met – a goal that entails consistent maintenance. The beneficiation of biomass for energy production (biodiesel and green hydrogen) may be

enabled by the establishment of South Africa's Hydrogen Valley. The Valley is to include the transformation of the Bushveld complex and regions around Johannesburg, Mogalakwena, and Durban, which enables access to sites in Mpumalanga.

The collection of alien vegetation will be carried out by youth from across South Africa. As noted in the preceding section, the employment of youth is considered a key contribution of the project as it will contribute to addressing South Africa's high youth unemployment rate. The project will also focus on equipping participants with skills related to entrepreneurship, which contributes to human capital development. In addition, the SMMEs which it is envisaged will be established are anticipated to be moveable, which increases the likelihood of sustained biomass supply.



Map 8.5: Terrestrial biodiversity sector plan (Steve Tshwete LM, 2017)

Partners

The project is championed by The Impact Catalyst (IC). Other partners include:

- the DFFE;
- mines (Thungela, Exxaro, Anglo, and other junior miners);
- communities;
- municipalities;
- the Department of Agriculture, Land Reform and Rural Development (DALRRD);
- Eskom; and
- MWCB.

Eskom is a key participating partner in the initiative and may provide land for the establishment of a biomass plant.

Key metrics

Key project metrics for the removal of alien vegetation and biomass beneficiation are outlined in Table 8.26.

Table 8.26: Alien vegetation removal and biomass project metrics

Indicator	Value	Comment
CAPEX requirements	R3 million	The specified amount is for a business plan that will determine further required funding. Possible sources of funding include MWCB, national and provincial government, and the private sector.
Direct jobs to be created during operations	Up to 200	Across various areas for alien vegetation removal.
Targeted start of operations	April/May 2022	Alien vegetation removal is expected to start soon, while the beneficiation business plan is being completed.
Number of beneficiaries (SMMEs)	TBD	Dependent on the tonnage that can be tackled from different sites. To be clarified in the business plan.
Capacity of SMMEs	2 000 ℓ of biodiesel	Dependent on the allowance of Eskom for the specified volume of diesel.

Current status, risks, and challenges identified

Currently, the project is in the feasibility stage. The business plan for the project was expected to be finalised by April 2022 with the removal of alien vegetation expected to start in April/May 2022.

Among the project's needs are stakeholder commitments to the project and funding. Various grants are available for an initiative of this nature; however, the total funding required for the beneficiation of biomass will only be available once the business plan is finalised. Furthermore, the number of SMMEs to be established will depend on the tonnage of biomass available and the size of the market for end products. Another key consideration relates to the cost of transporting biomass to the relevant sites. Given the low calorific value of

biomass, longer distances may render the project financially unfeasible. However, this may be mitigated as SMMEs may be moved closer to the sources of biomass.

Under the Biomass Action Plan for Electricity Production in South Africa, the replacement of coal with biomass at coal-fired power stations was not deemed economically viable. The alien vegetation removal and beneficiation initiative does not aim to replace coal with biomass as feedstock for coal-fired power stations. Nonetheless, financing commitments made by France, Germany, the United Kingdom, and the United States as part of COP26 to support South Africa's transition away from coal may improve the viability of biomass as a replacement fuel (IEA Bioenergy, 2021).

Action plan

Table 8.27 outlines actions to be taken for the implementation of the project the organisation responsible for each step, and the relevant timeframe.

Table 8.27: Alien vegetation removal and biomass beneficiation action plan

Action	Responsibility	Timeframe
Complete business plan	IC	Short-term (1-3 years)
Secure funding as identified in the business plan	IC	
Conduct training exercises to capacitate employees	IC and relevant partner	
Secure required sites to host biomass plants	IC	
Obtain relevant permits and authorisations	IC	
Procure equipment for biomass beneficiation	IC	
Commence biomass beneficiation	Plant operator	
Secure offtake agreements with end users	Plant operator	Ongoing
Undertake monitoring and evaluation exercises	Plant operator	Ongoing

8.3.2.8 Crop farming with mine-affected water

Rationale

With more than 80% of South Africa's coal resources being located in Mpumalanga, the mining sector is the largest contributor to the provincial economy. As a result, local communities depend significantly on mining operations for employment, local development, and services. However, as South Africa undergoes its JET along with the broader international community, the demand for coal is expected to fall coal mines in the province to come under pressure. Given the expected closure of mines in the province over the long term, mining land may become available for other purposes. These would, in turn, need to be utilised for sustaining local communities and ensuring a JET. Furthermore, as Mpumalanga is considered a key province in the broader South African agriculture sector, programmes to ensure a JET from mining to agriculture require consideration.

Large volumes of acid mine drainage pose significant threats to the quality of South Africa's water resources. As climate change is expected to exacerbate the provision of fresh water in many countries, particularly in water-scarce countries such as South Africa, there is a need to safeguard existing water sources.

In addition to its environmental benefits, irrigation with mine-affected water is considered a way of ensuring sustained livelihoods as mines reach closure and communities require diversification away from mining. Studies done in this regard have found that crops such as maize and stooling rye grow much better when irrigated with mine-affected water than they do under a system of rain-fed crop production (Annandale, et al., 2019). This finding is of particular interest as the study site was located in Middelburg, Mpumalanga. In addition, the crops were proven to be more profitable than their rain-fed counterparts, thus supporting the argument that agriculture can help sustain communities post-shutdown.

The Nkangala DM IDP emphasises the need to protect and promote the agricultural sector through the advancement of supplementary activities like agro-processing. The project provides an opportunity to contribute to the promotion of agricultural activities in the area. Local government strategic documents that were examined for the policy review identify agriculture as one of the sectors to consider in efforts to diversify the economy and create employment – this due to the fact that a successful agricultural sector has the capacity to employ large numbers of relatively low skilled workers. The initiative, therefore, addresses issues related to human, social, and economic capital.

Description

One of the agricultural projects to be explored to mitigate the effects of the KPS shutdown is an initiative that focuses on farming with winter wheat. The Winter Wheat Pilot project, which ran from April 2021 to December 2021, was geared towards the production of winter wheat[17] on rehabilitated mine land at the Wonderfontein Colliery near Belfast. The colliery is located in Emakhazeni LM, which borders on Steve Tshwete LM. While the project made use of mine-affected water for irrigation purposes, this aspect of operations was considered a secondary element of the overall project.

The pilot was a collaboration between Glencore, MWCB, the International Council on Mining and Metals, and B4D. Commercialisation was expected to commence in February 2022, with the project anticipated to have the following impacts:

- enhanced collaboration and engagement with the industry and across several sectors to improve post-closure land use opportunities;
- facilitation of sustainable businesses that contribute to a green circular economy;
- a clear path to diversification of local economies away from mining operations; and
- increased employment opportunities, higher income, and reduced food insecurity.

When fully implemented, the winter wheat project is expected to support more than 14 300 smallholder farming families, which in turn support approximately 57 000 individuals in the province (Gleeson, 2021) The land used

[17] Winter wheat may be defined as wheats that sprout before freezing occurs in colder seasons and then becomes dormant until soil temperatures increase in the summer months. Winter wheats are usually sown in fall and is then harvested in the summer.

for the pilot project was provided by the Wonderfontein Colliery, with two properties adjacent to the main site belonging to the local community. The pilot site comprised 2.8 ha of land, which was divided into two 0.4 ha controlled sites and five 0.4 ha smallholder sites. Five smallholder farmers participated in the pilot to test whether the techniques and skills required may be successfully transferred through field extension.

Picture 8.5: Winter Wheat Pilot project, Wonderfontein Colliery

Overall, the outcome of the pilot project demonstrated that winter wheat can be grown successfully in Mpumalanga. The project also showed that both rehabilitated mine land and mine water can be utilised for winter wheat production. If successful, the project may be launched at other sites in the province. In relation to KPS, it is recommended that the project be implemented in areas previously disturbed by mining activities at the Goedehoop and Koornfontein mines – both of which are in close proximity to the power station.

Irrigation with mine-affected water has also been utilised in other pilot programmes. At the Mafube Colliery, the long-term sustainability of using mine-affected water for agriculture was tested. The project, initiated by the Department of Water and Sanitation and the Water Research Commission (WRC), included the establishment of two 30 ha trial sites, one located on virgin land and the other on ground rehabilitated after mining. Saline-

tolerant crops such as wheat, maize, soya, and ryegrass were planted on a rotational basis. Water from the Mafube pit was used to irrigate the first crop – maize on virgin land. At the time of harvest, the area yielded 14.5 tonnes/ha, more than the 8 tonnes/ha obtainable for dryland crops. As such, the use of mine-affected water for crop irrigation is considered a crucial enabler for crop farming initiatives, including the WWP (James, 2018).

Partners

IC is considered the champion for this project. Other partners include Eskom, MWCB, DWS, DFFE, various farmers, communities, mines, DALRRD, research councils, suppliers, and offtakers.

Key metrics

Key project metrics associated with the use of mine-affected water for crop farming are outlined in Table 8.28.

Table 8.28: Crop farming with mine-affected water project metrics

Indicator	Value	Comment
CAPEX requirements	R7 million/site	Possible funders are MWCB, AngloCoal, Exxaro, WRC, and WRC360. It is understood that there are currently seven sites.
Direct jobs to be created during operations	8/ha	

Current status, risks, and challenges identified

It is understood that the project is currently in the implementation phase and will thus require replication for subsequent implementation. Following the finalisation of the report on outcomes of the Winter Wheat Pilot (due in April 2022), additional sites for implementation may be identified. However, to ensure the sustainability of the project and the expansion of the initiative to additional sites including those close to KPS, additional funding may need to be secured.

Action plan

Table 8.29 lists the action items to be completed to implement the project.

Table 8.29: Crop farming with mine-affected water action plan

Action	Responsibility	Timeframe
Engage with Goedehoop and Koornfontein mines to determine available land areas	IC	Medium-term (3-5 years)
Sign MOU with Goedehoop and Koornfontein mines for the use of rehabilitated mining land	IC	
Conduct a market study to determine the viability of the winter wheat project	IC	
Secure the necessary authorisations (with particular reference to the use of mine-affected water for irrigation purposes)	IC	
Create a business plan to determine the funding (CAPEX and OPEX) and skills needs	Servicer provider	
Secure necessary funding as identified in the business plan	IC	
Implement project	IC	
Commence with operations	IC and oversight agent	Ongoing
Undertake monitoring and evaluation exercises	IC	Ongoing

8.3.3 Pillar 3: Strengthen (Strengthen the communities by addressing the existing gaps and challenges in the community)

This pillar focuses on strengthening the local community by addressing the existing gaps and challenges in the community. It targets social capital interventions that focus on empowering the community. Figure 8.11 illustrates the interventions that fall under this pillar.

Figure 8.11: Pillar 3 interventions

The following are some of the benefits to be expected should the interventions be successfully implemented:

- skills levels of the local workforce are enhanced;
- community morale increases;
- youths are taken off the streets, which facilitates a reduction in drug abuse and alcohol abuse; and

- community members become educated about the potentially harmful effects of drug and alcohol abuse and develop much-needed life skills.

8.3.3.1 Digital connectivity and community platform

Rationale

Communities surrounding coal-fired power stations across South Africa are often considered marginalised because they rely significantly on the operations of the facilities not only for economic development but also for a sense of place. In addition, these communities may not be capacitated with the necessary digital skills to participate in the broader South African economy. Given the shutdown of KPS and the dependence of surrounding communities on the operation of coal mines, there is a need to diversify the economic base of such communities and lessen their dependence on coal – a process that constitutes the essence of the JET. Diversification entails increasing employment and entrepreneurial opportunities, with particular attention given to bringing youth and other vulnerable groups (e.g. women) into the economy. The provision of alternative employment and entrepreneurial opportunities contributes, in turn, to the alleviation of societal ills.

The needs identified above may be addressed through the provision of **digital services to communities** affected by the shutdown of coal-fired power stations, which in this case is KPS. As noted, the provision of digital services to facilitate the connectivity of community members and interaction with the broader market may enable improved societal relations and sustain their sense of place. Projects linked to the digital economy and digital entrepreneurship have often proved a catalyst for new products, services, business models, markets, and growth in jobs (The World Bank Group, 2018).

Additionally, this project is aligned with the local municipality's priorities. That is, the project is linked to a smart cities project, which promotes governance “through technologically enhanced involvement and engagement with citizens who have universal access to services and information where socio-economic development and efficient service delivery are at the core” (Steve Tshwete LM, 2022). The smart cities project aims to augment Steve Tshwete LM’s capacity to set up an effective and efficient ICT infrastructure. It is envisaged that Steve Tshwete LM broadband network will be an engine for growth and development, presenting opportunities to address socio-economic disparities and to build sustainable, safe and resilient communities.

The efficient use of these digital services necessitates access to an affordable and high-quality internet connection. Heavy reliance on mobile data is a costly and unsustainable solution to internet connectivity considering the high cost of data, which tends to be a significant expense for households/individuals with lower incomes. Community members clearly require alternative options for connecting to the internet, access to which can promote community participation and involvement in digital platforms.

According to Rey-Moreno (2017), a community network is not merely installed telecommunications infrastructure used to meet personal communication needs. It is also an instrument that promotes community efforts towards growth and development by contributing to a local ecosystem that advances the lives of its residents. Digital platforms that can be accessed via community networks tend to encourage and capacitate local end users to create content relating to their needs, community heritage, local opportunities, and local events. This, in turn, gives agency to communities, enabling them to establish an environment that will improve their lived experiences. Providing internet connectivity improves communication, enhances knowledge and

content production and sharing – and promotes access to educational resources, jobs, and networking opportunities (VPUU, 2019).

Given the above, there is a need to implement projects related to social capital, with key linkages to the development of human capital in affected communities (as many of these communities often lack the necessary digital skills). Furthermore, there exists an opportunity for Eskom to inform communities on the status of projects implemented and possible opportunities in which the community can participate. This may further contribute to sustaining Eskom's reputation as it undergoes the JET.

Description

The project will be divided into two components. The first concerns the digital connectivity of shutdown-affected communities for which Wi-Fi connections will be installed and maintained. The second component is the digital community platform project, which will enable communities to access digital services via a shared community platform. These types of services encourage the participation of communities in the digital economy as with the smart cities project. As such, the project can be linked to the following components, which will be supported and enabled through the smart cities project:

- social services, made accessible through the provision of free public Wi-Fi in underserved areas and through improved internet usage in libraries; communities will have access to free portals that present free e-learning opportunities, easy access to career information, and a platform for youth to access job opportunities; and
- economic development through the promotion of the digital economy. For SMMEs, entrepreneurs, and job seekers, this promotion may occur through public portals that increase access to services, digital noticeboards, and digital advertising (Steve Tshwete LM, 2022).

The platform will offer potential project partners opportunities to add their respective services and content to ensure that end users engage with the online and digital world. For example, the platform would allow partners to share job opportunities and projects running in the area. They could also advertise their products and services or any news/information that might socially or economically benefit end users. In addition, the platform would allow community members to apply for opportunities presented, advertise their small businesses and access e-services, among other things. The platform will keep the community engaged while contributing to strengthened community ties.

The digital connectivity component involves the provision of internet access to the PSA using Wi-Fi technology. The initiative will allow PSA communities to gain access to the digital platform and all the information contained therein. As an enabler of this project and in line with the smart cities initiative, Steve Tshwete LM "will continue its efforts of providing free Wi-Fi access at all municipal-owned and managed facilities, townships and informal settlements". This will be done through its smart access programme in a bid to combat unequal access to technology (STLM, 2022). Moreover, an opportunity exists for partnership with the municipality and for the provision of additional services to ensure that universal access reaches areas beyond those identified and catered for by the municipality.

Finally, there is an opportunity with this project to promote community participation and involvement in the installation of the infrastructure required for internet connectivity, something that would help upskill local

workers. Community members could be trained in how to assemble, maintain and repair the infrastructure and to address network issues that may arise.

Partners

Eskom will be a key partner as its projects will be run on the developed app/platform. However, it is recommended that an entity experienced in such an undertaking be appointed. Steve Tshwete LM is another potential partner because it runs the smart cities initiative under which this project falls. The smart cities initiative also encompasses the smart access programme, which aims to provide internet access to various communities. This will provide a broadband network to enable the use of the digital community platform. The project is also open to partnerships with various stakeholders that may have an interest in the platform such as mining houses located in the area and other partners who could contribute to the digital connections component.

Key metrics

The table below provides an estimate of the key project metrics associated with the project.

Table 8.30: Digital connectivity and community platform project metrics

Indicator	Value	Comment
CAPEX requirements	R500 000	Includes estimated cost of the digital community platform. It is assumed that the cost of installation will be covered by the selected service provider.
OPEX requirements	R1 000 000	Estimated OPEX costs.
Direct jobs to be created during operations	10 - 15	Employment opportunities created through the establishment of the community platform.

Overall, the project is expected to cost approximately R1 500 000. As noted in the above table, it is assumed that the cost of installation will be covered by the selected service provider (i.e. internet connection companies).

Current status, risks, and challenges identified

Buy-in from key stakeholders and participants will be required. Key obstacles to the implementation of the project include the following:

- a lack of awareness of the potential benefits of accessing the platform and, consequently, a low level of buy-in from participants. Insufficient use of the platform by community members and businesses may render the project unsuccessful;
- unavailability of funding;
- lack of access to Wi-Fi/broadband connections; and
- lack of clarity amongst community members regarding the rationale for establishing a digital community platform.

Action plan

Key action items for the implementation of the project (the installation of digital connections and the creation of a digital community platform) are listed in **Table 8.31**. The table also lists the institutions responsible for

taking these actions and the relevant timeframes. The installation of the infrastructure for digital connection will need to precede the implementation of the digital platform as communities will not be able to make use of the platform without access to Wi-Fi.

Table 8.31: Digital connectivity and community platform action plan

Action	Responsibility	Timeframe
Digital connection action plan		
Appoint service provider	Eskom, Steve Tshwete LM, and project partners	Short-term (1-3 years)
Wi-Fi site design to ensure appropriate solution and estimate costs	Eskom, Steve Tshwete LM, and project partners	
Configuration and installation of relevant infrastructure	Contracted service provider	
Service turn-up and acceptance	Contracted service provider	
Monitoring and maintenance	Service provider	Ongoing
Digital community platform action plan		
Appointment of a service provider	Eskom	Short-term (1-3 years)
Reach agreement between Eskom and service provider on the cost estimate	Eskom and service provider	
Set up Eskom project on the community platform	Service provider	
Select, train and equip digital entrepreneurs (DEs)	Service provider	
Activate host communities on the community platform	Service provider	
Contract, support and pay DEs	Service provider	Ongoing
Engage with communities via the community platform site	Eskom and service provider	Ongoing
Undertake monitoring and evaluation exercises	Service provider	Ongoing

8.3.3.2 Upgrade/expand sports and recreational facilities

Rationale

The key findings of the baseline assessment of the KPS PSA indicated that drug and alcohol abuse are rampant in the area, the result of unemployment and a lack of alternative activities to engage in, among other factors. It was also found that PSA communities are deeply engaged with each other in sporting activities such as soccer/football, netball, and volleyball, creating more opportunities for these engagements. However, the area has an inadequate supply of sporting facilities, and the existing sporting infrastructure has not been maintained. Hence, there is a need for the upgrade and expansion of the facilities. This will offer the youth activities to engage in outside of employment and school and provide a platform where communities can continue to engage and spend their leisure time, thereby promoting community ties.

Recreation centres cater for social groups and individuals of all age groups, offering activities that range from sports and afterschool programmes to educational and youth initiatives. Recreation centres are important for developing or maintaining a healthy and vibrant community. Some of the benefits of recreation centres include:

- improved health on the part of community members who make use of recreational facilities;
- improved family ties;
- reduced crime;
- promotion of cultural diversity;
- the availability of facilities that can be used for after-school care; and
- the provision of common ground areas that promote inclusivity and offer opportunities to interact with other people (The Sports Facilities Company, 2016 and Perfectmind, 2016).

The feasibility of this intervention is still under investigation. Particular attention is being given to the possibility of expanding or upgrading sports and recreational facilities that will host programmes for the youth.

Description

Engagements with community members have yielded significant insights into the dynamics of the community. The privately-owned property that comprises Plots 167 and 168 was, before the COVID-19 pandemic, a hub for community activity. A hall, basketball courts, a cafeteria, and soccer and rugby fields are located on Plot 168 (Plot 167 currently does not have any infrastructure), and the facility was used to host communal sporting events. However, recurrent waves of COVID-19 resulted in the closure of the facility, which has now deteriorated significantly and become prone to theft and vandalism. Ideally, this property should fall within the remit of the initiative to upgrade and expand facilities as the potential for the property to regain its status as a community hub is considerable. Various community activities could also be held at the property once it is revamped.

It is recommended that a detailed assessment of the community's sporting and recreational needs be undertaken in order to determine how funding for upgrades and expansions may best be spent.

Partners

The Mpumalanga Provincial Government, in partnership with Eskom, is considered the key implementing agent for this intervention. Furthermore, partnerships with NGOs or welfare-driven foundations in the area may be considered to maximise the anticipated benefits of the project.

Key metrics

Although exact costs for the upgrade/expansion of facilities will need to be determined by a qualified contractor, it is recommended that between R1.5 million and R2 million is allocated towards the intervention (note that this amount does not include the purchase of land).

Current status, risks, and challenges

Recreation centres tend to require significant investments of time, human capital, and financial resources. Perhaps as a consequence, they tend to not be prioritised, especially when there are more pressing claims on available resources.

Action plan

The following table illustrates the high-level action plan for the intervention.

Table 8.32: Upgrade/expansion of sports and recreational facilities action plan

Action	Responsibility	Timeframe
Determine community needs	Mpumalanga Provincial Government/Eskom	Short-term (1-3 years)
Investigate the current state of existing sports and recreation infrastructure		
Determine funding needs and acquire funding; appoint coaches/facilitators for activities		
Appoint service provider to upgrade/expand sports/recreation centres		
Commence with activities		

8.3.3.3 Community health programmes

Rationale

The baseline profile of KPS PSA indicated that substance abuse is prevalent among communities in the area, particularly the youth. These social ills are associated with high unemployment, poverty, and inadequate recreational facilities, all of which often contribute to idleness. The prevalence of social ills in combination with a high incidence of TB, STDs, and HIV/AIDS has significantly affected the health levels of communities in the region. To ensure that the shutdown does not exacerbate these social ills, it will be essential to establish community health and awareness programmes. The effectiveness of this intervention in dealing with the above-mentioned issues requires that it be accompanied by other interventions such as the establishment of recreational facilities and other economic opportunities.

Description

In response to the prevailing health needs of communities in the Komati area, the project will entail the roll-out of community health programmes aimed at raising awareness about various health issues. Within the context of KPS, it is recommended that the project focus on TB, STDs, HIV/AIDS, and other diseases that are taking a particular toll on the community. Health programmes will also need to address chronic disease, unintended pregnancy, alcohol and drug abuse, nutrition, physical activity, and obesity prevention.

Essentially, the project will provide information to community members and assistance for changing harmful behaviour. These offerings may be delivered through seminars, classes, or workshops held at a designated site in the Komati area.

Recommendations

A suitable location from which community health programmes can be run is available for sale (Plot 167 [6 305 m²] and Plot 168 [5.5094 ha]). The main buildings on this privately-owned property include a large hall with a stage; a cafeteria equipped with a kitchen; and a pub with a ladies' bar, pool tables, and dartboards. There is also a braai area, a large parking area in front of the building, and a substantial portion of land that is partly

used as a soccer field. This property can also be used for other purposes such as recreational activities, ECD-focused programmes, and a career development centre.

Partners

It is recommended that the intervention be driven by the Mpumalanga Provincial Department of Health in partnership with Eskom. Partnerships with NGOs in the area may also be considered.

Key metrics

Table 8.33 lists key metrics of the project in terms of operational expenditure and employment opportunities likely to be created. The cost of land and infrastructure is not included in the financial estimates.

Table 8.33: Community health programmes key metrics

Indicator	Value	Comment
OPEX requirements	R1.5 million	Estimated OPEX costs per annum.
Direct jobs to be created during operations	3	It is suggested that the team start with at least three individuals and grow as new programmes are introduced. However, this growth might not result in additional employment opportunities as the services to be provided may be outsourced.

Action plan

Table 8.34 provides the high-level action items associated with the roll-out of community health programmes.

Table 8.34: Community health programmes action plan

Action	Responsibility	Timeframe
Determine the health needs of the community	Mpumalanga Provincial Department of Health/Eskom	Short-term (1-3 years)
Establish governance structure and secure partnerships		
Determine and acquire funding, and acquire necessary equipment/sites		
Commence with activities		

8.3.3.4 Roll out of commercial-scale community gardens

Rationale and description

Community gardens offer a shared space for gardening, allowing for more people to utilise and enjoy the land while sharing the responsibility for maintaining it. Such gardens play a key role in communities, facilitating social and economic development. This is achieved through enabling community members to assemble and work together in a place of recreation that can also function as an income-generating initiative (Food & Trees for Africa, n.d.).

The establishment of community gardens promotes green spaces and is beneficial both for those involved in the gardens and the larger community (given that it improves the quality of life in the area). Rolled out at a commercial scale, these gardens have the potential to produce a significant amount of food, thereby

contributing to food security. As the gardens make fresh and nutritious produce accessible, they also contribute to improving the diet and overall health of the community.

Additional benefits include:

- **Stronger communities:** Sharing a community garden allows residents to engage and connect with each other. Those involved in the garden tend to become personally invested in the initiative, developing a sense of ownership and community spirit.
- **Educational opportunities:** Community gardens are a source of continuous teaching and learning with regard to respecting and caring for the environment. They are also a good place for children (and adults) "to learn about where food comes from and gain a basic introduction to environmental issues, work skills, and business principles" (Livingston, 2022 and Food & Trees for Africa, n.d.).

The community gardens intervention, therefore, is one that might usefully be introduced in the KPS PSA. Unemployed persons can participate in the project and earn an income, something that would encourage a sense of community responsibility and strengthen community ties.

This intervention is part of the agriculture and agro-processing initiative, which seeks not only to roll out community gardens but also to provide infrastructure for the support of small-scale and emerging farmers. That is, the goal of the intervention is to ensure the growth and development of agricultural enterprises, agro-processing, and community gardens – this for employment creation and improved food security. The intervention will involve farming projects as well as the upskilling and training of participants to run bigger gardens, among other initiatives (Eskom, 2021c). As such, the intervention may benefit from the skills development and SMME incubation programmes.

Partners

The Mpumalanga Provincial Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) is considered the key implementing agent for this initiative with support and assistance from Eskom.

Key metrics

Table 8.35 provides the key metrics associated with the roll-out of commercial-scale community gardens.

Table 8.35: Community gardens key metrics

Indicator	Value	Comment
CAPEX	R1.5 million	Estimated CAPEX (excluding the purchase of land). Will need to be confirmed/updated by a proficient service provider.
Direct jobs to be created during operations	10 - 15	The number of employment opportunities to ensue from the intervention is dependent on the size of the project, which can only be determined by a qualified service provider.

Current status, risks, and weaknesses

A portion of privately-owned land has been identified for the project in Komati Village; however, verifications are still required to determine whether it is owned by Eskom, where it is situated exactly and how large the

space is. The costs of the intervention are thus dependent on an investigation by a proficient/experienced service provider.

Action plan

The table below outlines the actions required for the implementation of the project in addition to the organisations responsible for these actions and the associated timeframes.

Table 8.36: Commercial-scale community gardens action plan

Action	Responsibility	Timeframe
Appoint service provider, conduct land verification, and determine community members' interest	Eskom/ DARDLEA/community members	Short-term (1-3 years)
Secure necessary funding and conduct training		
Register/form a community garden cooperative		
Prepare the site for implementation and commence with operations		
Undertake monitoring and evaluation exercises		Ongoing

8.3.3.5 Early childhood development-focused programmes

Rationale and description

According to the KPS PSA baseline profile, there is a need for the establishment of additional ECDs in the area, particularly in communities that are on the outskirts of Komati Village. Furthermore, several existing ECD facilities need to be upgraded. The poor state of some of the facilities is attributed to limited resources. The lack or poor state of certain ECDs has led to some children being cared for at home by family members. This form of care has also enabled cash-strapped households to reduce spending on transport that would otherwise have been required to take children to ECDs. As such, the establishment of ECD-focused programmes will provide communities with easy access to ECDs while upgrades will enable the state of existing facilities to be improved. These initiatives will benefit from other interventions such as the community gardens project and the establishment of sports and recreation centres if the latter are successfully implemented.

A suitable site for hosting an ECD centre is Plot 168 in Komati Village, which hosts the Wonderland Preschool. It is recommended that the facility be refurbished and/or expanded to enable the provision of ECD-related services.

Partners

The Mpumalanga Provincial Department of Social Development is considered the key driver of this intervention. It will act in partnership with Eskom in terms of a Memorandum of Agreement signed in May 2022.

Key metrics

The key metrics associated with the establishment of ECD centres in Komati are given in the table below.

Table 8.37: ECD centres key metrics

Indicator	Value	Comment
CAPEX	R2.5 million	Costs for a new facility. Should the Wonderland Preschool be refurbished, costs may be lower.
OPEX	R1.3 million	Estimated OPEX per annum. Costs will be dependent on years of experience/service of staff as well as the number of children enrolled in the ECD facility.
Direct jobs to be created during operations	20	Will be determined by the number of children enrolled in the ECD centre and may require revision upon confirmation of demand.

Action plan

The development of ECD programmes and facilities is expected to be implemented in the short term (i.e. one to three years). The immediate requirement for the intervention is the identification of a suitable site to host a facility or programmes, the determination of a governance structure, and the determination and acquisition of funding.

A high-level action plan associated with the intervention is provided in Table 8.38.

Table 8.38: ECD action plan

Action	Responsibility	Timeframe
Determine ECD needs of the community	Mpumalanga Provincial Department of Social Development/Eskom	Short-term (1-3 years)
Secure suitable site for hosting ECD programmes		
Secure necessary funding and an adequate number of practitioners (provide training where necessary)		
Commence with operations		

8.3.4 Pillar 4: Grow (facilitate growth of SMMEs and economy through localisation of supply chains)

This subsection provides an overview of the interventions or projects identified/recommended for augmenting the interventions under the Stabilise pillar. These interventions are aimed at facilitating the growth of SMMEs and the local economy through the localisation of supply chains and stem from opportunities presented by R&R initiatives for KPS. The interventions may in some instances also be applicable to other power stations, namely GPS and HPS.

The proposed interventions can be divided into two groups. The first set of interventions are classified as “quick wins” – that is, interventions that are easily attainable over a short period of time. The second set of interventions is classified as “big rewards”. These interventions are expected to have a significant impact on the local economy and ensure the long-term sustainability thereof. Furthermore, these interventions are geared towards the diversification of the local economy in preparation for the JET. Figure 8.12 presents a high-level overview of the interventions that fall under Pillar 4. Each intervention is discussed in greater detail in the subsections that follow.

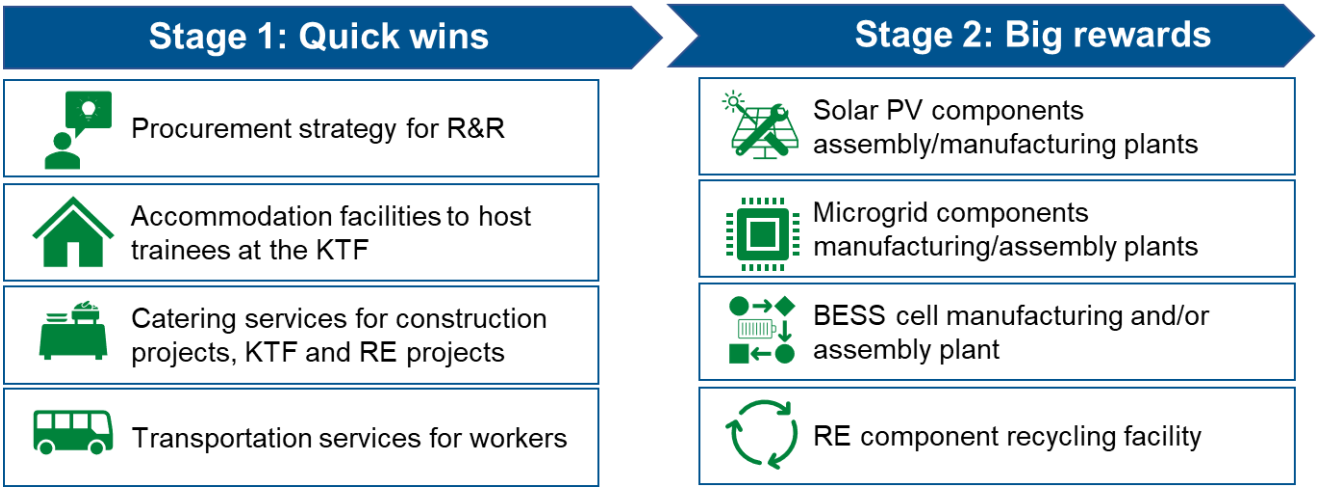


Figure 8.12: Pillar 4 interventions

It is anticipated that the interventions proposed under Pillar 4 will strengthen the capabilities and capacity of the local economy. Growth in local SMMEs is expected to contribute to an improvement in the livelihoods of households, maintaining or increasing local purchasing power and thus supporting local trade. Furthermore, the successful implementation of these interventions may contribute to the industrialisation of the local economy through the localisation of manufacturing related to new energy technologies. Given the potential of localisation to generate employment and industrialisation, localisation opportunities require consideration as part of repurposing and repowering initiatives for all power stations.

8.3.4.1 Procurement strategy for R&R

Rationale and description

The decommissioning of KPS, in addition to its subsequent repowering and repurposing, is expected to result in various procurement opportunities in which local business can participate. Currently, the production of renewable energy components is dominated by suppliers located in Asia. Eskom has noted that South Africa does not have suppliers that have done BESS-related engineering, procurement and construction to the magnitude of Eskom's requirements. As such, investments in cell producing plants will be required to stimulate other suppliers in the associated value chain.

To this end, Eskom has developed a Supplier Development and Localisation Strategy (SDLS) related to the deployment of renewable energies. The SDLS focuses on increasing the capacity, capability, competitiveness, and cost-effectiveness of suppliers within the RE value chain. Broadly, the SDLS aims to achieve sustainable local economic development and advance the South African government's development and growth objectives through leveraging Eskom's procurement spend.

The SDLS aims to achieve the following:

- localisation through compliance with the minimum threshold for local production and content;
- support for BESS-related R&D in South Africa and related technology transfers;

- development of South Africa's skills pool;
- empowerment of communities in the vicinity of these projects through creating employment; facilitating local procurement; and developing skills, businesses, and suppliers; and
- transformation within the construction sector (with particular reference to the mining and electricity sector).

As outlined in Pillar 2 of the KPS implementation plan, a total of 150 MW of solar PV and 150 MW of BESS will be deployed at KPS during the R&R of the facility. This presents an opportunity for the stimulation of local businesses through participation in the localisation of supply chains linked to renewable energies. It should be noted that the deployment of BESS at KPS forms part of a larger localisation drive by Eskom regarding battery storage, with a total of 13 sites (including KPS) identified for the deployment of BESS. Phase 1 (which includes eight sites) is to be completed by June 2023, while the remaining four sites are to be completed by December 2024. KPS, included in Phase 2, is expected to be completed in March 2026.

The SDLS also focuses on skills development (i.e. engineering, technical, and artisanal skills, among others) to ensure that the strategy has maximum impact concerning the scope and sustainability of local development. In addition, the SDLS aims to support SMMEs through the provision of services relating to mentoring, subcontracting, and job training. Furthermore, security and/or guarantees are to be provided through trade or credit agreements and preferential procurement.

Partners

Eskom is expected to act as the champion for this intervention. Partnerships with public and private institutions may also need to be established where possible and feasible. Furthermore, partnerships with TVET colleges may need to be established, which may require the support of the provincial education department. Partnerships with other branches of the Mpumalanga Provincial Government may also be considered to facilitate the implementation of the intervention.

Key metrics

The key metrics for this intervention are not available as they will need to be determined based on the number of businesses that can participate (which is, in turn, dependent on the predetermined qualification criteria). However, it is anticipated that the provision of support to local manufacturers and suppliers will result in local employment creation as well as the establishment or diversification of local industries.

It should be noted that the projects that make up Phases 1 and 2 of Eskom's BESS deployment are collectively valued at R11 billion, with the 150 MW solar and 150 MW BESS initiatives at KPS valued at over R5 billion.

Current status, risks, and challenges identified and recommendations

It is recommended that an assessment of local industries' capabilities be undertaken to inform decisions regarding funding requirements. This will also provide a baseline against which targeted interventions can be initiated. As noted previously, the renewable energy market is dominated by international role players that are typically able to provide these RE components at a lower cost. This is something that will need to be taken into consideration during implementation of the SDLS.

Action plan

The following table indicates the high-level action plan associated with the intervention.

Table 8.39: Local business opportunities action plan

Action	Responsibility	Timeframe
Include local content requirements for contracted services in tenders	Eskom	Short-term (1-5 years)
Advertise opportunities for local businesses	Eskom and partners	
Prioritise local businesses when issuing contracts (provided all other requirements are met)	Eskom	

8.3.4.2 Accommodation facilities to host trainees at the KTF

Rationale and description

The JET broadly outlines the empowerment of workers and communities with the necessary skills to ensure decent jobs and economic opportunities as South Africa undergoes its energy transition. Otherwise stated, programmes and reskilling initiatives are essential in driving an equitable transition. As such, one of the proposed interventions to mitigate the shutdown of KPS is the establishment of KTF. The purpose of the KTF is to equip Eskom employees, qualifying local community members, and individuals beyond the local area with the necessary skills and knowledge pertaining to renewable energy technologies.

Based on the above, an influx of individuals into the area is anticipated as the need for skills relating to renewable energy technologies becomes increasingly pressing. Furthermore, this is expected to be sustained given the proposed shutdown of coal-fired power stations as outlined in IRP2019.[18]

As noted in Section 3.5, Eskom employees (including those from neighbouring power stations) constitute most of the clients of guesthouses in the KPS area. According to VPC (2021), one guesthouse owner in the area reported that they used to own 14 such houses in Komati Village. However, this number had declined to seven. Furthermore, the individual reported minimal turnover and an inability to cover basic costs.

The intervention proposed in this context is that available guesthouses in the community surrounding KPS (such as the Lakama Guest House) be used to host individuals who undergo training at the KTF. An intervention of this nature will contribute directly to increasing the revenues of guesthouses and assist in ensuring a sustainable source of income. If it succeeds, the intervention will be supportive of the area's economic capital.

As the number of guesthouses in the local community is small, an intervention of this nature may ultimately necessitate the establishment of additional guesthouses. In addition, there are numerous people in the IZOI who have catering and cleaning skills. Thus, should there be an increase in guesthouses in the area, it is recommended that local workers be offered the chance to provide accommodation-related services.

[18] According to IRP2019, 10 500 MW of electricity generated from coal will be decommissioned by Eskom by 2030 and 35 000 MW by 2050.

Accommodation providers may also make use of the interventions focused on the digital activation of the local community to advertise their services.

In summation, there are opportunities for employment creation, an increase in the number of local SMMEs, an increase in revenue generation in the local economy by both guesthouses and businesses that supply guesthouses with goods and services, and an increase in government tax revenue.

Partners

This intervention is expected to be driven by local guesthouse owners in partnership with Eskom. Should there be a need on the part of Eskom for accommodation services in the area, local guesthouses need to be made aware thereof through digital platforms as part of the digital activation project.

Key metrics

As the intervention aims to utilise existing guesthouses in the area, facilities may need to be upgraded/refurbished. While the amount of funds that will be required to enable the local facilities to upgrade their offerings and become preferred suppliers is not possible to determine, it would be advisable to allocate at least R3 million towards this under the supplier development programme. The investment requirements for the establishment of an additional accommodation facility will need to be determined through a feasibility study. It would be advisable to allocate about R500 000 for conducting such a study and developing a bankable business plan.

Between 45 and 150 new employment opportunities may be created solely for catering for KTF.

Current status, risks, challenges identified, and recommendations

Currently, the intervention is in a concept phase and implementation will need to be considered by Eskom. The utility will thus need to facilitate engagements with guesthouse owners in the area to determine their willingness to participate in the intervention. Importantly, the intervention is largely reliant on the establishment of the KTF, and the commencement of training activities at the academy. In addition, the establishment of additional accommodation facilities is dependent on the demand for these activities. As such, it is recommended that a comprehensive investigation be undertaken prior to the establishment of additional facilities.

Action plan

The following table outlines the high-level action plan associated with the intervention.

Table 8.40: Accommodation facilities action plan

Action	Responsibility	Timeframe
Determine accommodation needs/requirements	Eskom	Short-term (1-3 years)
Engage with local accommodation owners or guesthouses	Eskom	

Action	Responsibility	Timeframe
Engage with the Tourism Grading Council to assist with setting requirements and auditing existing facilities	Local guesthouse owners/Eskom	
Develop a programme to facilitate upgrading of the facilities that meet the requirements to enable them to be registered as preferred suppliers	Local guesthouse owners/Eskom	
Register qualified local facilities as preferred suppliers	Local guesthouse owners/Eskom	
Undertake feasibility study and develop a bankable business plan for establishing additional accommodation facility	Eskom	

8.3.4.3 Catering services for construction projects, KTF, and RE projects

Rationale and description

Catering services broadly include activities related to food preparation, transportation of food items, and cleaning. Therefore, the undertaking of catering services in the local area may contribute to the creation of employment opportunities across several professions. Based on the profile of the primary study area, skills in the IZOI are related to catering, including cooking, cleaning, and administrative proficiencies.

The shutdown and subsequent R&R of KPS is expected to result in an influx of individuals to the area. This may be due to construction-related activities as well as the roll-out of economic projects that attract individuals in search of employment. In addition, the KTF may require catering services for its attendees.

The proposed intervention entails the provision of catering services to meet the needs of these arrivals, i.e. persons involved with construction projects, the KTF, and renewable energy projects outlined in the KPS implementation plan. There is a critical synergy between the provision of catering services and accommodation facilities. As indicated above, there may be an initiative to provide accommodation for individuals attending the KTF. Catering services may form part of this initiative if the need arises.

In addition, catering services may utilise the produce grown as part of the commercial agrivoltaics facility proposed for KPS, thus providing an offtake for this produce and helping to ensure the sustainability of the facility. Caterers may also procure food items from local retailers such as the OK in Komati Village or the Food Zone in Blinkpan, furthering the economic impact of the intervention. Furthermore, caterers may make use of the interventions focused on the digital activation of the local community to advertise their services.

The intervention could be hosted on Plot 168 in Komati Village, which is equipped with the necessary equipment. However, the facility may need to be refurbished or expanded as it has not been in operation for quite some time.

Partners

Overall, the initiative is to be championed by local community members or businesses, with support from Eskom.

Key metrics

The following table lists the key metrics associated with the intervention.

Table 8.41: Catering services key metrics

Indicator	Value	Comment
CAPEX requirements	R2 million	Estimated funding requirement for the refurbishment of the facility on Plot 168. Excludes the cost of land.
Feasibility study and business plan	R350 000 – R500 000	-
Direct jobs	5 - 15	May increase if the demand for catering services increases.

Current status, risks, challenges identified, and recommendations

The intervention is considered as being in a concept phase. Ultimately, the success of the proposed project will rely on the securing of catering contracts with the champions of projects in the area where there is a need for such a service.

Action plan

Table 8.42 provides the key steps required to undertake the initiative.

Table 8.42: Catering services action plan

Action	Responsibility	Timeframe
Secure land and building	Eskom	Short-term (1-3 years)
Determine catering requirements/needs		
Undertake a feasibility study and develop a business plan		
Secure funding		
Refurbish facility, acquire equipment, and undertake training where necessary		
Commence operations	Community members	

8.3.4.4 Transportation services for workers

Rationale and description

Following the anticipated increase in the number of individuals in the area, there may be an increase in the demand for transportation services in the local community. For example, individuals attending the KTF may

require transport from their place of accommodation to the academy and back. Furthermore, workers employed through the repowering and repurposing initiatives proposed for KPS may require transportation services.

The skills profile of the area surrounding KPS indicates minimal availability of highly skilled individuals, with most community members only having some form of secondary education. As such, their participation in the provision of transportation services may be suitable should they not be upskilled or reskilled.

It is in this context that an intervention involving the provision of transportation services to workers in the area is proposed. Crucially, the intervention will need to be driven by a private sector entity operating in the area.

Key metrics

The extent of the transportation to be provided will be dependent on the demand for such a service. However, it is not possible to determine the demand for transportation services at present. It is thus recommended that an assessment in this regard be undertaken when the activities related to the shutdown, repurposing, and repowering of KPS commence. In addition, the assessment will need to take into consideration the cyclical nature of demand for such services.

Partners

This intervention does not have a dedicated champion as it stands. Eskom may participate in the initial stages of the project to secure an agreement with a service provider. However, once this agreement has been secured, the responsibility for providing the required services will be placed on the service provider.

Current status, risks, challenges identified, and recommendations

As indicated above, it is strongly recommended that community participation be maximised where possible. The most significant obstacle to the success of the project mainly stems from a lack of demand for transportation services or the sustainability of such demand. Furthermore, demand for these services may be cyclical and thus vary in the course of the year. Neither the anticipated employment opportunities to ensue from the project nor the investment requirements for the service can be quantified as yet. The costs related to the provision of transportation services may be subsidised by Eskom. However, the total investment or funding requirements will be determined upon negotiation with service providers.

Action plan

Table 8.43 outlines the key action items associated with the intervention.

Table 8.43: Transportation services action plan

Action	Responsibility	Timeframe
Identify preferred service provider	Eskom	Short-term (1-3 years)
Secure agreement with a preferred service provider		
Determine funding required		
Commence with operations	Service provider	

8.3.4.5 Microgrid components manufacturing

Rationale and description

As noted previously, access to reliable electricity is known to act as an enabler of economic growth and development. Furthermore, although the majority of South Africans have access to electricity, a significant proportion is still without electricity. As such, there exists a need to develop and deploy alternative sources of electricity to ensure South Africans have adequate access to electricity.

One of the interventions proposed for the KPS site is the establishment of a containerised microgrid assembly facility under Pillar 2. However, under Pillar 4, the proposed intervention relates to the actual manufacturing of microgrid components. As noted in discussions about various interventions included under Pillar 4 of the KPS implementation plan, the shutdown of other coal-fired power stations (as necessitated by Eskom's and South Africa's JET) is considered necessary to ensure economies of scale.

This intervention, which is essentially an expansion of the containerised microgrid intervention listed under Pillar 2, is intended to facilitate the manufacture of microgrid components at the KPS site. As noted, the success and sustainability of the intervention will depend on the deployment of similar technologies at other coal-fired fired power stations to be shut down by Eskom. In the event that the initiative does prove successful, the local economy may benefit in the form of sustained employment creation and economic diversification. As KPS is considered the flagship operation for South Africa's transition away from its reliance on coal electricity generation, the area may become a crucial hub for renewable energy technologies – including those relating to microgrid component manufacturing and assembly.

Partners

Although this intervention is still in the conceptualisation phase, Eskom is likely to act as an initial champion of the initiative. Thereafter, it is likely that ownership of the intervention will be transferred to a local organisation with the necessary experience in the fabrication and assembly of microgrids. Eskom's role in the intervention may therefore be reduced following its commencement.

Current status, risks, challenges identified, and recommendations

As noted previously, the success and sustainability of the intervention will depend on the deployment of microgrids at other coal-fired power stations that are shut down by Eskom. Furthermore, there is a need to identify suitable partners for such an intervention to ensure, as mentioned, that it is operated sustainably. The intervention is still in a concept phase and funding for the project has yet to be secured. As such, it is recommended that a funding analysis be undertaken. Given the nature of this project and its dependence on economies of scale arising from the deployment of similar technologies at other Eskom coal-fired power stations scheduled to be shut down, it is anticipated that the project will be implemented over the long term (i.e. in the next five to 10 years).

8.3.4.6 Solar PV components assembly/manufacturing plants

Rationale and description

Eskom's JET is founded on three key principles:

i. Decrease carbon emissions, bringing environmental benefits.
ii. Ensure a reliable, clean electricity supply.
iii. Stimulate economic development while protecting and increasing jobs.

South Africa's latest NDC[19] (updated in September 2021) and the decommissioning of coal-fired power generation as outlined in IRP2019 both support the first component of Eskom's JET. The second and third components of Eskom's JET may be considered complementary, with the provision of a clean and reliable electricity supply acting as a key driver of economic development and employment creation. These two components also largely support the reduction of carbon emissions.

Given the above, there is a need to develop the capacity and capabilities of the South African economy to manufacture/assemble components of renewable energy technologies. This largely stems from the likely increase in renewable energy demand given the need to reduce carbon emissions and plug the electricity generation gap left by the shutdown of coal-fired power stations. In essence, the development of South Africa's renewable energy manufacturing capability may be considered an industrialisation approach facilitated through localisation. It should be noted that industrialisation through localisation is viewed as a cornerstone of the South African Economic Reconstruction and Recovery Plan.

The proposed intervention entails the establishment of facilities dedicated to the manufacturing or assembly of solar PV components. As solar PV is considered a green alternative for electricity generation, the reduced reliance on coal-fired electricity generation may result in a sustained demand for this technology. Facilities of such a nature may also provide practical training opportunities to those attending the KTF. Therefore, it may be beneficial to consider the synergies between the training opportunities provided by the KTF and the establishment of solar PV plants at KPS. The attainment of practical experience may prove vital for the deployment of solar PV on a national scale and at the sites of coal-fired power stations shut down by Eskom.

Such an intervention provides for a multitude of impacts in the local and, to some extent, the broader provincial economy. The local production of solar PV components or the assembly thereof could contribute directly to the industrialisation of the local economy, the creation of employment opportunities, and the diversification of the local economy away from its reliance on coal. However, it is recommended that the feasibility of local solar PV component manufacturing/assembly be thoroughly investigated. This recommendation mainly stems from the lower cost of imports, something that makes it essential to determine which components are economically viable for local manufacturing.

[19] In 2021, South Africa updated its annual NDC mitigation targets to range between 395 Mt and 510 Mt of CO_2-equivalent by 2025, with a further reduction to between 350 Mt and 420 Mt CO_2-equivalent by 2030. The country aspires to reach net zero CO_2 by 2050.

Apart from the above, the manufacturing of solar PV components at KPS may feed into repowering and repurposing initiatives implemented at other power stations to be shut down by Eskom. Consideration will need to be given to the extent of solar PV deployment at other power stations to ensure economies of scale.

Lastly, consideration needs to be given to local community members with skills relevant to manufacturing activities of this nature. According to the baseline of the Komati PSA, a number of electricians and welders reside in the area; their skills could be deployed in solar PV-related initiatives.

Key metrics

The key metrics associated with the establishment of manufacturing/assembly lines for solar PV components are not known. As per the recommended feasibility study, the scale of the proposed project will need to be determined. This will be key in establishing CAPEX and OPEX requirements, which will also depend on the types of components to be manufactured or assembled. The number of job opportunities, likewise, will be determined by the size of the facilities. Employment opportunities may range from 2.7 direct FTE person-years for every MW of PV modules assembled to 0.33 direct FTE person-years per MW in the case of mounting structures (EScience Associates, Urban-Econ Development Economists & Blue Horizon Energy Consulting Services, 2013).

Partners

It is not anticipated that Eskom will champion this intervention over the long term. As with the microgrid assembly and fabrication plant, the participation of Eskom may largely be concentrated in the initial stages of the project, such as those during which funding is secured. Thereafter, operations may be transferred to a business with the relevant knowledge and expertise, with Eskom providing support where needed.

Current status, risks, challenges identified, and recommendations

As noted previously, the local manufacturing or assembly of certain solar PV components may not be feasible given the lower cost option of importing these components. Therefore, it is recommended that a determination be made as to which components are best suited for local manufacturing/assembly. As indicated, consideration will need to be given to the deployment of solar PV as part of the repowering or repurposing of other power stations to be shut down by Eskom. This will ensure economies of scale and that the project remains feasible.

In addition to the above, key synergies exist between this intervention and the microgrid assembly plant. Thus, components produced as part of the solar PV manufacturing facility may be utilised in the manufacturing of microgrids, a possibility addressed in the following intervention. As has been emphasised, the success of this project is highly dependent on achieving economies of scale through deploying solar PV across the board at coal-fired power stations that are being shut down. Given the period of time over which these shutdowns are scheduled to occur, it is anticipated that the project will be implemented over the long term (i.e. in the next five to 10 years).

8.3.4.7 BESS cell manufacturing and/or assembly plant

Rationale and description

As noted with regard to several interventions proposed for the KPS site, renewable energy solutions are to become increasingly important as the South African economy is decarbonised. Due to the anticipated increase in the deployment of renewable energies on both a utility scale and for self-generation purposes, the demand for BESS is likely to increase.

This intervention thus entails the establishment of a BESS cell manufacturing and/or assembly plant. Furthermore, repowering and repurposing initiatives will be required to mitigate the impact of the shutdown of coal-fired power stations. These initiatives may include renewable energies such as wind or solar PV, which – in turn – require BESS. Therefore, the establishment of a BESS cell manufacturing and/or assembly plant at KPS may supply these components to repowering and repurposing projects at other power stations to be shut down by Eskom. This may contribute to the economies of scale required for such an intervention.

As indicated in the baseline of the Komati PSA, there are welders and electricians in the local community. Therefore, the establishment of a BESS cell manufacturing or assembly plant may contribute to the alleviation of unemployment within the region. Other benefits associated with an intervention of this nature may include the diversification and industrialisation of the local economy, the small-scale localisation of BESS cell manufacturing/assembly, and the diversification of the skills composition of local communities.

Partners

Partnerships for this intervention have not yet been identified. However, Eskom will probably be involved in the initial stages of the project, whereafter ownership will be transferred to an organisation with the necessary knowledge and expertise (such as an original equipment manufacturer). Alternatively, ownership of the project may be transferred to community members equipped with the necessary skills (e.g. those who have attended the KTF) under the supervision or guidance of Eskom.

Current status, risks, challenges identified, and recommendations

A facility of this nature is likely to require a significant amount of funding. As such, Eskom may need to consider partnering with organisations that have vested interests in BESS cell manufacturing or entities such as national departments (e.g. the **dtic**). In addition, adequate offtake for BESS cells will need to be secured to ensure the continued viability of the plant. Therefore, consideration may need to be given to the location of consumers, demand volumes, system requirements or specifications, and transportation services.

Given the nature of this project and its dependence on economies of scale arising from the shutdown and deployment of similar technologies at other Eskom coal-fired power stations, it is anticipated that this project will be implemented over the long term (i.e., in the next five to ten years).

8.3.4.8 RE component recycling

Rationale and description

As indicated previously, the reduction in carbon to limit the increase in global temperatures to below 2°C (and preferably to 1.5°C) compared to pre-industrial levels is likely to be driven by the deployment of renewable energy technologies. Although the large-scale deployment of these technologies is necessary, consideration needs to be given to their operational lifespan and the subsequent generation of waste once these components reach the end of their life cycle.

Since the early 2000s, the amount of global solar PV installed has increased significantly. According to IRENA (2022), the installations amounted to around 922 gigawatts (GW) by the end of 2021. Furthermore, projections indicate that global installed solar PV capacity could reach 1.8 terawatts (TW) in 2025 (SolarPower Europe, 2020). In terms of wind installations, global wind power capacity amounted to 873 GW in 2022, up from 873 GW in 2021 (GWEC, 2022). In South Africa alone, according to IRP2019, the total installed capacity of solar PV and wind is projected to reach 8 288 MW and 17 742 MW, respectively, by 2030 (DMRE, 2019).

It may thus be concluded that significant volumes of solar PV waste (especially solar panels, given their average lifespan of between 25 to 30 years) and wind waste (wind turbines having a lifespan of around 20 years) will be generated in the coming years. Waste generated from auxiliary components that accompany renewable energy generation (e.g. BESS) may also contribute significantly to the volumes of waste generated by the renewable energy sector.

Given the above, an intervention entailing the recycling of renewable energy components is proposed. The opportunity for initiatives of this nature relates mainly to circular economy principles, which aim to facilitate activities that preserve value in the form of energy, labour, and materials. As such, the component costs of renewable energies may be reduced significantly should refurbished/recycled components be available.

This intervention may hold various benefits for the local economy and the broader provincial economy. These include the diversification of the local economy away from its coal dependency, employment creation, the creation of industries geared toward the JET, and the development of skills complementary to the JET. Furthermore, the intervention may provide an opportunity to train individuals who attend the KTF.

Partners

Partnerships for the intervention have not yet been determined. However, Eskom may again act as the initial champion of the project, whereafter ownership would be transferred to community members equipped with the necessary skills (e.g. those who have attended the KTF). During operations, Eskom may thus focus on supervision or guidance provision.

Current status, risks, challenges identified, and recommendations

First and foremost, the availability of renewable energy components for recycling will need to be considered. The purpose of such an assessment is to ascertain whether sufficient volumes of waste exist to render recycling operations viable or sustainable. Furthermore, key linkages with the shutdown of other coal-fired power stations will need to be considered. Eskom will need to determine its role in the initial roll-out of the project and the subsequent operation thereof. Crucially, it is recommended that the participation of local

community members be prioritised to further amplify the benefits of the project. Engagements with community members revealed a need for ownership of and participation in economic activities in the area. Therefore, it is vital that local community members are upskilled to participate in and, if possible, own interventions.

Given the nature of this project and its dependence on economies of scale arising from the shutdown and deployment of similar technologies at other Eskom coal-fired power stations, it is anticipated that this project will be implemented over the long term (i.e., in the next five to ten years).

8.3.5 Pillar 5: Communicate

This pillar provides an overview of the key stakeholders that are being communicated with – also those that have been or will be engaged. The pillar is divided into two groups, the first focusing on the internal communication platforms and the second on external communication platforms. The communication platforms are aimed at disseminating the key findings of the study highlighting the mitigation measures identified. The main objectives of communication include informing, consulting, collaborating, and involving. The means and frequency of communication vary across the different stakeholders.

8.3.5.1 Internal communication platforms

The internal communication platforms relate to Eskom employees, from management, contractors, and organised labour to all other employees. Figure 8.13 lists the various internal platforms that are being engaged.

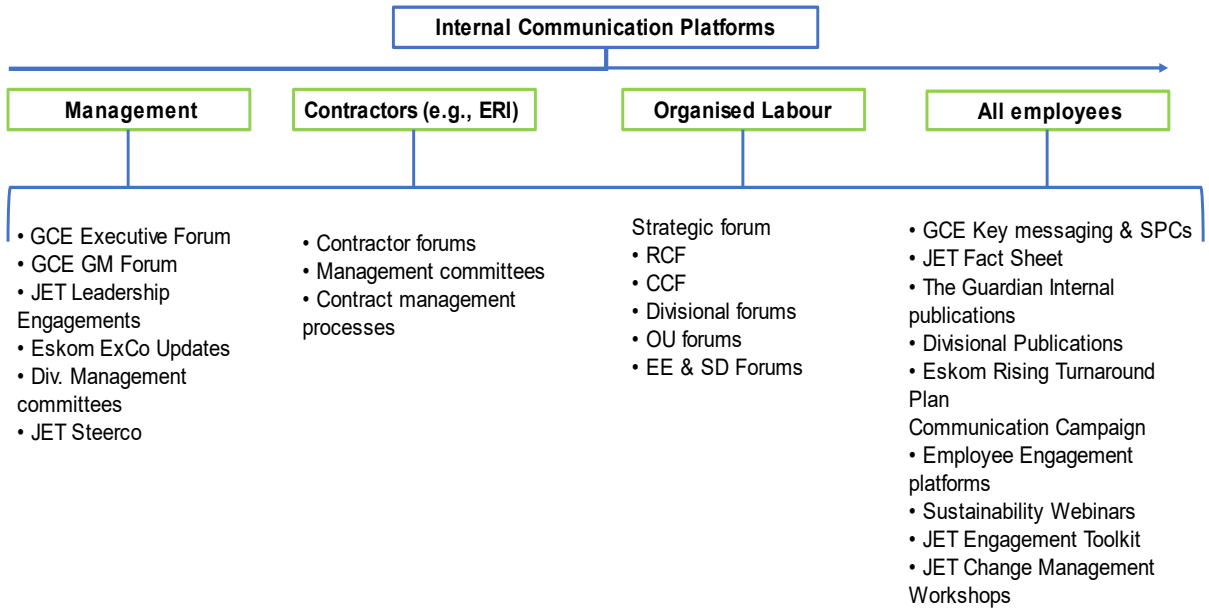


Figure 8.13: Internal communication platforms

Figure 8.14 illustrates the labour engagement process followed for the consultation of and engagement with employees and labour.

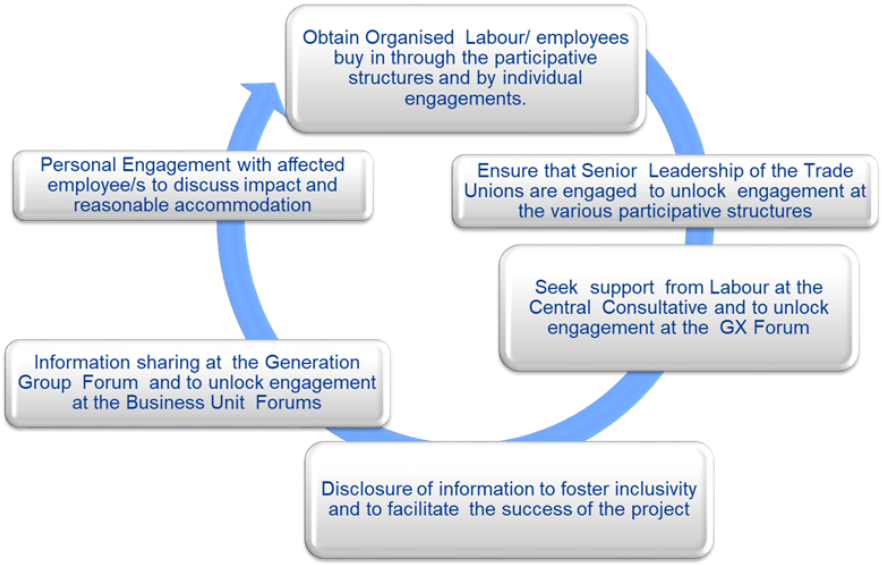


Figure 8.14: Engagement process flow

The following are the participative structure platforms, which are integral to the engagement process flow indicated above.

Strategic Forum

The purpose of engaging the Strategic Forum is to:

- discuss strategic issues and issues of principle;
- share the rationale of Eskom's strategic decision of repurposing the Generation's retired power station; and
- use the Strategic Forum as a sounding board and redirection to consultative structures.

Central Consultative Forum (CCF)

The CCF is to be convened to address and agree on the approach; this may include the establishment of a work team, which will present its plan for adoption at the CCF plenary.

Generation National Group Forum (GGF)

The GGF is to be convened for information-sharing purposes and to deal with issues and implementation methods.

Business Unit (Power Station) Forum

This forum is to be convened for information-sharing purposes and to address issues that are specific to affected employees at that specific site.

8.3.5.2 External communication platforms

The external stakeholders comprise those outside of Eskom that may be affected by, have an interest in or are somewhat relevant to the study. The list includes stakeholders that have been previously engaged and will be engaged further to communicate the key findings of the study.

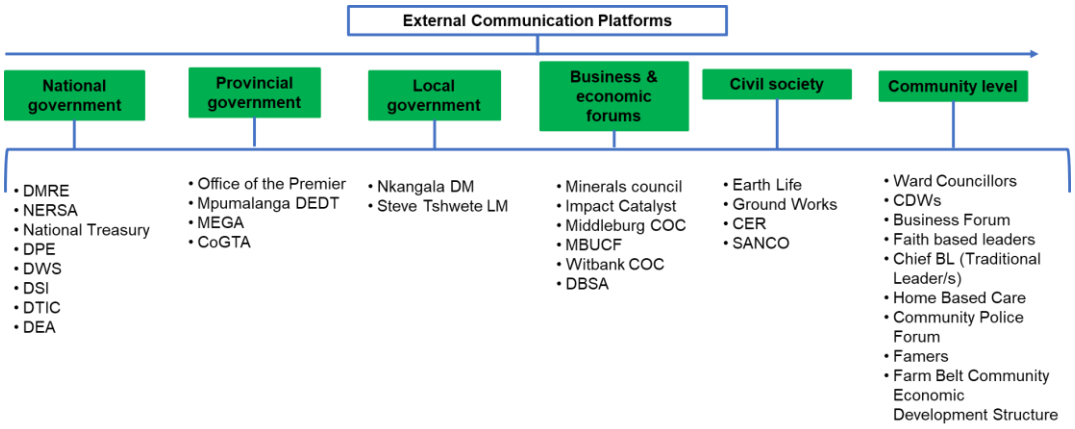


Figure 8.15: External communication platforms

8.4 Partnerships and collaboration

The purpose of this subsection is to provide an overview of potential partners relevant to the implementation of projects required for the mitigation of the KPS shutdown. Mitigation measures require a collaborative effort from various stakeholders beyond Eskom to ensure long-term sustainability of the local economy and community. However, it should be noted that Table 8.44 simply outlines the possible involvement of the respective partners, all of which will require further engagement.

Potential partners were grouped according to national departments, provincial departments and associations, funding associations, implementing agents, research councils and similar organisations (such as technology incubators), and development and support. Each of the identified potential partners is categorised according to various areas of possible involvement. These include finance (F), implementation (I), knowledge (K), technology (T), assets (A), and regulatory (R).

Table 8.44: Potential partnerships and collaborations, and area of involvement

Group	Partner	Description	F	I	K	T	A	R
National departments	Department of Forestry, Fisheries and the Environment	• Purpose: to ensure that all South Africans have access to an environment that is not harmful to their health and well-being. • Aim: attainment of the Millennium Development Goals, with specific reference to environmental protection and poverty reduction, through the promotion of various initiatives. • Objective: to provide leadership in environmental management, utilisation, and conservation – and in the protection of ecological infrastructure. • Involved in alien vegetation removal and beneficiation and in the Kruger National Park Beneficiation Scheme.						✓
	South African National Biodiversity Institute	• Contributes to South Africa's sustainable development through: ○ facilitating access to biodiversity data; ○ generating information and knowledge; ○ capacity building; ○ providing policy advice; and ○ showcasing and conserving biodiversity through national botanical and zoological gardens.						
	Department of Water and Sanitation	• Purpose: custodian of South Africa's water resources – formulates and implements policies governing this sector. • Mission: to serve South Africans by: ○ contributing positively as the custodian of water and sanitation resources; ○ ensuring the provision of water and sanitation services to South Africans;						✓

Group	Partner	Description	F	I	K	T	A	R
		○ leading the sector and enabling partners with knowledge and capacity to ensure that all water services are delivered; and ○ being committed to innovation and the use of technologies as a catalyst for positive change. • Involved in the Brugspruit Water Pollution Control Works project, which seeks to provide fit-for-purpose water for community projects, as well as in mine water projects related to irrigation.						
	Department of Mineral Resources and Energy	• Aim: to develop mineral resources and an energy sector that promotes economic growth and development, social equity, and environmental sustainability. • Mission: to regulate, transform and promote the minerals and energy sectors, providing sustainable and affordable energy for growth and development while ensuring that all South Africans derive sustainable benefits from the country's mineral wealth. • Involved in the Brugspruit Water Pollution Control Works project, which seeks to provide fit-for-purpose water for community projects.						✓
	Department of Agriculture, Land Reform and Rural Development	• Aim: to accelerate land reform, catalyse rural development and improve agricultural production with the goal of stimulating economic development and food security through: ○ transformed land ownership patterns; ○ agrarian reform; ○ implementation of an effective land administration system; ○ sustainable livelihoods; ○ innovative sustainable agriculture; ○ promotion of access to opportunities for youth, women, and other vulnerable groups; and ○ integrated rural development.						✓
	Department of Cooperative Governance and Traditional Affairs	• Purpose: provision of a functional and developmental local government system that delivers on its Constitutional and legislative mandates within a system of cooperative governance.						✓
	Department of Science and Innovation	• Aim: to provide leadership, an enabling environment, and resources for science, technology, and innovation to support South African development.			✓			✓
	Department of Trade, Industry and Competition	• Focus: facilitation of a dynamic and globally competitive South African economy with the goal of contributing meaningfully to economic transformation, inclusive growth and development, decent employment, and equity. • Mission:						✓

Group	Partner	Description	F	I	K	T	A	R
		○ promote structural transformation towards a dynamic industrial and globally competitive economy; ○ provide a predictable, competitive, equitable and socially responsible environment conducive to investment, trade, and enterprise development; ○ broaden participation in the economy to strengthen economic development; ○ continually improve the skills and capabilities of the **dtic** to effectively deliver on its mandate and respond to the needs of South Africa's economic citizens; ○ coordinate the contributions of government departments, state entities, and civil society to effect economic development; and ○ improve alignment between economic policies, the plans of the state, and its agencies as well as with government's political and economic objectives and mandate. • Involved in the Industrial Parks Revitalisation Programme, the Special Economic Zone Programme, the Digital Hubs Programme, the Water Industry Masterplan, and the Renewable Energy Masterplan.						
	Department of Public Works and Infrastructure	• Purpose: provision of accommodation and property management services to all ministries of the South African government. • Mission: ○ providing strategic leadership to the South African construction and property industries; ○ establishing and ensuring compliance to policy and legislative prescripts for the management of state-owned and leased-in immovable assets and South African construction and property sectors; ○ providing strategic direction on the integration of public works priorities; and ○ contributing to the national goals of job creation and poverty alleviation through Public Works Programmes.						✓
	South African Local Government Association	• Purpose: represent, promote and protect the interests of local governments and raise the profile of local government, amongst other objectives. • Responsibility: ○ to represent the interests of local government within the system of government as a whole and to support its members in the fulfilment of their developmental obligations. ○ to be an active participant in the intergovernmental relations system, to provide common policy positions on numerous issues, to voice local government interests and to provide solutions to the challenges facing local government.						
	National Treasury	• Purpose: management of South Africa's national government finances and supporting efficient and sustainable public financial management.	✓					✓

Group	Partner	Description	F	I	K	T	A	R
Provincial departments and associations	Mpumalanga Provincial Government	• Mission: to ensure equitable transformation and enhancement of the image of the MPG through the provision of advice and information, coordination, and monitoring and support services. • Main areas of focus include: ○ economic growth that will result in job creation; ○ efficient and effective administration; ○ efficient and effective financial management; and ○ integrated development and planning.	✓					✓
	Gauteng Provincial Government	• Purpose: tasked with the overall governance of the Gauteng province. • Responsibility: the provision of social services such as education, health, and social development; economic functions like agriculture and roads; and provincial governance and administration.	✓					✓
	Mpumalanga Department of Economic Development and Tourism	• Seeks to promote economic growth while ensuring environmental management for sustainability purposes. • Includes: ○ the Mpumalanga Economic Growth Agency; ○ the Mpumalanga Economic Regulator; and ○ the Mpumalanga Tourism and Parks Agency. • May assist with: ○ provision of guidance on economic opportunities; and ○ developing partnerships.	✓					✓
	Nkangala DM	• Responsibility: to ensure sustainable infrastructure and service provision through an efficient, competitive and responsive economic infrastructure network with the goal of promoting further investment in the area. • Objectives: ○ integrated and sustainable human settlements and improved quality of household life; ○ an efficient, competitive and responsive economic infrastructure network; ○ decent employment through inclusive economic growth; ○ to inculcate and improve financial sustainability and management; ○ a responsive, accountable, effective, efficient and sound governance system; ○ a skilled and capable workforce supportive of inclusive growth; ○ vibrant, equitable and sustainable rural communities and food security; and ○ protection and enhancement of environmental assets and natural resources.	✓					✓

Group	Partner	Description	F	I	K	T	A	R
	Steve Tshwete LM	• Objective: to improve the lives of its residents through the provision of high-quality services. • Responsibility: support the achievement of the project objectives by virtue of being the host of KPS and through its access to knowledge of the area as well as to resources and partnerships within the area. • Role: facilitating mitigation projects and providing key assets to promote the success of the respective projects.	✓					✓
Funding agencies	Development Bank of Southern Africa	• Purpose: to promote inclusive and sustainable economic development, growth, and regional integration through infrastructure finance and development. • Role: provision of funding, including in the pre-feasibility phase of projects (but excluding conceptual studies). • Partners: collaborates with other international DFIs and is involved in Nkangala DM as an implementing agent.	✓					
	United States Agency for International Development	• Purpose: leads international development and humanitarian efforts to save lives, reduce poverty, strengthen democratic governance and help people progress beyond assistance. • Focuses on a multitude of areas, including: ○ agriculture and food security; ○ climate change; ○ economic growth and trade; ○ innovation, technology, and research; and ○ water and sanitation.	✓					
	Industrial Development Corporation of South Africa	• Responsibility: to maximise its development impact through job-rich industrialisation while contributing to an inclusive economy; this contribution is through, among others, funding black-owned and empowered companies, black industrialists, women, and youth-owned and empowered enterprises.	✓					
	World Bank	• Purpose: provides loans and grants to the governments of low- and middle-income countries for the purpose of pursuing capital projects.	✓					
	International Finance Corporation	• Purpose: provides investment, advice, and asset management that are mutually reinforcing and can be tailored to a client's specific needs. • Key areas of expertise include: ○ agribusiness and forestry; ○ education; ○ financial institutions; ○ health; ○ infrastructure;	✓					

Group	Partner	Description	F	I	K	T	A	R
		○ manufacturing; and ○ tourism, retail, and property.						
	Independent Growth Finance	• Purpose: funds growing UK businesses that have funding requirements of up to £20 million. • Involved in the Agri-Processing Resource Efficiency Project and the Green Building Programme.	✓					
Implementing partners	Impact Catalyst	• Mission: to deliver positive socioeconomic change aligned with the Sustainable Development Goals through collaboration. • Key areas of impact include: ○ economic development; ○ health; ○ education; ○ social empowerment; and ○ service delivery. • Involved in a number of projects that could be replicated in other PSAs (e.g. winter wheat cultivation, agro-processing, and biodiesel production). • Involved in the development of the Mpumalanga JET Strategy. • Partners include: ○ AngloAmerican; ○ the CSIR; ○ Exxaro; and ○ the IDC.		✓	✓			
	Mine Water Coordinating Body	• Purpose: a public-private platform that enables the mining industry, government, and civil society to work together in identifying and implementing management solutions to improve water quality and availability; it also seeks to address sustainable mine closure in Mpumalanga. • MWCB's role relates to: ○ business plan implementation; ○ the supply of relevant infrastructure; ○ securing funding; ○ project coordination; and ○ monitoring, reporting and facilitation between mines and commercial farmers. • Involved in in-situ remediation of mine water, irrigation with mine-affected water, and associated activities.		✓	✓		✓	
	Mines and associations	• Includes various mines and associations related to the mining sector such as the Minerals Council South Africa and Mining Dialogue 360.	✓	✓			✓	

Group	Partner	Description	F	I	K	T	A	R
		○ Mines in Mpumalanga include AngloAmerican, Exxaro, and Thungela, amongst others. Mining companies in the province predominantly focus on coal mining while participating in multiple socioeconomic activities and upliftment projects. ○ The Minerals Council South Africa is a mining industry employers' organisation that supports and promotes the South African mining industry. It promotes employer interests by providing strategic support and advisory input. ○ Mining Dialogue 360 focuses on research, data analytics, dialogue, and community consultation work within the mining sector. It is also involved in mine rehabilitation and closure, improving food security in mine-affected communities, and (with the Wits Mining Institute) the mapping of artisanal and small-scale mining ecosystems.						
	GreenCape	• Mission: to mobilise the African green economy through collaborating with businesses, investors, academia, and government to unlock investment and employment potential related to green technologies and services. • Through its Alternative Service Delivery Unit, GreenCape works with various communities to ensure that all stakeholders not only survive but adapt and then thrive in the face of acute shock and the chronic stresses faced by cities. • Involved in the development of the Mpumalanga Green Economy Cluster under the leadership of DEDT, which focuses on the identification of effective mechanisms to develop the Mpumalanga economy – this to support the JET of the province and create green jobs.		✓				
Research councils	Trade & Industrial Policy Strategies	• Purpose: independent, non-profit, economic research institution that supports economic policy development. • Responsibility: to undertake quantitative and qualitative research, project management, dialogue facilitation, capacity building, and knowledge sharing. • Focus areas: trade and industrial policy, sustainable growth, inequality, and economic inclusion.			✓			
	Council for Scientific and Industrial Research	• Purpose: leading scientific and technology research organisation that researches, develops, localises and diffuses technologies to accelerate socioeconomic prosperity in South Africa. • Focuses on achieving science, engineering, and technology competencies through: ○ conducting research and development, innovating transformative technologies and accelerating their diffusion; ○ improving the competitiveness of high-impact industries able to support South Africa's reindustrialisation by collaboratively developing, localising and implementing technology; ○ driving socioeconomic transformation through RD&I that supports the development of a capable state;			✓			

Group	Partner	Description	F	I	K	T	A	R
		○ building and transforming human capital and infrastructure; and ○ diversifying income while maintaining financial sustainability and good governance.						
	MINTEK	• Purpose: MINTEK is South Africa's national minerals research organisation and one of the world's leading technology organisations. It specialises in minerals processing, extractive metallurgy, and related areas. • Involved in the cloSURETM Process (biological treatment of acid mine drainage).			✓			
	University of Cape Town Energy Research Centre	• Purpose: undertakes research into energy problems pertinent to Africa. • Research focus areas: ○ energy, poverty and development; ○ energy efficiency; ○ modelling; ○ environment and climate change; and ○ economics. • Involved in research relating to the repurposing of mine waste, growing fibre crops in mines, and acid mine drainage.			✓			
	Wits Mining Institute	• Purpose: long-established platform with expertise in mining-related fields of study; dedicated to informing the emergence of a 21st century model of mining that is both sustainable and competitive. • Involved in the mapping of artisanal and small-scale mining ecosystems in collaboration with Mining Dialogues 360.			✓			
	International Institute for Sustainable Development	• Purpose: independent think tank founded in 1990 that works to shape and inform international policy on sustainable development governance. • Focus: areas deemed ripe for transformation where policy shifts have the potential to contribute to change and where there is a proven record of making significant gains.			✓			
	Water Research Commission	• Purpose: ○ promote coordination, cooperation, and communication in the area of water research; ○ establish water research needs and priorities; ○ fund research into priority issues concerning water; ○ promote the effective transfer of information and technology; and ○ enhance knowledge and capacity building within the water sector.			✓			
	University of Pretoria Department of	• Purpose: Provide the very best undergraduate and postgraduate education in the broad arena of plant sciences, including plant taxonomy, ecology, medicinal plant science, biotechnology, agronomy, plant pathology, horticulture, and soil science.			✓			

Group	Partner	Description	F	I	K	T	A	R
	Plant and Soil Sciences	• Involved in research related to ecology, biodiversity, plant biotechnology, soil science, and plant pathology.						
Technology partners	Navitas	• Purpose: focuses on energy (specifically renewable energy) through its wholly owned Kabi Energy subsidiary; collaborates with individuals with a proven track record in deal origination and execution; has a deep understanding of sector-specific dynamics and issues as well as strong networks in the financial, energy, and business sectors.			✓	✓		
	South African Photovoltaic Industry Association	• Aim: to promote cohesion, collaboration, and consistency in the solar PV industry in South Africa.			✓	✓		
	South African Wind Energy Association	• Purpose: SAWEA activities are focused on: ○ advocacy for the implementation of ambitious, consistent South African energy policy that harnesses the country's immense wind resources; ○ facilitation and promotion of excellent practice in the associated localisation, socioeconomic, economic development, and transformational areas of wind power; ○ endorsement and recognition of excellent operational practice in the generation of wind power; ○ provision of pertinent information to current and prospective investors seeking to enter the South African wind power market; ○ provision of up-to-date, dependable public information on the socioeconomic contributions of the wind industry in South Africa; ○ promotion of renewable power in large- and small-scale applications in South Africa as a least-cost option and as a direct contribution to the achievement of national development and climate change objectives; and ○ promotion of wind and renewable power investment in Africa through partnership and dialogue both within South Africa and the region.			✓	✓		
	Vestas	• Role: participates in the manufacturing, installation, and service of onshore and offshore wind turbines.	✓		✓	✓		
	Technology Innovation Agency	• Purpose: a national public entity that serves as the key institutional intervention to bridge the innovation gap between research and development undertaken by higher education institutions, science councils, public entities, and the private sector – and commercialisation. • Focus: technology development, from proof of concept to pre-commercialisation. • Manages:			✓	✓		

Group	Partner	Description	F	I	K	T	A	R
		○ the Seed Fund; ○ the Technology Development Fund; and ○ the Commercialisation Support Fund.						
Development and support	Middelburg Chamber of Commerce and Industry	• Mission: development and organisation of commerce and trade as well as the provision of support to and creation of opportunities for sustainable development in Steve Tshwete LM. • Provides training to businesses, financial actors, and employees in the business environment. It also offers project management expertise to facilitate the implementation of projects. • Role: to ensure that there is engagement between the chamber and Eskom for developing an understanding as to the opportunities presented by the shutdown, the skills that will be required, and the training opportunities that will need to be offered.			✓			
	Agricultural Business Chamber of South Africa	• Purpose: influential association of agribusinesses operating in South and Southern Africa. • Role: to ensure that agribusiness plays a constructive role in the country's economic growth, development, and transformation, and to create an environment in which agribusinesses of all sizes and in all sectors can thrive, expand and be competitive.			✓			
	Agri South Africa	• Vision: to ensure an inclusive and prosperous agricultural sector through demonstrating its values and with the cooperation of its members. • Promotes the development, profitability, stability, and sustainability of agriculture in South Africa by means of its involvement with and input on national and international policy (and the implementation thereof).			✓			
	United Nations Development Programme	• Purpose: helping countries eliminate poverty and achieve sustainable economic growth and human development. • Relies entirely on voluntary contributions from United Nations member states, multilateral organisations, the private sector, and other sources; support comes in the form of unrestricted regular resources and contributions earmarked for a specific theme, programme, or project.		✓				
	Deutsche Gesellschaft für Internationale Zusammenarbeit	• Purpose: service provider in the field of international cooperation for sustainable development and international education work. • Supports people in acquiring specialist knowledge, skills, and management expertise. • Assists organisations, public authorities, and private businesses to optimise their organisational, managerial, and production processes.	✓					

9 MONITORING AND EVALUATION PLAN

This section outlines the monitoring and evaluation (M&E) plan for the proposed interventions meant to mitigate the impacts that are expected to ensue as a result of the shutdown of KPS. The plan focuses on projects that are to be implemented solely by Eskom or by the utility in partnership with other organisations. This is due to the fact that Eskom will not be able to influence or control the implementation of projects undertaken solely by third parties and thus cannot be monitored in this regard.

M&E comprises processes that are intended to improve the performance of projects or organisations to realise the desired results. The **monitoring** aspect of M&E provides detailed information on monitored activities to assist in identifying areas where improvements should be made (this is done continuously as the project is being implemented). The **evaluation** aspect assesses a project to understand whether the objectives have been achieved and, if so, to what extent (this is usually done once a project has concluded or after an appropriate period of time has passed).

The purpose of the M&E plan is to provide Eskom and key project partners with a tool to track and assess the results of the proposed interventions throughout their lifespans. To achieve this, a ToC-based approach has been adopted for the M&E framework. This aims to establish a common understanding between Eskom and key partners regarding the desired goals and activities while clarifying tasks and resources that will be required before the implementation begins. The M&E plan outlines:

- the indicators used to track implementation progress and progress towards achieving the goals of the interventions;
- the sources of information used to inform the indicators;
- how data will be collected from the sources of information to track the indicators;
- how often data should be collected for the indicators; and
- the planned targets to be achieved.

9.1 Theory of Change (ToC) and M&E indicators

As outlined in Figure 7.1, the long-term impact that may ensue as a result of the KPS shutdown is a decline in the quality of life and deterioration of the local community. The proposed interventions aim to mitigate the immediate and medium-term outcomes that could eventually lead to such a long-term impact. Thus, **the long-term goal** of the proposed interventions is to improve the quality of life in the community through a set of actions mapped through a ToC. Having said this, **Eskom's line of accountability** lies between the outputs that are produced and the outcomes that are derived from the implemented interventions. This is because everything up to and including these outputs can be controlled and managed by Eskom, while the outcomes will reflect actions that are undertaken not only by Eskom but also other stakeholders involved in the development of the local economies.

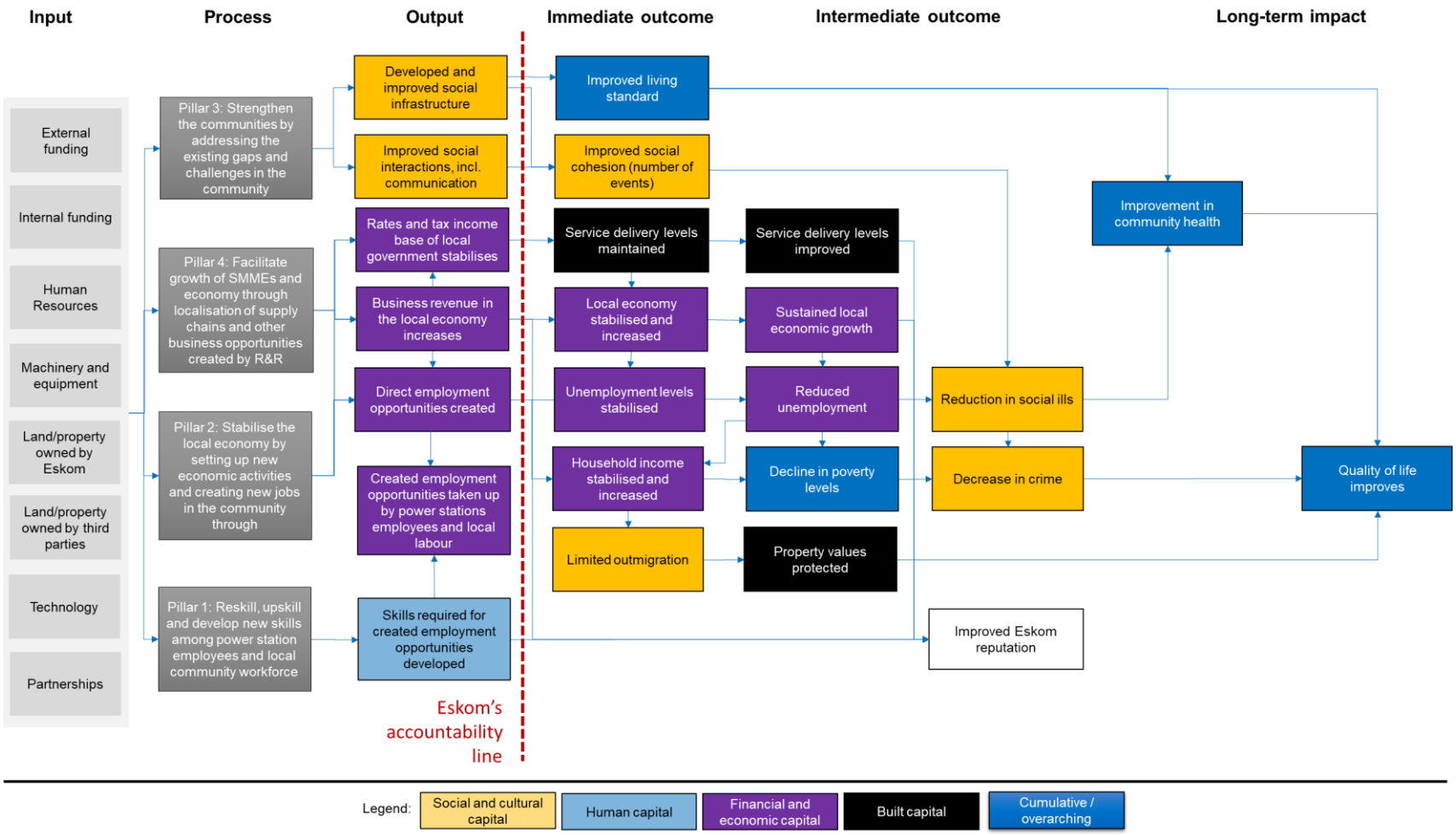


Figure 9.1: ToC for community capital interventions

Figure 9.1 illustrates the developed ToC, which comprises the devised interventions (grouped under respective pillars) and describes what changes these interventions can bring in the short, medium, and long terms to achieve the intended impact. The ToC is a useful tool for guiding and focussing the M&E plan as it assists with determining key monitoring and evaluation questions, what to measure, what information to collect and how to structure data analysis and reporting. Given that each of the pillars that make up the implementation plan encompasses several projects, the ToC only includes the main causal linkages of the projects overall rather than for each project specifically.

Figure 9.1 shows that the implementation of the identified pillars will require access to a range of inputs such as funding, human resources, and partnerships. The implementation (i.e. process) of projects within the pillars and their subsequent successful completion (i.e. output), where Eskom's line of accountability stops, will enable positive changes in economic capital, social capital, human capital, and built capital over the short to long terms.

For example, the implementation of Pillar 2 projects will contribute to an increase in the local economy's business revenue. This could occur directly (as a result of businesses created/supported by these projects) or indirectly (as a result of businesses supplying goods and services to the projects). The increased business activity and revenue will contribute to stabilised/increased production and value-add in the economy, which will in turn contribute to sustained growth of the local economy. The implementation of the Pillar 2 projects will also result in the creation of direct employment opportunities, which will contribute first to stabilisation of unemployment and income levels in the region and then to their improvement. The increase in employment and household income facilitated by the continued growth of the local economy can be expected to contribute to a decline in poverty levels. The decline in poverty levels, together with positive changes in the social and built environments of the local community, will ultimately enable an improvement in the quality of life of the communities. As mentioned, though, the ability of Eskom to control and manage the above chain of events stops at the output level.

The indicators that can be used by Eskom to measure the results of activities up to and including the output level are listed in Table 9.1. Indicators that can be considered to measure the outcomes and impacts, should government or other stakeholders decide to monitor and evaluate the changes that are taking place in the area, are presented in **Annexure 3.**

The proposed indicators are a mix of those that measure process or what is being done as part of the interventions (i.e. monitoring indicators) and those that measure outcomes (i.e. evaluation indicators). Monitoring/process indicators track the progress of the interventions and assist with determining whether intended activities are being implemented as planned. Evaluation/outcome indicators track how successful intervention activities have been in achieving objectives. They also assist with assessing how the intervention activities have made a difference.

Table 9.1: M&E indicators to be used by Eskom to monitor and evaluate interventions up to its line of accountability indicated in the ToC

Component from ToC	Indicator	M/E*	Eskom resp.
Inputs			
Funding	Funding contributed by Eskom (Rand)	M	✓
	Funding provided/leveraged by partners (Rand)	M	✓
	Funding secured from external sources as part of public finance (DFIs etc.) (Rand)	M	✓
Human resources	Number and composition of Eskom HR involved in implementation	M	✓
	Number and composition of partner HR involved in implementation	M	✓
Machinery and equipment	Value and type of machinery and equipment provided by Eskom (Rand)	M	✓
	Value and type of machinery and equipment provided by partners (Rand)	M	✓
Land/property	Ha of land/property provided by Eskom	M	✓
	Ha of land/property provided by partners	M	✓
	Ha of land/property provided by external sources	M	✓
Technology	Value and type of technologies provided by Eskom (Rand)	M	✓
	Value and type of technologies provided by partners (Rand)	M	✓
Partnerships	Number of project partners with which Eskom has a formal agreement	M	✓
	Number of public organisations with which Eskom and partners have a formal agreement	M	✓
	Number of private organisations with which Eskom and partners have a formal agreement	M	✓
Processes			
Pillar 1: Reskill, upskill and develop new skills among power station employees and local community workforce	Number of reskilling, upskilling, and developing new skills initiatives implemented	M	✓
	Number of Eskom employees enrolled in reskilling, upskilling, and developing new skills initiatives	M	✓
	Number of community members enrolled in reskilling, upskilling, and developing new skills initiatives	M	✓
	Number of SMMEs that completed incubation programmes	M	✓
	Capital expenditure to complete/implement reskilling, upskilling, and developing new skills initiatives (Rand)	M	✓
	Operational expenditure for reskilling, upskilling, and developing new skills initiatives (Rand)	M	✓
Pillar 2: Stabilise the local economy by setting up new economic activities and creating new jobs in the community	Number of local economy stabilising projects implemented	M	✓
	Capital expenditure to implement local economy stabilising projects (Rand)	M	✓
	Operational expenditure to operate local economy stabilising projects (Rand)	M	✓
	Number of businesses supported by local economy stabilising projects	M	✓
Pillar 3: Strengthen the communities by addressing	Number of community strengthening initiatives completed/implemented	M	✓
	Capital expenditure to implement community strengthening initiatives (Rand)	M	✓

Component from ToC	Indicator	M/E*	Eskom resp.
the existing gaps and challenges in the communities	Operational expenditure for community strengthening initiatives (Rand)	M	✓
Pillar 4: Facilitate growth of SMMEs and economy through localisation of supply chains and other business opportunities created by R&R	Number of SMME and economic growth projects implemented	M	✓
	Capital expenditure to implement SMME and economic growth projects (Rand)	M	✓
	Operational expenditure to operate SMME and economic growth projects (Rand)	M	✓
	Number of businesses supported by SMME and economic growth projects	M	✓
Outputs			
Skills required for created employment opportunities developed	Number of Eskom employees that completed skills initiatives	M/E	✓
	Number of community members that completed skills initiatives	M/E	✓
	Number of SMMEs that completed incubation programmes	M/E	✓
Direct employment opportunities created	Number of jobs created through R&R projects during construction	M/E	✓
	Number of jobs created through other projects during construction	M/E	✓
	Number of jobs created through R&R projects during operations	M/E	✓
	Number of jobs created through other projects during operations	M/E	✓
Business revenue in local economy increases	Revenue generated by businesses involved in pillar projects (Rand)	M/E	✓
	Contribution of business revenue generated by operation of pillar projects to the Steve Tshwete LM economy (%)	M/E	✓
	Revenue generated by businesses supported by pillar projects (Rand)	M/E	✓
Rates and tax income base of local government stabilises	Rates and taxes paid to local government by the implemented projects (Rand)	M/E	✓
	Contribution to local government revenue as % of total rates and taxes collected by local government (%)	M/E	✓
Created employment opportunities taken up by power stations employees and local labour	Number of direct construction jobs filled by individuals from the PSA	M/E	✓
	Number of direct construction jobs filled by individuals who were previously contracted by Eskom	M/E	✓
	Number of direct operational jobs filled by individuals from the PSA	M/E	✓
	Number of direct operational jobs filled by individuals who were previously contracted by Eskom	M/E	✓
	Number of Eskom employees redeployed to repurposing and repowering projects, per gender and residence	M/E	✓
	Number of non-Eskom employees filling positions at repurposing and repowering projects, per gender and residence	M/E	✓
Developed and improved social infrastructure	Number and type of social facilities/amenities developed	M/E	✓
	Number and type of social facilities/amenities refurbished/upgraded	M/E	✓
	Number of beneficiaries supported by facilities/amenities, per facility	M/E	✓

Component from ToC	Indicator	M/E*	Eskom resp.
Improved social interactions, incl. communication	Number and % of community residents connected to the local platform	M/E	✓
	Number of social enhancement events held	M/E	✓

**M – monitoring; E- evaluation*

9.2 M&E framework

The following table presents the M&E framework developed to assess the implementation of projects recommended for the mitigation of the KPS shutdown impacts. The framework for outcome and impact indicators is provided in **Annexure 3.** The implementation of the M&E framework will require a dedicated M&E unit within Eskom and/or its partners. Such a unit will need to be staffed with qualified and experienced personnel, who will be tasked with developing and implementing the framework.

Table 9.2: M&E framework to assess interventions up to Eskom's line of accountability indicated in the ToC

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
I	Funding contributed by Eskom (Rand)	Project financials/reports	Semi-annually for 5 years	0	TBD
I	Funding provided/leveraged by partners (Rand)	Project financials/reports	Semi-annually for 5 years	0	TBD
I	Funding secured from external sources as part of public finance (DFIs etc.) (Rand)	Project financials/reports	Semi-annually for 5 years	0	TBD
I	Number and composition of Eskom HR involved in implementation	Project reports	Semi-annually for 5 years	0	TBD
I	Number and composition of partner HR involved in implementation	Project reports	Semi-annually for 5 years	0	TBD
I	Value and type of machinery and equipment provided by Eskom (Rand)	Project financials	Semi-annually for 5 years	0	TBD
I	Value and type of machinery and equipment provided by partners (Rand)	Project financials	Semi-annually for 5 years	0	TBD
I	Ha of land/property provided by Eskom	Project reports	Semi-annually for 5 years	0	TBD
I	Ha of land/property provided by partners	Project reports	Semi-annually for 5 years	0	TBD
I	Ha of land/property provided by external sources	Project reports	Semi-annually for 5 years	0	TBD
I	Value and type of technologies provided by Eskom (Rand)	Project financials	Semi-annually for 5 years	0	TBD

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
I	Value and type of technologies provided by partners (Rand)	Project financials	Semi-annually for 5 years	0	TBD
I	Number of project partners with which Eskom has a formal agreement	Project reports	Semi-annually for 5 years	0	TBD
I	Number of public organisations with which Eskom and partners have a formal agreement	Project reports	Semi-annually for 5 years	0	TBD
I	Number of private organisations with which Eskom and partners have a formal agreement	Project reports	Semi-annually for 5 years	0	TBD
P	Number of reskilling, upskilling, and developing new skills initiatives implemented	Project reports	Semi-annually for 5 years	0	TBD
P	Number of Eskom employees enrolled in reskilling, upskilling, and developing new skills initiatives	Project reports	Semi-annually for 5 years	0	TBD
P	Number of community members enrolled in reskilling, upskilling, and developing new skills initiatives	Project reports	Semi-annually for 5 years	0	TBD
P	Number of SMMEs that completed incubation programmes	Project reports	Semi-annually for 5 years	0	TBD
P	Capital expenditure to complete/implement reskilling, upskilling, and developing new skills initiatives (Rand)	Project financials	Semi-annually for 5 years	0	R21.2 million
P	Operational expenditure for reskilling, upskilling, and developing new skills initiatives (Rand)	Project financials	Annually	0	TBD
P	Number of local economy stabilising projects implemented	Project reports	Semi-annually for 5 years	0	TBD
P	Capital expenditure to implement local economy stabilising projects (Rand)	Project financials	Semi-annually for 5 years	0	R6 585 million
P	Operational expenditure to operate local economy stabilising projects (Rand)	Project financials	Annually	0	TBD
P	Number of businesses supported by local economy stabilising projects	Project reports	Semi-annually for 5 years	0	TBD
P	Number of community strengthening initiatives completed/implemented	Project reports	Semi-annually for 5 years	0	TBD
P	Capital expenditure to implement community strengthening initiatives (Rand)	Project financials	Semi-annually for 5 years	0	R7 million

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
P	Operational expenditure on community strengthening initiatives (Rand)	Project financials	Annually	0	TBD
P	Number of SMME and economic growth projects implemented	Project reports	Semi-annually for 5 years	0	TBD
P	Capital expenditure to implement SMME and economic growth projects (Rand)	Project financials	Semi-annually for 5 years	0	R6 million
P	Operational expenditure to operate SMME and economic growth projects (Rand)	Project financials	Annually	0	TBD
P	Number of businesses supported by SMME and economic growth projects	Project reports	Semi-annually for 5 years	0	TBD
O	Number of Eskom employees that completed skills initiatives	Project reports	Semi-annually for 5 years	0	236-300
O	Number of community members that completed skills initiatives	Project reports	Semi-annually for 5 years	0	25-50 p.a.
O	Number of SMMEs that completed incubation programmes	Project reports	Semi-annually for 5 years	0	5-10 p.a.
O	Number of jobs created through R&R projects during construction	Project reports	Semi-annually for 5 years	0	2 238
O	Number of jobs created through other projects during construction	Project reports	Semi-annually for 5 years	0	
O	Number of jobs created through R&R projects during operations	Project reports	Annually	0	670
O	Number of jobs created through other projects during operations	Project reports	Annually	0	
O	Revenue generated by businesses involved in pillar projects (Rand)	Project reports	Annually	0	TBD
O	Contribution of business revenue generated by operation of pillar projects to the Steve Tshwete LM economy (%)	Project financials and statistical databases	Annually	0	TBD
O	Revenue generated by businesses supported by commercial projects (Rand)	Survey of businesses supported by commercial projects	Annually	0	TBD
O	Rates and taxes paid to local government by the implemented projects (Rand)	Project reports	Annually	0	TBD
O	Contribution to local government revenue as % of total rates and taxes collected by local government (%)	Project reports, IDP, National Treasury	Annually	0	TBD

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
O	Number of direct construction jobs filled by individuals from the PSA	Project reports	Semi-annually for 5 years	0	TBD
O	Number of direct construction jobs filled by individuals who were previously contracted by Eskom	Project reports	Semi-annually for 5 years	0	TBD
O	Number of direct operational jobs filled by individuals from the PSA	Project reports	Semi-annually for 5 years	0	TBD
O	Number of direct operational jobs filled by individuals who were previously contracted by Eskom	Project reports	Semi-annually for 5 years	0	TBD
O	Number of Eskom employees redeployed to repurposing and repowering projects, per gender and residence	Project reports	Semi-annually for 5 years	0	Up to 231
O	Number of non-Eskom employees filling positions at repurposing and repowering projects, per gender and residence	Project reports	Semi-annually for 5 years	0	TBD
O	Number and type of social facilities/amenities developed	Project reports	Semi-annually for 5 years	0	TBD
O	Number and type of social facilities/amenities refurbished/upgraded	Project reports	Semi-annually for 5 years	0	TBD
O	Number and % of community residents connected to the local platform	Project reports	Semi-annually for 5 years	0	TBD
O	Number of social enhancement events held	Project reports	Semi-annually for 5 years	0	TBD

10 RISK ASSESSMENT

This section presents the identification and assessment of external and internal risks associated with the mitigation of the socio-economic impacts identified earlier in the report which could pose a threat to successfully mitigating the potential impacts arising from the KPS shutdown.

The section starts with a presentation of the scope and objective of the risk assessment as well as of internal and external factors that define the relationship between the mitigation measures directly linked to Eskom and the external environment. It then proceeds to analyse the risks and present a treatment plan.

10.1 Scope and objective

The **scope** of the risk assessment is limited to the shutdown of KPS in 2022 which, as described earlier in the report, will lead to negative impacts on the economy (reduced production and employment, out-migration of skills) and on people (reduced income, community health deterioration, dilapidation of built infrastructure) while producing positive effects on the environment (greater water availability and improved ambient air quality).

Given the above scope, Eskom's broad **objective** is:

To manage and mitigate socio-economic impacts (positive and negative) and realise opportunities that will ensue from the shutdown of KPS in September 2022

All risks will, therefore, be identified and assessed from the perspective of what could influence the achievement of the above objective.

10.2 Internal and external environment analysis

The following table presents the external and internal context within which the objective is expected to be pursued.

Table 10.1: External and internal context

Factor	Implications
External	
Government focus	• Government proactively drives JET. • Mobilisation of efforts - Impact Catalyst, MWCB activities, DDM.
Economy and financial capital	• Businesses in the PSA are dependent on local purchasing power, i.e. mainly income of HHs residing in the area. • Local mining activities have declined, leading to the loss of jobs and many HHs becoming impoverished. • Steve Tshwete LM struggles to maintain and improve service delivery – budget constraints.
Human capital	• Low levels of skills in the communities. • Poor state of health – TB, HIV and AIDS, malnutrition, chronic diseases. • High incidence of drug and alcohol abuse. • High unemployment rate, especially post COVID-19.
Built capital	• Limited access to piped water and other basic services.

Factor	Implications
	• Most community members prefer to rent – affordability and uncertainty about the future. • Insufficient number of sporting facilities.
Social capital	• Closure of Sizanane and parts of Goedehoop North – increasing population densities in some communities.
Natural (environmental) capital	• Good solar potential. • Poor ambient air quality (as perceived by community).
Political capital	• Various groups of community leaders operate in the area; some are radical in their approaches. • Relationships with some of the stakeholders are strained.
Regulatory	• Any option approved will need to undergo EIA and other licensing procedures that may take at least eight months (TBC) to complete.
Internal	
Repurposing and repowering options	• Options are still being investigated in terms of feasibility and viability. • No concrete plan set up yet, although some options appear to be more viable than others.
Water	• Runs purification plant and will need to maintain it after shutdown. • Provides water to Komati Village.
Land	• Land and facilities are owned by Eskom. • Property is serviced.
Skills	• Employees may need to be reskilled and trained to be able to take up new positions; however, reskilling and training can only be done once the actual options are defined and the skills gap is assessed.
Legal	• Legal obligations/legal liability linked to post-shutdown liabilities (i.e. properties – poor security creating a third-party liability etc.). • No legal obligations regarding contracts (e.g. coal) with power stations. • The final land ownership of the site is still to be decided, which makes it difficult to determine an entire suite of legal obligations to ensue. • Note: legal reviews for liabilities and partnerships are underway.
Employees	• Existing SLA for sudden need to redeploy staff to other power stations.

10.3 Risk analysis

Risk is defined as the chance of something happening that will negatively impact objectives (the effect of uncertainty on objectives). Since the objective is to "*manage and mitigate socioeconomic impacts (positive and negative) and realise opportunities that will ensue from the shutdown of KPS in September 2022"*, the risk for the purpose of this study is defined as any event that will compromise Eskom's ability to manage and mitigate impacts. It is worth noting that managing and mitigating impacts requires partnerships with various groups of stakeholders, community buy-in, access to resources (i.e. money, HR, infrastructure, and support of employees), and employees' support and acceptance of these measures.

Considering the above, the following table captures the external and internal high-level risks.

Table 10.2: High-level risks inventory

Causes of the risk (What will cause this to happen?)	Risk (What can happen?)	Consequences of the risk (What will be the effect if this happens?)
Internal		
• Ramping down of production based on Eskom's operational plan. • Uncertainty about what will happen to Komati people after closure.	Low morale of employees	• Stress • Absenteeism • Increased risk of incidents at work • Poor plant performance • Negative attitude towards the HR processes
• Unsuitable/contested (by employees) redeployment strategy. • Delayed formulation of new training requirements and prolongs the uncertainty regarding the future staff requirements. • Limited transparency, i.e. insufficiently detailed information shared during engagements regarding the redeployment and repowering and repurposing strategy. • Raised expectations during the pre-shutdown engagements.	Employees not accepting HR processes	• Industrial action and sympathy strikes at KPS and other stations • Plant sabotage (possibly causing catastrophic failure) • Drop in employee morale • Loss (exodus) of skills in the area/staff turnover
• Catastrophic failure of the equipment due to limited maintenance and lack of funding. • Eskom decision to shut down before September 2022.	Premature shutdown of the power station (i.e. before September 2022)	• Employees not accepting the processes • Labour unrest – protest actions (short-term) • Plant sabotage (short-term) • Drop in employee morale; employment panic • Premature loss of jobs by contractors • Cost implications due to premature contract termination • Loss (exodus) of skills in the area/staff turnover
• Ramping down of power station based on the Eskom operational plan. • Job insecurity due to the ramp down. • Redundancy due to reduction in production.	Loss of critical skills	• Depletion of core experience and plant knowledge base • Unreliable plant and processes • Depreciating experience levels • Low morale
External		
• Inadequate engagement with the community prior to the shutdown. • Lack of transparency with respect to the mitigation plan developed.	Community opposing the shutdown	• Instability and social unrest in the local community due to shutdown • Premature shutdown of the power station due to “blockage” of the key point by community members • Adverse local media reporting
• Mitigation measures developed without consultation with communities; loss of power in influencing their own future.	Community refusal to accept and	• Social unrest and destabilisation of communities

Causes of the risk (What will cause this to happen?)	Risk (What can happen?)	Consequences of the risk (What will be the effect if this happens?)
• Lack of knowledge of the mitigation measures proposed, i.e. lack of transparency and participatory approach to formulation of mitigations. • Mitigation measures are not accepted due not meeting community expectations. • Power struggles within the community.	support mitigations measures	• Delays in ensuring continued and sustainable livelihoods of communities • Loss of trust between communities and Eskom • Sustained impact on the reputation of Eskom • Plant sabotage • Loss of government trust • Sustained adverse national press reporting
• Premature shutdown. • Community opposing the planned shutdown. • Community refusal to accept and support mitigation measures.	Local community instability	• Increase in crime • Community member and/or employee fatalities and injuries • Sabotage of plant • Closure of businesses to protect property; linked to this development, a loss of income • Sustained impact on the reputation of Eskom • Loss of government trust • Sustained adverse national press reporting
• Relocation of Eskom employees to other power stations. • Failure to timeously launch upskilling and reskilling programmes targeting community members and employees.	Inability to access skilled labour to implement mitigations	• Delays in implementation of mitigation measures • “Import” of skills from other parts of the country
• Government departments working in silos. • Power play between local and provincial government. • Bureaucratic processes. • Lack of leadership and decision-making ability.	Delayed decision-making by government and support of the proposed mitigation plan	• Delays in implementation of mitigation measures • Worsening of the relationship between government and Eskom • Sustained impact on the reputation of Eskom
• Businesses, NGOs and civil society organisations (CSOs) do not provide adequate support for Eskom’s mitigation plan.	Businesses, NGOs, and CSOs do not provide adequate support for Eskom’s mitigation plan	• Businesses, NGOs and CSOs do not provide adequate support for Eskom’s mitigation plan • Sustained impact on the reputation of Eskom

10.4 Risk control and treatment plan

The following table provides a list of controls and associated treatments that either already exist or will need to be put in place to prevent the risk from emerging.

Table 10.3: Risk controls and control owners

Risk (What can happen?)	Controls (What controls are already in place?)	Control owner	RCE	Treatment (What treatment needs to be put in place?)
Internal				
Low morale of employees caused by ramping down of Komati	• Keep employees up to date with changes to ensure there is no uncertainty.	HR department and power station management	None	• Identify future skills requirements and develop the HR plan focusing on upskilling and reskilling employees.
Employees not accepting HR processes	• Existing HR management processes. • Emergency response plan developed by the station (i.e. signed SLAs with other power stations). • Existing agreements with staff where, if they acquire a position at another power station at the same level, they will be released at a time convenient for Komati. • Support from the national key point and SAPS. • Regular employee engagements through the CBF regarding the mitigation plan and other aspects.	HR department and power station management	Mostly ineffective	• Regular employee engagements through the CBF regarding the mitigation plan and other aspects.
Premature shutdown of the power station (i.e. before September 2022)	• Emergency response plan developed by the station (i.e. signed SLAs with other power stations). • Existing agreements with staff where, if they acquire a position at another power station at the same level, they will be released at a time convenient for Komati. • Support from the national key point and SAPS. • Regular employee engagements through the CBF.	HR department and power station management	Mostly effective	• Ensure escape clauses included in all new contracts. • Engage current contractors on possibility of early shutdown.
Loss of critical skills	• Mutual transfer of excess skill to business units. • Continuous review of the operational model. • Regular employee engagements through the CBF regarding the mitigation plan and other aspects.	HR department and power station management	Mostly effective	• Identify future skills requirements and develop HR plan focused on upskilling and reskilling employees.
External				

Risk (What can happen?)	Controls (What controls are already in place?)	Control owner	RCE	Treatment (What treatment needs to be put in place?)
Community opposing the shutdown	• Engagement with the community at the start and end of the study to give it a voice in proceedings.	Urban-Econ and stakeholder management department	Mostly effective	• Continued engagement with the community after the study making use of various means and media. • Establishing a community information sharing portal to build trust and give communities a voice.
Community refusal to accept and support mitigation measures	• Engagement with the community at the start and end of the study to give it a voice in proceedings. • Adequate communication with community leaders and community members about the mitigation measures. • Obtaining inputs on the mitigation measures proposed.	Urban-Econ, stakeholder management department, and power station management	Mostly effective	• Establishing a community information sharing portal to build trust and give communities a voice.
Local community instability	• Industrial action contingency plan. • Adequate communication with community leaders and community members about the mitigation measures.	Stakeholder management department and power station management	Mostly effective	• Establishing a community information sharing portal to build trust and give communities a voice.
Inability to access skilled labour to implement mitigations	• HR plan.	HR department and power station management	None	• Identify skills requirements for the implementation of mitigation measures. • Identification of skills gaps in the community. • Setting up training and education programmes to upskill and reskill community members and employees.
Government dragging its feet on decision-making and supporting mitigation plan	• Continuous and targeted engagements with government at all levels and at the right levels within departments. • Involvement in collaboration platforms.	Stakeholder management department	Mostly effective	• Continuous and targeted engagements with government at all levels at the right levels within departments. • Participation in collaboration platforms. • Lobbying with the DPE, DOE, the **dtic**, and DFFE.
Businesses, NGOs and CSOs do not provide adequate support of Eskom's mitigation plan	• Involvement in collaboration platforms.	Stakeholder management department	Mostly ineffective	• Building partnerships with businesses, NGOs and CSOs that benefit all parties and meet their objectives. • Handing over ownership and responsibility for implementation of

Risk (What can happen?)	Controls (What controls are already in place?)	Control owner	RCE	Treatment (What treatment needs to be put in place?)
				projects to the best suited and qualified party. • Continued proactive involvement in collaboration platforms.

10.5 Risk rating and monitoring requirements

The following table provides a rating of the risks identified and indicates those long-term risks that will need to be monitored.

Table 10.4: Risk rating and monitoring requirements

Risk	Risk assessment				Monitoring requirement
	RCE	C	L	Rating	
Internal					
Low morale of employees caused by ramping down of KPS	None	2	E	II	Monitor on a monthly basis
Employees not accepting HR processes	Mostly ineffective	2	D		Once-off/limited
Premature shutdown of the power station (i.e. before September 2022)	Mostly effective				Once-off/limited
Loss of critical skills	Mostly effective	2	E	II	Monitor on a monthly basis
External					
Community opposing the shutdown	Mostly effective	4	D	I	Monitor on a weekly basis
Community refusal to accept and support mitigation measures	Mostly effective	4	D	I	Monitor on a weekly basis
Local community instability	Mostly effective	5	E	I	Monitor on a daily basis
Inability to access skilled labour to implement mitigations	None	5	C	II	Monitor on a monthly basis
Government dragging its feet on decision-making and supporting mitigation plan	Mostly effective	5	D	I	Monitor on a monthly basis
Businesses, NGOs and CSOs do not provide adequate support of Eskom's mitigation plan	Mostly ineffective	5	C	II	Monitor on a monthly basis

REFERENCES

Agribook.digital. (2022, May). *Agro-processing*. Retrieved May 2022, 2022, from Agribook.digital: https://agribook.co.za/adding-value/agro-processing/

Anglo American. (2015). *Social and Labour Plan Goedehoop Colliery 2015-2019.* Retrieved from Minerals Council South Africa: https://www.mineralscouncil.org.za/downloads/send/56-slps/842-slp-goedehoop-2019

Anglo American. (2021, June 7). *Anglo American Completes Demerger of Thungela Thermal Coal Business*. Retrieved from Anglo American : https://www.angloamerican.com/media/press-releases/2021/07-06-2021

Annandale, J. G., du Plessis, M., Tanner, P., & Heuer, S. (2021). *Should Irrigation With Mine-Affected Water Be Considered Part Of The Long-Term Strategy To Manage Acid Mine Drainage In The Witwatersrand Goldfields?* Pretoria: International Mine Water Association. Retrieved from https://www.imwa.info/docs/imwa_2021/IMWA2021_Annandale_14.pdf

Annandale, J. G., Tanner, P. D., du Plessis, M. H., Brugess, J., Ronquest, Z. D., & Heuer, S. (2019). *Irrigation with mine affected waters: A demonstration with untreated colliery water in South Africa.* Pretoria: International Mine Water Association. Retrieved from https://www.imwa.info/docs/imwa_2019/IMWA2019_Annandale_71.pdf

Arnoldi, M. (2022, March 10). *SAWEA urges Eskom to accelerate land designation process in Mpumalanga*. Retrieved from Creamer Media's Engineering News: https://www.engineeringnews.co.za/article/sawea-urges-eskom-to-accelerate-land-designation-process-in-mpumalanga-2022-03-10/rep_id:4136

Bayat, A. (2005). *Discussion Paper - Defining Social Capital: A brief overview of the key aspects and debates* . Western Cape: n/a.

Bellini, E. (2020, June 8). *Agrivoltaics works better with leafy greens, root crops*. Retrieved from pv magazine: https://www.pv-magazine.com/2020/06/08/agrivoltaics-works-better-with-leafy-greens-root-crops/

Burger, S. (2021, March 30). *Vestas optimistic about South Africa, Africa's onshore wind potential*. Retrieved from Creamer Media's Engineering News: https://www.engineeringnews.co.za/article/vestas-optimistic-about-south-africa-africas-onshore-wind-potential-2021-03-30

Burton, J., Marquard, A., & McCall, B. (2019). *Socio-Economic Consideration for a Paris Agreement-Compatible Coal Transition in South Africa.* Cape Town, South Africa: Energy Research Centre, University of Cape Town.

Burton, J., Marquard, A., & McCall, B. (2019). *Socio-economic considerations for a Paris Agreement-compatible coal Transition in South Africa.* South Africa: Energy Research Centre, University of Cape Town.

Chireshe, F. (2022, May 4). *There is a future for coal truckers as South Africa looks to a low-carbon economy*. Retrieved from Daily Maverick: https://www.dailymaverick.co.za/article/2022-05-04-there-is-a-future-for-coal-truckers-as-south-africa-looks-to-a-low-carbon-economy/

Chireshe, F., & Bole-Rentel, T. (2022). *Exploring Alternative Option for Coal Trucker in a Biomass Supply Chain.* Pretoria: Trade & Industrial Policy Strategies. Retrieved from https://www.tips.org.za/research-archive/sustainable-growth/green-economy-2/item/download/2217_12d906030cee429a3afc84f343ea7dc8

Creamer Media. (2020, October 9). *Black royalty minerals announces appointment of CEO for Koornfontein Mine* . Retrieved from Creamer Media's Mining Weekly: https://www.miningweekly.com/article/black-royalty-minerals-announces-appointment-of-ceo-for-koornfontein-mine-2020-10-09/rep_id:3650

Creamer, T. (2021, March 25). *Agriculture seen as key just transition enabler in Mpumalanga, but arable land needs urgent safeguarding*. Retrieved from Creamer Media: https://www.engineeringnews.co.za/article/agriculture-seen-as-key-just-transition-enabler-in-mpumalanga-but-arable-land-needs-urgent-safeguarding-2021-03-25

CSIR. (2022). *Agroprocessing*. Retrieved May 20, 2022, from CSIR: https://www.csir.co.za/agroprocessing

Cutifani, M. (2021, April 8). *Proposed demerger.* Retrieved May 19, 2022, from AngloAmerican: https://www.angloamerican.com/~/media/Files/A/Anglo-American-Group/PLC/products/thermal-coal/demerger/demerger-of-south-african-thermal-coal-operations-presentation-transcript.pdf

DataWorld. (2019). *Mpumalanga Spatial Development Framework.* Mbombela: Department of Cooperative Governance and Traditional Affairs Mpumalanga Province. Retrieved from https://cogta.mpg.gov.za/documents/SpatialDevFramework/PSDF%20Final%20Report.pdf

DBSA. (2021). *About DBSA*. Retrieved April 08, 2021, from https://www.dbsa.org/

DEDT. (2020). *Strategic Plan 2025-2025.* Retrieved from Department of Economic Development and Tourism Mpumalanga: http://www.dedtmpumalanga.gov.za/sites/default/files/documents/DEDT%20Strategic%20Plan%202020-2025.pdf

DMRE. (2019). *Integrated Resource Plan (IRP2019).* Pretoria, South Africa: Department of Mineral Resources and Energy.

DMRE. (2022). *Mineral Statistics.* Pretoria, South Africa: DMRE.

DWS. (2019). *National Water and Sanitation Master Plan.* Pretoria: Department of Water and Sanitation. Retrieved from https://www.gov.za/sites/default/files/gcis_document/201911/national-water-and-sanitation-master-plandf.pdf

Emery, M., & Flora, C. B. (2006). Spiraling-Up: Mapping Community Transformation with Community Capitals Framework. *Journal of the Community Development Society, 37*, 19-35.

EScience Associates, Urban-Econ Development Economists & Blue Horizon Energy Consulting Services. (2013). *Photovoltaics Electricity: The Localisation Potential of Photovoltaics and a Strategy to Support the Large Scale Roll-Out in South Africa.* Retrieved from WWF:

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

Eskom . (2021). *Integrated Report 31 March 2021.* Johannebsurg: Eskom Holding SOC Ltd.

Eskom. (2019). *Social Plan Procedure.* Johannesburg: Eskom.

Eskom. (2019). *Social Plan with Respect to Coal-Fired Power Stations. Scope Clarification Meeting. 19 May 2019.*

Eskom. (2020a). *Komati Power Station.* Retrieved 12 23, 2020, from Eskom: https://www.eskom.co.za/Whatweredoing/ElectricityGeneration/PowerStations/Pages/Komati_Power_Station.aspx

Eskom. (2021a, December 14). *Eskom receives DFFE's decisions on minimum emissions standard; will engage DFFE and key stakeholders on way forward*. Retrieved from Eskom: https://www.eskom.co.za/eskom-receives-dffes-decisions-on-minimum-emissions-standard-will-engage-dffe-and-key-stakeholders-on-way-forward/

Eskom. (2021b). SEIA presentation_CSI Komati .

Eskom. (2021c). Social Plans for Komati (PPT).

Eskom. (2021d). *Labour and procurement data provided by Eskom in Q1 2021.*

Eskom. (2021e). *Generic Funding Proposal Komati Agricultural Innovation.* Johannesburg: Eskom.

Food & Trees for Africa. (n.d.). *Community Market Gardens*. Retrieved May 10, 2022, from https://trees.org.za/food-security/community-market-gardens/

Fourie, Z. (2022, March 19). *Rehabilitation of Wilge River will take time*. Retrieved from Ridge Times: https://ridgetimes.co.za/283296/rehabilitation-of-wilge-river-will-take-time/

GIZ. (2019, November). *Steve Tshwete Local Municipality Long Term Strategy 2040.* Retrieved from GIZ: https://www.giz.de/en/downloads_els/STLM%202040%20LTS-Final%2001-11-2019.pdf

GIZ. (2019). *Steve Tshwete Local Municipality Long Term Strategy 2040.* Middelburg: Steve Tshwete Local Municipality.

Gleeson, D. (2021, September 30). *Glencore-backed mine rehab pilot to showcase post-closure opportunities*. Retrieved from International Mining: https://im-mining.com/2021/09/30/glencore-backed-mine-rehab-pilot-to-showcase-post-closure-opportunities/

GlobalAfrica Network. (2017, November 17). *An economic overview of Mpumalanga Province*. Retrieved from GlobalAfrica Network: https://www.globalafricanetwork.com/company-news/economic-overview-of-mpumalanga-province/

GreenCape. (2020). *Resilient Urbanism: The intersection of shared data and inclusive public engagement.* Retrieved April 08, 2021, from https://www.greencape.co.za/content/resilience-case-study-resilient-urbanism-the-intersection-of-shared-data-and-inclusive-public-engagement-2/

GreenCape. (n.d.). *The Alternative Service Delivery Unit*. Retrieved March 08, 2021, from https://www.greencape.org.za/content/sector/the-alternative-service-delivery-unit

GWEC. (2022). *Global Wind Report 2022*. Retrieved from Global Wind Energy Council: Subsequently, it may be concluded that significant volumes of solar PV waste (especially solar panels given their average lifespan of between 25 to 30 years) may be generated in the coming years.

Henderson, L. (2020). *Invasive Alien Plants in South Africa.* Pretoria: Agricultural Research Council. Retrieved from https://wwfafrica.awsassets.panda.org/downloads/invasive_alien_plants_in_south_africa.pdf

Hobbs, P. O. (2008). Management of Environmental Impacts from Coal Mining in the Upper Olifants River Catchment as a Function of Age and Scale. *International Journal of Water Resources Development , 24*(3), 417-431.

ICLEI Africa. (2020). *Green Building Guidelines of Steve Tshwete Local Municipality.* Middelburg: Steve Tshwete Local Municiplaity.

IEA Bioenergy. (2021). *Implementation of Bioenergy in South Africa - 2021 Update.* Paris: International Energy Agency bioenergy. Retrieved from https://www.ieabioenergy.com/wp-content/uploads/2021/11/CountryReport2021_SouthAfrica_final.pdf

ILO. (2012, November 20). *"Alien plants" boost green jobs in South Africa*. Retrieved from International Labour Organization: https://www.ilo.org/global/about-the-ilo/mission-and-objectives/features/WCMS_193578/lang--en/index.htm

Impact Catalyst. (2019). *Impact Catalysts: About Us*. Retrieved April 08, 2021, from https://impactcatalyst.co.za/

Impact Catalyst; and MWCB. (2021). Socio-economic upliftment Project upliftment action plan. Impact Catalyst; and MWCB.

IRENA. (2022). *Snapshot of Global PV Markets 2022.* Paris: International Energy Agency. Retrieved from https://iea-pvps.org/wp-content/uploads/2022/04/IEA_PVPS_Snapshot_2022-vF.pdf

IUCN. (2021). *Invasive Alien Species and Climate Change.* Gland: International Union fo Conservation of Nature. Retrieved from https://www.iucn.org/sites/dev/files/ias_and_climate_change_issues_brief_2021.pdf

James, N. (2018, August 10). *Mafube colliery trialling use of mining-impacted water for agriculture*. Retrieved from Creamer Media's Mining Weekly: https://www.miningweekly.com/article/mafube-colliery-participates-in-pilot-crop-irrigation-project-2018-08-10

Jeffrey, L. (2021). *Independent Competent Person's Report on Goedehoop Colliery.* Johannesburg: South Africa Coal Operations. Retrieved from https://thungela.s3.eu-west-1.amazonaws.com/downloads/investors/Goedehoop-Colliery-CPR-dated-25-March-2021.pdf

Khumalo, J. (2018, April 10). *Gupta-owned mines placed under a management agreement*. Retrieved from https://www.news24.com/citypress/business/gupta-owned-mines-placed-under-a-management-agreement-20180410

Longe, O. M., Rao, N. D., Omowole, F., Oluwalami, A. S., & Oni, O. T. (2017). A Case Study on Off-grid Microgrid for Universal Electricity Access in the Eastern Cape of South Africa. *International Journal of Energy Engineering, 7*(2), 55-63. Retrieved from https://core.ac.uk/download/pdf/83641769.pdf

Makgetla, N., & Patel, M. (2021). *The Coal Value Chain in South Africa.* Retrieved May 20, 2022, from Trade & Industrial Policy Strategies: https://www.tips.org.za/research-archive/item/download/2120_3437ada309c23a71265cbe0c491a17cb

Mckay, D. R. (2020). *What Is Career Development?* Retrieved May 10, 2022, from https://www.thebalancecareers.com/what-is-career-development-525496

Mendelow, A. (1991). Stakeholder mapping. *Proceedings of the 2nd International Conference on Information Systems*, (pp. 10-24).

Minerals Council. (2021). *Community*. Retrieved April 08, 2021, from https://www.mineralscouncil.org.za/work/community

Mtsweni-Tsipane, R. (2022, February 25). *State of the Province Address by the Premier of Mpumalanga Province.* Retrieved from Mpumalanga Provincial Government: http://www.mpumalanga.gov.za/media/speeches/otp/SOPA.2022.pdf

Mugido, W., Blignaut, J., Joubert, M., De Wet, J., Knipe, A., Joubert, S., . . . van der Vyfer, M. (2014). Determinign the feasibility of harvesting invasive alien plant species for energy. *South African Journal of Science, 110*, 1-6. Retrieved from http://www.scielo.org.za/pdf/sajs/v110n11-12/12.pdf

Nassiep, S. (2022). JET Komati PS Repurposing & SEIM Progress Feedback . Eskom.

Nkangala DM. (2019). *Nkangala District Municipality Integrated Development Plan 2019-2020.* Middelburg: Nkangala District Municipality. Retrieved from https://cogta.mpg.gov.za/IDP/2019-20IPDs/Nkangala/Nkangala2019-20.pdf

Nkangala DM. (2019). *Nkangala DM IDP 2019/2020.*

Nkangala DM. (2020). *Annual Draft Budget of Nkangal DM.*

Nkangala DM. (2020). *NDM Final Integrated Development Plan 2020-2021.* Retrieved from Department of Cooperative Governance and Traditional Affairs: https://www.cogta.gov.za/cgta_2016/wp-content/uploads/2021/02/Nkangala-2020-21-reviewed-IDP.pdf

Nkangala DM. (2021). *Annual Budget of Nkangala District Municipality 2021/22 to 2023/24.* Retrieved from National Treasury: http://mfma.treasury.gov.za/Documents/03.%20Budget%20Documentation/2021-22/Adopted%20Budget/03.%20District/DC31%20Nkangala/ANNUAL%20BUDGET%202021-22.pdf

Nkangala DM. (2021). *Draft Integrated Development Plan: 4th Review 2021-2022.* Middelburg: Nkangala District Municipality.

Nkosi, N., Muzenda, E., Mamvura, T. A., Belaid, M., & Patel, B. (2020). The Development of a Waste Tyre Pyrolysis Production Plant Business Model for the Gauteng Region, South Africa. *Process, 8*(776), 1-17. Retrieved from https://mdpi-res.com/d_attachment/processes/processes-08-00766/article_deploy/processes-08-00766-v2.pdf

NPC. (2019). *Social Partner Dialogue for a Just Transition .*

Ntlamelle, T. (2015). The efficacy of SMME incubation as a strategy for enterprise development in South Africa. Johannesburg: University of the Witwatersrand.

Oelofse, S. (2020). *Draft Tyre Industry Waste Management Plan.* Pretoria: Council for Scientific and Industrial Research. Retrieved from http://sawic.environment.gov.za/documents/11444.pdf

Omarjee, L. (2022, March 2). *Eskom has to build a 'record' amount of transmission lines to keep lights on*. Retrieved from fin24: https://www.news24.com/fin24/economy/eskom-has-to-build-a-record-amount-of-transmission-lines-to-keep-lights-on-20220302

Pelinescu, E. (2015). The impact of human capital on economic growth. *Proceda Economics and Finance, 22*, 184-190. Retrieved from https://pdf.sciencedirectassets.com/282136/1-s2.0-S2212567115X00050/1-s2.0-S2212567115002580/main.pdf?X-Amz-Security-Token=IQoJb3JpZ2luX2VjEM3%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaCXVzLWVhc3QtMSJHMEUCIQD7gNYG6Ixl04mL3h%2Ff3pWrBfFZdRlCCcPA05dAqrYwCwIgcYc4rIQofP

Pitzer, K. A., & Streeter, C. L. (2015). Mapping Community Capitals: A Potential Tool for Social Work. *Advances in Social Work, 16*(2), 358-371.

Pombo-van Zyl, N. (2018, November 5). *Eskom launches demo solar microgrid project*. Retrieved from ESI Africa: https://www.esi-africa.com/industry-sectors/future-energy/eskom-launches-solar-microgrid-project/

Quantec. (2021a, December 7). *Employment and Unemployment*. Retrieved from EasyData: https://www.easydata.co.za/dataset/RUEM/

Quantec. (2021b, December 7). *Households' Facilities*. Retrieved from EasyData: https://www.easydata.co.za/dataset/RHHF/

Quantec. (2021c, November 29). *Population, Number of Household and Densities*. Retrieved from EasyData: https://www.easydata.co.za/dataset/RPOP/

Quantec. (2022a, February 17). *Regional Output and GVA at basic prices*. Retrieved from EasyData: https://www.easydata.co.za/dataset/RGVA/

Quantec. (2022b, February 17). *Employment and Compensation*. Retrieved from EasyData: https://www.easydata.co.za/dataset/REMP/

Quantec. (2022c). *QLFS 2020q4 - Labour force characteristics and Key Indicators - Official definition of unemployment*. Retrieved from EasyData: https://surveys.easydata.co.za/TableViewer/tableView.aspx

Rambharos, M. (2020, November 17). *Eskom Just Energy Transition.* Retrieved May 13, 2022, from Trade & Industrial Policy Strategies: https://www.tips.org.za/images/TIPS_webinar_17_Nov_Eskom_Just_Energy_Transition_Mandy_Rambharos.pdf#:~:text=Eskom%20definition%20of%20the%20Just%20Energy%20Transition%20The,NET%20ZERO%20carbon%20emissions%20in%20an%20Eskom%20context%3F

Ratshomo, K., & Nembahe, R. (2017). *South African Coal Sector Report.* Pretoria: Department of Mineral Resources and Energy. Retrieved from http://www.energy.gov.za/files/media/explained/South-African-Coal-Sector-Report.pdf

Reynolds-Clausen, K., & Singh, N. (2016). *Eskom's Revised Coal Ash Strategy and Implementation Progress.* Johannesburg: Eskom. Retrieved from http://nla.org.za/webfiles/conferences/2016/Manuscripts/Tuesday,%2027%20September%202016/T308%20ESKOM%20revised%20coal%20ash%20strategy%20and%20implementation%20progress.pdf

Ruano, A. J., Milán-García, J., Rumí, M. E., & Valenciano, J. D. (2021). Scientific Production on the Social Economy: A Review of Worldwide Research. *International Society for Third-Sector Research, 32*, 925-943. Retrieved from https://link.springer.com/content/pdf/10.1007/s11266-021-00361-7.pdf

SolarPower Europe. (2020). *Global Market Outlook for Solar Power 2021-2025.* Brussels: SolarPower Europe. Retrieved from https://www.infobuildenergia.it/wp-content/uploads/2020/06/SolarPower-Europe_Global-Market-Outlook-for-Solar-2021-2025_V3.pdf

South African Government. (2021, November 4). *President Cyril Ramaphosa: COP26 Energy Session*. Retrieved from South African Government: https://www.gov.za/speeches/cop26-energy-session-4-nov-2021-0000

Stats SA. (2012). *Census 2011.*

Stats SA. (2021). *Quarterly Labour Force Survey Quarter 4: 2020.* Pretoria: Statistics South Africa. Retrieved from http://www.statssa.gov.za/publications/P0211/P02114thQuarter2020.pdf

Stern, D. I., Burke, P. J., & Bruns, S. B. (2017). *The Impact of Electricity on Economic Development: A Macroeconomic Perspective.* Berkeley: University of California. Retrieved from https://escholarship.org/content/qt7jb0015q/qt7jb0015q.pdf?t=psd398

Steve Tshwete LM. (2010). *Steve Tshwete LM SDF.*

Steve Tshwete LM. (2017). *Draft Spatial Development Framework.* Middelburg: Steve Tshwete Local Municipality. Retrieved from https://stevetshwetelm.gov.za/budget/comments%20-%20tp/Steve%20Tshwete%20SDF%20Review_Draft_Oct%202017.pdf

Steve Tshwete LM. (2019). *IDP 2019-2020.*

Steve Tshwete LM. (2020). *Steve Tshwete LM Tabled Budget 2020/21-2022/23.*

Steve Tshwete LM. (2021). *STLM Annual Budget 2021/2022 to 2023/2024.* Retrieved from Steve Tshwete Local Municipality: https://stlm.gov.za/wp-content/uploads/2021/06/PART-1-Combined-document-BB.pdf

Steve Tshwete LM. (2022). 2022/2023 Integrated Development Plan (IDP).

Stoddard, E. (2021, April 8). *Anglo American unveils its exit from coal in JSE-listed spin-off*. Retrieved from Daily Maverick: https://www.dailymaverick.co.za/article/2021-04-08-anglo-american-unveils-its-exit-from-coal-in-jse-listed-spin-off/

the **dtic**. (2021, May 18). *Policy Statement on Localisation for Jobs and Industrial Growth.* Retrieved from Department: Trade, Idustry and Competition: http://www.thedtic.gov.za/wp-content/uploads/Policy_Statement.pdf

The World Bank Group. (2018). *South Africa Digital Economy Assessment.* Washinton, D.C.: The World Bank Group.

UN. (2022). *All About the NDCs*. Retrieved from United Nations Climate Action: https://www.un.org/en/climatechange/all-about-ndcs

Urban-Econ Development Economists. (2015). *A feasibility study and a business plan for downstream beneficiation of fly ash in nkangala district municipality: business plan for the production of lightweight aggregate.*

Urban-Econ Development Economists. (2019). *Market Assessment for the Centre of Excellence of Steel and Metal Fabrication.*

USDT. (2017, June 6). *Fly Ash Facts for Highway Engineers*. Retrieved from United States Department of Transportation: https://www.fhwa.dot.gov/pavement/recycling/fach01.cfm

VPC. (2021). *Draft Report for Komati Thermal Power Plant.* Washington D.C.: The World Bank.

VPUU. (2019). *V-NET: Bringing Internet Connectivity into Low-Income Areas*. Retrieved May 23, 2022, from http://vpuu.org.za/programmes/ict4d/v-net-bringing-internet-connectivity-into-low-income-areas/

Yaqoob, H., Teoh, Y. H., Sher, F., Jamil, M. A., Murtaza, D., Al Qubeissi, M., . . . A, M. (2021). Current Status and Potential of Tire Pyrolysis Oil Production as an Alternative Fuel in Developing Countries. *Sustainability, 13*(3214), 1-26. Retrieved from https://mdpi-res.com/d_attachment/sustainability/sustainability-13-03214/article_deploy/sustainability-13-03214.pdf

ANNEXURE 1: IMPACT ASSESSMENT

Natural capital	**Impact: Availability of land where KPS is located as a factor of production**		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is associated with the opening up of one of the factors of production, i.e. land.	Positive
	Extent (E)	Impact will be concentrated in the IZOI, i.e. limited to the footprint of KPS.	5
	Duration (D)	Permanent as KPS will be shut down indefinitely.	5
	Magnitude (M)	The socio-economic environment will be altered.	6
	Probability (P)	The impact will definitely occur.	5
	Significance (S)	High.	Pos 80
	Mitigation/enhancement measure concept		
	• Explore repurposing and repowering opportunities at the project site.		
	Impact: Availability of water previously consumed by KPS for other productive uses		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is associated with reduced demand for water in the WMA; this reduction improves security of water supply in the catchment and makes the supply available for other productive uses.	Positive
	Extent (E)	The entire Inkomati WMA will benefit from the savings in water consumption, which will also benefit the Upper Olifants WMA.	3
	Duration (D)	Permanent as KPS will not be returned to service.	5
	Magnitude (M)	Given the amount of water that will be saved, the impact will be of a moderate level.	6
	Probability (P)	Since the shutdown of the power station will definitely take place, the impact will definitely occur.	5
	Significance (S)	High.	Pos 70
	Mitigation/enhancement measure concept		
	• Explore economic activities linked to the local agricultural land, the realisation of which has thus far been prevented due to insufficient availability of water. • The continued use of the existing water purification plant to set up new economic activities where water is the main input.		
	Impact: Improved air quality due to reduced emissions from KPS		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is associated with reduced harmful emissions in the atmosphere due to the halt on burning coal and other fuels to generate electricity at the plant.	Positive

	Extent (E)	The extent will be primarily local and regional.	3
	Duration (D)	The duration will be permanent as KPS will not be returned to service.	5
	Magnitude (M)	The magnitude will be of low value.	4
	Probability (P)	Since the shutdown of the power station will definitely take place, the impact will definitely occur.	5
	Significance (S)	Medium.	Pos 60
	Mitigation/enhancement measure concept		
	• Explore opportunities associated with the shutdown of the power station and introduce new economic activities that are more environmentally friendly, particularly from the air quality perspective.		
Financial and economic capital	**Impact: Jeopardised prosperity and growth of the KPS PSA economy**		
	Aspect	**Impact rating**	**Score**
	Nature	Negative impact.	Negative
	Extent (E)	The shutdown will affect businesses and households in the PSA, influencing the prosperity of the entire area.	4
	Duration (D)	KPS will be shut down permanently.	5
	Magnitude (M)	Severe impairment of the existing socioeconomic environment and a threat to its continued viability.	6
	Probability (P)	Definite impact.	5
	Significance (S)	Medium.	Neg 60
	Mitigation/enhancement measure concept		
	• Eskom to consider repowering KPS to maintain economic stimulus in the area. • Eskom to explore opportunities for repurposing land and infrastructure that it owns in the PSA to introduce new, sustainable economic activities. • Engage with various stakeholders, business owners, and community members to create solutions together to ensure the economic sustainability of the PSA.		
	Impact: Slowdown of provincial growth and development due to shutdown of KPS		
	Aspect	**Impact rating**	**Score**
	Nature	Negative impact.	Negative
	Extent (E)	Impact is spread over the entire province.	3
	Duration (D)	The impact will be permanent as KPS will be shut down indefinitely.	5
	Magnitude (M)	The economy of Mpumalanga will decline by 0.44%; given this, the magnitude is deemed to be moderate.	4
	Probability (P)	Highly probable.	4
	Significance (S)	Medium.	Neg 48
	Mitigation/enhancement measure concept		

- Eskom to form and maintain partnerships with local, provincial, and national government stakeholders to explore and devise landmark projects that could create new pockets of economic activity.
- Identify projects that are already being considered or planned by various stakeholders in the province (and specifically in the Nkangala DM) to ensure faster acceptance and implementation.

Impact: Increase in unemployment in the PSA of KPS

Aspect	Impact rating	Score
Nature	Negative impact.	Negative
Extent (E)	The impact will affect the labour force in the PSA.	4
Duration (D)	Permanent as KPS will be shut down indefinitely.	5
Magnitude (M)	Moderate changes in employment.	6
Probability (P)	Highly probable.	4
Significance (S)	Medium.	Neg 60

Mitigation/enhancement measure concept

- Devise a skills development and training plan to align with the project development plan for the PSA, focusing on the upskilling and reskilling of local labour. This will help to optimise the match between the local demand for and supply of labour once the interventions planned for the area are implemented.

Impact: Increase in unemployment in Mpumalanga due to shutdown of KPS

Aspect	Impact rating	Score
Nature	Negative impact.	Negative
Extent (E)	Impact is to take place in the entire province.	3
Duration (D)	Permanent as KPS will be shut down indefinitely.	5
Magnitude (M)	Moderate when considering the percentage of jobs that will be no longer supported and the effects on job creation.	6
Probability (P)	Highly probable.	4
Significance (S)	Medium.	Neg 56

Mitigation/enhancement measure concept

- Eskom to partake in partnerships among government, labour, and businesses meant to work together towards the realisation of development plans suggested to mitigate the slowdown of economic activities in the province.
- Partners to tap into government skills programmes established to upskill and reskill local labour and to align supply with demand.

Impact: Declining household income and wealth in the PSA of KPS

Aspect	Impact rating	Score
Nature	Negative impact.	Negative
Extent (E)	The impact will affect households in the PSA.	4
Duration (D)	Permanent as KPS will be shut down indefinitely.	5

	Magnitude (M)	Households will continue to function but in a modified way.	6
	Probability (P)	Most likely.	4
	Significance (S)	Medium.	Neg 60
	Mitigation/enhancement measure concept		
	• Mitigation measures are the same as those proposed for the impact on local and regional economies as well as those concerning unemployment.		
Social and cultural capital	**Impact: Loss of social cohesion and family ties in the KPS PSA**		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is negative as it is associated with the out-migration of people and the loss of their cultural and social capitals.	Negative
	Extent (E)	Impact is to take place in the PSA.	4
	Duration (D)	Permanent.	5
	Magnitude (M)	Noticeable impact, but slight.	4
	Probability (P)	Probable.	3
	Significance (S)	Low to medium.	Neg 39
	Mitigation/enhancement measure concept		
	• Mitigation measures are the same as those proposed for the impact on local and regional economies as well as those concerning unemployment.		
	Impact: Loss of sense of place due to KPS shutdown		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is negative as it is associated with the shutdown of the power station.	Negative
	Extent (E)	Impact will be concentrated in the immediate zone of influence.	5
	Duration (D)	Permanent.	5
	Magnitude (M)	Moderate because half of the power station is already shut down as of 2020.	4
	Probability (P)	Highly probable.	4
	Significance (S)	Medium.	Neg 56
Human capital	**Impact: Deterioration of health of KPS PSA communities**		
	Aspect	**Impact rating**	**Score**
	Nature	Negative impact.	Negative
	Extent (E)	Impact will take place in the PSA.	4
	Duration (D)	Permanent.	5
	Magnitude (M)	Moderate due to the propensity of local households to resolve alcohol and drug abuse as well as problems with dietary issues and STDs.	6
	Probability (P)	Highly probable.	4

	Significance (S)	Medium.	Neg 60
	Mitigation/enhancement measure concept		
	• Set up counselling centres for alcohol and drug abuse patients. • Set up recreational centres and programmes to keep people, especially the youth, occupied. • Partner with NGOs and launch awareness programmes focusing on the harmful effects of alcohol and drug abuse. • Implement social projects that target the youth and empower females. • Launch campaigns about the benefits of a healthy diet. • Set up community gardens: these could provide work for certain unemployed individuals, be used as educational centres for children and give families who tend the gardens access to nutritious food.		
	Impact: Exodus of skills from the KPS PSA		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is negative as it is associated with the out-migration of skilled individuals from the area, which can degrade the human capital.	Negative
	Extent (E)	Impact will take place in the PSA.	4
	Duration (D)	KPS will be shut down permanently.	5
	Magnitude (M)	Moderate.	6
	Probability (P)	Highly probable.	4
	Significance (S)	Medium.	Neg 60
	Mitigation/enhancement measure concept		
	• Invest in career development centres and/or exhibitions to advise students on careers and opportunities; if successful, this measure will reduce the large pool of unemployed and low skilled labour. Partner with the MCCI, NAFCOC, other chambers of commerce, and local stakeholders to facilitate these initiatives and maximise their impact. • Depending on the skills development plan, investigate the need and opportunity for the expansion of the local post-school education facilities or the creation of training centres in partnership with other institutions, corporates, and agencies.		
Built capital	**Impact: Loss of property value in the PSA of KPS**		
	Aspect	**Impact rating**	**Score**
	Nature	The impact is negative due to the potential loss in investment value.	Negative
	Extent (E)	Impact will take place in the PSA.	4
	Duration (D)	Permanent.	5
	Magnitude (M)	Low.	4
	Probability (P)	Probable.	3
	Significance (S)	Low to medium.	Neg 39
	Mitigation/enhancement measure concept		
	• Explore repurposing and repowering opportunities on the project site.		
	Impact: Dilapidation of built environment in KPS PSA		

	Aspect	Impact rating	Score
	Nature	The impact is negative due to the potential net effect on demand for education and medical facilities as well as the ability of government to continue the provision of existing services.	Negative
	Extent (E)	Impact will be spread throughout the PSA.	4
	Duration (D)	Permanent.	5
	Magnitude (M)	Low.	4
	Probability (P)	Probable.	3
	Significance (S)	Low to medium.	Neg 39

ANNEXURE 2: IMAGES OF THE PRIVATELY-OWNED PROPERTY IN KOMATI VILLAGE

FOR SALE

ERF 167 & 168

6305m² Zoned land in Blinkpan District, Middelburg, Mpumalanga, near Komati Power station, with business rights for sale. Erf 167 - see below.

Erf 168. 5.5094ha Land with buildings in Blinkpan District, Middelburg, Mpumalanga, Near Komati Power Station. The main building includes the following: Large hall with stage, Cafeteria with kitchen, pub with ladies bar including Pool tables & Dartboards, Braai area, large parking area in front of building and at the rear of the building is a huge area of which part is used as a soccer field. See below

FRONT VIEW OF BUILDING

CAFETERIA ENTRANCE

PARKING AREA

MAIN ENTRANCE

COVERED AREA NEXT TO BRAAI AREA

BRAAI AREA

REAR AREA OF BUILDING

PARKING AREA

SOCCER FIELD BEHIND BUILDINGWHICH IS PART OF THE PROPERTY

HALL USED FOR A POOL COMPWTITION

OPEN FIELD BEHIND BUILDINGWHICH IS PART OF THE PROPERTY

HALL WHEN EMPTY

FRONT AREA OF BAR

REAR AREA OF BAR

POOL TABLES I N BAR

DART BOARDS IN BAR

CAFETERIA

CAFETERIA KITCHEN

LADIES BAR

ANNEXURE 3: M&E FRAMEWORK FOR OUTCOME AND IMPACT INDICATORS

Table A.1: M&E indicators to be used to monitor and evaluate changes brought about by Eskom's interventions and the activities of partners

Component from ToC	Indicator	M/E*	Eskom responsibility
Immediate outcomes			
Service delivery levels maintained	% change in households with access to electricity for lighting in the PSA	E	x
	% change in households with access to electricity for cooking in the PSA	E	x
	% change in households with access to water in the PSA	E	x
	% change in households with access to sewerage in the PSA	E	x
	% change in households with access to waste disposal in the PSA	E	x
	% of community residents who report "no decline in access to services"	E	x
Unemployment levels stabilised	Number of unemployed individuals in the PSA, by age and gender	E	x
	Change in unemployment rate in the PSA, by age and gender	E	x
Household income stabilised and increased	Number and % of households dependent on social grants in the PSA	E	x
	Number and % of households deriving earned income in the PSA	E	x
	Average household income in the PSA (Rand)	E	x
	Difference in average household income relative to the provincial average (Rand and %)	E	x
	% of community residents who report "no decline" and/or "increase" in income levels	E	x
Local economy stabilised and increased	Number and size of businesses operating in the PSA	E	x
	Production levels of the businesses operating in the PSA	E	x
	% change in business revenue derived in the PSA	E	x
Limited out-migration	Population in the PSA, by age	E	x
	Population growth rate in the PSA, by age	E	x
	% of residents that indicate they plan to remain in the PSA	E	x
Improved living standard	GPD per capita in the PSA (Rand)	E	x
	% change in PSA GDP per capita	E	x
	Number of households with access to secure tenure	E	x
	% of households with access to secure tenure	E	x
Improved social cohesion	% of community residents who report improved social cohesion (e.g. public safety, social status and economic cohesion, social capital, community networks and trust) (community survey)	E	x

Component from ToC	Indicator	M/E*	Eskom responsibility
	Number of incidents relating to unrest in the PSA	E	x
Intermediate outcomes			
Service delivery levels improved	% change in households with access to electricity for lighting in the PSA	E	x
	% change in households with access to electricity for cooking in the PSA	E	x
	% change in households with access to water in the PSA	E	x
	% change in households with access to sewerage in the PSA	E	x
	% change in households with access to waste disposal in the PSA	E	x
	% of community residents who report improved access to services	E	x
Reduced unemployment	Number of unemployed individuals in the PSA, by age and gender	E	x
	Change in unemployment rate in the PSA, by age and gender	E	x
Sustained local economic growth (RGDP growth)	Number and size of businesses operating in the PSA	E	x
	Production levels of the businesses operating in the PSA	E	x
	% change in business revenue derived in the PSA	E	x
Decline in poverty levels	Number and % of households living below the poverty line in the PSA	E	x
	% change in average household income in the PSA	E	x
	% of community residents who report a decline in poverty levels	E	x
Property values protected	Number of residential property sales in the PSA	E	x
	Average sale prices, per property type and size (apartment, townhouse, loose standing house)	E	x
	% change in property values	E	x
Improved Eskom reputation	% of community residents who were “satisfied” or “very satisfied” with Eskom’s services	E	x
Reduction in social ills	Number of and % change in unplanned pregnancies in the PSA	E	x
	Number of and % change in alcohol abuse reported incidents in the PSA	E	x
	Number of and % change in drug abuse reported incidents in the PSA	E	x
Decrease in crime	Number of and % change in reported crimes, per type, in the PSA	E	x
Impact			
Improvement in community health	% of community residents who report improved health	E	x
	Number of and % change in respiratory diseases reported in the PSA	E	x
Quality of life improves	Average life expectancy at birth (male and female)	E	x
	% of community residents who report improved quality of life	E	x

Table A.2: M&E framework to monitor and evaluate interventions beyond Eskom's line of accountability indicated in the ToC

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
IO/ItO	% change in households with access to electricity for lighting in the PSA	Stats SA Census	Every 10 years	To be updated once new census data is published	TBD
IO/ItO	% change in households with access to electricity for cooking in the PSA	Stats SA Census	Every 10 years	To be updated once new census data is published	TBD
IO/ItO	% change in households with access to water in the PSA	Stats SACensus	Every 10 years	To be updated once new census data is published	TBD
IO/ItO	% change in households with access to sewerage in the PSA	Stats SACensus	Every 10 years	To be updated once new census data is published	TBD
IO/ItO	% change in households with access to waste disposal in the PSA	Stats SA Census	Every 10 years	To be updated once new census data is published	TBD
IO	% of community residents who report "no decline in access to services"	PSA Community Survey	Annual	TBD	TBD
IO	Change in unemployment rate in the PSA, by age and gender	PSA Census	Biennial	TBD	TBD
IO	Number and % of households dependent on social grants in the PSA	PSA Census	Biennial	TBD	TBD
IO	Number and % of households deriving earned income in the PSA	PSA Census	Biennial	TBD	TBD
IO	Average household income in the PSA (Rand)	PSA Census	Biennial	TBD	TBD
IO	Difference in average household income relative to the provincial average (Rand and %)	PSA Census, Stats SA data	Biennial	TBD	TBD
IO	% of community residents who report "no decline" and/or "increase" in income levels	PSA Community Survey	Annual	TBD	TBD
IO	Number and size of businesses operating in the PSA	PSA Business Survey	Annual	TBD	TBD
IO	Production levels of the businesses operating in the PSA	PSA Business Survey	Annual	TBD	TBD
IO	% change in business revenue derived in the PSA	PSA Business Survey	Annual	TBD	TBD
IO	Population in the PSA, by age	PSA Census	Biennial	TBD	TBD

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
IO	Population growth rate in the PSA, by age	PSA Census	Biennial	TBD	TBD
IO	% of community residents who indicate they intend to remain in the province	PSA Business Survey	Annual	TBD	TBD
IO	GPD per capita in the PSA (Rand)	PSA Business Survey, PSA Census	Biennial	TBD	TBD
IO	% change in PSA GDP per capita	PSA Business Survey, PSA Census	Biennial	TBD	TBD
IO	Number of households with access to secure tenure	PSA Census	Biennial	TBD	TBD
IO	% of households with access to secure tenure	PSA Census	Biennial	TBD	TBD
IO	% of community residents who report improved social cohesion (e.g. public safety, social status and economic cohesion, social capital, community networks and trust)	PSA Community Survey	Annual	TBD	TBD
IO	Number of incidents relating to unrest in the PSA	South African Police Service Annual Crime Report	Annual	TBD	TBD
IO	Ambient air pollution in the PSA	Monthly air quality monitoring reports	Annual	TBD	TBD
ItO	% of community residents who report improved access to services	PSA Community Survey	Annual	TBD	TBD
ItO	Number of unemployed individuals in the PSA, by age and gender	PSA Census	Biennial	TBD	TBD
ItO	Change in unemployment rate in the PSA, by age and gender	PSA Census	Biennial	TBD	TBD
ItO	Number and size of businesses operating in the PSA	PSA Business Survey	Annual	TBD	TBD
ItO	Production levels of the businesses operating in the PSA	PSA Business Survey	Annual	TBD	TBD
ItO	% change in business revenue derived in the PSA	PSA Business Survey	Annual	TBD	TBD
ItO	Number and % of households living below the poverty line in the PSA	PSA Community Survey	Annual	TBD	TBD
ItO	% change in average household income in the PSA	PSA Census	Biennial	TBD	TBD
ItO	% of community residents who report a decline in poverty levels	PSA Community Survey	Annual	TBD	TBD
ItO	Number of residential property sales in the PSA	Lightstone database	Annual	TBD	TBD

I/P/O/IO /ItO/Im*	Indicator	Source of data/data gathering method	Frequency of measurement	Baseline	Targets
ItO	Average sale prices, per property type and size (apartment, townhouse, loose standing house)	Lightstone database	Annual	TBD	TBD
ItO	% change in property values	Lightstone database	Annual	TBD	TBD
ItO	% of community residents who were “satisfied” or “very satisfied” with Eskom’s services	PSA Community Survey	Annual	TBD	TBD
ItO	% of community residents who report reduced social ills (e.g. alcohol abuse and illiteracy)	PSA Community Survey	Annual	TBD	TBD
ItO	Number of and % change in unplanned pregnancies in the PSA	DOH database, local clinics, civil organisation datasets	Annual	TBD	TBD
ItO	Number of and % change in alcohol abuse reported incidents in the PSA	DOH database, local clinics, civil organisation datasets	Annual	TBD	TBD
ItO	Number of and % change in drug abuse reported incidents in the PSA	DOH database, local clinics, civil organisation datasets	Annual	TBD	TBD
ItO	Number of and % change in reported crimes, per type, in the PSA	South African Police Service Annual Crime Report	Every five years	TBD	TBD
Im	% of community residents who report improved health	PSA Community Survey	Annual	TBD	TBD
Im	Number of and % change in respiratory diseases reported in the PSA	DOH database, local clinics	Annual	TBD	TBD
Im	Average life expectancy at birth (male and female)	PSA Census	Biennial	TBD	TBD
Im	% of community residents who report improved quality of life	PSA Community Survey	Annual	TBD	TBD

**I – Input; P – Process; O – Output; IO – Immediate outcome; ItO – Intermediate outcome; Im – Impact*

ANNEXURE 4: STUDY STAKEHOLDER DATABASE

Note: The following table provides an overview of the stakeholder engagements undertaken by Urban-Econ as part of the study, the date of engagement, and the purpose of the engagement. The names and contact details of individuals engaged have not been included as per the Protection of Personal Information Act (POPIA).

Table A.3: Stakeholder engagement database as part of the Urban-Econ study

Stakeholder group	Entities represented	Date of engagement	Purpose of engagement
National government	DBSA	11 December 2020 8 March 2021	Discuss potential for participation in mitigation measures
	DFFE	2 March 2021	Introduce study and share preliminary results and opportunities. Discuss mitigation approach and the role of DDFE in the realisation in opportunities, in addition to support that can be provided to Eskom and its partners
	the **dtic**	2 December 2020	Discuss potential for participation in mitigation measures
Provincial government	DEDT	15 November 2021	Discussion on provincial projects
	Mpumalanga Provincial Government/DEDT	9 February 2021	Collate and discuss development opportunities, interventions and projects that the government has in a pipeline (short and long-term projects) and those that are still investigated
Local government	Nkangala DM	29 October 2020	Understanding policy and decision-making influence
	Steve Tshwete LM	4 August 2020 10 March 2022	Understanding policy and decision-making influence
	Ward Committee Members/Councillors	15 September 2020 16 September 2020 12 April 2022	Determining/evaluating the dynamics of the community to inform impact assessment
Mining houses and organisations	Minerals Council South Africa (with representation from Exxaro, Glencore, AngloAmerican Coal, South32, Seriti)	2 March 2021 2 December 2020 10 February 2021	Presence in the area
	Thungela Resources	9 May 2022	Identification of possible areas of participation

Stakeholder group	Entities represented	Date of engagement	Purpose of engagement
		24 May 2022	
Local CBOs, NGOs & PBOs	Farm Belt Community Economic Development Structure	17 September 2020	Determining/evaluating the dynamics of the community to inform impact assessment
	JOG Church	16 September 2020 12 April 2022	
	Thubalethu Community Structure		
	Traditional Council		
KPS suppliers	Various private entities	12 November 2020	KPS suppliers engaged to inform impact analysis
Organised business	MCCI	10 November 2020 24 November 2020 4 December 2020	Presence in the area
	MWCB	19 February 2021 13 April 2021	Investigating projects to be developed in the region
NPOs	GreenCape	22 February 2021 17 March 2022	Investigating projects to be developed in the region
	The Impact Catalyst	10 March 2022	Investigating projects to be developed in the region
Local communities	Komati Village Koornfontein Village Blinkpan	15 & 16 September 2020 12 April 2022	Discussion on study scope and impact of the power stations' shutdown
Local farmers	Driefontein Farm	15 &16 September 2020 5 May 2022	Determining/evaluating the dynamics of the area to inform the impact assessment
	Koornfontein Farm		
	Bultfontein Farm		
	Goedehoop Farm		
Local small businesses	Businesses located in communities surrounding KPS	1 & 2 October 2020 12 April 2022	Informing the shutdown’s impacts