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- KPMG does not have a duty of care or any legal obligation to any third party in connection with the Services.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
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<tbody>
<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
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<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<td>DoE</td>
<td>Department of Energy</td>
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<td>EIA</td>
<td>Economic Impact Assessment</td>
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<tr>
<td>EIUG</td>
<td>Energy Intensive Users Group</td>
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<td>EUF</td>
<td>Energy Utilisation Factor</td>
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<td>FBE</td>
<td>Free Basic Electricity</td>
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<tr>
<td>GHG</td>
<td>Greenhouse Gases</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GOS</td>
<td>Gross Operating Surplus</td>
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<tr>
<td>GWh</td>
<td>Gigawatt hours</td>
</tr>
<tr>
<td>GVA</td>
<td>Gross Value Added</td>
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<td>IEP</td>
<td>Integrated Energy Plan</td>
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<td>I-O</td>
<td>Input-Output</td>
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<tr>
<td>IRP</td>
<td>Integrated Resource Plan</td>
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<tr>
<td>ISO</td>
<td>International Organisation Standards</td>
</tr>
<tr>
<td>LTIR</td>
<td>Loss Time Injury Rate</td>
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<tr>
<td>MW</td>
<td>Megawatts</td>
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<tr>
<td>NDP</td>
<td>National Development Plan</td>
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<tr>
<td>NOSA</td>
<td>National Occupational Safety Association</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
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<tr>
<td>OHSAS</td>
<td>Occupational Health and Safety Assessment Series</td>
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<tr>
<td>PDCA</td>
<td>plan-do-check-act</td>
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<tr>
<td>PPI</td>
<td>Producer Price Inflation</td>
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</table>
QLFS  Quarterly Labour Force Survey
q-o-q  quarter-on-quarter
SAM  Social Accounting Matrix
SARB  South African Reserve Bank
SDGs  Sustainable Development Goals
SIC  Standard Industrial Classification
StatsSA  Statistics South Africa
UAGS  Unplanned Automatic Grid Separations
UK  United Kingdom
UN  United Nations
UNDP  United Nations Development Programme
USA  United States of America
y-o-y  year-on-year
### Glossary of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average per year</strong></td>
<td>The average per year is the total impact over the period, divided by number of years.</td>
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<tr>
<td><strong>Direct impact</strong></td>
<td>Includes the first round effects where increased demand for particular goods/services leads to increased business activity and thus a direct change in sectoral production. This would be the number of people employed by the power station in order for the power station to operate.</td>
</tr>
<tr>
<td><strong>Energy Availability Factor (EAF)</strong></td>
<td>Measures plant availability including planned maintenance and unplanned breakdowns and energy losses not under plant management control.</td>
</tr>
<tr>
<td><strong>Gross Domestic Product (GDP)</strong></td>
<td>A monetary value of all the finished goods and services produced within a country’s borders in a specific period. In addition, GDP is a good indicator of economic growth and welfare, as it represents, amongst other, the remuneration of employees and gross operating surplus (GOS) (profits) as components of value added to the economy.</td>
</tr>
<tr>
<td><strong>Gross Operating Surplus (GOS)</strong></td>
<td>Economic rent or value of capital services flows or benefit from the asset.</td>
</tr>
<tr>
<td><strong>High-income households</strong></td>
<td>Include households with an annual income of R305 115 and above.</td>
</tr>
<tr>
<td><strong>Household income</strong></td>
<td>All receipts by all members of a household, in cash and in kind, in exchange for employment, or in return for capital investment, or receipts obtained from other sources such as social grants, pension, etc.</td>
</tr>
<tr>
<td><strong>Indirect impact</strong></td>
<td>Includes the second round effects that change the demand for factors of production and household income, which can be explained by the inter-linkages of sectors in the economy. With reference to this project, these impacts emanate from the increased demand for goods and services acquired by the power station’s suppliers from external service providers such as consultants, external training providers, sub-contractors, etc, as well as increased employment opportunities created on the back of this economic activity. These industries themselves generate additional economic output and employment and in turn generate additional demand for goods and services along their supply chains.</td>
</tr>
<tr>
<td><strong>Induced impact</strong></td>
<td>Includes the multiplier effect that arises through the second round of spending. This is the increase in household income and the additional spending that arises from the change in income levels from the new employment opportunities created due to expenditure by the supplier. The induced contributions stem from how electricity industry employees and the employees of its suppliers spend a share of the additional income generated through their consumption of goods and services in the wider economy.</td>
</tr>
<tr>
<td><strong>Integrated Development Plan</strong></td>
<td>Integrated Development Plans (IDPs) are required to be undertaken by all District and Local Municipalities. The IDPs set out the development vision for the municipality and allies this to dedicated projects to be undertaken over the life span of the IDP (5 years).</td>
</tr>
<tr>
<td><strong>ISO 14001</strong></td>
<td>International standard that provides assurance that environmental impact is being measured and improved.</td>
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</table>
**ISO 9001**
International standard that specifies requirements for a quality management system (QMS). Organizations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements.

**ISO 17025**
International standard that provides a laboratory with the criteria necessary to implement in order for it to perform its test work competently.

**Lost Time Injury Rate (LTIR)**
The LTIR refers to the proportional representation of the occurrence of lost-time injuries (including occupational diseases) over 12 months per 200 000 working hours.

**Low-income households**
Include households with an annual income of up to R6 324

**Medium income households**
Include households with an annual income of between R6 324 and R305 114

**OHSAS 18001**
Occupational Health and Safety Management System (OHSMS) with the purpose of measuring and improving organisational health and safety impacts

**Rest of South Africa**
The provinces of South Africa, with the exception of Mpumalanga

**Unplanned Automatic Grid Separations (UAGS)**
This tracks the average grid separation rate.
## Contents

- **Disclaimer**  
  2

### Executive summary  
  9

#### 1 Aim, context and overview of report  
  15

1.1 The development of Grootvlei Power Station  
  15

1.2 Purpose of this study  
  17

1.3 Acknowledgements  
  17

1.4 Data validation, data quality and data reliance  
  17

1.5 Layout of the report  
  19

#### 2 Approach to estimating Grootvlei Power Station’s economic contribution  
  21

#### 3 Economic and industry overview  
  25

3.1 South African economic overview  
  25

3.2 Mpumalanga economic overview  
  30

3.3 Electricity industry overview  
  32

#### 4 Grootvlei Power Station’s estimated economic contribution through capital expenditure  
  35

4.1 Grootvlei Power Station’s capital investment  
  35

4.2 Grootvlei Power Station’s estimated contribution to GDP through capital expenditure  
  37

4.3 Grootvlei Power Station’s estimated contribution to employment through capital expenditure  
  39

4.4 Grootvlei Power Station’s estimated contribution to the national fiscus through capital expenditure  
  41

4.5 Grootvlei Power Station’s estimated contribution to households through capital expenditure  
  42

4.6 Potential future economic benefits through capital expenditure  
  43

#### 5 Grootvlei Power Station’s estimated economic contribution through day-to-day operations  
  46
5.1 Grootvlei Power Station’s income through electricity generation 46
5.2 Grootvlei Power Station’s estimated contribution to GDP through day-to-day operations 46
5.3 Grootvlei Power Station’s estimated contribution to employment through day-to-day operations 49
5.4 Grootvlei Power Station’s estimated contribution to the national fiscus through day-to-day operations 51
5.5 Grootvlei Power Station’s estimated contribution to households through day-to-day operations 52
5.6 Estimated future economic benefits through day-to-day operations 53

6 Local Economy 56
6.1 Economic overview of Dipaleseng Local Municipality and the local towns 56
6.2 Estimated economic contribution through capital expenditure and day-to-day operations 60

7 Grootvlei Power Station’s quality of jobs 64
7.1 Measuring the quality of jobs 64
7.2 Estimating quality of jobs 65

8 Conclusion 68
8.1 Grootvlei Power Station’s economic contribution to Mpumalanga and the rest of South Africa 68
8.2 Quality of jobs and skills development 71
8.3 Local community impact 72

Appendix 74
Input-Output table 74
Input-Output table as an analytical tool 79
The Social Accounting Matrix 82
Limitations 84
Disclaimer 84
Executive summary

Eskom contracted KPMG Services (Pty) Ltd (KPMG) to undertake a research project on the economic impact of the Hendrina, Grootvlei, Kriel, Camden and Komati Power Stations’ capital and operational expenditure over the period 2014/15 to 2016/17.

The purpose of this economic impact report is to highlight the economic contribution that Grootvlei coal fired power station (hereafter “Grootvlei Power Station”) makes to Mpumalanga, the rest of South Africa and Dipaleseng Local Municipality. The document sets out Grootvlei Power Station’s estimated footprint through the positive economic spin-offs from the capital investment as well as its day-to-day operation. Current spend for capital investment and day-to-day operation relates to the period 2014/15 to 2016/17.

Importance of determining Grootvlei Power Station’s estimated economic contribution

As part of fulfilling Eskom’s mandate “to provide electricity in an efficient and sustainable manner”\(^1\), Grootvlei Power Station provides coal fired power, facilitating the generation of electricity in Mpumalanga and South Africa. Grootvlei Power Station is the 12\(^{th}\) largest (of 14) coal station by generating capacity. Grootvlei Power Station has a generating capacity of 1 180 Megawatt (MW). With this, Grootvlei Power Station addresses an estimated 2.5% of South Africa’s electricity needs.

In order to realise the Eskom mandate, Grootvlei Power Station needs to implement the safety, health, environment and quality requirements through the plan-do-check-act (PDCA) quality cycle. In achieving some of these requirements, Grootvlei Power Station potentially considered economic development, environmental duty of care and social equity to continually improve performance and achieve stakeholder requirements. Therefore, Grootvlei Power Station ensures security of electricity supply, which enables economic growth.

Estimating Grootvlei Power Station’s economic contribution confirms that the electricity sector and Grootvlei Power Station in particular is effectively contributing to national energy and economic growth targets. This is evident not only from the contribution it makes to economic productivity, employment, tax revenue and household income but also through the positive influences on quality of jobs.

Approach to determining Grootvlei Power Station’s estimated economic contribution

The Economic Impact Assessment (EIA) considered for this project is based on the theory of input-output analysis developed by Wassily Leontief. The basis of input-output analysis is that it shows the financial interdependencies between different sectors of the economy in a matrix format. EIAs are widely accepted, with several credible international organisations such as the United Nation’s Food and Agriculture Organisation, the World Bank, International Model for Policy Analysis of Agricultural Commodities and Trade, the Organisation for Economic Co-operation and Development employing the methodology.

We incorporate the structure of this input-output model into the national accounting systems of various countries, including South Africa, to form an important representation of measures such as Gross Domestic Product (GDP). In this report, we focus on Grootvlei Power Station’s impact on

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Mpumalanga, South Africa and Dipaleseng Local Municipality through GDP, job creation, tax collection and poverty alleviation.

Through its capital investment and day-to-day operations, Grootvlei Power Station directly influences outcomes in the economy. More specifically, it does so through the forward and backward linkages with other industries and its operations within the energy industry and the entire economy. Linkages refer to forward and backward linkages that occur between consecutive steps of a production value chain. A forward linkage exists where Grootvlei Power Station uses the product of a particular firm or industry as an input or raw material in production. Conversely, a backward linkage occurs where another firm or industry uses Grootvlei Power Station’s product as raw materials or inputs. The benefit of having an increased number of such backward linkages within an economy is that such linkages centre local demand for raw materials and reduces dependence on imports. Instead, local industry can rely on local suppliers for the supply of raw materials.

**Grootvlei Power Station’s estimated economic contributions**

As mentioned, Grootvlei Power Station’s capital expenditure and day-to-day operations influence Mpumalanga and South Africa in terms of their contribution to employment creation, economic growth, government tax revenue, as well as poverty alleviation. These estimated impacts, based on the EIA results, are summarised below.
GROOTVLEI POWER STATION’S CONTRIBUTION BETWEEN 2014/15 AND 2016/17 THROUGH CAPITAL EXPENDITURE AND DAY-TO-DAY OPERATIONS

Grootvlei Power Station impacts the economy, specifically in terms of increased electricity generation, which remains a major enabler of economic development. Grootvlei Power Station’s capital expenditure and day-to-day operations continue to contribute to job creation, fiscal revenue and value add in the energy sector. This in turn contributes to a more efficient and productive economy through the long-term nature of the economic benefit streams it creates, especially in downstream user industries such as manufacturing and upstream industries such as coal mining.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga
Grootvlei Power Station’s local community impact

Mpumalanga province is divided into three district municipalities (Nkangala, Ehlanzeni and Gert Sibande), which are further subdivided into 17 local municipalities. Grootvlei Power Station is located in Dipaleseng Local Municipality within the Gert Sibande district and will impact the economy of the local municipality. As such, we estimated Grootvlei Power Station’s economic impacts in terms of economic growth and employment. These estimated impacts on the local economy, based on the EIA results, are summarised below.

Estimated local impact of Grootvlei Power Station

Dipaleseng Local Municipality

Grootvlei power station is located in the Dipaleseng Local Municipality. However, the majority of the majority of employees reside outside the municipality. The Dipaleseng Local Municipality had a moderately diversified economy and this dispersion of economic activity amongst the economic sectors means that the municipality is less vulnerable to sector disruption. The existence of Grootvlei in the municipality contributes to the diversification of the local community.

- **R473 million**
  - Estimated annual average GDP impact on the local municipality from capital and operational expenditure
- **1102 jobs**
  - Estimated annual average employment impact on the local municipality from capital and operational expenditure

Grootvlei Power Station contributes positively to both economic growth and employment in Dipaleseng

- **1%** of Dipaleseng Local Municipality’s GDP
- **1.2%** of Dipaleseng Local Municipality’s labour force
- **23%** of Grootvlei Power Station employees reside in the Dipaleseng Local Municipality
- **67%** of the rest of South Africa
- **10%** of the rest of Mpumalanga

Source: KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga and Beuteng

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2 Albert Luthuli, Bushbuckridge, Dipaleseng, Dr JS Moroka, Emakhazeni, Emalahleni, Goven Mbeki, Lekwa, Mbombela, Mkhondo, Msukaligwa, Nkomazi, Pixley ka Seme, Steve Tshwete, Thaba Chweu, Thembile Hani and Victor Khanye
Grootvlei Power Station’s quality of jobs

Over and above the economic contributions resulting from Grootvlei Power Station’s investment and day-to-day operations, Grootvlei Power Station’s activities relating to quality of jobs affect the economy via their associated outcomes.

To examine the quality of jobs, we constructed a methodology based on OECD and UN perspectives of job quality. The main finding from the assessment is that, across the utilities sector in Mpumalanga, Grootvlei Power Station employees earn notably more than the industry average. This is not surprising considering that Grootvlei Power Station employ many people with scarce skills. These workers’ salaries reflect the scarcity of their skills and the international demand for their services.

As South Africa looks to intensify productivity and bolster economic growth, the full range of role players needs to draw on their strengths and synergies. With so many linkages in the economy through its various activities, Grootvlei Power Station has an important role to play by contributing to the country’s energy needs and thus, to economic growth more broadly.
Aim, context and overview
1 Aim, context and overview of report

1.1 The development of Grootvlei Power Station

Grootvlei Power Station is situated approximately 100 km south-east of Johannesburg and 50 km from the town of Heidelberg. The power station is under the ownership and operation of South Africa’s major energy provider, Eskom.

Eskom commissioned the first unit of Grootvlei Power Station in 1969. It is located on flat agricultural land that is 1 568 m above sea level. The lack of significant water sources lowers the power station’s flood exposure. Grootvlei Power Station’s 50-year power station life ends in 2025. Eskom may decommission the power station either before or after the 50 year period, as long as it is based on economic viability, balance sheet strength and safe operations.3

1.1.1 Prior to the development of Grootvlei Power Station

Before the development of Grootvlei Power Station, the electricity mix of South Africa included various sources for generating electricity. In 1886, gas engines and steam turbines were used to power up lamps on the South African streets, followed by the introduction of hydroelectric power.4 It was not until 1912 that discussions about the first coal power station would take place. The main driver was the need to power the national railway line. This would start the broader process of the commissioning of coal-powered stations.

1.1.2 After the development of Grootvlei Power Station

In 1969, the initial turbine unit 3 of Grootvlei Power Station was commissioned. It was not until 1977 that all six were commissioned and the power station was fully operational.5 In 1989, the power station was mothballed, but it was refurbished and re-commissioned between 2005 and 2008. The return to service of this power station has contributed to alleviating electricity demand pressures on the national grid by providing maintenance space for other power stations.

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3 Eskom, Power Station Preservation and Decommissioning, Presentation, 10 May 2017.
5 Information supplied by Grootvlei Power Station Manager
Grootvlei Power Station was the first station of its size to have dry cooling and both direct (unit 5) and indirect cooling (unit 6) systems. Unit 6 uses demineralised water as a cooling medium. The outside plant is considered as a conventional Eskom design of that era.6

1.1.3 Achievements at Grootvlei Power Station

Grootvlei Power Station has also been recognised for its operating performance at the Eskom 2010, 2011, 2012, 2013, 2014 and 2015 Winter Awards. Grootvlei Power Station was awarded the best power plant category and leader in power management on two occasions. In 2015, Grootvlei Power Station’s unit 6 achieved a 91.19% Energy Availability Factor (EAF), earning the power station second place in the Best Unit EAF category. The EAF, measures plant availability including planned maintenance and unplanned breakdowns and energy losses not under plant management control.

It also earned third place for the Best Station Energy Utilisation Factor (EUF) of 95.42%. The EUF, measures the usage time for which an equipment can be used. This is the highest percentage that Grootvlei Power Station has achieved since 2010. All units have also achieved zero Unplanned Automatic Grid Separations (UAGS).7

Grootvlei Power Station has several policies for upholding health and safety standards in place. These are focused on ensuring consistent quality management delivered to consumers and the implementation of sound occupational health and safety performances. In particular, Grootvlei Power Station possesses the following notable certifications:

- ISO14001 certification, which is an Environmental Management System (EMS) aimed at measuring an improving an organisation’s environmental impact.
- ISO 9001 certification, which is a Quality Management System (QMS) providing organisations with a systematic approach for meeting customer objectives by means of process improvement.
- OHSAS 18001 certification, which is an Occupational Health and Safety Management System (OHSMS) with the purpose of measuring and improving organisational health and safety impacts.8

Furthermore, between 2012 and 2017, lost-time injury rate (LTIR) showed a general downward trend. The LTIR refers to the proportional representation of the occurrence of lost-time injuries (including occupational diseases) over 12 months per 200 000 working hours. At Grootvlei Power Station, the average LTIR for both Eskom employees and contractors decreased from 0.61 to 0.09, which means that the number of working hours lost because of occupational injuries (including diseases) decreased from six to one hour. Therefore, this indicates improved Occupational Health and Safety standards.

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6 Eskom, Grootvlei Power Station, nd
7 Information supplied by Grootvlei Power Station Manager
9 Data from Grootvlei Power Station manager.
Grootvlei Power Station received the National Occupational Safety Association (NOSA) Safety System 5-star grading, for the safety measures they have in place. Additionally, Grootvlei Power Station received the Best Environmental Performing and Water Consumption Power Station Award.

1.1.4 Grootvlei Power Station at present

Grootvlei Power Station currently generates 1 180 MW of electricity from its six units. This consists of:

- four units installed rated capacity of about 200 MW
- two units installed rated capacity of about 190 MW

In this way, it has the potential to contribute 2.5% to the national electricity grid. In 2013, the power station was returned to service after approximately 18 years of non-use since 1989 when it began a preservation (mothballing) programme.

This report aims to show that Grootvlei Power Station not only continues to generate electricity for the country, but also provides other economic benefits through productivity, employment, taxes and household income.

1.2 Purpose of this study

Eskom contracted KPMG Services (Pty) Ltd (KPMG) to conduct a research project assessing the economic impacts of the following five coal-fired power stations: Hendrina, Kriel, Komati, Grootvlei and Camden, in light of the production ramp down. This document forms part of the project and focuses on the direct, indirect and induced economic impacts of Grootvlei Power Station in South Africa, Mpumalanga and Dipaleseng Local Municipality.

In particular, we consider Grootvlei Power Station’s capital and operational expenditure between 2014/15 and 2016/17. We report on the economic impact through GDP, employment, tax revenue and household income of Grootvlei Power Station’s capital expenditure and operational cost.

1.3 Acknowledgements

We would like to express our appreciation for the time and cooperation provided to the KPMG project team by the management, staff and members of Eskom and Grootvlei Power Station. In particular, we acknowledge the assistance of Grootvlei Power Station Manager, Gersh Bonga and Finance Manager, Mathepelo Mokoena.

1.4 Data validation, data quality and data reliance

The data used in this analysis has been received directly from the Eskom and Grootvlei Power Station teams.

Grootvlei Power Station team provided the majority of the data including capital expenditure, operating costs, salaries and wages, and the direct number of employees. Being most familiar with this data, the Eskom team conducted the initial allocation of data to industries using the globally employed Standard Industrial Classification (SIC) codes. This classification is in line with previous projects conducted by the internal KPMG technical team including previous projects for Eskom (i.e. an EIA for the Koeberg nuclear Power Station and a deep dive into Medupi Power Station), the South African Petroleum Industry Association, the Independent Power Producers Project Office, telecommunications operator Vodacom, the Gautrain Management Agency, Transnet, amongst

10 Information supplied by Grootvlei Power Station Manager
others. Through an iterative process, the data and initial allocations were then sense checked by the KPMG team.

In this form, the KPMG team inputted the data into the EIA model to understand the economic impacts thereof. Both project teams discussed and confirmed the assumptions used to populate the model to ensure their relevance and appropriateness. EIAs are widely accepted, with several credible international organisations such as the United Nation’s Food and Agriculture Organisation, the World Bank, International Model for Policy Analysis of Agricultural Commodities and Trade, the Organisation for Economic Co-operation and Development employing the methodology.

KPMG has compared the model’s results with the previously mentioned projects to ensure that they align with the type and quantum of investment as well as the sector.

The relevant management and finance teams at Grootvlei Power Station as well as head office then reviewed this classification and the figures employed. Constant engagement and communication with the Eskom project sponsor and project manager was present throughout the process. In this way, the data forming part of the EIA has been reconciled and validated both internally and externally by the appropriate Eskom and KPMG teams. KPMG also has formal risk management and quality assurance processes in place that require the engagement and risk partners’ review of the final output. The overall process is summarised in the diagram.

As evident from the processes, the KPMG team and Eskom went through several steps to ensure the information and data results are feasible, reliable and accurate, taking into account the limitations with a model such as the EIA model. However, the procedures carried to date by KPMG, do not constitute an audit, examination or review in accordance with generally accepted auditing standards and, therefore, KPMG do not express an opinion and/or make any other form of representation regarding the sufficiency of the procedures that KPMG performed.
1.5 Layout of the report

The layout for the rest of the report consists of the following sections:

- In Section 2 we introduce the theoretical framework of the EIA used in modelling the economic impact of Grootvlei Power Station’s investment and operations in Mpumalanga, South Africa and Dipaleseng economies.
- In Section 3 we provide the context in which Grootvlei Power Station operates in terms of national and provincial economic overview, as well as an overview of the electricity industry.
- In Section 4 we estimate the economic impact of Grootvlei Power Station’s contribution to the economies of Mpumalanga and the rest of South Africa. This section considers the capital investment of the power station.
- In Section 5 we continue to estimate the economic impact of Grootvlei Power Station’s contribution to the economies of Mpumalanga and the rest of South Africa. In contrast to section 4, this section considers the day-to-day operations of the power station.
- In Section 6 we provide an economic overview of Grootvlei Power Station’s local municipality and towns as well as the estimated economic impact that its activities has on them.
- In Section 7 we consider the impact of Grootvlei Power Station’s activities as they relate to the quality of jobs.
- In Section 8 we provide a conclusion summarising the main contributions of capital expenditure and day-to-day operations in Grootvlei Power Station, to the Mpumalang, South Africa and Dipaleseng economies.
Modelling approach
2 Approach to estimating Grootvlei Power Station’s economic contribution

The EIA we employ for this project uses the theory of input-output analysis developed by Wassilly Leontief as a basis. The analysis shows the interdependencies between different sectors of the economy in a matrix format. Various countries, including South Africa, have incorporated the structure of this input-output model into their national accounting systems. It therefore forms an important part of measuring variables such as GDP.

In addition to studying the structure of national economies, we use input-output analysis as a tool for economic planning. We also use it to identify economically related sector clusters and so-called “key” or “target” sectors. These sectors are most likely to increase the internal coherence of a specified economy. We do this by analysing the linkages between the different sectors in the economy.

Linkages refer to forward and backward linkages that occur between consecutive steps of a production value chain. A forward linkage exists where the products that are produced by the electricity industry are used by particular firms or sectors as inputs or raw materials. Conversely, a backward linkage occurs where Grootvlei Power Station uses the product of another firm or sector as raw materials or inputs during the production process. The benefits of having an increased number of such backward linkages within an economy is that it centres local demand for raw materials and reduces the sector’s dependence on imports, as we rely on local suppliers for the supply of raw materials.

When estimating the impacts of Grootvlei Power Station, this approach considers the direct, indirect and induced impacts.

1 The direct impact includes the first round of effects where increased demand for particular goods/services leads to increased business activity and thus a direct change in sectoral production. This is the impact associated with Grootvlei Power Station’s infrastructure investment and operational expenditure.

2 The indirect impact includes the second round of effects that change the demand for factors of production and household income, which can be explained by the inter-linkages of sectors in the economy. With reference to this project, these impacts emanate from the increased demand from Grootvlei Power Station’s acquisition of goods and services from external service providers, as well as increased employment opportunities created on the back of this economic activity.

3 The induced impact includes the multiplier effect that arises through the second round of spending. This is the increase in household income and the additional spending that arises from the change in income levels from the new employment opportunities created due to Grootvlei Power Station’s expenditure.

The sum of the direct, indirect and induced impacts represents the total impact.

According to Keynesian economic theory, any injection into the economy via investment capital, government spending or the like will result in a proportional increase in overall income (measured through GDP) at a national, provincial and local level. The basic principle of this theory is that
increased spending will have carry-through or multiplier effects or impacts, which result in even greater aggregate spending over time. The multiplier itself is an attempt to measure the size of those carry-through effects or impacts. The multiplier takes all direct and indirect benefits from that investment or from the change in demand into account. The size of the impact or the effect on the economy depends on the size of the multiplier in the economy.

We use this theory as the basis for estimating the economic impact of Grootvlei Power Station’s investment spending and operations expenditure in South Africa. We apply an extension to the input-output matrix, the Social Accounting Matrix (SAM), in our analysis. A SAM is a presentation of the national accounts of a country that places the focus on issues that are of special interest in a country, e.g. an analysis of interrelationships between structural features of an economy and the distribution of income and expenditure among household groups. We collect the required data from a number of different sources including, inter alia, national accounts, income and expenditure surveys and integrated economic accounts.

A SAM shows, amongst other things:

- The structure of the costs of production and the value added, which is generated in the production process
- The inter-dependencies of sectors
- The flows of goods and services produced within the national economy
- The flows of goods and services with the rest of the world
- The expenditure by different household groups

The following analysis uses a 2014 SAM for the Mpumalanga as well as South Africa, built by KPMG. We utilised the following data from a number of different sources:

- Capital investment values and generation capacity for the periods 2014/15 – 2016/17 supplied by Eskom
- Operational expenditure and income for the periods 2014/15 – 2016/17 supplied by Eskom
- Average price per Gigawatt hours (GWh) supplied by Eskom
- National Accounts from the South African Reserve Bank (SARB) for 2014
- Income and expenditure surveys from StatsSA
- Labour force surveys from StatsSA
- GDP statistical release (P0441) from StatsSA

We used this SAM to estimate how the activities of Grootvlei Power Station in one or more parts of the economy could affect other sectors of the economy, and how the sector investment and operational impact are distributed in the economy. It thereby highlights the economic linkages within the economy and has the ability to show the direct, indirect and induced effects of a given expenditure on the following economic factors:

| GDP is a good indicator of economic growth and welfare, as it represents, amongst others, the remuneration of employees and gross operating surplus (GOS) (profits) as components of value added to the economy. |
| Labour form an important part of the primary production factors needed for Grootvlei Power Station’s operations. The number of people employed because of Grootvlei Power Station’s capital spending and operations is determined by the EIA. |
Grootvlei Power Station’s impact on **public finances** is its direct tax contributions. In addition, Grootvlei Power Station’s indirect contribution to public finance is included in this analysis.

South Africa has high levels of poverty, with 45% of the population (est. 2.4 million) living in poverty on an average income of less than R3 000 per annum. One of the components of the EIA is to determine whether Grootvlei Power Station’s investment and operations have a positive impact on poverty alleviation. We show how Grootvlei Power Station’s operations benefit low-income households, this is reflected through **income that low-income households received**

The basis of this analysis is therefore an assessment of how direct economic activity could potentially lead to other forms of economic activity. The size of the created economic activity is measured by means of the multiplier effect. The different rounds of the multiplier effect, from the initial spending in a sector due to Grootvlei Power Station’s investment, through to economically active individuals spending their salaries on goods and services (and its resultant effects), is then estimated as the direct, indirect and induced impacts of Grootvlei Power Station’s investment and operations.

For more detail, an appendix with the methodology’s technical concepts is provided.

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11 The definition of low, medium and high-income household categories follows from the definition in the Income and Expenditure Survey (IES) 2010/11 by StatsSA. Low-income households include households with a monthly income of up to R9 886; medium income households include households with a monthly income of between R9 887 and R21 002; high-income households include households with a monthly income of R21 003 and above.
Economic & industry overview
3.1 South African economic overview

South Africa is a middle-income, emerging market with an abundant supply of natural resources and well-developed financial, legal, communications, energy and transport sectors. In 2016, South Africa was Africa’s second largest economy in terms of nominal GDP (US$), with Nigeria in first place.

South Africa’s macroeconomic environment is currently under pressure, characterised by a lower than expected growth rate, high, structural unemployment, high inflation, a volatile and depreciated currency.

Source: SARB, Stats SA, IHS Global Insight

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14 BMI, Based on Nominal GDP (USD bn)
3.1.1 Unemployment

South Africa’s official\textsuperscript{15} unemployment rate during Q4 of 2016 was a high 26.5\textsuperscript{16} and can be attributed to structural unemployment, i.e. a mismatch between the required and actual skills of the labour market. In general, the energy sector employs semi- and unskilled workers\textsuperscript{17}.

Continued elevated unemployment, along with deflated economic growth is likely to weigh on consumer purchasing power and confidence.\textsuperscript{18} Weak economic growth results in lower tax revenue yield, which in turn reduces governments’ ability to meet its obligations, particularly to the vulnerable, without having to borrow. Furthermore, rising income taxes directly reduce the ability for households to save and meet their living commitments. The number of households receiving at least one form of social grant rose from 29.9\% (of the population) in 2003 to 44.3\% in 2010. This rose to 45.5\% in 2015.\textsuperscript{19}

To alleviate the burden of electricity prices on the poor, in 2001, the government announced the provision of Free Basic Electricity (FBE) to poor households, which makes provision for 50 kWh of electricity to poor households identified by municipalities and connected to the national grid.

3.1.2 GDP

In terms of GDP for 2016, the major sectors consisted of the financial services sector, which contributed 20\%, the manufacturing sector 12\% and the mining sector 7\% to GDP\textsuperscript{20}. Although the energy sector (comprising of electricity, gas and water) contributed 2\%,\textsuperscript{21} electricity is a major input of all sectors. Decreased levels of security of supply of electricity, as well as electricity inflation, affect the productivity of all sectors with electricity as an input. The Energy Intensive Users Group (EIUG) consists of members from the Mining and Quarrying, Manufacturing, Electricity, Gas and Water Supply, Agriculture, Hunting, Forestry and Fishing, Transport, Storage and Communication and Wholesale and Retail Trade. This diverse array illustrates the broad need for electricity in the South African economy.

The World Economic Forum’s Global Competitiveness Index for 2016/17 ranks South Africa 47\textsuperscript{th} amongst 138 measured countries. South Africa’s financial and legal institutions perform particularly well.\textsuperscript{22} In terms of quality of electricity supply, South Africa ranks 112\textsuperscript{th} with a downward trend. As such, an improvement of electricity supply may work to improve competitiveness.

3.1.3 Inflation

On average, consumer prices exceeded the SARB’s inflation target (3 to 6\%) between 2007 and 2009, returning to the target range from 2010. The Consumer Price Index (CPI) steadily increased from 2011 and since 2014, the SARB reacted by increasing the repo rate from 5.75\% in July 2015 to 7\% in January 2017. Consequently, although inflationary pressures have declined, the rate hikes affect consumers with high debt, and some default on their credit obligations. The resultant reduced consumer spending contributes to a slowing economy.

\textsuperscript{15} The official definition excludes discouraged work seekers.
\textsuperscript{18} BMI, Emerging Markets Monitor, 2017. [Accessed on 11 February 2017]
CPI inflation in December 2016 rose to 6.8% year-on-year (y-o-y), which is outside of the SARB’s inflation target. However, this has declined to 6.1% in March 2017, still slightly above the inflation target. Inflation could still decline during the course of the year as above-normal summer rainfall could reverse the drought conditions and provide consumer food price inflation relief. Real GDP is forecast to fluctuate between 0.12% y-o-y in 2016 and 2.2% y-o-y in 2020. CPI inflation is expected to decline steadily from 2017 to 2018.

One of the largest drivers of CPI is ‘Electricity and other fuels’ which experienced a 7.4% y-o-y increase in December 2016.

A volatile ZAR/US$ exchange rate presents further inflationary pressures and raises borrowing costs. This can raise South Africa’s net national debt to GDP and result in excess repayments relative to GDP. This, in turn, limits resources for government investment spending and can inhibit the country’s further development. The graph below shows that going forward, inflationary pressures will remain along with low real GDP growth.

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Source: SARB, IMF, OECD

3.1.4 Key policies

South Africa’s rapid population growth, an ageing energy infrastructure as well as an energy-intensive socio-economic development agenda has led to increasing energy needs.

The Integrated Resource Plan (IRP) 2010 – 2030 sets out the country’s long-term energy needs and generating capacity requirements to secure a sustainable energy sector. In addition, the updated draft IRP, published in November 2016, focuses on electricity provision to 2050.

The Integrated Energy Plan (IEP), which takes into account all previous policies such as the IRP, aims to guide future energy investment, as well as to identify and recommend policy development to shape the energy industry. The IEP is enabled though the National Energy Act and is considered to be more descriptive than the IRP which is more prescriptive.


The National Development Plan 2030, South Africa’s blueprint for economic growth and development, aims to eliminate poverty and reduce inequality in South Africa by 2030.

3.1.5 Other global and domestic factors

Since the global financial crisis in 2007/08, growth in South Africa has decelerated, with real GDP growth declining from 5.5% y-o-y in 2005 to an estimated 0.4% y-o-y in 2016.26 GDP forecasts for 2017 suggest a slight increase in growth to 1.1%.27 This overall downward trend can be attributed to the slowdown in global economic activity, especially for South Africa’s trade partners, tied to a number of domestic factors. These include infrastructure gaps, labour market rigidity and unrest, and weak investment flows.28 The possibility of constrained electricity supply would further decrease growth forecasts and economic competitiveness, suggesting consistent supply of electricity from alternative sources.

Both local and external factors have an impact on South Africa’s economic outlook. The local factors that could place downward pressure on South Africa’s growth prospects include constrained electricity supply (load shedding), labour unrest accompanied by low commodity prices as well as potential divestment from the platinum and gold mining sectors.29 Potential platinum and gold mining divestments would mainly arise due to rising labour costs and labour unrest, electricity shortages and declining profitability. The threat of load shedding has been mitigated of late, which has positively affected the economy through fewer disruptions to business activity and wastage of products, as well as the lowered cost of generating back-up electricity incurred by households and businesses.30

Statistics South Africa (StatsSA) reported in March 2017 that the South African economy contracted by 0.3% quarter-on-quarter (q-o-q) during the last quarter of 2016. This was notably weaker than a growth rate of 0.4% q-o-q seen in the preceding quarter. The negative reading is associated with a contraction in the contribution to real gross domestic product (GDP) by the mining (-0.9% q-o-q) and manufacturing (-0.4% q-o-q) sectors, as production in both industries declined. However, the agricultural sector posted its first positive reading (+2.4% y-o-y) since Q1 of 2015 due to improved summer rainfall, while the services sectors all recorded positive y-o-y growth. In turn, mining (-3.1% y-o-y), manufacturing (-0.7% y-o-y) and utilities (-3.2% y-o-y) performed weaker.31

In the first half of 2017, a downgrade of South Africa’s sovereign rating from investment-grade “BBB-” (with a negative outlook) to a non-investment-grade “BB+” by both S&P Global Ratings and Fitch took place. The implication is that South African debt is now sub-investment grade. These changes have put fiscal and growth outcomes at risk in that internal government and party divisions could delay potential fiscal and structural reforms. A heightened sense of tension in the domestic political climate is resulting in more attention being paid to party political matters and less to national governance issues. As a result, the fiscal consolidation and structural reforms needed to place South Africa on a more sustainable economic trajectory over the long term will likely be delayed. Overall, these could affect the funding of planned infrastructure projects due to the increased associated borrowing costs.

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31 KPMG analysis
Developments in the United States of America (USA) and China are key economic drivers, which have an impact on the global economy and emerging markets such as South Africa. Continued interest rate hikes in the USA can produce depreciatory pressure on the Rand relative to the dollar. South Africa is dependent on foreign portfolio investment inflows and a higher USA interest rate could lead to an outflow of portfolio investment and a depreciation of the rand. The dampened economic activity in China translates into dampened demand for commodity exports to China and suggests a muted outlook for emerging markets like South Africa. In 2012, China was the destination for almost 84% of South Africa’s exports. Therefore, this could negatively affect South Africa’s economy because China is the largest importer of coal, precious metals and steel, amongst other things.

Other global risks include Brexit and its effect on South Africa. According to Moody’s, South Africa faces considerable exposure, all due to South Africa’s financial links with the United Kingdom (UK). Further risks include prospects of dampened growth in the UK.

The subdued outlook for economic growth over the medium term could negatively affect the economy because of rising production costs and expensive imports. In this context, a stable and cost-efficient supply of electricity will be a necessary condition in driving growth and productivity in the South African economy.

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33 Moody’s, Moody’s: Impact of Brexit on Sub-Sahara Africa is limited, but South Africa is more exposed, 2016. https://www.moodys.com/research/Moodys-Impact-of-Brexit-on-Sub-Sahara-Africa-is-limited--PR_351685 [Accessed on 06 February 2017]
3.2 Mpumalanga economic overview

The Mpumalanga economy has not performed well in terms of important macroeconomic variables such as, growth and unemployment, which could be attributable to low growth on a national level. In this section, we outline a number of variables that differentiate the Mpumalanga province from the average South African economy and the significance thereof.

3.2.1 GDP

With an annual economic growth rate of -0.2% for the year 2015, Mpumalanga’s contribution to South Africa’s GDP was the smallest compared to the other provinces (except the Free State). Mpumalanga’s GDP amounted to R222 billion in 2015, which contributed 7% (in constant prices) to South Africa’s national GDP.34 The main economic sectors contributing to economic growth in 2015 include the mining sector (20%), the wholesale sector (13%), the manufacturing sector (12%) and the government general services sector (11%). In March 2017, y-o-y inflation was 5.1% in Mpumalanga.35

3.2.2 Population and Demographics

In the 2016 statistical release of the mid-year population estimates report, Mpumalanga had an estimated population of 4.3 million people. Of this, 2.13 million are males and 2.2 million are females.

In terms of population group, the Mpumalanga population consists of 93.4% Black Africans, 6.0% White, 0.3% Indian/Asian and 0.3% Coloured.\textsuperscript{36}

3.2.3 Unemployment

Mirroring the structural challenges faced at a national level, Mpumalanga suffers from high unemployment. The unemployment rate of 31.0\% is slightly higher than the national average of 26.5\% recorded in the fourth quarter of 2016. The absorption rate, which is the proportion of the working-age population employed, was 40.9\% in Mpumalanga in the fourth quarter of 2016. This is lower than the South African absorption rate of 43.5\%.

In terms of education levels, 9.5\% of individuals aged 25-64 have progressed through post-secondary level; this is lower than the national average of 12.1\%.\textsuperscript{37} In 2016, labour was employed mostly in the formal sector\textsuperscript{38} (7 150 000) followed by the informal sector\textsuperscript{39} (2 510 000), private households (1 010 000) and the agriculture sector (88 000).\textsuperscript{40} Thus, in reducing the unemployment rate both provincially and nationally, it is important to increase the number of educated and skilled labour, especially in the formal sector where there is generally an increasing demand for skilled labour.


\textsuperscript{38} Formal sector definition: The formal sector has the following two components:

(i) Employers and own-account workers registered for VAT or income tax.

(ii) Employees paying income tax and those not paying tax but working in firms with five or more workers.

\textsuperscript{39} Informal sector: The informal sector has the following two components:

(i) Employees working in establishments that employ fewer than five employees, who do not deduct income tax from their salaries/wages; and

(ii) Employers, own-account workers and persons helping unpaid in their household business who are not registered for either income tax or value-added tax.

3.3 Electricity industry overview

In 2008, the Electricity, Gas and Water sector contributed 2% to South Africa’s GDP and by 2016 this increased to 2.4% (R64 billion).\(^{41}\)

Electricity is crucial for the functioning of the overall economy, particularly for energy-intensive sectors like mining and manufacturing.\(^{42}\)

Annual producer price inflation (PPI) for electricity and water was 10.8% in March 2017.\(^{43}\) This was higher than the average PPI figure of 5.2% for final manufactured goods in March 2017.\(^{44}\) These price increases result in future inflation for prices of consumer goods and subsequently discourage consumers from saving and reduce their purchasing power.

The main source for South Africa’s electricity generation in 2016 was coal, followed by nuclear, diesel and gas, pump storage, hydro- and wind sources.\(^{45}\)

Recently, South Africa experienced energy constraints again, through loadshedding, that were an impediment to economic growth in 2015. Eskom’s large power projects such as the Kusile and Medupi power plants, which have been under construction for about 10 years,\(^{46}\) will add approximately 10 000 megawatts (MW) of capacity to the national grid.\(^{47}\) These projects could potentially alleviate the electricity supply constraints in the country.


Furthermore, South Africa’s reliance on coal means that the country is a major emitter of greenhouse gases (GHG). In response, the country indicated its intention to opt for ‘green’ energy sources to reduce emissions.\(^{48}\)

South Africa is the fifth largest coal producer in the world, producing an average of 224 million tones of marketable coal annually.\(^{49}\)

Eskom has 14 coal-fired power stations in South Africa, of which 11 are located primarily in the Mpumalanga province. Currently, South Africa has 46,417 MW of installed capacity, with 30,066 MW (65%) of this capacity being installed in Mpumalanga.

In 2016, 90.7% of households in Mpumalanga had electricity connections. This is higher than the national average of 89.5%, which is an indication that Eskom and municipalities, together with the Department of Energy (DoE) have made considerable progress towards accelerating the government’s objective of universal access to electricity by 2025.

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Grootvlei’s estimated economic contribution through capital expenditure
4  Grootvlei Power Station’s estimated economic contribution through capital expenditure

Since 1969, Grootvlei Power Station has contributed towards both the Mpumalanga and South African economies through job creation, infrastructure development, community development and transformation. This section of the report provides insight into the nature and magnitude of Grootvlei Power Station’s contribution to the economy through capital expenditure, as well as the knock on effects resulting from the power station’s direct capital investment.

4.1  Grootvlei Power Station’s capital investment

Grootvlei Power Station’s capital expenditure is classified in the following four categories:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1: <strong>Property, Plant and Equipment (PPE)</strong></td>
<td>Refers to tangible assets used as part of the power station’s daily operations. These include vehicles, computer equipment, plant and laboratory equipment, properties, office equipment, security equipment and furniture.</td>
</tr>
<tr>
<td>Category 2: <strong>General Overhauls (GO) Capex</strong></td>
<td>Assets that are specific to electricity operations such as boilers, turbines, electrical equipment, common plant equipment, piping and similar assets. This includes capital expenditure associated with long shut-downs for maintenance purposes of usually 90 days or more.</td>
</tr>
<tr>
<td>Category 3: <strong>Technical plan projects</strong></td>
<td>Capital expenditure relating specifically to the power station. Examples include replacement of cables, isolation valves, coal analysers, sluiceway covers, etc.</td>
</tr>
<tr>
<td>Category 4: <strong>Group Capital Division projects</strong></td>
<td>Capital associated with projects for upgrades or refurbishment of major components or any project that ensures compliance to environmental or safety legislation. This is allocated from the national budget (i.e. Eskom head office).</td>
</tr>
</tbody>
</table>

Source: Eskom
Capital expenditure by Grootvlei Power Station increased from about R298 million in FY2014/15 to R554 million in FY2015/16. This includes capital associated with PPE, GO, technical plan projects and Group Capital Division projects. In the case of Grootvlei Power Station, this includes capital expenditure spent within South Africa as well as internationally.

**GO capital** at Grootvlei Power Station increased by about R515 million from R9 million in FY2014/15 to R524 million in FY2016/17. This was primarily due to increased capital expenditure on boiler and turbine equipment. This explains the upward trend in GO capital shown on the graph.

Due to the nature of the capital expenditure associated with Grootvlei Power Station, Eskom sources the majority of capital goods from South Africa, although a portion is foreign. Grootvlei Power Station’s **foreign capital spend** over the period FY2014/15 to FY2016/17 totalled about R255 million. In comparison, R1.4 billion of the capital expenditure was made within South Africa (including Mpumalanga).

It is noteworthy that the model used to estimate the economic contribution has used only the local spend. The foreign component effects a separate economic impact.

Source: Grootvlei data and KPMG calculations
Over the period FY2014/15 to FY2016/17, 8.4% of Grootvlei Power Station’s **local capital spend** (i.e. R1.4 billion), was spent in Mpumalanga. This amounted to R126 million.

Over the period FY2014/15 to FY2016/17, **49%** of this **provincial** capital expenditure was spent on projects relating to **GO Capital** and another **49%** on **Technical Plan Projects and Group Capital Division**.

Not only will Grootvlei Power Station be able to assist in securing a portion of future electricity supply, but also capital expenditure by Grootvlei Power Station is likely to create a number of economic benefits for both Mpumalanga and the rest of South Africa. This includes economic growth, the creation of jobs and poverty alleviation.

### 4.2 Grootvlei Power Station’s estimated contribution to GDP through capital expenditure

Since GDP represents the total value of all final goods and services produced in the country, it is fundamental to estimating the economic value produced in Mpumalanga and the rest of South Africa. In this section we estimate the economic contribution of capital expenditure for the period FY2014/15 to FY2016/17.

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Source: Grootvlei Power Station data and KPMG calculations
The following table indicates the estimated economic activity created in Mpumalanga due to the capital expenditure by Grootvlei Power Station of R126 million between FY2014/15 and FY2016/17. It is important to note that KPMG only took the capital expenditure that took place within Mpumalanga into account.

### IMPACT ON MPUMALANGA

<table>
<thead>
<tr>
<th>GDP impact 50 (Rand millions)</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2014/15</td>
<td>R9 million</td>
<td>R2 million</td>
<td>R1 million</td>
<td>R12 million</td>
</tr>
<tr>
<td>FY2015/16</td>
<td>R6 million</td>
<td>R2 million</td>
<td>R1 million</td>
<td>R8 million</td>
</tr>
<tr>
<td>FY2016/17</td>
<td>R6 million</td>
<td>R2 million</td>
<td>R1 million</td>
<td>R8 million</td>
</tr>
<tr>
<td>Total GDP impact</td>
<td>R20 million</td>
<td>R6 million</td>
<td>R2 million</td>
<td>R28 million</td>
</tr>
<tr>
<td>Annual average GDP impact between FY2014/15 and FY2016/17</td>
<td>R7 million</td>
<td>R2 million</td>
<td>R1 million</td>
<td>R9 million</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga

The total estimated provincial economic activity created due to the local capital expenditure over the period FY2014/15 to FY2016/17 was in the order of R28 million. The direct impact accounted for about 0.003% of the total GDP impact.

The following table shows the expected economic activity created in the rest of South Africa (excluding Mpumalanga) due to the local capital expenditure by Grootvlei Power Station. The results below are attributable only to the capital expenditure spent outside of the Mpumalanga province and the rest of South Africa (i.e. R1.4 billion), and not the total expenditure amount including Mpumalanga (i.e. R1.5 billion).
IMPACT ON THE REST OF SOUTH AFRICA (EXCLUDING MPUMALANGA)

<table>
<thead>
<tr>
<th>GDP impact (Rand millions)</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2014/15</td>
<td>R179 million</td>
<td>R55 million</td>
<td>R90 million</td>
<td>R324 million</td>
</tr>
<tr>
<td>FY2015/16</td>
<td>R313 million</td>
<td>R121 million</td>
<td>R130 million</td>
<td>R566 million</td>
</tr>
<tr>
<td>FY2016/17</td>
<td>R339 million</td>
<td>R132 million</td>
<td>R139 million</td>
<td>R609 million</td>
</tr>
<tr>
<td>Total GDP impact</td>
<td>R831 million</td>
<td>R308 million</td>
<td>R359 million</td>
<td>R1 498 million</td>
</tr>
<tr>
<td>Annual average GDP impact between FY2014/15 and FY2016/17</td>
<td>R277 million</td>
<td>R103 million</td>
<td>R120 million</td>
<td>R499 million</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa

The estimated economic activity created in the rest of South Africa, due to the local capital expenditure over the period FY2014/15 to FY2016/17 was in the order of R1.5 billion. This impact represented an estimated 0.01% of the GDP for the rest of South Africa.51

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

4.3 Grootvlei Power Station’s estimated contribution to employment through capital expenditure

Grootvlei Power Station’s capital expenditure also contributes towards promoting and sustaining employment in the economy, which generates income for households, both directly and indirectly.

Grootvlei Power Station has created and/or sustained three kinds of jobs in the South African economy. These include the direct jobs that were created as a result of on-going capital expenditure, the so-called indirect jobs resulting from multiplier effects of the capital expenditure and lastly the induced jobs that occur as a result of the payment of salaries and wages to people who are directly employed by Grootvlei Power Station for capital related projects. These jobs, created due to Grootvlei Power Station’s capital expenditure, are depicted below.

50 These numbers have been rounded off to the nearest whole number.
51 Total GDP of the rest of South Africa excluding Mpumalanga from 2014 to 2016 = R11 269 393 million (Source: IHS Global Insight).
The table below indicates the estimated impact on employment from Grootvlei Power Station’s capital expenditure in Mpumalanga. These numbers reflect the average number of jobs sustained per year over the relevant period.

### IMPACT ON MPUMALANGA

<table>
<thead>
<tr>
<th>Average number of jobs sustained per year over the period</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2014/15</td>
<td>27</td>
<td>14</td>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>FY2015/16</td>
<td>10</td>
<td>10</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>FY2016/17</td>
<td>10</td>
<td>9</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Annual average jobs sustained between FY2014/15 and FY2016/17</td>
<td>16</td>
<td>11</td>
<td>4</td>
<td>31</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga

It is estimated that the capital expenditure by Grootvlei Power Station, over the period **FY2014/15 to FY2016/17**, sustained on average about **31 jobs** per year in Mpumalanga.

The table below shows the estimated impact on employment sustained on average per year, in the rest of South Africa (excluding Mpumalanga) due to the local capital expenditure by Grootvlei Power Station.
### IMPACT ON THE REST OF SOUTH AFRICA (EXCLUDING MPUMALANGA)

<table>
<thead>
<tr>
<th></th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2014/15</td>
<td>437</td>
<td>254</td>
<td>365</td>
<td>1 056</td>
</tr>
<tr>
<td>FY2015/16</td>
<td>555</td>
<td>460</td>
<td>532</td>
<td>1 548</td>
</tr>
<tr>
<td>FY2016/17</td>
<td>598</td>
<td>491</td>
<td>568</td>
<td>1 657</td>
</tr>
<tr>
<td>Annual average jobs sustained between FY2014/15 and FY2016/17</td>
<td>530</td>
<td>402</td>
<td>489</td>
<td>1 420</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa

The capital expenditure by Grootvlei Power Station over the period **FY2014/15 to FY2016/17** sustained about **1 420 jobs** on average per year, in the rest of South Africa (over and above the jobs sustained in Mpumalanga). This impact represented an estimated **0.01%** of formal employment in the rest of South Africa.55

### 4.4 Grootvlei Power Station’s estimated contribution to the national fiscus through capital expenditure

Not only does capital expenditure by Grootvlei Power Station contribute towards economic growth and job creation, it also contributes to the national fiscus. This occurs due to the increase in government revenue flows from the collection of direct and indirect tax revenue by Grootvlei Power Station, through the suppliers they use during expansion and related capital projects. It also includes the broader fiscal impacts generated through the linkages between the capital expenditure and other economic sectors.

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52 Please note that the employment figures shown in the table only include formal sector jobs created. Jobs created in the informal sector are not included and therefore this underestimates the total number of jobs that could potentially be created in the economy.

53 The average per year is the total impact over the period, divided by number of years.

54 Please note that the employment figures shown in the table only include formal sector jobs created. Jobs created in the informal sector are not included and therefore this underestimates the total number of jobs that could potentially be created in the economy.

55 The average number of jobs in the rest of South Africa between 2014 and 2016 was 14 641 000 (Source: StatsSA Statistical release P0211, Quarterly Labour Force Survey (QLFS), Quarter 4, 2016).
Capital expenditure associated with Grootvlei Power Station resulted in an estimated contribution of **R261 million** to total government revenue in South Africa (including Mpumalanga). This is over the period **FY2014/15 – FY2016/17**.

Of this amount, an estimated **R4 million** in tax revenue was generated from Mpumalanga. This amount is associated with direct and indirect tax revenue collected by the national fiscus from companies in Mpumalanga linked to Grootvlei Power Station’s capital expenditure.

The increase in government revenue stems from the collection of **direct and indirect tax revenue** by the companies associated with capital expenditure, as well as the broader fiscal impacts generated through the linkages the capital expenditure has with other economic sectors.

**Source:** KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

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### 4.5 Grootvlei Power Station’s estimated contribution to households through capital expenditure

Poverty alleviation is one of the South African government’s main priorities. The government classifies a low-income household as a household that earns between R1 and R6 324 annually.\(^{56}\)

Therefore, it is important to understand how the households in Mpumalanga and the rest of South Africa will also benefit from the activities associated with the local capital expenditure by Grootvlei Power Station through the downward stream of income sources, i.e. salaries and wages.
Households in Mpumalanga and the rest of South Africa also benefited from the capital expenditure by Grootvlei Power Station. This occurred through the downward stream of income sources, i.e. salaries and wages.

The total income received by households in Mpumalanga, over the period FY2014/15 to FY2016/17, was estimated to be in the order of R6 million. An estimated R1 million (8.9% of total household income) of this amount went to lower income households in Mpumalanga.

In addition, the total income received by households in the rest of South Africa (excluding Mpumalanga), over the period FY2014/15 to FY2016/17, was estimated to be in the order of R659 million. Approximately R19 million (2.9% of total household income) of this amount went to lower income households in the rest of South Africa (excluding Mpumalanga).

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

4.6 Potential future economic benefits through capital expenditure

Grootvlei Power Station’s capital expenditure contributed positively towards improving economic development in Mpumalanga, as well as the rest of South Africa over recent years. The increase in overall productivity and efficiency drove overall economic growth, because of the long-term nature of the economic benefit streams created, especially in downstream user industries. It is also evident that future capital expenditure in Grootvlei Power Station will continue to have a positive impact on the Mpumalanga and South African economies. The long-term economic benefits that could be realised because of capital expenditure by Grootvlei Power Station are shown in the table below. Please note that these figures are based on Grootvlei Power Station specific information and capital spending structure and, as such, should not be used as an indication for any other type of investment.

### Potential long-term economic benefits to Mpumalanga and the rest of South Africa from future capital expenditure by Grootvlei Power Station

Every R1 of new investment in infrastructure development in Grootvlei Power Station potentially contributes 25 cents to the Mpumalanga economy. In addition, it potentially generates another R1.12 to the rest of South Africa. These multiplier impacts highlight the contribution that infrastructure development and capital expenditure in electricity infrastructure makes to the economy, as well as the efficiency and productivity thereof.
Additional capital expenditure into infrastructure development associated with Grootvlei Power Station potentially implies the following:

- 1 job in Mpumalanga per R1 million invested and
- 3 jobs in the rest of South Africa per R1 million invested.

Every R1 of new investment into infrastructure development associated with Grootvlei Power Station, potentially contributes **12 cents** to national government revenue.

Future capital expenditure by Grootvlei Power Station implies potential poverty alleviation impact for Mpumalanga and the rest of South Africa in that

- 8.9% of household income generated in Mpumalanga will flow to low-income households
- 2.9% of household income generated in the rest of South Africa will flow to low-income households.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga
Grootvlei’s estimated economic contribution through day-to-day operations
5 Grootvlei Power Station’s estimated economic contribution through day-to-day operations

Electricity has been a key driver of the country’s development over the past century and will continue to be a key enabler for economic growth and job creation. Grootvlei Power Station also has a responsibility towards society, the economy and environment. Indeed, as the results below indicate, Grootvlei Power Station’s day-to-day operations positively affect Mpumalanga and South Africa.

In this section of the report, we consider Grootvlei Power Station’s direct contribution to the economy; in terms of electricity generation and operational spend, as well as the knock on effects that have results from such expenditure.

5.1 Grootvlei Power Station’s income through electricity generation

Even though Grootvlei Power Station does not necessarily generate revenue from its operations, it does however generate internal revenue sales along with other sources of income. These activities still ensure a reliable supply of electricity to the national grid, consequently creating and sustaining economic activity since electricity is used country wide by all sectors. In this way, it is a key enabler for economic growth and job creation.

The total internal electricity sales decreased from **R4.4 billion in FY2014/15** to about **R4.3 billion in FY2016/17**, highlighting a decrease of about **2%** on average per year.

**Other income** also decreased from **R45 million in FY2014/15** to **R9 million in FY2016/17**.

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Source: Grootvlei data and KPMG calculations

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5.2 Grootvlei Power Station’s estimated contribution to GDP through day-to-day operations

Since GDP represents the total value of all final goods and services produced in the country, it is fundamental to estimating the economic value produced in South Africa. In this section we estimate the economic contribution of operational expenditure for the period FY2014/15 to FY2016/17.
Grootvlei Power Station’s day-to-day operations relating to electricity generation created GDP in Mpumalanga. The results are shown in the table below.

<table>
<thead>
<tr>
<th>IMPACT ON MPUMALANGA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GDP impact</strong> (Rand millions)</td>
</tr>
<tr>
<td>FY2014/15</td>
</tr>
<tr>
<td>FY2015/16</td>
</tr>
<tr>
<td>FY2016/17</td>
</tr>
<tr>
<td><strong>Total GDP impact</strong></td>
</tr>
</tbody>
</table>

| Annual average GDP impact between FY2014/15 and FY2016/17 | R1 101 million | R2040 million | R427 million | R3 568 million |

Source: KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga

Total economic activity created in Mpumalanga from the day-to-day operations of Grootvlei Power Station between FY2014/15 to FY2016/17 was estimated to be in the order of R10.7 billion. The direct impact accounted for 31% of the total GDP impact, which shows the importance of the so-called multiplier effect of generation cost on the Mpumalanga economy. The GDP impact represented an estimated 1.2% of the provincial Mpumalanga GDP.

Over and above the impact on GDP in the Mpumalanga province, there is also an impact on the Gauteng economy. This is due to the fact that about 71% of employees of Grootvlei Power Station live in Gauteng. As a result, the salaries and wages flowing into Gauteng, and the resulting demand for goods and services in Gauteng, will have an impact on the Gauteng economy. In particular, an estimated average of about R347 million per year in GDP over the period FY2014/15 to FY2016/17 was generated in Gauteng due to the spending of these salaries and wages.

The following table shows the estimated economic activity in the rest of South Africa (excluding Mpumalanga and Gauteng) due to the current day-to-day operations of Grootvlei Power Station between FY2014/15 and 2016/17.

Source: KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga

Over and above the impact on GDP in the Mpumalanga province, there is also an impact on the Gauteng economy. This is due to the fact that about 71% of employees of Grootvlei Power Station live in Gauteng. As a result, the salaries and wages flowing into Gauteng, and the resulting demand for goods and services in Gauteng, will have an impact on the Gauteng economy. In particular, an estimated average of about R347 million per year in GDP over the period FY2014/15 to FY2016/17 was generated in Gauteng due to the spending of these salaries and wages.

The following table shows the estimated economic activity in the rest of South Africa (excluding Mpumalanga and Gauteng) due to the current day-to-day operations of Grootvlei Power Station between FY2014/15 and 2016/17.

57 Total GDP of Mpumalanga from 2014 to 2016 = R922 030 million (Source: IHS Global Insight).
### IMPACT ON THE REST OF SOUTH AFRICA (EXCLUDING MPUMALANGA AND GAUTENG)

<table>
<thead>
<tr>
<th>GDP impact (Rand millions)</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2014/15</td>
<td>R0</td>
<td>R235 million</td>
<td>R1 355 million</td>
<td>R1 590 million</td>
</tr>
<tr>
<td>FY2015/16</td>
<td>R0</td>
<td>R243 million</td>
<td>R1 254 million</td>
<td>R1 497 million</td>
</tr>
<tr>
<td>FY2016/17</td>
<td>R0</td>
<td>R261 million</td>
<td>R1 354 million</td>
<td>R1 615 million</td>
</tr>
<tr>
<td>Total GDP impact</td>
<td>R0</td>
<td>R739 million</td>
<td>R3 962 million</td>
<td>R4 701 million</td>
</tr>
<tr>
<td>Annual average GDP impact</td>
<td>R0</td>
<td>R246 million</td>
<td>R1 321 million</td>
<td>R1 567 million</td>
</tr>
<tr>
<td>between FY2014/15 and FY2016/17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa

The total estimated economic activity created due to the costs involved in the day-to-day operations of Grootvlei Power Station over the period FY2014/15 to 2016/17 was in the order of **R4.7 billion**. This impact represented an estimated **0.04%** of the GDP for the rest of South Africa. ⁵⁸

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⁵⁸ Total GDP of the rest of South Africa excluding Mpumalanga from 2014 to 2016 = R11 269 393 million (Source: IHS Global Insight).
5.3 Grootvlei Power Station’s estimated contribution to employment through day-to-day operations

Grootvlei Power Station contributes towards promoting employment in the electricity industry as well as the rest of the economy, which generates income for households, both directly and indirectly. Over the period FY2014/15 to FY2016/17, on average per year, Grootvlei Power Station employed 528 people directly through its operations. This number excludes the people employed temporarily and the people associated with the capital projects.

Between 2014 and 2016, employment in the Mpumalanga utility sector (which includes electricity) grew by about 9.5%. Over this period, this sector employed, on average, about 1.6% of Mpumalanga’s workforce and, on average, about 26.9% of the national utility sector’s workforce.

Grootvlei Power Station employed, on average, per year over the period FY2014/15 to FY2016/17 528 people within its operations.

Grootvlei Power Station’s labour force are skilled and semi-skilled employees. This implies that Grootvlei Power Station provides high quality employment opportunities.

Grootvlei Power Station created and/or sustained three kinds of jobs in the South African economy. These include the direct jobs that were created due to on-going operations, the so-called indirect jobs resulting from multiplier effects of the operating expenditure and lastly, the induced jobs that occur due to the payment of salaries and wages to people who are directly employed by Grootvlei Power Station. These jobs, created due to Grootvlei Power Station’s operations, are depicted below.

Source: StatsSA Statistical release P0211 (Quarterly Labour Force Survey (QLFS), Quarter 4, 2016), Grootvlei Power Station data

Grootvlei Power Station created and/or sustained three kinds of jobs in the South African economy. These include the direct jobs that were created due to on-going operations, the so-called indirect jobs resulting from multiplier effects of the operating expenditure and lastly, the induced jobs that occur due to the payment of salaries and wages to people who are directly employed by Grootvlei Power Station. These jobs, created due to Grootvlei Power Station’s operations, are depicted below.
The table below indicates the estimated impact on employment from Grootvlei Power Station day-to-day operations in Mpumalanga. These numbers reflect the average number of jobs sustained per year over the relevant periods.

<table>
<thead>
<tr>
<th>IMPACT ON MPUMALANGA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of jobs sustained per year over the period</td>
</tr>
<tr>
<td>FY2014/15</td>
</tr>
<tr>
<td>FY2015/16</td>
</tr>
<tr>
<td>FY2016/17</td>
</tr>
<tr>
<td>Annual average jobs sustained between FY2014/15 and FY2016/17</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga

It is estimated that the day-to-day operations associated with Grootvlei Power Station, over the period FY2014/15 to FY2016/17, sustained, on average, about 7 622 jobs per year in Mpumalanga. This represented 0.6% of total formal employment in the province.

Over and above the above impact on employment in the Mpumalanga province, there is also an impact on the Gauteng economy. This is due to the fact that about 71% of employees of Grootvlei Power Station live in Gauteng. As a result, the salaries and wages flowing into Gauteng, and the resulting demand for goods and services in Gauteng, will have an impact on the Gauteng economy. In particular, an estimated average of 620 jobs per year over the period FY2014/15 to FY2016/17 was generated in Gauteng due to the spending of these employees’ spending of salaries and wages and the additional demand for goods and services this creates.

The table below shows the estimated impact on employment sustained on average per year, in the rest of South Africa (excluding Mpumalanga and Gauteng) due to the current day-to-day operations associated with Grootvlei Power Station.
### IMPACT ON THE REST OF SOUTH AFRICA (EXCLUDING MPUMALANGA AND GAUTENG)

<table>
<thead>
<tr>
<th>Average number of jobs sustained per year over the period</th>
<th>Direct impact</th>
<th>Indirect impact</th>
<th>Induced impact</th>
<th>Total impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2014/15</td>
<td>0</td>
<td>1 808</td>
<td>4 779</td>
<td>6 587</td>
</tr>
<tr>
<td>FY2015/16</td>
<td>0</td>
<td>1 716</td>
<td>4 431</td>
<td>6 147</td>
</tr>
<tr>
<td>FY2016/17</td>
<td>0</td>
<td>1 760</td>
<td>4 782</td>
<td>6 541</td>
</tr>
<tr>
<td>Annual average jobs sustained between FY2014/15 and FY2016/17</td>
<td>0</td>
<td>1 761</td>
<td>4 664</td>
<td>6 425</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa

The day-to-day operations associated with Grootvlei Power Station over the period FY2014/15 to FY2016/17 sustained about **6 425 jobs** on average per year, in the rest of South Africa (over and above the jobs sustained in Mpumalanga and Gauteng) over this period. This impact represents an estimated **0.04%** of formal employment in the rest of South Africa.\(^{62}\)

### 5.4 Grootvlei Power Station’s estimated contribution to the national fiscus through day-to-day operations

Grootvlei Power Station and the electricity sector’s contribution to public finance represent a major part of its positive impact within the societies in which it operates. The industry’s contribution to public finances is both direct and indirect, through a wide range of taxes, as well as non-taxation revenue mechanisms.

Grootvlei Power Station and the electricity sector also contribute indirectly to government tax revenue and stimulate economic activity throughout its operations, incorporating a wide range of producers and suppliers.

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\(^{59}\) Please note that the employment figures shown in the table only include formal sector jobs created. Jobs created in the informal sector are not included and therefore this underestimates the total number of jobs that could potentially be created in the economy.

\(^{60}\) The average number of jobs in Mpumalanga from 2014 and 2016 was 1 161 333 (Source: StatsSA Statistical release P0211, Quarterly Labour Force Survey (QLFS), Quarter 4, 2016).

\(^{61}\) Please note that the employment figures shown in the table only include formal sector jobs created. Jobs created in the informal sector are not included and therefore this underestimates the total number of jobs that could potentially be created in the economy.

\(^{62}\) The average number of jobs in the rest of South Africa between 2014 and 2016 was 14 641 000 (Source: StatsSA Statistical release P0211, Quarterly Labour Force Survey (QLFS), Quarter 4, 2016).
Day-to-day operations associated with Grootvlei Power Station resulted in an estimated contribution of **R4.4 billion** to total government revenue in South Africa (including Mpumalanga). This is over the period FY2014/15 – FY2016/17.

An estimated **54% or R2.4 billion**, of this total government revenue comes from Mpumalanga. This amount is associated with direct and indirect tax revenue collected by the national fiscus from companies in Mpumalanga linked with Grootvlei Power Station’s day-to-day operational cost.

The increase in government revenue stems from the collection of **direct and indirect tax revenue** by the companies and suppliers associated with the day-to-day operations, as well as the broader fiscal impacts generated through the linkages the operational expenditure has with other economic sectors.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

### 5.5 Grootvlei Power Station’s estimated contribution to households through day-to-day operations

Poverty alleviation is one of the South African government’s main priorities. Due to the nature of Grootvlei Power Station’s operational expenditure, a greater income flow occurs to households outside the province than within, affecting the impact on poverty alleviation at a national level. Therefore, it is important to understand how the households in Mpumalanga and the rest of South Africa will benefit from the activities associated with Grootvlei Power Station’s day-to-day operations through the downward stream of income sources, i.e. salaries and wages.
Households in Mpumalanga and the rest of South Africa also benefitted from the day-to-day operations of Grootvlei Power Station. This occurred through the downward stream of income sources, i.e. salaries and wages. The total income received by households in Mpumalanga over the period **FY2014/15 to FY2016/17** was estimated to be in the order of **R3.5 billion**. Lower income households in Mpumalanga received an estimated **R403 million** (12% of the total).

In addition, the total income received by households in the rest of South Africa (excluding Mpumalanga), over the period **FY2014/15 to FY2016/17**, was estimated to be in the order of **R6.2 billion**. An estimated **R305 million** (4.9% of total) of this amount went to lower income households in the rest of South Africa (excluding Mpumalanga).

**Source:** KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

### 5.6 Estimated future economic benefits through day-to-day operations

Over the period FY2014/15 to FY2016/17, Grootvlei Power Station’s electricity generation and operations contributed to a more efficient and productive economy through the long-term nature of the economic benefit streams it created, especially in downstream user industries. Other benefits that could be realised because of the continued operational cost for Grootvlei Power Station are shown in the table below.

#### Potential long-term economic benefits to Mpumalanga and the rest of South Africa associated with day-to-day operations of Grootvlei Power Station

- **Every R1 of spend** on operational cost at Grootvlei Power Station, potentially contributes **85 cents** to the Mpumalanga economy. In addition, it potentially generates another **37 cents** to the rest of South Africa. These multiplier impacts highlight the contribution of on-going operations and generation to the economy as well as the efficiency and productivity thereof.

- Additional operational expenditure associated with Grootvlei Power Station, potentially implies the following:
  - **2 jobs in Mpumalanga per R1 million spent** and
  - **2 jobs in the rest of South Africa per R1 million spent.**
Every R1 of spend on running Grootvlei Power Station, potentially contributes 10 cents to national government revenue.

Future operational cost by Grootvlei Power Station implies poverty alleviation impact for Mpumalanga and the rest of South Africa in that

- 11.7% of household income generated in Mpumalanga will flow to low-income households
- 4.9% of household income generated in the rest of South Africa will flow to low-income households.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga
Local Economy
6 Local Economy

Mpumalanga province is divided into three district municipalities (Nkangala, Ehlanzeni and Gert Sibande), which are further subdivided into 17 local municipalities. Grootvlei Power Station is located in Dipaleseng Local Municipality within the Gert Sibande district.

This section of the report provides insight into the economic overview of Dipaleseng Local Municipality. We also consider the economic overview of Groovlei and Balfour towns where Grootvlei Power Station employees reside within the municipality. In addition, we estimate the economic impact of Grootvlei Power Station’s contribution to the economy of Dipaleseng Local Municipality.

6.1 Economic overview of Dipaleseng Local Municipality and the local towns

6.1.1 Dipaleseng Local Municipality overview

Dipaleseng Local Municipality is the smallest of seven municipalities in the Gert Sibande district. The municipality is situated 80km southeast of Johannesburg and benefits from the spill over effects of development (i.e. infrastructure) in Gauteng. The main economic sectors in the municipality are Community Services, Manufacturing, Trade, and Agriculture. Electricity is the fifth largest economic sector in the municipality, after the aforementioned sectors. The electricity sector’s contribution to total industry in the municipality was 8.5% in 2015.

In 2015, the population of Dipaleseng Local Municipality was 43,142, which represented 4.0% of the Gert Sibande population. The municipality is characterised by a high urban population rate of [63-67].

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[63] Albert Luthuli, Bushbuckridge, Dipaleseng, Dr JS Moroka, Emakhandeni, Ermahleni, Govan Mbeki, Lekwa, Mbombela, Mkhondo, Msukaligwa, Nkomazi, Pixley ke Seme, Steve Tshwete, Thaba Chweu, Thembisile Hani and Victor Khanye


[65] IHS Global Insight, 2017

[66] IHS Global Insight, 2017

[67] IHS Global Insight, 2017

Source: Stats SA, AfriGIS, IHS Global Insight
88.7%, which was higher than Mpumalanga province’s urban population rate of 48.9% in the same period. This implies that majority of the Dipaleseng Local Municipality population resides in towns or cities, which are characterised by high population densities and access to infrastructure.

In the Dipaleseng Local Municipality, 8 799 (20.4%) people were formally employed in 2015. The unemployment in the Dipaleseng Local Municipality was 35.2%, which was higher than the provincial unemployment rate of 28.2% in the same period. The average annual disposable income for municipality residents was R1 251 in 2010 constant prices. In 2015, an estimated 17.6% of Dipaleseng Local Municipality individuals lived below the food poverty line of R498, a smaller share than the national average of 21.8%. In 2015, 75.8% of the citizens older than 15 years were functionally literate in the municipality. This was lower than the national literacy rate of 83.0%. A lower literacy implies a lower skilled work force.

The Dipaleseng Local Municipality had a moderately diversified economy as indicated by the Tress Index score of 33.3 in 2015. The Tress Index measures the level of diversification in an economy. Diversification is the measure of how vulnerable an economy is to exogenous factors such as climatic conditions and price fluctuations. An index score close to 100 is indicative of a concentrated economy with high vulnerability, whilst an index score close to zero indicates diversification and minimal vulnerability. Dipaleseng Local Municipality scored higher than Mpumalanga province (35.4), which was less diverse. The dispersion of economic activity amongst the economic sectors means that the municipality is less vulnerable to sector disruption. The existence of Grootvlei in the municipality contributes to the diversification of the local community.

6.1.2 Grootvlei town overview

Grootvlei is an old mining town in Mpumalanga located in the Dipaleseng Local Municipality. The community had a booming economy in the 1970s and 1980s, when demand for coal was heightened. As a result, new jobs were created and economic activity ensued.

In the 2011 Census, Grootvlei town had a population of 2 843, representing about 8.8% of the Dipaleseng Local Municipality population in the same period. Of this population, 87.9% were African, 10.9% White, 0.2% Indian or Asian, 0.7% Coloured and 0.2% were other. The racial composition in Grootvlei town was similar to that of the Dipaleseng Local Municipality.

In 2011, 849 (22.1%) of Grootvlei town’s population were in formal employment. The unemployment rate at the time of the Census in Grootvlei town was 33.7%. The Census also showed that a sizeable number (46.6%) of the population were not economically active. The Census considered people economically inactive if they were able and available to work in the week prior to the survey but did not work, did not look for work, and did not try to start their own business. The definition includes students and adults caring for children at home. The unemployment rate and the economically inactive statistics imply that there was a lack of employment opportunities within the town during that period.

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68 IHS Global Insight, 2017
69 IHS Global Insight, 2017
70 IHS Global Insight, 2017
71 IHS Global Insight, 2017
72 IHS Global Insight, 2017
73 IHS Global Insight, 2017
74 The Development Bank of South Africa measures the Tress Index by ranking sector contributions to GDP, allocating weights to the sectors based on their position, calculating the sum total of the weighted values and converting the values into index format.
75 IHS Global Insight, 2017
76 AfriGIS Census Portal, data accessed from StatsSA
77 AfriGIS Census Portal, data accessed from StatsSA
78 AfriGIS Census Portal, data accessed from StatsSA
79 AfriGIS Census Portal, data accessed from StatsSA
80 Stats SA. [Accessed on 11 May 2017]
6.1.3 Balfour town overview

Balfour is a small coal mining and maize farming town in the Dipaleseng Local Municipality. The town is located in what is known as Cosmos country, the south western area of Mpumalanga that is at the centre of the country’s coal mining.\(^{81}\) The town has been in existence since the 1800s and was named Balfour in 1905 after the British Minister of the time.

In the 2011 Census, Balfour town had a population of 3 201, representing about 7.2% of the Dipaleseng Local Municipality population.\(^{82,83}\) Of this population, 50.2% were African, 38.4% White, 9.4% Indian or Asian, 1.4% Coloured and 0.6% were other.\(^{84}\) This differs from the racial composition of the Dipalesneg Local Municipality in 2011, which was 91.6% African, 6.9% White, 0.9% Indian or Asian and, 0.6% Coloured.\(^{85}\)

In 2011, 1 203 (37.6%) of Balfour town’s population were in formal employment.\(^{86,87}\) This number does not account for Balfour town employees who reside elsewhere. The unemployment rate at the time of the Census in Balfour town was 7.3%.\(^{88}\) The Census also showed that a sizeable number (34.3%) of the population were not economically active.\(^{89}\) The low unemployment rate in the town partly explains the level of economic inactivity. Lack of employment opportunities also explains the size of economically inactive people in the town.


\(^{82}\) AfriGIS Census Portal, data accessed from StatsSA

\(^{83}\) Most recent an available data

\(^{84}\) AfriGIS Census Portal, data accessed from StatsSA

\(^{85}\) AfriGIS Census Portal, data accessed from StatsSA

\(^{86}\) AfriGIS Census Portal, data accessed from StatsSA

\(^{87}\) Most recent an available data

\(^{88}\) AfriGIS Census Portal, data accessed from StatsSA

\(^{89}\) The Census considered people economically inactive if they were able and available to work in the week prior to the survey but did not work, did not look for work, and did not try to start their own business. The definition includes students and adults caring for children at home
6.1.4 Grootvlei Power Station Employee location

There are 548 permanent employees working at Grootvlei Power Station. The employees reside in the town of Grootvlei and other locations. These typically include Balfour, Heidelberg, Villiers, Gauteng and parts of South Africa.

Grootvlei Power Station is located in the Dipaleseng Local Municipality. However, the majority of the employees reside outside the municipality.

Other industries that are near the power station include:

- Wholesale and retail trading
- Catering and accommodation
- Farming businesses
- Logistics businesses
- Local municipality (Dipaleseng) and other government departments
- Gold mine (Sibanye Gold)
- Coal mine (Mpumelelo mine)
- Manufacturing businesses
- Finance institutions, insurance, real estate and other business services

Source: Data supplied by Grootvlei Power Station

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90 Eskom data submitted by Finance department at head office
6.2 **Estimated economic contribution through capital expenditure and day-to-day operations**

In this section of the report, we consider Grootvlei Power Station’s direct contribution to the local economy in terms of capital expenditure and day-to-day operations, as well as the knock on effects that have resulted from such expenditure. Additionally, we consider Grootvlei Power Station’s combined impact on the local economy and highlight how Grootvlei Power Station’s expenditure could create potential economic benefits in the future.

6.2.1 **Capital expenditure in the local municipality**

Total capital expenditure in the whole of Mpumalanga over the period **FY2014/15 to FY2016/17** was about **R126 million**. Approximately **R76 million** (60%) of this total capital expenditure was spent in the rest of the Mpumalanga province and **R50 million** (40%) was spent in **Dipaleseng local municipality**.

Of the **R50 million** capital expenditure that was spent in Dipaleseng Local Municipality, about **60%** was used to procure **GO Capital**.

**About 39%** of the capital expenditure was spent on **Technical Plan Projects and Group Capital Division** projects.
6.2.2 Operational expenditure in the local municipality

Day-to-day operational expenditure by the Grootvlei Power Station in Dipaleseng Local Municipality over the FY2014/15 to FY2016/17 period amounted to R1.4 billion.

Operational expenditure decreased by 20% on average per annum, from R538 million in FY2014/15 to R428 million in FY2016/17.

Grootvlei Power Station’s total operational expenditure on goods and services over the FY2014/15 to FY2016/17 period amounted to 39%, of which an average of 78% was spent on coal.

Over the FY2014/15 to FY2016/17 period, 6% of total Grootvlei Power Station operational expenditure was allocated to salaries and wages.

Source: Grootvlei data and KPMG calculations

Source: Grootvlei data and KPMG calculations
6.2.3 Estimated economic contribution through the capital and operational spending in the local municipality

In this section of the report, we consider Grootvlei Power Station’s combined impact on the local economy through both capital investment and day-to-day operations. These are summarised below.

The annual average estimated municipal economic activity created due to the local capital expenditure and operational cost over the period FY2014/15 to FY2016/17 was in the order of **R473 million**. The direct impact accounted for about **63%** of the total GDP impact.

The graph provided indicates the estimated economic activity created in Dipaleseng Local Municipality due to Grootvlei Power Station’s capital expenditure and operational cost between **FY2014/15 and FY2016/17**. It is important to note that only the capital expenditure and operational cost that took place within Dipaleseng Local Municipality was taken into account.

It is estimated that the capital expenditure and operational cost by Grootvlei Power Station, over the period **FY2014/15 to FY2016/17**, sustained on average an estimated **1102 jobs** per year in Dipaleseng Local Municipality.

The graph indicates the estimated impact on employment from the capital expenditure and operational by Grootvlei Power Station in Dipaleseng Local Municipality. These numbers reflect the average number of jobs sustained per year over the relevant period.

In conclusion, not only does Grootvlei Power Station contribute to the economic development of the province of Mpumalanga, but benefits also accrue to Dipaleseng Local Municipality in which it is situated. Both capital and operational expenditure by Grootvlei Power Station contribute positively to GDP and employment in Dipaleseng Local Municipality.

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91 Please note that the employment figures shown in the table only include formal sector jobs created. Jobs created in the informal sector are not included and therefore underestimates the total number of jobs that could potentially be created in the economy.
Grootvlei Power Station’s quality of jobs
7 Grootvlei Power Station’s quality of jobs

7.1 Measuring the quality of jobs

One of the United Nations Development Programme (UNDP) Sustainable Development Goals (SDGs) is ‘decent work and economic growth’. The goal is to achieve “full and productive employment, and decent work, for all women and men by 2030.”

Moving beyond mere job creation, the aim is to generate employment that is “sustainable, more productive and inclusive.”

The National Development Plan (NDP) 2030 envisages building a country with skilled workers in the labour force. The country’s energy sector – in particular Grootvlei Power Station in Mpumalanga – is a prime example of an industry that employs semi-skilled and skilled workers in activities that are supportive of decent work and the government’s goals of a developmental state.

Sustainable and productive jobs filled by skilled workers are qualities that emerging economies are searching for in employment creation. High quality jobs support not only growing household income (and a growing middle class), but a decline in economic inequality by improving the living conditions of workers. However, as indicated in the National Treasury’s Budget Review 2017, local economic growth “will not be sufficient to markedly reduce unemployment, poverty and inequality.”

Employers have found it challenging to fill vacancies, with 31% of employers citing difficulty to fill jobs during 2015. At the time, some of the most difficult positions to fill were associated with skilled trades, engineers, management and executive staff, accounting and finance staff, and technicians, amongst others. Almost half (47%) of employers cited a lack of technical competencies or hard skills.

To remedy this, the government’s Nine-Point Plan is focussed on a few key areas in order to reignite growth and job creation. One of these focus areas is the energy sector. Resolving South Africa’s energy challenges includes expanding the country’s nuclear, coal and renewable power base. South Africa is mainly dependent on coal based power, with the 1 180 MW Grootvlei Power Station in Mpumalanga being a part of this system.

Eskom, and specifically Grootvlei Power Station, is seen as providing a high quality of employment. However, measuring and quantifying decent and high quality work is difficult. Both the World Bank and Organisation for Economic Co-operation and Development (OECD) have expressed challenges in doing so. The biggest challenge is whether the quality of a job is defined from the perspective of the workers, the employer, or society as a whole.

Workers may identify a quality job as having high standards of health and safety, security of employment, and favourable remunerations. Companies might define a high quality job as being short of

96 Mail & Guardian, SA’s skills deficit has a negative effect on employment, 2015. [http://mg.co.za/article/2015-05-18-sas-skills-deficit-has-a-negative-effect-on-employment] [Accessed on 14 February 2017]
97 Mail & Guardian, SA’s skills deficit has a negative effect on employment, 2015. [http://mg.co.za/article/2015-05-18-sas-skills-deficit-has-a-negative-effect-on-employment] [Accessed on 14 February 2017]
associated with a skilled and efficient workforce. Society as a whole might consider the suitability of available jobs given the nature of the labour market.

The OECD broadly considers three components to understanding the quality of employment, namely earnings, the risk of job loss and the quality of the working environment. Grootvlei Power Station complies, to a certain extent, with these components in order to guarantee high quality employment for their workers. 100

7.2 Estimating quality of jobs

7.2.1 Grootvlei Power Station employee earnings

Earnings quality determines how important earnings are to a workers’ well-being in terms of average earnings and earnings inequality. By utilising earnings data collected by Statistics South Africa (StatsSA),101 and data provided by Eskom, the average income earned per worker per occupational category was calculated. Furthermore, these occupations can be distributed into the three skills levels - unskilled, semi-skilled and skilled. Grootvlei Power Station uses mainly semi-skilled and skilled labour.

Within-industry distribution is calculated based on the skill levels of various employees, classified under three broad categories:

— Unskilled workers are persons with limited skills and lower educational attainment, e.g. a matric certificate or lower. These employees perform work that does not require specialised experience. This category includes cleaners, gardeners and those employed in rudimentary tasks.

— Semi-skilled workers are persons with basic training, knowledge and experience to complete specific tasks, though without specialised skills. These employees would have some form of post-secondary training. This category includes delivery drivers, entry-level administrative workers and customer service representatives.

— Skilled workers are persons with a specialised skillset required to complete a specific task and will most often have a tertiary education. This category includes white- and blue-collar professions, ranging from administrative workers, electricians and lab technicians, computer programmers and lawyers.

The main finding from KPMG’s analysis of proprietary data is that Eskom employees – and in particular those working at Grootvlei Power Station – earn higher salaries than those in a similar industry in Mpumalanga. For example, semi-skilled workers – e.g. plant and machine operators and assemblers – at Grootvlei Power Station earned an average of R184 466102 during 2016. This is higher than an average of R107 162103 observed for semi-skilled workers in the broader utilities sector in Mpumalanga.

Skilled workers from Grootvlei Power Station earned on average R418 036104 in 2016, while the average employee in the utilities industry in Mpumalanga earned R296 421105. This highlights the earnings quality offered by Grootvlei Power Station to its employees and implies that the semi-skilled and skilled jobs offered by the power station come with above-average salaries in order to recruit and retain these employees.

102 Eskom data and KPMG calculations
104 Eskom data and KPMG calculations
7.2.2 Grootvlei Power Station job security

The risk of job loss or labour market security determines the unemployment risk for a worker as well as the benefits received in case of unemployment. The high level of salaries at Grootvlei Power Station should however not be surprising. The government’s identification of the top 100 occupations in high demand in South Africa features many skills associated with the electricity sector that are in short supply. These include diverse engineering jobs; project, financial and construction managers; welders, boilermakers and fitter & tuners; and industrial machinery mechanics. This implies that the semi-skilled and skilled jobs offered by Eskom, and specifically Grootvlei Power Station, comes with above-average salaries in order to recruit and retain these employees with scarce skills.

These skills are also in demand internationally, requiring consideration for exchange rate issues. The South African rand depreciated from an average of R7.25/US$1 in 2011 to R14.70/US$1 in 2016. This translates into a significantly higher cost of rand remuneration for a workers whose skills are in demand on a global stage in that can be rewarded in USD. The unemployment risk for those individuals employed at Grootvlei Power Station are low due to the high demand for their skills – semi-skilled or skilled. The high demand for sustainable and productive jobs filled by skilled workers in South Africa emphasises high labour market security.

Additionally, many of Grootvlei Power Station’s employees and the jobs created by spending associated with these jobs are considered to be in the middle class. A strong middle class promotes the development of human capital, creates a stable source of demand for goods and services, inspires entrepreneurship, and supports inclusive political and economic institutions. All of these factors underpin stronger economic growth.

7.2.3 Grootvlei Power Station working environment

Quality of the working environment depends on the balance between job demands (which impairs health) and job resources (which mitigates their effects). At Grootvlei Power Station, there are good management practices in play that ensures a safe and consistent working experience for the employees. This is evident from their ISO 14001, ISO 9001, OHSAS 18001 certifications; National Occupational Safety Association (NOSA) Safety System 5-star grading and the award for the best power plant category and leader in power management. Additionally, there are various employer-provided training and on-the-job training opportunities available, which aids in improving job demands and increasing job resources at the power station.

Working at a power station is also prone to various challenges that can be seen as a stimulating work environment. By keeping their employees stimulated and allowing for work autonomy, learning opportunities, social support at work, as well as good management practices, Grootvlei Power Station ensures that its workers has a high quality working environment.

In conclusion, Grootvlei Power Station’s employees are highly skilled and well paid, earning more than the average workers in similar industries in Mpumalanga. Due to the highly skilled employees working at Grootvlei Power Station and the high demand for skilled employees in the country, the risk of unemployment is low for workers at this power station. The working environment at this power station is conducive for high quality employment. Consequently, the employment offered by the facility is in line with the NDP and broader UNDP goals for job creation. Job quality has increasingly become a prominent topic, especially for the South African economy, where this kind of employment is beneficial on several levels and supportive of the developmental state agenda.

108 Roosevelt Institute, Why a Strong Middle Class Is Necessary For Growth, 2012.
Conclusion
8 Conclusion

The purpose of this economic impact report was to highlight the economic contribution that Grootvlei Power Station makes to Mpumalanga and the rest of South Africa. Grootvlei Power Station is the 12th largest coal-fired power station in South Africa and is under the ownership and operation of South Africa’s major energy provider, Eskom.

Electricity is a key input for the majority of products and processes in our economy, making Grootvlei Power Station a direct contributor to economic growth, both in Mpumalanga and South Africa. In addition, the power station’s forward and backward linkages with other industries expand on this direct impact in the form of indirect and induced impacts. This refers to the flow of funds and services between Grootvlei Power Station and its suppliers situated in different sectors of the economy.

8.1 Grootvlei Power Station’s economic contribution to Mpumalanga and the rest of South Africa

In the sections above, we showed that Grootvlei Power Station’s capital expenditure and operational activities have a positive impact on Mpumalanga as well as the rest of South Africa in terms of its contribution to employment creation, to economic growth as well as government tax revenue.

These impacts together with potential future impacts of Grootvlei Power Station’s capital expenditure and day-to-day operations in the South African economy are summarised below.
GROOTVELIPOWER STATION’S CONTRIBUTION BETWEEN 2014/15 AND 2016/17 THROUGH CAPITAL EXPENDITURE AND DAY-TO-DAY OPERATIONS

Grootvlei Power Station impacts the economy, specifically in terms of increased electricity generation, which remains a major enabler of economic development. Grootvlei Power Station’s capital expenditure and day-to-day operations continue to contribute to job creation, fiscal revenue, and value add in the energy sector. This, in turn, contributes to a more efficient and productive economy through the long-term nature of the economic benefit streams it creates, especially in downstream user industries such as manufacturing and upstream industries such as coal mining.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

Grootvlei Power Station’s capital expenditure and day-to-day operations contributed positively towards improving economic development in Mpumalanga, as well as the rest of South Africa over the past few years. The impact on Mpumalanga was generated primarily from operational expenditures. However, in the case of capital expenditure the majority of the impact occurred in the rest of South Africa. This is because Eskom sources the majority of capital goods required by the power station from outside the Mpumalanga province.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga
The increase in overall productivity and efficiency drove overall economic growth, because of the long-term nature of the economic benefit streams created, especially in downstream user industries. It is also evident that future investment in Grootvlei Power Station will continue to have a positive impact on the economies of Mpumalanga and the rest of South African. The long-term economic benefits that could be realised because of capital expenditure by Grootvlei Power Station are shown in the table below:

<table>
<thead>
<tr>
<th>Potential long-term economic benefits to Mpumalanga and the rest of South Africa from future capital expenditure by Grootvlei Power Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every R1 of new investment in infrastructure development in Grootvlei Power Station potentially contributes 25 cents to the Mpumalanga economy. In addition, it potentially generates another R1.12 to the rest of South Africa. These multiplier impacts highlight the contribution that infrastructure development and capital expenditure in electricity infrastructure makes to the economy, as well as the efficiency and productivity thereof.</td>
</tr>
<tr>
<td>Additional capital expenditure into infrastructure development associated with Grootvlei Power Station potentially implies the following:</td>
</tr>
<tr>
<td>o 1 job in Mpumalanga per R1 million invested and</td>
</tr>
<tr>
<td>o 3 jobs in the rest of South Africa per R1 million invested.</td>
</tr>
<tr>
<td>Every R1 of new investment into infrastructure development associated with Grootvlei Power Station, potentially contributes 12 cents to national government revenue.</td>
</tr>
<tr>
<td>Future capital expenditure by Grootvlei Power Station implies potential poverty alleviation impact for Mpumalanga and the rest of South Africa in that</td>
</tr>
<tr>
<td>o 8.9% of household income generated in Mpumalanga will flow to low-income households</td>
</tr>
<tr>
<td>o 2.9% of household income generated in the rest of South Africa will flow to low-income households.</td>
</tr>
</tbody>
</table>

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

Over the period 2014/15 to 2016/17, Grootvlei Power Station’s electricity generation and operations contributed to a more efficient and productive economy through the long-term nature of the economic benefit streams it created, especially in downstream and upstream user industries such as manufacturing and coal mining. It is also evident that the on-going operations associated with Grootvlei Power Station will continue to have a positive impact on the economies of Mpumalanga and the rest of South Africa through the long-term economic benefits. The benefits that could be realised because of the continued day-to-day operations costs of Grootvlei Power Station are shown in the table below:
### Potential long-term economic benefits to Mpumalanga and the rest of South Africa associated with day-to-day operations of Grootvlei Power Station

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<tbody>
<tr>
<td>Every R1 of spend on operational cost at Grootvlei Power Station, potentially contributes 85 cents to the Mpumalanga economy. In addition, it potentially generates another 37 cents to the rest of South Africa. These multiplier impacts highlight the contribution of on-going operations and generation to the economy as well as the efficiency and productivity thereof.</td>
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<tbody>
<tr>
<td>Additional operational expenditure associated with Grootvlei Power Station, potentially implies the following:</td>
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  - 2 jobs in Mpumalanga per R1 million spent and
  - 2 jobs in the rest of South Africa per R1 million spent.

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<tbody>
<tr>
<td>Every R1 of spend on running Grootvlei Power Station, potentially contributes 10 cents to national government revenue.</td>
<td></td>
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<p>| | |</p>
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<thead>
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<th></th>
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<tbody>
<tr>
<td>Future operational cost by Grootvlei Power Station implies poverty alleviation impact for Mpumalanga and the rest of South Africa in that</td>
<td></td>
</tr>
</tbody>
</table>

  - 11.7% of household income generated in Mpumalanga will flow to low-income households
  - 4.9% of household income generated in the rest of South Africa will flow to low-income households.

Source: KPMG analysis from 2014 Social Accounting Matrix for South Africa and Mpumalanga

### 8.2 Quality of jobs and skills development

As stated in the NDP, “South Africa needs an economy that is more inclusive, more dynamic and in which the fruits of growth are shared equitably. In 2030, the economy should be close to full employment, equip people with the skills they need, ensure that ownership of production is more diverse and able to grow rapidly, and provide the resources to pay for investment in human and physical capital.”

As a responsible corporate citizen, Eskom aims to transform society and support economic development by not only creating jobs, but also creating good quality of jobs. Grootvlei Power Station employees earn notably more than the industry average. This is expected considering that Grootvlei Power Station employ many people with scarce skills. These workers’ salaries reflect the scarcity of their skills and the international demand for their services.

As South Africa looks to intensify productivity and bolster economic growth, the full range of role players needs to draw on their strengths and synergies. With so many linkages in the economy...

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through its various activities, Grootvlei Power Station has an important role to play by contributing to the country’s energy needs and thus, to economic growth more broadly.

8.3 Local community impact

Electricity is the fifth largest contributor to industries within Dipaleseng Local Municipality. The labour force in Dipaleseng Local Municipality is dispersed amongst the economic sectors; this makes the municipality less vulnerable to sector disruption. The power station’s existence therefore contributes to the economic stability of the local municipality.

Grootvlei Power Station contributes positively to both productivity and employment in the Dipaleseng Local municipality. The annual average GDP impact on the local municipality from capital and operational expenditure over the period FY2014/15 to FY2016/17 is potentially R 473 million which equated to 1.0% of Dipaleseng Local Municipality’s GDP. The annual average employment impact on the local municipality over the period FY2014/15 to FY2016/17 from capital and operational expenditure is \(1 \times 10^2\) jobs, which equated to 1.2% of Dipaleseng Local Municipality’s labour force.

Grootvlei Power Station has a positive impact on the local Grootvlei town community as well as on other towns. As indicated, 12% of Grootvlei Power Station employees reside in Balfour town, 11% in Grootvlei town and 77% in the rest of South Africa. The positive impacts are derived from employees’ demand for goods and services in Grootvlei town and the communities in which they reside. The location of Grootvlei town also leads to increased demand for basic services and infrastructure.

Grootvlei Power Station has contributed to previously disadvantaged communities through philanthropy and donations. Through its Corporate Social Responsibility (CSR) initiatives, Grootvlei power station has contributed to Siyathemba Township primary schools and, park homes in the Ekukhanyeni youth center. The power station has assisted the schools through upgrades of sports facilities, palisade fencing and supply of copier machines. Continued social investment will assist in reducing unemployment, poverty and improving people’s lives. Therefore, the continued operations of Grootvlei Power Station will continue to support economic growth through the upliftment of communities and poverty alleviation.

To conclude overall, as South Africa looks to intensify productivity and bolster economic growth, the full range of role players needs to draw on their strengths and synergies. With so many linkages in the economy through its various activities, Grootvlei Power Station has an important role to play by contributing to the country’s energy needs and thus, to economic growth more broadly. Grootvlei Power Station has achieved some safety, health, environment and quality requirements through the PCDA quality cycle. These achievements have contributed to economic development, environmental duty of care and social equity in order to continually improve performance and achieve stakeholder requirements. Grootvlei Power Station, with the capacity to supply 1 180 MW, aligns with South Africa’s energy policy and demands. This highlights Grootvlei Power Station’s role in South Africa’s current economic environment as well as future development and growth.

110 KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga
111 Total GDP of the Dipaleseng Local Municipality from 2014 to 2016 = R47 365 million (Source: IHS Global Insight).
112 KPMG analysis from 2014 Social Accounting Matrix for Mpumalanga
113 The average number of jobs in Dipaleseng 2014 and 2016 was 93 242 million (Source: IHS Global Insight)
115 Eskom, Grootvlei Power Station, nd http://www.eskom.co.za/sites/heritage/Pages/early-years.aspx [Accessed on 03 May 2017]
Appendix
Appendix

Input-Output table

The Input-Output (I-O) table forms the nucleus of any model that analyses and projects the economy on an industry-to-industry basis.

What is an I-O table?

The I-O table is a summarised version, in quantified terms, of all transactions that took place between the main economic stakeholders in a particular year. The main feature of an input-output table is that it divides these economic transactions into the main sectors of the economy, starting with Agriculture, Forestry and Fishing right through to Community Services.

The main economic decision-makers who are responsible for the transaction activities contained in the I-O table are entrepreneurs, workers, households and government.

The I-O table, an extension of the National Accounts of a country, disaggregated into the various sectors of the economy. For this reason, I-O tables are compiled and published by Statistics South Africa (StatsSA). These sectoral figures are therefore strictly compatible with the macro national accounting data published by the South African Reserve Bank and StatsSA on a regular basis.

Theoretical framework of an Input-Output table

The I-O table with regard to an open economy, as illustrated below, makes provision for two kinds of transactions on a sectoral level, namely the purchase of intermediate and primary inputs on the one side, and the supply of intermediate and final outputs on the other side. This classification distinguishes four types of transactions that can be arranged by means of symbols in such a way that each one could be identified according to a particular quadrant.
Table 1: Schematic representation of an I-O table

Quadrant I represents the intermediate inputs that at the same time are intermediate outputs. Quadrant I, usually referred to as the transaction table or transaction matrix, displays the flow of goods and services among the various sectors for purposes of production. This flow of goods and services flow is normally regarded as intermediate in nature. From left to right each row depicts (in Rand value) the goods and services which the producing sectors sell to themselves and to other sectors for application in their specific production processes. In each column, appear purchases, i.e. inputs, by a specific sector (in Rand value) from other sectors. For example, the term ‘$x_{ij}$’ indicates sales/outputs from sector i to sector j or “conversely” the purchases/inputs of sector j from sector i.

Quadrant II shows the final demand for locally produced goods and services on a sectoral basis, classified according to the main consuming sector. The final demand components are indicated by the symbols C, G, I, S and E where:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Final sales/output from the different sectors to households.</td>
</tr>
<tr>
<td>G</td>
<td>Current purchases by the government sector from the different sectors.</td>
</tr>
<tr>
<td>I</td>
<td>Gross domestic fixed investments (sales/outputs by the different sectors) which are regarded as capital goods.</td>
</tr>
<tr>
<td>S</td>
<td>Changes in inventories during the period covered by the table. The relevant figure can have either a positive or a negative value, depending on whether inventories increased or decreased in the various sectors. The changes in savings in the Input-Output Table denote the total change of a specific product irrespective of the sector of the economy where the changes occurred.</td>
</tr>
<tr>
<td>E</td>
<td>Exports by the different sectors.</td>
</tr>
</tbody>
</table>
Quadrant III reflects the remuneration of labour, the gross operating surplus, the net indirect taxes and the intermediate imports for each sector, thus the primary inputs. It represents gross value added (the portion of gross domestic product which originates from each of these sectors), as well as each sector’s intermediate imports. The symbols used to indicate the various types of primary inputs are as follows:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Remuneration of employees, i.e. the purchase of labour services from households by each sector.</td>
</tr>
<tr>
<td>T</td>
<td>Indirect tax/payments by the various sectors to the government. This is usually shown as a net figure, for example taxes less subsidies.</td>
</tr>
<tr>
<td>P</td>
<td>Gross operating surplus (before direct tax) of each sector, which includes provision for depreciation and undistributed profits.</td>
</tr>
<tr>
<td>M</td>
<td>Each sector’s intermediate imports applied as raw materials or parts in production processes. The imports by a specific sector also refer to the imports of other sectors from which raw materials are purchased.</td>
</tr>
</tbody>
</table>

Quadrant IV shows purchases/inputs by final consumers from primary sources, for example, direct purchases/inputs of labour services (domestic workers) which form part of consumer expenditure, and remuneration to employees in the government sector. The indirect taxes and subsidies included in the final demand and depreciation on fixed government assets are also depicted in Quadrant IV. The horizontal V-vector in quadrant IV represents the total value of the various types of primary inputs which were purchased by each final demand component.

The X-row vector at the bottom as well as the X-column vector on the right hand side of the I-O table, represent the total gross inputs and total gross output (total production) respectively for the various sectors. As the total inputs for a particular sector are also equal to its total outputs, each xᵢ in the total gross inputs row should be equal to the corresponding xᵢ in the total gross output column. This condition, however, does not apply to the final demand and primary input components. Although it appears as if the primary input and the final demand components are related, (e.g. payments to employees in relation to private consumer expenditure and net indirect taxes in relation to consumption expenditure by general government) they are not equal. A condition which applies to the final demand and primary input components is that the total final demand transactions should balance the total primary inputs.

The total gross outputs and the total gross inputs are associated by the common symbol Z, which can be defined as the sum of all intermediate sales/outputs as well as sales/outputs to final consumers or, in terms of inputs, the sum of all intermediate and primary inputs. It is calculated by adding up the figures in the total gross output column or those in the total gross input row.

As mentioned, the I-O table is a classified explanation of the National Accounts in tabular format (matrix format). Although it is possible to calculate Gross Domestic Product (GDP) by using an I-O table, the total gross output is, however, not the same as the GDP. The total gross outputs measure all transactions (intermediate as well as final demand transactions) which occur in a given year. A product can be counted more than once, resulting in double or multiple-counting. The GDP on the contrary, avoids double counting and measures only the production for a given year. Both the GDP and the expenditure on GDP can be read from the I-O table. The GDP is the total of primary inputs less imports, and expenditure on GDP is the same as final demand.
Standard symbol of the I-O table

In all relevant literature, it is common practice to depict an I-O table by means of standardised symbols. By using these standardised symbols, the key interrelationships and key identities in relation to the National Accounts’ concepts are demonstrated. These formal relationships serve as the basis according to which the I-O table is compiled as an analytical tool in the format of a model. Total gross outputs and total gross inputs for a specific sector are equal by definition and this is proven respectively by aggregating horizontally in the rows and vertically in the columns. This concept can be illustrated with the help of Table 1 in relation to the i-th sector. It is, for example, shown that the production of this sector is consumed by all the different types of consumers, i.e. intermediate and final consumers. The intermediate and final demands represent the total production/output of the i-th sector. Where n sectors and one final demand component are distinguished, the relationship is as follows:

Inversely, column j indicates the inputs of sector j from all other sectors as well as its primary inputs. The primary inputs consist of remuneration of labour, gross operating surplus, net indirect tax and imports. The following equation is arrived at when adding from top to bottom (vertical) for n sectors in column j.

The aggregates of the row totals and column totals of the I-O table show the total gross production (Z), for the overall economy. When expressed in the form of an equation, the following applies:
How totals

\[ Z = \sum_{i=1}^{n} x_i + V \]

where

- \( Z \) = total production or outputs
- \( \sum_{i=1}^{n} x_i \) = total outputs of various sectors
- \( V = W + T + P + M \) (total primary inputs)

Column totals

\[ Z = \sum_{j=1}^{n} x_j + F \]

where

- \( Z \) = total production or outputs
- \( \sum_{j=1}^{n} x_j \) = total inputs of various sectors
- \( F = C + G + I + S + E \) (total final demand)

Therefore, since

\[ \sum_{i=1}^{n} x_i = \sum_{j=1}^{n} x_j \]

and all intermediate transactions are cancelled out, and if

\[ V = Y + M \]

where

\[ Y = W + T + P \]

this implies that

*primary inputs = value added + imports*

and that the following basic identity equation of the National Accounts is arrived at, namely:

\[ Y + M = C + G + I + S + E \]

this implies

*value added + imports = total final demand*

If imports \((M)\) are moved to the right hand side of the equation, the basic National Accounts' identity is derived, namely:

\[ Y = C + G + I + S + (E - M) \]

this implies

*Gross Domestic Income (production) = Expenditure on Gross Domestic Product*
**Input-Output table as an analytical tool**

The function of an Input-Output Table is twofold. Firstly, the table presents a descriptive framework of the economic structure of a country by showing the interrelationships between sectors by means of the transactions table. It is an extension on the Macro-National Accounts level. The detailed nature of the input-output table is determined by the availability of data, government disclosure regulations and available research funds rather than by a set of rules. Secondly, an input-output table serves as an economic model. Van den Bogaerde (1972:53) points out that an economic model involves the exposition of the relationships between economic variables in the form of equations. These equations are then combined to form a complete model. An economic model can thus be defined as a set of equations which show mutual dependence or interrelationships of economic variables. As an input-output table’s formal exposition complies with these requirements, it can be considered as a model, which is useful for analytical purposes.

An input-output model as an analytical tool is pre-eminently suitable for measuring the effects of autonomous disturbances in the economy. Given specific assumptions with regard to the nature of the production function, the input-output model can generally be utilised for the above-mentioned purposes, because of their mathematical features. The matrices which can be derived from the input-output model, are used as instruments for economic analysis. This is done by means of the so-called technical input coefficients’ matrix and the Leontief inverse matrix. These two key characteristics of an input-output table are briefly discussed below.

**Technical coefficients matrix**

As mentioned above, the technical input coefficient matrix forms the basis of any input-output model. Technical coefficients are only calculated for sectors (Quadrant I in Table 1) and can be expressed in monetary or physical units. A technical coefficient (in monetary units) is defined as the quantity of intermediate inputs which a particular sector requires from another sector in order to supply a Rand unit of output. The technical coefficients are calculated by dividing all the elements in each column of the transaction matrix by the total of the gross inputs/outputs of the different sectors.

The technical coefficients matrix is an orderly collection of technical coefficients and is indicated by a capital letter ‘A’. It is based on specific assumptions and conditions which must be valid before it can be used as an instrument.
Leontief inverse

By the application of the final demand equation, a system of output equations for different sectors can be calculated; for example:

The inverse of $(I - A)$ is known as the Leontief inverse $(I - A)^{-1}$.

If the existence of the inverse $(I - A)^{-1}$ is accepted, it can be applied to express output/production as a function of final demand. This means that, if the final demand is known, total production can be calculated by means of known relationships and given all the assumptions and limitations inherent in an input-output model.
This can also be illustrated as
\[ \sum_{i=1}^{n} x_i = \sum_{i=1}^{n} x_j \]
and all intermediate transactions are cancelled out, and if
\[ V = Y + M \]
where
\[ Y = W + T + P \]
this implies that
\[ \text{primary inputs} = \text{value added} + \text{imports} \]
and that the following basic identity equation of the National Accounts is arrived at, namely:
\[ Y + M = C + G + I + S + E \]
this implies
\[ \text{value added} + \text{imports} = \text{total final demand} \]
If imports (M) are moved to the right hand side of the equation, the basic National Accounts' identity is derived, namely:
\[ Y = C + G + I + S + (E - M) \]
this implies
\[ \text{Gross Domestic Income (production)} = \text{Expenditure on Gross Domestic Product} \]

This can also be illustrated as
\[ \begin{pmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{pmatrix} = \begin{pmatrix} X_1 - x_{12} - x_{22} - \cdots - x_{1n} \\ X_2 - x_{22} - x_{23} - \cdots - x_{2n} \\ \vdots \\ X_n - x_{n1} - x_{n2} - \cdots - x_{nn} \end{pmatrix} \]
\[ i = 1, 2, \ldots, n \]
Should these elements be converted to technical coefficients, then
\[ \frac{x_{ij}}{y_j} = a_{ij} \]
\[ i = 1, 2, \ldots, n \]
Replace all \( x_{ij} \), then
\[ \begin{align*}
  f_1 &= X_1 - a_{11}x_{11} - a_{12}x_{12} - \cdots - a_{1n}x_{1n} \\
  f_2 &= X_2 - a_{21}x_{21} - a_{22}x_{22} - \cdots - a_{2n}x_{2n} \\
  \vdots & \hspace{1cm} \vdots \\
  f_n &= X_n - a_{n1}x_{n1} - a_{n2}x_{n2} - \cdots - a_{nn}x_{nn} 
\end{align*} \]
By grouping similar terms
\[ \begin{align*}
  f_1 &= (1 - a_{11})X_1 - a_{12}x_{12} - \cdots - a_{1n}x_{1n} \\
  f_2 &= -a_{12}X_1 + (1 - a_{22})X_2 - \cdots - a_{2n}X_n \\
  \vdots & \hspace{1cm} \vdots \\
  f_n &= -a_{n1}X_1 - a_{n2}X_2 - \cdots + (1 - a_{nn})X_n 
\end{align*} \]
This can be written in matrix format as
\[ F = (I - \beta)X \]
where
\[ F = \begin{pmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{pmatrix}, \quad I = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}, \quad \beta = \begin{pmatrix} -a_{11} & -a_{12} & \cdots & -a_{1n} \\ -a_{21} & -a_{22} & \cdots & -a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ -a_{n1} & -a_{n2} & \cdots & -a_{nn} \end{pmatrix} \]
By multiplying the above equation on both sides by \((I - \beta)^{-1}\), we get
\[ (I - \beta)^{-1}F = (I - \beta)^{-1}(I - \beta)X \]
and
\[ X = (I - \beta)^{-1}F \]
as is
\[ \Delta X = (I - \beta)^{-1}\Delta F \]
where
\[ \Delta F = \text{change in final demand} \]
\[ \Delta X = \text{change in production} \]
The Social Accounting Matrix

A Social Accounting Matrix (SAM) is a comprehensive, economy-wide database, which contains information on the flow of resources that take place between the different economic agents that exist within an economy (i.e. business enterprises, households, government, etc.) during a given period of time – usually one calendar year.

When economic agents in an economy are involved in transactions, financial resources change hands. The SAM provides a complete database of all transactions that take place between these agents in a given period, thereby presenting a “snapshot” of the structure of the economy for that period. As a system for organising information, a SAM presents a powerful tool in terms of which the economy can be described in a complete and consistent way:

- Complete in the sense that it provides comprehensive accounting of all economic transactions for the entity being represented (i.e. country, region/province, city, etc.), and
- Consistent in that all incomes and expenditures are matched.

Consequently, a SAM can provide a unifying structure within which the statistical authorities can compile and present the national accounts.

Like the traditional Input-Output Table, the SAM reflects the inter-sectoral linkages in terms of sales and purchases of goods and services, as well as the remuneration of production factors that forms the essence of any economy’s functioning. Additionally important is that a SAM reflects the economic related activities of households in some detail. Households are responsible for decisions that have a direct and indirect effect on important economic variables such as private consumption expenditures and savings. These economic aggregates are important drivers of the economic growth processes and, ultimately, the creation of employment opportunities and wealth. Private consumption expenditure, for example, consists of approximately 60% of total gross final domestic spending in the economy. By combining households into meaningful categories, such as a range of income levels, the impact on these households welfare of a changing economic environment is made possible by the SAM.

It is clear from the above that because of the intrinsic characteristics of the SAM, once compiled, it renders itself as a useful tool for analytical purposes. Especially, based on the mathematical traits of the matrix notations that describe its structure, a SAM can be transformed into a powerful econometric tool/model. For example, the model can be used to quantify the probable impact on the economy of a new infrastructural project such as a new power station – both the construction phase and the operational phase will be modelled.

Thus apart from serving as an extension to a country’s National Accounts, the SAM in its model form opens up many opportunities for the economic analyst to conduct rigorous policy and other impact analyses for the purpose of ensuring optimal benefit to the stakeholders concerned.

Application of the SAM

The development of the SAM is very significant as it provides a framework within the context of the International System of National Accounts (SNA) in which the activities of all economic agents are accentuated and prominently distinguished. By combining these agents into meaningful groups, the SAM makes it possible to clearly distinguish between groups, to research the effects of interaction between groups, and to measure the economic welfare of each group. There are two key reasons for compiling a SAM:

- Firstly, a SAM provides a framework for organising information about the economic and social structure of a particular geographical entity (i.e. a country, region or province) for a particular time period (usually one calendar year); and
Secondly, to provide a database that can be used by any one of a number of different macro-economic modelling tools for evaluating the impact of different economic decisions and/or economic development programmes.

Because the SAM is a comprehensive, disaggregated, consistent, and complete data system of economic entities that captures the interdependence that exists within a socio-economic system, it can be used as a conceptual framework for exploring the impact of exogenous changes in such variables as exports, certain categories of government expenditure, and investment on the entire interdependent socio-economic system. In this regard, sophisticated macro-econometric models are included, such as the Computable General Equilibrium models (CGEs). The SAM, because of its finer disaggregation of private household expenditure into relatively homogenous socio-economic categories that are recognisable for policy purposes, has been used to explore issues related to income distribution.

The SAM’s main contribution in the field of economic policy planning and impact analysis is divided into two categories:

- As a Primary Source of Economic Information: as a detailed and integrated national and regional accounting framework consistent with officially published socio-economic data, a SAM instantly projects a picture of the nature of a country or region’s economy. It lends itself to both descriptive and structural analysis.
- As a Planning Tool: due to its mathematical/statistical underpinnings it can be transformed into a macro- econometric model that can be used to:
  - Conduct economic forecasting exercises/scenario building;
  - Conduct economic impact analysis both for policy adjustments at a national and provincial level and for large project evaluation;
  - Conduct self-sufficiency analysis, i.e. gap analysis, to determine, with the help of the inter industry and commodity flows contained in the provincial SAM, where possible investment opportunities exist; and
  - Calculate the inflationary impacts on provincial level of price changes instigated at national level (i.e. administered prices, VAT, etc.).

To summarise, the SAM mechanism provides a universally acceptable framework within which the economic impact of development projects and policy adjustments can be reviewed and assessed at both national and provincial/regional levels. It serves as an extension to the official National Accounts of a country’s economy and, therefore, provides a wealth of additional information, especially when disaggregated to more detailed levels.
Limitations

We have relied upon the sources of information referred to in this report. Except where specifically stated, we have not sought to establish the reliability of those sources. We have, however, reviewed the information and have sought explanations for key trends and salient features identified by us. We have also satisfied ourselves, as far as possible, that the information presented is consistent with other information obtained by us in the course of the work undertaken to prepare this report.

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As such, this report may not necessarily disclose all matters about the project or reveal errors or irregularities, if any, in the information and representations made to us and upon which we have relied.

Estimations made embody assumptions on the behaviour of factors in the macro and micro economy, and the project itself. These assumptions were based on evidence available as at the time of this report. Users of the forecasts may consider other assumptions to be more appropriate, which may materially change the outcome of the forecasts.

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