

# Socio-Economic Impact Assessment of the Proposed Eskom Power Station in the Witbank Geographical Area



**Final Report  
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## **Section 1: INTRODUCTION**

The purpose of this report is to present the results of the Socio-Economic Impact Assessment of the proposed coal-fired power station and associated infrastructure in the Witbank geographical area. The Socio-Economic Impact Assessment forms part of the Environmental Impact Assessment process prescribed by the National Environmental Management Act, and requires obtaining the approval from the Department of Environmental Affairs and Tourism.

### **1.1 Project background**

Since 1999 there has been an overall increase in electricity demand in South Africa, this is vividly illustrated by the peak demand increase from 27,813 MW in 1993 to 36,165 MW in 2005.

Eskom Holdings Limited is the primary supplier of the electricity in South Africa. It has planned to raise its capacity by 10,000 MW by the year 2014, including demothballing of a number of plants. It is guided by the Integrated Strategic Electricity Plan (ISEP).

As part of the plan to increase the electricity capacity in South Africa, Eskom intends to bring back three of the mothballed plants. In addition, Eskom is investigating the possibility of establishing pumped-storage scheme peaking type plants, an establishment of a Pebble-Bed Modular Reactor (PBMR) plant, as well as construction of new coal-fired power stations.

In this context, Eskom has appointed Ninham Shand Consulting Services to embark on the Environmental Impact Assessment process with regard to activities pertaining to establishment of the proposed coal-fired power station in the Witbank geographical area. As part of this process, Ninham Shand has commissioned Urban-Econ Development Economists to provide specialist inputs related to socio-economic impacts of the proposed project. The study area is described in the following chapter.

### **1.2 Study area**

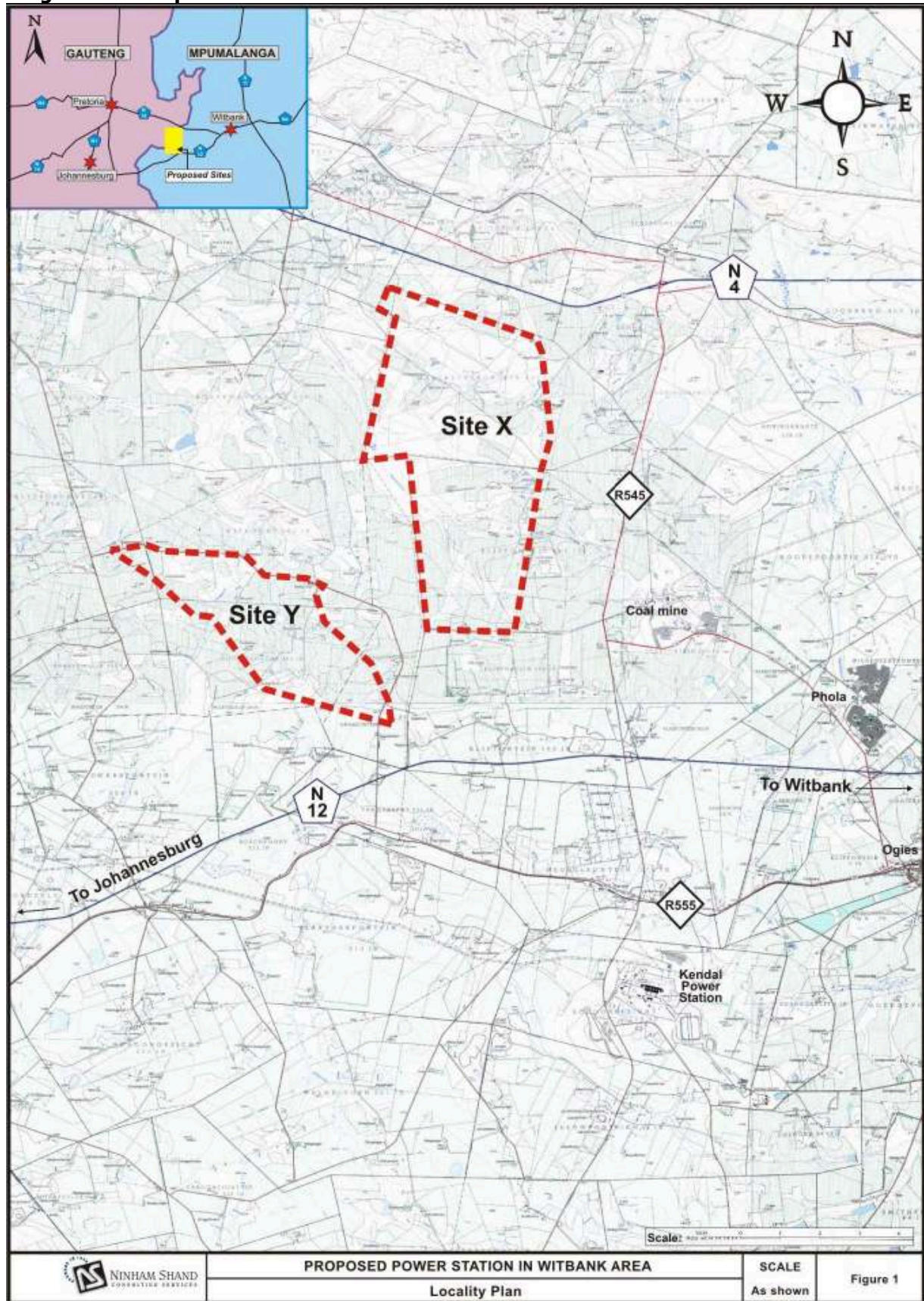
A site selection process resulted in identification of two potential sites for the construction of a coal-fired power station in the Witbank geographical area. The study area covers the western side of the Mpumalanga Province, including Delmas LM, and the eastern tip of the Gauteng Province between the N4 and N12 national highways, including Kungwini LM.

Diagram 1.1 illustrates the location of the alternative sites (Site X and Site Y).

Site X is located within the boundaries of the Delmas Local Municipality, Mpumalanga between the N1 and N12 national highways. It is situated on the western side of R545 on the perimeter of the coal reserve, proposed to supply the power station. The land on this site is currently used for crop production and grazing.

Site Y traverses the Delmas Local Municipality, Mpumalanga and the Kungwini Local Municipality, Gauteng. The majority of the area of Site Y is located within the Kungwini Local Municipality, Gauteng. It is located north of the N12 national highway and to the south-west of Site X. The land on this site is currently used for agricultural purposes.

Diagram 1.1: Map of the alternative sites



Source: New Coal Fired Power Station in the Witbank geographical area Background Information Document, August 2006

### 1.3 Project goals and objectives

The projects' **goal** is:

**“To assess the potential impacts of the construction and operation of the proposed coal-fired power station on the net welfare of the local communities and economic development in the area”**

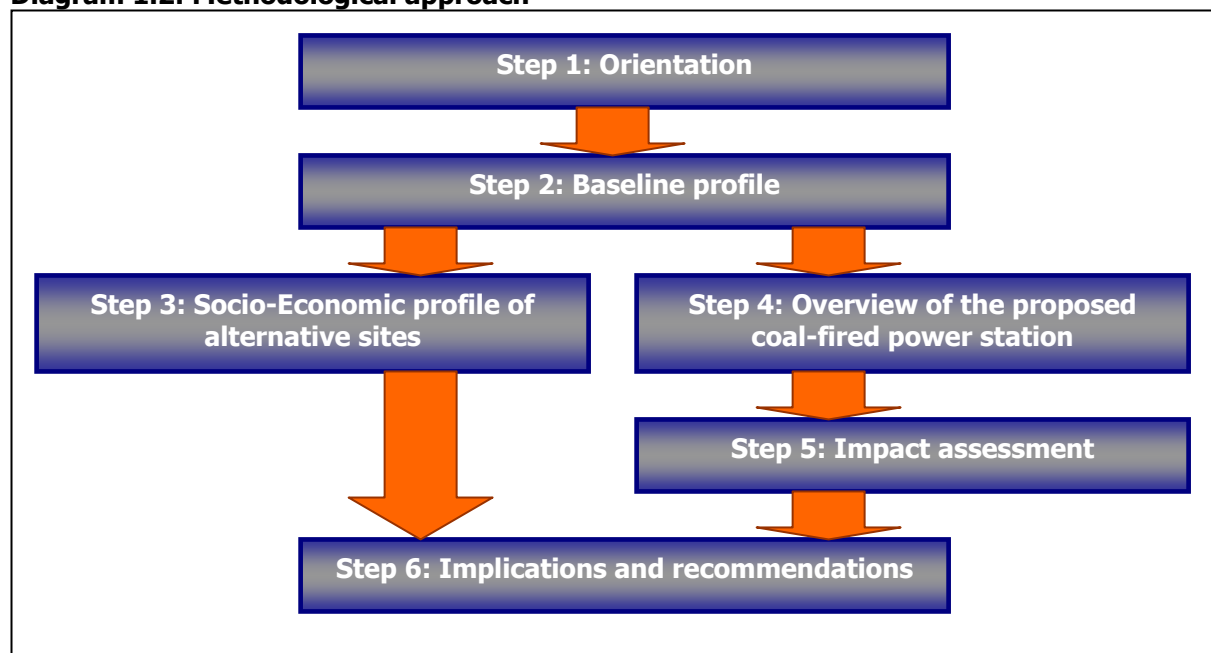
In this context, the **objectives** of the study are as follows:

- Develop an understanding of the strategic national importance of the new coal fired power station
- Develop an economic profile of the local areas and regions
- Develop a basic social profile of communities located in the local areas and regions
- Identify potential impact, including direct, indirect and cumulative
- Interpret the results in relation to impact on the net societal welfare and economic development
- Make recommendations pertaining to possible mitigation measures.

### 1.4 Methodological approach

The following diagram conceptually illustrates the approach followed in this study.

**Diagram 1.2: Methodological approach**



#### Step 1: Orientation

The study commences with consultation with the client regarding particulars of the project and its goals and objectives. During this step, all relevant existing information is collected, in particular data related to the construction of the proposed coal-fired power station. Timeframes and milestones are finalised during this step.

#### Step 2: Baseline profile

This step involves a compilation of the social and economic profiles of the local areas and regions. The outcome of this step is the analysis of the following criteria:

- Population
- HIV/AIDS situation
- Average household income
- Occupation profile
- Size of the economy
- Economic growth rates
- Economic structure
- Employment
- Sectoral employment structure.

The above-mentioned indicators will be analysed with regard to the following areas:

- Delmas Local Municipality (location of Site X)
- Kungwini Local Municipality (location of the majority of Site Y)
- Gauteng Province (location of the Kungwini LM)
- Mpumalanga Province (location of the Delmas LM)
- South Africa.

The socio-economic analysis is performed based on the secondary data available from Stats SA and Quantec Research. This analysis will provide a broad understanding of the economic trends and social structure in the areas, where potential sites are located. The more detailed analysis of the sites and their socio-economic structure is performed during the next step.

### **Step 3: Socio-economic profile of alternative sites**

The purpose of this step is to provide an overview of the potential sites with regard to socio-economic profile of communities located within their boundaries.

This information is imperative to performing an accurate socio-economic impact assessment and, therefore, requires access to primary data. In order to collect the primary data a survey is undertaken. The survey's questions relate to socio-economic characteristics of people working and residing within the boundaries of the alternative sites.

### **Step 4: Overview of the proposed coal-fired power station**

The purpose of this step is to provide basic information with regard to the economic and social aspects of the proposed coal-fired power station. In this context, the following outcomes are envisioned:

- Value of capital investments and estimated number of employed people during the construction phase
- Value of operational expenditure and estimated number of sustainable jobs involved during the operational phase.

Primary and secondary data will be used to estimate the construction and operational statistics of the proposed coal-fired power station.

### **Step 5: Impact assessment**

The impact assessment exercise refers to identification and evaluation of socio-economic impacts resulting from the establishment of the proposed power station in the area. The analysis of impacts will be performed for two stages of the coal-fired power station life cycle, i.e. construction phase and operational phase.

The main objective of this step is to determine the loss/gain of the local communities' welfare, as well as extent of impact on the economy in the area. The analysis of the strategic importance and impact of the proposed coal-fired power station on the development of the national economy does not form part of this study.

**Step 6: Implications and recommendations**

The purpose of this step is to highlight implications of the establishment of a coal-fired power station in the Witbank geographical area on the social welfare of the local communities and the regional economy. Interpretations are based on the outcomes of the impact assessment exercise (Step 4) and data presented as part of Step 3: Overview of alternatives.

The step concludes with a list of recommendations that specify possible mitigation measures to maximise the positive effect and minimise adverse effects of the construction and operation of the proposed coal-fired power station on the alternative sites.

**1.5 Report outline**

Apart from this introductory section, the report is structured as follows:

<b>Section</b>	<b>Title</b>	<b>Description</b>
Section 2	Socio-Economic Profile	This section outlines the socio-economic profile of the regions, which comprise the study area.
Section 3	Overview of the development and sites	This section outlines the nature and extent of economic activities involved in construction and operation of the power station, as well as socio-economic profiles of communities located within the boundaries of the alternative sites.
Section 4	Socio-Economic Impact Modelling	This section provides the results of the socio-economic impact modelling.
Section 5	Implications and recommendations	This section interprets the socio-economic impacts identified in the previous section in terms of implications on social lives of the local communities and local and regional economies. It also provides recommendations with regard to minimising adverse effects and maximising negative impacts.

**Section 2: BASELINE PROFILE**

The purpose of this section is to provide a socio-economic profile of the study area and benchmark it against the national economy. The objective of this exercise is to develop a good understanding of the area’s demographic trends and economic performance. The analysis is performed with regard to their economic development and demographic situation.

In this context, the section is structured as follows:

- Population dynamics
- Average household income
- Poverty profile
- Employment profile
- Economic performance
- Sectoral structure
- Sectoral growth rates
- Sectoral employment.

The baseline socio-economic profile covers the following regions:

- South Africa (for benchmark analysis)
- The Gauteng Province (where Site Y is predominantly located)
- The Mpumalanga Province (where Site X is located)
- Delmas Local Municipality (location of the Site X)
- Kungwini Local Municipality (dominant location of Site Y).

**2.1 Population dynamics**

The population of any geographic area is the cornerstone of the development process, as it affects the economic growth through provision of labour and entrepreneurial skills, and forms the demand for the production output. Thus, the analysis of its dynamics, including size and growth pattern, is imperative for understanding the future trends.

Table 2.1 summarises the population size and its growth in the areas under discussion. In 2005, the South African population equalled approximately 48.5 million people. About 21.1% of the national population resided in the Gauteng Province.

**Table 2.1: Population, 1996 & 2005**

Geographical area	Population		
	1996	2005	1996/2005 annual growth rate
South Africa	40,576,575	48,534,580	2.0%
Gauteng	7,353,669	10,235,497	3.7%
Mpumalanga	2,815,795	3,392,908	2.1%
Kungwini LM	40,151	120,095	12.9%
Delmas LM	52,589	59,382	1.4%

*Source: StatsSA (Census 2001 and 1996) & Urban-Econ estimates, 2006*

The South African population grew by 2% per annum between 1996 and 2005. In the Gauteng Province, the population growth rate exceeded the national average growing at a rate of 3.7% per annum. In Mpumalanga, where approximately 3.4 million people resided in 2005, the annual population growth was 2.1%.

The Kungwini Local Municipality, the area where the majority of Site Y is located, had the population of 120,095 people in 2005. Its population grew tremendously since 1996 based on Stats SA statistics. The 12.9% population growth is considered slightly overestimated, however, the recent residential development around the Bronkhorspruit Dam indicate the popularity of the area among those working in the Johannesburg Metropolitan Municipality, Tshwane or Ekurhuleni.



On the other hand, the population of the Delmas Local Municipality, where Site X is located, was half the size of the Kungwini LM population in 2005. In addition, its population dynamics were weaker than that of the Kungwini LM and national average.

The population trends are greatly affected by HIV/AIDS, thus the analysis of the virus's spreading dynamics provides insight to the future shortage of skills in the area.

According to the 'National HIV and Syphilis prevalence Survey' of 2005 completed by the South African Department of Health, the HIV/AIDS prevalence among antenatal clinic attendees was 30.2% in 2005, with the confidence limits of 29.1% and 31.2%. This is a 5.7% increase since 2000.

Mpumalanga was ranked second with regard to the HIV prevalence rate among the antenatal clinic attendees. Its average rate was 34.8%, while its confidence limits were between 31.0% and 38.5%. The Mpumalanga Province is followed by the Gauteng Province with the prevalence rate of 32.4% and confidence limits between 30.6% and 34.3%.

The major group of people suffering from HIV/AIDS is between 25 and 29 years of age, followed by people of 30-34 years of age.

The South African National HIV/AIDS survey estimated that 10.8% of the population aged from 2 years and older was HIV positive in 2005. According to their survey, Mpumalanga is ranked second with regard to the prevalence rate (15.2%). The Gauteng Province is ranked fifth among the South African provinces, with the HIV prevalence rate among people 2 years and older of 10.8%.

The significant difference between the Department of Health estimations and the South African National HIV/AIDS survey results could be explained by the fact that they used different population groups from which the data was gathered. In the first case, the survey was completed among pregnant women attended antenatal clinics; in the second case, it was a household survey, which included a sample of people aged from 2 years of age and older.

According to Quantec Research database, approximately 6 million people were HIV positive in South Africa in 2005. The number of infected people has grown by 20.5% between 1995 and 2005. Gauteng had 1.3 million HIV infected people in 2005, while Mpumalanga had approximately 482 thousand infected people (Table 2.2).

**Table 2.2: HIV/AIDS prevalence rate**

Geographical area	Number of HIV/AIDS infected people			Number of deaths caused of HIV/AIDS		
	1995	2005	1995/2005 annual growth	1995	2005	1995/2005 annual growth
South Africa	939,054	6,049,181	20.5%	16,010	447,921	39.5%
Gauteng	180,319	1,316,238	22.0%	2,760	101,043	43.3%
Mpumalanga	109,622	481,815	16.0%	2,156	39,265	33.7%
Kungwini LM	986	10,850	27.1%	15	834	49.5%
Delmas LM	2,105	9,075	15.7%	37	753	35.1%

Source: Quantec Research, 2006

The HIV prevalence rate in the Kungwini LM grew by 27.1% per annum, reaching 10.8 thousand people in 2005. The Delmas LM had approximately nine thousand HIV positive citizens; however, its growth rate was substantial lower than that of the Kungwini LM.

As indicated in the above Table, the increase in HIV prevalence rate among the population has led to an increase of number of deaths caused by this pandemic.

The population in the Kungwini LM has been growing at a faster pace, as indicated in Tale 2.1, however, its rapidly increasing HIV positive population highlights the fact that the area will face a shortage of skills and labour force in the medium-term posing a threat to local economic development. The same can be said with regard to the developmental prospects of the Delmas LM. Its HIV prevalence rate was growing at a slower pace than that of the Kungwini LM, however, it has had a slower than average population growth rate, which is indicative to out-migration of people.

## 2.2 Income distribution and poverty

Income distribution is one of the most important indicators of the regional welfare. Income level determines the ability to meet basic needs and provides information on the poverty level in the area. Table 2.3 indicates the summary of the monthly income distribution among families residing in the analysed regions.

**Table 2.3: Monthly income distribution among households, 2005**

Income category	South Africa	Gauteng	Mpumalanga	Kungwini LM	Delmas LM
No income	23.6%	19.1%	24.1%	13.0%	21.9%
R1 - R506	8.1%	4.6%	10.3%	9.4%	7.5%
R507 - R1 012	17.7%	11.4%	20.2%	19.4%	20.8%
R1 013 - R2 024	16.0%	16.6%	17.5%	20.6%	21.0%
R2 025 - R4 048	13.0%	15.6%	12.6%	13.4%	14.5%
R4 049 - R8 096	9.2%	11.7%	7.2%	7.6%	6.8%
R8 097 - R16 192	6.5%	9.4%	4.7%	6.3%	3.9%
R16 193 - R32 384	3.8%	7.0%	2.3%	5.5%	2.5%
R32 385 - R64 768	1.4%	3.1%	0.6%	2.6%	0.8%
R64 769 - R129 536	0.4%	0.9%	0.2%	1.3%	0.2%
R129 537 - R259 072	0.3%	0.4%	0.2%	0.5%	0.1%
R259 073 or more	0.1%	0.3%	0.1%	0.3%	0.1%
<b>Total (number of households)</b>	11,201,268	2,650,866	732,951	20,936	13,371
<b>Weighted average</b>	4,961	8,229	3,372	7,889	3,469

Source: StatsSA (Census 2001) & Urban-Econ calculations, 2006

In 2005, the biggest income group in South Africa comprised of households earning no income. It was followed by households earning in the range of R507 and R1,012. The third biggest group earned between R1,013 and R2,024 per month. In 2005, the average monthly household income in South Africa was R4,961.

In the Kungwini LM, the biggest income group earned between R1,013 and R2,024 (20.6%), followed by 19.4% of households earning between R507 and R1,012. The average household monthly income in the area was R7,889 in 2005 - higher than the national average monthly household income. Gauteng, where the Kungwini LM is situated, is the most prosperous province in South Africa. Local Municipality's vicinity to the economic hub of the nation, Johannesburg, has had a positive impact on the economy of the area.

In the Delmas LM, the income distribution picture looks different compared to the Kungwini LM. Households in this area earn R3,469 on average. It is substantially lower than the average monthly household income in the adjacent Local Municipality, and slightly lower than the national average monthly household income of R4,961.

One of the ways to calculate the poverty rate in the area is to use the Bureau of Market Research (BMR) poverty line measurement. According to the BMR, the poverty rate is calculated as the percentage of people living below the Minimum Living Level (MLL). The BMR defines the MLL as the minimum income necessary for an 'average' family if its members 'are to maintain their health and have acceptable standards of hygiene and sufficient clothing needs'. The 2005 estimated Minimum Living Level equalled R1,950 per month per household. Considering this measure as the poverty line, it can be concluded, that in 2005 approximately 65.4% of the South African population were living below the poverty line. In the Kungwini LM, the situation was slightly better - 62.4% of the population were living below BMR's MLL. In the Delmas LM, the percentage of the population living below the poverty line was substantially higher and equalled 71.1%.

The comparison of the income distribution in the analysed areas, highlight the fact that, on average, households in the Kungwini LM are better off than households in the Delmas LM. The Delmas LM has bigger percentage of households who live on less than R506 per month and it has lower percentage of households who earn more than R8,096 per month.

### 2.3 Employment profile

Analysis of the labour force provides vital information pertaining to economic and social trends in the region. Table 2.4 presents the overview of the labour force statistics in the areas under discussion.

**Table 2.4: Labour force profile (mid 2005 estimates)**

Employment category	South Africa	Gauteng	Mpumalanga	Kungwini LM	Delmas LM
Economically Active Population (EAP), number	19,017,661	5,622,337	1,221,715	64,464	24,997
Employed, number	9,855,204	3,160,302	634,776	45,948	12,695
Labour absorption capacity, %	51.8%	56.2%	52.0%	71.3%	50.8%
Unemployed (expanded definition), number	9,162,457	2,462,035	586,939	18,516	12,302
Unemployment rate (expanded definition), %	48.2%	43.8%	48.0%	28.7%	49.2%

Source: StatsSA (Census 2001 and 1996) & Urban-Econ estimates, 2006

South Africa comprised approximately 19 million economically active people in 2005. More than the third of this group of the population resided in the Gauteng Province, while Mpumalanga contributed 6.4% to the national labour force pool the same year.

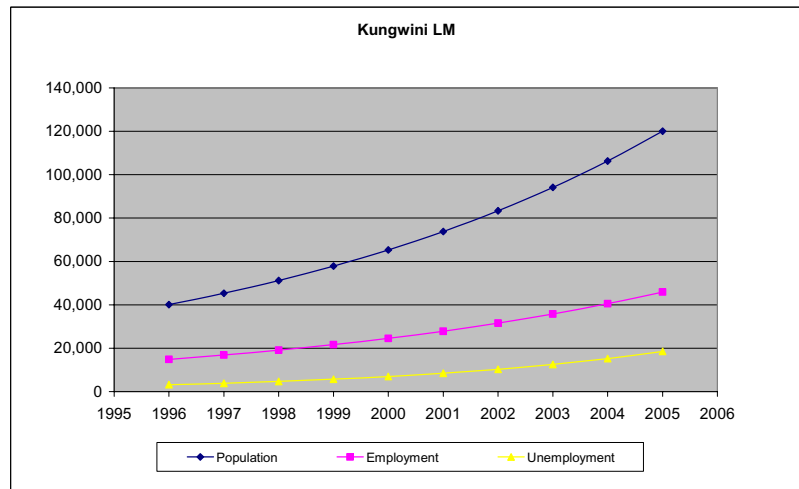
The labour absorption capacity, or ability of the economy to provide employment to its labour force, was measured at 51.8% nationwide. In the Gauteng Province, the labour absorption capacity equalled 56.2%, while in the Mpumalanga Province it was 52.0%.

The Kungwini LM labour force was approximately 64,464 people with a higher-than-average labour absorption capacity of 71.3%. The Delmas LM comprised 24,997 economically active people in 2005, of which 12,695 were formally employed.

Diagrams 2.1 and 2.2 illustrate population, employment and unemployment trends in the Kungwini and Delmas LMs.

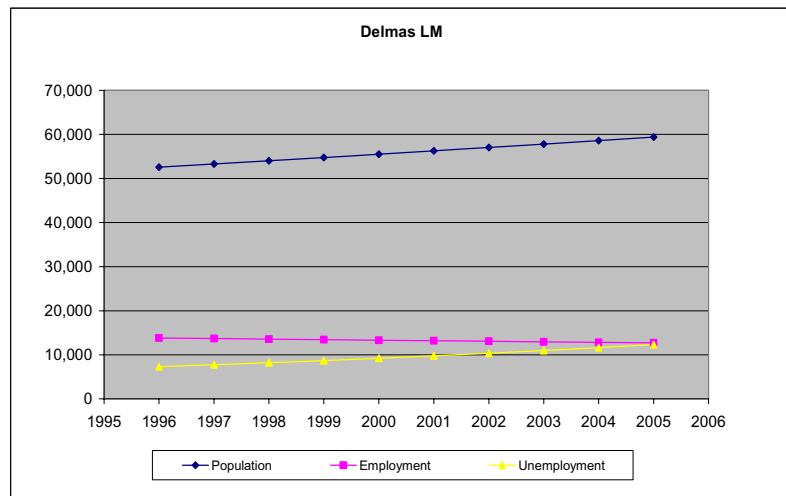
As indicated on Diagram 2.1, the Kungwini LM employment has been growing at a slightly faster pace than unemployment. This indicates that as the population in the Kungwini LM was growing, the economy was able to produce new job opportunities; however, its job creation rate was unable to cope with the high population growth, thus resulting in increase of unemployment in the area.

**Diagram 2.1: Kungwini LM labour force trends**



Source: Census 2001 and 1996 and Urban-Econ estimates, 2006

**Diagram 2.2: Delmas LM labour force trends**



Source: Census 2001 and 1996 and Urban-Econ estimates, 2006

The employment in the Delmas LM, as illustrated on Diagram 2.2, has been declining since 1996, while unemployment has been growing. This indicates that the local economy was unable to create enough job opportunities to match the supply of the local labour since the economy was stagnating.

## 2.4 Occupation profile

The occupation profile is an indicator of the quality of the labour force in the region. It provides information on the employability of local workers and their proficiency level, and assists in identifying the shortage of skills in the economy by matching the demand with supply.

Table 2.5 indicates occupation profiles of the analysed areas. The South African labour force comprises of large groups of semi-skilled population engaged in elementary occupations. There is also an abundance of craft related trades workers, service workers and clerks.

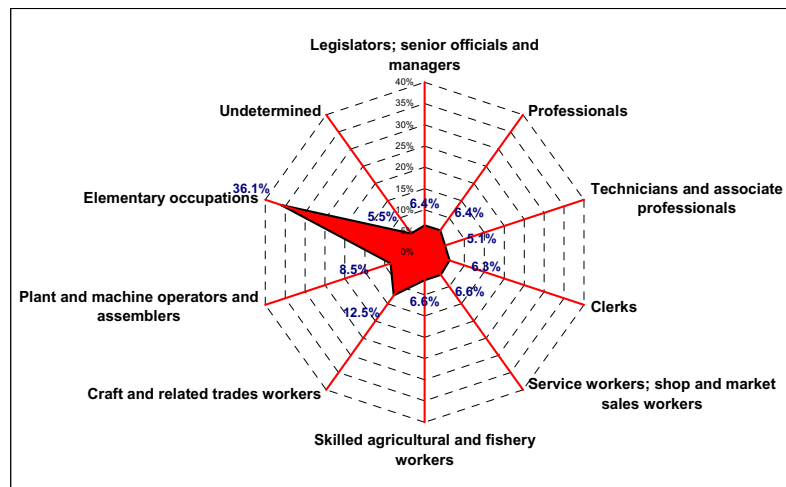
**Table 2.5: Occupation profile**

Occupation category	South Africa	Gauteng	Mpumalanga	Kungwini LM	Delmas LM
Legislators; senior officials and managers	5.4%	7.2%	3.7%	6.4%	4.1%
Professionals	7.0%	9.3%	4.4%	6.4%	3.1%
Technicians and associate professionals	9.6%	9.7%	7.3%	5.1%	4.1%
Clerks	10.9%	13.1%	8.3%	6.3%	7.2%
Service workers; shop and market sales workers	10.2%	11.4%	8.6%	6.6%	6.2%
Skilled agricultural and fishery workers	2.8%	0.9%	5.6%	6.6%	7.3%
Craft and related trades workers	12.2%	12.5%	14.7%	12.5%	13.0%
Plant and machine operators and assemblers	8.8%	8.2%	10.6%	8.5%	17.9%
Elementary occupations	26.5%	20.4%	32.1%	36.1%	33.0%
Undetermined	6.7%	7.3%	4.7%	5.5%	4.1%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Source: StatsSA (Census 2001) & Urban-Econ calculations, 2005

Diagram 2.3 illustrates the occupation profile of the labour force in the Kungwini LM. It is heavily skewed towards the elementary occupations, i.e. sales and services elementary occupations, agricultural workers, and labourers in mining, construction and transport sectors. Elementary occupations are related to unskilled and semi-skilled labourers, thus it can be defined that at least 38.1% of the labour force in the Kungwini LM is semi-skilled or unskilled.

**Diagram 2.3: Kungwini LM occupation profile**



Source: Census 2001 and 1996 and Urban-Econ estimates, 2006

The second most frequent occupation in the area is craft and related trades (12.5%).

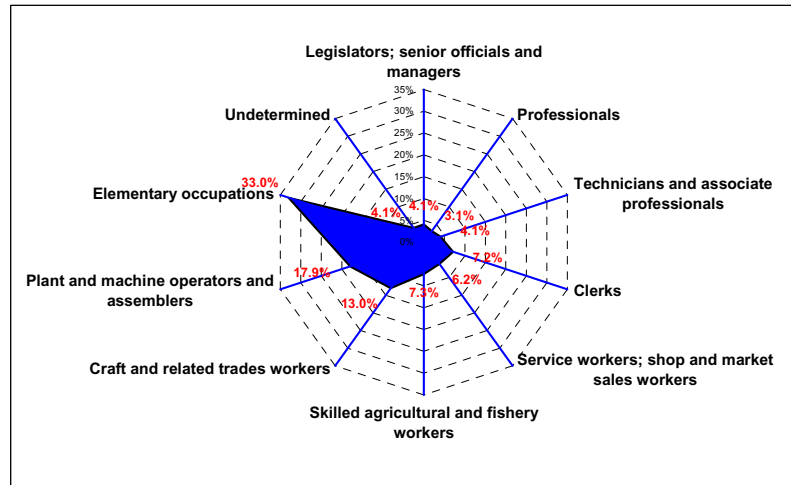
These refer to extraction and building trades, metal and machinery related trades, food processing, textile and garment trades, etc.

The rest of occupations are equally allocated over the other portion of the labour force.

Diagram 2.4 demonstrates the occupation profile of the labour force in the Delmas LM. It is observed that the dominant occupation in the area is elementary occupations. This is similar to the Kungwini LM occupation profile. However, the major difference between these two areas is the percentage of plant and machine operators. In the Delmas LM, 17.9% of the labour force is engaged in this occupation,

compared to 8.5% in the Kungwini LM. This indicates that the demand for machine operators and assemblers in the Delmas LM is higher than that in the Kungwini LM, highlighting the difference in the economic structure between these two areas.

**Diagram 2.4: Delmas LM occupation profile**



Source: Census 2001 and 1996 and Urban-Econ estimates, 2006

The slightly bigger proportion of skilled agricultural workers in the Delmas LM compared to the Kungwini LM reflects the higher importance of the agricultural sector in the Delmas LM. On the other hand, the bigger proportion of professionals and managers in the Kungwini LM, compared to the Delmas LM, indicates that the Kungwini LM services sector and financial sector are bigger. This correlates with the fact that the Kungwini LM has a higher monthly average household income than the Delmas LM.

## 2.5 Economic performance

The economic performance of the region can be measured by means of the Gross Geographical Product (GGP). It is the measure of the value of final goods and services produced within the geographic area. Table 2.6 indicates the GGP of the analysed areas for 1995, 2000 and 2005 in constant 2000 prices and 2005 GGP in current prices.

**Table 2.6: GGP (Rand' million), 1995, 2000, 2005**

Geographical area	Constant 2000 prices			Current
	1995	2000	2005	2005
South Africa	722,018.9	831,228.4	1,001,987.5	1,336,239
Gauteng	240,136.6	280,478.8	344,123.6	450,688
Mpumalanga	48,265.6	57,110.8	66,109.0	91,025
Kungwini LM	3,956.9	4,571.8	5,337.3	4,950
Delmas LM	900.5	1,049.8	1,164.1	1,833

Source: Quantec Research & Urban-Econ estimates, 2006

In 2005, the South African economy valued R1,002 billion in constant 2000 prices, or R1,336 billion in current prices. The Gauteng Province contributed approximately 34% towards the national GDP, while the Mpumalanga economy's input was 6.6%. The size of the Kungwini LM economy was R5.3 billion, and the Delmas LM economy valued R1.2 billion in 2005 in constant 2000 prices.

The growth of the South African economy, illustrated in Diagram 2.5 and 2.6, has been affected by the following international and national financial and economic trends:

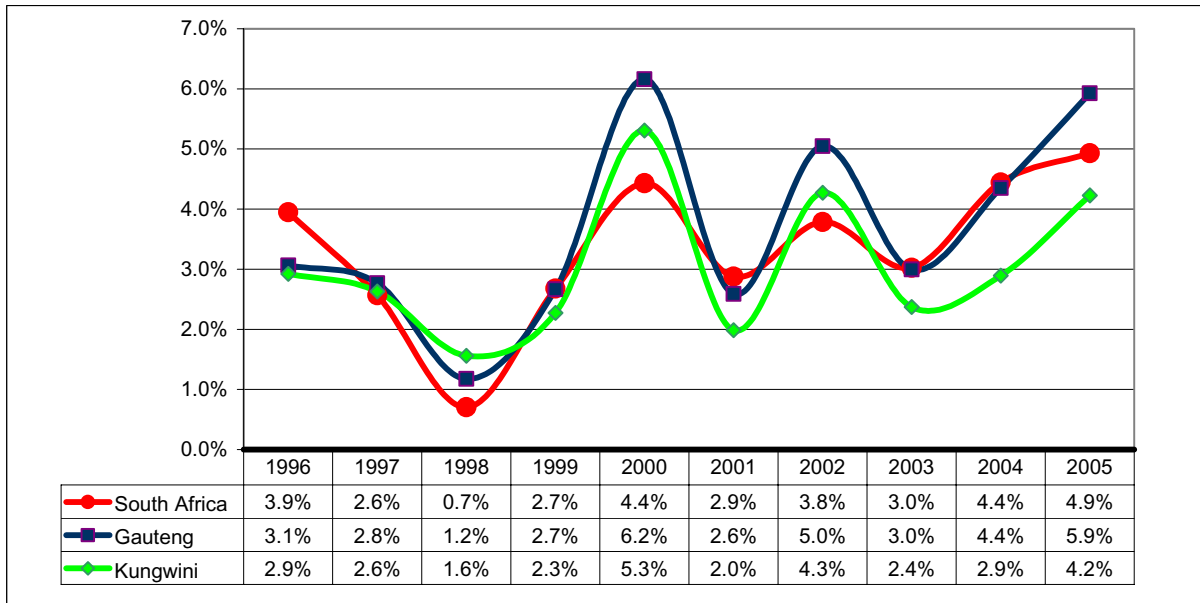
- The Southeast Asian financial crises in 1997 and 1998
- Rand depreciation during 1999 and 2000
- Slow economic activity in 2001 and September 11<sup>th</sup> tragedy in the USA
- Recovery of the Rand during 2002
- Weakness of the European economy and decrease in demand for South African exports in 2003
- Accelerating growth in Asia and United States in 2004 and higher international prices for commodities
- Low interest rates and growth-supportive fiscal policy in South Africa in 2004
- Brisk increase in oil prices in 2005
- Strong domestic expenditure in 2005.

During the analysed period, the Kungwini LM, as illustrated in Diagram 2.5, has been slightly affected by the international and national trends described above:

- In 1999, the economy has slowed down to 2.2% as a result of the overall slow performance of the national and provincial economies affected by the financial crises in Southeast Asia
- In 2000, the local economy peaked at 5.3% - higher than national average
- It has slowed down in 2001 only to increase in pace in 2002
- In 2004 and 2005 it continued to grow mainly affected by strong domestic expenditure.

The Kungwini LM grew at an average 3% between 1995 and 2005. It is lower than provincial average of 3.7% and national average of 3.3% during the same period.

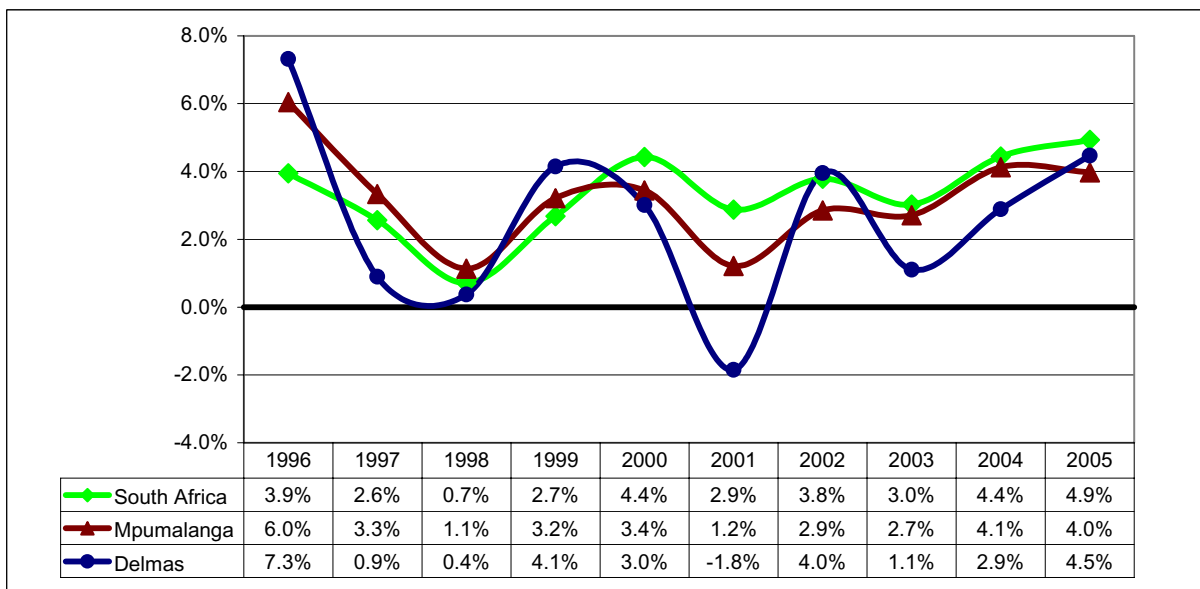
**Diagram 2.5: South Africa, Gauteng and Kungwini LM economy growth rates, 1995-2005**



Source: Quantec Research & Urban-Econ estimates, 2006

The economic dynamics of the Mpumalanga and Delmas LM economies are different compared to the Gauteng and Kungwini LM economies.

**Diagram 2.6: South Africa, Mpumalanga and Delmas LM economy growth rates, 1995-2004**



Source: Quantec Research & Urban-Econ estimates, 2006

Firstly, the average annual growth rate of the Delmas LM economy during the period between 1995 and 2005 was 2.6% - substantially lower than the national average rate of 3.3%. Secondly, due to the different economic structure of the Delmas LM economy compared to the Kungwini LM economy, the international and national economic trends during the past few years had a different level of impact on these areas.

The Delmas LM had briskly recovered from the 1998 stagnation period, only to fall again in 2001 due to slowdown of electricity generation capacity as a result of the low demand for electricity by the manufacturing sector. Following this, the contraction of the manufacturing and electricity supply sectors in 2003 has slowed down the Delmas LM economy to 1.1% the same year. Nevertheless, the Delmas LM economy has been able to recover from the unfavourable economic conditions during 2004 and 2005. In 2005, it has reached a growth rate of 4.5%.

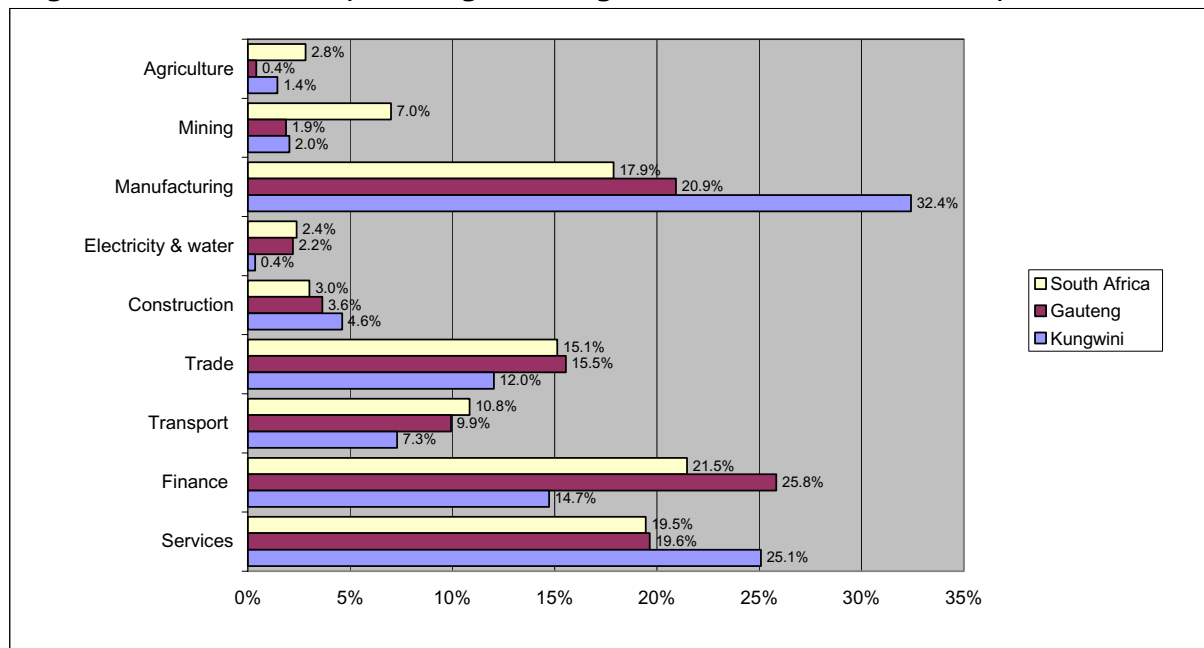
## 2.6 Sectoral structure

The sectoral structure of an economy is a good indication of its diversification and dependency on a particular sector. Diagrams 2.7 and 2.8 illustrate economic structures of the South African, Gauteng, Mpumalanga, Delmas LM and Kungwini LM economies.

The South African economy comprises 66.9% of tertiary sector, 23.3% of secondary sector and 9.8% of primary sector. This indicates that the national economy is dominated by the services sector, such as finance, trade and government. However, while the developed countries, such as USA, encompass approximately 3% of primary sector in its economic structure, the South African economy is still fairly dependant on the primary activities, such as mining and agriculture (cumulative 9.8% of GDP).

The Kungwini LM economic structure is dominated by three sectors namely manufacturing (32.4%), general services (25.1%) and finance (14.7%). The trade sector is the fourth largest sector in the Kungwini LM economy contributing 12% to the local economy.

**Diagram 2.7: South Africa, Gauteng and Kungwini LM economies structure, 2005**



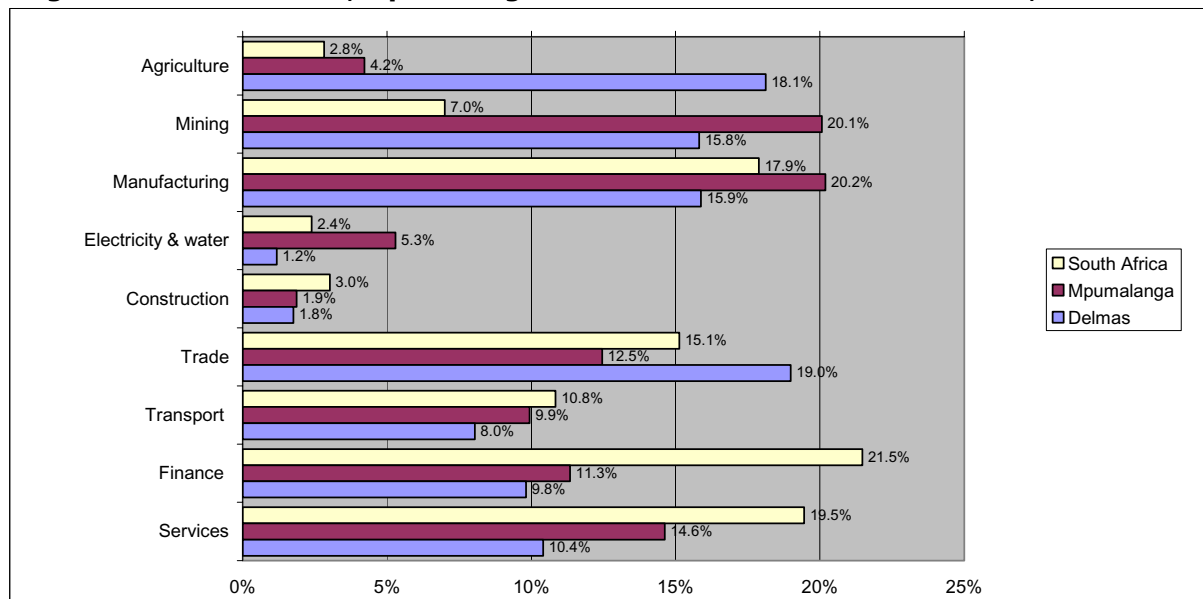
Source: Quantec Research & Urban-Econ estimates, 2006

The smallest economic sectors in the Kungwini LM are the agriculture, mining and electricity and water sectors. This indicates that the Kungwini LM is primarily a service-oriented economy, but also includes well-established manufacturing industries.

The Delmas LM economic structure is different compared to the Kungwini LM. It is greatly dependant on the agricultural (18.1%), trade (19%), mining (15.8%) and manufacturing (15.9%) sectors.

The electricity and water and construction sectors are the smallest economic sectors in the Delmas LM. They contribute 1.2% and 1.8% to the economy, respectively.

**Diagram 2.8: South Africa, Mpumalanga and Delmas LM economies structure, 2005**



Source: Quantec Research & Urban-Econ estimates, 2006

## 2.7 Sectoral growth rates

Table 2.7 indicates the annual sectoral growth rates of the analysed areas during the period between 1995 and 2005.

Between 1995 and 2005, the South African economy was growing at an average rate of 3.3% per annum. During this period, the sectors that reported a higher than average growth rate were tertiary sectors, in particular the trade, financial services and transportation.

**Table 2.7: Average annual sectoral growth rates (1995-2005)**

Sector	South Africa	Gauteng	Mpumalanga	Kungwini LM	Delmas LM
Agriculture	3.3%	-1.4%	4.8%	0.7%	10.4%
Mining	0.9%	-4.2%	1.9%	-6.2%	-0.6%
Manufacturing	2.5%	2.5%	3.7%	3.4%	4.0%
Electricity & water	1.6%	0.6%	1.8%	-3.5%	-6.8%
Construction	4.1%	5.9%	1.0%	5.5%	-1.8%
Trade	4.3%	4.5%	4.0%	4.5%	3.4%
Transport	6.4%	7.4%	6.6%	5.0%	2.4%
Finance	5.6%	7.9%	4.0%	5.7%	4.9%
Services	1.1%	0.4%	1.7%	1.4%	-1.9%
<b>Total</b>	<b>3.3%</b>	<b>3.7%</b>	<b>3.2%</b>	<b>3.0%</b>	<b>2.6%</b>

Source: Quantec Research and Urban-Econ calculations, 2006

The Gauteng Province economy grew at a higher than national average growth rate during the analysed period. The major growth sectors in the Gauteng Province were the financial services, transportation and construction sectors. In the Kungwini LM, these sectors along were also the biggest contributors to the economic development of the area. However, the Kungwini LM mining and electricity sectors have been declining at a rapid rate of 6.2% and 3.5% respectively. These sectors,



as described in the previous section, are the smallest economic sectors in the Kungwini LM, therefore, their contraction did not have a noticeable negative impact on the economy in general.

The Delmas LM economy has been growing at a slower rate than the provincial (Mpumalanga) and national economies. It has experienced a decline in such sectors as the mining, electricity and water, construction and general services. While the electricity and water and construction sectors contributed 3% in total to the local economy, the mining and services sectors are relatively large generators of the value-added in the area. Therefore, the decline in these sectors has had a substantial impact on the overall performance of the Delmas LM economy. On the other hand, the agricultural sector – the second biggest contributor to the Delmas LM economy (18.1%) – has been performing very well during the analysed period. Its annual average growth rate between 1995 and 2005 was 10.4% per annum.

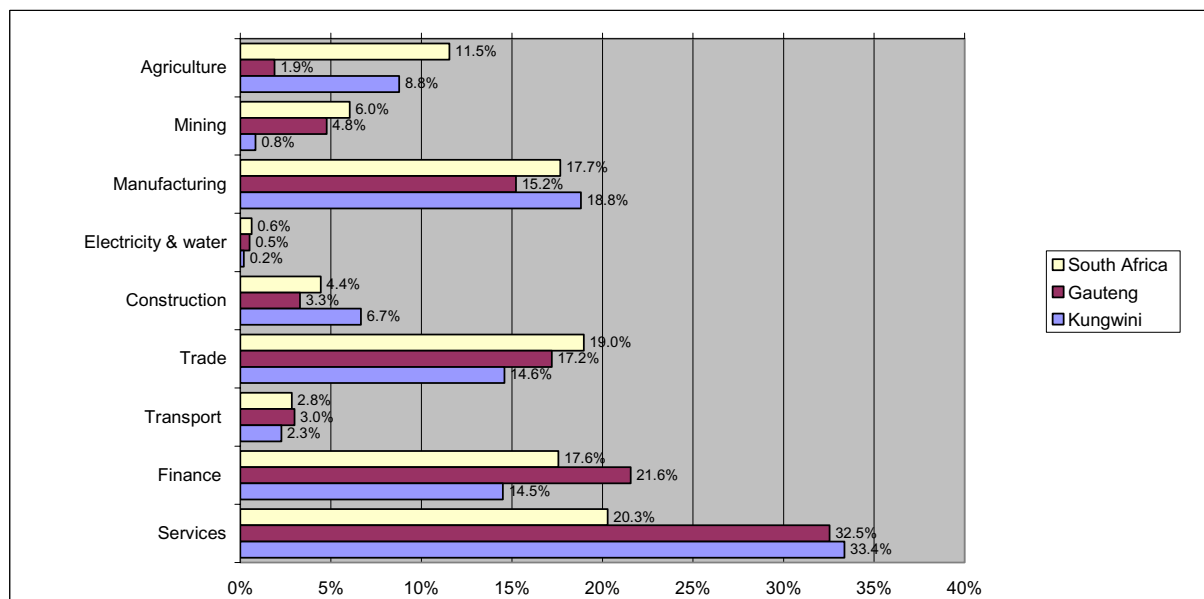
## 2.8 Sectoral employment

The following diagrams illustrate sectoral employment structures of the South African, Gauteng, Mpumalanga, Kungwini LM and Delmas LM economies.

The South African economy sectoral employment structure is relatively diversified. The biggest employment sectors are the services, trade, financial, manufacturing and agriculture sectors. The sectoral employment structure is correlated with the sectoral GGP contribution: the biggest contributors to the GGP are also the biggest employers.

In the Kungwini LM, the largest job-creating sector is the services sector (33.4%) that incorporates community services such as education and health services, as well as general government services. The second largest employer in the area is the manufacturing sector (18.8%). The financial services and trade are the third and fourth largest contributors to job creation in the Kungwini LM. The electricity and water sector employs the smallest number of workers in the local economy - 0.2%, but it is also the smallest sector in terms of GGP. On the other hand, the agriculture is also one of the smallest contributors to the GGP of the Kungwini LM (2%), but it employs 8.8% of the total number of workers in the area. This reflects the fact that the agricultural sector generates small value-added, while being a labour intensive sector.

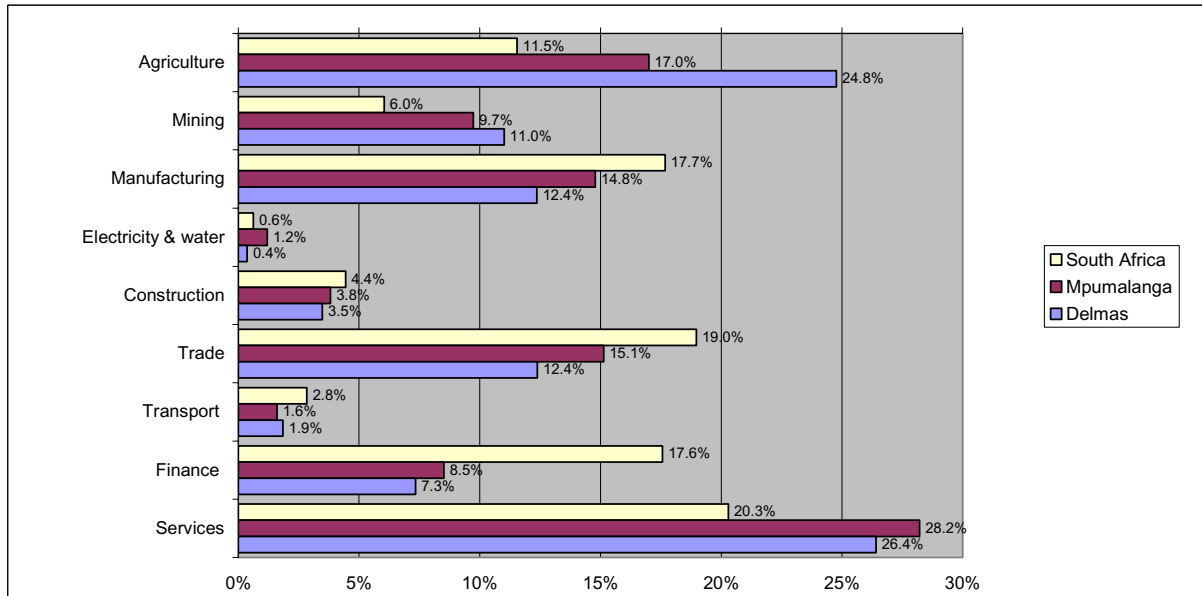
**Diagram 2.9: South Africa, Gauteng and Kungwini LM sectoral employment structure, 2005**



Source: Quantec Research & Urban-Econ estimates, 2006

The sectoral employment structure in the Delmas LM is different compared to the Kungwini LM. The largest contributor to job creation in the Delmas LM is the services sector (26.4%). However, the second largest contributor is the agricultural sector (24.8%). This highlights that the local economy is highly dependant on the performance of the agricultural sector and its job creation ability. The third and fourth largest employers are the manufacturing and trade sectors, each of which contributes 12.4% to the employment in the area. As in the case with the Kungwini LM, the electricity and water sector employs the smallest number of workers in the Delmas LM.

**Diagram 2.9: South Africa, Mpumalanga and Delmas LM sectoral employment structure, 2005**



Source: Quantec Research & Urban-Econ estimates, 2006

## 2.9 Summary

The socio-economic analysis of the Kungwini LM, where the majority of Site Y is located, and the Delmas LM, where Site X is situated, was performed on the background of the South African economy, as well as economies of the provinces that encompass these local municipalities. The analysis revealed the following:

- The Kungwini LM population equalled 120,095 in 2005; the Delmas LM population was 59,832 the same year.
- The population of the Kungwini LM was growing rapidly, while the Delmas LM population was increasing at a rate of 1.4% per annum between 1996 and 2005.
- The HIV/AIDS prevalence in Mpumalanga is worse than in the Gauteng Province according to both the Department of Health Statistics and the South African National HIV/AIDS survey.
- According to Quantec Research, the Kungwini LM HIV/AIDS prevalence rate was lower than that of the Delmas LM.
- The average monthly household income in the Kungwini LM is R7,889, while in the Delmas LM – R3,469.
- The Delmas LM has 71.1% households living below the poverty line, while the Kungwini LM has 62,4%.
- The Kungwini LM Economically Active Population equalled 64,464 in 2005, while in the Delmas LM – 24, 997.
- The labour absorption capacity in the Kungwini LM is higher than that in the Delmas LM – 71.3% compared to 50.8%, respectively.
- The Kungwini LM and the Delmas LM occupation profiles are skewed towards the elementary occupations, i.e. mining, construction, transportation and agricultural labourers.

- The Delmas LM has higher percentage of skilled agricultural workers indicating importance of this sector in the area, while the Kungwini LM has a higher percentage of professionals and managers that correlates with the higher average monthly household income.
- The Kungwini LM economy equalled R5.3 billion, while the Delmas LM valued R1.2 billion in 2005 in constant 2000 prices.
- The Kungwini LM economy was growing at a rate of 3% per annum, the Delmas LM grew by 2.6% per annum between 1995 and 2005.
- The largest contributors of the Kungwini LM economy are the manufacturing (32.4%) and services (25.1%) sectors, while the smallest sectors are the electricity and water (0.4%) and agriculture (1.4%).
- The Delmas LM economy is dominated by the trade sector (19%), agriculture (18.1%), mining and manufacturing. The smallest sectors in the area are the electricity and water (1.2%) and construction (1.8%) sectors.
- The fastest growing sectors in the Kungwini LM were tertiary sectors, while the mining and electricity and water sectors have been declining by 6.2% and 3.5% per annum, respectively. However, the former sectors are the smallest contributors to the economy; therefore, they did not have a great impact on the economic performance in general.
- The fastest growing sector in the Delmas LM was agriculture with 10.4% growth per annum between 1995 and 2005. The mining, electricity and water, construction and services sector has been declining during the analysed period. While electricity and water and construction sector are the smallest contributors to the economy and their contraction did not have a substantial impact on the economic performance, the mining and service sectors contribute 26.2% in total to the economy, thus their poor performance had a noticeable negative impact on the economy of the Delmas LM.
- The biggest job creating sectors in the Kungwini LM are services, manufacturing, finance and trade, while the electricity and mining sectors are the smallest employers in the local area. This is correlated with the economic structure.
- In the Delmas LM, the agriculture and services sector employ 51.2% of the total employed population in the area. This highlights the fact that the Delmas LM is dependant on the agricultural sector performance as well as the services sector.

The above summary of the socio-economic analysis indicates that the Delmas LM has a more vulnerable economy compared to the Kungwini LM, due to the following:

- High poverty rates
- Decreasing number of employment opportunities
- Lower quality of life, including striking HIV/AIDS prevalence in the area
- Slow economic growth
- High dependency on the agricultural sector with regard to employment opportunities.

**Section 3: SOCIO-ECONOMIC PROFILE OF ALTERNATIVE SITES**

The purpose of this section is to provide a socio-economic profile of people residing and working within the boundaries of the alternative sites.

Two alternative sites have been identified as potential for the establishment of a power station in the Witbank geographical area:

- Site X is located within the boundaries of the Delmas Local Municipality, Mpumalanga between the N1 and N12 national highways. It is situated on the western side of R545 on the perimeter of the coal reserve, proposed to supply the power station. The land on this site is currently used for crop production and grazing.
- Site Y traverses the Delmas Local Municipality, Mpumalanga, and the Kungwini Local Municipality, Gauteng. The majority of the area of Site Y is located within the Kungwini Local Municipality, Gauteng. It is located north of the N12 national highway and to the south-west of Site X. The land on this site is currently used for agricultural purposes.

Table 3.1 summarises the result of the socio-economic survey undertaken among communities residing on the sites under discussion.

**Table 3.1: Socio-economic profile of communities residing on Site X and Site Y**

Criteria	Indicator	Site X		Site Y	
		Number	% of total	Number	%
<b>Site population</b>					
	Number of people	104		214	
	Number of families	27		43	
<b>Employment</b>					
	Staying on the farm	47	86.5%	43	72.9%
	Coming from outside the farm	7	13.5%	16	27.1%
	Employed outside the farm	4		29	
<b>Unemployment</b>					
	Staying on the farm	13		42	
<b>Employment profile</b>					
	Permanently employed	37	56.1%	49	49.0%
	Part-time employed	16	24.2%	9	9.0%
	Unemployed	13	19.7%	42	42.0%

*Source: Socio-Economic Survey, Urban-Econ, 2006*

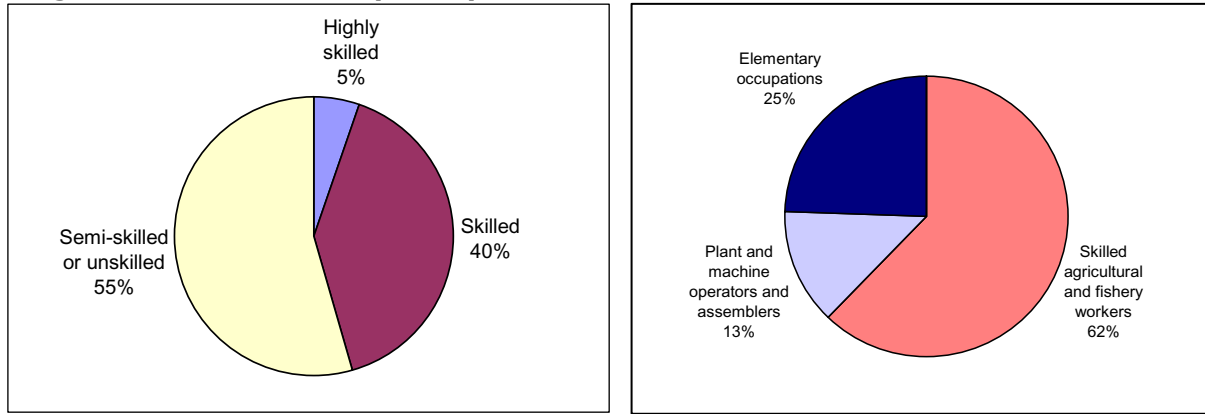
The Socio-Economic Survey completed for Sites X and Y indicated the following:

- Site X has approximately 104 people residing within its borders comprising of 27 families; Site Y is populated by 214 people forming 43 families
- Out of 64 people in working age residing on Site X, 47 people are employed on the local farms; on Site Y, 43 out of 114 workers are employed locally
- The unemployment rate on Site X is 20.3%, while the unemployment rate on Site Y is 37%
- Those employed on Site X and Site Y are predominately permanent employees.

Diagram 3.1 illustrates skill and occupation profiles among the workers employed on Site X.

- Approximately 55% of Site X employees are semi-skilled and unskilled, 40% are skilled and minor 5% are highly skilled
- The dominant occupation among the workers is agricultural trades, while the rest of the employees are involved in elementary occupations and operating plants and machines (e.g. drivers).

**Diagram 3.1: Skill and occupation profiles, Site X**

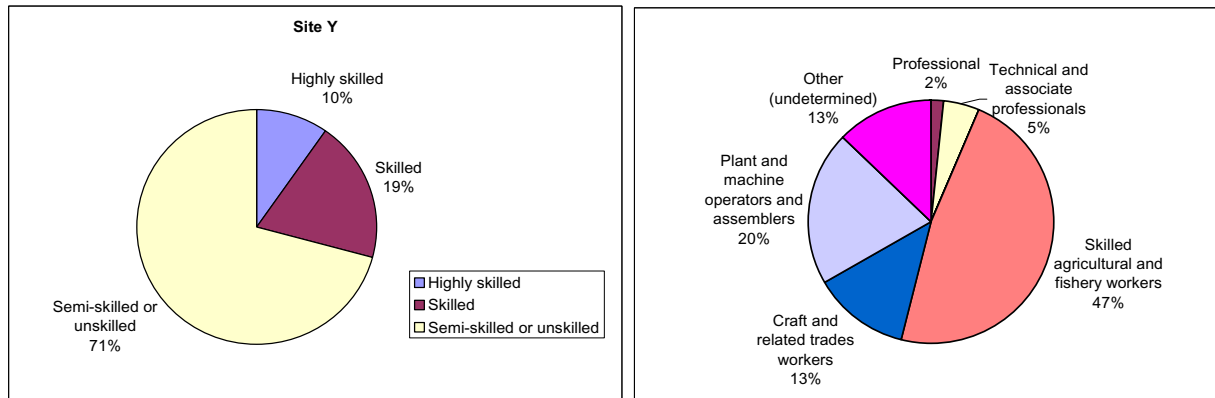


Source: Socio-Economic Survey, Urban-Econ, 2006

Diagram 3.2 illustrates skill and occupation profiles of employees on Site Y.

- Site Y skills profile shows the domination of semi-skilled and unskilled workers (71%); 19% of the workers are skilled, and 10% are highly skilled
- The occupation profile of Site Y workers is more diversified than of Site X:
  - 47% of workers are skilled agricultural workers
  - 20% are machine operators (e.g. drivers)
  - 13% are craft related workers (e.g. woodworkers)
  - 7% are professionals and technical assistants.

**Diagram 3.2: Skill and occupation profiles, Site Y**



Source: Socio-Economic Survey, Urban-Econ, 2006

Table 3.2 indicates estimated wage bill and turnover of farms located on Sites X and Y.

**Table 3.2: Estimated wage bill and turnover of economic activities on Site X and Site Y**

Indicator	Site X	Site Y
Estimated Wage Bill (per site per annum)	R720,000	R900,000
Estimated annual turnover (per site per annum)	R12,600,000	R13,300,000

Source: Socio-Economic Survey, Urban-Econ, 2006

As indicated in the table, economic activities that take place on Site X bring an estimated turnover of R12.6 million per annum. During the socio-economic survey, it was identified, that besides farming activities that take place on site X, there is a compost making activity that has been established only recently and is currently at the start-up phase.

Economic activities on Site Y generate approximately R13.3 million per annum in turnover. Within the boundaries of this site the following activities supplement the farming activities:

- Woodworking (8 employees)
- Café (1 employee)
- School (3 employees)
- Compost making.

The wage bill of workers employed on Site X equals approximately R720,000 per annum. The salary and wage expenditure on Site Y values about R900,000 per annum.

## **Summary**

Based on the Socio-Economic Survey, conducted among the farms located within the alternative sites, it can be preliminary identified that the establishment of a power station on Site Y will have bigger negative socio-economic impacts than that on Site X due to the following:

- Site Y has a bigger population than Site X
- Site Y has a bigger number of employed population on that site than Site X
- Site Y has a bigger wage bill than Site X
- Site Y has a bigger turnover than Site X
- Site Y has a more diversified economy than Site X
- Site Y has an educational facility.

**Section 4: OVERVIEW OF THE PROPOSED COAL-FIRED POWER STATION**

The purpose of this section is to provide a concise description of the proposed coal-fired power station. The following information is presented as part of this section:

- Employment creation during the construction and operational phases
- Total value of investments during the construction phase
- Operational expenditure
- Expenditure on salaries and wage during the operational phase
- Skills requirement.

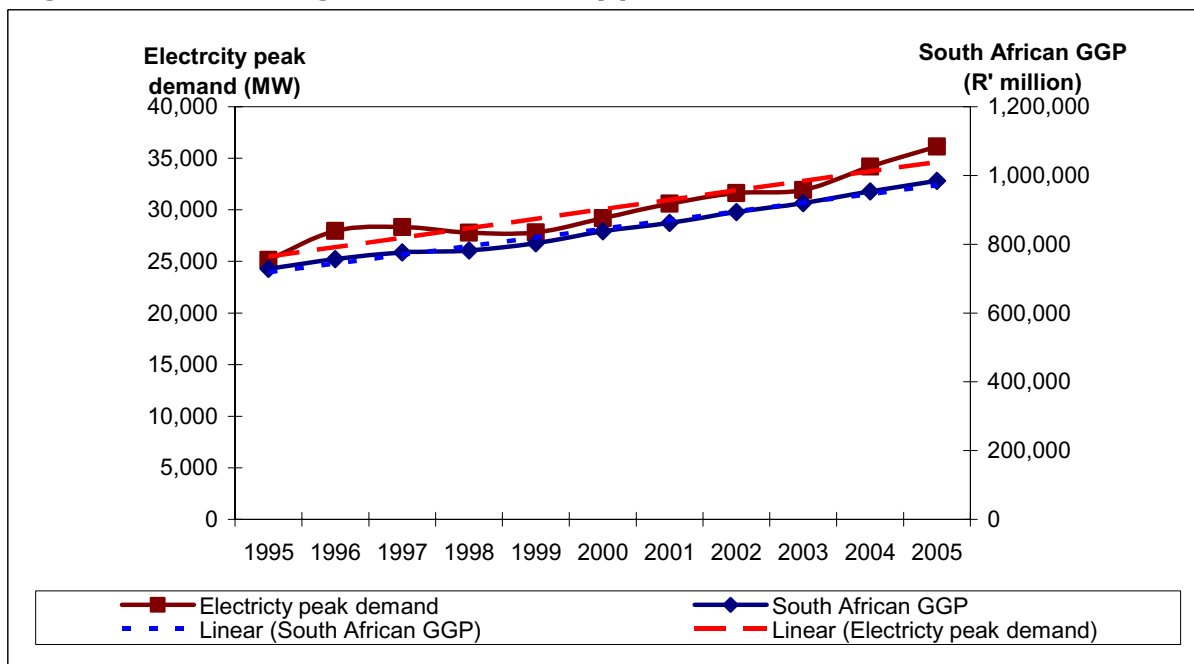
Due to the fact that the operational context of the proposed coal-fired power station has not been yet finalised, the information with regard to its operational and construction phases is very limited. In particular, it refers to information on the size of economic activities, number of people employed, Rand value of input materials, etc. In this context, the OPEX data has been estimated based on the information provided by Eskom and in the National Integrated Resource Plan 2 published in 2004 and updated to 2005 by Urban-Econ.

**4.1 Industry outlook**

South Africa has a well-established energy supply system. The country’s energy resource is dominated by coal, which is the most widely used primary fuel. South Africa is ranked seventh in the world with regard to coal reserves and fifth in terms of its production (South Africa Yearbook 2005). South African coal reserves are relatively shallow with thick seams, what makes its production one of the cheapest in the world. Since over 90% of all electricity in the country is generated by coal-fired power stations, the electricity in South Africa is relatively cheap. Coal-fired power stations are predominantly located in proximity to major coal reserves in South Africa – in Mpumalanga and Free State.

Electricity generation is the cornerstone of the South African economy. Its relatively cheap price has attracted energy-intensive industries that have greatly contributed to the economic development of the country. The following diagram illustrates the correlation between the peak demand for electricity and economic growth: increase in economic growth creates bigger demand for electricity.

**Diagram 4.1: Economic growth and electricity peak demand, 1995-2005**

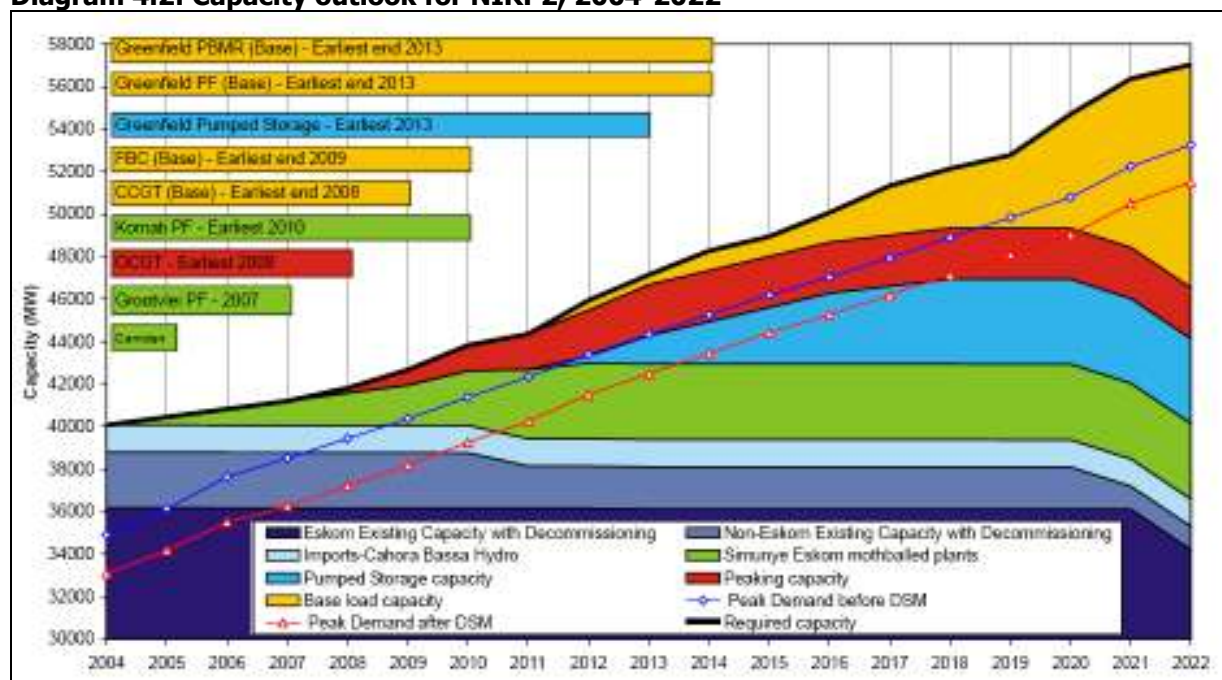


Source: Quantec Research Data, Digest of South African Energy Statistics 2005, South Africa Yearbook 2005/2006

Electricity generation in South Africa is dominated by Eskom Holdings Limited. It supplies approximately 95% of all electricity in the country. While Eskom does not have exclusive generation rights, it has a practical monopoly on bulk electricity. It also operates the Integrated National High-Voltage Transmission System and supplies electricity directly to large consumers such as mines, mineral beneficiators and other large industries. In addition, it supplies directly to commercial farmers and, through the Integrated National Electrification Programme (INEP), to a large number of residential consumers (South Africa Yearbook 2005).

Increasing demand for electricity by industrial sectors and residencies has put pressure on the Eskom's capacity. In response to this, Eskom has embarked on the strategy to increase the transmission capacity. The first step is to reintroduce the three mothballed power stations, namely, Kamden, Grootvlei and Kamati. The second step is to establish new power stations and peaking plants. The following diagram illustrates the planned capacity increase and the forecast demand for electricity up to 2022.

**Diagram 4.2: Capacity outlook for NIRP2, 2004-2022**



Source: National Integrated Resource Plan 2, 2004

The diagram shows that the electricity capacity in South Africa is under strain. Introduction of the Demand-Side Management (DSM) by Eskom and demothbaling of the three plants should solve the problem with electricity shortage in the short-term. However, it will not be sufficient in the medium term. Therefore, construction of new coal-fired power stations is imperative to avoid energy crisis in the county in the nearest future. In the long-term, introduction of more efficient and environmentally friendly power plants are planned.

#### **4.2 Assumptions concerning the proposed coal-fired power station**

The CAPEX and OPEX data has been estimated based on the following assumptions concerning the proposed coal-fired power station in Witbank geographical region:

- Type of the power station – pulverized fuel coal-fired power station
- Number of units – 6
- Capacity of each unit – 900 MW
- Total capacity of the power station – 5,400 MW
- Construction phase duration – 2006 till 2014
- Full operation - 2014
- Power station life span – 40 to 50 years.



### 4.3 Estimated capital expenditure (CAPEX)

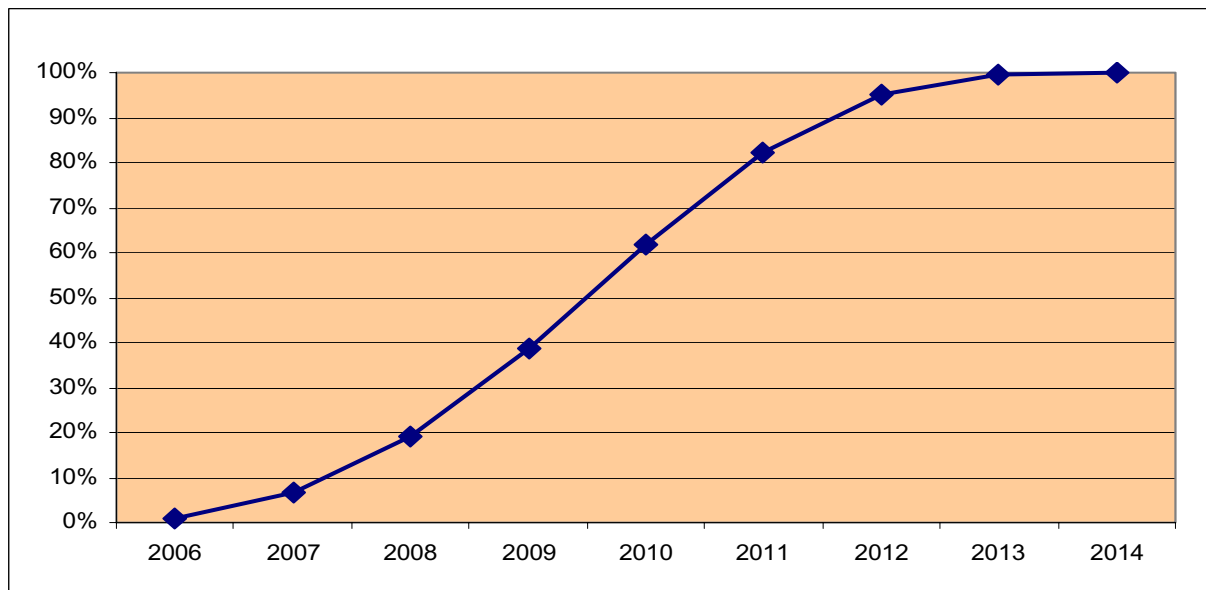
The estimated capital expenditure required to establish the proposed coal-fired power station, including the support infrastructure, is estimated at about R42 billion in 2005 prices. The anticipated investment will be allocated among the following articles:

- Construction works - 7% of the total CAPEX expenditure
- Plant and machinery - 85% of the total CAPEX expenditure
- Land - 0.04% of the total CAPEX expenditure
- Labour – 8% of the total CAPEX expenditure.

It is assumed that 60% of the plant’s equipment and machinery will be imported from overseas, and 2% of the labour expenditure will be spent on foreign experts and consultants.

The construction of the proposed power station will follow the pattern illustrated on Diagram 4.3.

**Diagram 4.3: Capital expenditure pattern of the construction of the proposed power station**



Source: Eskom, 2006

### 4.4 Estimated job creation during the construction phase

It is anticipated that approximately 3,670 people will be employed during the construction phase. The construction phase will commence in 2006 and finish in 2014, when all 6 units are fully constructed. The workforce is estimated to be distributed as follows:

- Highly skilled - 20%
- Skilled - 35%
- Semi-skilled or unskilled - 45%.

### 4.5 Estimated operational expenditure (OPEX)

The projected annual operation and maintenance cost of the proposed coal-fired power station equals R2,056 million. This will be spent within the local and regional economies. The operational and maintenance expenditure is assumed to be allocated as follows:

- Materials - 50.9%
- Labour - 24.5%

- Maintenance - 10.1%
- Water - 4.5%
- Consumables - 8%
- Administration - 2%.

#### **4.6 Estimated job creation during the operational phase**

The proposed coal-fired power station is anticipated to provide 800 sustainable job opportunities. The allocation of jobs will be approximately as follows:

- Highly skilled - 10%
- Skilled - 60%
- Semi-skilled or unskilled - 30%.

#### **4.7 Summary**

The construction of the proposed coal-fired power station in Witbank geographical region will require investment of about R42 billion. During a four-year period of the construction phase, approximately 3,670 jobs will be created. About 45% of the workforce will comprise unskilled labour.

During the operational phase, which is envisioned to last for 40 to 50 years, the power station will employ 800 people and cost about R2,056 million per annum to operate and maintain.

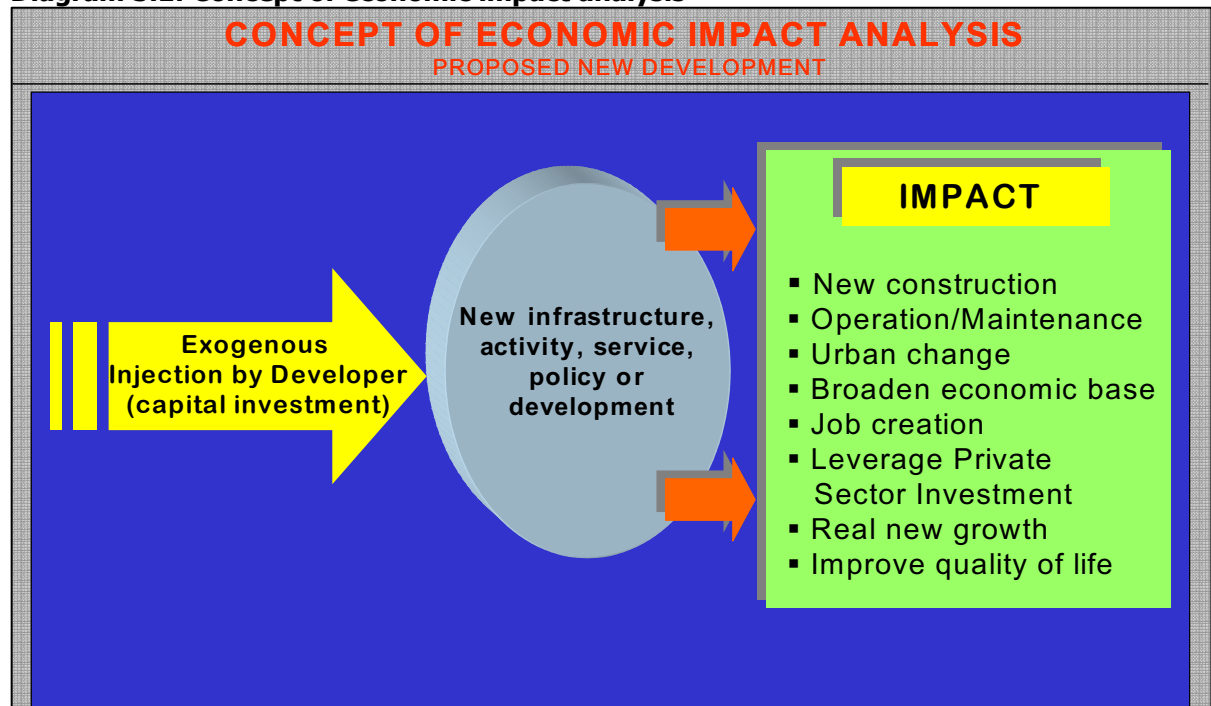
## Section 5: IMPACT ASSESSMENT

The purpose of this chapter is to estimate and quantify the potential negative and positive effects on the economy and societal welfare as a result of the establishment of the proposed coal-fired power station in the Witbank geographical area. The analysis is based on the estimates provided in the previous chapter.

### 5.1 Background to impact assessment

Economic impact assessment (EIA) is the study of the way in which the direct benefits and costs of a proposed project affect the local, regional, or national economy. **Economic impacts** refer to the effects on the level of economic activity in a given area because of some form of external intervention in the economy. The intervention can be in a form of new investment in infrastructure, new development, or adoption of a new policy or services (Diagram 5.1). These interventions subsequently have a diverse effect on economic environment.

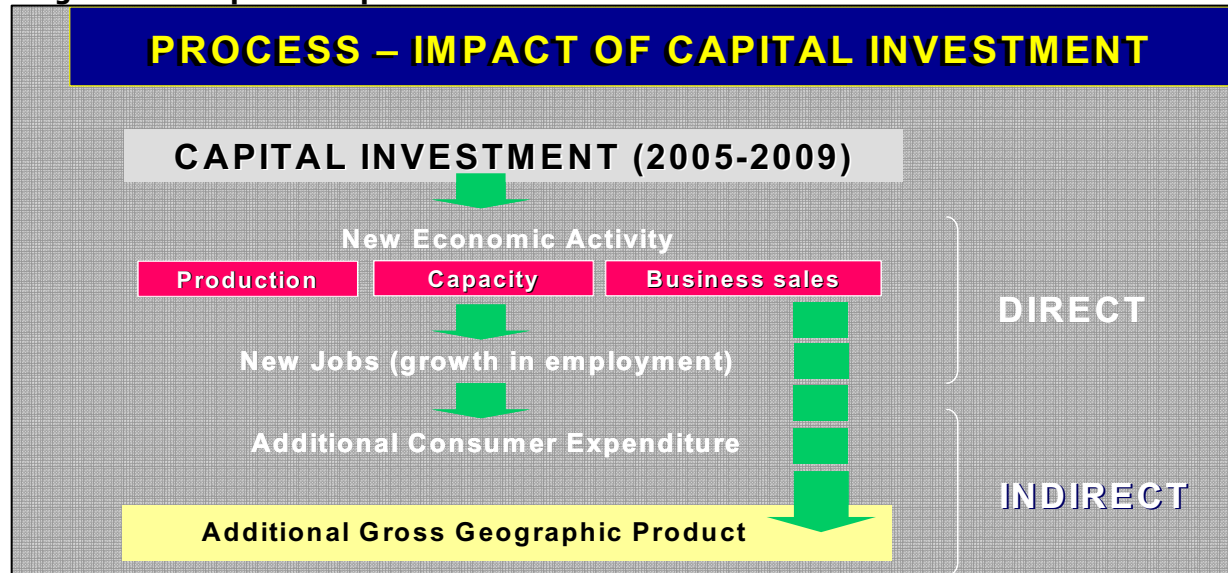
**Diagram 5.1: Concept of economic impact analysis**



Recent advances in economic forecasting and modelling techniques not only consider the direct benefits of the proposed development on its users, but also the broader influences the local and regional economy. The economic impacts in this regard are defined as effects on the levels of economic activity in a given area and the benefit to the economy, such as generation of additional jobs, business sales, improved quality of life, and/or disposable income. To quantify the most likely economic impact of a new business or expansion of an existing activity into a specific area, two types of economic impact can be measured, namely, direct and indirect impacts (Diagram 5.2):

- The **direct economic effects** are generated when the new business creates new jobs and purchases goods and services to operate the new facility. Direct impact results in an increase in job creation, production, business sales and household income.
- The **indirect economic effects** occur when the suppliers of goods and services to the new businesses experience larger markets and potential to expand. Indirect impacts result in an increase in job creation, GGP and household income.

Diagram 5.2: Impact of capital investment



Economic impacts can be also viewed in terms of their duration, or the stage of life cycle the development takes place. The current study analyses two stages of the proposed coal-fired power station life cycle, i.e. construction phase and operational phase. Due to the duration of these phases, the impact are therefore, separated into those observed during the construction phase and those experienced during the operational phase. The construction phase economic impacts are of temporary nature, thus they have a temporary effect. On the other hand, the operational phase of the proposed power station would be between 40 and 50 years, hence the impacts during this stage would be of sustainable nature.

The economic impacts during construction and operational phases can be viewed in terms of a change in the following:

- Job creation
- Value-added (or GGP)
- Personal income
- Business output (or sales volume)
- Impact on the balance of payments.

Any of these measures can be an indicator of improvement in the economic well-being of residents, which is generally the goal of any investment project. The net economic impact is usually viewed as the expansion or contraction of an area's economy, resulting from the induced changes.

In order to quantify the economic impact of any investment project an Input/Output model is used. The model contains information on inter-sector relations, including tables that describe, for each sector included in the model, the amount of input the sector requires from other sectors to produce one unit of output. Thus, it is a set of equations describing the relationships that link the output of the industry with all other industries in an economy.

To embark on the modelling process of direct and indirect impacts of the proposed coal-fired power station, a number of assumptions with regard to the model and data were made. The assumptions were as follows:

- The CAPEX and OPEX figures reflect the real situation accurate enough for the purpose of the impact assessment
- The impact assessment assumes that the proposed development concept is financially viable, and both, private and public companies will be involved in its realisation
- Production activities in the economy are grouped in homogeneous sectors
- The mutual interdependence of sectors is expressed in meaningful input factors

- Each sector’s inputs are a function of the specific sector’s production, comparative advantage and location
- The production by different sectors is equal to the sum of the production of separate sectors’
- The technical coefficients of the Input/Output model remain constant for the period over which forecast projection is made.

## **5.2 Impact assessment of the proposed coal-fired power station**

The following paragraphs describe the effects on the local and regional economies, which are both directly and indirectly attributed to the establishment of the proposed coal-fired power station in the Witbank geographical area. It includes socio-economic impacts arising from construction and operation of the power station, including employment generation and economic growth.

### **5.2.1 Impact during the construction phase**

The establishment of the proposed coal-fired power station in the Witbank geographical area is estimated to have a total capital cost of R42 billion. However, approximately 51.1% of this amount will be spent on imported equipment and hiring foreign specialists. Therefore, a total of R20,539 million will be spent locally during the construction phase.

The period of construction has been assumed to extend over 9 years, starting in 2006 and finishing in 2014. The following table indicates the direct, indirect and cumulative impacts of the construction of the power station over this period.

**Table 5.1: Socio-economic impacts during the construction phase (2005 prices)**

<b>Category</b>	<b>Direct</b>	<b>Indirect</b>	<b>Total</b>
<b>New Business Sales (R)</b>	17,950,600,000	37,520,800,000	55,471,400,000
<b>GGP (R)</b>	4,198,400,000	12,198,500,000	16,397,000,000
<b>Employment (person-years)</b>	29,360	26,200	55,560

*Source: Urban-Econ Input-Output Model, 2006*

As indicated in the table, the construction of the proposed coal-fired power station will lead to expansion of **business sales** by R17.95 billion over 9 years. The affected parties could be located in the Mpumalanga Province and the Gauteng Province, as well as other regions in South Africa. The increase in business sales will mainly be noticed in the construction sector, as the demand for bricks, concrete, pipes, etc. will increase.

The increase in direct business sales will have positive spin-off effects on the supporting businesses, for example, plants and factories that manufacture construction materials and other inputs required for operating a power station. A total of R37.5 billion in new business sales will be generated as the result of the indirect impact on the power station construction.

The establishment of the coal-fired power station in the region will generate approximately R4.2 billion in **value-added**. The second and subsequent round effects arisen from the construction of the power station will indirectly increase the study area’s GGP by additional R12.2 billion.

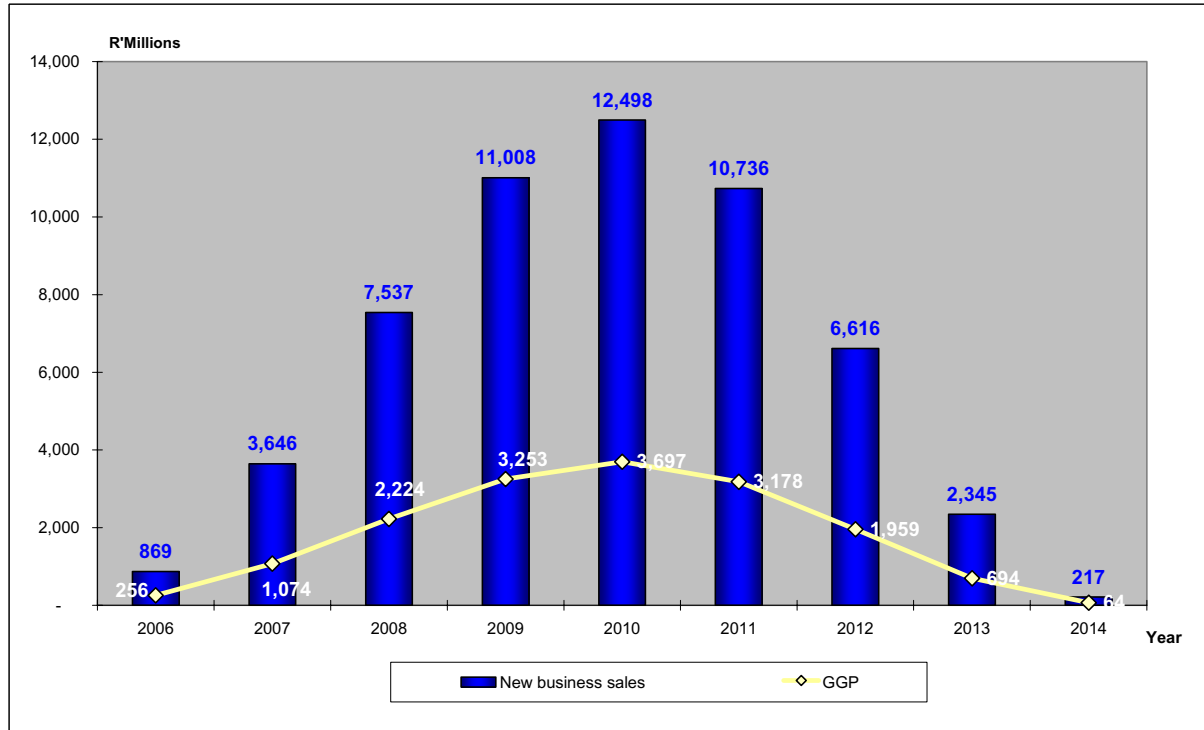
During the construction phase, 55,560 **employed person-years** will be created. This includes direct jobs, i.e. construction workers and supporting services, as well as indirect jobs, i.e. jobs created within businesses that support companies directly involved in construction of and supply of material to the power station. The 55,560 employed person-years correlate with approximately 3,670 new direct jobs and 3,275 indirect employment opportunities created during the whole construction period.

The following diagram illustrates the flow of total generated new business sales and value-added. It is shown that a relatively small amount of new business sales and value-added will be created during the first and last two years of the construction period. This is attributed to the fact that the construction of the proposed power station will take place in the following pattern:

- 2006 – 1<sup>st</sup> unit start up
- 2007 – 2<sup>nd</sup> and 3<sup>rd</sup> units start up
- 2008 – 4<sup>th</sup> and 5<sup>th</sup> units start up
- 2009 – 6<sup>th</sup> unit start up.

The capital investment, and subsequently the increase in new business sales and GGP, will peak during the fifth year of the construction period, i.e. 2010.

**Diagram 5.1: Distribution of impacts during the construction phase**



Source: Urban-Econ Input-Output Model, 2006

### 5.2.2 Impact during the operational phase

The economic impacts of the coal-fired power station during the operational phase are calculated based on the estimates provided in the previous section. The results have been interpreted for one full year of its operations, which will take place in 2014.

The following table indicates the results of the Input-Output model with regard to the operational phase.

**Table 5.2: Socio-economic impacts during the full year of operation (2005 prices)**

Category	Direct	Indirect	Total
<b>New Business Sales (R)</b>	2,293,800,000	4,766,200,000	7,059,900,000
<b>GGP (R)</b>	1,178,400,000	1,488,600,000	2,667,200,000
<b>Employment (person-years)</b>	800	5,430	6,230

Source: Urban-Econ Input-Output Model, 2006

It is anticipated that 800 **jobs** will be created by the power station directly. At the same time, the operation of the power station by means of the multiplier effect will create additional 5,430 jobs. These jobs will be formed mainly in the trade, mining and transportation sectors. Thus, through direct and flow on effects the operating power station will create 6,230 sustainable jobs.

It is expected that the **value-added** will increase by R2.67 billion per annum, of which R1.18 billion will be generated directly by the operations of the power station.

Operational expenditure of R2.06 billion per annum will lead to an increase in **new business sales** by additional R7.06 billion per annum. This includes direct as well as indirect spin-offs. Approximately R2.3 billion of new business sales will be generated as a result of direct effects.

### 5.3 Summary

Table 5.3 summarises socio-economic impacts of the construction of the proposed coal-fired power station during the construction and operational phases.

**Table 5.3: Socio-economic impacts during the construction and operational phases**

Category	Direct	Indirect	Total
<b>Construction phase (2006-2014, 2005 prices)</b>			
<b>New Business Sales (R)</b>	17,950,600,000	37,520,800,000	55,471,400,000
<b>GGP (R)</b>	4,198,400,000	12,198,500,000	16,397,000,000
<b>Employment (person-years)</b>	29,360	26,200	55,560
<b>Operational phase (per annum starting 2014, 2005 prices)</b>			
<b>New Business Sales (R)</b>	2,293,800,000	4,766,200,000	7,059,900,000
<b>GGP (R)</b>	1,178,400,000	1,488,600,000	2,667,200,000
<b>Employment (person-years)</b>	800	5,430	6,230

## **Section 6: IMPLICATIONS AND RECOMMENDATIONS**

The purpose of this section is to interpret the socio-economic impacts identified in the previous section in terms of implications on local and regional economies and social lives of the local communities. It also provides recommendations with regard to minimising adverse effects and maximising positive impacts.

Due to the fact that the alternatives sites are located in different geographical regions, but are very close to each other, it is assumed that the procurement and employment patterns will be the same despite of the location of the power station. Therefore, the implications will be similar for both of the sites. In this context, they are analysed in terms of the study area's economy, which constitutes the Mpumalanga and Gauteng economies.

### **6.1 Impact on the balance of payments**

The balance of payments is a summary of all economic transactions between South Africa and the rest of the world. The balance of payments is divided into the current and capital accounts. The current account deals with exports and imports, while the capital account refers to Foreign Direct Investments (FDI), Investment Portfolio and Other Investments.

The current account, or the trade balance, is measured in terms of surplus or deficit. The surplus is experienced when the value of purchased domestic goods by foreign economies exceeds the value of foreign goods purchased by the domestic economy. On the other hand, the deficit reflects the situation when imports surpass exports in the domestic economy.

The construction of the coal-fired power station will require purchase of foreign labour and foreign plant equipment and machinery to the amount of R15,348 million. This will interfere with the balance of payments, and the trade balance in particular, increasing the outflow of money from South Africa.

Since 2002, the South African economy has had a negative trade balance. In 2005, the trade deficit was R50.1 billion. Although it is difficult to predict what will be the state of the trade balance in the future, it can be said that the outflow of R21.5 billion, almost half of the 2005 trade deficit, will have a significant impact on the current account.

In the case the country runs into a trade deficit due to purchase of the necessary equipment for the current project, it will not necessarily be a negative transaction, as the money would have financed strategically important asset in South Africa, which would have positive spin-off effects on the national economy. Although R21.5 billion could be viewed in terms of lost jobs and economic development in the local economy, the nature of expenditure offers some comfort since it is related to acquisition of the latest technology in coal-fired power generation and offers possibility for skills transfer. In addition, as was displayed in Diagram 4.1, the supply of electricity and the economic growth show positive correlation between each other. Thus, investment in the energy sector is imperative to sustaining the economy growth and achieving the target of 6% per annum. That is why the interference with balance of payment in this context is also viewed as having positive spin-offs.

### **6.2 Impact on business development**

The establishment of the power station will have implications on business development in the local and regional economies. This impact could be grouped according to the following elements:

- Local and regional during the construction phase
- Local and regional during the operation phase
- Site specific.

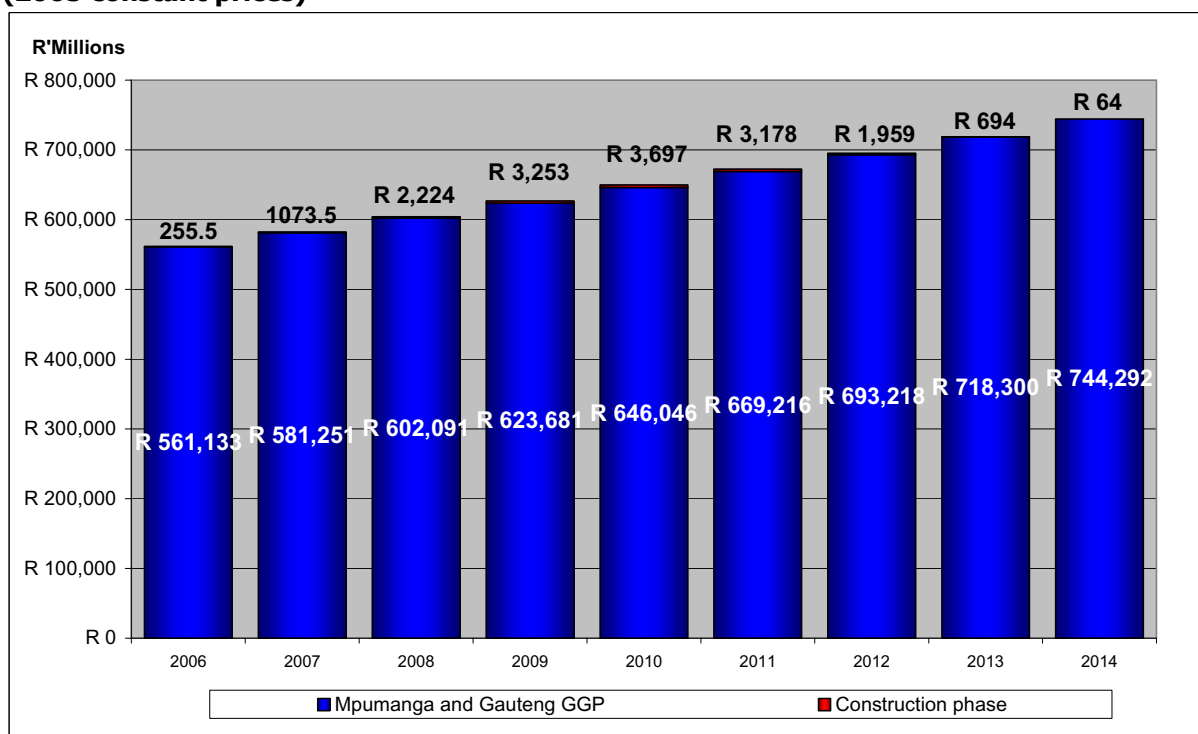


### 6.2.1 Implications during the construction phase

The proposed Site X and Site Y are located in different geographical regions, i.e. Mpumalanga and Gauteng. The sites are very close to each other and situate along the border of these two provinces. It is believed that the procurement pattern with regard to sourcing the labour force and materials during the construction phase will be the same for both cases: the majority of materials supply and labour will be sourced from the Gauteng Province, and the rest predominantly from the Mpumalanga Province.

The construction of the power station will increase the national value-added by R20.5 billion between 2006 and 2014. The majority of the capital expenditure will take place between 2008 and 2011. Assuming that the construction will commence in 2006, the Mpumalanga economy grows by 3.2% per annum and the Gauteng economy increases by 3.7% per annum, the construction of the power station will have the following direct and indirect impacts on these economies (Diagram 6.1).

**Diagram 6.1: Cumulative impacts on the study area GGP during the construction phase (2005 constant prices)**



As illustrated on the above diagram, the peak of the capital expenditure will take place in 2010. The study area's GGP, i.e. Mpumalanga and Gauteng, will increase as indicated in Table 6.1.

**Table 6.1: Cumulative contribution to economic growth of the region (direct and indirect impacts, 2005 prices)**

Category	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>Mpumalanga and Gauteng GGP (R'billions)</b>	561.13	581.25	602.09	623.68	646.05	669.22	693.22	718.30	744.29
<b>GGP growth due to PP construction</b>	0.05%	0.18%	0.37%	0.52%	0.57%	0.47%	0.28%	0.10%	0.01%

Source: Urban-Econ Input-Output Model, 2006

The above-mentioned implications of the construction phase will unfold alongside the following developments:

- Increase in production capacity of existing firms: The construction of the power station will require substantial amount of brick, metal and concrete products. Increase in the demand for

these materials is anticipated to be of such extent that the local manufacturing companies will have to increase their production capacity to meet the deadlines.

- Establishment of new SMMEs: Alongside the increase in production capacity of the existing firms, the demand for services and products produced during the construction period of the power station will provide opportunities for new small and medium enterprise development.
- Improved competitiveness: Growing number of SMMEs and increased production output by the existing firms will contribute to improvement of competitiveness among these companies by means of applying new technologies and providing better service.
- Change in the size of the local economy: The establishment of the power station will directly and indirectly increase the size of the local economy. Firstly, the capital expenditure spent on the construction will generate additional value-added. Secondly, the demand for construction materials followed by the extension of production capacities of the existing firms and establishment of new firms will result in growth of the regional economies.

**6.2.2 Implications during the operation phase**

The operational phase will have a substantial impact on the study area’s economy. It is estimated that once the power station operates in its full capacity, which is envisioned to be in 2014, it will increase the study area’s GGP by R2.7 billion, or 0.36%, including direct and indirect spin-offs.

**6.2.3 Implications on local farmers**

Table 6.2 indicates the estimated turnover of the economic activities on Site X and Site Y and their anticipated contribution to the provincial GGP.

**Table 6.2: Turnover and GGP of Site X and Site Y**

Category	Turnover	GGP
<b>Site X</b>	R12.6 million	R6.048 million
<b>Site Y</b>	R13.3 million	R6.384 million

*Source: Socio-Economic Survey and Urban-Econ Input-Output Model, 2006*

The opportunity cost of establishing the power station on Site X is R6.048 million. If the power station is constructed on Site Y, the economy will lose a total of R6,384 million. Comparing these figures with the anticipated increase in the study area’s GGP by R1.18 billion (only direct impact), it can be stated that the construction of the power station is seen as the best alternative for either of the sites in terms of their monetary value. Nevertheless, proper mitigation measures should be introduced to address the issue of lost source of income by farmers.

**Recommendations**

In the case when the farm is not directly affected by the footprint of the power station and support activities and infrastructure, it is recommended that farmers are offered to proceed with their activities on the land.

**6.3 Impact on employment**

The establishment of the proposed coal-fired power station will have positive as well as negative impacts on employment and income levels.

In its broad perspective, the construction of the power station will generate approximately 3,670 direct jobs during the construction phase and 800 sustainable direct jobs during the operations phase. Approximately 2,019 jobs during the construction phase and 560 jobs during the operational phase will be created for highly skilled and skilled people. In total, 4,470 people and their households will benefit from employment created during the construction and operational phases of the power station.

On the other hand, the construction of the power station will lead to a loss of jobs by people working on one of the alternative sites. If the power station is established on Site X, 54 people will lose their source of income. If the power station is built on Site Y, 59 people will lose jobs. The majority of these

people, as was described earlier in Section 3, are semi-skilled or unskilled, therefore, it will be very difficult for them to acquire new employment in short-term. In addition, most of the people working on the farms on Site X or Site Y are the heads of households and the sole providers for their families. As a result, families of 54 workers on Site X or 59 people on Site Y could be left without any source of income.

To summarise all of the above, the opportunity cost of construction of the proposed power station is 54 workers, in case of Site X, or 59 workers, in case of Site Y, left with no income. This compared to the number of jobs directly created by the power station could be considered as unsubstantial cost to incur. However, proper mitigation measures are suggested in order to address the issue of lost employment opportunities.

### **Recommendations**

- Assist in developing new skills among people who worked on the farms and lost their jobs due to construction of the power stations
- Where possible employ these people during the construction and operational phases.

## **6.4 Impact on income**

The construction of the power station on one of the alternative sites will also have a positive and negative impact on the income levels of people currently working on one of the sites and those people who will be employed by the power station during its construction and operation.

The construction of the power station on Site X will lead to a loss of income in magnitude of R720,000 per annum. This income is earned by 54 people working on Site X. In the case of Site Y, currently employed 59 workers will lose R900,000 of annual sustainable income in total.

On the other hand, the establishment of the power station will produce sustainable income for 800 people during the operational phase, whose annual wage bill will value approximately R504 million. This, compared to a loss of R720,000 (Site X) or R900,000 (site Y), is a substantial contribution to an increased quality of life of local communities and their livelihood.

### **Recommendations**

Assist people who lost jobs on the farms due to the construction of the power station in acquiring new jobs.

## **6.5 Impact on social lives of local communities**

The construction of the proposed coal-fired power station will require relocating of families currently residing on one of the alternative sites. If the power station is to be established on Site X, 27 families will be disrupted and will have to be relocated, in the case the power station is constructed on Site Y, 43 families will be affected.

The relocation of families from their home would have a negative impact on their lives in terms of:

- Potential loss of family ties
- Disruption to day-to-day lives
- Change in social interaction and patterns
- Change in community value system with movement from the traditional way of life.

### **Recommendations**

- Monitor movement of local communities and people, in particular those who live on the site where power station is built
- Assist in acquiring new jobs
- Establish community forums
- Ensure constant collaboration between Eskom and construction companies and local communities.

### **6.6 Other impacts**

In addition to the above-mentioned implications of establishing the new power station, the following repercussions need to be taken due cognisance of:

- Increased crime and violence in the area
- Health risks
- Local road congestion
- Noise due to construction and traffic
- Potential loss of education facilities (Site Y).

## **7. CONCLUSION**

The establishment of the proposed coal-fired power station in the Witbank geographical area will bring significant socio-economic benefits to the local and regional economies. This is based on the fact that the anticipated development will:

- Stimulate real growth and development in Mpumalanga and Gauteng and will contribute to the overall sustainable economic growth and development
- Stimulate employment creation and reduction in unemployment – with an emphasis on the lower income communities, empowering and employing them
- Stimulate the development of the construction sector
- Stimulate the development of the manufacturing sector that produces materials used in construction of the power station
- Increase business development as a direct result of the sustainable operational and maintenance expenditure.

The socio-economic disadvantages are associated with the following:

- Inconvenience during the construction period, i.e. the concentration of construction labour on the site during the construction phase, potential crime, violence and health risks
- Loss of sustainable jobs by people currently working on one of the alternative sites
- Interference with the balance of payments
- Disruption of social lives.

Based on the assessment of the possible impacts of the proposed establishment of the power station, the following can be highlighted:

1. The benefits of establishing the proposed power station in the Witbank geographical area outweigh the disadvantages from an economic point of view
2. The construction of the proposed power station will have the same macro socio-economic impacts despite of its location on Site X or Site Y
3. In terms of micro socio-economic situation at the alternatives sites, it is suggested that the power station be established on Site X, as it will lead to smaller negative socio-economic impacts compared to Site Y.

In order to ensure that the negative impacts are minimised, the following is recommended:

- Assistance in skills development to those employed and residing on the site where the power station will be built
- Where possible, employment of those who lost jobs as the result of the construction of the power station on the site where they were working
- Monitor movement of local communities and people, in particular those who live on the site where power station is built
- Establish community forums
- Ensure constant collaboration between Eskom and construction companies and local communities.

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