

ENVIRONMENTAL IMPACT ASSESSMENT FOR ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT

14/12/16/3/3/2/1036, 1037 and 1038

SPECIALIST REPORT: ECONOMIC IMPACT ASSESSMENT

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27 February 2018



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Compliance with Appendix 6 of GN 326 of 7 April 2017

Regulatory Requirements	Section of Report
(a) The person who prepared the report; and the expertise of that person to carry out the specialist study or specialised process.	Annexure B
(b) a declaration that the person is independent	Page ii
(c) an indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA) an indication of the quality and age of base data used for the specialist report	Source and date is provided throughout report
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	p.29
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 1 & Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives	Section 3 & Section 5
(g) an identification of any areas to be avoided, including buffers	Section 3 & Section 5
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	p.23
(i) a description of any assumptions made and any uncertainties or gaps in knowledge	p.29-30
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities	3.2, 3.4, 3.5 & Section 5
(k) any mitigation measures for inclusion in the EMPr	Section 4
(l) any conditions for inclusion in the environmental authorisation	Section 5
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation	
(n) a reasoned opinion— (i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 5
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report	
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto	
(q) any other information requested by the competent authority	

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DECLARATION OF CONSULTANTS' INDEPENDENCE

David Dyason, who is an economist from North-West University, Trade Research Area, is an independent consultant to NAKO ILISO (consultants for Eskom Holdings SOC Ltd), i.e. he has no business, financial, personal or other interest in the activity, application or appeal in respect of which they were appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of this specialist performing such work.



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Signature of Economics Specialist:

Name of specialist

27/02/2018

Date:

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ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT

ENVIRONMENTAL IMPACT ASSESSMENT

APPENDIX K: ECONOMIC IMPACT ASSESSMENT

Title: Economic Impact Assessment for Eskom's Northern Kwazulu-Natal Strengthening Project Environmental Impact Assessment

Specialists: D Dyason

Project Name: Eskom's Northern Kwazulu-Natal Strengthening Project: Environmental Impact Assessment

Status of report: FINAL

NAKO ILISO Project Number: 1600048

Date: February 2018

SPECIALIST

Approved for TRADE by:



27/02/2018

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Executive summary

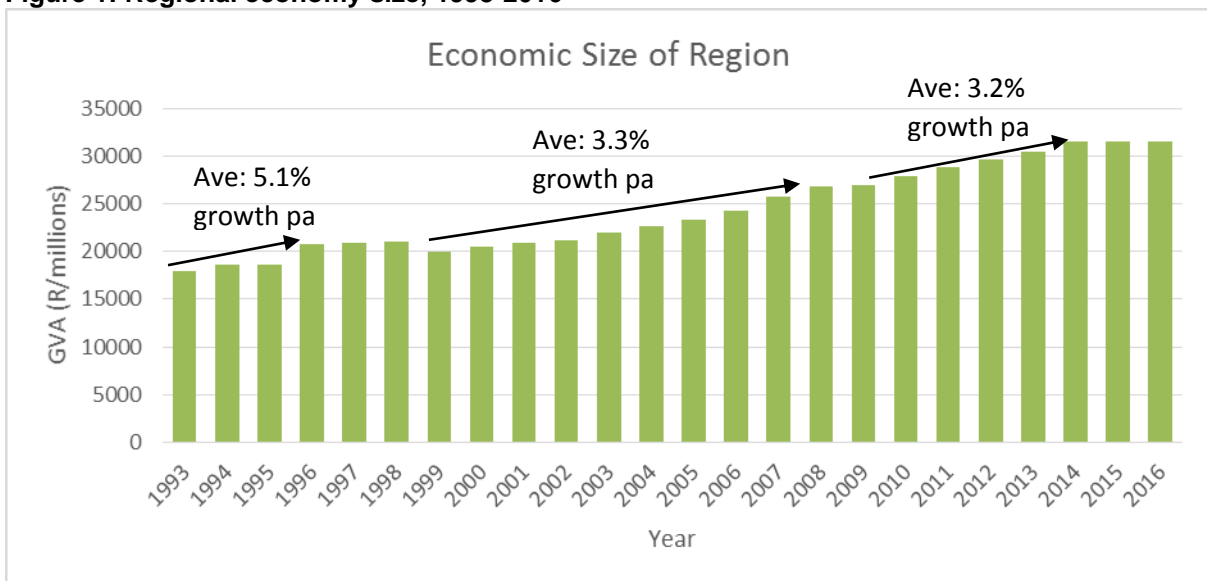
Background

TRADE were commissioned by NAKO ILISO, to conduct a specialist economic impact assessment, with a specific focus on tourism. The purpose of this report is to provide specialist economic input to the EIA process for the proposed Iphiva Substation, Normandie-Iphiva 400 kV powerline, Iphiva-Duma 400 kV powerline and 165 km of 132 kV Distribution powerlines.

The study area comprise a total of 12 local municipal areas including Mkhondo (Mpumalanga), eDumbe (KZN), Abaqulusi (KZN), UPhongolo (KZN), Nongoma (KZN), Ulundi (KZN), Ntambanana (KZN), Mfolozi (KZN), Hlabisa (KZN), Mtubatuba (KZN), The Big 5 False Bay (KZN) and Jozini (KZN). These areas combined represent the regional economy for the study area.

The size of the regional economy is illustrated in Figure 1.

Figure 1: Regional economy size, 1993-2016



Source: Stats SA ex. Quantec 2017

The regional economy had 3 periods of extended growth including 1993 - 1996, between 1999 - 2007 and lastly 2009 - 2014. The regional economy increased steadily between 2009 and 2014 and has since been stable at the same levels up to 2016.

The economy for the region, as illustrated in Figure1, entails a number of sectors. **Tourism is** not an economic sector in its own right, but is **a complex and composite sector** comprising mainly of the following sectors: accommodation, transportation, food and beverages, cultural

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and recreational activities. The activities undertaken by the tourist relate with the travel, destination, and entertainment activities and expenditure that tourists make.

The tourism sector contributes approximately **6% to GVA** for the regional economy, a figure slightly higher than the national average. The total number of people employed in tourism amounts to approximately 4.6% of all employment within the regional economy. Figure 2 shows the relative size of the tourism sector for the region.

Figure 2: Relative Size of Tourism Sector



Source: Stats SA ex. Quantec & Author's calculations 2017

The tourism value of the region is estimated at R1.9 billion (GVA) for 2016 and employment amounts to approximately 9 831 for the corresponding year.

Economic Impact Assessment

In terms of locational theory, various land uses / economic activities reveal distinctly different location preferences (and sensitivities). In this context, the concept of highest and best use is important. In a free market society, on-going competition between different land uses is regulated by the market mechanism. Every site in the urban system has a highest and best economic use and equilibrium in the market will only be reached when the highest and best uses are allocated to a site. This highest and best economic use is a function of physical and economic factors. Physical factors refer to the location of the site, the size thereof, visibility etc. Economic factors mainly refer to the productivity of the land use, including the return on investment and site rent achievable. The visual quality of the area has an economic value in that it enables the tourism activity to take place and as a result generate economic value.

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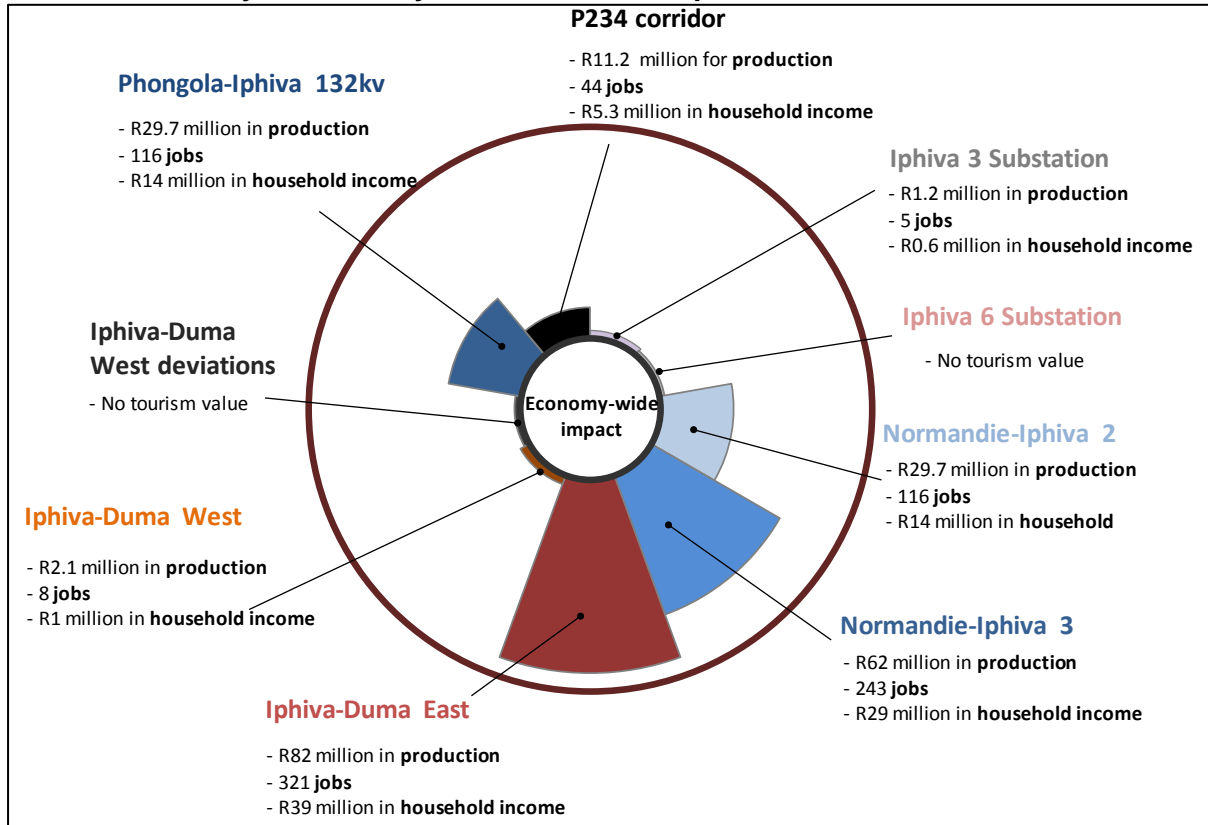
The agglomeration of eco- and nature-based tourism is high within this region and a large share of these establishments cater for the international tourism market and even state their tariffs in Euro and Dollar instead of South African Rand. The intensity of the economic impact for tourism activity will be different for each property/activity and depends on *inter alia* the:

- **Land use type** – property with tourism activity, such as game farming, lodges, protected areas and nature reserves should, as far as possible, be eliminated from the preferred alignment.
- **Distribution powerline route** – The route should be on the boundary of farms and not transcend properties diagonally or through the middle.
- **Size of the property** – A powerline that transcend properties diagonally or through the middle, for property smaller than 200ha – tips an argument for expropriation
- **Existing infrastructure** – Do not place powerlines over or in close proximity to tourism infrastructure.
- **Visibility of the new structure** - Place the powerlines / pylons and substation in areas where it is not visible from tourism areas/hides/etc.
- **Market related compensation** for the affected property should be provided where the powerline is developed.
- Landowners should be **consulted** about their preferred configuration if their property is affected.

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value (final sales) for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare. The corridor and site with the lowest economic value is preferred for the Transmission and Distribution powerline and sub-station developments. Figure 1 illustrates the economy-wide value for each corridor and site based on tourism activity.

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Table 1: Summary of economy-wide economic impact for each corridor and site



Source: Authors calculation, 2018

The preferred corridor for development:

- Normandie-Iphiva 2
- Iphiva 6 Substation
- Iphiva-Duma west with deviations

The economic impact assessment quantifies the economic value associated with tourism activity for each alternative. The alternative with the lowest economic value is preferred for the development of the powerlines and substation. In very sensitive tourism areas and where the existing economic activity will be significantly altered, burying the powerlines will mitigate the negative visual and associated economic impact of powerlines. If financially viable, this option could be considered for the most sensitive portions of the P234 corridor.

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SECTION 1: INTRODUCTION

1.1 Background

ESKOM Holdings SOC Ltd (Eskom) has commissioned a project to strengthen the supply of electricity in northern KwaZulu-Natal (KZN). The northern KZN network is currently fed at 132 kV by Normandie Substation and Impala Substation. The major load centres are Pongola and Makhatini Flats. The Normandie Substation is situated approximately 80 km north-west of Pongola and Impala Substation is situated approximately 180 km south of Makhatini Flats. High voltage drops are experienced in the 132 kV network and the voltages are approaching unacceptable levels as the demand increases. Contingencies on the main 132 kV supplies also lead to thermal overloading of the remaining network.

In order to alleviate current and future network constraints in northern KZN, it is proposed that the Iphiva 400/132 kV Substation be introduced in the area, which will de-load the main sub-transmission network and improve the voltage regulation in the area.

The proposed project triggers several activities listed in the National Environmental Management Act (Act 36 of 1998) (NEMA) as requiring environmental authorisation before they can commence. The purpose of this study is to undertake an Environmental Impact Assessment (EIA) process, with associated Public Participation Process (PPP) and specialist studies, to enable the competent authority to decide whether the project should go ahead or not, and if so, then on what conditions. Four application forms will be submitted, one of each for the following:

1. The Iphiva Substation;
2. The 400 kV powerline from the Iphiva Substation to the Normandie Substation;
3. The 400 kV powerline from the Iphiva Substation to the Duma Substation, and
4. 65 km of 132 kV distribution lines.

1.2 Aim of the report

TRADE were commissioned by **NAKO ILISO**, to conduct a specialist economic impact assessment, with a specific **focus on tourism**, for the project.

The assessment will entail:

- A baseline economic analysis to provide an understanding of the current economic environment.
- An in-depth analysis of proposed positive and negative economic impacts resulting from the proposed project.
- A description of the potential impacts on the economic environment.

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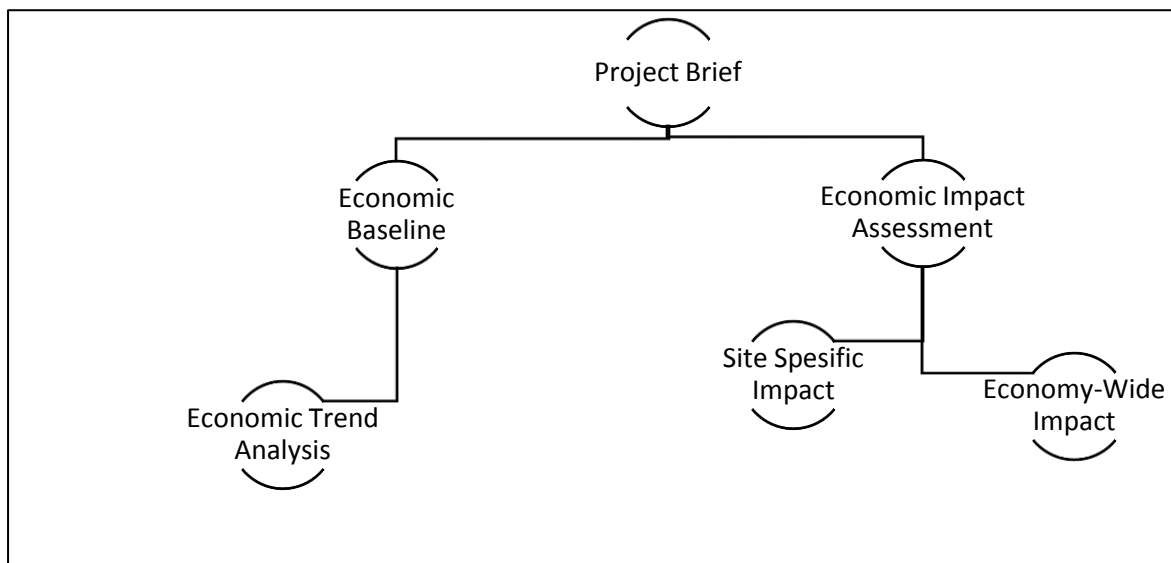
- An assessment of the economic impacts of the proposed project, by applying one or a combination of the following procedures, depending on the availability and applicability of economic and econometric models;
 - Utilise existing national Social Accounting Matrix (SAM) tables to undertake the indirect impacts
 - Derive multipliers to apply to direct impacts
- The recommendation of mitigation measures to improve positive and decrease negative impacts as a result of the proposed project.

The main purpose of this report is to provide input to the EIA process, which aims to find corridors for the proposed powerlines that will avoid the most negative environmental impacts possible. The preferred corridor and site should preferably avoid the areas that would have the greatest negative impacts on tourism and related activity in the study area and should instead promote and drive growth in the region through the additional electricity capacity that will be provided.

1.3 Methodology

The research methodology for the study is outlined in Figure 1.1.

Figure 1.1: Methodology



Project brief:

This step includes the finalisation and confirmation about the requirements for the economic impact assessment.

Economic Baseline:

A brief description about the economic environment for the study area. The sectors that drive the local and regional economy as well as the growth trends in economic activity and employment is provided. The data is sourced from Stats SA and Quantec.

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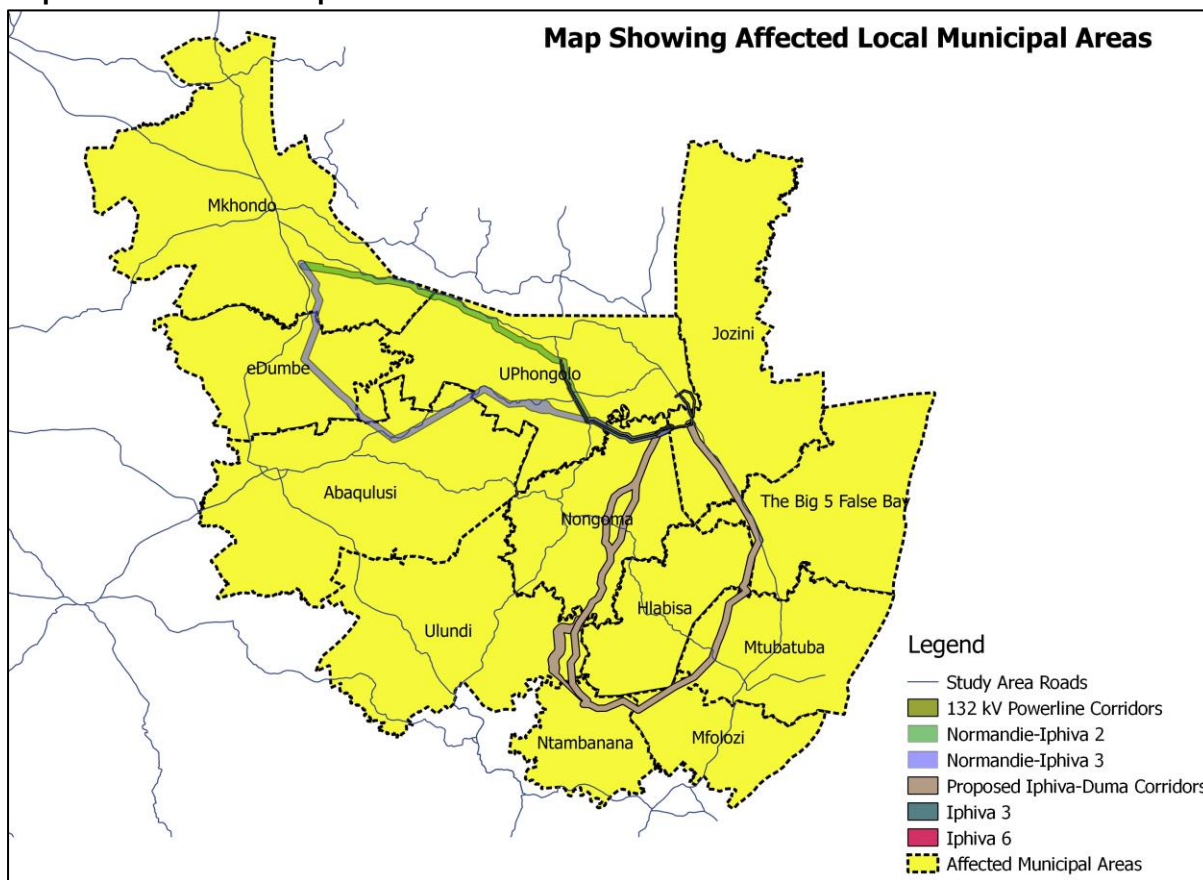
Economic Impact Assessment:

Assessing the impact of the various components of the project on the economy. This step aims to assess the qualitative and quantitative impacts on the economy as a result of the strengthening project. The assessment will be conducted on a local and regional level. The site specific impact will highlight the effect for tourism activity within the proposed corridors while the regional impact on the economy is assessed through a social accounting matrix (SAM) analysis.

1.4 Study Area

The upgrade is predominantly located within Northern KwaZulu-Natal. There are a number of local municipal areas (i.e. 12 in total) affected by the project including Mkhondo (Mpumalanga), eDumbe (KZN), Abaqulusi (KZN), UPhongolo (KZN), Nongoma (KZN), Ulundi (KZN), Ntambanana (KZN), Mfolozi (KZN), Hlabisa (KZN), Mtubatuba (KZN), The Big 5 False Bay (KZN) and Jozini (KZN). Map 1.1 shows the project and the affected local municipalities.

Map 1.1: Affected Municipal Areas



Compiled by Author, 2018

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1.5 Report outline

The remainder of the report is structured in terms of the following headings:

Chapter 2: Economic Overview

Chapter 3: Quantitative Impact Assessment

Chapter 4: Qualitative Impact Assessment & Mitigation

Chapter 5: Recommendations

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SECTION 2: ECONOMIC OVERVIEW

The purpose of this section is to provide an overview of the economic environment for the region where the project will take place. Activities in the economy is captured and reported on according to sectors. These sectors are used to explain how the economy has developed / changed over time which signal the sectors (activities) which are the driving force for the area and as well as sectors which have a competitive advantage over the rest of the country's economy. The economy is divided into 10 sectors namely:

1. Agriculture, forestry and fishing
2. Mining and quarrying
3. Manufacturing
4. Electricity, gas and water
5. Construction
6. Wholesale and retail trade, catering and accommodation
7. Transport, storage and communication
8. Finance, insurance, real estate and business services
9. General government
10. Community, social and personal services

Tourism is not an economic sector in its own right, but is a complex and composite sector comprising mainly of the following sectors: **accommodation, transportation, food and beverages, cultural and recreational activities**. The activities undertaken by the tourist relate with the travel, destination, entertainment activities and expenditure that tourists make while away from their place of residence. The tourist utilises products and services of other sectors such as; food and beverage suppliers, wholesalers, financial services, manufacturing, constructions etc. The activities included in the tourism sector can be broadly defined as the activities arising from persons travelling away from their usual environment (e.g. work and daily life); staying for more than 24 hours, but not longer than a consecutive year; for leisure, business or other purposes (World Travel Organisation).

2.1 Regional economic trends

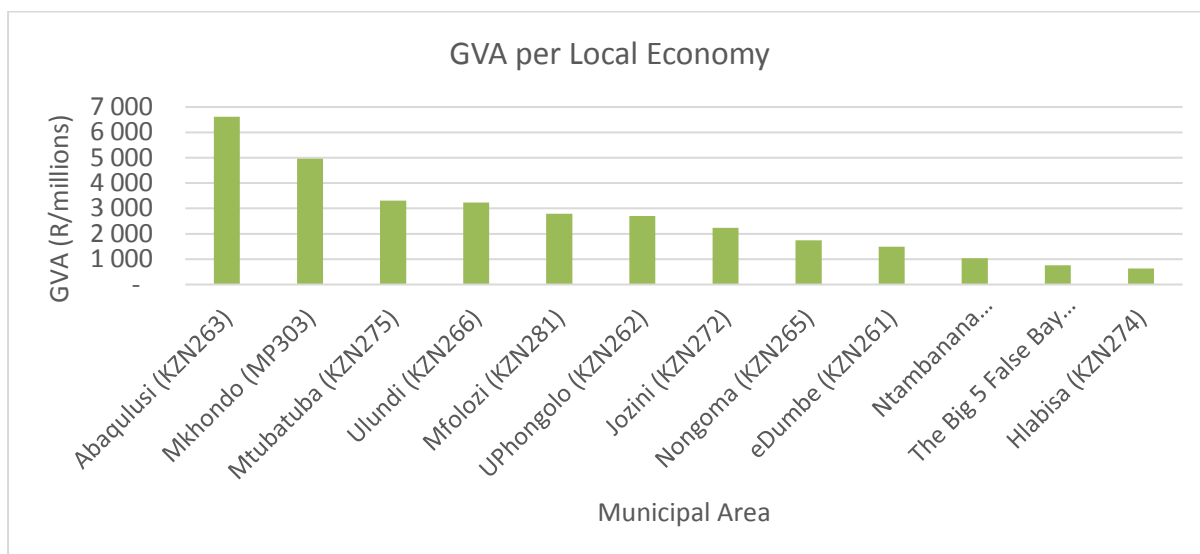
The study area includes a total of 12 local economies, represented as municipal areas. The regional economic trend analysis combines the economic value of each of these areas and are hence force referred to as the region and regional economy.

2.1.1 Economic profile and size of region

The size of the economy for each municipal area that form part of the regional economy is illustrated in Figure 2.1. The figure shows the Gross Value Added (GVA) for each municipal area. **GVA is the value of economic activity** for all goods and services produced within a geographical area over a year.

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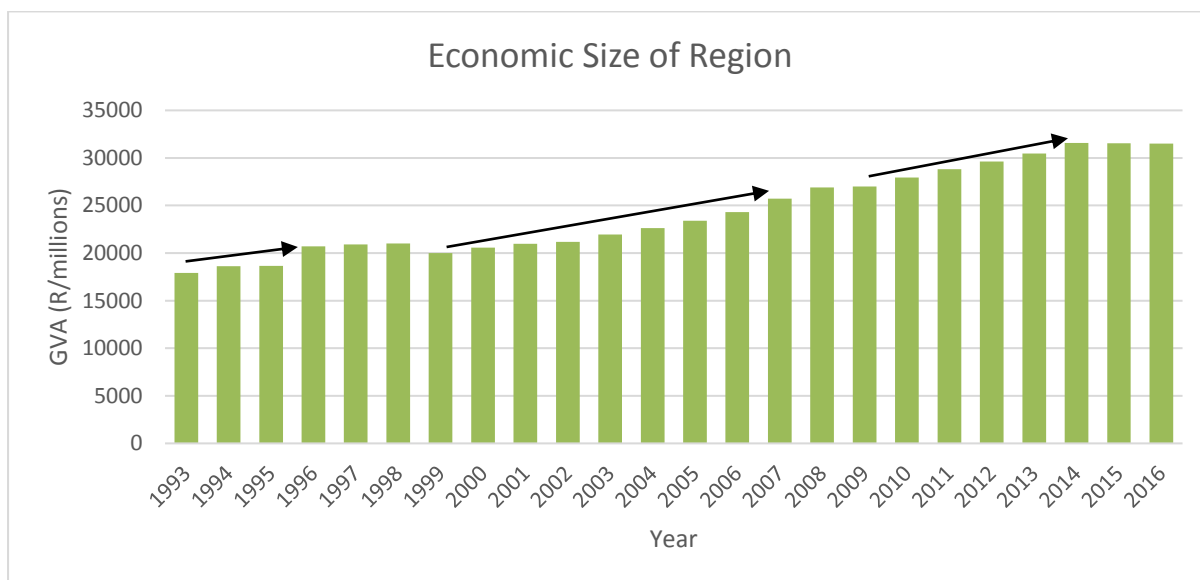
Figure 2.1: GVA per local municipal area



Source: Stats SA ex. Quantec 2017

The Abaqulusi economy with Vryheid as the main centre has the largest economy followed by Mkhondo with Piet Retief as main node and Mtubatuba with Mtubatuba and St Lucia as main centres. The size of the regional economy is illustrated in Figure 2.2. The figure shows the economic size of the economy for the region between 2011 and 2016.

Figure 2.2: Size of the regional economy, 2011-2016 (Real, constant 2010 prices)



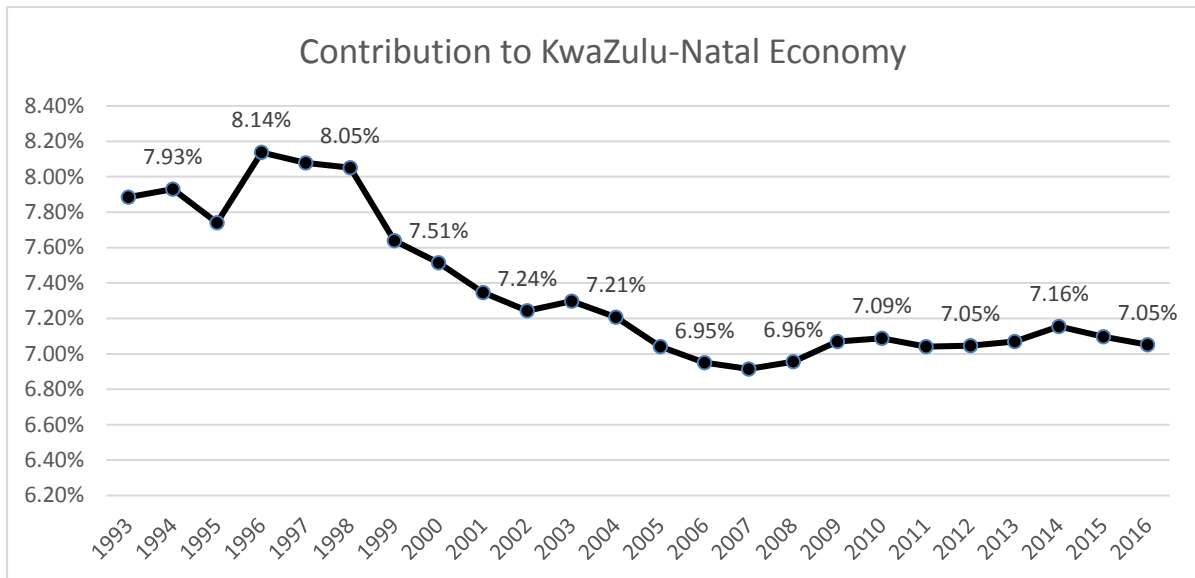
Source: Stats SA ex. Quantec 2017

The regional economy had 3 periods of extended growth, where the size of the economy expanded. These includes 1993 to 1996, then between 1999 and 2007 and lastly between 2009 and 2014. The regional economy increased steadily between 2009 and 2014 and has since been stable at the same levels up to 2016. Compared with the Kwazulu-Natal (KZN)

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economy, the region's economy contributes approximately 7% to the provincial economy. (see Figure 2.3).

Figure 2.3: Region contribution to KZN economy, 2011-2016

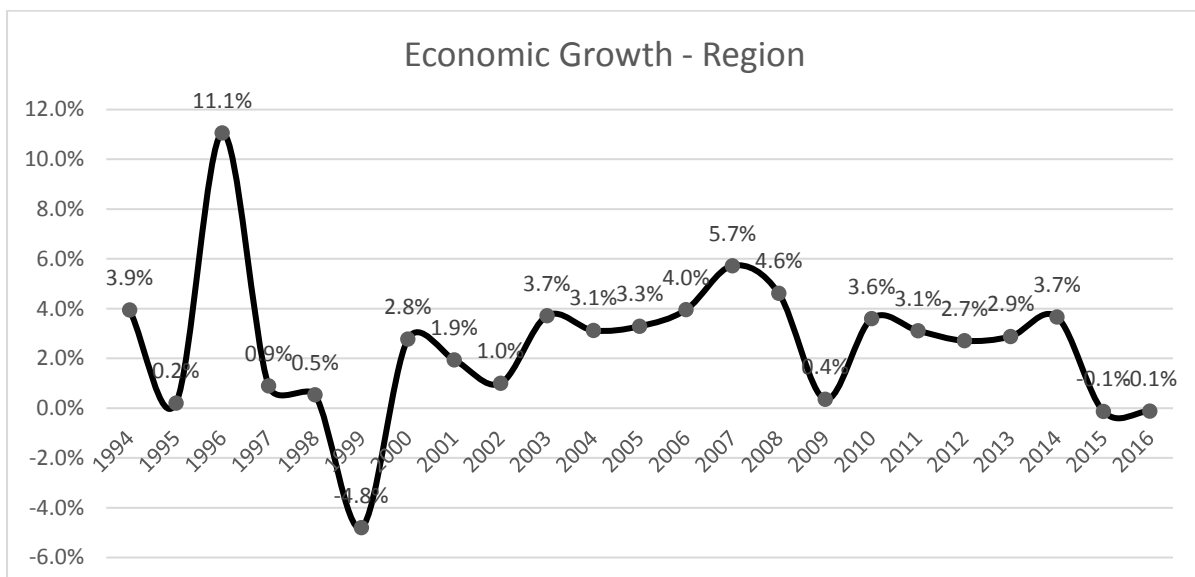


Source: Stats SA ex. Quantec 2017

2.1.2 Economic growth

The economic growth of the region is shown in Figure 2.4.

Figure 2.4: Economic Growth, 2011-2016



Source: Stats SA ex. Quantec 2017

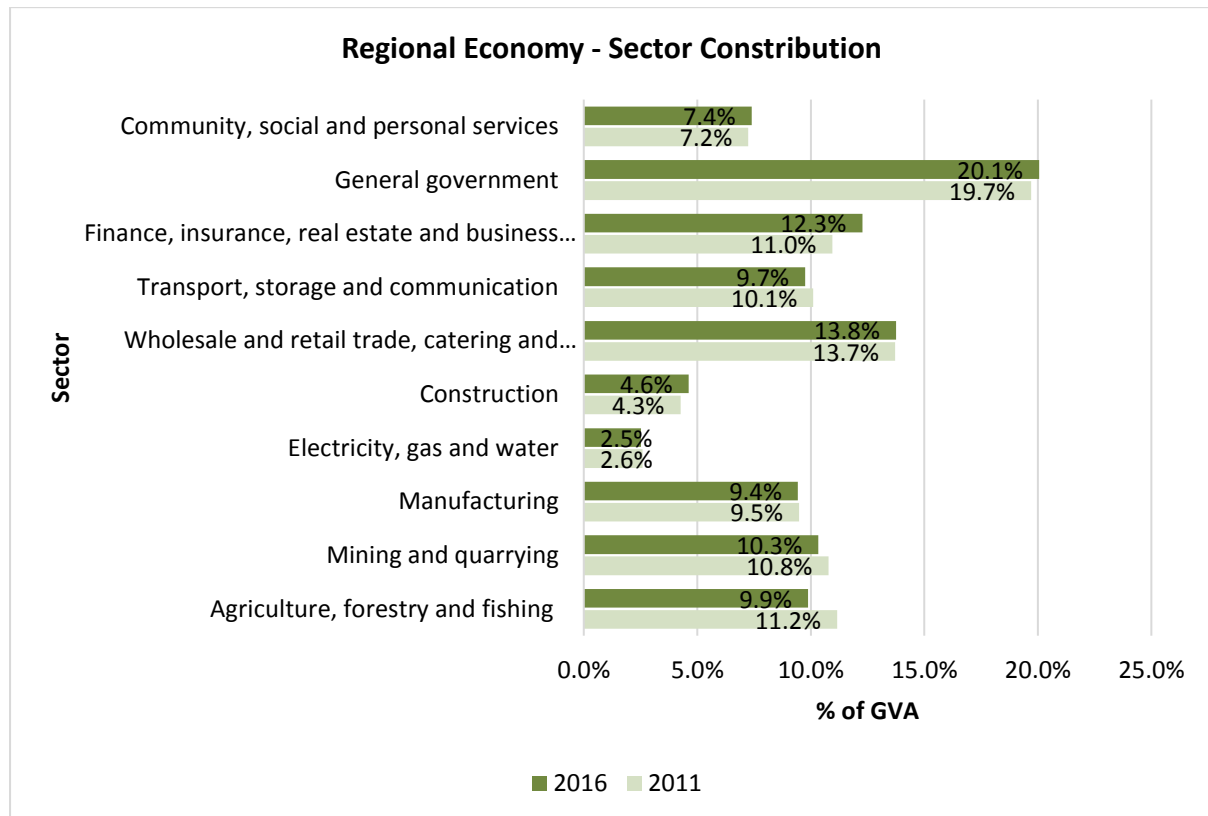
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The economic growth for the period from 1993 to 2016 was on average 2.5% per annum while the short term growth from 2014 to 2016 was just over 1% per annum. The regional economy experiences mostly positive economic growth.

2.1.3 Major economic sectors

The contribution of each sector to the regional economy is illustrated in Figure 2.5.

Figure 2.5: Sector Contribution, 2011 & 2016



Source: Stats SA ex. Quantec 2017

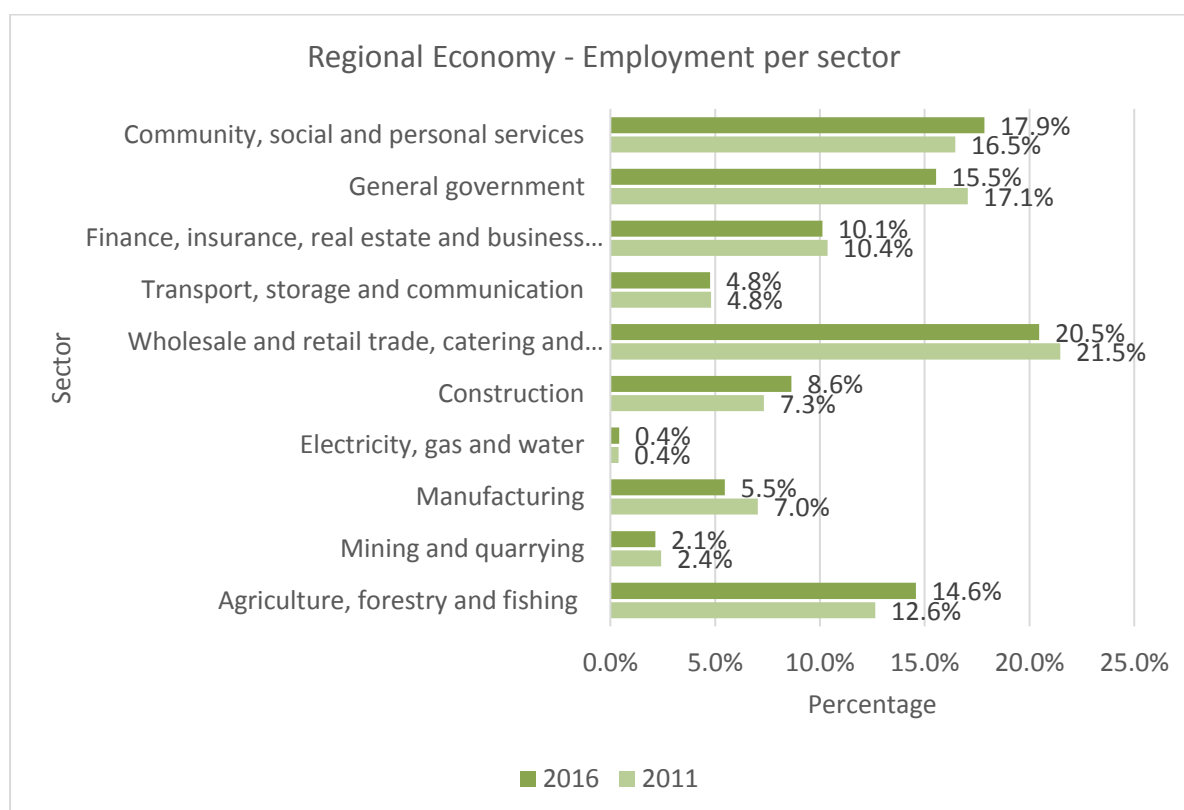
The economy has not experienced significant changes to its driving sectors over the past 5 years. The government services sector is the major contributor to the economy at 20.1% in 2016 (up from 19.7% in 2011), followed by retail and trade (13.8%), finance and business services (12.3%) and mining (10.3%). The economy is relatively diversified, with almost all the sectors contributing equally towards the economy.

2.1.4 Employment profile of the region

The employment profile for the region is illustrated in Figure 2.6.

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Figure 2.6: The employment per sector for the study area



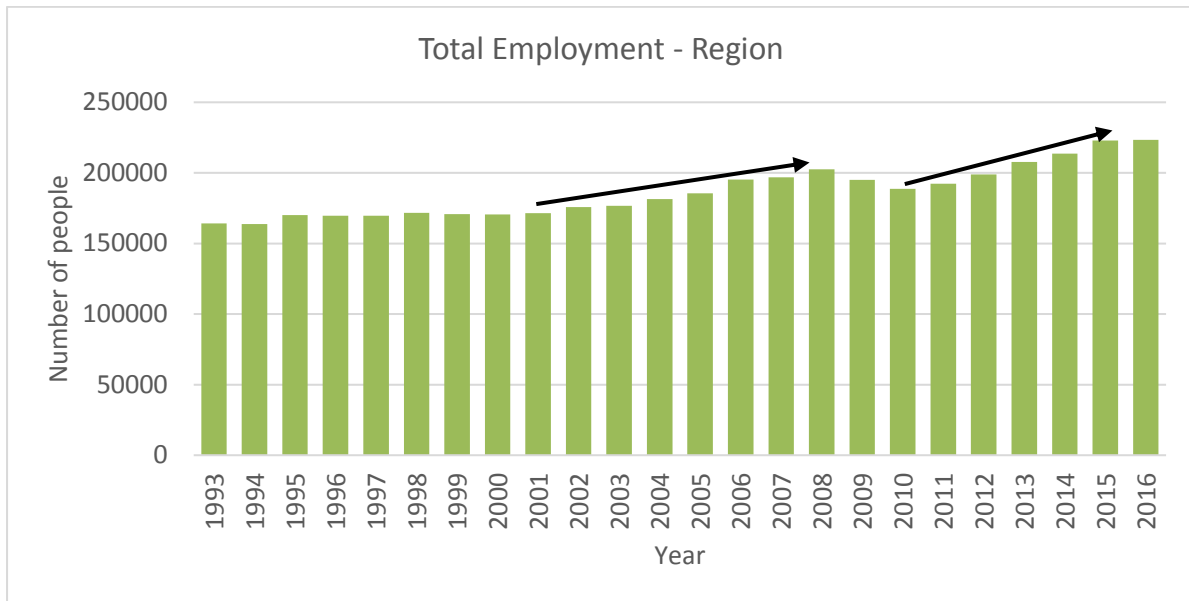
Source: Stats SA ex. Quantec & Author's calculations 2017

The wholesale and retail trade sector is the largest within the regional economy contributing 20.5% of work opportunities. This is followed by community and social services (17.9%) and general government (15.5%). The agriculture sector is also one of the largest employers, contributing approximately 14.6% of employment in 2016. The change in employment for the region is shown in Figure 2.7.

Employment in the regional economy has increased significantly more between 2010 and 2015 compared to the prior period. The total number of people employed amounts to 223 373 in 2016, the highest it has been for the region.

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Figure 2.7: Total employment for the regional economy, 1993 – 2016

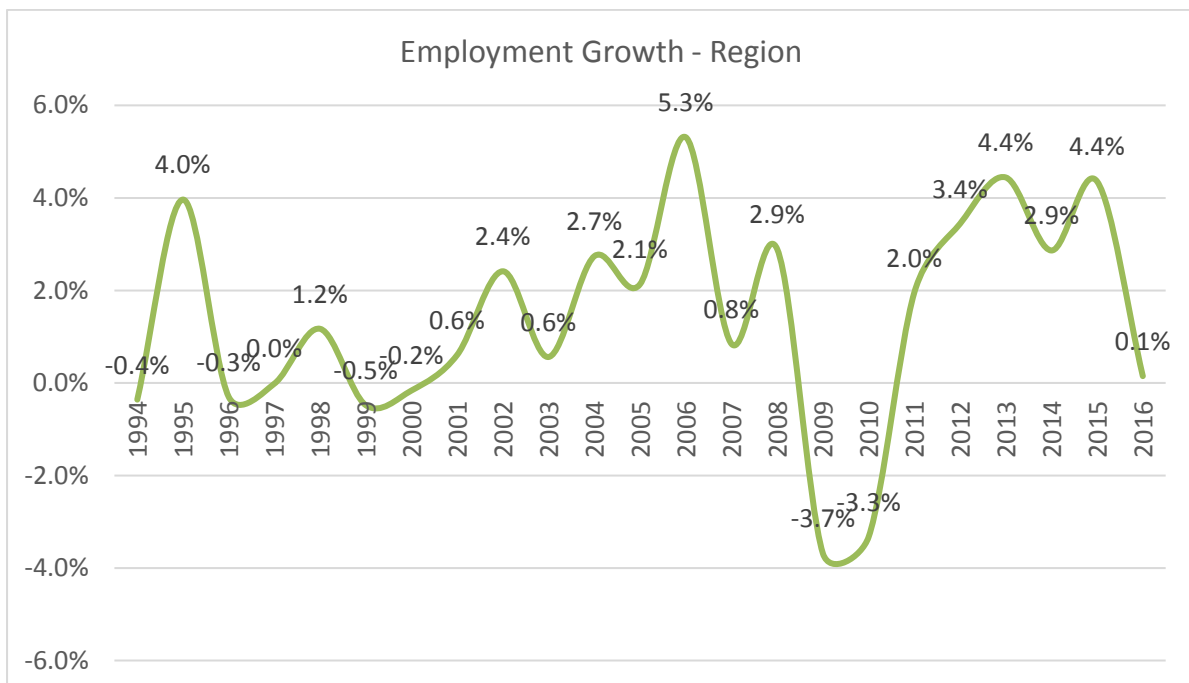


Source: Stats SA ex. Quantec & Author's calculations 2017

2.1.5 Employment growth

The employment growth is illustrated in Figure 2.8.

Figure 2.8: Employment Growth, 1994-2016



Source: Stats SA ex. Quantec & Author's calculations 2017

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Apart from the negative employment growth in 2009/2010, the region has experienced positive and mostly high employment growth since 2002. The average annual employment growth for the regional economy was 1.4% per annum between 1994 and 2016 and over the past 5 years (2012-2016) was at 3%.

2.1.6 Tourism Sector

In order to determine the size of the tourism sector, international best practise is used. The World Travel and Tourism Council (WTTC) developed a methodology to calculate the contribution of tourism to a country's Gross Domestic Product (GDP). According to their report the industries (sectors) that have a direct positive impact from tourism is:

- Accommodation services
- Food & beverage services
- Retail Trade
- Transportation services
- Cultural, sports & recreational services

Analysis of these sub-sectoral trends within the study area shows the relative size of the tourism sector. Figure 2.9 shows the relative size of the tourism sector for the region.

Figure 2.9. Relative Size of Tourism Sector

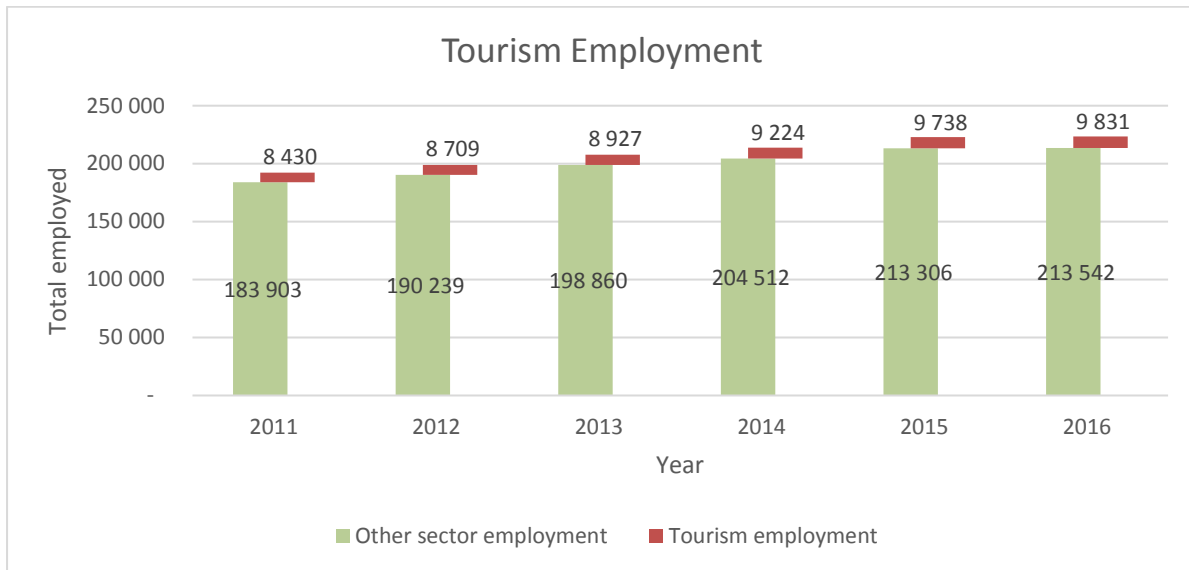


Source: Stats SA ex. Quantec & Author's calculations 2017

The tourism sector contributes approximately 6% to GVA for the regional economy, a figure slightly higher than the national average. The contribution of tourism to the regional economy, has stayed more or less constant over the past 5 years. The employment for the tourism sector in the regional economy is illustrated in Figure 2.10.

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Figure 2.10: Tourism employment



Source: Stats SA ex. Quantec & Author's calculations 2017

The total number of people employed in tourism amounts to approximately 4.6% of all employment within the regional economy.

The study area is characterised by some of South Africa's most luxurious private game reserves that attract international tourists. South Africa's wildlife coupled with the high standard of infrastructure provides the country with a competitive advantages within the global economy. As a result of this competitive advantage within the global economy, all role players should ensure that this sector be protected as this is a resource not many other countries in the world have. The tourism sector does play an important role in the regional economy and for this reason, expansion and development of this sector should be encouraged.

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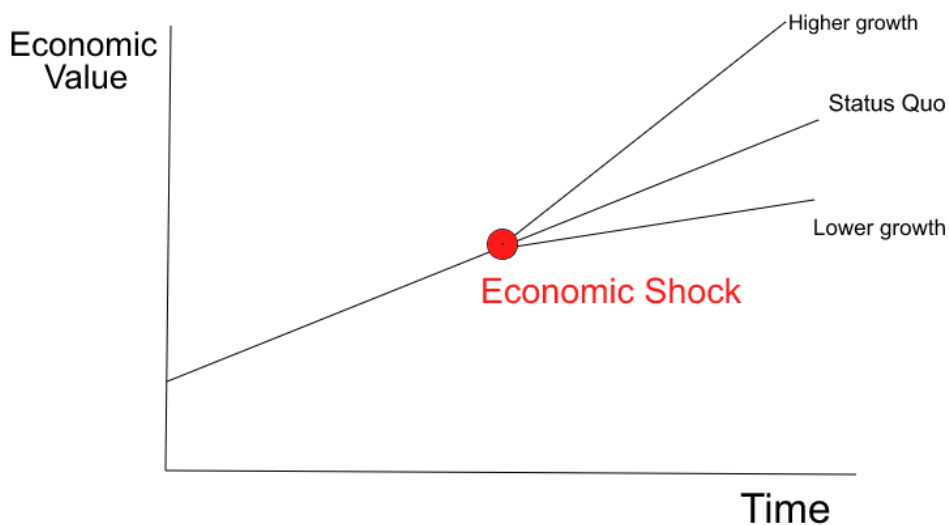
SECTION 3: QUANTITATIVE IMPACT ASSESSMENT

3.1 Introduction

In terms of locational theory, different land uses compete for land in the same areas, said differently, various land uses / economic activities reveal distinctly different location preferences (and sensitivities). In this context, the concept of highest and best use is important. In a free market society, on-going competition between different land uses is regulated by the market mechanism. Every site in the economy has a highest and best economic use and equilibrium in the market will only be reached when the highest and best uses are allocated to a site. This highest and best economic use, is a function of physical and economic factors. Physical factors refer to the location of the site, the size thereof, visibility etc. Economic factors mainly refer to the productivity of the land use, including the return on investment and site rent achievable¹.

The objective of the economic impact assessment is to quantify the net-effect on the economy as a result of the project. Figure 3.1 shows how an incident in the economy can change the economic value over time.

Figure 3.1: Economic Assessment as an Impact Quantifying Tool



Source: Author

As Figure 3.1 illustrates, an economic impact assessment is a tool that measures the impact on the economy as a result of a specific activity that takes place. The effect on the economy can be a benefit, a cost, or there can be no substantial change within the economy.

The focus of this report is analysing the economic impact for tourism. The tourism activities within this area includes nature-based tourism. This is tourism that involves travelling to relatively undisturbed natural areas with the specific objective of studying, admiring and

¹ Source: Demacon. 2012. New Largo Economic Impact. D Dyason & H du Toit.

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enjoying the scenery, fauna and flora, either directly or in conjunction with activities such as trekking, canoeing, mountain biking, hunting and fishing (Turpie et al. 2005).

A major impact on tourism is the aesthetics and natural environment in which these activities take place. For this reason the visual quality of the area has an economic value in that it enables the tourism activity to take place and as a result generate economic value. Furthermore, the investment that has taken place to develop the tourism activities and infrastructure in this region could potentially be negatively affected.

The relationship between a visual impact and tourism activity is summarised by Oberholzer (2005)² which identifies that visual triggers are related to the receiving environment and the nature of the project in the following ways:

- Areas with important scenic corridors
- Areas of important tourism or recreational value
- A change in land use from the prevailing use
- A significant change to the fabric and character of the area
- Possible visual intrusion in the landscape

“The clearest benefit of landscape is that of **visual amenity**, where landscape character and quality combine to produce familiar and attractive (or neutral or unattractive) views. These, by their nature, are often highly subjective, although the landscape designation process has established a widely accepted standard”³.

The economic value of this benefit is emphasised by the land use that are applied to the specific area. The economic value of tourism also take place outside of the market i.e. it is externalities. This means that the value is based on other aspects such as feel good moments and personal preference and not quantifiable within a market price.

Estimating the value of land used for wilderness or protected area is not as straight-forward as highlighted by Willy Verheye⁴ (2009). “Entire zones are reserved for wildlife and nature protection and are not for sale. Although it is difficult to rate the productive or real estate value of this land, it is not free but has - besides its direct income from tourism - only a moral, social or aesthetic value”.

However, in most cases - and within the study area – the **value of the property is closely related to production value of the land**. In other words, a private game reserve not only have the wildlife and undisturbed land, there is also other activities such as accommodation, game viewing, functions and other related activity that provides an indication of the value of the economic production that takes place on the property. This, in essence, is tourism and in this region is a major economic driver. The tourism value of the region is estimated at R1.9 billion (GVA) for 2016 and employment amounts to approximately 9 831 for the corresponding year.

The area under consideration is one of the regions in South Africa that receive a large contingent of international visitors, especially for nature and eco-tourism activities.

² Oberholzer, B., 2005. Guideline for involving visual & aesthetic specialists in EIA processes, Cape Town: CSIR, Provincial Government of the Western Cape, Department of Environmental Affairs & Development. Available at: http://www.capecapeway.gov.za/Text/2005/10/5_deadp_visual_guideline_june05.pdf.

³ Eftec. June 2006. <https://www.ofgem.gov.uk/ofgem-publications/57966/14986-visual-impacteftec010606-pdf>.

⁴ LAND USE, LAND COVER AND SOIL SCIENCES – Vol. III - The Value and Price of Land - Willy Verheye

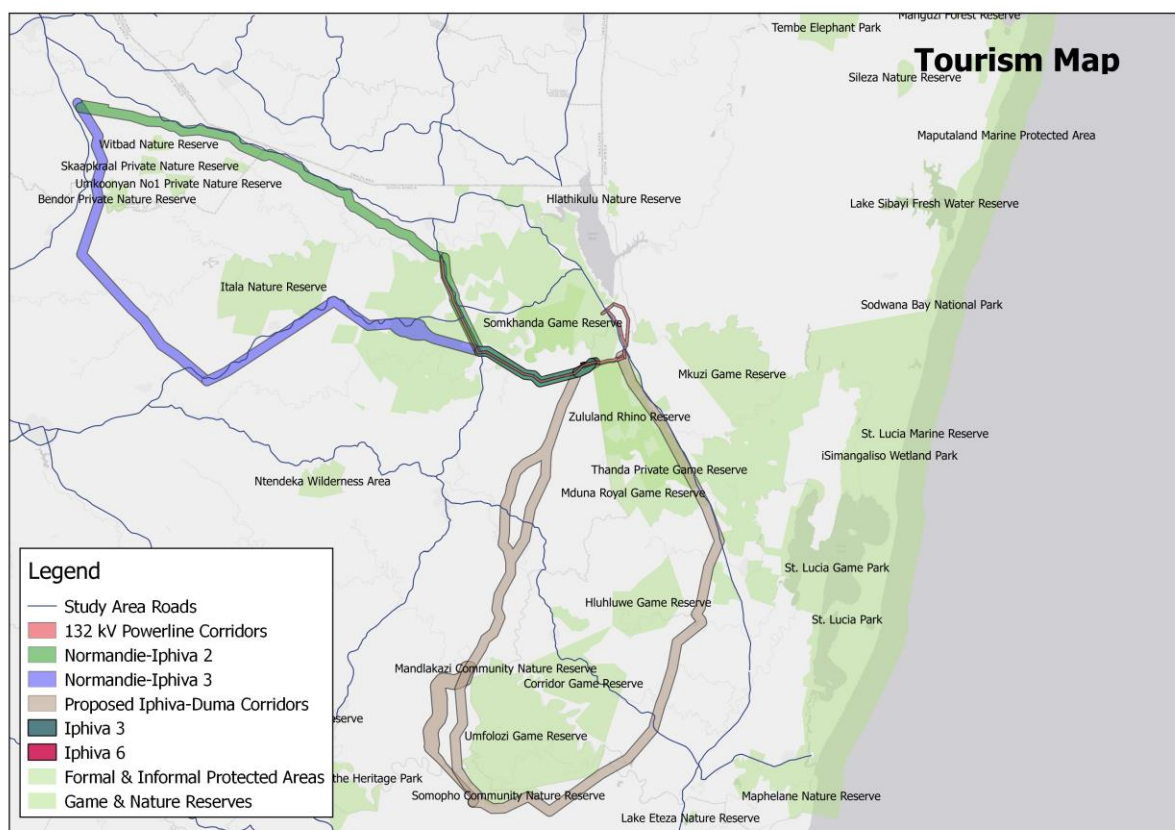
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The economic impact assessment is divided into two sections. The first section explains the **local economic impact**, or the area of influence, and considers the corridors and sub-station areas for analysis. The second section explains the **economy-wide impact**. The impact on the local area will result in value chain implications throughout the economy and this is quantified on the economy through Social Account Matrices (SAM) analysis.

3.2 Local Economic Impact

Map 3.1 shows the various corridors and sub-stations that are considered with the affected tourism activities / lodges / nature reserves and game farms.

Map 3.1: Tourism map



Source: Data supplied by Nako Iliso, 2018

The impact assessment will consider the tourism land use in the proposed corridors. In order to estimate the extent of the impact on tourism the following key determinants are considered for the affected properties:

- 1) Land use type
- 2) Size of the property
- 3) Powerline route
- 4) Existing infrastructure
- 5) Visibility of the new structure

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Each of these aspects are explained in more detail below.

3.2.1 Land use type

Land has a production value and the existing land use on that property determines the value of the impact that will be realised. There is a high economic value on aesthetics for nature-based tourism activities, and for this reason have a high sensitivity for linear infrastructure development. In general the following negative impact on property values is evident with the construction of high-voltage Transmission powerline:

Residential property: Is associated with a lower sales price if affected by a powerline.

Industrial property: Generally, a low value impact as these land-uses are significantly less sensitive to high-voltage powerlines.

Commercial property: Limited research is available for commercial property, however the value impact will depend on the type of commercial activity and the location of the power lines. The impact is expected to be lower than that of residential and tourism land-use.

Tourism property: Previous studies, of similar nature to this study that was done by the author found that the impact on tourism property is between **-5% and -30%, depending on the type of activity, size of the property and the visibility** of the high-voltage Transmission powerline.

3.2.2 Size of property

The size of the affected farm or portion will to a large extent determine the impact of such a development on the production capabilities of the farm. On a large farm with more than 500 ha of land the chances are greater to have a corridor where the impact is minimal on the activities. This is compared to a smaller farm, less than 200 ha, where a power line is more prominent and could decrease the available land for production. Figure 3.2 illustrates the rationale.

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Figure 3.2: Size and impact

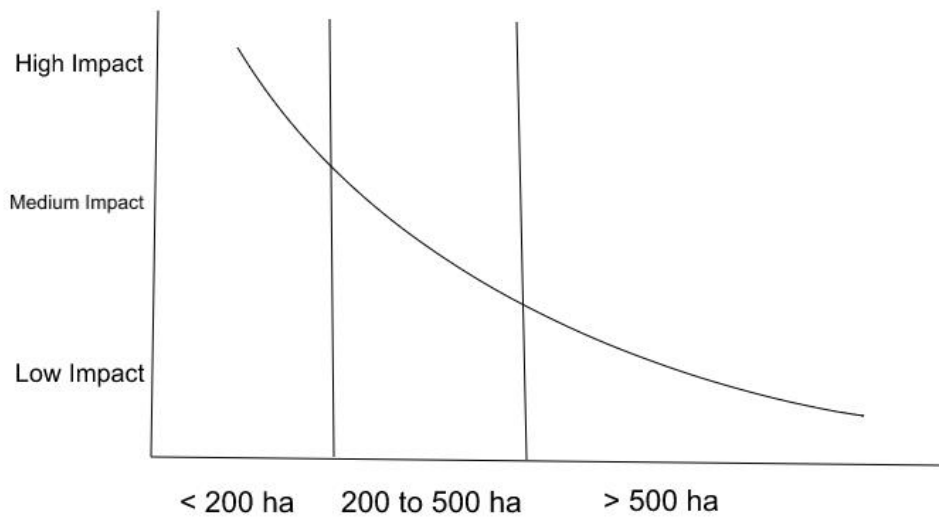
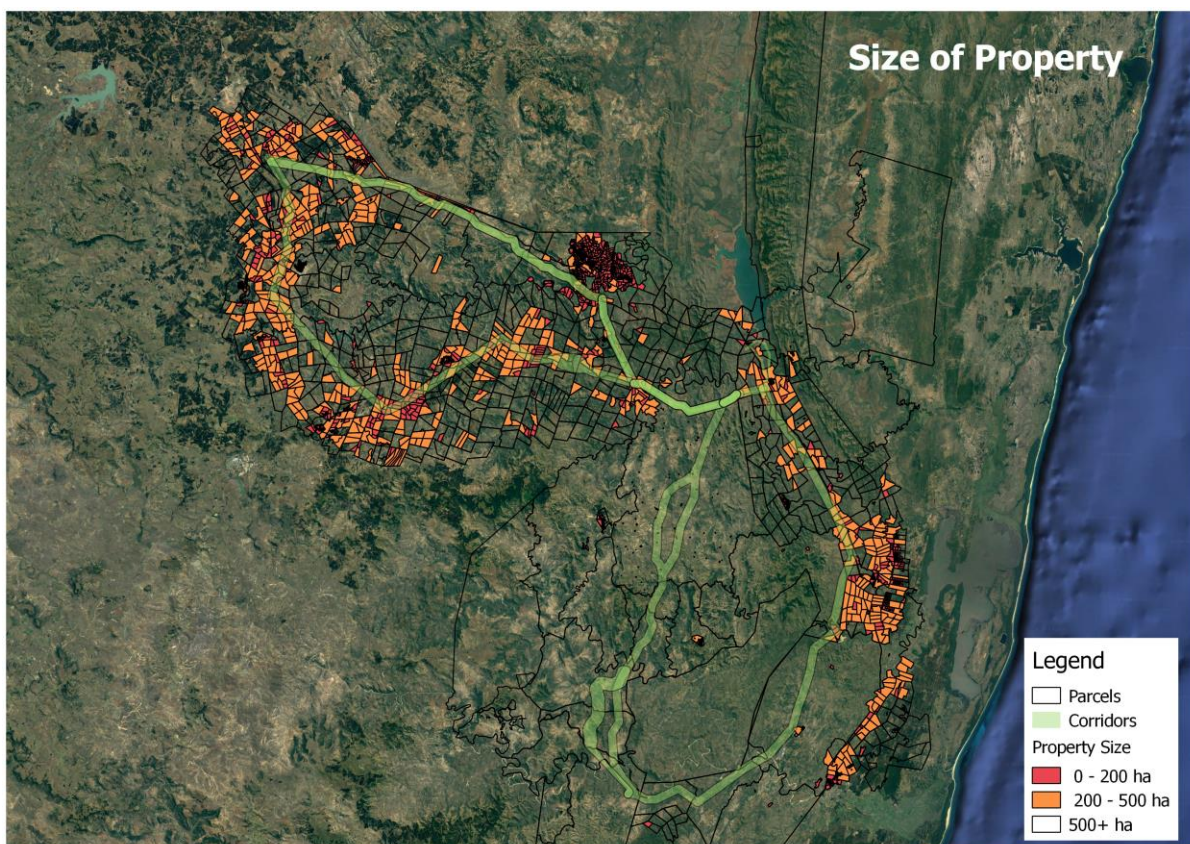


Figure 3.2 show that a bigger farm will have a lower impact whereas the smaller farms will be impacted on a larger scale. A map of the property sizes within the study area is illustrated below.

Map 3.2: Property Size



Source: Author, 2018

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Properties where the size is below 200ha and where tourism activity takes place (nature reserve/game gaming) is likely to experience a higher negative impact on their production and property value compared to properties that are above 500ha in size.

3.2.3 Powerline route

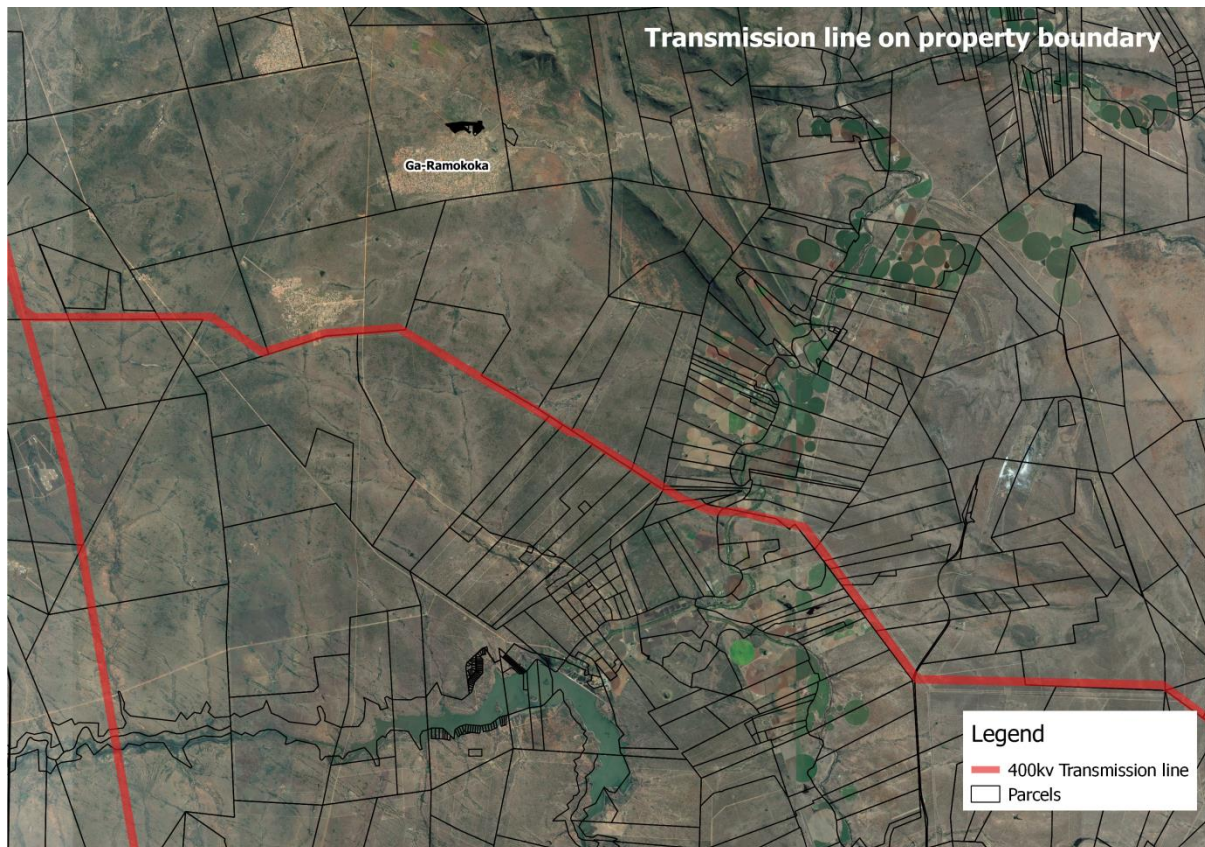
The configuration of the power line is also an important determinant. The negative impact on properties can be mitigated by ensuring the powerline is situated on boundaries and or follow existing linear infrastructure and do not cross the property in the middle. The following two examples are provided to indicate how route layout can mitigate some of the negative impact of new powerline developments.

Example 1: Powerline route that transcends across farm portions exacerbating the negative impact on the economic value for the property.



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Example 2: Powerline route located on the boundary of farm portions, reducing the negative impact.



3.2.4 Existing infrastructure

The route of the powerline should not be located in close proximity or in sight of existing tourism infrastructure such as:

- Any type of accommodation
- Viewpoints / Scenic areas
- Hides
- Other infrastructure such as: wedding venue, administration building, etc.

These areas tend to receive the most visits from tourists and the visual effect of a high-voltage Transmission powerline and pylons will most likely influence the experience of the tourist.

3.2.5 Visibility of the powerline and pylons

The viewshed provided by the visual specialist illustrates the visibility of the powerline and the substation structures. The following is evident from the visibility analysis.

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Table 3.1: Visibility & Economic Impact

Alternative	Visual Findings	Economic Impact Implication
Iphiva 3 (substation)	High to medium visual magnitude on north-western part of Manyoni Private Game Reserve. Medium to low visual magnitude on central (higher ground) part of Zimanga Private Game Reserve.	Impact on tourism activity will range from low to high. The visual magnitude of this site is significantly more than Site 6. The impact on tourism for this site will be high
Iphiva 6 (substation)	High to medium visual magnitude on small section (of high ground) in the north-western part of Manyoni Private Game Reserve. Mainly low visual magnitude on higher ground for central part of Zimanga Private Game Reserve.	Impact ranges from low to high, but in comparison, is lower than Iphiva 3. This site is preferred as it will have a lower economic impact compared to Iphiva 3.
Normandie-Iphiva 2	The visual magnitude within the corridor range from low to high. The R66 corridor has a higher visual impact	The property value impact will depend on the final route configuration. Mitigating the visual effect is important in limiting the negative economic impact.
Normandie-Iphiva 3	The visual magnitude within the corridor range from low to high. The corridor closest to the R33 has a higher visual impact	The property value impact will depend on the final route configuration. Mitigating the visual effect is important in limiting the negative economic impact.
Iphiva-Duma east (excl P234 corridor)	The visual magnitude within the corridor range from low to high.	The visual magnitude on the game reserves and protected areas within this corridor is significantly higher compared to the Iphiva-Duma west corridor.
Iphiva-Duma west (excl P234 corridor)	The visual magnitude within the corridor range from low to high.	There are a significant lower number of game reserves and protected areas that are affected by the visual impact of this corridor.
P234 corridor	The visual impact is high for the area adjacent the corridor. Some roads, hides and scenic points within the adjacent game reserves will have high visibility of the corridor.	Low to high impact is expected. Due diligence on the location of the lodges adjacent the corridor indicate that the majority of the accommodation establishment is not situated in close proximity of the corridor. When identifying the final route mitigation measures should limit some the negative economic impact.
Iphiva/Pongola 132kv distribution lines (excl. P234)	The R66 corridor has a high visual impact due to the cumulative effect of the 132kv and the 400kv Transmission powerline.	The property value impact will depend on the final route configuration. Mitigating the visual effect is important in limiting the negative economic impact.

Alternative	Visual Findings	Economic Impact Implication
132 kV Line to Candover/Makhathini		No tourism activity is directly affected

Implication for medium to high economic impact:

- Change in tourism target market for the affected area – price adjustments due to lower aesthetic appeal. Tourism activity will continue, albeit in an altered way.
- Change in scenic route or scenic site configuration.
- A loss in property value of the area is anticipated.

Implication for low to medium economic impact:

- Activity can continue albeit in a slightly altered way.
- Change in scenic route or scenic site configuration.
- Negligible loss to the economic value of the area.
- If any, only a slight impact on property prices

The impact on future development (5 to 10 years ahead):

- The visibility of the power lines and pylons will in most cases influence future development of lodges and game reserves.
- The disadvantage of existing power lines is that the lines and pylons influence the aesthetic value for certain areas, which will alter future development. The implication is that the man-made structure (powerlines) might alter the demand from the target market (tourist).
- On the other hand, there is an advantage in knowing where the powerlines will be, as new development can now be configured to limit and mitigate the direct view of these lines.

3.2.6 Identifying the Preferred Alternative – Estimating the Local Economic Value

The aim of the following sub-section is to quantify the economic value of each alternative (corridor and site) in order to identify the preferred option. The methodology to determine the economic value is based on sectoral analysis for both GVA and employment for the regional economy, Tourism National Account data (Stats SA) as well as establishment rates, occupancy level and average length of stay data as provided by stakeholders.

The economic value for tourism and related activity within the study area is estimated at R6 303 per hectare⁵. The following assumptions is applied:

- The study area is considered as the final destination of the tourist (this implies that if the tourism activities is lost the tourist will have to consider another area outside of the study area – this result in a loss in economic value for the region) – direct impact.

⁵ The value is based on:

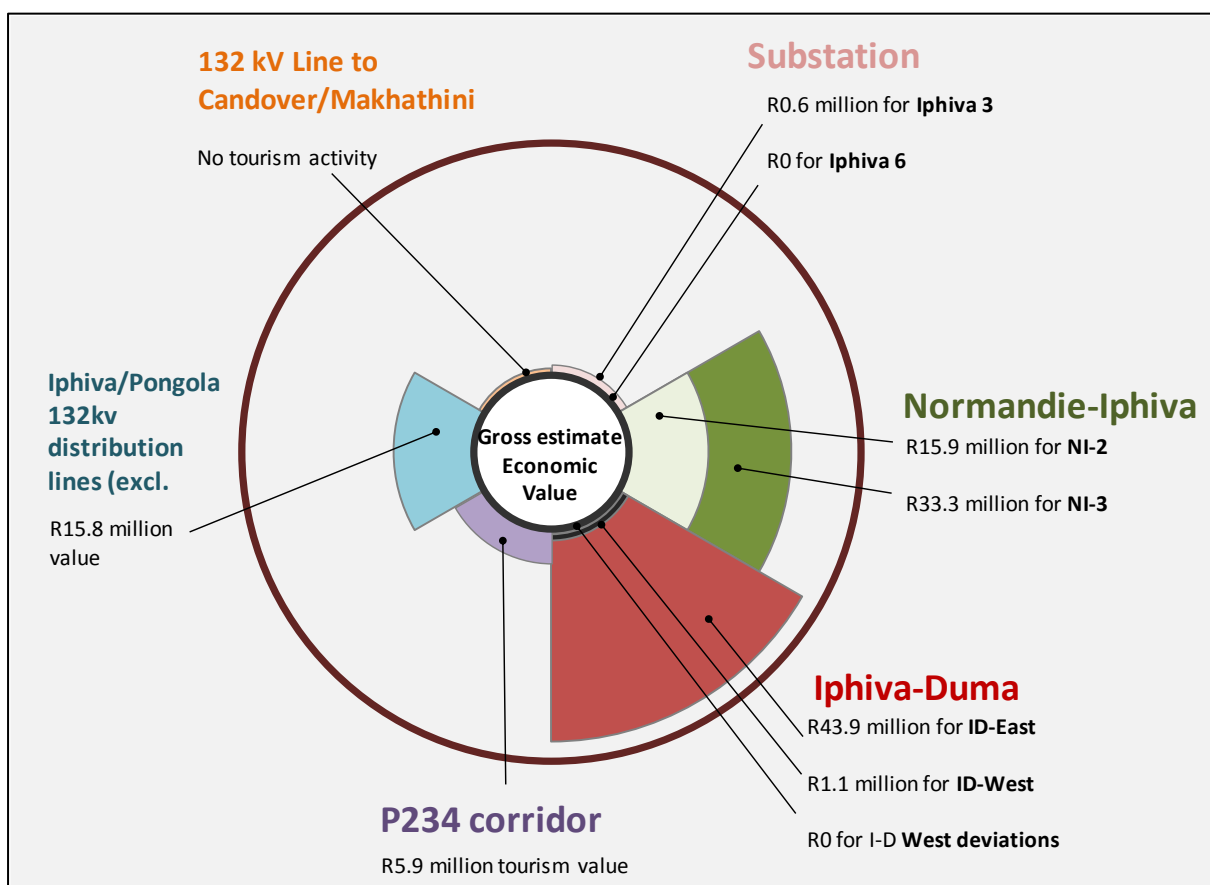
- Data from the Tourism Social Account of 2011 – 2015
- Lodges and reserves in the study area compiled from internet search
- Information from Karen Odendaal (Manyoni), 2017
- Statistics South Africa

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- Tourists have additional expenditure that is not spend within this region, however it is still a benefit for the national economy that should be considered – indirect impact.
- The value per hectare is an **average** for the area – difference in this value between low and high season can be expected. The value will also be different between private game reserves, national and provincial nature reserves and other forms of tourism activity.
- The employment level is based on the data received by Manyoni Private Game Reserve and Stats SA.

Figure 3.3 shows the **economic value** associated with each substation site and powerline corridor for tourism property that falls within the corridors or sub-station sites.

Figure 3.3: Economic value associated with each alternative, 2017 values



Source: Authors calculation, 2018

Note: The values above does not represent accounting values, it is economic values and reflect final demand for goods and services for tourism activity.

Figure 3.3 illustrates the value of tourism related activity for each corridor and sub-station site. It is important to highlight that the values represent an average economic value for the regional economy and estimated at R6 303 per hectare for **tourism related activity across the value-chain**. The values is based on the total hectare of tourism activity that falls within the corridors of the alternatives and illustrated in Table 3.2.

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Table 3.2. Tourism property within each alternative, 2017 nominal value

Alternative	Total hectare of reserve/lodge/game farm
Iphiva 3 (substation)	106
Iphiva 6 (substation)	0
Normandie-Iphiva 2 with deviations	2 510
Normandie-Iphiva 3 with deviations	5 284
Iphiva-Duma east (excl P234 corridor)	6 969
Iphiva-Duma west (excl P234 corridor)	178
Iphiva-Duma west deviations	0
P234 corridor	948
Iphiva/Pongola 132kv distribution lines (excl. P234)	2 510
132 kV Line to Candover/Makhathini	0

Source: Authors calculation, 2018

Important consideration:

An important consideration of the powerlines is the possibility of additional powerlines in the future. In a number of existing powerline developments, new lines are being developed adjacent existing corridors. The following examples is provided. Image 3 – this image shows the addition of 3 more 400kv Transmission powerlines in Limpopo in a corridor where 2 Transmission powerlines were already located.

Image 3: Example of additional Transmission powerlines - Limpopo

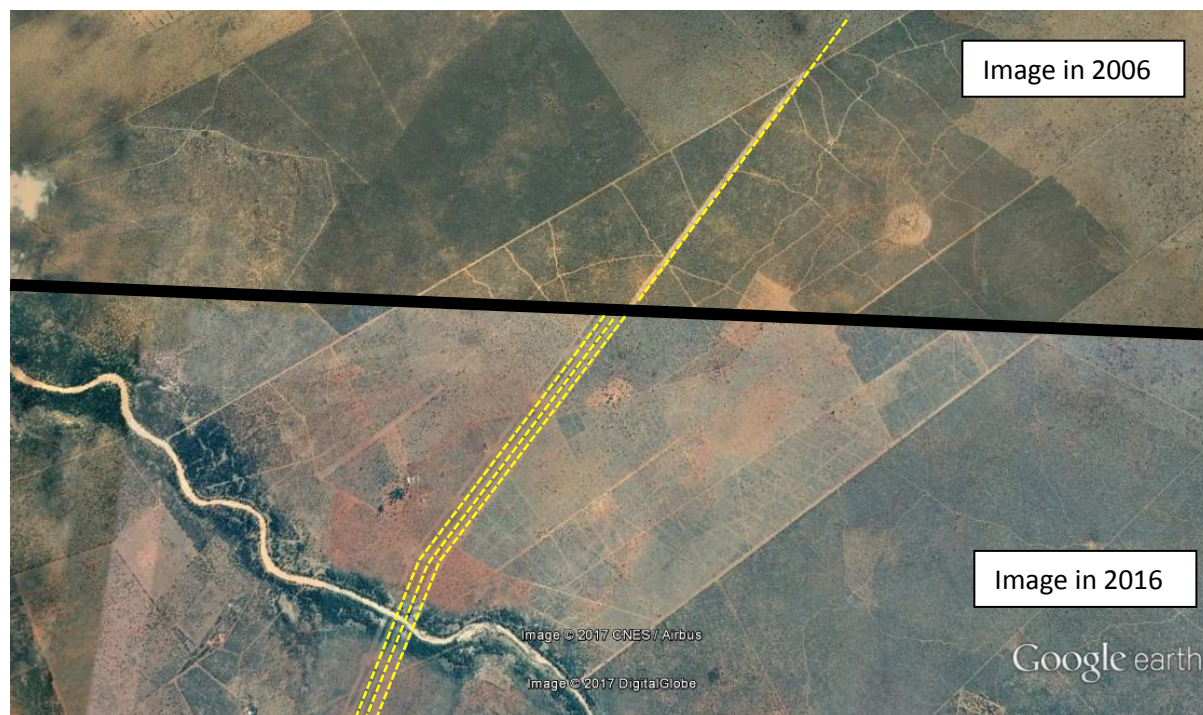
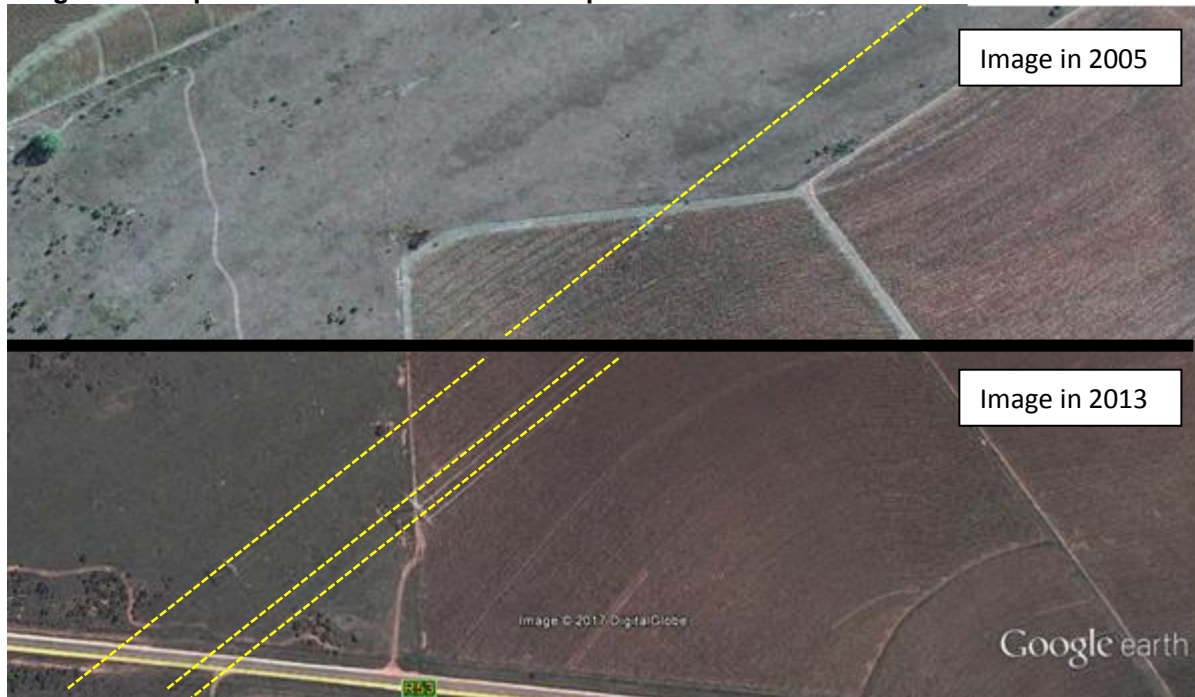


Image 4 – the additional Transmission powerline, a 765kv line just outside Potchefstroom in the North West province. The new line was constructed adjacent the existing 400kv line.

Image 4: Example of additional Transmission powerline – North-West



For this reason, there is a possibility that the preferred corridor could, in future, be used for additional powerlines. Therefore, a corridor should be chosen where additional lines should be possible without having any additional negative cumulative impact on the economy.

3.3 Economy-Wide Impact

The economy-wide impact is measured using an social accounting matrix (SAM) which is a representation of national or regional economic accounting that records the way industries trade with one another and produce (in other words; the flow of goods and services).

A SAM is laid out as a square matrix in which each row and column is called an “account.” Flows are registered in a matrix, simultaneously by origin and by destination (OECD, 2006) and contains complete information on different institutional accounts, such as households and the government. Households are usually the ultimate owners of the factors of production.

The relationship between the initial spending and the total effects generated by the spending is known as the multiplier effect of the sector, or more generally as the impact of the sector on the economy as a whole.

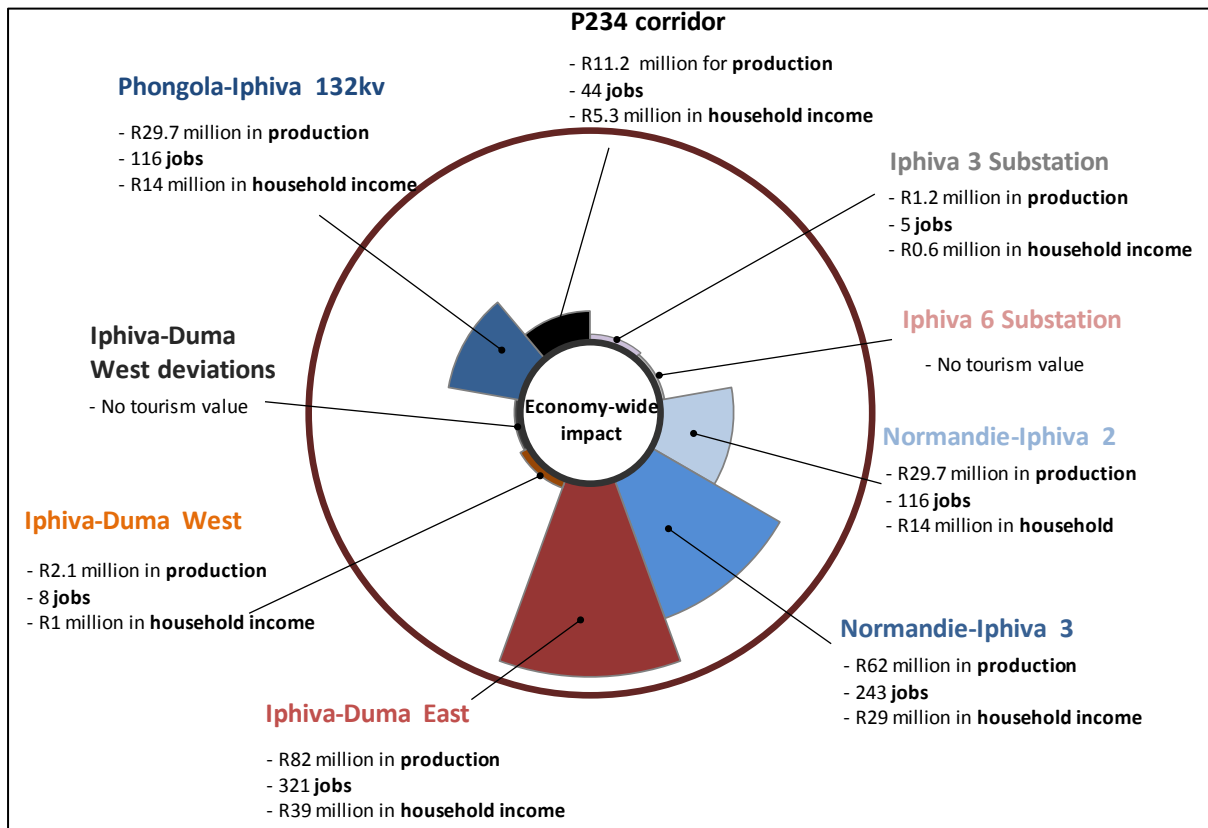
Impacts are measured in terms of the following:

- **Production** refers to the value of output generated in the economy as a result of the existing tourism activity.
- **Employment** reflects the number of jobs created by the tourism activity.
- **Household income** refers to the income received by households as a result of their involvement in the activity and downstream beneficiation production.

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The total impact of the alternatives is summarised in Figure 3.4.

Figure 3.4: Summary of economy-wide economic impact



Source: Authors calculation, 2018

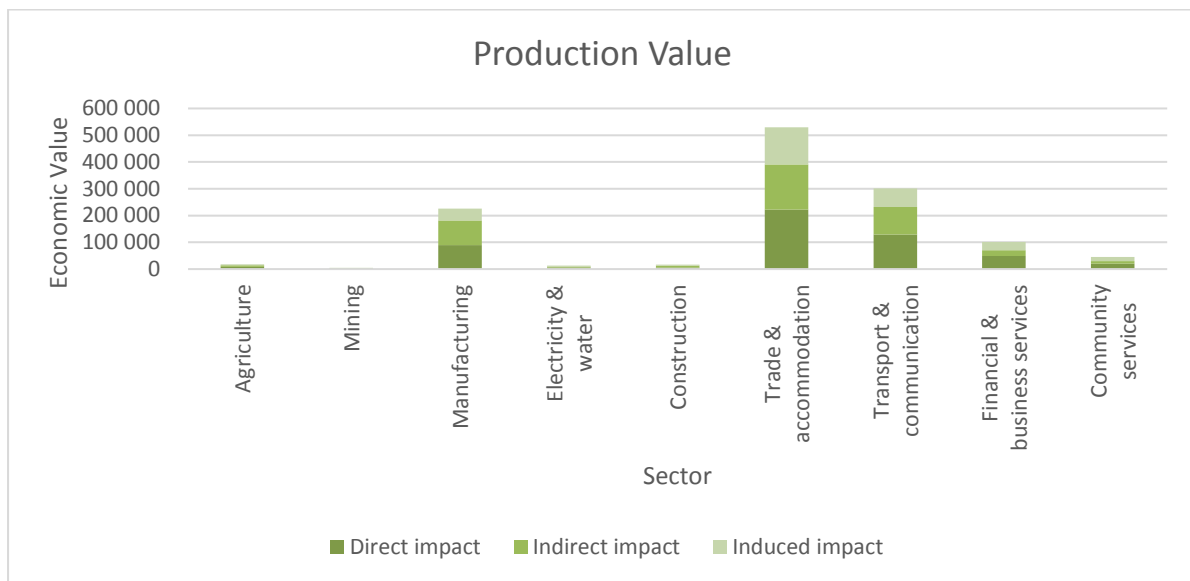
Subsequent paragraphs summarise the benefit that the tourism activity contributes within the national economy. The detailed quantitative economic impact tables is available as an annexure at the end of this report.

3.3.1 Iphiva 3

The assessment illustrates the economic value of tourism activity within the site and its contribution within the economy. The economy-wide impact of the R668 069 value of the site is illustrated in the following figures. Figure 3.5 shows the total production within the economy as a result of the economic value.

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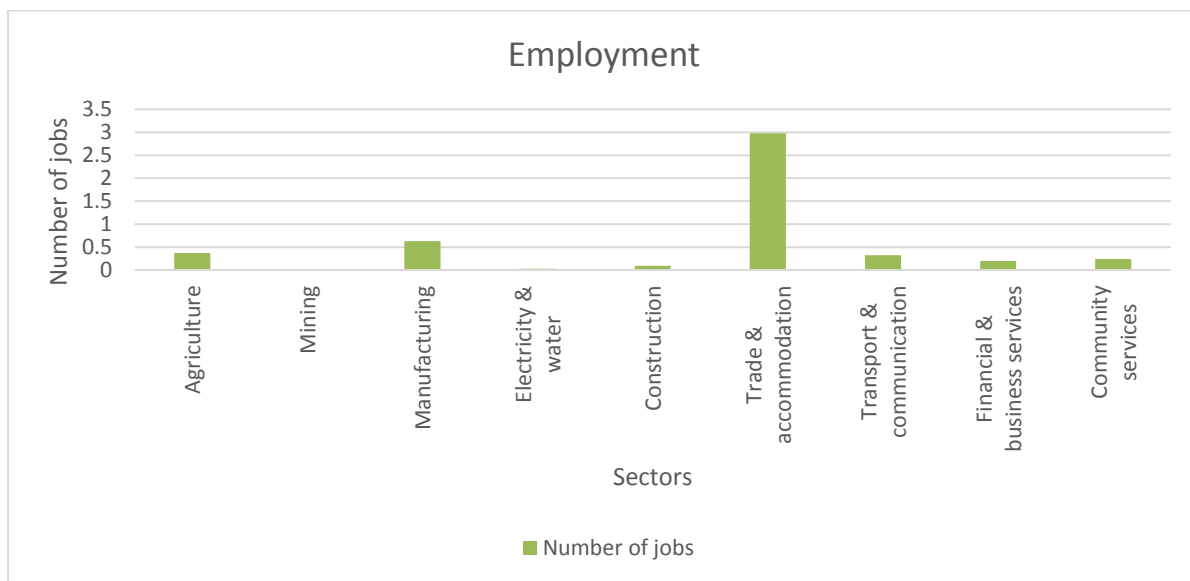
Figure 3.5: Direct, Indirect and Induced Impact on Sectors, 2017 values



Source: Authors calculations, 2017

In total the multiplier effect on the economy results in a total impact of R1.255 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.6.

Figure 3.6: Employment impact



Source: Authors calculations, 2017

A total of 5 direct job opportunities are created as a result of the economic value of the site, with the major beneficiary the trade and accommodation sector.

3.3.2 Iphiva 6

There is no tourism activity taking place within this site. For this reason, no tourism benefit within the economy. The visual from this site is however still important as nearby tourism

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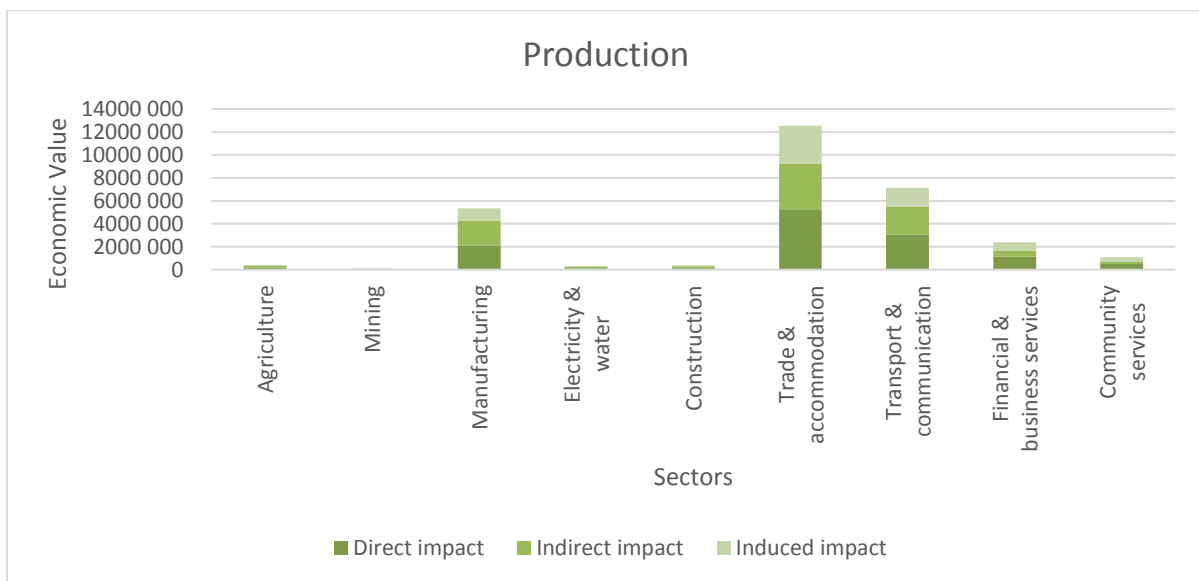
activity could be negatively affected through the visual impact. The location within the site for the substation needs to be where the visual impact is the lowest.

The preferred alternative for the substation site is Iphiva 6.

3.3.3 Normandie-Iphiva 2

The assessment illustrates the economic value of tourism activity within the corridor and its contribution within the economy. The economy-wide impact of the R15 819 378 value of the site is illustrated in the following figures. Figure 3.7 shows the total production within the economy as a result of the economic value.

Figure 3.7: Direct, Indirect and Induced Impact on Sectors, 2017 values

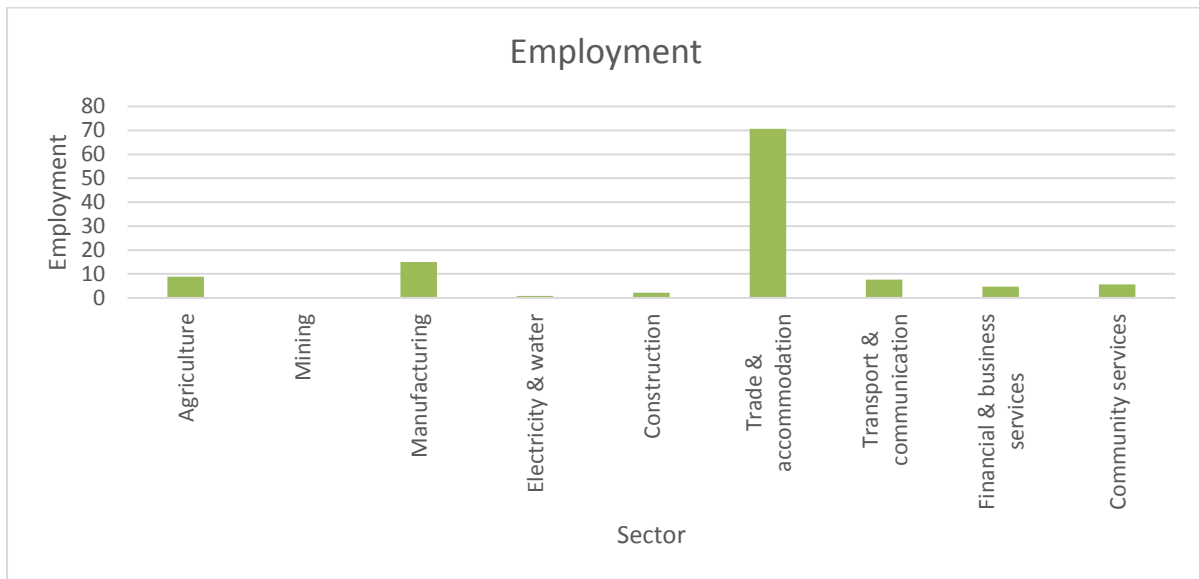


Source: Authors calculations, 2017

In total the multiplier effect on the economy results in a total impact of R29.7 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.8.

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Figure 3.8: Employment impact



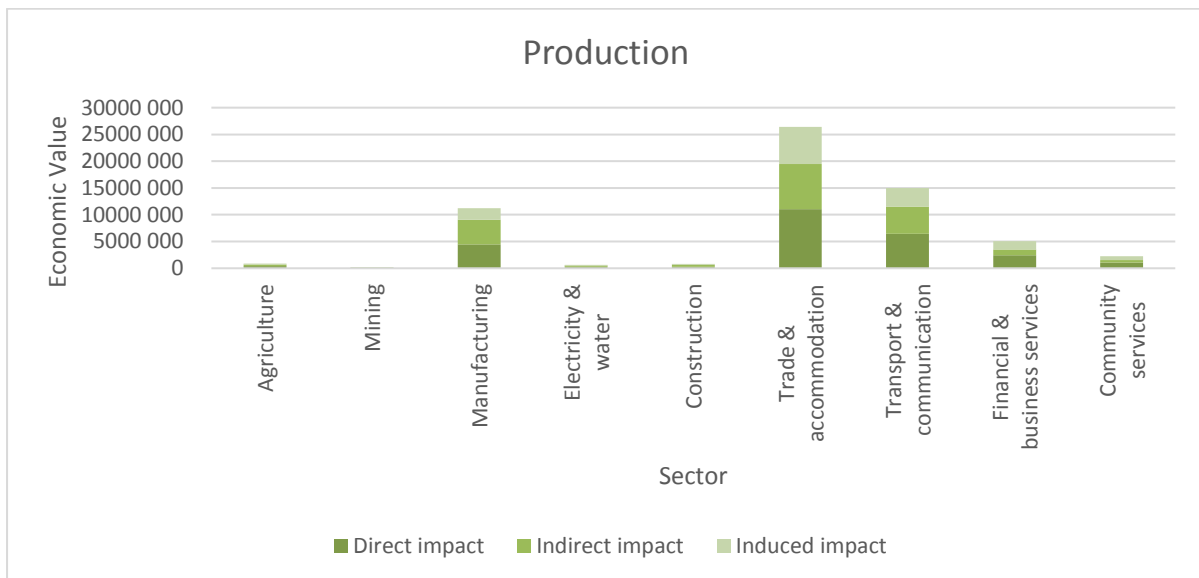
Source: Authors calculations, 2017

A total of 116 direct job opportunities are created as a result of the economic value of the corridor, with the major beneficiary the trade and accommodation sector.

3.3.4 Normandie-Iphiva 3

The assessment illustrates the economic value of tourism activity within the corridor and its contribution within the economy. The economy-wide impact of the R 33 302 626 value of the site is illustrated in the following figures. Figure 3.9 shows the total production within the economy as a result of the economic value.

Figure 3.9: Direct, Indirect and Induced Impact on Sectors, 2017 values

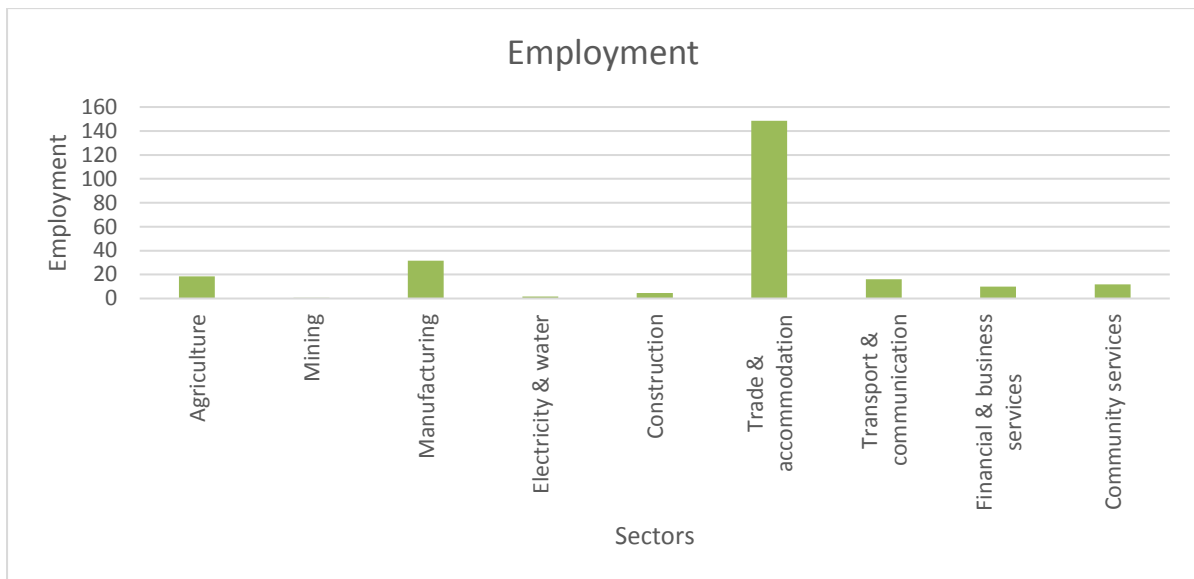


Source: Authors calculations, 2017

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In total the multiplier effect on the economy results in a total impact of R62.5 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.10.

Figure 3.10: Employment impact



Source: Authors calculations, 2017

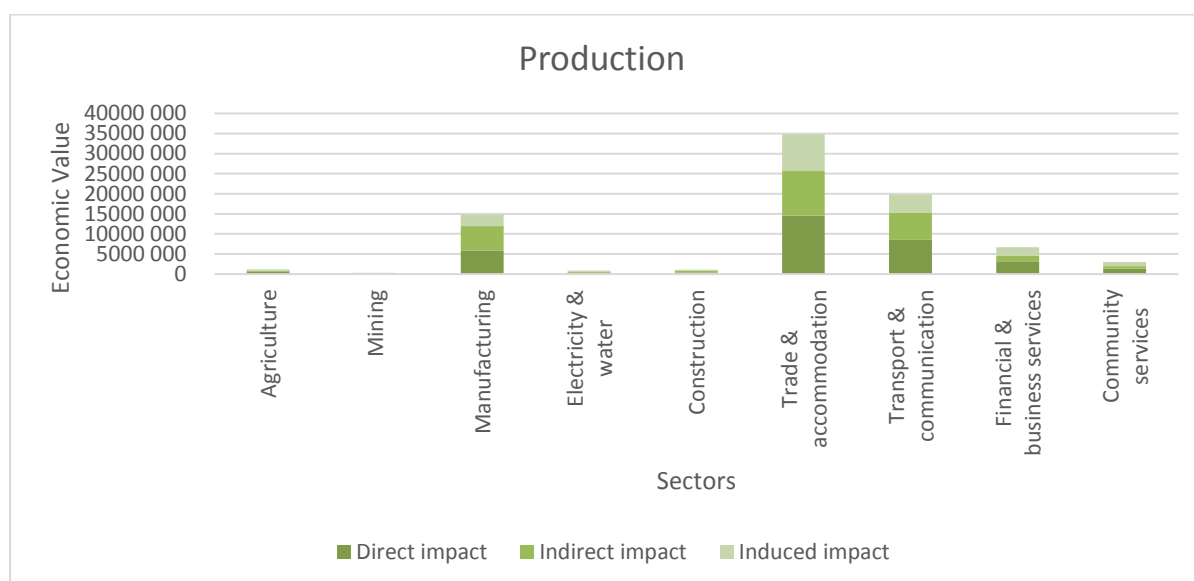
A total of 243 direct job opportunities are created as a result of the economic value of the corridor, with the major beneficiary the trade and accommodation sector.

3.3.5 Iphiva-Duma East

The assessment illustrates the economic value of tourism activity within the corridor and its contribution within the economy. The economy-wide impact of the R43 924 930 value of the corridor is illustrated in the following figures. Figure 3.11 shows the total production within the economy as a result of the economic value.

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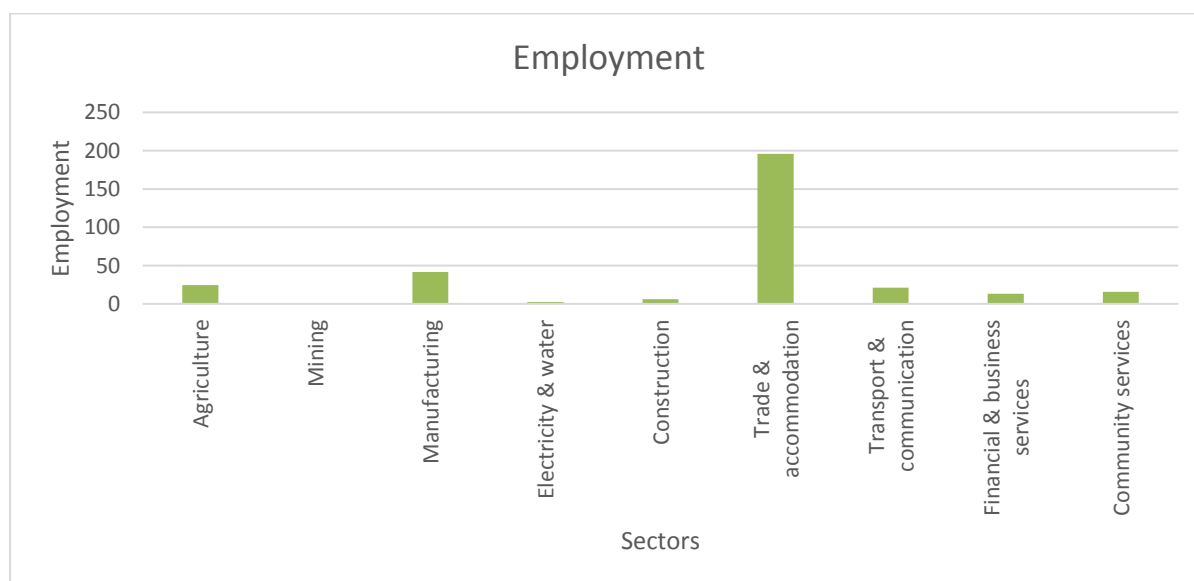
Figure 3.11: Direct, Indirect and Induced Impact on Sectors, 2017 values



Source: Authors calculations, 2017

In total the multiplier effect on the economy results in a total impact of R82.5 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.12.

Figure 3.12: Employment impact



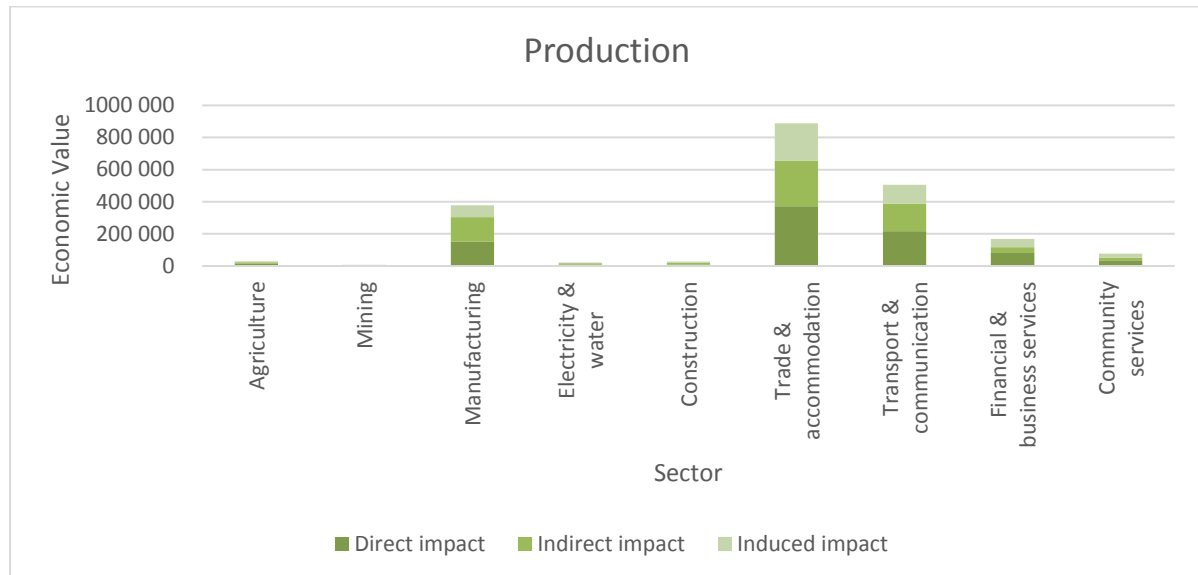
Source: Authors calculations, 2017

A total of 321 direct job opportunities are created as a result of the economic value of the corridor, with the major beneficiary the trade and accommodation sector.

3.3.6 Iphiva-Duma West

The assessment illustrates the economic value of tourism activity within the corridor and its contribution within the economy. The economy-wide impact of the R1 120 591 value of the corridor is illustrated in the following figures. Figure 3.13 shows the total production within the economy as a result of the economic value.

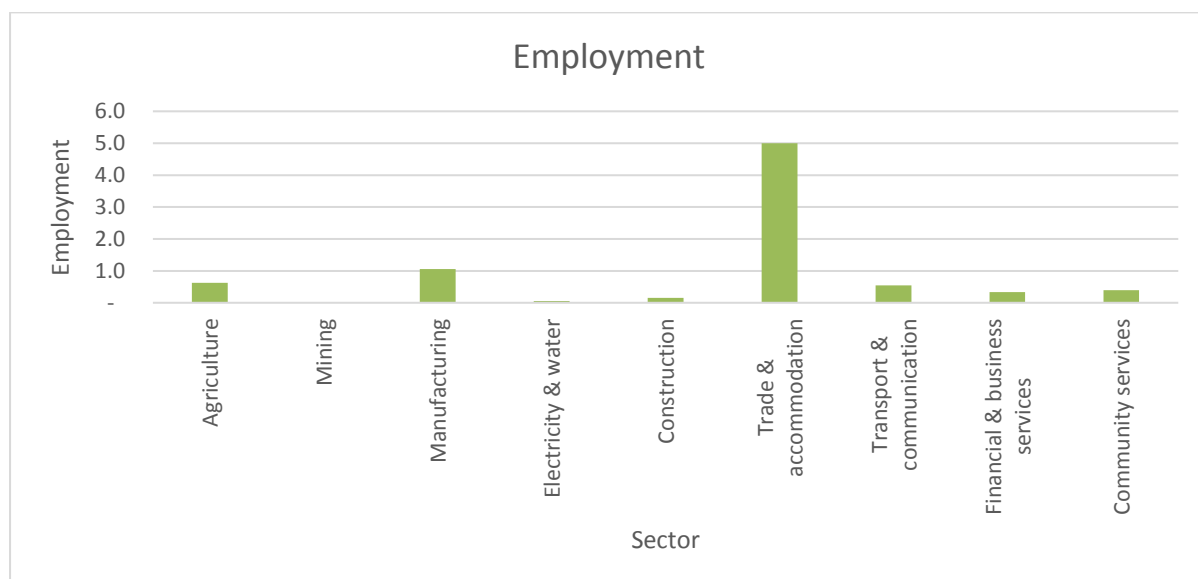
Figure 3.13: Direct, Indirect and Induced Impact on Sectors, 2017 values



Source: Authors calculations, 2017

In total the multiplier effect on the economy results in a total impact of R2.1 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.14.

Figure 3.14: Employment impact



Source: Authors calculations, 2017

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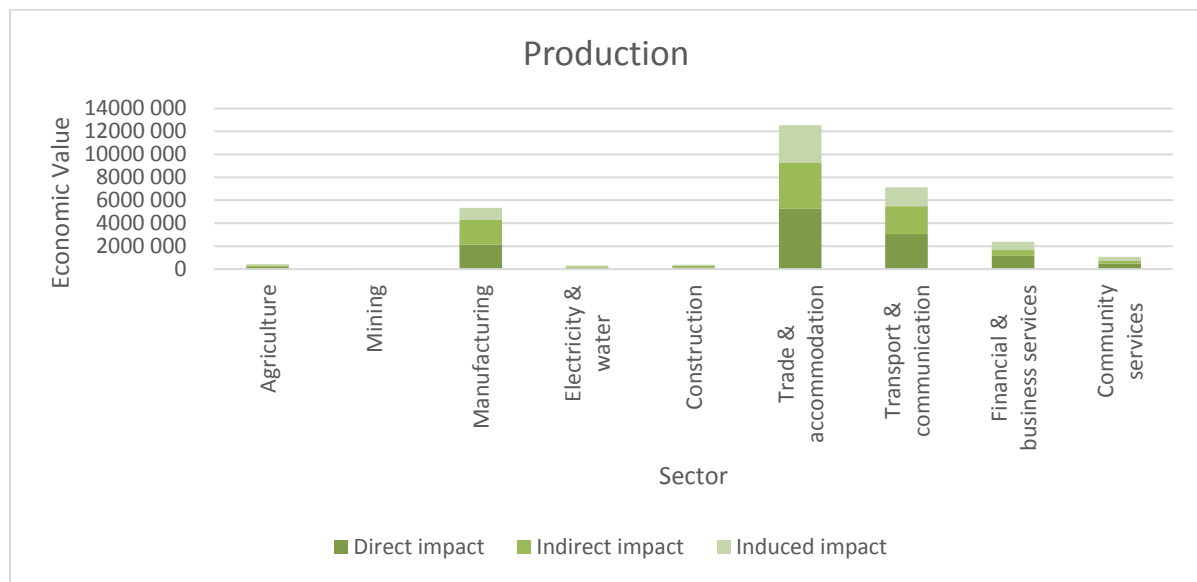
A total of 8 direct job opportunities are created as a result of the economic value of the site, with the major beneficiary the trade and accommodation sector.

The **alternatives for Iphiva-Duma west has no quantified impact on tourism activity**. For this reason the **deviations should be considered as possible alternatives** for development.

3.3.7 132kv Pongola-Iphiva

The assessment illustrates the economic value of tourism activity within the corridor and its contribution within the economy. The economy-wide impact of the R15 819 378 value of the site is illustrated in the following figure. Figure 3.15 shows the total production within the economy as a result of the economic value.

Figure 3.15: Direct, Indirect and Induced Impact on Sectors, 2017 values

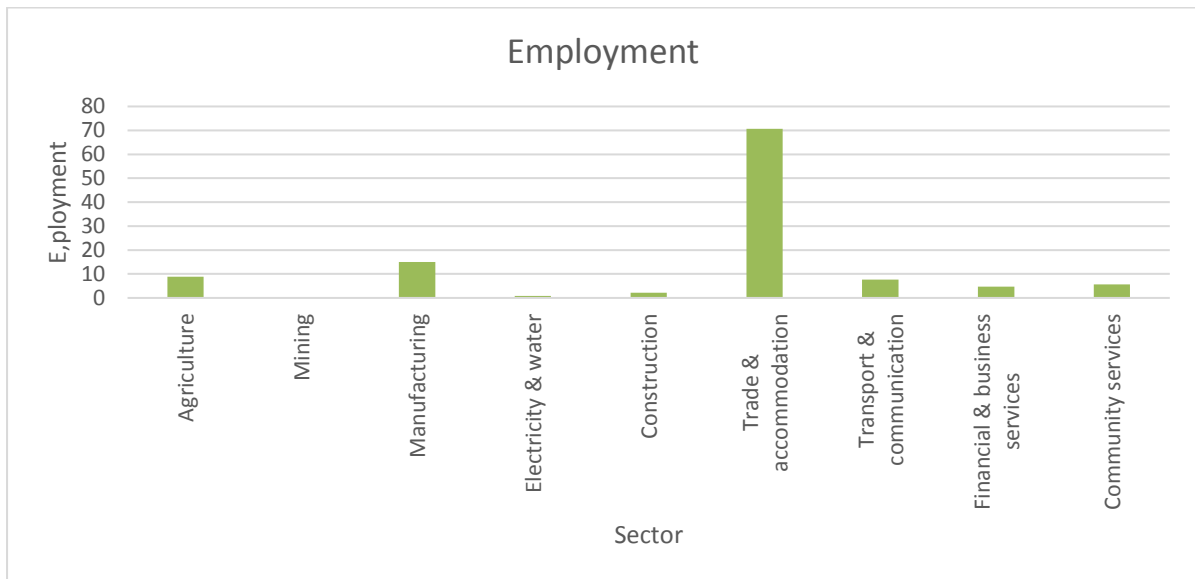


Source: Authors calculations, 2017

In total the multiplier effect on the economy results in a total impact of R29.7 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.16.

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Figure 3.16: Employment impact



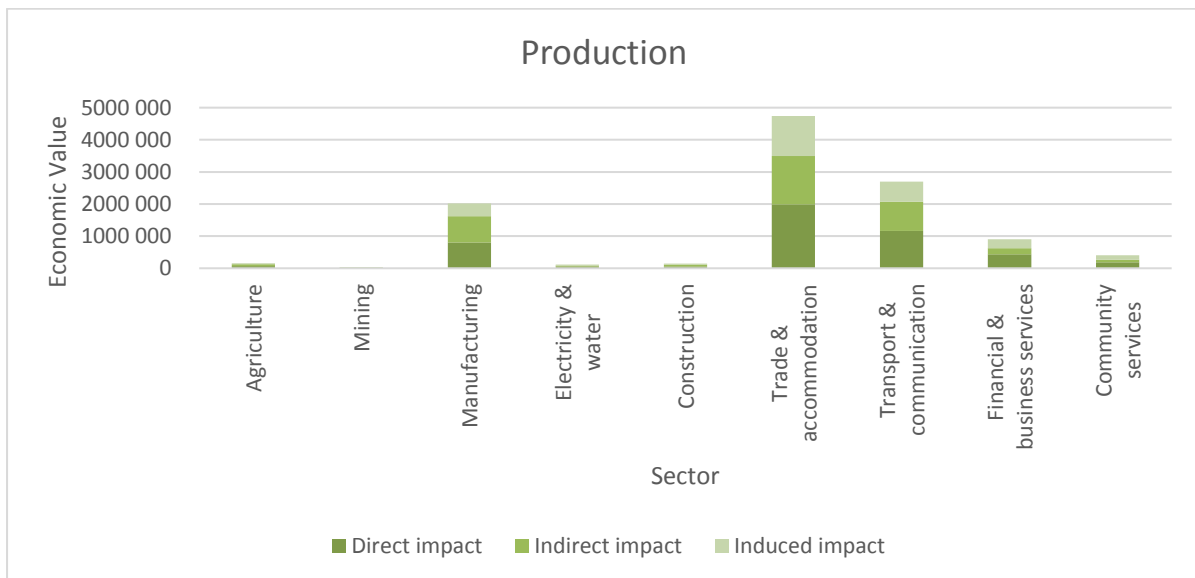
Source: Authors calculations, 2017

A total of 116 direct job opportunities are created as a result of the economic value of the corridor, with the major beneficiary the trade and accommodation sector.

3.3.8 132kv Double Circuit (P234 corridor)

The assessment illustrates the economic value of tourism activity within the site and its contribution within the economy. The economy-wide impact of the R4 242 114 value of the corridor is illustrated in the following figures. Table 3.17 shows the total production within the economy as a result of the economic value.

Figure 3.17: Direct, Indirect and Induced Impact on Sectors, 2017 values

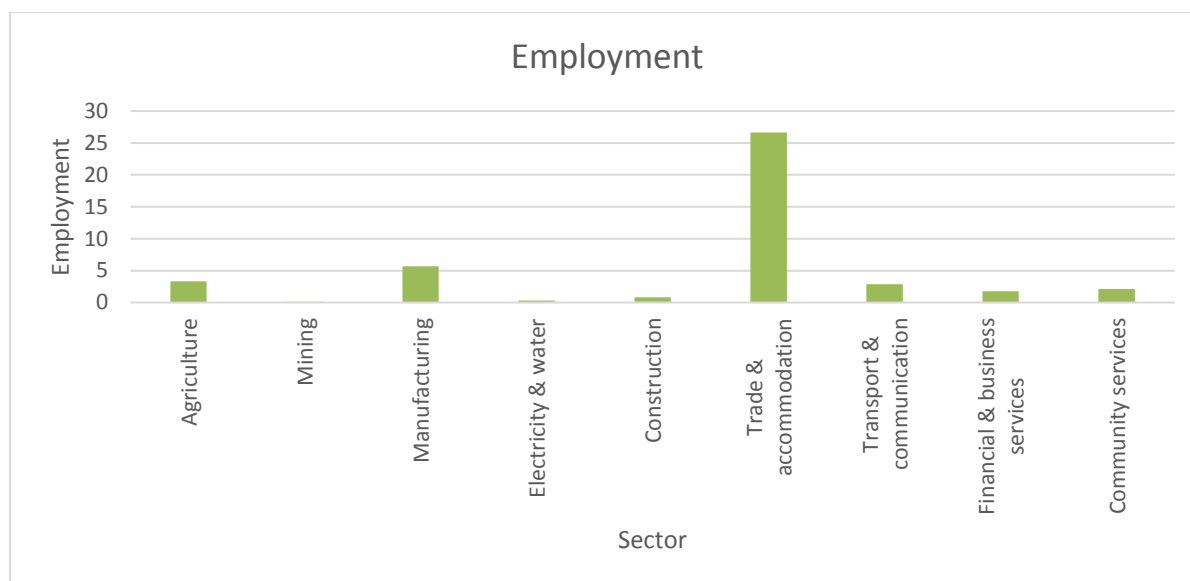


Source: Authors calculations, 2017

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In total the multiplier effect on the economy results in a total impact of R11.2 million benefit to the economy of which the major beneficial sector is the trade and accommodation sector (42.2%) and the transport sector (24%). The employment impact is illustrated in Figure 3.18.

Figure 3.18: Employment impact



Source: Authors calculations, 2017

A total of 44 direct job opportunities are created as a result of the economic value of the corridor, with the major beneficiary the trade and accommodation sector.

3.3.9 132 kV Line to Candover/Makhathini

No tourism activity is situated within this corridor.

3.4 Comparative Assessment

Not only are there negative impact for the affected properties, but the development of sub-stations and the power lines will also have a positive impact on the economy. The investment value for the substation, estimated at R1.25 billion while the distribution lines cost in the order of R2 million per kilometre for single circuit lines and R4 million for double circuit lines above ground.

If the Iphiva 3 site is used for the sub-station and a 9km double circuit distribution line is constructed within the P234 corridor the benefit of this investment in the economy amounts to R3.2 billion rand (2017 values). This is a significant investment for the economy. This benefit is mainly for the construction and maintenance of the infrastructure and does not illustrate the positive spin-off impact due to the increase in electricity capacity for the region.

The cost associated with burying the lines is understood to be higher, however no value was provided. If the cost is higher and the entire 9km stretch is buried the investment value and positive impact on the national economy is expected to be much higher. However, the

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opportunity cost associated with the additional investment for buried lines could result in inefficient use of capital for the economy.

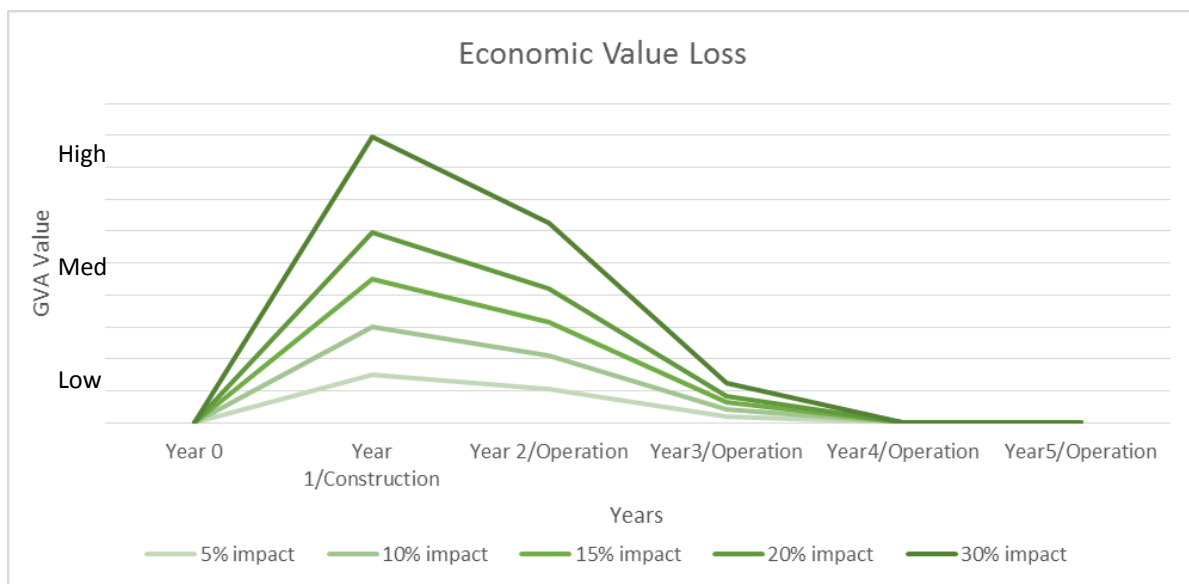
Is this additional cost, to bury the lines, necessary to reduce the possible negative impact on existing tourism activity in the region? An exact answer to this question at this stage is only speculation, as the exact route of the powerlines have not yet been determined, only corridors have been identified.

3.4.1 P234 corridor

At this stage, the direct economic value of the P234 corridor is estimated at R5.9 million per annum for all tourism related activity within the value-chain with the economy-wide impact amounting to R11.2 million (2017 values). This value represent the **economic value** of the corridor and **not the value that could be lost for adjacent property owners** as a result of the powerline development. Once the route has been identified, a professional valuer should be appointed to determine the loss in value for the **affected properties**.

The impact on tourism is expected to be short-run and should diminish over time **if there are minimal to no interruption on the operation** of the existing activity (see Figure 3.19).

Figure 3.19: Diminishing effect of economic loss

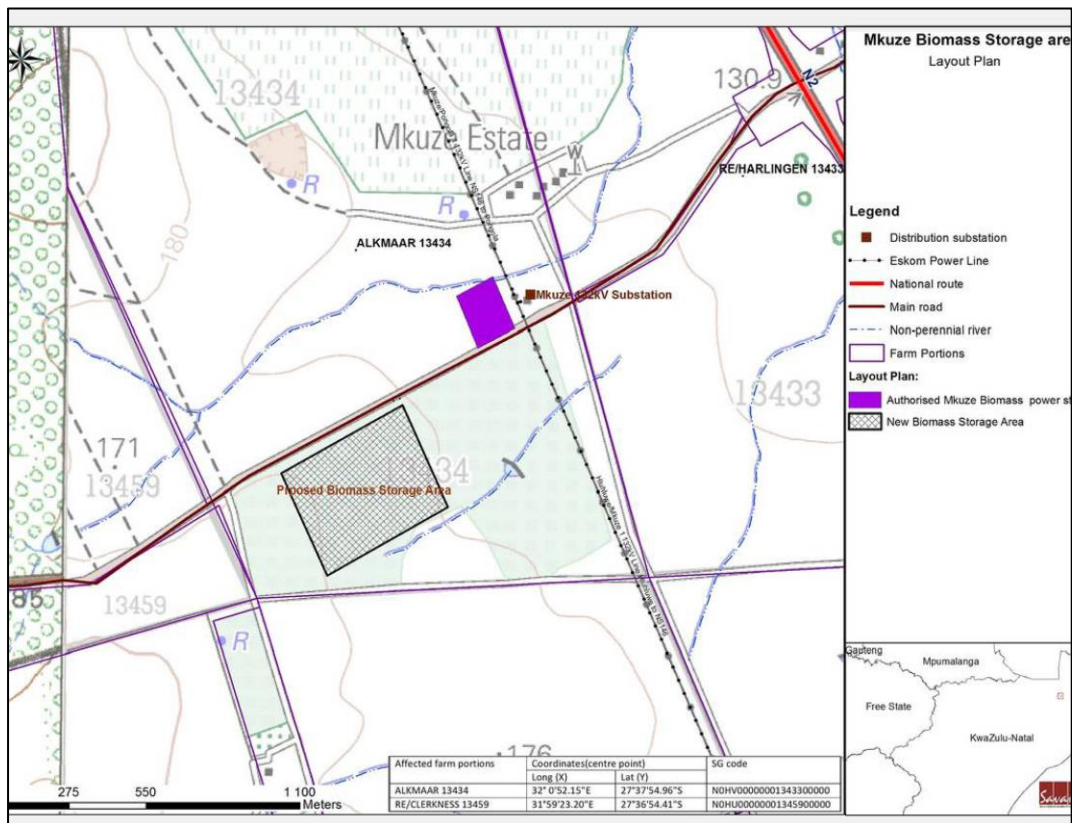


It is expected that buried lines will have an even lower negative impact on tourism in the area.

However, if other projects - such as the biomass power station mentioned below - develop in the same corridor (P234) the mitigation of burying the lines underground does not hold. For example, the development of a biomass power station, with associated activity, would have a similar negative visual impact in this area. Map 3 indicates plans for the authorised Mkuze biomass power station adjacent the P234.

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Map 3: Mkuze biomass power plant



Source: <https://www.esi-africa.com/wp-content/uploads/2015/05/Alessandro-Piccinini.pdf>

A number of sources indicate that this project has been approved for development⁶.

3.5 SYNTHESIS

The section quantified the economic value on a local and economy-wide geographic level.

The agglomeration of eco- and nature-based tourism is high within this region and a large share of these establishments cater for the international tourism market and even state their tariffs in Euro and Dollar instead of South African Rand.

The intensity of the economic impact for tourism activity will be different for each property/activity and depends on *inter alia* the:

⁶ <https://www.esi-africa.com/wp-content/uploads/2015/05/Alessandro-Piccinini.pdf>, <http://www.engineeringnews.co.za/print-version/mkuze-biomass-project-south-africa-2014-03-21> and <http://www.sahra.org.za/sahris/sites/default/files/additionaldocs/Mkuze%20Biomass%20Motivation%20for%20EA%20amendmt%20PIP%2010.03.14.pdf>

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- **Land use type** – property with tourism activity, such as game farming, lodges, protected areas and nature reserves should, as far possible, be eliminated from the preferred alignment.
- **Powerline route** – The route should be on the boundary of farms and not transcend properties diagonally or through the middle.
- **Size of the property** – A powerline that transcend properties diagonally or through the middle, for property smaller than 200ha, tips an argument for expropriation
- **Existing infrastructure** – Do not place powerlines over or in close proximity to tourism infrastructure.
- **Visibility of the new structure** - Place the powerlines / pylons and substation in areas where it is not visible from tourism areas/hides/etc.
- **Market related compensation** for the affected property should be provided where the powerline is developed.
- Landowners should be **consulted** about their preferred configuration if their property is affected.

Once a route for the powerline is available, it will be possible to quantify the property value impact on individual properties. A registered property valuer should assess each individual affected property to determine the value impact, if any.

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare for final sales. The corridor with the lowest economic value is preferred for the powerline and sub-station developments.

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SECTION 4: QUALITATIVE IMPACT ASSESSMENT & MITIGATION

4.1 Introduction

The key issues identified during the Scoping Phase informed the terms of reference of the specialist studies. Each issue consists of components that, on their own or in combination with each other, give rise to potential impacts (either positive or negative) from the project onto the environment or from the environment onto the project. In the EIA the significance of the potential impacts will be considered before and after identified mitigation is implemented for direct, indirect, and cumulative impacts, in the short and long term.

A description of the nature of the impact; any specific legal requirements as well as the stage (construction / decommissioning or operation) will be given. Impacts are considered to be the same during construction and decommissioning.

The following criteria will be used to evaluate significance:

- **Nature:** This is an appraisal of the type of effect the activity is likely to have on the affected environment. The description includes what is being affected and how. The nature of the impact will be classified as positive or negative, and direct or indirect.
- **Extent:** This indicates the spatial area that may be affected (**Table 4.1**).

Table 4.1: Geographical extent of impact

Rating	Extent	Description
1	Site	Impacted area is only at the site – the actual extent of the activity.
2	Local	Impacted area is limited to the site and its immediate surrounding area
3	Regional	Impacted area extends to the surrounding area, the immediate and the neighbouring properties.
4	Provincial	Impact considered of provincial importance
5	National	Impact considered of national importance – will affect entire country.

- **Duration:** This measures the lifetime of the impact (**Table 4.2**).

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Table 4.2: Duration of Impact

Rating	Duration	Description
1	Short term	0 – 3 years, or length of construction period
2	Medium term	3 – 10 years
3	Long term	> 10 years, or entire operational life of project.
4	Permanent – mitigated	Mitigation measures of natural process will reduce impact – impact will remain after operational life of project.
5	Permanent – no mitigation	No mitigation measures of natural process will reduce impact after implementation – impact will remain after operational life of project.

- **Intensity / severity:** This is the degree to which the project affects or changes the environment; it includes a measure of the reversibility of impacts (**Table 4.3**).

Table 4.3: Intensity of Impact

Rating	Intensity	Description
1	Negligible	Change is slight, often not noticeable, natural functioning of environment not affected.
2	Low	Natural functioning of environment is minimally affected. Natural, cultural and social functions and processes can be reversed to their original state.
3	Medium	Environment remarkably altered, still functions, if in a modified way. Negative impacts cannot be fully reversed.
4	High	Cultural and social functions and processes disturbed – potentially ceasing to function temporarily.
5	Very high	Natural, cultural and social functions and processes permanently cease and valued, important, sensitive or vulnerable systems or communities are substantially affected. Negative impacts cannot be reversed.

- **Potential for irreplaceable loss of resources:** This is the degree to which the project will cause loss of resources that are irreplaceable (**Table 4.4**).

Table 4.4: Potential for irreplaceable loss of resources

Rating	Potential for irreplaceable loss of resources	Description
1	Low	No irreplaceable resources will be impacted.
3	Medium	Resources can be replaced, with effort.
5	High	There is no potential for replacing a particular vulnerable resource that will be impacted.

- **Probability:** This is the likelihood or the chances that the impact will occur (**Table 4.5**).

Table 4.5: Probability of Impact

Rating	Probability	Description
1	Improbable	Under normal conditions, no impacts expected.
2	Low	The probability of the impact to occur is low due to its design or historic experience.
3	Medium	There is a distinct probability of the impact occurring.
4	High	It is most likely that the impact will occur
5	Definite	The impact will occur regardless of any preventative measures.

- **Confidence:** This is the level of knowledge or information available to the environmental impact practitioner or a specialist that informs his/her judgement (**Table 4.6**).

Table 4.6: Confidence in level of knowledge or information

Rating	Confidence	Description
1	Low	Judgement based on intuition, not knowledge/ information.
2	Medium	Common sense and general knowledge informs decision.
3	High	Scientific / proven information informs decision.

- **Consequence:** This is calculated as extent + duration + intensity + potential impact on irreplaceable resources.

- **Significance:** The significance will be rated by combining the consequence of the impact and the probability of occurrence (i.e. consequence x probability = significance). The maximum value which can be obtained is 100 significance points (**Table 4.7**).

Table 4.7: Significance of issues (based on parameters)

Rating	Significance	Description
1-14	Very low	No action required.
15-29	Low	Impacts are within the acceptable range.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.
45-59	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.
60-80	High	Impacts are of great importance, mitigation is crucial.
81-100	Very high	Impacts are unacceptable.

- **Cumulative Impacts:** This refers to the combined, incremental effects of the impact, taking other past, present and future developments in the same area into account. The possible cumulative impacts will also be considered.
- **Mitigation:** Mitigation for significant issues will be incorporated into the EMPR.

4.2 Quantitative Economic Impact Assessment

The quantitative economic impact tables are provided below for each of the various development scenarios. The focus is on the tourism activity that will be impacted by the development, however there is also a positive impact on the economy that will result from the additional electricity capacity that will be added to this area.

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4.2.1 Iphiva Substation

Table 4.8: Iphiva Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The substation should not be constructed on property used for tourism activity					
			Minimise	Place the substation in an area that is not visible from the tourism areas					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva 3</i>									
Negative, direct without mitigation	2	5	5	5	5	3	17	85	
Negative, direct with mitigation	1	4	5	5	4	3	15	60	
<i>Iphiva 6</i>									
Negative, direct without mitigation	1	5	3	1	3	3	10	30	
Negative, direct with mitigation	1	4	3	1	3	3	9	27	

Table 4.9: Iphiva Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the substation is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			Mitigation						
			Avoid						
			Minimise	Place the substation in an area that is not visible from the tourism areas					
			Restore/Rehabilitate						
			Compensate/Offset						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva 3</i>									
Negative, direct without mitigation	2	5	4	5	5	3	16	80	
Negative, direct with mitigation	1	4	3	5	4	3	13	52	
<i>Iphiva 6</i>									
Negative, direct without mitigation	2	5	4	5	5	3	16	80	
Negative, direct with mitigation	1	4	3	5	4	3	13	52	

Table 4.10: Iphiva Substation Impact Table

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a substation, the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The substation should not be constructed on property used for tourism activity					
			Minimise	Place the substation in an area that is not visible from the tourism areas					
			Restore/Rehabilitate						
			Compensate/Offset						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva 3</i>									
Negative, direct & indirect without mitigation	4	5	5	5	5	3	19	95	
Negative, direct & indirect with mitigation	4	5	5	5	4	3	19	76	
<i>Iphiva 6</i>									
Negative, direct without mitigation	4	5	4	5	4	3	18	72	
Negative, direct with mitigation	1	4	3	1	3	3	9	27	

Table 4.11: Iphiva Substation Impact Table

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The substation should not be constructed on property used for tourism activity					
			Minimise	Place the substation in an area that is not visible from the tourism areas					
			Restore/Rehabilitate						
			Compensate/Offset						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva 3</i>									
Negative, direct without mitigation	4	5	5	5	5	3	19	95	
Negative, direct with mitigation	4	5	5	5	4	3	19	76	
<i>Iphiva 6</i>									
Negative, direct without mitigation	4	5	4	5	4	3	18	72	
Negative, direct with mitigation	1	4	3	1	3	3	9	27	

Table 4.12: Iphiva Substation Impact Table

Impact Description: Construction phase impact - Displacement effect of residential owners			Mitigation						
			Avoid	Vacant land should be preferred to land where people are residing					
			Minimise						
			Restore/Rehabilitate						
			Compensate/Offset	Residents that reside within the proximity of the proposed substation should be compensated for their property					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva 3</i>									
Negative, direct without mitigation	1	5	2	1	2	2	9	18	
Negative, direct with mitigation	1	4	2	1	2	2	8	16	
<i>Iphiva 6</i>									
Negative, direct without mitigation	1	5	4	3	4	2	13	52	
Negative, direct with mitigation	1	4	3	3	4	2	11	44	

Findings:

- Iphiva 6 is preferred as the site that will have the lowest negative Impact on tourism, economic activity and employment for the region.
- In order to achieve the lowest possible negative economic impact, the most important mitigation activity is to find a suitable location where the visual impact is as low as possible for the surrounding areas.

4.2.2 Normandie-Iphiva Corridor

Table 4.13: Normandie-Iphiva Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerline and pylons in such a manner that it is not visible from tourism areas. The powerline should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Normandie-Iphiva 2</i>									
Negative, direct without mitigation	1	5	4	5	5	3	15	75	
Negative, direct with mitigation	1	4	3	5	4	3	13	52	
<i>Normandie-Iphiva 3</i>									
Negative, direct & indirect without mitigation	1	5	4	5	5	3	15	75	
Negative, direct & indirect with mitigation	1	4	3	5	4	3	13	52	

Table 4.14: Normandie-Iphiva Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the powerlines is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Normandie-Iphiva 2</i>									
Negative, direct without mitigation	2	5	4	5	5	3	16	80	
Negative, direct with mitigation	1	4	3	5	3	3	13	39	
<i>Normandie-Iphiva 3</i>									
Negative, direct & indirect without mitigation	2	5	4	5	5	3	16	80	
Negative, direct & indirect with mitigation	1	4	3	5	3	3	13	39	

Table 4.15: Normandie-Iphiva Substation Impact Table

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of powerline the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Normandie-Iphiva 2</i>									
Negative, direct & indirect without mitigation	4	5	4	5	4	3	18	72	
Negative, direct & indirect with mitigation	2	4	2	5	3	3	13	39	
<i>Normandie-Iphiva 3</i>									
Negative, direct & indirect without mitigation	4	5	4	5	4	3	18	72	
Negative, direct & indirect with mitigation	2	4	2	5	3	3	13	39	

Table 4.16: Normandie-Iphiva Substation Impact Table

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The substation should not be constructed on property used for tourism activity					
			Minimise	Place the substation in an area that is not visible from the tourism areas					
			Restore/Rehabilitate						
			Compensate/Offset						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Normandie-Iphiva 2</i>									
Negative, direct without mitigation	4	5	4	5	4	3	18	72	
Negative, direct with mitigation	2	4	2	5	3	3	13	39	
<i>Normandie-Iphiva 3</i>									
Negative, direct without mitigation	4	5	4	5	4	3	18	72	
Negative, direct with mitigation	2	4	2	5	3	3	13	39	

4.2.3 Iphiva-Duma Corridor

Table 4.17: Iphiva-Duma Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerline should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva-Duma East</i>									
Negative, direct without mitigation	1	5	4	5	5	3	15	75	
Negative, direct with mitigation	1	4	3	5	4	3	13	52	
<i>Iphiva-Duma West</i>									
Negative, direct & indirect without mitigation	1	5	4	5	5	3	15	75	
Negative, direct & indirect with mitigation	1	4	3	5	4	3	13	52	

Table 4.18: Iphiva-Duma Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the powerline is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva-Duma East</i>									
Negative, direct without mitigation	2	5	4	5	5	3	16	80	
Negative, direct with mitigation	1	4	3	5	3	3	13	39	
<i>Iphiva-Duma West</i>									
Negative, direct & indirect without mitigation	2	5	4	5	5	3	16	80	
Negative, direct & indirect with mitigation	1	4	3	5	3	3	13	39	

Table 4.19: Iphiva-Duma Substation Impact Table

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a powerline the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerline across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva-Duma East</i>									
Negative, direct & indirect without mitigation	4	5	4	5	4	3	18	72	
Negative, direct & indirect with mitigation	2	4	2	5	3	3	13	39	
<i>Iphiva-Duma West</i>									
Negative, direct & indirect without mitigation	4	5	4	5	4	3	18	72	
Negative, direct & indirect with mitigation	2	4	2	5	3	3	13	39	

Table 4.20: Iphiva-Duma Substation Impact Table

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerlines is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Iphiva-Duma East</i>									
Negative, direct without mitigation	4	5	4	5	4	3	18	72	
Negative, direct with mitigation	2	4	2	5	3	3	13	39	
<i>Iphiva-Duma West</i>									
Negative, direct without mitigation	4	5	4	5	4	3	18	72	
Negative, direct with mitigation	2	4	2	5	3	3	13	39	

4.2.4 132kv Pongola-Iphiva

Table 4.21: Pongola-Iphiva Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerline and pylons in such a manner that it is not visible from tourism areas. The powerline should be constructed on the boundary of farms. Powerline across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	5	3	5	4	3	14	56	
Negative, direct with mitigation	1	4	3	3	3	3	11	33	

Table 4.22: Pongola-Iphiva Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the powerlines is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerline and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	2	5	3	4	4	3	14	56	
Negative, direct with mitigation	1	4	3	3	3	3	11	33	

Table 4.23: Pongola-Iphiva Substation Impact Table

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a powerline the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct & indirect without mitigation	3	5	3	4	4	3	15	60	
Negative, direct & indirect with mitigation	2	4	2	3	3	3	11	33	

Table 4.24: Pongola-Iphiva Substation Impact Table

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	3	5	3	4	4	3	15	60	
Negative, direct with mitigation	2	4	2	3	3	3	11	33	

4.2.5 132kv Double Circuit (P234 corridor)

Table 4.25: Combinations of burying and multi-circuit towers in the P234 Corridor

	Iphiva-Duma West	Iphiva-Duma East
All above ground (132k V powerlines on double circuit towers)	1	2
Burying 4 x 132 kV powerline and construct 1 x 400 kV powerline next to them	3	4
Bury all of the lines	(same as 3)	5
Bury the 400 kV powerline and construct 132 kV above ground on double circuit towers next to it	(same as 1)	6
One tower with 1x400 kV and 2x 132kV powerlines and 1 x 132kV powerline buried	N/A	7

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Table 4.26: Double Circuit Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Alternative 1</i>									
Negative, direct	1	5	5	5	5	3	16	80	
<i>Alternative 2</i>									
Negative, direct	1	5	5	5	5	3	16	80	
<i>Alternative 3</i>									
Negative, direct	1	5	4	5	5	3	15	75	
<i>Alternative 4</i>									
Negative, direct	1	5	4	5	5	3	15	75	
<i>Alternative 5</i>									
Negative, direct	1	3	2	1	2	3	7	14	
<i>Alternative 6</i>									
Negative, direct	1	5	5	5	5	3	16	80	
<i>Alternative 7</i>									
Negative, direct	1	5	5	5	5	3	16	80	

Table 4.27: Double Circuit Substation Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the substation is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			Mitigation							
			Avoid	The powerlines should not be constructed on property used for tourism activity.						
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.						
			Restore/Rehabilitate							
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance		
<i>Alternative 1</i>										
Negative, direct	2	5	4	5	5	3	16	80		
<i>Alternative 2</i>										
Negative, direct	2	5	4	5	5	3	16	80		
<i>Alternative 3</i>										
Negative, direct	2	5	3	5	5	3	15	75		
<i>Alternative 4</i>										
Negative, direct	2	5	3	5	5	3	15	75		
<i>Alternative 5</i>										
Negative, direct	1	3	2	1	2	3	7	14		
<i>Alternative 6</i>										
Negative, direct	2	5	4	5	5	3	16	80		
<i>Alternative 7</i>										
Negative, direct	2	5	4	5	5	3	16	80		

Table 4.28: Double Circuit Substation Impact Table

<p>Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a substation, the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.</p>			Mitigation							
			Avoid	The powerlines should not be constructed on property used for tourism activity.						
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.						
			Restore/Rehabilitate							
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance		
<i>Alternative 1</i>										
Negative, direct & indirect	4	5	4	5	5	3	18	90		
<i>Alternative 2</i>										
Negative, direct & indirect	4	5	4	5	5	3	18	90		
<i>Alternative 3</i>										
Negative, direct & indirect	4	5	3	5	4	3	17	68		
<i>Alternative 4</i>										
Negative, direct & indirect	4	5	3	5	4	3	17	68		
<i>Alternative 5</i>										
Negative, direct & indirect	1	3	2	2	2	3	8	16		
<i>Alternative 6</i>										
Negative, direct & indirect	4	5	3	5	5	3	17	85		
<i>Alternative 7</i>										
Negative, direct & indirect	4	5	3	5	5	3	17	85		

Table 4.29: Double Circuit Substation Impact Table

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate /Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Alternative 1</i>									
Negative, direct & indirect	4	5	4	5	5	3	18	90	
<i>Alternative 2</i>									
Negative, direct & indirect	4	5	4	5	5	3	18	90	
<i>Alternative 3</i>									
Negative, direct & indirect	4	5	3	5	4	3	17	68	
<i>Alternative 4</i>									
Negative, direct & indirect	4	5	3	5	4	3	17	68	
<i>Alternative 5</i>									
Negative, direct & indirect	1	3	2	2	2	3	8	16	
<i>Alternative 6</i>									
Negative, direct & indirect	4	5	3	5	5	3	17	85	
<i>Alternative 7</i>									
Negative, direct & indirect	4	5	3	5	5	3	17	85	

4.2.5 132 kV Candover S/S from existing Iphiva to Pongola Line

Table 4.30: 132 kV Line to Candover/Makhathini Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	1	3	3	2	3	8	16	

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Table 4.31: 132 kV Line to Candover/Makhathini Impact Table

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the powerlines is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes).			Mitigation					
			Avoid			The powerlines should not be constructed on property used for tourism activity.		
			Minimise			Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.		
			Restore/Rehabilitate					
Compensate/Offset			Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>132kv Pongola-Iphiva corridor</i>								
Negative, direct without mitigation	1	1	3	3	2	3	8	16

Table 4.32: 132 kV Line to Candover/Makhathini Impact Table

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a powerline the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation					
			Avoid			The powerlines should not be constructed on property used for tourism activity.		
			Minimise			Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.		
			Restore/Rehabilitate					
			Compensate/Offset			Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.		
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>132kv Pongola-Iphiva corridor</i>								
Negative, direct & indirect without mitigation	1	1	3	3	2	3	8	16

Table 4.33: 132 kV Line to Candover/Makhathini Impact Table

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	1	3	3	2	3	8	16	

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SECTION 5: RECOMMENDATIONS

The aim of this report is to consider the economic value of tourism activities that will be impacted by the proposed development, identify the preferred corridors for the powerline development and substation site. The P234 corridor is a specific focus for analysis as it provides the only area of accessibility for the powerline to access the Mkuze area.

5.1 Substation Site

The preferred site for the substation development is site 6. There is currently no tourism activity taking place on this site. The visual assessment shows that this site has the lowest visual impact on the surrounding areas, which is preferred when considering the tourism activity within the area. The substation should preferably be developed in the northern part of the site.

5.2 Corridor configuration

The preferred 400kv Transmission powerline corridors are **Normandie-Iphiva 2 and Iphiva-Duma west 1 or 2 with the deviation in the south**. These are chosen as their impact on existing tourism activity is the lowest. Within these corridors a route should be chosen where the key determinants, highlighted earlier, should be considered in order to minimise any negative impact on tourism activity in the economy.

The construction of powerlines within a corridor should not be a straight line, but rather follow farm boundaries and areas on farms where no economic activity takes place (interaction with owners are important to determine the best possible route across affected property).

The additional effect of adding a power line to an existing corridor is not exponential or linear but rather diminishing i.e. the adding of an additional line to a corridor has a lesser effect on an already affected property than the introduction of the same new line would have on a newly affected property.

Depending on the location, the powerlines are not expected to prevent hunting or tourism activity on a farm. The location of the lines should preferably be on the boundary or where it is least visible (mitigation measures should be implemented). The line could however result in changes in how the activity will take place. This means that the activity should be able to continue albeit in a modified way i.e. creating visual barriers, re-alignment of hives and scenic routes, etc. will most likely have to take place.

5.3 P234 corridor

The tourism activity along this corridor makes it sensitive for most linear infrastructure developments. In order to limit the negative economic impact, resulting from the visual impact of the powerlines, burying the powerlines along the most sensitive area along this ± 9 km stretch will mitigate most of the negative economic impacts. If this is not possible, the powerlines should be placed in such a way to minimise the visual impact for the adjacent properties. The

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value of the economic impact is expected to vary between -5% and -30% of the affected properties.

The proposed activities should be authorised with the following conditions for inclusion within the environmental authorisation:

- Once the route has been finalised an independent professional property valuer should be appointed to quantify the value impact for directly affected properties with appropriate compensation.
- A cost comparison analysis is proposed between burying powerlines and overhead powerlines. If the cost is similar, burying the powerlines is proposed for high value tourism areas.

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ANNEXURE A: QUANTITATIVE ECONOMIC IMPACT TABLES

Iphiva 3

Table 1: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Values]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	7 839	5 881	4 119	17 839	1.4%
Mining	1 844	1 142	1 064	4 050	0.3%
Manufacturing	89 707	91 625	44 304	225 637	18.0%
Electricity & water	5 888	4 150	3 289	13 327	1.1%
Construction	6 119	6 960	3 312	16 391	1.3%
Trade & accommodation	222 022	168 780	139 174	529 977	42.2%
Transport & communication	129 584	101 881	69 757	301 222	24.0%
Financial & business services	48 437	21 562	31 243	101 242	8.1%
Community services	20 679	9 568	15 423	45 670	3.6%
Total	532 120	411 549	311 686	1 255 355	100%

Source: Authors calculations, 2017

Table 2: Employment impact

Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	0.4	7.7%
Mining	0.0	0.2%
Manufacturing	0.6	13.0%
Electricity & water	0.0	0.7%
Construction	0.1	1.9%
Trade & accommodation	3.0	61.1%
Transport & communication	0.3	6.6%
Financial & business services	0.2	4.1%
Community services	0.2	4.8%
Total	5	100%

Source: Authors calculations, 2017

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Table 3: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	17 839	426	7 125	7 551	1.3%
Mining	4 050	95	1 795	1 890	0.3%
Manufacturing	225 637	4 378	86 728	91 107	15.3%
Electricity & water	13 327	302	5 735	6 037	1.0%
Construction	16 391	376	6 813	7 189	1.2%
Trade & accommodation	529 977	13 930	254 670	268 599	45.1%
Transport & communication	301 222	6 382	125 276	131 657	22.1%
Financial & business services	101 242	2 091	51 052	53 144	8.9%
Community services	45 670	1 096	26 810	27 907	4.7%
Total	1 255 355	29 077	566 004	595 081	100%

Source: Authors calculations, 2017

Iphiva 6

There is no tourism activity taking place within this site.

Normandie-Iphiva 2

Table 4: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	185 632	139 261	97 533	422 425	1.4%
Mining	43 668	27 039	25 198	95 905	0.3%
Manufacturing	2 124 203	2 169 614	1 049 094	5 342 911	18.0%
Electricity & water	139 412	98 260	77 892	315 564	1.1%
Construction	144 889	164 815	78 421	388 126	1.3%
Trade & accommodation	5 257 313	3 996 593	3 295 547	12 549 453	42.2%
Transport & communication	3 068 447	2 412 459	1 651 804	7 132 709	24.0%
Financial & business services	1 146 955	510 561	739 815	2 397 331	8.1%
Community services	489 672	226 560	365 196	1 081 428	3.6%

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[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Total	12 600 191	9 745 162	7 380 499	29 725 852	100%

Source: Authors calculations, 2017

Table 5: Employment impact

Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	8.8	7.7%
Mining	0.3	0.2%
Manufacturing	15.0	13.0%
Electricity & water	0.8	0.7%
Construction	2.2	1.9%
Trade & accommodation	70.6	61.1%
Transport & communication	7.6	6.6%
Financial & business services	4.7	4.1%
Community services	5.6	4.8%
Total	116	100%

Source: Authors calculations, 2017

Table 6: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	422 425	10 099	168 705	178 803	1.3%
Mining	95 905	2 255	42 504	44 758	0.3%
Manufacturing	5 342 911	103 675	2 053 661	2 157 336	15.3%
Electricity & water	315 564	7 142	135 799	142 941	1.0%
Construction	388 126	8 908	161 327	170 236	1.2%
Trade & accommodation	12 549 453	329 844	6 030 383	6 360 227	45.1%
Transport & communication	7 132 709	151 112	2 966 433	3 117 545	22.1%
Financial & business services	2 397 331	49 524	1 208 882	1 258 406	8.9%
Community services	1 081 428	25 962	634 848	660 809	4.7%
Total	29 725 852	688 520	13 402 541	14 091 061	100%

Source: Authors calculations, 2017

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Table 7: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	296 494	222 429	155 780	674 703	1.4%
Mining	69 747	43 188	40 246	153 181	0.3%
Manufacturing	3 392 801	3 465 332	1 675 624	8 533 757	18.0%
Electricity & water	222 670	156 941	124 411	504 022	1.1%
Construction	231 419	263 245	125 255	619 919	1.3%
Trade & accommodation	8 397 039	6 383 403	5 263 684	20 044 126	42.2%
Transport & communication	4 900 957	3 853 206	2 638 279	11 392 442	24.0%
Financial & business services	1 831 929	815 474	1 181 640	3 829 044	8.1%
Community services	782 109	361 863	583 296	1 727 268	3.6%
Total	20 125 166	15 565 082	11 788 215	47 478 463	100%

Source: Authors calculations, 2017

Table 8: Employment impact

Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	14.1	7.7%
Mining	0.4	0.2%
Manufacturing	23.9	13.0%
Electricity & water	1.2	0.7%
Construction	3.5	1.9%
Trade & accommodation	112.8	61.1%
Transport & communication	12.2	6.6%
Financial & business services	7.5	4.1%
Community services	8.9	4.8%
Total	185	100%

Source: Authors calculations, 2017

Table 9: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	674 703	16 130	269 457	285 587	1.3%
Mining	153 181	3 601	67 887	71 489	0.3%

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[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Manufacturing	8 533 757	165 591	3 280 130	3 445 721	15.3%
Electricity & water	504 022	11 407	216 900	228 307	1.0%
Construction	619 919	14 228	257 674	271 902	1.2%
Trade & accommodation	20 044 126	526 831	9 631 794	10 158 625	45.1%
Transport & communication	11 392 442	241 358	4 738 019	4 979 377	22.1%
Financial & business services	3 829 044	79 100	1 930 840	2 009 940	8.9%
Community services	1 727 268	41 466	1 013 986	1 055 452	4.7%
Total	47 478 463	1 099 712	21 406 687	22 506 400	100%

Source: Authors calculations, 2017

Iphiva-Duma East

Table 10: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	515 436	386 679	270 814	1 172 929	1.4%
Mining	121 251	75 079	69 965	266 296	0.3%
Manufacturing	5 898 176	6 024 267	2 912 970	14 835 413	18.0%
Electricity & water	387 098	272 833	216 280	876 211	1.1%
Construction	402 308	457 634	217 748	1 077 691	1.3%
Trade & accommodation	14 597 737	11 097 154	9 150 591	34 845 481	42.2%
Transport & communication	8 520 013	6 698 561	4 586 486	19 805 061	24.0%
Financial & business services	3 184 696	1 417 652	2 054 209	6 656 557	8.1%
Community services	1 359 649	629 077	1 014 024	3 002 750	3.6%
Total	34 986 364	27 058 937	20 493 087	82 538 389	100%

Source: Authors calculations, 2017

Table 11: Employment impact

Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	24.5	7.7%
Mining	0.7	0.2%
Manufacturing	41.6	13.0%

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Sector	Number of jobs (direct impact)	Percentage (total)
Electricity & water	2.1	0.7%
Construction	6.1	1.9%
Trade & accommodation	196.0	61.1%
Transport & communication	21.2	6.6%
Financial & business services	13.0	4.1%
Community services	15.6	4.8%
Total	321	100%

Source: Authors calculations, 2017

Table 12: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	1 172 929	28 041	468 435	496 475	1.3%
Mining	266 296	6 261	118 018	124 279	0.3%
Manufacturing	14 835 413	287 870	5 702 304	5 990 173	15.3%
Electricity & water	876 211	19 830	377 067	396 897	1.0%
Construction	1 077 691	24 735	447 950	472 685	1.2%
Trade & accommodation	34 845 481	915 863	16 744 282	17 660 145	45.1%
Transport & communication	19 805 061	419 586	8 236 755	8 656 341	22.1%
Financial & business services	6 656 557	137 511	3 356 647	3 494 158	8.9%
Community services	3 002 750	72 086	1 762 752	1 834 839	4.7%
Total	82 538 389	1 911 782	37 214 210	39 125 992	100%

Iphiva-Duma West

Table 13: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	13 150	9 865	6 909	29 923	1.4%
Mining	3 093	1 915	1 785	6 794	0.3%
Manufacturing	150 471	153 688	74 314	378 474	18.0%
Electricity & water	9 875	6 960	5 518	22 353	1.1%
Construction	10 263	11 675	5 555	27 494	1.3%

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[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Trade & accommodation	372 410	283 105	233 445	888 961	42.2%
Transport & communication	217 359	170 890	117 008	505 257	24.0%
Financial & business services	81 246	36 166	52 406	169 819	8.1%
Community services	34 687	16 049	25 869	76 605	3.6%
Total	892 555	690 315	522 810	2 105 680	100%

Source: Authors calculations, 2017

Table 14: Employment impact

Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	0.6	7.7%
Mining	0.0	0.2%
Manufacturing	1.1	13.0%
Electricity & water	0.1	0.7%
Construction	0.2	1.9%
Trade & accommodation	5.0	61.1%
Transport & communication	0.5	6.6%
Financial & business services	0.3	4.1%
Community services	0.4	4.8%
Total	8	100%

Source: Authors calculations, 2017

Table 15: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	29 923	715	11 950	12 666	1.3%
Mining	6 794	160	3 011	3 171	0.3%
Manufacturing	378 474	7 344	145 474	152 818	15.3%
Electricity & water	22 353	506	9 620	10 125	1.0%
Construction	27 494	631	11 428	12 059	1.2%
Trade & accommodation	888 961	23 365	427 172	450 537	45.1%
Transport & communication	505 257	10 704	210 132	220 836	22.1%
Financial & business services	169 819	3 508	85 633	89 141	8.9%
Community services	76 605	1 839	44 970	46 810	4.7%

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[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Total	2 105 680	48 772	949 391	998 164	100%

Source: Authors calculations, 2017

132kv Pongola-lphiva

Table 16: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	185 632	139 261	97 533	422 425	1.4%
Mining	43 668	27 039	25 198	95 905	0.3%
Manufacturing	2 124 203	2 169 614	1 049 094	5 342 911	18.0%
Electricity & water	139 412	98 260	77 892	315 564	1.1%
Construction	144 889	164 815	78 421	388 126	1.3%
Trade & accommodation	5 257 313	3 996 593	3 295 547	12 549 453	42.2%
Transport & communication	3 068 447	2 412 459	1 651 804	7 132 709	24.0%
Financial & business services	1 146 955	510 561	739 815	2 397 331	8.1%
Community services	489 672	226 560	365 196	1 081 428	3.6%
Total	12 600 191	9 745 162	7 380 499	29 725 852	100%

Source: Authors calculations, 2017

Table 17: Employment impact

Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	8.8	7.7%
Mining	0.3	0.2%
Manufacturing	15.0	13.0%
Electricity & water	0.8	0.7%
Construction	2.2	1.9%
Trade & accommodation	70.6	61.1%
Transport & communication	7.6	6.6%
Financial & business services	4.7	4.1%
Community services	5.6	4.8%
Total	116	100%

Source: Authors calculations, 2017

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Table 18: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	422 425	10 099	168 705	178 803	1.3%
Mining	95 905	2 255	42 504	44 758	0.3%
Manufacturing	5 342 911	103 675	2 053 661	2 157 336	15.3%
Electricity & water	315 564	7 142	135 799	142 941	1.0%
Construction	388 126	8 908	161 327	170 236	1.2%
Trade & accommodation	12 549 453	329 844	6 030 383	6 360 227	45.1%
Transport & communication	7 132 709	151 112	2 966 433	3 117 545	22.1%
Financial & business services	2 397 331	49 524	1 208 882	1 258 406	8.9%
Community services	1 081 428	25 962	634 848	660 809	4.7%
Total	29 725 852	688 520	13 402 541	14 091 061	100%

Source: Authors calculations, 2017

132kv Double Circuit (P234 corridor)

Table 19: Direct, Indirect and Induced Impact on Sectors, 2017 values

[2017 Prices]					
Sector	Direct impact	Indirect impact	Induced impact	Total impact	Percentage (total)
Agriculture	70 111	52 597	36 837	159 546	1.4%
Mining	16 493	10 213	9 517	36 222	0.3%
Manufacturing	802 289	819 440	396 231	2 017 960	18.0%
Electricity & water	52 654	37 112	29 419	119 185	1.1%
Construction	54 723	62 249	29 619	146 591	1.3%
Trade & accommodation	1 985 631	1 509 470	1 244 693	4 739 793	42.2%
Transport & communication	1 158 919	911 160	623 868	2 693 947	24.0%
Financial & business services	433 193	192 834	279 420	905 446	8.1%
Community services	184 944	85 569	137 931	408 444	3.6%
Total	4 758 957	3 680 643	2 787 535	11 227 135	100%

Source: Authors calculations, 2017

Table 20: Employment impact

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Sector	Number of jobs (direct impact)	Percentage (total)
Agriculture	3.3	7.7%
Mining	0.1	0.2%
Manufacturing	5.7	13.0%
Electricity & water	0.3	0.7%
Construction	0.8	1.9%
Trade & accommodation	26.7	61.1%
Transport & communication	2.9	6.6%
Financial & business services	1.8	4.1%
Community services	2.1	4.8%
Total	44	100%

Source: Authors calculations, 2017

Table 21: Labour remuneration, 2017 Value

[2017 Prices]					
Sector	Total impact	Low income households	Other households	total households	Percentage
Agriculture	159 546	3 814	63 718	67 532	1.3%
Mining	36 222	852	16 053	16 905	0.3%
Manufacturing	2 017 960	39 157	775 646	814 802	15.3%
Electricity & water	119 185	2 697	51 290	53 987	1.0%
Construction	146 591	3 365	60 932	64 296	1.2%
Trade & accommodation	4 739 793	124 579	2 277 611	2 402 189	45.1%
Transport & communication	2 693 947	57 073	1 120 390	1 177 463	22.1%
Financial & business services	905 446	18 705	456 582	475 286	8.9%
Community services	408 444	9 805	239 775	249 581	4.7%
Total	11 227 135	260 047	5 061 995	5 322 042	100%

Source: Authors calculations, 2017

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ANNEXURE B

David Dyason

■ 072 267 7617 ■ David.Dyason@nwu.ac.za ■ MCom Economics (NWU)

ECONOMIST

Research Focus area: Real estate economics, Geographical economics and Economic impact assessment analysis

Experienced market analyst with more than 10 years' experience in socio-economic research, economic impact assessments, spatial analysis, real estate economics, and qualitative & quantitative research methodologies.

- Private and Public sector projects.
- More than 50 projects completed varying from land use feasibility studies, economic impact assessments and strategic plan development.
- Presenter at workshops and public participation events
- Currently employed as a lecturer and researcher at the North-West University

Education

NORTH WEST UNIVERSITY

PhD in Economics, in progress from 2016 (Title: Assessing the economic impact of a South African university campus)

M Com Economics, 2005 (Title: Manufacturing exports and transport costs from South Africa's secondary cities)

Spatial Technologies

GIS Practitioner (MapInfo), 2009

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Work Experience

2015 – Current: North West University (Potchefstroom Campus)

Lecturer in Economics, consultant, researcher

Specialisation:

- Geographical economics
- Economic impact assessments
- Real estate economics
- Mapping & spatial analysis

2008 to 2015: Demacon Market Studies

Market Analyst & GIS Professional

Specialisation:

- Economic impact studies
- Mixed use real estate studies
- market potential analysis
- Spatial analysis

2006 to 2007: Urban Econ Development Economists

Junior Development Economist

Specialisation:

- Local economic development
- Survey analysis
- Business plan development

Published Work

Dyason, D. & Kleynhans, E.P.J. 2017. A university in a small city: Discovering which sectors benefit, Acta Commercii. 17(1): a513.

Project Experience

- Residential Market Studies
 - Tlokwe Integrated Housing Project
 - Witbank Rental Houses Project
 - Protea Glen Residential Study

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- Ikageng Rental Houses Study
- Mixed Use Market Studies
 - Stilfontein Golf Estate & Short-Stay Study
 - Evaton Local Economic Development Plan
 - George CBD Renewal
 - West Wits Economic Sustainability
- Retail Market Studies
 - Ikageng Retail Study (Potchefstroom)
 - Ventersdorp Retail Study
 - Forest Hill City Retail Study (Centurion)
- Economic Impact Assessment Studies
 - Gope Diamond Mine Economic Impact Assessment (Botswana)
 - Delta-Epsilon Power Lines Economic Impact Assessment (Lephalale to Potchefstroom)
 - Epsilon Power Station Economic Impact Assessment (Potchefstroom)
 - New Largo Coal Mine Economic Impact Assessment (Mpumalanga)
 - Kolomela Iron Ore Impact Assessment (Postmasburg)
 - Thabazimbi Iron Ore Impact Assessment (Thabazimbi)
- Strategic Studies
 - Mahikeng Freight Hub Feasibility Study (Mahikeng)
 - Nkomazi Migration Plan (Mpumalanga)
 - Limpopo Medical Market Analysis
 - HASS / Phonak National Market Study
 - Logistic Corridor Analysis
- GIS Professional

Affiliations

Member of the Economic Society of South Africa.

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