

ENVIRONMENTAL IMPACT ASSESSMENT PROPOSED MOKOPANE INTEGRATION PROJECT

FINAL REPORT

ECONOMIC IMPACT ASSESSMENT

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Conningarth Consultants has been established by Dr Dawie Mullins in 1989 as an independent economic consulting group specialising Macro-Economic Impact Analysis, Cost Benefit Analysis and Regional Development.

Over the years Conningarth has built a core group of specialists covering a wide spectrum of knowledge, including mathematical modelling for economic projections. Conningarth has been responsible for the construction of the 9 provincial Social Accounting Matrix's (SAM) under the auspices of the Development Bank of Southern Africa as well as one for the EThekweni Municipality, Swaziland and Lesotho and converting it to econometric models.

Conningarth has been involved in a number of Environmental Impact Assessment Projects including the following: -

- DWAF- Tugela Water Project;
- Eskom – Nuclear 1;
- Eskom – Gamma Grassridge 765kV

The study was team was compiled as follows:

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1 BACKGROUND

1.1 Eskom Planning

In its long term planning Eskom has come to the conclusion that the power supply to the northern part of the Limpopo province needs to be strengthened. As part of this process an Environmental Impact Assessment (EIA) is being performed by Savannah Environmental (PTY) Ltd, who in turn appointed Conningarth Economists to do the economic impact study.

The project consists of components, which according to the interested and affected parties, will impact negatively on the economic and financial viability of their present activities and in some cases prevent future expansion. As the project involves a number of different components they are presented in short in the following:

- Construction of a new 400/kV substation near Mokopane;
- The integration of the new substation into the transmission system by looping in and out of the Matimba-Witkop 400kV transmission lines (i.e. two parallel lines for a distance of 10km;
- Construction of a new 400kV transmission power line between the new Delta substation near the Medupi power station and the new Mokopane Substation, a distance of approximately 150km;
- Construction of a new 400kV transmission power line between the new Mokopane Substation and the existing Witkop Substation, a distance of approximately 60km.
- Construction of a new 400kV transmission power line between the Delta Substation and the existing Witkop Substation, a distance of approximately 200km; and
- Associated works to integrate the new-substation into the transmission grid and accommodate the new lines at existing substations.

This segment of the EIA is to identify and calculate possible negative economic impacts of the construction and operation of the power lines on the present activities in the identified corridors. Conningarth Economists' contribution is therefore to support the EIA process and contribute to the final decision making process.

1.2 Project Area

The Lephalale vicinity is the location of a new coal-fired power station - Medupi - and according to present planning information the possibility exists that as many

as three additional new power stations can over time be constructed in this area, bringing the total to five power stations. The implication is that over time the urban area will grow substantially due to the construction of the power stations, the accompanying mining activities and the increase in support services.

In the rural area of the Lephalale district a transformation in farming practises has taken place over the last number of years, with cattle farming being replaced by game and the associated eco-tourism and hunting activities. According to some sources the cattle population presently in the Lephalale district is only 25% of what it was 15 years ago. This change in the farming activity is accompanied by an investment in several tourist facilities, covering a range from basic to luxury up-market accommodation. The proposed corridors within which the main structures carrying the power lines are to be constructed cross over several of these facilities on its way to the Marken region.

From the Marken area to Mokopane and onwards, the land usage changes from mainly commercial farming to communal subsistence farming in the tribal trust areas. From the urban area of Mokopane to the Witkop substation the power lines traverse a mixed area with subsistence communities, small holdings and a number of commercial farms.

2 APPROACH

In the following number of sections the approach that was followed in collecting data, the econometric models used to estimate the macro-economic parameters, the economic activities identified which might be affected by the construction and operation of the power lines and the assumptions used to estimate the macro-economic impacts are discussed.

Cognisance is taken of the fact that in some cases the impact might be temporary and in others a permanent impact might be the result.

2.1 Corridors

A number of possible corridors within which the power lines could be constructed have been identified. During the scoping process of the EIA these possible power line corridors were reduced. These corridors are 5km wide, which allow for substantial local manoeuvring in determining the final position of the lines. Eskom will only negotiate the servitude of 55m per line, in total 110m.

2.1.1 Corridor 1

Corridor 1 from the Medupi Power station/farm Naauw Ontkomen 509LQ to the farm Doornfontein 721LS, covering an area 90 000 hectares, with the affected

farms included, the area is 150 000 hectares. From Lephalale it first follows a route along the lower flat area, then enters into the mountainous area and finds its way over a number of nature conservation areas until it reaches the farm Doornfontein 721LS.

The main economic activities are cattle and game farming with the value added in the case of game of eco-tourism and hunting.

As the corridor approaches Doornfontein it passes over some communal land where mostly subsistence agriculture is practised.

Although the corridor passes over the Lephalale (Palale) River and the accompanying irrigation it appears that it will not impact on the irrigation activities.

2.1.2 Corridor 2

Corridor 2 from the Medupi Power station/farm Vogelstruisfontein 472LQ to the farm Doornfontein 721LS, covering an area of 94 000 hectares, with the affected farms included, the area is 149 400 hectares. From Lephalale it follows a route across the lower flat area, north of the Marken/Lephalale tar road, after Marken it passes the mountainous area and finds its way over a number of game farms areas it reaches the farm Doornfontein 721LS.

The main economic activities are cattle and game farming with the value added in the case of game of eco-tourism and hunting.

As the corridor approaches Doornfontein it passes across some communal land where mostly subsistence agriculture is practised.

2.1.3 Corridors 4, 5, 6

Two of the corridors are to accommodate Corridors 1, 2 and 8 from their destination points to the Witkop substation. Corridor 6 is an alternative for a part of Corridor 5 from the Mokopane substation to Witkop substation.

2.1.4 Corridor 7

Corridor 7 is defined as the area from the new Delta substation to the Medupi Power station and roughly covers an area of 13 500 hectares with the affected farms included, a total of 22 500 hectares is involved. It was originally cattle country, some of the farms are still only cattle and one or two have converted to game with some tourist facilities.

The corridor is a part of the three main corridors identified towards Mokopane.

2.1.5 Corridor 8

Corridor 8 is along the existing servitude for the existing 400kV power lines from Matimba power station to Witkop substation. From Lephalale it first follows a route along the lower flat area, south of the Marken/Lephalale tar road, past Marken it by passes the mountainous area and finds its way across a number of game farm areas until it reaches the farm Doornfontein 721LS.

The main economic activities are cattle and game farming with the value added in the case of game of eco-tourism and hunting.

As the line approaches Doornfontein it passes over some communal land where mostly subsistence agriculture is practised.

2.1.6 Corridor 8 Deviation

During the inter-action process with the stakeholders an additional corridor was defined, which is known as the Corridor 8 Deviation. From Lephalale it follows the same route as Corridor 8 up to close to Marken (at the farm Uitkomst 507LR) where swings north west to join up with Corridor 2 (at the farm Weltevredenheid 660LR), when past the mountainous area it leaves the proposed Corridor 2 route (at the farm Madamefontein 721LR) and joins the original Corridor 8 route (at the farm Elandsfontein 768LR).

The main economic activities are cattle and game farming with the value added in the case of game of eco-tourism and hunting.

As the line approaches Doornfontein it passes over some communal land where mostly subsistence agriculture is practised.

2.2 Analytical Approach

2.2.1 Power Line Corridor Options

For purposes of identifying the possible economic impacts of the power lines, the different corridors have been grouped in four options as explained below:

- Option 1 :- Corridor 7 ► Corridor 1 ► Corridor 4, 5 and 6;
- Option 2: - Corridor 7 ► Corridor 2 ► Corridor 4, 5 and 6;
- Option 3: - Corridor 7 ► Corridor 8 ► Corridor 4, 5 and 6.
- Option 4: - Corridor 7 ► Corridor 8 ► Corridor 8 Deviation ► Corridor 2 ► Corridor 8 Deviation ► Corridor 8 ► Corridor 4,5 and 6

If processed as above it is obvious that all four of the options share Corridor 7 and in a major part also have the same alternatives as far as Corridors 4, 5 and 6 is concerned. Corridor 7 will therefore be analysed mostly from the angle to determine whether there are any major flaws in the corridor that can force the power lines away from the corridor.

For Corridors 1, 2, 8 and 8 Deviation the economic benchmark will be determined against whether it will be possible to measure the possible economic impact of the construction and operation of the power lines. The assumptions used to estimate macro-economic impacts will be formulated.

To estimate the economic activities for each option they have been divided in to a number of sub-sections in order to attain greater accuracy. In the following diagram the detail of the subsections are presented.

Table 1:- Detailed Descriptions of Corridor Options 1, 2 and 3.

Sub-section	Route 1		Route 2		Route 3	
	Corridor	Description	Corridor	Description	Corridor	Description
1	7	From Delta to Medupi	7	From Delta to Medupi	7	From Delta to Medupi
2	1	To Lephalale	2	To Vogelstruisfontein 472LQ	8	To Vogelstruisfontein 472LQ
3	1	To Alem 544LR	2	To Magalakwin 666LR	8	To Kirstenbosch 497LR
4	1	To St Etienne 798LR	2	To Emmaus 275LR	8	To Zwartkop 742LR
5	1	To Doornfontein 721LS	2	To Doornfontein 721LS	8	To Doornfontein 721LS
6	4,5,6	To Witkop	4,5,6	To Witkop	4,5,6	To Witkop

In the following table Option 4 (Corridors 7, 8, 8 Deviation, 2, 8 Deviation, 8 plus 4, 5 and 6) is presented.

Table 2: - Detailed Description of Corridor Option 4

Subsections	Corridor	Description
1	7	From Delta to Medupi
2	8	From Medupi to Vogelstruisfontein 472LQ
3	8	From Vogelstruisfontein 472LQ to Uitkomst 507LR
4	Linking 8 and 2	From Uitkomst 507LR to Tevredenheid 660LR
5	2	From Tevredenheid 660LR to Madamefontein 721LR
6	Linking 1 and 8	From Madamefontein 721LR to Elandsfontein 766LR
7	8	From Elandsfontein 766LR to Doornfontein 721LS
8	4,5,6	From Doornfontein 721LS to Witkop

From the above table it is clear that the number of sections used are more than those for the other three routes and a more detailed approach is necessary.

2.2.2 Benchmarking

Reading the project documentation and interacting with the affected parties it appears that farming with both game and cattle, and proposed mining activities could be affected by the positioning of the power lines.

Cattle farming has over time been overtaken by game as the major land use activity, although it differs from area to area, in some of the mountain areas the cattle grazing areas is as low as 10% of the available area, but in other areas it is still around 50%.

The game farming supports the value added components of eco-tourism and also stimulates the hunting industry. This is probably the one activity that can be very negatively affected by the construction of the power lines as the possibility exists that the lines will impact on the bushveld experience of the visitors and eventually affect the accommodation occupation rate, which in turn negatively impacts on the business of the individual. This applies to the eco-tourist visitors as well as the hunters, perhaps a lesser impact on local biltong hunters than the overseas trophy hunters. There are a number of very large and well known safari and wildlife conservation business ventures in the area, such as Lephalale Wilderness (Corridor 1), Touchstone Game Ranch (Corridor 1), Percy Fyfe Nature Reserve (Corridor 4), Legadema Exclusive Reserve (Corridor 2 and partially

Corridor 8 Deviation), Rhinoland Safaris (Corridor 8), Mama Tau White Lion Private Game Lodge (Corridor 1) etc.

Power lines also impact on the game breeders as they are also involved with eco-tourism but additionally game catching is affected due to the hazard power lines pose to helicopters especially where the placing of bomas are restricted in the mountainous areas.

To the west of Lephalale there is also an eco-park investment development, Commiphora Eco Park, with 52 envisaged units which can be affected if Corridor 2, which passes south of the development, is selected. There are also a few farms which belong to the Lephalale Municipality and others that have been sold to the government. What the future planning and development is for these farms is not known at this stage.

A coal mining company or companies are busy exploring for coal reserves, specifically in areas affected by Corridor 2 (area of the farms Vucht 436LQ, Wellington 432LQ, Rondeboschje 429LQ, Grootgenoeg 426LQ, Garibaldi 486LQ, Weltevreden 482LQ and Pretoria 483LQ) and is it necessary to also take into consideration the possible impact on the communal trust areas.

2.2.3 Assumptions

A number of assumptions have been formulated and used with the benchmark in order to estimate the economic impact of the power lines in a specific corridor. Formulating the assumptions is very difficult as the affected landowners believe that they will lose their total clientele, while less emotional involved persons tend to under-estimate the impacts.

The impacts used per corridor are presented in the next table. In determining the impact a matrix was developed which was populated using the Delphi technique, asking a couple of knowledgeable people their opinion on the size of the impact, then using an average to determine the overall impact. The matrix developed is presented below.

Table 3: Matrix used to calculate the impact of the construction of the power lines

	Homestead	Pre-sale game handling facility	Restrictions on game catching	Impact on eco-conservation
	Impact Percentage	Impact Percentage	Impact Percentage	Impact Percentage
Cattle Farming				
Game Farming – breeding				
Game Farming and related activities: ** Eco-tourists- holiday ** Eco –tourists- trophy hunter companions ** Trophy Hunting ** Biltong Hunting ** Sale of excess animals				

The use of the matrix is to determine the negative impact of the power lines. In the case of cattle farming questions considered are such as:

- Does it affect the farmer’s use of his homestead?
- To what extent does it affect the farmer’s economic situation? etcetera.

Similarly questions on the pre-sale game handling facilities, game catching and eco-conservation are to be considered.

A second matrix is then developed allocating weights to the different activities and applying the percentage, an impact is calculated which is applied to every segment to estimate the possible negative impact of the construction and operation of the power lines.

In completing the table for the different corridors the following assumptions were made regarding the impacts during the construction and operational period.

Table 4:-Severity and Permanency of the Impacts

	Construction	Operation
Cattle Farming	Temporary - medium	Temporary - low
Game Breeding	Temporary - medium	Permanent – medium
Eco-tourists	Temporary - high	Permanent - medium
Trophy Hunting	Temporary -high	Permanent - high
Biltong Hunting	Temporary -medium	Permanent - low

From the above table it appears that some economic activities will be affected differently during the operational and construction periods, in terms of permanency and severity of the impact. The construction of roads onto properties is included in the construction activities.

2.3 Data

2.3.1 Sources

As already explained, it was decided to estimate the economic activity along each of the four routes identified, which again is represented by a number of corridors. To improve the accuracy of the results Corridors 1, 2 and 8 have been subdivided into a number sections, which eventually was added together to provide a set of macro-economic results for each route.

From the above explanation on the approach, it is obvious that sources providing reliable data per route are not available and it was necessary to collect raw data, as explained in the next paragraph.

A number of sources were used to obtain generic data on certain sections of the hunting and game industry: -

- The National Profile and Economic Impact of Biltong Hunters in South Africa by Dr. P. Van der Merwe and Prof. Dr. M Saayman – published by Institute for Tourism and Leisure Studies, North West University (2008).
- Professional Hunting Association of South Africa (PHASA) – Verbal communication.
- Managing Game Farms from a Tourism Perspective by Dr. P. Van der Merwe and Prof. Dr. M Saayman – published by the Institute for Tourism and Leisure Studies, North West University (2004).
- Telephone discussion with Mr Japie Ellis, Limpopo Provincial Chairman of the Red Meat Producer Organisation (RPO) and also a cattle farmer in the area.
- Prospectus's of various safari hunting units and game catching companies.

- Game pricelists and Vleissentraal publications on previous game sales.
- Informative articles in Landbou Weekblad, Farmers Weekly and Hunting SA.

2.3.2 Data Gathering

To collect data related to each corridor a number of farm owners per sub-section were identified and a telephonic survey was conducted, with as many as possible, a full list of persons phoned is attached as an annexure. The following questions have been asked:

- The size of the affected farm – hectares,
- Farming activities –cattle, game and/or irrigation.
- Estimated carrying capacity of the farm – ha/LSU,
- If game – only breeding or is tourism and hunting part of the business,
- How many beds are involved, daily tariffs and estimated occupation rate,
- Hunting – trophy and/or biltong.
- Game prices.

In some cases owners were prepared to supply extensive information on condition that it be treated confidentially, others were only prepared to give basic information.

The data obtained was grouped into the different sub-sections and an extensive data base was constructed to be used to estimate the present economic activities per corridor.

2.3.3 Annual Turnover

The following table presents the estimated annual turnover per activity per corridor option expressed in 2009 prices.

Table 5:- Estimated Turnover of Cattle Farming and Game Farming per Corridor Option (2009 prices)

	Cattle Farming R. Mil	Game Farming and Related Activities R. Mil.
Route 1	R3.91	R99.28
Route 2	R5.24	R96.78
Route 3	R5.10	R68.18
Route 4	R5.10	R74.11

From the table it appears that in Options 1 and 2 the current economic activities are much larger than in Options 3 and 4.

In a section of Option 2, in Corridor 2 Anglo Coal has prospecting rights over a large and shallow coal deposit. The proposed power lines cross this section of Corridor 2 and would potentially impact on the proposed future mining activities. The present estimation is that it will in the future deliver between 5 and 10 million tons of coal per year. Although the coal is not mined at present it does enter the decision-making process as a future economic activity as the positioning of the lines can affect future mining activities.

From the above table it is clear that cattle farming are relatively small in comparison to game farming and the related value added activities. Included in the cattle farming figures is an estimation of the value of stock present in the tribal areas along the different corridor options.

2.4 Models

2.4.1 Macro Economic Impact Model (MEIM)

A MEIM has been constructed for the project area and the identified routes using the Limpopo Social Accounting Matrix's (SAM).

The following direct, indirect and induced impacts are estimated by MEIM:

- Surplus Value.
- Gross Domestic Product.
- Capital Formation
- Households (Total and Low).
- Employment Creation.

The macro economic impact model comprises various sub-models which are used in determining the values of the above economic variables. These are described in some detail below.

The primary impetus drivers of the MEIM Models are:

- Annual turnover;
- Direct employment
- Capital employed
- Economic data in the form of a SAM; and
- Economic multipliers.

By using a SAM applicable to the study area (Limpopo Provincial SAM), multipliers have been calculated. The multipliers which were used in this study to determine the economic impacts for the Macro Economic Model are as follows:

- Economic growth (i.e. the impact on GDP).
- Job creation (i.e. the impact on labour requirements).
- Income distribution (i.e. the impact on low-income, poor households and the total income of households).

An example of the sector multipliers used in this study is as follows:

- Direct effect: refers to effects occurring directly in the specific sector.
- Indirect effects: refer to those effects occurring in the different economic sectors that link backward to specific economic sector due to the supply of intermediate inputs.
- Induced effects: refers to the chain reaction triggered by the salaries and profits (less retained earnings) that are ploughed back into the economy in the form of private consumption expenditure.

The MEIM has therefore been adapted to use the current economic data to present a set of parameters representing the current situation, and then using the impacted situation to present a set of parameters on the future situation.

2.4.2 Cost Effectiveness Model

The MEIM is a static model presenting a “once of” situation, while the impacts are very often a permanent loss and is it necessary to present a result showing the more complete picture. To do this a Cost Effectiveness Analysis (CEA) was performed for each of the corridor options, using the two cost streams for Eskom, construction and maintenance, projected forward for a 20 year period and then discounting it to present the impact as a Present Value using a 8% discount rate. Added to this is the annual permanent cost to the system, impacts on present

economic activities, due to the construction and operation of the power lines, also discounted and calculated as a present value. Adding these two values makes it possible to compare the four options in terms of cost effectiveness to the system.

3 RESULTS

3.1 Macro Economic Impact Analysis Results

3.1.1 Current Macro Economic Results

The current macro-economic parameters for the four routes are presented in the following table.

Table 7: - Current Macro-economic Parameters for the Four Identified Routes (2009 prices)

	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (corridor 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Gross Domestic Product (R.mil.)	R67.13	R62.54	R46.45	R50.15
Direct	R40.47	R38.82	R28.09	R30.39
Indirect/Induced	R107.60	R101.36	R74.54	R80.54
Total				
Employment (Numbers)				
Direct	1 235	1 183	849	920
Indirect/Induced	644	618	447	484
Total	1 879	1 801	1 296	1 403
Capital Formation (R.mil.)	R160.95	R152.99	R112.74	R121.56
Household Income (R.mil.)				
Low Income	R8.48	R8.26	R5.83	R6.33
Medium/High	R46.39	R44.64	R32.10	R34.77
Total	R54.87	R52.89	R37.93	R41.11

The above table indicates that in all four routes the economic activities are relatively extensive, in terms of employment creation in the area, the direct number varies between 1 235 for Route 1 and 849 for Route 3. A number of the indirect and induced parameters are also in the Lephalale area. Overall Route 1 is at present the route with the most economic activities with Route 3 the lowest.

3.1.2 Impacted Macro Economic Results

In the next table the negative impact of the construction of the power lines is presented as a percentage per route after the Delphi technique was applied to

each of the routes and was used in the monetary calculation. In the interpretation of the following table it must be kept in mind that it is an average percentage shown, in the calculations different impacts are used for the individual sections.

Table 6: Average Negative Percentage Applied to the Respective Corridor Options

Corridor Option	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (Corridors 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Negative Impact	-52.9%	-51.9%	-38.0%	-34.4%

In the next table the negative impacts due to the construction and operation of the power lines are presented after the negative percentages were applied to the respective bench marks.

Table 7: the Estimated Negative Annual Macro Economic Impacts of the Impact of the Construction and operation of the Power Lines (2009 prices)

	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (Corridors 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Gross Domestic Product (R.mil.)				
Direct	-R29.53	-R28.26	-R6.21	-R14.32
Indirect/Induced	-R19.60	-R18.75	-R4.12	-R9.51
Total	-R49.13	-R47.01	-R10.33	-R23.83
Employment (Numbers)				
Direct	-613	-587	-129	-298
Indirect/Induced	-312	-298	-66	-151
Total	-925	-885	-194	-449
Capital Formation (R.mil.)	-R73.10	-R69.96	-R15.37	-R35.46
Household Income (R.mil.)				
Low Income	-R4.46	-R4.27	-R0.94	-R2.16
Medium/High	-R22.93	-R21.95	-R4.82	-R11.13
Total	-R27.39	-R26.21	-R5.76	-R13.29

From the above table it appears that the construction of the power lines will have a negative impact on all four routes.

3.2 Results of the Cost Effectiveness Analysis

The Cost Effectiveness Analysis for the four options was performed in terms of the construction and maintenance cost involved for Eskom and added is the estimated negative impact on the existing economic activities in the each of the corridor options. These negative economic impacts are a cost to the system and therefore added to attain the total cost over a period of time to the system.

In the next table the discounted Present Value (PV) for Eskom and the farms per corridor option is presented.

Table 8: Cost Effectiveness Comparison for the four Corridor Options

Option	Present Value Eskom R Mil.	Present Value Farms R.Mil.	Total Present Value Rand Mil.
Option 1 (Corridors 7, 1 plus 4, 5 and 6)	R1247.44	R556.82	R1 804.25
Option 2 (Corridors 7, 2 plus 4, 5 and 6)	R1271.32	R532.86	R1 804.18
Option 3 (Corridors 7, 8 plus 4, 5 and 6)	R1315.41	R274.47	R1 589.88
Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)	R1363.18	R270.12	R1 633.30

From the above table it appears that Corridor Options 3 and 4 is the more costly options to Eskom, but once the negative impacts are taken into consideration, it appears that Options 3 and 4 are in terms of cost to the system the preferable options.

3.3 Comparison of the four Corridor Options

In the following table a number of parameters for the corridor options are compared.

Table 9:- Comparison of the different Corridor Options using a number of Parameters (2009 prices)

	Option 1 (Corridors 7, 1 plus 4, 5 and 6)	Option 2 (Corridors 7, 2 plus 4, 5 and 6)	Option 3 (Corridors 7, 8 plus 4, 5 and 6)	Option 4 (Corridors 7, 8, 8dev, 2, 8dev, 8 plus 4, 5 and 6)
Annual Turnover (R. Mil.)	R99.28	R96.78	R68.18	R74.11
Annual Impact on Turnover (R.mil)	-R52.51	-R50.25	-R25.88	-R25.47
Total Annual GDP (R.mil)	R107.60	R101.36	R74.54	R80.54
Annual Impact on GDP (R.mil)	-R49.13	-R47.01	-R10.33	-R23.83
Direct Employment Losses	-613	-587	-129	-298
Overall Percentage Impact	-52.9%	-51.9%	-38.0%	-34.4%
Negative Impact (Rand/meter)	R208.81	R196.07	R97.61	R92.70
Total PV	R1 804.18	RR1 804.18	R1 589.88	R1 633.30

From the above table it appears that a number of parameters indicate that of the four corridor options, Option3 and 4 appear to be the more acceptable options, with Options 1 and 2 less acceptable. If the negative impact is expressed as an impact per meter of the respective corridor length, Options 3 and 4 are less than 50% of the impact on Options 1 and 2. The CEA analysis also shows that the PV for Option 3 and 4 is the less costly to the system

The table indicates that the annual turnover on Corridor Option 3 (Corridors 7, 8 plus 4, 5 and 6), which consists mostly of Corridor 8, is the lowest of all four options, and it could be argued that the reason for less development is the presence of the existing power lines within this corridor. Although there might be truth in the argument, the counter argument is that by again utilising it you intrude less on present activities.

3.4 Interpretation and Recommendation

In terms of the above analysis we are of the opinion that in terms of economic parameters the least impact will be in either Corridor Option 3 or 4. If it is accepted that the two options are defined as follows:

- Option 3: - Corridor 7 ► Corridor 8 ► Corridor 4, 5 and 6.
- Option 4: - Corridor 7 ► Corridor 8 ► Corridor 8 Deviation ► Corridor 2 ► Corridor 8 Deviation ► Corridor 8 ► Corridor 4,5 and 6

We must caution that in the case of both options there are impacts and that the final route determination will be of utmost importance.

4 MITIGATION

All four routes include areas of commercial cattle and game farming as well as tribal areas where the inhabitants practise subsistence farming, meaning that they plant a bit of maize, sorghum and vegetables and run a number of cattle and goats.

Taking the above into consideration the following are recommended to mitigate the possible impacts of the construction and operation of the power lines:

- The determination of the final route within a corridor must be done in consultation with the land owner.
- In the case of homesteads, Eskom must in the determination of the final route minimise the impact.
- Where tourist facilities are involved the impact must be minimised.
- Where tribal land is involved Eskom must involve the local chief structure in the determination of the final route.
- On many of the properties hunting is practised and is it necessary that Eskom establish contact with the land owner before entering the property.
- In the case of tribal land the lines must avoid house clusters and minimise impact on the lands and vegetable gardens.

ANNEXURE

Farmers contacted were cooperative and friendly. They had no problem to give the information requested. Due to cell phone reception most of the farmers had to be phoned more than once and in some cases up to five times before contact was made. Some of the large game ranches or nature conservancies have not responded to e-mail enquiries.

Table 10:- List of Farms with Land Owners or Farm Managers Contacted

<u>Corridor 1</u>	<u>Person Contacted</u>		<u>Date</u>
Annexatie 544 LQ	Nel	Cobus	07/04/2010
Rivierplaats 541 LQ	Klarenbeek	Mrs	14/04/2010
Bouwlust 566 LQ	Klarenbeek	Mrs	14/04/2010
Duikerrivier 568 LQ	Klarenbeek	Mrs	14/04/2010
Sterkwater 560 LR	Nel	Porini	06/04/2010 07/04/2010
Norfolk 559 LR	Strydom	Dirk	07/04/2010
Colesberg 556 LR	Strydom	Dirk	07/04/2010
Adelaide 557 LR	Strydom	Dirk	07/04/2010
Hanover 555 LR	Maud	Ken	06/04/2010
Duna 554 LR	Maud	Ken	06/04/2010
Woolwich 565LR	Maud	Ken	06/04/2010
Maria 564 LR	Maud	Ken	06/04/2010
Dolphin	Maud	Ken	06/04/2010
Nywerheid 484 LR	Maud	Ken	06/04/2010
New Belgium 608 LR (chalet)	Hayward	Henry	14/04/2010
New Belgium 608 LR (chalet)	Hayward	Henry	14/04/2010
Spreeubal 608 LR	Van Rensburg	At	14/04/2010
New Belgium 608 LR (part)	Van Rensburg	At	14/04/2010
Groot Denderen 533 LR	Geerkens	Henry	15/04/2010
Touchstone Game Ranch	Rood	Simon	e-mail
Alem 544 LR (sub-divided)	Pretorius	WM	07/04/2010 09/04/2010
Alem 544 LR	Walker	Clive	14/04/2010
Lith 541 LR	Walker	Clive	14/04/2010
Gorche 577 LR	Walker	Clive	14/04/2010
Dordrecht 578 LR	Walker	Clive	14/04/2010
Groot Denderen 533 LR	Walker	Clive	14/04/2010
Moerdyk 593 LR	Walker	Clive	14/04/2010
Wilderness 533 LR			
Daggakraal 591 LR (sub-divided)	Botha	KJ	09/04/2010
Hanover 555 LR	Van Rensburg	Andries	14/04/2010
Total farms contacted	26		
Trust Area	20		
Farms not contacted	22		

Total farms	68
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Corridor 2

Welgelegen 469 LQ	Du Plessis	Jaques	06/04/2010
Gorkum 473 LQ			
Vucht 436 LQ (1 & 4)	Pretorius	Jannie	13/04/2010
Uiterste 475 LQ	Van Niekerk	André	08/04/2010
Wellington 432 LQ	Van Staden	PT	07/04/2010
Uitkyk 476 LQ	Pretorius	HC	08/04/2010
Rondeboschje 429 LQ (portion)	Aland	Neels	08/04/2010
Garibaldi 480 LQ	Nortjé	Mias	08/04/2010
Pretoria 483 LQ	Jacobs	Flippie	08/04/2010
Grootgenoeg 426 LQ	Aland	Neels	08/04/2010
Grootgenoeg 426 LQ	Lewies	Jannie	09/04/2010
Trent 209 LR	Lewies	Jannie	09/04/2010
Killarney 210 LR	Lewies	Jannie	09/04/2010
Rooibokpan 216 LR	Shaw	Louis	13/04/2010
Tiel 218 LR	Botha	JW (Willie)	20/04/2010
Fairland 219 LR	Lochner	Pan	09/04/2010
Scheveningen 444 LR	Botha	JW (Willie)	20/04/2010
Pieterman 445 LR	Botha	JW (Willie)	20/04/2010
Eastland 441 LR (lodge)	Botha	JW (Willie)	20/04/2010
Eastland 441 LR (camping)	Botha	JW (Willie)	20/04/2010
Leerdam 443 LR	Botha	JW (Willie)	20/04/2010
Helderdaagsfontein 442 LR	Botha	JW (Willie)	20/04/2010
Smitswinkel 438 LR	Botha	JW (Willie)	20/04/2010
Witpan 447 LR	De Kock	Johan	16/04/2010
Roodepan	De Kock	Johan	16/04/2010
Schoonhoven 448 LR	De Kock	Johan	16/04/2010
Altefraai 425 LR	Nortjé	Mias	08/04/2010
Total farms contacted	22		
Trust Area	23		
Farms not contacted	21		
Total farms	66		

Corridor 4, 5 and 6

Elandsfontein 726 LS	Schutte	Ben	07/04/2010
Dansfontein	Schutte	Ben	07/04/2010
Total farms contacted	2		
Trust Area	0		
Farms not contacted	8		
Total farms	10		

Corridor 7

Total farms contacted	0
Trust Area	0
Farms not contacted	14

Total farms	14
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Corridor 8

George Town 532 LR			
Weltevreden 508 LR	Aland	Neels	08/04/2010
Weltevreden 508 LR	Glas	Menno	16/04/2010
Kirstenbosch 497 LR (East)	Van Der Walt	Buks	22/04/2010
Werkendam 474 LQ	Robinson	Clive	22/04/2010
Johannisberg 509 LR (1 & 2)	Van Der Schyff	Mrs	22/04/2010
Uitkomst 507 LR	Geerkens	Mrs	22/04/2010
Lhea 534 LR	Geerkens	Mrs	22/04/2010
Paarl 482 LR			
Rhinoland	Kotze	Marius	22/04/2010
Klavervley 529 LR	Kotze	Marius	22/04/2010
Total farms contacted	10		
Trust Area	22		
Farms not contacted	29		
Total farms	61		

Corridor 8 - Deviation

Marken 457 LR (4,5 an6)	Van Tonder	Rita	07/04/2010
Liliefontein 506 LR	Scott	Hendrik	22/04/2010
Welgelegen 469 LQ	Du Plessis	Jaques	06/04/2010
Uiterste 475 LQ	Van Niekerk	André	08/04/2010
Werkendam 474 LQ	Robinson	Clive	22/04/2010
Gelyk 481 LQ			
Johannisberg 509 LR (1 & 2)	Van Der Schyff	Mrs	22/04/2010
Weltevreden 508 LR	Aland	Neels	08/04/2010
Weltevreden 508 LR	Glas	Menno	16/04/2010
Uitkomst 507 LR	Geerkens	Mrs	22/04/2010
Total farms contacted	9		
Trust Area	20		
Farms not contacted	43		
Total farms	72		

Grand total farms contacted	59
Grand total farms	291
Percentage of total farms contacted	20.27%

Grand total trust land farms	85
Percentage of trust land trustees contacted	0%

Grand total commercial farms	206
Percentage of commercial farms contacted	28.64%

Note: The total number of farms indicated per corridor in the list above are approximate figures as some of the farms have been sub-divided and others have been consolidated. This information cannot be read from the maps used and must be obtained from the Deeds Office.