Musina Special Economic Zone License Application For Designation – Pre-Feasibility Study
EXECUTIVE SUMMARY

Introduction

The South African Government, through the Department of Trade and Industry (the dti) have implemented a programme to investigate the feasibility of establishing various Special Economic Zones (SEZ's) in predetermined municipalities, in order to accelerate economic development and create a favourable environmental for investment and job creation.

The SEZs are expected to contribute towards strengthening South Africa’s terms of trade through the export of value-added commodities, the creation of stronger value chains and provision of much-needed jobs in previously disadvantaged regions. Much will however, depend on the kind of packages made available to investors and the extent to which they will offset, for particular industries, any exogenous disadvantages experienced in locating in the SEZ.

Musina as a Region

Musina was one of these sites identified based on the potential of the area as a pivotal trading point along the North-South Corridor, the gateway to the Southern Africa Development Community (SADC) and Southern Africa. The decision was furthermore based on large scale logistics and agricultural activities based in and around the town and the border post.

The private sector based Limpopo Eco-Industrial Park (LEIP) business plan also identified an untapped opportunity in the petro-chemical sector, which could be further harnessed and grown if included in the SEZ.

Competitive and comparative advantage

The competitive advantages offered by Musina as a potential site to become a Special Economic Zone lies primarily on its geographic location on the North-South Corridor and the access it provides to the SADC countries. The Limpopo Province is also renowned for its agriculture activities and the range of agro-production that takes place in the Province, from fruits to vegetables and livestock.

The northern regions of the province have an ideal climate and soil conditions to produce vegetables almost all year round while the eastern highveld has great horticulture potential. It is one of the largest supply regions to the Johannesburg Fresh Produce Market (JFPM).

Nature of Opportunities

Key opportunities identified in the pre-feasibility study included industrial ventures in the petrochemical, agro-processing and logistics support sectors.

Petrochemical industry opportunities

The private sector identified a number of opportunities in the region, and most notably the Coal to Hydrocarbons project as part of the Limpopo Eco-Industrial Park (LEIP).
The proposed Carbon to Hydrocarbon (CTHC) plant will make use of the coal reserves present in the Musina area and access to the transport infrastructure which will enable the products to be distributed throughout South Africa, the SADC countries and internationals markets.

The proposed plant will not make use of SASOL technology but the intention is to make use of one of several new generation (Carbon to Liquid) CTL technologies. These technologies include the following:

- The Shell Coal Gasification Process which has been proven in various plants around the world and offers many advantages. The process produces syngas. All the coal will first be processed through this gasification phase. The advantages of the Shell gasification process are improved yields and a cleaner process (environmentally acceptable).

- The syngas is then processed into methanol which is the primary product for further processing into a variety of products. The downstream processes and products that can then be produced include the following:
  - The methanol to gasoline processing technology was developed by Exxon Mobil in the early eighties and demonstrated in New Zealand using natural gas.
  - The Haldor Topsoe (Denmark) and Toyo Engineering (Japan) processes produces di-methyl ether (DME) from methanol.
  - Methanol to Propylene. Lurgi is developing the methanol to propylene process. No commercial plants are in operation yet.
  - to polypropylene (PP). The conversion processes to convert propylene to polypropylene are very mature. A number of process licensors, including companies such as Lyondell Basell, can provide technical support and turnkey projects.

- The processing technologies deployed in the various processes will produce a wide range of by-products, such as waxes, black tars, ammonia and urea (agriculture fertilisers), LPG (Liquid Petroleum Gas), a range of solvents, linear Alpha-olefins and ethylene.

While the technological viability of the proposed processes appears sound, the economic viability of the project depends largely on the quality and price of coal sourced from the area, the price of crude oil and by-products and the access to markets (transport costs) that will enable it to recover the exceptional high capital cost of constructing the proposed plant and clean up the high volume of greenhouse gas emissions - i.e. carbon dioxide. These prices are driven largely by the OPEC oil producers and international supply demand dynamics. The long term outlook for crude oil prices is projected to increase. The target markets for the various products are mostly the export markets, such as China for di-methyl ether and Propylene, South Africa and Sub-Saharan Africa for the lesser by-products and gasoline.

Agriculture Opportunities

Agriculture is the backbone for the development of the food and beverages manufacturing sub-sector in any economy. Limpopo is known as the fruit basket of South Africa with climatic conditions providing for variety of fruits, nuts and vegetable. The sector contributes approximately 7.4% to the South African Agricultural production. Agriculture is pivotal in the economic and social development of the province as far as employment, food production and export is concerned.
The province’s agriculture sector is estimated to contribute the majority (more than 50%) of South Africa’s mangos, paw-paws, avocados, tomatoes and potatoes and significant percentages (35% - 50%) of the country’s tea, citrus production (oranges, soft citrus and lemons), bananas and litchis. It is further estimated that ca 45% of the R4 billion annual turnover of the Johannesburg Fresh Produce Market comes from the Limpopo Province. The surrounding provinces namely Mpumalanga and the North West also have a strong agricultural base.

**Land suitability**

The area north of the Soutpansberg mountain range is Mopaniveld, and is mainly suited for extensive cattle or game farming. There are a number of irrigation regions along the more important river systems such as the Limpopo, Nwanedi and Nzhelele regions. The Limpopo Valley in particular is well suited for the production of vegetables. The Soutpansberg mountain range is an important forestation area and planted with soft and hard woods. This area (Dry and Wet Soutpansberg) is also suitable for the production of horticulture produce such as Avocado, Macadamia, Citrus and Flowers.

The Thohoyandou district (which falls largely in the Levubu irrigation area) is suitable for the production of crops such as Avocado, Macadamia, Mango, Citrus and Paprika.

The Vhembe District Municipality generates an intermediate contribution towards the provincial agriculture sector of ca 18% per annum. Thohoyandou is situated in the south of the Vhembe district, and is the lush agricultural centre of Vhembe, with banana plantations, subtropical fruit, tobacco and maize lands. The most important agricultural commodities are nuts and subtropical fruit. The most important production area for these commodities is the Levubu Valley.

The north and western parts of the district is sparsely populated, whereas Thohoyandou is one of the most densely populated areas in the Province. The production potential of this area is negatively impacted by high population concentrations which sterilize high potential agricultural land and place much pressure on the water resources. The urban space in these areas reflects a large number of informal villages of varying sizes that were originally established and have since grown organically with very little planning.

The ARC study on land suitability for crop cultivation in the Limpopo province was recently concluded by the ARC and it determined that most of the agricultural areas are marginally suited or unsuited to most conventional rain fed arable agriculture enterprises. While soil and climate conditions are suited to vegetable production (in Vhembe, Waterberg and Capricorn) the lack of available water will constrain further development. In Vhembe there is little potential to use surface water for irrigation as it competes with the water requirements for human settlement. Agriculture projects will therefore rely almost exclusively on groundwater extraction, which is used extensively for commercial farming projects. There is also very little run-off that can support the construction of dams. In areas where water is available, it is mostly due to the disruption of irrigation systems.

Land in the other districts of Limpopo, ie Sekhukhune, Capricorn, Mopani and Capricorn, are more suited for rain fed agriculture production. In these areas, the demand from influx of people and the inevitable future mining & industrial developments related to the natural gas and coal reserves (in Waterberg) and mining activities in Capricorn and Mopani need to be taken into consideration. In most cases, the water use/supply is in balance and any overexploitation by either mining or agriculture related activities will result in water shortages for human consumption.
Therefore, it appears that only about 5% of the total land area can be considered arable. Of this potential, 72% is used for dry land production (rain fed) and 20% is under irrigation. About 78% of the land area is suitable for grazing. A sizeable portion (16%) is used for the purposes of nature conservation or forestry.

**Agro-processing opportunities**

The development of new agriculture and agro-processing businesses in the Limpopo Province in general and Vhembe District specifically, has to take various aspects into consideration. The land suitability is a key driver, while markets and access to market as well as processing/conversion technologies are just as important. The technologies and conversion processes to convert agriculture produce into products, such as food, animal feeds and other useful products, is generally readily available. Access to markets and demand is then the remaining driver for the business opportunities.

The South African demand for farm produce such as fruits, vegetables, meat and poultry products and food products grows in line with the population growth. Food demand is highly concentrated in the major metropolitan areas, such as Gauteng and Durban while some food products are also exported to SADC. Fresh citrus and processed fruits (juice concentrations) are also exported but to a limited degree. In some cases, South Africa is a net importer of certain products and processed food products and together with the increase in demand for certain products, these provide opportunities for new business establishment in an area such as Limpopo.

Agriculture products that are imported that present opportunities for greater local production, include products such as processed dry beans, apple juice, soy-oil cake (used for animal feeds). Increased market demand from local and SADC markets include almost all processed food products such as cereals and to a lesser extent fresh fruits and vegetables. The recent announcement by the dti to increase import duties and levies on imported chicken products, also creates an opportunity to introduce new poultry abattoirs and broiler production units in the Limpopo Province.

Challenges that the establishment of agriculture in the Vhembe district faces includes aspects such as poor access to markets, high input costs – seeds and fertilisers, high percentage of unskilled workers, poor infrastructure eg roads and land tenure and proof of ownership or permission to occupy (PTO). The establishment of a strong agro-processing industry in the area will contribute to a stimulation of agriculture in the area. Export of processed food products will also find a ready market in SADC.

However, the ability and capacity of the SADC countries to produce more of their own demand internally, will have to be monitored as there is already evidence that export of fruit and vegetable juices to the SADC countries is on the decline. The Zimbabwe government recently introduced a ban on all fresh fruit and vegetable imports from South Africa, while processed food products from South Africa accounts for ca 70% of retail sales in this sector.

The land suitability, export market potential and local market growth opportunities was assessed to arrive at potential business opportunities for the Limpopo province in general and the Musina agro-processing SEZ specifically.

Based on initial pre-feasibility studies, the following industries and associated agriculture venture can be established:
### Product/produce

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<thead>
<tr>
<th>Product/produce</th>
<th>Rationale</th>
<th>Requirements</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fresh produce trading</td>
<td>Limpopo supplies in &gt;40% of JFPM requirement for fresh produce – vegetables and fruits. Capitalise on local and export opportunities and demand.</td>
<td>Development of farmers to produce commercial scale. Irrigation for farmers. Integration of JFPM with regional markets on same trading platform on internet. Fresh cut and frozen vegetables can be additional industrial opportunities.</td>
<td>Increase in commercial scale farming for the area in vegetables. Small scale farmer development into commercial operations.</td>
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<tr>
<td>Soy bean processing for animal and human consumption</td>
<td>Human consumption: Increased demand for staple food in Sub-Saharan Africa. Animal feed: replace imported soy oil-cake</td>
<td>Soy oil and cake extrusion plant. Soy-meat extruder. Agriculture: Increased production of soy-beans in other districts of the Limpopo.</td>
<td>Target of ca 5,000 to 10,000 tons per annum will create between 500 and 1,000 new employment opportunities.</td>
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<td>Grain cereal production</td>
<td>Limpopo grows all grains, maize, wheat, sorghum etc. No local processing takes place. Cereals demand continues to grow.</td>
<td>Cereal extruder Agriculture: Dedicated maize, wheat, sorghum and barley production for food processing.</td>
<td>Direct employment of 23 people in plant. Additional employment in agriculture/farms.</td>
</tr>
<tr>
<td>Dehydrated vegetables</td>
<td>All South Africa supply of dehydrated vegetables is currently imported.</td>
<td>Drying plant and wide range of vegetable supply, e.g. carrots and onions, leaks and broccoli etc.</td>
<td>Direct employment of ca 80 people and farmer development.</td>
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The opportunities that can be developed over time, includes the following:

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<thead>
<tr>
<th>Product/produce</th>
<th>Rationale</th>
<th>Requirements</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry bean processing</td>
<td>South Africa imports the majority of its dry bean requirements. The land in Limpopo is suitable for dry bean production</td>
<td>Agriculture: Increased dry bean production in local farms. Canning plant.</td>
<td>To be determined as it will depend on the type of beans and economic feasibility of local production.</td>
</tr>
<tr>
<td>Apple juice production</td>
<td>South Africa imports ca R1 billion of un-clarified apple juice per annum for blending and cider production.</td>
<td>Agriculture: Apple production in Waterberg District. Apple extrusion plant.</td>
<td>Concept and viability study in process together with multinational beverage company.</td>
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</tbody>
</table>
The pre-feasibility study has indicated that there are some good opportunities to establish agriculture and agro-processing businesses in the proposed SEZ in Musina. While Musina has the competitive advantage of being on the border with Zimbabwe, it is not necessarily in close proximity to the major source of agriculture activity required to provide the raw material for the agro-processing ventures. The Zimbabwe and SADC export market demand is not considered sustainable at current growth levels due to the strategies of SADC countries to employ strategies of import substitution industrialisation.

While this bodes well for plant, equipment and machinery supplies, the idea of these countries is to reduce reliance on imported food and food products. If the operations in Musina have to re-focus their market inward to the high demand areas in Gauteng and other metropolitan areas, the distance to markets will be a competitive disadvantage. The optimal placement of such expansive agro-processing business ventures would most likely be Polokwane or as a second choice Makhado. While the projects and business opportunities identified can be housed in the SEZ, it alone does not justify the establishment of an Agro-Processing SEZ.

Support Clusters

Support industries that can be established in the Vhembe district and the proposed Musina SEZ, include the following:

- **Fertiliser blending plant for the farming activities.** The fertiliser blending plant will also require support from a soil and leaf analysis laboratory to determine the nutrient requirements for the farmer’s crops. This will provide the menu for the preparation of the blended fertiliser that is optimised for the specific crops and soils of the farmers in the region.

- **Composting facility.** The waste from the proposed broiler hatchery and chicken meat processing plant can be processed and packaged on site in a rendering and composting plant.
• **Food Technology Centre.** The soya and maize extrusion plants will have the capacity and capability to produce a wide range of animal feeds and ready-to-eat cereals for human consumption. A food technology centre will support the development of foods and feeds while it will also provide training for the centre staff as well as outside entrepreneurs that want to enter the food production industry.

• **Seedling nursery.** The vegetable farmers that supply to the fresh produce trading hub and fresh cut vegetable producer can obtain seedlings from a high quality seedling producer within the proposed SEZ.

• **Greenhouses.** While it is the intention to grow the surrounding agriculture activities, on-site greenhouses will provide support to the farmers to supplement their production of high value produce, such as peppers, while also providing training.

• **Other support industries.** The farming community and the operations within the SEZ will require support from industries such as irrigation equipment suppliers, greenhouse infrastructure suppliers and construction providers, various farm equipment maintenance and component suppliers such as farm equipment components etc. The support services can also accommodate advisors in pest and weed control for horticulture and field crops as well as disease control (veterinarian services) for chickens and other livestock.

• **Offices, conference and training centre.** The industrial hub should also provide accommodation for government officials, company representatives from local and international investors and operators and other service providers.

**Challenges and Constraints**

The key challenges faced for the various industries include the completion of a detailed feasibility study for the establishment of the coal to hydrocarbons complex. A detailed analysis of the environmental impact of the proposed Shell gasification process is required as well as the completion of a bankable feasibility study. This will require the engagement of a multinational petrochemical partner and finance as the cost of such a feasibility study is estimated at US$50 million.

With regards to the agro-processing complex, a key challenge is the establishment of commercial scale farming operations to supply the raw materials in excess of what is already currently available.

Land tenure concerns related to the transfer of ownership to new owners as part of the land restitution process will inevitably prove to be a constraint for attracting finance and investment. The policy of neighbouring countries to drive local development in order to replace imported food products with home-grown products will have to be monitored closely.

Evidence of the impact of such policies are already emerging as Zimbabwe recently placed a ban on importing fresh produce from South Africa – estimated at ca R120 million per annum. While the new import duties on imported frozen chicken meat from Brazil and other South American countries will temper imports from these countries (contributing ca 5% to South Africa’s food import basket), the same does not apply to producers in Europe due to the trade agreement between SADC and EU, ie the Trade, Development and Cooperation Agreement (TDCA). Local broiler producers can still expect competition from the EU as a result.
The EU market is one of the major trading partners for South African produced vegetables and vegetable products. The increasing demand for high value fresh produce from South Africa necessitates that producers have access to an international airport with cargo handling facilities. The closest international airport with cargo handling facilities is Polokwane International Airport.

**Recommendation**

From the results of the pre-feasibility study it can be concluded that, although certain risks and constrains exist which would complicate the development of a SEZ in Musina, it is highly unlikely that any of these risks and constraints could be considered as inhibitors or fatal flaws. The pre-feasibility study has proven that significant opportunity exist around the three sectors identified, i.e. logistics, agriculture and petro-chemicals. These include the upstream value chain as well as several downstream opportunities. The Musina area is ideally situated on the North-South Corridor, which is the gateway to the SADC markets.

These include the upstream value chain as well as several downstream opportunities. The Musina area is ideally situated on the North-South Corridor, which is the gateway to a population of 277 million people in the SADC markets.

Investors have indicated an interest in investing in both the upstream and downstream opportunities. These opportunities will be narrowed down to specific high potential possibilities, and will be categorised as quick wins or long term developments during the next phases of the study. The high potential opportunities will be further pursued in an attempt to develop a basis from which the investors can build bankable business plans to locate their business in the proposed Musina SEZ.

It is important that logistic infrastructure and logistic services for this potential zone to be forced by industry, there is however sufficient market requirement evidence that justifying the need for relevant logistic infrastructure. The current supply chain activities as a result of the already existing inbound and outbound movement through the border post will have an opportunity with formal logistic infrastructure and process offerings to optimize this value chain and to have a positive economic impact on the supply chain.

Such investment would however only be possible if the Musina SEZ is able to provide prospective investors with attractive reasons to locate their business there. Such attractions could include certain fiscal incentives like tax holidays and preferential procurement policies, but must also include an enabling environment conducive to attracting foreign direct investment, such as sufficient serviced land.

As a baseline for unlocking the potential of an SEZ in Musina, Government and private sector would need to work together to ensure:

- Appropriate skills development;
- Effective and industry specific incentive packages;
- Efficient and effective administration and partnering with global actors;
- Provision of appropriate infrastructure;
- Optimum financing arrangements;
- Interest from portfolio of capital providers;
• Access to IP in some cases;
• Access to structured market opportunity in some cases; and
• Timing – first mover advantage.

If a basic foundation of hard and soft infrastructure and an effective support system can be established upon which the key drivers or catalytic projects can build, the Musina SEZ can become a reality. The next phases of this study will be to investigate the means of achieving exactly this.
### TABLE OF CONTENTS

**EXECUTIVE SUMMARY**

**TABLE OF CONTENTS**

**TABLE OF FIGURES**

**TABLE OF TABLES**

**LIST OF ACRONYMS**

1. **Policy Review**
   1.1 National Industrial Policy Framework (NIPF)
   1.2 Industrial Policy Action Plan- 2015/2016 (IPAP)
   1.3 National Development Plan (NDP)
   1.4 New Growth Path (NGP)
   1.5 National Development Initiative
   1.6 National Framework for Sustainable Development
   1.7 Strategic Infrastructure Projects (SIP)
   1.8 Sector Specific Policies and Incentives – Petro-Chemical
      1.8.1 Mineral Beneficiation Strategy
      1.8.2 The key action plans for optimal value creation (beneficiation) of coal
      1.8.3 Critical areas of intervention for implementation of the beneficiation strategy
   1.9 Sector Specific Policies and Incentives – Agro-processing
      1.9.1 Department of Agriculture, Forestry and Fisheries (DAFF Strategic Plan)
      1.9.2 Market and trade policies
      1.9.3 Land reform policy
      1.9.4 Agriculture Support Programmes
   1.10 Sector Specific Policies and Incentives – Logistics
      1.10.1 National Freight Logistic Strategy (NFLS)
      1.10.2 National Transport Master Plan (NATMAP 2050)
   1.11 Other policy initiatives
      1.11.1 National Waste Management Strategy
      1.11.2 Green Economy Strategy
      1.11.3 Tripartite Free Trade Area (COMESA, EAC and SADC)
      1.11.4 Agricultural Broad-Based Black Economic Empowerment (AgriBEE)
      1.11.5 Competition Act
      1.11.6 Manufacturing Competitiveness Enhancement Programme (MCEP)
   1.12 Technology Specific Policies and Incentives
      1.12.1 SEDA Technology Programme (STP)
      1.12.2 Technology Transfer Unit (TTU)
      1.12.3 Small, Micro- and Medium-sized Enterprises (SMME) Development Incentives
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.12.4 Industrial Development-Related Incentives</td>
<td>250</td>
</tr>
<tr>
<td>1.12.5 Trade, Export and Investment Incentives</td>
<td>251</td>
</tr>
<tr>
<td>1.12.6 SA Aquaculture Incentives</td>
<td>251</td>
</tr>
<tr>
<td>1.12.7 Co-operatives in South Africa</td>
<td>251</td>
</tr>
<tr>
<td>1.13 Special Economic Zones (SEZs)</td>
<td>252</td>
</tr>
<tr>
<td>1.14 Regional Policies and Programmes</td>
<td>253</td>
</tr>
<tr>
<td>1.14.1 NEPAD and CAADP</td>
<td>253</td>
</tr>
<tr>
<td>1.14.2 SADC Trade Protocol</td>
<td>253</td>
</tr>
<tr>
<td>1.14.3 The Southern African Customs Union (SACU)</td>
<td>254</td>
</tr>
<tr>
<td>1.15 Policies of the Limpopo Province</td>
<td>254</td>
</tr>
<tr>
<td>1.15.1 Draft Limpopo Green Economy Plan: 2011</td>
<td>254</td>
</tr>
<tr>
<td>1.15.2 Limpopo Provincial Growth and Development Strategy, 2004/16</td>
<td>255</td>
</tr>
<tr>
<td>1.15.3 Limpopo Employment Growth and Development Plan, 2009/16</td>
<td>256</td>
</tr>
<tr>
<td>1.15.4 LEGDP Implementation Action Plan 2010/11-2011/12</td>
<td>257</td>
</tr>
<tr>
<td>1.15.5 Industrial Development Fund</td>
<td>257</td>
</tr>
<tr>
<td>1.15.6 Green Economy Plan</td>
<td>257</td>
</tr>
<tr>
<td>1.15.7 Industrial Development Programme: Priority Growth Sectors</td>
<td>258</td>
</tr>
<tr>
<td>1.15.8 The Limpopo Industrial Master Plan</td>
<td>263</td>
</tr>
<tr>
<td>1.15.9 Limpopo Economic Development Strategy</td>
<td>263</td>
</tr>
<tr>
<td>1.16 Conclusion</td>
<td>264</td>
</tr>
<tr>
<td>2. Economic Review</td>
<td>174</td>
</tr>
<tr>
<td>2.1 Socio Economic Context</td>
<td>174</td>
</tr>
<tr>
<td>2.1.1 Background</td>
<td>174</td>
</tr>
<tr>
<td>2.1.2 Socio-Economic Conditions and Trends</td>
<td>175</td>
</tr>
<tr>
<td>2.1.3 Demographics</td>
<td>175</td>
</tr>
<tr>
<td>2.1.4 Employment</td>
<td>176</td>
</tr>
<tr>
<td>2.1.5 Income Levels and Wages</td>
<td>177</td>
</tr>
<tr>
<td>2.1.6 Economic Growth and Production</td>
<td>178</td>
</tr>
<tr>
<td>2.1.7 Exports and Imports</td>
<td>181</td>
</tr>
<tr>
<td>2.1.8 Local Government Finances</td>
<td>182</td>
</tr>
<tr>
<td>2.1.9 Investment Levels (Foreign Direct and Domestic Investment) and Trends</td>
<td>183</td>
</tr>
<tr>
<td>2.1.10 Education Levels</td>
<td>184</td>
</tr>
<tr>
<td>2.1.11 Analysis of Tertiary Institutions</td>
<td>185</td>
</tr>
<tr>
<td>2.1.12 Economic Development Challenges</td>
<td>190</td>
</tr>
<tr>
<td>2.2 Regional Transport</td>
<td>192</td>
</tr>
<tr>
<td>2.2.1 The North – South Corridor</td>
<td>192</td>
</tr>
<tr>
<td>2.2.2 Road Network</td>
<td>194</td>
</tr>
<tr>
<td>2.2.3 Rail Network</td>
<td>195</td>
</tr>
<tr>
<td>2.2.4 Airport - Musina</td>
<td>200</td>
</tr>
<tr>
<td>2.3 Industrial Infrastructure</td>
<td>201</td>
</tr>
</tbody>
</table>
2.3.1 Assessment of Available Infrastructure (Quality and Functionality) 201
2.3.2 Analysis of Existing Infrastructure 201
  2.3.2.1 Industrial Land and Property 201
  2.3.2.2 Water 202
  2.3.2.3 Energy 203
  2.3.2.4 Information, Communication and Technology (ICT) 204
  2.3.2.5 Housing 204
2.3.3 Summary 205

3. Sector Review 31
  3.1 Sector Analysis – National 31
    3.1.1 Value Chain Analysis 31
      3.1.1.1 Agriculture primary production 33
      3.1.1.2 Volume of agricultural production 33
      3.1.1.3 Gross value of agriculture production 33
      3.1.1.4 Gross Farming income 33
      3.1.1.5 Expenditure on intermediate goods and services 34
      3.1.1.6 Consumption expenditure on food 34
      3.1.1.7 Imports and exports of agricultural products 34
      3.1.1.8 Summary 35
    3.1.2 Summary 36
  3.1.3 Analysis of Identified Sectors for the SEZ 37
    3.1.3.1 Limpopo Agriculture analysis 37
    3.1.3.2 Limpopo land use 40
    3.1.3.3 Agriculture in Limpopo 40
    3.1.3.4 Key considerations Limpopo 41
    3.1.3.5 Agriculture potential in Vhembe district 42
  3.2 Market Analysis – Agriculture 43
    3.2.1 Field Crops and Horticulture 44
      3.2.1.1 Grain and oil seeds 44
      3.2.1.2 Sugar 44
      3.2.1.3 Fruit 44
      3.2.1.4 Wine 44
      3.2.1.5 Vegetables 45
      3.2.1.6 Cotton 45
      3.2.1.7 Tobacco 45
      3.2.1.8 Tea 45
    3.2.2 Livestock Farming 45
      3.2.2.1 Dairy farming 45
      3.2.2.2 Beef farming 46
      3.2.2.3 Sheep and goat farming 46
      3.2.2.4 Poultry and pig farming 46
      3.2.2.5 Aquaculture 46
    3.2.3 Fresh produce trading 46
      3.2.3.1 Imports and Exports 47
      3.2.3.2 Trade balances - Agriculture 47
      3.2.3.3 Trade review - Zimbabwe 48
  3.3 Market Analysis – Agro-processing 49
    3.3.1 Industry overview 49
    3.3.2 Agro-processing production 50
3.3.3 Agro-processing value add
3.3.4 Agro-processing Trade: Import and Export
3.3.5 Agro-processing sub-sector contribution to trade
3.3.6 Agro-processing geographic distribution
3.3.7 Agro-processing SWOT analysis
3.4 Trends in Food and Vegetable markets
3.5 Opportunity Identification and Analysis – Agro Processing
3.6 Identification and Analysis of Key Sectors, Value Chain and Product Lines
3.6.1 Introduction and methodology
3.6.2 Poultry and broiler production
3.6.3 Soybeans and oil-cake
3.6.4 Fruit juice industry
3.6.5 Dry Beans
3.6.6 Fresh Cut Vegetables.
3.6.7 Fertiliser industry
3.7 Prioritisation of Agri-processing Sectors
3.7.1 Availability of Raw Materials
3.7.2 Access to Markets
3.7.2.1 Access to Road Network
3.7.2.2 Access to rail network
3.7.3 Strategies for Prioritised Sectors and Value Chains
3.7.3.1 The DAFF Strategy Plan
3.7.3.2 Agricultural Production, Health and Food Safety
3.7.4 Determine Long-Term Economic Viability of the Identified SEZ
3.7.5 South Africa’s Trade with Africa
3.7.6 Identification of Catalytic Projects
3.8 Catalytic agro-processing opportunities
3.8.1 Fresh produce trading
3.8.2 Vegetables dehydration
3.8.3 Soya food production
3.8.4 Fertiliser Blending plant
3.8.5 Additional opportunities in agro-processing
3.9 Sector Analysis – Logistics and Trade
3.9.1 Value Chain Analysis
3.9.2 Market Analysis
3.9.2.1 Corridor logistic demand
3.9.2.2 Transport operators in South Africa
3.9.2.3 Logistics Companies expanding into Africa
3.9.2.4 Transnet Strategy
3.9.3 Identification of Catalytic Projects
3.10 Sector Analysis – Petro-chemicals
3.10.1 Value Chain Analysis of Coal-to-Hydrocarbons
3.10.1.1 Scope
3.10.1.2 Southern Africa Regional Scenarios
3.10.1.3 Study Approach – The Use of the 5 – C Framework
3.10.1.4 Technology Assessment
3.10.1.5 Ranking Value Chain Options on an Integrated Cost Basis
3.10.1.6 Relative Robustness Coal to Methanol and Coal to Gasoline Options
3.10.1.7 Conclusions

3.11 Musina Coal to Hydrocarbon Complex

3.12 Market study
3.12.1 Overview methanol markets
3.12.2 Overview DME markets
3.12.3 Markets for polypropylene
3.12.4 Road transportation fuels in South Africa and Limpopo
3.12.5 Outlook for product market combinations
3.13 Overview of the Supply and Demand for Methane Gas in South Africa

3.13.1 Historical Natural Gas consumption in South Africa
3.13.2 Natural Gas Sales Structure
3.13.3 Future Natural Gas Consumption and Supply in SA

3.14 Overview of the Ammonia Market

3.14.1 World Market

3.14.2 RSA Market

3.14.2.1 Sasolburg Ammonia Synthesis Process

3.14.2.2 Secunda Ammonia from Coal-to-Liquid Fuels Process

3.15 Overview of the Ammonium nitrate Market

3.15.1 World Market

3.15.2 RSA Market

3.16 Overview of the Urea Market

3.16.1 World Market

3.16.2 RSA Market

3.17 Overview of the Ethylene Market

3.17.1 World Market

3.17.2 RSA Market

3.18 Overview of the Propylene Market

3.18.1 World Market

3.18.2 RSA Market

3.19 Overview of the Black Products Market

3.19.1 Primary Coal Tar Products and their Applications

3.19.1.1 Coke oven coal tar

3.19.1.2 Sasol derived Coal Tar

3.19.2 Summary of Coal Tar Products Market size

3.19.3 Wood Preservatives

3.19.4 Disinfectants (Also sometimes called “black disinfectants”)

3.19.5 Road Tars

3.19.6 Absorption Oils

3.19.7 Heating Fuels

3.19.8 Mining Chemicals

3.19.9 Binder Pitch

3.19.10 Electrode Paste

3.19.11 Consumption of Naphthalene

3.19.12 Creosote Oils in Carbon Black

3.20 Overview of the Linear Alpha-olefins Market

3.20.1 World Market

3.20.2 RSA Market

3.21 Overview of the CTL Solvents Market

3.21.1 World Market

3.21.1.1 Acetone

3.21.1.2 MEK

3.21.2 RSA Markets
3.21.2.1 Acetone 161
3.21.2.2 MEK 162

3.22 Overview of the Waxes Market 162
3.22.1 World Market 162
3.22.2 RSA Market 163

3.23 The South African Liquid Fuels Market 164
3.23.1 Market Size 164
3.23.2 Market Growth 165
3.23.2.1 Regional Breakdown of the Liquid Fuels Market 165
3.23.2.2 Liquid Fuels Market Segments 167
3.23.2.3 Supply of Liquid Fuels in SA 168
3.23.2.4 Fuel Grades 169
3.23.2.5 Fuel Distribution in SA 169
3.24.6.1 Ammonia 172
3.24.6.2 Urea 172
3.24.7.1 Ethylene 172
3.24.7.2 Black products 172
3.24.7.3 Linear Alpha-olefins 173
3.24.7.4 CTL (Coal to Liquid) Solvents 173
3.24.8.1 Liquid Fuels 173

4. Unlocking the Potential 207
4.1 Policy and Strategy 207
4.2 Stakeholder and Investor Readiness 207
4.3 Skills and Human Capital 208
4.4 Technology 213
4.4.1 Introduction 213
4.4.2 Hydroponics 213
4.4.3 Agriculture hubs and agro-processing centres 215
4.5 Availability of Land 219
4.6 Environment and Sustainability 219
4.6.1 Site 1. Musina – Limpopo Eco-industrial Park Land (LEIP) 220
4.6.1.1 Environment 220
4.6.1.2 Sustainability 223
4.6.2 Site 2. Musina – Lee Family land 224
4.6.2.1 Environment 224
4.6.2.2 Sustainability 227
4.6.3 Summary 227
4.7 Stakeholder and Investor Readiness 227
4.8 Bulk Infrastructure 228
4.9 Summary 228

5. Benchmarking 229
5.1 Defining SEZs 266
5.2 Types and Characteristics of SEZs 268
5.3 Economic Benefits of SEZs 271
5.3.1 Types and Categories of Economic Benefit 271
5.3.2 Foreign direct investment (FDI) 272
5.3.3 Employment Creation 273
5.3.4 Export Growth and Diversification 274
5.3.5 Industrial Upgrading, Technology Transfer and Dynamic Effects 276
5.3.6 Government Revenues and Costs 277
5.4 Key Issues and Approach to Assessment during Feasibility 277
5.4.1 Policy Framework 279
5.4.2 Incentive Framework 280
5.4.3 Institutional Framework 282
5.4.4 Physical Development and Management 282
5.4.5 Sectors (Petro-Chemical, Agro-Processing and Logistics) 283
  5.4.5.1 Sector – Petro-Chemical 283
  5.4.5.2 Sector – Agro-Processing 283
  5.4.5.3 Sector – Logistics 284
5.4.6 Technology (Petro-Chemical, Agro-Processing and Logistics) 287
  5.4.6.1 Technology – Petro-Chemical 287
  5.4.6.2 Technology – Agro-Processing 287
  5.4.6.3 Technology – Logistics 288
5.5 Summary of the SEZ Benchmarking Desktop study 292
5.5.1 Key challenges faced by SEZs today 292
5.5.2 A new approach to the SEZ Strategy 293

6. Analysis of Strategic Options 296

7. Way Forward 299

7.1 Phase 2: Feasibility Study – Go/No Go 299
  7.1.1 Legislated Requirements of a Basic Assessment Process 301
  7.1.2 Proposed Project Phases 301
    7.1.2.1 Initial Phase 301
    7.1.2.2 Public Participation Process (PPP) 301
    7.1.2.3 Stakeholder Engagement 302
    7.1.2.4 Environmental Management Programme 302

8. Summary 307

9. Contact details 308

10. References 309
TABLE OF FIGURES

Figure 1: A Beneficiation Strategy for the South African Minerals Industry (Draft Mineral Beneficiation Strategy 2009) .............................................................. 238

Figure 2: Location of Musina, the Vhembe District Municipality and the Limpopo Province .... 174

Figure 3: Average real annual economic growth rate per region: 2002 – 2012 (Source: StatsSA, 2013) .................................................................................................................................. 180

Figure 4: Provincial contributions national GDP: 1997, 2007 and 2012 (Source: StatsSA, 2013) .............................................................................................................................................. 180

Figure 5: Percentage contribution to the total South African export in 2000, 2005 and 2011 (Source: UrbanEcon, 2012 using Quantec data) .............................................................................................................. 182

Figure 6: Inter-regional economic links of Musina’s location on the North-South Corridor ...... 193

Figure 7: Road conditions as of December 2012 ................................................................ 194

Figure 8: Existing Rail Network – Musina ........................................................................... 196

Figure 9: The Lee family owned land adjacent to Beitbridge Border Post ............................... 197

Figure 10: Site-layout of the proposed Logistics Hub ............................................................. 198

Figure 11: Conceptual drawing of the proposed Logistics Hub ........................................... 199

Figure 12: Transnet proposed site for a Multipurpose Facility ............................................... 199

Figure 13: Airport proximity to the town of Musina ................................................................ 200

Figure 14: Industrial land and property available in Musina (Source : Musina 2012/13-2017 Integrated Development Plan (IDP)) ...................................................................................................................... 201

Figure 15: Vhembe District Municipality water treatment and sewerages map (Source: Vhembe Integrated Development Plan (2012/13-2016/17)) ........................................................................................................ 202

Figure 16: Agro Processing Value Chain (Source: Dti) ................................................................ 32

Figure 17: Agriculture Value Chain ......................................................................................... 32

Figure 18: Agriculture Value Chain in South Africa .............................................................. 35

Figure 19: Limpopo land use .................................................................................................... 40

Figure 20: The relative shares by divisions in the agro-processing industry ....................... 50

Figure 21: The relative contribution to export by divisions in the agro-processing industry .... 51

Figure 22: The relative contribution to imports by divisions in the agro-processing industry .... 52

Figure 23: Key factors driving consumer market trends in EU .............................................. 55

Figure 24: Land suitability in Limpopo for vegetable production .......................................... 59
Figure 25: Land Suitability for Horticulture Production: Citrus and Subtropical fruits ............. 60
Figure 26: Historic and projected poultry demand vs production ........................................... 63
Figure 27: Soybean value chain ............................................................................................. 65
Figure 28: Key Corridors in Limpopo ..................................................................................... 73
Figure 29: Geographic location of Musina to main African corridors ..................................... 74
Figure 30: Limpopo Rail Network .......................................................................................... 75
Figure 31: Logistics Value Chain ............................................................................................ 90
Figure 32: A value chain perspective of the logistics and supply chain service providers in South Africa .......................................................... 91
Figure 33: South African Fleet and Logistic Companies in Sub-Saharan Africa .................... 94
Figure 34: Typical intermodal container facility ...................................................................... 97
Figure 35: Consolidated Warehouse Concept ........................................................................ 98
Figure 36: Study scope: Methanol platform ........................................................................... 99
Figure 37: Value chain modelling through the 5-C framework .............................................. 101
Figure 38: Integrated cost levels MCTH options .................................................................. 103
Figure 39: Robustness Coal to Methanol for Power vs. Coal to Gasoline ......................... 103
Figure 40: Options for the Musina Coal to Hydrocarbons Complex .................................... 106
Figure 41: Global Methanol Capacities vs. Demand ............................................................. 108
Figure 42: Shift in methanol production capacities ................................................................. 109
Figure 43: Top 25 World Methanol Producers ....................................................................... 109
Figure 44: Global Methanol Capacity, Cumulative Growth Capacity vs. Demand ............ 110
Figure 45: Top 25 World Methanol Consumers .................................................................... 111
Figure 46: Methanol Trade flows ........................................................................................ 112
Figure 47: Methanol Spot Prices .......................................................................................... 113
Figure 48: Methanol trade from/to Africa .............................................................................. 114
Figure 49: Methanol conversion to DME .............................................................................. 115
Figure 50: DME production centres ..................................................................................... 117
Figure 51: Market distribution for polypropylene grades by geographical region .......... 118
Figure 52: Global polypropylene consumption in 2006 ....................................................... 119
Figure 53: Global polypropylene capacity in 2006 ............................................................... 119
Figure 54: The 2006 supply and demand balance for polypropylene .................................. 119
Figure 55: Global Polypropylene Trade Flows ................................................................. 120
Figure 56: Projected capacity and consumption for polypropylene in 2011 .................. 120
Figure 57: Global Capacity expansion, 2008-2011 ....................................................... 121
Figure 58: Capacity utilization history .......................................................................... 122
Figure 59: Polypropylene price fluctuation history ....................................................... 122
Figure 60: Correlation between Price and Utilization of polypropylene capacity .......... 122
Figure 61: LPG Consumption by application sector in South Africa (2007) ............... 126
Figure 62: Aggregated Gasoline, Diesel & LPG consumption in SA 2001-2007 .......... 126
Figure 63: Approximate retail market shares in South African fuels retailing ............. 127
Figure 64: Gasoline consumption by province in South Africa in the first half of 2008 ... 128
Figure 65: Diesel consumption for transportation by province in South Africa - first half of 2008 ................................................................. 128
Figure 66: Example composition of gasoline pump price in Gauteng ......................... 130
Figure 67: Summary opportunities Product Market combinations ................................ 132
Figure 68: Sasol Gas Third Party Natural Gas Sales Structure ................................... 134
Figure 69: Outlook for Natural Gas Consumption – Eastern SA ................................ 135
Figure 70: Outlook for Natural Gas Consumption – Western SA ................................ 135
Figure 71: Natural Gas Distribution – Infrastructural Development ............................ 136
Figure 72: Ammonia Prices versus Natural Gas Prices – US Gulf Coast ..................... 137
Figure 73: Sasolburg Ammonia Synthesis Process ...................................................... 138
Figure 74: Secunda Ammonia from Coal-to-Liquid Fuels Process ............................... 139
Figure 75: World’s consumption of Ammonium Nitrate (2006) .................................... 140
Figure 76: World consumption of Urea (2006) ........................................................... 142
Figure 77: Global Usage of Urea – Total market 122 million t/a .................................. 142
Figure 78: US Prices for Urea ..................................................................................... 143
Figure 79: Breakdown of Ethylene consumption by region and product (2004) .......... 145
Figure 80: Ethylene Europe Spot Euro/MT .................................................................. 146
Figure 81: Global Usage of Propylene – Total market 72 million t/a ......................... 147
Figure 82: Propylene Europe Spot Euro/MT (Source: SRIC; CMR) ............................ 148
Figure 83: World capacity for Linear alpha-olefins by producer (2003) ....................... 156
Figure 84: Global Usage of PAO’s – Total market 2.5 million t/a ............................... 156
Figure 85: 1-Butene and 1-Hexene Price History US Cents/KG ............................................. 157
Figure 86: World consumption of acetone (2004)................................................................. 159
Figure 87: Major world producers of MEK (2006).................................................................. 159
Figure 88: Sasol Solvents Secunda Site - Flow Diagram (Source: Sasol) .............................. 160
Figure 89: Sasol Solvents Sasolburg Site - Flow Diagram (Source: Merrill Lynch) ................. 161
Figure 90: World consumption of waxes (2005) .................................................................. 162
Figure 91: SA Liquid Fuels Market – Millions litres (Source: SAPIA) ..................................... 164
Figure 92: Regional fuels Consumption during 2005 –litres (Source: SAPIA) ....................... 166
Figure 93: Regional Petrol Consumption during 2005 – Total 11.17 billion litres (Source: SAPIA) .................................................................................................................. 166
Figure 94: Regional Diesel Consumption during 2005 – Total 8.12 billion litres ................. 167
Figure 95: Liquid Fuels Market Segments during 2005 – litres (Source: SAPIA) .................... 167
Figure 96: Typical high density hydroponic vegetable production ........................................... 214
Figure 97: Map of the Musina sites showing their location in relation to each other, the Boabab Tree Reserve and the Limpopo River, which form the border between South Africa and Zimbabwe .................................................................................................................. 220
Figure 98: Land cover map of Musina site 1 showing that the site is largely natural and untransformed........................................................................................................................... 221
Figure 99: Vegetation map of Musina site1 showing both Musina Mopane Bushveld and Limpopo Ridge Bushveld within the study area ........................................................................... 222
Figure 100: Proposed layout of the LEIP site ........................................................................... 223
Figure 101: Landcover map of Musina site 2 showing that the site is largely natural, but has areas which have undergone transformation (at the border post to Zimbabwe) ...................... 225
Figure 102: Vegetation map of Musina site 2 showing the same vegetation types as that of site 1 above ....................................................................................................................................... 226
Figure 103: Value Adds of a SEZ.......................................................................................... 267
Figure 104: Conceptual Layout of a SEZ .............................................................................. 268
Figure 105: The Footprint of SEZs in Africa ........................................................................... 270
Figure 106: Number of firms per SEZ for selected countries .................................................. 273
Figure 107: SEZ export growth trajectory (Farole, 2011) ......................................................... 276
Figure 108: SEZs - islands to catalysts (Farole and Achini, 2011) .......................................... 277
Figure 109: Typical government revenues and costs from SEZ development (FIAS, 2008) ... 277
Figure 110: Logistics Cost as % of GDP for Selected Countries ........................................ 285
Figure 111: SA Administrative Costs vs. Costs of Other Countries................................ 286
Figure 112: The Modal Contribution for Selected Countries ........................................... 286
Figure 113: Logistics Trend Radar (Source: DHL TrendRadar 2013) .............................. 288
Figure 114: Economic Pillars for Musina SEZ .............................................................. 296
Figure 115: Key activities of the next phase of the Feasibility Study for the Musina Petro-
chemical, Agro-processing and Logistics SEZ Report ............................................... 299
Figure 116: Outline of the Basic Assessment Process ....................................................... 303
Figure 117: Key activities of the 3rd phase of the Feasibility Study for the Musina Petro-
chemical, Agro-processing and Logistic SEZ Report ................................................. 304
Figure 118: Illustration of a potential process flow methodology for a typical feasibility study
leading to a bankable Business Plan ................................................................. 305
**TABLE OF TABLES**

Table 1: Total population by area ................................................................. 176
Table 2: Overall unemployment and youth unemployment rate by area ................................................................. 176
Table 3: Industry share of total employment (2001) ............................................. 177
Table 4: Percentage of individuals per monthly income category (Source: StatsSA, 2012) ............ 178
Table 5: Limpopo regional gross domestic product .................................................. 179
Table 6: Relative size of industries per province: 2012 ............................................. 181
Table 7: Auditor General audit outcomes for relevant municipalities ......................... 183
Table 8: Financial distress rating of relevant municipalities (Source: SA Treasury, 2013) .......... 183
Table 9: Gross domestic fixed investment for relevant areas (Source: Quantec database, 2012) 184
Table 10: Select educational statistics by area ............................................................. 184
Table 11: List of tertiary institutions and the courses they offer in the Limpopo Province ........ 190
Table 12: MLM SWOT Analysis – Integrated Development Plan (IDP 2012/13 – 2017) ............ 191
Table 13: Electricity service level in the Musina Local Municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17)) ................................................................................. 203
Table 14: Types of energy used in the municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17) – as derived from StatsSA Census 2011) ...................................................... 203
Table 15: Types of housing structure in the municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17) – as derived from StatsSA Census 2011) .............................................. 204
Table 16: Housing backlog in the Vhembe District Municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17)) ....................................................................................... 204
Table 17: South Africa agriculture output ........................................................................ 36
Table 18: Volume of Agricultural Production by Product and Location ........................................ 37
Table 19: Agriculture – contribution to regional GDP ....................................................... 37
Table 20: Land Suitability in Vhembe ............................................................................. 43
Table 21: SA Fresh Produce Markets .............................................................................. 47
Table 22: Value of imports and exports ............................................................................ 48
Table 23: Fresh fruit used for processing (volumes) ......................................................... 66
Table 24: SA fruit juice exports ....................................................................................... 67
Table 25: Selected Commodity Exports to Africa .............................................................. 77
Table 26: Breakdown of Fleet Size Distribution .................................................................... 93
Table 27: Regional footprint of JSE listed logistic operators in Sub-Saharan Africa ............... 94
Table 28: Overview of refinery capacities in RSA ................................................................. 125
Table 29: Diesel and Gasoline Demand in RSA during 1Q08 ................................................ 129
Table 30: Estimated end-use market structure for ammonia ............................................... 139
Table 31: Application sectors of Urea .................................................................................. 143
Table 32: Range of distillate cuts ......................................................................................... 150
Table 33: Summary of the estimated consumption of coal tar derived products in SA .......... 151
Table 34: Estimated capacity for tar derivative .................................................................... 153
Table 35: Estimated manufacture capacity ......................................................................... 154
Table 36: Level of exports and average prices (estimate – expected error in published data) ... 157
Table 37: Summary of the South African acetone market ..................................................... 161
Table 38: Summary of the South African MEK market ......................................................... 162
Table 39: Summary of the South African wax market ......................................................... 164
Table 40: Market Shares of the main fuel retailers during 2005 in percentages (Source: SAPIA) 169
Table 41: Benefits of agro-processing and agro-trade hubs ................................................ 217
Table 42: Possible agro-processing hubs in SEZ ................................................................. 219
Table 43: Types of SEZs ...................................................................................................... 269
Table 44: Examples of SEZs ............................................................................................... 270
Table 45: FDI flows into SEZ’s for selected countries (Farole, 2011) .................................. 272
Table 46: Direct employment associated within SEZ’s globally (FIAS, 2008) ...................... 273
Table 47: Direct employment associated within select SEZ programmes (Farole, 2011) ....... 274
Table 48: Exports associated within SEZs globally (FIAS, 2008) ....................................... 275
Table 49: Basic SEZ Policy Framework .............................................................................. 280
Table 50: SEZ Incentives in Africa ...................................................................................... 281
Table 51: International SEZ Incentives ............................................................................... 282
Table 52: Key Technologies Affecting Tomorrows Logistics Industry (Source: DHL TrendRadar 2013) .............................................................................................................. 290
# LIST OF ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>ABET</td>
<td>Adult Basic Education and Training</td>
</tr>
<tr>
<td>AgriBEE</td>
<td>Agricultural Broad-Based Black Economic Empowerment</td>
</tr>
<tr>
<td>AGV</td>
<td>Automatic Guided Vehicles</td>
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<tr>
<td>AMI</td>
<td>Advanced Metals Initiative</td>
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<tr>
<td>AMTS</td>
<td>Advanced Manufacturing Technology Strategy</td>
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<td>ASEZ</td>
<td>Aqaba Special Economic Zone</td>
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<tr>
<td>ASGISA</td>
<td>Accelerated and Shared Growth Initiative for South Africa</td>
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<tr>
<td>BAR</td>
<td>Basic Assessment Report</td>
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<tr>
<td>BBBEE</td>
<td>Broad Based Black Economic Empowerment</td>
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<td>BBSDP</td>
<td>Black Business Supplier Development Programme</td>
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<td>BID</td>
<td>Background Information Document</td>
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<tr>
<td>BRICS</td>
<td>Brazil, Russia, India, China and South Africa</td>
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<td>CAADP</td>
<td>Comprehensive Africa Agriculture Development Programme</td>
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<td>Conservation Agriculture Regional Working Group</td>
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<td>CASP</td>
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<td>CBD</td>
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<td>Clean Development Mechanism</td>
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<td>CIS</td>
<td>Co-operative Incentive Scheme</td>
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<tr>
<td>COMESA</td>
<td>Common Market for Eastern and South Africa</td>
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<td>COPAC</td>
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<td>DAFF</td>
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<td>Hectare</td>
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<tr>
<td>HEI</td>
<td>Higher Education Institute</td>
</tr>
<tr>
<td>HET</td>
<td>Higher Education and Training</td>
</tr>
<tr>
<td>I&amp;APs</td>
<td>Interested and Affected Parties</td>
</tr>
<tr>
<td>IBSA</td>
<td>India Brazil South Africa</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
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</tr>
<tr>
<td>IDC</td>
<td>Industrial Development Corporation</td>
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<tr>
<td>IDP</td>
<td>Integrated Development Plan</td>
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<td>IDZ</td>
<td>Industrial Development Zone</td>
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<td>IP</td>
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<td>IPAP</td>
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<td>ISRDP</td>
<td>Integrated Sustainable Rural Development Programme</td>
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<td>Integrated Transport Plan</td>
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<td>Key Action Plans</td>
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<tr>
<td>Km</td>
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<td>Km²</td>
<td>Square Kilometre</td>
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<td>Key Performance Areas</td>
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<td>Local Economic Development</td>
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<td>LEDET</td>
<td>Limpopo Department of Economic Development, Environment and Tourism</td>
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<td>LEIP</td>
<td>Limpopo Eco-Industrial Park</td>
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<td>LEGDP</td>
<td>Limpopo Employment Growth and Development Plan</td>
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<tr>
<td>LIMS</td>
<td>Livestock Information Management System</td>
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<td>LISKAP</td>
<td>Limpopo Industrial Sector Key Action Plan</td>
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<td>LM</td>
<td>Local Municipality</td>
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<td>MAFISA</td>
<td>Micro Agricultural Finance Institution of South Africa</td>
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<td>MCEP</td>
<td>Manufacturing Competitiveness Enhancement Programme</td>
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<td>MFEZ</td>
<td>Multi-Facility Economic Zone</td>
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<td>MLM</td>
<td>Musina Local Municipality</td>
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<tr>
<td>MMDB</td>
<td>Minerals and Mining Development Board</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MPRDA</td>
<td>Minerals and Petroleum Resources Development Act</td>
</tr>
<tr>
<td>MTEF</td>
<td>Medium Term Expenditure Framework</td>
</tr>
<tr>
<td>MTSF</td>
<td>Medium Term Strategic Framework</td>
</tr>
<tr>
<td>NATMAP</td>
<td>National Transport Master Plan</td>
</tr>
<tr>
<td>NDP</td>
<td>National Development Plan</td>
</tr>
<tr>
<td>NEDLAC</td>
<td>National Economic Development and Labour Council</td>
</tr>
<tr>
<td>NEMA</td>
<td>National Environmental Management Act</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<td>NFLS</td>
<td>National Freight Logistics Strategy</td>
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<tr>
<td>NGOs</td>
<td>Non-Governmental Organizations</td>
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<td>NGP</td>
<td>New Growth Plan</td>
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<td>NIP</td>
<td>National Infrastructure Plan</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>-----------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>NIPF</td>
<td>National Industrial Policy Framework</td>
</tr>
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<td>NQF</td>
<td>National Qualifications Framework</td>
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<td>NRF</td>
<td>National Research Foundation</td>
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<td>NSDS</td>
<td>National Skills Development Strategy</td>
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<td>PBC</td>
<td>Platinum Beneficiation Committee</td>
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<td>PESTEL</td>
<td>Political, Economic, Social, Technical,</td>
</tr>
<tr>
<td></td>
<td>Environmental and Legal</td>
</tr>
<tr>
<td>PGDS</td>
<td>Provincial Growth and Development Strategy</td>
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<tr>
<td>PPP</td>
<td>Public Private Partnership/Public Participation Process</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>REDI</td>
<td>Regional Economic Development and Integration Programme</td>
</tr>
<tr>
<td>RSA</td>
<td>Republic of South Africa</td>
</tr>
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<td>SA</td>
<td>South Africa</td>
</tr>
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<td>SACU</td>
<td>Southern African Customs Union</td>
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<td>SADC</td>
<td>Southern Africa Development Community</td>
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<td>SAM</td>
<td>Social Accounting Matrix</td>
</tr>
<tr>
<td>SARS</td>
<td>South African Revenue Service</td>
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<td>SDF</td>
<td>Spatial Development Framework</td>
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<tr>
<td>SDI</td>
<td>Spatial Development Initiative</td>
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<tr>
<td>SEDA</td>
<td>Small Enterprise Development Agency</td>
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<td>SETA</td>
<td>Sector Education and Training Authority</td>
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<td>SEZ</td>
<td>Social Economic Zone</td>
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<tr>
<td>SIDZ</td>
<td>Saldanha Industrial Development Zone</td>
</tr>
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<td>SIP</td>
<td>Strategic Infrastructure Project</td>
</tr>
<tr>
<td>SMME</td>
<td>Small, Medium and Micro Enterprise</td>
</tr>
<tr>
<td>SP</td>
<td>Strategic Programmes</td>
</tr>
<tr>
<td>SPIi</td>
<td>Support Programme for Industrial Innovation</td>
</tr>
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<td>SPGRC</td>
<td>SADC Plant Genetic Resource Centre</td>
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<td>SSAS</td>
<td>Sector-Specific Assistance Scheme</td>
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<td>StatsSa</td>
<td>Statistic South Africa</td>
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<tr>
<td>STP</td>
<td>SEDA Technology Programme</td>
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<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities and</td>
</tr>
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<td></td>
<td>Threats</td>
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<td>TECZ</td>
<td>Trade and Economic Cooperation Zone</td>
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<tr>
<td>TBD</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>THIRP</td>
<td>Technology and Human Resources for Industry Programme</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>TTU</td>
<td>Technology Transfer Unit</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>UNECA</td>
<td>United Nations Economic Commission for Africa</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>UWC</td>
<td>University of Western Cape</td>
</tr>
<tr>
<td>V</td>
<td>Volt</td>
</tr>
<tr>
<td>VAT</td>
<td>Value Added Tax</td>
</tr>
<tr>
<td>VDM</td>
<td>Vhembe District Municipality</td>
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<td>WSA</td>
<td>Water Services Authorities</td>
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<tr>
<td>ZAR</td>
<td>South African Rand</td>
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</table>
1. Sector Review

1.1 Sector Analysis – National

South Africa has a dual agricultural economy, with both well-developed commercial farming and more subsistence-based production in the deep rural areas. Covering 1.2-million square kilometres of land, South Africa is one-eighth the size of the United States and has seven climatic regions, from Mediterranean to subtropical to semi-desert. This biodiversity, together with a coastline 3 000 kilometres long and served by eight commercial ports, favours the cultivation of a highly diverse range of marine and agricultural products, from deciduous, citrus and subtropical fruit to grain, wool, cut flowers, livestock and game. While 12% of South Africa’s land can be used for crop production, only 22% of this is high-potential arable land. The greatest limitation is the availability of water, with uneven and unreliable rainfall. Around 1.3-million hectares are under irrigation, and around 50% of South Africa’s accessible water is used for agriculture.

Agricultural activities range from intensive crop production and mixed farming in winter rainfall and high summer rainfall areas to cattle ranching in the bushveld and sheep farming in the arid regions. Maize is most widely grown, followed by wheat, sugar cane and sunflowers. South Africa is not only self-sufficient in virtually all major agricultural products, but is also a net food exporter. Important export groups are wine, citrus, maize, grapes, sugar, apples, pears and quinces. Important export products include agro processing products, such as under natured ethyl alcohol and hides and skins.

Agriculture as a percentage of GDP has decreased over past four decades, currently contributing around 2%. This implies that the economy is maturing, moving towards the secondary and tertiary sectors. However, farming remains vitally important to the economy with 638 000 people formally employed (Statistics SA, 2012 Q2) – although it’s estimated that around 8,5-million people are directly or indirectly dependent on agriculture for their employment and income. The sector’s significance is largely because of its potential to create jobs, and is a key focus of the New Growth Path, a plan by the government to create 5-million new jobs by 2020. Plans include programmes to promote commercially oriented small-scale farming and food processing. Government support is also available to smallholders on land acquired through land reform.

1.1.1 Value Chain Analysis

South Africa has about 7000 agro-processing businesses. These are dominated by a few large diversified majors and their profit margins are continuously under pressure. They are distributed across the country and operate in specific commodity value chains.

Most importantly, they source their raw material - from farmers, commodity exchanges and imports - and they operate on commercially sustainable premises. Agro-processors are therefore in a unique position to help small-scale farmers become commercially successful. They can provide market access, extension support and can be a conduit for finance to these farmers. This is an institutional delivery mechanism for the government that can be to the mutual benefit of the government and the private-sector agro-processor.

The source, processing and final markets for agro-processing in South Africa are illustrated in the following 2 diagrams.
Figure 1: Agro Processing Value Chain (Source: Dti)

Figure 2: Agriculture Value Chain
1.1.1.1 Agriculture primary production

Gross farming income from all agricultural products for the year ended 30 June 2013 is estimated at R178,050 million, which is 10,1% higher than for the previous corresponding period. Gross farming income from field crops increased by 7, 3% and amounted to R49, 287 million. The income from horticultural products rose by 11, 3%, from R40, 538 million in 2012 to R45,126 million. Income from animal products amounted to R83, 637 million, an increase of 11, 2%. Prices received by farmers for agricultural products and prices paid by farmers for farming requisites increased on average by 8,5% and 10,8% respectively, resulting in the terms of trade dropping from 0,87 to 0,86 during the period under review.

1.1.1.2 Volume of agricultural production

The volume of field-crop production decreased slightly by 0, 2%, mainly as a result of decreases in the production of maize and all winter crops, except for canola. Maize production decreased by 658,000 tons or 5, 2% from the previous season. Wheat and barley production decreased by 135,599 tons (6, 7%) and 14,000 tons (4,5%) respectively from 2011/12.

Horticultural production showed a decrease of 0, 7%, which can mainly be attributed to decreases in the production of deciduous fruit and vegetables. Production of wine grapes and table grapes decreased by 84,482 tons (4,6%) and 19,345 tons (7%) respectively. With reference to vegetables, onions and tomatoes showed the largest decreases, with 27,053 tons (4,3%) and 24,975 tons (4,6%) respectively, from 2011/12.

Animal production increased by 3, 6% as a result of increases in fresh milk (229,229 litres or 7,2%), number of stock slaughtered (550,227 carcasses or 6,2%), as well as poultry meat (46,051 tons or 3,1%) from 2011/12.

Some of the reasons for the above decreases include the lack of suitable land and the reduced demand for these fresh and processed products from our neighbouring countries. Agriculture production in Sub-Saharan Africa is increasing as these countries are turning the tide of import dependency. Production of commodity crops in South Africa will most likely see a sustained increase in demand as staple feed for the population in Sub Saharan Africa is expected to double in the next 10 years.

1.1.1.3 Gross value of agriculture production

The gross value of animal products, field crops and horticultural products contributed 46,4%, 28,6% and 25,0% respectively to the total gross value of agricultural production. The poultry meat industry made the largest contribution with 17, 4%, followed by maize with 13, 2% and cattle and calves slaughtered with 10,1%.

1.1.1.4 Gross Farming income

The gross income from field crops increased by 7,3% to R49,287 million for the year ended 30 June 2013. Income from maize amounted to R26, 554 million, only 3, 7% higher than the R25, 615 million of the previous 12 months. Income from soya beans increased by 48, 9% to R3, 544 million and that from sunflower seed showed an increase of 13,1% to R2,857 million. Income from sugar cane at R6, 142 million was only R19 million or 0, 3% higher than that of the previous 12 months. Income from groundnuts, however, decreased by 22, 7% to R437 million and then from cotton by 49, 2% to R86 million.
The gross income from horticultural products increased by 11,3%, from R40,538 million in 2011/12 to R45,126 million in 2012/13. Income from deciduous and citrus fruit increased by 13,4% and 6,2% and amounted to R11,586 million and R8,094 million respectively. Income from subtropical fruit increased by 3,7% to R2,622 million. Income from viticulture increased by 8,4% to R4,277 million. Income from vegetable production increased by 12,0% to R15,853 million.

The gross income from animal products was 11,2% higher in 2012/13 and amounted to R83,637 million, compared to R75,246 million in 2011/12. Producers earned R18,290 million from slaughtered cattle and calves, as against the previous R17,693 million—an increase of 3,4%. Income from slaughtered sheep increased by 5,4% to R4,130 million. Income from poultry meat production rose by 18,3% to R31,464 million and income from egg production, at R8,410 million, was 8,7% higher than in the previous year. Producers earned R11,617 million from milk production, which is 18,6% more than in the previous year. Income from wool and ostrich products decreased by 13,5% to R1,805 million and by 6,5% to R276 million respectively.

The net farm income (after the deduction of all production expenditure, excluding expenditure on fixed assets and capital goods) amounted to R56,565 million for the 12 months that ended on 30 June 2013, which is 7,6% more than in the previous 12 months. Payments for salaries and wages, which represented 10,7% of the total farming costs, amounted to R13,507 million.

1.1.1.5 Expenditure on intermediate goods and services

Expenditure on intermediate goods and services during 2012/13 is estimated at R100,047 million, which represents a rise of 11,6% from R89,632 million in 2011/12. Large increases occurred in expenditure on seed and plants (18,0%), fuel (15,3%), packing material (14,8%) and dips and sprays (13,6%).

Expenditure on farm feeds remained the biggest expenditure item, accounting for 20,9% of total expenditure, followed by fuel (14,3%), farm services (13,1%), maintenance and repairs of machinery and implements (11,1%) and fertilisers (9%).

1.1.1.6 Consumption expenditure on food

The consumption expenditure on food for the year ended 30 June 2013 increased by 9,7% and amounted to R445,312 million, as against the R406,042 million of the previous year. Expenditure on meat increased by 9,1% to R142,471 million, on bread and grain products by 6,6% to R118,764 million, and on fruit and vegetables (including potatoes) by 14,4% to R62,929 million. Milk, milk products and eggs, as well as oils and fats also show increases of 14,3% to R52,359 million and 12,2% to R9,869 million respectively. Expenditure on sugar show a decrease of 2,9% to R6,373 million.

Meat represented 32% of the expenditure on the food component; bread and grains 27%; fruit and vegetables (including potatoes) 14%; milk, milk products and eggs 12%; oils and fats 2%; and sugar 1%.

1.1.1.7 Imports and exports of agricultural products

The estimated value of imports for 2012/13 came to R54,778 million, an increase of 12,3% from R48,790 million for 2011/12. The value of exports increased by 16,4%, from R53,898 million in 2011/12 to R62,750 million in 2012/13.
According to the 2012/13 export values, citrus fruit (R7,981 million), wine (R6,965 million), maize (R5,294 million), apples, pears and quinces (R5,172 million) and grapes (R4,576 million) were the most important agricultural export products.

Rice (R6,200 million), wheat and meslin (R4,201 million), poultry (R3,781 million), un-denatured ethyl alcohol (R3,225 million) and oil-cake (R3,153 million) accounted for the highest imports in terms of value. During 2012/13, the Netherlands, with exports to the value of R6,862 million, the United Kingdom (R5,588 million), Zimbabwe (R5,011 million), Mozambique (R3,309 million) and China (R2,589 million) were the five largest trading partners of South Africa in terms of export destinations for agricultural products. About 19.8% of the total value of agricultural exports from South Africa for the period July 2012 to June 2013 went to the Netherlands and the United Kingdom combined.

1.1.1.8 Summary

The value chain is reflected in the following diagram:

*Figure 3: Agriculture Value Chain in South Africa*
1.1.2 Summary

The national agricultural production and the dominant areas are listed in the tables below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Field Crops</th>
<th>Horticulture</th>
<th>Animal production</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R million</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008/09</td>
<td>35 083,7</td>
<td>33 588,1</td>
<td>60 952,5</td>
<td>129 624,3</td>
</tr>
<tr>
<td>2009/10</td>
<td>30 405,0</td>
<td>33 771,2</td>
<td>65 516,2</td>
<td>129 692,4</td>
</tr>
<tr>
<td>2010/11</td>
<td>34 022,4</td>
<td>36 284,5</td>
<td>67 852,6</td>
<td>138 159,5</td>
</tr>
<tr>
<td>2011/12</td>
<td>47 679,8</td>
<td>40 776,9</td>
<td>75 938,1</td>
<td>164 394,8</td>
</tr>
</tbody>
</table>

*Source: Stats SA, 2013

Table 1: South Africa agriculture output

<table>
<thead>
<tr>
<th>Agricultural Product</th>
<th>Dominant Production Locations</th>
<th>Average Annual Volume Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>North West; Free State; Mpumalanga</td>
<td>13,2 metric ton</td>
</tr>
<tr>
<td>Wheat</td>
<td>Western Cape; Free State</td>
<td>2.1 metric ton</td>
</tr>
<tr>
<td>Barley</td>
<td>Western Cape</td>
<td>192 000 ton</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>Free State; North West; Northern Cape</td>
<td>88 800 ton</td>
</tr>
<tr>
<td>Sunflower Seeds</td>
<td>Free State; North West Mpumalanga; Limpopo</td>
<td>872 000 ton</td>
</tr>
<tr>
<td>Soya Beans</td>
<td>Free State; Mpumalanga; KwaZulu-Natal</td>
<td>500 000 ton</td>
</tr>
<tr>
<td>Sorghum</td>
<td>Free State; Mpumalanga; Limpopo; N. West</td>
<td>255 000 ton</td>
</tr>
<tr>
<td>Canola</td>
<td>Western Cape; North West; Limpopo</td>
<td>30 800 ton</td>
</tr>
<tr>
<td>Dry Beans</td>
<td>Mpumalanga; Free State; Gauteng; North West; KZN; Limpopo; Western Cape; Northern Cape</td>
<td>60 000 ton</td>
</tr>
<tr>
<td>Sugar</td>
<td>Eastern Cape; Mpumalanga; KwaZulu-Natal</td>
<td>20 metric ton</td>
</tr>
<tr>
<td>Deciduous Fruits</td>
<td>Western Cape; Eastern Cape; Free State; Mpumalanga; Gauteng</td>
<td>1 750 000 ton</td>
</tr>
<tr>
<td>Wine</td>
<td>Western Cape</td>
<td>403.3 million liters exported</td>
</tr>
<tr>
<td>Citrus and Subtropical Fruit</td>
<td>Limpopo; Mpumalanga; Eastern Cape; KwaZulu-Natal; Western Cape; N.Cape</td>
<td>46 896 ton subtropical fruit</td>
</tr>
<tr>
<td>Potatoes</td>
<td>North West; Northern Cape; KwaZulu-Natal; Free State; Mpumalanga; Eastern Cape; Western Cape</td>
<td>1 853 000 ton</td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Limpopo; Mpumalanga; KwaZulu-Natal; Eastern Cape; Western Cape</td>
<td>459 217 ton</td>
</tr>
<tr>
<td>Onions</td>
<td>Mpumalanga; Western Cape; Free State</td>
<td>417 579 ton</td>
</tr>
<tr>
<td>Cabbages</td>
<td>Mpumalanga; KwaZulu-Natal</td>
<td>138 161 ton</td>
</tr>
<tr>
<td>Cotton</td>
<td>Mpumalanga; Limpopo; Northern Cape; KwaZulu-Natal</td>
<td>&lt;10 000 ton</td>
</tr>
</tbody>
</table>
Table 2: Volume of Agricultural Production by Product and Location

<table>
<thead>
<tr>
<th>Agricultural Product</th>
<th>Dominant Production Locations</th>
<th>Average Annual Volume Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>Mpumalanga; Limpopo; North West</td>
<td>10 200 ton</td>
</tr>
<tr>
<td>Tea</td>
<td>Western Cape; Eastern Cape</td>
<td>-</td>
</tr>
<tr>
<td>Flowers</td>
<td>Western Cape</td>
<td>-</td>
</tr>
<tr>
<td>Livestock</td>
<td>All Provinces</td>
<td>Largest agricultural sector</td>
</tr>
<tr>
<td>Dairy</td>
<td>Free State; North West; KwaZulu-Natal; Eastern Cape; Western Cape; Mpumalanga</td>
<td>3 129 metric liters</td>
</tr>
<tr>
<td>Beef Cattle</td>
<td>Eastern Cape; Free State; KwaZulu-Natal; Limpopo; North West; Mpumalanga; Northern Cape</td>
<td>820 000 ton</td>
</tr>
<tr>
<td>Sheep and Goats</td>
<td>Eastern Cape; Northern Cape; Free State; Western Cape; Mpumalanga</td>
<td>-</td>
</tr>
<tr>
<td>Poultry and Pigs</td>
<td>All Provinces</td>
<td>930 000 ton broilers</td>
</tr>
<tr>
<td>Fish</td>
<td>Western Cape; Eastern Cape</td>
<td>2.6 million pigs slaughtered from August 2007 to August 2008</td>
</tr>
<tr>
<td>Game</td>
<td>Limpopo; Northern Cape; Eastern Cape; Western Cape</td>
<td>-</td>
</tr>
<tr>
<td>Beekeeping</td>
<td>Western Cape; KwaZulu-Natal</td>
<td>2 000 ton</td>
</tr>
</tbody>
</table>

The role that the Limpopo Province plays in the total agricultural output of the country is evident. However, very little value add takes place within the province itself. High transport costs of raw unprocessed agriculture produce will most likely contribute towards greater localisation of agro-processing in proximity to the source of supply. The SEZ can play a major role in accelerating this move.

Table 3: Agriculture – contribution to regional GDP

<table>
<thead>
<tr>
<th>Province</th>
<th>Percentage contribution to GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free State</td>
<td>9.2</td>
</tr>
<tr>
<td>Limpopo</td>
<td>3</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Source: AGRISETA Sector Analysis

1.1.3 Analysis of Identified Sectors for the SEZ

1.1.3.1 Limpopo Agriculture analysis

The Limpopo Province accounts for at least 10,2 % of the total area of the Republic of South Africa and is endowed with agricultural resources making it one of South Africa's key regions for the production of livestock, fruits and vegetables, cereals and tea. A notable limiting resource in the province is water and it is therefore hugely dependant on irrigation. The environment and transformation initiatives in the country have compelled the agricultural symmetry in the province to assume a different landscape, one informed by land reform outcomes and the participation of black entrepreneurs in the agribusiness value chain.
Limpopo is the second-largest producer of potatoes in the country accounting for 19% of the country’s total production. The annual yields of mangoes, tomatoes, pawpaw, citrus, litchis, macadamia nuts and avocados contribute enormously to the production rate of the country. Thohoyandou is situated in the south of Vhembe district, on the main road between Louis Trichardt and the Kruger National Park. This is the lush agricultural centre of Vhembe, with banana plantations, subtropical fruit, and tobacco and maize lands.

Vhembe District Municipality generates an intermediate contribution towards the provincial agriculture sector of ca 18% per annum. The most important agricultural commodities are nuts (about 50% of provincial production), and subtropical fruit (26% of provincial production). The most important production area for these commodities is the Levubu Valley.

The north and western parts of the district is sparsely populated, whereas Thohoyandou is one of the most densely populated areas in the Province. The nodes are well defined, with Makhado, Thohoyandou and Musina as the most important.

The area north of the Soutpansberg mountain range is Mopani veld, and is only suitable for extensive cattle or game farming. There are a number of irrigation regions along the more important river systems with the Limpopo, Nwanedi and Nzhelele regions as examples. The Limpopo Valley in particular is well suited for the production of dates. The Soutpansberg mountain range is an important forestation area and 15 563 ha are planted with soft and hard woods. This area (Dry and Wet Soutpansberg) is also suitable for the production of crops such as Avocado, Macadamia, Citrus and Flowers. The Thohoyandou district (which falls largely in the Levubu irrigation area) has high agricultural potential and is suitable for the production of crops such as Avocado, Macadamia, Mango, Citrus and Paprika. However, the production potential of this area is negatively impacted by high population concentrations which sterilize high potential agricultural land and place much pressure on the water resources. The same also applies to the Dzanani and Vuwani districts where the average population density varies from 100 to 200 persons per km². The urban space in these areas reflects a large number of informal villages of varying sizes that were originally established and have since grown organically with very little planning. Large part of the land also falls under the tribal authorities. This makes it difficult for development to take place, as the land tenure system is not favourable to commercial development.

Only about 4, 72% of the total land area can be considered arable. Of this potential, 72% is used for dry land production and 20% is under irrigation. About 78% of the land area is suitable for grazing. A sizeable portion (16%) is used for the purposes of nature conservation or forestry. The land is very fertile and good for agriculture.

White farmers in Limpopo who practice large scale commercial farming systems occupy roughly 70% of the total land area. These farmers operate well organized large farms positioned on prime land. Smallholder farms are located mostly in the former homeland areas covering at least 30% of the provincial land surface area. For smallholder farms, production technologies are less advanced and are largely focused on subsistence.
Agricultural Sector

Limpopo’s location gives it strategic advantage in terms of providing fresh products to Gauteng, the densely urbanised economic heartland of South Africa.

The Vhembe district in the far north of the Letaba Valley in the Eastern Mopani District are major contributors to the Johannesburg Fresh Produce Market, with Limpopo growers as a group contributing about 45% of the produce sold at Africa’s biggest market.

Cattle and game ranching occur in the higher and drier areas of the province, while the lower-lying regions are rich in fruit, tea, citrus and vegetables. One of the best known products of the region is the marula fruit, used to make Amarula Cream Liqueur.

Some of South Africa’s biggest agricultural businesses are located in Limpopo, with the province’s fruit and vegetables forming a significant portion of the nation’s export offering. Although parts of Limpopo are well-watered, many areas are dry, which means that irrigation projects take on enormous importance. Four irrigation schemes below the Flag Boshielo Dam have prospered (542 hectares in extent). All four schemes have potato crops, with Krokodil also having a maize component.

Commercial Farming

Most of South Africa’s large co-operatives have become companies over the last few years. The two most active in Limpopo are NTKLA (with its headquarters in Modimolle) and AFGRI, South Africa’s biggest agricultural company which is based in Centurion. NTK is a shareholder in Venda Roller Mills in Thohoyandou and operates 10 grain silos, 23 retail outlets, 28 flour depots ad one cold storage facility.

Some of the world’s biggest farming enterprises operate in Limpopo. Westfalia, part of the Hans Merenskey Group, is the largest avocado grower, while ZZ2 is the biggest fresh tomato enterprise. Westfalia, which produces significant quantities of mango, litchi, citrus and macadamia nuts, also has three agri-processing plants in the province. Avocado oil is processed in Tzaneen, juice and avocado puree is made at Politsi and dried mangos are produced at Hoedspruit. Westfalia has large farms in Letaba River Valley (Constantia Estate), the Hoedspruit District (Marieskop Estate) and in the Mooketsi Valley (Goedgelegen Estate).

Crops

The Levubu Valley in the north is particularly fertile, with guavas and macadamia nuts among the crops that thrive there. Valley Farms is a successful enterprise that grows fruits such as mangos and guavas, and produces concentrates, purées and dried fruits. The processing plant was bought in 2008 by the national government on behalf of the local community.

Limpopo is well known for its vast and plentiful citrus and tea estates. The Zebediela Citrus Estate has been bought by the Bjatladi community with the support of the Limpopo Local Economic Development Programme, and the focus has shifted from bulk supply to producing smaller, consumer-friendly quantities.
Livestock

The bushveld is cattle country, where extensive ranching operations are often supplemented by controlled hunting. About 80% of South Africa's hunting industry is found in Limpopo.

1.1.3.2 Limpopo land use

The current land utilization by agriculture is determined by the natural resources such as soils, water and climate as well as land ownership. Land utilised for commercial farming is about 70% of the total farm land whilst land utilisation for small scale/emerging farming is less than 30%.

![Limpopo land use map]

Figure 4: Limpopo land use

1.1.3.3 Agriculture in Limpopo

The province produces about 75% of South Africa’s mangoes, 65% of its papayas, 36% of its tea, 25% of its citrus, bananas, and litchis, 60% of its avocados, 60% of its tomatoes, 285 000 tons of potatoes, and 35% of its oranges.

Vhembe District Municipality is situated in the north of Limpopo Province. The Kruger National Park lies to the east. To the north and north-west it shares international borders with Zimbabwe and Botswana respectively. The district capital is Thohoyandou. Community Services is the largest employer in Vhembe, followed by trade and then the agricultural sector. The mining sector is stable, but there is a decline in the manufacturing and construction sectors.

Although the land is fertile and well suited to agriculture, a large portion of it falls under tribal authorities which hinder development. Nevertheless, there are opportunities for developing viable, sustainable agricultural projects. Both commercial and subsistence farming occur. Beef, field crops and cotton are produced, and there is potential to develop agro-processing. Game farming is also important.
There is also potential for development in mining and tourism, especially eco-tourism. Mapungubwe, an important archaeological and international heritage site, is located in the Vhembe-Dongola National Park. Both Mapungubwe and Thulamela are traditional heritage sites and examples of early settlement and culture in South Africa. Tourism opportunities in the district also lie in reserves such as Madimbo-Mashakatini, which can attract a large number of tourists. It is of paramount importance that the government and private sector co-operate in developing these sites. The district has a relatively limited supply of both ground and surface water resources. The Limpopo River System is considered to be the life-blood of the northern Vhembe semiarid area.

District agriculture production includes products/produce such as:

- Sunflower, cotton, maize and peanuts which are cultivated in the Bela-Bela and Modimolle areas. Modimolle is also known for its table-grape crops;
- Tropical fruit, such as bananas, litchis, pineapples, mangoes and pawpaws, as well as a variety of nuts, are grown in the Tzaneen and Makhado areas. Tzaneen is also at the centre of extensive tea and coffee plantations;
- Citrus production in the Musina area is recorded at ca 4 000ha, 2 800ha of tomatoes and 980ha of cotton;
- Makhados’ production of various fruits, vegetables and nuts is recorded at 13,916 ha and includes the following crops: avocado, banana, litchi mango, macadamia, tomato, potato and onions; and
- Thohoyandou has plantations of avocado (1 141ha), bananas (135ha) and tea (1 071ha).

Extensive forestry plantations are also found in the region, including hardwood for furniture manufacture. In addition to commercial agriculture, subsistence farming is the mainstay of a large section of the rural population.

1.1.3.4 Key considerations Limpopo

The key competitive advantage of the Limpopo Province is its geographic location and proximity to SADC markets.

**Subtropical** - Limpopo province is a high producer of various subtropical fruit and citrus, opportunity exist to expand the agro processing industry. The province has the potential to become a national producer and supplier of subtropical, not only in their natural form but with value addition. The opportunity includes the core activities of fruit processing into juices, concentrate, pulp, puree, concentrate, dehydration, canned, citrus extracts and oils (macadamia and avocado oil for cosmetic and edible oil).

**White meat processing** - Chicken is purchased across all income categories and as a result poultry is commodity that is in high demand. Limpopo province might not be the highest producer of broilers/poultry but the province has numerous poultry activities which cannot be ignored and the opportunity for poultry value addition in the province can be of high benefit.

**Grain** - Opportunity for grain processing exists in numerous sectors as it provides stable goods for normal household consumption and it is strongly linked with the animal sector. The processing of grains can be done both on small and commercial scale presenting a window of opportunity for rural entrepreneurs to engage in grain value addition.

The following agricultural economic constraints where identified within Limpopo:
Constraints:

- Unavailability of proof of PTOs by farmers claiming the portion in food security projects;
- Delays in finalizing lease agreement between investors and tribal Authority;
- Post settlement support to these land reform beneficiaries is insufficient (only CASP);
- Lack of agricultural skills by land reform beneficiaries;
- Infighting amongst the beneficiaries;
- Lack of agricultural business by communities; and
- Insufficient post settlement supports (financially) and dilapidated infrastructure.

Other constraints that was also identified include the following: no proper marketing channels, use of poor quality rams/buck, stock theft, high feeds cost, diseases, lack of day old chick supply, difficult in meeting export market requirements by farmers, lack of Agro-industries in the district for value addition, high inputs costs- seeds and fertilizers, strategic partnership model not working, theft, lack of funding to establish earth dams, water scarcity, high percentage of unskilled personnel, high unemployment rate, monopolizing of tenders has become a tendency, poor infrastructure i.e. roads and irrigation canals, vandalizing of fences, lack of water supply in the camps, drought, none compliance to the cooperative Act of 2005 by cooperatives, lack of access roads, lack of debushing machineries.

1.1.3.5 Agriculture potential in Vhembe district

According to a survey conducted by ARC on behalf of Department of Development and Land reform, the suitability of land in the Vhembe district for agriculture production is as follows:

Soils

Moderately deep to deep, well-drained loamy or clay loam soils occur commonly in the escarpment and Soutpansberg areas, as well as sporadically across the district. Deeper sands also occur in various areas towards the Limpopo. Good soils are thus in overabundance relative to the availability of water.

Water Availability

The Vhembe District Municipality covers part of the Limpopo as well as parts of Levuhu and Letaba WMAs. With respect to Levuhu and Letaba, it occupies the Levuhu/Mutale sub-area and parts of Shingwedzi and Klein Letaba sub-areas. In the Limpopo WMA, it occupies the Nwanedi and Nzhelele sub-areas, part of the Sand sub-area and a limited area in the northeast of the Mogalakwena sub-area.

Apart from the Levuhu/Mutale area, where the new Nandoni Dam resulted in a temporary water surplus, little or no opportunity exists for expansion of irrigation in this District Municipality.

<table>
<thead>
<tr>
<th>WMA</th>
<th>Sub-Area</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luvuvhu and Letaba</td>
<td>Luvuvhu/Mutale</td>
<td>12400 ha irrigated; yield of Albasini Dam insufficient; high but un-monitored groundwater use; short term surplus available following the completion of the Nandoni Dam; allocations being made for domestic water use and to revitalize irrigation schemes which have fallen into disuse.</td>
</tr>
<tr>
<td></td>
<td>Shingwedzi</td>
<td>Situated almost entirely in the Kruger National Park;</td>
</tr>
</tbody>
</table>
Musina SEZ License Application

Pre-Feasibility Study for the Musina SEZ, Limpopo Province

<table>
<thead>
<tr>
<th>WMA</th>
<th>Sub-Area</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Klein Letaba</td>
<td>Surface water over-extended; 5100 ha irrigated; irrigation downstream of the Middle Letaba Dam in disuse due to decreasing assurance of water supply; targeted for revitalization, despite insufficient water supply.</td>
</tr>
<tr>
<td>Limpopo (2003)</td>
<td>Mogala-kwena</td>
<td>Water supply and water use currently approximately in balance; 10300 ha irrigated; platinum mines expanding in area and there is still vast untapped mining potential; only potential for additional water resources is from ground water; thus no or limited horizontal expansion in irrigation.</td>
</tr>
<tr>
<td></td>
<td>Sand</td>
<td>All water overexploited; the driest sub-area; runoff mm/a; surface water very limited; no scope for the construction of dams; bulk of water requirements met from groundwater resource and water transfers; huge irrigation requirement s rely almost exclusively on ground water; - registered irrigation requirement cannot be sustained from either the very limited surface water or the groundwater resource.</td>
</tr>
<tr>
<td></td>
<td>Nzhelele</td>
<td>Surface water overexploited; water use dominated by irrigation; supplied by the Mutshedzi Dam, farm dams, run-of-river in the upper reaches of the catchment, and the Nzhelele Dam in the lower reaches; much of the irrigation managed by emerging farmers.</td>
</tr>
<tr>
<td></td>
<td>Nwanedi</td>
<td>Surface water overexploited; without major dams in the catchment the she surface water resource is limited; ample groundwater resources, although use of it is limited; substantial irrigation, much of it managed by emerging farmers.</td>
</tr>
</tbody>
</table>

Table 4: Land Suitability in Vhembe

1.2 Market Analysis – Agriculture

Following a substantial rebound in 2011, the agricultural sector continued its growth in 2012, when real gross income surpassed the peak level it registered during 2008. The increase in commodity prices, together with the volume of field crop production remained the main drivers of this growth.

For the 2013 period, growth in horticultural products were expected to be the main driver of growth in the sector due to the rapid depreciation of the exchange rate coinciding with favourable yields and good quality of export produce. Yet, during the baseline period the average annual growth rate of real gross income is anticipated to be weaker compared to the past decade due to the marginal growth projected for commodity prices in general.
1.2.1 Field Crops and Horticulture

1.2.1.1 Grain and oil seeds

The grain industry is one of the largest in South Africa, producing between 25% and 33% of the country's total gross agricultural production. The largest area of farmland is planted with maize, followed by wheat and, to a lesser extent, sugarcane and sunflowers. Maize is the largest locally produced field crop, and the most important source of carbohydrates in the southern African region. South Africa is the main maize producer in the Southern African Development Community (SADC).

More than 9 000 commercial maize producers are responsible for the major part of the South African crop, while the rest is produced by thousands of small-scale producers. Maize is produced mainly in North West province, the Free State, the Mpumalanga Highveld and the KwaZulu-Natal Midlands. Local consumption of maize amounts to about 8 million ton, and the surplus is exported. Wheat is produced in the winter rainfall areas of the Western Cape and the eastern parts of the Free State. Barley is produced mainly on the southern coastal plains of the Western Cape. Sorghum is cultivated in the drier parts of summer rainfall areas such as Mpumalanga, the Free State, Limpopo, North West and Gauteng. South Africa is the world's 10th largest producer of sunflower seed, which is produced in the Free State, North West, the Mpumalanga Highveld and Limpopo province. Groundnuts are grown mainly in the Free State, North West and the Northern Cape.

1.2.1.2 Sugar

South Africa is the world's 13th largest sugar producer. Sugarcane is grown in 15 areas extending from northern Pondoland in the Eastern Cape through the coastal belt and Midlands of KwaZulu-Natal to the Mpumalanga Lowveld. An estimated 2.5 million ton of sugar is produced each season. Some 50% is marketed in southern Africa, with the rest exported to Africa, the Middle East, North America and Asia.

1.2.1.3 Fruit

Deciduous fruit is grown mainly in the Western Cape and in the Langkloof Valley in the Eastern Cape. Smaller production areas are found along the Orange River and in the Free State, Mpumalanga and Gauteng. This industry's export earnings represent about 12% of South Africa's total earnings from agricultural exports. Citrus is produced in the irrigation areas of Limpopo, Mpumalanga, the Eastern Cape, Western Cape and KwaZulu-Natal. Pineapples are grown in the Eastern Cape and northern KwaZulu-Natal. Other subtropical crops - avocados, mangoes, bananas, litchis, guavas, pawpaws, granadillas, and macadamia and pecan nuts - are produced in Mpumalanga, Limpopo and in the subtropical coastal areas of KwaZulu-Natal and the Eastern Cape.

1.2.1.4 Wine

South Africa is the ninth largest wine producer in the world. Over 110 000ha of land are under cultivation, with over 300-million vines. About 84% of wines are produced by cooperatives. Over 4 000 primary wine producers employ over 60 000 people. South African wine exports rose from 22-million litres in 1992 to almost 314-million litres in 2007, with exports, between January 2007 and January 2008, outstripping domestic sales for the first time ever. Wine is exported via Komatipoort.
1.2.1.5 Vegetables

About 40% of South Africa's potato crop is grown in the high-lying areas of the Free State and Mpumalanga. Limpopo, the Eastern, Western and Northern Cape, and the high-lying areas of KwaZulu-Natal are also important production areas. Of the total crop, about 50% is delivered to fresh produce markets and a further 18% processed, with the South African potato processing industry having grown tremendously over the past decade. Potatoes make up about 40% of vegetable farmers' gross income, with tomatoes, onions, green mealies and sweetcorn contributing about 38%. Tomatoes are mainly produced in Limpopo, the Mpumalanga Lowveld and Middelveld, the Pongola area of KwaZulu-Natal, the southern parts of the Eastern Cape, and the Western Cape. Onions are grown in Mpumalanga, the Western Cape and the southern Free State. Cabbage production is concentrated in Mpumalanga and the Camperdown and Greytown districts of KwaZulu-Natal.

1.2.1.6 Cotton

Cotton is cultivated in Mpumalanga, Limpopo, Northern Cape, KwaZulu-Natal and North West. It constitutes about 74% of natural fibre and 42% of all fibre processed in South Africa. Cotton is grown under irrigation as well as in dryland conditions. 75% of local production is harvested by hand.

1.2.1.7 Tobacco

Virginia tobacco is produced mainly in Mpumalanga and Limpopo, with smaller quantities of Oriental tobacco grown in the Western and Eastern Cape. There are more than 1 000 growers in the country, producing some 34-million kilograms every year on about 24 000ha of land.

1.2.1.8 Tea

Honeybush tea grows mainly in the coastal and mountainous areas of the Western Cape and in certain areas of the Eastern Cape. Honeybush has become a commercial crop, with the production of more than 100 tons of processed tea per year.

1.2.2 Livestock Farming

Livestock is the largest agricultural sector in South Africa, with a population of some 13.8-million cattle and 28.8-million sheep. Stock breeders concentrate on the development of breeds that are well adapted to diverse climatic and environmental conditions. According to the latest available agriculture census, Limpopo’s’ number of livestock on farms in 2007 was recorded at 318,128 cattle, 53,592 sheep, 111,216 pigs, 50,198 game, 22,864,301 chickens. (Census of Commercial Agriculture, 2007, Limpopo: Provincial Statistics for Selected Products)

1.2.2.1 Dairy farming

Dairy is produced throughout South Africa, with most farms in the eastern and northern Free State, North West, the KwaZulu-Natal Midlands, the Eastern and Western Cape, Gauteng and the southern parts of Mpumalanga. The dairy industry is important to South Africa’s job market, with over 4 000 milk producers employing about 60 000 farmworkers and indirectly providing jobs to some 40 000 people. Limpopo province is not a major milk producing area in South Africa due to relatively low population density, and
the hot and arid climate that prevails in most of the northern and western areas of the province. There were only 58 milk producers in Limpopo out of the South African total of 4856 producers [1.2%].

1.2.2.2 Beef farming

South Africa produces 85% of its meat requirements, with 15% imported from Namibia, Botswana, Swaziland, Australia, New Zealand and the EU. Local demand generally outstrips production, even though there are untapped reserves in the communal farming areas. Cattle ranches are found mainly in the Eastern Cape, parts of the Free State and KwaZulu-Natal, Limpopo and the Northern Cape.

1.2.2.3 Sheep and goat farming

South African sheep farming is concentrated in the Northern and Eastern Cape, Western Cape, Free State and Mpumalanga, with Ermelo in Mpumalanga being one of the largest wool-producing districts. About 50% of the country's sheep are fine-woolled Merinos.

1.2.2.4 Poultry and pig farming

South Africa's poultry and pig farms are more intensive than the extensive sheep and cattle production, and are found near the metropolitan areas of Gauteng, Durban, Pietermaritzburg, Cape Town and Port Elizabeth. South Africa's annual poultry meat production is around 960,000 tons. Broiler production contributes about 80% to total poultry meat production, with the rest made up of mature chicken slaughter (culls), small-scale and backyard poultry production, ducks, geese, turkeys and other specialised white meat products. Limpopo only contributes 2% to poultry farming even though the population in Limpopo is high.

1.2.2.5 Aquaculture

The aquaculture industry in South Africa continues to make meaningful progress in cultivation technology, marketing strategy, marketing practice and scientific innovation. The commercial exploitation of aquaculture and fish farming in inland regions is hampered to a large degree by the large fluctuations in temperature between seasons and day night differentials. Further research and development of suitable fish breeds and breeding processes is required to fully develop the aquaculture potential in South Africa.

1.2.3 Fresh produce trading

South Africa has 18 fresh produce markets trading a total of more than R12 billion in fresh produce. The Johannesburg Fresh Produce Market is the largest.

<table>
<thead>
<tr>
<th>Fresh Produce Market</th>
<th>Value R</th>
<th>Volume (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg</td>
<td>4 037 276 224.94</td>
<td>1 314 489.18</td>
</tr>
<tr>
<td>Tshwane</td>
<td>2 454 351 983.06</td>
<td>668 845.95</td>
</tr>
<tr>
<td>Cape Town</td>
<td>2 126 228 885.39</td>
<td>517 607.69</td>
</tr>
<tr>
<td>Durban</td>
<td>906 279 080.44</td>
<td>383 320.75</td>
</tr>
<tr>
<td>Springs</td>
<td>472 502 302.71</td>
<td>200 171.49</td>
</tr>
<tr>
<td>Pietermaritzburg</td>
<td>398 810 047.52</td>
<td>152 340.44</td>
</tr>
<tr>
<td>Bloemfontein</td>
<td>364 306 165.41</td>
<td>131 383.24</td>
</tr>
<tr>
<td>East London</td>
<td>255 110 566.58</td>
<td>124 633.93</td>
</tr>
</tbody>
</table>
## 1.2.3.1 Imports and Exports

In 2012 South Africa exported products to a total value of R709,191 million and imported R831,042 million, making South Africa a net importer to the tune of R121,851 million. Agricultural products represented R55,518 million or 7.8% of total exports and R53,620 million or 6.5% of total imports in 2012. South Africa was therefore a net exporter of agricultural products, with a positive trade balance of ca R1,897 million. Under the scenario of a weaker exchange rate, it is critical that South Africa remains a net exporter of agricultural produce. In 2012, exports to Africa exceeded exports to the EU for the first time, with Africa representing 31.2% and EU representing 29.9% of agricultural exports.

This makes Africa the largest trading partner for South African agricultural exports and this market is expected to grow consistently, especially for commodities such as fresh fruits and wine.

## 1.2.3.2 Trade balances - Agriculture

- Agricultural products represented R55,518.6 million or 7.8% of total exports and R53,620.8 million or 6.5% of total imports in 2012. South Africa was therefore a net exporter of agricultural products in 2012, with a positive trade balance of R1,897.8 million;
- Over the past 10 years the share of agricultural products in total trade has been fluctuating between 10.2% (in 2009) and 6.6% (in 2007) for exports and between 4.5% (in 2006) and 6.53% (in 2009) for imports;
- Since 2003 the trade balance for agricultural products fluctuated between negative R75.7 million (2007 was the only year with a negative balance) and positive R11,202.0 million (in 2009);
- All of South Africa’s export markets are captured in the first six regions. Trade with Brazil, Russia, India and China (BRIC countries) is highlighted separately, but is also included in the relevant trade areas, e.g. exports to China are also reflected in exports to Asia;
- During 2012 exports to Africa exceeded exports to the EU for the first time, with Africa representing 31.2% and EU representing 29.9% of agricultural exports; and
- Agricultural exports to BRIC countries have increased from 2.8% of total agricultural exports to 7.2% during the past ten years.

<table>
<thead>
<tr>
<th>Fresh Produce Market</th>
<th>Value R</th>
<th>Volume (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klerksdorp</td>
<td>246 088 066.69</td>
<td>140 210.68</td>
</tr>
<tr>
<td>Port Elizabeth</td>
<td>238 922 137.54</td>
<td>118 957.01</td>
</tr>
<tr>
<td>Welkom</td>
<td>151 553 618.25</td>
<td>80 464.08</td>
</tr>
<tr>
<td>Vereeniging</td>
<td>146 247 890.46</td>
<td>99 164.42</td>
</tr>
<tr>
<td>Kimberley</td>
<td>73 995 783.72</td>
<td>40 203.67</td>
</tr>
<tr>
<td>Uitenhage</td>
<td>40 964 915.98</td>
<td>25 556.04</td>
</tr>
<tr>
<td>Witbank</td>
<td>39 002 319.35</td>
<td>22 371.46</td>
</tr>
<tr>
<td>Umtata</td>
<td>31 968 066.86</td>
<td>16 893.14</td>
</tr>
<tr>
<td>George</td>
<td>18 923 568.90</td>
<td>10 082.83</td>
</tr>
<tr>
<td>Nelspruit</td>
<td>17 602 073.72</td>
<td>10 098.44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12 20 133 697.53</strong></td>
<td><strong>4 056 794.44</strong></td>
</tr>
</tbody>
</table>

Table 5: SA Fresh Produce Markets
The following table summarises the trade balance:

<table>
<thead>
<tr>
<th>Year</th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Agriculture</td>
</tr>
<tr>
<td>2009</td>
<td>541 173,4</td>
<td>35 039,2</td>
</tr>
<tr>
<td>2010</td>
<td>585 547,4</td>
<td>34 626,8</td>
</tr>
<tr>
<td>2011</td>
<td>621 327,7</td>
<td>44 926,4</td>
</tr>
<tr>
<td>2012</td>
<td>832 917,2</td>
<td>53 071,0</td>
</tr>
</tbody>
</table>

Source: Stats SA, 2013

Table 6: Value of imports and exports

1.2.3.3 Trade review - Zimbabwe

Zimbabwe’s economy is mainly agriculture based and therefore a substantial amount of export to South Africa consists of agro based products such as prepared foodstuffs, beverages, tobacco and manufactured tobacco substitutes, animal products, vegetable products and animal or vegetable waxes among a variety of other products.

South Africa remains among the top trading partners for Zimbabwe. For a number of years, South Africa has been Zimbabwe’s single largest trading partner accounting for at least 40% of total exports and 60% of total imports. Presently, the majority of local manufacturers have resorted to importing raw materials from South Africa due to the decline in domestic raw materials supplies. Additionally, Zimbabwe currently imports household and basic goods from South Africa as the local industry is still struggling to meet demand. Zimbabwe’s farming output, including its staple maize crop, has slumped more than 60% since 2000, following seizures of white-owned farms by President Robert Mugabe’s government.

Statistics from the Zimbabwe National Statistical Agency show that during the past few years there has been a marked decline in Zimbabwe exports to South Africa, while imports from South Africa to Zimbabwe have increased significantly.

Currently, the majority of Zimbabwean supermarket shelves are constituted by around 70 percent imported products mainly from South Africa and 30 percent locally manufactured products. Manufacturing utilisation levels are currently constrained at around 40 percent, a situation that has been compounded since dollarisation by minimal liquidity in the economy, utilisation of antiquated machinery and poor utility services.

According to recent statistics, the trade deficit between Zimbabwe and South Africa is R5.3 billion. Zimbabwe is importing goods worth R32.3 billion from South Africa compared to exports of ca R27 billion to that country. The goods Zimbabwe is importing from South Africa range from basic agricultural produce such as pumpkins, butter nuts, oranges, apples, cauliflower and processed food products such as cereals and many others to high-tech products such as cars and machinery. Cars and machinery comprise ca 22% of Zimbabwe imports from South Africa. Zimbabwe’s total imports include fresh food (vegetables, fruit and
nests), estimated at R1,25 billion per annum, including beverages. Zimbabwe also imports ca R4 billion fertilisers and animal feeds.

In the short to medium term there are some primary goods that Zimbabwe is importing from South Africa that can be substituted with locally produced goods. Most agricultural produce are the easiest ones to deal with in the short term. This can be implemented using the model of import substitution industrialisation. The process has already started and recently Zimbabwe announced a total ban on South African imports of fresh fruit and vegetables based on the notion that increased local production would meet domestic demand in Zimbabwe. The ban will mostly affect supplies of tomatoes, potatoes, mangoes, grapes and apples from South Africa, which is estimated at R120 million per annum.

1.3 Market Analysis – Agro-processing

1.3.1 Industry overview

South Africa’s R49-billion agro-processing sector plays a significant role in terms of job creation and sustainability in the economy. Since the 2008-09 global financial crises, food processing had grown by over 2% more than South Africa’s manufacturing sector as a whole. The government’s New Growth Path (NGP) and National Development plan (NDP) had both identified agro-processing as a sector with high growth potential, despite the challenges of imports competition, loss of market, and the unstable currency and exchange rate.

Agro-processing (industry) is a subset of manufacturing that processes raw materials and intermediate products derived from the agricultural sector. Agro-processing thus means transforming products originating from agriculture, forestry and fisheries. The main megatrends that drive the growth of the agro-processing industry globally at national and international levels, include the rise in population growth; higher income growth that induces greater demand for highly processed and higher-value food products; greater participation of women in the paid labour force and increased ownership of household appliances (such as microwave ovens and refrigerators). Moreover, additional trends such as growing urbanization and the internationalization of retail have also contributed to the development of the agro-processing industry, especially in developing countries. Despite these promising trends, however, stringent public and mandatory standards pertaining to food safety, the shift from product to process standards, the rising scope of standards and the importance of collective private standards are the biggest challenges for expanding the export of agribusiness products to developed countries. South Africa needs to pay particular attention to the issue of food standards for purposes of compliance with the country’s export markets. The government agencies, the Department of Trade and Industry are working with the relevant industries and the SA Bureau of Standards to develop voluntary standards, to be followed by compulsory specifications, to protect South African consumers from low-quality and fraudulent imports.

The agro-processing industry in general plays a critical role for development, especially in developing countries. The agro-processing sector on average contributes 52%, 36% and 32% of the total manufacturing value added for Low, Middle and Upper Middle income countries, respectively. Furthermore, the contribution could reach 66% for agriculture-based countries and 38% and 37% for the transforming and urbanized countries, respectively. A World Bank Development Report (2008) noted that agribusiness can stimulate growth in the agricultural sector and reduce rural poverty. Similarly, the agro-processing industry has been identified by the New Growth Path as a key candidate for creating jobs and spurring growth
owing to its strong linkages with primary agriculture. IPAP also reveals that six of the top ten manufacturing industries with higher growth multipliers are the divisions of the agro-processing industry. In order to realise the full potential of these divisions, however, it is imperative to address the challenges facing the SME agro-processing industry.

1.3.2 Agro-processing production

The agro-processing industry plays a considerable role in contributing to the total output of the manufacturing sector. In general, output of the sector has been growing by an annual average rate of 3.3% since 2000, but has fallen by 7% owing to the recession in 2009. Agro-processing industry contributes the largest share (ca 30%) of the total output of the manufacturing sector, followed by metal, machinery and equipment.

The agro-processing industry contributed more than R330 billion of the total output of the manufacturing sector, followed by the metal, machinery and equipment industry (R225 billion) and the transport equipment industry (R155.3 billion) during 2006-2010. The trend shows that there has been consistent growth of real output for all sectors except metal, machinery and equipment during the past four decades.

An analysis of the real output produced by the agro-processing industry indicates that the food division is the most dominant (42%), followed by the paper (14%) and beverages industries (12%). The growth of leather and leather products during the past decade is considerable, though its share is still marginal (ca 1%). The wearing apparel and textiles divisions are the only divisions whose output declined during the last decade – its contribution to the total agro processing output is ca 7%.

Figure 5: The relative shares by divisions in the agro-processing industry

1.3.3 Agro-processing value add

Value added of an industry is its contribution to the Gross Domestic Product (GDP) of the whole economy. It is obtained by deducting the intermediate inputs used in the production process from the final output value. The agro-processing industry’s value added is the largest component of the manufacturing sector
and it contributed more than R82 billion during 2006-2010, followed by metal, machinery and equipment (R58 billion). The relative contribution of divisions to the total value added of agro-processing reveals that more than 50% of the value added was contributed by the food and beverages division, followed by the paper and wood divisions that contributed 12% and 8%, respectively, of the total agro-processing industry value added. In general, an analysis of the trend of the relative contribution in that the share of beverages, tobacco and wearing apparel displays a decline. There is, however, growth of the food, paper and leather divisions’ share to the total value added of the agro-processing industry.

Real domestic fixed investment in the manufacturing sector, and specifically in the agro-processing sector amounted for ca 28% of total investment in the manufacturing sector.

1.3.4 Agro-processing Trade: Import and Export

Of all manufacturing industries, metal, machinery and equipment generate the highest export values. While most of the manufacturing industries have shown an increasing trend in export value, the real export value of the agro-processing industry has declined over the last decade. The percentage share of export is largely dominated by metal, machinery and equipment (39.8%), followed by transport equipment (17.6%) and agro-processing (14.1%).

The sectoral contribution of the agro-processing industry to export values reveals that food exports accounted for 27%, followed by paper (18%), beverages (14%), wood (11%) and furniture (10%).

![Figure 6: The relative contribution to export by divisions in the agro-processing industry](image)

Food, beverages and paper are the dominant agro-processing divisions in terms of export values, where they accounted for more than 63% of the total export value.

The trade balance of the total manufacturing sector shows that the sector as a whole has been a net importer during the past three decades. A close look at various periods, however, shows that the net trade position of the manufacturing sector increased significantly over the past decade. The significant growth in net imports was due to the change of the agro-processing, chemicals and refinery industries from being net exporters to become net importers.
The metal, machinery and equipment industry, followed by transport equipment, agro-processing and chemicals, are the largest importers within the manufacturing sector. While the import share of the metal, machinery and equipment industry is declining marginally, this industry remains the leading importer of manufacturing goods. Within the agro-processing industry, imports by the wearing apparel and textiles division contributed roughly the same as the food imports. They account for 53% of total imports while paper, rubber and footwear divisions accounted for 11%, 9% and 8%, respectively.

![Figure 7: The relative contribution to imports by divisions in the agro-processing industry](image)

Similar to the trend in the manufacturing sector, there was a sharp increase in imports of most industries over the last decade. Imports of beverages, wearing apparel and furniture more than doubled during this period. The highest share of imports among agro-processing was for processed food (26.7%), followed by wearing apparel (14.7%), textiles (10.9%), paper (10.8%) and rubber (9.5%).

### 1.3.5 Agro-processing sub-sector contribution to trade

#### Food

The main food products exported include cane sugar (ca 10%), prepared fruit and nuts (8%) and fruit juice (8%), which account for more than 26% of the total export of food products. Export destinations for South African food exports are the SADC (36%), EU (18%) and Eastern Asia (10%). The other regions such as Western Asia, Sub-Saharan Africa (excluding the SADC), Northern Africa and NAFTA contribute less than 4% each of the total export destinations.

The main products imported are rice (11%), soybean oil cake (mostly used for animal feed production - 9%), palm oil (8%), and soybean oil (7.3%). The import origins of these products include South Asia (29%), ca 22% from South America and 21% from the EU.

#### Beverage

Wine is the top beverage export product, contributing 63% of the total beverage exports, followed by ethyl alcohol in alcohol and sprit form (23%). Notably, sprit beverages also top the list of beverage imports at ca 60%. Sweetened non-alcoholic beverages (9%) and malt (7%) are the next top listed imported beverage
products. The EU alone accounts for ca 65% of all beverages imported followed by NAFTA, which is the second main source of imports, accounting for 12% of imports

**Paper and Pulp**

SA has been a net exporter of paper and paper products since 1988. The trade balance, however, is getting narrower and is close to zero currently. This is further confirmed by the decline of the export-output ratio that reached a similar level to that of the import-domestic demand ratio. Among the products exported, chemical wood pulp, kraft paper and paper account for 36%, 13% and 11%, respectively, of the export value. The main export destinations of these products are South Asia (27%), the EU (19%), the SADC (14%) and East Asia (11%).

The main imported paper products include paper and paper board (used in the packaging industry and with special coatings), paper for writing and tissue papers. Together these products account for 59% of the total imports of paper and paper products. Imported paper products originated from the UK (47.6% of the total imports) followed by East Asia (14%), South Asia (9%) and NAFTA (7%).

**Furniture**

The trade balance for furniture is driven by imports of various products from China and Asian countries. Currently more than 20% of the domestic demand is met by imports and less than 20% of local producer furniture is exported. The main export destination of furniture products are the EU and the SADC, which account for 62.4% and 11.9% of the total exports, respectively. Seats, knock-down furniture and lounge suites are the main products imported and representing 49% and 36% of the total imports of furniture. It should be noted, however, that ‘seats’ can include car seats destined for the automotive assemblers.

**Leather and leather products**

Among the leather products, bovine or equine leather and leather of animals contributed 12.5% and 6.2% of the total export values, respectively.

The list of main leather products imported includes travel goods, handbags, wallet and jewellery cases, accounting for 48% of the total imports. Among the main origins of imports are East Asia (45%), Americas Rest (South and Central America) (20%), South Asia (13%) and the EU (7%).

**1.3.6 Agro-processing geographic distribution**

The regional distribution of the agro-processing industries indicates that:

- food, beverages and tobacco production centres are mainly located in the Gauteng, Western Cape and KwaZulu-Natal 26%, 23% and 22% respectively to total output;
- textiles, clothing and leather production occurs mainly in KwaZulu-Natal, the Western Cape and Gauteng each accounting for 36%, 22.2% and 20.7% of the total output, respectively; and
- production of wood, paper, publishing and printing products is dominated by operations in Gauteng, KwaZulu-Natal and the Western Cape, where each contributed 35.3%, 29.6% and 15.6% of the total output, respectively;
1.3.7 Agro-processing SWOT analysis

Key factors affecting the competitiveness of the agro-processing industry includes the following (applicable to the vegetable and fruit processing):

**Strengths:**

- Access to high quality raw materials;
- Counter seasonal supply of fresh produce to the Northern hemisphere markets;
- Established niche export markets; and
- Leadership in various sectors, e.g. citrus exports.

**Weaknesses:**

- Canning: expensive raw material inputs make industry less competitive. There is also a concentration of the supply base and lack of competition in the local industry;
- Strength of international private label brands has fuelled increased imports, e.g. jams and baby foods. Local brands are not able to compete;
- Large % of canned food is imported (tinned tomatoes; canned vegetable is especially uncompetitive owing to small scale of production; cost of packaging);
- All air dehydrated vegetables are imported, mostly from China; and
- Lack of support for local producers opens up the market for low priced low quality products from international suppliers.

**Opportunities**

- Innovation: new fruit varieties, packaging innovations from glass and metal to plastic;
- Counter-seasonal trade in fresh produce: Northern Hemisphere markets;
- Multinational companies seeking diversification of supplier base and seeking suppliers in Southern Africa (e.g. multinational beverage companies and processed food companies);
- Introduce stringent food quality regulations to prevent poor and cheap imported products; and
- Establish multi-nodal fresh produce and food processing hubs/centres with optimised logistics and trade systems (e.g. Greenport: Netherlands).

**Threats:**

- Canners lack the will to invest in expanded production owing to low profit margins/high input costs;
- Increased importing of low quality and cheap raw materials and finished goods;
- Logistics costs: Distance to markets and market access;
- Land tenure: the transfer of land process is cumbersome. Land cannot be used to secure funding if ownership is not registered;
- African countries that used to import fresh produce (fruits and vegetables) from South Africa are establishing their own agriculture capacity (more water available) and are becoming less reliant on South African producers; and
Changing consumer behaviour and awareness is leading to changes in preferences such as organic produce.

The changes in global food production creates an opportunity for South Africa to introduce new technologies and processes as well as food products in intensive farming methods, such as hydroponics.

1.4 Trends in Food and Vegetable markets

The European and EFTA (European Free Trade Association) represents an important market for South African agricultural produce. The following extracts from CBI Trend Mapping for Fresh Fruit and Vegetables were compiled by the CBI, Ministry of Foreign Affairs, Swiss Import Promotion Programme. CBI (Centre for the Promotion of Imports from developing countries) is an Agency of the Ministry of Foreign Affairs of the Netherlands.

The main trends for the coming years will be healthy natural products, corporate social responsibility (CSR) and convenience. More integrated CSR programmes and certification programmes are introduced with increased sharing of information along the total supply chain. The programmes contain food safety issues, environmental issues and social issues. Preconditions for entering the European market are good taste and adherence to maximum residue limits (MRLs). Although Eastern European countries’ exports to the EU, which rival DC exports, are increasing, there remains a demand for tropical and exotic products. Exports of these products to Eastern Europe will grow too.

![Figure 8: Key factors driving consumer market trends in EU](image-url)
The above diagram covers the key aspects that are driving consumer and market trends in the EU and EFTA. These include the following:

**Food safety as a precondition:** Food safety continues to be very important. Within the northwest European market, product requirements are already higher than the official EU requirements. Strict compliance with MRLs (maximum residue levels) and microbial contamination are a precondition when entering the EU market. Tracking and tracing is becoming more important, as well as certification such as GLOBALG.A.P. (Good Agricultural Practice) in order to ensure safety in relation to fresh fruit and vegetables.

**CSR is becoming mainstream:** Corporate Social Responsibility (CSR) and sustainability continue to gain importance. Consumers are more concerned about where products come from and how they are made. They thus demand more sustainable (i.e. socially and environmentally responsible) foods from retailers. Social aspects of CSR include Fair Trade and other similar ethical certifications. GLOBALG.A.P. has become a minimum standard for most European supermarkets, especially in the northwest European market. Certification relates to good agricultural practices including working conditions and production methods. CSR can include seasonal product consumption (which is cheaper) and local-for-local consumption which can be a threat for exporters from developing countries.

**Healthy living:** Health has always been a selling point for fresh fruit and vegetables. In the coming years, the importance of communication on the health benefits of these products will increase, as will the further introduction of ‘super fruits and vegetables’. Super fruits have special genetic characteristics and only a limited number of fruits may qualify. Examples of super fruits include a variety of berries (raspberry, goji berry, cranberry, acai berry or blueberry), pomegranate or papaya. Super fruits with good taste are particularly interesting for high-end consumers. Super vegetables are less interesting as they are also produced in Europe.

**Pure and natural:** In northwest Europe, demand for pure and natural products and organic products are still increasing. Consumers relate organic fruit and vegetables to health and better taste. Consumers can identify these products via certified product labels. Organic and natural aspects, including fair trade, will become an integral part of companies’ social responsibility programmes. New products will target specific groups and may include healthy snacks for children or healthy food alternatives for the obese society.

**Healthy convenient food:** Convenience (ready-to-eat, cut and mixed, longer shelf life, snack size) and smaller portion-packs are becoming more popular in northwest Europe. Although demand in other parts of Europe is still low, it is on the increase. Examples of convenience fresh fruit and vegetables include ready-to-elect, pre-cut or ripened products. An underlying trend is the improvement of ripening processes for fruits such as mango, pineapple and avocado in the importing country. This improves taste and lowers costs and means that pre-ripened fruit does not have to be flown in from exporting countries. Fruits can often be picked in an unripe condition and shipped to the importing countries instead of being picked ripe. Varieties that can ripen in conditioned environments are required.

**GM products:** EU countries have strict rules for approving genetically modified organisms or foods (GM products) for the market. Genetically modified fruit and vegetables are not currently permitted to enter the market. All food products containing more than 0.9% GM products must be labelled and follow strict traceability rules. It is expected that GM fruits and vegetables will continue to be banned from the EU for many years.
**Product safety:** Phytosanitary issues are always important to European control agencies. Detection of diseases or pests may cause rejection of trade of ultimately lead to import bans. At the moment, Citrus Black Spot disease in South Africa causes concern with European control agencies.

The shifting trends and demands from the key exports markets necessitates that South African producers asses and improve/upgrade their processes and products to meet these requirements or run the risk of losing market share.

Due to the fragile and perishable nature of the product, this industry requires a high degree of coordination between the different actors along the chain. Logistics and transportation are key supporting activities in the global fruit and vegetable value chain. Conditions for participating in the fruit and vegetable Global Value Chain (GVC) have changed as a result of the adoption of rigorous standards in the industry as reflected above. Exporting countries that have problems in meeting the standards may lose the export market.

Maintaining standards and quality and at the same time remaining flexible to meet changing consumer demands and tastes requires continuous investment in new technologies to increase market acceptance. It is therefore difficult for small scale farmers to meet these requirements on an on-going basis. This is especially true for high value added fragile and perishable products, such as berries and cherries that offer higher returns than commodified fruits and vegetables.

South Africa can take note of these developments and look for opportunities within the SEZ’s to enter new products into the existing markets wherein South African exporters already have good penetration. Notable the berries and cherries as well as other super fruits and vegetables need to be exploited. Countries such as Chile and Kenya apparently already have successes in these and similar products destined for the EU markets.

### 1.5 Opportunity Identification and Analysis – Agro Processing

The research team identified investment and business opportunities for the proposed SEZ in Limpopo using the following structured approach:

- Obtain information from the key government departments involved in the agriculture, agro-processing and logistics industry in the province and in the immediate region, i.e. local and district municipalities;
- Review current provincial and national economic activity in the sector and subsectors;
- Review the provincial profile in terms of economic activity and resources as well as infrastructure, specifically roads and transport network. In this regard, access and proximity to major consumer markets and export markets where considered;
- Review economic performance of sectors and sub-sectors in the agriculture industry of South Africa with the objective to identify:
  - High growth sectors that have further growth potential and that might require additional productive capacity;
  - High import volumes and value of food and fresh produce that might offer opportunities for replacement;
  - Sectors within agriculture that have garnered government support and would therefore be more receptive to local institutions for support and growth; and
Fundamental changes in the economic sector that will introduce significant changes to the structure of the local industry, e.g. the increase of import duties and levies on poultry meat.

Using the above assessment, the team identified opportunities for the expansion of current economic, agriculture and industrial activities that could capitalise on the opportunities. The objective is to determine if the opportunities can be exploited by current industrial and agricultural partners or if new enterprises needed to be established.

It was also necessary to identify the suitability of the land and agriculture resources (skills etc) and the location thereof in relation to the proposed SEZ to determine the likelihood that the farming community will be able to capitalise on these opportunities.

These opportunities are then assessed and include in the SEZ strategy as catalytic projects and projects that needed further development and projects that are only in concept stage.

### 1.6 Identification and Analysis of Key Sectors, Value Chain and Product Lines

#### 1.6.1 Introduction and methodology

While Limpopo and the Vhembe District provide opportunities for agriculture production of primary agricultural products the region in the vicinity of the Musina municipality has limited agricultural potential except for vegetables and certain crops. The research conducted by the team included the following documents, discussions and findings:

- The Agriculture Research Council (ARC) is currently conducting a study into the Establishment of Fruit and Vegetable Enterprises and the Development of Mini and Macro AgriParks in different provinces of South Africa on behalf of the Department of Rural Development and Land Reform. The report findings in terms of Apart from the Levuvhu/Mutale area, where the new Nandoni Dam resulted in a temporary water surplus, little or no opportunity exists for expansion of irrigation in this District Municipality;
- The Department of Agriculture and the National Agriculture Marketing Council conducted a study in 2008 into the economic viability of establishing two fresh produce depot facilities per province in South Africa. The study highlighted the suitability of Vhembe as the most suitable and likely site due to its proximity to production areas suitable for vegetable production;
- Limpopo Province has five district municipalities. The gross farm income from vegetables in this province runs into millions in all five district municipalities, with the highest income coming from Capricorn, Mopani, Sekhukhune, Vhembe and Waterberg, which generated R 162 million, R141 million, R74 million, R39 million and R27 million, respectively. The leading vegetables produced in Limpopo Province are tomatoes, potatoes, onions, sweet potatoes, pumpkins, peppers, cucumber, beetroots and to a certain extent, carrots; and
- In terms of fruit production, all district municipalities also have gross farm income that runs into millions, with the main producing areas being Mopani, Sekhukhune, Vhembe, Capricorn and Waterberg, which generated R283 million, R197 million, R53.9 million, R20.9 million and R13.4 million, respectively. The major fruits produced in all districts are citrus, followed by various subtropical fruits, which are not substantially produced in Sekhukhune and Waterberg district municipalities. However, the latter two districts produced substantial amounts of table grapes.
The agriculture potential of the Limpopo province is illustrated in the following two diagrams developed by the ARC as part of their research project in respect of the “Establishment of Fruit and Vegetable Enterprises and Development of Mini and Macro AgriParks in different Provinces of South Africa” currently underway. The first illustration covers most vegetable products and indicates that the land area in Vhembe is marginally suited for vegetable production.

Figure 9: Land suitability in Limpopo for vegetable production

The following diagram illustrates that the area around Musina in Vhembe is not suited for horticulture production, such as citrus and subtropical fruits. The closest areas are in Makhado and Thoyoyandou. This does prompt the question of Makhado might not be a more suitable location for an agro-processing hub.
Besides the obvious agriculture based opportunities that have been identified out of existing surveys and research, there are a few opportunities that can be considered within a more expansive agriculture and agro-processing development strategy for the proposed Musina SEZ. These include the following:

- The production of apples in the Waterberg district also holds promise for the future as does the production of cherries and berries (strawberries and blueberries) in the Polokwane and Haenertsburg areas of Limpopo;
- The various industry associations, such as the Fruit and Vegetable Canners Association, Skin, Hide and Leather Council, SA Poultry Association and others did not raise any new project or business opportunities that could be associated with the proposed SEZ in Musina. However, in discussions with firms in Polokwane, the possible establishment of a new apple project to produce apple juice for the cider industry was indicated as a new venture. It appears that the Waterberg district has a unique climate and soil environment that is conducive to the production of the required variety of apples for the cider industry;
- A further opportunity that can be developed is the establishment of a fish feed production facility in the same area. The Highveld region production of legumes and summer and winder cereals can provide the feedstock for a fish feed factory that can be used to provide fish feed to micro aquaculture farms in the Inyaka Dam area. The aquaculture production can be integrated with the irrigation systems of the citrus and subtropical fruit projects;
- Zimbabwe remains a net importer of cereal products, animal feeds and fertilisers and whilst the country has banned imports of fresh fruit and vegetables and nuts, the imports of processed food products is still a significant contributor to the retail food industry in Zimbabwe. Together with the export markets further north in Zambia, the following agro-processing projects could be considered viable in Musina:
o Soya bean processing for human consumption – meat and animal protein replacement products that include meat equivalent products, and meat extenders as well as soya milk products for lactose intolerant consumers;
o Soya bean processing for animal feed production – soy oilcake is still imported into South Africa in large quantities to produce animal feed;
o Cereal production – for the local and export market;

- Poultry processing – abattoir and rendering plant for chicken processing. The introduction of the new import duties and levies on poultry processed products by the dti has opened the door for poultry production to grow and expand again in South Africa. With a projected increase in demand for poultry products of over R5 billion over the next 5 years, the large Limpopo (and Zimbabwe) population and the fact that only 2% of South Africa's poultry meat production takes place in the Limpopo, the opportunity to establish a substantial poultry processing facility in Musina SEZ appears very viable; and
- A fertiliser blending plant. The Limpopo province is a significant user of fertiliser, accounting for ca 10% of the country’s fertiliser consumption. Zimbabwe imports fertilisers and a blending plant on the border of Zimbabwe will be able to also supply in the needs of its farming community.

The above opportunities needs to be included in an overarching strategy to develop the soya bean and cereal (wheat and maize) production in available land in relative close proximity to the Musina SEZ. The apple production might be too far from the Musina SEZ to be included in the same location. However, a satellite site in the Waterberg district might be considered.

The following factors are considered key drivers for the development of the agro-processing SEZ in Musina:

- The geographic location of the Musina SEZ and its proximity to the SADC neighbours of South Africa;
- The development of the North-South corridor (Dar Es Salaam). This prompted the assessment of the logistics network and the role it can play in the logistic supply chain of various products and commodities; and
- The major role that the agriculture plays in the Geographic GDP of the province and South Africa. It was noted that while the area is a key producer of a number of agriculture products, little value adding takes place in the province itself.

Each of the proposed business opportunities for the Musina agro-processing SEZ was reviewed in terms of the sub-sector economics and market conditions.

1.6.2 Poultry and broiler production

Broiler production, especially broiler meat production is the largest segment of South African agriculture accounting for ca 23% of all agricultural production and 35% of all animal products in South Africa. The farm income from broiler meat for 2010 was R32.7 billion and R54 billion at retail level (eggs and meat included). Broiler production dominates the agricultural sector and it is the main supplier in protein terms of food than all other animal proteins combined followed by beef. The growth had spill-over effects in the grain and chick industries. Broiler meat accounts for about 93.6% to the total poultry-meat production, with the rest made up of mature chicken slaughter (culls), small-scale and backyard broiler meat production and other specialized broiler meat products (geese, turkey, ducks and guinea fowl).
The North West Province produces 24% of the entire broiler meat in South Africa followed by Western Cape by 21%, Mpumalanga 18% and KwaZulu-Natal 16%. Limpopo and Northern Cape were the least producers, producing 2% each.

Over the next decade the growth in the consumption of chicken meat is projected to outpace the growth for all the other types of meat, mainly due to its competitive price relative to other proteins. With an increase of 47% (compared to 84% over the period 2002 – 2012) over the next decade, the total consumption of chicken meat is projected to reach almost 2.56 million tons by 2022. This implies that per capita consumption of chicken meat will exceed 48kg by 2022. The consumption of eggs is also expected to increase by 33% (compared to 38% over the period 2002 – 2012), exceeding 545 thousand tons by 2022. Beef consumption is expected to grow by 27% (compared to 10% over the period 2002 – 2012). Although the sheep meat market is relatively small, growth of 16% (compared to a contraction of 18% over the period 2002 – 2012) is expected over the next decade. Pork consumption is projected to grow by 41% (compared to 62% over the period 2002 – 2012) until 2022. South Africa is expected to remain a net importer of chicken meat as the annual average growth in production (1.6%) is outpaced by the growth in consumption (3.7%) over the outlook period. Chicken production will increase to 1.73 million tons over the next decade (BFAP).

The domestic market consists of approximately 265 formal abattoirs. These abattoirs sell mainly to 5 main retailers (Pick n Pay, Shoprite-Checkers, Spar, Woolworths and MassMart) and SMME’s in the retail sector. These retailers buy the largest share of domestic production. The broiler meat industry in South Africa is dominated by 2 large producers, namely Rainbow and Astral. Together these 2 companies produce 50% of the total broiler meat production. The other 4 medium-sized producers (Tydstroom, Daybreak, Chubby Chick and Rocklands) produce more than 400 000 broilers each per week or 15% of the market. Argyle owns 2% of the market with more than 300 000 broilers per week followed by approximately 49 smaller producers producing less than 200 000 broilers per week each and around 1745 subsistence farmers (selling approximately 500 live chickens per week).

The retail food industry is valued at R250 billion per annum. Animal products comprise 29% of this market (R72 bn per annum) and broiler meat 35% of the animal products, ie R24 bn per annum. Brazilian broiler producers aggressively target the South African market and account for the major portion of imported broiler products, such as deboned (38%) and on-the-bone frozen (40%) chicken portions of a total of 325,800 tons being imported in 2012. This represents ca R5.4 billion in value terms. The following diagram illustrates the current and projected shortfall in broiler meat and the projected growth in imported broiler meat under this scenario. The industry approached government in 2013 and requested that duties be imposed on imported processed broiler meat (whole and portions). The dti imposed import duties and levies on imported chicken products in 2014 and paved the way for the recovery and expansion of the broiler industry in South Africa. Limpopo and Mpumalanga can capitalise on this opportunity and enter the market on a commercial scale.
Together with the growth in local broiler production, the industry will require broiler feeds. Soya oil-cake is a significant ingredient of broiler feeds and currently South Africa is a net importer of soybean oil cake.

1.6.3 Soybeans and oil-cake

Soybean consumption in the country is estimated at 32% for oil and oilcake, 60% for animal feed (especially in the broiler and egg industries) and 8% for human consumption. Soy oil (18% of the seed) is processed to specific oil products for use in the food industry. Soy bean products also have very specific advantages such as the lowering of cholesterol and combating of heart diseases. Soybeans also serve as valuable source of proteins for vegetarians.

The contribution of the soybean industry to the gross value of agricultural production corresponds with the trend in the area planted and total production for soybeans. The industry’s contribution to the gross value of agricultural production was at very lower levels during 2002 season and this declined slightly during the year 2003. This was followed by considerable fluctuations from 2003 until the gross value of agricultural production reached higher level during 2009 season. The observed fluctuation in Soya beans GVP was as a result of inconsistencies in both production volumes and prices of soya beans over the period under analysis. The soy GVA increased dramatically during the year 2011 to close at the highest of about R2.25 billion.

The contribution of various provinces to the national Soya beans production is depicted in Figure 2 below. Mpumalanga province produces the greatest quantities of soybeans in three districts namely, Gert Sibande, Nkangala and Mankaligwa in the towns of Middleburg, Delmas, Ermelo and Secunda. It is followed by the
Free State province, Thabo Mofutsanyane district, around the towns of Bethlehem, Witsieshoek and Harrismith, serves as the main producing region in Free State Province.

Mpumalanga is the main producer of soybeans (ca 300,000 ton/annum) followed by Free State (190,000 ton per annum). Limpopo produces ca 60,000 ton per annum. The production of soya beans in Limpopo can be increased given the right soil and climate conditions.

The demand for soybeans is largely from the crushing or processing industries. Factors that increase the demand for meal and soybean oil such as rising incomes and populations result in a greater demand of soybean through increased crushing activities. Rising incomes (per capita GDP) and population leads to a higher demand for livestock products as food consumption increases. This in turn stimulates the demand for animal feed as the production of livestock is increased to meet rising food demand. As such the demand for oilseed meal also rises as more protein feed is being demanded. Likewise, rising incomes and populations will also lead to a greater consumption of vegetable oils as the demand for cooking oils and dairy products increases. However, the use of soybean oil in cooking and other food preparation activities is relatively lower than for other oils from other oilseeds namely, canola and sunflower.

- Oil and oilcake 250,000 ton/annum
- Seeds and feeds 150,000 ton/annum
- Human consumption 50,000 ton/annum
- Export 150,000 ton/annum

Soya bean exports to various regions of Sub Saharan Africa have been far below 150 thousand tons for most part of the period under review, as compared to the volume of soybeans sold on the domestic market. South Africa is able to process its total local production in local facilities and even export some soybeans. However, South Africa still imports a significant percentage of its soy oil and oil-cake requirements.
Both imports and exports of soya bean oil are predominantly refined oil. Imports of soya bean oil from Brazil and Argentina have decreased significantly over the past five years, while imports from Spain, the Netherlands and, to a lesser extent, Germany have increased significantly. A share of these imports is then re-exported mostly to Zimbabwe, and also to Zambia and the Congo.

Summer grain producers increased sunflower planting from 453 000 hectares in 2012 to 504 000 hectares in 2013 while soybean plantings increased from 472 000 hectares to 529 000 hectares in 2013. Due to lower yields the average real gross income per hectare of sunflower is expected to be lower in 2013 despite the higher prices levels. The average real gross income per hectare of soybeans however, is expected to increase in 2013 due to higher prices and improved yields. The good returns offered by soybeans will encourage producers to increase soybean plantings further in 2014. Due to the drought experienced by summer grain producers in the western parts of the summer rainfall areas in 2013, producers are expected to increase sunflower plantings in 2014 because of its drought resistant characteristics, despite the lower average real gross income per hectare achieved in 2013.

**Domestic soybean oilcake situation and trends**

Over the past decade South Africa has had to import close to 90% of its domestic consumption of soybean oilcake on average. However, the continued growth in local soybean production and crushing capacity over the baseline period will result in a significant growth in locally available soybean oilcake, making South Africa less dependent on imports. Despite higher domestic production of soybean oilcake, prices will still be
determined by international prices and the exchange rate, hence the local soybean oilcake price is to projected decline on average during 2014 before moving upwards again.

Over the next years there will be fierce competition between the local and imported soybean cake with the quality and nature of the local product that has to be established and settled as it makes its way into the animal feed market.

Forward linkage:

- Animal feed and human food consumption markets in Southern Africa.

Backward linkages:

- Soybean production and farming; and
- Farm input, such as fertiliser, crop remedies (agro-chemicals), transport.

### 1.6.4 Fruit juice industry

The South African juices category recorded volume sales of over 160 million liters per annum and is projected to grow at ca 4% per annum for the foreseeable future. Factors like the country’s subtropical climate, a high proportion of young population, and increasing health consciousness are driving juices consumption and sales in the country. On the other hand, food price inflation is expected to impact the sale of juices in future.

The volumes of fruits (citrus, subtropical and deciduous) available for processing in South Africa fluctuate yearly, depending on the crop size and the percentages of exportable fruit. Processors purchase directly from the growers as well as form the NFPMs. The following table illustrates the volume of fruits from local producers that is processed:

<table>
<thead>
<tr>
<th>Category</th>
<th>Processing Tons ('000)</th>
<th>Juice Tons</th>
<th>% juice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deciduous fruits</td>
<td>482</td>
<td>336</td>
<td>70%</td>
</tr>
<tr>
<td>Subtropical fruits</td>
<td>127</td>
<td>126</td>
<td>99%</td>
</tr>
<tr>
<td>Citrus fruits</td>
<td>485</td>
<td>460</td>
<td>95%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 7: Fresh fruit used for processing (volumes)*

Approximately 23% of the deciduous and citrus fruit production is sent for processing. Fruit juices are exported in concentrated/frozen form or fresh. Annual exports of fruit juices amount to ca 28,000 ton per annum. Imports are minimal and estimated at 2,800 ton at a value of ca R300 million per annum for subtropical and citrus juices.

South Africa is a net exporter of fresh and concentrated fruit juices valued at R4.4 bn per annum (ca 362,000 tons per annum) of which apple juice exports comprise ca R1.1 bn. It is interesting to note that South Africa industry also imports ca R1 bn fruit juice, comprising R700m of apple juice predominantly from China. The local production of ca 237,000 tons of apple juice per annum is mostly sold as fresh, while some is used for apple cider production (Distell in Western Cape). The local varieties of apples (juice extracted from them) are not suited for cider production and therefore the local distillers have to blend a number of
varieties to obtain the correct blend for apple cider. Apple juice is produced by the maceration and pressing of apples. The resulting expelled juice may be further treated by enzymatic and centrifugal clarification to remove the starch and pectin, which holds fine particulate in suspension, and then pasteurized for packaging in glass, metal or aseptic processing system containers, or further treated by dehydration processes to a concentrate. Due to the complex and costly equipment required to extract and clarify juice from apples in large volume, apple juice is normally commercially produced. China is one of the world’s largest apple producers. The apple juice imported to South Africa is mostly used as a base for blending other juice concentrates in, e.g. guava and mango, and for cider production. The imported juice from China is very cheap (un-clarified) and would likely be very difficult to replace.

Citrus development in the EU market is constrained due to the high cost of land and production. The large multinational beverage companies are also looking at diversifying their supply risk and intend to spread the sourcing of ingredients and base raw products from more than just one area. This creates an opportunity to South Africa to increase its role in the global beverage supply chain. South Africa is also the closest agriculture market to EU of all countries in the Southern Hemisphere.

South Africa is a major exporter of fruit juices to counter cyclical markets in the Northern Hemisphere as illustrated below.

<table>
<thead>
<tr>
<th>Juice exports (2013)</th>
<th>Rand million</th>
<th>Volume (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>R 1 200</td>
<td>129 679 548</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>R 748</td>
<td>56 103 544</td>
</tr>
<tr>
<td>Pineapple</td>
<td>R 413</td>
<td>40 321 041</td>
</tr>
<tr>
<td>Tomato</td>
<td>R 3</td>
<td>327 616</td>
</tr>
<tr>
<td>Grape juice</td>
<td>R 772</td>
<td>68 880 167</td>
</tr>
<tr>
<td>Apple</td>
<td>R 1 000</td>
<td>96 527 346</td>
</tr>
<tr>
<td>Juice of any other single citrus fruit</td>
<td>R 637</td>
<td>51 781 310</td>
</tr>
<tr>
<td>Juice of any other single fruit or vegetable</td>
<td>R 1 200</td>
<td>565 332 019</td>
</tr>
<tr>
<td>Mixture of juices (of Fruit, vegetables)</td>
<td>R 2 200</td>
<td>7 644 656 426</td>
</tr>
<tr>
<td>TOTAL</td>
<td>R 8 173</td>
<td>8 653 609 017</td>
</tr>
</tbody>
</table>

Table 8: SA fruit juice exports

Opportunities:

- Apple juice to replace imported juice from China.
- Guava and Mango juice targeting ‘super fruit’ health conscious market in Europe.
- Lemon oils and concentrated lemon juice for EU and USA markets. The export of lemon juice concentrate from South Africa is underexploited.

Forward linkages:

- Juices are sold to consumers through the retail outlets and through the hospitality industry.
Backward linkages:

- Limpopo contributes less than 1% towards the local apple production. Production occurs mostly in the Mopani and Vhembe districts. In general Limpopo is not considered an apple producing region;
- Apple production in the Waterberg district could open up new opportunities.

### 1.6.5 Dry Beans

South Africa, three types of beans are mainly produced, namely Red Speckled beans, Small White canning beans and Large White Kidney beans. The Red Speckled beans command the biggest market share and are mainly sold in retail quantities in the supermarkets for preparation at home. Small White canning beans are mainly used for canning purposes and because of the increasing consumer demand for convenience foods, there is a growing market for these beans. Large White Kidney beans are mainly used for retail packaging and to a lesser extent for canning purposes. Other locally produced bean types such as the Haricot beans have a very limited domestic market.

Dry beans are an ideal rotation crop and research has shown that dry beans ensure higher yields in a crop rotation system. From an economic perspective it makes sense to plant beans in a crop rotational system with maize on suitable soils. The recommendation is one year of dry beans out of every three to four years in a crop rotation system.

Production percentage per production area is as follow:

- Free State 43%;
- Mpumalanga 24%;
- Limpopo 10%;
- North West 8%;
- Gauteng 8%; and
- KwaZulu Natal 7%

On average, the local dry bean industry contributes R343 million towards the gross value of agricultural production and this represents a 1% contribution towards the total field crop’s GVP.

#### Domestic Market and Consumption

The domestic market is made up of both informal and formal markets. The informal markets include hawkers and spaza shops, formal market is made up of various retail stores, grain buyers, processors while exports is mainly African countries more so in food aid schemes and niche markets exist for split beans.

The domestic consumption of dry beans in S.A far exceeded the domestic production, the consumption levels have increased over the years reaching peak volumes of 140,000 tons in 2008/09 and the production levels have declined over the year. This makes South Africa a net import of dry beans to meet domestic demand.
Exports

South Africa’s dry beans exports during the year 2009 were destined mainly for countries such as Zimbabwe, Mozambique, France, Mauritius, Zambia and Angola. South Africa does not have to pay duties to export dry beans to countries such as Zambia, Mozambique and Mauritius due to a SADC free trade agreement, playing in favor for S.A as the demand for imports of dry beans is on the increase in these countries.

Imports

Imports of dry beans amount to an average of 75 000 tons per annum and the imports originates mainly from Asia, the America- Brazil, Canada and Europe, while imports from African countries are at minimum level.

Processing of Dry Beans

Dry beans are available to the consumer either as packed dry beans or as processed dry beans. Red speckled, Large White Kidney and Small White beans are canned in a saline solution and can also be canned in tomato sauce (baked beans). Canners require high volumes and have to look outside of country for more volumes as local production is not able to meet local consumption. Split bean is also a growing niche market for export and it can be processed in the form of flour, bread and pasta.

According to industry experts, the canning side of the market is in the region of 15 000 to 17 000 tons per annum. This implies that pre-packers use around 100 000 tons of beans per annum. A small percentage (approximately 15%) of the local bean crop is used for canning of beans. Canners try to meet their requirements locally, but have, in the past, bought relatively large quantities on the international market. The largest canner in SA, which cans more than 50% of the beans, is situated in Gauteng. Other canners are found in the Western Cape, Kwazulu-Natal and Mpumalanga.

Opportunity: Canning of dry bean produce in Limpopo.

Backward Linkages: Increased growth of dry beans in the Limpopo province. The ARC study indicates that the land suitable for bean production is in Vhembe (marginally suited) and Capricorn (ideally suited). The lack of potential to expand the irrigation in Vhembe might be a constraint.

Forward linkages: South Africa and SADC processed food market.

1.6.6 Fresh Cut Vegetables.

The increased trend to healthy living is reflected in consumer preferences for fresh products, such as fresh fruits and vegetables. Currently the EU market consumes ca 80,000 tons per fresh fruits per annum (25,000 tons imported) and ca 68,000 tons of fresh vegetables per annum (12,000 tons imported). The preferred packaging is fresh. There is a growing trend to buy fresh-cut vegetables and fruits and the demand for
these products is growing in excess of 4% per annum. A key driver for this trend is the high value of the products and the attractive margins for the entire value chain. The retailers in EU are continuously seeking new products to diversify their product range.

The establishment of a High Care fruit and vegetable processing and packaging facility adjacent to the fresh produce trade hubs, can capitalise on this demand in the local and export markets. It is, however, essential that the cold chain be maintained from the first handling of the produce to the final sale to the consumer and that the process does not take longer than 24 hours. This necessitates that such a facility be supported by a highly efficient logistics service provider. Since the attractive markets as the major metropolitan areas of South Africa and EU, it would also essential that the High Care facility is in close proximity to an airport.

A high care facility in the proposed Musina SEZ will need to be in close proximity to its production areas for most of the vegetables and also to an international airport to access the EU market. This might be a key constraint for its establishment in Musina — a better location would be Polokwane.

1.6.7 Fertiliser industry

The South African fertiliser industry is faced with increasing imports and poor local production facilities that are using outdated technologies. South Africa imports a significant component of the fertiliser requirement due to the fact that only Phosphate (P) is available locally with some nitrogen (N, mostly in the form of Ammonia). The full complement of the potassium (K) is imported. Phosphate is available from Phalaborwa and Ammonia-based fertiliser can be obtained from Sasol. The potassium can be imported via Maputo — much closer than Richards Bay.

A fertiliser blending plant will blend the N, K and P to meet local soil conditions and plant nutrient requirements. This will require access to a soil and leaf analysis laboratory that can be established on the same site or more central in the province, i.e. Polokwane.

The total South African demand for fertilisers is estimated at R12 billion for 2013/14 and ca 10-12% of this demand is applied to agriculture in the Limpopo province with a further R3 billion export opportunity to Zimbabwe.

The local (South African) production of fertilisers has become a significant industry and player in the South African and African agriculture industries. A brief overview of the fertiliser industry provides the background for an opportunity in the Musina SEZ: a fertiliser blending plant.

The South African fertiliser industry supplies about 2 million tons of fertiliser products annually at a value of around R12 billion. This is equal to about 750,000 tons of plant nutrient (N + P2O5 + K2O). It is estimated that ca 400,000 tons of the fertiliser is exported to predominantly Sub-Saharan countries. The importance of the industry is highlighted by the fact that it represents approximately 20% of RSA chemical industry (excluding oil). South Africa has an abundance of phosphor (P) required to produce the fertiliser while potassium has to be imported as there is no local source of supply for this ingredient. Nitrogen (N) is sourced from SASOL and meets ca 50% of the fertiliser demand. This means that ca 160,000 tons of potassium and 150,000 tons of nitrogen (as Urea) is imported into the country.

The main manufacturers of fertilisers in South Africa are Omnia, SASOL and Kynoch (previously Yara). Between them they produce 94% of South Africa’s fertiliser demand. Profert is a small player in the
industry. There are also a number of fertiliser blenders in South Africa that blend the N:K:P concentration to meet specific plant and soil requirements.

Fertiliser is consumed by the agriculture industry and mostly crops such as maize (40% of consumption), sugar cane (between 15% and 18%) and wheat (10%). A small percentage is used for the production of animal feeds. The production areas responsible for the production of these crops therefore also represent the major markets for locally producer fertilisers. 40% of total domestic fertiliser is consumed by Gauteng, Mpumalanga, Limpopo and North West province, while the Free State uses 20% and the remaining 40% is consumed in Kwazulu-Natal and the Western Cape.

South Africa’s import of fertiliser is steadily increasing as the demand increases and as current production capacity continuous to decline due to the age of the current production facilities. In a report by Grain SA, Grain SA Fertiliser Report (NAMC: 2011), the researchers point out that current government incentives do not support the establishment of a fertiliser plant.

The proposed Musina SEZ offers a significant competitive advantage for a fertiliser production plant and blending plant due to its proximity to Foskor, Phalaborwa (for the supply of phosphate) and the Maputo harbour for the import of Urea and Potassium. It is also close to some of the main markets in Limpopo (wheat and maize) and Zimbabwe (export).

1.7 Prioritisation of Agri-processing Sectors

The government priorities are aligned with the development of agriculture/aquaculture and food processing as guided by the IPAP and SIP strategies and supported by the DAFF and provincial policies and strategies. Prioritised sectors are driven to a large extent by the availability of raw materials and secondly by access to markets.

In the case of the proposed Musina SEZ, the key drivers will initially be the establishment of opportunities that can make immediate use of the available raw materials and capitalise on an existing market need. These include opportunities to:

- Process soybeans and cereals for human consumption producing alternative meat equivalent products (soya) and cereals (wheat, maize, sorghum etc.) for the consumer market;
- Soy-oil cake production and associated soy-oil production for animal feeds (beef and poultry to a lesser extent);
- Fresh produce trading hub to provide fresh vegetables (predominantly) to the traders on the Fresh Produce Markets (FPMs);
- Vegetable drying facility. South Africa currently imports all its dried (dehydrated) vegetables; and
- Fertiliser blending plant. The fertiliser consumption in the Limpopo Province creates a natural demand for a fertiliser blending plant. The blending plant will blend N, K and P according to the plant nutrient requirements of the farmers’ soil and crop leaf analysis.

The second phase development of opportunities for the Musina SEZ requires the further development of supply chain in some form or another:
The fresh produce trade hub in Musina requires engagement with the farmers to produce vegetables according to the market requirements. The success of the trade hub will also require intervention and integration with other FPM’s in the country, namely the JFPM and TFPM;

The establishment of a High Care fruit and vegetable processing facility will also require participation of farmers in the area and partnering with a suitable logistics company. Export facilities via;

Soy oil cake production will depend on the increased production of soybeans on farms in the area. While the market prices are trending upwards, there will be good motivation for existing farmers to increase their current hectares under soybean and also attract new farmers;

Cereal production and processing plant can utilise the cereals from the farmers in the province. Most of the cereal production takes place in areas further south from Musina. However, a cereal processing plant for human food consumption will most likely stimulate cereal production in the areas closer to Musina; and

Poultry and broiler production. The new trade barriers imposed on imported broiler meat from Brazil and other South American countries creates the opportunity to current broiler producers to increase their capacity and for new entrants to enter the market. It is estimated that by 2020 a further R5bn in broiler meat will be required to satisfy the local demand.

The establishment of Agro-parks is a concept that is used to attract investment to agro-processing facilities or hubs within a given area that has good and varied agriculture production potential. The implementation of such an initiative in the Bushbuckridge proposed facility will provide the impetus for the development of the surrounding agriculture production of the crops and livestock required. The Agro-park initiative is still in concept phase in South Africa although it has been applied successfully in other developing countries in Africa and further afield.

It is proposed that such an initiative be introduced to the Musina SEZ.

1.7.1 Availability of Raw Materials

The agricultural activities in Limpopo range from small vegetable gardens to commercial farming, both rain fed and irrigation. Farming activities include:

- Field crops ((summer cereals, winter cereals, oil seeds, legumes, fodder crops);
- Vegetables – all types of;
- Citrus – mostly in the eastern areas of the province;
- Subtropical fruit – mostly in eastern and middle areas of the province; and
- Nuts (macadamia and groundnuts).

The farming activities already provide produce to the Johannesburg Fresh Produce market – it is estimated that ca 40-45% of the vegetables sold on the JFPM originates in Limpopo. Fruits (citrus and subtropical) are sold to a number of fruit juice and fruit drying facilities in the Capricorn and Mopani district municipal areas (Granor Passi (Letsitele and Polokwane), Letaba Citrus processors (Letsitele)) and Walko Foods in the Vhembe municipal district.

The livestock enterprises include all forms of animal husbandry. The livestock is processed in the Limpopo province by ca 60 red meat abattoirs and several poultry abattoirs such as Mike’s Chickens and Spiffs.
Animal feed suppliers to the livestock industry in Limpopo include companies such as Brennco Feeds (Makhado). Maize mills in the Limpopo province include VKB Mills in Thohoyandou while Nedan Oil mills extrude oil from cotton seeds, sunflower seeds and soy beans.

In the cereals agro-industry, the Limpopo province is a lesser supplier of crops such as white maize (2% of national production), sunflower (10% of national), soya (7%), groundnuts (6%), dry beans (13%) sorghum (14%) and wheat (7%). The extent to which the areas under cereal production can be expanded needs to be investigated but it should not be a constraining factor to the establishment of feed and food (for human consumption) processing facilities in the SEZ.

1.7.2 Access to Markets

1.7.2.1 Access to Road Network

Limpopo is highly accessible, with a network of excellent roads and railway connections, as well as a number of small airports, including the Kruger Mpumalanga International Airport.

The Musina Local Municipality is located in the northern part of the Vhembe District Municipality of the Limpopo Province. The municipality is strategically placed between South Africa and Zimbabwe and therefore also linked to other SADC countries, such as Zambia.

The Musina Municipality is bounded in the east by the Kruger National Park, Gauteng to the south, and Botswana to the west. It is linked to the major centres in South Africa via the N1 route to Pretoria and Johannesburg. The following illustrations indicate the road linkages with Gauteng and Mpumalanga and via Polokwane to Botswana and to the major corridors in Sub Saharan Africa.

![Figure 13: Key Corridors in Limpopo](image-url)
1.7.2.2 Access to rail network

The rail freight system of Limpopo is a crucial element of the South African transportation system and is a significant factor in the movement of freight within the Province and through the Province to destinations in the interior, both within and beyond South African borders. The Limpopo rail system generates significant traffic which passes through or into neighbouring provinces in South Africa and it is of great strategic and economic value. There are three important main lines, including the Pyramid South (Pretoria) to Beitbridge line which connects with the Zimbabwean system and points north to Dar es Salaam. The second important line is the branch from Pyramid South to Lephalale, serving coal, iron ore and chrome mines. The third is the arterial line from Goudplaas on the Beitbridge line, running south-eastwards to the Maputo line at Kaapmuiden. It serves the Tzaneen, Letsitele agricultural area in the north and the mining area on the Phalaborwa branch in the south. There are three agricultural branches running from the Beit Bridge line but they have all closed in recent years, although there is still traffic potential which could be of benefit if they were to be re-opened in the future.

More than 17-million tons of general freight cargo was transported by rail across Limpopo on two important arterial routes, both of which catered for domestic and international traffic; one long branch having main line standard which generated over 6-million tons of coal and iron ore traffic; and three rural branch lines. Of this total, just over a half million tons consisted of transit traffic, moving through Gauteng Province to Beitbridge and points north. It can be seen, therefore that rail is a significant provider of transportation capacity; however, its market share of general freight traffic has declined in recent years.
An increase in rail market share assumes that the substantial investment planned for rail infrastructure, rolling stock and locos will facilitate a significant improvement in rail service delivery. One such an initiative is the transport of export citrus produce from the Province via the Maputo Port.

![Limpopo Rail Network](image)

**Figure 15:** Limpopo Rail Network

### 1.7.3 Strategies for Prioritised Sectors and Value Chains

#### 1.7.3.1 The DAFF Strategy Plan

The primary goal of the DAFF strategy plan 2012/13-2016/17 is to improve the lives of the majority of South Africans, which requires that programmes be directed towards unemployment, food security and the reduction of poverty.

#### 1.7.3.2 Agricultural Production, Health and Food Safety

**Purpose of the Programme:** To manage the risks associated with animal diseases, plant pests, genetically modified organisms and registration of products used in agriculture. Promote food safety and create an enabling environment for increased and sustainable agricultural production. The programme comprises three sub-programmes, namely Plant Production and Health; Animal Production and Health; and Inspection and Quarantine Services. Plant Production and Health: Focuses on increasing agricultural productivity with the emphasis on a sustainable plant production system, efficient use of genetic resources and manages risks associated with plant pests, diseases and GMOs.
Animal Production and Health: Aims to improve livestock production through the implementation of animal production and health strategies, projects and programmes founded on sound animal health and production management principles, an informed extension service and sustainable natural resource management. Inspection and Quarantine Services: Focuses on the provision of leadership, guidance and support in ensuring compliance with agricultural legislation and regulatory frameworks and overseeing the effective implementation of risk management strategies and plans for regulated agricultural products.

Implementation strategy

Increasing agricultural production requires maximum stakeholder participation. To this effect, the department will work with all stakeholders within the sector on initiatives and interventions to increase production within the subsistence, smallholder and commercial environments. The department will engage with other government departments to ensure the comprehensive implementation of agricultural production strategies. Job and wealth creation lie at the epicentre of these production strategies and coordinated implementation is crucial to the delivery of the expected targets.

Key activities will focus on new and existing farmers through strengthening the implementation of comprehensive support programmes in all provinces and implementation of production strategies and related services. The focus will be on:

- Maintaining and, where required, strengthening the regulatory framework for agricultural production, health and veterinary public health through the implementation of agricultural production and health schemes, projects and programmes;
- Responding to climate change through drafting and developing of early warning and early response plans for quarantine pests and diseases of economic importance; and
- Increasing public sector participation in intensifying agricultural production.

In support of trade and international market access, the branch will continue to clear impediments associated with international standards and export market requirements, and will work towards:

- Improving compliance with legislation and international requirements through effective biosecurity and food safety frameworks and the effective implementation of risk management strategies;
- Continuing with major surveillance programmes to detect, delimit or monitor incidences of animal and plant pests and diseases;
- Invigorating participation at international standard-setting forums; and
- Promoting public awareness of national and international regulatory measures.

1.7.4 Determine Long-Term Economic Viability of the Identified SEZ

The long term viability of the SEZ will be driven by the following key factors:

- Continued demand for SA products in Africa. SA has consistently run a trade surplus with Africa since 1994. This trade surplus with Africa has increased from just R6.3bn in 1994 to a massive R40.86bn in 2012, and a peak of R47.35bn in 2011). The surplus is mainly driven by increased exports to Mozambique, Zambia, Zimbabwe and the DRC over the past two decades;
• Economic Stability of SADC;

• SADC Trade Agreement. The Agreement between members of the Southern African Development Community is a free trade agreement. The objective of the trade agreement was to achieve a Free Trade Area, with 85% duty-free trade by 2008. This stimulates trade between South Africa and the rest of the members of the SADC;

• Maintenance of the Corridors and Access Routes. In order to facilitate joint planning, implementation, coordination, monitoring and reporting of regional trade, transport facilitation and implementation of infrastructure projects, SADC has configured corridors into “clusters”, that is, grouping of countries served by a set of corridors which share ports and or other transport and logistics infrastructure. The "Corridor Cluster" is used as an organisational vehicle for consultations and convening technical and ministerial meetings that address the common issues across a set of corridors shared by countries. This approach has been motivated by the absence of formal and functional joint corridor management committees in the majority of corridors and the need to rationalise corridor institutions and meetings. The cluster approach will still allow Member States where justified to meet at specific corridor level or bilaterally as when necessary; and

• Continued Supply of Raw Material to Processors in the SEZ. The continued supply of raw materials to the SEZs will be dependent on agricultural production. Factors that influence the production of raw materials include land availability, climate changes and water supply. Various agricultural industries are working on ways to promote food (raw material) security, taking these factors into considerations and working on methods to bypass them.

1.7.5 South Africa’s Trade with Africa

Export opportunities and growth of demand from South Africa’s main trading partners is a key consideration for sustaining the proposed SEZ. Out of total commodity exports from South Africa, “Prepared Foodstuffs” came in 6th, with “Vegetable” products in 8th place and “Animal Products” in 10th.

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<thead>
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<td>17.2</td>
</tr>
</tbody>
</table>

*Source: Standard Bank – Special Report, August 2013*

Table 9: Selected Commodity Exports to Africa

The above table includes exports to countries such as DRC, Zimbabwe, Mozambique and Angola.

1.7.6 Identification of Catalytic Projects

The Development Facilitation Act No. 67 (1995) Section (1) outlines the general principles for land development. The principles should underpin development in terms of policy, administrative practice and laws by promoting efficient and integrated land development through which the municipality must:
Promote the integration of the social, economic, institutional and physical aspects of land development;
Promote integrated land development in rural and urban areas in support of each other;
Promote the availability of residential and employment opportunities in close proximity to or integrated with each other;
Optimize the use of existing resources including such resources relating to agriculture, land, minerals, bulk infrastructure, roads, transportation and social facilities;
Promote a diverse combination of land uses, also at the level of individual erven or subdivisions of land;
Discourage the phenomenon of "urban sprawl" in urban areas and contribute to the development of more compact towns and cities;
Contribute to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs; and
Encourage environmentally sustainable land development practices and processes.

The identification of catalytic projects entailed an assessment of the key drivers and value chains within the agro-processing sector where opportunities are evident from our industry analysis and the matching thereof with current competitive enablers such as availability of raw materials and access to markets.

1.8 Catalytic agro-processing opportunities

The following projects where identified:

- Fresh produce trading – this is also aligned with the ARC observation
- Soy food production
- Vegetable dehydration
- Fertiliser blending plant

1.8.1 Fresh produce trading

**Opportunity and sub-sector**

Agriculture. Opportunity to establish a fresh produce collection, cleaning, grading and distribution facility in the SEZ.

**Nature of the Project**

The project entails the establishment of a fresh produce trade hub in the SEZ to capitalize on the vegetable production potential of the Vhembe area and the proximity to local and export markets.

The area's geographic location with regards to the export potential exploitation to the SADC region is a key consideration. Other benefits offered by the location in Musina:

- **Lower rates** than those charged in areas such as Midrand in Gauteng;
- The area has a very **stable workforce** that is also cheap; and
- Within vegetable production area.

**Rationale**

This project is aligned with the following National and Provincial Government Priorities:

- Local beneficiation and secondary value adding to agricultural products produced in the province;
• Providing South African citizens with good quality affordable food products, thus mitigating rising food prices and food security;
• Buying local: Establishment of sustainable and competitive local businesses;
• Local job creation – the fresh produce preparation facility plant will create ca 120 direct employment opportunities and upstream collection and packaging a further 48 employment opportunities;
• BBBEE empowerment through shareholding in the newly established business entity;
• Local procurement of goods and services;
• Training, mentoring and capacity building of operators and maintenance staff. People from the local communities will be trained to operate and maintain the facility; and
• Ongoing maintenance and support using local skills.

**Demand and markets**
The South African processed foods and fresh produce market is estimated in excess of R20 billion per annum.

Fresh produce suppliers to the JFPM and TFPM are the main competitors. A new emerging competitor includes the farming communities in the SADC countries as these become more productive and able to meet internal demand, thereby reducing the demand for imported fresh produce from South Africa.

**Competition**

**Export Potential**
Export potential exists to SACU and SADC.

**Skills Requirements**
Up to 120 permanent jobs will be created on site to operate and maintain the extrusion plant. Operators will receive on-the-job training.

**Linkages in the value chain**
- Backward linkages:
  - Tomato, potato and other vegetable producers in the region; and
  - Maintenance: Plant and equipment;
- Forward linkages:
  - Large food processors, e.g. McCains;
  - Food product manufactures, e.g. Simba, Willards, etc.;
  - Fresh produce markets; and
  - Consumers.

Value chain:
The technology is well established and comprises low technology sections that are robust and easily maintained.

**Technology**

Fresh vegetables from local farmers.

**Raw material requirements**

The Limpopo produces about 75% of South Africa's mangoes, 65% of its papayas, 36% of its tea, 25% of its citrus, bananas, and litchis, 60% of its avocados, 60% of its tomatoes, 285 000 tons of potatoes, and 35% of its oranges.

**Financials**

Investment of ca R15 million.

**Operating Partners**

To be identified.

Suitable buildings. Financial incentives will support the location of the extruder in the proposed SEZ.

**Key constraints and enablers.**

The land redistribution objective is to provide land for black farmers. Due to in-efficiencies in administrative processes, land claim disputes between CPA’s and Trusts and tribes, the land ownership transfer process cannot be finalised. This is considered a major deterrent to black farmers obtaining finance to grow crops and vegetables on their land.
1.8.2 Vegetables dehydration

Opportunity and sub-sector
Agriculture. Opportunity to establish a vegetable drying, freezing and air dry plant.

The project entails the establishment of a drying facility that includes an air dry facility for vegetable drying and fruit drying as well as freeze drying of vegetables using produce from the area.

Nature of the Project
South Africa currently imports more than 90% of its dried vegetable requirements for the local processed food industry. Companies such as Unilever, are seeking to expand their procurement and include South Africa as a regular supplier of dried vegetables.

This project is aligned with the following National and Provincial Government Priorities:

- Local beneficiation and secondary value adding to agricultural products produced in the province;
- Providing South African citizens with good quality affordable food products, thus mitigating rising food prices and food security;
- Buying local: Establishment of sustainable and competitive local businesses;
- Local job creation – the fresh produce preparation facility plant will create ca 60 direct employment opportunities and upstream supply of fresh vegetables can create a further 20 employment opportunities;
- Local procurement of goods and services; and
- Supporting the government School Nutrition Programme.

Rationale
The South African processed foods and fresh produce market is estimated in excess of R440 billion per annum. Target markets include the food processors (e.g. Unilever) and direct distribution to School Nutrition Programme suppliers.

Competition
The only competitor in dried vegetable production is imported dried vegetable products originate mostly from China. These products are not of a high quality.

Export Potential
Export potential exists to SACU and SADC.

Skill Requirements
Up to 80 permanent jobs will be created on site to operate and maintain the extrusion plant. Operators will receive on-the-job training.

Backward linkages:
- Tomato, potato and other vegetable producers in the region;
- Supplier of vegetable drying plant and equipment; and
- Maintenance: Plant and equipment.

Forward linkages:
- Large food processors, e.g. Unilever, Pioneer Foods;
- School Nutrition Programmes of the government; and
- Consumers.

Demand and markets

Value chain:
The technology is well established and comprises low technology sections that are robust and easily maintained. Plant and equipment is available from local suppliers.

**Technology**

Fresh vegetables from local farmers.

**Raw material requirements**

The Limpopo produces about 75% of South Africa's mangoes, 65% of its papayas, 36% of its tea, 25% of its citrus, bananas, and litchis, 60% of its avocados, 60% of its tomatoes, 285 000 tons of potatoes, and 35% of its oranges.

**Financials**

Investment of ca R10 million.

**Operating Partners**

Neltropica (Alldays, Limpopo)

Suitable buildings. Financial incentives will support the location of the extruder in the proposed SEZ.

**Key constraints and enablers.**

The land redistribution objective is to provide land for black farmers. Due to inefficiencies in administrative processes, land claim disputes between CPA’s and Trusts and tribes, the land ownership transfer process cannot be finalised. This is considered a major deterrent to black farmers obtaining finance to grow crops and vegetables on their land.

**1.8.3 Soya food production**

**Opportunity and sub-sector**

Agro-processing: Processed foods.

The opportunity that exists is to produce soya mince in Musina.
Nature of the Project

The project entails the establishment of a twin extruder plan in Musina that will extrude the soya mince. The size of the extruder/s will be decided by the final market demand study of both the local and export (SADC) markets. The related packaging and distribution company will also be established to sort the logistics/distribution to the market.

Rationale

A draft business plan is available. The business plan was based on the meals that government is providing on a daily basis. Just the demand from government is enough to validate the project. The project in Musina will also focus on SADC. Except for the demand from government a full market demand study must still be conducted. The availability of input e.g. grain is not a constraint. The impact of the distance to the market on the profitability must still be established.

Demand and markets

No other plant is operating in the province. Processed foods are “imported” from Gauteng and other regions. Food export to SADC through Zimbabwe is growing rapidly.

Competition

Great potential to export to SADC with Musina as port to Africa.

Skills Requirements

Employment:
- Basic operators to run the extruder. Two managers and some technical support staff to do basic maintenance;
- Employment creation:
  - 20 employees initially in extruder plant;
  - 40 - 50 employees in the packaging plant; and
- Training will be provided by the North West university.

Linkages

- Retail industry;
- Government procurement: Correctional services, military, school feed programmes;
- Consumers; and
- Export SADC.
North West University can supply the equipment. Twin screw extruders.

**Technology Requirement**

No raw material is available within the boundaries of the municipal area.

**Raw material requirements**

The possibility to establish production of raw materials can be investigated. Initially raw materials will have to be imported from Gauteng- depending on the size of the operation

**Financials**

The investment required (approximate) is estimated at R50 million.

**Operating Partners**

Yes

**Key constraints and enablers**

What key constraints exist to make this project viable? What enablers are required to support investment and funding for the project?

The only constraint is to finalize and confirm the market demand.

### 1.8.4 Fertiliser Blending plant

**Opportunity and sub-sector**

Agro-processing. Opportunity to establish a fertiliser blending plant in Musina to service the local and cross-border demand for blended NKP fertilisers.

The proposed fertiliser blending plant to be set up in the SEZ will be using local and imported granular N, P and K fertilisers and micro nutrients to be blended in a standard dry material (powder/granules) blending plant. The fertiliser blends will comprise both normal dry powder for application to the soil as well as water soluble blends that can be fed through irrigation systems (fertigation) and foliar spray.
The area’s geographic location (i.e. strategically placed in Musina, Limpopo), enables it to benefit from:

- **Lower rates** than those charged in areas such as Polokwane;
- The area has a **stable workforce** that is also cheap; and
- Within cereals and vegetable production area in Limpopo.

The South African fertilizer industry is highly dependent on imported fertilizers. This is mainly because of the absence of potassium sources, no urea production facilities and limited production capacity for downstream fertilizer products in South Africa. Fertilizers are also exported mainly to neighbouring countries, such as Zimbabwe. A blending plant in Musina will service both the Limpopo and Zimbabwe market.

This project is aligned with the following National and Provincial Government Priorities:

- Local beneficiation and value adding to agricultural input products used in the province;
- Providing South African farmers with access to customized fertilizer blends, thereby optimizing their thus mitigating rising food prices and food security;
- Buying local: Establishment of sustainable and competitive local businesses;
- Local job creation – the processing plant will create ca 23 employment opportunities and downstream distribution;
- Local procurement of goods and services;
- Blending technology is readily available in South Africa. Expertise is required to develop blends according to soil and leaf analysis;
- Training, mentoring and capacity building of plant operators and maintenance staff. People from the local communities will be trained to operate and maintain the extrusion plant; and
- Ongoing maintenance and support. To ensure long term sustainability an ongoing maintenance and support contract will be entered into. This will ensure that the plant is properly maintained and remain operational.

The South African fertiliser market is estimated at more than R12,4 billion per annum. Some 1,961 million tons of fertiliser is consumed by the South African agriculture sector while ca 400,000 tons is exported to neighbouring African countries, including Zimbabwe (250,000 tons per annum). Zimbabwe also imports fertilisers from other countries. The Limpopo province accounts for ca 12% of the national fertiliser demand.

There is no local fertilizer blender in the area. The main supplier of blended fertilizers includes companies such as SASOL and Omnia.

Export potential exists to Zimbabwe and other SADC countries.
**Skills Requirements**

Up to 23 permanent jobs will be created on site to operate and maintain the blending and packaging plant as well as the soil and leaf analysis laboratory.

Operators will receive on-the-job training.

Forward linkages:
- Sugar cane and vegetable producers in the region; and
- Transport and distribution;

Backward linkages:
- Maintenance: Plant and equipment;
- Imported Urea and Potassium;
- Phosphate (Foskor);
- Local suppliers of Phosphate and packaging materials (Afripack); and
- Polypropylene producers (Safrisol and SASOL).

**Linkages in the value chain**

The technology is well established.

**Technology**

**Raw material requirements**

- Urea, Phosphate and Potassium.
- Packaging materials (Polypropylene bags).
- Chemicals for soil and leaf analysis.
**Financials**
Investment of ca R60 million.

**Operating Partners**
International investors expressed interest. Omnia and Agricultural Research Council have expertise in soil and leaf analysis.

**Key constraints and enablers.**
Suitable buildings. No real constraints have been identified.
Financial incentives will support the location of the blender and soil and leaf analysis plant in the proposed SEZ.

### 1.8.5 Additional opportunities in agro-processing

The potential to further develop the SEZ and establish more agro-processing facilities should include the following projects. It would be essential that the establishment of these projects go hand-in-hand with the development of the value chain and raw material supplies:

- **Poultry processing:** The Limpopo province only produces and processes ca 2% of the national poultry production. The introduction of trade duties and levels on imported frozen chicken portions will contribute towards such a project being viable;

- **Dry bean processing (canning):** South Africa imports a significant portion of its dry bean requirement. Local production does not seem adequate and before the canning facility can be established, it would be necessary to establish the bean varieties and local area land and climate suitability. Initial indications are that the area is suitable;

- **Fruit juice:** While the export of subtropical and citrus fruit juices is stagnating due to own production increase in the SADC countries, the demand for apple juice and mango juice is high. Apple juice is imported from China to meet local blenders and cider producers’ demand. It appears that an area in Waterberg is suited for the cultivation of the required apple variety for this purpose. This can be investigated further. However, it should be noted that the Musina SEZ would not be suited for the establishment of an apple juice concentration plant;

- **Cereal production:** While Limpopo is not a major producer of cereal crops, the opportunity exists to process cereals into food for human consumption. The target market would be the local retailers and the northern neighbouring countries;

- **Soy-bean oil cake production:** The Limpopo province is also not noted for its soya bean production. The opportunity to process soybean for soy oil-cake lies therein that South Africa still imports a significant portion of its oil-cake requirements to produce animal feeds; and

- **Fresh cut vegetables and fruits:** The demand for special fresh cut vegetables and fruits in Europe is increasing at better than GDP growth rates. The opportunity exists to produce and supply fresh cut vegetables and some berries and cherries (Mopani district) from the Limpopo province to the EU markets. However, the constraint is that the berry production areas and the vegetable production areas are not in close proximity to an international export. A more suitable location for the fresh cut and packaging processing plant would be Polokwane.

In the further assessment of the feasibility of the SEZ, the above opportunities will be clarified or a strategy for their implementation proposed as a medium term development opportunity.
1.9 Sector Analysis – Logistics and Trade

While growth prospects in the developed world are meagre at best, big business turns its attention to developing regions such as southern Africa for its next growth frontier. Multinational corporations, unlike governments, do not see political boundaries when they consider a region, they regard the growth of consumer populations, the development of economies, the discovery of raw materials, the availability of labour and the ease with which products and services can be moved into, out of and within that region. This ‘business mobility’ stretches further than the physical rail lines and highways between countries; it includes the openness of governments to collaborate with one another and with the private sector; the removal of regulatory and operational barriers in cross-border trade; the availability of logistics services that penetrate the entire region, not just one country; and, critically, the availability of appropriately skilled people who are the lifeblood of a vibrant logistics sector. Although Africa’s current participation in global trade is negligible – less than 5%, governments and businesses agree unanimously that the potential of the continent, southern Africa in particular, is palpable. This sentiment is evidenced by the increase in foreign direct investment in sub-Saharan Africa from US $29 billion in 2010 to US $37 billion in 2011. However, southern Africa still has many bridges to build before it represents a coherent region of economic potential to investors. Intra-African trade is estimated at only 10%, while regional trade in the developing markets of South America and Asia is 22% and 50%, respectively. The 9th State of Logistics survey for South Africa 2012 delivers a message of action. South Africa must make great strides in addressing critical issues relating to the road freight sector, shifting freight from road to rail and addressing rampant skills shortages and misalignment in the logistics sector. The Southern African Development Community (SADC) needs to see governments and the private sector joining hands to realise ambitious inland corridor initiatives and develop a world-class maritime transhipment community that would open the region up for trade. Globally, the scales are tipping that measure the trade-offs favouring economic specialisation, economies of scale and growth in international trade at the cost of a higher demand for freight transport. A reframing of the role of logistics in supporting truly sustainable economic development is imminent.

Key elements to note:

- **Logistic Cost:** Logistics costs as a percentage of total GDP have risen by 0.7% to 12.6% in 2011 and are estimated to have risen to 12.8% in 2012. A starker reality is painted, however, when considering logistics costs as a percentage of only the primary (extraction) and secondary (beneficiation) sectors. Logistics costs as a percentage of the transportable GDP was 44% in 2011 and 46% in 2012; and

- **Transport Infrastructure:** The report highlights the severe disparity in road conditions depending on the government authority responsible for its upkeep. On the rail side, heavy-haul freight lines are well maintained and general freight lines show a slight improvement, while branch networks are in a state of disrepair. Ports show steady improvement and are reported to be fairly well-maintained. The Airports Company of South Africa (ACSA) provides world-class aviation infrastructure at most of the airports under its jurisdiction. South Africa has a legacy of good, comprehensive transport infrastructure plans that do not get implemented. The Moving South Africa Forward Strategy developed in 1998 was succeeded by the National Freight Logistics Strategy in 2005 and then the National Transport Master Plan 2050 (NATMAP 2050). The first two plans had limited impact while it is too early to judge the results of NATMAP 2050. Renewed emphasis by government in 2012 on infrastructure development resulted in the establishment of the Presidential Infrastructure Coordinating Commission (PICC), headed by the President, to coordinate and oversee the
implementation of strategic infrastructure projects (SIPs) that stimulate social and economic growth. Public-sector funding for all infrastructure projects is estimated at R844.5 billion for the 2012/2013–2014/2015 period, with Transnet to invest a further R300 billion in rail and port developments over seven years starting in 2012. However, private-sector involvement is non-negotiable for the success of transport infrastructure projects – both from a funding and planning point of view.

1.9.1 Value Chain Analysis

The role of logistics is an essential part of every trade. The customers generate demand for products, which operations create using the necessary resources and logistics move everything around to supply the goods in a good condition and in time to the customers.

A value chain is the full range of activities — such as design, production, marketing and distribution — businesses go through to bring a product or service from conception to their customers. For companies that produce goods, the value chain starts with the raw materials used to make their products and consists of everything that is added to it before it ends up being sold to consumers.

Activities could be split into two categories: primary activities and support activities. Primary activities include:

- Inbound logistics: This refers to everything involved in receiving, storing and distributing the raw materials used in the production process;
- Operations: This is the stage where raw products are turned into the final product;
- Outbound logistics: This is the distribution of the final product to consumers;
- Marketing and sales: This stage involves activities like advertising, promotions, sales force organization, selecting distribution channels, pricing, and managing customer relationships of the final product to ensure it is targeted to the correct consumer groups; and
- Service: This refers to the activities that are needed to maintain the product's performance after it has been produced. This stage includes things such as installation, training, maintenance, repair, warranty and after sales services.

The support activities help the primary functions and comprise:

- Procurement: This is how the raw materials for the product are obtained;
- Technology development: Technology can be used across the board in the development of a product, including in the research and development stage, in how new products are developed and designed and process automation;
- Human resource management: These are the activities involved in hiring and retaining the proper employees to help design, build and market the product; and
- Firm infrastructure: This refers to an organization's structure and its management, planning, accounting, finance and quality control mechanisms.

This diagram below provides a view of an integrated logistics supply value chain that illustrated the value chain activities from the sourcing of goods to the final destination where it normally reached the customer or users.
The South African logistics industry is dominated by asset-based transport service providers while 3PL, 4PL and consulting services are still considered relatively new in the industry. 3PL is defined as "a firm that provides multiple logistics services for use by customers. Preferably, these services are integrated, or bundled together, by the provider. Among the services 3PLs provide are transportation, warehousing, cross-docking, inventory management, packaging, and freight forwarding." The characteristics of a 4PL service provider is that aspects of the clients’ supply chain are managed by the 4PL organisation.

There are however a large number of companies in the industry that provide consulting, planning, 3PL and 4PL services to the industry in addition to their asset-based logistic support services, such as transport and warehousing. Support services for the industry in the entire supply chain extend to the retail outlets where merchandising is also subcontracted.

The following diagram provides a perspective on the logistic and supply chain service providers/players in the value chain.

**Figure 16: Logistics Value Chain**
The above diagram, however, does not do justice to the industry, since there are various companies that play in more than one of the fields and the integrated nature of their services is not portrayed effectively.

The current overview of the industry as presented herewith in this report, addresses only a small segment of the above industry and therefor the feasibility study thus concentrated on the asset-based logistic service providers that provide transport services.

1.9.2 Market Analysis

The Medium and Heavy vehicle Industry and users has been identified as a key partner to the potential success of the SEZ in Musina. Below follows an overview of this industry and the key role-players

1.9.2.1 Corridor logistic demand

In South Africa, Logistics costs as a percentage of total GDP have risen by 0.7% to 12.6% in 2011 and are estimated to have risen slightly to 12.8% in 2012. Inland freight volumes have risen across the board in 2011 (+4.9% in tonnes, +10.1% in tonne-km) and 2012 (+1.8% in tonnes, +2.1% in tonne-km) with the most significant growth being on the KwaZulu-Natal–Gauteng and Western Cape–Gauteng corridors. Worth
noting is the slight increase in overall rail market share, from 11.1% in 2010 to 11.5% in 2012 in terms of tonnes, and from 29.3% in 2010 to 29.9% in 2012 in terms of tonne-km.

The development and growth of the SADC market is a key driver for logistics demand in South Africa. Approximately 60% of cargo volumes imported through South Africa to SADC is destined for Zambia, the Democratic Republic of Congo and Angola, while the remaining 40% is destined for Zimbabwe, Mozambique and Malawi. It is estimated that 48% of these volumes are transported by road from the Port of Durban while 52% is transshipped via coastal shipping. An analysis of the logistic activity in the main corridors affecting South Africa (Trans Caprivi excluded), indicates that there is significant growth opportunities for road and rail logistics.

The economic and growth characteristics of the major transhipment corridors in SADC (Ref: 9th State of Logistics survey for South Africa 2012, CSIR) are estimated as follows:

The Maputo Corridor:
- Corridor catchment economic statistics:
  - Population of 50 million
  - GDP of US$120 billion
  - Expected growth 4-5%

- Transport sector growth
  - Plans to expand capacity to 300,000 TEU
  - Expected growth of 8-10%
  - Road and rail links are good

Dar es Salaam corridors - key road and rail corridor to Zimbabwe, Zambia, DRC Malawi and Tanzania:
- Corridor catchment economic characteristics:
  - Population of 110 million
  - GDP of US$ 40 billion
  - Expected GDP growth 6-8%

- Transport growth
  - Plans to expand to 1 million TEU capacity
  - Sector growth is projected at 8-10%
  - Opportunity to intermodal hubs

The market growth clearly supports the growth and development of adequate border facilities to support transport operators.
1.9.2.2 Transport operators in South Africa

The number of fleet operators and fleet size of transport and logistics operators in South Africa provides an indication of the size of the industry in terms of rolling road assets.

At the extreme are small entrepreneurial companies, often with single vehicles. The small new companies are viable, because they have minimal overhead (office space and staff) and, in many cases, provide low-quality service with badly maintained vehicles. This sector is growing rapidly, and academics and researchers have expressed concerns that a situation similar to that of the minibus industry is developing.

According to SAFTI (South African Freight Transport Institute) the total population of MHCV in South Africa is owned by an estimated 70,000 fleet operators ranging from single vehicle fleets to fleets over 3,000 units. The following table provides a breakdown of the fleet size distribution:

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<thead>
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<th>Operator Fleet</th>
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<td>100-500</td>
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<td>Category</td>
<td>Total Vehicles</td>
</tr>
<tr>
<td>4 - 8 tons</td>
<td>107,193</td>
</tr>
<tr>
<td>8 - 14 tons</td>
<td>65,031</td>
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<tr>
<td>14 - 20 tons</td>
<td>28,585</td>
</tr>
<tr>
<td>20 - 30 tons</td>
<td>25,102</td>
</tr>
<tr>
<td>Total</td>
<td>333,014</td>
</tr>
</tbody>
</table>

Table 10: Breakdown of Fleet Size Distribution

1.9.2.3 Logistics Companies expanding into Africa

Logistics companies have over the years also expanded their market reach into Africa as the market for transport and logistics continues to grow. Most of the major logistic companies listed on the JSE have now established branch operations in several Sub-Saharan countries. Although their footprint in Africa is not as extensive as the OEM footprint, it is clear that the South African base provides a sound launch-pad for their Africa expansive strategies. The geographic presence of the following listed companies is illustrated in the following figure - Unitrans, Grindrod, Value Group, Bidvest, Barloworld, Imperial, Eqstra, Super Group, Cargo Carriers and Trenkor.

Sub-Saharan Africa is set to maintain a growth of ca 4.5% in 2013, supported by higher commodity prices and rising export demand. The region’s growth is however, predicted to slow to under 3% in 2014.
The geographic footprint of the leading South Africa (listed companies) operations in Africa, is illustrated in the following table:

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Table 11: Regional footprint of JSE listed logistic operators in Sub-Saharan Africa

1.9.2.4 Transnet Strategy

Transnet intends to shift its capital expenditure focus over the coming years from maintenance expenditure to expansionary investments on rail and port projects across South Africa. The expansion of South Africa’s rail, port and pipeline infrastructure is expected to result in a significant increase in freight volumes, especially in commodities such as iron-ore, coal and manganese. It will also lead to a significant modal shift from road to rail.

The bulk of the investment, R201-billion, will be directed towards railway projects, which have been designed to increase freight volumes to 350-million tons a year, from the 202-million tons achieved in the year to March 31, 2012.
Supporting the rail-volume growth aspiration is a plan to materially increase the capacity of Transnet Freight Rail’s key commodity lines, which includes:

- Increasing coal volumes by 44%, from 68-million tons last year to 98-million tons by 2018/19, which will be above the 92-million-ton-a-year nameplate capacity for the privately owned Richards Bay Coal Terminal, in KwaZulu-Natal;
- Raising the capacity of the iron-ore export channel from Sishen, in the Northern Cape, to Saldanha, in the Western Cape, by 57%, from 53-million tons to 83-million tons; and
- Increasing the capacity of the general freight business by a material 113%, from 80-million tons a year currently to 180.3-million tons a year by the end of the period.

The capital to be invested in the port system (R47-billion for the Transnet National Ports Authority and R33-billion for Transnet Port Terminals) should also enable Transnet to increase its container handling capacity by 76%, from 4.3-million twenty-foot equivalent units (TEUs), to 7.6-million TEUs.

1.9.3 Identification of Catalytic Projects

It is recommended for the Musina SEZ to have a sector focus on the logistics. The main aim of this sector should be:

- To improve the connection between the Gauteng, Limpopo province and SADC;
- To reduce the total cost of logistics;
  - To increase the efficiency of the logistics system;
  - To increase economic activity in the Musina in particular and Limpopo in general;
  - To improve supply chain interactions. Musina will become a designated area in which all logistics-related activities are brought together to promote seamless supply chains, i.e. a one-stop logistics shop; and
  - Businesses tend to gravitate to these areas, thus, travel cost and congestion should be reduced.

The opportunities identified for the establishment of a logistics SEZ in Musina includes the following:

- A dedicated custom control **bonded warehouse** that will provide benefits for import and export value adding activities;
  - Bonded warehouses are buildings or other secured areas in which dutiable goods may be stored, manipulated, or undergo manufacturing operations without payment of duty. It may be managed by the state or by private enterprise. In the latter case a customs bond must be posted with the government. This system exists in all developed countries of the world. Upon entry of goods into the warehouse, the importer and warehouse proprietor incur liability under a bond. This liability is generally cancelled when the goods are:
    - exported; or deemed exported;
    - withdrawn for supplies to a vessel or aircraft in international traffic;
    - destroyed under Customs supervision; or
Withdrawn for consumption domestically after payment of duty.

While the goods are in the bonded warehouse, they may, under supervision by the customs authority, be manipulated by cleaning, sorting, repacking, or otherwise changing their condition by processes that do not amount to manufacturing. After manipulation, and within the warehousing period, the goods may be exported without the payment of duty, or they may be withdrawn for consumption upon payment of duty at the rate applicable to the goods in their manipulated condition at the time of withdrawal. In the United States, goods may remain in the bonded warehouse up to five years from the date of importation. Bonded warehouses provide specialized storage services such as deep freeze or bulk liquid storage, commodity processing, and coordination with transportation, and are an integral part of the global supply chain.

- **Vehicle distribution centre** and vehicle storage area that will partly be bonded for the non SA homologated vehicles as a through flow from the SA ports to Africa and for new vehicles that has been assembled in SA to be exported to various Africa countries
  - Repair booth
  - Accessory centre
  - PDI activities
  - Safe Guard
  - Custom control

- **Container yard**
  - Due to the fact that timely imports and exports needs to be made the Maputo Corridor can become an important backup and second port for product to and from South Africa – apart from Durban and Richards Bay. The root to the port is also shorter from Gauteng and cost plays an important role in logistics. Once again like the VDC, containers can be stacked and loaded in such a facility in the process to be exported or imported.

  It can be combined with the Bonded Warehouse concepts to make distribution and sorting of materials easier from containers. The BCOCC are already involved at the Port of Entry they can play their role in the customs requirements for Bonded Warehouse clearing processes.

A typical Intermodal container facility consists of the following:

**Main components:**
- full container yard
- empty container yard
- warehouse
- railway siding (if required)
- gate (access controlled)
• office

**Equipment required**

• full container handlers (reach stackers)
• empty container handlers
• forklifts (for the warehouse activities)

**Typical ICD**

The ICD size and equipment required depends on the projected cargo/container throughput.

• The optimal size should be minimum of 30 000 m².

• Equipment
  - 2 x reach stackers
  - 1 x empty container handler
  - 2 x forklifts

A typical facility would cost in the region of:

• Property  R 30 mil
• Equipment  R 16 mil

Below is an image of a typical intermodal container facility:

*Figure 19: Typical intermodal container facility*
- **Other goods Distribution Centre**
  - Consolidation of imported and exported goods
  - Distribution of these goods

- **Consolidated Warehouses**
  - Trucking services are providing a critical role in the logistics process for South Africa. It provides the daily door to door road haulage throughout South Africa. Hauling general cargo can be from 1 tonne to 36 tonne loads. It generally consists of palletised goods through to machinery and industrial equipment. The logistics are facilitated from all main centre hubs and spoke warehouses and then forwarded to all outlying towns using main routes. Hub and Spoke Consolidated warehouses can be used in the process of bulk repack and buffering processes.

  ![Figure 20: Consolidated Warehouse Concept](image)

- **Truck stop**
  - Ablution facilities
  - Overnight accommodation
  - Shop
  - Petrol Depot
    - Diesel and Petrol and Gas
    - Service Centre

Second hand vehicles exported through the border post to Sub-Saharan Africa can also make use of the facilities.
1.10 Sector Analysis – Petro-chemicals

1.10.1 Value Chain Analysis of Coal-to-Hydrocarbons

There is currently a project underway that is exploring options to maximize the value of the coal resources nearby to the Musina SEZ, for example to convert coking coal to coke, and thermal coal to methanol, diesel and chemicals. The Musina SEZ CTH (coal-to-hydrocarbons) projects are planned to be constructed in the Limpopo Eco-Industrial Park (LEIP). Analysis of the thermal coal resources show excellent characteristics for coal gasification and conversion to syngas liquids, particularly its high fixed carbon content and low in sulphur, chlorine, moisture and ash. Considering improved coal gasification technology and this coal quality, the scope for downstream products is significant.

1.10.1.1 Scope

The following figure outlines the scope of the Musina SEZ CTH (coal-to-hydrocarbons) study and shows methanol as a versatile platform for evacuating “coal energy” from a stranded coal resource.

![Figure 21: Study scope: Methanol platform](image)

Methanol and conversion of methanol to derived products offers the opportunity to maximize transportation economics by extracting waste streams and transporting/distributing only higher value products. Technically, storing methanol in tanks and transporting it via pipelines does not pose any problems. Methanol tanking-pumping-piping has been demonstrated successfully, examples are two long distance test runs in Canada (crude line from Alberta to Barnaby c. 1150 km and Cochin LPG pipeline.

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1 Methanol Platform: Conversion of syngas to methanol as a basis for developing methanol derived products such as gasoline, dimethyl ether, olefins and other organic chemicals.
c. 3000 km\(^2\). Although it is slightly more toxic than gasoline, being easily biodegradable, spills of methanol persist for shorter duration in the environment when compared to petroleum spills\(^3\).

1.10.1.2 Southern Africa Regional Scenarios

The Musina Coal to Hydrocarbons (MCTH) project team engaged the Energy Research Centre (University of Cape Town) and a local energy consultant, CMCS, to assist with the development of three specific regional scenarios.

The regional scenarios assumed the same level of economic and population growth in all cases. These scenarios were used to develop a view on the potential volume, timing and value of MCTH products for the regional market.

1.10.1.3 Study Approach – The Use of the 5 – C Framework

Investment decisions for large energy developments, like the Musina Coal to Hydrocarbons (MCTH) project, are advised by consideration of five (5) critical uncertainties:

- **Crude oil price**: Crude oil is increasingly becoming the price marker for energy products, largely through the globalization and increase in trade of LNG, the conversion of gas to liquids (GTL) and the increased appreciation of the opportunity value of natural gas by major resource holding (MRH) countries. Aggressive increases in crude prices, and all commodities directly linked to oil, have been felt over the past 4-5 years. As a freely traded and fungible commodity, crude oil prices are influenced by both short-term effects and longer-term trends as defined by hydrocarbon production fundamentals. Additionally, the political drivers of MRHs (e.g. OPEC) can influence both short-term effects and long-term trends of oil/gas prices. The long lead times to the development and long production horizons of energy projects argue for a principal focus on longer term trends in oil price developments rather than short(er) term effects;

- **Capital costs (CAPEX)**: The last 4-5 years have seen a substantial increase in the investment costs of projects as represented by EPC and commodity prices. This trend reflects a strong relationship to global economic activity (major project developments) and commodity / energy prices. An important observation is that the trend towards higher CAPEX has generally lagged behind the upward trend in crude oil price. This lag is partly explained by the infrastructure and real estate development activities in the Middle East, stimulated by significant national revenues from high oil/gas prices;

- **Connectivity to Crude price**: Energy economies that are significantly dependent on hydrocarbon (oil or gas) imports provide a strong basis for linking the prices of energy products and organic chemicals to the price of crude oil. The extent to which such a link supports energy project investments in Southern Africa is a critical consideration. Product pricing in reference to international crude prices is a well-established and continuing practice in the Southern African transport fuels sector. The increasing use of diesel (LNG, CNG or LPG) as a power generation fuel for gas turbines should of necessity lead to the reflection of oil/gas price exposure in this sector;

- **Call on product**: The volume, timing and value of demand for methanol or its derivative products

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\(^2\) Beyond oil and gas: The Methanol Economy by G.A. Olah et al ISBN 3-527-31275-7

\(^3\) http://www.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm
will define the real demand to underpin the material investment represented by the MCTH project. The electric power and transport fuels sectors are the primary avenues of real demand for energy products in the Southern African market. This requires an understanding of competing products and their logistics for these sectors, as these will be the price makers for MCTH products; and

- **Coal price.** Apart from CAPEX, fuel/feedstock input cost is the most significant determinant of the costs of energy products and consequently defines the robustness of investment economics. Coal consumption/conversion systems are generally more capital intensive than oil/gas based systems. It is therefore critical that coal consuming developments benefit from controlled feedstock cost exposure relative to product price movements. Coal price/cost is a key control point for EIS/MCTH where ownership of the coal and stable input costs to mine-mouth developments offer a significant advantage over imported crude/gas/(coal) based developments. This argues for the MCTH coal supply system to be a fully integrated value chain with limited payment or custody transfer points.

These 5 uncertainties are systematically explored for each of the CTH value chains by using a proprietary network simulation and optimization tool, as shown in the figure below. The tool supports the modelling of coal supply into an infrastructure that converts coal into syngas and subsequently into methanol or one if its derivatives like DME or gasoline or polypropylene. The optimisation vehicle returns the preferred upgrading route on the basis of demand and netbacks returned by markets for methanol, DME, gasoline and polypropylene. The rank order of attractiveness follows from running the tool in simulation mode.

**Figure 22: Value chain modelling through the 5-C framework**

The framework is 100% data driven. This implies that key data have to be defined for the supply of feedstocks and utilities (coal quality, quantities, pricing, BFW, power). The coal conversion superstructure is described in terms of yields on intake, fixed costs and capital requirements for various conversion / production capacities. Products need to be disposed to markets. A distribution network has been defined together with modes of transportation and corresponding unit costs have been estimated. A longer-term outlook on product demand will be developed through detailed market analysis and scenario workshop. As a result this approach supports strategic investment decisions.
leading towards profitable and competitive investments in coal to hydrocarbon value chains with an ensured technical viability

1.10.1.4 Technology Assessment

Technologies considered for deployment by the Musina Coal to Hydrocarbon project were reviewed in terms of maturity and key performance items.

The Shell Coal Gasification Process features a syngas cooler and is operational in 6 facilities with proven high availability (> 85%). An alternative gasification technology using the water quench concept has passed the rigorous internal technology release programme in Shell, has a number of patents pending and is currently under design for two projects (PowerGen in the UK and ZeroGen in Australia). The current maximum design capacity of the Shell gasifier is 4000 tpd of coal.

Methanol process technology has been proven extensively, particularly with natural gas derived syngas for the production of 5000 tpd of methanol in the Middle East and the Caribbean.

The technology is considered mature with a number of well-respected companies licensing the technology (Lurgi, DPT, One Synergy, Haldor Topsoe). China is an advanced stage of constructing coal based mega-methanol facilities and these plants will have been in operation for a number of years before the MCTH projects reach a final investment decision or financial close.

The Methanol to Gasoline process technology was developed by Exxon Mobil in the early eighties and demonstrated in New Zealand on the basis of natural gas at a capacity of 14500 bbl/d (the envisaged MCTH capacity is some 17000 bbl/d). Uhde is currently licensing the MTG technology on global basis. Two coal based MTG plants are currently under construction in China and a number of other feasibility studies have been announced.

The di-methyl ether (DME) process is currently being commercialized in China, up to a capacity of 620 ktpa. There are two process licensors: Haldor Topsoe and Toyo.

Lurgi is developing the Methanol to Propylene process. No commercial plants are in operation yet. Two plants are currently under construction in China with capacities up to 520 ktpa propylene.

Polypropylene processes are very mature with capacities up to 500 ktpa with multiple process licensors, including LyondellBasell.

Conversion of the full capacity of an 1800 ktpa methanol facility into a single product would require 2 world scale DME units (c. 2 X 620 ktpa) and a nominal scale up (to 550 ktpa) of the largest methanol to propylene unit being deployed in China.

1.10.1.5 Ranking Value Chain Options on an Integrated Cost Basis

The figure below shows the integrated costs of the value chain options studied. This analysis assumed 100% loading of the plants. Integrated cost is the aggregate of cash costs and a capital charge. For this study a capital charge of 11% was assumed to cover depreciation, tax and a return on investment of 8%. This analysis showed that methanol production offers the lowest cost per ton of product. The other
value chains suffer for the low efficiency in conversion of methanol and the higher capital cost for more process units.

Figure 23: Integrated cost levels MCTH options

1.10.1.6 Relative Robustness Coal to Methanol and Coal to Gasoline Options

The following figure shows how economic robustness develops with crude price taken as flat RT over the lifetime of the project for the “coal to methanol” to power option and for the “coal to gasoline” option.

Figure 24: Robustness Coal to Methanol for Power vs. Coal to Gasoline

This figure illustrates that in a “lower priced crude world” where a lower capex escalation is to be expected (c. 4% nominal increase or 1% above inflation), earning powers for the “coal to methanol for power” option are robust as of 90 $/bbl (flat RT) with 11% IRR and increases to 16% IRR at 110 $/bbl. A “higher priced crude world” (110 - 130 $/bbl) on the other hand, could face higher capital escalation rates (e.g. 14.3% nominal). Even in this business environment the “coal to methanol for power” option shows IRRs ranging between 10% ($110/bbl flat RT) and 15% (130 $/bbl).
However, it is improbable that oil prices would remain flat in real terms while capital costs escalate at rates above inflation. As energy is the “lifeblood” of economic activity, it is equally improbable that sustained lower oil prices would not lead to a correction in capital costs. Without these eventual balancing adjustments, in the relationship between capex and oil prices, investment in oil production and energy systems more widely would become unstable and stall.

The relative robustness analysis showed that the direct commercialization of methanol into the hydrocarbon space (in power generation on a diesel LHV parity basis or as a blend stock on a gasoline LHV parity basis) presents the most robust case for the MCTH complex. Based on historical precedent in the transport fuels sector and the confident assumption that such commercial contracts can be realized, also in power generation, the direct marketing of methanol shows robustness in both a “low capex low oil price” setting and in a “high capex high oil price setting. Using MTG as an example, all further conversion value chains of methanol are relatively less robust, but potentially still economically viable subject to how commercial contracts are structured to support downside risk and share upside potential as oil (and gas) supply tightness returns.

1.10.1.7 Conclusions

Most of the technologies being considered for the MCTH development have been substantially confirmed by previous demonstration projects and commercial developments – notably syngas-to- methanol and methanol-to-gasoline. To the extent that any further de-risking of technologies is required, projects in China are already under construction (notably DME and MTP) and are expected to be in production before a final investment decision on MCTH will be required.

The technical and commercial prospects for an agreement for the use of methanol to fuel power turbines have been substantially supported by at least one original gas turbine equipment manufacturer (OEM). A significant body of literature is available on the efforts invested by GT OEMs to demonstrate the suitability of methanol and DME as turbine fuels.

The uncertainty framework represented by the 5C structure suggests that a plausible opportunity space for the development of an MCTH complex can be developed. It is however apparent that the scale, inherent complexity and the strategic importance of such a development for the region would require a balance of project specific and macro-economic factors. This will require a coordinated effort to secure support and commitment from the government(s) and financial institutions and the involvement of one or more partners to drive the project through its various stages of de-risking.

The assumptions made in the initial premises discussions were arguably too simplistic and not sufficiently reflecting of the complexities to be considered. Remaining uncertainties with respect to future oil price outlooks, capital cost tendencies and the inter-relationship between these require a focus to develop a case acceptable to financiers. These uncertainties are common to the oil and gas and power industries and mechanisms for mitigating these exposures in the process towards a final investment decision should be explored.

The study showed that the transport fuels and power markets of Southern Africa offer sufficient volume opportunities for a methanol platform within the timeframe considered for the MCTH project (as of 2014 and continuing to increase beyond that timeframe). A final decision on the initial markets (power and/or
M10 and/or gasoline), and further volume growth opportunities, for the MCTH complex will be subject to strategic choices and tactical considerations to drive successful multi-party negotiations.

The opportunity for an MCTH complex to define its pricing relative to internationally traded and hard currency denominated hydrocarbons (diesel, gasoline, LNG, etc.) is a strong proposition. All value chains considered demonstrated the importance of the price spread between mine-mouth coal and imported crude oil or oil-derived products. This strongly favours the development of a fully integrated mine-mouth coal-to-hydrocarbon project to develop a strong hedge against an uncertain oil price outlook, which will be influenced by many factors outside the direct control of the project. This includes an expected shift towards more challenging and more costly hydrocarbon production developments into the future.

Against the increasingly tight power supply and liquid fuels market, and considering diesel and gasoline LHV price parity relative to new refinery developments, direct methanol marketing and methanol-to-gasoline conversion economics showed sufficient promise to warrant further pursuit.

Methanol would be well positioned to compete against diesel (or LNG) as a fuel into the peak- and mid-merit order of the power generation system. The coal to methanol for power option featured as a very robust option. With both oil price and capex escalated at the same rate of 4% aai (or 1% above inflation) an IRR of 12% was realised. With oil price escalated at 7% (or 4% above inflation), the economics became significantly more attractive with an IRR of 14% for capex escalating at 14.3% and an IRR of 19% with capex escalating at 4%. The case with capital costs escalating at 14.3% aai to start up would require a flat real terms oil price of $100/bbl to deliver an IRR of 8%. A project lifetime price series of $100/bbl flat RT is equal to a 2008 price of $66/bbl escalating at 7% aai (or 4% above inflation) to a maximum $200/bbl (RT), on an NPV8 basis. The timing of the use of methanol to power should receive attention, moving the start-up date from 2017 to 2014 improved the IRR from 19% to 20%.

The M10 transportation fuels market offers a high price opportunity for methanol as a blend stock on an LHV parity basis to gasoline. However, the gasoline market is not deep enough to capture 1800 ktpa of methanol. By 2014 only some 1000 ktpa of methanol could be disposed into the gasoline pool as M10. The peak-to-mid merit power market could consume the c. 800ktpa balance of methanol or any surplus would need to be exported. Potential exports could in the near term-to-medium term be exposed to cheaper methanol from low cost natural gas to methanol plant. Methanol transportation costs, e.g. to M10 blending depots, would be a key consideration to avoid value leakage.

The conversion of syngas to methanol to gasoline is still economically robust, but less so than direct commercialization of methanol. With crude price escalating at 7% and capex escalating at 14.3% an IRR of c. 8% was achieved. With crude escalation at 7% and capex escalating at 4% the IRR achieved was c. 12%. With both crude and capex escalating at 4% the IRR was c. 6%. The case with capital costs escalating at 14.3% aai to start up would require a flat real terms oil price of $130/bbl to deliver an IRR of 8%. A project lifetime price series of $130/bbl flat RT is equal to a 2008 price of $88/bbl escalating at 7% aai (or 4% above inflation) to a maximum $200/bbl (RT), on an NPV8 basis.

At 114 $/bbl crude flat RT (or c. $75/bbl 2008MOD escalating at 7% aai), the integrated costs for the production of gasoline from coal is breakeven with the integrated costs for gasoline production for a new-build refinery of 220 kb/d (capex $5 bln mid-2008) with capex escalation of 4% aai. The higher the crude price, the more attractive gasoline from coal becomes relative to gasoline from crude. The breakeven point
for the “coal to gasoline” option to be more attractive over “gasoline from crude”, moves to lower crude prices in a world of escalating crude prices.

Polypropylene (PP) has to target export markets as the RSA market is small and more than saturated by Sasol and Safripol supplies of PP on the basis of advantaged feedstocks (CTL by-product streams).

In the international polypropylene markets PP ex MCTH competes with natural gas based PP from the Middle East. The common target export market is China. PP ex-MCTH into China would be challenged by indigenous coal based polypropylene production, at least until China experiences significant indigenous coal shortages.

Market opportunities for DME were considered limited. Only the use of DME as 100% mass transportation fuel is foreseen beyond 2025. Major limitations relate to the lack of LPG like transport and storage systems.

1.11 Musina Coal to Hydrocarbon Complex

The following figure provides a high level scope of the Musina Coal to Hydrocarbon value chain study. It shows how methanol conversion options were carried out by the value chain analysis.

![Figure 25: Options for the Musina Coal to Hydrocarbons Complex](image)

A cost estimate for the conversion of coal into clean syngas and the subsequent conversion of this syngas into methanol or gasoline is currently been developed by Jacobs Engineering. Toyo prepared similar estimates for the conversion of methanol into DME. The results of these studies have been made available to Shell Global Solutions and form the basis of the technical input to the value chain analysis. The set of technical data has been complemented by literature data for those units not covered by
separate EIS studies, notably MTP and PP. All utility requirements have been inferred from individual studies and brought on a consistent basis.

1.12 Market study

The envisaged end products methanol, gasoline, DME, and polypropylene can be disposed into local markets for road transportation fuels, power and intermediate chemicals or export markets. This section outlines the key features of these markets.

1.12.1 Overview methanol markets

1.12.1.1 Methanol as chemical intermediate

Methanol is a colourless, toxic, flammable liquid, used as antifreeze, a general solvent, a fuel, and a denaturant for ethyl alcohol. It is also referred to as carbinol, methyl alcohol, wood alcohol and wood spirits.

The bulk of methanol is converted into formaldehyde (a precursor for the plastics industry). Methanol is also used to produce methyl tertiary butyl ether (MTBE). MTBE is an oxygenate, which is blended with gasoline as octane booster and to create a cleaner burning fuel. It can also be used directly in its pure form as a transportation fuel, and as a blending component with gasoline. It cannot be used as blending component with diesel as methanol is immiscible with diesel and methanol cannot be compression-ignited. Methanol is neither physically compatible with diesel fuel nor compatible with the operation of diesel engines.

1.12.1.2 Methanol into fuels markets

Methanol/gasoline blends have been trailed over an extensive period of time starting in Germany and California in the 1970s. This research was prompted by high-energy prices but as soon as price of crude crashed at the beginning of the 1980s the key driver for sponsoring this research disappeared.

M100 (pure MeOH) has recently been trailed in China but blends are preferred for the following reasons: Poor cold start characteristics of pure MeOH which means that in cold weather conditions, there could be problems with engine start up. Flame Invisibility of pure methanol in daylight; and high toxicity (safety risk); Methanol has half the energy density of gasoline (5040 kcal/kg vs. 10600 kcal/kg for gasoline) which means that for a given quantity of fuel, methanol will deliver less power and hence less performance and mileage than gasoline.

M15 (15% MeOH, 85% Gasoline) is a popular transportation fuels blend in Northern China and setting the trend for the application of M15 throughout the country. Minor fuel injection modifications are required as due to the lower calorific value of methanol a higher injection volume per second is required to deliver similar performance as a 100% gasoline engine.

The M85 (85% MeOH, 15% Gasoline) blend may become common in China longer term as more progress in government regulations has been made on standardization. However significant engine modifications are required to use M85 as a fuel. Corrosion prevention is the key.
1.12.1.3  Methanol into the power market

Little is known about the use of synthetic fuels like methanol and DME for use in gas turbines for power production.

1.12.1.4  Methanol supply

The total methanol production capacity was estimated 49.1 million metric tons in 2007, a net increase about 4.2 million metric tons compared to 2006 as shown in the following figure. Chemical Market Associates Inc (CMAI) estimates that nearly 12 million metric tons of methanol capacity exists in China. This is an increase of about 3.5 million metric tons in the last two years.

![Figure 26: Global Methanol Capacities vs. Demand](image)

When global methanol operating rates⁴ are near a nominal level of 85% or above, the methanol market is considered “strong”, with high prices and attractive margins for even high-cost producers. When methanol-operating rates fall to the 75% range or below, the market is generally considered “weak” with market prices very near the cost of production.

The methanol industry has experienced very high operating rates since 2002. This continues in 2008, but begins a noticeable downward trend as significant new capacity enters the industry. Based on expected supply and demand, the height of excess supply is expected in the 2009/10 timeframe.

In the short term (up to 2012) low – cost capacity “mega methanol production centers” will continue to dominate supply. South America, Northeast Asia (China) and the Middle East have become the largest methanol producing regions in the world, representing approximately 73% of total production in 2007. This is expected to continue. A significant shift⁵ in methanol production will take place, as shown in the following

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⁴ Operating rates: the percentage of total production capacity being utilized at a given time.
⁵ Source: CMAI, World Methanol Summary 2007
North America production will become insignificant on a global scale, and with the highest natural gas costs in the world, production in this region continues to decline. Methanol production in Europe is also expected to decline significantly.

The largest Methanol producers / marketers in the world are Methanex, MHTL (Methanol Holdings Trinidad Limited), NPC-Iran, SABIC and Mitsubishi Gas Chemicals. Combined, they represent 35% of the current capacity around the world, as can be seen in the figure below.

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*Source: CMAI, World Methanol Summary 2007*
Based on the probable capacity additions around the world, capacity will shortly significantly exceed demand\(^7\).

For 2009 expectations are for 26.4 million metric tons (gross capacity additions) versus 15.3 million metric tons (demand growth). The result being that over 50% of current methanol production capacity is under threat from new lower - cost capacity, as can be seen in the figure below.

![Global Methanol Capacity, Cumulative Growth Capacity vs. Demand](image)

**Figure 29:** Global Methanol Capacity, Cumulative Growth Capacity vs. Demand

1.12.1.5 Methanol demand

In 2007 world methanol demand was estimated at 38.1 million metric tons. It has grown at an annual rate of about 3.3% over the last five years.

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\(^7\) Source: World Methanol Conference, November 2007, Dave McCaskill
The largest methanol consumers in the world are Celanese, Hexion, BP, Lyondell/Millennium and Dyna, as can be observed in the figure above. These companies represent 16% of current global methanol consumption. Formaldehyde remains the largest single methanol derivative and is expected to maintain this position.

Overall methanol demand is increasing significantly with strong growth in some regions/segments and decline in others. Major consumption centers where new methanol capacities will be exported (from the Middle East, South America and Northeast Asia) are North America, Europe and Asia. Currently China is the biggest Methanol import market, it the future it may play a significant role in Methanol export.

1.12.1.6 Methanol trade patterns

The international trade of methanol is a very large part of this industry, growing from 8 million metric tons in 1990 to almost 21.65 million metric tons in 2007, as shown in the figure below. It is expected that trade will expand to almost 33 million metric tons in 2012 – a forecasted increase of nearly 60%. Today 54% of local world demand is met by imported methanol.

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8 Source: SMAI, World Methanol Summary 2007
9 Source: CMAI, World Methanol Summary 2007
South America and the Middle East are the main methanol export regions, representing almost 82% of the industry activity in 2007. The largest methanol importing regions are North America, West Europe and Northeast Asia. These regions have much higher methanol demand than they have local production capacity, and the existing local production that does exist is often some of the highest cost in the industry.

1.12.1.7 Methanol Price

Historically methanol market prices have been between 200$ and 300$ per metric ton. Supply – side issues have led to an extremely volatile market since mid-2006, where disruptions to supply have caused significant price spikes. Current prices are in the range 400 – 420 $/t because of the temporary supply tightness, as can be seen in the figure below.
With the industry transitioning to the majority of supply sourced from remote mega producing centers, production and logistics costs to deliver product to the major consuming centers of the world and escalating construction costs will likely drive typical regional pricing near the 200$ - 225$ per metric ton level. Methanol pricing will decline during the “new capacity” years (2009-2010). Prices will further be influenced by the manufacturing cost of Middle East/China production, investment return plus, logistics costs, value of methanol into alternative energy applications (turbine fuel, fuel oils, etc.). An article in Hydrocarbon Processing is one of the sources that provide more insights in the global methanol business, including a longer-term view on methanol pricing\(^\text{10}\). Furthermore, it should be noted that if the reliability of mega methanol plants is not high, price spikes and price volatility might persist.

1.12.1.8 Methanol in South Africa

South Africa primarily consumes ‘chemical grade’ methanol. Its entire requirement is imported for paint, timber, biodiesel and chipboard manufacturing. More than 70 % of the imported methanol is consumed in the timber industry and chipboard manufacturing plants. Consumption is concentrated around Johannesburg (50%), Durban (30%) and Cape Town (20%). Methanol is currently not used in the power generation sector.

Sasol is the only producer of Methanol in South Africa and other SADC countries. Its methanol plant located in Sasolburg has a capacity of 140 000tpa. Sasol produces ‘fuel grade methanol’ which has a purity of 98.4 %. It exports the entire production to other African countries such as Nigeria, Kenya and some of the SADC countries (detailed breakdown is shown in the figure below).

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\(^{10}\) J. Jordan, World Methanol overview: 2007 and beyond, HP, April 2007, p. 61
Figure 33: Methanol trade from/to Africa

Since indigenous production of methanol is not of ‘chemical grade’, Sasol supports the domestic demand of South Africa by importing it from Trinidad and Tobago. The methanol imported is a superior grade methanol called ‘chemical grade’ which has a purity of 99.9%.

At present, there is no evidence that domestic methanol production is being encouraged in South Africa. There are currently some public discussions around its potential use in the power generation sector (in fuel cells) but there are no firm plans for implementation to date.

1.12.2 Overview DME markets

1.12.2.1 DME and the chemicals intermediates market

Dimethyl ether (DME) is a colorless and combustible gas at ambient temperature and pressure. DME has physical properties that are similar to liquefied petroleum gas (LPG), and can be stored and transported as a liquid product in pressurized vessels.

DME is produced from methanol by combining two methanol molecules. Water is produced as by-product, as shown in the figure below. This is the so-called two-step process from syngas through methanol to DME. This process is licensed by amongst others Toyo and Haldor Topsoe.
Haldor Topsoe has also developed a one-stage process that converts syngas directly into DME. This design claims significant economies of scale benefits with design capacities ranging between 1 and 2 mln ton per annum. Such capacities would support low cost DME production for power and transportation fuel purposes. The first commercial plant of this size is currently operational at Bandar Iman in Iran.

The most important application for DME today is as aerosol propellant. DME replaces chlorofluorocarbons that have been eliminated due to their harmful effect on the Earth’s ozone layer. Over 50% of the demand for DME worldwide is for this application.

DME is also an excellent methylation agent for the production of di-methyl sulfate, poly-alkylbenzene, and high purity N, N-dimethylaniline, as well as many other chemicals. Given that DME is miscible with many resins and solvents, it is now being used as a cleaning material for laboratory systems and some high precision, high value added cleaning applications, such as in electronics.

1.12.2.2 DME for the road transportation fuels market

DME can be used in compression-ignition engines. In relation to conventional diesel, DME has the following advantages:

- No particulate matter (PM); very low NOx; no SOx);
- Low CO$_2$ emissions;
- Low engine noise;
- High fuel economy;
- High well-to-wheel efficiency;
- Thermal efficiency equivalent to diesel engine performance; and
- DME has a higher cetane number than diesel. [Compare 55-60 for DME to 40-55 for diesel].

Blends of 10-20% DME with diesel have been tested with satisfactory engine performance.$^{11}$ However, DME has no lubricity and even 5% blends have resulted in significant reduction in lubricity that reduces life expectancy of engine and reduce car availability. With DME blended into diesel, there is also a reduction in

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$^{11}$ Wang Hewu, Zhou Longbao, Vehicle Exhaust Treatment, Technology and Control [Institute of Internal Combustion Engine, School of Energy and Power Engineering, Xi’an Jiaotong University, Xi’an, People’s Republic of China: hwang15@mail.xjtu.edu.cn
flash point because of high volatility of DME. Significant engine modifications are required for vehicles to run on DME diesel blends.

The current industry approach therefore is to focus on the development of dedicated engines running on 100% DME. OEMs including Nissan and Volvo have developed such vehicles for mass transportation purposes.

Volvo and Nissan are involved in testing DME fuelled trucks in Sweden and in Japan. In August and September 2006, such trucks were demonstrated in Stockholm and Brussels respectively. Volvo together with Isuzu presented trucks on the 4th Asian DME in Kiyakyshu, Japan in November 2007.

China is clearly leading the developments of large scale DME based mass transportation. Shanghai has put more than 90 DME-fuelled buses into operation this year, up from 10 in 2007. It plans to have 1000 buses in service by 2010. On the 1st of July 2008, the Chinese government reduced VAT on DME from 17% to 13%.

1.12.2.3 DME for power generation

DME for Power generation is currently at the exploratory stage and there are no industrial applications yet. GE and Siemens have successfully completed development trials with gas turbines on DME. However, these OEMs show little interest in discussing further developments due to lack of a clear business case.

1.12.2.4 DME as export product

Deep-sea export of DME requires pressurized and cooled transport comparable to LPG transportation. Dedicated DME storage and movement facilities need to be put in place at export ports in combination with converted LPG cargos (with reference to the lack of lubricant issue referred to above).

1.12.2.5 Large scale production of DME in China

China is currently the only country that decided to heavily invest in DME production capacity. China’s drive towards DME relates to its aspiration to significantly reduce its dependency from foreign import so hydrocarbons and monetize its coal deposits instead. Additional drivers come from the environmental need for cleaner transportation fuels. China’s DME production capacity is projected to grow from 1 million tons per year in 2007 to more than 6 million tons per year in 2012. DME in China is produced via the coal-based methanol route. Main DME producers are Shenhua, XinAo (Methanex), and Sinopec. Recent DME announcements include a 3-million tons per year plant by Sinopec to build in five phases of 600 ktpa each. As shown in the following figure, there are other DME capacity announcements around the world notably by BC Jindal group in India, Total and the National Iranian Oil Company (NIOC).
DME in South Africa

Currently there are no DME production facilities in RSA. DME blending with diesel requires significant engine modifications including resolution of sealing issues. This is unlikely to happen in South Africa. Furthermore, additional infrastructure investments at depots and forecourts will be needed.

The introduction of DME as LPG blend is also not likely on short term due to the lack of a transport LPG market in South Africa. Only about 100 gasoline cars are converted per year to run on LPG. This is a very thin market. Annual LPG consumption is 0.76 billion liters (433 kt). DME could only replace some 20% (80 kt) for possible cooking and transport applications.

The power production infrastructure in RSA is constrained in capacity and logistics. Following years of underinvestment in base load capacity, much of peak power production capacity has been dragged into mid-merit and base load range. When the base load capacity is restored, DME may offer an attractive alternative against natural gas that is currently used to produce mid-merit power. Commercial competitiveness of DME against natural gas for new or retrofitted stations must be assessed with a coherent view on evolution of the power market.

In an effort to ease the tight electricity market, the RSA government is developing plans to stimulate use of LPG as cooking fuel. Price subsidies are part of the plan. This may offer opportunities to co-develop a DME cooking fuels market, as the combustion performance of DME and LPG are similar. Once infrastructure investments are being put in place this could be a stepping-stone towards a DME market for mass transportation purposes thereby building on China’s experience. Policy changes and incentives would have to be put in place to establish a solid DME market in RSA.

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12 “DME Global Developments” Ulrich Berger, Waldemar Liebner Lurgi AG 29.11.2007
1.12.3 Markets for polypropylene

1.12.3.1 Homopolymer propylene

The market study focused on the homopolymer grade for polypropylene. The production of copolymers would require the import of significant volumes of co-monomers (e.g. butenes), which is considered not viable. The following figure shows that in most parts of the world homopolymers are in higher demand than copolymers. Homopolymers are typically used for demanding chemical, thermal and mechanical applications requiring high tensile strength and stiffness. Such end uses represent the bulk of demand side. Copolymers typically find high-end market niches where specific properties like high impact resistance are important. Being a thermoplastic, quite a variety of processing options can be deployed to produce polypropylene products, such as: injection molding; sheet production; film molding; blow molding; fibre; Raffia; and die cut applications. The versatility of polypropylene is obvious from “film” used in food packaging to “trays” on which food is served.

![Figure 36: Market distribution for polypropylene grades by geographical region](image)

1.12.3.2 Supply - Demand - Trade flows in 2006

In 2006, the worldwide consumption of polypropylene amounted to some 43 million tons. The figure below shows that the largest market for polypropylene was China with a consumption of about 9.4 million tons.

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Alberta Polypropylene Market Study; CMAI; 2004
With a production capacity of about 6 million tons in 2006, China was a net importer of polypropylene, as can be seen in the following figure.

Figure 38: Global polypropylene capacity in 2006

Except for China, the Middle East and Africa, capacity exceeded consumption in all regions in 2006, shown in the figure below.

Figure 39: The 2006 supply and demand balance for polypropylene

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14 TEMPI Conference, June 19-20 2007, Houston, Texas
As can be seen in the figure below, supply and demand imbalances are the driving forces for international trade, which involved about 12.5 million tons of polypropylene in 2006.

![Global Polypropylene Trade Flows](image)

**Figure 40: Global Polypropylene Trade Flows**

### 1.12.3.3 The projected supply - demand situation in the 2011 – 2013 time frame

A forward view on supply and demand based on announced capacity additions is shown in the following figure. In 2011 capacity would exceed consumption in all regions but China and Eastern Europe. China’s import, while still high would be reduced to some 2.2 million tons in 2011. It is noteworthy that the consumption/capacity ratio for Middle East-Africa is expected to be only 54 %, the lowest of any region. Most of the planned capacity additions in this region would be destined for export markets.

![Projected capacity and consumption for polypropylene in 2011](image)

**Figure 41: Projected capacity and consumption for polypropylene in 2011**
Global PP consumption is projected to grow to 55.3 million tons by 2011, equivalent to an average annual growth rate (AAGR) of 5.4%/year. At the same time, average PP capacity globally is projected to increase from 46.2 million tons in 2006 to 68.7 million tons in 2011. The figure below shows announced capacity expansions from 2008-2013. An estimated 27 million tons of polypropylene capacity should come on stream by 2013. Of this, 4.8 million tons (18%) would be built in China, 5.3 million tons (19.5%) would be built in the rest of Asia Pacific while 5.5 million tons (20%) would be built in the Middle East.

Figure 42: Global Capacity expansion, 2008-2011

To summarize the market outlook for polypropylene in the early part of next decade:

- China would continue to have more consumption than capacity;
- The Middle East would shift to the largest net export position with most of its exports destined for China;
- Western Europe, North America and Japan would shift from a net export to a net import position;
- Asia Pacific continues to be a net exporter; and
- In the absence of further capacity additions, the consumption/capacity ratio for polypropylene on a global basis (equivalent to capacity utilization if one ignores inventory changes) will drop from 92% in 2006 to 80% in 2011. This has significant pricing implications.

1.12.3.4 Utilization Dynamics and pricing

The following figures illustrate the cyclic nature of the polypropylene business over the past 18 years.

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15 Source: ICIS
The price of the polypropylene product has a strong effect on the utilization of the production plants, as can be seen in the following figure. Note that the PP spread strongly correlates with capacity utilization.
In accordance with supply-demand dynamics in transparent markets, the figure above clearly shows how prices slide as demand falls and capacity is less utilized. Generally, 92-95% capacity utilization is considered healthy; less than 90% utilization goes along with a significant downward pressure on product pricing.

1.12.3.5 Polypropylene Production in SADC

South Africa’s polypropylene production amounted to some 350 kilo tons in 2006. Sasol produced 240 kt and Safripol produced 110 kt. These are the only two players in the South African polypropylene market. In the same year 2006, demand for polypropylene was around 240 kt. Thus in 2006 production capacity exceeded demand for polypropylene in RSA. There is no polypropylene production in other SADC countries. Sasol exports a significant share of its production to other SADC countries. In 2006 Sasol exported 120 kt of its polypropylene production, one-third of it to China. Safripol on the other hand, sinks its entire production into the RSA market.

The main end use of polypropylene in South Africa is in domestic appliances, pipes, containers, sheets and textile fibers. South Africa also imports a very small amount of polypropylene approximately 3% of the total demand. These are high quality copolymer grades generally used in high-tech applications.

In 2008 Sasol commissioned a 300 ktpa polypropylene plant at Secunda for homo- and copolymer polypropylene. These products will be headed for continental markets and deep-sea exports. The competitive position of South African producers exporting to China will have to be assessed relative to Middle East and Asian Pacific competitors.

Polypropylene trading ports in South Africa are in Durban and in Cape Town. The Durban port is the main one used as it is close to Johannesburg and most of the polypropylene converters are located near Durban.

The average annual growth rate of polypropylene consumption in RSA is forecasted at 7.5% between 2006 and 2011. This would mean demand is growing at a faster than GDP.

South Africa already faces polypropylene overcapacity and the projected utilization for local demand by 2015 is around 70-75%. This would translate into a downward pressure on polypropylene pricing.

Finally, the emergence of growth drivers and growth killers need to be assessed in the context of the local South African and potential export markets.

Common growth drivers for the polypropylene market could be:

- Substitution: This might be for example, replacement of extruded polystyrene (EPS) by extruded polypropylene (EPP);

- Most activities that result in GDP growth would also bear on the polypropylene market; for example growth in the automotive industry would lead to increasing polypropylene demand because of the engineering plastics used in several components of modern cars; growth in construction and building would require more cement and material packaging; a more financially empowered population can afford to spend more money on consumer goods that would most often come in polypropylene packaging.

Common growth killers could be:
• Increased recycling of plastics;
• Substitution: Some common materials that could replace polypropylene in certain applications are LDPE (Linear low density polyethylene) in extrusion coating; HDPE (High density polyethylene) and PET (Polyethylene terephthalate) in blow molding;
• Development of the destination countries’ plastic industries; and
• The absence of growth drivers.

1.12.4 Road transportation fuels in South Africa and Limpopo

1.12.4.1 Summary

Transportation fuels for road transportation in South Africa and Limpopo are principally gasoline and diesel and these are well established. LPG use as a transportation fuel in South Africa is minimal with less than 10 LPG refuelling locations in South Africa, and is not supported by the government. There is no use of LPG as a transportation fuel in Limpopo at present. In addition, it should be noted that Limpopo imports all its refined products.

The transportation fuels market in South Africa is heavily regulated, with gasoline and diesel prices being sensitive to foreign exchange fluctuations and driven by international crude oil prices. In addition to pricing regulations, in South Africa, environmental fuel specifications are being introduced such as a specification for low sulphur diesel (500ppm) in 2006.

In terms of consumption, car ownership and hence gasoline demand is expected to continue to grow in the region. In addition freight transportation is dominated by road transportation making it a significant driver of diesel demand. This is expected to continue.

The retail fuels network in South Africa is well established and dominated by a relatively small number of companies, all of whom have access to refined products via established refineries or GTL/CTL plants. Any new supply of Gasoline or Diesel into the retail transportation fuels market would require an off-take agreement with a retail network owner.

1.12.4.2 Introduction to transportation fuels in South Africa

South Africa has the second largest refining sector in Africa, with conventional oil refining capacity of 523,000 b/d and 205,000 b/d synthetic fuels capacity (producing synfuels primarily from coal and some natural gas). The refineries operate on imported crude, so the gasoline and diesel prices in South Africa are linked to the price of crude oil in international markets which are quoted in US dollars (US$) per barrel and are sensitive to the Rand/Dollar exchange rate. A brief summary of the current refineries, their owner/operators and capacities, as well as two planned refineries that have been publicly announced is given in the table below.
Refinery | Owner/Operator | Capacity (b/d)
--- | --- | ---
Durban | Shell & BP (Sapref) | 180,000
Secunda (CTL) | Sasol | 160,000 (oil equivalent)
Durban | Engen (Enref) | 125,000
Sasolburg Natref | Total & Sasol (Natref) | 100,000
Cape Town | ChevronTexaco, African Legends (Calref) | 110,000
Mossel Bay (GTL) | PetroSA | 45,000 (oil equivalent)

| Planned refineries | |
| --- | --- | --- |
| Richards Bay in the KwaZulu-Natal Province | Drako Oil & Energy | 300,000 |
| Coega Industrial Development Zone (IDZ)-Eastern Cape | PetroSA | 200,000 |

**Table 12:** Overview of refinery capacities in RSA

The South African Government has taken a number of initiatives to assist in managing environmental issues relating to refinery activities such as the introduction of a standardized reporting format for refinery emissions; a common emissions control strategy; implementation of a standard for reporting of flaring and refinery emergencies and proposals to tax CO2 emissions from power stations and refineries.

The transportation fuels market is similarly regulated, with the Department of Environment Affairs & Tourism (DEA&T) being responsible for setting fuel specifications. In the future these will depend on the urban air quality improvement requirements and the Vehicle Emissions Strategy (which is currently being developed).

Since 2008, all new vehicles have been required to have catalytic converters fitted to reduce the level of harmful emissions. In order to improve air quality, the government has banned the addition of lead to petrol and has reduced the level of sulphur in diesel from 0.3% to 0.05%. Gasoline grades currently available in South Africa are: 91 RON, 93 RON, 95 RON, 93 RON lead replacement petrol (LRP) and 95 RON LRP octane.

Low sulphur (0.05%) and ultra-low sulphur diesel (0.005%) are available in South Africa. Although the ultra-low sulphur diesel is only available at some Sasol, Shell, Total and BP retail stations and constitute only 3% of diesel sales.

**1.12.4.3 Biofuels in South Africa and Limpopo**

In December 2005, a Biofuels Task Team was formed comprising 12 South African national government departments and was chaired by the Department of Minerals and Energy. They developed ‘The Draft Biofuels Industry Strategy’. This targets the development of a biofuels industry in South Africa. The draft strategy proposes a mandatory blending of biofuels components with gasoline and diesel to be introduced as E8 (8% ethanol in gasoline) and B2 (2% Biodiesel in diesel). It also proposes that the existing fuel tax exemption for biodiesel (40% tax exemption) be extended to bio-ethanol.

At present, the South African government does not provide any incentives or subsidies to producers to increase the production of biodiesel. Currently, the quantity of biodiesel produced in South Africa is very low due to the shortage of the supply of vegetable oil (frequently waste vegetable oils) which is used as a
feedstock for its production. While an increase in the production of biodiesel is expected in the future, driven by the recent steep rises in crude prices, this growth is likely to be quite slow.

There is no expectation of any significant biofuels developments in Limpopo, although there may be some small-scale biodiesel production.

1.12.4.4 LPG use as a transportation fuel in South Africa and Limpopo

In 2007, South Africa’s total LPG consumption figure stood at approximately 0.76 billion litres. Of this significantly less than 1% was consumed as a fuel for transportation, as can be seen in the figure below. Conversion costs to convert a gasoline vehicle to run on LPG are prohibitive – with the largest converting company, Adceng in South Africa converting only around 100 vehicles a year. In addition the price of LPG exceeds that of diesel and gasoline, and there are fewer than 10 refuelling points in South Africa. LPG is not used as a transportation fuel in Limpopo.

Figure 46: LPG Consumption by application sector in South Africa (2007)

1.12.4.5 Historical consumption of Gasoline, Diesel and LPG

In South Africa, diesel is used as a transportation fuel but also for power generation. The government of South Africa currently does not support the usage of LPG in transportation, as there is a shortage of supply of LPG in the country (the figure below illustrates the breakdown).

Figure 47: Aggregated Gasoline, Diesel & LPG consumption in SA 2001-2007
Limpopo imports all its diesel and gasoline, as it does not have a refinery. The major fuels retailing companies in Limpopo include Engen (market share 24%), BP, Total, Shell and Caltex. LPG is primarily distributed by BP – but is not used as a transportation fuel.

1.12.4.6 Transportation fuels market in South Africa

The transportation fuels retail market in South Africa is dominated by a small number of companies, with the branded fuels marketers having access to diesel and gasoline via their interests in the South African refineries and GTL/CTL plants. Approximate market shares are illustrated in the following figure. The overall market leader is Engen with a market share of 25%. Caltex, BP and Shell each have approximately 16-18% of the market while Total has a market share of about 12%. These percentages are approximate and change from product to product.

**Figure 48:** Approximate retail market shares in South African fuels retailing

- BP Southern Africa (Pty) Ltd have 790 BP branded service stations, 26 depots and other (including 3 costal installations) distribution sites;
- Chevron South Africa (Pty) Ltd (CALTEX) has a significant market share of gasoline sales in South Africa with approximately 950 retail outlets, 28 terminals and a fleet of some 132 tanker trucks;
- Engen Petroleum Ltd: Market leader in South African fuels marketing with expanding market shares in the SADC region;
- Shell South Africa (Pty) Ltd has some 18% share of the market with over 800 retail sites;
- Total South Africa (Pty) Ltd has some 12% share of market 688 branded service stations, a network of depots and a fleet of road tankers; and
- White Pumpers are individual private fuels marketing sites and some smaller chains including Sasol’s fuels retail outlets.
The principle fuels marketing companies in South Africa are members of SAPIA (South African Petroleum Industry Association) who publish data on gasoline and diesel sales by application and province. The following figures are based on SAPIA data and illustrate the gasoline and diesel consumption by province for transportation fuels in the first half of 2008.

**Figure 49:** Gasoline consumption by province in South Africa in the first half of 2008

**Figure 50:** Diesel consumption for transportation by province in South Africa - first half of 2008

Again based on SAPIA data, the figure below illustrates the gasoline and diesel demand for the different transportation markets in South Africa during the first quarter of 2008. It is notable that 92% of gasoline sales are made through retail garages.

<table>
<thead>
<tr>
<th>Transportation Fuel Customer</th>
<th>DIESEL</th>
<th>% Diesel</th>
<th>Gasoline</th>
<th>%Gasoline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Co-ops</td>
<td>17041219</td>
<td>7%</td>
<td>2248271</td>
<td>1%</td>
</tr>
<tr>
<td>Construction</td>
<td>6667516</td>
<td>3%</td>
<td>43107</td>
<td>0%</td>
</tr>
<tr>
<td>Farmers</td>
<td>2867031</td>
<td>1%</td>
<td>115825</td>
<td>0%</td>
</tr>
<tr>
<td>General Dealers</td>
<td>36305659</td>
<td>14%</td>
<td>8320203</td>
<td>3%</td>
</tr>
<tr>
<td>Government</td>
<td>1047475</td>
<td>0%</td>
<td>168872</td>
<td>0%</td>
</tr>
<tr>
<td>Independent LPG Marketers</td>
<td>1301960</td>
<td>1%</td>
<td>380811</td>
<td>0%</td>
</tr>
<tr>
<td>Local Authorities</td>
<td>2994604</td>
<td>1%</td>
<td>15408</td>
<td>0%</td>
</tr>
<tr>
<td>Mining</td>
<td>17489174</td>
<td>7%</td>
<td>258965</td>
<td>0%</td>
</tr>
</tbody>
</table>
1.12.4.7 Recent trends in transportation fuels demand in South Africa

Demand for diesel surged by 12% in 2007 mainly driven by stronger economic growth and diesel consumption in OCGT plants to generate electricity. The corresponding growth in gasoline demand was 2.5%. In the fourth quarter of 2007, gasoline sales were flat when compared to the corresponding period in 2006 probably attributable to petrol price increases in the fourth quarter.

Historically 62.5% of the retail motor-fuel sales in South Africa have been gasoline, 37.5% diesel. Demand for diesel as a transportation fuel is growing in South Africa, driven by the increasing use of road for freight transport and the increasing use of Diesel-fuelled trucks. The government aims to convert the minibus taxi fleets from gasoline to diesel fuelled vehicles, which if implemented will impact the demand balance between gasoline and diesel reinforcing the trend towards dieselfication, which is also evident in truck sales. Truck sales reached a record high in 2007, when a total of 37 069 trucks, vans, and buses were sold. This corresponds to a 12% increase when compared to sales in 2006 and is more than double the 16 327 sales recorded in 2003. Current expectations are that the market will reach 40 000 sales in 2008.

Car ownership in South Africa is expected to continue to grow (from around 93 cars per 1000 population today, to around 130 cars per 1000 population by 2020, with a corresponding growth in Gasoline demand likely to be around 1.9% p.a. This would result in a demand in a gasoline demand in 2020 corresponding to around 10.6 Mt.

1.12.4.8 Market Pricing for transportation fuels

The retail fuels market in South Africa is semi-regulated and gasoline retail and diesel wholesale prices are fixed. The largest component of the fuel price is the international component of the price- the Basic Fuel Price (BFP). This is set based on what it would cost to import gasoline/diesel to South Africa. BFP consists of a number of components – the largest of which relates to international spot markets.

For Gasoline this is based on the FOB (Fee on Board) price calculated as 50% of the Mediterranean spot price for Premium unleaded gasoline and 50% of the Singapore spot price for 95 Octane unleaded gasoline.

For Diesel the FOB is calculated as 50% of the Mediterranean price for Gasoil and 50% of the Arab Gulf price for Gasoil, plus the quoted spot price market premiums applicable.

Other smaller components of the BFP include the freight cost to bring finished products to South African ports, insurance costs, ocean loss allowance, cargo dues, coastal storage and stock financing costs. Fuel prices are also dependent on the magisterial district zones where the fuel is sold. To arrive at the final pump price in the different pricing zones (magisterial district zones) domestic transport costs, government imposed taxes, levies and retail and wholesale margins are added to the BFP. For gasoline pricing, the most
significant of these is the zone differential for transport costs which results in price differentials depending on the theoretical costs of transporting ‘imported’ fuels to the different zones. (Zone A assumes rail transportation, B, road transportation and C, transportation by pipeline).

From the perspective of supplying gasoline or diesel to the South African market, the price available to the supplier would essentially be the BFP, plus any difference achievable between the assumed transportation costs as determined by the zone differentials, and the actual transportation costs. The following figure provides a worked out example.

![Figure 51: Example composition of gasoline pump price in Gauteng](image)

### 1.12.4.9 Conclusions

Opportunities exist to supply the increasing demand for both Gasoline and Diesel as transportation fuels in South Africa. The viability of these opportunities will depend upon a number of factors, most notably:

- Availability of supply on the spot markets and crude availability – since market prices are determined on an import parity pricing system;
- Cost competitiveness of any new supply with the BFP formula;
- Opportunities to benefit from transportation cost differences; and
- The successful negotiation of an off-take agreement with an established fuels retailer to bring the gasoline or diesel to market.

### 1.12.5 Outlook for product market combinations

#### 1.12.5.1 Projections Polypropylene Markets

International markets:

- Current worldwide PP production capacity amounts to some 46 mln ton. Some 12.5 mln ton is being traded over the globe. North America and Europe are net exporters to China. For the 2008-2011 timeframe some 15.6 mln ton of capacity expansions have been confirmed (China 4.8 mln ton, rest of Asia Pacific 4.3 mln ton and Middle East 5.5 mln ton;
• Middle East will become the largest PP exporter early in the next decade. A significant number of projects will come on-stream which are based on the monetization of FCC based propylene (otherwise fuel value), C3LPG (otherwise exported as cracker feedstock or used as refinery fuel) or propylene ex liquid fed ethylene plants. PP exports from the Middle East are projected to grow to some 6 mln ton per annum by 2020;

• Asia Pacific continues to hold significant overcapacity for PP export;

• China’s Average Annual Growth Rate (AAGR) of 8.1% for PP is only partly met by capacity additions i.e. China continues to be the largest importer of polypropylene by 2020: some 7 mln ton per annum; and

• North America, Western Europe and Japan become balanced or net importer by the end of this decade.

SADC markets:

• PP supply and demand are currently significantly imbalanced in the SADC region, specifically there is much higher local production of homopolymer grade PP than can be absorbed by local markets leading to significant quantities of exports, while special copolymer grades are imported;

• Installed PP production capacities by Sasol (250 ktpa, 2006) and Safripol (ex DOW plant, 110 ktpa). In 2008, Sasol commissioned a 300 ktpa PP plant in Secunda for homo- and copolymer PP (impact and random). All plants are fed by propylene ex Sasol’s CTL plant at Secunda. The amount of propylene (some 760 ktpa) represents some 10% of the 160 kbb/d production by both Sasol CTL plants. There is no PP production in other SADC countries;

• In 2006, RSA consumed some 240 kt. As Safripol only produces for local consumption, some 130 ktpa of Sasol output goes to local PP converters predominantly located near Durban. Some 3% of demand in RSA is met by imports of high quality grades. Hence, the majority of PP production is currently being exported;

• In 2006, Sasol exported 120 kt of its PP production. Some 40 kt left for China, the remainder was shipped to Africa & Europe. The entire production of Sasol’s new 300 ktpa Secunda plant is exported;

• The average annual growth rate (AAGR) for RSA is projected at some 7.5 % for the 2006 – 2011 timeframe. Under the assumption that this would be sustainable over the 2006 - 2025 time frames, PP demand in RSA would increase to some 660 ktpa in 2020 starting from 240 kt in 2006. The 2008 installed PP capacity base in RSA is some 760 ktpa;

• Under these assumptions, local PP supply and demand for homopolymers do not balance until 2022;

• Propylene cannot be readily moved around. It has to be compressed and refrigerated into the liquid state for transportation in dedicated vessels and road transport cargos. It has to be converted in either a liquid (e.g. IPA, a solvent) or solid (polypropylene) to move it at low costs. In Europe, a dedicated propylene pipeline grid is in place to connect propylene suppliers and off takers. It is hard to see how the development of such an infrastructure could be established in RSA, nor indeed what would drive such a development in the short to medium term;

• Given that Safripol currently source their propylene from their competition (Sasol), it is expected that an alternative and cost competitive source of propylene (demand estimated to be 300t/d) would represent an attractive proposition to Safripol. However, since delivery of the propylene would have to
be based on road or rail transport, the transportation costs are considered to be prohibitive; and

• Deep Sea sales of polypropylene into China are probably the only export option for the Musina Coal to Hydrocarbon complex if it were to manufacture PP. To include the viability of this option in the Value chain analysis a high level view of the cost curve for polypropylene supplies into China has been developed. It has been assumed that PP supplies ex ME and AP are first quartile from a cost perspective. PP on the basis of FCC propylene has been taken as proxy. Under the assumed 90 $/bbl crude price scenario the cash cost of delivery to China of PP ex ME have been estimated at 960 $/t. The cash cost of PP on the basis of propylene from a Chinese naphtha cracker has been taken as proxy for 4th quartile supplies. These costs have been estimated at 1700 $/t for a 90$/bbl scenario. It is envisaged that cash costs for PP from coal are even higher. Hence, a robust and sustainable outlet for PP ex MCTH into China can only be achieved in case PP FOB cost Maputo are competitive with 1st and 2nd quartile cash cost levels which have been estimated at 900 USD/ton.

1.12.5.2 Projection on methanol exports

Deep Sea sales of Methanol into China follow the same as outlined above for polypropylene. Methanol ex MCTH has to compete with Natural Gas based methanol ex ME and indigenous methanol from coal. In this analysis both Natural Gas and coal have been priced at energy parity with crude at 90 $/bbl. These are 12 $/MMBTU for Natural Gas in the Middle East and 100 $/ton for coal in China. SRI data have been used as starting point for development of the cost curve analysis. This cost curve analysis shows that in order to ensure a robust and sustainable methanol export situation of MCTH methanol into China, methanol would need to be delivered FOB at Maputo at 400 $/ton.

1.12.5.3 Summary of opportunities for product market combinations

The figure below summarises the viability of the various product/market combinations as a result of the scenario analysis and in line with the projections outlined above.

**Opportunities for product/market combinations**

*Figure 52: Summary opportunities Product Market combinations*
1.12.6 Summary of outlook for product volumes and prices for markets

The call on products (demand data) over the lifetime of the project has been determined through a scenario approach for all product-market combinations. The study focuses on four key markets: regional market for transportation fuels as outlets for methanol, DME and gasoline, the regional power market for methanol and DME, and local and export markets for internationally traded chemicals (methanol and polypropylene). The three regional scenarios developed provided a longer-term view on demand for products to be supplied by the MCTH project.

1.13 Overview of the Supply and Demand for Methane Gas in South Africa

Methane gas is the major component of natural gas, accounting for in excess of 90% of the composition. Pure methane gas is therefore a substitute for natural gas. Natural gas in SA is currently supplied from only two sources. The oldest source is the PetroSA-operated gas field in the Bredasdorp basin, off-shore from Mossel Bay in the Western Cape. This operation is primarily supplying the Gas-to liquids operations in Mossel Bay, and currently no distribution network exists to supply third-part natural gas users in the region. The only natural gas pipeline that is available to third-party consumers in SA is the Sasol Gas network.

1.13.1 Historical Natural Gas consumption in South Africa

1.13.1.1 Western SA

PetroSA (previously Mossgas and Soekor), a state owned company, was established through the Central Energy Fund (CEF) in 1992 for strategic reasons. Natural gas produced from the F-A and E-M fields in the Mossel Bay area are used as feedstock to the PetroSA synthetic liquid fuels plant, which has a capacity of 45 000 barrels/day of liquid fuels. The gas consumption is in the range of 75 million GJ per annum, which equates to 0.069 Tcf per annum. By January 2002 gas reserves amounted to 0.414 trillion cubic feet (Tcf), only sufficient for another six years of production. PetroSA has announced an agreement with Pioneer Natural Resources in late 2005 that will lead initially to additional gas supply equivalent to around 53% of their consumption from 2007 to 2012.

Long-term supply to PetroSA could theoretically come from the Kudu field offshore of Namibia, with supplementary gas from the Ibhubesi field offshore of South Africa’s west coast.

1.13.1.2 Eastern SA (Sasol Gas)

Sasol launched their project to bring natural gas from Mozambique to South Africa in mid-2002. This project, valued at $1200 million at initiation, was developed as a PPP between Sasol, the South African and Mozambican governments. The cost for the pipeline portion alone was $400 million. The project comprises a large gas field development at Temane and Pande. Initially 18 wells in Temane (this field has higher pressure) are feeding the pipeline, to be followed by 16 wells in the Pande field. The gas field has an estimated reserve of 3.2 Tcf, and is expected to have a 25 year lifespan. Sasol has placed the tenders for the Pande connection pipeline in late 2006.

The pipeline, which follows a route of 865 km from Mozambique to Secunda, was then extended to Sasolburg, from where gas is distributed via the existing Sasol Gas infrastructure to customers. The gas is cleaned, dried and compressed at a Central Processing Facility before it enters the pipeline. The 660 mm
A diameter pipeline can handle gas at a pressure of 126 bar. The gas pipeline at start-up in 2004 had a capacity to deliver 120 million GJ/annum, ramping up to 240 million GJ/annum at full compression, should more gas become available. The natural gas is used by Sasol itself in Sasolburg, where it replaced coal gasification, as well as to supply commercial customers that previously used Sasol synthesis gas.

Before the implementation of the natural gas pipeline, Sasol was supplying around 20 million GJ/annum of a methane rich synthetic gas to around 700 customers in Gauteng, Mpumalanga and Kwazulu Natal, as well as a hydrogen-rich gas to Egoli Gas from Sasolburg at a rate of 30 million GJ/annum. The initial supply of 120 GJ/annum is a contractual obligation as part of Sasol’s agreement with the governments of SA and Mozambique.

1.13.2 Natural Gas Sales Structure

The Sasol Gas third-party sales structure for natural gas in South Africa is shown in the following figure:

![Sasol Gas Third Party Natural Gas Sales Structure](image)

Figure 53: Sasol Gas Third Party Natural Gas Sales Structure

From the diagram above it can be seen that third-party natural gas sales in SA is mainly in the primary metals sector. These sales exclude internal sales to Sasol operations, as well as PetroSA’s consumption from their own resources.

1.13.3 Future Natural Gas Consumption and Supply in SA

The DME has published an outlook for natural gas consumption up to 2028. This outlook is split between the “Eastern market” (Sasol Gas infrastructure), and the “Western Market” (Current PetroSA/Mossgas infrastructure plus new Western Coast and South Cape Coast infrastructural developments). The outlook is demonstrated in the following figures:
Figure 54: Outlook for Natural Gas Consumption – Eastern SA

Figure 55: Outlook for Natural Gas Consumption – Western SA

The projected consumption of natural gas by 2028 is around 380 million GJ/a, which is equivalent to 0.34 Tcf/annum. It is therefore clear that further natural gas resources need to be commercialised to meet this expected demand.

In terms of infrastructural development, the DME foresees the following development to take place in SA:
This plan makes provision for an eventual grid that forms a ring-supply connecting all coastal areas as well as a connection from the West Coast to Gauteng via Sishen. This plan is the basis used to determine the existing and planned future position of natural gas pipelines in SA.

1.14 Overview of the Ammonia Market

Ammonia (NH3) is made synthetically by means of a reaction between nitrogen and hydrogen. The hydrogen is prepared from synthesis gas, which typically is produced from natural gas, but also other sources such as refinery gas, coal, crude oil and even wood. Nitrogen is supplied from air or in pure form from air separation plants.

Generally the production of conventional synthetic ammonia is an energy intensive, complex process, operating at elevated temperatures and pressures. Ammonia gas itself is highly dangerous. The gas is mostly compressed and liquefied, and transported in special high-pressure vessels.

1.14.1 World Market

In 2005, global ammonia production grew to 110 million metric tons, with an estimated value of $35 billion. Estimated growth is around 1.8%p.a. Ammonia is the basic building block of the world nitrogen industry and is the intermediate product from which a wide variety of nitrogen fertilizer materials and industrial products are produced. Fertilizer use accounts for an estimated 85-90% of the end-use market for ammonia. Although the direct application of ammonia accounts for approximately 25% of the nitrogen fertilizer market in the United States, on a worldwide basis ammonia is generally processed into a variety of downstream products prior to being applied to the soil.
The major downstream fertilizer products include urea, ammonium nitrate, and ammonium sulfate and ammonium phosphates. A wide variety of industrial uses for ammonia and its derivative products account for the remaining 10-15% of the world market, including explosives.

Many producers produce anhydrous ammonia in about 80 countries. In 1974 the developing countries accounted for 27% of ammonia capacity. By 2003 their share was 52%. Some 88% of world’s ammonia production is processed or used in the countries where it is produced. The remaining 12% of world ammonia production enters international trade directly for all end-users\textsuperscript{16}.

As an example of the global impact of natural gas prices upon ammonia prices, the US market situation is analysed. The US is the largest producer and consumer of ammonia, and therefore a global price setter. Natural gas prices during the 1990’s have been fairly stable, and relatively low, moving at an average price of around $2 per mm BTU. However, since 2000 the price has been moving very erratically, with particularly high peaks in the Northern winter period, especially in the US. Part of this drastic change was caused by the Enron scandal, but general supply and demand factors are also playing a major role.

Natural gas prices are typically based upon the Henry Hub, which is the largest centralised point for natural gas spot and futures trading in the United States. The New York Mercantile Exchange (NYMEX) uses the Henry Hub as the point of delivery for its natural gas futures contract. Many natural gas marketers also use the Henry Hub as their physical contract delivery point or their price benchmark for spot trades of natural gas. Ammonia prices are based upon reported US Golf coast F.O.B. prices. The relative process of ammonia and natural gas since 1990 can be seen in the following diagram:

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{Ammonia_Prices_versus_Natural_Gas_Prices_-_US_Gulf_Coast.png}
\caption{Ammonia Prices versus Natural Gas Prices – US Gulf Coast}
\end{figure}

\textsuperscript{16} Source: International Fertilizer Industry Association
Apart for the period around 1994, there is a very good relationship between ammonia prices and natural gas prices. For the period as a whole the correlation coefficient between the two data series is 0.64. By removing the data for the period April 1994 to April 1995, the correlation coefficient increases to 0.78. It is therefore a fair comment to say that there is a significant correlation between the ammonia and natural gas price.

1.14.2 RSA Market

Ammonia is produced by Sasol from two distinct Sasol processes – from the Coal-to-Liquid Fuel process in Secunda and from a dedicated ammonia synthesis process using reformed natural gas in Sasolburg. South Africa is a net importer of ammonia and typically between 60 000 and 100 000 tons is imported annually. In 2005 a total of 66 196 tons of ammonia were imported at an F.O.B. cost of R102 million (F.O.B. price R1540/ton ($235/ton)), or around 35% below the delivered price in SA.

1.14.2.1 Sasolburg Ammonia Synthesis Process

The key feedstock into the Sasolburg ammonia synthesis process is natural gas from Mozambique, which is synthesized in Sasolburg prior to feeding into the ammonia and other Sasol processes.

The Sasolburg process has undergone a number of de-bottlenecks, with the current budgeted capacity at approximately 315 000t/a. The process forms an integral part of the Sasolburg Gas Loop and availability of synthesized gas is dependent on the efficiency of the Gas Loop at any given time and the economics of the various Sasol processes comprising the Gas Loop.

![Sasolburg Ammonia Synthesis Process](image)

**Figure 58: Sasolburg Ammonia Synthesis Process**

1.14.2.2 Secunda Ammonia from Coal-to-Liquid Fuels Process

In Secunda ammonia is produced from the extraction of phenols and tars out of the phenolsolvan plant. A key feedstock into the phenolsolvan plant is gas liquor, produced from the coal gasification process. Current ammonia production capacity from the phenolsolvan plant is 345 000t/a.
Figure 59: Secunda Ammonia from Coal-to-Liquid Fuels Process

The total SA ammonia market is around 725 000 tpa. The estimated end-use market structure for ammonia is shown in the table below:

<table>
<thead>
<tr>
<th>% of total sales</th>
<th>Application</th>
<th>Major end-users</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-45</td>
<td>Explosives</td>
<td>AEL, BME, Sasol Nitro</td>
</tr>
<tr>
<td>45-50</td>
<td>Fertilizers</td>
<td>Omnia, Yara, Sasol Nitro</td>
</tr>
<tr>
<td>5-10</td>
<td>Metal Processing</td>
<td>Impala Platinum</td>
</tr>
<tr>
<td></td>
<td>Cyanide</td>
<td>Sasol Polymers</td>
</tr>
<tr>
<td></td>
<td>Chemical/Biochemical</td>
<td>Bioproducts, African Amines, Anchor Yeast</td>
</tr>
</tbody>
</table>

Table 14: Estimated end-use market structure for ammonia

1.15 Overview of the Ammonium nitrate Market

Ammonium nitrate is the primary component of commercial mining explosives. Traditionally ammonium nitrate is made synthetically by means of a reaction between 60% nitric acid and ammonia. Nitric acid is basically an ammonia derivative, implicating that ammonium nitrate is a direct ammonia derivative, with no significant other feedstock required.

The process consists of the reaction of 60% nitric acid with ammonia vapour in a loop reactor. Some water is evaporated due to heat of reaction, resulting in a 78% ammonium nitrate solution. The rest of the water is removed with vacuum distillation, leaving a 99.7% product in molten form. This melt is then formed into prills in a prilling tower.

1.15.1 World Market

Ammonium nitrate (AN) is used mainly as a nitrogen fertilizer material and accounts for about 15% of the world nitrogen fertilizer market. World AN production in 2006 was more than 15 million metric tons (nitrogen content), or 43 million tons as is with an estimated F.O.B. value of about $6.5 billion ($150/ton). Industrial use of ammonium nitrate, primarily as an explosive material, accounts for 15–20% of world ammonium nitrate consumption.
Following its commercial evolution after World War II, AN supply/demand grew steadily for many years and the AN market is now mature. Once the primary nitrogen fertilizer product, ammonium nitrate has lost this position to urea, which has a higher nitrogen content, is more stable, has a lower transportation cost on a nitrogen-content basis and is often less costly to produce.

The industry decline since 1988 was largely due to a major drop in consumption and production in the former USSR and Eastern Europe, the result of the economic turmoil these regions experienced during the 1990s. Consumption in Western Europe also declined because of a general decline in nitrogen fertilizer consumption resulting from changes in the European Union’s agricultural subsidy policy. Consumption in the former USSR and Eastern European regions dropped by a combined 3.0 million metric tons of nitrogen between 1986 and 2006.

A marginal average annual world growth rate for ammonium nitrate of about 0.8% was projected for the forecast period to 2011. Urea has become the solid nitrogen fertilizer material of choice throughout most of the world and will account for most of the expected growth in nitrogen fertilizer during the forecast period. Urea also enjoys a production cost advantage over ammonium nitrate. It does not contribute to groundwater nitrate contamination as much as ammonium nitrate.

The following pie chart shows the world’s consumption of ammonium nitrate:

Because of security apprehensions following the September 2001 attack on the World Trade Centre and the explosion of the Grand Paroisse warehouse in Toulouse, France, stringent measures to reduce the risk posed by ammonium nitrate were introduced in May 2003. In the past few years, several countries, including China, Colombia, Algeria and the Philippines, have banned fertilizer-grade ammonium nitrate. Restrictions on ammonium nitrate certification, transportation and storage conditions are having a great impact on the countries of the former USSR, and the market is expected to trend lower along with reduced consumption levels in Western Europe.
1.15.2 RSA Market

The total South African ammonium nitrate market is around 500 000 tpa as nitrogen, or 1.4 million tpa as ammonium nitrate. Inland prices are around R1500 per ton. Most of the ammonium nitrate produced is actively converted into end-product explosives and fertilisers.

1.16 Overview of the Urea Market

Synthesized from ammonia and carbon dioxide (CO$_2$), urea is the only primary nitrogen product chemically classified as organic (because of its carbon content). Because urea is produced from ammonia and carbon dioxide, which is a by-product of ammonia production, all urea plants are located adjacent to or in proximity to an ammonia plant. Most world output is in solid form (prills or granular, or crystalline for specialized small-volume uses).

In a number of industrialized countries, a growing volume of liquid product is consumed in the production of nitrogen solution fertilizers, and in liquid cattle feeds. While fertilizer use dominates consumption of urea, important secondary markets are in use as a source of non-protein nitrogen in cattle feeds, as a basic building block for urea-formaldehyde resin systems, and as a raw material for melamine and cyanurate synthesis. South Africa used to produce 300 000 t/a urea at the AECI Modderfontein site, but this plant was closed down in 1999 due to the related closure of the ammonia plant.

1.16.1 World Market

The most significant aspect of the historical world supply/demand balance is the relatively steady growth in production (equal to apparent consumption), with only a minor pause in 2000 and 2001 when the Southeast Asian economy suffered a significant temporary slowdown.

Although urea is consumed primarily as a fertilizer material, a significant industrial market for urea also exists in the industrialized countries. Industrial uses are estimated to account for around 10% of the world urea market. Because of its high nitrogen content (46%), urea is the most popular form of solid nitrogen fertilizer, particularly in the developing regions of the world, and is traded widely in the international market. Urea fertilizer consumption increased at an average annual rate of 3.5% between 1994 and 2006 while nitrogen fertilizer, in total, increased at a rate of only 1.9% per year. Thus, urea gained considerable market share at the expense of other nitrogen fertilizer materials. The following pie chart shows world consumption of urea:
Apparent consumption is defined as production plus imports minus exports. World apparent consumption of urea increased by 61% between 1994 and 2006 and is forecast to increase by an additional 12% between 2006 and 2011 (an average annual growth rate of 2.3%). Most regions will post gains. The Asian regions stretching from the Middle East to Southeast Asia and including Japan accounted for 72% of world urea consumption in 2006. The global market for urea reached around 122 million tons in 2006, with a value of around $27 billion. The estimated usage of urea is as follows:

Global trade in urea is significant and reached 24.1 million t/a in 2001.

### 1.16.2 RSA Market

Urea is used primarily to manufacture mixed fertilisers and animal feeds, as well as urea formaldehyde resins. The market size varies considerably depending upon the outlook for the agricultural industry. The total SA market in 2006 is estimated at 653 000 t/a, compared to 670 000 t/a in 2002. The breakdown of application sectors for urea is as follows:
Applications for Urea

<table>
<thead>
<tr>
<th>Applications for Urea</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertiliser feedstock</td>
<td>17</td>
</tr>
<tr>
<td>Animal feeds feedstock</td>
<td>19</td>
</tr>
<tr>
<td>Direct agricultural sales</td>
<td>48</td>
</tr>
<tr>
<td>Urea formaldehyde resins</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
</tbody>
</table>

**Table 15: Application sectors of Urea**

All urea used and exported from South Africa is from imported sources. There is no duty on imported urea. Since 2002, the prices for urea have moved considerably in major currencies due to exchange rate fluctuations as well as feedstock cost increases. The 2004 US$ price of urea has reached $185 per ton, increasing to $220/ton in 2006. This is demonstrated in the following chart:

**Figure 63: US Prices for Urea**

Based upon these prices, the average SA coastal price for urea during 2006 was in the order of $0.24/kg, and inland prices are around $0.27/kg. Globally the growth rate for urea consumption has only been around 1 – 2% p.a. during the 1990’s. The medium term outlook is better at 2 - 4% p.a., based upon U.S. and Asian growth. The SA growth rate is expected to be similar, but highly influenced by climatic conditions. Urea supply in SA is from direct imports, mainly from low-cost sources such as SABIC in Saudi Arabia as well as Norsk Hydro in Qatar.

The major fertiliser companies are the major consumers of urea via their blended fertilisers and animal feed operations. They are also the major distributors to direct agricultural users. The major users are:

- Omnia;
- Norsk Hydro/Kynoch;
- Sasol;
• Voermol;
• Chemserve Resinkem;
• ACM Woodchem; and
• FormaChem.

1.17 Overview of the Ethylene Market

Ethylene is one of the major petrochemical feedstock products, primarily used to produce polymers such as polyethylenes, or polymer intermediates such as ethylene oxide/ethylene glycol. Ethylene is also the feedstock for major chemical products, including ethylbenzene, glycol ethers and others.

The conventional source of ethylene is from cracking units that produce a range of olefins such as ethylene, ethylene and butylenes from feedstock such as naphtha or ethane. South Africa has a unique feedstock position due to recovery from the Fischer Tropsch process by Sasol in Secunda. Generally this process produces relatively less ethylene than propylene, compared to conventional crackers.

1.17.1 World Market

As one of the largest-volume commodity chemicals produced worldwide, ethylene is used as a raw material in the production of plastics, fibres and other organic chemicals that are ultimately consumed in the packaging, transportation and construction industries and in a multitude of industrial and consumer markets. As such, its demand is sensitive to both economic and energy cycles. In 2004, global ethylene production amounted to almost 104 million metric tons, with an estimated value of $85 billion. This level of production represented an average annual growth of almost 4% from the 1997 level. By far the largest world market for ethylene is the production of polymers—principally polyethylenes. During 2004–2009, polyethylenes were the largest consumers of ethylene at 59% of total ethylene consumption and were expected to grow by 4% per year.

Regionally, consumption of polyethylenes accounts for the largest percentage of total ethylene consumption in the other regions category, with 83%, followed by Central/South America with 73%, China with 66% and the Middle East with 61%. The percentage of ethylene consumption accounted for by polyethylenes in mature PE consuming regions such as Western Europe and North America was around 55–58%. The next-largest share of ethylene consumption was accounted for by ethylene oxide (EO) and ethylene dichloride (EDC) which had a 13–14% share. In Japan, EDC as a percentage of ethylene consumption was the highest of all regions, at 20%, while in China it was the lowest at 7%, as shown in the following figure.
World ethylene requirements for ethylene dichloride (primarily for vinyl chloride/polyvinyl chloride) will grow at 4% per year. Ethylene consumption for ethylbenzene (for styrenic polymers) and for ethylene oxide (primarily for terephthalate polyester resins) will grow at annual rates of 3–5%. Other fast-growing end uses, albeit from smaller bases, include linear alpha-olefins, ethylene-propylene elastomers and vinyl acetate. In contrast, some major ethylene derivatives, such as ethyl alcohol and acetaldehyde, will continue to lose volume as a result of competing technologies.

Global trade in ethylene is very small due to logistical considerations and most ethylene is used actively, or converted to downstream products in close regional proximity to production.

### 1.17.2 RSA Market

The only current local market for ethylene is in polymer manufacturing. Current consumption of ethylene in South Africa is estimated as follows:

- **Polyethylene:**
  - Sasol Polymers [LDPE & LLDPE]: 180 - 190 000 t/a;
  - Dow Plastics [HDPE]: 160 - 180 000 t/a;

- **PVC:**
  - Sasol Polymers: 80 - 90 000 t/a;

- **Co-monomer in PP:**
  - Sasol Polymers: 8 - 12 000 t/a.

The total consumption is therefore estimated at around 454 000 tons. Ethylene prices in SA (Dow Plastics prices) are based upon international prices, plus a significant premium (20% estimated). The price history of ethylene is as follows:
Since 2002, the prices for commodities such as ethylene have moved considerably in major currencies due to exchange rate fluctuations. The US$ has depreciated by more than 30% to the Euro, as well as Yen and Pound. The current US$ price of ethylene, however, is around $800 per ton. Current SA prices are R5600/ton.

The SA growth rate is more related to installed capacity, and operating rates, of ethylene consuming operations such as Sasol Polymers and Dow Plastics. Sasol is increasing their ethylene production by a further 200 000 t/a, mainly as part of Project Turbo. Sasol is also significantly increasing in LLDPE production as well as a new 220 000 t/a LDPE plant [part of Turbo].

Ethylene supply in SA is very concentrated with only one supplier, namely Sasol Secunda and Sasolburg. Sasol’s capacity is currently around 454 000 t/a from two plants in Secunda and one in Sasolburg. The Sasol Project Turbo will add a further 192 000 t/a ethylene capacity. The only users of ethylene in SA currently are Sasol [via Sasol Polymers] and Dow Plastics. Sasol’s captive consumption of ethylene accounts for around 63% of the market.

1.18 Overview of the Propylene Market

Propylene is one of the major petrochemical feedstock products, primarily used to produce polymers such as polypropylene, or polymer intermediates such as acrylonitrile and propylene oxide/polyols. Propylene is also the feedstock for major chemical products, including oxo-alcohols, cumene, nonene and others.

The conventional source of propylene is from refinery off-gas C3 streams, or from cracking units that produce a range of olefins such as ethylene, propylene and butylenes from feedstock such as naphtha or ethane. South Africa has a unique feedstock position due to recovery from the Fischer Tropsch process by Sasol in Secunda. Two grades of propylene are typically produced, namely a polymer grade and a chemical grade. Production is split 50/50.
1.18.1 World Market

The global market for propylene reached around 72 million tons in 2006, with a value of around $40 billion. The bulk of propylene production and consumption is concentrated in North America, Western Europe and Japan. In 2002, these areas represented about 61% of the world capacity and 62% of demand, down from 68% and 70%, respectively, in 1998. Demand in other regions has shown dramatic growth in the last decade and will continue to outpace growth in the established petrochemical centres during the next five years. Growth in propylene has been and will continue to be influenced primarily by the requirements of the polypropylene industry. World propylene consumption will increase at about 4.5–5% per year during the 2002–2007 periods. The highest growth in consumption is expected in the Middle East (20% per year), Africa (10% per year), and Central and South America (8% per year). This is in contrast to the established consuming regions of North America, Western Europe and Japan, where the projected average demand growth will be 3.5%, 2.9%, and 1.8% per year, respectively.

The growth projection for world consumption assumes that enough propylene capacity will be available to support this growth. Construction of splitters in refineries and propane dehydrogenation facilities will provide some of the propylene capacity growth. Additional capacity will come from ethylene co-product streams resulting from the expansion of existing ethylene plants and from grass roots ethylene units that will start up worldwide during 2002–2007. The estimated usage of propylene is as follows:

![Figure 66: Global Usage of Propylene – Total market 72 million t/a](image)

Global trade in propylene is relatively small though, as most propylene is used actively, or converted to downstream products in close regional proximity to production. Although the market is huge, export potential would be limited by existing supply infrastructures. Expensive logistics - $150/ton

1.18.2 RSA Market

The largest local market for propylene is in polypropylene manufacturing. Prior to 1982, propylene was also used for production of chlorinated solvents - carbon tetrachloride/perchloroethylene. Propylene production declined in 2000 because of an explosion at Sasol Polymers’ polypropylene plant. The plant was down from February 2000 and started up again in September 2000. Acrylonitrile has been a product from
propylene up to May 1999 when this plant has been mothballed. The maximum consumption of propylene by this plant was 74 400 t/a, reached in 1998.

Sasol started producing n-butyl alcohol and acrylic acid in Sasolburg during 2003 in a joint venture with Mitsubishi Chemical Company. The facility also uses propylene from Sasol Polymers in Secunda. Sasol has also announced their intention to manufacture propylene oxide from propylene in Sasolburg. Current consumption of propylene is South Africa is estimated as follows:

- Polypropylene:
  - Sasol Polymers: 230 000 t/a
  - Dow Plastics: 100 000 t/a
- N-Butanol: 100 000 t/a
- Acrylic acid: 22 000 t/a

The total consumption in 2006 is therefore estimated at around 452 000 tons. Propylene prices in SA are based upon international prices. The price history of propylene is as follows:

Since 2002, the prices for commodities such as propylene have moved considerably in major currencies due to exchange rate fluctuations. The US$ has depreciated by more than 30% to the Euro, as well as Yen and Pound. The current US$ price of propylene, however, is around $550 per ton.

The SA growth rate is more related to installed capacity, and operating rates, of propylene consuming operations such as Sasol Polymers, Dow Plastics and Sasol Dia. Sasol is increasing their PP production by a further 300 000 t/a as part of Project Turbo, while they have also announced a propylene oxide plant with a 60 000 t/a capacity. These two developments should increase local consumption by around 345 000 t/a, or an increase of around 76% to 800 000 t/a total propylene demand.
Propylene supply in SA is very concentrated with only two suppliers, namely Sasol Secunda and Sapref [Shell/BP] in Durban. Sasol’s capacity is currently around 530 000 t/a and Sapref around 32 000 t/a. However, Sapref’s supply in 2003 was only 20 000 t/a. There is a possibility of further propylene extraction in Durban. The Sasol Project Turbo t will add a further 432 000 t/a propylene capacity.

The only users of propylene in SA currently are Sasol [via Sasol Polymers, Sasol Dia and soon Sasol Solvents] and Dow Plastics. Sasol’s captive consumption of propylene accounts for around 78% of the market.

1.19 Overview of the Black Products Market

Tar produced from coal gasification contains a range of so-called “black products”. This overview attempts to give a broader picture of these markets.

By the distillation of crude tar, a range of products is produced. These include:

- Light and heavy naphtha;
- Medium creosote;
- Heavy creosote;
- Residue oil;
- Pitch.

Crude tar, its derivatives and/or blends thereof are used in many applications, including:

- Wood preservatives;
- Black disinfectants;
- Road tars;
- Heating oils;
- Absorption oils;
- Carbon black [used in tyres];
- Brickets;
- Electrode binding pastes;
- Mining chemicals;
- Calcined pitch, etc.

It is important to note that there are major differences in properties between coal tar products and the heavy bituminous fractions obtained from the refining of crude oil. The result of this is that the different products are mostly used in separate applications. For instance, this means that road tar and road bitumen should not be seen as being similar products.

This section provides a short overview of the primary coal tar/bituminous products and their applications.
1.19.1 Primary Coal Tar Products and their Applications

Coal tar is produced in South Africa from mainly two sources, namely:

- Mittal (Iscor) - High-temperature coke ovens (>1 000ºC); and
- Sasol - Medium and lower temperature gasifiers.

1.19.1.1 Coke oven coal tar

Coke oven derived coal tar is recovered in two steps from the coke oven off-gases. In a primary recovery step, cold water is sprayed into the hot coke oven gas, which condenses the heavy tar fractions. This is called primary coal tar and contains mainly organic compounds with boiling points above 100ºC. The balance of the tar products are recovered from coke oven gas with scrubbing oil and contain compounds with boiling points between 25 and 100ºC. These two fractions are either used separately or blended together.

Due to the high temperature of the coke ovens, coke oven tar is thermally stable compared to low temperature tars. All coal tars, however, consist mainly of aromatic organics compared to bituminous products, which are mostly aliphatic. Coke oven coal tar consists mainly of the following fractions:

- Naptha (mixture of light aromatics, e.g.: BTX);
- Naphthalene;
- High creosote oils;
- Medium creosote oils;
- Low creosote oils;
- Pitch (including road tars);
- Other, including tarry acids (cresylic acid).

When coal is gasified, the gas is cooled and quenched, resulting in a gas stream (which is further processes to synthesis gas), an aqueous stream (from which phenols and ammonia is recovered) and a heavies stream containing oil and tar.

1.19.1.2 Sasol derived Coal Tar

The SASOL oil and tar stream contains 2-3% ash, which is removed through a filtering process. The resulting product is distilled to give approximately the following range of distillate cuts:

<table>
<thead>
<tr>
<th>Volume % of crude tar/oil</th>
<th>Fraction</th>
<th>Boiling range (deg C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-12</td>
<td>Light Naphtha</td>
<td>&lt;60</td>
</tr>
<tr>
<td></td>
<td>Heavy Naphtha</td>
<td>160 – 200</td>
</tr>
<tr>
<td>30</td>
<td>Medium creosote</td>
<td>200 – 275</td>
</tr>
<tr>
<td>10</td>
<td>Heavy creosote</td>
<td>275 – 350</td>
</tr>
<tr>
<td>20</td>
<td>Residue oil</td>
<td>350 – 420</td>
</tr>
<tr>
<td>30</td>
<td>Pitch</td>
<td>&gt;420</td>
</tr>
</tbody>
</table>

*Table 16: Range of distillate cuts*
The naphtha is used as a source of aromatics and as a fuel blending stock, blends of pitch is used as a fuel and reductant in the iron producing industry (i.e. CTF400 in blast furnaces), as a binder in road tars (TOSAS) and heating fuel, blends of the creosotes and residue oil in the wood preservatives market, disinfectant market, mining chemicals and as an absorption oil of coal gas.

Pitch is divided into various hardness grades, depending on its softening point in degrees Centigrade (i.e. Ring-and-Ball test). Road tar, for instance, is made from the pitch fraction softening at 70 to 80ºC.

### 1.19.2 Summary of Coal Tar Products Market size

The total summary of the estimated consumption of coal tar derived products in SA is shown below. These figures are based upon historical data from around the year 2000.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Market size (tons/annum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood preservatives</td>
<td>58 000</td>
</tr>
<tr>
<td>Black disinfectants</td>
<td>1 400</td>
</tr>
<tr>
<td>Road tars</td>
<td>10 000</td>
</tr>
<tr>
<td>Heating oils</td>
<td>800 000</td>
</tr>
<tr>
<td>Absorption oils</td>
<td>8 000</td>
</tr>
<tr>
<td>Carbon black</td>
<td>20 000</td>
</tr>
<tr>
<td>Binder pitch</td>
<td>86 000</td>
</tr>
<tr>
<td>Electrode pastes</td>
<td>80 000</td>
</tr>
<tr>
<td>Mining chemicals</td>
<td>100</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>12 000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 075 500</strong></td>
</tr>
</tbody>
</table>

**Table 17:** Summary of the estimated consumption of coal tar derived products in SA

Excluded from this table is 360 000 t.p.a. of Sasol’s creosote which is hydrogenated to fuel and diesel. This consists mainly of, phenol and cresols. Also excluded from the analysis are light aromatic oils, mainly used to produce BTX products [Benzene, Tolune, Xylenes].

### 1.19.3 Wood Preservatives

Blends of residue oil, medium creosote and heavy creosote. SASOL brand names are as follows:

- SAK100 (blend of 60% residue oil, 14% heavy creosote and 25% medium creosote);
- SAK K (blend of 85% SAK100 and 15% waxy oil 15 or 30 from the SASOL process); and
- SAK70 (blend of 25% pitch, 20% residue oil, 25% heavy creosote 30% medium creosote). This product is also called “Carbolineum” in the trade.

Prices are calculated on a sliding scale according to volume taken. The prices are around R0.83 – R1.06 per liter (based upon year 2000) - Carbolineum and Creosote, the packed product, sell for approximately R1.50/liter in the market.
It is difficult to estimate the capacity for a specific application because blends are made up from different cuts of the distillation column and additional feedstock is sometimes imported from other factories. The major manufacturers and suppliers of creosote-based products to the wood preservative market are as follows:

- Sasol: 100 000 tpa; and
- Iscor Suprachem: 25 000 tpa.

**1.19.4 Disinfectants (Also sometimes called “black disinfectants”)**

These consist exclusively of medium creosote. Two products are marketed by SASOL:

- Kreside (creosote cut 210ºC to 290ºC); and
- Kreside M (creosote cut 235ºC to 290ºC).

These products are used in formulations by the producers of the disinfectant and contain approximately 30 V/V% kresides:

- Kreside R1 250 / m³ (year 2000); and
- Kreside M R1 300 / m³ (year 2000).

SASOL Carbo Tar is the only known supplier of creosote feedstock into the “black disinfectant” market.

**1.19.5 Road Tars**

Tar-derivatives are used mostly as a drench-coating to prepare (“prime”) the surface of newly constructed roads for the final coats of aggregate and bitumen, as well as pre-coating aggregate to improve the adherence to bitumen. A range of special formulations also exists for the surface treatment of gravel and dirt roads and rejuvenation of road seals and premix surfaces.

**SASOL Carbo Tar**

- Stone Precoats: SAK70 (blend of 25% pitch, 20% residue oil, 25% heavy creosote and 30% medium creosote) from Carbo Tar;
- Superquick dry;
- Tar Primers: RT1-4, RT3-12.

**Suprachem**

- Range of product-names;
- Blend compositions are unknown.

The TOSAS products are placed on par with the Iscor/Suprachem prices in the market. Prices are quoted in c/litre. The 2000 list price in the market for bulk delivery in the coastal areas (zone 3) is approximately 107 c/litre and the price range for the Gauteng region (zone 1) varies between 97 and 125 c/litre.
### Table 18: Estimated capacity for tar derivative

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Estimated capacity (tons/annum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOSAS (supplied by Carbo Tar)</td>
<td>3,600</td>
</tr>
<tr>
<td>Suprachem (ISCOR)</td>
<td>5,000</td>
</tr>
<tr>
<td>Others (steel companies) –est.</td>
<td>1,400</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,000</strong></td>
</tr>
</tbody>
</table>

1.19.6 **Absorption Oils**

Naphthalene contained in cooking gas crystallizes and causes blockages of pipelines. These as well as other aromatics are removed with creosote, containing a high percentage of substituted naphthalene, which is a good absorbent of unsubstituted naphthalenes. The spec for unsubstituted naphthalene in the absorption oil is 10% (v/v). The Sasol product contains more or less 6%, while the ISCOR product contains more or less 25%. The SASOL product is clearly a better product:

- Absorption oil (100% medium creosote with distillation cut of 235°C to 290°C) on the Sasol Didier column.
- Absorption oil: R1 150 / m³ [2000]

Sasol Carbo Tar is the only supplier. ISCOR’s Barbette plant in Vanderbijlpark (producing 400 to 500 m³/month), shut down permanently in July 1998.

1.19.7 **Heating Fuels**

The heating-fuels business is difficult to evaluate due to the diverse nature of the carriers of energy, for example electricity, oil, coal, gas and coke. These forms of energy are all interchangeable, within the limits of equipment already installed at the consumer of the energy.

Fuel-oils historically had a market share of approximately 13 to 15% of the total market as a heating application, while electricity had approximately 20%, coal 50%, gas 3% and coke 12%.

Fuel oils are generally categorized according to their viscosity:

- Pitch, a solid;
- Residual oils – high viscosity product that has to be heated in order to vaporize it;
- Distillates – lower viscosity product that doesn’t need any heating before vaporising.

The average year 2000 prices (delivered) for the fuel-oils are:

- Pitch - List price of R355/ton;
- Residual oils - List price of R950/m³, market price of R800/m³;
- Distillate oils - List price of R1.25 to R1.30 per litre, market price of R1.10 to R1.20 per litre.
The major suppliers are Sasol, Mittal/Iscor and FFS, a recycler of oils and other products. Sasol owns FFS.

### 1.19.8 Mining Chemicals

Very small volumes of SAK70 and SAK100 are used in a mining chemical application. SAK70 is mainly used in blends in a collector application in coal flotation. SAK100 is mainly used as foam in gold/PGM flotation. The SAK70 blends are selling for approximately R2 500/ton [2000] in the market. The SAK100 (approximately 10% SAK100) is selling for approximately R3 000/ton in the market.

Sasol is the only known supplier supplying into this market.

### 1.19.9 Binder Pitch

Binder pitch is primarily used in the manufacturing of anodes in the aluminium industry and cathodes in the steel industry. Their function is to bind the carbon particles, which results in a binder matrix. The ‘green’ anodes and ‘green’ cathodes are then baked resulting in the final anode or cathodes. In this process the pitch becomes carbon. It is also being used in Söderberg Pasta.

The price of binder pitch is in the region of R1 000/t (2000), depending on the specific grade of binder pitch being used. The major supplier of binder pitch in South Africa is Mittal/Iscor. Suprachem supplies Alusaf with approximately 25 000 t/y of binder pitch; supplies EMSA with approximately 8 000 t/y only locally and 15 000 t/y go to Ferroveld.

### 1.19.10 Electrode Paste

Electrode Paste is used to manufacture Söderberg electrodes. These electrodes are used mainly in the ferro-alloy industry. The commercial Electrode Paste price is in the range of R2 000 – R2 500 per ton (year 2000).

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Estimated Capacity Tons/Annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ferroveld</td>
<td>50 000 – 75 000</td>
</tr>
<tr>
<td>Rand Carbide</td>
<td>Small volume(^a)</td>
</tr>
<tr>
<td>Char Technologies</td>
<td>Small volume(^b)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>± 60 000 – 80 000</td>
</tr>
</tbody>
</table>

**Table 19: Estimated manufacture capacity**

Legend:

\(^a\) Rand Carbide produces Electrode Paste as a by-product; their ovens are old and small.

\(^b\) Char Technologies planned a plant; some capacity was introduced but is not clear how much. Further capacities are still a possibility.

Ferroveld has six ovens for production. They used to operate four ovens but have added two additional ovens (even after these expansions there were talks of them doubling their capacity). They produce Söderberg paste that is based on calcined anthracite (ECA – electrical calcined anthracite) mixed with pitch.
1.19.11 Consumption of Naphthalene

Naphthalene is a by-product from the Mittal/Iscor crude tar processing. Naphthalene is used mainly to manufacture Phthalic Anhydride (NCP) and to a smaller extent Naphthalene Sulphonate. The consumption is estimated at 12 000 t.p.a. at R1 400 per ton. It should be noted that Phthalic Anhydride is also manufactured from ortho-xylene (all imported @ 13 000 t.p.a.).

1.19.12 Creosote Oils in Carbon Black

Creosote oils used in the production of carbon black, which is a major feedstock in the rubber industry. Prices are in the order of R1 per litre (2000). The only supplier is Mittal/Iscor.

1.20 Overview of the Linear Alpha-olefins Market

Alpha-olefins are straight-chain (linear) hydrocarbons characterized by a double bond in the terminal (or Alpha) carbon position. Therefore the name ‘linear Alpha-olefins’, abbreviated as LAO’s. LAO applications are as follows:

- C4-C8: Polymers and polyethylene co-monomer;
- C6-C8: Low-molecular weight fatty acids and mercaptans;
- C6-C10: PVC Plasticiser alcohols (‘Oxo-alcohols’);
- C10-C12: Poly-alpha-olefins (synthetic lubricants), amines, amine-oxides;
- C10-C16: Detergent alcohols;
- C16-C18: Lubricant additives, surfactants;
- C20-C30+: Oil field chemicals, waxes.

The major application of LAO’s is as a co-monomer in polyethylene manufacturing. Linear low-density polyethylene (LLDPE) is a copolymer of LAO’s such as 1-butene, 1-pentene, 1-hexene and 1-octene. The level of inclusion of LAO’s in LLDPE is typically 9-10%, but can be as low as 3%. 1-Butene accounts for 31% of consumption, but is losing market share to 1-hexene and 1-octene. The inclusions of LAO’s results in superior tear strength and stress crack resistance in LLDPE. The higher LAO’s such as hexene and pentene enhances this. LLDPE accounts for 80% of LAO usage as co-monomer.

High-density polyethylene (HDPE) has high stiffness, but is susceptible to environmental stress cracking by many liquids such as household detergents. LAO’s such as mainly hexene, but also butene and octene are included at rates of 0.5%-3%. This greatly enhances stress crack resistance, but also gives a softer, more flexible plastic.

Most LAO’s are produced by means of oligomerisation of ethylene. This means that ethylene molecules are linked together by means of special catalysts. The major producers are BP Amoco, Shell Chemical Co. and Chevron Chemical Company. This technology therefore implies that the major cost driver for this process is ethylene. The price of 1-hexene, for example, is historically in the order of US$ 250 - 400 above the ethylene price.

PetroSA has a particular interest in 1-butene and 1-hexene only, based upon feedstock availability.
1.20.1 World Market

World linear alpha-olefin capacity (excluding butene-1 from refinery streams) amounted to approximately 3.5 million metric tons by year-end 2003. There are currently eight producers of alpha-olefins operating eleven plants internationally, as can be seen in the following figure.

![Figure 68: World capacity for Linear alpha-olefins by producer (2003)]

In 2003, world alpha-olefin production was just over 2.5 million metric tons, valued at almost $2.5 billion (based on 2003 U.S. prices). North America accounted for almost 68% of world production during 2003, followed by Western Europe, South Africa, Japan and Russia.

The largest uses for linear alpha-olefins are as comonomers for polyethylene production, for the production of alcohols (used largely in detergents and plastics) and for making polyalpha-olefins (used in synthetic lubricants). Forecasts of growth rates vary significantly by region. On a global scale, total LAO consumption should average 4-5% annually through 2008. However, growth for comonomer-grade LAOs is expected to be considerably higher, or 5-8% globally. The estimated usage of PAO’s is as follows:

![Figure 69: Global Usage of PAO’s – Total market 2.5 million t/a]

Global trade in LAO’s is significant, with in excess of 60% of production being exported. Prices achieved by Sasol for alpha-olefin exports are much lower than local selling prices. The level of exports and average prices are indicated in the table below (includes 1-hexene and 1-octene):
### Table 20: Level of exports and average prices (estimate – expected error in published data)

<table>
<thead>
<tr>
<th>Year</th>
<th>Mass Tons</th>
<th>F.O.B. Value Rm</th>
<th>F.O.B. Price R/kg</th>
<th>F.O.B. Price $/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>101758</td>
<td>308</td>
<td>3.02</td>
<td>0.50</td>
</tr>
<tr>
<td>2000</td>
<td>137884</td>
<td>477</td>
<td>3.46</td>
<td>0.52</td>
</tr>
<tr>
<td>2001</td>
<td>169513</td>
<td>925</td>
<td>5.46</td>
<td>0.68</td>
</tr>
<tr>
<td>2002</td>
<td>171000*</td>
<td>1002</td>
<td>5.85</td>
<td>0.59</td>
</tr>
<tr>
<td>2003</td>
<td>160125</td>
<td>1049</td>
<td>6.55</td>
<td>0.93</td>
</tr>
<tr>
<td>2004</td>
<td>179810</td>
<td>908</td>
<td>5.05</td>
<td>0.77</td>
</tr>
<tr>
<td>2005</td>
<td>430481</td>
<td>1230</td>
<td>2.85</td>
<td>0.45</td>
</tr>
</tbody>
</table>

1.20.2 RSA Market

In SA 1-butene and 1-hexene are exclusively used in the production of LLDPE and HDPE. None of the other applications are applicable. Total consumption of 1-butene is 1700 t/a and 1-hexene 6600 t/a. Prices in SA are based upon international import-parity prices for Dow Plastics, while Sasol Polymers pays an internally agreed price for hexene. There is no local duty applicable on imported alpha-olefins, and prices tend to be close to import parity. The international price history of LAO’s is as follows:

**Figure 70:** 1-Butene and 1-Hexene Price History US Cents/KG

The current US$ price of 1-butene is around $1000 per ton. The SA growth rate is linked with production capacity for LLDPE and HDPE, which is expected to stay constant over the medium term. Sasol is the only local producer, and they are also the most dominant supplier globally in hexene with a 30% market share. Total hexene capacity is 200 000 t/a consisting of three units, while a fourth unit is under consideration. Sasol also produces 47 000 t/a of 1-octene, exclusively for Dow. This represents 14% of the global supply. A second unit of similar size came into production during September 2004.

The only customers in SA are Sasol Polymers [LLDPE] and Dow Plastics [HDPE], both located in Sasolburg. Sasol Polymers uses 900 t/a of 1-butene in food-grade LLDPE [1-hexene not allowed], and 6600 t/a of 1-hexene in other LLDPE grades. Dow Plastics uses 800 t/a 1-butene in HDPE. Sasol is the only global producer of 1-octene, under a sole-supply agreement with Dow. Dow uses 1-octene in novel technology to obtain superior polymer performance. Sasol tried to introduce 1-pentene as a replacement for other alpha-
olefins, but this was unsuccessful. However, this does indicate a significant level of inter-product substitution in alpha-olefins

1.21 Overview of the CTL Solvents Market

A large variety of mainly oxygenated solvents are produced in the CTL process. These include:

- Acetone;
- MEK;
- MIBK;
- Iso-propanol;
- N-propanol;
- Ethanol;
- Others and blends;

This overview only covers a few of these products as examples of the market potential.

1.21.1 World Market

1.21.1.1 Acetone

Global production of acetone was almost 5 million metric tons in 2004, valued at nearly $4 billion. Global capacity utilization rose to 88% in 2004 from 81% in 2001 because of increased demand. Acetone prices reached record highs in the fourth quarter of 2004 as a result of rising feedstock costs and robust demand. Consumption is expected to grow at an average annual rate of 4.5% from 2004 to 2009.

Because cumene peroxidation is the largest source of acetone, demand for co-product phenol, rather than demand for acetone, determines capacity utilization. With the exception of bisphenol-A, growth in phenol demand does not correlate with growth in acetone demand. Therefore, acetone supply/demand is frequently unbalanced, with phenol demand usually greater than acetone demand, resulting in an oversupply of acetone. As a result, phenol producers have been evaluating production technologies that bypass co-product acetone. The following pie chart shows world consumption of acetone:
1.21.1.2 MEK

Methyl ethyl ketone (MEK) is a colourless, stable, flammable liquid with an odour similar to that of acetone. It is miscible with water and a variety of organic solvents. Its exceptional solvency makes it a powerful and valuable solvent for many substances, especially resinous materials.

Global production of MEK was almost 0.5 million metric tons in 2006, valued at nearly $0.4 billion. Approximately 58% of global MEK capacity was concentrated in the three major regions in 2006 (United States, Western Europe and Japan) compared with 75% in 2003. The following pie chart shows the top six producers as of October 2006:

In 1990, MEK was designated as a hazardous air pollutant (HAP) as defined by Title III of the Clean Air Act Amendments (CAAAs). As part of the CAAAs, the EPA was required to establish national emission standards for hazardous air pollutants (NESHAPs). As part of the NESHAP program, renamed the Air Toxics Program, the EPA has been establishing control technology guidelines (CTGs) directed at specific industries identified as emitting relatively large quantities of HAPs.
After nearly ten years from the time the Chemical Manufacturers Association (CMA) originally petitioned the EPA to delist MEK from the HAPs list, MEK was officially delisted on December 14, 2005. MEK will continue to be regulated as a volatile organic compound (VOC). The removal of MEK from the HAPs list could reverse the overall declining trend of MEK consumption for coating applications.

1.2.1.2 RSA Markets

Sasol Solvents is involved in the manufacturing and marketing of a wide range of solvent type products from CTL.

The Secunda solvents operations are integrated into the SSF synthetic fuels. The solvents are basically recovered from process streams and not synthesized as such. The flow diagram for the Secunda site is shown in the following chart:

![Flow Diagram of Sasol Solvents Secunda Site](source: Sasol)

The Sasol Solvents operations at the other Sasol site in Sasolburg consists of both recovery-based solvents, as well as a conventional methanol plant based upon synthesis gas. The flow diagram for this site is as follows:
1.2.1.2.1 Acetone

The South African acetone market is around 19,000 tpa. A summary is as follows:

<table>
<thead>
<tr>
<th>Sector</th>
<th>Application</th>
<th>2000 tpa</th>
<th>Value 2000 (US$ '000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Spec Paints and Coatings</td>
<td>Solvents – Ketones</td>
<td>3,800</td>
<td>1,845</td>
</tr>
<tr>
<td>Pure Funct &amp; Form Spec</td>
<td>Solvents – Ketones</td>
<td>125</td>
<td>64</td>
</tr>
<tr>
<td>Fine Chemicals</td>
<td>Commodity Organic Chemicals</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Form Spec Adhesives &amp; Sealants</td>
<td>Solvents – Ketones</td>
<td>700</td>
<td>280</td>
</tr>
<tr>
<td>Form Spec Agricultural Specialities</td>
<td>Solvents – Ketones</td>
<td>180</td>
<td>126</td>
</tr>
<tr>
<td>Consumer Form - Cosmetics and Toiletries</td>
<td>Solvents – Ketones</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td>Consumer Form - Household and Cleaning</td>
<td>Solvents – Ketones</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Form Spec Inks</td>
<td>Solvents – Ketones</td>
<td>160</td>
<td>112</td>
</tr>
<tr>
<td>End-use Textiles</td>
<td>Solvents – Ketones</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>Other (unidentified)</td>
<td></td>
<td>8,443</td>
<td>1,351</td>
</tr>
<tr>
<td>Commodity Organics</td>
<td>Commodity Organic Chemicals</td>
<td>5,120</td>
<td>819</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>18,610</strong></td>
<td><strong>4,611</strong></td>
</tr>
</tbody>
</table>

Table 21: Summary of the South African acetone market
1.21.2.2 MEK

The South African MEK market is around 2 700 tpa. A summary is as follows:

<table>
<thead>
<tr>
<th>Manufacturers</th>
<th>Tariff Heading</th>
<th>Tariff Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sasol Solvents</td>
<td>29.14.12</td>
<td>Butanone (methyl ethyl ketone)</td>
</tr>
</tbody>
</table>

Applications in the Local Market

<table>
<thead>
<tr>
<th>Sector</th>
<th>Application</th>
<th>2000 tpa</th>
<th>Value 2000 (US$ '000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Spec Adhesives and Sealants</td>
<td>Solvents – Ketones</td>
<td>240</td>
<td>149</td>
</tr>
<tr>
<td>Form Spec Inks</td>
<td>Solvents – Ketones</td>
<td>450</td>
<td>103</td>
</tr>
<tr>
<td>Form Spec Paints and Coatings</td>
<td>Solvents – Ketones</td>
<td>1,900</td>
<td>1,713</td>
</tr>
<tr>
<td>Commodity Organics</td>
<td>Commodity Organic Chemicals</td>
<td>100</td>
<td>93</td>
</tr>
<tr>
<td>Pure Function and Form Spec</td>
<td>Solvents – Ketones</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2,700</strong></td>
<td><strong>2,067</strong></td>
</tr>
</tbody>
</table>

Table 22: Summary of the South African MEK market

1.22 Overview of the Waxes Market

Waxes are a composite of ten of the more significant wax types commercially available today. A generally accepted definition of the term wax does not exist, primarily because of the large number of products with wax-like properties and the chemical complexity of individual wax types. Selection of the ten wax types surveyed is based largely on commercial importance and volumes consumed.

1.22.1 World Market

The world market for waxes is estimated at 11 – 13 million tpa, worth around $12 billion. The following pie charts show world consumption of waxes by major type and world consumption of petroleum wax by region.

Figure 75: World consumption of waxes (2005)
Waxes are used in a wide variety of applications and are important components of many household and industrial products. Their many uses include paper coating, candles, textile and leather products, polishes, adhesives, fruit and vegetable coatings, cosmetics, medicinal, inks, lubricants, rubber compounding and plastics compounding. These applications cover a broad marketing spectrum from commodity-type markets, such as paper coating, to more specialty-type markets, such as cosmetics. Waxes are typically processed and blended to meet specific performance requirements, often by specialized companies in the distribution chain that also provide considerable technical service. Examples of such companies include Koster Keunen (United States), Paramelt (the Netherlands) and S. Kato and Company (Japan).

Petroleum waxes are usually classified as by-products of lubricating oil production and clearly dominate the overall wax market. More than fifty companies produce petroleum waxes worldwide and most are crude oil refiners. Some refiners sell unfinished waxes to a small number of large consumers, while others elect to move most of their wax output through specialist marketing companies that often process the wax further before resale.

1.22.2 RSA Market

At Sasol in Sasolburg syngas from coal gasification is fed to the low-temperature Fischer Tropsch reactors, called Arge-reactors, where the hydrocarbon chains of length C15 to C150 are formed. These hydrocarbons are essentially synthetic waxes with the long-chain product being hard waxes, the medium-chain product is medium waxes and the short-chain product is petroleum jelly (Vaseline). The products below C20 are sent to the Natref refinery for inclusion in the fuel pool. SCI produces approximately 150 000 tons/annum waxes in total. The South African wax market is around 113 000 tpa. A summary is as follows:

| Waxes [non-captive] Product Profile |  
|-----------------------------------|---|
| Manufacturers | Tariff Heading | Tariff Description |
| Sapref | 27.12 | Petroleum jelly; paraffin wax; microcrystalline petroleum wax, slack was, ozokerite, lignite wax, peat wax, other mineral waxes, and similar products obtained by synthesis or by other processes, whether or not coloured. |

| Sasol Wax |  
|-----------|---|
| Sector | Application | 2000 tpa | Value 2000 (US$ ’000) |
| Form Spec Adhesives & Sealants | Commodity Organic Chemicals | 2 400 | 2 232 |
| Conversion Plastic | Heat Stabilizers/Lubricants | 500 | 594 |
| Form Spec Inks | Waxes | 121 | 252 |
| End-use Food & Beverages | Waxes | 240 | 380 |
| Consumer Form - Household and Cleaning | Waxes: Decorative Candles | 22 800 | 18 071 |
| Consumer Form - Household and Cleaning | Waxes: Functional Candles | 68 000 | 38 626 |
| Consumer Form - Household and Cleaning | Waxes: Polishes | 2 020 | 1 719 |
| Form Spec Paints & Coatings | Waxes | 197 | 117 |
| Pure Funct & Form Spec | Commodity Organic Chemicals | 280 | 284 |
| Consumer Form - Cosmetics and | Commodity Organic Chemicals | 500 | 1 651 |
Table 23: Summary of the South African wax market

Current wax prices are around $1/kg for commodity grades.

1.23 The South African Liquid Fuels Market

1.23.1 Market Size

Based upon official industry statistics, supplied by SAPIA (SA Petroleum Industry Association) the total South African liquid fuels market reached 24.4 billion litres in 2006, of which petrol of all kinds accounted for 46.2%. The breakdown of consumption over the last decade is shown in the following diagram:

![Figure 76: SA Liquid Fuels Market – Millions litres (Source: SAPIA)](image)

It is clear that the liquid fuels market is dominated by petrol and diesel.

The total consumption of liquid fuels is equivalent to 24.4 billion litres per annum, which is equivalent to around 423 000 barrels/day of product.
1.23.2 Market Growth

The total fuels market showed an average annual growth rate of 2.5% from 1994 – 2006. Petrol, however, showed a lower growth of 1.3%, compared to diesel that showed an above average growth of 4.5%, and jet fuel (5.5%). The increased use of diesel is related to both the increased sales of diesel-powered passenger vehicles, as well as increased road transportation of heavy vehicles, which are exclusively diesel-based.

During the period 2002 – 2006 the SA economy grew on average at 4.5% per annum which is significantly higher rates than preceding years. During this period the consumption of petrol grew at 2.2% or half of the GDP growth. In contrast, diesel growth from 2002 – 2006 was 6.3% per annum, or around 2% above GDP.

Assuming a medium term growth in GDP of around 4.5% the consumption of fuels by 2012 is estimated as follows:

- Petrol: grow from 11.28 billion litres to 12.9 billion litres
- Diesel: grow from 8.71 billion litres to 12.6 billion litres
- Other: grow from 4.4 billion litres to 5.7 billion litres

The total increase in liquid fuels consumption is forecast to be 6.8 billion litres p.a. This is equivalent to 118 000 barrels/day of product. The overall growth rate is therefore forecast at 4.2% p.a. or 0.3% below the GDP forecast.

1.23.2.1 Regional Breakdown of the Liquid Fuels Market

The regional market breakdown for liquid fuels, and in particular petrol, is of major importance to the supply of bio-ethanol. It will be necessary to optimise the supply-logistics of bio-ethanol to ensure minimum cost and maximum market penetration. The regional consumption of all fuel categories is shown in the following figure:
Figure 77: Regional fuels Consumption during 2005 – litres (Source: SAPIA)

Looking at petrol on its own the regional consumption is as follows:

Figure 78: Regional Petrol Consumption during 2005 – Total 11.17 billion litres (Source: SAPIA)
For diesel on its own the regional consumption is as follows:

![Figure 79: Regional Diesel Consumption during 2005 – Total 8.12 billion litres](image)

Gauteng, KZN, Western Cape and Mpumalanga, which accounts for around 69%, or 5.6 billion litres.

### 1.23.2.2 Liquid Fuels Market Segments

The major market segments according to SAPIA are shown below:

![Figure 80: Liquid Fuels Market Segments during 2005 – litres (Source: SAPIA)](image)
It is clear that as far as petrol is concerned, the major market segment is retail garages, which account for 92% of petrol sales. For diesel the market is more spread out, with retail garages accounting for 32.3%, general dealers 12% and agriculture also 12%.

### 1.23.2.3 Supply of Liquid Fuels in SA

Primary producers of liquid fuel products in SA are limited to the following operations:

- **Conventional refineries:**
  - SAPREF, Durban (50% BP; 50% Shell) – Capacity: 180 000 barrels/day (around 10 billion litres of crude oil per year);
  - Genref, Durban (Engen) – Capacity: 125 000 barrels/day, and with minimal Capex up to 150 000 barrels/day;
  - Calref, Cape Town (Chevron) – Capacity: 100 000 barrels/day;
  - Natref, Sasolburg (64% Sasol; 36% Total) – Capacity: recently increased to 108 000 from 86 000 barrels/day;

- **Synthetic fuel operations:**
  - Sasol Synthetic Fuels, Secunda (Coal based) – Capacity: 150 000 barrels/day (likely to increase in future, using natural gas);
  - PetroSA/Mossgas, Mossel Bay (Natural gas and condensate based) – Capacity: 45 000 barrels/day.

Total capacity is therefore currently around 708 000 barrels/day of crude oil equivalent. Assuming a conversion rate to liquid fuels of 85%, this is equivalent to around 602 000 barrels/day. This compares to demand in 2006 of 423 000 barrels/day. Total capacity utilisation in 2006 was therefore estimated at 70.3%.

Based upon the forecast overall growth in consumption of 4.2% p.a., the existing capacity is sufficient for around 7-8 years of growth. The SA liquid fuels industry has a track record of brown field expansion to account for market growth. In addition, an official feasibility study for a Sasol 4 plant, possibly in the Limpopo province is currently underway. This is likely to add around 80 000 barrels/day capacity. It is therefore expected that continuous investment in debottlenecking and capacity creeping will make it very difficult to justify a new refinery in SA, taking into account SA’s lack of crude oil resources, linked with economies of scale for new refineries that require minimum sizes of 200 000 barrel/day upwards. The relative retail market shares of the main fuel retailers are shown in the following diagram:
Table 24: Market Shares of the main fuel retailers during 2005 in percentages (Source: SAPIA)

As far as petrol is concerned, Engen has a 26.9% share of retail sales, while Shell, BP and Caltex are roughly of a similar size at 16 – 18% each. It should be noted that SA has a surplus of petrol available in the inland regions from the Sasol and NATREF operations, while diesel is in relative shortage. The operations are run at capacity to supply enough diesel. This is a negative position for inland produced ethanol, in that ethanol will result in further excess of petrol, which will have to be transported to coastal regions by road and rail, which is uneconomical. On the other hand, biodiesel will be in more demand in the inland region. Coastal refineries have a relative shortage of petrol, meaning that bio ethanol will be in relative more demand in these regions.

1.23.2.4 Fuel Grades

It is important to understand the market segmentation between the different grades of petrol. Each grade of petrol has its own blend stock requirement, and would have different requirements related to ethanol blending. As of 1 January 2006 the new fuel regulations were in place, which required for Gauteng the following petrol products:

- 93 Octane Unleaded;
- 95 Octane Unleaded;
- 93 Octane Lead Replacement Fuel.

For SA as a whole, 59.8% of petrol was unleaded by September 2006. This split is, however, not similar throughout the country. In the Eastern Cape unleaded petrol is 55.3% of all petrol. The detailed split between petrol grades for the Eastern Cape is as follows:

- 95 Octane Unleaded: 53%;
- 93 Octane Unleaded: 2%;
- 95 Octane Lead replacement: 43%;
- 93 Octane Lead replacement: 2%.

1.23.2.5 Fuel Distribution in SA

Inland fuel distribution in SA is very complicated from a technical and logistical perspective, and bio ethanol blended petrol would have to fit into this structure. The principal of distribution is that liquid fuels are distributed from production facilities (Durban, Sasolburg and Secunda) by pipelines to depots, from where
the product is loaded into road and rail tankers for distribution to retail garages, as well as other end-users. The pipelines are owned and operated by Petronet, part of Transnet, which provide the service to the major oil companies. Regions that are not connected to this pipeline, such as the Eastern Cape, is therefore logistically excluded from the large and lucrative inland fuel market.

The pipelines are managed in a complicated manner, in that multiple products (various grades of petrol, diesel and jet fuel) are pumped through the same pipeline, in a carefully planned sequential manner. For example, Engen in Durban could request Petronet to send a “plug” of 93 Octane unleaded fuel from Durban to the Alrode depot. Along the way from Durban to Alrode, some of the product may be siphoned off at say, Kroonstad. Additional product would then be added by Petronet to the pipeline to ensure that Engen gets their required volume in Alrode. This is done on the basis of “Fungibility”. This means that only specification-based product is allowed in the pipeline, which means that 93 Octane unleaded fuel placed in the pipeline by any source, can be supplied to any user.

Placing multiple products in the pipeline causes mixing, or contamination, of products at the interface between types. The relatively small quantity of contaminated product is mixed into a grade of product which would be consistent with specifications, For example, where 95 Octane follows 93 Octane; the mixed volume would be blended into 93 Octane. When diesel is followed by petrol, the mixed product is slowly blended into the diesel pool.

1.24 Summary

The proposed coal to hydrocarbons plant will make use of the coal reserves present in the area and the transport infrastructure which will enable the products to be distributed throughout South Africa, the SADC countries and internationals markets.

The proposed plant will not make use of SASOL technology but the intention is to make use of one of several new generation (Carbon to Liquid) CTL technologies. These technologies include the following:

- The Shell Coal Gasification Process which has been technically proven in various plants around the world and offers many advantages. The process produces syngas. All the coal will first be processed through this gasification phase. The advantages of the Shell gasification process are improved yields and a cleaner process (environmentally acceptable).

- The syngas is then processed into methanol which is the primary product for further processing into a variety of products. The downstream processes and products that can then be produced include the following:
  - The methanol to gasoline processing technology was developed by Exxon Mobil in the early eighties and demonstrated in New Zealand using natural gas.
  - The Haldor Topsoe (Denmark) and Toyo Engineering (Japan) processes produces di-methyl ether (DME) from methanol.
  - Methanol to Propylene. Lurgi is developing the methanol to propylene process. No commercial plants are in operation yet.
Musina SEZ License Application

Pre-Feasibility Study for the Musina SEZ, Limpopo Province

- Propylene to polypropylene (PP). The conversion processes to convert propylene to polypropylene are very mature. A number of process licensors, including companies such as Lyondell Basell, can provide technical support and turnkey projects.

- The processing technologies deployed in the various processes will produce a wide range of by-products, such as waxes, black tars, ammonia and urea (agriculture fertilisers), LPG (Liquid Petroleum Gas), a range of solvents, linear Alpha-olefins and ethylene.

- While the technological viability of the proposed processes appears sound, the economic viability of the project depends largely on the price of coal and the price of crude oil. These prices are driven largely by the OPEC oil producers and international supply demand dynamics. The long term outlook for crude oil prices is projected to increase. The target markets for the various products are mostly the export markets, such as China for DME and PP, South Africa and Sub-Saharan Africa for the lesser by-products and gasoline.

1.24.1 Product overview

The proposed CTH (Carbon to Hydrocarbons) project will produce a range of products directly, i.e., methanol, Di-methyl ether (DME), polypropylene (PP) and transportation fuels as the primary products. A wide range of downstream products can also be produced from the by-products and primary products of the proposed process and plant.

1.24.2 Methanol

There is a growing worldwide demand for methanol. The projected sales of methanol will come from Deep Sea sales of methanol into China. Methanol from the MCTH (Musina Coal to Hydrocarbons) project has to compete with Natural Gas based methanol from the Middle East and indigenous methanol from coal.

1.24.3 Di-methyl ether (DME)

DME is difficult to transport and has no immediate uses in South Africa although extensive use of DME occurs in China.

1.24.4 Polypropylene

SA is largely self-sufficient in the production of PP and even exports it at present, however, there is a growing demand for PP worldwide. Deep Sea sales of polypropylene into China are probably the only export option for the Musina Coal to Hydrocarbon (MCTH) complex if it were to manufacture PP.

1.24.5 Transportation fuels

Opportunities exist to supply the increasing demand for both Gasoline and Diesel as transportation fuels in South Africa. The viability of these opportunities will depend upon a number of factors, most notably:

- Availability of supply on the spot markets and crude availability – since market prices are determined on an import parity pricing system;
- Cost competitiveness of any new supply with the BFP (Basic Fuel Price) formula;
- Opportunities to benefit from transportation cost differences; and
• The successful negotiation of an off-take agreement with an established fuels retailer to bring the gasoline or diesel to market.

1.24.6 Other downstream products

1.24.6.1 Ammonia

Ammonia can also be produced from syngas and will become increasingly important. Ammonia is produced by Sasol from two distinct Sasol processes – from the Coal-to-Liquid Fuel process in Secunda and from a dedicated ammonia synthesis process using reformed natural gas in Sasolburg. South Africa is a net importer of ammonia and typically between 60,000 and 100,000 tons is imported annually.

The total South African ammonium nitrate market is around 500,000 tpa as nitrogen, or 1.4 million tpa as ammonium nitrate. Inland prices are around R1,500 per ton. Most of the ammonium nitrate produced is actively converted into end-product explosives and fertilisers.

1.24.6.2 Urea

Synthesized from ammonia and carbon dioxide (CO₂), urea is the only primary nitrogen product chemically classified as organic (because of its carbon content). Because urea is produced from ammonia and carbon dioxide, which is a by-product of ammonia production, all urea plants are located adjacent to or in proximity to an ammonia plant. Most world output is in solid form (prills or granular, or crystalline for specialized small-volume uses).

Urea is an important component to the fertilizer industry (N: Nitrogen) and is currently imported.

1.24.7 Other by-products

1.24.7.1 Ethylene

Ethylene is one of the major petrochemical feedstock products, primarily used to produce polymers such as polyethylenes, or polymer intermediates such as ethylene oxide/ethylene glycol. Ethylene is also the feedstock for major chemical products, including ethylbenzene, glycol ethers and others.

The conventional source of ethylene is from cracking units that produce a range of olefins such as ethylene, ethylene and butylenes from feedstock such as naphtha or ethane. South Africa has a unique feedstock position due to recovery from the Fischer Tropsch process by Sasol in Secunda. Generally this process produces relatively less ethylene than propylene, compared to conventional crackers.

1.24.7.2 Black products

Tar produced from coal gasification contains a range of so-called “black products”. This can be further processed into a variety of other products such as:

• Wood preservatives
• Black disinfectants
• Road tars
• Heating oils
• Absorption oils
• Carbon black  
• Binder pitch  
• Electrode pastes  
• Mining chemicals  
• Naphthalene

1.24.7.3 Linear Alpha-olefins

The major application of Linear Alpha-olefins (LAO) is as a co-monomer in polyethylene manufacturing. Linear low-density polyethylene (LLDPE) is a copolymer of LAO’s such as 1-butene, 1-pentene, 1-hexene and 1-octene. The level of inclusion of LAO’s in LLDPE is typically 9-10%, but can be as low as 3%. 1-Butene accounts for 31% of consumption, but is losing market share to 1-hexene and 1-octene. The inclusions of LAO’s results in superior tear strength and stress crack resistance in LLDPE. The higher LAO’s such as hexene and pentene enhances this. LLDPE accounts for 80% of LAO usage as co-monomer.

High-density polyethylene (HDPE) has high stiffness, but is susceptible to environmental stress cracking by many liquids such as household detergents. LAO’s such as mainly hexene, but also butene and octene are included at rates of 0.5%-3%. This greatly enhances stress crack resistance, but also gives a softer, more flexible plastic. Safripol and SASOL are the major users of LOA’s in South Africa.

1.24.7.4 CTL (Coal to Liquid) Solvents

A large variety of mainly oxygenated solvents are produced in the CTL process. These include:

• Acetone;  
• MEK;  
• MIBK;  
• Iso-propanol;  
• N-propanol;  
• Ethanol; and  
• Others and blends of the above.

1.24.8 Waxes

Waxes are a composite of ten of the more significant wax types commercially available today. A generally accepted definition of the term wax does not exist, primarily because of the large number of products with wax-like properties and the chemical complexity of individual wax types.

1.24.8.1 Liquid Fuels

Liquid Fuels such as paraffin and LPG (Liquid Petroleum Gas) can also be produced in downstream processes.

1.24.9 Skills

The development of such an industry in Musina will require trained technicians, scientists, engineers and many other trained specialists. In-service-training will not be possible in a new plant. This problem will have to be addressed from the outset.
2. Economic Review

2.1 Socio Economic Context

2.1.1 Background

Musina, located in the Northern part of the Limpopo Province, is the most northern town in South Africa and is also the main port of entry by road from Sub-Saharan Africa (through Botswana and Zimbabwe) into the Republic of South Africa. Musina Local Municipality (MLM) belongs to the Vhembe District Municipality (VDM), which consists of four local municipalities, namely Musina, Makhado, Thulamela and Mutale, of which Musina Local Municipality is bounded by Makhado Local Municipality to the South and Mutale Local Municipality to the East. Musina is also bounded in the South-West by the Local Municipality of Blouberg (Capricorn District Municipality).

Musina Local Municipality is located near the confluence of the Limpopo and Sand River. It covers an area of approximately 757 829 ha, that extends from the confluence of the Mogalakwena and Limpopo rivers in the West to the confluence of the Nwanedi and Limpopo rivers in the East and from Tshipise and Mopane in the South to Botswana/Zimbabwe borders in the North. The municipal area consists mainly of commercial farms and only 0.08% of the total area is urban in nature.

![Location of Musina, the Vhembe District Municipality and the Limpopo Province](image)

Figure 81: Location of Musina, the Vhembe District Municipality and the Limpopo Province

The town of Musina is described as a provincial growth point and first order human settlement. It is characterised by relatively high levels of economic activity and rendering of services to local and surrounding communities (with emphasis on injections from Zimbabwe).

The link with Zimbabwe has become one of the busiest roads in the world and the busiest in Africa, due to black market importers from Zimbabwe and people looking for employment. This is mainly due to thousands crossing (and fleeing) the border into South Africa every day. According to the New York Times,
in January 2009, Musina had a shifting population of about 15 000 foreigners, the majority Zimbabweans, many of whom lived in a refugee camp at the showground or in the streets.

The town of Musina is structured in terms of a Central Business District (CBD), residential areas and two industrial areas. The CBD has developed in a linear manner along the National Roads, which extends through Musina and serves as a primary traffic route in/through the town. The CBD is divided into a retail core and peripheral zones (commercial and residential in nature).

The Musina Local Municipality, consisting mainly of Musina, is approximately 18.5 km from Beit Bridge Border Post, 209.8 km from Polokwane, the capital city of Limpopo Province, 460.0 km from Pretoria and 520.0 km from Johannesburg.

2.1.2 Socio-Economic Conditions and Trends

The significance of impacts is often highly dependent on the economic environment or context within which they occur. For example, job creation in a small local community with a stagnating economy and high unemployment will be far more significant than it would be in a larger community with a healthy economy. In order to offer such baseline information to the impact assessment this section presents socio-economic conditions and trends.

The proposed SEZ area in the Limpopo Province is situated in the Musina Local Municipality (in the town of Musina), which forms part of the Vhembe District Municipality.

Socio-economic information and data was gathered from the following key sources:

- Census data from the Statistics South Africa database;
- Treasury data on municipal finances;
- Auditor General data on municipal finances;
- Economic development and planning documents such as growth strategies, Integrated Development Plans (IDP), Local Economic Development (LED) strategies and Spatial Development Frameworks (SDF);
- Other studies conducted in the area; and
- Database information (e.g. Quantec).

2.1.3 Demographics

The total population of the relevant municipalities as estimated in the 2001 and 2011 censuses along with population growth estimates are displayed in the following table. These can then be compared with provincial and national estimates also provided in the table.

The population of Limpopo in 2001 was estimated to be 5 million, constituting around 11.2% of the South African population. At this time the Musina Local Municipality had a total population of 39,310.

In 2011, the total population of the Musina Local Municipality was estimated at approximately 68,359, suggesting a particularly high annual average population growth rate of 5.5% between 2001 and 2011. This population growth rate is substantially higher than the population growth at both the provincial and the
The district population grew at an annual rate of 0.8% from 1.198 million in 2001 to 1.295 million in 2011.

<table>
<thead>
<tr>
<th>Year</th>
<th>South Africa</th>
<th>Limpopo</th>
<th>Vhembe District Municipality</th>
<th>Musina Local Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>44,819,800</td>
<td>4,995,500</td>
<td>1,198,000</td>
<td>39,310</td>
</tr>
<tr>
<td>2011</td>
<td>51,770,600</td>
<td>5,404,900</td>
<td>1,294,700</td>
<td>68,359</td>
</tr>
<tr>
<td>Ave Annual Population Growth</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.8%</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

Source: StatsSA, 2013

Table 25: Total population by area

2.1.4 Employment

The following table presents both the official overall unemployment and the youth unemployment rates (i.e. unemployment among people aged 15 – 35 years) for the relevant study areas. For the sake of comparison, unemployment statistics are also shown for the province and country as a whole.

Unemployment is a particularly serious challenge in Limpopo. In 2011, the estimated unemployment in the province was higher than for all other provinces at 38.7%. The Vhembe District Municipality had an almost identical unemployment rate of 38.9%.

The situation in Musina is better than for the overall district particularly when one considers the high population growth rate. In line with the national decrease in the unemployment rate, unemployment in Musina fell from 24.9% in 2001 to 18.7% in 2011. This is substantially better than provincial and national averages and indicates the strong role of Musina in providing work opportunities to the wider area.

<table>
<thead>
<tr>
<th>Year</th>
<th>South Africa</th>
<th>Limpopo</th>
<th>Vhembe District Municipality</th>
<th>Musina Local Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>41.6%</td>
<td>47.3%</td>
<td>53.0%</td>
<td>24.9%</td>
</tr>
<tr>
<td>2011</td>
<td>29.8%</td>
<td>38.9%</td>
<td>38.7%</td>
<td>18.7%</td>
</tr>
<tr>
<td>Youth Unemployment Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>51.1%</td>
<td>58.5%</td>
<td>65.0%</td>
<td>27.8%</td>
</tr>
<tr>
<td>2011</td>
<td>48.9%</td>
<td>49.4%</td>
<td>50.6%</td>
<td>22.5%</td>
</tr>
</tbody>
</table>

Source: StatsSA, 2013

Table 26: Overall unemployment and youth unemployment rate by area

With regard to the sectoral division of employment opportunities, for the Vhembe District Municipality the dominant sector in terms of employment provision in 2001 was community, social and personal services (32 % of jobs) followed by agriculture (17% of jobs) and wholesale and retail trade (see table below). In the Musina Local Municipality the dominant sector in terms of employment provision was agriculture (61% of jobs) followed by community, social and personal services (10% of jobs). In the period since 2001 it is likely
that there have been significant increases in the proportion of total jobs to be found in the mining and wholesale and retail trade.

<table>
<thead>
<tr>
<th>Industry/Sector</th>
<th>Limpopo</th>
<th>Vhembe District Municipality</th>
<th>Musina Local Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, hunting, forestry and fishing</td>
<td>20.5%</td>
<td>17.1%</td>
<td>61.3%</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>4.8%</td>
<td>1.4%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>7.0%</td>
<td>6.4%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Electricity, gas and water supply</td>
<td>1.1%</td>
<td>1.4%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Construction</td>
<td>5.9%</td>
<td>7.2%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Wholesale, retail trade, repairs, hotels &amp; restaurants</td>
<td>14.6%</td>
<td>14.2%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Transport, storage and communication</td>
<td>3.6%</td>
<td>3.8%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Financial, insurance, real estate and business service</td>
<td>5.4%</td>
<td>5.5%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Community, social and personal services</td>
<td>24.9%</td>
<td>31.8%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Private households</td>
<td>12.1%</td>
<td>11.2%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Extraterritorial organisations</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Representatives of foreign governments</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Source: StatsSA, 2002*

Table 27: Industry share of total employment (2001)

Unfortunately sectoral employment statistics were not collected in the 2011 Census, thereby not allowing for an examination of more recent statistics on this aspect.

### 2.1.5 Income Levels and Wages

The following table reports on individual incomes in the study area for 2011. Between 39% and 44% of individuals earned no income in the province, district and local municipality. The majority of those with some form of income tended to be low earners with around 43% of individuals in the Vhembe District Municipality and Musina Local Municipality earning less than R1 600 per month in 2011.
With respect to dependency ratios (the number of non-working aged people per 100 working aged people aged), in 2011 these were measured at 67.3 for Limpopo, 69.9 for the Vhembe District Municipality and 44.5 for the Musina Local Municipality. The district ratios are significantly higher than the national average dependency ratio of 52.7 whilst the local Musina ratios are lower (StatsSA, 2013).

### 2.1.6 Economic Growth and Production

In 2008, the entire South African economy was severely impacted by the global recession, resulting in a negative economic growth rate of 1.5% (StatsSA, 2012). The effect of the recession is similarly observed in provincial statistics, with Limpopo’s economy shrinking by 1.7% during this period. Aside from this dip in economic activity, Limpopo has maintained an average annual growth rate of between 2.4% (2002/2003) and 4.8% (2005/2006). Limpopo regional gross domestic product reached roughly R223 billion in 2012, as shown in the following table.
## Table 29: Limpopo regional gross domestic product

Average real annual economic growth rates for each province and for the country as a whole from 2002 to 2012 are given in in the table below. With an average growth rate of 2.9% over the period, Limpopo ranks joint 7th (with the North West) out of the nine provinces in terms of average annual economic growth over the period.
When examining the relative contribution of the nine provinces to national GDP over time (as shown in the figure below), Limpopo’s contribution to the South African economy has increased steadily from 5.8% to 7.1% between 1997 and 2012.

The relative size of the GDP contribution per sector for each of the provinces is shown in the following table. From the data it is clear that the key contribution and currently exploited comparative advantages in Limpopo lie in the mining and quarrying sectors which account for 28.7% of provincial GDP followed by the services sectors (accounting for 30% of GDP) and the wholesale and retail trade sector (11% of GDP).
### Table 30: Relative size of industries per province: 2012

#### 2.1.7 Exports and Imports

The figure below shows the contribution of the province to South Africa’s overall exports between 2000 and 2011. Limpopo remains a relatively minor contributor to overall exports. However, its contribution has shown the greatest overall increase among the provinces from a very low base of 0.8% in 2000 to 2.2% in 2011. This represents a 2.75 fold increase in its share of national exports. The province exports most of its products (56.4% of total exported goods) to Asia, of which 68.8% are mineral products. Europe is the destination for 17.8% of exports and Africa and America contributes 15.1% and 10.6% respectively (UrbanEcon, 2012).
2.1.8 Local Government Finances

Most businesses rely on municipal services at least to some degree. Therefore, as a general rule, investors are more likely to invest in areas where they perceive that municipal services will be available and effectively delivered. Healthy local government finances help to build confidence in potential investors and residents. They give some indication that a municipality is able to service its clients and grow sustainably.

To contextualize and complement the discussion on the state of local government finances, the local government audit outcomes for the relevant municipalities between 2007 and 2012 are summarized in Error! Reference source not found. below. While the relationship between a municipality’s audit outcomes and its financial health is not unequivocal, audit outcomes provide a good indication of the state of municipal financial management.

The audit outcome of Limpopo regressed in the 2012/13 auditing year for the second consecutive year (Auditor-General SA, 2013). In 2012 Limpopo fared the worst of all provinces in terms of progress toward unqualified financial statements, with only 6% of auditees\(^\text{17}\) in the province receiving unqualified audit assessments (Auditor-General SA, 2012).

The Vhembe District Municipality received a disclaimer audit in the most recent year and a qualified audit for the two years prior to this suggesting a failure to supply the documentation necessary to form an audit opinion. For the two most recent audit periods, the Musina Local Municipality received a qualified audit which was a regression compared with the three years prior to this when unqualified audits were received.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Audit outcome 2011-12</th>
<th>Audit outcome 2010-11</th>
<th>Audit outcome 2009-10</th>
<th>Audit outcome 2008-09</th>
<th>Audit outcome 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limpopo</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mpumalanga</td>
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<tr>
<td>Gauteng</td>
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</tr>
<tr>
<td>North West</td>
<td></td>
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</tr>
<tr>
<td>KwaZulu-Natal</td>
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<tr>
<td>Free State</td>
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</tr>
<tr>
<td>Northern Cape</td>
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</tr>
<tr>
<td>Eastern Cape</td>
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</tr>
<tr>
<td>Western Cape</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

17 Auditees refer to all municipalities and municipal entities in local government that are audited by the audit-general of South Africa.
### Table 31: Auditor General audit outcomes for relevant municipalities

To examine the state of local government finances, National Treasury scores each municipality on a scale of one to three on eight key measures of financial health. Municipalities receiving an aggregate score of 16 or more are classified to be in financial distress. Both the Vhembe District Municipality and the Musina Local Municipality were classified as being in financial distress as can be seen by their scores in the following table.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Cash Coverage</th>
<th>Cash Balances</th>
<th>Reliance on Capital Grants</th>
<th>Over Spending Operational</th>
<th>Under Spending Capital</th>
<th>Debtors % Own Revenue</th>
<th>Creditors Cash</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vhembe District Municipality</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Musina Local Municipality</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>

Source: SA Treasury, 2013

Table 32: Financial distress rating of relevant municipalities (Source: SA Treasury, 2013)

The overall picture that emerges from audit outcomes and financial distress measures is not encouraging and will require improvement particularly if the chances of success are to be maximised in tackling large and complex projects such as that envisaged by the SEZ programme.

### 2.1.9 Investment Levels (Foreign Direct and Domestic Investment) and Trends

Total gross domestic fixed investment (in constant 2005 prices) is given in the table below. Limpopo, the Vhembe District Municipality and the Musina Local Municipality experienced significant growth in fixed investment between 1999 and 2008. This growth was largest in the 2005-08 period in which growth in fixed

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18 A description of the eight measures as well as the aspects on which the municipalities are evaluated can be found in National Treasury, 2012. The measure of financial distress is "intended to provide an initial indication of which municipalities may be approaching ‘financial crisis’" (National Treasury, 2012:2).
investment was 67% for Limpopo, 59% for the Vhembe District Municipality and a very high 103% for the Musina Local Municipality. The growth in fixed investment slowed significantly in the 2008-11 period, growing by only 1.1% at the provincial level while the district recorded negative growth and the Musina Local Municipality grew by 7.7%.

<table>
<thead>
<tr>
<th></th>
<th>Gross Domestic Fixed Investment (constant 2005 prices in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limpopo</td>
<td>10,801</td>
</tr>
<tr>
<td>Vhembe District Municipality</td>
<td>1,916</td>
</tr>
<tr>
<td>Musina Local Municipality</td>
<td>147</td>
</tr>
</tbody>
</table>


Table 33: Gross domestic fixed investment for relevant areas (Source: Quantec database, 2012)

2.1.10 Education Levels

The availability of adequately skilled people is often a key determining factor of the willingness of businesses to invest in a given area. It also, to a large extent, determines the degree to which local residents are able to take advantage of employment opportunities.

The following table shows that Limpopo as well as the Vhembe District Municipality and the Musina Local Municipality have lower education levels than the national average – often by a significant margin. What is particularly worrying is the proportion of the population aged 20+ without any schooling although this has improved between 2001 and 2011. While education levels have improved significantly from 2001 to 2011, the percentage of people older than 20 without schooling in 2011 was still as high as 17.7% in the Vhembe District Municipality (more than double the national average) and 11.3% in the Musina Local Municipality.

The percentage of the population aged 20+ with a higher education in 2011 was 9.9% in the Vhembe District Municipality and 6.8% in the Musina Local Municipality.

<table>
<thead>
<tr>
<th></th>
<th>South Africa</th>
<th>Limpopo</th>
<th>Vhembe District Municipality</th>
<th>Musina Local Municipality</th>
</tr>
</thead>
<tbody>
<tr>
<td>No schooling (aged 20+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>18.0%</td>
<td>33.2%</td>
<td>32.2%</td>
<td>25.4%</td>
</tr>
<tr>
<td>2011</td>
<td>8.6%</td>
<td>17.3%</td>
<td>17.7%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Matric (aged 20+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>20.4%</td>
<td>14.1%</td>
<td>14.3%</td>
<td>12.5%</td>
</tr>
<tr>
<td>2011</td>
<td>28.4%</td>
<td>22.3%</td>
<td>21.6%</td>
<td>21.6%</td>
</tr>
<tr>
<td>Higher Education (aged 20+)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>8.5%</td>
<td>6.8%</td>
<td>7.5%</td>
<td>4.9%</td>
</tr>
<tr>
<td>2011</td>
<td>12.1%</td>
<td>9.5%</td>
<td>9.9%</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

Source: StatsSA, 2013

Table 34: Select educational statistics by area
2.1.11 Analysis of Tertiary Institutions

The South African Government recognises the right of all South Africans to a basic education, including adult basic education and further education. According to the Bill of Rights of the country’s Constitution, the state has an obligation, through reasonable measures, to progressively make this education available and accessible. South Africa has one of the highest rates of public investment in education in the world. The Government spends approximately 7% of the gross domestic product (GDP) and 20% of total state expenditure on education.

The South Africa’s National Qualifications Framework (NQF) recognises three broad bands of education:

- General Education and Training (GET);
- Further Education and Training (FET);
- Higher Education and Training (HET).

Under the South African Schools Act of 1996, education is compulsory for all South Africans from the age of seven (grade 1) to the age of fifteen, or the completion of grade 9. GET also includes Adult Basic Education and Training (ABET), which is available to all adults who want to finish their basic education. Further Education and Training (FET) runs from grade 10 to grade 12 and also includes career-oriented education and training offered in FET institutions, such as technical colleges, community colleges and private colleges. Diplomas and certificates are qualifications recognised at this level.

In 2009, the national Department of Education was split into two separate ministries – Basic Education (DBE) and Higher Education and Training (DHET). Apart from these, the sector education and training authorities (SETA) was also moved from the Department of Labour to the DHET, aiming to foster a more co-operative approach to skills development. Each ministry is responsible for its level of education across the country as a whole, while each province has its own education department. The Ministry of Higher Education and Training is responsible for tertiary education up to doctorate level, technical and vocational training, as well as adult basic education. It also oversees public and private FET colleges, which cater for out-of-school youth and adults. HET or tertiary education includes education for undergraduate and postgraduate degrees, certificates and diplomas, up to the level of the doctoral degree.

The Limpopo Province presents a vibrant higher education sector with 12 state-funded tertiary institutions, namely 1 university (University of Limpopo and Turfloop Graduate School of Leadership), 1 comprehensive institution (University of Venda), 7 Further Education and Training (FET) institutions and 2 agricultural colleges that work in co-operation with the Council of Technicon Education (SERTEC). Thus prospective students in Limpopo have access to several tertiary institutions and a variety of courses, which are listed in the following table.
<table>
<thead>
<tr>
<th>Tertiary Institution</th>
<th>Location</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Limpopo</td>
<td>Polokwane</td>
<td>• Agricultural Economics and Animal Production;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Geography and Environmental Studies;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Soil Science, Plant Production and Remote Sensing;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Water and Sanitation;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Biochemistry, Microbiology and Biotechnology;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Physiology and Environmental Health;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Biodiversity;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Chemistry;</td>
</tr>
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<td></td>
<td></td>
<td>• Physics and Geology;</td>
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<tr>
<td></td>
<td></td>
<td>• Computer Science;</td>
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<tr>
<td></td>
<td></td>
<td>• Mathematics and Applied Mathematics;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Statistics and Operations Research;</td>
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<tr>
<td></td>
<td></td>
<td>• Accounting and Auditing;</td>
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<tr>
<td></td>
<td></td>
<td>• Business Management;</td>
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<td></td>
<td></td>
<td>• Economics;</td>
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<td></td>
<td></td>
<td>• Development Studies;</td>
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<td></td>
<td>• Human Resource Management;</td>
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<td>• Transport Management;</td>
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<td></td>
<td></td>
<td>• Criminal Law and Procedure;</td>
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<tr>
<td></td>
<td></td>
<td>• Legal Aid Clinic;</td>
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<tr>
<td></td>
<td></td>
<td>• Legal Pluralism and Jurisprudence;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mercantile and Labour Law;</td>
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<tr>
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<td>• Private Law;</td>
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<td>• Public and Environmental Law;</td>
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<td></td>
<td></td>
<td>• Commerce in Accountancy;</td>
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<tr>
<td></td>
<td></td>
<td>• Oral Health Sciences;</td>
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<td>• Health Care Sciences;</td>
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<td>• Health Sciences;</td>
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<td>• Medicine;</td>
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<td></td>
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<td>• Pathology and Pre-Clinical Sciences;</td>
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<tr>
<td></td>
<td></td>
<td>• Mathematics, Sciences and Technology Education;</td>
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<tr>
<td></td>
<td></td>
<td>• Educational Studies;</td>
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<tr>
<td></td>
<td></td>
<td>• Language and Social Sciences Education;</td>
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<tr>
<td></td>
<td></td>
<td>• Communication;</td>
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<td></td>
<td></td>
<td>• Information Technology;</td>
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<tr>
<td></td>
<td></td>
<td>• Media;</td>
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<tr>
<td></td>
<td></td>
<td>• Translation and Interpreting;</td>
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<tr>
<td></td>
<td></td>
<td>• Lexicography;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• African Languages;</td>
</tr>
<tr>
<td></td>
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<td>• Performing Arts.</td>
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<tr>
<td>Turffloop Graduate School of Leadership - University of Limpopo</td>
<td>Polokwane</td>
<td>• Master of Business Administration;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Master of Development;</td>
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<tr>
<td></td>
<td></td>
<td>• Masters of Public Administration;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Executive Management Programme;</td>
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<td>• Management Development Programme;</td>
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<td>• Co-operative Management Programme.</td>
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<tr>
<td>University of Venda</td>
<td>Thohoyandou</td>
<td>• Agricultural Economics and Agribusiness;</td>
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<td></td>
<td>• Agricultural and Rural Engineering;</td>
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<td></td>
<td></td>
<td>• Animal Science;</td>
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<td></td>
<td></td>
<td>• Consumer Sciences;</td>
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<tr>
<td></td>
<td></td>
<td>• Food Science and Technology;</td>
</tr>
<tr>
<td>Capricorn FET College</td>
<td>Polokwane, Seshego and Senwabarwana</td>
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<td></td>
</tr>
<tr>
<td>• Marketing;</td>
<td>• Marketing;</td>
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<tr>
<td>• Office Administration;</td>
<td>• Office Administration;</td>
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</tr>
<tr>
<td>• Transport and Logistics;</td>
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<tr>
<td>• Electrical Infrastructure Construction;</td>
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<td>Plant Production;</td>
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<tr>
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<tr>
<td>Curriculum Studies and Educational Management;</td>
<td>Curriculum Studies and Educational Management;</td>
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<tr>
<td>Early Childhood Education;</td>
<td>Early Childhood Education;</td>
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<tr>
<td>Professional Studies;</td>
<td>Professional Studies;</td>
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</tr>
<tr>
<td>Ecology and Resource Management;</td>
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<tr>
<td>Geography and Geo-Information Sciences;</td>
<td>Geography and Geo-Information Sciences;</td>
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<td>Hydrology and Water Resources;</td>
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<tr>
<td>Mining and Environmental Geology;</td>
<td>Mining and Environmental Geology;</td>
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<tr>
<td>Urban and Regional Planning;</td>
<td>Urban and Regional Planning;</td>
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<tr>
<td>Institute of Semi-Arid Environment and Disaster Management;</td>
<td>Institute of Semi-Arid Environment and Disaster Management;</td>
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<td>GIS Resource Centre;</td>
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### Musina SEZ License Application

**Pre-Feasibility Study for the Musina SEZ, Limpopo Province**

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| Sekhukhune FET College       | Groblersdal and Tubatse         | *Civil Engineering Construction;  
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|                              |                                 | *Engineering Related and Design;  
                               |                                  | *Finance, Economics and Accounting;  |
|                              |                                 | *Information Technology and Computer Science;  
                               |                                  | *Generic Management;            |
|                              |                                 | *Marketing Management;           
                               |                                  | *Office Administration;         |
|                              |                                 | *Tourism Management;            
                               |                                  | *Community House Building;      |
|                              |                                 | *Brick making;                  
                               |                                  | *Welding and Metalwork;         |
|                              |                                 | *Boiler making;                 
                               |                                  | *Carpentry and Joinery;         |
|                              |                                 | *Fitting and Turning;           
                               |                                  | *Motor repairs and Maintenance;|
|                              |                                 | *Information Communication Technology Skills;  
                               |                                  | *Life Skills and entrepreneurship development and support;  
                               |                                  | *Civil Engineering;             |
|                              |                                 | *Mechanical Engineering;        
                               |                                  | *Electrical Engineering;        |
|                              |                                 | *Human Resources Management;    
                               |                                  | *Travel and Tourism Management; |
|                              |                                 | *Financial Management.          |
| Vhembe FET College           | Makwarela, Mashamba and Mavhai  | *Electrical Engineering and Building Construction;  
                               |                                  | *Electrical Infrastructure Construction;  
                               |                                  | *Engineering and Related Design;  
                               |                                  | *Finance, Economics and Accounting;  
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                               |                                  | *Public Management;             |
|                              |                                 | *Public Relations;              
                               |                                  | *Hospitality;                   |
|                              |                                 | *Skills.                        |
| Waterberg FET College        | Mokopane area                   | *Office Administration;         
                               |                                  | *Finance, Economics and Accounting;  
                               |                                  | *Engineering and Related Design (Automotive Repair or Welding);  
                               |                                  | *Hospitality;                   |
|                              |                                 | *Information Technology;        
                               |                                  | *Primary Agriculture;           |
|                              |                                 | *Marketing;                     
                               |                                  | *Tourism;                      |
|                              |                                 | *Civil Engineering Construction (Plumbing);  
                               |                                  | *Electrical Infrastructure Construction;  
                               |                                  | *Primary Health;                |


Table 35: List of tertiary institutions and the courses they offer in the Limpopo Province

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<tr>
<th>Tertiary Institution</th>
<th>Location</th>
<th>Courses Offered</th>
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<tr>
<td>Madzivhandila Community Agricultural College</td>
<td>Thohoyandou</td>
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<td>• Agriculture: Plant Production.</td>
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<tr>
<td>Tompi Seleka Community Agricultural College</td>
<td>Thohoyandou</td>
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An Industrial Ecology Faculty will be provided, in future, for master students where engineers and natural scientists will be required to work together. The faculty will spearhead innovation and challenge students to devise theories and develop practical solutions for the industrial-environmental challenges facing humanity today. The faculty will be developed in association with the University of Venda, as a result of the establishment of the Limpopo Eco-Industrial Park (LEIP).

Greater collaboration is needed between identifying and matching industry needs and skills with tertiary education programmes in the Limpopo Province. These types of skills can only be identified through engagements with stakeholders and service providers, after which recommendations can be made to higher education institutions in the Limpopo Province.

As seen from the list above, Musina does not have any tertiary institution in its local municipality region. Students who desire to pursue with tertiary education, need to travel to Thohoyandou or Polokwane due to the lack of tertiary education facilities and infrastructure in the municipality region. Addressing the skills and education problem in Limpopo, should further start on primary and secondary school levels. The Limpopo Education Department reportedly continues to experience difficulty, resulting in poor infrastructure and service delivery to schools, and ultimately in poor attendance and pass rates in schools. The vast backlog of classrooms and learner support material, especially in the rural areas impedes proper teaching and learning. Only once the school system is able to produce good students, will the Universities and FETs be efficient in developing the skills so desperately needed in the region. Apart from this, there is a lack of availability of ABET centres, that could respond to the high illiteracy rate among the adult population and also a lack of technical skills institution that could support the mining operations that are happening in the region, therefore resulting in the mining companies sourcing skills from other towns.

The provincial educational authorities need to establish a working group in close consultation with industry players to develop a plan to address these concerns.

2.1.12 Economic Development Challenges

The Musina Local Municipality (MLM) SWOT analysis – IDP (MLM, 2012/13 - 2017) presents the results of a SWOT analysis with regard to local economic development. The MLM IDP considers that the achievement of the developmental goals that is inherent in the Limpopo Employment Growth and Development Strategy and which forms the foundation of the IDP, requires well structure human and financial resources and administration support. As reflected in the preceding sections, skills shortages, boom and bust cycles associated with mining and low beneficiation levels are recognised as key challenges.
## STRENGTHS
- Workplace Skills Plan in place for capacity building;
- Development of Policies and Procedures;
- Existing By-laws in place;
- Duty sheets for all posts in place;
- Active Web site;
- Budget fully aligned to IDP and operational plans;
- IT systems in place and operational;
- Availability of undeveloped land.

## WEAKNESSES
- Some policies/procedures still pending;
- Lack of proper implementation of existing policies;
- Gender/disability in-balance;
- Current lack of office space to accommodate anticipated staff;
- Inability to align skills programmes with SETA initiated programmes;
- Inability to attract competent candidates in strategic and specialized areas (no retention strategy);
- Lack of recognition of prior learning in the organisation;
- Insufficient training budget;
- Lack of UPS;
- Unavailability of service land for developments;

## OPPORTUNITY
- Availability of grants for skills levy;
- Recognition of prior learning is a potential for internal growth;
- Regular review of existing organogram to keep track of manpower needs;
- Training budget available to address training needs;
- Formulate an employment equity strategy to address equity gaps;
- Proper grading of staff as a result of job evaluations;
- Improvement of debt recovery;
- Improved service delivery through satellite offices.

## THREATS
- Lack of motivation and low morale due to lack of competitive incentives;
- Inexistent of succession plans;
- Lack of update job-evaluations;
- Lack of skill and capacity results in outsourcing services to an external service provider (consultants);
- Irrecoverable debts;
- Cable thefts;
- Electricity load shedding;
- Unregistered taxis;
- Delay of water and sanitation services for new developments.

### Table 36: MLM SWOT Analysis – Integrated Development Plan (IDP 2012/13 – 2017)

#### 2.1.13 Comparative and Competitive advantage

The advantage of this SEZ compared to other areas includes the following:

- uniquely close proximity to all mineral resources required to provide competitive pricing advantage to the metallurgical cluster development, including coal, iron, chrome
- plans include building of electricity generation for the metallurgical cluster and therefore no added load on the national grid
- close proximity to the border between SA and Zimbabwe which results in good access to the SADC market
ideal location on the main North-South N1 Corridor, which enables strong logistics drivers in support of the envisaged logistics cluster

- strong future potential of a cross-border zone that will attract additional industries
- possible development of a dry port for expanded flow of products, vehicles on SA roads
- added future expansion potential in the agro-processing industries for supply of products to Gauteng and SADC
- agriculture support industries, including fertiliser plants based on the proximity to Foskor in Phalaborwa
- strong potential for cold storage
- The technological viability of the proposed processes used in the identified clusters appears sound
- Producers have access to Polokwane International Airport for international cargo handling facilities
- cross-border trade
- vehicle distribution centre because of proximity to export cross-border route
- High possibility for intermodal facilities involving road and rail, including transfer of cargo from road to rail

The greatest advantage of this SEZ is that it is the gateway into Africa from South Africa.

### 2.2 Regional Transport

Access to flexible, efficient and cost effective transport modes is critical to the investment attractiveness of the proposed SEZ in Musina. This logistical accessibility ensures that raw materials and finished products will be received by the producer or consumer in an efficient manner and at the lowest logistical add-on cost to the product. Furthermore, it is important that these raw materials and finished goods arrive at its destination in the same quality standard as it was when despatched or issued. The section to follow, seeks to define and discuss the economic interconnectivity influence of the North-South Corridor on Musina.

#### 2.2.1 The North – South Corridor

The town of Musina is located north east of South Africa on the North-South Transport Corridor, also known as the N1 National Road. In the figure below, the North-South Corridor links South Africa to six Sub-Saharan African countries and their economies, namely, Botswana, Zimbabwe, Malawi, Zambia, Democratic Republic of Congo and Tanzania and traverses via the town of Musina, located less than 20km’s away from the Beitbridge International Border Crossing to Zimbabwe. The Corridor then branches south east, joining the N3, where it links to the Port of Durban on the N2. The N1 also intersects with the N4 Maputo Corridor linked to the Port of Maputo.
According to TradeMark Southern Africa, the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC) Tripartite Regional Economic Communities (RECs) are deepening regional economic integration through working together on market integration, infrastructure development and industrial development. In the area of infrastructure, the efficiency and reliability of transport corridors are improved through addressing infrastructure constraints and operational inefficiencies, improvements in policies and procedures, corridor institutional development and the promotion of coordinated approaches to planning, programming and financing.

Particularly investment into infrastructure such as roads, rail, systems and border crossings will promote the increase inter-regional trade and guarantees an increase in freight volumes moving via Musina. Furthermore, the North-South Corridor links the port of Durban to the Copper belt in Democratic Republic of Congo and Zambia and has spurs linking the port of Dar es Salaam and the Copper belt and Durban to Malawi.

The sections to follow will discuss strategic transport infrastructure such as roads, rail, airports and ports linked to Musina. These sections also seek to acknowledge and discuss the research and findings of the

Figure 85: Inter-regional economic links of Musina’s location on the North-South Corridor

2.2.2 Road Network

According to a map commissioned by TradeMark Southern Africa, the conditions of the overall state of National Roads on the North South Corridor as of December 2012 are illustrated in the figure below:

![Figure 86: Road conditions as of December 2012](image-url)

According to the assessment, the National Roads, namely the N1, N3 and N2 linking the town of Musina to the Port of Durban are regarded as being in a ‘good condition.’ However, the road network across the

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19 Source: Trade Mark Southern Africa (www.trademarksa.org)
border, north of Musina have been rated as being in mostly a ‘fair condition,’ with some branch road links ‘under construction’ or in a ‘poor condition.’

Key road infrastructural challenges as highlighted during the Freight Transport Implementation Strategy for the Limpopo Province are as follows:

- Less than 35% of the road network in the Limpopo Province is paved
- General lack of maintenance in all modes of transport
- Excessive overloading on Provincial roads further contributes to the rapid deterioration of the road network
- Insufficient calibrated weighing equipment (i.e. weigh bridges)
- No dedicated fund for road maintenance and other transport corridors in the Province
- Lack of catering for specific needs of truckers (i.e. truck stops)

According to the Limpopo Province Freight Databank, an average of 292 freight trucks crosses the Beitbridge Border crossing per day. An estimated 2.52 million tons of road freight cargo is transported through this border post annually, with the tonnage split almost equally northbound and southbound. The road freight cargo is varied, with 40% of the vehicles being tarpaulin covered and only 6% carrying containers.

In conclusion, although the road network links to Musina faces challenges with planned maintenance and ongoing upgrades, no immediate threat by the existing road infrastructure is foreseen for the establishment of the Musina SEZ.

### 2.2.3 Rail Network

The town of Musina is located on an existing main railway line. As illustrated in the figure below, this mainline stretches 579 km from Pretoria to Beitbridge, via Musina, also linking Musina to City Deep in Johannesburg. The mainline also extends across the border linking to various other Sub-Saharan African countries, as the line links with two continuous rail routes within present day Zimbabwe.
Figure 87: Existing Rail Network – Musina

Rail cargoes total approximately 1.26 million tons per annum compared to road freight of 2.52 million tons per annum. Typically rail freight cargo comprises of the following main commodities:

- Petroleum – 150,000 tons;
- Containers – 150,000 tons;
- Coal products – 60,000 tons; and
- Other commodities include: cement, liquid bulk, maize, grain, wheat and fertilizers.

In respect of rail cargo clearing, international containers and break-bulk cargoes to and from the ports of South Africa and Mozambique travel in bond through the border. However, visual checks take place by railway officials at Musina, in respect of container seals and break-bulk cargo tarping. South African exports by rail are bonded at City Deep and as mentioned, but checked for integrity at Musina.

According to the Freight Transport Implementation Strategy of the Department of Transport and Roads, the following key challenges were identified for rail in the Limpopo Province:

- Underutilization of the rail infrastructure;
- Insufficient rolling stock allocation to mainline and branches;
- Lack of coordinated planning between Transnet (Transnet Freight Rail), Provincial Government and Industry;
- Freight transport mainly consists of road and rail, with limited intermodal freight;
- Loss of Rail Market Share to road freight results in lack of competitiveness within the freight transport sector – detrimental to the consumer or prospecting investors; and
The reduction in the railway line capacity and operational efficiency means the railways become unattractive for freight transport customers or prospecting investors.

However, the private sector had presented to the public sector a proposed Gateway City project initiative in the form of a one-stop shop solution to counter the current logistical challenges and to incorporate the Musina SEZ. The proposed Gateway City project is essentially a private sector led initiative to build a logistics hub and multi-model facility adjacent to the Beitbridge Border Crossing.

The land is ideally located and is owned by the Lee Family. This includes the farms of Templehof, Munnichhausen and some of the land on the farm located on the east side of the N1, as per the highlighted demarcated land illustrated in the figure below:

![Figure 88: The Lee family owned land adjacent to Beitbridge Border Post](image)

The Lee Family directly and indirectly own approximately 4900ha of land which and have started the restructuring process of placing parcel of land into different entities. The Lee Family is prepared to donate their land to the Limpopo Government for the following:

- Expansion for Customs, SARS and the Border Control Operational Coordinating Committee (BCOCC);
The Lee Family proposed that the Gateway Logistics Hub be located on 100ha of land that already have been appropriately zoned and recently apparently been declared as the “Township of Beitbridge.” The Lee Family have already introduced a Logistics Hub Master Plan which was presented and welcomed by SANRAL, SARS, BCOC, Customs and the Department of Public Works. The site-out of the proposed logistics hub is seen in the figure below:

**Figure 89:** Site-layout of the proposed Logistics Hub

The figure below is an artist conceptual illustration of the possible services offerings by the proposed Logistics Hub:
Figure 90: Conceptual drawing of the proposed Logistics Hub

The Lee’s Family’s proposal also correlates with Transnet’s long-term planning to have a Multipurpose Terminal in the same geographic area. Transnet’s proposed sites (“Proposed Development Site I” and “Proposed Development Site II”) are highlighted in the figure below:

Figure 91: Transnet proposed site for a Multipurpose Facility
In conclusion, from a regional rail and logistics transport perspective, Transnet’s long-term planning and the logistics hub proposed by the Lee family aligns and positively supports the establishment of the proposed Musina SEZ.

2.2.4 Airport - Musina

Musina currently has an airport located on the south western side of the town as illustrated in the figure below.

![Airport proximity to the town of Musina](image)

**Figure 92:** Airport proximity to the town of Musina

The airport consists of a 1920.24 m (6300 feet) stretch of runway that accommodate light commercial and cargo aircraft. The airport is currently classified as a ‘small airport’ with an elevation of approximately 1904 m above sea-level. The closest international airport is located in Polokwane approximately 200 km south of Musina.

According to the Freight Transport Implementation Strategy for Limpopo the follow key challenges were noted:

- The Musina airport infrastructure is underutilized; and
- The outcome of the Polokwane International Airport as a proposed Cargo Hub study needs to be determined and possibly fast-tracked as it may compliment the Musina SEZ.

Although air transportation is the most expensive means of moving cargo and people, access this mode of air transportation will not be a threat for the establishment of the Musina SEZ.
2.3 Industrial Infrastructure

2.3.1 Assessment of Available Infrastructure (Quality and Functionality)

The town of Musina is host very little industrial activity and the main economic drivers are the farming and transportation and logistics related activities like the truck stops and warehouses found bordering the road through the town towards the border.

2.3.2 Analysis of Existing Infrastructure

2.3.2.1 Industrial Land and Property

Two industrial nodes are found in Musina, viz. Musina Extension 1; Musina Extension 3 and Musina Township, as shown in the following figure.

![Figure 93: Industrial land and property available in Musina (Source: Musina 2012/13-2017 Integrated Development Plan (IDP))](image)

Industrial Node 1 is located to the South of Musina Township and is easily accessible of the National road (N1). This industrial area has rail facilities and caters mainly for heavy and noxious industries. According to the Musina 2012/13-2017 Integrated Development Plan (IDP), sufficient erven for heavy industries are still available for the medium and long term.

Industrial Node 2 is located to the North of Musina in close proximity to the National road (N1). This industrial area caters only for light and service industries. The IDP states that sufficient erven is available for light and service industries for the medium and long term.

The majority of the land in Musina is under private ownership. Property development can occur on the significant vacant land parcels that are available in the urban areas within the town of Musina, specifically to the West of the CBD.

Areas outside of the town have been identified with agricultural potential and are best suited for this purpose. Areas listed in the IDP include; land along the Limpopo River (Limpopo valley-including Weipie...
farms), an area along the Sand river (to the West of Mopane), the Nwanedi farms (only small section in municipal area), an area along the Nzhelele river (Nzhelele irrigation area) and an area along the Nwanedi river (state land leased by small farmers).

A factor that needs consideration is that the IDP states that there are 351 land claims lodged on 351 farm subdivisions, covering some 27% of the municipal area. Twenty one of these claims are on state land, located mainly along the National road and rail routes and adjacent to Mapungubwe. Result being that well located land is “tied-up” in a lengthy land claim investigation process. A further issue being that this can create an uncertain environment for investors wanting to invest in this area.

2.3.2.2 Water

The Vhembe District Municipality is the Water Services Authority (WSA) and Musina Local Municipality is the Water Services Provider (WSP). The WSA purchases bulk raw water from the Department of Water Affairs, and then processes the water for reticulation. The sources of water in the District are from 11 dams: Nandoni, Nzhelele, Damani, Tshakhuma, Mutshedzi, Vondo, Nwanedi, Lupepe, Middle Letaba, Albasini and Mahonisi. Groundwater is also a very valuable source of water.

The Vhembe Integrated Development Plan (2013-2014) states that there are a large number of households that already have access to water. There are, however, numerous upgrading, resource extension, operation and maintenance and refurbishment needs in regards to water services infrastructure.

There is adequate supply of water for the Musina area. Infrastructure upgrading and refurbishment is the major problem listed for Musina’s water abstraction and reticulation to those areas that require water.

![Figure 94: Vhembe District Municipality water treatment and sewerages map (Source: Vhembe Integrated Development Plan (2012/13-2016/17))](image)

The Musina 2012/13-2017 Integrated Development Plan (IDP) states that 7879 households in the urban area of Musina have metered yard connections. The areas of Madimbo, Malale, Domboni, Tanda, Tshikhudini, Tshipise, Doreen and Esme’ Four have been identified as priority areas for reticulated water provision.
Although there is adequate supply of water at this stage, a key problem area identified in the IDP relates to the commercial component of the economy in that there is a real possibility that progressively less water will be available in future for irrigation purposes. This will seriously affect the production levels of the Agriculture sector, which at present represents one of the drivers of the local economy.

2.3.2.3 Energy

Regarding the Energy availability in the Musina Local Municipality, the current electricity service level in the municipality is as follows:

<table>
<thead>
<tr>
<th>Local Municipality</th>
<th>Number of Household per local municipality</th>
<th>Backlog</th>
<th>Non Grid Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makhado</td>
<td>114060</td>
<td>14 298</td>
<td>5087</td>
</tr>
<tr>
<td>Thulamela</td>
<td>137852</td>
<td>34 600</td>
<td>1158</td>
</tr>
<tr>
<td>Mutale</td>
<td>21075</td>
<td>3383</td>
<td>1001</td>
</tr>
<tr>
<td>Musina</td>
<td>14203</td>
<td>1112</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>287190</strong></td>
<td><strong>52 281</strong></td>
<td><strong>7246</strong></td>
</tr>
</tbody>
</table>

Table 37: Electricity service level in the Musina Local Municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17))

The types of energy used in the municipality are as follows:

<table>
<thead>
<tr>
<th>Energy</th>
<th>Mutale</th>
<th>Thulamela</th>
<th>Musina</th>
<th>Makhado</th>
<th>VDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>4 636</td>
<td>50 715</td>
<td>10 727</td>
<td>53 249</td>
<td>119 326</td>
</tr>
<tr>
<td>Gas</td>
<td>134</td>
<td>903</td>
<td>135</td>
<td>1 072</td>
<td>2 244</td>
</tr>
<tr>
<td>Paraffin</td>
<td>58</td>
<td>957</td>
<td>206</td>
<td>1 336</td>
<td>2 556</td>
</tr>
<tr>
<td>Wood</td>
<td>17 380</td>
<td>88 044</td>
<td>5 116</td>
<td>64 246</td>
<td>174 787</td>
</tr>
<tr>
<td>Coal</td>
<td>10</td>
<td>73</td>
<td>28</td>
<td>122</td>
<td>242</td>
</tr>
<tr>
<td>Animal dung</td>
<td>10</td>
<td>178</td>
<td>5</td>
<td>99</td>
<td>293</td>
</tr>
<tr>
<td>Solar</td>
<td>33</td>
<td>141</td>
<td>30</td>
<td>128</td>
<td>331</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>None</strong></td>
<td>1 483</td>
<td>15 581</td>
<td>3 795</td>
<td>14 634</td>
<td>35 494</td>
</tr>
</tbody>
</table>

Table 38: Types of energy used in the municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17) – as derived from StatsSA Census 2011)

According to the Musina IDP:

- 7879 households in the urban area have metered (conventional and pre-paid) electrical house connections;
- 2459 Indigent households receive free basic electricity; and
- 523 households in the rural villages receive free basic electricity from Eskom.

There is no backlog of electricity in urban areas. The backlog for electricity is specifically in the villages; viz:

- Madimbo: 372
- Domboni: 60
• Malale: 480
• Tanda: 99
• Tshikhudini: 101
• Total: 1112 Households

2.3.2.4 Information, Communication and Technology (ICT)

The Vhembe IDP states that although ICT is a critical business enabler, ICT is not awarded the required importance as a valuable business process within the Municipal sphere. As such, IT utilisation in terms of the automation of business processes is low. The use of IT in enhancing service delivery to stakeholders is limited. There is a lack of systems (applications) that can support business processes and this indicates that the majority of processes are performed manually. Internet access is weak and together with technological problems, progress in this field needs concerted effort. The same applies for broadband connectivity. This will be considered as a negative factor to international investors.

2.3.2.5 Housing

According to Census 2011, the total number of households in Musina is 20,042. This is an increase of 8,465 households since the Census 2001 figures. Below is a table showing the different types of housing structures:

Table 39: Types of housing structure in the municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17) – as derived from StatsSA Census 2011)

The Vhembe IDP lists the Housing Backlog in the District as follows:

Table 40: Housing backlog in the Vhembe District Municipality (Source: Vhembe Integrated Development Plan (2012/13-2016/17))
There is a year on year increase in the housing backlog in Musina of approximately 1,124 units. This is still far lower than the other Municipalities in the District.

### 2.3.3 Summary

<table>
<thead>
<tr>
<th>Availability</th>
<th>Quality</th>
<th>Functionality</th>
<th>Appropriateness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land</strong></td>
<td>Available from private owners</td>
<td>Suitable – detailed evaluation required to select most suitable land</td>
<td>Suitable – detailed evaluation required to select most suitable land</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>Water constraints exist throughout Limpopo</td>
<td>Poor infrastructure</td>
<td>Poor infrastructure</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>Available</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td><strong>ICT</strong></td>
<td>Connections available</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>Limited housing available</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td><strong>Sewage</strong></td>
<td>Being upgraded</td>
<td>Poor</td>
<td>Poor</td>
</tr>
</tbody>
</table>
3. Unlocking the Potential

3.1 Policy and Strategy

It seems that despite the above-mentioned policies, strategies, programmes and agreements, government at this stage lacks policy through which an economic and market environment can be provided for the transformation of South Africa’s agricultural, forestry and fisheries sectors, whilst maintaining productivity and production efficiency for purposes of ensuring national food security and a robust trade balance. Furthermore, uncoordinated implementation and planning by government has frustrated the effective implementation of government strategy, with each programme designing its own implementation plan, leaving a fragmented scattering of projects across South Africa’s landscape.

The realisation of the change government aims to effect through its strategies critically depends on its ability to translate strategic objectives into effective implementation plans, supported by monitoring and evaluation systems. The poor performance of South Africa’s strategic plans and policies may not lie entirely or even mainly in their content, but in the lack of effective implementation, continuous monitoring and evaluation of progress made, and resultant corrective action. More important is the disjointed implementation of government policies and strategies. Cooperative governance requires effective management across all three spheres of government, sector organisations, and producers. Without an integrated approach and effective management of actions, roles and responsibilities, most strategies devised by DAFF will result in ineffective implementation.

In terms of transformation and equity interventions and initiatives, the focus in agriculture in particular has been skewed towards new entrants, especially linked to the land reform programme, while inadequate support has been given to existing participants in the sector who are marginalised. There is therefore a need to correct this imbalance, for example by effecting changes that will facilitate existing smallholders’ gainful access to markets, by focusing less on primary co-operatives and more on secondary (e.g. marketing) co-operatives; and to improve the quality and accessibility of support systems and infrastructure in order that larger numbers of producers may benefit.

3.2 Stakeholder and Investor Readiness

The unlocking of the agriculture potential in South Africa remains the responsibility of both the private and public sector. The government has demonstrated its willingness and readiness to support such initiatives through its key policies and strategies, ie the IPAP, the NDP and NGP. It now remains the responsibility of the government departments and agencies to further develop and implement supporting strategies. The IDC of SA is a key player in providing the funding for such initiatives. The main agri produce and food processing companies in South Africa are aware of the future challenges of food security that faces South Africa and Sub-Saharan Africa over the next 15 years and that a doubling of production and processing would be required in that time. Companies such as Afgri are already planning ahead and intend to expand their local processing operations. Their and other similar organisations could view participation in the SEZ’s as strategic initiatives to position them for competitive export to the rest of Africa.
3.3 Skills and Human Capital

South Africa has a high unemployment rate which is even more evident in the SEZ regions identified.

Sharing agricultural technologies currently practiced in South Africa, and relying on South Africa’s world-class educational institutions to train agriculturalists from neighbouring countries, can further improve the lives of millions of people across southern Africa. The USA Office of Global Food Security is currently working with the South African government and its Strategic Partnership with South Africa represents an important opportunity to bring together the private sector, South African government, and Feed the Future programs to unlock the potential of Africa’s agricultural sector. For precisely this reason, this department actively works with South African companies and academic institutions to disseminate key technologies and promote agricultural training.

The implementation of this programme needs to be an integral part of the SEZ agriculture and agro-processing strategy.

Besides this initiative, the AgriSETA is also actively engaging the industry to identify skills shortages and develop strategies to close the gaps.

Agriculture sector employment

The past few years have seen huge reductions in employment levels and a very high unemployment rate – currently estimated at 31.1%. The agricultural sector has also witnessed a general decline in sector employment, although this has been characterised by growth of employment in some sub-sectors and contraction in others. Further, the size of employment is determined not only by contraction of the sector but by other factors like mechanisation of processes, size of the sub sector, family run entities among emerging farmers that do not employ other people, and the labour needs of some sub-sectors, for example animal production and fruit growing is not labour intensive and mostly relies on seasonal labour for activities like wool shearing and fruit picking. According to stakeholders, employment levels have also been affected by labour law (minimum wages and LRA protections) as well as security of tenure provisions in relation to farm houses. Such issues may not in themselves result in job shedding, but are factors that are taken into account by farm owners when deciding (for example) whether to employ additional people or to invest in labour saving equipment.

The sector is characterised by the need for highly skilled and qualified farm managers and technical staff on the one hand and large numbers of unskilled and semi-skilled workers on the other. The need for seasonal workers is also justified given the nature of most of the business processes that require different labour input at different stages of the growth process. Many managers and employees of emerging farms are mainly untrained and unqualified. This is one of the contributors of lack of success of new enterprises and a critical one as stakeholders indicate that land reform recipients are drawn from a diverse range of people from different occupational backgrounds who do not necessarily know anything about farming. Farming is a high skills occupation with a complex set of agricultural and business skills. Unless the skills challenge is addressed it is anticipated that most emergent enterprises will fail to become viable and sustainable and create jobs. Moving beyond subsistence farming requires a major shift in operational culture and practice which can only come from skilled managers and staff. Agriculture relies more on semi-skilled labour than other services. The sector also relies on migrant, casual and seasonal labour.
Employment in the sector is based on those who work in production and processing at farms and in factories. The challenge for the sector, according to stakeholders, is the concentration of production in rural areas and at locations outside the cities whilst processing is generally located in larger towns. This presents farmers with high costs of transportation as without an efficient rural railway infrastructure transportation has to be by road. Storage facilities are also far away from rural areas and movement of goods to production facilities also entails huge transportation costs and increased environmental pollution. The concentration of processing infrastructure in the larger towns, e.g. mills and abattoirs is affecting the rural economy and restricting its potential to provide a viable market for farm produce, sustain viable small farms and create employment.

The establishment of the regionally distributed Agro-parks will address this situation and bring the processing closer to the source of primary agriculture production. This will also address the high and increasing transport costs and associated metropolitan pollution. It is however, essential that the Agro-Park rollout be included in a national strategy that ensures that the Agro-parks work in concert to promote regional agricultural development and agro-processing (value add) within the regions.

The AgriSETA identified a number skills needs as part of the National Education and Training Strategy for Agriculture (AET Strategy)

The AET Strategy developed by the Department of Agriculture, Fisheries and Forestry (in consultation with various key stakeholders in the agricultural sector) highlights priority skills needs and constraints within the sector and categorises needs within the following 5 broad areas:

- **Agricultural production** – the past focus on a narrow band of commodities (relevant mainly to the commercial sector) and related research be expanded to address the needs of small-scale and subsistence farmers (e.g. more focus on mixed farming and rural livelihood sustainability skills).

- **Agricultural engineering** – with specific focus to be placed on technologies suitable for small-scale farmers (e.g. relevant and post-harvesting techniques related to processing and storage of produce) – to address this need the scarcity of agricultural engineers requires attention.

- **Agricultural economics** – a critical need was identified for general agricultural economic skills (ranging spectrum of farm planning, farm management, enterprise management, marketing, finance, etc.) – with the need to training both farmers and extension officers in such fields.

- **Agricultural development** – a specific need was identified to develop agricultural extension officers and services to support especially emerging and small-scale farmers over the full spectrum (a need exists for both new curriculum in the training of new extension officers and the re-training and upgrading of existing officers)

- **Veterinarians** – the need to develop state veterinarians in order for the state to perform its role and function (particularly in its preventative, monitoring and regulatory role and function)

While this addresses rural livelihood, it does not necessarily support the development of commercial scale agriculture development.
A critical cross cutting skills need in all areas highlighted in this AET strategy is the need for agricultural environmentalists with knowledge and skills on researching and implementing sustainable resource management in production, engineering, economics, development and veterinary practice. However, there is a general shortage of skills in environmentalists. Studies that have explored the skills need in the environmental sector have indicated that there is a shortage of about 800 environment-related scientists and 1500 environment-related technical skills in the public sector, and this shortage is impacting negatively on service delivery like water provision. For example, about 55% of local authorities have sub-standard water because of a lack of skills in waste water treatment.

The AgriSETA survey identified specific skills requirements and gaps such as

- Low literacy and numeracy levels – both amongst workers within the sector at large and at owner/manager level in many of the small-scale farming.
- Farm management skills (and general management skills in other agricultural businesses) coupled with a business orientation and entrepreneurship skills.
- A general need to increase compliance with environmental, occupational health and safety, animal welfare, produce safety and hygiene standards, regulations and requirements (local and international)

A critical constraint is the poor educational levels of a large proportion of the labour force in the sector demanding a considerable effort and investment in ABET and other life skills programmes. Need for improved management skills and relevant technological knowledge for increasing productivity levels and improved production methods. Rising importance for environmentally responsible production and processing management systems. Rising competitive and international markets increases need for business and marketing abilities among owners and managers. There is increasing requirements for compliance with environmental, health and safety, and international trade standards. Information technology although not a priority, is increasing in importance.

Business management ability is becoming increasingly important as more farmers are making decisions about restructuring their businesses, diversification and developing supplementary

The profile of these farmers reflects a large contingent of older and less educated people who are generally less flexible, tend to stick to known practices and are less likely to experiment with new technology. Within this target group, candidates with good entrepreneurial ability are scarce. There is a perceived shortage of Agricultural Extension officers and advisors to assist this target group. However, a large pool of young unemployed graduates exists who could assist such emerging farmers if they were mobilised and made accessible to farmers. Similarly the potential pool of retired commercial farmers could serve as mentors to this target group.
Small scale farming

Farm Management (Mainly owners / managers)
- Farm management & entrepreneurship
- Resource management and record keeping
- Financial planning and management
- Project management
- Business plan development

Marketing and processing skills:
- Processing and packaging
- Transport management
- Marketing produce, including branding
- Planning for marketing
- Knowledge of markets

Technical knowledge and skills needs:
- Production management (related to specific enterprise)
- Demonstration of production techniques
- Natural resources management

Mechanical knowledge
- Farm maintenance
- Repairs of machinery and equipment
- Electrical maintenance and installation

Commercial farming and agro-processing

The commercial agricultural sector will increasingly have to compete in the global market and the ever increasing need to increase productivity to remain profitable and viable, it can be stated that many of the existing farmers and managers / owners lack business management and entrepreneurial orientation. Equity policy and the need to become BEE compliant require that commercial enterprises appoint and develop black owners / directors / managers. Changing local and global consumer preferences require farmers to change traditional farming methods and practices. The sector needs to be responsive to environmental drivers. Skills and knowledge requirements include:

Specific occupations identified as being in short supply are:
- Global food and international quality standards
- Production Managers (food processing)
- Product specialisation to international specifications (research skills)
- Forklift drivers, heavy vehicle/truck drivers and mobile plant operators
- Experienced and competent artisans (millwrights, electricians, fitters and turners,
- Agricultural Equipment Technicians
- Pest and weed controllers
- Horticultural specialists
- Product traceability requirements
- Organic produce and products
Skills training

South Africa’s agriculture skills are produced in high schools, agricultural colleges, FET colleges, and Higher Education institutions. In high school, a large cohort of learners takes Agricultural Science as a subject. FET colleges offer complete qualifications and short courses. Colleges of Agriculture (11) can offer qualifications up to degree level and 19 universities offer qualifications in Agriculture ranging from agricultural economics, animal and plant sciences, and horticulture among others, at under and post graduate levels. While long term planning of skilling of new entrants in the sector can be done through close consultation between the sector, agricultural schools and colleges, FET colleges and HET institutions so that they teach relevant skills, there are other avenues for training for those who are already employed in the sector, for example skills programmes and learnerships. There are 15 registered qualifications for the primary agriculture sub sectors. Currently, AgriSETA has 94 registered learnerships that can address the skills needs of the identified scarce skills. AgriSETA has approved / accredited a number of training providers across the country to deliver the theoretical and practical components of these learnerships. These include agricultural colleges, FET colleges, and private providers. Currently, the AgriSETA has 246 registered and approved providers distributed nationally with 14 in Mpumalanga. There are also 3 FET colleges in Mpumalanga in Nelspruit, Standerton and Witbank.

The provincial bursary scheme has been centralized in the Department of Education (DoE), the Department works closely with this Department to ensure that the skill deficiencies in the agricultural sector continue to be addressed.

Food technology centres

The Limpopo Agro-Food Technology Station (LATS) was established in 2007 and officially launched in 2008 at the University of Limpopo. The Station establishment was an initiative by the Department of Science and Technology (DST) through the then Tshumisano Trust to improve agro processing services in Limpopo Province. The station is now under Technology Innovation Agency. SMME’s Agro processing sector in Limpopo Province is involved in turning primary agricultural products into other commodities for national and international markets. It is a dynamic and fast growing sector and therefore has the potential to provide opportunities for income generation and employment in the Province and the country at large.

The station is meant to ensure that there is food processing information available, especially to people living in rural areas of Limpopo Province. And to alleviate poverty as it builds on the assets of poor people (indigenous knowledge and skills and local natural resources). Its strategic partners are Limpopo Department of Agriculture (LAD) and Limpopo Department Economic Development, Environment & Tourism (LEDET). LATS offers its services to SME’s, Agricultural co-operatives and Food Industries to help them meet the national and international product market requirements. The Station is based at the University of Limpopo, Turfloop Campus under the School of Agricultural and Environmental Sciences (SAES). The station also helps in student training through internship programs and postgraduate training in partnership with several departments within the university. Services provided by the Station include the following:

- Testing and analysis of processed and unprocessed foods. This service involves testing the products that are ready for markets from the SMMEs and food industries.
• **New products development.** The SMME’s are trained by food technologists on how to process product of their choice based on SABS standards.

• **Product and process improvement.** This involves improving a low standard product or process of SMME.

• **Training SMME’s on food processing.** The Station trains SMMEs based on client’s drawings or specifications.

• **SMME’s technology audit.** This involves Audits performed at SMEs, often in SMEs premises as a first contact or on a newly installed machines/Production plants to identify the potential for improvement and the required interventions.

• **Internship Programme.** The Station trains interns in food processing and also postgraduate students working on food processing related projects. The Station receives funds from DST for annual internship programmes.

It would be useful to align the training programmes and services offered by the Station with the objectives and short, medium and long term opportunities of the agro-processing SEZ in Limpopo.

### 3.4 Technology

#### 3.4.1 Introduction

Suitable technologies for fresh produce handling and processing are readily available and small scale operations are being developed by leading international companies such as Buhler, North West University Centre for Advanced Manufacturing Technologies (CFAM) and Roff Industries. The deployment of these technologies should be actively promoted by the financial and government institutions.

The development of the SEZ also needs to be cognisant of other related industry developments such as the use of Agri-centres (agro-processing and trading centres) in the centre of a number of large scale farming units, and high yielding production technologies such as hydroponics. These can impact on the success of the agro-processing activities in the SEZ.

#### 3.4.2 Hydroponics

Hydroponics is a controlled method of agriculture which allows organic production of vegetables at the highest yield possible. Farming is done in an enclosed structure, without soil, but in a selected growing medium where lightning, Temperature and nutrients are closely regulated.

Humans are inherently dependent on the optimization of land space and the preservation of biodiversity. The human population is increasing, and is predicted to expand from 7.0 billion to 9.5 billion people within the next 40 years (Sahara Forest Project, 2009). A parallel increase in the demand for food species is implied, and estimates claim that food production will need to be doubled in order to compensate (Sahara Forest Project, 2009). The trouble with this becomes evident upon the consideration of the productivity of current systems of agriculture and fresh water harvesting: despite our efforts, 1.0 billion people suffer from hunger and 1.2 billion live in areas with water scarcity (Sahara Forest Project, 2009).
In response to the global food security problems, hydroponic agriculture facilities as well as power plant/greenhouse desalination facilities have been investigated in an effort to:

- Limit terrestrial biodiversity loss through the reversion of large tracts of current farmland into sustainable and fundamentally natural environments;
- Limit aquatic biodiversity loss through the development of more cost-effective distillation processes;
- Produce algae for biofuels, limiting abrasive, environmentally damaging fuel harvesting;
- Expand capacity to supply fresh water, foods, and economic stability to arid communities; and
- Optimize space in current agricultural as well as urban settings.

There are two basic forms of hydroponics: soil-less mediums, such as clay, sand, rock wool, perlite, and vermiculite, and true hydroponics, which use only a water-based solution of required plant nutrients. The most commonly grown hydroponic crops are lettuce, tomatoes, peppers, cucumbers, herbs, and flowers.

Aqua- and hydroponic production of fresh produce is a controlled method of agriculture, which allows organic production of vegetables at the highest yield possible. The organic (chemical free) industry is the fastest-growing industry segment worldwide. World organic food sales jumped from $23 billion in 2002 to $52 billion in 2008 (Datamonitor, 2009). Production of fresh produce close to the end-user markets also allow a greater selection of cultivars by selecting produce based on taste, variety, demand, and suitability for indoor production. Shorter transport times leads to a higher quality fresh produce on the shelf, which in turn provides the consumer with a better tasting product.

![Figure 95: Typical high density hydroponic vegetable production](image-url)

The introduction of hydroponics to peri-urban and metropolitan areas in South Africa, such as Gauteng and Western Cape, will attempt to meet the metropolitan dwellers’ fresh vegetable needs without being dependent on ‘imported’ produce. These developments will present a threat to rural development of vegetable production for fresh markets. This places further emphasis on the development of agri-hubs and centres where the lower infrastructure costs can still provide benefits for conventional food production whilst also benefitting the introduction of hydroponics at the right time.
3.4.3 Agriculture hubs and agro-processing centres

Agricultural hubs comprise a combination of regional distributed working farms (agri-villages) clustered together in producing common horticulture and livestock products on a semi-commercial scale and an agri-processing centre strategically located in close proximity to all the farms/villages (central). This allows small farmers access to secure land and local markets, and are an educational, environmental, and aesthetic amenity for nearby communities. The naming of the concept as a “park” is intended to convey the role an agro-park plays in open space preservation. While the term suggests the permanent land conservation and recreational use for the local community, it also evokes the traditional model of a business park, where multiple tenants operate under a common management structure.

Agri-industrial Centres

Structure of a typical Agri-Industrial Park includes the following:

- An agricultural centre designed to provide required support services and to achieve excellence in production, marketing and profitability;
- Fresh Fruit and vegetable handling (cleaning, cooling, grading, packing) for FPMs and processors;
- Processing facility for fruit and vegetables, such as juicing, canning, fresh pack etc;
- Slaughtering facility for beef and poultry and packaging/freezing;
- Warehousing and refrigeration;
- Logistics support (loading and shipping) and associated reefer facilities;
- Training and extension services, and Research and Development, eg Food Technology Centres;
- Farm mechanisation equipment supply and rental centre;
- Animal feed processing plant – beef, sheep and poultry feeds;
- Fertiliser blending plant and soil and leaf analysis laboratory;
- Farm agrichemicals and remedies (disease, pesticides and herbicides) supply and support; and
- Office and ablution for centre management and extension services.

Agricultural Training Centre

A specific objective of the Agri-industrial park will be to support improvement in Education, standard of living, quality of life and productivity.

In many developing countries major farmer problems are:

- Inadequate know-how, lack of resources and remoteness from market. Once farmers gain better know-how, become trained in better agro-technology and get appropriate input supply and an access to markets – their agricultural and economic performance will be dramatically increased.
- Advancement in agricultural practices and agro-technology should be gradual. Agro-technology should not be copied from one place to another as is. Rather, agro-technology should be adopted slowly and must be adjusted to local conditions and the capabilities of local farmers.

The gradual adoption, development and assimilation of improved agro-technology, agricultural practices and agronomic know-how will allow a steady progress of farmers and continuous improvement of their livelihood.
The major objective of the Agricultural Training Centre is to improve farmers’ know-how and agricultural capabilities by:

- The introduction of advanced agro-technology;
- Supplying basic agricultural and managerial studies;
- Training farmers in advanced agricultural practices; and
- The provision of continuous guidance and extension.

Striving for a Collective Success

The key to success for such agriculture hubs lies in the combination of farming activities in one area that enables large scale production of produce and livestock and the associated economies of scale. It is becoming increasingly evident that small holder farmers will remain excluded from the mainstream agriculture business if they are not able to pool resources and start operating as commercial farmers. The key drivers therefore include:

- A collection of multiple farms in ‘villages’ that will produce wide range of products and services (milk, eggs, poultry, fish, crops, etc.);
- Each village will manage its own farm with the support of the government extension services and the relevant stakeholders in the processing centres;
- The goods will be delivered to the Industrial Centres (Agri-Centre) for processing, packing, marketing, distribution, etc. These facilities will be aligned with national and multinational exporters, food processors and retailers;
- The Centres will provide various services to farms, including warehouses and refrigeration, veterinarian services and labs, centre of excellence, training, etc.; and
- The farms and the centres will work in harmony:
  - Supporting the on-going farms activities;
  - Sharing financial benefits; and
  - Farmers (communities) will hold shares in the Industrial Centre entity.

The Model

The development and establishment of new regional agro-industry centres, Agro villages containing agriculture families and related industries entails the following:

- Farms produce 1 or minimal products on a relatively large scale and become specialists
- All products are sold to the Agri-centre facility – off take
- Agri-centre processes all products for distribution to other farms or sale to external market
- Agri-centre provides all non-core services centrally to all the farms at lower cost and higher quality
- Individual farms will have a shareholding in Agri-centre in partnership with private investors.

Benefits of the model

The following table summarises the benefits of the model:

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialisation in 1 or few products on commercial scale farming</td>
<td>Greater focus and higher product yield, increased efficiencies and lower input costs</td>
</tr>
<tr>
<td>Off-take from Agri-centre</td>
<td>Increased competitiveness</td>
</tr>
<tr>
<td>Non-core services offered centrally by Agri-centre</td>
<td>Low risk associated with logistics, packing, storage, marketing and sales to market</td>
</tr>
<tr>
<td></td>
<td>Lower cost, greater efficiency and higher quality of</td>
</tr>
<tr>
<td>Services</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Individual farm ownership but shared ownership in Agri-centre</td>
<td>Direct benefit linked to performance however motivation to work together for additional profits – Distribution of proceeds principle</td>
</tr>
<tr>
<td>Agri-centre management to handle market interaction</td>
<td>Specialists with many years’ experience undertaking processing, marketing, business administration, market contracts, logistics etc.</td>
</tr>
<tr>
<td>Training centres at Agri-centre</td>
<td>Centralised on-going training to facilitate knowledge transfer and interaction between the farms</td>
</tr>
<tr>
<td>Sustainable farming</td>
<td>Preservation of farmlands and rural development. Development in line with natural resources</td>
</tr>
<tr>
<td>Social benefits</td>
<td>An increase in public access to and education about agriculture produce processing (eg Food and Technology Training Centres)</td>
</tr>
</tbody>
</table>

**Table 41: Benefits of agro-processing and agro-trade hubs**
**Implementation**

It is proposed that the implementation of the Agri-centres (trade and processing hubs) be coordinated amongst the provinces. The following table provides a possible scenario of the typical products and services that can be incorporated in the proposed SEZs in Mpumalanga, Limpopo and Free State.

<table>
<thead>
<tr>
<th>Food and Agro-processing</th>
<th>Limpopo Agro-Park Musina</th>
<th>Mpumalanga Agro-Park Nkomazi/Bushbuckridge</th>
<th>Free State Agro-Park Harrismith</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broiler and slaughtering</td>
<td>Whole fresh and IFQ, Whole fresh and IFQ</td>
<td>Whole fresh and IFQ</td>
<td>Whole fresh and IFQ</td>
</tr>
<tr>
<td>Meat (beef feedlots)</td>
<td>Beef (meat processing) various options</td>
<td>Beef (meat processing) various options</td>
<td>Beef and sheep processing</td>
</tr>
<tr>
<td>Aquaculture</td>
<td>Fish feed factory</td>
<td>Fish breeding</td>
<td>Fish feed factory and fish breeding</td>
</tr>
<tr>
<td>Maize and wheat</td>
<td></td>
<td></td>
<td>Milling and cereal production</td>
</tr>
<tr>
<td>Soya</td>
<td>Soya extrusion plant for human food consumption and animal feed</td>
<td>Soya oil cake and oil</td>
<td>Soya oil cake and oil</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Oil – human consumption and oil-cake for animal feed</td>
<td>Oil cake production for animal feeds</td>
<td></td>
</tr>
<tr>
<td>Fruit juice concentration</td>
<td>Mango and Guava juicing plant</td>
<td>Guava and Mango juicing plant. Lemon juice and oil extrusion plant.</td>
<td>Berry and cherries juice, fresh</td>
</tr>
<tr>
<td>Fruit and vegetable Canning</td>
<td>Tomatoes and various vegetables, Dry- beans</td>
<td>Berries and cherries and vegetables</td>
<td></td>
</tr>
<tr>
<td>Drying (air)</td>
<td>Vegetables eg onions and cabbage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Essential oil</td>
<td></td>
<td>Lemon oil recovery</td>
<td>Various essential oil extrusion</td>
</tr>
<tr>
<td>Fresh produce trading</td>
<td>Preparation of fruits and vegetables for FPMs and SADC and processors</td>
<td>Vegetables and fruits for FPMs and Processors</td>
<td>Vegetables (potatoes) High value added vegetables</td>
</tr>
<tr>
<td>Fertiliser production plant</td>
<td>Fertiliser production facility: N:K:P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertiliser blending facility</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Hatchery (chicks)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Confectionary production</td>
<td>Sweets production</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The benefits of the proposed integrated agro-processing centres and agriculture hubs needs to be promoted to the food and beverage industry at a local and international level to attract direct access to markets. The fresh produce trade can commence as the early adopter and catalyst of the agro-centres with integration to the major FPM’s in Gauteng (JFPM and TFPM) and KwaZulu-Natal (Durban) and Free State (Bloemfontein). Food processing and the other activities can follow thereafter.

### Agriculture development

The centre management will have to include agriculture specialists and extension services to assist with the development of the Agri-villages to ensure sustainable supply of quality produce to the agro-centres. The selection of the agro-villages will be driven by the suitability of the land in the surrounding areas of the SEZ’s.

### 3.5 Availability of Land

Two possible sites have been identified for the Musina SEZ, as indicated in the map below. Due to the various sectors that this SEZ will service, both sites might have to be developed. The difference in industries also might require that the site not be co-located.

For the purpose of this report the sites will be called the Limpopo Eco-industrial Park (LEIP) site and the Lee Family land.

These sites will however be fully assessed in the Environmental and Sustainability section hereunder.

### 3.6 Environment and Sustainability

There are two sites currently being investigated for Musina, as indicated in the map below. Both lie in close proximity to the border of Zimbabwe.
3.6.1 Site 1. Musina – Limpopo Eco-industrial Park Land (LEIP)

3.6.1.1 Environment

The site in question is a part of the expansive savannah biome and comprises two vegetation types, namely Musina Mopane Bushveld and Limpopo Ridge Bushveld. According to the latest land cover mapping, the site could be described as largely natural and untransformed, despite bordering on Musina town. There are, however, no threatened ecosystems that have been recorded for the site.
The Baobab Tree Nature Reserve is located on the site’s south western border (see figure below), while the Marelan Nature reserve is located to the north west of the site (although not documented on SANBI’s Biodiversity mapping portal, it is visible on Google Maps).

In terms of watercourses, the site is intersected by numerous perennial and non-perennial rivers, which feed into the great Limpopo river system (which essentially forms the entire north eastern border of the proposed site). Numerous wetlands are noted along the Limpopo river area of the site, as well as one large system on the southern extent of the site (denoted in cyan blue on the map below).

![Land cover map of Musina site 1 showing that the site is largely natural and untransformed](image)

**Figure 97:** Land cover map of Musina site 1 showing that the site is largely natural and untransformed
Figure 98: Vegetation map of Musina site1 showing both Musina Mopane Bushveld and Limpopo Ridge Bushveld within the study area
3.6.1.2 Sustainability

The site is very large (approximately 25km²) and is bounded by Musina town to the south, the N1 to the west and the Limpopo River to the north east. It comprises almost entirely natural area and is thus, given the size of the site, acting as a valuable carbon sink as well as natural habitat.

The extensive infrastructure and buildings proposed for the site, as well as various industrial plants, are considered high in terms of the socio-economic stimuli (at least in the short to medium term). However, the densities of the proposed infrastructure would need to be carefully considered so as to:

- Retain some of the natural open space and provide areas of relief for those occupying the site; and
- Respect all watercourses on site, including their 1:100 floodline areas and/or proposed buffer areas (the latter of which subject to further on site ecological investigation).

Out of the developments proposed for the site, the proposed ecotourism area and small solar plant facility are considered highly positive developments, which would yield sustainable economic development and job creation, yielding positive impacts into the long term, as they are not depletive/extractive of natural resources.

![Figure 99: Proposed layout of the LEIP site](image-url)
3.6.2 Site 2. Musina – Lee Family land

3.6.2.1 Environment

This site is fairly close to the above mentioned site and thus similar ecological conditions prevail. It is a part of the savannah biome and comprises the same two vegetation types as above, namely Musina Mopane Bushveld and Limpopo Ridge Bushveld.

According to the latest land cover mapping on SANBI’s BGIS Portal, the site could also be described as largely natural and untransformed, despite areas in the central north of the site which are urban/built-up near the border post to Zimbabwe and where there are also areas of cultivation. The site is also bisected by the N1 road corridor.

No threatened ecosystems have been recorded for the site, although it does fall almost entirely within the Marelani Nature Reserve.

In terms of watercourses, the site is also intersected by numerous perennial and non-perennial rivers, which feed into the great Limpopo river system (which essentially forms the entire northern border of the proposed site).

As per the previous site, numerous wetlands are noted along the Limpopo river area of the site (denoted in cyan blue on the map below).
Figure 100: Landcover map of Musina site 2 showing that the site is largely natural, but has areas which have undergone transformation (at the border post to Zimbabwe)
**Figure 101:** Vegetation map of Musina site 2 showing the same vegetation types as that of site 1 above.
3.6.2.2  Sustainability

The site in question is significantly smaller (approximately 6km²) and more linear than that of site 1. Its location adjacent to the N1 means that it is easily accessible to a major road network and is likely to be serviced more easily with bulk water and/or electricity supply.

Socio-economically, the mixed use nature of the proposed development for this site (commercial retail and office space, industrial warehousing, trucking facilities and a solar plant) is considered a positive aspect of the proposed development, which will target a slightly wider audience as well as attract and develop varying skill sets. As per site 1, the development would promote job creation in the short-medium term.

Ecologically, the site is not considered to be more pristine that that of site 1, although the fact that it is located within a Nature Reserve needs to be further investigated. It is unclear whether the Reserve has been protected in terms of law (such as the National Environmental Management Protected Areas Act of 2003) or not.

3.6.3  Summary

At the macro level, site 1 is considered more pristine and thus more environmentally sensitive. As such, it is not considered ideal for long term economic development, as it would come at a higher cost to the natural environment and would also attract a limited type of market.

Therefore, site 2 is considered to be the more appropriate option for development in the short, medium and long term, but this would be subject to:

- Revision of proposed development densities and creating setback lines from watercourses and key natural areas; and
- Discussion and negotiation with conservation bodies managing the Marelani Nature Reserve regarding its ability to be partially developed – and suspensive conditions which may be applicable.

Should the above Reserve be considered a no-go area, then the project team need to be prepared to target the second site (with the same above conditions being applicable). It is therefore critical that discussions with the applicable conservation authorities take place at the earliest opportunity with respect to the standing of the Reserve and its ability for part thereof to be encroached upon.

3.7  Stakeholder and Investor Readiness

The unlocking of the agriculture potential in South Africa remains the responsibility of both the private and public sector. The government has demonstrated its willingness and readiness to support such initiatives through its key policies and strategies, ie the IPAP, the NDP and NGP. It now remains the responsibility of the government departments and agencies to further develop and implement supporting strategies. The IDC of SA is a key player in providing the funding for such initiatives. The main agri produce and food processing companies in South Africa are aware of the future challenges of food security that faces South Africa and Sub-Saharan Africa over the next 15 years and that a doubling of production and processing would be required in that time. Companies such as Afgri are already planning ahead and intend to expand their local processing operations. Their and other similar organisations could view participation in the SEZ’s as strategic initiatives to position them for competitive export to the rest of Africa.
3.8 Bulk Infrastructure

Once the site for the SEZ has been secured from the municipality the extent of the development will be determined. Bulk infrastructure will have to be assessed and the required investment will then be calculated. The findings will then be presented to the municipality for final approval.

There is currently adequate supply of water for the Musina area. Infrastructure upgrading and refurbishment is the major problem listed for Musina’s water abstraction and reticulation to those areas that require water.

There is also still a backlog of electricity supply to residential areas and the supply of electricity to the existing businesses in intermitted and unreliable. Major plans of private sector stakeholders for installation of solar systems and other energy projects will need to be assessed in more detail during the feasibility study phase.

3.9 Summary

As a baseline for unlocking the potential of an SEZ in Musina, the government and private sector would need to work together to ensure the following:

- Skills development;
- Effective and industry specific incentive packages;
- Efficient and effective administration and partnering with global actors;
- Provision of appropriate bulk and other infrastructure;
- Optimum financing arrangements;
- Interest from portfolio of capital providers;
- Access to IP of private sector partners in some cases;
- Access to structured market opportunity in some cases; and
- Timing – first mover advantage.
4. Policy Review

There are various policies, white papers and Government plans that shape the industrial environment in South Africa. The following policies, papers and plans influence the logistics, petro-chemicals and agro-processing hubs in South Africa.

4.1 National Industrial Policy Framework (NIPF)

The National Industrial Policy Framework (NIPF) was the first comprehensive statement of Government’s approach to industrialisation and industrial policy in South Africa. The NIPF sets out Government’s broad approach to industrialisation in the context of the Accelerated and Shared Growth Initiative of South Africa (ASGI-SA) and its target of halving unemployment and poverty by 2016 through accelerated growth of at least 6% from 2010. The primary objective of the NIPF is to set out government’s approach to the industrial development of the South African economy. Consequently the NIPF sets out a vision for the industrial economy for both the short-medium and medium-long term. It aims to provide strategic direction to the economy with respect to the issue of industrial development. First, it is aimed at providing greater clarity and certainty to the private sector and social partners with respect to investment decisions leading up to 2014 and beyond. Second, it is intended to provide a reference point for substantial improvements in intra-governmental coordination of the numerous and complex set of policies and projects that will form part of the NIPF.

The NIPF’s situational analysis indicates that the major structural weakness in the industrial economy has seen employment losses in traditional commodity sectors of the economy (such as agriculture and mining) and that these have not adequately been offset by rapid growth in non-traditional tradable sectors (such as in manufacturing and certain tradable services). These sectors are critical for employment creation because they are generally both labour-intensive and characterised by relatively low-skill intensity. Therefore its conceptualisation of industrialisation is not restricted to the manufacturing sector but involves a structural change in the growth path towards a more labour-absorbing and value-adding economy. While the NIPF is aimed at unlocking constraints that will benefit the entire economy, there is a particular emphasis on growing non-traditional tradable goods and services due to their relative intensity in low-skilled labour and potential for value-addition. These sectors include manufactured products outside of mineral processing, services that can compete in export markets as well as against imports, including certain non-traditional agricultural and mining activities.

The NIPF sets out some key principles for all government departments with respect to the design and implementation of industrial and sector policies. Such policies drives evidence-based Key Action Plans (KAPs), which are of sufficient scale to achieve structural change in the economy and are supported through an appropriate mix of regulatory change and industrial financing. Where appropriate, industrial financing will be dispensed on a far more conditional basis, be aimed in particular at new activities and made available for a limited time.

The NIPF encompasses the following core objectives:

- To facilitate diversification beyond current reliance on traditional commodities and non-tradable services. This requires the promotion of increased value-addition per capita characterised particularly by movement into non-traditional tradable goods and services that compete in export markets as well as against imports;
The long-term intensification of South Africa’s industrialisation process and movement towards a knowledge economy;

The promotion of a more labour-absorbing industrialisation path with a particular emphasis on tradable labour-absorbing goods and services and economic linkages that catalyse employment creation;

The promotion of a broader-based industrialisation path characterised by greater levels of participation of historically disadvantaged people and marginalised regions in the mainstream of the industrial economy; and

Contributing to industrial development on the African continent with a strong emphasis on building its productive capabilities.

The NIPF envisions the implementation of thirteen strategic programmes (SP):

- SP1: Sector Strategies;
- SP2: Industrial Financing;
- SP3: Trade Policy;
- SP4: Skills and Education for Industrialisation;
- SP5: Competition Policy and Regulation;
- SP6: Leveraging Public Expenditure;
- SP7: Industrial Upgrading;
- SP8: Innovation and Technology;
- SP9: Spatial and Industrial Infrastructure;
- SP10: Finance and Services to Small Enterprises;
- SP11: Leveraging Empowerment for Growth and Employment;
- SP12: Regional and African Industrial and Trade Framework; and
- SP13: Coordination, Capacity and Organisation.

The Manufacturing Investment Programme (MIP) is an incentive designed to stimulate investment growth, in line with the South African government’s NIPF. The objective of the incentive is to stimulate investment within the manufacturing industry, to enhance the sustainability of manufacturing investment projects by small enterprises and to support large to medium sized investment projects in manufacturing that would otherwise not be established without the grant.

The NIPF strategically targets various sectors, including agriculture and mining. The agriculture and agro-processing sector broadly is one of the most labour-intensive in the economy. It will be investigated further to identify opportunities for employment creation and new enterprise development. The NIPF led to the implementation of the Industrial Policy Action Plan 2007/8 (IPAP).
4.2 Industrial Policy Action Plan- 2015/2016 (IPAP)

IPAP is fundamentally a policy and action plan designed to help build South Africa’s industrial base in critical sectors of production and value-added manufacturing. The Industrial Policy Action Plan 2007/8 (IPAP) was approved and mainly contained easy-to-do actions applicable to various sectors. The IPAP indicated that the mining and mineral beneficiation sectors required more comprehensive strategies. Thus, the IPAP was revised to form the Industrial Policy Action Plan (2011/12-2013/14) IPAP2. The 2011/12-2013/14 Industrial Policy Action Plan (IPAP2) aims to generate a new path of industrialisation. IPAP2 states that government has committed to making employment creation the main criterion for economic policy, as well as that industrial policy and the IPAP form part of a larger set of inter-related policies and strategies, which make up government’s New Growth Path (NGP).

The purpose of the IPAP2 is to expand production in value-added sectors with high employment and growth multipliers that compete in export markets as well as compete in the domestic market against imports. In so doing, the action plan also places emphasis on more labour absorbing production and services sectors, the increased participation of historically disadvantaged people and regions in the economy and will facilitate, in the medium term, South Africa’s contribution to industrial development in the African region.

In terms of IPAP2, seven sets of policies are regarded as crucial to scaling up industrial policy:

- Stronger articulation between macro- and micro-economic policies, in particular striving for a competitive and stable exchange rate regime and a competitive real interest rate regime;
- Industrial financing channeled to real economy sectors, with both investment incentives and concessionary (although conditional) finance from development finance institutions such as the Industrial Development Corporation (IDC) being utilised as instruments in allocating capital to productive investment;
- Leveraging public and private procurement, focusing on a limited number of large and strategic procurement fleets;
- Developmental trade policies, lowering tariffs on intermediate inputs and increasing tariff and non-tariff protection for final goods;
- Competition and regulatory policies that lower costs for productive investments by reducing the market power of dominant firms;
- Skills and innovation policies that are aligned to sectoral priorities; and
- Deploying these policies in general and in relation to more ambitious sector strategies.

The transversal and sector-specific programmes and interventions outlined in successive iterations of IPAP have sought to achieve the following objectives in a process of continuous improvement and learning-by-doing:

- Enabling and strengthening the internal alignment and co-ordination between the Dti divisions responsible for important related work: industrial development, trade policy, investment and export promotion, and incentive support and enterprise development;
Continuously scaling-up transversal policy interventions by removing KAPs that have been achieved and adding new ones where relevant and appropriate;

- Strengthening and deepening sector plans with the addition of new KAPs based on policy research and stakeholder engagement to identify and correct market failures in key sectors during the previous year. This process includes the removal of KAPs achieved and, in limited cases, the removal of those that for a variety of reasons have proven unworkable;

- Enabling and contributing to intra-governmental alignment and co-ordination across a range of Action Plans where other government departments have shared responsibility or are the lead department(s); and

- Enabling and strengthening oversight of the time-bound action plans by the executive, Parliament and society at large.

The IPAP also summarises the transversal and sector-specific key progress highlights from the work carried out in 2012. Full progress reports are independently submitted to the executive, legislature and NEDLAC.

The IPAP targets the enhancement of local industrial capability and support mechanisms from government involvement through to financial support. Economic Sectors and Employment Clusters targeted by the IPAP include the agro-processing, biofuels and aquaculture sub-sectors.

In particular, the Key Performance Areas (KPA) highlighted in the IPAP that are relevant to the agriculture subsector includes the following:

- The development of a Food-processing Strategy and Action Plan;
- The development of a small-scale milling industry;
- The enhancement of competition in the Fruit and Vegetable Canning Industry by supporting new enterprise development;
- The development of a Soybean Action Plan promoting market linkages between primary agricultural producers and processors;
- Development of the organic food sector;
- Supporting the Public-Private Partnership (PPP) for Food Security;
- Accelerate development of biofuels; and
- Promote investment in Aquaculture.

The IPAP therefore provides a strategic intent to support the development of agriculture and agro-processing industries, as well as mineral beneficiation industries.

### 4.3 National Development Plan (NDP)

The NDP aims to eliminate poverty and reduce inequality by 2030. According to the plan, South Africa can realise these goals by drawing on the energies of its people, growing an inclusive economy, building capabilities, enhancing the capacity of the state, and promoting leadership and partnerships throughout society.
The National Planning Commission believes that South Africa can create 11 million jobs by 2030 by:

- Improving economic policy coordination and implementation;
- Building partnerships between the public sector, business and labour to facilitate, direct and promote investment in labour-intensive areas;
- Raising competitiveness and export earnings through better infrastructure and public services, lowering the costs of doing business, improving skills and innovation and targeting state support to specific sectors;
- Strengthening the functioning of the labour market to improve skills acquisition, match job seekers and job openings and reduce conflict.

By 2030, South Africa's rural communities must have better opportunities to participate fully in the economic, social and political life of the country. People should be able to access high-quality basic services that enable them to be well nourished, healthy and increasingly skilled. Rural economies will be supported by agriculture and, where possible, by mining, tourism, agro-processing and fisheries.

The NDP supports the expansion of irrigated land, farmer access to markets and agriculture training and capacity building by providing the overall policy direction.

4.4 New Growth Path (NGP)

The New Growth Path (NGP), which seeks to create a more inclusive economic growth system by inter alia, supporting more labor absorptive economic activities, sets out a range of practical measures at sectoral level. The NGP states that “there is growing consensus that creating decent work, reducing inequality and defeating poverty can only happen through a new growth path founded on a restructuring of the South African economy to improve its performance in terms of labor absorption as well as the composition and rate of growth”. The main purpose of the NGP is to address unemployment, inequality and poverty. In particular, the NGP identified achieving a goal of creating five million jobs by 2020, namely in the private sector. In order to achieve this, a number of job drivers have been identified, which are as follows:

- Infrastructure for employment and development;
- Improving job creation in economic sectors (agricultural value-chain, mining value chain, manufacturing, tourism and high level services);
- Seizing the potential of new economies;
- Investing in social capital; and
- Spatial development.

For the job drivers to facilitate job creations, a policy package is to be developed for these particular areas/sectors. The policies identified are distinguished between macroeconomic and microeconomic policies. The microeconomic policies relate to ten programmes, which are:

- Active industrial policy;
- Rural development policy;
- Competition policy;
• Stepping up education and skills development;
• Enterprise development;
• Broad Based Black Economic Empowerment (BBBEE);
• Labour policies;
• Technology policy;
• Developmental trade policies; and
• Policies for African development.

The NGP also identifies six priority sectors, focused on infrastructure and rebuilding the productive sectors of the economy. This policy framework prioritizes the mining value chain, which includes mineral beneficiation and manufacturing, as one of the key economic activities that present the highest value proposition towards the attainment of its objectives.

The NGP is a critical document that indicates the new approach national government plans to take to develop the country. There are a number of job drivers as well as programmes that are applicable to the Musina Local Municipality and need to be taken into consideration for the Petro-chemical, Agro-processing and Logistic Hub SEZ in Musina.

4.5 National Development Initiative

One of South Africa's key industrial policies remains committed to fostering sustainable industrial development in areas where poverty and unemployment are at their highest. This objective is carried out through the Spatial Development Initiative (SDI), which focuses on high-level support in areas where socio-economic conditions require concentrated government assistance and where inherent economic potential exists. The SDI programme focuses government’s attention across the various national, provincial and local governmental spheres with the goal of ensuring that investments are fast-tracked and that synergies between the various types of investments are maximised.

The SDI programme is a short-term investment strategy that aims to unlock inherent economic potential in specific spatial locations in South Africa. The programme uses public resources to promote private sector investment in regions with a high potential for economic growth. All of the major projects in the SDI are based on Public Private Partnerships (PPP), and are set to provide opportunities for participation in sectors such as agriculture, mining, tourism, environment, forestry, infrastructure and ports. A key component of this initiative is the move towards international competitiveness, regional co-operation and a more diversified ownership base.

The SDI programme is an interdepartmental investment strategy led by the Dti and the Department of Transport and involves strategic initiatives by government aimed at:

• Crowding of investment: This investment (including financial, technical and institutional resources) cannot only be made by the public sector and its parastatal agencies, but must also make sense for the private sector. The crowding-in effect has been strengthened by the fact that some of the infrastructure development projects that were previously funded by the public sector are increasingly being funded by way of private sector investment and lending;
• Public-Private Partnerships (PPPs);
• Inherent economic potential;
• Rapid planning and delivery;
• Restructuring the apartheid space economy;
• Generating sustainable employment;
• Maximising private sector investment; and
• Exploiting South Africa’s under-utilised locational and economic advantages.

4.6 National Framework for Sustainable Development

The purpose of the National Framework on Sustainable Development is to enunciate South Africa’s national vision for sustainable development and specify strategic interventions in order to re-orientate SA’s development path in a more sustainable direction. It proposes a national vision, principles and areas for strategic intervention and will act as a guideline for the development of the national strategy and action plan. The national framework for sustainable development aims to:

• Identify key short, medium and long-term challenges to South Africa’s sustainable development efforts;
• Set the framework for a common understanding and vision of sustainable development; and
• Define strategic focus areas for intervention.

In this context, the following strategic goals are elaborated and are relevant for the Musina SEZ

• To reduce resource use as well as the carbon intensity of the economy;
• To provide equal access to resources and a decent quality of life for all citizens;
• To ensure effective integration of sustainability concerns into all policies and planning.

Subsequently, a strategy and action plan for 2010/16 was approved and includes the following priorities:

• Responding effectively to climate change;
• Towards a green economy;
• Building sustainable communities;
• Sustaining ecosystems and using natural resources efficiently; and
• Enhancing governance systems and capacity.

This strategy and the action plan are very generic. The principles, vision, broad objectives and strategies are regarded as comprehensive and are relevant to the establishment of the Musina SEZ.
4.7 Strategic Infrastructure Projects (SIP)

The South African Government adopted a National Infrastructure Plan (NIP) in 2012, with the intent of transforming the South African economic landscape, while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services, as well as supporting the integration of African economies.

Based on this plan, the South African Government has identified eighteen Strategic Integrated Projects (SIPs) to take place in South Africa in the next 10 to 20 years. The SIPs have been developed and approved to support economic development and address service delivery in the poorest SA provinces. The SIPs cover catalytic projects that can fast-track development and growth. Work is being aligned with key cross-cutting areas: human settlement planning and skills development.

The SIPs comprise:

- 5 Geographically-focussed SIPs;
- 3 Spatial SIPs;
- 3 Energy SIPs;
- 3 Social Infrastructure SIPs;
- 2 Knowledge SIPs;
- 1 Regional Integration SIP; and
- 1 Water and Sanitation SIP.

Of the Strategic Integrated Projects, SIP-1 affects Limpopo. The objectives of SIP-1 are to coordinate and implement strategic infrastructure within a 20 year planning framework for the Northern Mineral belt, and to unlock its full potential via improved logistics linkages. SIP-1 is focussed on the Waterberg and speaks to investment in rail, water pipelines, and energy generation and transmission infrastructure. However, land ownership issues in the area, according to the SIP-1 documentation, could delay full implementation for up to seven years, although the land issues are unlikely to affect the proposed SEZ.

SIP-6 also affects the Limpopo province, as the aim of this SIP is to develop a national capacity to assist the 23 least resourced districts, in order to address all the maintenance backlogs and upgrades required in water, electricity and sanitation bulk infrastructure. A part from this, the road maintenance programme will also enhance service delivery capacity thereby impacting positively on the population.

SIP-11 can also be considered for the Limpopo province, as this SIP covers agri-logistics and rural infrastructure. With this SIP, the Government intends to improve investment in agricultural and rural infrastructure, thus supporting expansion of production and employment; small-scale farming and rural development, including facilities for storage; transport links to main networks (main roads, railway lines, ports); expansion of agricultural colleges; amongst others.

SIP-14, whose aim is higher education infrastructure, as well as SIP-15, which aims at expanding access to communication technology, also affects the Limpopo Province. These SIPs have as main objectives to develop infrastructure for higher education as well as ICT connectivity, providing better access to rural areas in the poorest districts.
4.8 Sector Specific Policies and Incentives – Petro-Chemical

4.8.1 Mineral Beneficiation Strategy

The South African National Beneficiation Strategy is a strategic intervention that became a national policy. This section of the report outlines the key aspects of the strategy and provides an indication of the support that the Government is willing to provide in order to promote local beneficiation of raw materials in South Africa.

The mineral beneficiation strategy seeks to fundamentally change the behaviour of business in order to facilitate a seamless and enabled beneficiation environment for affected minerals. It is the intention of the Department of Mineral Resources (DMR) to transform South Africa from a resource\(^{20}\) to a knowledge\(^{21}\) based economy, creating sustainability beyond the mining phase. The strategy of legal intervention aims to address the need for South Africa to derive maximum value from its wealth of mineral resources and optimise the benefits for South Africa. The strategy is also aligned to other broader national programmes, including, but not limited to the industrialisation, energy security programme and the Advanced Manufacturing Technology Strategy (AMTS). The strategy is premised on the need to unlock downstream and side-stream values and provide the initial analysis of opportunities and challenges in downstream beneficiation as well as suggesting instruments that must be investigated and implemented to enhance value addition. The total net beneficiation of minerals is maximised by a combination of downstream and side-stream linkages.

The Government’s strategy focuses on:

- Creating comparative and competitive advantage for the country;
- Increasing value addition per capita; and
- Benchmarking against economically progressive countries.

\(^{20}\) A resource-based economy is a system in which all goods and services are available without the use of money, credits, barter or any other system of debt or servitude. All resources become the common heritage of all of the inhabitants, not just a select few. The premise upon which this system is based is that the Earth is abundant with plentiful resources; our practice of rationing resources through monetary methods is irrelevant and counterproductive to our survival.

\(^{21}\) A knowledge-based economy has four pillars, namely (i) innovation (ii) education (iii) economic and institutional regime (iv) information and infrastructure. Economies that are directly based on the production; distribution and use of knowledge and information. This is reflected in the trend in OECD economies towards growth in high-technology investments, high-technology industries, more highly-skilled labour and associated productivity gains.
The beneficiation strategy contains a framework, as shown in the figure above, within which South Africa can implement an orderly development of the country’s mineral value chains in order to leverage benefit from inherent comparative and competitive advantages. The strategy is intended to support national programmes such as the NIPF, which is consistent with the provisions for a sector-specific strategy and key action plans for downstream mineral beneficiation. The framework of the mineral beneficiation strategy is supported by four pillars, namely:

- The creation of regulatory incentives and enablers;
- The co-ordination of multi-stakeholder structures supporting various aspects of beneficiation;
- The utilisation of existing international agreements to overcome barriers to international markets; and
- The development of key action plans to target cross cutting factors that influence effective beneficiation.

**4.8.2 The key action plans for optimal value creation (beneficiation) of coal**

The South African government intends to implement the following key action plans to achieve the optimal value creation of coal:

- Policy support for clean and efficient use of coal in power generation can encourage the inclusion of existing advanced technologies for low emissions coal-fired electricity production, thereby providing secure and clean energy;
- Policy support for technology transfer, through mechanisms such as the Clean Development Mechanism (CDM), bilateral and multilateral funds such as the Global Environment Facility and the Prototype Carbon Fund;
- Investment into research, development and demonstration of new technologies such as clean coal technologies and carbon capture and storage. These could provide a very significant opportunity for major reductions in emissions;
• Investment in Research and Development (R&D) to find innovative means for beneficiation (recycling) of gasses emitted in the generation electricity; and

• Investment in technology to optimise use of coal bed methane (CBM).

4.8.3 Critical areas of intervention for implementation of the beneficiation strategy

The synopsis below highlights critical areas of intervention that the South African government intends to effect in order to ensure the seamless and effective implementation of the beneficiation of South Africa’s mineral commodities. This includes, but is not limited to:

• Regulatory incentives: The beneficiation off-sets against the Mining Charter’s requirement for 26% Black Economic Empowerment (BEE) ownership is a major milestone towards creating an enabling environment for value addition. There is scope for the establishment of favourable trading conditions, such as use of export/import levies on ore, to improve local access to the required minerals for local consumption as well as the use of existing versus new incentives. The Broad-Based Socio-Economic Empowerment Charter for the Mining Industry (i.e. Mining Charter), encourages both downstream and side stream value addition through the beneficiation element: This element makes provision for mining companies to offset up to 11% of their ownership requirements against the value of their levels of beneficiation;

• Investment in R&D initiatives, which will be aimed at unlocking the intrinsic value of South Africa’s minerals through finding new products and/or technologies in support of local beneficiation;

• Commitment by producers of minerals to support local beneficiation in terms of availing access to minerals in South Africa readily;

• Alignment of existing initiatives on skills development to required proficiency for optimising beneficiation;

• Ensuring security of energy supply through investment in new generation capacity, implementing energy efficiency measures and pursuing co-generation potential, where possible; and

• Expanding South Africa’s economic policy framework to ensure international market access to locally beneficiated goods.

4.9 Sector Specific Policies and Incentives – Agro-processing

South Africa has a dual agricultural economy, with both well-developed commercial farming and more subsistence-based production in the deep rural areas. Covering 1.2-million square kilometres of land, South Africa is one-eighth the size of the United States and has seven climatic regions, from Mediterranean to subtropical to semi-desert. This biodiversity, together with a coastline 3 000 kilometres long and served by eight commercial ports, favours the cultivation of a highly diverse range of marine and agricultural products, from deciduous, citrus and subtropical fruit to grain, wool, cut flowers, livestock and game. While 12% of South Africa’s land can be used for crop production, only 22% of this is high-potential arable land. The greatest limitation is the availability of water, with uneven and unreliable rainfall. Around 1.3-million hectares are under irrigation, and around 50% of South Africa’s accessible water is used for agriculture.

Agricultural activities range from intensive crop production and mixed farming in winter rainfall and high summer rainfall areas to cattle ranching in the bushveld and sheep farming in the arid regions. Maize is
most widely grown, followed by wheat, sugar cane and sunflowers. South Africa is not only self-sufficient in virtually all major agricultural products, but is also a net food exporter. Important export groups are wine, citrus, maize, grapes, sugar, apples, pears and quinces. Important export products include agro processing products, such as under natured ethyl alcohol and hides and skins.

Agriculture as a percentage of GDP has decreased over past four decades, currently contributing around 2%. This implies that the economy is maturing, moving towards the secondary and tertiary sectors. However, farming remains vitally important to the economy with 638 000 people formally employed (Statistics SA, 2012 Q2) – although it’s estimated that around 8,5-million people are directly or indirectly dependent on agriculture for their employment and income. The sector’s significance is largely because of its potential to create jobs, and is a key focus of the New Growth Path, a plan by the government to create 5-million new jobs by 2020. Plans include programmes to promote commercially oriented small-scale farming and food processing. Government support is also available to smallholders on land acquired through land reform.

The Department of Agriculture, Forestry and Fisheries (DAFF) is the custodian of South Africa’s agriculture policies and strategies.

4.9.1 Department of Agriculture, Forestry and Fisheries (DAFF Strategic Plan)

The DAFF Strategic Plan (2012/13-2016/17) has been compiled within the guidelines provided by the National Treasury and the Department of Public Service and Administration (DPSA).

The service delivery targets for the Medium Term Expenditure Framework (MTEF) period are guided by Government’s broad national challenges in terms of the Medium Term Strategic Framework (MTSF) priorities. Government identified twelve key outcomes to be implemented through inter-governmental cooperation over the MTEF period. The DAFF contributes directly into three of the 12 outcomes to achieve related outputs. These three key outcomes are:

- **Outcome 4**: Decent employment through inclusive economic growth;
- **Outcome 7**: Vibrant, equitable and sustainable rural communities contributing towards food security for all; and
- **Outcome 10**: Protect and enhance our environmental assets and natural resources.

The Strategic Priorities of the DAFF Plan are to:

- Create employment by increasing the number of participants in the agricultural, forestry and fisheries sectors through support for smallholders and processors;
- Improve the food security initiative by coordinating production systems to increase the profitable production, handling and processing of food, fibre and timber products by all categories of producers;
- Improve the income and conditions of farm workers, foresters and fishers;
- Enhance exports by facilitating market access for agricultural, forestry and fisheries products; and
- Ensure the sustainable use of natural resources by means of promoting environmentally sustainable production systems and the efficient use of natural resources.
The Key policy developments of the DAFF Plan are as follows:

- The **Zero Hunger Programme** seeks to link subsistence producers and smallholder producers/producers to government institutions such as government schools (i.e. to supply the School Nutrition Programme), public hospitals and prisons, and in the medium term also be a conduit through which food produced by smallholders can be used to meet the nutritional needs of low-income individuals and households in communities at large. Its implementation is already being tested and refined through the collaboration of DAFF and the provincial departments of agriculture and by means of linking it to the Comprehensive Agricultural Support Programme (CASP);

- The **Strategic Plan for Smallholder Producers** is a broader initiative that seeks to improve support to smallholder producers and in doing so increase the number of smallholder producers. It will do this by means of better aligning—and where necessary adjusting—what is in effect a large number of distinct functions, e.g., extension, cooperatives development, marketing, mechanisation, financial services, spatial planning, etc. The plan also seeks to identify innovative means by which the environment can be made more conducive to smallholder development, for instance by promoting land rental markets, and by using land acquired via land redistribution;

- The **Aquaculture Programme** is presently being implemented by means of fish production projects around the country, in partnership with the Dti. The programme is guided by the National Aquaculture Strategic Framework. DAFF has established an Aquaculture Development Zone in the Eastern Cape, through a partnership with the East London Industrial Development Zone (ELIDZ). Two further identified zones are undergoing Environmental Impact Assessment (EIA) processes. DAFF has completed the establishment of an Aquaculture Demonstration Centre in partnership with Free State Agriculture and the Chinese government. To date, DAFF has facilitated the establishment of at least 10 fish farms;

- DAFF has initiated the elaboration of its **Agro-processing Strategic Framework**, covering the period 2012 to 2016. Agro-processing is one of the sectors identified in both the IPAPs and NGP as potentially capable of creating jobs on a large scale. This is validated by the fact that agro-processing—and in particular food processing—is one of the sectors with the highest employment multipliers in the economy. The NGP forecasts the creation of 145 000 jobs in agro-processing by 2020. The central challenge that remains is how the potential that has been identified can be realised in practice; and

- DAFF has initiated a process of elevating **Spatial Analysis of Agriculture, Forestry and Fisheries** as a key planning tool for both DAFF and the provincial departments of agriculture. The purpose of the spatial analysis is to help identify high-impact interventions at a national, provincial and local level, further guiding both the conceptualisation and implementation of initiatives such as Zero Hunger and the Strategic Plan for Smallholder Producers. The initiative is in partnership with the Department of Rural Development and Land Reform (DRDLR), the Department of Science and Technology (DST), and the CSIR.
4.9.2 Market and trade policies

One of the major policies impacting South Africa’s agriculture, forestry and fisheries sectors has been the progressive deregulation of markets since the 1990s. This market deregulation process went hand-in-hand with another process, namely foreign trade liberalisation, which had already started prior to the new democratic dispensation as South Africa sought to fulfil its commitments under the World Trade Organisation’s Agreement on Agriculture of 1994. Furthermore, at around the same time, a wide range of other instruments used to subsidise agricultural production among commercial farmers, such as fixed improvements, conservation works, fencing and emergency relief, were removed.

Openness to trade has long been seen as an important element of sound economic policy towards economic growth and the alleviation of poverty. The question, however, is how strong a force trade liberalisation is in economic growth, and how economic growth transmits such benefits to the poor. While there seems to be consensus amongst growth and development economists that economic growth will, in general, lead to increases in income, there is growing evidence that suggests that high levels of inequality hamper the pace at which an economy can benefit from liberalisation, which means that growth on its own cannot be an adequate antidote to inequality.

While the impact of trade liberalisation on food security in South Africa remains uncertain, increasing trade remains a priority, and there are several challenges that the industry faces to fully realise its export potential. One challenge, for example, is the poor state of market intelligence on international agricultural markets; another is the absence of effective trade promotion strategies; and a third is the persistence of high tariff barriers to agricultural imports among some of South Africa’s major trading partners.

The composition and direction of trade is not optimal. Issues to consider include:

- South Africa’s positioning in Africa (i.e. Africa requires special interventions, for example, to mitigate trade risks, standardise Non-Tariff Measures where policy space allows, etc.) given the opportunities that exist, but also the lack of capacity on trade issues in Africa; and
- Redirecting trade to new and possibly more sustainable markets, e.g. Asia. Innovative interventions are required to capitalize on the opportunities that exist. In this regard PPP are vitally important, as well as closer cooperation between relevant government departments and parastatals.

It is imperative that more emphasis is put on the potential impact of bilateral trade agreements since it has implications for policy space and South Africa’s future trade direction.

4.9.3 Land reform policy

The three major elements of the land reform programme are:

- **Redistribution**, through which citizens can apply for assistance to acquire or access land for farming and/or settlement;
- **Restitution**, involving the restoration of land, or cash compensation, to victims of forced removals, and operating under the Restitution of Land Rights Act (Act No. 22 of 1994); and
- **Tenure reform**, aimed at improving tenure security of all South Africans and to accommodate diverse forms of land tenure, including types of communal tenure.
Land reform has enabled the broadening of access to land and participation in agriculture and forestry. By means of these policy adjustments, redistribution projects have become more successful in terms of production. However, as the amount of support per individual has risen, the number of different individuals benefitting has declined to the point where redistribution is scarcely able to address the land needs of smallholders who might like to ‘graduate’ out of the former homelands.

4.9.4 Agriculture Support Programmes

Comprehensive Agricultural Support programme (CASP) was established in 2004. The function of this programme is to support new farmers. CASP is relevant in the context of the development of the agriculture and forestry sectors as it could be applied to emerging farmers and forestry growers now that forestry and agriculture have been combined into a single department.

Comprehensive Rural Development Programme (CRDP) - Following the 2009 elections, the government recommitted itself to intensifying its rural development efforts through the establishment of a new Department of Rural Development and Land Reform (DRDLR). DRDLR has been given the mandate to develop a Comprehensive Rural Development Programme (CRDP) throughout the country. The intention is to use this programme to promote rural development on the one hand, and land and agrarian reform on the other, in a manner that is mutually supportive.

The CRDP is aimed at being an effective response against poverty and food insecurity by maximizing the use and management of natural resources to create vibrant, equitable and sustainable rural communities. The programme must improve the standard of living and welfare, rectify past injustices through rights-based interventions, and address skewed patterns of distribution and ownership of wealth and assets. The strategic objective of the CRDP is therefore to facilitate integrated development and social cohesion through participatory approaches in partnership with all sectors of society.

Livelihoods Development Support Programme - The Farmer Settlement Programme (FSP), which was responsible for post-settlement agricultural support to land reform beneficiaries, had no dedicated budget until 2004. The FSP, now renamed the Livelihoods Development Support Programme, has limited reach and impact, rather than being a mechanism for restructuring the economic and market environment for smallholder and subsistence farmers (National Treasury, 2007; Hall, 2009).

4.10 Sector Specific Policies and Incentives – Logistics

4.10.1 National Freight Logistic Strategy (NFLS)

According to the National Freight Logistics Strategy (NFLS) a major change occurred in the industry from rail to road. Due to the fact that rail was unable to fulfil the necessary logistics, it caused a shift from rail to road based logistics. Keeping this in mind implied that the necessary action and response to the key rail corridors would need to be at a level that it could provide an effective alternative to the current road logistics approach.

According to the Strategy, the approach needs to accommodate and optimise the freight logistics and systems on a tactical and operational level. The market has moved from a supply orientated to customer and demand market. This caused a magnitude of required transformations to the sub sectors.
There are critical links between the major production centres, areas of entrance and exit (Ports of Entry) which needs to be considered. These key corridors can also provide a more cost effective and more efficient line haul capacity in the new transformed regulatory and institutional environment. However, certain critical decisions need to be made to enable tactical short term objectives and long term strategic goals.

The Strategy points the following areas out, which are areas that cannot be delayed in the upgrade processes:

- Capacity upgrade of the Durban corridor and port, or switch the corridor import and export traffic to another corridor and port;
- The enhancement of multi modal concepts and solutions and inter modal facilities especially for the Durban and Cape Town corridors;
- Create greater hinterland connectivity and efficiencies for Coega
- The delivery of greater rail capacity at a more cost effective and affordable rates for bulk from Sishen to Port Elizabeth/ Coega; and
- Build greater operational capacity for the Maputo corridor.

The NFLS has further identified the following corridors as strategically important:

- Cape Town - Johannesburg;
- Cape Town – East London;
- Cape Town – Windhoek;
- Richards Bay – Ermelo;
- Walvis Bay – Maputo;
- Durban – Richards Bay;
- Johannesburg – Durban;
- Johannesburg – Beitbridge;
- Johannesburg – East London;
- Cape Town – Port Elisabeth - London – Durban – Maputo (Future coastal corridor); and
- Johannesburg – Maputo.

4.10.2 National Transport Master Plan (NATMAP 2050)

The South African Cabinet has initiated a project through the Department of Transport (DOT) to develop a National Transport Master Plan (NATMAP) that will develop and establish a multimodal, transportation system to meet South Africa’s transport needs as far in the future as 2050. The plan aims to solve SA’s transport issues by 2050. It was originally called the Integrated Transport Plan (ITP) and was first discussed in a Cabinet meeting in 2005.

Certain principles underpin the objectives and vision of the master plan. These principles need to be prioritised as implementable with measurable outcomes such as trade facilitation and co-ordination, and
should create an environment which is favourable for the movement of goods and services. These principles are:

- Freight drives the economy;
- Freight is one of the most economic enablers; and
- Freight enables the accessibility to international markets.

Key issues identified from the Gauteng – Maputo Corridor include the following:

- There are few ship calls and there is an absence of scheduled container service at the port of Maputo which limits freight growth;
- The draught limitations are restricting the possible use of larger vessels in the port; and
- The poor condition of the cross border rail infrastructure and almost no rail traffic to the port of Maputo is limiting the use of rail on the Maputo corridor.

The infrastructure in the freight logistics sector proves to be insufficient to sustain a world class logistics system. Apart from this, road, assets and infrastructure in ports and rail have attracted very low levels of investment and the conditions of these infrastructures remain a contributor to inefficiencies in freight logistics.

The quality issue in the resource base contributes to a lack in integration between the rail and road transport modes. Potential integration benefits are therefore lost through reductions in reliability and an increase in cost.

4.11 Other policy initiatives

4.11.1 National Waste Management Strategy

The objectives of the National Environmental Management Waste Act, 2008 include: minimising the consumption of natural resources, avoiding and minimising the generation of waste and reducing, re-using, recycling and recovering of waste, promoting and ensuring the effective delivery of waste services. It is stated in the National Waste Management Strategy that the most favoured option in the hierarchy of waste management requires firstly that the:

- Generation of waste is reduced;
- Waste that cannot be reduced is reused or recycled; and
- Waste that cannot be reused or recycled should be treated or the energy should be recovered before the waste is disposed of through land filling (the landfill option is the least favourable option).

The utilisation of waste as an input into a Plasma Waste Gasification Plant is supportive of the national waste management drive of the Department of Environmental Affairs. Such a plant could be located in the Musina SEZ.
4.11.2 Green Economy Strategy

Government is in the process of developing a Green Economy Strategy for South Africa. The term green economy typically refers to two anticipated and inter-linked developmental outcomes for the South African economy:

- Growing economic activity (which leads to investment, jobs and competitiveness) in the green industry sector; and
- A shift in the economy as a whole towards cleaner industries and sectors with a low environmental impact compared to its socio-economic impact.

Key issues driving a national green economy include:

- Substantial growth in investment necessary to achieve climate change mitigation and adaptation;
- Increasing recognition that clean technology development offers significant business opportunities and gains;
- A growing need to develop/elaborate the economic case for environmental management and sustainable development;
- Realisation that functioning ecosystems underpin all economic and social activity and that ecosystem failure will seriously compromise our ability to address social and economic priorities even in a short term; and
- Natural resources are national economic assets and that most economies, particularly the South African economy depends heavily on energy and mineral resources, biodiversity, agriculture, forestry, fishing and tourism.

In defining the South African green economy, government has undertaken to develop a Green Economy Plan, which will incorporate the following:

- A supportive regulatory framework to develop green industries and sector action plans;
- Market instruments to incentivise the use and production of cleaner and low carbon products without having a huge negative impact on production costs;
- Greater localisation of manufacturing of materials in, for example, solar, nuclear, wind, hydro power and electronics;
- Review import duties structure to ensure highest level of local component manufacturing whilst maintaining competitive pricing; and
- Integrate the different work streams that occur at different sites and scale-up existing initiatives.

4.11.3 Tripartite Free Trade Area (COMESA, EAC and SADC)

Plans are in progress to establish an integrated market covering 26 countries in eastern and southern Africa. Commonly known as the Tripartite Free Trade Area, the integrated market comprises of the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC). Negotiations are expected to be completed by 2014, with the launch of the Tripartite Free Trade Area (FTA) planned for 2016.
Once operational, a single FTA is expected to boost regional integration through improved investment flows and enhanced competition, improving southern and eastern Africa’s attractiveness as lucrative regions in Africa. The location of the Nkomazi and Musina SEZs on the borders between South Africa and Mozambique and South Africa and Zimbabwe respectively will result in it being a key factor in the FTA.

The general objectives of the Tripartite Free Trade Area include:

- To promote the rapid social and economic development of the region through job and wealth creation and the elimination of poverty, hunger and disease through building skills, innovativeness and hard and soft infrastructure; and through improving the location of factors for sustainable generation of national, regional and foreign investment and of trade opportunities;
- To create a large single market with free movement of goods and services and business persons, and eventually to establish a customs union;
- To resolve the challenges of multiple memberships and expedite the regional and continental integration processes;
- To build a strong people-based Tripartite Free Trade Area; and
- To promote close cooperation in all sectors of economic and social activity among the Tripartite Member States.

In order to fulfil and realize the objectives set out in Article 3 of this Agreement, Tripartite Member States shall:

- Eliminate all tariffs and non-tariff barriers to trade in goods;
- Liberalise trade in services and facilitate cross-border investment and movement of business persons;
- Harmonise customs procedures and trade facilitation measures;
- Enhance co-operation in infrastructure development;
- Establish and promote cooperation in all trade-related areas among Tripartite Member States;
- Establish and maintain an institutional framework for implementation and administration of the Tripartite Free Trade Area and eventually a Customs Union;
- Build competitiveness at the regional, industry and enterprise level in order to promote beneficial utilisation of regional and global market and investment opportunities and beneficial participation in globalisation;
- Adopt and implement policies in all sectors of economic and social life that promote and consolidate an equitable society and social justice; and
- Undertake cooperation in other areas to advance the objectives of this Agreement.

From this agreement, participating countries agree to undertake and initiate trade facilitation programs. These programs need to achieve the reduction and streamlining of the administrative processes involved thereby ensuring that common standard of trade and trade procedures within these trade areas should suit the conditions among the Tripartite Member States. Those procedures that facilitate international trade and logistics must be reviewed to ensure a simplified trade between the partners.
The promotion of one stop border posts was identified as a key enabler and therefore the possibility to integrate the SEZ concepts of a Bonded Warehouse and logistics trade ports with the Border Posts.

4.11.4 Agricultural Broad-Based Black Economic Empowerment (AgriBEE)

As the name implies, Agricultural Broad-Based Black Economic Empowerment (or ‘Agri BEE’), encapsulates the agricultural sector’s approach to Broad-Based Black Economic Empowerment (BBBEE). Agri BEE seeks to complement other initiatives such as farmer development support and land reform, by incentivising the sector to integrate black people in different ways (e.g., equity owners, managers, etc.) and at different points in the agricultural value chain, broadly speaking. The Agri BEE Transformation Charter was gazetted in March 2008, and the Agri BEE Charter council was inaugurated in December 2008. The mandate of the Council is, inter alia, to align the Agri BEE Charter with the Codes of Good Practise in terms of Section 9 of the Broad-Based Black Economic Empowerment Act, Act No. 53 of 2003.

While the rationale for Agri BEE is clear enough, to date it appears to have had little impact because it is not enforceable, i.e. the charter is not legally binding and only indicative scorecards are in place. DAFF is therefore in the process of consulting Dti in order to have Sector Codes published in terms of Section 9 of the Act, which will allow DAFF to apply binding Sector Codes.

4.11.5 Competition Act

The new South African competition law forms an important part of reforms designed to both address the country’s historical economic structure and encourage broad-based economic growth. Addressing the trend towards increasing concentration in agriculture, forestry and fisheries requires robust application of competition policy, although this is unlikely to be sufficient on its own. The objectives of such an intervention must encourage free and fair competition, prevent the concentration of economic power and thereby promote ‘balanced development’ within agriculture, forestry and fisheries.

4.11.6 Manufacturing Competitiveness Enhancement Programme (MCEP)

The Manufacturing Competitiveness Enhancement Programme will provide production and distressed funding support to boost productivity and competitiveness, raise investment and create jobs. Businesses that invest in new machinery, plant and equipment, as well as in product development, process redesign, standards accreditation, and feasibility and marketing studies, will qualify for the incentive.

The programme is aimed at labour-intensive sectors already covered by incentives – including the clothing, textiles, leather and footwear and automotive sectors. Incentives will target improvements to business conditions and productivity through skills development, business incubation, reducing red tape, technology transfers and adaptation, and providing access to markets and logistics.
4.12 Technology Specific Policies and Incentives

Funds and Grants Available to the Agricultural and Agro-processing Industry include the following:

4.12.1 SEDA Technology Programme (STP)

SEDA Technology Programme (STP) is a division of SEDA (Small Enterprise Development Agency) focusing on technology business incubation, quality and standards and technology transfer services and support to small enterprises.

STP seeks to stimulate economic growth and development through facilitating technological innovation increasing the accessibility to, and utilisation of technology and technical support for small enterprises, whilst at the same time improving the sustainability and international competitiveness of small enterprises supported through the programme. STP, as a programme of the Dti, is therefore responsible for the provision of both financial and non-financial technology transfer, business incubation and quality support services for small enterprise.

4.12.2 Technology Transfer Unit (TTU)

The Technology Transfer Unit (TTU) of STP has two main objectives, namely:

- To provide technology transfer services to small enterprises; and
- To provide specific technology support to women-owned enterprises.

The latter objective focuses on the provision of technology transfer services and support to women-owned enterprises (>50% woman ownership), while both objectives are aimed at providing funding for small enterprises to acquire the necessary technology and technical support for effective technology transfer transactions. STP offers financial assistance in the form of a non-repayable grant up to a maximum of R600k per project.

4.12.3 Small, Micro- and Medium-sized Enterprises (SMME) Development Incentives

- **Black Business Supplier Development Programme (BBSDP)** provides a grant to a maximum of R1 000 000 (R800 000 maximum for tools, machinery and equipment and R200 000 maximum for eligible enterprises to improve their corporate governance, management, marketing, productivity and use of modern technology);

- **The Co-operative Incentive Scheme (CIS)** is a 90:10 matching cash grant for registered primary co-operatives (a primary co-operative consists of five or more members who are historically disadvantaged individuals). The CIS is an incentive for co-operative enterprises in the emerging economy to acquire competitive business development services, and the maximum grant that can be offered to one co-operative entity under the scheme is R350 000;

- **Incubation Support Programme (ISP)** The Dti initiated the ISP as a grant to develop incubators into successful enterprises with the potential to revitalise communities and strengthen local and national economies. The ISP encourages partnerships in which big business assists SMMEs with skills transfer, enterprise development, supplier development and marketing opportunities; and
• **The Technology and Human Resources for Industry Programme (THRIP)** is a partnership programme funded by the Dti and managed by the National Research Foundation (NRF). On a cost-sharing basis with industry, THRIP supports science, engineering and technology research collaborations focused on addressing the technology needs of participating firms and encouraging the development and mobility of research personnel and students among participating organisations.

### 4.12.4 Industrial Development-Related Incentives

These grants related to Industrial development within various industries with a focus on Manufacturing. The following grants are applicable to this industry:

• **Manufacturing Competitiveness Enhancement Programme (MCEP)**, which consists of:
  - Industrial financing loan facilities managed by the IDC; and
  - Production incentive grants administered by the Dti.

The Production Incentive is the largest component of the MCEP (80% by Rand value). Calculation of MCEP credits for the Production Incentive for each enterprise will be up to 25% of the manufacturing value added.

• **Seda Technology Programme (STP)** provides a range of services that assist small enterprises, particularly enterprises in the 2nd economy, to access and acquire technology. STP offers financial assistance in the form of a non-repayable grant up to a maximum of R600,000 per project;

• **Support Programme for Industrial Innovation (SPII)** is designed to promote technology development in South Africa's industry, through the provision of financial assistance for the development of Innovative products. SPII is a R2 million maximum grant. The levy-based grant is based on a percentage of sales over a fixed number of years. SPII contribution is at least 20% of total project costs;
  - Sector-Specific Assistance Scheme (SSAS) is a reimbursable 80:20 cost-sharing grant offering financial support to export councils, joint action groups and industry associations. Maximum allocation per project is R1.5 million;
  - Foreign Investment Grant (FIG) is linked to a successful MIP application. It compensates foreign investors for the costs incurred by moving machinery and equipment from abroad to South Africa. An entity can only qualify once for the grant. The grant will be the lower of:
    - 15% of the cost of qualifying imported machinery and equipment; or
    - The actual transport costs of relocating these machinery and equipment;

• **Enterprise Investment Programme (EIP)** is designed to stimulate investment into the manufacturing and related services sectors as part of the government’s efforts to create further employment and ensure sustained growth within the industry. The programme aims to encourage further investment into the industry by providing a grant of up to 30% towards qualifying investment below R200m in plant, machinery and equipment and commercial vehicles required for establishing new and expansions of existing operations;
• **Textile Competitiveness Improvement Programme (CTCIP)** - The main objective of this programme is to assist industry in upgrading processes, products and people to re-position it so it competes effectively against other low cost producing countries. The incentive programme provides investment support to South African registered entities by offering a cost-sharing grant. Grant support for each approved partnership will be limited to a cumulative ceiling of R25-million over the period of the programme implementation.

### 4.12.5 Trade, Export and Investment Incentives

- **Export Marketing and Investment Assistance (EMIA):** This scheme bears costs for space rental, the construction and maintenance of stands.

### 4.12.6 SA Aquaculture Incentives

The Dti has launched a R800-million incentive programme for marine and freshwater fishing projects aimed at growing the country’s aquaculture industry.

### 4.12.7 Co-operatives in South Africa

In the Co-operatives Development Policy of 2004, government acknowledges the existence, relevance and value of informal, traditional co-operative-type organisations (stokvels, etc.). The policy highlights the importance of integrating them into the formal economy. One of the key benefits of the formalisation is access to state and private sector support (financial or non-financial) toward growing institutional capacity and sustainability of informal co-operative entities. Financial provisions made available to co-operatives through the Dti and its agencies include:

- Start-up grants, financing up to 90% of co-operative start-up costs (not exceeding R300,000);
- A special projects fund that is available for projects in excess of R300,000 subject to strict criteria;
- Funding to assist co-operatives with compliances, training and administration subject to a sound business plan;
- One of the agencies with which the Dti has partnered is the Micro Agricultural Finance Institution of South Africa (MAFISA) which drives and facilitates the development of financial services to develop small business in the agricultural sector; and
- Land Bank which supports the development for co-operatives in the agricultural sector.

In South Africa, the following non-financial support is available for co-operative:

- **Umsobomvu Trust** – provides business development services in the form of training and linkages to markets for new and existing co-operative enterprises;
- **COPAC** – the Co-Operative and Policy Alternative Centre provides grass roots approaches to supporting and promoting self-sustaining enterprises. It provides training, advocacy and research to support and inform the co-operative movement;
- **SEDA** – the Small Enterprise Development Agency provides support by creating and improving the regulatory environment to foster entrepreneurship, works towards expanding market opportunities for small enterprises as well as training for these enterprises;
Department of Agriculture – the DoA also assists co-ops with registration and training, they also created a database called Codas which profiles co-operatives;

Department of Housing – provides non-financial support through social housing foundations as well as technical support and training funded by donor agencies;

Department of Social Development – provides training through the sustainable livelihoods programme;

Department of Public Services and Administration – trains co-operative members as well as Community Development Workers to enable them to offer support to co-operatives in their communities;

Department of Public Works – provides support to co-operatives through the EPWP programmes; and

National Treasury – developed legislation to assist co-operatives, i.e. the Co-operative Banks Act of 2007.

4.13 Special Economic Zones (SEZs)

Special Economic Zones (SEZs) are considered to be critical policy tools in support of long-term industrial and economic development. Within an SEZ, specific environments can be created to encourage foreign and domestic investment. The location of the current proposed and existing SEZs speaks to all the policy frameworks and goals as outlined above, and uses the concept of economic space to bring various supportive components together to ensure competitive advantage for certain manufactured goods. Amendments to the IDZ legislation are under way, to broaden the scope to include other forms of SEZ, which will strengthen Government’s ability to deploy specific incentive tools for all SEZs, and these are expected to be finalised in approximately the second quarter of 2014, with roll out of the Jewellery Manufacturing Precinct of OR Tambo and Saldanha Bay, beginning in the third or fourth quarter 2014.

SEZs will be required to focus on the manufacture of value added goods. As each SEZ is designated, it will be required to work along the value and supply chains to form strong linkages to ensure effective and competitive production. It is envisaged that the designation and development of SEZs will provide a basis for such areas to support implementation of IPAP, regional industrial development strategies and the NDP. The SEZs are expected to contribute towards strengthening South Africa’s terms of trade through the export of value-added commodities, the creation of stronger value chains and provision of much-needed jobs in previously disadvantaged regions. Much will however, depend on the kind of packages made available to investors and the extent to which they will offset, for particular industries, any exogenous disadvantages experienced in locating in the SEZ.
4.14 Regional Policies and Programmes

The proposed SEZ has both an international and local focus when it comes to addressing markets and attracting investors. It is therefore prudent to also be cognisant of policies that transcend South Africa’s borders.

4.14.1 NEPAD and CAADP

South Africa as a member of the African Union subscribes to its programmes, the key one being the New Partnership for Africa’s Development (NEPAD) and its Comprehensive Africa Agricultural Development Programme (CAADP). It is also a signatory of the Maputo Declaration, which requires countries to commit at least 10% of their budgets to agriculture. Engagements with the NEPAD Secretariat are underway to design the process according to which South Africa will implement CAADP.

4.14.2 SADC Trade Protocol

In August 1996 a new political and economic environment emerged within southern Africa when the SADC Protocol on Trade – also known as the Maseru Protocol – was adopted. The aim of the Protocol on Trade is to liberalise 85% of intra-SADC trade, paving the way for the SADC Free Trade Area (FTA). The FTA was launched in August 2008. Under the FTA, member states liberalise trade through removing tariffs and non-tariff barriers. South Africa has fully implemented the Trade Protocol. Currently 99% of imports from SADC into the South African market are free of customs duties.

Other SADC protocols that are in place include:

- SADC protocol on Forestry;
- SADC protocol on Fisheries;
- SADC Fire Management Action Plan;
- Revised Protocol on Shared Watercourse Systems;
- SADC Sugar Protocol;
- SADC Protocol on Inland Fisheries;
- Draft Protocol on Management of Farm Animal Genetic Resources;
- Seed Security Network;
- SADC Plant Genetic Resources Centre (SPGRC) Long Term Sustainability Strategy;
- SADC Programme on Conservation and Sustainable Use of Plant and Genetic Resources for Food and Agriculture;
- Livestock Information Management System (LIMS);
- Regional Plan for Avian Influenza Contingencies;
- Harmonisation of sanitary and phytosanitary requirements; and
- Conservation Agriculture Regional Working Group (CARWG).
4.14.3 The Southern African Customs Union (SACU)

SACU consists of Botswana, Lesotho, Namibia, South Africa and Swaziland and was established in 1910, with its primary aim being to promote economic development among its members through regional coordination of trade. SACU has successfully negotiated trade agreements with the European Union (EU) and SADC, among others. Since all members of SACU are also members of SADC, questions remain about the future of SACU, given SADC’s long-term targets to become a Customs Union.

4.15 Policies of the Limpopo Province

The Limpopo Provincial Government has initiated a number of key initiatives in support and advancement of developmental growth in the Province, which are relevant for the SEZ project

4.15.1 Draft Limpopo Green Economy Plan: 2011

The Draft Limpopo Green Economy Plan is aimed at promoting sustainable local production and consumption, efficient use of energy and water and protection of natural and created resources. It proposes socially and environmentally sustainable solutions to economic exclusion and resource degradation. The Draft Plan, which aims to implement minimization of waste, air pollution and degradation of the environment as a whole is directly relevant to the SEZ.

The Draft Economy Plan places emphasis on healthy living conditions for the people of Limpopo and anticipates that the green economy in Limpopo will achieve coupled benefits for the economy and the environment. The Draft Plan encompasses long-term industrial development goals, which will address issues such as energy security in relation to renewable energy, water use, waste management and green buildings in the Province.

Ecological economy, low carbon economy and circular economy are some of the drives that are mentioned in the Draft Plan, which also provides that waste management should regard waste, not as simply being disposable but as a renewable energy resource that can be converted into energy while also adding the benefit of creating green jobs.

While the Draft Plan indicates that the Province is looking into the potential of green waste management in relation to businesses the concept of green waste management, as it may pertain in the Limpopo context, is not explained in detail with the Draft Plan mentioning, only, that waste management should be environmentally sustainable. A Plasma Waste Gasification Plant can provide a means to achieving green waste management in the Limpopo Province.

The goals of the Draft Limpopo Green Economy Plan are:

- Short Term (to 2015):
  - Generate Jobs; and
  - Improve Environmental Quality;
- Medium Term (2015-2020):
  - Create Enabling Conditions for Green Growth; and
  - Change Behavioural and Production Patterns;
Musina SEZ License Application

Pre-Feasibility Study for the Musina SEZ, Limpopo Province

- Long-Term (2020-2050):
  - Build a New Economic/Environmental Paradigm for Limpopo.

The following key focus areas of a SEZ in Musina would be in support of the above:

- Sustainable Production and Consumption;
- Water Management;
- Sustainable Waste Management Practices;
- Clean Energy and Energy Efficiency;
- Resource Conservation and Management;
- Agriculture, Food Production and Forestry;
- Green buildings and the built environment;
- Sustainable Transport and Infrastructure;
- Green Municipalities; and
- Cross-cutting.

4.15.2 Limpopo Provincial Growth and Development Strategy, 2004/16

The Limpopo Province adopted a Provincial Growth and Development Strategy (PGDS) which is a culmination of various discussions with stakeholders from all sectors towards realising the dream of sustainable and integrated development that seeks to promote economic growth and development, improve the quality of life of its citizen; raise the institutional efficiency of government and attain regional integration and enhance innovation.

The PGDS is underpinned by the Reconstruction and Development Programme, the National Spatial Development Plan (NSDP), and all provincial documents that have a bearing on growth and development in Limpopo. The Province adopted five development objectives of which the performance indicators correspond to those of the Millennium Development Goals. These objectives are to:

- Improve the quality of life of the population of Limpopo;
- Grow the economy of the Province, sustainable job creation, innovation and competitiveness;
- Improve the institutional efficiency and effectiveness of Government;
- Address priorities that cut across the three objectives above, such as BEE;
- Address HIV/AIDS-TB, poverty reduction, issues of land and environment; and
- Attain regional integration.

The PGDS is based on taking advantage of the Province’s competitive conditions in mining, agriculture and tourism to turn the economy of the Province around. The industrial value chain becomes a catalyst towards building local economies in those competitive sectors. This approach forms the basis of ensuring that the resources of the Province are focussed towards the greatest impact as well as the basis for meaningful local
economic development and economic growth towards bridging the divide between the first and second economy.

The PGDS provides a vision for development that reflects the development priorities in terms of social needs and competitive economic growth potential of the Province, but is also consistent with national development imperatives. This commitment is based on a strategy of seven development industrial clusters following the value-chain approach, as a vehicle to create employment opportunities; to raise the international competitiveness and investment rating of the Province; to combine public and private sector contributions to development and to align the interventions of various public development institutions for greater impact. These seven clusters were carefully selected based on the premise that agriculture, mining, tourism and manufacturing are the main drivers of the Limpopo Province economy.

4.15.3 Limpopo Employment Growth and Development Plan, 2009/16

The Limpopo Employment Growth and Development Plan 2009/16 (LEGDP) provides a framework for provincial government, municipalities, the private sector and all organs of civil society to contribute together and to benefit, in pursuit of the strategic priorities encapsulated in the Medium Term Strategic Framework (MTSF) of the Province and the country as a whole. The priorities of the MTSF are:

- Creation of decent work opportunities
- Education and skills development
- Health care
- Safety and Security
- Rural development and land reform

The LEGDP seeks to ensure that government resources, efforts and energy are channelled towards creating an enabling environment, offering opportunities to the people of the Limpopo Province to be a part of creating an economy, which is able to improve their quality of life. This is hoped to be achieved through appropriate support to provincial growth points towards the creation of decent jobs and sustainable livelihoods through beneficiation of Limpopo’s vast natural resources; the erection of reliable health care infrastructure; the building of social infrastructure of an acceptable standard; the provision of social development; comprehensive rural development; food security; a healthy society; a vibrant green economy and sustainable land reform.

The LEGDP states that it is the intention of the government to develop an integrated master plan for industrial development, which will marshal the design of strategic programmes and targets that are aimed at directing strategies and action plans for aligned and effective policy intervention. The notion of identifying challenges and overcoming the existing impediments to growth is fundamental to the LEGDP, to ensure that growth rates are sustainable, non-inflationary and effective in alleviating poverty and unemployment.

The LEDGP emphasises the Province’s aim to embark on a road mapping process for developing the Limpopo Industrial Sector Key Action Plan (LISKAP), which is led by the Provincial Economic Cluster and Economic Development Department. Sectors identified under the LISKAP are: Mining and Minerals Beneficiation Industries; Enterprise Development (SMME and Cooperative Development); Regional
Economic Development and Integration Programme; Public Infrastructure Investment Programme; Water Resource Development and Demand Management; Agriculture and Rural Development Programme; Healthcare Development Programme; Safety and Security; Environmental and Natural Resources Development Programme; and Green Economy and Creation of Jobs as well as Corporate Governance, ICT and Innovation Enabled Industries.

In terms of the LEDGP, a global transition to a low-carbon and sustainable economy can create large numbers of green jobs across many sectors of the economy, and indeed can become an engine of development for the Province.

### 4.15.4 LEGDP Implementation Action Plan 2010/11-2011/12

The LEGDP Implementation Action Plan 2010/11-2011/12 (IAP) was developed with the aim of setting the agenda for the development of a provincial economy able to improve the quality of life of its people. The IAP is a tool through which stakeholders are provided with the necessary framework to:

- Guide activities and programmes throughout the Province, whether these are implemented by government, private sector or civil society, to create an enabling environment for addressing LEGDP Key Actions Programmes (KAPs) and to harness opportunities;
- Input into the LEGDP KAPs to address backlogs with regard to bottlenecks and obstacles faced by government, the private sector and civil society in addressing LEGDP objectives;
- Integrate planning activities by departments, municipalities, government agencies, private sector and civil society to ensure sustainable and integrated development;
- Assess challenges confronting key programme areas in addressing LEGDP anticipated outcomes (LEGDP key actions plan), by directing planning activities and outcomes; and
- Monitor and evaluate progress towards ensuring the appropriate utilisation of resources.

### 4.15.5 Industrial Development Fund

The LEDGP refers to the establishment of an Industrial Development Fund. The fund will target support of those municipalities, which are economically under developed. The LEDGP provides that the Fund will prioritise the provision of infrastructure and services that would ensure productive investment leading to the creation or maintenance of jobs; improve regional competitiveness, balance development in urban and rural areas and increase and improve employment.

In terms of the LEDGP, the Province lacks adequate environmental legislation to promote a sustainable economy. The LEDGP is looking into key strategic interventions, which will assist with the development of green jobs; the development of climate change strategies and that will attract investment into the Province.

### 4.15.6 Green Economy Plan

In terms of the LEDGP, the green economy is considered within the context of agriculture, manufacturing, construction, installation, maintenance as well as scientific and technical, administrative and service-related activities that contribute substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes activities that help to protect and restore ecosystems and biodiversity,
reduce energy, materials and water consumption through high-efficiency and avoidance strategies; de-carbonize the economy and minimize or altogether avoid the generation of all forms of waste and pollution.

The LEGDP indicates that the pattern of employment is changing, where new forms of employment are beginning to emerge in favour of greener, cleaner and more sustainable occupations. This has led to changing patterns of investment flows into areas from renewable energy generation up to energy efficiency projects at the household and industrial level.

In terms of the LEGDP, a global transition to a low-carbon and sustainable economy can create large numbers of green jobs across many sectors of the economy, and can become an engine of development for the Province. In light of the need to dramatically reduce humanity’s environmental footprint, the Limpopo Province is positioning itself for this new phenomenon.

4.15.7 Industrial Development Programme: Priority Growth Sectors

The changing international environment, which places pressure on all regional economies to liberalize trade and investment regimes, calls for a more creative industrial development plan to enhance the productive capability, capacity and efficiency of industrial sectors specifically the manufacturing sectors. This phenomenon calls upon industries to:

• Diversify export products and markets;
• Create a conducive business environment;
• Invest in the necessary physical infrastructure; and
• Develop industrial technology at the firm level in order to raise the technical capabilities and global competitiveness of domestic industrial firms.

Above all, it should recognize that it is firms that compete on domestic and international markets, and therefore the provincial industrial plan needs to fortify the competitive capabilities of industries. It is against this backdrop, that the provincial government developed an integrated Industrial development master plan that:

• Enables industries to be competitive, innovative and diversified into value-added products;
• Contributes significantly to the province GVA, balance of payments and can attract fixed direct investment;
• Generates higher labour incomes and raises the living standards of the general population, thereby contributing significantly to eradicating poverty;
• Produces goods encompassing increasingly higher value-added activities to complement its natural geographical advantages whilst balancing a more-labour absorption industrialization pathway; and
• Has an extensive linkage with the rest of the domestic economy.

The integrated master plan for industrial development will include a number of high impact sectoral portfolios and initiatives. Those initiatives will also marshal the design of a strategic program and set of targets aiming at directing strategies and action plans for aligned and effective policy intervention. Fundamental is the notion of identifying challenges and overcoming the existing impediments to growth,
ensuring that growth rates are sustainable, non-inflationary and effective in alleviating poverty and unemployment.

**Key Strategic Interventions:**

The industrial development emphasis to be pursued by the province is to move onto an industrialization trajectory that is responsive to:

- Intensification of Limpopo's industrialization process and movement towards a knowledge economy.
- Provision by domestic manufacturers of the capital goods that the growing economy needs and will continue to demand.
- Promotion of more labour-absorbing industrial sectors, with an emphasis on tradable labour-absorbing goods and services and economic linkages that catalyse employment creation.
- Promotion of a broader based industrialization path that is characterized by greater levels of participation of historically disadvantaged people, and marginalized regions in the mainstream of the industrial economy.

The province is to embark on a road mapping process of developing the Limpopo Industrial Sector Key Action Plan [LISKAP] with the primary aim of deepening and diversifying the provincial industrial base.

The LISKAP’s main objective is to identify interventions that will enable the province to revitalize both the natural-resource based and advanced manufacturing growth in the province with a focus on integrating SMMEs at the 2nd, 3rd, 4th and lower tiers into the regional, national, continental and global value chains of the selected sectors. Similarly this initiative is aligned to the NIPF. Sectors identified under LISKAP are:

- **Mining and Minerals Beneficiation Industries:** The key objective is to transform the Limpopo mining and minerals industries from being just a resource-based to a knowledge-based industry by 2030 through the creation of conducive and favourable environment for effective value addition;

- **Enterprise Development: SMMES and Cooperatives Development Programme:** The aim of this programme is to promote the development and transformation of the provincial economy by promoting the SMME sector, ensuring that SMMEs in the province are better able to contribute to and benefit from sustained economic growth by becoming more competitive, profitable, and able to create more and better employment opportunities;

- **Regional Economic Development and Integration Programme (REDI):** The key questions to observe is how the marginalized regions in the province can tap into or are pushed onto the power of the new economic frontier? Therefore, REDI focuses fundamentally on addressing the key obstacles to the functioning of the economy, primarily through infrastructural interventions which will enable all regions better access to markets and resources and to attain the full economic potential of which they are capable;

- **Public Infrastructure Investment Programme:** The government has a pressing need to accelerate sustainable socio-economic development by, amongst other things, rolling out on a mass scale physical, social and economic infrastructure. The core aspects of the socio-economic infrastructure are:
  - Bulk infrastructure (Sewer, Water and Sanitation, Electricity, and Communication);
• Social Infrastructure such as housing, school and hospitals; and
• Economic Infrastructure such as freight and logistics;

• **Water Resource Development and Demand Management:** Limpopo appears to be in the grip of a water crisis with alarms emanating from water specialists that all point towards a water stressed province – rivers are dying and major water storage dams are highly contaminated. Access to clean water is a basic human right, unfortunately in many parts of the country and in Limpopo currently, we cannot take it for granted that this right is being met;

• **Agriculture and Rural Development Programme:** The key strategic challenges are as follows:
  
  • **Extension Services:**
    - The Extension Services is indispensable for the success of the Limpopo Agricultural Performance Revival and Bio-diversity Sectors Development Strategy; and
    - Extension services have a key role to play in the LDA achieving its mandate among the four target clients i.e. 1) Food insecure households, (2) Subsistence and emerging farming, (3) profitable commercial small-scale farming and (4) profitable large-scale farming. Amongst other roles, the extension services should provide farmers with technical advice, assist them to plan, co-operate and gain access to the resources they need. During this information era, these services have become dynamic and complex, and in most cases, with the extension services not being up-to-date;

  • **Infrastructure:**
    - Priority should be given to the projects that fall within the poverty nodes in the Province as defined in the Integrated Sustainable Rural Development Programme (ISRDP). However, it is strongly recommended that priority also be given to those areas of extremely high poverty in the Province, which fall outside the defined nodes; and
    - Currently, this plan identifies four categories of support that should qualify for support from the LDA, more especially for farmers in the lower hierarchy of the four groups:
      - Off-farm infrastructure: Grant funding will enable individuals or groups to develop and/or improve production efficiency. The off-farm infrastructure include pumping stations, main water canals/pipes, access roads, market infrastructure and soil conservation structures;
      - On-farm infrastructure: On-farm infrastructure includes irrigation mainlines, night dams, minimum stock watering facilities, essential productive assets, certain boundary fencing and dipping infrastructure;
      - Capacity building infrastructure: The capacity building infrastructure should include the costs of administering the project, training and aftercare programs in order to enhance the capacity of local decision-making, management and administration; and
      - Input costs: The input costs support would enable farmers, more especially in the lower hierarchy, to acquire medium- and long-term financing production inputs, for drought tolerant crops, where external funding is not possible;
Use of Limited Resources:

- Most of the Natural Resources such as rivers and the associated wetlands are facing the state of deterioration. Some catchments areas are in state of degradation due to over-cultivation, soil erosion, overgrazing, over-harvesting of medicinal plants and firewood. In other cases, dangerous agricultural chemicals are used in agricultural fields which are situated in catchments areas. The province should respect Land Use Planning and Zoning, Natural Resource Conservation and National Environmental Act, such that land zoned for various uses should stay as such until there is resolution/record of Decision to change land use. Departments of Agriculture, Economic Development and Government and Housing should manage and enforce these laws;

- In the Province, there are still farmers who are not using water-saving technology systems of irrigation, while water scarcity is increasing. The province must support and promote water-saving technology for irrigation by all farmers; and

- Sand mining and mineral prospecting that result in borrow-pits should be highly administered and enforce rehabilitation of land disturbed. Departments of Mining, Local Government and Economic Development should enforce management of the interventions proposed. Mining sand from rivers should be banned and heavy fines should be imposed. Green Scorpions should be appointed and must enforce these proposals;

Climate Change:

- The effects of climate change are being felt worldwide. These effects include extremes in climate. Most exotic crops and animals which in the Province are not tolerant to extreme temperatures. Consequently, most exotic crops will become extinct under extremes in climate. The province must support research and university experiments to keep abreast of this subject. The province must plant more trees per household and many provincial roads must be turned into avenues;

Collapsing of Land Reform Projects:

- The collapse of land reform projects contributes to the reduced effect of agriculture on the GDP. Various factors, inter alia; lack of post settlement support, lack of production inputs; lack of working tools ; financing and limited skills in best-practices on agricultural production among the beneficiaries, do play a role in the diminishing agricultural contribution; and

- The state must provide full support to land reform clients and minimize group farming approaches that compel potential farmers to exit project. Furthermore, the state and/or struggling land-owners must lease/rent the land to capable entrepreneurs to remove the mortgage burden;

Legislation and Policies:

- Policies and Legislation should promote equity and ensure entrepreneurs are competitive and incentivized. The state must support champions that would create jobs and pay taxes;

Land Claims:

- The land reform process has proceeded slowly in Limpopo. By 2008 the Department of Land Affairs (DLA) had transferred only 3% of the land area to land reform beneficiaries.
The gradual pace of land reform has negatively impacted on the agricultural sector as delays have given rise to uncertainty, thus undermining long term investment. There is a need to identify young/motivated agricultural entrepreneurs to manage the productive farms with government, Land Bank, the IDC and development corporations assisting with financing of the programmes;

- **Access to National Markets:**
  - The Province is a production area for more than 65% of horticultural crops in RSA. The province should also create its own Fresh Produce Market and processing/value-adding facilities; and
  - Transformation of the agricultural industries 90:10 conundrum to ensure that small scale farming plays a significant role in food security and food production;

- **Agriculture and Rural Development Programme:** The key strategic interventions are as follows:
  - **Basic Unit of the Target of Clients:**
    - The Target Clients (voting masses) in Agricultural Sector, which must be the target of the LDA are farmers, who have distinct four classifications: (1) Food insecure households, (2) Subsistence and emerging farming, (3) profitable commercial small-scale farming and (4) profitable large-scale farming; and
    - The province must consider recruiting well trained black agricultural entrepreneurs to farming;
  - **Food Insecure Households:**
    - Appropriate interventions in this “sector” should be aligned to the specific objective of the “sector”, namely: food security. Therefore, agricultural interventions must focus on:
      - Mobilization of the poor to engage in agricultural production, through a facilitated process of self-reflection;
      - Low-risk, low-cost vegetable and fruit production in the homestead yard, and food processing and storage techniques (mainly indigenous);
      - Explore wild fruit and vegetable to venture into new agri-products;
      - Homestead rainwater harvesting and re-use of grey water;
      - Basic training in modern commodity production techniques, mainly in dry land fields (typically 1-2 hectare); and
      - Mobilization of commodity-based extension services, recognition and support of households’ efforts;
  - **Subsistence and Emerging Farming:**
    - The Specific objectives of the subsistence and emerging farmers are (i) income generation and (ii) self-development. In this context, the LDA intervention strategies must focus on:
      - Integrating modern and indigenous production techniques; and
      - Integrating modern and indigenous storage techniques;
Profitable small-scale commercial farming:

- The profitable small-scale commercial farming revolves around profit making understanding of various components of managing the entity and seeking opportunities for increasing profits;
- The specific objectives of Profitable Small-scale farmers include: (i) improved profit, (ii) simplified management and (iii) economic growth;
- In this context, the agricultural intervention strategies should focus on support in:
  - Technical issues;
  - Institutional issues;
  - Communication and network issues;
  - Marketing issues; and
  - Logistic and productive infrastructural support;

Large-Scale commercial farmers:

- In broad terms, the specific objectives of large-scale commercial farmers revolve around (i) profit maximisation, (ii) simplification of sustainable management to free up available time and (iii) seeking opportunities for economic growth and (iv) diversification of production. The strategic intervention roles of the LDA would mainly be facilitation instead of support. For instance, in land reform farms, large scale commercial production can be achieved through joint ventures;

Typical farming systems in Limpopo Province:

- Limpopo Province has 23 farming systems with unique macro opportunities. The strategic interventions from the LDA would be to ensure that the right macro opportunities are aligned with the appropriate farming systems. Also, to provide appropriate win-win support within the farming systems, along with ensuring that the natural resources within the farming systems are used in a sustainable manner.

4.15.8 The Limpopo Industrial Master Plan

The Limpopo Department of Economic Development, Environment and Tourism (LEDET) embarked on the development of a five-year Industrial Development Master Plan for the Limpopo province. The Industrial Master Plan should contribute to the development of the key sectors of the provincial economy by strengthening industrial linkages, increased value-added activities and enhancing productivity.

4.15.9 Limpopo Economic Development Strategy

The objective of the Limpopo Economic Development Strategy (LEDS) is to stimulate, promote and sustain unity and an enabling environment conducive for economic development, social justice and improved quality of life for its entire people. LEDs is underpinned by the Reconstruction and Development Programme and the National Spatial Development Plan. One of the pillars towards the realisation of this vision statement, of the provincial government, is economic development. Limpopo is also currently developing the following:
• Limpopo five year Industrial Development Master Plan;
• Limpopo Targeted Investors Strategy; and
• Limpopo Targeted Investment and Trade Recruitment Strategy.

4.16 Conclusion

It seems that despite the above-mentioned policies, strategies, programmes and agreements, government at this stage lacks policy through which an economic and market environment can be provided for the transformation of South Africa’s agricultural, forestry and fisheries sectors, whilst maintaining productivity and production efficiency for purposes of ensuring national food security and a robust trade balance. Furthermore, uncoordinated implementation and planning by government has frustrated the effective implementation of government strategy, with each programme designing its own implementation plan, leaving a fragmented scattering of projects across South Africa’s landscape.

The government aims to translate strategic objectives into effective implementation plans, supported by monitoring and evaluation systems. The poor performance of South Africa’s strategic plans and policies may not lie entirely or even mainly in their content, but in the lack of effective implementation, continuous monitoring and evaluation of progress made, and resultant corrective action. More important is the disjointed implementation of government policies and strategies. Cooperative governance requires effective management across all three spheres of government, sector organisations, and producers. Without an integrated approach and effective management of actions, roles and responsibilities, most strategies devised by DAFF will result in ineffective implementation.

In terms of transformation and equity interventions and initiatives, the focus in agriculture in particular has been skewed towards new entrants, especially linked to the land reform programme, while inadequate support has been given to existing participants in the sector who are marginalised. There is therefore a need to correct this imbalance, for example by effecting changes that will facilitate existing smallholders’ gainful access to markets, by focusing less on primary co-operatives and more on secondary (e.g. marketing) co-operatives; and to improve the quality and accessibility of support systems and infrastructure in order that larger numbers of producers may benefit.
5. Benchmarking

Special Economic Zones or commonly referred to as SEZs, is not a new concept. In fact the establishment of SEZs dates back to the Roman era, where SEZs were located at strategic junctions of trade routes. The Aqaba Special Economic Zone (ASEZ) is an example of an SEZ that was established during the Roman Era, approximately 500 BC. The ASEZ is located in Jordan and was built at the trade junction where Asia connects with Africa.

Today the benefits of Special Economic Zones have been realised globally and thus exists in both Developed and Developing countries. This Chapter of the report seeks to define, enlighten, and understand the primary factors that contribute to the successful implementation of the SEZs in Developed and Developing countries, and how this can be acclimatised to positively harness the economic potential of South Africa.

Based on the fact that this study is still in its Pre-Feasibility Phase, it is recommended that during the Detailed Feasibility Study Phase that physical site visits and interviews be conducted at selected and agreed upon SEZs present in both Developed and Developing Countries.

These visits will also seek to understand the inter-regional connectivity of countries with standing trade agreements. In the case of South Africa, the inter-regional connectivity of the proposed SEZs with member states of the Common Market for Eastern and South Africa (COMESA) must be considered. Synergetic and value adding beneficiation between trading countries needs to be considered to ensure that the SEZs complement each other and supports the long-term sustainability and growth of these Zones for generations to come.

5.1 Defining SEZs

Internationally SEZs acts as catalysts for concentrated decentralisation of economic activities. It accelerates growth where manufacturing and commercial activities are promoted and conducted on preferential taxation terms, supported by good infrastructure development as well as knowledge based and capacity building programs. The following figure summarises the typical principles of a SEZ and the value addition for tenants in a SEZ.
The development strategy of a SEZ focuses on key economic drivers for the specific region, while key enabling projects increases connectivity and provides the necessary linkages to the cluster. A typical SEZ model incorporates an integrated development approach which comprises of industrial, commercial, educational, residential service and knowledge components. SEZ’s in India markets themselves as areas where people can: discover, make, sell, service, trade, learn, live and play. A typical SEZ therefore consist of the following:

- Research and development facilities;
- Industrial and manufacturing facilities;
- Warehousing, sales and distribution facilities;
- Maintenance and service facilities;
- Basic shopping facilities like restaurants, banks, groceries, stationary, etc.;
- Incubation, training and education facilities;
- Housing;
- Exercise facilities like gyms, running/walking tracks, golf courses, etc.; and
- SEZ’s can come in various form, sizes and layouts. The following figure indicates a conceptual layout of what a SEZ could look like:
Figure 104: Conceptual Layout of a SEZ

The term “economic zones” encompasses a wide variety of related concepts, including:

- Free Trade Zones (FTZ);
- Free Ports (FP);
- Foreign Trade Zones (FTZ);
- Export Processing Zones (EPZ);
- Special Economic Zones (SEZ);
- Free Export Zones (FEZ);
- Trade and Economic Cooperation Zones (TECZ);
- Economic Processing Zones (EPZ);
- Free Zones (FZ); and
- Multi-Facility Economic Zones (MFEZ).

### 5.2 Types and Characteristics of SEZs

The principles incorporated in the basic concept of a SEZ include:

- Geographically delimited area;
- Usually physically secured (fenced-in);
- Single management/administration;
- Eligibility for benefits based upon physical location within the zone;
- Separate customs area (duty-free benefits); and
- Streamlined procedures.
The table below broadly illustrates the different types of zones currently in existence internationally.

<table>
<thead>
<tr>
<th>Types of Zones</th>
<th>Development</th>
<th>Objective</th>
<th>Physical Configuration</th>
<th>Services Related Activities</th>
<th>Markets</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Trade Zone (Commercial Free Zone)</td>
<td>Support trade</td>
<td>Size &lt; 50 ha</td>
<td>Ports of entry</td>
<td>Entrepôt and trade-related activities</td>
<td>Domestic re-export</td>
<td>Colon Free Zone, Panama</td>
</tr>
<tr>
<td>Traditional EPZ</td>
<td>Export manufacturing</td>
<td>Size &lt; 100 ha total area designated as an EPZ</td>
<td>None</td>
<td>Manufacturing, other processing</td>
<td>Mostly export</td>
<td>Karachi EPZ, Pakistan</td>
</tr>
<tr>
<td>Hybrid EPZ</td>
<td>Export manufacturing</td>
<td>Size &lt; 100 ha; only part of the area is designated as an EPZ</td>
<td>None</td>
<td>Manufacturing, other processing</td>
<td>Export and domestic market</td>
<td>Lat Krabang Industrial Estate, Thailand</td>
</tr>
<tr>
<td>Freeport</td>
<td>Integrated development</td>
<td>Size &gt; 100 Km²</td>
<td>None</td>
<td>Multi-use</td>
<td>Domestic, internal and export markets</td>
<td>Aqaba Special Economic Zone, Jordan</td>
</tr>
<tr>
<td>Enterprise Zone, Empowerment, Urban Free Zones</td>
<td>Urban revitalization</td>
<td>Size &lt; 50 ha</td>
<td>Distressed urban or rural areas</td>
<td>Multi-use</td>
<td>Domestic</td>
<td>Empowerment Zone, Chicago</td>
</tr>
<tr>
<td>Single Factory EPZ</td>
<td>Export manufacturing</td>
<td>Designation for individual enterprises</td>
<td>Countrywide</td>
<td>Manufacturing, other processing</td>
<td>Export market</td>
<td>Mauritius Mexico Madagascar</td>
</tr>
</tbody>
</table>

**Table 43: Types of SEZs**

The following tables depict a few examples of SEZs:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Size</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology or Science Parks</td>
<td>Promote high tech and science-based industries</td>
<td>&lt; 50 ha</td>
<td>Singapore Science Park, Singapore</td>
</tr>
<tr>
<td>Petrochemical Zones</td>
<td>Promote energy industries</td>
<td>100 - 300 ha</td>
<td>Loem Chabang Industrial Estate, Thailand</td>
</tr>
<tr>
<td>Financial Services</td>
<td>Development of off-shore financial services</td>
<td>&lt; 50 ha</td>
<td>Labuan Offshore Financial Centre, Malaysia</td>
</tr>
</tbody>
</table>
Table 44: Examples of SEZs

There has been a major growth in the amount of SEZs worldwide in early 2000. In 2003 more than 3000 SEZs existed in 116 different countries, compared to 500 SEZs in 73 countries in 1999. Africa has also bought into the concept with 31 countries already having SEZs, and important ones like Botswana in a process of establishing SEZs. The following map indicates the footprint of SEZs in Africa.

Figure 105: The Footprint of SEZs in Africa

It is evident in the figure above that SEZs are dominant in countries located in southern and eastern Africa. It can further be deduced that South Africa is inter-regionally linked with several of the southern African countries of which most of them already has in SEZs in various stages of development or operations.
South Africa’s inter-regional connectivity to other African countries has been made possible by the vast network of transport corridors such as the North-South Corridor, Maputo Development Corridor (MDC), Trans Kalahari Corridor and Trans Oranje Corridors. Ports of South Africa are also inter-regional linked with a limited Feeder Vessel Service currently linking East London to the Port of Walvis Bay in Namibia. South African airports already provide inter-regional connectivity, as it links the country to other countries in Africa.

5.3 Economic Benefits of SEZs

This section provides a brief discussion and assessment of the likely benefits associated with the SEZs. In the main it draws on the international literature and other sources to illustrate potential economic impacts which can then be the subject of further assessment during the detailed feasibility study phase.

In this regard, it focuses mainly on the potential economic impact of successful SEZs. It needs to be recognised that numerous examples of failures are also to be found. It provides a brief overview of:

- The sources and types of economic impacts that have materialised from other SEZs; and
- Results of impact assessments conducted on SEZs

5.3.1 Types and Categories of Economic Benefit

Relatively recently the Facility for Investment Climate Advisory Services (FIAS) that services the World Bank Group and International Finance Corporation (IFC) conducted a review of SEZs focusing on their performance and lessons learned for zone development (FIAS, 2008). This review noted that the economic benefits from zone development are both static and dynamic.

Static benefits are generally more straightforward and include (FIAS, 2008):

- Direct employment creation and resulting in local income generation;
- Export growth and export diversification;
- Foreign exchange earnings;
- Foreign direct investment; and
- Government revenues.

Dynamic benefits, on the other hand, are recognised as much harder to measure. However, according to FIAS, they are often more important to the long-term contributions from zone development. These benefits include (FIAS, 2008):

- Indirect employment creation;
- Skills upgrading;
- Technology transfer;
- “Demonstration effect” arising from application of “best practices”; and
- Regional development.
Farole (2011) further distinguishes between economic benefits according to the stages at which they emerge over time. Static benefits such as investment and job creation are generally derived in the relatively short term. SEZ programs that are successful in contributing to long-term development leverage of these static benefits into dynamic economic benefits such as technology transfer and the encouragement of domestic entrepreneurs.

5.3.2 Foreign direct investment (FDI)

Attracting FDI is widely recognised as one of the key rationales behind the establishments of SEZs. According to FIAS (2008), supporters of SEZs claim that by offering world-class facilities and best practice policies, zones can offset some aspects of an often otherwise adverse investment climate.

Unfortunately, the impact of zones on FDI is hard to gauge given the lack of data. Many zones do not track foreign investment flows separately, thus the data is uneven. While data is generally lacking, the data that is available suggests that SEZs are an important destination of FDI in some countries. China is the prime example in this regard where SEZs have been successful and account for over 80% of cumulative FDI (FIAS, 2008).

Recent research using Chinese municipal datasets has also shown that the SEZ program increased FDI not merely through firm relocation, and did not crowd out domestic investment. In addition, most SEZs were found to achieve agglomeration economies and generate wage increases for workers more than the increase in the local cost of living (Wang, 2013). Other successes include the Philippines where the share of FDI flows going into the country’s economic zones increased from more than 30% in 1997 to over 81% in 2000. This was also evident in Bangladesh where $103 million of the total $328 million of FDI inflows were registered in Export Processing Zones or EPZs only (UNCTAD, 2003 in FIAS, 2008).

The table below shows FDI into SEZs focusing on African countries and three other countries for comparative purposes. Within Africa, Ghanaian, Kenyan and Tanzanian SEZs have managed to attract relatively significant FDI while Nigerian SEZs have largely been a failure in this respect (Farole, 2011).

<table>
<thead>
<tr>
<th>Country</th>
<th>Total SEZ FDI stock (US$m)</th>
<th>SEZ FDI per capita (2000-2008) (US$)</th>
<th>SEZ FDI as % of total national FDI (2000-2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>1,435</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>2,611</td>
<td>141</td>
<td>18</td>
</tr>
<tr>
<td>Vietnam</td>
<td>36,760</td>
<td>325</td>
<td>100</td>
</tr>
<tr>
<td>Ghana (Tema)</td>
<td>68</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>Ghana (single units)</td>
<td>2,806</td>
<td>120</td>
<td>-</td>
</tr>
<tr>
<td>Kenya (EPZs)</td>
<td>162</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Kenya (single units)</td>
<td>155</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nigeria</td>
<td>N/A</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Tanzania</td>
<td>210</td>
<td>5</td>
<td>18</td>
</tr>
</tbody>
</table>

Sources: SEZ FDI; author’s compilation from individual country; SEZ authorities; national FDI data from UNCTAD.

Table 45: FDI flows into SEZ’s for selected countries (Farole, 2011)
The figure below elaborates on the FDI data below by showing the number of firms that are located in SEZs per country. As one would expect, countries with significant FDI flows into SEZs are also characterised by greater numbers of firms within SEZs, with Dominican Republic having close to 600 such firms.

![Figure 106: Number of firms per SEZ for selected countries](image)

It can further be observed in the figure above that from an Africa perspective Nigeria and Tanzania has less than 50 FDI firms located in their economic zones.

### 5.3.3 Employment Creation

SEZs have been found to play a major role in employment creation in certain countries. The table below shows that, globally, approximately 68 million jobs are in firms located within SEZs. In addition, research has shown that the rate of job creation in a number of SEZ programs has been rapid.

Employment in the Dominican Republic’s industrial free zones, for example, rose from 500 in 1970 to almost 200,000 in 2008 (FIAS, 2008). Aside from direct employment, indirect employment effects can also be substantial.

<table>
<thead>
<tr>
<th>Region</th>
<th>Direct Employment (millions)</th>
<th>Percentage of National Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>68.441</td>
<td>0.21%</td>
</tr>
<tr>
<td>Asia and the Pacific</td>
<td>61.089</td>
<td>2.3%</td>
</tr>
<tr>
<td>Americas</td>
<td>3.084</td>
<td>1.15%</td>
</tr>
<tr>
<td>Western Europe</td>
<td>0.179</td>
<td>-</td>
</tr>
<tr>
<td>Central &amp; East Europe &amp; Central Asia</td>
<td>1.590</td>
<td>0.001%</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>1.458</td>
<td>1.59%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>1.040</td>
<td>0.20%</td>
</tr>
</tbody>
</table>

**Note**: Estimates from FIAS database were formulated on ILO data. In some cases where discrepancies arise due to inclusion of indirect employment figures (as identified by WEPZA), a revised direct employment figure was calculated using a standard ratio of 1:2; that is, for every one direct job created, two direct jobs are in turn created. Sources: BearingPoint; ILO database; WEPZA (2007); FIAS research.

**Table 46**: Direct employment associated within SEZ's globally (FIAS, 2008)
The table below also shows that employment within individual countries can be high for those with successful SEZ programmes. Within Africa, Kenya stands out as a country with a significant proportion (e.g. 15%) of total jobs to be found within SEZs.

<table>
<thead>
<tr>
<th>Country</th>
<th>SEZ Employment (2008)</th>
<th>SEZ Employment as % of National Industrial Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>218,299</td>
<td>3%</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>124,517</td>
<td>30%</td>
</tr>
<tr>
<td>Honduras</td>
<td>130,000</td>
<td>30%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1,172,000</td>
<td>19%</td>
</tr>
<tr>
<td>Ghana (Tema)</td>
<td>2,025</td>
<td>3.5%</td>
</tr>
<tr>
<td>Ghana (single units)</td>
<td>26,534</td>
<td>-</td>
</tr>
<tr>
<td>Kenya (EPZs)</td>
<td>15,127</td>
<td>15%</td>
</tr>
<tr>
<td>Kenya (single units)</td>
<td>15,551</td>
<td>-</td>
</tr>
<tr>
<td>Lesotho</td>
<td>45,130</td>
<td>&gt;80%</td>
</tr>
<tr>
<td>Nigeria (Calabar) (est.)</td>
<td>1,156</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Nigeria (Onne, oil &amp; gas)</td>
<td>20,000</td>
<td>N/A</td>
</tr>
<tr>
<td>Tanzania</td>
<td>7,500</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

Sources: SEZ employment based on data from individual country SEZ authorities; national industrial employment from various sources.

Table 47: Direct employment associated within select SEZ programmes (Farole, 2011)

5.3.4 Export Growth and Diversification

In many countries, SEZ programmes account for a major share of exports. Using 2005 data, FIAS (2008) lists the following examples of shares in total exports:

- Americas: Nicaragua (79.4%); the Dominican Republic (77%); Panama (67%);
- Asia and the Pacific: Bangladesh (75.6%); Sri Lanka (67.1%); the Philippines (78.2%); Pakistan (50.3%);
- Middle East and North Africa: Lebanon (36.3%); Bahrain (68.9%); Morocco (61%); and
- Sub-Saharan Africa (SSA): Ghana (22.4%); Madagascar (80%); Mauritius (34.4%).

The following table shows that globally, exports from SEZs totalled approximately US$851 Billion in 2007. As one would expect, Asia made the largest contribution to this total.

<table>
<thead>
<tr>
<th>Region</th>
<th>Exports (US$ millions)</th>
<th>Percentage of Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>851,032</td>
<td>40.8%</td>
</tr>
<tr>
<td>Asia and the Pacific</td>
<td>510,666</td>
<td>41.0%</td>
</tr>
<tr>
<td>Americas</td>
<td>72,636</td>
<td>39.0%</td>
</tr>
<tr>
<td>Central and East Europe and Central Asia</td>
<td>89,666</td>
<td>38.7%</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>169,459</td>
<td>36.4%</td>
</tr>
</tbody>
</table>
Aside from increased volumes, SEZ programs (especially those focused on Export Processing Zones - EPZs) have also been able to catalyse export diversification in particular from a reliance on primary sector commodities (i.e. minerals beneficiation) to manufactured exports.

Key examples of this trend include (FAIS, 2008):

- Costa Rica, where the EPZ share of national manufactured exports jumped from less than 10% in 1990 to 55% in 2003;
- Tunisia, where the EPZ share of national manufactured exports has more than doubled since 1990; and
- Kenya, where the share of national manufactured exports has increased from 3.5% in 1997 to 19.3% in 2003.

In reviewing the Indian experience with SEZs, Aggarwal (2010) finds that, “while SEZs are stimulating direct investment and employment, their role appears to be more valuable in bringing about:

- Economic transformation from a resource-led economy to a skill and technology-led economy;
- From low value added economic activities to high value added economic activities;
- From low productive sectors to high productive sectors; and
- From unorganised to organized sectors, both at the national and regional levels.”

With regard to export growth trajectories, the figure below compares the export growth paths of two successful SEZs (Suzhou in China and Costa Rica) to three African SEZ programs (Ghana, Kenya, and Lesotho) and three non-African programs (Bangladesh, the Dominican Republic, and Vietnam).
The figure shows that most zone programs start slowly, growing linearly in the initial stages, before hitting a growth inflection point. At this point the more successful SEZ programs seem to have grown exponentially (Farole, 2011).

### 5.3.5 Industrial Upgrading, Technology Transfer and Dynamic Effects

With regard to the catalytic role of SEZs in industrial upgrading and technology transfer, evidence of success is less clearly defined. On the one hand, there is clear evidence of the catalytic role played by EPZs in the East Asian newly industrialized economies, especially the Republic of Korea and Taiwan (China). FIAS (2008) also cites the technology parks in India which “were critical to the expansion and upgrading of Information and Communications Technology (ICT) activities, not just in terms of routine data entry and software coding operations, but also in much more complex software development, content development, and multimedia operations.” On the other hand, surveys have not been able to find a significant difference between EPZ and non-EPZ-based export-oriented firms in terms of technology transfer and linkages (UNCTAD, 2003).

With regard to the longer term aim of SEZs in fostering wider economic development, the figure below provides a schematic of the transition between a so-called ‘island’ SEZ(s), where linkages to the domestic economy are severely limited or non-existent, and ‘catalyst’ SEZ(s), in which technological capabilities are being upgraded and domestic linkages are created (Farole and Acklin, 2011). It is this transition that has the potential to amplify static benefits and ensure that dynamic benefits also emerge.
5.3.6 Government Revenues and Costs

SEZ development can have particularly complex impacts on government revenues and budgets. The use of incentives is especially important in this regard and, as pointed out by FIAS (2008) and other observers, a key issue are whether investors would have located in a zone or region without the provision of incentives in the first place? This is generally an extremely difficult question to answer, in particular in the planning and feasibility phase of SEZ development.

The figure below provides a basic overview of potential complexities by showing the main revenue gains commonly associated with SEZs alongside the costs.

**Figure 109: Typical government revenues and costs from SEZ development (FIAS, 2008)**

5.4 Key Issues and Approach to Assessment during Feasibility

The preceding section has provided an overviewed the type and nature of economic benefits one can expect from successful SEZs. These are then the benefits that will need to be investigated and assessed to the degree possible for the proposed SEZ during the feasibility phase. The approach to, and information required for, their assessment is the subject of this section.
As per the differentiation used by FIAS (2008), the potential economic benefits of SEZs can be divided into so-called static as well as dynamic benefits as previously defined in this Chapter. Given their more quantifiable nature, the focus of assessment will need to fall on static benefits. This is not to say that dynamic benefits are not important or will be ignored. Rather, it is a reflection of the difficulty and high levels of uncertainty associated with their assessment.

The review in the preceding section indicates that it would be necessary to consider and assess the following benefits:

- Direct investment (foreign and local) within the SEZ;
- Potential to catalyse other investment or commercial activity outside the SEZ;
- Employment and associated income (the emphasis here would be on direct impacts with indirect or multiplied impacts also assessed);
- Export growth and diversification;
- Value addition opportunities and spin-offs; and
- Dynamic impacts.

With regard to approach, an economic impact model will be constructed that allows for the prediction of likely impacts based on inputs from the detailed financial feasibility study. These inputs would essentially be quantified estimates of new investment and expenditure that can be ascribed to the SEZ. In other words, it will be necessary to determine which investments occur specifically as a result of the SEZ and its associated policies/incentives (i.e. investments that would not have occurred without the SEZ). Specific data required from the financial feasibility study to feed into the economic assessment would thus include:

- Nature and cost of infrastructure/establishment investment associated with the SEZ spread over time;
- Nature and cost of on-going operational expenditure required to operate the SEZ spread over time;
- Nature and value of private sector investments that are expected to materialise as a result of the SEZ. This would need to include an indication of what portion of investment would be form local and foreign sources. It would also need to indicate the degree to which new firms are likely to produce for or service the local market versus the overseas markets; and
- Details of any financial and other incentives (aside from infrastructure) that are to be provided in order to attract investment.

These inputs would then need to be adjusted and augmented in order to convert them into a sensible prediction of possible economic benefits. This process of prediction would need to rely on an appropriate economic impact assessment model which allows for the consideration of multiplied indirect and induced economic impacts.

A review of economic impact models used in South Africa indicates that the model used to predict likely impacts from the Saldanha Industrial Development Zone (SIDZ) seems most appropriate as a point of departure (see WESGRO, 2011). This model is essentially expenditure driven and relies on a provincial Social Accounting Matrix (SAM) in order to predict indirect impacts. In all cases benefits would be allocated to the years in which they are expected to materialise thereby showing their spread over time.
Given uncertainties it will be necessary to use scenarios with regard to expenditure and associated impacts (e.g. low, middle and high road).

5.4.1 Policy Framework

The package of fiscal incentives has become almost standardised amongst SEZs internationally and typically includes:

- Corporate tax reductions or exemption;
- Duty-free importation of raw material, capital goods, and intermediate inputs;
- No restrictions or taxes on capital and profits repatriation;
- Exemption from foreign exchange controls (where applicable);
- No charges on exports; and
- Exemption from most local and indirect taxes; etc.

Although there are many arguments for incentives, international experience suggests that a best-practice policy and incentive framework needs to be streamlined, encouraging zones to compete on the basis of facilitation, facilities, and services, rather than on the provision of incentives. In the case of the proposed Musina SEZ, this could also include providing reasons for someone to want to live in Musina rather than in Gauteng, i.e. provide the same type of infrastructure, internet connection, living conditions, quality of school and hospitals, etc., equal or better than the living conditions he will have access to in Gauteng.

This should be covered in a comprehensive and well developed policy framework. The international standard for a basic policy framework includes the following:

<table>
<thead>
<tr>
<th>Concept of Extra-territoriality</th>
<th>Outside domestic customs territory</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eligible for national certificates of origin</td>
</tr>
<tr>
<td></td>
<td>Eligible to participate in national trade agreements/arrangements</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eligibility for Benefits</th>
<th>No minimum export requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Manufacturers and services</td>
</tr>
<tr>
<td></td>
<td>Foreign and local firms</td>
</tr>
<tr>
<td></td>
<td>Expansions of existing enterprises</td>
</tr>
<tr>
<td></td>
<td>Private developers of zones</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Foreign and Local Ownership</th>
<th>No limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equal treatment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Private Zone Development</th>
<th>Clearly defined in legislation; specific zone designation criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eligible for full benefits</td>
</tr>
<tr>
<td></td>
<td>Competition from government-run zones on a level playing field</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sales to the Domestic Market</th>
<th>Liberalized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provided on a blanket basis rather than case by case</td>
</tr>
</tbody>
</table>
### Incentive Framework

When the location, environment and policy framework are unable to attract FDI to a SEZ, fiscal incentives are often required as a catalyst to kick start the process. The following two tables below provide a broad comparison between some of the more successful SEZ programs in Africa and internationally:

<table>
<thead>
<tr>
<th>Background</th>
<th>SEZ Conceptual Stage</th>
<th>MFEZ Implemented 2005</th>
<th>SEZ Bill approved Implementation 2014/15</th>
<th>Free Port Zone Implemented 1970</th>
<th>Free Zone Implemented Very successful</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of SEZs</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Jobs created</td>
<td>TBD</td>
<td>5600</td>
<td>TBD</td>
<td>TBD</td>
<td>4500</td>
</tr>
<tr>
<td>FDI/SEZ (millions)</td>
<td>TBD</td>
<td>USD 800</td>
<td>TBD</td>
<td>USD 1173</td>
<td>USD 2600</td>
</tr>
<tr>
<td>Exports per SEZ Region (millions)</td>
<td>TBD</td>
<td>USD 600</td>
<td>TBD</td>
<td>TBD</td>
<td>USD 1300</td>
</tr>
<tr>
<td>Tax Incentives</td>
<td>Corporate tax reduction from 25% to 15%</td>
<td>0% tax for 5 yrs, thereafter 50% tax on years 6 to 8 years, thereafter 75% tax on profits</td>
<td>No corporate tax for 10 years</td>
<td>Corporate tax of 15% for processing activities</td>
<td>100% exemption on profitable income for 10 years, taxes will not exceed 8% thereafter</td>
</tr>
<tr>
<td>Exemption on import duties</td>
<td>TBD</td>
<td>Raw material Equipment Machinery Parts &amp; Spares</td>
<td>Raw material Equipment Machinery Parts &amp; Spares</td>
<td>Raw material Equipment Machinery Parts &amp; Spares</td>
<td>Raw material Equipment Machinery Parts &amp; Spares</td>
</tr>
<tr>
<td>Unrestricted repatriation of Profits</td>
<td>TBD</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>VAT</td>
<td>Yes</td>
<td>Deferment on VAT on machinery and equipment</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Training Subsidy</td>
<td>Yes</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Employment subsidy</td>
<td>Employment incentive for employees earning below 60K per annum</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>
### Table 50: SEZ Incentives in Africa

<table>
<thead>
<tr>
<th>Background</th>
<th>SEZ Conceptual Stage</th>
<th>SEZ Implemented 1980</th>
<th>FEZ Implemented 2003</th>
<th>SEZ Implemented 1960’s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SEZ Conceptual Stage</td>
<td>Very successful</td>
<td>Very successful</td>
<td>Successful</td>
</tr>
<tr>
<td>No of SEZs</td>
<td>10</td>
<td>15</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Jobs created</td>
<td>TBD</td>
<td>+ 30,000,000 (*including all types of industrial parks and zones)</td>
<td>83,000</td>
<td>60,000 (*560,000 by 2020)</td>
</tr>
<tr>
<td>FDI/SEZ (millions)</td>
<td>TBD</td>
<td>USD 690,000 (*Estimated 46% FDI contribution to GDP since 2007)</td>
<td>USD 16,300 (*2012)</td>
<td>USD 6,940 (*2012)</td>
</tr>
<tr>
<td>Exports per SEZ Region (millions)</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

| Tax Incentives | Corporate tax reduction from 25% to 15% | No Tax Holidays | Tax holidays 1-5 years | Income tax exemption for foreign nationals |
|               | Corporate tax, income tax: 100% reduction for 5 yrs, 50% reduction for the next 2 yrs | Acquisition tax, registration tax, property tax: 5-15 yrs 100% or 50% reduction | Tariff for capital goods: 100% reduction for 5 yrs |

| Exemption on import duties | TBD | Raw material | Raw material |
|                           |     | Equipment   | Equipment    |
|                           |     | Machinery   | Machinery    |
|                           |     | Parts & Spares | Parts & Spares |

| Unrestricted repatriation of Profits | TBD | Yes | TBD |
|                                      |     |     | TBD |

| VAT | TBD | Yes | TBD |
|     |     |     | TBD |

| Training Subsidy | TBD | Yes | TBD |
|                 |     |     | TBD |

| Employment subsidy | TBD | Yes | TBD |
|                    |     |     | TBD |
### Institutional Framework

A further contributor to the successful outcome of a SEZ program is the autonomy and effectiveness of the body managing the SEZ operation. While a wide range of institutional arrangements have been used, international experience suggests that success is dependent on:

- The autonomy of the body;
- Adequate funding;
- Customer orientation;
- Power over other government departments;
- Partnerships with private zone operators;
- Maximising the role of the private sector in service provision; and
- One element which is of critical importance is that SEZ authorities purely regulate functions, and do not own, develop and operate SEZ’s.

Best-practice guidelines for the development of an effective institutional framework ensure the following:

- Sufficient autonomy for the zone authority;
- Adequate authority by constituting an independent board comprised of government and private representatives;
- A one-stop shop approach through legislation that provides the body with single point authority (also over other government agencies in core areas); and
- The zone entity outsources and privatises as many as possible non-core functions and services to be able to focus on core activities.

### Physical Development and Management

The success of SEZs is critically linked to the way in which they are located, developed, and managed. Management of SEZs is enhanced when they are operated on a cost-recovery rather than a subsidized basis, and are market-oriented and customer focused. This is best accomplished when SEZ development and operation are undertaken by private sector groups on a commercial basis, rather than by government organizations that frequently are subject to political pressures and funding constraints.

The following are best-practice guidelines for the physical development of zones:

- Implement land use planning and zoning efforts in defined areas for industrial and commercial development to guide the actions of private developers;
- Develop SEZ designation criteria in the SEZ law and implementing regulations to ensure that SEZs are conveniently located (e.g. near population centres and transportation hubs) and minimize offsite infrastructure development expenditures of government; and
- Establish a land use planning and infrastructure development unit in the government to ensure adequate planning and support of offsite infrastructure provision.
5.4.5 Sectors (Petro-Chemical, Agro-Processing and Logistics)

5.4.5.1 Sector – Petro-Chemical

There are some critical areas of intervention that the South African government intends to effect in order to ensure the seamless and effective implementation of the beneficiation of South Africa’s mineral commodities. This includes, but is not limited to:

- Regulatory incentives: The beneficiation off-sets against the Mining Charter’s requirement for 26% Black Economic Empowerment (BEE) ownership is a major milestone towards creating an enabling environment for value addition. There is scope for the establishment of favourable trading conditions, such as use of export/import levies on ore, to improve local access to the required minerals for local consumption as well as the use of existing versus new incentives. The Broad-Based Socio-Economic Empowerment Charter for the Mining Industry (i.e. Mining Charter), encourages both downstream and side stream value addition through the beneficiation element: This element makes provision for mining companies to offset up to 11% of their ownership requirements against the value of their levels of beneficiation;

- Investment in R&D initiatives, which will be aimed at unlocking the intrinsic value of South Africa’s minerals through finding new products and/or technologies in support of local beneficiation;

- Commitment by producers of minerals to support local beneficiation in terms of availing access to minerals in South Africa readily;

- Alignment of existing initiatives on skills development to required proficiency for optimising beneficiation;

- Ensuring security of energy supply through investment in new generation capacity, implementing energy efficiency measures and pursuing co-generation potential, where possible; and

Expanding South Africa’s economic policy framework to ensure international market access to locally beneficiated goods.

5.4.5.2 Sector – Agro-Processing

The Greenport initiative of the Netherlands provides an excellent benchmark for the effective production, marketing and distribution of fresh produce grown in Europe. The Netherlands is the top horticultural trading hub in the world. The horticulture sector in the Netherlands is concentrated in the so-called Greenports. Greenport(s) Holland is a network, representing the Dutch cluster of businesses related to horticulture, including arboriculture and floriculture. Greenport(s) Holland is about local and remote food production, innovation, knowledge, research & development food technology, wholesale, international trade & exports, food logistics and renewable energy supply. The Greenport(s) Holland strategy is based on the belief that operating as a network based on shared interests, is to the benefit of all of the partners. In the network, enterprises, business interest organizations, national, regional and local governments, banks and NGO’s are represented. All members participate in the executive (Steering Board), which is supported by a team of experts (Management Group), both led by a Programme Manager and a Network Secretary. The network connects the 5 Dutch Greenport-zones as well as a number of satellite-production sites on horticulture, floriculture and arboriculture. The 5 by the Dutch government officially designated
Greenports are: Greenport Westland/Oostland, Greenport Venlo – Rhein/Maas, Greenport Aalsmeer, Greenport Duin en Bollenstreek and Greenport Boskoop.

Greenport(s) Holland represents on an average yearly basis:

- 12 000 hectares of glass house production area in the Netherlands and 4000 hectares abroad (growing);
- 140 000 hectares of production area in the open field;
- 7-8 billion Euro worth of local fresh production (2,1 billion Euro horticulture and 4,9 billion Euro floriculture and arboriculture in 2009);
- 13 500 enterprises primary on fresh produce and another 15 300 in the entire value chain;
- 290 000 jobs directly related to fresh produce and 455 000 to the total horticulture cluster;
- Export of 14,5 billion Euro worth of fresh products;
- A yearly 6,6 billion Euro surplus on the Dutch Balance of Trade; representing 21% of the total surplus;
- Net added value of 1 billion Euro on Dutch technology supply; and
- Net added value of 2,5 billion Euro on Dutch quality seeds and young plants and cuttings.

The Johannesburg Fresh Produce Market (JFPM) is embarking on a project – the Market of the Future (MOTF). This project will contribute towards the JFPM becoming a world player in the fresh produce marketing and distribution. One of the possible themes in the MOTF is a virtual trading platform. The participation of regional fresh produce markets in this virtual market will contribute towards improved trade and lower transport costs. The establishment of a virtual network and trading platform will open up new opportunities for coordination, consolidation and collaboration in an extended international (Sub Saharan) tradeparc of fresh produce hubs and networks, and create the possibilities for making chain information directly and real-time available and usable to support decision making of all partners in the horticultural network. This will be an integral part of making geographically dispersed fresh produce markets and processing hubs competitive and economically viable. Needless to say, the support of an efficient and cost effective road/rail logistics infrastructure is essential.

5.4.5.3 Sector – Logistics

The State of Logistics Survey conducted by the CSIR in collaboration with Imperial, provides a good overview and comparison of the South African logistics industry in relation to international logistic performance.
The logistics costs are a useful measure to assess the overall logistics performance of an economy. It is however not straightforward to draw conclusions from these statistics:

- Higher logistics costs could be associated with higher economic activity. However, if logistics operations are cost effective, then as a percentage of total economic activity, this percentage should decrease;
- Poor infrastructure, road conditions and vehicle conditions can impact negatively on economic performance and introduce relatively higher logistics costs;
- Transporting goods in African countries costs more due to poor road conditions and frequent breakdown of trucks. Rail networks are also inefficient due to the historic disparate and uncoordinated development of railway lines by colonial governments and other foreign investors’ intent on only developing a railway for the transport of minerals to the closest harbour;
- It would therefore not be surprising to find that logistics costs on the African continent are higher than the international benchmark.

Most obvious is that developing countries generally have higher logistics costs when compared to developed countries (except for Finland, in this instance).

If the logistics costs are broken down into transportation, warehousing, inventory carrying and administration costs for selected countries, as shown below, it is interesting to find similarities in the cost components share of total logistics costs. Transportation costs have always been the highest cost element in South Africa and it seems that this is also true for most other countries. It is interesting to note that South Africa has the second lowest transportation cost percentage, after Europe.

**Figure 110: Logistics Cost as % of GDP for Selected Countries**
The modal contribution for selected countries shown below can provide more answers and insight. While South Africa is very reliant on road transport, similar to India and Brazil, we have the added disadvantage of no inland waterways to transport freight. This might partially explain why South Africa has higher total logistics costs. However, when comparing the costs in the USA and China, which have similar modal configurations, China has much higher total logistics costs.

Two factors that are not usually taken into account when comparing these costs, which could explain the differences between countries, are the influence of hidden or opportunity costs on the system and the nature of the economies of each country. For instance, it is postulated that India’s low logistics costs can be
attributed to the hidden or opportunity cost of poor service (low cost equals low service). Furthermore, because India is a service-orientated economy, it could mean that its logistics costs would be lower than, for instance, China’s manufacturing orientated economy. It would therefore be worthwhile bringing in two other dimensions, i.e. service quality, and nature of economy, when comparing countries26. Further research into this is clearly required.

Agro Based Logistics

From a logistics point the African Governments are focused and in the process to address the food security and agricultural requirements to feed the rapidly growing and urbanisation processes.

The unexplored opportunities are more or less nine billion of a possible population by 2050 for the continent. The total GDP on agriculture averages 29% and employs 65% of the labour in agro based countries.

Therefore it has become so ever more important to build a logistics network with the private sector and other institutions to enable a logistics agro focused process through hub and spoke distribution and processing (e.g. jamming and canning, wash and process to freeze) and from there to distribute though consolidated warehouses to the associated countries.

5.4.6 Technology (Petro-Chemical, Agro-Processing and Logistics)

5.4.6.1 Technology – Petro-Chemical

The technology processes that are suggested for the SEZ in Musina include:

- Coal to Liquids plant – producing fuel products;
- Synthetic Bitumen plant – using by-products from the above plant;
- Wastewater treatment plant – cleaning the waste from the industries above;
- Waste gasification plant – generating energy from the waste of all of the above processes.

5.4.6.2 Technology – Agro-Processing

Food processing encompasses a wide variety of technologies to preserve and prepare foods for later use and consumption. These include:

- Drying – extraction of moisture using the sun, air heat or vacuum;
- Salting – adding salt or a brine;
- Curing – adding a chemical (sodium nitrate);
- Fermentation – use of bacteria, yeast or moulds;
- Freeze drying – freezing and then removing moisture using vacuum;
- Canning – aseptic packaging;
- Pasteurisation;
- Refrigeration;
• Freezing;
• Concentration;
• Irradiation; and
• Extrusion – using pressure extruders.

The various technologies are applied to meat, vegetables and a variety of fruits to preserve and enable transport and storage and is readily available for us in South Africa.

5.4.6.3 Technology – Logistics

Mapping and Analysis of Global Trends

In April 2013, DHL undertook a thorough logistics impact assessment of megatrends and new technologies. The aim of this assessment was to enable strategic positioning and rapid adoption of innovative concepts. From its thorough logistics impact assessment, DHL has created a unique tool in cooperation with Detecon International Consulting, designed to help logistic companies derive new strategies and develop more powerful projects and innovations. The centrepiece of this tool is a graphic highlighting the change potential of each key trend and its approximate timeframe.

![Logistics Trend Radar](Image)

**Figure 113:** Logistics Trend Radar (Source: DHL TrendRadar 2013)
The various trends are described in more detail in the following table:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Trend</th>
<th>Impact</th>
<th>Relevance</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>T01</td>
<td>Big Data / Data-as-a-Service</td>
<td>High</td>
<td>&lt; 5 years</td>
<td>Big data analytics represents the “industrial revolution of data”; it allows the processing of previously untapped data sources and enables real-time analytics on a broader scale. Sample use cases: nugg.ad (DP Mail), NavAir Deckplate (US Navy)</td>
</tr>
<tr>
<td>T02</td>
<td>Cloud Computing</td>
<td>High</td>
<td>&lt; 5 years</td>
<td>Beyond the hype, the paradigm of cloud-based services is increasingly tangible for logistics; new process cloud-based concepts (S-BPM) support management of globally distributed, federated logistics networks and enterprises. Sample use cases: Red Prairies (DHL Pilot), Logistics Mall, LOGICAL, Metasonic S-BPM Suite</td>
</tr>
<tr>
<td>T03</td>
<td>Autonomous Logistics</td>
<td>Medium</td>
<td>&gt; 5 years</td>
<td>Autonomous logistics enables innovations such as cellular transport systems, self-steering vehicles, and unmanned aerial vehicles, offering new and efficient transport solutions for existing infrastructures and in remote areas. Sample use cases: Self Driving Car (Google), Unmanned Aerial Vehicles (Matattern)</td>
</tr>
<tr>
<td>T04</td>
<td>3D Printing</td>
<td>Medium</td>
<td>&gt; 5 years</td>
<td>This disruptive production technology will change tomorrow’s logistics by necessitating specific networks for materials delivery; but it will also offer new business opportunities for logistics providers. Sample use cases: DHL CSI research project “3D Printing”, DirectSpare research project (EU)</td>
</tr>
<tr>
<td>T05</td>
<td>Robotics &amp; Automation</td>
<td>Medium</td>
<td>&lt; 5 years</td>
<td>Robotics and automation technologies support zero-defect logistics processes and enable new levels of productivity; self-learning systems can flexibly adapt to changing logistics environments. Sample use cases: Parcel Robot, Robot Cell Light (DHL), Stewart Gough Platform (Effizienzcluster LogistikRuhr)</td>
</tr>
<tr>
<td>T06</td>
<td>Internet of Things</td>
<td>Medium</td>
<td>&lt; 5 years</td>
<td>Internet of Things technology will enable physical objects to become active participants in logistics processes; in addition, smart objects will enable self-steering processes and new services such as event-driven solutions. Sample use cases: Tracing Intelligent Logistics Objects (TiLO) (Effizienzcluster LogistikRuhr)</td>
</tr>
<tr>
<td>T07</td>
<td>Next-generation Telematics</td>
<td>High</td>
<td>&lt; 5 years</td>
<td>The next generation of telematics will be based on real-time shipment and traffic data, enabling new solutions for dynamic routing and value-added services such as flexible delivery offerings. Sample use cases: Smart Truck (DHL), Connected Drive, TeleMatics (BMW, MAN, T-Systems)</td>
</tr>
<tr>
<td>T08</td>
<td>Quantum Computing</td>
<td>Low</td>
<td>&gt; 5 years</td>
<td>Quantum computing will cause a paradigm shift, offering operational speedsparser exceeding those in conventional computing; in addition, quantum cryptography will make information transmission completely secure. Sample use cases: IBM Quantum Computing, D-Wave One (D-Wave Systems)</td>
</tr>
<tr>
<td>T09</td>
<td>Augmented-reality</td>
<td>Low</td>
<td>&lt; 5 years</td>
<td>By adding virtual layers of context-specific information at the right time and in the right place, augmented reality</td>
</tr>
</tbody>
</table>
Reshoring

New and innovative ways of improving logistics (and especially transport) efficiency and managing logistics demand are essential. One such strategy is reshoring.

Reshoring, the practice of bringing supply (manufacturing) back closer to the shores where the actual demand occurs, is another trend changing the face of global logistics. A number of factors spur reshoring such as a rising Chinese middle class that has driven up wages, eroding the low-cost advantage of regional specialisation; and a drive to lower unemployment in the developed countries where the demand is concentrated in the first place. Reshoring is expected to decrease global trade as a percentage of global GDP in the next few years, having a profound effect on global logistics that is not yet fully understood. The current generation of leaders grew up in a world where global trade as a percentage of GDP doubled in three decades. The next three decades will probably see the exact opposite.

This trend and the development of excellent harbours along the South African coastline will most likely impact on the growth of the trade activities through Nkomazi (Maputo Corridor) and Messina (Dar es Salaam Corridor). The development of new harbours of expanded harbour capacity such as Beira, could be one such an initiative.

Warehouse operational developments

The greatest area of growth will be in Real Time Warehouse Control Systems. The reduced costs of warehouse control systems will place these systems well within reach of warehouses. The reduced costs and increased performance of warehouse control systems will result in automated warehouse control systems with traditional material handling equipment being a superior alternative.

High Rise Warehousing with Automated storage retrieval systems permits rapid material transports and short access times:

- Perfect space utilisation thanks to minimal clearances;
- Optimised goods handling performance thanks to modified dynamics and a variety of different drive units;
- Easy maintenance thanks to the use of high quality machine elements;

<table>
<thead>
<tr>
<th>Technology Trend</th>
<th>Impact</th>
<th>Relevance</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics</td>
<td></td>
<td></td>
<td>will provide new perspectives in logistics planning, process execution, and visual analytics. Sample use cases: DSC Global IT Strategy &amp; Solutions: AR project for “Vision Picking – Augmented Reality Solution for Warehouse Operations”</td>
</tr>
<tr>
<td>T10 Low-cost Sensor Technology</td>
<td>Medium</td>
<td>&lt; 5 years</td>
<td>With the cost of initial investment dropping, the next few years are likely to see new creative uses of established consumer sensortechnologies (e.g., Kinect, 3-D-Scanning) for logistics purposes. Sample use cases: DHL Solutions and Innovation: Research project Trans4Goods</td>
</tr>
</tbody>
</table>

Table 52: Key Technologies Affecting Tomorrows Logistics Industry (Source: DHL TrendRadar 2013)
• Short assembly times thanks to compact assemblies and pre-commissioned storage and retrieval systems;
• Adaptation for your load carriers with specially designed load handling devices;
• High density of storage by utilizing the cubic space available and with the help of narrow aisles;
• Tighter inventory control through computerization resulting in higher inventory accuracy;
• Reduced access in the aisles, improving the security of the material;
• Increased space utilization via random storage versus dedicated space allocated to different parts;
• Ability to tie the storage system to the manufacturing and the distribution systems via computer control, permitting a higher level of system performance;
• Better utilization of storage and retrieval equipment.

Automation in warehousing immediately conjures the image of a high-rise Automated Storage Retrieval System. Typically it involves the use of high-rise racks with a storage machine operating within the aisle, serving both sides of the aisle. Loads are stored in the racks and retrieved either automatically or in a semi-automated fashion. The loads could either be unit loads that are palletized, or, in some cases, involve drawers and totes that are used to store smaller parts.

This platform will involve the following structure components and systems:
• Rack Structure: An Automated Storage Retrieval System consists of a rack structure;
• The structural frame of the S/R machine is used to guide the carriage for accurate locating of the load as it is raised and lowered. The carriage carries the mechanism to carry, store and retrieve the load. The storage and retrieval mechanism can either be a shuttle device or a push pull arrangement with a pin to engage/disengage the load;
• Storage/Retrieval Machine: The storage retrieval (S/R) machine operates within a storage aisle. Its function is to store and retrieve loads. It is designed for applications requiring high lifts, fast speeds;
• Transfer Stations: Pick and Deposit station is a location at which a load is entering or leaving storage is supported in a manner suitable for handling by the S/R machine. These may be a simple as a fork truck or shuttle car.

Other Automation:
• Automatic Guided Vehicles (AGVs)
• Carousels: An alternative to moving a vehicle, with or without a person on board, to the loads,
5.5 Summary of the SEZ Benchmarking Desktop study

In summarizing this Chapter centred on benchmarking SEZs, the following can be concluded:

- The SEZ concept has been around for centuries;
- SEZs promotes attract Foreign Direct Investment (FDI);
- SEZs require very huge initial capital investment;
- SEZs simulate regional and inter-regional economic growth;
- SEZs needs to be very well supported and funded;
- SEZs requires highly incentivised benefits to attract investors and kick-start the tenant take-up at least in the initial stages of establishment;
- Promotes job creation directly through providing permanent jobs, and indirectly, through the temporary provision of employment during the construction and development phase;
- The economic benefit of an SEZ in a region also provides sustainable economic growth for existing tertiary sector businesses as employed individuals now have more spending power;
- It has also been recommended that the management of SEZs be done by the private sector; and
- R&D and local technical skills development is an essential component required to support the sustainability, attractiveness and growth of SEZs.

It has to be noted that not all SEZs were historically successful. According to an article recently published by the World Bank last year, the major reasons for the failure of SEZs could be attributed to poor governance, a lack of institutional framework and political commitment, weak implementation capacity, and a lack of proper monitoring and evaluation (M&E) mechanisms, among others.

5.5.1 Key challenges faced by SEZs today

In today’s new endeavours, many of the past lessons have been reflected at different degrees to increase their viability, but on the other hand, many new SEZs seem to be haunted by similar or new problems. An assessment of several zones in African countries revealed the following issues:

- **Legal and institutional framework.** In many African countries, the current legal and institutional framework for SEZs is either outdated or does not exist, even though the SEZ initiative has been launched or, even in some cases, the parks have been built and operational, such as the Lekki Free Zone and Ogun-Guangdong Zone in Nigeria and the Oriental Industrial Park in Ethiopia. This is like “putting the cart in front of horse”, which has created a lot of confusion and deterred potential investors;

- **Resettlement issues.** In several zones, state governments promised to provide the compensation in the case of land acquisition and resettlement, however, these promises were not or only partially fulfilled, which hinders the further development of the zones. This is especially prominent in the zones which have advanced the furthest, such as the Ogun-Guangdong zone and the Lekki zone in Nigeria, though for the Lekki Zone, the government has promised to settle it 2012. The KoKo zone in the Delta State of Nigeria is at the very early stage, but once it advances, the issue will be quite significant due to the KoKo town in the zone's proximity;
Infrastructure. This is an overall constraint for all the zones but at different degrees. In general, power, gas, roads, ports, airports are the key constraints and many governments and developers try to resort to the PPP approach to solve the constraints. Given the large investments required for the zones, a strong commitment from government and active participation of the private sector is crucial. New ports are proposed for Lekki zone (Nigeria) and Bagamoyo zone (Tanzania). In the Jin Fei zone in Mauritius, host government built off-site infrastructure;

Environmental impact. All the zones have committed to comply with the environmental standards and minimize the environmental impact; however, the environmental issue is still outstanding for many zones, especially for those with oil and petrochemical sectors. So far some zones have completed the environmental impact assessment but some have yet to complete, such as the KoKo zone and Asaba ICT Park in Nigeria. When the zones begin to operate, the issue of managing wastes and pollution will continue to be a challenge, especially for those zones with a high component of oil processing and petrochemical sectors, such as the KoKo zone;

Zone management and operational know-how. Most of the zone developers, including the relevant government agencies, do not have the zone management and operational experiences, and many zone developers are only construction companies; therefore, it's a challenge for them to identify the right partners to provide the critical knowledge and expertise on Zone management and operations. In this regard, the Lekki zone is relatively in a better position, which has a former zone developer as its minority stakeholder; and

Host government ownership and continuity. This is especially a challenge for local zones that face a new state government that does not fully recognize the potentials of the economic zones and or fully acknowledge the commitments made by the previous government.

5.5.2 A new approach to the SEZ Strategy

Experienced experts and critics are of the view that in order to avoid falling into the same pitfalls of the past, Africa needs a new SEZ strategy, which builds one the following thrusts:

- A stronger stakeholder ownership, which includes a sound legal, regulatory framework, and effective institutions, as well as a better communication and consensus building strategy between the government and private sector/civil society;

- A better business environment inside the zone, including efficient services, such as one-stop shop and good infrastructure;

- A realistic scheme - starting small and implementable. It’s crucial to make one or two zones work first before scaling-up;

- Certain-level flexibility and autonomy at local level: using SEZs to pilot new reforms, as East Asian experience shows, which would require certain level of autonomy at local level;

- Technology transfer, diffusion and skills training. This is crucial for the zones to acquire sufficient manpower and make their products competitive;

- Better linkages with local economy. The zones need to build on local comparative advantages and have local suppliers as part of their value chains; and

- Clear objectives, coupled with sound benchmarking/M&E and competition. While zones may enjoy certain level flexibility and strong support from the government, they also need to be
accountable for the intended results, measured rigorously against the pre-set targets and benchmarked across different zones. Certain level of competition can be a positive catalyst.
6. **Analysis of Strategic Options**

The objective of the Musina SEZ is to become the catalyst for focussed growth through accelerated development in areas identified as being key economic drivers. Several strategic drivers have been identified throughout this report, and can be dubbed as the main pillars in which the Musina SEZ can be build. As indicated in the figure below these drivers alone cannot ensure the success of the SEZ, but also requires an enabling environment which includes a basic foundation (physical infrastructure, strong basic education and training levels, a conducive working and living environment and a stable social and political environment) and a good supporting system.

**Figure 114: Economic Pillars for Musina SEZ**

Should any one of the above building blocks not fall into place, the Musina SEZ stands the risk of not being successful.

Musina has certain competitive and comparative advantages which supports the establishment of the Musina SEZ, which includes the following:

- Geographic Location of Musina relative to SADC
- Gateway into Africa;
- Low cost infrastructure;
- Access to skilled labour;
- Access to Networks:
  - Road Infrastructure;
  - Corridor infrastructure;
Trucks and strong International logistics companies;
Volume logistic and people movement through border;
Growth of SADC and rest of Africa; and
Increase of Vehicle sales and motor Industry related activities in Africa.

Further to the above advantage the long term viability of the Musina SEZ will be further supported by the following factors:

- The volumes on the Gauteng-Beitbridge corridor is projected to grow by 40% between 2003 and 2020;
- 90% of freight is transported by road;
- The Growth of the Southern Africa Region;
- The gateway to a 600 million people consumer base;
- The major goods moving through the corridor is processed foods, mining products, fertilizer and chemicals;
- The importance of rail transport decreased as a transport medium; and
- Transport cost is the most expensive cost for freight, followed by management and admin cost and then storage and port cost.

The project team has however also identified certain risks and threats which include:

- Lack of provincial traffic safety standards inhibits the movement of freight transport in Limpopo. This includes allocated hazardous materials (hazmat) routes, accident statistics and related infrastructure;
- Poor load control strategies exacerbates the deterioration of road transport systems;
- Lack of bilateral agreements to ensure efficiency at Border Posts hinders significantly on the development of freight transport in Limpopo;
- Lack of co-ordination between National, Provincial and Local spheres regarding road transport planning, maintenance and operations in the province imply that there will be discourse in the identification and formulation of the main requirements for main freight transport routes in the province. Furthermore communication and coordination regarding the implementation for freight related projects with the relevant agencies eg. consolidated packaging of the North-South Corridor (NSC) and Musina to Africa Strategic Supplier Hub Initiative (MUTASSHI);
- Lack of incentives for mode shift from road to rail implies that there will always be a mismatch between the type of commodity transported and the appropriate mode for transporting it;
- A coordination framework guiding interaction on freight related projects is needed to ensure all stakeholders interact in freight transport related matters;
- Strengthening regulatory framework implementation;
- Infrastructure:
- Lack of provincial freight transport corridors profiling hinders proper holistic strategic planning of infrastructure that support freight movement;
- Lack of freight transport infrastructure, including intermodal facilities;
- Network condition is acceptable, however this is not essentially all through the transport system especially the secondary transport network;
- Overloading control is still inefficient, contributing to the deterioration of transport infrastructure; and
- Inadequate maintenance budget hinders the provision of required standard and quality of transport infrastructure.

Operational:
- Loss of Rail Market Share results in lack of competitiveness within the freight transport sector;
- Reduction in railway line capacity as well as operation efficiency means the railways become unattractive to freight transport customers;
- Current overloading control operations are contributing to road maintenance problem;
- Transportation of Dangerous Goods not comprehensive; and
- Lack of efficiency at border post hinders freight operations.

During the following phases of the study the project team will analyse the status quo and effectiveness of all the above and make recommendations as to the actions required to ensure the successful implementation of the Musina SEZ.

The project team will further continue engagements with the major role players in terms of the key drivers and catalytic projects in order to gauge their appetite for investing in Musina. From the engagements a strategic plan will be developed to attract these investors to the Musina area.
7. Way Forward

7.1 Phase 2: Feasibility Study – Go/No Go

The next step is to conduct a full feasibility study of the Musina Petro-chemical, Agro-processing and Logistics SEZ.

**Figure 115:** Key activities of the next phase of the Feasibility Study for the Musina Petro-chemical, Agro-processing and Logistics SEZ Report

A number of key issues will be addressed during this phase, which will include the following:

- **Technical Aspects:**
  - Detailed geo-technical investigation of land portion;
  - Topographical surveys;
  - Land availability, suitability, and planning;
  - Completion of civil engineering studies;
  - Detailed Land use zoning, site planning and design density, building design, vehicle movement and parking, landscape, signage, parking and traffic control;
Urban designs, landscape design and architectural design;
Bulk Infrastructure (water, energy, waste, etc.);

Financial Aspects:
Financial modelling and scenario planning (including exploration on PPP, Equity, state, etc.);
Financial Forecasting:
  - Sustainable revenue and the sources of revenue;
  - Turnover and profit;
  - Operational financing;
  - Capital financing;

Legal and Policy Aspects:
- Detailed Environmental Impact Assessment (EIA);
- Public consultations;
- Contracts and agreements;
- Land ownership and use rights;
- Detailed Land use zoning, site planning and design density, building design, vehicle movement and parking, landscape, signage, parking and traffic control;
- Labour relations and related;

Socio – Economic Aspects:
- Traffic impact studies;
- Spatial Development Framework (SDF);
- Economic impact assessments;
- Detailed Industry and Sector Assessment studies;

Risk Analysis:
- Identification and analysis of all key risk factors (local, national and global);
- Risk monitoring and Assessment;
- Risk Response and Mitigation;
- Risk Contingency Planning;
- Risk Tracking;
- Processes to Address Immediate Unforeseen risks.

*Detailed Environmental Impact Assessment

The development of the SEZ will necessitate obtaining environmental authorisation as per the requirements of the National Environmental Management Act. At this stage, we have assumed that the Logistics site will be less than 20Ha in extent and as such will require authorisation through a Basic
Assessment process (7-9 month process). The Petro-chemical part of the SEZ will require a full Scoping and Environmental Impact Assessment process (12-18 month process). This assumption is based on information obtained from this pre-feasibility study and it must therefore be noted that should additional information come to light which affects this assumption it will have time and cost implications.

7.1.1 Legislated Requirements of a Basic Assessment Process

The requirements of a Basic Assessment, as laid down in the National Environmental Management Act and Environmental Impact Assessment Regulations (GN R543 in GG 33306 of 18 June 2010 as amended on 10 December 2010), include:

- Make an application to the Department of Environmental Affairs (DEA);
- Conduct a public participation process (PPP);
- Give notice, in writing, of the proposed application to any organ of state which has jurisdiction in respect of any aspect of the activity;
- Open and maintain a register of all interested and affected parties (I&APs) in respect of the application;
- Consider all comments and representations received from I&APs following the PPP, and subject the proposed application to basic assessment;
- Prepare a Basic Assessment Report (BAR) (including a draft Environmental Management Programme (EMPr));
- Give all registered I&APs an opportunity to comment on the BAR;
- Collate all comments received on the draft report and submit the final BAR to DEA for adjudication.

7.1.2 Proposed Project Phases

7.1.2.1 Initial Phase

The initial phase of the basic assessment will consist of data collection which will coincide with Phase 1 of the SEZ development. This will be done by accessing all relevant information available from you, the client, and from our own sources as well as conducting inspections of the proposed sites. The purpose of the inspection will be to familiarise our team with the sites and any environmental (social and ecological) constraints and opportunities associated therewith.

Following the above-mentioned steps, the NEMA EIA application form will be completed and submitted to the DEA. The PPP will commence once we have received a reference number from the department.

The environmental constraints and possible alternatives mentioned in this report will need to be considered and managed accordingly. An Environmental Management Programme (EMPr) will need to be specifically designed to mitigate the identified environmental risks and manage such requirements.

7.1.2.2 Public Participation Process (PPP)

The Public Participation Process (PPP) is an integral component of the assessment process, and adherence to the legal requirements of the procedures will need to be strictly monitored and thus form an important
component of the Department’s decision-making process. The approach to the PPP will therefore be clearly documented and will outline the process for the identification of stakeholders, methods of information dissemination, etc.

In order for the process to be inclusive, it is important that all key stakeholders and role players be identified at, and involved from, the inception stage of the project. An initial stakeholder database will be drawn up based on our existing databases and information obtained from you/your department. Further I&APs will be identified through site visits and advertising of the project.

7.1.2.3 Stakeholder Engagement

Following identification of stakeholders and I&APs, the first round of stakeholder interaction will be initiated. This will include engagement with the relevant provincial and local government structures and specific organised stakeholder groupings, specifically with the affected communities and Non-Governmental Organisations (NGOs).

Once the Background Information Document (BID) has circulated, a public meeting will be held to provide stakeholders with further information and provide a forum for gathering initial concerns and issues. This meeting will need to be linked to the overall SEZ development programme to ensure that information is disseminated at the appropriate time in the overall programme.

The initial steps in the PPP can be summarised as follows:

- Advertising of the project (notifying the public of the project and providing details to become registered as an I&AP);
- Distribution of a BID to key stakeholders and registered I&APs. The document will provide sufficient detail for stakeholders to provide meaningful feedback;
- Public meeting.

Following the initial steps in the PPP, the issues raised will be compiled into the Draft BAR which will be circulated to the client’s team and within our team for responses, as required. The Draft BAR will then be circulated for I&AP/stakeholder comment. The legislated length of the comments period is 40 days, after which the report will be finalised for submission to the Department for adjudication.

Following the adjudication process, all registered I&APs and key stakeholders will be notified of the outcome and availability of the authorisation as well as the outline of the Appeals process.

7.1.2.4 Environmental Management Programme

As part of the environmental authorisation for the proposed SEZ development, a site specific Environmental Management Programme (EMPr) will be developed. The draft EMPr will be circulated with the draft BAR for comment by I&APs/key stakeholders. The draft will be updated with all comments received, following which it will be submitted with the final BAR.

The EMPr will be finalised following receipt of the environmental authorisation in order to incorporate the relevant conditions of the authorisation.
Econogistics has a sound track record in the production of EMPrs, having drafted EMPrs for small (single site developments) to large developments (815 ha) as well as some of Transnet’s biggest and most comprehensive EMPrs. Not only will this ensure an EMPr that is acceptable to you and the authorities, but it will also be expedited by the fact that we are familiar with the production of practical, user-friendly EMPrs.

**Figure 116: Outline of the Basic Assessment Process**

This activity will take place over a period of **12 weeks (3 months)**, and the **deliverable** for the phase will be in the form of a **feasibility report** covering, but not limited to, all the components expressed above.

Based on the outcomes of this Feasibility Study, a Go/No Go decision will be made before proceeding with Phase 3 of the study.
### 7.2 Phase 3: SEZ Strategy Document and Detailed Business Plan Development

<table>
<thead>
<tr>
<th>Phase 3: SEZ Strategy Document</th>
<th>Key Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SEZ Commercial Framework</strong></td>
<td>- Develop the commercial framework</td>
</tr>
<tr>
<td><strong>Operational and Governance Framework</strong></td>
<td>- Develop the operational and Governance Framework</td>
</tr>
<tr>
<td><strong>Monitoring and Evaluation</strong></td>
<td>- Monitoring and Evaluation of the SEZ project</td>
</tr>
</tbody>
</table>
| **Strategy Documentation**     | - SEZ Strategy statement (Mission statement, Goals and objectives Performance indicator, SWOT analysis, value proposition)  
- Industrial Sector Development Plan  
- Spatial Development Plan  
- Technology Development Plan  
- Investment facilitation and aftercare plan  
- Logistics Plan  
- Marketing Plan  
- Infrastructure Development Plan  
- Environment Management Plan  
- Human Capital Development Plan  
- SME Development Plan  
- Quality Management Plan  
- Health and Safety Plans  
- Stakeholder Management Plan  
- Financial Plan and Business Plan  
- Energy Plan  
- Governance structure and Institutional Arrangements |

#### Figure 117: Key activities of the 3rd phase of the Feasibility Study for the Musina Petro-chemical, Agro-processing and Logistic SEZ Report

Following the successful completion of Phase 2 in terms of conceptual development, Phase 3 will see the findings of the various developments in that phase being evaluated in order to inform the compilation of a **SEZ Strategy Document**. The SEZ Strategy Document will address, amongst others, the following key issues:

- SEZ Strategy statement (Mission statement, Goals and objectives Performance indicator, SWOT analysis, value proposition);
- Industrial Sector Development Plan;
- Spatial Development Plan;
- Technology Development Plan;
- Investment facilitation and aftercare plan;
- Logistics Plan;
- Marketing Plan;
- Infrastructure Development Plan;
- Environment Management Plan;
- Human Capital Development Plan;
- SME Development Plan;
• Quality Management Plan;
• Health and Safety Plans;
• Stakeholder Management Plan;
• Financial Plan and Business Plan;
• Energy Plan;
• Governance structure and Institutional Arrangements.

In addition, this Phase will see the development of the following implementation documents:

• Commercial Framework;
• Operational and Governance Framework;
• Monitoring and Evaluation;
• Business Plan - the schematic below illustrates a potential process flow methodology for a typical feasibility study leading to a “bankable” Business Plan;
• Application for the SEZ designation with and on behalf of the province based on the Dti guidelines and regulations.

This activity will take place over a period of **12 weeks (3 Months)**, and the **deliverable** for the phase will be in the form of SEZ Commercial Plan, Operational Plan Business Plan and the Strategy document.
8. **Summary**

From the results of the pre-feasibility study it can be concluded that, although certain risks and constrains exists which would complicate the development of a SEZ in Musina, it would be too early to identify any of these risks and constraints as fatal flaws. The pre-feasibility study has proven that significant value chains exist around the three sectors identified, i.e. Petro-chemicals, logistics and agriculture. These include the upstream value chain as well as several downstream opportunities. The Musina area is ideally situated on the North-South Corridor, which is the gateway to the SADC markets.

Investors have indicated an interest in investing in both the upstream and downstream opportunities. These opportunities will be narrowed down to specific high potential possibilities, and will be categorised as to quick wins and long term developments during the next phases of the study. The high potential opportunities will be further pursued in an attempt to develop a basis from which the investors can build bankable business plans to locate their business in the Musina SEZ.

Such investment would however only be possible if the Musina SEZ is able to provide prospective investors with attractive reasons to locate their business there. Such attractions could include certain fiscal incentives like tax holidays and preferential procurement policies, but must also include an enabling environment conducive to attracting foreign direct investment.

As a baseline for unlocking the potential of an SEZ in Musina government and private sector would need to work together to ensure:

- Skills development;
- Effective and industry specific incentive packages;
- Efficient and effective administration and partnering with global actors;
- Provision of appropriate infrastructure;
- Optimum financing arrangements;
- Interest from portfolio of capital providers;
- Access to IP in some cases;
- Access to structured market opportunity in some cases; and
- Timing – first mover advantage.

If a basic foundation of hard and soft infrastructure and an effective support system can be established upon which the key drivers or catalytic projects can build, the Musina SEZ can become a reality. The next phases of this study will be to investigate the means of achieving exactly this.
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